LittlevGL Documentation

Release 6.1.2

Gabor Kiss-Vamosi

Apr 02, 2020

CONTENTS

1 Points forts **2**

2 Eléments requis **3**

3 FAQ **4**

3.1 Où commencer ? . . . 4
3.2 Où puis-je poser des questions ? . . . 4
3.3 Est-ce que mon microcontrôleur/matériel est supporté ? . . . 4
3.4 Mon écran est-il supporté? . . . 5
3.5 LittlevGL est-il libre ? Comment puis-je l'utiliser dans un produit commercial ? . . . 5
3.6 Rien ne se passe, mon pilote d'affichage n'est pas appelé. Qu'est-ce que j'ai raté ? . . . 5
3.7 Pourquoi le pilote d'affichage n'est appelé qu'une seule fois ? Seule la partie supérieure de l'écran est actualisée. . . . 5
3.8 Pourquoi je ne vois que des parasites à l'écran? . . . 5
3.9 Pourquoi vois-je des couleurs incorrectes à l'écran ? . . . 6
3.10 Comment accélérer mon interface utilisateur ? . . . 6
3.11 Comment réduire l'utilisation de mémoire flash/MEM ? . . . 6
3.12 Comment réduire l'utilisation de la MEV . . . 7
3.13 Comment travailler avec un système d'exploitation ? . . . 7
3.14 Comment contribuer à LittlevGL ? . . . 7
3.15 Comment LittlevGL est-il versionné ? . . . 7
3.16 Où puis-je trouver la documentation de la version précédente (5.3) ? . . . 8

English (en) - 中文 (zh-CN) - Français (fr) - Magyar (hu) - Türk (tr)

Version PDF: `LittlevGL.pdf`

LittlevGL est une bibliothèque graphique gratuite et à code source ouvert offrant tout ce dont vous avez besoin pour créer une interface graphique embarquée avec des éléments graphiques faciles à utiliser, de superbes effets visuels et une faible empreinte mémoire.

Site Internet • **GitHub** • **Forum** • **Démonstration en ligne** • ***Simulateur*** • **Blog**

CHAPTER

ONE

POINTS FORTS

- Eléments de base évolués tels que boutons, graphiques, listes, curseurs, images, etc.
- Graphiques avancés avec animations, anti-crénelage, opacité, défilement doux
- Périphériques d' entrée variés tels que pavé tactile, souris, clavier, encodeur, etc.
- Prise en charge multilingue avec encodage UTF-8
- Prise en charge de plusieurs écrans, c-à-d utilisation simultanée d' un écran TFT et d' un écran monochrome
- Eléments graphiques entièrement personnalisables
- Indépendant du matériel : utilisable avec n' importe quel microcontrôleur ou écran
- Adaptable pour fonctionner avec peu de mémoire (64 ko de mémoire Flash, 16 ko de MEV)
- SE, mémoire externe et GPU pris en charge mais non requis
- Fonctionne avec un seul tampon d' affichage même avec des effets graphiques avancés
- Ecrit en C pour une compatibilité maximale (compatible C++)
- Simulateur pour débuter sur PC la conception d' interface graphique embarquée sans le matériel embarqué
- Tutoriels, exemples, thèmes pour une conception rapide
- Documentation disponible en ligne et hors ligne
- Gratuit et à code source ouvert, sous licence MIT

CHAPTER

TWO

ELÉMENTS REQUIS

- Microcontrôleur ou processeur 16, 32 ou 64 bits
- Une vitesse d'horloge supérieure à 16 MHz est recommandée
- Flash/MEM : une taille supérieure à 64 ko pour les composants essentiels (une taille supérieure à 180 ko est recommandée)
- MEV :
  - Utilisation de MEV statique : approximativement 8 à 16 ko en fonction des types d'objets et des fonctionnalités utilisés
  - Pile : taille supérieure à 2 ko (une taille supérieure à 4 ko est recommandée)
  - Données dynamiques (tas) : taille supérieure à 4 ko (une taille supérieure à 16 ko est recommandée si plusieurs objets sont utilisés). Défini par `LV_MEM_SIZE` dans *lv_conf.h*.
  - Tampon d'affichage : taille supérieure à "*résolution horizontale*" pixels (une taille supérieure à 10 × "*résolution horizontale*" est recommandée)
- Compilateur conforme à C99 ou plus récent
- Connaissances de bases en C (ou C++) : pointeurs, structures, fonctions de rappel.

Notez que l'utilisation de la mémoire peut varier en fonction de l'architecture, du compilateur et des options de compilation.

CHAPTER

THREE

FAQ

3.1 Où commencer ?

- Pour un aperçu général de LittlevGL, visitez littlevgl.com
- Accédez à la section *Démarrer* pour essayer des démonstrations en ligne dans votre navigateur, en savoir plus sur le simulateur et les bases de LittlevGL.
- Vous trouverez un guide de portage détaillé dans la section *Portage*.
- Pour savoir comment LittlevGL fonctionne, accédez à *Vue d' ensemble*.
- Pour lire des tutoriels ou partager vos propres expériences, accédez au Blog
- Pour découvrir le code source de la bibliothèque, consultez-le sur GitHub : https://github.com/littlevgl/lvgl/.

3.2 Où puis-je poser des questions ?

Pour poser des questions sur le forum : https://forum.littlevgl.com/.

Nous utilisons le suivi des problèmes de GitHub pour les discussions relatives au développement. Vous ne devez donc l' utiliser que si votre question ou votre problème est étroitement lié au développement de la bibliothèque.

3.3 Est-ce que mon microcontrôleur/matériel est supporté ?

Chaque microcontrôleur capable de piloter un affichage via un port parallèle, SPI, une interface RVB ou autre, et conforme aux *éléments requis*, est pris en charge par LittlevGL.

Cela comprend :

- Les microcontrôleurs "courants" tels que les STM32F, STM32H, NXP Kinetis, LPC, iMX, dsPIC33, PIC32, etc.
- Les modules Bluetooth, GSM, WiFi tels que les Nordic NRF et Espressif ESP32
- Le tampon de trame de Linux comme /dev/fb0 ce qui inclut également les ordinateurs monocartes comme le Raspberry Pi
- Et tout ce qui possède un microcontrôleur suffisamment puissant et le nécessaire pour piloter un écran

3.4 Mon écran est-il supporté?

LittlevGL nécessite uniquement un simple pilote pour copier un tableau de pixels dans une zone donnée de l'affichage. Si vous pouvez le faire avec votre écran, vous pouvez utiliser cet écran avec LittlevGL.

Cela comprend :

- Les TFT avec une profondeur de couleur de 16 ou 24 bits
- Les moniteurs avec port HDMI
- Les petits écrans monochromes
- Les écrans à affichages en niveaux de gris
- Les matrices LED
- Ou tout autre affichage où vous pouvez contrôler la couleur/l'état des pixels

Consultez la section *Portage* pour en savoir plus.

3.5 LittlevGL est-il libre ? Comment puis-je l'utiliser dans un produit commercial ?

LittlevGL est fourni sous licence MIT, ce qui signifie que vous pouvez le télécharger et l'utiliser à vos fins sans obligation.

3.6 Rien ne se passe, mon pilote d'affichage n'est pas appelé. Qu'est-ce que j'ai raté ?

Assurez-vous que vous appelez `lv_tick_inc(x)` dans une interruption et `lv_task_handler ()` dans votre boucle principale `while (1)`.

Apprenez-en plus dans les sections *Tic* et *Gestionnaire de tâche*.

3.7 Pourquoi le pilote d'affichage n'est appelé qu'une seule fois ? Seule la partie supérieure de l'écran est actualisée.

Assurez-vous que vous appelez `lv_disp_flush_ready(drv)` à la fin de votre *fonction de rappel du pilote d'affichage*.

3.8 Pourquoi je ne vois que des parasites à l'écran?

Il y a probablement un bogue dans votre pilote d'affichage. Essayez le code suivant sans utiliser LittlevGL :

```
#define BUF_W 20
#define BUF_H 10
lv_color_t buf[BUF_W * BUF_H];
lv_color_t * buf_p = buf;
uint16_t x, y;
for(y = 0; y < BUF_H; y++) {
    lv_color_t c = lv_color_mix(LV_COLOR_BLUE, LV_COLOR_RED, (y * 255) / BUF_H);
    for(x = 0; x < BUF_W; x++){
        (*buf_p) =  c;
        buf_p++;
    }
}

lv_area_t a;
a.x1 = 10;
a.y1 = 40;
a.x2 = a.x1 + BUF_W - 1;
a.y2 = a.y1 + BUF_H - 1;
my_flush_cb(NULL, &a, buf);
```

3.9 Pourquoi vois-je des couleurs incorrectes à l'écran ?

Le format de couleur de LittlevGL n'est probablement pas compatible avec le format de couleur de votre écran. Vérifiez `LV_COLOR_DEPTH` dans *lv_conf.h*.

Si vous utilisez des couleurs 16 bits avec SPI (ou toute autre interface orientée octets), vous devez probablement définir `LV_COLOR_16_SWAP 1` dans *lv_conf.h*. Les octets supérieurs et inférieurs des pixels seront échangés.

3.10 Comment accélérer mon interface utilisateur ?

- Activez les optimisations du compilateur
- Augmentez la taille du tampon d'affichage
- Utilisez 2 tampons d'affichage et transférez le tampon en DMA (ou une technique similaire) en arrière-plan
- Augmentez la vitesse de fonctionnement des ports SPI ou parallèle si vous les utilisez pour piloter l'affichage
- Si votre écran dispose d'un port SPI, envisagez de passer à un modèle avec port parallèle, car son débit est beaucoup plus élevé.
- Conservez le tampon d'affichage dans la MEV interne (pas dans la SRAM externe) car LittlevGL l'utilise intensivement ce qui implique un temps d'accès minimal.

3.11 Comment réduire l'utilisation de mémoire flash/MEM ?

Vous pouvez désactiver toutes les fonctionnalités (animations, système de fichiers, GPU, etc.) et les types d'objet non utilisés dans *lv_conf.h*.

Si vous utilisez GCC, vous pouvez ajouter

- `-fdata-sections -ffunction-sections` aux options du compilateur
- `--gc-sections` aux options de l'éditeur de liens

pour supprimer les fonctions et variables inutilisées.

3.12 Comment réduire l'utilisation de la MEV

- Réduisez la taille du *tampon d'affichage*
- Réduisez `LV_MEM_SIZE` dans *lv_conf.h*. Cette mémoire est utilisée lorsque vous créez des objets tels que des boutons, des étiquettes, etc.
- Pour travailler avec un `LV_MEM_SIZE` réduit, vous pouvez créer les objets uniquement à l'utilisation et les supprimer lorsqu'ils ne sont plus nécessaires.

3.13 Comment travailler avec un système d'exploitation ?

Pour travailler avec un système d'exploitation où les tâches peuvent s'interrompre, vous devez protéger les appels de fonctions liés à LittlevGL avec un mutex. Consultez la section *Système d'exploitation et interruption* pour en savoir plus.

3.14 Comment contribuer à LittlevGL ?

Il y a plusieurs façons de contribuer à LittlevGL :

- Ecrivez quelques lignes sur votre projet pour inspirer les autres
- Répondez aux questions des autres
- Signalez et/ou corrigez des bogues
- Suggérez et/ou implémentez de nouvelles fonctionnalités
- Améliorez et/ou traduisez la documentation
- Ecrivez un article de blog sur vos expériences

Pour en savoir plus, consultez le Guide de contribution

3.15 Comment LittlevGL est-il versionné ?

LittlevGL suit les règles de gestion sémantique de version :

- Versions *majeures* pour les modifications incompatibles de l'API. P.ex. 5.0.0, 6.0.0
- Versions *mineures* pour des fonctionnalités nouvelles mais compatibles avec les versions antérieures. P.ex. 6.1.0, 6.2.0
- Versions *correctives* pour les corrections de bogues à compatibilité ascendante. P.ex. 6.1.1, 6.1.2

Les nouvelles versions sont développées dans les branches `dev-X.Y` sur GitHub. Elles peuvent être clonées pour tester les fonctionnalités les plus récentes. Cependant, tout peut être modifié dans ces branches.

Les corrections de bogues sont ajoutées directement à la branche `master` sur GitHub et une version de correction de bogues est créée chaque mois.

3.16 Où puis-je trouver la documentation de la version précédente (5.3) ?

Vous pouvez la télécharger ici et l'ouvrir hors ligne :

`Docs-v5-3.zip`

3.16.1 Démarrer

Démonstrations en ligne

Vous pouvez découvrir à quoi ressemble LittlevGL sans installer ou télécharger quoi que ce soit, sur la plateforme cible ou sur l'ordinateur de développement. Il existe des interfaces utilisateurs prêtes à être essayées facilement dans votre navigateur.

Allez à la page Démonstrations en ligne et choisissez la démonstration qui vous intéresse.

Simulateur sur PC

Vous pouvez essayer LittlevGL **en utilisant uniquement votre PC** (c'est-à-dire sans carte de développement). LittlevGL fonctionnera sur un environnement de simulation sur le PC dans lequel il est possible d'écrire et d'expérimenter de réelles applications LittlevGL.

Le simulateur sur PC présente les avantages suivants :

- Indépendant du matériel - Écrivez du code, exécutez-le sur PC et visualisez le résultat sur le moniteur du PC.
- Multi-plateforme - Tous les ordinateurs Windows, Linux ou OS X peuvent exécuter le simulateur PC.
- Portabilité - Le code écrit est portable, ce qui signifie qu'il suffit de le copier pour l'utiliser sur un matériel embarqué.
- Validation facile - Le simulateur est également très utile pour signaler des bogues car il représente une plateforme commune pour chaque utilisateur. C'est donc une bonne idée de reproduire un bogue dans le simulateur et d'utiliser l'extrait de code dans le forum.

Choisir un EDI

Le simulator est portés sur plusieurs EDIs (Environnement de Développement Intégré). Choisissez votre EDI préféré, lisez son README sur GitHub, téléchargez le projet, et chargez le dans EDI.

Vous pouvez utiliser n'importe quel EDI pour le développement mais, pour des raisons de simplicité, ce didacticiel est axé sur la configuration d'Eclipse CDT. La section suivante décrit la configuration d'Eclipse CDT de manière plus détaillée.

Note : si vous utilisez Windows, il est généralement préférable d'utiliser Visual Studio ou CodeBlocks. Ils fonctionnent directement sans nécessiter d'étapes supplémentaires.

Configurer Eclipse CDT

Installer Eclipse CDT

Eclipse CDT iest un IDE C/C++.

Eclipse est un logiciel écrit en Java de ce fait, soyez certain que l'**environnement d'exécution Java** est installé sur votre système.

Sur les distribution basée sur Debian (p.ex. Ubuntu) : `sudo apt-get install default-jre`

Note : si vous utilisez d'autres distributions, installez un 'Java Runtime Environment' adapté à votre distribution.

Vous pouvez télécharger Eclipse CDT à partir de : https://eclipse.org/cdt/downloads.php. Démarrez l'installeur est choisissez *Eclipse CDT* dans la liste.

Installer SDL 2

Le simulateur PC utilise la librairie multi-plateforme SDL 2 pour simuler un écran TFT et un pavé tactile.

Linux

Sur **Linux** vous pouvez installer facilement SDL 2 à partir d'un terminal :

1. Trouvez la version actuelle de SDL 2 : `apt-cache search libsdl2 (e.g. libsdl2-2.0-0)`
2. Installez SDL 2 : `sudo apt-get install libsdl2-2.0-0` (remplacez par la version trouvée)
3. Installez le paquet de dévellopement de SDL 2 : `sudo apt-get install libsdl2-dev`
4. Si les paquets de construction essentiels ne sont pas déjà installés : `sudo apt-get install build-essential`

Windows

Si vous utilisez **Windows** vous devez en premier lieu installer MinGW (version 64 bits). Après ça, effectuez les étapes suivantes pour ajouter SDL 2 :

1. Téléchargez les libraries de développement de SDL.Allez sur https://www.libsdl.org/download-2.0.php et téléchargez *Development Libraries: SDL2-devel-2.0.5-mingw.tar.gz*
2. Décompressez l'archive et allez dans le répertoire *x86_64-w64-mingw32* (pour MinGW 64 bits) ou *i686-w64-mingw32* (pour MinGW 32 bits)
3. Copiez le répertoire *_⋯mingw32/include/SDL2* vers *C:/MinGW/⋯/x86_64-w64-mingw32/include*
4. Copiez le contenu de *_⋯mingw32/lib/* dans *C:/MinGW/⋯/x86_64-w64-mingw32/lib*
5. Copiez *_⋯mingw32/bin/SDL2.dll* dans *{eclipse_workspace}/pc_simulator/Debug/*. Faites le plus tard quand Eclipse est installé.

Note : si vous utilisez **Microsoft Visual Studio** à la place d'Eclipse alors vous n'avez pas besoin d'installer MinGW.

OS X

Sur **OS X** vous pouvez facilement installer SDL 2 avec brew : `brew install sdl2`

Si quelque chose ne fonctionne pas, alors référez-vous à ce tutoriel pour débuter avec SDL.

Projet pré-configuré

Un projet pré-configuré pour la librairie graphique, basé sur la dernière version publiée, est toujours disponible. Vous pouvez trouver le plus récent sur GitHub ou sur la page de téléchargement. Notez que le projet est configuré pour Eclipse CDT.

Ajouter le projet pré-configuré à Eclipse CDT.

Lancez Eclipse CDT. Une boîte de dialogue au sujet du **chemin de l' espace de travail** est affichée. Avant de la valider, vérifiez le chemin et copiez à cet emplacement, puis décompressez, le projet pré-configuré préalablement téléchargé. Après ça vous pouvez accepter le chemin de l' espace de travail. Bien entendu, ce chemin peut être modifié mais dans ce cas il faut copier le projet vers l' emplacement correspondant.

Fermez la fenêtre de démarrage et allez à **Fichier->Importer⋯** et choisissez **Généralités->Projets existants dans l' espace de travail**. **Allez au répertoire racine** du projet et cliquez **Terminer**

Sur **Windows** vous devez effectuer deux actions additionnelles :

- Copiez le fichier **SDL2.dll** dans le répertoire Debug du projet
- Faites un clic droit sur le projet -> Propriétés -> Génération C/C++ -> Paramètres -> Bibliothèques -> Ajouter⋯et ajoutez *mingw32* au-dessus de SDLmain et SDL. L' ordre est important : mingw32, SDLmain, SDL

Compilation et exécution

Vous êtes maintenant prêt à utiliser la librairie graphique LittlevGL sur votre PC. Cliquer sur l' icône Marteau de la barre de menu pour compiler le projet. Si vous avez tout fait correctement aucune erreur ne se produira. Notez que sur certains systèmes des étapes additionnelles peuvent être requises pour qu' Eclipse prenne en compte SDL 2, mais dans la plupart des cas, la configuration du projet téléchargé est suffisante.

Après avoir compiler avec succès, cliquez sur le bouton Jouer de la barre de menu pour démarrer le projet. Maintenant une fenêtre doit apparaître au milieu de l' écran.

Tout est prêt pour utiliser la librairie graphique LittlevGL pour l'apprentissage ou pour débuter le développement sur votre PC.

Aperçu rapide

Ici, vous pouvez apprendre les points les plus importants sur LittlevGL. Vous devriez le lire en premier pour avoir une impression générale, puis les sections détaillées *Portage* et *Vue d' ensemble* après cela.

Ajouter LittlevGL à votre projet

Les étapes suivantes montrent comment configurer LittlevGL sur un système embarqué avec un écran et un pavé tactile. Vous pouvez utiliser le *Simulateur* pour obtenir des projets 'prêts à utiliser' pouvant être exécutés sur votre PC.

- Téléchargez ou clonez la librairie
- Copiez le répertoire `lvgl` dans votre projet
- Copiez `lvgl/lv_conf_templ.h` sous le nom `lv_conf.h` au même niveau que le répertoire `lvgl`et définissez au minimum les macros `LV_HOR_RES_MAX`, `LV_VER_RES_MAX` et `LV_COLOR_DEPTH`.
- Incluez `lvgl/lvgl.h` quand vous devez utiliser les fonctions de LittlevGL.
- Appelez `lv_tick_inc(x)` chaque `x` millisecondes **à partir d'une horloge ou d'une tâche** (`x` doit être compris entre 1 et 10). Ceci est requis pour la synchronisation interne de LittlevGL.
- Appelez `lv_init()`
- Créez un tampon d'affichage pour LittlevGL

```
static lv_disp_buf_t disp_buf;
static lv_color_t buf[LV_HOR_RES_MAX * 10];                     /* Déclare un tampon␣
↪pour 10 lignes */
lv_disp_buf_init(&disp_buf, buf, NULL, LV_HOR_RES_MAX * 10);    /* Initialise le␣
↪tampon d'affichage */
```

- Implémentez et enregistrez une fonction qui **copie un tableau de pixels** vers une zone de l'écran :

```
lv_disp_drv_t disp_drv;               /* Descripteur du pilote d'affichage */
lv_disp_drv_init(&disp_drv);          /* Initialisation de base */
disp_drv.flush_cb = my_disp_flush;    /* Définit la fonction du pilote */
disp_drv.buffer = &disp_buf;          /* Définit le tampon d'affichage */
lv_disp_drv_register(&disp_drv);      /* Finalement, enregistre le pilote */

void my_disp_flush(lv_disp_t * disp, const lv_area_t * area, lv_color_t * color_p)
{
    int32_t x, y;
    for(y = area->y1; y <= area->y2; y++) {
        for(x = area->x1; x <= area->x2; x++) {
            set_pixel(x, y, *color_p);  /* Définit la couleur d'un pixel de l'écran.*/
            color_p++;
        }
    }

    lv_disp_flush_ready(disp);         /* Indique que les données peuvent être␣
↪transférées à l'écran */
}
```

- Implémentez et enregistrez une fonction qui peut **lire un périphérique d'entrée**. P.ex. pour un pavé tactile :

```
lv_indev_drv_t indev_drv;                   /* Descripteur du pilote du périphérique d
↪'entrée */
lv_indev_drv_init(&indev_drv);              /* Initialisation de base */
indev_drv.type = LV_INDEV_TYPE_POINTER;     /* Le pavé tactile est un périphérique␣
↪semblable à un pointeur */
indev_drv.read_cb = my_touchpad_read;      /* Définit la fonction du pilote */
lv_indev_drv_register(&indev_drv);          /* Finalement, enregistre le pilote */

bool my_touchpad_read(lv_indev_t * indev, lv_indev_data_t * data)
{
    static lv_coord_t last_x = 0;
    static lv_coord_t last_y = 0;
```

(continues on next page)

(continued from previous page)

```
    /* Mémorise l'état et les coordonnées, si pressé */
    data->state = touchpad_is_pressed() ? LV_INDEV_STATE_PR : LV_INDEV_STATE_REL;
    if(data->state == LV_INDEV_STATE_PR) touchpad_get_xy(&last_x, &last_y);

    /* Définit les coordonnées (si relâché, les dernières coordonnées quand pressé) */
    data->point.x = last_x;
    data->point.y = last_y;

    return false; /* Retourne `faux` car pas de tampon et plus de données à lire */
}
```

- Appelez `lv_task_handler()` périodiquement, chaque quelques millisecondes, dans la boucle principale `while(1)`, sur interruption d'une horloge ou à partir d'une tâche du système d'exploitation. Cela redessine l'écran si nécessaire, gère les périphériques d'entrée, etc.

Apprendre les bases

Les objets (éléments visuels)

Les éléments graphiques tels que les boutons, les étiquettes, les curseurs, les graphiques, etc. sont appelés des objets dans LittlevGL. Allez à [Types d'objet] (/object-types/index) pour voir la liste complète des types disponibles.

Chaque objet possède un objet parent. L'objet enfant se déplace avec le parent et si vous supprimez le parent, les enfants seront également supprimés. Les enfants ne peuvent être visibles que sur leurs parents.

L'*écran* est le parent "racine". Pour obtenir l'écran actuel, appelez `lv_scr_act()`.

Vous pouvez créer un nouvel objet avec `lv_<type>_create(parent, obj_to_copy)`. Une variable `lv_obj_t *` est retournée qui doit être utilisée comme référence à l'objet pour définir ses paramètres. Le premier paramètre est le *parent* souhaité, le second paramètre peut être un objet à copier (`NULL` si inutilisé). Par exemple :

```
lv_obj_t * slider1 = lv_slider_create(lv_scr_act(), NULL);
```

Pour définir certains attributs de base les fonctions `lv_obj_set_<parameter_name>(obj, <value>)` peuvent être utilisées. Par exemple :

```
lv_obj_set_x(btn1, 30);
lv_obj_set_y(btn1, 10);
lv_obj_set_size(btn1, 200, 50);
```

Les objets ont également des paramètres spécifiques au type qui peuvent être définis par les fonctions `lv_<type>_set_<parameter_name>(obj, <valeur>)`. Par exemple :

```
lv_slider_set_value(slider1, 70, LV_ANIM_ON);
```

Pour voir l'API complète, consultez la documentation des types d'objet ou le fichier d'en-tête associé (p.ex. `lvgl/src/lv_objx/lv_slider.h`).

Styles

Les styles peuvent être affectés aux objets pour changer leur apparence. Un style décrit tout à la fois l'apparence des objets de type rectangle (comme un bouton ou un curseur), des textes, des images et des

lignes.

Voici comment créer un nouveau style :

```
static lv_style_t style1;                /* Déclare un nouveau style. Devrait être
↪`static` */
lv_style_copy(&style1, &lv_style_plain);  /* Copie un style intégré */
style1.body.main_color = LV_COLOR_RED;          /* Couleur principale */
style1.body.grad_color = lv_color_hex(0xffd83c) /* Dégradé de couleur (orange) */
style1.body.radius = 3;
style1.text.color = lv_color_hex3(0x0F0)        /* Couleur de texte (vert) */
style1.text.font = &lv_font_dejavu_22;          /* Change la police */
...
```

Pour appliquer un nouveau style à un objet, utilisez les fonctions `lv_<type>set_style(obj, LV_<TYPE>_STYLE_<NOM>, &my_style)`. Par exemple :

```
lv_slider_set_style(slider1, LV_SLIDER_STYLE_BG, &slider_bg_style);
lv_slider_set_style(slider1, LV_SLIDER_STYLE_INDIC, &slider_indic_style);
lv_slider_set_style(slider1, LV_SLIDER_STYLE_KNOB, &slider_knob_style);
```

Si le style d' un objet est `NULL`, il héritera du style de son parent. Par exemple, le style des étiquettes est `NULL` par défaut. Si vous les placez sur un bouton, elles utiliseront les propriétés `style.text` du style du bouton.

Apprenez-en plus dans la section *Styles*.

Evénements

Les événements sont utilisés pour informer l' utilisateur si quelque chose s' est produit avec un objet. Vous pouvez affecter une fonction de rappel à un objet qui sera appelée si l' objet est cliqué, relâché, déplacé, en cours de suppression, etc. Voici à quoi cela ressemble :

```
lv_obj_set_event_cb(btn, btn_event_cb);                /* Affecte une fonction de
↪rappel au bouton */

...

void btn_event_cb(lv_obj_t * btn, lv_event_t event)
{
    if(event == LV_EVENT_CLICKED) {
        printf("Cliqué\n");
    }
}
```

Apprenez-en plus dans la section *événements*.

Exemples

Bouton avec étiquette

```
lv_obj_t * btn = lv_btn_create(lv_scr_act(), NULL);     /* Ajoute un bouton à l'écran
↪actuel */
lv_obj_set_pos(btn, 10, 10);                            /* Définit sa position */
```

(continues on next page)

(continued from previous page)

```
lv_obj_set_size(btn, 100, 50);                          /*Définit sa taille */
lv_obj_set_event_cb(btn, btn_event_cb);                 /* Affecte une fonction de␣
↪rappel au bouton */

lv_obj_t * label = lv_label_create(btn, NULL);          /* Ajoute une étiquette au␣
↪bouton */
lv_label_set_text(label, "Button");                     /* Définit le texte de l
↪'étiquette */

...

void btn_event_cb(lv_obj_t * btn, lv_event_t event)
{
    if(event == LV_EVENT_CLICKED) {
        printf("Cliqué\n");
    }
}
```

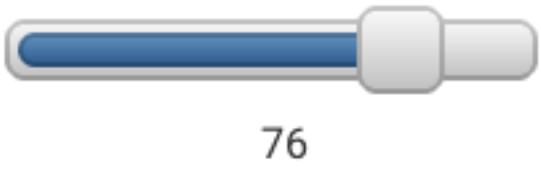
Bouton avec styles

Ajoutez des styles au bouton de l'exemple précédent :

```
static lv_style_t style_btn_rel;                        /* Une variable pour␣
↪enregistrer le style relâché */
lv_style_copy(&style_btn_rel, &lv_style_plain);         /* Initialise à partir d'un␣
↪style intégré */
style_btn_rel.body.border.color = lv_color_hex3(0x269);
style_btn_rel.body.border.width = 1;
style_btn_rel.body.main_color = lv_color_hex3(0xADF);
style_btn_rel.body.grad_color = lv_color_hex3(0x46B);
style_btn_rel.body.shadow.width = 4;
style_btn_rel.body.shadow.type = LV_SHADOW_BOTTOM;
style_btn_rel.body.radius = LV_RADIUS_CIRCLE;
style_btn_rel.text.color = lv_color_hex3(0xDEF);

static lv_style_t style_btn_pr;                         /* Une variable pour␣
↪enregistrer le style pressé */
lv_style_copy(&style_btn_pr, &style_btn_rel);           /* Initialise à partir du␣
↪style relâché */
style_btn_pr.body.border.color = lv_color_hex3(0x46B);
style_btn_pr.body.main_color = lv_color_hex3(0x8BD);
style_btn_pr.body.grad_color = lv_color_hex3(0x24A);
style_btn_pr.body.shadow.width = 2;
style_btn_pr.text.color = lv_color_hex3(0xBCD);

lv_btn_set_style(btn, LV_BTN_STYLE_REL, &style_btn_rel);    /* Définit le style␣
↪relâché du bouton */
lv_btn_set_style(btn, LV_BTN_STYLE_PR, &style_btn_pr);      /* Définit le style␣
↪pressé du bouton */
```

Curseur et alignement de l' objet

```
lv_obj_t * label;

...

/* Crée un curseur au centre de l'affichage */
lv_obj_t * slider = lv_slider_create(lv_scr_act(), NULL);
lv_obj_set_width(slider, 200);                          /* Définit la largeur */
lv_obj_align(slider, NULL, LV_ALIGN_CENTER, 0, 0);    /* Aligne au centre du parent␣
↪(écran) */
lv_obj_set_event_cb(slider, slider_event_cb);         /* Affecte une fonction de␣
↪rappel */

/* Crée une étiquette sous le curseur */
label = lv_label_create(lv_scr_act(), NULL);
lv_label_set_text(label, "0");
lv_obj_set_auto_realign(slider, true);
lv_obj_align(label, slider, LV_ALIGN_OUT_BOTTOM_MID, 0, 10);

...

void slider_event_cb(lv_obj_t * slider, lv_event_t event)
{
    if(event == LV_EVENT_VALUE_CHANGED) {
        static char buf[4];                                 /* Maximum 3 octets pour␣
↪le nombre plus 1 octet final nul */
        snprintf(buf, 4, "%u", lv_slider_get_value(slider));
        lv_label_set_text(slider_label, buf);               /* Actualise le texte */
    }
}
```



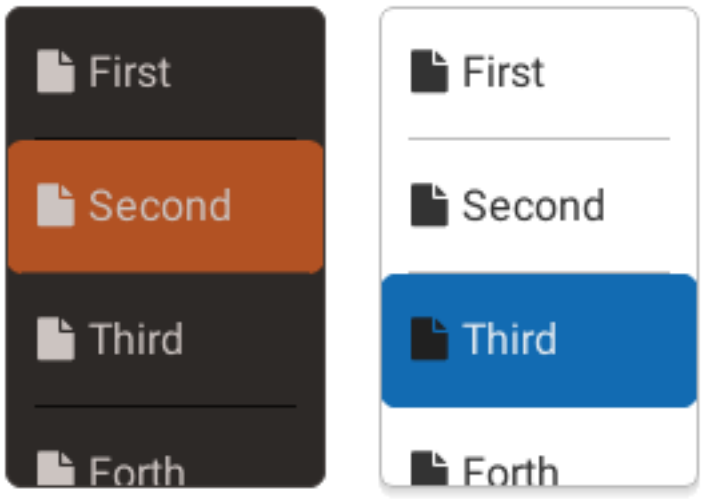
Liste et thèmes

```
/* Textes des éléments de la liste */
const char * txts[] = {"First", "Second", "Third", "Fourth", "Fifth", "Sixth", NULL};

/* Initialise et définit un thème. `LV_THEME_NIGHT` doit être activé dans lv_conf.h.␣
↪*/
lv_theme_t * th = lv_theme_night_init(20, NULL);
```

(continues on next page)

(continued from previous page)

```
lv_theme_set_current(th);

/* Crée une liste */
lv_obj_t* list = lv_list_create(lv_scr_act(), NULL);
lv_obj_set_size(list, 120, 180);
lv_obj_set_pos(list, 10, 10);

/* Ajoute des boutons */
uint8_t i;
for(i = 0; txts[i]; i++) {
    lv_obj_t * btn = lv_list_add_btn(list, LV_SYMBOL_FILE, txts[i]);
    lv_obj_set_event_cb(btn, list_event);       /* Affecte une fonction de rappel */
    lv_btn_set_toggle(btn, true);               /* Active la fonction de bascule */
}

/* Initialise et définit un autre thème. `LV_THEME_MATERIAL` doit être activé dans lv_
↪conf.h.
 * Si `LV_THEME_LIVE_UPDATE 1` alors le style de la liste précédente sera également␣
↪mis à jour. */
th = lv_theme_material_init(210, NULL);
lv_theme_set_current(th);

/* Crée une autre liste */
list = lv_list_create(lv_scr_act(), NULL);
lv_obj_set_size(list, 120, 180);
lv_obj_set_pos(list, 150, 10);

/* Ajoute des boutons avec les mêmes textes */
for(i = 0; txts[i]; i++) {
    lv_obj_t * btn = lv_list_add_btn(list, LV_SYMBOL_FILE, txts[i]);
    lv_obj_set_event_cb(btn, list_event);
    lv_btn_set_toggle(btn, true);
}

...

static void list_event(lv_obj_t * btn, lv_event_t e)
{
    if(e == LV_EVENT_CLICKED) {
        printf("%s\n", lv_list_get_btn_text(btn));
    }

}
```



Utiliser LittlevGL avec Micropython

Apprenez-en plus sur *Micropython*.

```
# Crée un bouton et une étiquette
scr = lv.obj()
btn = lv.btn(scr)
btn.align(lv.scr_act(), lv.ALIGN.CENTER, 0, 0)
label = lv.label(btn)
label.set_text("Button")

# Charge l'écran
lv.scr_load(scr)
```

Contribuer

LittlevGL utilise le forum pour poser et répondre aux questions et l'outil de suivi des problèmes de GitHub pour les discussions relatives au développement (comme les rapports de bogues, les suggestions de fonctionnalités etc.).

Il existe de nombreuses possibilités de contribuer à LittlevGL telles que :

- **Aidez les autres** sur le forum.
- **Inspirez les gens** en parlant de votre projet dans la catégorie Mon projet du forum ou en l'ajoutant à la rubrique [Références](https: / /blog.littlevgl.com/2018-12-26/references)
- **Améliorez et/ou traduisez la documentation.** Visitez le dépôt Documentation pour en apprendre plus **Écrivez un article de blog** sur vos expériences. Regardez comment faire dans le dépôt [Blog] (https://github.com/littlevgl/blog).
- **Signalez et/ou corrigez des bogues** avec l'outil de suivi des problèmes de GitHub
- **Aidez au développement**. Vérifiez les problèmes en cours, en particulier ceux avec la mention Aide demandée et partagez vos idées sur un sujet ou implémentez une fonctionnalité.

Si vous souhaitez contribuer à LittlevGL, veuillez lire les guides ci-dessous pour commencer.

- Guide de contribution

- Guide de convention de code

Micropython

Qu' est-ce que Micropython ?

Micropython est une version de Python destinées aux microcontrôleurs.En utilisant Micropython vous pouvez écrire du code Python 3 et l' exécuter directement sur des architectures aux ressources limitées.

Points forts de Micropython

- **Compact** - s' exécute dans seulement 256 ko d' espace de code et 16 ko de MEV. Aucun SE n' est nécessaire, bien qu' il soit possible de l' exécuter sur un SE, si vous le souhaitez.
- **Compatible** - s' efforce d' être aussi compatible que possible avec le Python de référence (CPython).
- **Adaptable** - supporte de multiples architectures (x86, x86-64, ARM, ARM Thumb, Xtensa).
- **Interactif** - le cycle compilation-programmation-démarrage n'est pas nécessaire. Avec REPL (l'invite interactive) vous pouvez entrer des commandes et les exécuter immédiatement, lancer des scripts etc.
- **Populaire** - de nombreuses plateformes sont supportées. Le nombre d' utilisateurs est en constante augmentation. Variantes notables : MicroPython, CircuitPython, MicroPython_ESP32_psRAM_LoBo
- **Orienté embarqué** - fourni avec des modules spécifiques aux systèmes embarqués, comme le module machine pour accéder au matériel bas-niveau (broches d' E/S, CAN, UART, SPI, I2C, RTC, horloges etc.)

Pourquoi Micropython + LittlevGL ?

Actuellement, par défaut, Micropython ne dispose pas d' une bonne librairie de haut-niveau pour réaliser des interfaces graphiques. LittlevGL est une librairie basée sur l' utilisation de composants orientés objet, ce qui en fait une candidate idéale pour s' interfacer à un langage de plus haut-niveau tel que Python. LittlevGL est implémentée en C est ses APIs sont en C.

Voici quelques avantages à utiliser LittlevGL avec Micropython :

- Développez des interfaces graphiques en Python, language de haut-niveau très populaire. Utilisez des paradigmes tels que la programmation orientée objet.
- Actuellement, le développement d' interface graphique nécessite de nombreuses itérations pour obtenir un résultat correct. Avec C, chaque itération nécessite de **`modifier le code` > `compiler` > `programmer` > `exécuter`**.En Micropython il faut seulement **`modifier le code` > `exécuter`**. Vous pouvez même exécuter des commandes de manière interactive en utilisant REPL (l' invite interactive)

Micropython + LittlevGL peuvent être utilisés pour :

- Le prototypage rapide d' interface graphique.
- Réduire le cycle de modification et d' optimisation de l' interface graphique.
- Modéliser l' interface graphique d' une manière plus abstraite en définissant des objets composites réutilisables, en tirant avantage des fonctionnalités du langage Python telles que l'héritage, les clôtures, les listes en compréhension, les générateurs, la gestion d' exception, les entiers multiprécision et autres.
- Rendre LittlevGL accessible à une plus large audience. Aucun besoin de connaître le C dans le but de créer une interface graphique fonctionnelle sur un système embarqué.C' est également vrai pour CircuitPython vision. CircuitPython a été conçu avec l' éducation à l' esprit, pour rendre plus facile à des utilisateurs, nouveaux ou inexpérimentés, de débuter avec le développement embarqué.
- Création d' outils pour utiliser LittlevGL à un niveau supérieur (concepteur graphique par glisser-déposer, par exemple).

Alors, à quoi ça ressemble ?

TL;DR : C' est très similaire à l' API C, mais orienté objet pour les composants de LittlevGL.

Plongeons droit dans un exemple !

Un exemple simple

```
import lvgl as lv
lv.init()
scr = lv.obj()
btn = lv.btn(scr)
btn.align(lv.scr_act(), lv.ALIGN.CENTER, 0, 0)
label = lv.label(btn)
label.set_text("Button")
lv.scr_load(scr)
```

Comment l' utiliser?

Simulateur en ligne

Si vous souhaitez expérimenter LittlevGL + Micropython sans télécharger quoi que ce soit - vous pouvez utiliser notre simulateur en ligne !C' est un ensemble LittlevGL + Micropython entièrement fonctionnel qui s' exécute dans le navigateur et permet d' éditer et d' exécuter un script Python.

Click here to experiment on the online simulator

Hello World

Simulateur PC

Micropython est porté sur de nombresues plateformes, dont Unix, ce qui permet de compiler et exécuter Micropython (+ LittlevGL) sur une machine Linux (sur une machine Windows, d' autres outils peuvent être nécessaires : VirtualBox ou WSL ou MinGW ou Cygwin etc.).

Cliquez ici pour en savoir plus sur la compilation et l' utilisation du port Unix

Plateforme embarquée

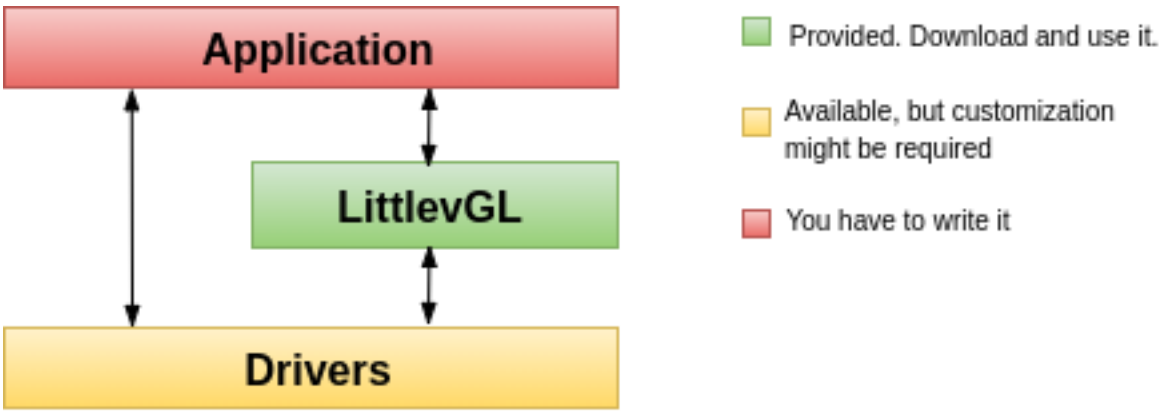
Au final, le but est d' exécuter sur une plateforme embarquée. Micropython et LittlevGL peuvent être utilisés sur de nombreuses architectures embarquées, telles que STM32, ESP32 etc.Vous aurez également besoin de pilotes d' affichage et d' entrée. Nous avons quelques exemples de pilotes (ESP32 + ILI9341, ainsi que d' autres exemples), mais il est fort probable que vous souhaitiez créer vos propres pilotes d' affichage et d' entrée pour vos besoins spécifiques. Les pilotes peuvent être implémentés soit en C en tant que module Micropython, soit en Micropython pur !

Où trouver plus d' informations ?

- Dans le sujet du Blog
- Dans le README `lv_micropython`
- Dans le README `lv_binding_micropython`
- Sur le forum LittlevGL (n' hésitez pas à demander quoi que ce soit !)
- Dans la documentation et sur le forum Micropython

3.16.2 Portage

Aperçu système



Application Votre application qui crée l' interface graphique et gère les tâches spécifiques.

LittlevGL La bibliothèque graphique elle-même. Votre application peut communiquer avec la bibliothèque pour créer une interface graphique. Elle contient une interface HAL (Hardware Abstraction Layer, couche d' abstraction matérielle) permettant d' enregistrer vos pilotes de périphérique d' affichage et d' entrée.

Pilote Outre vos pilotes spécifiques, il contient des fonctions pour gérer l' écran, éventuellement un GPU (processeur graphique), et lire un pavé tactile ou des boutons.

Selon le microcontrôleur, l existe deux configurations matérielles typiques? Une avec contrôleur LCD/TFT intégré et l' autre sans. Dans les deux cas, un tampon d' affichage sera nécessaire pour mémoriser l' image actuelle de l' écran.

1. **Microcontrôleur avec contrôleur TFT/LCD** Si votre microcontrôleur dispose d' un contrôleur TFT/LCD, vous pouvez connecter un écran directement via une interface RVB. Dans ce cas, le tampon d' affichage peut résider dans la MEV interne (si le microcontrôleur dispose de suffisamment de MEV) ou dans la MEV externe (si la microcontrôleur a une interface mémoire).
2. **Contrôleur d' affichage externe** Si votre microcontrôleur ne dispose pas d' un contrôleur TFT/LCD alors un contrôleur d' affichage externe (par exemple SSD1963, SSD1306, ILI9341) doit être utilisé. Dans ce cas, le microcontrôleur peut communiquer avec le contrôleur d' affichage via un port parallèle, SPI ou parfois I2C. Le tampon d' affichage est généralement situé dans le contrôleur d' affichage, ce qui économise beaucoup de MEV pour le microcontrôleur.

Configurer un projet

Obtenir la librairie

LittlevGL Graphics Library is available on GitHub: https://github.com/littlevgl/lvgl.

You can clone it or download the latest version of the library from GitHub or you can use the Download page as well.

La librairie graphique est le répertoire **lvgl** qui doit être copié dans votre projet.

Configuration file

There is a configuration header file for LittlevGL called **lv_conf.h**. It sets the library' s basic behaviour, disables unused modules and features, adjusts the size of memory buffers in compile-time, etc.

Copy **lvgl/lv_conf_template.h** next to the *lvgl* directory and rename it to *lv_conf.h*. Open the file and change the `#if 0` at the beginning to `#if 1` to enable its content.

lv_conf.h can be copied other places as well but then you should add `LV_CONF_INCLUDE_SIMPLE` define to your compiler options (e.g. `-DLV_CONF_INCLUDE_SIMPLE` for gcc compiler) and set the include path manually.

Dans le fichier de configuration, les commentaires expliquent la signification des options. Vérifiez au moins ces trois options de configuration et modifiez-les en fonction de votre matériel :

1. **LV_HOR_RES_MAX** Your display' s horizontal resolution.
2. **LV_VER_RES_MAX** Your display' s vertical resolution.
3. **LV_COLOR_DEPTH** 8 for (RG332), 16 for (RGB565) or 32 for (RGB888 and ARGB8888).

Initialisation

To use the graphics library you have to initialize it and the other components too. The order of the initialization is:

1. Call *lv_init()*.
2. Initialize your drivers.

3. Enregistrez les pilotes de périphérique d' affichage et d' entrée dans LittlevGL. En savoir plus sur l' enregistrement : *Affichage* et *Périphérique d' entrée*.
4. Appelez `lv_tick_inc(x)` toutes les `x` millisecondes dans une interruption pour indiquer le temps écoulé. *En savoir plus*.
5. Appelez `lv_task_handler()` périodiquement toutes les quelques millisecondes pour gérer les tâches liées à LittlevGL. *En savoir plus*.

Interface d' affichage

Pour configurer un affichage, les variables `lv_disp_buf_t` et `lv_disp_drv_t` doivent être initialisées.

- **lv__disp__buf__t** contient le(s) tampon(s) graphique(s) interne(s).
- ** lv_disp_drv_t ** contient les fonctions de rappel pour interagir avec l' affichage et manipuler des éléments liés au dessin.

Tampon d' affichage

`lv_disp_buf_t` peut être initialisé comme ceci :

```
/* Une variable statique ou globale pour mémoriser les tampons */
    static lv_disp_buf_t disp_buf;

   /* Tampon(s) statique(s) ou global(aux). Le second tampon est optionnel */
    static lv_color_t buf_1[MY_DISP_HOR_RES * 10];
    static lv_color_t buf_2[MY_DISP_HOR_RES * 10];

/* Initialise `disp_buf` avec le(s) tampon(s) */
    lv_disp_buf_init(&disp_buf, buf_1, buf_2, MY_DISP_HOR_RES*10);
```

Il y a 3 configurations possibles concernant la taille de la mémoire tampon :

1. **Un tampon** LittlevGL dessine le contenu de l' écran dans un tampon et l' envoie à l' affichage. Le tampon peut être plus petit que l' affichage. Dans ce cas, les zones les plus grandes seront redessinées en plusieurs parties. Si seules de petites zones changent (p.ex. appui sur un bouton), seules ces zones seront actualisées.
2. **Deux tampons de taille différente de l' écran** ayant deux tampons LittlevGL peut dessiner dans un tampon tandis que le contenu de l' autre tampon est envoyé à l' écran en arrière-plan. Le DMA ou une autre méthode doit être utilisé pour transférer les données à l' écran afin de permettre au CPU de dessiner dans le même temps. De cette manière, le rendu et le rafraîchissement de l' affichage deviennent parallèles. De même que pour *Un tampon*, LittlevGL dessine le contenu de l' affichage en fragments si le tampon est plus petit que la zone à actualiser.
3. **Deux tampons de la taille d' un écran**. Contrairement à *Deux tampons de taille différente de l' écran* LittlevGL fournira toujours tout le contenu de l' affichage, pas seulement des fragments. De cette façon, le pilote peut simplement changer l' adresse du tampon d' affichage par celle du tampon préparé par LittlevGL. Par conséquent, cette méthode est la meilleure lorsque le microcontrôleur dispose d' une interface LCD/TFT et que le tampon d' affichage est un emplacement dans la MEV.

Pilote d' affichage

Une fois l' initialisation des tampons effectuée, les pilotes d' affichage doivent être initialisés. Dans le cas le plus simple, seuls les deux champs suivants de `lv_disp_drv_t` doivent être définis :

- **buffer** pointeur sur une variable `lv_disp_buf_t` initialisée.
- **flush_cb** une fonction de rappel permettant de copier le contenu d'un tampon dans une zone spécifique de l'écran.

Il y a quelques champs de données optionnels :

- **hor_res** résolution horizontale de l'écran. (`LV_HOR_RES_MAX` par défaut à partir de *lv_conf.h*)
- **ver_res** résolution verticale de l'écran. (`LV_VER_RES_MAX` par défaut à partir de *lv_conf.h*)
- **color_chroma_key** une couleur qui sera dessinée de manière transparente sur les images incrustées. `LV_COLOR_TRANSP` par défaut à partir de *lv_conf.h*)
- ** user_data ** donnée utilisateur personnalisée pour le pilote. Son type peut être modifié dans *lv_conf.h*.
- ** anti-aliasing ** utilise un anti-crénelage (lissage des bords). `LV_ANTIALIAS` par défaut à partir de *lv_conf.h*
- **rotated** si `1` permute `hor_res et` ver_res'. LittlevGL dessine dans le même sens dans les deux cas (lignes du haut vers le bas); le pilote doit donc également être reconfiguré pour modifier le sens de remplissage de l'écran.
- **screen_transp** si `1` l'écran peut avoir un style transparent ou opaque. `LV_COLOR_SCREEN_TRANSP` doit être activé dans *lv_conf.h*

Pour utiliser un GPU, les fonctions de rappel suivantes peuvent être utilisées :

- **gpu_fill_cb** remplis une zone en mémoire avec une couleur
- **gpu_blend_cb** combine deux tampons en mémoire avec gestion de l'opacité.

Notez que ces fonctions doivent dessiner en mémoire (MEV) et non directement sur l'affichage.

Certaines autres fonctions de rappel facultatives facilitent et optimisent l'utilisation des écrans monochromes, à niveaux de gris ou autres écrans RVB non standard :

- **rounder_cb** arrondit les coordonnées des zones à redessiner. Par exemple une zone de 2 x 2 px peut être convertie en 2 x 8. Utile si la carte graphique ne peut actualiser que les zones ayant une hauteur ou une largeur spécifique (généralement une hauteur de 8 px avec des écrans monochromes).
- **set_px_cb** une fonction personnalisée pour écrire le *tampon d'affichage*. Utile pour enregistrer les pixels de manière plus compacte si l'affichage présente un format de couleur spécial (par exemple monochrome 1 bit, échelle de gris 2 bit, etc.). De cette façon, les tampons utilisés dans `lv_disp_buf_t` peuvent être plus petits pour ne contenir que le nombre de bits requis pour la taille de zone donnée. `set_px_cb` ne fonctionne pas avec la configuration de tampons d'affichage `Deux tampons de la taille d'un écran`.
- **monitor_cb** indique combien de pixels ont été actualisés et en combien de temps.

Pour définir les champs de la variable *lv_disp_drv_t*, celle-ci doit être initialisée avec `lv_disp_drv_init(&disp_drv)`. Et enfin, pour enregistrer un affichage pour LittlevGL, `lv_disp_drv_register(& disp_drv)` doit être appelée.

Dans l'ensemble, cela ressemble à ceci :

```
    lv_disp_drv_t disp_drv;                 /* Une variable pour contenir les pilotes.
↪ Peut être une variable locale */
    lv_disp_drv_init(&disp_drv);            /* Initialisation de base */
    disp_drv.buffer = &disp_buf;            /* Affecte un tampon initialisé */
    disp_drv.flush_cb = my_flush_cb;        /* Définit une fonction de rappel pour␣
↪dessiner à l'écran */
```

(continues on next page)

(continued from previous page)

```
    lv_disp_t * disp;
    disp = lv_disp_drv_register(&disp_drv); /* Enregistre le pilote et sauvegarde les␣
↪objets d'affichage créés */
```

Voici quelques exemples simples de fonctions de rappel :

```
void my_flush_cb(lv_disp_drv_t * disp_drv, const lv_area_t * area, lv_color_t * color_
↪p)
{
    /* Le cas le plus simple (mais aussi le plus lent) pour mettre tous les pixels à l
↪'écran un par un */
    int32_t x, y;
    for(y = area->y1; y <= area->y2; y++) {
        for(x = area->x1; x <= area->x2; x++) {
            put_px(x, y, *color_p)
            color_p++;
        }
    }

    /* IMPORTANT !!!
     * Informe la librairie graphique que vous êtes prêt pour le transfert */
    lv_disp_flush_ready(disp);
}

void my_gpu_fill_cb(lv_disp_drv_t * disp_drv, lv_color_t * dest_buf, const lv_area_t␣
↪* dest_area, const lv_area_t * fill_area, lv_color_t color);
{
    /* Cet exemple de code devrait être effectué par un GPU */
    uint32_t x, y;
    dest_buf += dest_width * fill_area->y1; /* Aller à la première ligne */

    for(y = fill_area->y1; y < fill_area->y2; y++) {
        for(x = fill_area->x1; x < fill_area->x2; x++) {
            dest_buf[x] = color;
        }
        dest_buf+=dest_width;    /* Aller à la ligne suivante */
    }
}

void my_gpu_blend_cb(lv_disp_drv_t * disp_drv, lv_color_t * dest, const lv_color_t *␣
↪src, uint32_t length, lv_opa_t opa)
{
    /* Cet exemple de code devrait être effectué par un GPU */
    uint32_t i;
    for(i = 0; i < length; i++) {
        dest[i] = lv_color_mix(dest[i], src[i], opa);
    }
}

void my_rounder_cb(lv_disp_drv_t * disp_drv, lv_area_t * area)
{
  /* Modifie les zones en fonction des besoins. Agrandir uniquement.
   * Par exemple, pour toujours avoir des lignes de 8 px de hauteur : */
   area->y1 = area->y1 & 0x07;
   area->y2 = (area->y2 & 0x07) + 8;
}
```

(continues on next page)

(continued from previous page)

```
void my_set_px_cb(lv_disp_drv_t * disp_drv, uint8_t * buf, lv_coord_t buf_w, lv_coord_
↪t x, lv_coord_t y, lv_color_t color, lv_opa_t opa)
{
    /* Écrit dans le tampon comme requis par l'affichage.
* Ecrit seulement 1 bit pour les écrans monochromes orientés verticalement : * /
 buf += buf_w * (y >> 3) + x;
 if(lv_color_brightness(color) > 128) (*buf) |= (1 << (y % 8));
 else (*buf) &= ~(1 << (y % 8));
}

void my_monitor_cb(lv_disp_drv_t * disp_drv, uint32_t time, uint32_t px)
{
  printf("%d px refreshed in %d ms\n", time, ms);
}
```

API

Display Driver HAL interface header file

Typedefs

typedef struct *__disp_drv_t* **lv_disp_drv_t**
Display Driver structure to be registered by HAL

typedef struct *__disp_t* **lv_disp_t**
Display structure. *lv_disp_drv_t* is the first member of the structure.

Functions

void **lv_disp_drv_init**(*lv_disp_drv_t* **driver*)
Initialize a display driver with default values. It is used to have known values in the fields and not junk in memory. After it you can safely set only the fields you need.

Parameters

- `driver`: pointer to driver variable to initialize

void **lv_disp_buf_init**(*lv_disp_buf_t* **disp_buf*, void **buf1*, void **buf2*, uint32_t *size_in_px_cnt*)
Initialize a display buffer

Parameters

- `disp_buf`: pointer *lv_disp_buf_t* variable to initialize
- `buf1`: A buffer to be used by LittlevGL to draw the image. Always has to specified and can' t be NULL. Can be an array allocated by the user. E.g. `static lv_color_t disp_buf1[1024 * 10]` Or a memory address e.g. in external SRAM
- `buf2`: Optionally specify a second buffer to make image rendering and image flushing (sending to the display) parallel. In the `disp_drv->flush` you should use DMA or similar hardware to send the image to the display in the background. It lets LittlevGL to render next frame into the other buffer while previous is being sent. Set to `NULL` if unused.
- `size_in_px_cnt`: size of the `buf1` and `buf2` in pixel count.

lv_disp_t ***lv_disp_drv_register**(*lv_disp_drv_t* **driver*)
Register an initialized display driver. Automatically set the first display as active.

Return pointer to the new display or NULL on error

Parameters

- `driver`: pointer to an initialized 'lv_disp_drv_t' variable (can be local variable)

void **lv_disp_drv_update**(*lv_disp_t* **disp*, *lv_disp_drv_t* **new_drv*)
Update the driver in run time.

Parameters

- `disp`: pointer to a display. (return value of `lv_disp_drv_register`)
- `new_drv`: pointer to the new driver

void **lv_disp_remove**(*lv_disp_t* **disp*)
Remove a display

Parameters

- `disp`: pointer to display

void **lv_disp_set_default**(*lv_disp_t* **disp*)
Set a default screen. The new screens will be created on it by default.

Parameters

- `disp`: pointer to a display

lv_disp_t ***lv_disp_get_default**(void)
Get the default display

Return pointer to the default display

lv_coord_t **lv_disp_get_hor_res**(*lv_disp_t* **disp*)
Get the horizontal resolution of a display

Return the horizontal resolution of the display

Parameters

- `disp`: pointer to a display (NULL to use the default display)

lv_coord_t **lv_disp_get_ver_res**(*lv_disp_t* **disp*)
Get the vertical resolution of a display

Return the vertical resolution of the display

Parameters

- `disp`: pointer to a display (NULL to use the default display)

bool **lv_disp_get_antialiasing**(*lv_disp_t* **disp*)
Get if anti-aliasing is enabled for a display or not

Return true: anti-aliasing is enabled; false: disabled

Parameters

- `disp`: pointer to a display (NULL to use the default display)

lv_disp_t ***lv_disp_get_next**(*lv_disp_t* **disp*)
Get the next display.

Return the next display or NULL if no more. Give the first display when the parameter is NULL

Parameters

- `disp`: pointer to the current display. NULL to initialize.

lv_disp_buf_t ***lv_disp_get_buf**(*lv_disp_t* **disp*)
Get the internal buffer of a display

Return pointer to the internal buffers

Parameters

- `disp`: pointer to a display

uint16_t **lv_disp_get_inv_buf_size**(*lv_disp_t* **disp*)
Get the number of areas in the buffer

Return number of invalid areas

void **lv_disp_pop_from_inv_buf**(*lv_disp_t* **disp*, uint16_t *num*)
Pop (delete) the last 'num' invalidated areas from the buffer

Parameters

- `num`: number of areas to delete

bool **lv_disp_is_double_buf**(*lv_disp_t* **disp*)
Check the driver configuration if it' s double buffered (both `buf1` and `buf2` are set)

Return true: double buffered; false: not double buffered

Parameters

- `disp`: pointer to to display to check

bool **lv_disp_is_true_double_buf**(*lv_disp_t* **disp*)
Check the driver configuration if it' s TRUE double buffered (both `buf1` and `buf2` are set and `size` is screen sized)

Return true: double buffered; false: not double buffered

Parameters

- `disp`: pointer to to display to check

struct lv_disp_buf_t
#include <lv_hal_disp.h> Structure for holding display buffer information.

Public Members

void ***buf1**
First display buffer.

void ***buf2**
Second display buffer.

void ***buf_act**

uint32_t **size**

lv_area_t **area**

volatile uint32_t **flushing**

struct _disp_drv_t
#include <lv_hal_disp.h> Display Driver structure to be registered by HAL

Public Members

lv_coord_t **hor_res**
Horizontal resolution.

lv_coord_t **ver_res**
Vertical resolution.

lv_disp_buf_t ***buffer**
Pointer to a buffer initialized with *lv_disp_buf_init()*. LittlevGL will use this buffer(s) to draw the screens contents

uint32_t **antialiasing**
1: antialiasing is enabled on this display.

uint32_t **rotated**
1: turn the display by 90 degree.

Warning Does not update coordinates for you!

uint32_t **screen_transp**
Handle if the the screen doesn't have a solid (opa == LV_OPA_COVER) background. Use only if required because it's slower.

void (***flush_cb**)(**struct** *_disp_drv_t* *disp_drv, **const** lv_area_t *area, *lv_color_t* *color_p)
MANDATORY: Write the internal buffer (VDB) to the display. 'lv_disp_flush_ready()' has to be called when finished

void (***rounder_cb**)(**struct** *_disp_drv_t* *disp_drv, lv_area_t *area)
OPTIONAL: Extend the invalidated areas to match with the display drivers requirements E.g. round `y` to, 8, 16 ..) on a monochrome display

void (***set_px_cb**)(**struct** *_disp_drv_t* *disp_drv, uint8_t *buf, lv_coord_t buf_w, lv_coord_t x, lv_coord_t y, *lv_color_t* color, *lv_opa_t* opa)
OPTIONAL: Set a pixel in a buffer according to the special requirements of the display Can be used for color format not supported in LittelvGL. E.g. 2 bit -> 4 gray scales

Note Much slower then drawing with supported color formats.

void (***monitor_cb**)(**struct** *_disp_drv_t* *disp_drv, uint32_t time, uint32_t px)
OPTIONAL: Called after every refresh cycle to tell the rendering and flushing time + the number of flushed pixels

void (***gpu_blend_cb**)(**struct** *_disp_drv_t* *disp_drv, *lv_color_t* *dest, **const** *lv_color_t* *src, uint32_t length, *lv_opa_t* opa)
OPTIONAL: Blend two memories using opacity (GPU only)

void (***gpu_fill_cb**)(**struct** *_disp_drv_t* *disp_drv, *lv_color_t* *dest_buf, lv_coord_t dest_width, **const** lv_area_t *fill_area, *lv_color_t* color)
OPTIONAL: Fill a memory with a color (GPU only)

lv_color_t **color_chroma_key**
On CHROMA_KEYED images this color will be transparent. `LV_COLOR_TRANSP` by default. (lv_conf.h)

lv_disp_drv_user_data_t **user_data**
Custom display driver user data

struct _disp_t
#include <lv_hal_disp.h> Display structure. *lv_disp_drv_t* is the first member of the structure.

Public Members

lv_disp_drv_t **driver**
< Driver to the display A task which periodically checks the dirty areas and refreshes them

lv_task_t ***refr_task**

lv_ll_t **scr_ll**
Screens of the display

struct *_lv_obj_t* ***act_scr**
Currently active screen on this display

struct *_lv_obj_t* ***top_layer**

See *lv_disp_get_layer_top*

struct *_lv_obj_t* ***sys_layer**

See *lv_disp_get_layer_sys*

lv_area_t **inv_areas**[**LV_INV_BUF_SIZE**]
Invalidated (marked to redraw) areas

uint8_t **inv_area_joined**[**LV_INV_BUF_SIZE**]

uint32_t **inv_p**

uint32_t **last_activity_time**
Last time there was activity on this display

Interface de périphérique d'entrée

Types de périphériques d'entrée

Pour configurer un périphérique d'entrée, une variable `lv_indev_drv_t` doit être initialisée :

```
lv_indev_drv_t indev_drv;
lv_indev_drv_init(&indev_drv);      /* Initialisation de base */
indev_drv.type =...                 /* Voir ci-dessous. */
indev_drv.read_cb =...              /* Voir ci-dessous. */
/* Enregistre le pilote dans LittlevGL et sauvegarde l'objet de périphérique d'entrée␣
↪créé */
lv_indev_t * my_indev = lv_indev_drv_register(&indev_drv);
```

type peut être

- **LV_INDEV_TYPE_POINTER** pavé tactile ou souris
- **LV_INDEV_TYPE_KEYPAD** clavier
- **LV_INDEV_TYPE_ENCODER** encodeur avec options gauche, droite et appui
- **LV_INDEV_TYPE_BUTTON** bouton externe

read_cb est un pointeur sur une fonction qui sera appelée périodiquement pour indiquer l'état actuel d'un périphérique d'entrée. Les données peuvent être placées dans un tampon, la fonction retourne `false` lorsqu'il ne reste plus de données à lire ou `true` lorsque le tampon n'est pas vide.

Visitez *Périphériques d'entrée* pour en savoir plus sur les périphériques d'entrée en général.

Pavé tactile, souris ou autre pointeur

Les périphériques d'entrée qui peuvent cliquer sur des points de l'écran appartiennent à cette catégorie.

```
indev_drv.type = LV_INDEV_TYPE_POINTER;
indev_drv.read_cb = my_input_read;

...

bool my_input_read(lv_indev_drv_t * drv, lv_indev_data_t*data)
{
    data->point.x = touchpad_x;
    data->point.y = touchpad_y;
    data->state = LV_INDEV_STATE_PR or LV_INDEV_STATE_REL;
    return false; /* Pas de tampon donc plus de données à lire */
}
```

Important: Les pilotes de pavé tactile doivent renvoyer les dernières coordonnées X/Y même lorsque l'état est *LV_INDEV_STATE_REL*.

Pour définir un curseur de souris, utilisez `lv_indev_set_cursor(my_indev, &img_cursor)` (`my_indev` est la valeur de retour de `lv_indev_drv_register`).

Pavé numérique ou clavier

Les claviers complets avec toutes les lettres ou plus simples avec quelques boutons de navigation sont décrits ici.

Pour utiliser un clavier :

- Enregistrez une fonction `read_cb` avec le type `LV_INDEV_TYPE_KEYPAD`.
- Activez `LV_USE_GROUP` dans *lv_conf.h*
- Un groupe d'objets doit être créé : `lv_group_t * g = lv_group_create()` et des objets doivent y être ajoutés avec `lv_group_add_obj(g, obj)`
- Le groupe créé doit être affecté à un périphérique d'entrée : `lv_indev_set_group(my_indev, g)` (`my_indev` est la valeur de retour de `lv_indev_drv_register`)
- Utilisez `LV_KEY_...` pour naviguer parmi les objets du groupe. Voir `lv_core/lv_group.h` pour les touches disponibles.

```
indev_drv.type = LV_INDEV_TYPE_KEYPAD;
indev_drv.read_cb = my_input_read;

...

bool keyboard_read(lv_indev_drv_t * drv, lv_indev_data_t*data){
  data->key = last_key();            /* Obtient  la dernière touche pressée ou␣
↪relâchée */

  if(key_pressed()) data->state = LV_INDEV_STATE_PR;
  else data->state = LV_INDEV_STATE_REL;
```

(continues on next page)

(continued from previous page)

```
  return false; /* Pas de tampon donc plus de données à lire */
}
```

Encodeur

Avec un encodeur, vous pouvez réaliser 4 actions :

1. Appuyer son bouton
2. Appuyer longuement son bouton
3. Tourner à gauche
4. Tourner à droite

En bref, les encodeurs fonctionnent comme ceci :

- En tournant l'encodeur, vous pouvez sélectionner l'objet suivant/précédent.
- Lorsque vous appuyez sur l'encodeur sur un objet simple (comme un bouton), vous cliquez dessus.
- Si vous appuyez sur l'encodeur sur un objet complexe (comme une liste, une boîte de message, etc.), l'objet passera en mode édition. Vous pouvez alors naviguer dans l'objet en tournant l'encodeur.
- Pour quitter le mode édition, appuyez longuement sur le bouton.

Pour utiliser un *encodeur* (comme un *clavier*), des objets doivent être ajoutés aux groupes.

```
indev_drv.type = LV_INDEV_TYPE_ENCODER;
indev_drv.read_cb = my_input_read;

...

bool encoder_read(lv_indev_drv_t * drv, lv_indev_data_t*data){
  data->enc_diff = enc_get_new_moves();

  if(enc_pressed()) data->state = LV_INDEV_STATE_PR;
  else data->state = LV_INDEV_STATE_REL;

  return false; /* Pas de tampon donc plus de données à lire */
}
```

Bouton

Bouton signifie bouton "matériel" externe à côté de l'écran, affecté à des coordonnées spécifiques de l'écran. Si un bouton est pressé, il simule l'appui sur la coordonnée attribuée (comme un pavé tactile)

Pour affecter des boutons aux coordonnées, utilisez `lv_indev_set_button_points(my_indev, points_array)`.`points_array` doit ressembler à `const lv_point_t points_array[] = { {12, 30}, {60, 90}, ... }`

Important: points_array ne peut être hors de portée. Déclarez-le en tant que variable globale ou en tant que variable statique dans une fonction.

```
indev_drv.type = LV_INDEV_TYPE_BUTTON;
indev_drv.read_cb = my_input_read;

...

bool button_read(lv_indev_drv_t * drv, lv_indev_data_t*data){
    static uint32_t last_btn = 0;   /* Mémorise le dernier bouton pressé */
    int btn_pr = my_btn_read();     /* Obtient l'ID (0, 1, 2 ...) du bouton pressé */
    if(btn_pr >= 0) {               /* Un bouton est-il pressé ? P.ex. -1 indique qu
↪'aucun bouton n'est pressé */
       last_btn = btn_pr;           /* Sauvegarde l'ID du bouton pressé */
       data->state = LV_INDEV_STATE_PR;  /* Définit l'état pressé */
    } else {
       data->state = LV_INDEV_STATE_REL; /* Définit l'état relâché */
    }

    data->btn = last_btn;            /* Enregistre le dernier bouton */

    return false;                    /* Pas de tampon donc plus de données à lire */
}
```

Autres fonctionnalités

Outre `read_cb`, une autre fonction de rappel `feedback_cb` peut également être spécifiée dans `lv_indev_drv_t`. `feedback_cb` est appelée lorsqu'un événement, quel qu'il soit, est envoyé par les périphériques d'entrée. (indépendamment de leur type). Cela permet de faire un retour à l'utilisateur, par exemple. jouer un son sur `LV_EVENT_CLICK`.

La valeur par défaut des paramètres suivants peut être définie dans *lv_conf.h* mais la valeur par défaut peut être surchargée dans `lv_indev_drv_t` :

- **drag_limit** Nombre de pixels à parcourir avant de faire glisser l'objet
- **drag_throw** Ralentissement du glissé après lâché en [%]. Une valeur haute signifie un ralentissement plus rapide
- **long_press_time** Temps d'appui avant de générer `LV_EVENT_LONG_PRESSED` (en millisecondes)
- **long_press_rep_time** Intervalle de temps entre deux envois `LV_EVENT_LONG_PRESSED_REPEAT` (en millisecondes)
- **read_task** pointeur sur l'objet `lv_task` qui lit le périphérique d'entrée. Ses paramètres peuvent être modifiés avec les fonctions `lv_task_...()`

Chaque périphérique d'entrée est associé à un affichage. Par défaut, un nouveau périphérique d'entrée est ajouté à l'affichage créé en dernier ou explicitement sélectionné (à l'aide de `lv_disp_set_default()`). L'affichage associé est sauvegardé et peut être modifié dans le champ `disp` du pilote.

API

Input Device HAL interface layer header file

Typedefs

typedef uint8_t **lv_indev_type_t**

typedef uint8_t **lv_indev_state_t**

typedef struct *_lv_indev_drv_t* **lv_indev_drv_t**
Initialized by the user and registered by 'lv_indev_add()'

typedef struct *_lv_indev_proc_t* **lv_indev_proc_t**
Run time data of input devices Internally used by the library, you should not need to touch it.

typedef struct *_lv_indev_t* **lv_indev_t**
The main input device descriptor with driver, runtime data ('proc') and some additional information

Enums

enum [anonymous]
Possible input device types

Values:

LV_INDEV_TYPE_NONE
Uninitialized state

LV_INDEV_TYPE_POINTER
Touch pad, mouse, external button

LV_INDEV_TYPE_KEYPAD
Keypad or keyboard

LV_INDEV_TYPE_BUTTON
External (hardware button) which is assigned to a specific point of the screen

LV_INDEV_TYPE_ENCODER
Encoder with only Left, Right turn and a Button

enum [anonymous]
States for input devices

Values:

LV_INDEV_STATE_REL = 0

LV_INDEV_STATE_PR

Functions

void **lv_indev_drv_init**(*lv_indev_drv_t* **driver*)
Initialize an input device driver with default values. It is used to surly have known values in the fields ant not memory junk. After it you can set the fields.

Parameters

- `driver`: pointer to driver variable to initialize

lv_indev_t ***lv_indev_drv_register**(*lv_indev_drv_t* **driver*)
Register an initialized input device driver.

Return pointer to the new input device or NULL on error

Parameters

- `driver`: pointer to an initialized 'lv_indev_drv_t' variable (can be local variable)

void **lv_indev_drv_update**(*lv_indev_t* **indev*, *lv_indev_drv_t* **new_drv*)
Update the driver in run time.

Parameters

- `indev`: pointer to a input device. (return value of `lv_indev_drv_register`)
- `new_drv`: pointer to the new driver

lv_indev_t ***lv_indev_get_next**(*lv_indev_t* **indev*)
Get the next input device.

Return the next input devise or NULL if no more. Give the first input device when the parameter is NULL

Parameters

- `indev`: pointer to the current input device. NULL to initialize.

bool **lv_indev_read**(*lv_indev_t* **indev*, *lv_indev_data_t* **data*)
Read data from an input device.

Return false: no more data; true: there more data to read (buffered)

Parameters

- `indev`: pointer to an input device
- `data`: input device will write its data here

struct lv_indev_data_t
#include <lv_hal_indev.h> Data structure passed to an input driver to fill

Public Members

lv_point_t **point**
For LV_INDEV_TYPE_POINTER the currently pressed point

uint32_t **key**
For LV_INDEV_TYPE_KEYPAD the currently pressed key

uint32_t **btn_id**
For LV_INDEV_TYPE_BUTTON the currently pressed button

int16_t **enc_diff**
For LV_INDEV_TYPE_ENCODER number of steps since the previous read

lv_indev_state_t **state**
LV_INDEV_STATE_REL or LV_INDEV_STATE_PR

struct _lv_indev_drv_t
#include <lv_hal_indev.h> Initialized by the user and registered by 'lv_indev_add()'

Public Members

lv_indev_type_t **type**
< Input device type Function pointer to read input device data. Return 'true' if there is more data to be read (buffered). Most drivers can safely return 'false'

bool (***read_cb**)(**struct** *_lv_indev_drv_t* *indev_drv, *lv_indev_data_t* *data)

void (***feedback_cb**)(**struct** *_lv_indev_drv_t* *, uint8_t)
Called when an action happened on the input device. The second parameter is the event from `lv_event_t`

lv_indev_drv_user_data_t **user_data**

struct *_disp_t* ***disp**
< Pointer to the assigned display Task to read the periodically read the input device

lv_task_t ***read_task**
Number of pixels to slide before actually drag the object

uint8_t **drag_limit**
Drag throw slow-down in [%]. Greater value means faster slow-down

uint8_t **drag_throw**
Long press time in milliseconds

uint16_t **long_press_time**
Repeated trigger period in long press [ms]

uint16_t **long_press_rep_time**

struct _lv_indev_proc_t
#include <lv_hal_indev.h> Run time data of input devices Internally used by the library, you should not need to touch it.

Public Members

lv_indev_state_t **state**
Current state of the input device.

lv_point_t **act_point**
Current point of input device.

lv_point_t **last_point**
Last point of input device.

lv_point_t **vect**
Difference between `act_point` and `last_point`.

lv_point_t **drag_sum**

lv_point_t **drag_throw_vect**

struct *_lv_obj_t* ***act_obj**

struct *_lv_obj_t* ***last_obj**

struct *_lv_obj_t* ***last_pressed**

uint8_t **drag_limit_out**

uint8_t **drag_in_prog**

struct *_lv_indev_proc_t*::[anonymous]::[anonymous] **pointer**

lv_indev_state_t **last_state**

uint32_t **last_key**

struct *_lv_indev_proc_t*::[anonymous]::[anonymous] **keypad**

union *_lv_indev_proc_t*::[anonymous] **types**

uint32_t **pr_timestamp**
Pressed time stamp

uint32_t **longpr_rep_timestamp**
Long press repeat time stamp

uint8_t **long_pr_sent**

uint8_t **reset_query**

uint8_t **disabled**

uint8_t **wait_until_release**

struct _lv_indev_t

#include <lv_hal_indev.h> The main input device descriptor with driver, runtime data ('proc') and some additional information

Public Members

lv_indev_drv_t **driver**

lv_indev_proc_t **proc**

struct *_lv_obj_t* ***cursor**
Cursor for LV_INPUT_TYPE_POINTER

struct *_lv_group_t* ***group**
Keypad destination group

const lv_point_t ***btn_points**
Array points assigned to the button ()screen will be pressed here by the buttons

Interface tic

The LittlevGL needs a system tick to know the elapsed time for animation and other tasks.

You need to call the `lv_tick_inc(tick_period)` function periodically and tell the call period in milliseconds. For example, `lv_tick_inc(1)` for calling in every millisecond.

`lv_tick_inc` should be called in a higher priority routine than `lv_task_handler()` (e.g. in an interrupt) to precisely know the elapsed milliseconds even if the execution of `lv_task_handler` takes longer time.

Sur FreeRTOS, `lv_tick_inc` peut être appelée dans `vApplicationTickHook`.

On Linux based operating system (e.g. on Raspberry Pi) `lv_tick_inc` can be called in a thread as below:

```
void * tick_thread (void *args)
{
      while(1) {
        usleep(5*1000);   /* Dors pendant 5 millisecondes */
        lv_tick_inc(5);      /* Indique à LittlevGL que 5 millisecondes se sont␣
↪écoulées */
    }
}
```

API

Provide access to the system tick with 1 millisecond resolution

Functions

uint32_t **lv_tick_get**(void)
Get the elapsed milliseconds since start up

Return the elapsed milliseconds

uint32_t **lv_tick_elaps**(uint32_t *prev_tick*)
Get the elapsed milliseconds since a previous time stamp

Return the elapsed milliseconds since 'prev_tick'

Parameters

- `prev_tick`: a previous time stamp (return value of systick_get())

Gestionnaire de tâche

Pour gérer les tâches de LittlevGL, vous devez appeler `lv_task_handler()` régulièrement à partir d'un des éléments suivants :

- boucle *while(1)* de la fonction *main()*
- interruption périodique d'une horloge (priorité plus basse que `lv_tick_inc()`)
- une tâche périodique du SE

Le délai n'est pas critique, mais il faut environ 5 millisecondes pour que le système reste réactif.

Exemple :

```
while(1) {
  lv_task_handler();
  my_delay_ms(5);
}
```

Pour en savoir plus sur les tâches, visitez la section *Tâches*.

Gestion du sommeil

Le microcontrôleur peut s'endormir lorsque aucune intervention de l'utilisateur n'est effectuée. Dans ce cas, la boucle principale `while (1)` devrait ressembler à ceci :

```
while(1) {
  /* Fonctionnement normal (pas de sommeil) si moins de 1 seconde d'inactivité */
  if(lv_disp_get_inactive_time(NULL) < 1000) {
          lv_task_handler();
  }
  /* Sommeil après une seconde d'inactivité */
  else {
          timer_stop();   /* Arrêt de l'horloge où lv_tick_inc() est appelée */
          sleep();                    /* Place le microcontrôleur en sommeil */
  }
  my_delay_ms(5);
}
```

Vous devez également ajouter ces lignes à la fonction de lecture de votre périphérique d'entrée si un appui est effectué :

```
lv_tick_inc(LV_DISP_DEF_REFR_PERIOD);  /* Force l'exécution de la tâche au réveil */
timer_start();                         /* Redémarre l'horloge où lv_tick_inc() est␣
↪appelée */
lv_task_handler();                     /* Appelle `lv_task_handler()` manuellement␣
↪pour traiter le réveil */
```

En plus de `lv_disp_get_inactive_time()`, vous pouvez vérifier `lv_anim_count_running()` pour voir si toutes les animations sont terminées.

Système d'exploitation et interruptions

LittlevGL n'est **pas compatible avec les fils d'exécution** par défaut.

Cependant, dans les cas suivants, il est valide d'appeler des fonctions liées à LittlevGL :

- Dans les *événements*. Apprenez-en plus dans *Evénements*.
- Dans *lv_tasks*. Apprenez-en plus dans *Tâches*.

Tâches et fils d'exécution

Si vous avez besoin d'utiliser de vraies tâches ou des fils d'exécution, vous avez besoin d'un mutex qui doit être acquis avant l'appel de `lv_task_handler` et libéré ensuite. Par ailleurs, vous devez utiliser ce même mutex dans les autres tâches et fils d'exécution lors de chaque appel de fonction et code liés à LittlevGL (`lv_...`). De cette façon, vous pouvez utiliser LittlevGL dans un environnement réellement multitâche. Utilisez simplement un mutex pour éviter l'appel concurrent des fonctions LittlevGL.

Interruptions

Essayez d'éviter d'appeler les fonctions LittlevGL à partir d'une interruption (sauf `lv_tick_inc()` et `lv_disp_flush_ready ()`). Mais si vous avez besoin de le faire, vous devez désactiver l'interruption qui utilise les fonctions LittlevGL pendant que `lv_task_handler` est en cours d'exécution. Il est préférable de positionner un indicateur ou une valeur et de le vérifier périodiquement dans une `lv_task`.

Journalisation

LittlevGL a un module *journal* intégré pour informer l'utilisateur de ce qui se passe dans la librairie.

Niveau de détail

Pour activer la journalisation, définissez `LV_USE_LOG 1` dans *lv_conf.h* et définissez `LV_LOG_LEVEL` sur l'une des valeurs suivantes :

- **LV_LOG_LEVEL_TRACE** Beaucoup de messages pour donner des informations détaillées
- **LV_LOG_LEVEL_INFO** Consigne les événements importants
- **LV_LOG_LEVEL_WARN** Journalise si quelque chose d'inattendu s'est produit mais n'a pas causé de problème
- **LV_LOG_LEVEL_ERROR** Uniquement les problèmes critiques, lorsque le système peut planter
- **LV_LOG_LEVEL_NONE** Ne journalise rien

Les événements dont le niveau est supérieur au niveau de journalisation défini seront également consignés. Par exemple si vous activez `LV_LOG_LEVEL_WARN`, *les erreurs* seront également consignées.

Journalisation avec printf

Si votre système prend en charge `printf`, il vous suffit d'activer `LV_LOG_PRINTF` dans *lv_conf.h* pour traiter les journaux avec `printf`.

Fonction de journalisation personnalisée

Si vous ne pouvez pas utiliser `printf` ou si vous souhaitez utiliser une fonction personnalisée pour journaliser, vous pouvez enregistrer une fonction de rappel "journaliseur" avec `lv_log_register_print_cb()` .

Par exemple :

```
void my_log_cb(lv_log_level_t level, const char * file, int line, const char * dsc)
{
  /* Envoie les messages via le port série */
  if(level == LV_LOG_LEVEL_ERROR) serial_send("ERROR: ");
  if(level == LV_LOG_LEVEL_WARN)  serial_send("WARNING: ");
  if(level == LV_LOG_LEVEL_INFO)  serial_send("INFO: ");
  if(level == LV_LOG_LEVEL_TRACE) serial_send("TRACE: ");

  serial_send("File: ");
  serial_send(file);

  char line_str[8];
  sprintf(line_str,"%d", line);
  serial_send("#");
  serial_send(line_str);

  serial_send(": ");
  serial_send(dsc);
  serial_send("\n");
}

...

lv_log_register_print_cb(my_log_cb);
```

Ajouter des messages

Vous pouvez également utiliser le module de journalisation via les fonctions `LV_LOG_TRACE/INFO/WARN/ERROR(description)`.

3.16.3 Vue d'ensemble

Objets

Dans LittlevGL, les **éléments de base** d'une interface utilisateur sont les objets, également appelés *éléments visuels*. Par exemple, un *Bouton*, une *Etiquette*, une *Image*, une *Liste*, un *Graphique* ou une *Zone de texte*.

Découvrez tous les *Types d'objet* ici.

Attributs d' objet

Attributs de base

Tous les types d' objet partagent certains attributs de base :

- Position
- Taille
- Parent
- Autorisation du glissé
- Autorisation du clic etc.

Vous pouvez définir/obtenir ces attributs avec les fonctions `lv_obj_set _...` et `lv_obj_get _...`. Par exemple :

```
/* Définit les attributs de base de l'objet */
lv_obj_set_size(btn1, 100, 50);          /* Taille du bouton */
lv_obj_set_pos(btn1, 20,30);      /* Position du bouton */
```

Pour voir toutes les fonctions disponibles, visitez la *documentation* de l' objet de base.

Attributs spécifiques

Les types d' objet ont aussi des attributs spéciaux. Par exemple, un curseur a

- Des valeurs minimum et maximum
- Une valeur courante
- Des styles personnalisés

Pour ces attributs, chaque type d' objet possède des fonctions API uniques. Par exemple pour un curseur :

```
/* Définit les attributs spécifiques du curseur */
lv_slider_set_range(slider1, 0, 100);           /* Définit les valeurs minimum et␣
↪maximum */
lv_slider_set_value(slider1, 40, LV_ANIM_ON);        /* Définit la valeur courante␣
↪(position) */
lv_slider_set_action(slider1, my_action);     /* Définit une fonction de rappel */
```

Les API des types d' objet sont décrites dans leur *Documentation* mais vous pouvez également consulter les fichiers d' en-tête respectifs (p.ex. *lv_objx/lv_slider.h*).

Mécanismes de fonctionnement de l' objet

Structure parent-enfant

Un objet parent peut être considéré comme le conteneur de ses enfants. Chaque objet a exactement un objet parent (à l' exception des écrans), mais un parent peut avoir un nombre illimité d' enfants. Il n' y a pas de contrainte pour le type du parent, mais il existe des objets parent typiques (par exemple un bouton) et enfants (par exemple une étiquette).

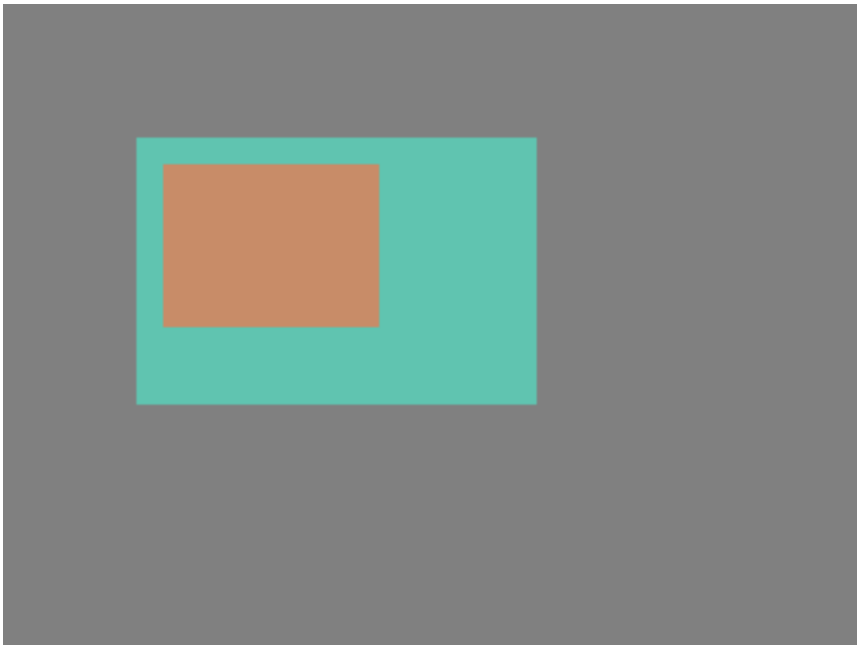
Se déplacer ensemble

Si la position du parent est modifiée, les enfants se déplaceront avec lui. Par conséquent, toutes les positions sont relatives au parent.

Les coordonnées (0, 0) signifient que les objets resteront dans le coin supérieur gauche du parent indépendamment de la position du parent.

```
lv_obj_t * par = lv_obj_create(lv_scr_act(), NULL); /* Crée un objet parent sur l
↪'écran actuel */
lv_obj_set_size(par, 100, 80);                          /* Définit la taille du␣
↪parent */

lv_obj_t * obj1 = lv_obj_create(par, NULL);                /* Crée un objet sur l
↪'objet parent créé précédemment */
lv_obj_set_pos(obj1, 10, 10);                           /* Définit la position du␣
↪nouvel objet */
```

Modifiez la position du parent :



```
lv_obj_set_pos(par, 50, 50);          /* Déplacez le parent. L'enfant va bouger avec. */
```

Pour simplifier, la définition des couleurs des objets n'est pas montrée dans l'exemple.

Visibilité uniquement sur le parent

Si un enfant est partiellement ou complètement hors de son parent, les parties extérieures ne seront pas visibles.

```
lv_obj_set_x(obj1, -30);          /* Déplace l'enfant en partie en dehors du parent */
```

Créer - supprimer des objets

Dans LittlevGL, les objets peuvent être créés et supprimés dynamiquement à l'exécution. Cela signifie que seuls les objets actuellement créés consomment de la MEV. Par exemple, si vous avez besoin d'un graphique, vous pouvez le créer à l'utilisation et le supprimer s'il n'est pas visible ou plus nécessaire.

Chaque type d'objet a sa propre fonction **create** avec une signature unifiée. Deux paramètres sont nécessaires :

- un pointeur sur l'objet parent. Pour créer un écran, donnez *NULL* comme parent.
- éventuellement un pointeur sur un autre objet du même type pour copie. Peut être *NULL* pour ne pas copier un autre objet.

Tous les objets sont référencés dans le code C en utilisant un pointeur `lv_obj_t`. Ce pointeur peut ensuite être utilisé pour définir ou obtenir les attributs de l'objet.

Les fonctions de création ressemblent à ceci :

```
lv_obj_t * lv_ <type>_create(lv_obj_t * parent, lv_obj_t * copy);
```

Il existe une fonction commune de **suppression** pour tous les types d'objet. Il supprime l'objet et tous ses enfants.

```
void lv_obj_del(lv_obj_t * obj);
```

`lv_obj_del` supprimera immédiatement l'objet. Si pour une quelconque raison vous ne pouvez pas supprimer l'objet immédiatement, vous pouvez utiliser `lv_obj_del_async(obj)`. Utile, par exemple si vous voulez supprimer le parent d'un objet dans le traitement de l'événement `LV_EVENT_DELETE`.

Vous pouvez supprimer tous les enfants d'un objet (mais pas l'objet lui-même) en utilisant `lv_obj_clean` :

```
void lv_obj_clean(lv_obj_t * obj);
```

Ecran - le parent le plus élémentaire

Les écrans sont des objets spéciaux qui n'ont pas d'objet parent. Il est donc créé ainsi :

```
lv_obj_t * scr1 = lv_obj_create(NULL, NULL);
```

Il y a toujours un écran actif sur chaque affichage. Par défaut, la librairie crée et charge un "objet de base" comme écran pour chaque affichage. Pour obtenir l'écran actuellement actif, utilisez la fonction `lv_scr_act()`. Pour en charger un nouveau, utilisez `lv_scr_load(scr1)`.

Les écrans peuvent être créés avec n'importe quel type d'objet. Par exemple, un *Objet de base* ou une image pour créer un fond d'écran.

Les écrans sont créés sur l'*affichage par défaut* actuellement sélectionné. L'écran *par défaut* est le dernier écran enregistré avec `lv_disp_drv_register` ou vous pouvez explicitement sélectionner un nouvel affichage par défaut avec `lv_disp_set_default (disp)`. `lv_scr_act()` et `lv_scr_load()` opèrent sur l'écran courant par défaut.

Visitez *Support multi-affichage* pour en savoir plus.

Couches

Ordre de création

By default, LittlevGL draws old objects on the background and new objects on the foreground.

For example, assume we added a button to a parent object named button1 and then another button named button2. Then button1 (with its child object(s)) will be in the background and can be covered by button2 and its children.

```
/* Crée un écran */
lv_obj_t * scr = lv_obj_create(NULL, NULL);
lv_scr_load(scr);          /* Charge l'écran */

/* Crée 2 boutons */
lv_obj_t * btn1 = lv_btn_create(scr, NULL);         /* Crée un bouton sur l'écran */
lv_btn_set_fit(btn1, true, true);                   /* Permet de définir␣
↪automatiquement la taille en fonction du contenu */
lv_obj_set_pos(btn1, 60, 40);                         /* Définit la position du␣
↪bouton */

lv_obj_t * btn2 = lv_btn_create(scr, btn1);         /* Copie le premier bouton */
lv_obj_set_pos(btn2, 180, 80);                     /* Définit la position du bouton */

/* Ajoute des étiquettes aux boutons */
lv_obj_t * label1 = lv_label_create(btn1, NULL);        /* Crée une étiquette sur le␣
↪premier bouton */
lv_label_set_text(label1, "Button 1");                  /* Définit le texte de l
↪'étiquette */

lv_obj_t * label2 = lv_label_create(btn2, NULL);          /* Crée une étiquette sur␣
↪le deuxième bouton */
lv_label_set_text(label2, "Button 2");                    /* Définit le texte de l
↪'étiquette */
```

(continues on next page)

(continued from previous page)

```
/* Supprime la deuxième étiquette */
lv_obj_del(label2);
```

Amener au premier plan

Il y a plusieurs façons d' amener un objet au premier plan :

- Use `lv_obj_set_top(obj, true)`. If `obj` or any of its children is clicked, then LittlevGL will automatically bring the object to the foreground. It works similarly to a typical GUI on a PC. When a window in the background is clicked, it will come to the foreground automatically.
- Use `lv_obj_move_foreground(obj)` to explicitly tell the library to bring an object to the foreground. Similarly, use `lv_obj_move_background(obj)` to move to the background.
- When `lv_obj_set_parent(obj, new_parent)` is used, `obj` will be on the foreground on the `new_parent`.

Top and sys layers

LittlevGL uses two special layers named as `layer_top` and `layer_sys`. Both are visible and common on all screens of a display. **They are not, however, shared among multiple physical displays.** The `layer_top` is always on top of the default screen (`lv_scr_act()`), and `layer_sys` is on top of `layer_top`.

The `layer_top` can be used by the user to create some content visible everywhere. For example, a menu bar, a pop-up, etc. If the `click` attribute is enabled, then `layer_top` will absorb all user click and acts as a modal.

```
lv_obj_set_click(lv_layer_top(), true);
```

The `layer_sys` is also using for similar purpose on LittlevGL. For example, it places the mouse cursor there to be sure it' s always visible.

Evénements

Les événements sont déclenchés dans LittlevGL quand il se produit quelque chose d' intéressant pour l' utilisateur, par exemple si un objet :

- est cliqué
- est déplacé
- sa valeur a changé, etc.

L' utilisateur peut affecter une fonction de rappel à un objet pour voir ces événements. En pratique, cela ressemble à ceci :

```
lv_obj_t * btn = lv_btn_create(lv_scr_act(), NULL);
lv_obj_set_event_cb(btn, my_event_cb);   /* Assigne une fonction de rappel */

...

static void my_event_cb(lv_obj_t * obj, lv_event_t event)
{
```

(continues on next page)

(continued from previous page)

```
    switch(event) {
        case LV_EVENT_PRESSED:
            printf("Pressed\n");
            break;

        case LV_EVENT_SHORT_CLICKED:
            printf("Short clicked\n");
            break;

        case LV_EVENT_CLICKED:
            printf("Clicked\n");
            break;

        case LV_EVENT_LONG_PRESSED:
            printf("Long press\n");
            break;

        case LV_EVENT_LONG_PRESSED_REPEAT:
            printf("Long press repeat\n");
            break;

        case LV_EVENT_RELEASED:
            printf("Released\n");
            break;
    }

       /* Etc. */
}
```

Plusieurs objets peuvent utiliser la même *fonction de rappel*.

Types d'événements

Les types d'événements suivants existent :

Evénements génériques

Tous les objets (tels que boutons/étiquettes/curseurs etc.) reçoivent ces événements génériques quel que soit leur type.

Relatifs aux périphériques d'entrée

Ils sont envoyés lorsqu'un objet est pressé/relâché etc. par l'utilisateur. Ils sont utilisés pour les périphériques d'entrée *clavier*, *encodeur* et *bouton*, ainsi que pour les *pointeurs*. Consultez la section *Périphériques d'entrée* pour en savoir plus à leur sujet.

- **LV_EVENT_PRESSED** L'objet a été pressé
- **LV_EVENT_PRESSING** L'objet est pressé(envoyé continuellement pendant l'appui)
- **LV_EVENT_PRESS_LOST** Le périphérique d'entrée est toujours pressé mais hors de l'objet
- **LV_EVENT_SHORT_CLICKED** Relâché avant un délai `LV_INDEV_LONG_PRESS_TIME`. Pas généré si l'objet est déplacé.

- **LV_EVENT_LONG_PRESSED** Pressé durant `LV_INDEV_LONG_PRESS_TIME`. Pas généré si l'objet est déplacé.
- **LV_EVENT_LONG_PRESSED_REPEAT** Généré après `LV_INDEV_LONG_PRESS_TIME` à chaque `LV_INDEV_LONG_PRESS_REP_TIME` ms. Pas généré si l'objet est déplacé.
- **LV_EVENT_CLICKED** Généré au relâché si l'objet n'est pas déplacé (indépendamment d'un appui long)
- **LV_EVENT_RELEASED** Généré dans tous les cas lorsque l'objet a été relâché, même s'il a été déplacé. Non généré si il y a eu déplacement pendant l'appui et si le relâché intervient en dehors de l'objet. Dans ce cas, `LV_EVENT_PRESS_LOST` est généré.

Relatif au pointeur

Ces événements sont envoyés uniquement par des périphériques d'entrée de type pointeur (p.ex. souris ou pavé tactile).

- **LV_EVENT_DRAG_BEGIN** le glissé de l'objet a débuté,
- **LV_EVENT_DRAG_END** le glissé de l'objet est terminé (lancé inclus),
- **LV_EVENT_DRAG_THROW_BEGIN** le lancé de l'objet a débuté (généré après un glissé avec "élan")

Relatif au pavé numérique et encodeur

Ces événements sont envoyés par les périphériques d'entrée clavier et encodeur. En savoir plus sur les *groupes* dans la section [Périphériques d'entrée] (overview/indev).

- **LV_EVENT_KEY** Une *touche* est envoyée à l'objet. Typiquement quand elle a été pressée ou répétée après un appui long
- **LV_EVENT_FOCUSED** L'objet est activé dans son groupe
- **LV_EVENT_DEFOCUSED** L'objet est désactivé dans son groupe

Evénements généraux

Autres événements généraux envoyés par la librairie.

- **LV_EVENT_DELETE** L'objet est en cours de suppression. Libérez les données associées allouées par l'utilisateur.

Evénements spéciaux

Ces événements sont spécifiques à un type particulier d'objet.

- **LV_EVENT_VALUE_CHANGED** La valeur de l'objet a changé (p.ex. pour un *Curseur*)
- **LV_EVENT_INSERT** Quelque chose est inséré dans l'objet (typiquement à une *Zone de texte*)
- **LV_EVENT_APPLY** "Ok", "Appliquer" ou un bouton spécifique similaire a été cliqué (typiquement à partir d'un objet *Clavier*)
- **LV_EVENT_CANCEL** "Fermer", "Annuler" ou un bouton spécifique similaire a été cliqué (typiquement à partir d'un objet *Clavier*)

- **LV_EVENT_REFRESH** Demande à actualiser l'objet. Jamais généré par la lirbarie mais peut l'être par l'utilisateur.

Visitez la documentation spécifique à partir de *Types d'objet* pour comprendre quels événements sont utilisés par un type d'objet.

Données personnalisées

Certains événements peuvent comporter des données personnalisées. Par exemple, `LV_EVENT_VALUE_CHANGED` indique dans certains cas la nouvelle valeur. Pour plus d'informations, voir la documentation des *Types d'objet*. Pour obtenir les données personnalisées dans la fonction de rappel, utilisez `lv_event_get_data()`.

Le type des données personnalisées dépend de l'objet, mais si c'est un

- entier alors c'est un `uint32_t *` ou un `int32_t *`
- texte alors c'est un `char *` ou un `const char *`

Envoyer des événements manuellement

Pour envoyer manuellement des événements à un objet, utilisez `lv_event_send(obj, LV_EVENT_..., &custom_data)`.

Par exemple, cela peut être utilisé pour fermer manuellement une boîte de message en simulant un appui sur un bouton, bien qu'il existe des manières plus simples de faire cela :

```
/* Simuler l'appui du premier bouton (les index partent de zéro) */
uint32_t btn_id = 0;
lv_event_send(mbox, LV_EVENT_VALUE_CHANGED, &btn_id);
```

Ou pour effectuer une actualisation générique :

```
lv_event_send(label, LV_EVENT_REFRESH, NULL);
```

Styles

Les *styles* sont utilisés pour définir l'apparence des objets. Un style est une structure avec des attributs tels que couleurs, marges, opacité, police, etc.

Il existe un type de style commun nommé **lv_style_t** pour chaque type d'objet.

En définissant les champs des variables `lv_style_t` et en les affectant aux objets avec `lv_obj_set_style`, vous pouvez modifier l'apparence des objets.

Important: Les objets mémorisent uniquement un pointeur vers un style, de ce fait le style ne peut donc pas être une variable locale détruite après la sortie de la fonction. **Vous devez utiliser des variables statiques, globales ou allouées dynamiquement.**

```
/* Portée sur le fichier */
lv_style_t style_1;             /* OK ! Les variables globales pour les styles sont␣
↪adaptées */
static lv_style_t style_2;      /* OK ! Les variables statiques en dehors des␣
↪fonctions sont adaptées */
```

(continues on next page)

(continued from previous page)

```
void my_screen_create(void)
{
  /* Portée sur la fonction */
  static lv_style_t style_3;    /* OK ! Les variables statiques dans les fonctions␣
↪sont adaptées */
  lv_style_t style_4;           /* Non ! Les styles ne peuvent pas être des variables␣
↪locales */

  ...
}
```

Utiliser les styles

Les objets ont un *style principal* qui détermine l'apparence de leur arrière-plan ou de leur partie principale. Cependant, certains types d'objet ont aussi des styles supplémentaires.

Par exemple, un curseur a 3 styles :

- Arrière-plan (style principal)
- Indicateur
- Bouton

Certains types d'objet ont un seul style. Par exemple :

- Etiquette
- Image
- Ligne, etc.

Chaque type d'objet implémente ses propres fonctions de gestion des styles. Vous devez les utiliser à la place de `lv_obj_set_style` quand c'est possible. Par exemple :

```
const lv_style_t * btn_style = lv_btn_get_style(btn, LV_BTN_STYLE_REL);
lv_btn_set_style(btn, LV_BTN_STYLE_REL, &new_style);
```

Pour voir les styles pris en charge par un type d'objet (*LV_<OBJ_TYPE>*STYLE*<STYLE_TYPE>*) vérifier la documentation du *Type d'objet* particulier.

Si vous **modifiez un style déjà utilisé** par un ou plusieurs objets, les objets doivent être avertis du changement de style. Il y a deux possibilités pour le faire :

```
/* Notifie un objet que son style est modifié */
void lv_obj_refresh_style(lv_obj_t * obj);

/* Notifie tous les objets avec un style donné (NULL pour notifier tous les objets) */
void lv_obj_report_style_mod(void * style);
```

`lv_obj_report_style_mod` will only refresh the *Main styles* of objects. If you change a different style, you will have to use `lv_obj_refresh_style`.

Héritage de styles

Si le *style principal* d'un objet est `NULL`, son style sera hérité du style de son parent. Cela facilite la création d'une interface cohérente. N'oubliez pas qu'un style décrit beaucoup de propriétés en même

temps. Ainsi, par exemple, si vous définissez le style d' un bouton et créez une étiquette avec le style `NULL`, l' étiquette sera rendue en fonction du style du bouton. En d' autres termes, le bouton garantit à ses enfants une apparence correcte.

Setting the `glass` style property will prevent inheriting that style (i.e. cause the child object to inherit its style from its grandparent). You should use it if the style is transparent so children use colors and features from its grandparent. Otherwise, the child objects would also be transparent.

Propriétés de style

Un style comporte 5 parties principales : commun, corps, texte, image et ligne. Chaque type d' objet utilise les champs qui le concernent. Par exemple, les *lignes* ne se soucient pas de *letter_space*, car elles ne sont pas concernées par le rendu de texte.

Pour voir quels champs sont utilisés par un type d' objet, voir la documentation des *Types d' objet*.

Les champs d' une structure de style sont les suivants :

Propriétés communes

- **glass** 1: Ne pas hériter de ce style

Propriétés de style de corps

Utilisé par les objets rectangulaires

- **body.main_color** Couleur principale (couleur du haut)
- **body.grad_color** Dégradé de couleur (couleur de fond)
- **body.radius** Rayon pour arrondir les angles (`LV_RADIUS_CIRCLE` pour dessiner un cercle)
- **body.opa** Opacité (0..255 ou *LV_OPA_TRANSP*, *LV_OPA_10*, *LV_OPA_20* ··· *LV_OPA_COVER*)
- **body.border.color** Couleur de bord
- **body.border.width** Largeur de bord
- **body.border.part** Segments de bord (*LV_BORDER_LEFT/RIGHT/TOP/BOTTOM/FULL* ou 'OR' de plusieurs valeurs)
- **body.border.opa** Opacité du bord (0..255 ou *LV_OPA_TRANSP*, *LV_OPA_10*, *LV_OPA_20* ··· *LV_OPA_COVER*)
- **body.shadow.color** Couleur de l' ombre
- **body.shadow.width** Largeur de l' ombre
- **body.shadow.type** Type d' ombre (*LV_SHADOW_BOTTOM/FULL*)
- **body.padding.top** Marge haute
- **body.padding.bottom** Marge basse
- **body.padding.left** Marge gauche
- **body.padding.right** Marge droite
- **body.padding.inner** Marge intérieure (entre les éléments constitutifs ou les enfants)

Propriétés de style de texte

Utilisés par les objets qui affichent du texte

- **text.color** Couleur de texte
- **text.sel_color** Couleur de texte sélectionné
- **text.font** Pointeur vers une police
- **text.opa** Opacité du texte (0..255 ou LV_OPA_TRANSP, LV_OPA_10, LV_OPA_20 ··· LV_OPA_COVER*)
- **text.letter_space** Espace de lettre
- **text.line_space** Espace de ligne

Propriétés de style d'image

Utilisé par les objets de type image ou les icônes sur les objets

- **image.color** Couleur pour la re-coloration de l'image en fonction de la luminosité des pixels
- **image.intense** Intensité de re-coloration (0..255 ou *LV_OPA_TRANSP*, *LV_OPA_10*, *LV_OPA_20* ···*LV_OPA_COVER*)
- **image.opa** Opacité de l'image (0..255 ou *LV_OPA_TRANSP*, *LV_OPA_10*, *LV_OPA_20* ··· *LV_OPA_COVER*)

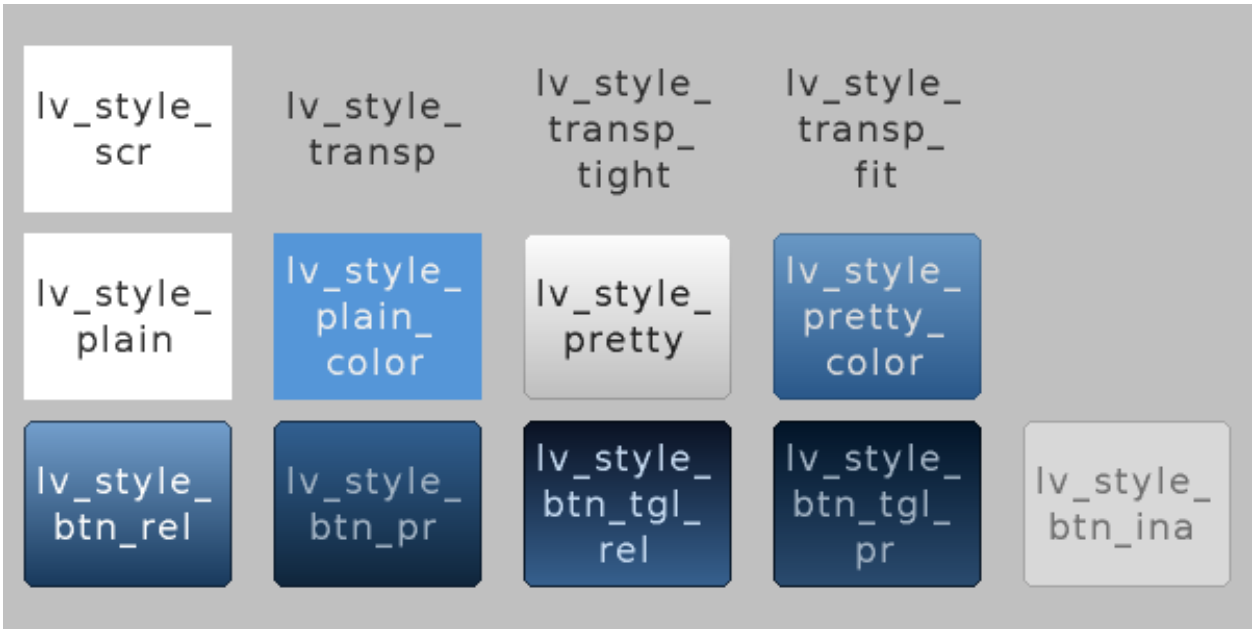
Propriétés de style de ligne

Utilisé par des objets contenant des lignes ou des éléments de type ligne

- **line.color** Couleur de ligne
- **line.width** Largeur de ligne
- **line.opa** Opacité de ligne (0..255 or *LV_OPA_TRANSP*, *LV_OPA_10*, *LV_OPA_20* ··· *LV_OPA_COVER*)

Styles intégrés

Il existe plusieurs styles intégrés dans la librairie :



Comme vous pouvez le constater, il y a des styles intégrés pour les écrans, les boutons, et les conteneurs opaques ou transparents.

Les styles `lv_style_transp`, `lv_style_transp_fit` et `lv_style_transp_tight` diffèrent uniquement par les marges : pour `lv_style_transp_tight` les marges sont nulles, pour `lv_style_transp_fit` seules les marges horizontales et verticales sont nulles mais il y a une marge intérieure.

Important: Les styles intégrés transparents ont *glass = 1* par défaut, ce qui signifie que ces styles (les couleurs, par exemple) ne seront pas hérités par les enfants.

Les styles intégrés sont des variables globales `lv_style_t`. Vous pouvez les utiliser ainsi :

```
lv_btn_set_style(obj, LV_BTN_STYLE_REL, &lv_style_btn_rel)
```

Créer de nouveaux styles

Vous pouvez modifier les styles intégrés ou en créer de nouveaux.

Lors de la création de nouveaux styles, il est recommandé de copier d'abord un style intégré avec `lv_style_copy(&dest_style, &src_style)` pour s'assurer que tous les champs sont initialisés avec une valeur appropriée.

N'oubliez pas d'initialiser le nouveau style comme `statique` ou `global`. Par exemple :

```
static lv_style_t my_red_style;
lv_style_copy(&my_red_style, &lv_style_plain);
my_red_style.body.main_color = LV_COLOR_RED;
my_red_style.body.grad_color = LV_COLOR_RED;
```

Animations de style

You can change the styles with animations using `lv_style_anim_...()` function. The `lv_style_anim_set_styles()` uses 3 styles. Two styles are required to represent the *start* and *end* state, and a third style required for the *animation*.

Here is an example to show how it works.

```
lv_anim_t a;
lv_style_anim_init(&a);                                                    /*␣
↪Initialisation de base */
lv_style_anim_set_styles(&a, &style_to_anim, &style_start, &style_end); /* Définit␣
↪les styles à utiliser */
lv_style_anim_set_time(&a, duration, delay);                             /* Définit la␣
↪durée et le délai */
lv_style_anim_create(&a);                                                 /* Crée l
↪'animation */
```

Essentially, `style_start` and `style_end` remain unchanged, and `style_to_anim` is interpolated over the course of the animation.

See `lv_core/lv_style.h` to know the whole API of style animations.

Check *Animations* for more information.

Exemple de style

L'exemple ci-dessous illustre l'utilisation des styles.

```
/* Crée un style */
static lv_style_t style1;
lv_style_copy(&style1, &lv_style_plain);    /* Copie un style intégré pour␣
↪initialiser le nouveau style */
style1.body.main_color = LV_COLOR_WHITE;
style1.body.grad_color = LV_COLOR_BLUE;
style1.body.radius = 10;
style1.body.border.color = LV_COLOR_GRAY;
style1.body.border.width = 2;
style1.body.border.opa = LV_OPA_50;
style1.body.padding.left = 5;            /* Marge horizontale, utilisée par l
↪'indicateur de barre ci-dessous */
style1.body.padding.right = 5;
style1.body.padding.top = 5;            /* Marge verticale, utilisée par l'indicateur␣
↪de barre ci-dessous */
```

(continues on next page)

(continued from previous page)

```
style1.body.padding.bottom = 5;
style1.text.color = LV_COLOR_RED;

/* Crée un simple objet */
lv_obj_t *obj1 = lv_obj_create(lv_scr_act(), NULL);
lv_obj_set_style(obj1, &style1);                          /* Applique le style créé */
lv_obj_set_pos(obj1, 20, 20);                             /* Définit la position */

/* Crée une étiquette sur l'objet. Le style de l'étiquette est NULL par défaut */
lv_obj_t *label = lv_label_create(obj1, NULL);
lv_obj_align(label, NULL, LV_ALIGN_CENTER, 0, 0);       /* Aligne l'étiquette au␣
↪milieu */

/* Crée une barre */
lv_obj_t *bar1 = lv_bar_create(lv_scr_act(), NULL);
lv_bar_set_style(bar1, LV_BAR_STYLE_INDIC, &style1);    /* Modifie le style de l
↪'indicateur */
lv_bar_set_value(bar1, 70);                               /* Définit la valeur de la␣
↪barre */
```

Thèmes

Creating styles for the GUI is challenging because you need a deeper understanding of the library, and you need to have some design skills. Also, it takes a lot of time to create so many styles for many different objects.

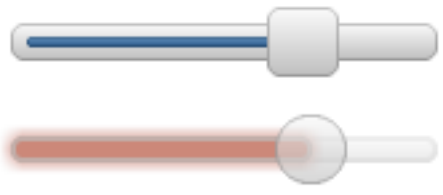
Themes are introduced to speed up the design part. A theme is a style collection which contains the required styles for every object type. For example, 5 styles for a button to describe its 5 possible states. Check the Existing themes or try some in the Live demo section. The theme selector demo is useful to see how a given theme and color hue looks on the display.

To be more specific, a theme is a structure variable that contains a lot of `lv_style_t *` fields. For buttons:

```
theme.btn.rel       /* Style de bouton relâché */
theme.btn.pr        /* Style de bouton pressé */
theme.btn.tgl_rel   /* Style de bouton bascule relâché */
theme.btn.tgl_pr    /* Style de bouton bascule pressé */
theme.btn.ina       /* Style de bouton inactif */
```

Un thème peut être initialisé par : `lv_theme_<nom>_init(hue, font)`. Où `hue` est une valeur de teinte de l'[espace colorimétrique HSV] (https://en.wikipedia.org/wiki/Hue) (0..360) et `font` est la police appliquée dans le thème (`NULL` utilise `LV_FONT_DEFAULT`)

Quand un thème est initialisé, ses styles peuvent être utilisés comme ceci :



```
/* Crée un curseur par défaut */
lv_obj_t *slider = lv_slider_create(lv_scr_act(), NULL);
lv_slider_set_value(slider, 70);
lv_obj_set_pos(slider, 10, 10);

/* Initialise le thème alien avec une teinte rouge */
lv_theme_t *th = lv_theme_alien_init(10, NULL);

/* Crée un nouveau curseur et applique les styles du thèmes */
slider = lv_slider_create(lv_scr_act(), NULL);
lv_slider_set_value(slider, 70);
lv_obj_set_pos(slider, 10, 50);
lv_slider_set_style(slider, LV_SLIDER_STYLE_BG, th->slider.bg);
lv_slider_set_style(slider, LV_SLIDER_STYLE_INDIC, th->slider.indic);
lv_slider_set_style(slider, LV_SLIDER_STYLE_KNOB, th->slider.knob);
```

You can ask the library to automatically apply the styles from a theme when you create new objects. To do this use `lv_theme_set_current(th)`.

```
/* Initialise le thème alien avec une teinte rouge */
lv_theme_t *th = lv_theme_alien_init(10, NULL);
lv_theme_set_current(th);

/* Crée un curseur. Il utilisera le style du thème actuel. */
slider = lv_slider_create(lv_scr_act(), NULL);
```

Themes can be enabled or disabled one by one in `lv_conf.h`.

Mise à jour automatique

By default, if `lv_theme_set_current(th)` is called again, it won't refresh the styles of the existing objects. To enable live update of themes, enable `LV_THEME_LIVE_UPDATE` in `lv_conf.h`.

Live update will only update objects using the unchanged theme styles, i.e. objects created after the first call of `lv_theme_set_current(th)` or to which the theme's styles were applied manually.

Périphériques d'entrée

Un périphérique d'entrée signifie généralement :

- Périphérique de type pointeur tel que pavé tactile ou souris
- Claviers, normal ou simple pavé numérique
- Encodeurs avec mouvement rotatif à gauche / droite et bouton
- Boutons matériels externes affectés à des points spécifiques de l'écran

---

Important: Avant de poursuivre votre lecture, veuillez lire la section [Portage](/porting/indev) sur les périphériques d'entrée

---

Pointeurs

Les périphériques d'entrée de type pointeur peuvent avoir un curseur (typiquement pour les souris).

```
...
lv_indev_t * mouse_indev = lv_indev_drv_register(&indev_drv);

LV_IMG_DECLARE(mouse_cursor_icon);                          /* Declare le fichier de l
↪'image. */
lv_obj_t * cursor_obj =  lv_img_create(lv_scr_act(), NULL); /* Crée un objet image␣
↪pour le curseur */
lv_img_set_src(cursor_obj, &mouse_cursor_icon);             /* Définit la source de l
↪'image */
lv_indev_set_cursor(mouse_indev, cursor_obj);               /* Connecte l'objet image␣
↪au pilote */
```

Notez que l'objet curseur devrait avoir `lv_obj_set_click(cursor_obj, false)`. Pour les images *cliquer* est désactivé par défaut.

Clavier et encodeur

Vous pouvez contrôler entièrement l'interface utilisateur sans pavé tactile ou souris à l'aide d'un clavier ou d'un ou plusieurs encodeurs. Cela fonctionne de manière similaire à la touche *TAB* sur un PC pour sélectionner l'élément dans une application ou une page Web.

Groupes

Les objets que vous souhaitez contrôler avec un clavier ou un encodeur doivent être ajoutés à un *groupe*. Dans chaque groupe, il y a exactement un seul objet focalisé qui reçoit les notifications de touche pressée ou les actions de l'encodeur. Par exemple, si une *Zone de texte* est sélectionnée et que vous appuyez sur une lettre d'un clavier, les codes sont envoyés et traités par la zone de texte. De la même manière, si un *Curseur* est sélectionné et que vous appuyez sur les flèches gauche ou droite, la valeur du curseur sera modifiée.

Vous devez associer un périphérique d'entrée à un groupe. Un périphérique d'entrée peut envoyer les codes à un seul groupe, mais un groupe peut recevoir des données de plusieurs périphériques d'entrée.

Pour créer un groupe, utilisez `lv_group_t * g = lv_group_create()` et pour ajouter un objet au groupe, utilisez `lv_group_add_obj(g, obj)`.

Pour associer un groupe à un périphérique d'entrée, utilisez `lv_indev_set_group(indev, g)`, où `indev` est la valeur de retour de `lv_indev_drv_register()`

Codes

Certains codes prédéfinis ont une signification particulière :

- **LV_KEY_NEXT** Sélectionne l'objet suivant
- **LV_KEY_PREV** Sélectionne l'objet précédant
- **LV_KEY_ENTER** Génère les événements `LV_EVENT_PRESSED/CLICKED/LONG_PRESSED` etc
- **LV_KEY_UP** Augmente la valeur ou se déplace vers le haut
- **LV_KEY_DOWN** Diminue la valeur ou se déplace vers le bas
- **LV_KEY_RIGHT** Augmente la valeur ou se déplace vers la droite
- **LV_KEY_LEFT** Diminue la valeur ou se déplace vers la gauche
- **LV_KEY_ESC** Ferme ou quitte (p.ex. ferme une *Liste déroulante*)

- **LV_KEY_DEL** Supprime (p.ex. le caractère à droite dans une *Zone de texte*)
- **LV_KEY_BACKSPACE** Supprime le caractère à gauche (p.ex. dans une *Zone de texte*)
- **LV_KEY_HOME** Se déplace au début ou en haut (p.ex. dans une *Zone de texte*)
- **LV_KEY_END** Se déplace à la fin (p.ex. dans une *Zone de texte*)

Les codes spéciaux les plus importants sont : `LV_KEY_NEXT/PREV`, `LV_KEY_ENTER` et `LV_KEY_UP/DOWN/LEFT/RIGHT`. Dans votre fonction `read_cb`, vous devez traduire certaines de vos codes en ces codes spéciaux pour naviguer dans le groupe et interagir avec l'objet sélectionné.

Habituellement, il suffit d'utiliser uniquement `LV_KEY_LEFT/RIGHT` car la plupart des objets peuvent être entièrement contrôlés avec eux.

Avec un encodeur, vous devez utiliser uniquement `LV_KEY_LEFT`, `LV_KEY_RIGHT` et `LV_KEY_ENTER`.

Edition et navigation

Comme les claviers disposent de nombreuses touches, il est facile de naviguer entre les objets et de les éditer. Cependant, les encodeurs ont un nombre très limité de "touches" ce qui rend la navigation difficile pas défaut. Les modes *navigation* et *édition* sont créés afin de résoudre ce problème avec les encodeurs, .

En mode *navigation*, les `LV_KEY_LEFT/RIGHT` des encodeurs sont traduits en `LV_KEY_NEXT/PREV`. Par conséquent, l'objet suivant ou précédent sera sélectionné en tournant l'encodeur. Un appui sur `LV_KEY_ENTER` passera en mode *édition*.

En mode *édition*, `LV_KEY_NEXT/PREV` sont utilisés normalement pour éditer l'objet. En fonction du type d'objet, une pression courte ou longue de `LV_KEY_ENTER` repasse en mode *navigation*. Généralement, un objet sur lequel vous ne pouvez pas appuyer (comme un *Curseur*) quitte le mode *édition* en cas de clic bref, mais avec un objet pour lequel un clic court a une signification (par exemple, *Bouton*) un appui long est requis.

Styliser l'objet sélectionné

Pour mettre en évidence visuellement l'élément sélectionné, son [Style principal] (/overview/style#utiliser-les-styles) sera mis à jour. Par défaut, de l'orange est mélangé aux couleurs d'origine du style. Une fonction de rappel pour modifier le style est définie par `lv_group_set_style_mod_cb(g, my_style_mod_cb)`. Cette fonction reçoit un pointeur sur un groupe d'objet et un style à modifier. Le modificateur de style par défaut ressemble à ceci (légèrement simplifié) :

```
static void default_style_mod_cb(lv_group_t * group, lv_style_t * style)
{
    /* Rend les corps un peu orange */
    style->body.border.opa = LV_OPA_COVER;
    style->body.border.color = LV_COLOR_ORANGE;
    style->body.border.width = LV_DPI / 20;

    style->body.main_color   = lv_color_mix(style->body.main_color, LV_COLOR_ORANGE,␣
↪LV_OPA_70);
    style->body.grad_color   = lv_color_mix(style->body.grad_color, LV_COLOR_ORANGE,␣
↪LV_OPA_70);
    style->body.shadow.color = lv_color_mix(style->body.shadow.color, LV_COLOR_ORANGE,
↪ LV_OPA_60);

    /* Recolore le texte*/
    style->text.color = lv_color_mix(style->text.color, LV_COLOR_ORANGE, LV_OPA_70);
```

(continues on next page)

(continued from previous page)

```
    /* Colorise les images */
    if(style->image.intense < LV_OPA_MIN) {
        style->image.color = LV_COLOR_ORANGE;
        style->image.intense = LV_OPA_40;
    }
}
```

Cette fonction de rappel modificateur de style est utilisée pour les claviers et encodeurs en mode *navigation*. En mode *édition*, une autre fonction de rappel est utilisée qui peut être définie avec `lv_group_set_style_mod_edit_cb()`. Par défaut, il utilise la couleur verte.

Démonstration en ligne

Essayez cette Démonstration en ligne pour voir comment une navigation de groupe sans pavé tactile fonctionne dans la pratique.

API

Périphérique d' entrée

Functions

void **lv_indev_init**(void)
Initialize the display input device subsystem

void **lv_indev_read_task**(*lv_task_t* **task*)
Called periodically to read the input devices

Parameters

- `task`: pointer to the task itself

lv_indev_t ***lv_indev_get_act**(void)
Get the currently processed input device. Can be used in action functions too.

Return pointer to the currently processed input device or NULL if no input device processing right now

lv_indev_type_t **lv_indev_get_type**(**const** *lv_indev_t* **indev*)
Get the type of an input device

Return the type of the input device from `lv_hal_indev_type_t` (`LV_INDEV_TYPE_...`)

Parameters

- `indev`: pointer to an input device

void **lv_indev_reset**(*lv_indev_t* **indev*)
Reset one or all input devices

Parameters

- `indev`: pointer to an input device to reset or NULL to reset all of them

void **lv_indev_reset_long_press**(*lv_indev_t* **indev*)
Reset the long press state of an input device

Parameters

- `indev_proc`: pointer to an input device

void **lv_indev_enable**(*lv_indev_t* **indev*, bool *en*)
Enable or disable an input devices

Parameters

- `indev`: pointer to an input device
- `en`: true: enable; false: disable

void **lv_indev_set_cursor**(*lv_indev_t* **indev*, *lv_obj_t* **cur_obj*)
Set a cursor for a pointer input device (for LV_INPUT_TYPE_POINTER and LV_INPUT_TYPE_BUTTON)

Parameters

- `indev`: pointer to an input device
- `cur_obj`: pointer to an object to be used as cursor

void **lv_indev_set_group**(*lv_indev_t* **indev*, *lv_group_t* **group*)
Set a destination group for a keypad input device (for LV_INDEV_TYPE_KEYPAD)

Parameters

- `indev`: pointer to an input device
- `group`: point to a group

void **lv_indev_set_button_points**(*lv_indev_t* **indev*, **const** lv_point_t **points*)
Set the an array of points for LV_INDEV_TYPE_BUTTON. These points will be assigned to the buttons to press a specific point on the screen

Parameters

- `indev`: pointer to an input device
- `group`: point to a group

void **lv_indev_get_point**(**const** *lv_indev_t* **indev*, lv_point_t **point*)
Get the last point of an input device (for LV_INDEV_TYPE_POINTER and LV_INDEV_TYPE_BUTTON)

Parameters

- `indev`: pointer to an input device
- `point`: pointer to a point to store the result

uint32_t **lv_indev_get_key**(**const** *lv_indev_t* **indev*)
Get the last pressed key of an input device (for LV_INDEV_TYPE_KEYPAD)

Return the last pressed key (0 on error)

Parameters

- `indev`: pointer to an input device

bool **lv_indev_is_dragging**(**const** *lv_indev_t* **indev*)
Check if there is dragging with an input device or not (for LV_INDEV_TYPE_POINTER and LV_INDEV_TYPE_BUTTON)

Return true: drag is in progress

Parameters

- `indev`: pointer to an input device

void **lv_indev_get_vect**(**const** *lv_indev_t* **indev*, lv_point_t **point*)
Get the vector of dragging of an input device (for LV_INDEV_TYPE_POINTER and LV_INDEV_TYPE_BUTTON)

Parameters

- `indev`: pointer to an input device
- `point`: pointer to a point to store the vector

void **lv_indev_wait_release**(*lv_indev_t* **indev*)
Do nothing until the next release

Parameters

- `indev`: pointer to an input device

lv_task_t ***lv_indev_get_read_task**(*lv_disp_t* **indev*)
Get a pointer to the indev read task to modify its parameters with `lv_task_...` functions.

Return pointer to the indev read refresher task. (NULL on error)

Parameters

- `indev`: pointer to an inout device

lv_obj_t ***lv_indev_get_obj_act**(void)
Gets a pointer to the currently active object in indev proc functions. NULL if no object is currently being handled or if groups aren't used.

Return pointer to currently active object

Groupes

Typedefs

typedef uint8_t **lv_key_t**

typedef void (***lv_group_style_mod_cb_t**)(**struct** *_lv_group_t* *, lv_style_t *)

typedef void (***lv_group_focus_cb_t**)(**struct** *_lv_group_t* *)

typedef struct *_lv_group_t* **lv_group_t**
Groups can be used to logically hold objects so that they can be individually focused. They are NOT for laying out objects on a screen (try `lv_cont` for that).

typedef uint8_t **lv_group_refocus_policy_t**

Enums

enum [anonymous]
Values:

LV_KEY_UP = 17

LV_KEY_DOWN = 18

LV_KEY_RIGHT = 19

LV_KEY_LEFT = 20

LV_KEY_ESC = 27

LV_KEY_DEL = 127

LV_KEY_BACKSPACE = 8

LV_KEY_ENTER = 10

LV_KEY_NEXT = 9

LV_KEY_PREV = 11

LV_KEY_HOME = 2

LV_KEY_END = 3

enum [anonymous]
Values:

LV_GROUP_REFOCUS_POLICY_NEXT = 0

LV_GROUP_REFOCUS_POLICY_PREV = 1

Functions

void **lv_group_init**(void)
Init. the group module

Remark Internal function, do not call directly.

lv_group_t ***lv_group_create**(void)
Create a new object group

Return pointer to the new object group

void **lv_group_del**(*lv_group_t* **group*)
Delete a group object

Parameters

- `group`: pointer to a group

void **lv_group_add_obj**(*lv_group_t* **group*, *lv_obj_t* **obj*)
Add an object to a group

Parameters

- `group`: pointer to a group
- `obj`: pointer to an object to add

void **lv_group_remove_obj**(*lv_obj_t* **obj*)
Remove an object from its group

Parameters

- `obj`: pointer to an object to remove

void **lv_group_remove_all_objs**(*lv_group_t* **group*)
Remove all objects from a group

Parameters

- `group`: pointer to a group

void **lv_group_focus_obj**(*lv_obj_t* **obj*)
Focus on an object (defocus the current)

Parameters

- `obj`: pointer to an object to focus on

void **lv_group_focus_next**(*lv_group_t* **group*)
Focus the next object in a group (defocus the current)

Parameters

- `group`: pointer to a group

void **lv_group_focus_prev**(*lv_group_t* **group*)
Focus the previous object in a group (defocus the current)

Parameters

- `group`: pointer to a group

void **lv_group_focus_freeze**(*lv_group_t* **group*, bool *en*)
Do not let to change the focus from the current object

Parameters

- `group`: pointer to a group
- `en`: true: freeze, false: release freezing (normal mode)

lv_res_t **lv_group_send_data**(*lv_group_t* **group*, uint32_t *c*)
Send a control character to the focuses object of a group

Return result of focused object in group.

Parameters

- `group`: pointer to a group
- `c`: a character (use LV_KEY_.. to navigate)

void **lv_group_set_style_mod_cb**(*lv_group_t* **group*, *lv_group_style_mod_cb_t* *style_mod_cb*)
Set a function for a group which will modify the object's style if it is in focus

Parameters

- `group`: pointer to a group
- `style_mod_cb`: the style modifier function pointer

void **lv_group_set_style_mod_edit_cb**(*lv_group_t* **group*, *lv_group_style_mod_cb_t* *style_mod_edit_cb*)
Set a function for a group which will modify the object's style if it is in focus in edit mode

Parameters

- `group`: pointer to a group
- `style_mod_edit_cb`: the style modifier function pointer

void **lv_group_set_focus_cb**(*lv_group_t* **group*, *lv_group_focus_cb_t* *focus_cb*)
Set a function for a group which will be called when a new object is focused

Parameters

- `group`: pointer to a group
- `focus_cb`: the call back function or NULL if unused

void **lv_group_set_refocus_policy**(*lv_group_t* **group*, *lv_group_refocus_policy_t* *policy*)
Set whether the next or previous item in a group is focused if the currently focussed obj is deleted.

Parameters

- `group`: pointer to a group
- `new`: refocus policy enum

void **lv_group_set_editing**(*lv_group_t* *group, bool *edit*)
Manually set the current mode (edit or navigate).

Parameters

- `group`: pointer to group
- `edit`: true: edit mode; false: navigate mode

void **lv_group_set_click_focus**(*lv_group_t* *group, bool *en*)
Set the `click_focus` attribute. If enabled then the object will be focused then it is clicked.

Parameters

- `group`: pointer to group
- `en`: true: enable `click_focus`

void **lv_group_set_wrap**(*lv_group_t* *group, bool *en*)
Set whether focus next/prev will allow wrapping from first->last or last->first object.

Parameters

- `group`: pointer to group
- `en`: true: wrapping enabled; false: wrapping disabled

lv_style_t ***lv_group_mod_style**(*lv_group_t* *group, **const** lv_style_t *style*)
Modify a style with the set 'style_mod' function. The input style remains unchanged.

Return a copy of the input style but modified with the 'style_mod' function

Parameters

- `group`: pointer to group
- `style`: pointer to a style to modify

lv_obj_t ***lv_group_get_focused**(**const** *lv_group_t* *group)
Get the focused object or NULL if there isn't one

Return pointer to the focused object

Parameters

- `group`: pointer to a group

lv_group_user_data_t ***lv_group_get_user_data**(*lv_group_t* *group)
Get a pointer to the group's user data

Return pointer to the user data

Parameters

- `group`: pointer to an group

lv_group_style_mod_cb_t **lv_group_get_style_mod_cb**(**const** *lv_group_t* *group)
Get a the style modifier function of a group

Return pointer to the style modifier function

Parameters

- `group`: pointer to a group

lv_group_style_mod_cb_t **lv_group_get_style_mod_edit_cb(const** *lv_group_t *group*)
Get a the style modifier function of a group in edit mode

Return pointer to the style modifier function

Parameters

- `group`: pointer to a group

lv_group_focus_cb_t **lv_group_get_focus_cb(const** *lv_group_t *group*)
Get the focus callback function of a group

Return the call back function or NULL if not set

Parameters

- `group`: pointer to a group

bool **lv_group_get_editing(const** *lv_group_t *group*)
Get the current mode (edit or navigate).

Return true: edit mode; false: navigate mode

Parameters

- `group`: pointer to group

bool **lv_group_get_click_focus(const** *lv_group_t *group*)
Get the `click_focus` attribute.

Return true: `click_focus` is enabled; false: disabled

Parameters

- `group`: pointer to group

bool **lv_group_get_wrap(***lv_group_t *group*)
Get whether focus next/prev will allow wrapping from first->last or last->first object.

Parameters

- `group`: pointer to group
- `en`: true: wrapping enabled; false: wrapping disabled

void **lv_group_report_style_mod(***lv_group_t *group*)
Notify the group that current theme changed and style modification callbacks need to be refreshed.

Parameters

- `group`: pointer to group. If NULL then all groups are notified.

struct _lv_group_t
#include <lv_group.h> Groups can be used to logically hold objects so that they can be individually focused. They are NOT for laying out objects on a screen (try `lv_cont` for that).

Public Members

lv_ll_t **obj_ll**
Linked list to store the objects in the group

lv_obj_t ****obj_focus**
The object in focus

lv_group_style_mod_cb_t **style_mod_cb**
A function to modifies the style of the focused object

lv_group_style_mod_cb_t **style_mod_edit_cb**
A function which modifies the style of the edited object

lv_group_focus_cb_t **focus_cb**
A function to call when a new object is focused (optional)

lv_style_t **style_tmp**
Stores the modified style of the focused object

lv_group_user_data_t **user_data**

uint8_t **frozen**
1: can't focus to new object

uint8_t **editing**
1: Edit mode, 0: Navigate mode

uint8_t **click_focus**
1: If an object in a group is clicked by an indev then it will be focused

uint8_t **refocus_policy**
1: Focus prev if focused on deletion. 0: Focus next if focused on deletion.

uint8_t **wrap**
1: Focus next/prev can wrap at end of list. 0: Focus next/prev stops at end of list.

Affichage

Important: The basic concept of *display* in LittlevGL is explained in the [Porting](/porting/display) section. So before reading further, please read the [Porting](/porting/display) section first.

In LittlevGL, you can have multiple displays, each with their own driver and objects.

Creating more displays is easy: just initialize more display buffers and register another driver for every display. When you create the UI, use `lv_disp_set_default(disp)` to tell the library which display to create objects on.

Why would you want multi-display support? Here are some examples:

- Have a "normal" TFT display with local UI and create "virtual" screens on VNC on demand. (You need to add your VNC driver).
- Avoir un grand écran TFT et un petit écran monochrome.
- Have some smaller and simple displays in a large instrument or technology.
- Have two large TFT displays: one for a customer and one for the shop assistant.

Utiliser un seul affichage

Using more displays can be useful, but in most cases, it's not required. Therefore, the whole concept of multi-display is completely hidden if you register only one display. By default, the lastly created (the only one) display is used as default.

`lv_scr_act()`, `lv_scr_load(scr)`, `lv_layer_top()`, `lv_layer_sys()`, `LV_HOR_RES` et `LV_VER_RES` sont toujours appliqués sur l'affichage créé en dernier (par défaut). If you pass

`NULL` as `disp` parameter to display related function, usually the default display will be used. P.ex. `lv_disp_trig_activity(NULL)` déclenchera une activité utilisateur sur l'affichage par défaut (voir ci-dessous dans *Inactivité*).

Affichage miroir

To mirror the image of the display to another display, you don't need to use the multi-display support. Just transfer the buffer received in `drv.flush_cb` to another display too.

Division d'image

You can create a larger display from smaller ones. You can create it as below:

1. Set the resolution of the displays to the large display's resolution.
2. In `drv.flush_cb`, truncate and modify the `area` parameter for each display.
3. Send the buffer's content to each display with the truncated area.

Ecrans

Every display has each set of Screens and the object on the screens.

Be sure not to confuse displays and screens:

- **Displays** are the physical hardware drawing the pixels.
- **Screens** are the high-level root objects associated with a particular display. One display can have multiple screens associated with it, but not vice versa.

Screens can be considered the highest level containers which have no parent. The screen's size is always equal to its display and size their position is (0;0). Therefore, the screens coordinates can't be changed, i.e. `lv_obj_set_pos()`, `lv_obj_set_size()` or similar functions can't be used on screens.

A screen can be created from any object type but, the two most typical types are the *Base object* and the *Image* (to create a wallpaper).

To create a screen, use `lv_obj_t * scr = lv_<type>_create(NULL, copy)`. `copy` can be an other screen to copy it.

To load a screen, use `lv_scr_load(scr)`. To get the active screen, use `lv_scr_act()`. These functions works on the default display. If you want to to specify which display to work on, use `lv_disp_get_scr_act(disp)` and `lv_disp_load_scr(disp, scr)`.

Screens can be deleted with `lv_obj_del(scr)`, but ensure that you do not delete the currently loaded screen.

Ecran opaque

Usually, the opacity of the screen is `LV_OPA_COVER` to provide a solid background for its children.

However, in some special cases, you might want a transparent screen. For example, if you have a video player that renders video frames on a lower layer, you want to create an OSD menu on the upper layer (over the video) using LittlevGL.

To do this, the screen should have a style that sets `body.opa` or `image.opa` to `LV_OPA_TRANSP` (or another non-opaque value) to make the screen opaque.

Also, `LV_COLOR_SCREEN_TRANSP` needs to be enabled. Please note that it only works with `LV_COLOR_DEPTH = 32`.

The Alpha channel of 32-bit colors will be 0 where there are no objects and will be 255 where there are solid objects.

Fonctionnalités des affichages

Inactivité

The user' s inactivity is measured on each display. Every use of an *Input device* (if associated with the display) counts as an activity. To get time elapsed since the last activity, use `lv_disp_get_inactive_time(disp)`. If `NULL` is passed, the overall smallest inactivity time will be returned from all displays (**not the default display**).

You can manually trigger an activity using `lv_disp_trig_activity(disp)`. If `disp` is `NULL`, the default screen will be used (**and not all displays**).

Couleurs

The color module handles all color-related functions like changing color depth, creating colors from hex code, converting between color depths, mixing colors, etc.

Les types de variable suivants sont définis par le module couleur :

- **lv_color1_t** Store monochrome color. For compatibility, it also has R, G, B fields but they are always the same value (1 byte)
- **lv_color8_t** A structure to store R (3 bit),G (3 bit),B (2 bit) components for 8-bit colors (1 byte)
- **lv_color16_t** A structure to store R (5 bit),G (6 bit),B (5 bit) components for 16-bit colors (2 byte)
- **lv_color32_t** A structure to store R (8 bit),G (8 bit), B (8 bit) components for 24-bit colors (4 byte)
- **lv_color_t** Equivaut à `lv_color1/8/16/24_t` selon le paramètre de profondeur de couleur
- **lv_color_int_t** `uint8_t`, `uint16_t` ou `uint32_t` selon le paramètre de profondeur de couleur. Utilisé pour construire des tableaux de couleurs à partir de valeurs numériques.
- **lv_opa_t** Un simple type `uint8_t` pour définir l' opacité.

Les types `lv_color_t`, `lv_color1_t`, `lv_color8_t`, `lv_color16_t` et `lv_color32_t` ont quatre champs :

- **ch.red** canal rouge
- **ch.green** canal vert
- **ch.blue** canal bleu
- **full** rouge + vert + bleu en une seule valeur

You can set the current color depth in *lv_conf.h*, by setting the `LV_COLOR_DEPTH` define to 1 (monochrome), 8, 16 or 32.

Conversion de couleur

You can convert a color from the current color depth to another. The converter functions return with a number, so you have to use the `full` field:

```
lv_color_t c;
c.red   = 0x38;
c.green = 0x70;
c.blue  = 0xCC;

lv_color1_t c1;
c1.full = lv_color_to1(c);        /* Retourne 1 pour les couleurs claires, 0 pour les␣
↪couleurs sombres */

lv_color8_t c8;
c8.full = lv_color_to8(c);        /*Give a 8 bit number with the converted color*/

lv_color16_t c16;
c16.full = lv_color_to16(c); /* Donne un nombre de 16 bits avec la couleur convertie␣
↪*/

lv_color32_t c32;
c32.full = lv_color_to32(c);        /* Donne un nombre de 32 bits avec la couleur␣
↪convertie */
```

Permutation 16 bits

You may set `LV_COLOR_16_SWAP` in *lv_conf.h* to swap the bytes of *RGB565* colors. It' s useful if you send the 16-bit colors via a byte-oriented interface like SPI.

As 16-bit numbers are stored in Little Endian format (lower byte on the lower address), the interface will send the lower byte first. However, displays usually need the higher byte first. A mismatch in the byte order will result in highly distorted colors.

Créer et mélanger les couleurs

You can create colors with the current color depth using the LV_COLOR_MAKE macro. It takes 3 arguments (red, green, blue) as 8-bit numbers. For example to create light red color: `my_color = COLOR_MAKE(0xFF,0x80,0x80)`.

Les couleurs peuvent aussi être créées à partir de codes hexadécimaux : `my_color = lv_color_hex(0x288ACF)` ou `my_color = lv_color_hex(0x28C)`.

Mixing two colors is possible with `mixed_color = lv_color_mix(color1, color2, ratio)`. Ration can be 0..255. 0 results fully color2, 255 result fully color1.

Colors can be created with from HSV space too using `lv_color_hsv_to_rgb(hue, saturation, value)` . `hue` should be in 0..360 range, `saturation` and `value` in 0..100 range.

Opacité

To describe opacity the `lv_opa_t` type is created as a wrapper to `uint8_t`. Some defines are also introduced:

- **LV_OPA_TRANSP** Value: 0, means the opacity makes the color completely transparent
- **LV_OPA_10** Valeur : 25, signifie que la couleur est un peu couvrante
- **LV_OPA_20 ···OPA_80** viennent logiquement

- **LV_OPA_90** Value: 229, means the color near completely covers
- **LV_OPA_COVER** Value: 255, means the color completely covers

You can also use the `LV_OPA_*` defines in `lv_color_mix()` as a *ratio*.

Couleurs intégrées

The color module defines the most basic colors such as:

- #FFFFFF `LV_COLOR_WHITE`
- #000000 `LV_COLOR_BLACK`
- #808080 `LV_COLOR_GRAY`
- #c0c0c0 `LV_COLOR_SILVER`
- #ff0000 `LV_COLOR_RED`
- #800000 `LV_COLOR_MAROON`
- #00ff00 `LV_COLOR_LIME`
- #008000 `LV_COLOR_GREEN`
- #808000 `LV_COLOR_OLIVE`
- #0000ff `LV_COLOR_BLUE`
- #000080 `LV_COLOR_NAVY`
- #008080 `LV_COLOR_TEAL`
- #00ffff `LV_COLOR_CYAN`
- #00ffff `LV_COLOR_AQUA`
- #800080 `LV_COLOR_PURPLE`
- #ff00ff `LV_COLOR_MAGENTA`
- #ffa500 `LV_COLOR_ORANGE`
- #ffff00 `LV_COLOR_YELLOW`

as well as `LV_COLOR_WHITE` (fully white).

API

Affichage

Functions

lv_obj_t ***lv_disp_get_scr_act**(*lv_disp_t* **disp*)

Return with a pointer to the active screen

Return pointer to the active screen object (loaded by 'lv_scr_load()')

Parameters

- `disp`: pointer to display which active screen should be get. (NULL to use the default screen)

void **lv_disp_load_scr**(*lv_obj_t* **scr*)
Make a screen active

Parameters

- `scr`: pointer to a screen

lv_obj_t ***lv_disp_get_layer_top**(*lv_disp_t* **disp*)
Return with the top layer. (Same on every screen and it is above the normal screen layer)

Return pointer to the top layer object (transparent screen sized lv_obj)

Parameters

- `disp`: pointer to display which top layer should be get. (NULL to use the default screen)

lv_obj_t ***lv_disp_get_layer_sys**(*lv_disp_t* **disp*)
Return with the sys. layer. (Same on every screen and it is above the normal screen and the top layer)

Return pointer to the sys layer object (transparent screen sized lv_obj)

Parameters

- `disp`: pointer to display which sys. layer should be get. (NULL to use the default screen)

void **lv_disp_assign_screen**(*lv_disp_t* **disp*, *lv_obj_t* **scr*)
Assign a screen to a display.

Parameters

- `disp`: pointer to a display where to assign the screen
- `scr`: pointer to a screen object to assign

lv_task_t ***lv_disp_get_refr_task**(*lv_disp_t* **disp*)
Get a pointer to the screen refresher task to modify its parameters with `lv_task_...` functions.

Return pointer to the display refresher task. (NULL on error)

Parameters

- `disp`: pointer to a display

uint32_t **lv_disp_get_inactive_time**(**const** *lv_disp_t* **disp*)
Get elapsed time since last user activity on a display (e.g. click)

Return elapsed ticks (milliseconds) since the last activity

Parameters

- `disp`: pointer to an display (NULL to get the overall smallest inactivity)

void **lv_disp_trig_activity**(*lv_disp_t* **disp*)
Manually trigger an activity on a display

Parameters

- `disp`: pointer to an display (NULL to use the default display)

static *lv_obj_t* ***lv_scr_act**(void)
Get the active screen of the default display

Return pointer to the active screen

static *lv_obj_t* ***lv_layer_top**(void)
Get the top layer of the default display

Return pointer to the top layer

static *lv_obj_t* ***lv_layer_sys**(void)
Get the active screen of the default display

Return pointer to the sys layer

static void **lv_scr_load**(*lv_obj_t* **scr*)

Couleurs

Typedefs

typedef uint32_t **lv_color_int_t**

typedef *lv_color32_t* **lv_color_t**

typedef uint8_t **lv_opa_t**

Enums

enum [anonymous]
Opacity percentages.

Values:

LV_OPA_TRANSP = 0

LV_OPA_0 = 0

LV_OPA_10 = 25

LV_OPA_20 = 51

LV_OPA_30 = 76

LV_OPA_40 = 102

LV_OPA_50 = 127

LV_OPA_60 = 153

LV_OPA_70 = 178

LV_OPA_80 = 204

LV_OPA_90 = 229

LV_OPA_100 = 255

LV_OPA_COVER = 255

Functions

static uint8_t **lv_color_to1**(*lv_color_t color*)

static uint8_t **lv_color_to8**(*lv_color_t color*)

static uint16_t **lv_color_to16**(*lv_color_t color*)

static uint32_t **lv_color_to32**(*lv_color_t color*)

static *lv_color_t* **lv_color_mix**(*lv_color_t c1*, *lv_color_t c2*, uint8_t *mix*)

static uint8_t **lv_color_brightness**(*lv_color_t color*)
Get the brightness of a color

Return the brightness [0..255]

Parameters

- `color`: a color

static *lv_color_t* **lv_color_make**(uint8_t *r*, uint8_t *g*, uint8_t *b*)

static *lv_color_t* **lv_color_hex**(uint32_t *c*)

static *lv_color_t* **lv_color_hex3**(uint32_t *c*)

lv_color_t **lv_color_hsv_to_rgb**(uint16_t *h*, uint8_t *s*, uint8_t *v*)
Convert a HSV color to RGB

Return the given RGB color in RGB (with LV_COLOR_DEPTH depth)

Parameters

- `h`: hue [0..359]
- `s`: saturation [0..100]
- `v`: value [0..100]

lv_color_hsv_t **lv_color_rgb_to_hsv**(uint8_t *r8*, uint8_t *g8*, uint8_t *b8*)
Convert a 32-bit RGB color to HSV

Return the given RGB color in HSV

Parameters

- `r8`: 8-bit red
- `g8`: 8-bit green
- `b8`: 8-bit blue

lv_color_hsv_t **lv_color_to_hsv**(*lv_color_t color*)
Convert a color to HSV

Return the given color in HSV

Parameters

- `color`: color

union lv_color1_t

Public Members

uint8_t **blue**

uint8_t **green**

uint8_t **red**

struct *lv_color1_t*::[anonymous] **ch**

uint8_t **full**

union lv_color8_t

Public Members

uint8_t **blue**

uint8_t **green**

uint8_t **red**

struct *lv_color8_t*::[anonymous] **ch**

uint8_t **full**

union lv_color16_t

Public Members

uint16_t **blue**

uint16_t **green**

uint16_t **red**

uint16_t **green_h**

uint16_t **green_l**

struct *lv_color16_t*::[anonymous] **ch**

uint16_t **full**

union lv_color32_t

Public Members

uint8_t **blue**

uint8_t **green**

uint8_t **red**

uint8_t **alpha**

struct *lv_color32_t*::[anonymous] **ch**

uint32_t **full**

struct lv_color_hsv_t

Public Members

uint16_t **h**

uint8_t **s**

uint8_t **v**

Polices

In LittlevGL fonts are collections of bitmaps and other information required to render the images of the letters (glyph). A font is stored in a **lv_font_t** variable and can be set in style' s *text.font* field. For example:

```
my_style.text.font = &lv_font_roboto_28;  /* Définit une police plus grande */
```

The fonts have a **bpp (bits per pixel)** property. It shows how many bits are used to describe a pixel in the font. The value stored for a pixel determines the pixel' s opacity. This way, with higher *bpp*, the edges of the letter can be smoother. The possible *bpp* values are 1, 2, 4 and 8 (higher value means better quality).

The *bpp* also affects the required memory size to store the font. For example, *bpp = 4* makes the font nearly 4 times greater compared to *bpp = 1*.

Support Unicode

LittlevGL supports **UTF-8** encoded Unicode characters. You need to configure your editor to save your code/text as UTF-8 (usually this the default) and be sure that, `LV_TXT_ENC` is set to `LV_TXT_ENC_UTF8` in *lv_conf.h*. (This is the default value)

Pour le vérifier, essayez

```
lv_obj_t * label1 = lv_label_create(lv_scr_act(), NULL);
lv_label_set_text(label1, LV_SYMBOL_OK);
```

If all works well, a ✓ character should be displayed.

Polices intégrées

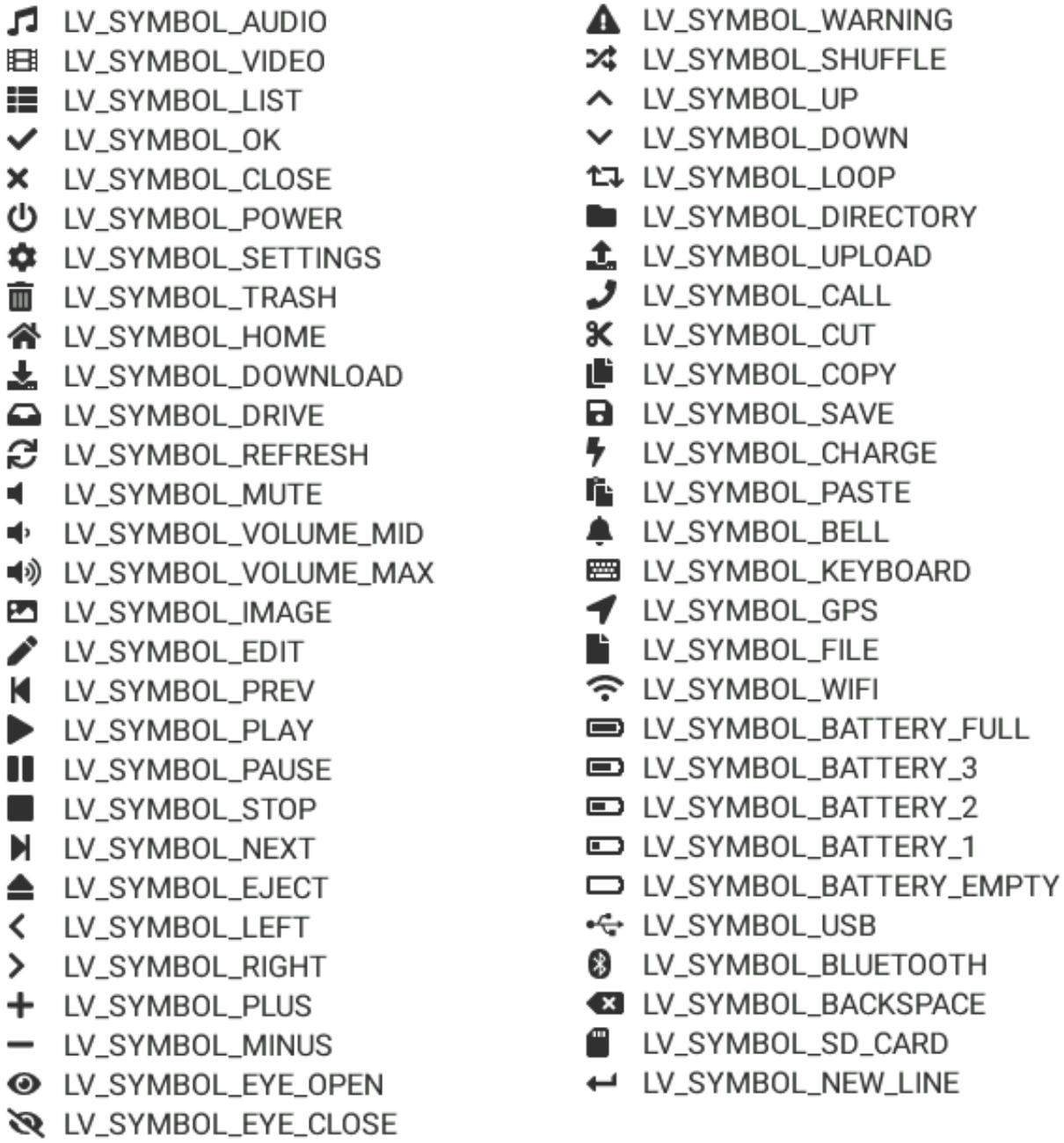
There are several built-in fonts in different sizes, which can be enabled in lv_conf.h by *LV_FONT_···* defines:

- `LV_FONT_ROBOTO_12` 12 px
- `LV_FONT_ROBOTO_16` 16 px
- `LV_FONT_ROBOTO_22` 22 px
- `LV_FONT_ROBOTO_28` 28 px

The built-in fonts are **global variables** with names like `lv_font_roboto_16` for 16 px hight font. To use them in a style, just add a pointer to a font variable like shown above.

Les polices intégrées ont *bpp = 4*, contiennent les caractères ASCII et utilisent la police Roboto.

In addition to the ASCII range, the following symbols are also added to the built-in fonts from the FontAwesome font.



Les symboles peuvent être utilisés ainsi :

```
lv_label_set_text(my_label, LV_SYMBOL_OK);
```

Ou avec des chaînes :

```
lv_label_set_text(my_label, LV_SYMBOL_OK "Apply");
```

Ou plusieurs symboles ensemble :

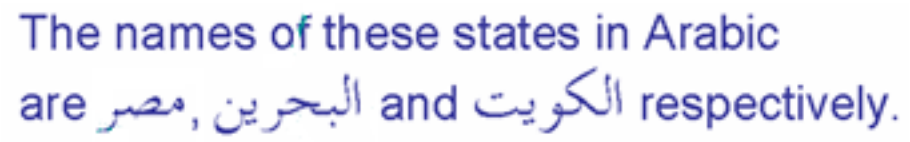
```
lv_label_set_text(my_label, LV_SYMBOL_OK LV_SYMBOL_WIFI LV_SYMBOL_PLAY);
```

Special features

Bidirectional support

Most of the languages use Left-to-Right (LTR for short) writing direction, however some languages (such as Hebrew) uses Right-to-Left (RTL for short) direction.

LittlevGL not only supports RTL texts but supports mixed (a.k.a. bidirectional, BiDi) text rendering too. Some examples:



The BiDi support can be enabled by `LV_USE_BIDI` in *lv_conf.h*

All texts have a base direction (LTR or RTL) which determines some rendering rules and the default alignment of the text (Left or Right). However, in LittlevGL, base direction is not only for labels. It' s a general property which can be set for every object. If unset then it will be inherited from the parent. So it' s enough to set the base direction of the screen and every object will inherit it.

The default base direction of screen can be set by `LV_BIDI_BASE_DIR_DEF` in *lv_conf.h*.

To set an object' s base direction use `lv_obj_set_base_dir(obj, base_dir)`. The possible base direction are:

- `LV_BIDI_DIR_LTR`: Left to Right base direction
- `LV_BIDI_DIR_RTL`: Right to Left base direction
- `LV_BIDI_DIR_AUTO`: Auto detect base direction
- `LV_BIDI_DIR_INHERIT`: Inherit the base direction from the parent (default for non-screen objects)

This list summarizes the effect of RTL base direction on objects:

- Create objects by default on the right
- `lv_tabview`: displays tabs from right to left
- `lv_cb`: Show the box on the right
- `lv_btnm`: Show buttons from right to left
- `lv_list`: Show the icon on the right
- `lv_ddlist`: Align the options to the right
- The texts in `lv_table`, `lv_btnm`, `lv_kb`, `lv_tabview`, `lv_ddlist`, `lv_roller` are processed to display correctly with RTL parts too

Subpixel rendering

Subpixel rendering means to increase the horizontal resolution by rendering on Red, Green and Blue channel instead of pixel level. It results in higher quality letter anti-alaising.

Subpixel rendering requires to generate the fonts with special settings:

- In the online converter tick the `Subpixel` box
- In the command line tool use `--lcd` flag. Note that the generated font needs about 3 times more memory.

Subpixel rendering works only if the color channels of the pixels have a horizontal layout. That is the R, G, B channels are next eachother and not above eachother. The order of color channels also needs to match with the library settings. By default the LittlevGL assumes `RGB` order, however it can ba swapped by setting `LV_SUBPX_BGR 1` in *lv_conf.h*.

Compress fonts

The bitmaps of the fonts can be compressed by

- ticking the `Compressed` check box in the online converter
- not passing `--no-compress`flag to the offline converter (applies compression by default)

The compression is more effective with larger fonts and higher bpp. However, it' s about 30% slower to render the compressed fonts. Therefore it's recommended to compress only the largest fonts of user interface, because

- they need the most memory
- they can be compressed better
- and probably they are used less frequently then the medium sized fonts. (so performance cost is smaller)

Ajouter une nouvelle police

Il y a plusieurs manières d' ajouter une nouvelle police à votre projet :

1. The simplest method is to use the Online font converter. Just set the parameters, click the *Convert* button, copy the font to your project and use it. **Be sure to carefully read the steps provided on that site or you will get an error while converting.**
2. Utilisez le [Convertisseur de polices hors ligne] (https://github.com/littlevgl/lv_font_conv) (nécessite l' installation de Node.js).
3. If you want to create something like the built-in fonts (Roboto font and symbols) but in different size and/or ranges, you can use the `built_in_font_gen.py` script in `lvgl/scripts/built_in_font` folder. (It requires Python and `lv_font_conv` to be installed)

To declare the font in a file, use `LV_FONT_DECLARE(my_font_name)`.

To make the fonts globally available (like the builtin fonts), add them to `LV_FONT_CUSTOM_DECLARE` in *lv_conf.h*.

Ajouter de nouveaux symboles

The built-in symbols are created from FontAwesome font.

1. Search symbol on https://fontawesome.com. For example the USB symbol. Copy it' s Unicode ID which is `0xf287` in this case.
2. Open the Online font converter. Add Add FontAwesome.woff. .
3. Set the parameters such as Name, Size, BPP. You' ll use this name to declare and use the font in your code.
4. Add the Unicode ID of the symbol to the range field. E.g. `0xf287` for the USB symbol. More symbols can be enumerated with `,`.
5. Convert the font and copy it to your project. Make sure to compile the .c file of your font.
6. Declare the font using `extern lv_font_t my_font_name;` or simply `LV_FONT_DECLARE(my_font_name);`.

Using the symbol

1. Convert the Unicode value to UTF8. You can do it e.g on this site. For `0xf287` the *Hex UTF-8 bytes* are `EF 8A 87`.
2. Create a `define` from the UTF8 values: `#define MY_USB_SYMBOL "\xEF\x8A\x87"`
3. Create a label and set the text. Eg. `lv_label_set_text(label, MY_USB_SYMBOL)`

Note - `lv_label_set_text(label, MY_USB_SYMBOL)` searches for this symbol in the font defined in `style.text.font` properties. To use the symbol you may need to change it. Eg `style.text.font = my_font_name`

Ajouter un nouveau moteur de polices

LittlevGL' s font interface is designed to be very flexible. You don' t need to use LittlevGL' s internal font engine but, you can add your own. For example, use FreeType to real-time render glyphs from TTF fonts or use an external flash to store the font' s bitmap and read them when the library needs them.

Pour ce faire, une variable `lv_font_t` personnalisée doit être créée :

```
/* Décrit les propriétés d'une police */
lv_font_t my_font;
my_font.get_glyph_dsc = my_get_glyph_dsc_cb;        /* Définit une fonction de rappel␣
↪pour obtenir des informations sur les glyphes */
my_font.get_glyph_bitmap = my_get_glyph_bitmap_cb;  /* Définit une fonction de rappel␣
↪pour obtenir l'image matricielle d'un glyphe */
my_font.line_height = height;                       /* La hauteur réelle de la ligne␣
↪où le texte s'inscrit */
my_font.base_line = base_line;                      /* La ligne de base mesurée à␣
↪partir du haut de la ligne */
my_font.dsc = something_required;                   /*  Enregistre ici toutes les␣
↪données spécifiques à l'implémentation */
my_font.user_data = user_data;                      /* Éventuellement des données␣
↪utilisateur supplémentaires */

...

/* Get info about glyph of `unicode_letter` in `font` font.
```

(continues on next page)

(continued from previous page)

```
 * Enregistre le résultat dans `dsc_out`.
 * La lettre suivante (`unicode_letter_next`) peut être utilisée pour calculer la␣
↪largeur requise par ce glyphe (crénage)
 */
bool my_get_glyph_dsc_cb(const lv_font_t * font, lv_font_glyph_dsc_t * dsc_out,␣
↪uint32_t unicode_letter, uint32_t unicode_letter_next)
{
    /* Votre code ici */

    /* Enregistre le résultat.
     * For example ...
     */
    dsc_out->adv_w = 12;        /* Espace horizontal requis par le glyphe en [px] */
    dsc_out->box_h = 8;         /* Hauteur de l'image en [px] */
    dsc_out->box_w = 6;         /* Largeur de l'image en [px] */
    dsc_out->ofs_x = 0;         /* Déplacement X de l'image en [px] */
    dsc_out->ofs_y = 3;         /* Déplacement Y de l'image mesuré depuis la ligne de␣
↪base */
    dsc_out->bpp   = 2;         /*Bits per pixel: 1/2/4/8*/

    return true;                /* true : glyphe trouvé; false : glyphe non trouvé */
}

/* Obtient l'image matricielle de `unicode_letter` à partir de `font`.*/
const uint8_t * my_get_glyph_bitmap_cb(const lv_font_t * font, uint32_t unicode_
↪letter)
{
    /* Votre code ici */

    /* The bitmap should be a continuous bitstream where
     * each pixel is represented by `bpp` bits */

    return bitmap;    /* Ou NULL si non trouvé */
}
```

Images

An image can be a file or variable which stores the bitmap itself and some metadata.

Enregistrer des images

Vous pouvez enregistrer des images à deux endroits

- en tant que variable en mémoire interne (MEV ou MEM)
- as a file

Variables

The images stored internally in a variable is composed mainly of an `lv_img_dsc_t` structure with the following fields:

- **header**

  - *cf* Format de couleur. Voir *ci-dessous*
  - *w* largeur en pixels (<= 2048)
  - *h* hauteur en pixels (<= 2048)
  - *always zero* 3 bits qui doivent toujours être à zéro
  - *reserved* réservé pour une utilisation future
- **data**pointeur sur un tableau où l'image elle-même est enregistrée
- **data_size** length of `data` in bytes

These are usually stored within a project as C files. They are linked into the resulting executable like any other constant data.

Fichiers

To deal with files you need to add a *Drive* to LittlevGL. In short, a *Drive* is a collection of functions (*open*, *read*, *close*, etc.) registered in LittlevGL to make file operations. You can add an interface to a standard file system (FAT32 on SD card) or you create your simple file system to read data from an SPI Flash memory. In every case, a *Drive* is just an abstraction to read and/or write data to a memory. See the *File system* section to learn more.

Images stored as files are not linked into the resulting executable, and must be read to RAM before being drawn. As a result, they are not as resource-friendly as variable images. However, they are easier to replace without needing to recompile the main program.

Formats de couleur

Divers formats de couleur intégrés sont pris en charge:

- **LV_IMG_CF_TRUE_COLOR** Simply stores the RGB colors (in whatever color depth LittlevGL is configured for).
- **LV_IMG_CF_TRUE_COLOR_ALPHA** Like `LV_IMG_CF_TRUE_COLOR` but it also adds an alpha (transparency) byte for every pixel.
- **LV_IMG_CF_TRUE_COLOR_CHROMA_KEYED** Like `LV_IMG_CF_TRUE_COLOR` but if a pixel has `LV_COLOR_TRANSP` (set in *lv_conf.h*) color the pixel will be transparent.
- **LV_IMG_CF_INDEXED_1/2/4/8BIT** Uses a palette with 2, 4, 16 or 256 colors and stores each pixel in 1, 2, 4 or 8 bits.
- **LV_IMG_CF_ALPHA_1/2/4/8BIT Only stores the Alpha value on 1, 2, 4 or 8 bits.** The pixels take the color of `style.image.color` and the set opacity. The source image has to be an alpha channel. This is ideal for bitmaps similar to fonts (where the whole image is one color but you'd like to be able to change it).

The bytes of the `LV_IMG_CF_TRUE_COLOR` images are stored in the following order.

For 32-bit color depth:

- Byte 0: Bleu
- Byte 1: Vert
- Byte 2: Rouge
- Byte 3: Alpha

For 16-bit color depth:

- Byte 0: Green 3 lower bit, Blue 5 bit
- Byte 1: Rouge 5 bits, Vert 3 bits de poids fort
- Byte 2: octet Alpha (seulement avec LV_IMG_CF_TRUE_COLOR_ALPHA)

For 8-bit color depth:

- Byte 0: Rouge 3 bits, Vert 3 bits, Bleu 2 bits
- Byte 2: octet Alpha (seulement avec LV_IMG_CF_TRUE_COLOR_ALPHA)

You can store images in a *Raw* format to indicate that, it' s not a built-in color format and an external *Image decoder* needs to be used to decode the image.

- **LV_IMG_CF_RAW** Indicates a basic raw image (e.g. a PNG or JPG image).
- **LV_IMG_CF_RAW_ALPHA** Indicates that the image has alpha and an alpha byte is added for every pixel.
- **LV_IMG_CF_RAW_CHROME_KEYED** Indicates that the image is chrome keyed as described in `LV_IMG_CF_TRUE_COLOR_CHROMA_KEYED` above.

Ajouter et utiliser des images

Vous pouvez ajouter des images à LittlevGL de deux manières :

- using the online converter
- créer manuellement des images

Convertisseur en ligne

The online Image converter is available here: https://littlevgl.com/image-to-c-array

Adding an image to LittlevGL via online converter is easy.

1. You need to select a *BMP*, *PNG* or *JPG* image first.
2. Give the image a name that will be used within LittlevGL.
3. Select the *Color format*.
4. Select the type of image you want. Choosing a binary will generate a `.bin` file that must be stored separately and read using the *file support*. Choosing a variable will generate a standard C file that can be linked into your project.
5. Hit the *Convert* button. Once the conversion is finished, your browser will automatically download the resulting file.

In the converter C arrays (variables), the bitmaps for all the color depths (1, 8, 16 or 32) are included in the C file, but only the color depth that matches `LV_COLOR_DEPTH` in *lv_conf.h* will actually be linked into the resulting executable.

In case of binary files, you need to specify the color format you want:

- RGB332 for 8-bit color depth
- RGB565 for 16-bit color depth
- RGB565 Swap for 16-bit color depth (two bytes are swapped)

- RGB888 for 32-bit color depth

Créer une image manuellement

If you are generating an image at run-time, you can craft an image variable to display it using LittlevGL. For example:

```
uint8_t my_img_data[] = {0x00, 0x01, 0x02, ...};

static lv_img_dsc_t my_img_dsc = {
    .header.always_zero = 0,
    .header.w = 80,
    .header.h = 60,
    .data_size = 80 * 60 * LV_COLOR_DEPTH / 8,
    .header.cf = LV_IMG_CF_TRUE_COLOR,          /* Définit le format de couleur */
    .data = my_img_data,
};
```

If the color format is `LV_IMG_CF_TRUE_COLOR_ALPHA` you can set `data_size` like `80 * 60 * LV_IMG_PX_SIZE_ALPHA_BYTE`.

Another (possibly simpler) option to create and display an image at run-time is to use the *Canvas* object.

Utiliser des images

The simplest way to use an image in LittlevGL is to display it with an *lv_img* object:

```
lv_obj_t * icon = lv_img_create(lv_scr_act(), NULL);

/* A partir d'une variable */
lv_img_set_src(icon, &my_icon_dsc);

/* A partir d'un fichier */
lv_img_set_src(icon, "S:my_icon.bin");
```

If the image was converted with the online converter, you should use `LV_IMG_DECLARE(my_icon_dsc)` to declare the image in the file where you want to use it.

Décodeur d' images

As you can see in the *Color formats* section, LittlevGL supports several built-in image formats. In many cases, these will be all you need. LittlevGL doesn' t directly support, however, generic image formats like PNG or JPG.

To handle non-built-in image formats, you need to use external libraries and attach them to LittlevGL via the *Image decoder* interface.

The image decoder consists of 4 callbacks:

- **info** get some basic info about the image (width, height and color format).
- **open** open the image: either store the decoded image or set it to `NULL` to indicate the image can be read line-by-line.
- **read** if *open* didn' t fully open the image this function should give some decoded data (max 1 line) from a given position.

- **close** ferme l'image ouverte, libére les ressources allouées.

You can add any number of image decoders. When an image needs to be drawn, the library will try all the registered image decoder until finding one which can open the image, i.e. knowing that format.

The `LV_IMG_CF_TRUE_COLOR_...`, `LV_IMG_INDEXED_...` and `LV_IMG_ALPHA_...` formats (essentially, all non-`RAW` formats) are understood by the built-in decoder.

Formats d'image personnalisés

The easiest way to create a custom image is to use the online image converter and set `Raw`, `Raw with alpha` or `Raw with chrome keyed` format. It will just take every byte of the binary file you uploaded and write it as the image "bitmap". You then need to attach an image decoder that will parse that bitmap and generate the real, renderable bitmap.

`header.cf` will be `LV_IMG_CF_RAW`, `LV_IMG_CF_RAW_ALPHA` or `LV_IMG_CF_RAW_CHROME_KEYED` accordingly. You should choose the correct format according to your needs: fully opaque image, use alpha channel or use chroma keying.

After decoding, the *raw* formats are considered *True color* by the library. In other words, the image decoder must decode the *Raw* images to *True color* according to the format described in [#color-formats](Color formats) section.

If you want to create a custom image, you should use `LV_IMG_CF_USER_ENCODED_0..7` color formats. However, the library can draw the images only in *True color* format (or *Raw* but finally it's supposed to be in *True color* format). So the `LV_IMG_CF_USER_ENCODED_...` formats are not known by the library, therefore, they should be decoded to one of the known formats from [#color-formats](Color formats) section. It's possible to decode the image to a non-true color format first, for example, `LV_IMG_INDEXED_4BITS`, and then call the built-in decoder functions to convert it to *True color*.

With *User encoded* formats, the color format in the open function (`dsc->header.cf`) should be changed according to the new format.

Enregistrer un décodeur d'image

Here's an example of getting LittlevGL to work with PNG images.

First, you need to create a new image decoder and set some functions to open/close the PNG files. It should looks like this:

```
/* Crée un nouveau décodeur et enregistre les fonctions */
lv_img_decoder_t * dec = lv_img_decoder_create();
lv_img_decoder_set_info_cb(dec, decoder_info);
lv_img_decoder_set_open_cb(dec, decoder_open);
lv_img_decoder_set_close_cb(dec, decoder_close);

/**
 * Obtient les informations sur une image PNG
 * @param decoder pointeur vers le décodeur auquel cette fonction appartient
 * @param src peut être un nom de fichier ou un pointeur sur un tableau C
 * @param header enregistre l'information ici
 * @returnLV_RES_OK : pas d'erreur ; LV_RES_INV : impossible d'obtenir l'information
 */
static lv_res_t decoder_info(lv_img_decoder_t * decoder, const void * src, lv_img_
↪header_t * header)
{
```

(continues on next page)

(continued from previous page)

```
  /* Vérifie si le type `src` est connu du décodeur */
  if(is_png(src) == false) return LV_RES_INV;

  /* Read the PNG header and find `width` and `height` */
  ...

  header->cf = LV_IMG_CF_RAW_ALPHA;
  header->w = width;
  header->h = height;
}

/**
 * Ouvre une image PNG et retourne l'image décodée
 * @param decoder pointeur vers le décodeur auquel cette fonction appartient
 * @param dsc pointeur sur le descripteur de cette session de décodage
 * @returnLV_RES_OK : pas d'erreur ; LV_RES_INV : impossible d'obtenir l'information
 */
static lv_res_t decoder_open(lv_img_decoder_t * decoder, lv_img_decoder_dsc_t * dsc)
{

  /* Vérifie si le type `src` est connu du décodeur */
  if(is_png(src) == false) return LV_RES_INV;

  /*Decode and store the image. If `dsc->img_data` is `NULL`, the `read_line`␣
↪function will be called to get the image data line-by-line*/
  dsc->img_data = my_png_decoder(src);

  /* Change le format de couleur si nécessaire. Pour le PNG, généralement un format
↪'brut' convient */
  dsc->header.cf = LV_IMG_CF_...

  /* Appelle une fonction de décodeur intégré si nécessaire. Ce n'est pas nécessaire␣
↪si `my_png_decoder` a décodé l'image au format couleurs vraies. */
  lv_res_t res = lv_img_decoder_built_in_open(decoder, dsc);

  return res;
}

/**
 * Décode `len` pixels à partir des coordonnées fournies `x`, `y` et enregistre-les␣
↪dans `buf`.
* Requis uniquement si la fonction "open" ne peut pas décoder l'intégralité du␣
↪tableau de pixels (dsc->img_data == NULL).
 * @param decoder pointeur vers le décodeur associé à la fonction
 * @param dsc pointeur vers le descripteur de décodeur
 * @param x coordonnée x de début
 * @param y coordonnée y de début
 * @param len nombre de pixels à décoder
 * @param buf un tampon pour enregistrer les pixels décodés
 * @return LV_RES_OK : ok ; LV_RES_INV : échec
 */
lv_res_t decoder_built_in_read_line(lv_img_decoder_t * decoder, lv_img_decoder_dsc_t␣
↪* dsc, lv_coord_t x,
                                                lv_coord_t y, lv_coord_t len, uint8_
↪t * buf)
{
```

(continues on next page)

(continued from previous page)

```
   /* Avec PNG, ce n'est généralement pas nécessaire */

   /* Copie `len` pixels à partir des coordonnées `x` et `y` au format couleurs␣
↪vraies dans `buf` */

}

/**
* Libère les ressources allouées
 * @param decoder pointeur vers le décodeur auquel cette fonction appartient
 * @param dsc pointeur sur le descripteur de cette session de décodage
 */
static void decoder_close(lv_img_decoder_t * decoder, lv_img_decoder_dsc_t * dsc)
{
 /* Libère toutes les données allouées */

  /* Appelle la fonction intégrée de fermeture si les fonctions intégrées open/read_
↪line ont été utilisées */
  lv_img_decoder_built_in_close(decoder, dsc);

}
```

Donc en résumé :

- In `decoder_info`, you should collect some basic information about the image and store it in `header`.
- In `decoder_open`, you should try to open the image source pointed by `dsc->src`. Its type is already in `dsc->src_type == LV_IMG_SRC_FILE/VARIABLE`. If this format/type is not supported by the decoder, return `LV_RES_INV`. However, if you can open the image, a pointer to the decoded *True color* image should be set in `dsc->img_data`. If the format is known but, you don't want to decode while image (e.g. no memory for it) set `dsc->img_data = NULL` to call `read_line` to get the pixels.
- Dans `decoder_close`, vous devez libérer toutes les ressources allouées.
- `decoder_read` is optional. Decoding the whole image requires extra memory and some computational overhead. However, if can decode one line of the image without decoding the whole image, you can save memory and time. To indicate that, the *line read* function should be used, set `dsc->img_data = NULL` in the open function.

Utiliser manuellement un décodeur d'image

LittlevGL will use the registered image decoder automatically if you try and draw a raw image (i.e. using the `lv_img` object) but you can use them manually too. Create a `lv_img_decoder_dsc_t` variable to describe the decoding session and call `lv_img_decoder_open()`, `lv_img_decoder_open()`.

```
lv_res_t res;
lv_img_decoder_dsc_t dsc;
res = lv_img_decoder_open(&dsc, &my_img_dsc, &lv_style_plain);

if(res == LV_RES_OK) {
  /* Faites quelque chose avec `dsc->img_data` */
  lv_img_decoder_close(&dsc);
}
```

Mise en cache des images

Sometimes it takes a lot of time to open an image. Continuously decoding a PNG image or loading images from a slow external memory would be inefficient and detrimental to the user experience.

Therefore, LittlevGL caches a given number of images. Caching means some images will be left open, hence LittlevGL can quickly access them from `dsc->img_data` instead of needing to decode them again.

Of course, caching images is resource-intensive as it uses more RAM (to store the decoded image). LittlevGL tries to optimize the process as much as possible (see below), but you will still need to evaluate if this would be beneficial for your platform or not. If you have a deeply embedded target which decodes small images from a relatively fast storage medium, image caching may not be worth it.

Taille du cache

The number of cache entries can be defined in `LV_IMG_CACHE_DEF_SIZE` in *lv_conf.h*. The default value is 1 so only the most recently used image will be left open.

The size of the cache can be changed at run-time with `lv_img_cache_set_size(entry_num)`.

Valeur des images

When you use more images than cache entries, LittlevGL can't cache all of the images. Instead, the library will close one of the cached images (to free space).

To decide which image to close, LittlevGL uses a measurement it previously made of how long it took to open the image. Cache entries that hold slower-to-open images are considered more valuable and are kept in the cache as long as possible.

If you want or need to override LittlevGL's measurement, you can manually set the *time to open* value in the decoder open function in `dsc->time_to_open = time_ms` to give a higher or lower value. (Leave it unchanged to let LittlevGL set it.)

Every cache entry has a "*life*" value. Every time an image opening happens through the cache, the *life* of all entries are decreased to make them older. When a cached image is used, its *life* is increased by the *time to open* value to make it more alive.

If there is no more space in the cache, always the entry with the smallest life will be closed.

Utilisation de la mémoire

Note that, the cached image might continuously consume memory. For example, if 3 PNG images are cached, they will consume memory while they are opened.

Therefore, it's the user's responsibility to be sure there is enough RAM to cache, even the largest images at the same time.

Nettoyer le cache

Let's say you have loaded a PNG image into a `lv_img_dsc_t my_png` variable and use it in an `lv_img` object. If the image is already cached and you then change the underlying PNG file, you need to notify LittlevGL to cache the image again. Otherwise, there is no easy way of detecting that the underlying file changed and LittlevGL will still draw the old image.

To do this, use `lv_img_cache_invalidate_src(&my_png)`. If `NULL` is passed as a parameter, the whole cache will be cleaned.

API

Décodeur d'image

Typedefs

typedef uint8_t **lv_img_src_t**

typedef uint8_t **lv_img_cf_t**

typedef lv_res_t (***lv_img_decoder_info_f_t**)(**struct** *_lv_img_decoder* *decoder, **const** void *src, *lv_img_header_t* *header)

Get info from an image and store in the `header`

Return LV_RES_OK: info written correctly; LV_RES_INV: failed

Parameters

- `src`: the image source. Can be a pointer to a C array or a file name (Use `lv_img_src_get_type` to determine the type)
- `header`: store the info here

typedef lv_res_t (***lv_img_decoder_open_f_t**)(**struct** *_lv_img_decoder* *decoder, **struct** *_lv_img_decoder_dsc* *dsc)

Open an image for decoding. Prepare it as it is required to read it later

Parameters

- `decoder`: pointer to the decoder the function associated with
- `dsc`: pointer to decoder descriptor. `src`, `style` are already initialized in it.

typedef lv_res_t (***lv_img_decoder_read_line_f_t**)(**struct** *_lv_img_decoder* *decoder, **struct** *_lv_img_decoder_dsc* *dsc, lv_coord_t x, lv_coord_t y, lv_coord_t len, uint8_t *buf)

Decode `len` pixels starting from the given `x`, `y` coordinates and store them in `buf`. Required only if the "open" function can't return with the whole decoded pixel array.

Return LV_RES_OK: ok; LV_RES_INV: failed

Parameters

- `decoder`: pointer to the decoder the function associated with
- `dsc`: pointer to decoder descriptor
- `x`: start x coordinate
- `y`: start y coordinate
- `len`: number of pixels to decode
- `buf`: a buffer to store the decoded pixels

typedef void (***lv_img_decoder_close_f_t**)(**struct** *_lv_img_decoder* *decoder, **struct** *_lv_img_decoder_dsc* *dsc)

Close the pending decoding. Free resources etc.

Parameters

- `decoder`: pointer to the decoder the function associated with
- `dsc`: pointer to decoder descriptor

typedef struct *__lv_img_decoder* **lv_img_decoder_t**

typedef struct *__lv_img_decoder_dsc* **lv_img_decoder_dsc_t**

Describe an image decoding session. Stores data about the decoding

Enums

enum [anonymous]

Source of image.

Values:

LV_IMG_SRC_VARIABLE

LV_IMG_SRC_FILE

Binary/C variable

LV_IMG_SRC_SYMBOL

File in filesystem

LV_IMG_SRC_UNKNOWN

Symbol (lv_symbol_def.h)

enum [anonymous]

Values:

LV_IMG_CF_UNKNOWN = 0

LV_IMG_CF_RAW

Contains the file as it is. Needs custom decoder function

LV_IMG_CF_RAW_ALPHA

Contains the file as it is. The image has alpha. Needs custom decoder function

LV_IMG_CF_RAW_CHROMA_KEYED

Contains the file as it is. The image is chroma keyed. Needs custom decoder function

LV_IMG_CF_TRUE_COLOR

Color format and depth should match with LV_COLOR settings

LV_IMG_CF_TRUE_COLOR_ALPHA

Same as `LV_IMG_CF_TRUE_COLOR` but every pixel has an alpha byte

LV_IMG_CF_TRUE_COLOR_CHROMA_KEYED

Same as `LV_IMG_CF_TRUE_COLOR` but LV_COLOR_TRANSP pixels will be transparent

LV_IMG_CF_INDEXED_1BIT

Can have 2 different colors in a palette (always chroma keyed)

LV_IMG_CF_INDEXED_2BIT

Can have 4 different colors in a palette (always chroma keyed)

LV_IMG_CF_INDEXED_4BIT

Can have 16 different colors in a palette (always chroma keyed)

LV_IMG_CF_INDEXED_8BIT

Can have 256 different colors in a palette (always chroma keyed)

LV_IMG_CF_ALPHA_1BIT

Can have one color and it can be drawn or not

LV_IMG_CF_ALPHA_2BIT
Can have one color but 4 different alpha value

LV_IMG_CF_ALPHA_4BIT
Can have one color but 16 different alpha value

LV_IMG_CF_ALPHA_8BIT
Can have one color but 256 different alpha value

LV_IMG_CF_RESERVED_15
Reserved for further use.

LV_IMG_CF_RESERVED_16
Reserved for further use.

LV_IMG_CF_RESERVED_17
Reserved for further use.

LV_IMG_CF_RESERVED_18
Reserved for further use.

LV_IMG_CF_RESERVED_19
Reserved for further use.

LV_IMG_CF_RESERVED_20
Reserved for further use.

LV_IMG_CF_RESERVED_21
Reserved for further use.

LV_IMG_CF_RESERVED_22
Reserved for further use.

LV_IMG_CF_RESERVED_23
Reserved for further use.

LV_IMG_CF_USER_ENCODED_0
User holder encoding format.

LV_IMG_CF_USER_ENCODED_1
User holder encoding format.

LV_IMG_CF_USER_ENCODED_2
User holder encoding format.

LV_IMG_CF_USER_ENCODED_3
User holder encoding format.

LV_IMG_CF_USER_ENCODED_4
User holder encoding format.

LV_IMG_CF_USER_ENCODED_5
User holder encoding format.

LV_IMG_CF_USER_ENCODED_6
User holder encoding format.

LV_IMG_CF_USER_ENCODED_7
User holder encoding format.

Functions

void **lv_img_decoder_init**(void)
Initialize the image decoder module

lv_res_t **lv_img_decoder_get_info**(**const** char *src, *lv_img_header_t* *header)
Get information about an image. Try the created image decoder one by one. Once one is able to get info that info will be used.

Return LV_RES_OK: success; LV_RES_INV: wasn't able to get info about the image

Parameters

- `src`: the image source. Can be 1) File name: E.g. "S:folder/img1.png" (The drivers needs to registered via `lv_fs_add_drv()`) 2) Variable: Pointer to an *`lv_img_dsc_t`* variable 3) Symbol: E.g. `LV_SYMBOL_OK`
- `header`: the image info will be stored here

lv_res_t **lv_img_decoder_open**(*lv_img_decoder_dsc_t* *dsc, **const** void *src, **const** lv_style_t *style)
Open an image. Try the created image decoder one by one. Once one is able to open the image that decoder is save in `dsc`

Return LV_RES_OK: opened the image. `dsc->img_data` and `dsc->header` are set. LV_RES_INV: none of the registered image decoders were able to open the image.

Parameters

- `dsc`: describe a decoding session. Simply a pointer to an `lv_img_decoder_dsc_t` variable.
- `src`: the image source. Can be 1) File name: E.g. "S:folder/img1.png" (The drivers needs to registered via `lv_fs_add_drv()`) 2) Variable: Pointer to an *`lv_img_dsc_t`* variable 3) Symbol: E.g. `LV_SYMBOL_OK`
- `style`: the style of the image

lv_res_t **lv_img_decoder_read_line**(*lv_img_decoder_dsc_t* *dsc, lv_coord_t *x*, lv_coord_t *y*, lv_coord_t *len*, uint8_t *buf)
Read a line from an opened image

Return LV_RES_OK: success; LV_RES_INV: an error occurred

Parameters

- `dsc`: pointer to `lv_img_decoder_dsc_t` used in `lv_img_decoder_open`
- `x`: start X coordinate (from left)
- `y`: start Y coordinate (from top)
- `len`: number of pixels to read
- `buf`: store the data here

void **lv_img_decoder_close**(*lv_img_decoder_dsc_t* *dsc)
Close a decoding session

Parameters

- `dsc`: pointer to `lv_img_decoder_dsc_t` used in `lv_img_decoder_open`

lv_img_decoder_t ***lv_img_decoder_create**(void)
Create a new image decoder

Return pointer to the new image decoder

void **lv_img_decoder_delete**(*lv_img_decoder_t* **decoder*)
Delete an image decoder

Parameters

- `decoder`: pointer to an image decoder

void **lv_img_decoder_set_info_cb**(*lv_img_decoder_t* **decoder*, *lv_img_decoder_info_f_t info_cb*)
Set a callback to get information about the image

Parameters

- `decoder`: pointer to an image decoder
- `info_cb`: a function to collect info about an image (fill an *`lv_img_header_t`* struct)

void **lv_img_decoder_set_open_cb**(*lv_img_decoder_t* **decoder*, *lv_img_decoder_open_f_t open_cb*)
Set a callback to open an image

Parameters

- `decoder`: pointer to an image decoder
- `open_cb`: a function to open an image

void **lv_img_decoder_set_read_line_cb**(*lv_img_decoder_t* **decoder*, *lv_img_decoder_read_line_f_t read_line_cb*)
Set a callback to a decoded line of an image

Parameters

- `decoder`: pointer to an image decoder
- `read_line_cb`: a function to read a line of an image

void **lv_img_decoder_set_close_cb**(*lv_img_decoder_t* **decoder*, *lv_img_decoder_close_f_t close_cb*)
Set a callback to close a decoding session. E.g. close files and free other resources.

Parameters

- `decoder`: pointer to an image decoder
- `close_cb`: a function to close a decoding session

lv_res_t **lv_img_decoder_built_in_info**(*lv_img_decoder_t* **decoder*, **const** void **src*, *lv_img_header_t* **header*)
Get info about a built-in image

Return LV_RES_OK: the info is successfully stored in `header`; LV_RES_INV: unknown format or other error.

Parameters

- `decoder`: the decoder where this function belongs
- `src`: the image source: pointer to an *`lv_img_dsc_t`* variable, a file path or a symbol
- `header`: store the image data here

lv_res_t **lv_img_decoder_built_in_open**(*lv_img_decoder_t* **decoder*, *lv_img_decoder_dsc_t* **dsc*)
Open a built in image

Return LV_RES_OK: the info is successfully stored in `header`; LV_RES_INV: unknown format or other error.

Parameters

- `decoder`: the decoder where this function belongs
- `dsc`: pointer to decoder descriptor. `src`, `style` are already initialized in it.

lv_res_t **lv_img_decoder_built_in_read_line**(*lv_img_decoder_t* *decoder, *lv_img_decoder_dsc_t* *dsc, lv_coord_t x, lv_coord_t y, lv_coord_t len, uint8_t *buf)

Decode `len` pixels starting from the given `x`, `y` coordinates and store them in `buf`. Required only if the "open" function can't return with the whole decoded pixel array.

Return LV_RES_OK: ok; LV_RES_INV: failed

Parameters

- `decoder`: pointer to the decoder the function associated with
- `dsc`: pointer to decoder descriptor
- `x`: start x coordinate
- `y`: start y coordinate
- `len`: number of pixels to decode
- `buf`: a buffer to store the decoded pixels

void **lv_img_decoder_built_in_close**(*lv_img_decoder_t* *decoder, *lv_img_decoder_dsc_t* *dsc)

Close the pending decoding. Free resources etc.

Parameters

- `decoder`: pointer to the decoder the function associated with
- `dsc`: pointer to decoder descriptor

struct lv_img_header_t

#include <lv_img_decoder.h> LittlevGL image header

Public Members

uint32_t **cf**

uint32_t **always_zero**

uint32_t **reserved**

uint32_t **w**

uint32_t **h**

struct lv_img_dsc_t

#include <lv_img_decoder.h> Image header it is compatible with the result from image converter utility

Public Members

lv_img_header_t **header**

uint32_t **data_size**

const uint8_t ***data**

struct _lv_img_decoder

Public Members

lv_img_decoder_info_f_t **info_cb**

lv_img_decoder_open_f_t **open_cb**

lv_img_decoder_read_line_f_t **read_line_cb**

lv_img_decoder_close_f_t **close_cb**

lv_img_decoder_user_data_t **user_data**

struct _lv_img_decoder_dsc

#include <lv_img_decoder.h> Describe an image decoding session. Stores data about the decoding

Public Members

lv_img_decoder_t ***decoder**
The decoder which was able to open the image source

const void ***src**
The image source. A file path like "S:my_img.png" or pointer to an *lv_img_dsc_t* variable

const lv_style_t ***style**
Style to draw the image.

lv_img_src_t **src_type**
Type of the source: file or variable. Can be set in `open` function if required

lv_img_header_t **header**
Info about the opened image: color format, size, etc. MUST be set in `open` function

const uint8_t ***img_data**
Pointer to a buffer where the image's data (pixels) are stored in a decoded, plain format. MUST be set in `open` function

uint32_t **time_to_open**
How much time did it take to open the image. [ms] If not set `lv_img_cache` will measure and set the time to open

const char ***error_msg**
A text to display instead of the image when the image can't be opened. Can be set in `open` function or set NULL.

void ***user_data**
Store any custom data here is required

Cache d' images

Functions

lv_img_cache_entry_t ***lv_img_cache_open**(**const** void **src*, **const** lv_style_t **style*)
Open an image using the image decoder interface and cache it. The image will be left open meaning if the image decoder open callback allocated memory then it will remain. The image is closed if a new image is opened and the new image takes its place in the cache.

Return pointer to the cache entry or NULL if can open the image

Parameters

- `src`: source of the image. Path to file or pointer to an *lv_img_dsc_t* variable
- `style`: style of the image

void **lv_img_cache_set_size**(uint16_t *new_slot_num*)

Set the number of images to be cached. More cached images mean more opened image at same time which might mean more memory usage. E.g. if 20 PNG or JPG images are open in the RAM they consume memory while opened in the cache.

Parameters

- `new_entry_cnt`: number of image to cache

void **lv_img_cache_invalidate_src**(**const** void **src*)

Invalidate an image source in the cache. Useful if the image source is updated therefore it needs to be cached again.

Parameters

- `src`: an image source path to a file or pointer to an *lv_img_dsc_t* variable.

struct lv_img_cache_entry_t

#include <lv_img_cache.h> When loading images from the network it can take a long time to download and decode the image.

To avoid repeating this heavy load images can be cached.

Public Members

lv_img_decoder_dsc_t **dec_dsc**

Image information

int32_t **life**

Count the cache entries' s life. Add `time_tio_open` to `life` when the entry is used. Decrement all lifes by one every in every *lv_img_cache_open*. If life == 0 the entry can be reused

Système de fichiers

LittlevGL has a 'File system' abstraction module that enables you to attach any type of file systems. The file system is identified by a drive letter. For example, if the SD card is associated with the letter `'S'`, a file can be reached like `"S:path/to/file.txt"`.

Ajouter un pilote

To add a driver, `lv_fs_drv_t` needs to be initialized like this:

```
lv_fs_drv_t drv;
lv_fs_drv_init(&drv);                     /* Initialisation de base */

drv.letter = 'S';                         /* Une lettre majuscule pour identifier le␣
↪lecteur */
drv.file_size = sizeof(my_file_object);   /* Taille requise pour enregistrer un objet␣
↪de fichier */
drv.rddir_size = sizeof(my_dir_object);   /*Size required to store a directory object␣
↪(used by dir_open/close/read)*/
```

(continues on next page)

(continued from previous page)

```
drv.ready_cb = my_ready_cb;                /* Fonction de rappel pour indiquer si le␣
↪lecteur est prêt à être utilisé */
drv.open_cb = my_open_cb;                  /* Fonction de rappel pour ouvrir un␣
↪fichier */
drv.close_cb = my_close_cb;                /* Fonction de rappel pour fermer un␣
↪fichier */
drv.read_cb = my_read_cb;                  /* Fonction de rappel pour lire un fichier␣
↪*/
drv.write_cb = my_write_cb;                /* Fonction de rappel pour écrire un␣
↪fichier */
drv.seek_cb = my_seek_cb;                  /* Fonction de rappel pour se déplacer dans␣
↪un fichier (déplacer le curseur) */
drv.tell_cb = my_tell_cb;                  /* Fonction de rappel pour donner la␣
↪position du curseur */
drv.trunc_cb = my_trunc_cb;                /* Fonction de rappel pour supprimer un␣
↪fichier */
drv.size_cb = my_size_cb;                  /* Fonction de rappel pour donner la taille␣
↪d'un fichier */
drv.rename_cb = my_size_cb;                /* Fonction de rappel pour renommer un␣
↪fichier */

drv.dir_open_cb = my_dir_open_cb;          /* Fonction de rappel pour ouvrir un␣
↪répertoire et lire son contenu */
drv.dir_read_cb = my_dir_read_cb;          /* Fonction de rappel pour lire le contenu d
↪'un répertoire */
drv.dir_close_cb = my_dir_close_cb;        /* Fonction de rappel pour fermer un␣
↪répertoire */

drv.free_space_cb = my_size_cb;            /* Fonction de rappel pour donner l'espace␣
↪libre d'un lecteur */

drv.user_data = my_user_data;              /* Toute donnée personnalisée si nécessaire␣
↪*/

lv_fs_drv_register(&drv);                  /* Finalement enregistre le lecteur */
```

Any of the callbacks can be `NULL` to indicate that that operation is not supported.

As an example of how the callbacks are used, if you use `lv_fs_open(&file, "S:/folder/file.txt", LV_FS_MODE_WR)`, LittlevGL:

1. Verifies that a registered drive exists with the letter `'S'`.
2. Checks if it' s `open_cb` is implemented (not `NULL`).
3. Calls the set `open_cb` with `"folder/file.txt"` path.

Exemple d' utilisation

L' exemple ci-dessous montre comment lire à partir d' un fichier :

```
lv_fs_file_t f;
lv_fs_res_t res;
res = lv_fs_open(&f, "S:folder/file.txt", LV_FS_MODE_RD);
if(res != LV_FS_RES_OK) my_error_handling();
```

(continues on next page)

(continued from previous page)

```
uint32_t read_num;
uint8_t buf[8];
res = lv_fs_read(&f, buf, 8, &read_num);
if(res != LV_FS_RES_OK || read_num != 8) my_error_handling();

lv_fs_close(&f);
```

Le mode dans `lv_fs_open` *peut être* `LV_FS_MODE_WR` *pour ouvrir en écriture ou* `LV_FS_MODE_RD | LV_FS_MODE_WR` *pour lecture/écriture*

This example shows how to read a directory' s content. It' s up to the driver how to mark the directories, but it can be a good practice to insert a `'/'` in front of the directory name.

```
lv_fs_dir_t dir;
lv_fs_res_t res;
res = lv_fs_dir_open(&dir, "S:/folder");
if(res != LV_FS_RES_OK) my_error_handling();

char fn[256];
while(1) {
    res = lv_fs_dir_read(&dir, fn);
    if(res != LV_FS_RES_OK) {
        my_error_handling();
        break;
    }

    /*fn is empty, if not more files to read*/
    if(strlen(fn) == 0) {
        break;
    }

    printf("%s\n", fn);
}

lv_fs_dir_close(&dir);
```

Utiliser les pilotes pour les images

Image objects can be opened from files too (besides variables stored in the flash).

To initialize the image, the following callbacks are required:

- open
- close
- read
- seek
- tell

API

Typedefs

typedef uint8_t **lv_fs_res_t**

typedef uint8_t **lv_fs_mode_t**

typedef struct *_lv_fs_drv_t* **lv_fs_drv_t**

Enums

enum [anonymous]

Errors in the filesystem module.

Values:

LV_FS_RES_OK = 0

LV_FS_RES_HW_ERR

LV_FS_RES_FS_ERR

LV_FS_RES_NOT_EX

LV_FS_RES_FULL

LV_FS_RES_LOCKED

LV_FS_RES_DENIED

LV_FS_RES_BUSY

LV_FS_RES_TOUT

LV_FS_RES_NOT_IMP

LV_FS_RES_OUT_OF_MEM

LV_FS_RES_INV_PARAM

LV_FS_RES_UNKNOWN

enum [anonymous]

Filesystem mode.

Values:

LV_FS_MODE_WR = 0x01

LV_FS_MODE_RD = 0x02

Functions

void **lv_fs_init**(void)

Initialize the File system interface

void **lv_fs_drv_init**(*lv_fs_drv_t* **drv*)

Initialize a file system driver with default values. It is used to surly have known values in the fields ant not memory junk. After it you can set the fields.

Parameters

- `drv`: pointer to driver variable to initialize

void **lv_fs_drv_register**(*lv_fs_drv_t* *drv_p)
Add a new drive

Parameters

- `drv_p`: pointer to an lv_fs_drv_t structure which is inited with the corresponding function pointers. The data will be copied so the variable can be local.

lv_fs_drv_t ***lv_fs_get_drv**(char *letter*)
Give a pointer to a driver from its letter

Return pointer to a driver or NULL if not found

Parameters

- `letter`: the driver letter

bool **lv_fs_is_ready**(char *letter*)
Test if a drive is rady or not. If the `ready` function was not initialized `true` will be returned.

Return true: drive is ready; false: drive is not ready

Parameters

- `letter`: letter of the drive

lv_fs_res_t **lv_fs_open**(*lv_fs_file_t* *file_p, **const** char *path, *lv_fs_mode_t* mode)
Open a file

Return LV_FS_RES_OK or any error from lv_fs_res_t enum

Parameters

- `file_p`: pointer to a *lv_fs_file_t* variable
- `path`: path to the file beginning with the driver letter (e.g. S:/folder/file.txt)
- `mode`: read: FS_MODE_RD, write: FS_MODE_WR, both: FS_MODE_RD | FS_MODE_WR

lv_fs_res_t **lv_fs_close**(*lv_fs_file_t* *file_p)
Close an already opened file

Return LV_FS_RES_OK or any error from lv_fs_res_t enum

Parameters

- `file_p`: pointer to a *lv_fs_file_t* variable

lv_fs_res_t **lv_fs_remove**(**const** char *path)
Delete a file

Return LV_FS_RES_OK or any error from lv_fs_res_t enum

Parameters

- `path`: path of the file to delete

lv_fs_res_t **lv_fs_read**(*lv_fs_file_t* *file_p, void *buf, uint32_t btr, uint32_t *br)
Read from a file

Return LV_FS_RES_OK or any error from lv_fs_res_t enum

Parameters

- `file_p`: pointer to a *lv_fs_file_t* variable
- `buf`: pointer to a buffer where the read bytes are stored

- `btr`: Bytes To Read
- `br`: the number of real read bytes (Bytes Read). NULL if unused.

lv_fs_res_t **lv_fs_write**(*lv_fs_file_t* **file_p*, **const** void **buf*, uint32_t *btw*, uint32_t **bw*)
Write into a file

Return LV_FS_RES_OK or any error from lv_fs_res_t enum

Parameters

- `file_p`: pointer to a *lv_fs_file_t* variable
- `buf`: pointer to a buffer with the bytes to write
- `btr`: Bytes To Write
- `br`: the number of real written bytes (Bytes Written). NULL if unused.

lv_fs_res_t **lv_fs_seek**(*lv_fs_file_t* **file_p*, uint32_t *pos*)
Set the position of the 'cursor' (read write pointer) in a file

Return LV_FS_RES_OK or any error from lv_fs_res_t enum

Parameters

- `file_p`: pointer to a *lv_fs_file_t* variable
- `pos`: the new position expressed in bytes index (0: start of file)

lv_fs_res_t **lv_fs_tell**(*lv_fs_file_t* **file_p*, uint32_t **pos*)
Give the position of the read write pointer

Return LV_FS_RES_OK or any error from 'fs_res_t'

Parameters

- `file_p`: pointer to a *lv_fs_file_t* variable
- `pos_p`: pointer to store the position of the read write pointer

lv_fs_res_t **lv_fs_trunc**(*lv_fs_file_t* **file_p*)
Truncate the file size to the current position of the read write pointer

Return LV_FS_RES_OK: no error, the file is read any error from lv_fs_res_t enum

Parameters

- `file_p`: pointer to an 'ufs_file_t' variable. (opened with lv_fs_open)

lv_fs_res_t **lv_fs_size**(*lv_fs_file_t* **file_p*, uint32_t **size*)
Give the size of a file bytes

Return LV_FS_RES_OK or any error from lv_fs_res_t enum

Parameters

- `file_p`: pointer to a *lv_fs_file_t* variable
- `size`: pointer to a variable to store the size

lv_fs_res_t **lv_fs_rename**(**const** char **oldname*, **const** char **newname*)
Rename a file

Return LV_FS_RES_OK or any error from 'fs_res_t'

Parameters

- `oldname`: path to the file

- `newname`: path with the new name

lv_fs_res_t **lv_fs_dir_open**(*lv_fs_dir_t* **rddir_p*, **const** char **path*)
Initialize a 'fs_dir_t' variable for directory reading

Return LV_FS_RES_OK or any error from lv_fs_res_t enum

Parameters

- `rddir_p`: pointer to a 'fs_read_dir_t' variable
- `path`: path to a directory

lv_fs_res_t **lv_fs_dir_read**(*lv_fs_dir_t* **rddir_p*, char **fn*)
Read the next filename form a directory. The name of the directories will begin with '/'

Return LV_FS_RES_OK or any error from lv_fs_res_t enum

Parameters

- `rddir_p`: pointer to an initialized 'fs_rdir_t' variable
- `fn`: pointer to a buffer to store the filename

lv_fs_res_t **lv_fs_dir_close**(*lv_fs_dir_t* **rddir_p*)
Close the directory reading

Return LV_FS_RES_OK or any error from lv_fs_res_t enum

Parameters

- `rddir_p`: pointer to an initialized 'fs_dir_t' variable

lv_fs_res_t **lv_fs_free_space**(char *letter*, uint32_t **total_p*, uint32_t **free_p*)
Get the free and total size of a driver in kB

Return LV_FS_RES_OK or any error from lv_fs_res_t enum

Parameters

- `letter`: the driver letter
- `total_p`: pointer to store the total size [kB]
- `free_p`: pointer to store the free size [kB]

char ***lv_fs_get_letters**(char **buf*)
Fill a buffer with the letters of existing drivers

Return the buffer

Parameters

- `buf`: buffer to store the letters ('\0' added after the last letter)

const char ***lv_fs_get_ext**(**const** char **fn*)
Return with the extension of the filename

Return pointer to the beginning extension or empty string if no extension

Parameters

- `fn`: string with a filename

char ***lv_fs_up**(char **path*)
Step up one level

Return the truncated file name

Parameters

- `path`: pointer to a file name

const char ***lv_fs_get_last**(**const** char **path*)
Get the last element of a path (e.g. U:/folder/file -> file)

Return pointer to the beginning of the last element in the path

Parameters

- `buf`: buffer to store the letters ('\0' added after the last letter)

struct _lv_fs_drv_t

Public Members

char **letter**

uint16_t **file_size**

uint16_t **rddir_size**

bool (***ready_cb**)(**struct** *_lv_fs_drv_t* *drv)

lv_fs_res_t (***open_cb**)(**struct** *_lv_fs_drv_t* *drv, void *file_p, **const** char *path, *lv_fs_mode_t* mode)

lv_fs_res_t (***close_cb**)(**struct** *_lv_fs_drv_t* *drv, void *file_p)

lv_fs_res_t (***remove_cb**)(**struct** *_lv_fs_drv_t* *drv, **const** char *fn)

lv_fs_res_t (***read_cb**)(**struct** *_lv_fs_drv_t* *drv, void *file_p, void *buf, uint32_t btr, uint32_t *br)

lv_fs_res_t (***write_cb**)(**struct** *_lv_fs_drv_t* *drv, void *file_p, **const** void *buf, uint32_t btw, uint32_t *bw)

lv_fs_res_t (***seek_cb**)(**struct** *_lv_fs_drv_t* *drv, void *file_p, uint32_t pos)

lv_fs_res_t (***tell_cb**)(**struct** *_lv_fs_drv_t* *drv, void *file_p, uint32_t *pos_p)

lv_fs_res_t (***trunc_cb**)(**struct** *_lv_fs_drv_t* *drv, void *file_p)

lv_fs_res_t (***size_cb**)(**struct** *_lv_fs_drv_t* *drv, void *file_p, uint32_t *size_p)

lv_fs_res_t (***rename_cb**)(**struct** *_lv_fs_drv_t* *drv, **const** char *oldname, **const** char *newname)

lv_fs_res_t (***free_space_cb**)(**struct** *_lv_fs_drv_t* *drv, uint32_t *total_p, uint32_t *free_p)

lv_fs_res_t (***dir_open_cb**)(**struct** *_lv_fs_drv_t* *drv, void *rddir_p, **const** char *path)

lv_fs_res_t (***dir_read_cb**)(**struct** *_lv_fs_drv_t* *drv, void *rddir_p, char *fn)

lv_fs_res_t (***dir_close_cb**)(**struct** *_lv_fs_drv_t* *drv, void *rddir_p)

lv_fs_drv_user_data_t **user_data**
Custom file user data

struct lv_fs_file_t

Public Members

void *__file_d__

lv_fs_drv_t *__drv__

struct lv_fs_dir_t

Public Members

void *__dir_d__

lv_fs_drv_t *__drv__

Animations

You can automatically change the value of a variable between a start and an end value using animations. L'animation est réalisée par l'appel périodique d'une fonction "animateur" avec comme paramètre la valeur correspondante.

La fonction "animateur" a la signature suivante :

```
void func(void * var, lv_anim_var_t value);
```

Cette signature est compatible avec la plupart des fonctions *set* de LittlevGL. Par exemple `lv_obj_set_x(obj, value)` ou `lv_obj_set_width(obj, value)`

Créer une animation

Pour créer une animation, une variable `lv_anim_t` doit être initialisée et configurée avec les fonctions `lv_anim_set_...()`.

```
lv_anim_t a;
lv_anim_set_exec_cb(&a, btn1, lv_obj_set_x);    /*Set the animator function and␣
↪variable to animate*/
lv_anim_set_time(&a, duration, delay);
lv_anim_set_values(&a, start, end);             /* Définit les valeurs initiale et␣
↪finale. P. ex. 0, 150 */
lv_anim_set_path_cb(&a, lv_anim_path_linear);   /* Définit le chemin à partir d'une␣
↪des fonctions `lv_anim_path_...` ou d'une fonction spécifique. */
lv_anim_set_ready_cb(&a, ready_cb);             /* Définit une fonction de rappel à␣
↪exécuter quand l'animation est prête (optionnel). */
lv_anim_set_playback(&a, wait_time);            /* Active le déroulé de l'animation␣
↪après un délai `wait_time` */
lv_anim_set_repeat(&a, wait_time);              /* Active la répétition d'une␣
↪animation après un délai `wait_time`. Peut être associé à la fonction `lv_anim_set_
↪playback`*/

lv_anim_create(&a);                             /* Débute l'animation */
```

You can apply **multiple different animations** on the same variable at the same time. For example, animate the x and y coordinates with `lv_obj_set_x` and `lv_obj_set_y`. However, only one animation can exist with a given variable and function pair. Therefore `lv_anim_create()` will delete the already existing variable-function animations.

Chemin d' animation

You can determinate the **path of animation**. In the most simple case, it is linear, which means the current value between *start* and *end* is changed linearly. A *path* is a function which calculates the next value to set based on the current state of the animation. Currently, there are the following built-in paths:

- **lv_anim_path_linear** animation linéaire
- **lv_anim_path_step** change en une seule fois à la fin
- **lv_anim_path_ease_in** lent au début
- **lv_anim_path_ease_out** lent à la fin
- **lv_anim_path_ease_in_out** lent au début et à la fin
- **lv_anim_path_overshoot** dépasse la valeur finale
- **lv_anim_path_bounce** bounce back a little from the end value (like hitting a wall)

Vitesse et durée

By default, you can set the animation time. But, in some cases, the **animation speed** is more practical.

The `lv_anim_speed_to_time(speed, start, end)` function calculates the required time in milliseconds to reach the end value from a start value with the given speed. The speed is interpreted in *unit/sec* dimension. For example, `lv_anim_speed_to_time(20,0,100)` will give 5000 milliseconds. For example, in case of `lv_obj_set_x` *unit* is pixels so *20* means *20 px/sec* speed.

Supprimer des animations

Vous pouvez **supprimer une animation** par `lv_anim_del(var, func)` en indiquant la variable animée et sa fonction animateur.

API

Périphérique d' entrée

Typedefs

typedef uint8_t **lv_anim_enable_t**

typedef lv_coord_t **lv_anim_value_t**
Type of the animated value

typedef void (***lv_anim_exec_xcb_t**)(void *, *lv_anim_value_t*)
Generic prototype of "animator" functions. First parameter is the variable to animate. Second parameter is the value to set. Compatible with `lv_xxx_set_yyy(obj, value)` functions The `x` in `_xcb_t` means its not a fully generic prototype because it doesn' t receive `lv_anim_t *` as its first argument

typedef void (***lv_anim_custom_exec_cb_t**)(**struct** *lv_anim_t* *, *lv_anim_value_t*)
Same as `lv_anim_exec_xcb_t` but receives `lv_anim_t *` as the first parameter. It' s more consistent but less convenient. Might be used by binding generator functions.

typedef *lv_anim_value_t* (***lv_anim_path_cb_t**)(**const struct** *_lv_anim_t* *)
Get the current value during an animation

typedef void (***lv_anim_ready_cb_t**)(**struct** *_lv_anim_t* *)
Callback to call when the animation is ready

typedef struct *_lv_anim_t* **lv_anim_t**
Describes an animation

Enums

enum [anonymous]
Can be used to indicate if animations are enabled or disabled in a case

Values:

LV_ANIM_OFF

LV_ANIM_ON

Functions

void **lv_anim_core_init**(void)
Init. the animation module

void **lv_anim_init**(*lv_anim_t* *a)
Initialize an animation variable. E.g.: lv_anim_t a; lv_anim_init(&a); lv_anim_set_…(&a); lv_anim_create(&a);

Parameters

- `a`: pointer to an `lv_anim_t` variable to initialize

static void **lv_anim_set_exec_cb**(*lv_anim_t* *a, void *var, *lv_anim_exec_xcb_t* exec_cb)
Set a variable to animate function to execute on `var`

Parameters

- `a`: pointer to an initialized `lv_anim_t` variable
- `var`: pointer to a variable to animate
- `exec_cb`: a function to execute. LittelvGL' s built-in functions can be used. E.g. lv_obj_set_x

static void **lv_anim_set_time**(*lv_anim_t* *a, uint16_t *duration*, int16_t *delay*)
Set the duration and delay of an animation

Parameters

- `a`: pointer to an initialized `lv_anim_t` variable
- `duration`: duration of the animation in milliseconds
- `delay`: delay before the animation in milliseconds

static void **lv_anim_set_values**(*lv_anim_t* *a, *lv_anim_value_t* *start*, *lv_anim_value_t* *end*)
Set the start and end values of an animation

Parameters

- `a`: pointer to an initialized `lv_anim_t` variable

- `start`: the start value
- `end`: the end value

static void **lv_anim_set_custom_exec_cb**(*lv_anim_t* *a, *lv_anim_custom_exec_cb_t exec_cb*)

Similar to `lv_anim_set_var_and_cb` but `lv_anim_custom_exec_cb_t` receives `lv_anim_t *` as its first parameter instead of `void *`. This function might be used when LittlevGL is binded to other languages because it's more consistent to have `lv_anim_t *` as first parameter.

Parameters

- `a`: pointer to an initialized `lv_anim_t` variable
- `exec_cb`: a function to execute.

static void **lv_anim_set_path_cb**(*lv_anim_t* *a, *lv_anim_path_cb_t path_cb*)

Set the path (curve) of the animation.

Parameters

- `a`: pointer to an initialized `lv_anim_t` variable
- `path_cb`: a function the get the current value of the animation. The built in functions starts with `lv_anim_path_...`

static void **lv_anim_set_ready_cb**(*lv_anim_t* *a, *lv_anim_ready_cb_t ready_cb*)

Set a function call when the animation is ready

Parameters

- `a`: pointer to an initialized `lv_anim_t` variable
- `ready_cb`: a function call when the animation is ready

static void **lv_anim_set_playback**(*lv_anim_t* *a, uint16_t *wait_time*)

Make the animation to play back to when the forward direction is ready

Parameters

- `a`: pointer to an initialized `lv_anim_t` variable
- `wait_time`: time in milliseconds to wait before starting the back direction

static void **lv_anim_clear_playback**(*lv_anim_t* *a)

Disable playback. (Disabled after `lv_anim_init()`)

Parameters

- `a`: pointer to an initialized `lv_anim_t` variable

static void **lv_anim_set_repeat**(*lv_anim_t* *a, uint16_t *wait_time*)

Make the animation to start again when ready.

Parameters

- `a`: pointer to an initialized `lv_anim_t` variable
- `wait_time`: time in milliseconds to wait before starting the animation again

static void **lv_anim_clear_repeat**(*lv_anim_t* *a)

Disable repeat. (Disabled after `lv_anim_init()`)

Parameters

- `a`: pointer to an initialized `lv_anim_t` variable

void **lv_anim_create**(*lv_anim_t* *a)
Create an animation

Parameters

- a: an initialized 'anim_t' variable. Not required after call.

bool **lv_anim_del**(void *var, *lv_anim_exec_xcb_t* exec_cb)
Delete an animation of a variable with a given animator function

Return true: at least 1 animation is deleted, false: no animation is deleted

Parameters

- var: pointer to variable
- exec_cb: a function pointer which is animating 'var', or NULL to ignore it and delete all the animations of 'var

static bool **lv_anim_custom_del**(*lv_anim_t* *a, *lv_anim_custom_exec_cb_t* exec_cb)
Delete an aniamation by getting the animated variable from a. Only animations with exec_cb will be deleted. This function exist becasue it's logical that all anim functions receives an lv_anim_t as their first parameter. It's not practical in C but might makes the API more conequent and makes easier to genrate bindings.

Return true: at least 1 animation is deleted, false: no animation is deleted

Parameters

- a: pointer to an animation.
- exec_cb: a function pointer which is animating 'var', or NULL to ignore it and delete all the animations of 'var

uint16_t **lv_anim_count_running**(void)
Get the number of currently running animations

Return the number of running animations

uint16_t **lv_anim_speed_to_time**(uint16_t *speed*, *lv_anim_value_t* *start*, *lv_anim_value_t* *end*)
Calculate the time of an animation with a given speed and the start and end values

Return the required time [ms] for the animation with the given parameters

Parameters

- speed: speed of animation in unit/sec
- start: start value of the animation
- end: end value of the animation

lv_anim_value_t **lv_anim_path_linear**(**const** *lv_anim_t* *a)
Calculate the current value of an animation applying linear characteristic

Return the current value to set

Parameters

- a: pointer to an animation

lv_anim_value_t **lv_anim_path_ease_in**(**const** *lv_anim_t* *a)
Calculate the current value of an animation slowing down the start phase

Return the current value to set

Parameters

- a: pointer to an animation

lv_anim_value_t **lv_anim_path_ease_out(const** *lv_anim_t* *a**)**
Calculate the current value of an animation slowing down the end phase

Return the current value to set

Parameters

- a: pointer to an animation

lv_anim_value_t **lv_anim_path_ease_in_out(const** *lv_anim_t* *a**)**
Calculate the current value of an animation applying an "S" characteristic (cosine)

Return the current value to set

Parameters

- a: pointer to an animation

lv_anim_value_t **lv_anim_path_overshoot(const** *lv_anim_t* *a**)**
Calculate the current value of an animation with overshoot at the end

Return the current value to set

Parameters

- a: pointer to an animation

lv_anim_value_t **lv_anim_path_bounce(const** *lv_anim_t* *a**)**
Calculate the current value of an animation with 3 bounces

Return the current value to set

Parameters

- a: pointer to an animation

lv_anim_value_t **lv_anim_path_step(const** *lv_anim_t* *a**)**
Calculate the current value of an animation applying step characteristic. (Set end value on the end of the animation)

Return the current value to set

Parameters

- a: pointer to an animation

struct _lv_anim_t
#include <lv_anim.h> Describes an animation

Public Members

void ***var**
Variable to animate

lv_anim_exec_xcb_t **exec_cb**
Function to execute to animate

lv_anim_path_cb_t **path_cb**
Function to get the steps of animations

lv_anim_ready_cb_t **ready_cb**
Call it when the animation is ready

int32_t **start**
: Start value

int32_t **end**
: End value

uint16_t **time**
: Animation time in ms

int16_t **act_time**
: Current time in animation. Set to negative to make delay.

uint16_t **playback_pause**
: Wait before play back

uint16_t **repeat_pause**
: Wait before repeat

lv_anim_user_data_t **user_data**
: Custom user data

uint8_t **playback**
: When the animation is ready play it back

uint8_t **repeat**
: Repeat the animation infinitely

uint8_t **playback_now**
: Play back is in progress

uint32_t **has_run**
: Indicates the animation has run in this round

Tâches

LittlevGL has a built-in task system. You can register a function to have it be called periodically. The tasks are handled and called in `lv_task_handler()`, which needs to be called periodically every few milliseconds. Voir *Portage* pour plus d'informations.

The tasks are non-preemptive, which means a task cannot interrupt another task. Therefore, you can call any LittlevGL related function in a task.

Créer une tâche

To create a new task, use `lv_task_create(task_cb, period_ms, LV_TASK_PRIO_OFF/LOWEST/LOW/MID/HIGH/HIGHEST, user_data)`. It will create an `lv_task_t *` variable, which can be used later to modify the parameters of the task. `lv_task_create_basic()` can also be used. It allows you to create a new task without specifying any parameters.

La fonction de rappel d'une tâche doit avoir la signature `void (* lv_task_cb_t)(lv_task_t *)`.

Par exemple :

```
void my_task(lv_task_t * task)
{
  /* Utilise les données de l'utilisateur */
  uint32_t * user_data = task->user_data;
  printf("my_task called with user data: %d\n", *user_data);
```

(continues on next page)

(continued from previous page)

```
  /* Fait quelque chose avec LittlevGL */
  if(something_happened) {
    something_happened = false;
    lv_btn_create(lv_scr_act(), NULL);
  }
}

...

static uint32_t user_data = 10;
lv_task_t * task = lv_task_create(my_task, 500, LV_TASK_PRIO_MID, &user_data);
```

Exécution et réinitialisation

`lv_task_ready(task)` fait exécuter la tâche lors du prochain appel de `lv_task_handler()`.

`lv_task_reset(task)` resets the period of a task. It will be called again after the defined period of milliseconds has elapsed.

Paramètres

Vous pouvez modifier ultérieurement certains paramètres des tâches :

- `lv_task_set_cb(task, new_cb)`
- `lv_task_set_period(task, new_period)`
- `lv_task_set_prio(task, new_priority)`

Tâches uniques

You can make a task to run only once by calling`lv_task_once(task)`. The task will automatically be deleted after being called for the first time.

Mesurer le temps d'inactivité

You can get the idle percentage time `lv_task_handler` with `lv_task_get_idle()`. Note that, it doesn't measure the idle time of the overall system, only `lv_task_handler`. It can be misleading if you use an operating system and call `lv_task_handler` in an task, as it won't actually measure the time the OS spends in an idle thread.

Appels asynchrones

In some cases, you can't do an action immediately. For example, you can't delete an object right now because something else is still using it or you don't want to block the execution now. For these cases, you can use the `lv_async_call(my_function, data_p)` to make `my_function` be called on the next call of `lv_task_handler`. `data_p` will be passed to function when it's called. Notez que seul le pointeur des données est enregistré. Vous devez donc vous assurer que la variable sera "à portée" lors de l'appel de la fonction. Pour cela, vous pouvez utiliser des données *statiques*, globales ou allouées dynamiquement.

Par exemple :

```
void my_screen_clean_up(void * scr)
{
  /* Libére des ressources liées à `scr` */

  /* Au final supprime l'écran */
  lv_obj_del(scr);
}

...

/* Fait quelque chose avec l'objet sur l'écran courant */

/* Supprime l'écran lors du prochain appel de `lv_task_handler`. Donc pas maintenant.
↪*/
lv_async_call(my_screen_clean_up, lv_scr_act());

/* L'écran est toujours valide donc vous pouvez faire d'autres choses avec */
```

If you just want to delete an object, and don' t need to clean anything up in `my_screen_cleanup`, you could just use `lv_obj_del_async`, which will delete the object on the next call to `lv_task_handler`.

API

Typedefs

typedef void (***lv_task_cb_t**)(**struct** *_lv_task_t* *)
Tasks execute this type type of functions.

typedef uint8_t **lv_task_prio_t**

typedef struct *_lv_task_t* **lv_task_t**
Descriptor of a lv_task

Enums

enum [anonymous]
Possible priorities for lv_tasks

Values:

LV_TASK_PRIO_OFF = 0

LV_TASK_PRIO_LOWEST

LV_TASK_PRIO_LOW

LV_TASK_PRIO_MID

LV_TASK_PRIO_HIGH

LV_TASK_PRIO_HIGHEST

_LV_TASK_PRIO_NUM

Functions

void **lv_task_core_init**(void)
Init the lv_task module

lv_task_t ***lv_task_create_basic**(void)
Create an "empty" task. It needs to initialzed with at least `lv_task_set_cb` and `lv_task_set_period`

Return pointer to the craeted task

lv_task_t ***lv_task_create**(*lv_task_cb_t task_xcb*, uint32_t *period*, *lv_task_prio_t prio*, void **user_data*)
Create a new lv_task

Return pointer to the new task

Parameters

- `task_xcb`: a callback which is the task itself. It will be called periodically. (the 'x' in the argument name indicates that its not a fully generic function because it not follows the `func_name(object, callback, ...)` convention)
- `period`: call period in ms unit
- `prio`: priority of the task (LV_TASK_PRIO_OFF means the task is stopped)
- `user_data`: custom parameter

void **lv_task_del**(*lv_task_t *task*)
Delete a lv_task

Parameters

- `task`: pointer to task_cb created by task

void **lv_task_set_cb**(*lv_task_t *task*, *lv_task_cb_t task_cb*)
Set the callback the task (the function to call periodically)

Parameters

- `task`: pointer to a task
- `task_cb`: the function to call periodically

void **lv_task_set_prio**(*lv_task_t *task*, *lv_task_prio_t prio*)
Set new priority for a lv_task

Parameters

- `task`: pointer to a lv_task
- `prio`: the new priority

void **lv_task_set_period**(*lv_task_t *task*, uint32_t *period*)
Set new period for a lv_task

Parameters

- `task`: pointer to a lv_task
- `period`: the new period

void **lv_task_ready**(*lv_task_t *task*)
Make a lv_task ready. It will not wait its period.

Parameters

- `task`: pointer to a lv_task.

void **lv_task_once**(*lv_task_t* *task)
Delete the lv_task after one call

Parameters

- `task`: pointer to a lv_task.

void **lv_task_reset**(*lv_task_t* *task)
Reset a lv_task. It will be called the previously set period milliseconds later.

Parameters

- `task`: pointer to a lv_task.

void **lv_task_enable**(bool *en*)
Enable or disable the whole lv_task handling

Parameters

- `en`: true: lv_task handling is running, false: lv_task handling is suspended

uint8_t **lv_task_get_idle**(void)
Get idle percentage

Return the lv_task idle in percentage

struct _lv_task_t
#include <lv_task.h> Descriptor of a lv_task

Public Members

uint32_t **period**
How often the task should run

uint32_t **last_run**
Last time the task ran

lv_task_cb_t **task_cb**
Task function

void ***user_data**
Custom user data

uint8_t **prio**
Task priority

uint8_t **once**
1: one shot task

Dessin

With LittlevGL, you don' t need to draw anything manually. Just create objects (like buttons and labels), move and change them and LittlevGL will refresh and redraw what is required.

Cependant, il peut être utile d' avoir une compréhension de base de la façon dont le dessin est effectué dans LittlevGL.

The basic concept is to not draw directly to the screen, but draw to an internal buffer first and then copy that buffer to screen when the rendering is ready. It has two main advantages:

1. **Avoids flickering** while layers of the UI are drawn. For example, when drawing a *background + button + text*, each "stage" would be visible for a short time.
2. **It's faster** to modify a buffer in RAM and finally write one pixel once than read/write a display directly on each pixel access. (e.g. via a display controller with SPI interface). Hence, it's suitable for pixels that are redrawn multiple times (e.g. background + button + text).

Types de tampons

As you already might learn in the *Porting* section, there are 3 types of buffers:

1. **One buffer** - LittlevGL draws the content of the screen into a buffer and sends it to the display. The buffer can be smaller than the screen. In this case, the larger areas will be redrawn in multiple parts. If only small areas changes (e.g. button press), then only those areas will be refreshed.
2. **Two non-screen-sized buffers** - having two buffers, LittlevGL can draw into one buffer while the content of the other buffer is sent to display in the background. Le DMA ou une autre méthode doit être utilisé pour transférer les données à l'écran afin de permettre au CPU de dessiner dans le même temps. This way, the rendering and refreshing of the display become parallel. If the buffer is smaller than the area to refresh, LittlevGL will draw the display's content in chunks similar to the *One buffer*.
3. **Two screen-sized buffers** - In contrast to *Two non-screen-sized buffers*, LittlevGL will always provide the whole screen's content, not only chunks. This way, the driver can simply change the address of the frame buffer to the buffer received from LittlevGL. Therefore, this method works best when the MCU has an LCD/TFT interface and the frame buffer is just a location in the RAM.

Mécanisme de rafraîchissement de l'écran

1. Something happens on the GUI which requires redrawing. For example, a button has been pressed, a chart has been changed or an animation happened, etc.
2. LittlevGL saves the changed object's old and new area into a buffer, called an *Invalid area buffer*. For optimization, in some cases, objects are not added to the buffer:
   - Hidden objects are not added.
   - Objects completely out of their parent are not added.
   - Areas out of the parent are cropped to the parent's area.
   - The object on other screens are not added.
3. A chaque `LV_DISP_DEF_REFR_PERIOD` (définie dans *lv_conf.h*) :
   - LittlevGL checks the invalid areas and joins the adjacent or intersecting areas.
   - Takes the first joined area, if it's smaller than the *display buffer*, then simply draw the areas' content to the *display buffer*. If the area doesn't fit into the buffer, draw as many lines as possible to the *display buffer*.
   - When the area is drawn, call `flush_cb` from the display driver to refresh the display.
   - If the area was larger than the buffer, redraw the remaining parts too.
- Fait la même chose avec toutes les zones jointes.

While an area is redrawn, the library searches the most top object which covers the area to redraw, and starts to draw from that object. For example, if a button's label has changed, the library will see that it's enough to draw the button under the text, and it's not required to draw the background too.

The difference between buffer types regarding the drawing mechanism is the following:

1. **One buffer** - LittlevGL needs to wait for `lv_disp_flush_ready()` (called at the end of `flush_cb`) before starting to redraw the next part.
2. **Two non-screen-sized buffers** - LittlevGL can immediately draw to the second buffer when the first is sent to `flush_cb` because the flushing should be done by DMA (or similar hardware) in the background.
3. **Two screen-sized buffers** - After calling `flush_cb`, the first buffer, if being displayed as frame buffer. Its content is copied to the second buffer and all the changes are drawn on top of it.

3.16.4 Types d'objet (éléments visuels)

Objet de base (lv_obj)

Vue d'ensemble

The 'Base Object' implements the basic properties of an object on a screen, such as:

- coordonnées
- objet parent
- enfants
- style principal
- des attributs tels que *Clic autorisé*, *Glissé autorisé*, etc.

In object-oriented thinking, it is the base class which all other objects in LittlevGL inherit from. This, among another things, helps reduce code duplication.

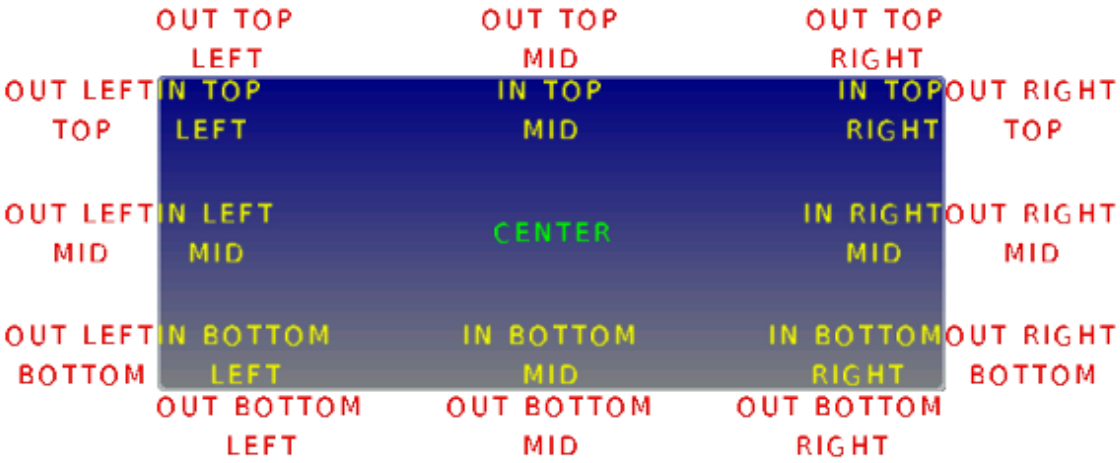
Coordonnées

The object size can be modified on individual axes with `lv_obj_set_width(obj, new_width)` and `lv_obj_set_height(obj, new_height)`, or both axes can be modified at the same time with `lv_obj_set_size(obj, new_width, new_height)`.

You can set the x and y coordinates relative to the parent with `lv_obj_set_x(obj, new_x)` and `lv_obj_set_y(obj, new_y)`, or both at the same time with `lv_obj_set_pos(obj, new_x, new_y)`.

You can align the object to another with `lv_obj_align(obj, obj_ref, LV_ALIGN_..., x_shift, y_shift)`.

- `obj` is the object to align.
- `obj_ref` is a reference object. `obj` will be aligned to it. If `obj_ref = NULL`, then the parent of `obj` will be used.
- The third argument is the *type* of alignment. These are the possible options:



The alignment types build like `LV_ALIGN_OUT_TOP_MID`.

- The last two arguments allow you to shift the object by a specified number of pixels after aligning it.

For example, to align a text below an image: `lv_obj_align(text, image, LV_ALIGN_OUT_BOTTOM_MID, 0, 10)`.Or to align a text in the middle of its parent: `lv_obj_align(text, NULL, LV_ALIGN_CENTER, 0, 0)`.

`lv_obj_align_origo` works similarly to `lv_obj_align` but, it aligns the center of the object rather than the top-left corner.

For example, `lv_obj_align_origo(btn, image, LV_ALIGN_OUT_BOTTOM_MID, 0, 0)` will align the center of the button the bottom of the image.

The parameters of the alignment will be saved in the object if `LV_USE_OBJ_REALIGN` is enabled in *lv_conf.h*. You can then realign the objects simply by calling `lv_obj_realign(obj)`. (It' s equivalent to calling `lv_obj_align` again with the same parameters.)

If the alignment happened with `lv_obj_align_origo`, then it will be used when the object is realigned.

If `lv_obj_set_auto_realign(obj, true)` is used the object will be realigned automatically, if its size changes in `lv_obj_set_width/height/size()` functions. It' s very useful when size animations are applied to the object and the original position needs to be kept.

Note that the coordinates of screens can' t be changed. Attempting to use these functions on screens will result in undefined behavior.

Parents et enfants

You can set a new parent for an object with `lv_obj_set_parent(obj, new_parent)`. To get the current parent, use `lv_obj_get_parent(obj)`.

To get the children of an object, use `lv_obj_get_child(obj, child_prev)` (from last to first) or `lv_obj_get_child_back(obj, child_prev)` (from first to last). To get the first child, pass `NULL` as the second parameter and use the return value to iterate through the children. The function will return `NULL` if there are no more children. For example:

```
lv_obj_t * child;
child = lv_obj_get_child(parent, NULL);
```

(continues on next page)

(continued from previous page)

```
while(child) {
    /* Fait quelque chose avec l'"enfant" */
    child = lv_obj_get_child(parent, child);
}
```

`lv_obj_count_children(obj)` indique le nombre d'enfants d'un objet. `lv_obj_count_children_recursive(obj)` indique également le nombre d'enfants mais compte récursivement les enfants d'enfants.

Ecrans

When you have created a screen like `lv_obj_create(NULL, NULL)`, you can load it with `lv_scr_load(screen1)`. The `lv_scr_act()` function gives you a pointer to the current screen.

Si vous avez plusieurs d'affichages, il est important de savoir que ces fonctions opèrent sur l'affichage créé en dernier ou explicitement sélectionné (avec `lv_disp_set_default`).

To get the screen an object is assigned to, use the `lv_obj_get_screen(obj)` function.

Couches

Il y a deux couches générées automatiquement :

- la couche supérieure
- la couche système

They are independent of the screens and the same layers will be shown on every screen. The *top layer* is above every object on the screen and the *system layer* is above the *top layer* too. You can add any pop-up windows to the *top layer* freely. But, the *system layer* is restricted to system-level things (e.g. mouse cursor will be placed here in `lv_indev_set_cursor()`).

Les fonctions `lv_layer_top()` et `lv_layer_sys()` retournent un pointeur sur la couche supérieure ou la couche système.

You can bring an object to the foreground or send it to the background with `lv_obj_move_foreground(obj)` and `lv_obj_move_background(obj)`.

Read the *Layer overview* section to learn more about layers.

Style

The base object stores the *Main style* of the object. To set a new style, use `lv_obj_set_style(obj, &new_style)` function. If `NULL` is set as style, then the object will inherit its parent's style.

Note that, you should use `lv_obj_set_style` only for "Base objects". Every other object type has its own style set function which should be used for them. For example, a button should use `lv_btn_set_style()`.

If you modify a style, which is already used by objects, in order to refresh the affected objects you can use either `lv_obj_refresh_style(obj)` on each object using it or to notify all objects with a given style use `lv_obj_report_style_mod(&style)`. If the parameter of `lv_obj_report_style_mod` is `NULL`, all objects will be notified.

Lisez la section *Styles* pour en savoir plus sur les styles.

Evènements

To set an event callback for an object, use `lv_obj_set_event_cb(obj, event_cb)`,

To manually send an event to an object, use `lv_event_send(obj, LV_EVENT_..., data)`

Lisez *Evénements* pour en savoir plus sur les événements.

Attributs

Certains attributs peuvent être activés/désactivés avec `lv_obj_set_...(obj, true/false)` :

- **hidden** - Hide the object. It will not be drawn and will be considered by input devices as if it doesn' t exist., Its children will be hidden too.
- **click** - Allows you to click the object via input devices. If disabled, then click events are passed to the object behind this one. (E.g. *Labels* are not clickable by default)
- **top** - If enabled then when this object or any of its children is clicked then this object comes to the foreground.
- **drag** - Enable dragging (moving by an input device)
- **drag_dir** - Enable dragging only in specific directions. Can be `LV_DRAG_DIR_HOR/VER/ALL`.
- **drag_throw** - Enable "throwing" with dragging as if the object would have momentum
- **drag_parent** - If enabled then the object' s parent will be moved during dragging. It will look like as if the parent is dragged. Checked recursively, so can propagate to grandparents too.
- **parent_event** - Propagate the events to the parents too. Checked recursively, so can propagate to grandparents too.
- **opa_scale_enable** - Enable opacity scaling. See the [#opa-scale](Opa scale) section.

Echelle d' opacité

If `lv_obj_set_opa_scale_enable(obj, true)` is set for an object, then the object' s and all of its children' s opacity can be adjusted with `lv_obj_set_opa_scale(obj, LV_OPA_...)`. Les opacités enregistrées dans les styles seront modifiées par ce facteur.

C' est très utile pour estomper/révéler un objet avec des enfants en utilisant une *Animation*.

A little bit of technical background: during the rendering process, the opacity of the object is decided by searching recursively up the object' s family tree to find the first object with opacity scaling (Opa scale) enabled.

If an object is found with an enabled *Opa scale*, then that *Opa scale* will be used by the rendered object too.

Therefore, if you want to disable the Opa scaling for an object when the parent has Opa scale, just enable Opa scaling for the object and set its value to `LV_OPA_COVER`. It will overwrite the parent' s settings.

Protection

There are some specific actions which happen automatically in the library. To prevent one or more that kind of actions, you can protect the object against them. The following protections exists:

- **LV_PROTECT_NONE** Aucune protection

- **LV_PROTECT_POS** Empêche le positionnement automatique (p.ex. mise en page dans les *Conteneurs*)
- **LV_PROTECT_FOLLOW** Empêche que l'objet soit suivi (effectue un "saut de ligne") dans un ordre automatique (p.ex. mise en page dans les *Conteneurs*)
- **LV_PROTECT_PARENT** Empêche le changement de parent automatique (p.ex. *Page* déplace les enfants créés sur l'arrière-plan vers la zone de défilement)
- **LV_PROTECT_PRESS_LOST** Evite de perdre un appui lors d'un déplacement hors de l'objet. (P.ex. un *Bouton* peut être relâché en dehors s'il est pressé)
- **LV_PROTECT_CLICK_FOCUS** Empêche la sélection automatique de l'objet s'il se trouve dans un *groupe* et que la sélection sur clic est activé.
- **LV_PROTECT_CHILD_CHG** Désactive le signal de changement d'enfant. Utilisé en interne par la librairie

Les fonctions `lv_obj_set/clear_protect(obj, LV_PROTECT_...)` active/désactive la protection. Vous pouvez également combiner les valeurs des types de protection avec *'OU'*.

Groupes

Once, an object is added to *group* with `lv_group_add_obj(group, obj)` the object's current group can be get with `lv_obj_get_group(obj)`.

`lv_obj_is_focused(obj)` tells if the object is currently focused on its group or not. If the object is not added to a group, `false` will be returned.

Lisez le *Périphériques d'entrée* pour en savoir plus sur les *groupes*.

Zone étendue de clic

By default, the objects can be clicked only on their coordinates, however, this area can be extended with `lv_obj_set_ext_click_area(obj, left, right, top, bottom)`. `left/right/top/bottom` describes how far the clickable area should extend past the default in each direction.

Cette fonctionnalité doit être activée dans *lv_conf.h* avec `LV_USE_EXT_CLICK_AREA`. Les valeurs possibles sont :

- **LV_EXT_CLICK_AREA_FULL** mémorise les 4 coordonnées en `lv_coord_t`
- **LV_EXT_CLICK_AREA_TINY** n'enregistre que les coordonnées horizontales et verticales (utilise la plus grande valeur de gauche/ droite et haut/bas) en `uint8_t`
- **LV_EXT_CLICK_AREA_OFF** Désactive cette fonctionnalité

Styles

Use `lv_obj_set_style(obj, &style)` to set a style for a base object.

Toutes les propriétés `style.body` sont utilisées. Le style par défaut pour les écrans est `lv_style_scr` et `lv_style_plain_color` pour les objets normaux

Evénements

Les Evénements génériques sont envoyés par ce type d' objet.

Apprenez-en plus sur les *Evénements*.

Touches

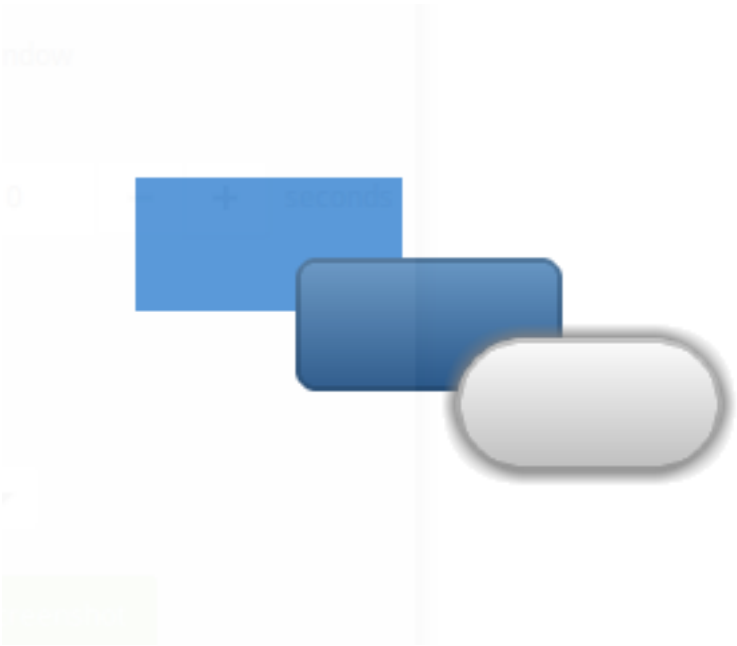
Aucune *touche* n' est traitée par ce type d' objet.

Apprenez-en plus sur les *touches*.

Exemple

C

Base obejcts with custom styles



code

```
#include "lvgl/lvgl.h"

void lv_ex_obj_1(void)
{
    lv_obj_t * obj1;
    obj1 = lv_obj_create(lv_scr_act(), NULL);
    lv_obj_set_size(obj1, 100, 50);
    lv_obj_set_style(obj1, &lv_style_plain_color);
    lv_obj_align(obj1, NULL, LV_ALIGN_CENTER, -60, -30);

    /*Copy the previous object and enable drag*/
```

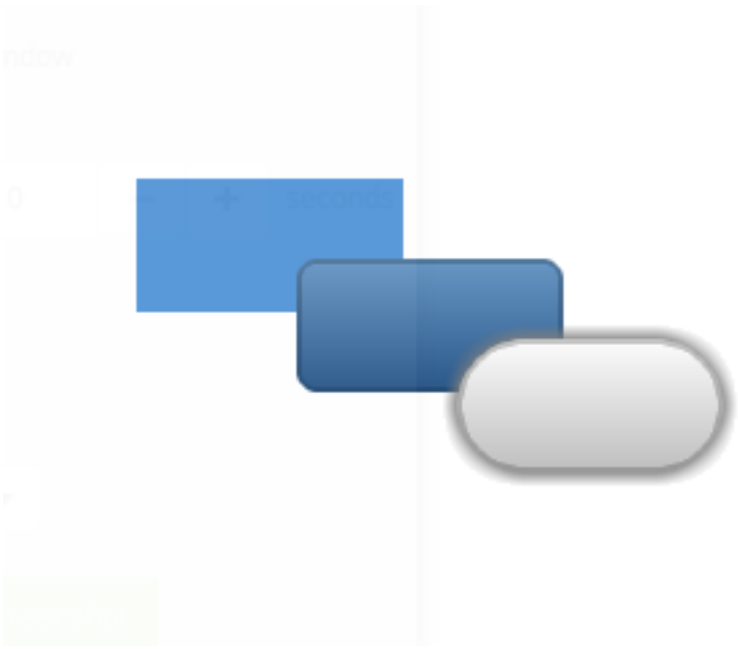
(continues on next page)

(continued from previous page)

```
    lv_obj_t * obj2;
    obj2 = lv_obj_create(lv_scr_act(), obj1);
    lv_obj_set_style(obj2, &lv_style_pretty_color);
    lv_obj_align(obj2, NULL, LV_ALIGN_CENTER, 0, 0);
    lv_obj_set_drag(obj2, true);

    static lv_style_t style_shadow;
    lv_style_copy(&style_shadow, &lv_style_pretty);
    style_shadow.body.shadow.width = 6;
    style_shadow.body.radius = LV_RADIUS_CIRCLE;

    /*Copy the previous object (drag is already enabled)*/
    lv_obj_t * obj3;
    obj3 = lv_obj_create(lv_scr_act(), obj2);
    lv_obj_set_style(obj3, &style_shadow);
    lv_obj_align(obj3, NULL, LV_ALIGN_CENTER, 60, 30);
}
```

MicroPython

Base obejcts with custom styles



code

```
obj1 = lv.obj(lv.scr_act())
obj1.set_size(100, 50)
obj1.set_style(lv.style_plain_color)
obj1.align(None, lv.ALIGN.CENTER, -60, -30)

# Copy the previous object and enable drag
obj2 = lv.obj(lv.scr_act(), obj1)
```

(continues on next page)

(continued from previous page)

```
obj2.set_style(lv.style_pretty_color)
obj2.align(None, lv.ALIGN.CENTER, 0, 0)
obj2.set_drag(True)

style_shadow = lv.style_t()
lv.style_copy(style_shadow, lv.style_pretty)
style_shadow.body.shadow.width = 6
style_shadow.body.radius = 800 # large enough to make it round

# Copy the previous object (drag is already enabled)
obj3 = lv.obj(lv.scr_act(), obj2)
obj3.set_style(style_shadow)
obj3.align(None, lv.ALIGN.CENTER, 60, 30)
```

API

Typedefs

typedef uint8_t **lv_design_mode_t**

typedef bool (***lv_design_cb_t**)(**struct** *_lv_obj_t* *obj, **const** lv_area_t *mask_p, *lv_design_mode_t* mode)

The design callback is used to draw the object on the screen. It accepts the object, a mask area, and the mode in which to draw the object.

typedef uint8_t **lv_event_t**

Type of event being sent to the object.

typedef void (***lv_event_cb_t**)(**struct** *_lv_obj_t* *obj, *lv_event_t* event)

Event callback. Events are used to notify the user of some action being taken on the object. For details, see *lv_event_t*.

typedef uint8_t **lv_signal_t**

typedef lv_res_t (***lv_signal_cb_t**)(**struct** *_lv_obj_t* *obj, *lv_signal_t* sign, void *param)

typedef uint8_t **lv_align_t**

typedef uint8_t **lv_drag_dir_t**

typedef struct *_lv_obj_t* **lv_obj_t**

typedef uint8_t **lv_protect_t**

Enums

enum [anonymous]

Design modes

Values:

LV_DESIGN_DRAW_MAIN

Draw the main portion of the object

LV_DESIGN_DRAW_POST

Draw extras on the object

LV_DESIGN_COVER_CHK
Check if the object fully covers the 'mask_p' area

enum [anonymous]
Values:

LV_EVENT_PRESSED
The object has been pressed

LV_EVENT_PRESSING
The object is being pressed (called continuously while pressing)

LV_EVENT_PRESS_LOST
User is still pressing but slid cursor/finger off of the object

LV_EVENT_SHORT_CLICKED
User pressed object for a short period of time, then released it. Not called if dragged.

LV_EVENT_LONG_PRESSED
Object has been pressed for at least `LV_INDEV_LONG_PRESS_TIME`. Not called if dragged.

LV_EVENT_LONG_PRESSED_REPEAT
Called after `LV_INDEV_LONG_PRESS_TIME` in every `LV_INDEV_LONG_PRESS_REP_TIME` ms. Not called if dragged.

LV_EVENT_CLICKED
Called on release if not dragged (regardless to long press)

LV_EVENT_RELEASED
Called in every cases when the object has been released

LV_EVENT_DRAG_BEGIN

LV_EVENT_DRAG_END

LV_EVENT_DRAG_THROW_BEGIN

LV_EVENT_KEY

LV_EVENT_FOCUSED

LV_EVENT_DEFOCUSED

LV_EVENT_VALUE_CHANGED
The object's value has changed (i.e. slider moved)

LV_EVENT_INSERT

LV_EVENT_REFRESH

LV_EVENT_APPLY
"Ok", "Apply" or similar specific button has clicked

LV_EVENT_CANCEL
"Close", "Cancel" or similar specific button has clicked

LV_EVENT_DELETE
Object is being deleted

enum [anonymous]
Signals are for use by the object itself or to extend the object's functionality. Applications should use *lv_obj_set_event_cb* to be notified of events that occur on the object.

Values:

LV_SIGNAL_CLEANUP
Object is being deleted

LV_SIGNAL_CHILD_CHG
Child was removed/added

LV_SIGNAL_CORD_CHG
Object coordinates/size have changed

LV_SIGNAL_PARENT_SIZE_CHG
Parent' s size has changed

LV_SIGNAL_STYLE_CHG
Object' s style has changed

LV_SIGNAL_BASE_DIR_CHG
The base dir has changed

LV_SIGNAL_REFR_EXT_DRAW_PAD
Object' s extra padding has changed

LV_SIGNAL_GET_TYPE
LittlevGL needs to retrieve the object' s type

LV_SIGNAL_PRESSED
The object has been pressed

LV_SIGNAL_PRESSING
The object is being pressed (called continuously while pressing)

LV_SIGNAL_PRESS_LOST
User is still pressing but slid cursor/finger off of the object

LV_SIGNAL_RELEASED
User pressed object for a short period of time, then released it. Not called if dragged.

LV_SIGNAL_LONG_PRESS
Object has been pressed for at least `LV_INDEV_LONG_PRESS_TIME`. Not called if dragged.

LV_SIGNAL_LONG_PRESS_REP
Called after `LV_INDEV_LONG_PRESS_TIME` in every `LV_INDEV_LONG_PRESS_REP_TIME` ms. Not called if dragged.

LV_SIGNAL_DRAG_BEGIN

LV_SIGNAL_DRAG_END

LV_SIGNAL_FOCUS

LV_SIGNAL_DEFOCUS

LV_SIGNAL_CONTROL

LV_SIGNAL_GET_EDITABLE

enum [**anonymous**]
Object alignment.

Values:

LV_ALIGN_CENTER = 0

LV_ALIGN_IN_TOP_LEFT

LV_ALIGN_IN_TOP_MID

LV_ALIGN_IN_TOP_RIGHT

LV_ALIGN_IN_BOTTOM_LEFT

LV_ALIGN_IN_BOTTOM_MID

LV_ALIGN_IN_BOTTOM_RIGHT

LV_ALIGN_IN_LEFT_MID

LV_ALIGN_IN_RIGHT_MID

LV_ALIGN_OUT_TOP_LEFT

LV_ALIGN_OUT_TOP_MID

LV_ALIGN_OUT_TOP_RIGHT

LV_ALIGN_OUT_BOTTOM_LEFT

LV_ALIGN_OUT_BOTTOM_MID

LV_ALIGN_OUT_BOTTOM_RIGHT

LV_ALIGN_OUT_LEFT_TOP

LV_ALIGN_OUT_LEFT_MID

LV_ALIGN_OUT_LEFT_BOTTOM

LV_ALIGN_OUT_RIGHT_TOP

LV_ALIGN_OUT_RIGHT_MID

LV_ALIGN_OUT_RIGHT_BOTTOM

enum [anonymous]

Values:

LV_DRAG_DIR_HOR = 0x1
Object can be dragged horizontally.

LV_DRAG_DIR_VER = 0x2
Object can be dragged vertically.

LV_DRAG_DIR_ALL = 0x3
Object can be dragged in all directions.

enum [anonymous]

Values:

LV_PROTECT_NONE = 0x00

LV_PROTECT_CHILD_CHG = 0x01
Disable the child change signal. Used by the library

LV_PROTECT_PARENT = 0x02
Prevent automatic parent change (e.g. in lv_page)

LV_PROTECT_POS = 0x04
Prevent automatic positioning (e.g. in lv_cont layout)

LV_PROTECT_FOLLOW = 0x08
Prevent the object be followed in automatic ordering (e.g. in lv_cont PRETTY layout)

LV_PROTECT_PRESS_LOST = 0x10
If the `indev` was pressing this object but swiped out while pressing do not search other object.

LV_PROTECT_CLICK_FOCUS = 0x20
Prevent focusing the object by clicking on it

Functions

void **lv_init**(void)
Init. the 'lv' library.

void **lv_deinit**(void)
Deinit the 'lv' library Currently only implemented when not using custorm allocators, or GC is enabled.

lv_obj_t ***lv_obj_create**(*lv_obj_t* **parent*, **const** *lv_obj_t* **copy*)
Create a basic object

Return pointer to the new object

Parameters

- `parent`: pointer to a parent object. If NULL then a screen will be created
- `copy`: pointer to a base object, if not NULL then the new object will be copied from it

lv_res_t **lv_obj_del**(*lv_obj_t* **obj*)
Delete 'obj' and all of its children

Return LV_RES_INV because the object is deleted

Parameters

- `obj`: pointer to an object to delete

void **lv_obj_del_async**(**struct** *_lv_obj_t* **obj*)
Helper function for asynchronously deleting objects. Useful for cases where you can't delete an object directly in an `LV_EVENT_DELETE` handler (i.e. parent).

See lv_async_call

Parameters

- `obj`: object to delete

void **lv_obj_clean**(*lv_obj_t* **obj*)
Delete all children of an object

Parameters

- `obj`: pointer to an object

void **lv_obj_invalidate_area**(**const** *lv_obj_t* **obj*, **const** lv_area_t **area*)
Mark an area of an object as invalid. This area will be redrawn by 'lv_refr_task'

Parameters

- `obj`: pointer to an object
- `area`: the area to redraw

void **lv_obj_invalidate**(**const** *lv_obj_t* **obj*)
Mark the object as invalid therefore its current position will be redrawn by 'lv_refr_task'

Parameters

- `obj`: pointer to an object

void **lv_obj_set_parent**(*lv_obj_t* *obj, *lv_obj_t* *parent)
Set a new parent for an object. Its relative position will be the same.

Parameters

- `obj`: pointer to an object. Can't be a screen.
- `parent`: pointer to the new parent object. (Can't be NULL)

void **lv_obj_move_foreground**(*lv_obj_t* *obj)
Move and object to the foreground

Parameters

- `obj`: pointer to an object

void **lv_obj_move_background**(*lv_obj_t* *obj)
Move and object to the background

Parameters

- `obj`: pointer to an object

void **lv_obj_set_pos**(*lv_obj_t* *obj, lv_coord_t *x*, lv_coord_t *y*)
Set relative the position of an object (relative to the parent)

Parameters

- `obj`: pointer to an object
- `x`: new distance from the left side of the parent
- `y`: new distance from the top of the parent

void **lv_obj_set_x**(*lv_obj_t* *obj, lv_coord_t *x*)
Set the x coordinate of a object

Parameters

- `obj`: pointer to an object
- `x`: new distance from the left side from the parent

void **lv_obj_set_y**(*lv_obj_t* *obj, lv_coord_t *y*)
Set the y coordinate of a object

Parameters

- `obj`: pointer to an object
- `y`: new distance from the top of the parent

void **lv_obj_set_size**(*lv_obj_t* *obj, lv_coord_t *w*, lv_coord_t *h*)
Set the size of an object

Parameters

- `obj`: pointer to an object
- `w`: new width
- `h`: new height

void **lv_obj_set_width**(*lv_obj_t* *obj, lv_coord_t *w*)
Set the width of an object

Parameters

- `obj`: pointer to an object

- `w`: new width

void **lv_obj_set_height**(*lv_obj_t* *obj, lv_coord_t *h*)
Set the height of an object

Parameters

- `obj`: pointer to an object
- `h`: new height

void **lv_obj_align**(*lv_obj_t* *obj, **const** *lv_obj_t* *base, *lv_align_t* *align*, lv_coord_t *x_mod*, lv_coord_t *y_mod*)
Align an object to an other object.

Parameters

- `obj`: pointer to an object to align
- `base`: pointer to an object (if NULL the parent is used). 'obj' will be aligned to it.
- `align`: type of alignment (see 'lv_align_t' enum)
- `x_mod`: x coordinate shift after alignment
- `y_mod`: y coordinate shift after alignment

void **lv_obj_align_origo**(*lv_obj_t* *obj, **const** *lv_obj_t* *base, *lv_align_t* *align*, lv_coord_t *x_mod*, lv_coord_t *y_mod*)
Align an object to an other object.

Parameters

- `obj`: pointer to an object to align
- `base`: pointer to an object (if NULL the parent is used). 'obj' will be aligned to it.
- `align`: type of alignment (see 'lv_align_t' enum)
- `x_mod`: x coordinate shift after alignment
- `y_mod`: y coordinate shift after alignment

void **lv_obj_realign**(*lv_obj_t* *obj)
Realign the object based on the last `lv_obj_align` parameters.

Parameters

- `obj`: pointer to an object

void **lv_obj_set_auto_realign**(*lv_obj_t* *obj, bool *en*)
Enable the automatic realign of the object when its size has changed based on the last `lv_obj_align` parameters.

Parameters

- `obj`: pointer to an object
- `en`: true: enable auto realign; false: disable auto realign

void **lv_obj_set_ext_click_area**(*lv_obj_t* *obj, lv_coord_t *left*, lv_coord_t *right*, lv_coord_t *top*, lv_coord_t *bottom*)
Set the size of an extended clickable area

Parameters

- `obj`: pointer to an object
- `left`: extended clickable are on the left [px]

- `right`: extended clickable are on the right [px]
- `top`: extended clickable are on the top [px]
- `bottom`: extended clickable are on the bottom [px]

void **lv_obj_set_style**(*lv_obj_t* *obj, **const** lv_style_t *style)
Set a new style for an object

Parameters

- `obj`: pointer to an object
- `style_p`: pointer to the new style

void **lv_obj_refresh_style**(*lv_obj_t* *obj)
Notify an object about its style is modified

Parameters

- `obj`: pointer to an object

void **lv_obj_report_style_mod**(lv_style_t *style)
Notify all object if a style is modified

Parameters

- `style`: pointer to a style. Only the objects with this style will be notified (NULL to notify all objects)

void **lv_obj_set_hidden**(*lv_obj_t* *obj, bool *en*)
Hide an object. It won't be visible and clickable.

Parameters

- `obj`: pointer to an object
- `en`: true: hide the object

void **lv_obj_set_click**(*lv_obj_t* *obj, bool *en*)
Enable or disable the clicking of an object

Parameters

- `obj`: pointer to an object
- `en`: true: make the object clickable

void **lv_obj_set_top**(*lv_obj_t* *obj, bool *en*)
Enable to bring this object to the foreground if it or any of its children is clicked

Parameters

- `obj`: pointer to an object
- `en`: true: enable the auto top feature

void **lv_obj_set_drag**(*lv_obj_t* *obj, bool *en*)
Enable the dragging of an object

Parameters

- `obj`: pointer to an object
- `en`: true: make the object dragable

void **lv_obj_set_drag_dir**(*lv_obj_t* *obj, *lv_drag_dir_t* *drag_dir*)
Set the directions an object can be dragged in

Parameters

- `obj`: pointer to an object
- `drag_dir`: bitwise OR of allowed drag directions

void **lv_obj_set_drag_throw**(*lv_obj_t* *obj, bool *en*)
Enable the throwing of an object after is is dragged

Parameters

- `obj`: pointer to an object
- `en`: true: enable the drag throw

void **lv_obj_set_drag_parent**(*lv_obj_t* *obj, bool *en*)
Enable to use parent for drag related operations. If trying to drag the object the parent will be moved instead

Parameters

- `obj`: pointer to an object
- `en`: true: enable the 'drag parent' for the object

void **lv_obj_set_parent_event**(*lv_obj_t* *obj, bool *en*)
Propagate the events to the parent too

Parameters

- `obj`: pointer to an object
- `en`: true: enable the event propagation

void **lv_obj_set_base_dir**(*lv_obj_t* *obj, lv_bidi_dir_t *dir*)

void **lv_obj_set_opa_scale_enable**(*lv_obj_t* *obj, bool *en*)
Set the opa scale enable parameter (required to set opa_scale with *lv_obj_set_opa_scale()*)

Parameters

- `obj`: pointer to an object
- `en`: true: opa scaling is enabled for this object and all children; false: no opa scaling

void **lv_obj_set_opa_scale**(*lv_obj_t* *obj, *lv_opa_t* *opa_scale*)
Set the opa scale of an object. The opacity of this object and all it's children will be scaled down with this factor. `lv_obj_set_opa_scale_enable(obj, true)` needs to be called to enable it. (not for all children just for the parent where to start the opa scaling)

Parameters

- `obj`: pointer to an object
- `opa_scale`: a factor to scale down opacity [0..255]

void **lv_obj_set_protect**(*lv_obj_t* *obj, uint8_t *prot*)
Set a bit or bits in the protect filed

Parameters

- `obj`: pointer to an object
- `prot`: 'OR'-ed values from `lv_protect_t`

void **lv_obj_clear_protect**(*lv_obj_t* *obj, uint8_t *prot*)
Clear a bit or bits in the protect filed

Parameters

- `obj`: pointer to an object
- `prot`: 'OR' -ed values from `lv_protect_t`

void **lv_obj_set_event_cb**(*lv_obj_t* *obj, *lv_event_cb_t* event_cb)
Set a an event handler function for an object. Used by the user to react on event which happens with the object.

Parameters

- `obj`: pointer to an object
- `event_cb`: the new event function

lv_res_t **lv_event_send**(*lv_obj_t* *obj, *lv_event_t* event, **const** void *data)
Send an event to the object

Return LV_RES_OK: `obj` was not deleted in the event; LV_RES_INV: `obj` was deleted in the event

Parameters

- `obj`: pointer to an object
- `event`: the type of the event from `lv_event_t`.
- `data`: arbitrary data depending on the object type and the event. (Usually `NULL`)

lv_res_t **lv_event_send_func**(*lv_event_cb_t* event_xcb, *lv_obj_t* *obj, *lv_event_t* event, **const** void *data)
Call an event function with an object, event, and data.

Return LV_RES_OK: `obj` was not deleted in the event; LV_RES_INV: `obj` was deleted in the event

Parameters

- `event_xcb`: an event callback function. If `NULL` `LV_RES_OK` will return without any actions. (the 'x' in the argument name indicates that its not a fully generic function because it not follows the `func_name(object, callback, ...)` convention)
- `obj`: pointer to an object to associate with the event (can be `NULL` to simply call the `event_cb`)
- `event`: an event
- `data`: pointer to a custom data

const void ***lv_event_get_data**(void)
Get the `data` parameter of the current event

Return the `data` parameter

void **lv_obj_set_signal_cb**(*lv_obj_t* *obj, *lv_signal_cb_t* signal_cb)
Set the a signal function of an object. Used internally by the library. Always call the previous signal function in the new.

Parameters

- `obj`: pointer to an object
- `signal_cb`: the new signal function

void **lv_signal_send**(*lv_obj_t* *obj, *lv_signal_t* signal, void *param)
Send an event to the object

Parameters

- `obj`: pointer to an object
- `event`: the type of the event from `lv_event_t`.

void **lv_obj_set_design_cb**(*lv_obj_t* *obj, *lv_design_cb_t* design_cb)
Set a new design function for an object

Parameters

- `obj`: pointer to an object
- `design_cb`: the new design function

void ***lv_obj_allocate_ext_attr**(*lv_obj_t* *obj, uint16_t ext_size)
Allocate a new ext. data for an object

Return pointer to the allocated ext

Parameters

- `obj`: pointer to an object
- `ext_size`: the size of the new ext. data

void **lv_obj_refresh_ext_draw_pad**(*lv_obj_t* *obj)
Send a 'LV_SIGNAL_REFR_EXT_SIZE' signal to the object

Parameters

- `obj`: pointer to an object

lv_obj_t ***lv_obj_get_screen**(**const** *lv_obj_t* *obj)
Return with the screen of an object

Return pointer to a screen

Parameters

- `obj`: pointer to an object

lv_disp_t ***lv_obj_get_disp**(**const** *lv_obj_t* *obj)
Get the display of an object

Return pointer the object's display

Parameters

- `scr`: pointer to an object

lv_obj_t ***lv_obj_get_parent**(**const** *lv_obj_t* *obj)
Returns with the parent of an object

Return pointer to the parent of 'obj'

Parameters

- `obj`: pointer to an object

lv_obj_t ***lv_obj_get_child**(**const** *lv_obj_t* *obj, **const** *lv_obj_t* *child)
Iterate through the children of an object (start from the "youngest, lastly created")

Return the child after 'act_child' or NULL if no more child

Parameters

- `obj`: pointer to an object

- `child`: NULL at first call to get the next children and the previous return value later

lv_obj_t ***lv_obj_get_child_back**(**const** *lv_obj_t* **obj*, **const** *lv_obj_t* **child*)
Iterate through the children of an object (start from the "oldest", firstly created)

Return the child after 'act_child' or NULL if no more child

Parameters

- `obj`: pointer to an object
- `child`: NULL at first call to get the next children and the previous return value later

uint16_t **lv_obj_count_children**(**const** *lv_obj_t* **obj*)
Count the children of an object (only children directly on 'obj')

Return children number of 'obj'

Parameters

- `obj`: pointer to an object

uint16_t **lv_obj_count_children_recursive**(**const** *lv_obj_t* **obj*)
Recursively count the children of an object

Return children number of 'obj'

Parameters

- `obj`: pointer to an object

void **lv_obj_get_coords**(**const** *lv_obj_t* **obj*, lv_area_t **cords_p*)
Copy the coordinates of an object to an area

Parameters

- `obj`: pointer to an object
- `cords_p`: pointer to an area to store the coordinates

void **lv_obj_get_inner_coords**(**const** *lv_obj_t* **obj*, lv_area_t **coords_p*)
Reduce area retried by *`lv_obj_get_coords()`* the get graphically usable area of an object. (Without the size of the border or other extra graphical elements)

Parameters

- `coords_p`: store the result area here

lv_coord_t **lv_obj_get_x**(**const** *lv_obj_t* **obj*)
Get the x coordinate of object

Return distance of 'obj' from the left side of its parent

Parameters

- `obj`: pointer to an object

lv_coord_t **lv_obj_get_y**(**const** *lv_obj_t* **obj*)
Get the y coordinate of object

Return distance of 'obj' from the top of its parent

Parameters

- `obj`: pointer to an object

lv_coord_t **lv_obj_get_width**(**const** *lv_obj_t* **obj*)
Get the width of an object

Return the width

Parameters

- `obj`: pointer to an object

lv_coord_t **lv_obj_get_height(const** *lv_obj_t* ***obj)**
Get the height of an object

Return the height

Parameters

- `obj`: pointer to an object

lv_coord_t **lv_obj_get_width_fit(const** *lv_obj_t* ***obj)**
Get that width reduced by the left and right padding.

Return the width which still fits into the container

Parameters

- `obj`: pointer to an object

lv_coord_t **lv_obj_get_height_fit(const** *lv_obj_t* ***obj)**
Get that height reduced by the top an bottom padding.

Return the height which still fits into the container

Parameters

- `obj`: pointer to an object

bool **lv_obj_get_auto_realign(const** *lv_obj_t* ***obj)**
Get the automatic realign property of the object.

Return true: auto realign is enabled; false: auto realign is disabled

Parameters

- `obj`: pointer to an object

lv_coord_t **lv_obj_get_ext_click_pad_left(const** *lv_obj_t* ***obj)**
Get the left padding of extended clickable area

Return the extended left padding

Parameters

- `obj`: pointer to an object

lv_coord_t **lv_obj_get_ext_click_pad_right(const** *lv_obj_t* ***obj)**
Get the right padding of extended clickable area

Return the extended right padding

Parameters

- `obj`: pointer to an object

lv_coord_t **lv_obj_get_ext_click_pad_top(const** *lv_obj_t* ***obj)**
Get the top padding of extended clickable area

Return the extended top padding

Parameters

- `obj`: pointer to an object

lv_coord_t **lv_obj_get_ext_click_pad_bottom(const** *lv_obj_t* ***obj)**
Get the bottom padding of extended clickable area

Return the extended bottom padding

Parameters

- `obj`: pointer to an object

lv_coord_t **lv_obj_get_ext_draw_pad(const** *lv_obj_t* ***obj)**
Get the extended size attribute of an object

Return the extended size attribute

Parameters

- `obj`: pointer to an object

const lv_style_t ***lv_obj_get_style(const** *lv_obj_t* ***obj)**
Get the style pointer of an object (if NULL get style of the parent)

Return pointer to a style

Parameters

- `obj`: pointer to an object

bool **lv_obj_get_hidden(const** *lv_obj_t* ***obj)**
Get the hidden attribute of an object

Return true: the object is hidden

Parameters

- `obj`: pointer to an object

bool **lv_obj_get_click(const** *lv_obj_t* ***obj)**
Get the click enable attribute of an object

Return true: the object is clickable

Parameters

- `obj`: pointer to an object

bool **lv_obj_get_top(const** *lv_obj_t* ***obj)**
Get the top enable attribute of an object

Return true: the auto top feature is enabled

Parameters

- `obj`: pointer to an object

bool **lv_obj_get_drag(const** *lv_obj_t* ***obj)**
Get the drag enable attribute of an object

Return true: the object is dragable

Parameters

- `obj`: pointer to an object

lv_drag_dir_t **lv_obj_get_drag_dir(const** *lv_obj_t* ***obj)**
Get the directions an object can be dragged

Return bitwise OR of allowed directions an object can be dragged in

Parameters

- `obj`: pointer to an object

bool **lv_obj_get_drag_throw**(**const** *lv_obj_t* *obj)
Get the drag throw enable attribute of an object

Return true: drag throw is enabled

Parameters

- `obj`: pointer to an object

bool **lv_obj_get_drag_parent**(**const** *lv_obj_t* *obj)
Get the drag parent attribute of an object

Return true: drag parent is enabled

Parameters

- `obj`: pointer to an object

bool **lv_obj_get_parent_event**(**const** *lv_obj_t* *obj)
Get the drag parent attribute of an object

Return true: drag parent is enabled

Parameters

- `obj`: pointer to an object

lv_bidi_dir_t **lv_obj_get_base_dir**(**const** *lv_obj_t* *obj)

lv_opa_t **lv_obj_get_opa_scale_enable**(**const** *lv_obj_t* *obj)
Get the opa scale enable parameter

Return true: opa scaling is enabled for this object and all children; false: no opa scaling

Parameters

- `obj`: pointer to an object

lv_opa_t **lv_obj_get_opa_scale**(**const** *lv_obj_t* *obj)
Get the opa scale parameter of an object

Return opa scale [0..255]

Parameters

- `obj`: pointer to an object

uint8_t **lv_obj_get_protect**(**const** *lv_obj_t* *obj)
Get the protect field of an object

Return protect field ('OR' ed values of `lv_protect_t`)

Parameters

- `obj`: pointer to an object

bool **lv_obj_is_protected**(**const** *lv_obj_t* *obj, uint8_t *prot*)
Check at least one bit of a given protect bitfield is set

Return false: none of the given bits are set, true: at least one bit is set

Parameters

- `obj`: pointer to an object
- `prot`: protect bits to test ('OR' ed values of `lv_protect_t`)

lv_signal_cb_t **lv_obj_get_signal_cb**(**const** *lv_obj_t* **obj*)
Get the signal function of an object

Return the signal function

Parameters

- `obj`: pointer to an object

lv_design_cb_t **lv_obj_get_design_cb**(**const** *lv_obj_t* **obj*)
Get the design function of an object

Return the design function

Parameters

- `obj`: pointer to an object

lv_event_cb_t **lv_obj_get_event_cb**(**const** *lv_obj_t* **obj*)
Get the event function of an object

Return the event function

Parameters

- `obj`: pointer to an object

void ***lv_obj_get_ext_attr**(**const** *lv_obj_t* **obj*)
Get the ext pointer

Return the ext pointer but not the dynamic version Use it as ext->data1, and NOT da(ext)->data1

Parameters

- `obj`: pointer to an object

void **lv_obj_get_type**(**const** *lv_obj_t* **obj*, *lv_obj_type_t* **buf*)
Get object' s and its ancestors type. Put their name in `type_buf` starting with the current type. E.g. buf.type[0]=" lv_btn" , buf.type[1]=" lv_cont" , buf.type[2]=" lv_obj"

Parameters

- `obj`: pointer to an object which type should be get
- `buf`: pointer to an *`lv_obj_type_t`* buffer to store the types

lv_obj_user_data_t **lv_obj_get_user_data**(**const** *lv_obj_t* **obj*)
Get the object' s user data

Return user data

Parameters

- `obj`: pointer to an object

lv_obj_user_data_t ***lv_obj_get_user_data_ptr**(**const** *lv_obj_t* **obj*)
Get a pointer to the object' s user data

Return pointer to the user data

Parameters

- `obj`: pointer to an object

void **lv_obj_set_user_data**(*lv_obj_t* **obj*, lv_obj_user_data_t *data*)
Set the object' s user data. The data will be copied.

Parameters

- `obj`: pointer to an object
- `data`: user data

void *__lv_obj_get_group__(__const__ *lv_obj_t* **obj*)
Get the group of the object

Return the pointer to group of the object

Parameters

- `obj`: pointer to an object

bool __lv_obj_is_focused__(__const__ *lv_obj_t* **obj*)
Tell whether the object is the focused object of a group or not.

Return true: the object is focused, false: the object is not focused or not in a group

Parameters

- `obj`: pointer to an object

lv_res_t __lv_obj_handle_get_type_signal__(*lv_obj_type_t* **buf*, __const__ char **name*)
Used in the signal callback to handle `LV_SIGNAL_GET_TYPE` signal

Return LV_RES_OK

Parameters

- `buf`: pointer to *`lv_obj_type_t`*. (`param` in the signal callback)
- `name`: name of the object. E.g. "lv_btn" . (Only the pointer is saved)

struct lv_reailgn_t

Public Members

__const__ __struct__ *_lv_obj_t* ***base**

lv_coord_t **xofs**

lv_coord_t **yofs**

lv_align_t **align**

uint8_t **auto_realign**

uint8_t **origo_align**
1: the origo (center of the object) was aligned with `lv_obj_align_origo`

struct _lv_obj_t

Public Members

__struct__ *_lv_obj_t* ***par**
Pointer to the parent object

lv_ll_t **child_ll**
Linked list to store the children objects

lv_area_t **coords**
Coordinates of the object (x1, y1, x2, y2)

lv_event_cb_t **event_cb**
Event callback function

lv_signal_cb_t **signal_cb**
Object type specific signal function

lv_design_cb_t **design_cb**
Object type specific design function

void ***ext_attr**
Object type specific extended data

const lv_style_t ***style_p**
Pointer to the object's style

void ***group_p**
Pointer to the group of the object

uint8_t **ext_click_pad_hor**
Extra click padding in horizontal direction

uint8_t **ext_click_pad_ver**
Extra click padding in vertical direction

lv_area_t **ext_click_pad**
Extra click padding area.

uint8_t **click**
1: Can be pressed by an input device

uint8_t **drag**
1: Enable the dragging

uint8_t **drag_throw**
1: Enable throwing with drag

uint8_t **drag_parent**
1: Parent will be dragged instead

uint8_t **hidden**
1: Object is hidden

uint8_t **top**
1: If the object or its children is clicked it goes to the foreground

uint8_t **opa_scale_en**
1: opa_scale is set

uint8_t **parent_event**
1: Send the object's events to the parent too.

lv_drag_dir_t **drag_dir**
Which directions the object can be dragged in

lv_bidi_dir_t **base_dir**
Base direction of texts related to this object

uint8_t **reserved**
Reserved for future use

uint8_t **protect**
Automatically happening actions can be prevented. 'OR'ed values from `lv_protect_t`

lv_opa_t **opa_scale**
Scale down the opacity by this factor. Effects all children as well

lv_coord_t **ext_draw_pad**
EXTtend the size in every direction for drawing.

lv_reailgn_t **realign**
Information about the last call to *lv_obj_align*.

lv_obj_user_data_t **user_data**
Custom user data for object.

struct lv_obj_type_t
#include <lv_obj.h> Used by `lv_obj_get_type()`. The object's and its ancestor types are stored here

Public Members

const char ***type**[**LV_MAX_ANCESTOR_NUM**]
[0]: the actual type, [1]: ancestor, [2] #1's ancestor ···[x]: "lv_obj"

Arc (lv_arc)

Vue d'ensemble

L'objet *arc* **trace un arc** entre les **angles de début et de fin** dans une certaine **épaisseur**.

Angles

To set the angles, use the `lv_arc_set_angles(arc, start_angle, end_angle)` function. The zero degree is at the bottom of the object and the degrees are increasing in a counter-clockwise direction. Les angles doivent être compris dans l'intervalle [0;360].

Notes

Les **largeur et hauteur** de l'*arc* doivent être **identiques**.

Actuellement, l'objet *arc* **ne prend pas en charge l'anticrénelage**.

Styles

To set the style of an *Arc* object, use `lv_arc_set_style(arc, LV_ARC_STYLE_MAIN, &style)`

- **line.rounded** - make the endpoints rounded (opacity won't work properly if set to 1)
- **line.width** - the thickness of the arc
- **line.color** - the color of the arc.

Evénements

Seuls les événements génériques sont envoyés par ce type d'objet.

Apprenez-en plus sur les *événements*.

Touches

Aucune *touche* n'est traitée par ce type d'objet.

Apprenez-en plus sur les *touches*.

Exemple

C

Simple Arc

code

```
#include "lvgl/lvgl.h"

void lv_ex_arc_1(void)
{
  /*Create style for the Arcs*/
  static lv_style_t style;
  lv_style_copy(&style, &lv_style_plain);
  style.line.color = LV_COLOR_BLUE;           /*Arc color*/
  style.line.width = 8;                       /*Arc width*/

  /*Create an Arc*/
  lv_obj_t * arc = lv_arc_create(lv_scr_act(), NULL);
  lv_arc_set_style(arc, LV_ARC_STYLE_MAIN, &style);          /*Use the new style*/
  lv_arc_set_angles(arc, 90, 60);
  lv_obj_set_size(arc, 150, 150);
  lv_obj_align(arc, NULL, LV_ALIGN_CENTER, 0, 0);
}
```

Loader with Arc

code

```
#include "lvgl/lvgl.h"

/**
 * An `lv_task` to call periodically to set the angles of the arc
 * @param t
 */
static void arc_loader(lv_task_t * t)
{
    static int16_t a = 0;

    a+=5;
    if(a >= 359) a = 359;

    if(a < 180) lv_arc_set_angles(t->user_data, 180-a ,180);
    else lv_arc_set_angles(t->user_data, 540-a ,180);

    if(a == 359) {
        lv_task_del(t);
        return;
    }
}

/**
 * Create an arc which acts as a loader.
 */
void lv_ex_arc_2(void)
{
  /*Create style for the Arcs*/
  static lv_style_t style;
  lv_style_copy(&style, &lv_style_plain);
  style.line.color = LV_COLOR_NAVY;           /*Arc color*/
```

(continues on next page)

(continued from previous page)

```
  style.line.width = 8;                       /*Arc width*/

  /*Create an Arc*/
  lv_obj_t * arc = lv_arc_create(lv_scr_act(), NULL);
  lv_arc_set_angles(arc, 180, 180);
  lv_arc_set_style(arc, LV_ARC_STYLE_MAIN, &style);
  lv_obj_align(arc, NULL, LV_ALIGN_CENTER, 0, 0);

  /* Create an `lv_task` to update the arc.
   * Store the `arc` in the user data*/
  lv_task_create(arc_loader, 20, LV_TASK_PRIO_LOWEST, arc);

}
```

MicroPython

Simple Arc

code

```
# Create style for the Arcs
style = lv.style_t()
lv.style_copy(style, lv.style_plain)
style.line.color = lv.color_make(0,0,255) # Arc color
style.line.width = 8                      # Arc width

# Create an Arc
arc = lv.arc(lv.scr_act())
arc.set_style(lv.arc.STYLE.MAIN, style)   # Use the new style
arc.set_angles(90, 60)
arc.set_size(150, 150)
arc.align(None, lv.ALIGN.CENTER, 0, 0)
```

Loader with Arc

code

```
# Create an arc which acts as a loader.
class loader_arc(lv.arc):

    def __init__(self, parent, color=lv.color_hex(0x000080),
                       width=8, style=lv.style_plain, rate=20):
        super().__init__(parent)

        self.a = 0
        self.rate = rate

        # Create style for the Arcs
        self.style = lv.style_t()
        lv.style_copy(self.style, style)
        self.style.line.color = color
        self.style.line.width = width

        # Create an Arc
        self.set_angles(180, 180);
        self.set_style(self.STYLE.MAIN, self.style);

        # Spin the Arc
        self.spin()

    def spin(self):
        # Create an `lv_task` to update the arc.
        lv.task_create(self.task_cb, self.rate, lv.TASK_PRIO.LOWEST, {})


    # An `lv_task` to call periodically to set the angles of the arc
    def task_cb(self, task):
        self.a+=5;
```

(continues on next page)

(continued from previous page)

```
        if self.a >= 359: self.a = 359

        if self.a < 180: self.set_angles(180-self.a, 180)
        else: self.set_angles(540-self.a, 180)

        if self.a == 359:
            self.a = 0
            lv.task_del(task)

# Create a loader arc
loader_arc = loader_arc(lv.scr_act())
loader_arc.align(None, lv.ALIGN.CENTER, 0, 0)
```

API

Typedefs

typedef uint8_t **lv_arc_style_t**

Enums

enum [anonymous]

Values:

LV_ARC_STYLE_MAIN

Functions

lv_obj_t ***lv_arc_create**(*lv_obj_t* **par*, **const** *lv_obj_t* **copy*)

Create a arc objects

Return pointer to the created arc

Parameters

- `par`: pointer to an object, it will be the parent of the new arc
- `copy`: pointer to a arc object, if not NULL then the new object will be copied from it

void **lv_arc_set_angles**(*lv_obj_t* **arc*, uint16_t *start*, uint16_t *end*)

Set the start and end angles of an arc. 0 deg: bottom, 90 deg: right etc.

Parameters

- `arc`: pointer to an arc object
- `start`: the start angle [0..360]
- `end`: the end angle [0..360]

void **lv_arc_set_style**(*lv_obj_t* **arc*, *lv_arc_style_t type*, **const** lv_style_t **style*)

Set a style of a arc.

Parameters

- `arc`: pointer to arc object
- `type`: which style should be set

- `style`: pointer to a style

uint16_t **lv_arc_get_angle_start**(*lv_obj_t* *arc)
Get the start angle of an arc.

Return the start angle [0..360]

Parameters

- `arc`: pointer to an arc object

uint16_t **lv_arc_get_angle_end**(*lv_obj_t* *arc)
Get the end angle of an arc.

Return the end angle [0..360]

Parameters

- `arc`: pointer to an arc object

const lv_style_t ***lv_arc_get_style**(**const** *lv_obj_t* *arc, *lv_arc_style_t* type)
Get style of a arc.

Return style pointer to the style

Parameters

- `arc`: pointer to arc object
- `type`: which style should be get

struct lv_arc_ext_t

Public Members

lv_coord_t **angle_start**

lv_coord_t **angle_end**

Barre (lv_bar)

Vue d'ensemble

The 'Bar' objects have got two main parts:

1. a **background** which is the object itself.
2. an **indicator** which shape is similar to the background but its width/height can be adjusted.

The orientation of the bar can be vertical or horizontal according to the width/height ratio. Logically, on horizontal bars, the indicator's width can be changed. Similarly, on vertical bars, the indicator's height can be changed.

Valeur et intervalle

A new value can be set by `lv_bar_set_value(bar, new_value, LV_ANIM_ON/OFF)`. The value is interpreted in a range (minimum and maximum values) which can be modified with `lv_bar_set_range(bar, min, max)`. L'intervalle par défaut est 1..100.

The new value in `lv_bar_set_value` can be set with or without an animation depending on the last parameter (`LV_ANIM_ON/OFF`). The time of the animation can be adjusted by `lv_bar_set_anim_time(bar, 100)`. The time is in milliseconds unit.

Symétrique

The bar can be drawn symmetrical to zero (drawn from zero, left to right), if it' s enabled with `lv_bar_set_sym(bar, true)`

Styles

To set the style of an *Bar* object, use `lv_bar_set_style(arc, LV_BAR_STYLE_MAIN, &style)`:

- **LV_BAR_STYLE_BG** - is a *Base object*, therefore, it uses its style elements. Its default style is: `lv_style_pretty`.
- **LV_BAR_STYLE_INDIC** - is similar to the background. It uses the *left*, *right*, *top* and *bottom* paddings to keeps some space form the edges of the background. Its default style is: `lv_style_pretty_color`.

Evénements

Les événements génériques sont les seuls à être envoyés par ce type d' objet.

Apprenez-en plus sur les *événements*.

Touches

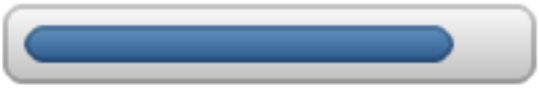
Aucune *touche* n' est traitée par ce type d' objet.

Apprenez-en plus sur les *touches*.

Exemple

C

Simple Bar

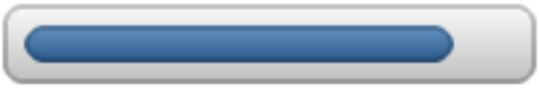


code

```
#include "lvgl/lvgl.h"

void lv_ex_bar_1(void)
{
    lv_obj_t * bar1 = lv_bar_create(lv_scr_act(), NULL);
    lv_obj_set_size(bar1, 200, 30);
    lv_obj_align(bar1, NULL, LV_ALIGN_CENTER, 0, 0);
    lv_bar_set_anim_time(bar1, 1000);
    lv_bar_set_value(bar1, 100, LV_ANIM_ON);
}
```

MicroPython

Simple Bar



code

```
bar1 = lv.bar(lv.scr_act())
bar1.set_size(200, 30)
bar1.align(None, lv.ALIGN.CENTER, 0, 0)
bar1.set_anim_time(1000)
bar1.set_value(100, lv.ANIM.ON)
```

API

Typedefs

typedef uint8_t **lv_bar_style_t**

Enums

enum [anonymous]

Bar styles.

Values:

LV_BAR_STYLE_BG

LV_BAR_STYLE_INDIC

Bar background style.

Functions

LV_EXPORT_CONST_INT(LV_BAR_ANIM_STATE_START)

LV_EXPORT_CONST_INT(LV_BAR_ANIM_STATE_END)

LV_EXPORT_CONST_INT(LV_BAR_ANIM_STATE_INV)

LV_EXPORT_CONST_INT(LV_BAR_ANIM_STATE_NORM)

lv_obj_t ***lv_bar_create**(*lv_obj_t* **par*, **const** *lv_obj_t* **copy*)
Create a bar objects

Return pointer to the created bar

Parameters

- `par`: pointer to an object, it will be the parent of the new bar
- `copy`: pointer to a bar object, if not NULL then the new object will be copied from it

void **lv_bar_set_value**(*lv_obj_t* **bar*, int16_t *value*, *lv_anim_enable_t* *anim*)
Set a new value on the bar

Parameters

- `bar`: pointer to a bar object
- `value`: new value
- `anim`: LV_ANIM_ON: set the value with an animation; LV_ANIM_OFF: change the value immediately

void **lv_bar_set_range**(*lv_obj_t* **bar*, int16_t *min*, int16_t *max*)
Set minimum and the maximum values of a bar

Parameters

- `bar`: pointer to the bar object
- `min`: minimum value
- `max`: maximum value

void **lv_bar_set_sym**(*lv_obj_t* **bar*, bool *en*)
Make the bar symmetric to zero. The indicator will grow from zero instead of the minimum position.

Parameters

- `bar`: pointer to a bar object
- `en`: true: enable disable symmetric behavior; false: disable

void **lv_bar_set_anim_time**(*lv_obj_t* **bar*, uint16_t *anim_time*)
Set the animation time of the bar

Parameters

- `bar`: pointer to a bar object
- `anim_time`: the animation time in milliseconds.

void **lv_bar_set_style**(*lv_obj_t* **bar*, *lv_bar_style_t* *type*, **const** lv_style_t **style*)
Set a style of a bar

Parameters

- `bar`: pointer to a bar object
- `type`: which style should be set
- `style`: pointer to a style

int16_t **lv_bar_get_value**(**const** *lv_obj_t* **bar*)
Get the value of a bar

Return the value of the bar

Parameters

- `bar`: pointer to a bar object

int16_t **lv_bar_get_min_value(const** *lv_obj_t* ***bar)**
Get the minimum value of a bar

Return the minimum value of the bar

Parameters

- `bar`: pointer to a bar object

int16_t **lv_bar_get_max_value(const** *lv_obj_t* ***bar)**
Get the maximum value of a bar

Return the maximum value of the bar

Parameters

- `bar`: pointer to a bar object

bool **lv_bar_get_sym(***lv_obj_t* ***bar)**
Get whether the bar is symmetric or not.

Return true: symmetric is enabled; false: disable

Parameters

- `bar`: pointer to a bar object

uint16_t **lv_bar_get_anim_time(***lv_obj_t* ***bar)**
Get the animation time of the bar

Return the animation time in milliseconds.

Parameters

- `bar`: pointer to a bar object

const lv_style_t ***lv_bar_get_style(const** *lv_obj_t* ***bar**, *lv_bar_style_t type*)
Get a style of a bar

Return style pointer to a style

Parameters

- `bar`: pointer to a bar object
- `type`: which style should be get

struct lv_bar_ext_t
#include <lv_bar.h> Data of bar

Public Members

int16_t **cur_value**

int16_t **min_value**

int16_t **max_value**

lv_anim_value_t **anim_start**

lv_anim_value_t **anim_end**

lv_anim_value_t **anim_state**

lv_anim_value_t **anim_time**

uint8_t **sym**

const lv_style_t ***style_indic**

Bouton (lv_btn)

Vue d'ensemble

Buttons are simple rectangle-like objects, but they change their style and state when they are pressed or released.

Etats

Les boutons peuvent prendre l'un des 5 états possibles :

- **LV_BTN_STATE_REL** - Released state
- **LV_BTN_STATE_PR** - Pressed state
- **LV_BTN_STATE_TGL_REL** - Toggled released state
- **LV_BTN_STATE_TGL_PR** - Toggled pressed state
- **LV_BTN_STATE_INA** - Inactive state

The state from `..._REL` to `..._PR` will be changed automatically when the button is pressed or released.

L'état peut être défini par programmation avec `lv_btn_set_state(btn, LV_BTN_STATE_...)`.

Bascule

You can configure the buttons as *toggle button* with `lv_btn_set_toggle(btn, true)`. In this case, on release, the button goes to *toggled released* state.

Mise en page et adaptation

Similarly to *Containers*, buttons also have layout and fit attributes.

- `lv_btn_set_layout(btn, LV_LAYOUT_...)` set a layout. The default is `LV_LAYOUT_CENTER`. So, if you add a label, then it will be automatically aligned to the middle and can't be moved with `lv_obj_set_pos()`. You can disable the layout with `lv_btn_set_layout(btn, LV_LAYOUT_OFF)`.
- `lv_btn_set_fit/fit2/fit4(btn, LV_FIT_..)` permet d'adapter automatiquement la largeur et/ou la hauteur du bouton en fonction des enfants, du parent et du type d'adaptation.

Effet d' encre

You can enable a special animation on buttons: when a button is pressed, the pressed state will be drawn in a growing circle starting from the point of pressing. It' s similar in appearance and functionality to the Material Design ripple effect.

Another way to think about it is like an ink droplet dropped into water. When the button is released, the released state will be reverted by fading. It' s like the ink is fully mixed with a lot of water and becomes invisible.

To control this animation, use the following functions:

- `lv_btn_set_ink_in_time(btn, time_ms)` - time of circle growing.
- `lv_btn_set_ink_wait_time(btn, time_ms)` - minim time to keep the fully covering (pressed) state.
- `lv_btn_set_ink_out_time(btn, time_ms)` - time fade back to releases state.

Cette fonctionnalité doit être activée avec `LV_BTN_INK_EFFECT 1` dans *lv_conf.h*.

Styles

A button can have 5 independent styles for the 5 states. You can set them via: `lv_btn_set_style(btn, LV_BTN_STYLE_..., &style)`. The styles use the `style.body` properties.

- **LV_BTN_STYLE_REL** - style of the released state. Default: `lv_style_btn_rel`.
- **LV_BTN_STYLE_PR** - style of the pressed state. Default: `lv_style_btn_pr`.
- **LV_BTN_STYLE_TGL_REL** - style of the toggled released state. Default: `lv_style_btn_tgl_rel`.
- **LV_BTN_STYLE_TGL_PR** - style of the toggled pressed state. Default: `lv_style_btn_tgl_pr`.
- **LV_BTN_STYLE_INA** - style of the inactive state. Default: `lv_style_btn_ina`.

When you create a label on a button, it' s a good practice to set the button' s `style.text` properties too. Because labels have `style = NULL` by default, they inherit the parent' s (button) style. Hence you don' t need to create a new style for the label.

Evénements

Outre les [événements génériques](/overview/event.html #evenements-generiques), les événements spéciaux suivants sont envoyés par les boutons :

- **LV_EVENT_VALUE_CHANGED** - sent when the button is toggled.

Note that, the generic input device-related events (like `LV_EVENT_PRESSED`) are sent in the inactive state too. You need to check the state with `lv_btn_get_state(btn)` to ignore the events from inactive buttons.

Apprenez-en plus sur les *événements*.

Touches

Les *touches* suivantes sont traitées par les boutons:

- **LV_KEY_RIGHT/UP** - Go to toggled state if toggling is enabled.
- **LV_KEY_LEFT/DOWN** - Go to non-toggled state if toggling is enabled.

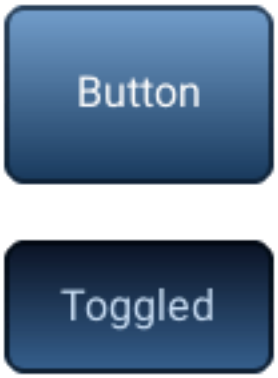
Note that, by default, the state of `LV_KEY_ENTER` is translated to `LV_EVENT_PRESSED/PRESSING/RELEASED` etc.

Apprenez-en plus sur les *touches*.

Exemple

C

Simple Buttons



code

```
#include "lvgl/lvgl.h"
#include <stdio.h>

static void event_handler(lv_obj_t * obj, lv_event_t event)
{
    if(event == LV_EVENT_CLICKED) {
        printf("Clicked\n");
    }
    else if(event == LV_EVENT_VALUE_CHANGED) {
        printf("Toggled\n");
    }
}

void lv_ex_btn_1(void)
{
    lv_obj_t * label;

    lv_obj_t * btn1 = lv_btn_create(lv_scr_act(), NULL);
```

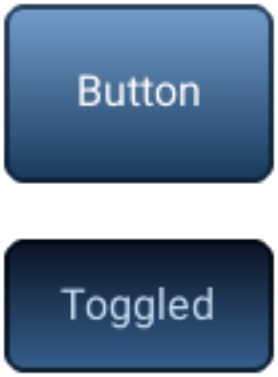
(continues on next page)

(continued from previous page)

```
    lv_obj_set_event_cb(btn1, event_handler);
    lv_obj_align(btn1, NULL, LV_ALIGN_CENTER, 0, -40);

    label = lv_label_create(btn1, NULL);
    lv_label_set_text(label, "Button");

    lv_obj_t * btn2 = lv_btn_create(lv_scr_act(), NULL);
    lv_obj_set_event_cb(btn2, event_handler);
    lv_obj_align(btn2, NULL, LV_ALIGN_CENTER, 0, 40);
    lv_btn_set_toggle(btn2, true);
    lv_btn_toggle(btn2);
    lv_btn_set_fit2(btn2, LV_FIT_NONE, LV_FIT_TIGHT);

    label = lv_label_create(btn2, NULL);
    lv_label_set_text(label, "Toggled");
}
```

MicroPython

Simple Buttons



code

```
def event_handler(obj, event):
    if event == lv.EVENT.CLICKED:
        print("Clicked")

btn1 = lv.btn(lv.scr_act())
btn1.set_event_cb(event_handler)
btn1.align(None, lv.ALIGN.CENTER, 0, -40)

label = lv.label(btn1)
label.set_text("Button")
```

(continues on next page)

(continued from previous page)

```
btn2 = lv.btn(lv.scr_act())
# callback can be lambda:
btn2.set_event_cb(lambda obj, event: print("Toggled") if event == lv.EVENT.VALUE_
↪CHANGED else None)
btn2.align(None, lv.ALIGN.CENTER, 0, 40)
btn2.set_toggle(True)
btn2.toggle()
btn2.set_fit2(lv.FIT.NONE, lv.FIT.TIGHT)

label = lv.label(btn2)
label.set_text("Toggled")
```

API

Typedefs

typedef uint8_t **lv_btn_state_t**

typedef uint8_t **lv_btn_style_t**

Enums

enum [anonymous]

Possible states of a button. It can be used not only by buttons but other button-like objects too

Values:

LV_BTN_STATE_REL
Released

LV_BTN_STATE_PR
Pressed

LV_BTN_STATE_TGL_REL
Toggled released

LV_BTN_STATE_TGL_PR
Toggled pressed

LV_BTN_STATE_INA
Inactive

_LV_BTN_STATE_NUM
Number of states

enum [anonymous]

Styles

Values:

LV_BTN_STYLE_REL
Release style

LV_BTN_STYLE_PR
Pressed style

LV_BTN_STYLE_TGL_REL
Toggle released style

LV_BTN_STYLE_TGL_PR
Toggle pressed style

LV_BTN_STYLE_INA
Inactive style

Functions

lv_obj_t ***lv_btn_create**(*lv_obj_t* **par*, **const** *lv_obj_t* **copy*)
Create a button object

Return pointer to the created button

Parameters

- `par`: pointer to an object, it will be the parent of the new button
- `copy`: pointer to a button object, if not NULL then the new object will be copied from it

void **lv_btn_set_toggle**(*lv_obj_t* **btn*, bool *tgl*)
Enable the toggled states. On release the button will change from/to toggled state.

Parameters

- `btn`: pointer to a button object
- `tgl`: true: enable toggled states, false: disable

void **lv_btn_set_state**(*lv_obj_t* **btn*, *lv_btn_state_t* *state*)
Set the state of the button

Parameters

- `btn`: pointer to a button object
- `state`: the new state of the button (from lv_btn_state_t enum)

void **lv_btn_toggle**(*lv_obj_t* **btn*)
Toggle the state of the button (ON->OFF, OFF->ON)

Parameters

- `btn`: pointer to a button object

static void **lv_btn_set_layout**(*lv_obj_t* **btn*, *lv_layout_t* *layout*)
Set the layout on a button

Parameters

- `btn`: pointer to a button object
- `layout`: a layout from 'lv_cont_layout_t'

static void **lv_btn_set_fit4**(*lv_obj_t* **btn*, *lv_fit_t* *left*, *lv_fit_t* *right*, *lv_fit_t* *top*, *lv_fit_t* *bottom*)
Set the fit policy in all 4 directions separately. It tells how to change the button size automatically.

Parameters

- `btn`: pointer to a button object
- `left`: left fit policy from `lv_fit_t`

- `right`: right fit policy from `lv_fit_t`
- `top`: top fit policy from `lv_fit_t`
- `bottom`: bottom fit policy from `lv_fit_t`

static void **lv_btn_set_fit2**(*lv_obj_t* *btn, *lv_fit_t* hor, *lv_fit_t* ver)
Set the fit policy horizontally and vertically separately. It tells how to change the button size automatically.

Parameters

- `btn`: pointer to a button object
- `hor`: horizontal fit policy from `lv_fit_t`
- `ver`: vertical fit policy from `lv_fit_t`

static void **lv_btn_set_fit**(*lv_obj_t* *btn, *lv_fit_t* fit)
Set the fit policy in all 4 direction at once. It tells how to change the button size automatically.

Parameters

- `btn`: pointer to a button object
- `fit`: fit policy from `lv_fit_t`

void **lv_btn_set_ink_in_time**(*lv_obj_t* *btn, uint16_t time)
Set time of the ink effect (draw a circle on click to animate in the new state)

Parameters

- `btn`: pointer to a button object
- `time`: the time of the ink animation

void **lv_btn_set_ink_wait_time**(*lv_obj_t* *btn, uint16_t time)
Set the wait time before the ink disappears

Parameters

- `btn`: pointer to a button object
- `time`: the time of the ink animation

void **lv_btn_set_ink_out_time**(*lv_obj_t* *btn, uint16_t time)
Set time of the ink out effect (animate to the released state)

Parameters

- `btn`: pointer to a button object
- `time`: the time of the ink animation

void **lv_btn_set_style**(*lv_obj_t* *btn, *lv_btn_style_t* type, **const** lv_style_t *style)
Set a style of a button.

Parameters

- `btn`: pointer to button object
- `type`: which style should be set
- `style`: pointer to a style

lv_btn_state_t **lv_btn_get_state**(**const** *lv_obj_t* *btn)
Get the current state of the button

Return the state of the button (from lv_btn_state_t enum)

Parameters

- `btn`: pointer to a button object

bool **lv_btn_get_toggle(const** *lv_obj_t* ***btn*)**
Get the toggle enable attribute of the button

Return true: toggle enabled, false: disabled

Parameters

- `btn`: pointer to a button object

static *lv_layout_t* **lv_btn_get_layout(const** *lv_obj_t* ***btn*)**
Get the layout of a button

Return the layout from 'lv_cont_layout_t'

Parameters

- `btn`: pointer to button object

static *lv_fit_t* **lv_btn_get_fit_left(const** *lv_obj_t* ***btn*)**
Get the left fit mode

Return an element of `lv_fit_t`

Parameters

- `btn`: pointer to a button object

static *lv_fit_t* **lv_btn_get_fit_right(const** *lv_obj_t* ***btn*)**
Get the right fit mode

Return an element of `lv_fit_t`

Parameters

- `btn`: pointer to a button object

static *lv_fit_t* **lv_btn_get_fit_top(const** *lv_obj_t* ***btn*)**
Get the top fit mode

Return an element of `lv_fit_t`

Parameters

- `btn`: pointer to a button object

static *lv_fit_t* **lv_btn_get_fit_bottom(const** *lv_obj_t* ***btn*)**
Get the bottom fit mode

Return an element of `lv_fit_t`

Parameters

- `btn`: pointer to a button object

uint16_t **lv_btn_get_ink_in_time(const** *lv_obj_t* ***btn*)**
Get time of the ink in effect (draw a circle on click to animate in the new state)

Return the time of the ink animation

Parameters

- `btn`: pointer to a button object

uint16_t **lv_btn_get_ink_wait_time(const** *lv_obj_t* ***btn*)**
Get the wait time before the ink disappears

Return the time of the ink animation

Parameters

- `btn`: pointer to a button object

uint16_t **lv_btn_get_ink_out_time(const** *lv_obj_t* *btn**)**
Get time of the ink out effect (animate to the releases state)

Return the time of the ink animation

Parameters

- `btn`: pointer to a button object

const lv_style_t ***lv_btn_get_style(const** *lv_obj_t* *btn, *lv_btn_style_t* type**)**
Get style of a button.

Return style pointer to the style

Parameters

- `btn`: pointer to button object
- `type`: which style should be get

struct lv_btn_ext_t
#include <lv_btn.h> Extended data of button

Public Members

lv_cont_ext_t **cont**
Ext. of ancestor

const lv_style_t ***styles**[**_LV_BTN_STATE_NUM**]
Styles in each state

uint16_t **ink_in_time**
[ms] Time of ink fill effect (0: disable ink effect)

uint16_t **ink_wait_time**
[ms] Wait before the ink disappears

uint16_t **ink_out_time**
[ms] Time of ink disappearing

lv_btn_state_t **state**
Current state of the button from 'lv_btn_state_t' enum

uint8_t **toggle**
1: Toggle enabled

Matrice de boutons (lv_btnm)

Vue d'ensemble

The Button Matrix objects can display **multiple buttons** in rows and columns.

The main reasons for wanting to use a button matrix instead of a container and individual button objects are:

- The button matrix is simpler to use for grid-based button layouts.

- The button matrix consumes a lot less memory per button.

Texte du bouton

There is a text on each button. To specify them a descriptor string array, called *map*, needs to be used. The map can be set with `lv_btnm_set_map(btnm, my_map)`. The declaration of a map should look like `const char * map[] = {"btn1", "btn2", "btn3", ""}`. Notez que **le dernier élément doit être une chaîne vide** !

Use `"\n"` in the map to make **line break**. E.g. `{"btn1", "btn2", "\n", "btn3", ""}`. Each line' s buttons have their width calculated automatically.

Contrôle des boutons

The **buttons width** can be set relative to the other button in the same line with `lv_btnm_set_btn_width(btnm, btn_id, width)` E.g. in a line with two buttons: *btnA, width = 1* and *btnB, width = 2*, *btnA* will have 33 % width and *btnB* will have 66 % width. It' s similar to how the `flex-grow` property works in CSS.

In addition to width, each button can be customized with the following parameters:

- **LV_BTNM_CTRL_HIDDEN** - make a button hidden (hidden buttons still take up space in the layout, they are just not visible or clickable)
- **LV_BTNM_CTRL_NO_REPEAT** - disable repeating when the button is long pressed
- **LV_BTNM_CTRL_INACTIVE** - make a button inactive
- **LV_BTNM_CTRL_TGL_ENABLE** - enable toggling of a button
- **LV_BTNM_CTRL_TGL_STATE** - set the toggle state
- **LV_BTNM_CTRL_CLICK_TRIG** - if 0, the button will react on press, if 1, will react on release

The set or clear a button' s control attribute, use `lv_btnm_set_btn_ctrl(btnm, btn_id, LV_BTNM_CTRL_...)` and `lv_btnm_clear_btn_ctrl(btnm, btn_id, LV_BTNM_CTRL_...)` respectively. More `LV_BTNM_CTRL_...` values can be *Or*ed

The set/clear the same control attribute for all buttons of a button matrix, use `lv_btnm_set_btn_ctrl_all(btnm, btn_id, LV_BTNM_CTRL_...)` and `lv_btnm_clear_btn_ctrl_all(btnm, btn_id, LV_BTNM_CTRL_...)`.

The set a control map for a button matrix (similarly to the map for the text), use `lv_btnm_set_ctrl_map(btnm, ctrl_map)`. Un élément de `ctrl_map` devrait ressembler à `ctrl_map[0] = width | LV_BTNM_CTRL_NO_REPEAT | LV_BTNM_CTRL_TGL_ENABLE`. Le nombre d' éléments doit être égal au nombre de boutons (en excluant les caractères de saut de ligne).

Une bascule

The "One toggle" feature can be enabled with `lv_btnm_set_one_toggle(btnm, true)` to allow only one button to be toggled at once.

Recolorer

The **texts** on the button can be **recolored** similarly to the recolor feature for *Label* object. To enable it, use `lv_btnm_set_recolor(btnm, true)`. After that a button with `#FF0000 Red#` text will be red.

Notes

L' objet Matrice de boutons est très léger, car les boutons ne sont pas créés mais simplement dessinés à la volée. This way, 1 button use only 8 extra bytes instead of the ~100-150 byte size of a normal *Button* object (plus the size of its container and a label for each button).

The disadvantage of this setup is that the ability to style individual buttons to be different from others is limited (aside from the toggling feature). If you require that ability, using individual buttons is very likely to be a better approach.

Styles

The Button matrix works with 6 styles: a background and 5 button styles for each state. You can set the styles with `lv_btnm_set_style(btn, LV_BTNM_STYLE_..., &style)`. L' arrière-plan et les boutons utilisent les propriétés `style.body`. Les étiquettes utilisent les propriétés `style.text` des styles de bouton.

- **LV_BTNM_STYLE_BG** - Background style. Uses all *style.body* properties including *padding* Default: *lv_style_pretty*
- **LV_BTNM_STYLE_BTN_REL** - style of the released buttons. Default: *lv_style_btn_rel*
- **LV_BTNM_STYLE_BTN_PR** - style of the pressed buttons. Default: *lv_style_btn_pr*
- **LV_BTNM_STYLE_BTN_TGL_REL** - style of the toggled released buttons. Default: *lv_style_btn_tgl_rel*
- **LV_BTNM_STYLE_BTN_TGL_PR** - style of the toggled pressed buttons. Default: *lv_style_btn_tgl_pr*
- **LV_BTNM_STYLE_BTN_INA** - style of the inactive buttons. Default: *lv_style_btn_ina*

Evénements

Besides the Generic events, the following Special events are sent by the button matrices:

- **LV_EVENT_VALUE_CHANGED** - sent when the button is pressed/released or repeated after long press. The event data is set to the ID of the pressed/released button.

Apprenez-en plus sur les *événements*.

Keys

Les *touches* suivantes sont traitées par les boutons :

- **LV_KEY_RIGHT/UP/LEFT/RIGHT** - To navigate among the buttons to select one
- **LV_KEY_ENTER** - To press/release the selected button

Apprenez-en plus sur les *touches*.

Exemple

C

Simple Button matrix

code

```
#include "lvgl/lvgl.h"
#include <stdio.h>

static void event_handler(lv_obj_t * obj, lv_event_t event)
{
    if(event == LV_EVENT_VALUE_CHANGED) {
        const char * txt = lv_btnm_get_active_btn_text(obj);

        printf("%s was pressed\n", txt);
    }
}


static const char * btnm_map[] = {"1", "2", "3", "4", "5", "\n",
                                  "6", "7", "8", "9", "0", "\n",
                                  "Action1", "Action2", ""};

void lv_ex_btnm_1(void)
{
    lv_obj_t * btnm1 = lv_btnm_create(lv_scr_act(), NULL);
    lv_btnm_set_map(btnm1, btnm_map);
    lv_btnm_set_btn_width(btnm1, 10, 2);        /*Make "Action1" twice as wide as
↪"Action2"*/
    lv_obj_align(btnm1, NULL, LV_ALIGN_CENTER, 0, 0);
    lv_obj_set_event_cb(btnm1, event_handler);
}
```

MicroPython

Simple Button matrix

code

```
def event_handler(obj, event):
    if event == lv.EVENT.VALUE_CHANGED:
        txt = obj.get_active_btn_text()
        print("%s was pressed" % txt)

btnm_map = ["1", "2", "3", "4", "5", "\n",
            "6", "7", "8", "9", "0", "\n",
            "Action1", "Action2", ""]

btnm1 = lv.btnm(lv.scr_act())
btnm1.set_map(btnm_map)
btnm1.set_btn_width(10, 2)        # Make "Action1" twice as wide as "Action2"
btnm1.align(None, lv.ALIGN.CENTER, 0, 0)
btnm1.set_event_cb(event_handler)
```

API

Typedefs

typedef uint16_t **lv_btnm_ctrl_t**

typedef uint8_t **lv_btnm_style_t**

Enums

enum [anonymous]

Type to store button control bits (disabled, hidden etc.)

Values:

LV_BTNM_CTRL_HIDDEN = 0x0008
Button hidden

LV_BTNM_CTRL_NO_REPEAT = 0x0010
Do not repeat press this button.

LV_BTNM_CTRL_INACTIVE = 0x0020
Disable this button.

LV_BTNM_CTRL_TGL_ENABLE = 0x0040
Button *can* be toggled.

LV_BTNM_CTRL_TGL_STATE = 0x0080
Button is currently toggled (e.g. checked).

LV_BTNM_CTRL_CLICK_TRIG = 0x0100
1: Send LV_EVENT_SELECTED on CLICK, 0: Send LV_EVENT_SELECTED on PRESS

enum [anonymous]
Values:

LV_BTNM_STYLE_BG

LV_BTNM_STYLE_BTN_REL

LV_BTNM_STYLE_BTN_PR

LV_BTNM_STYLE_BTN_TGL_REL

LV_BTNM_STYLE_BTN_TGL_PR

LV_BTNM_STYLE_BTN_INA

Functions

LV_EXPORT_CONST_INT(LV_BTNM_BTN_NONE)

lv_obj_t ***lv_btnm_create**(*lv_obj_t* **par*, **const** *lv_obj_t* **copy*)
Create a button matrix objects

Return pointer to the created button matrix

Parameters

- `par`: pointer to an object, it will be the parent of the new button matrix
- `copy`: pointer to a button matrix object, if not NULL then the new object will be copied from it

void **lv_btnm_set_map**(**const** *lv_obj_t* **btnm*, **const** char **map*[])
Set a new map. Buttons will be created/deleted according to the map. The button matrix keeps a reference to the map and so the string array must not be deallocated during the life of the matrix.

Parameters

- `btnm`: pointer to a button matrix object
- `map`: pointer a string array. The last string has to be: "" . Use "\n" to make a line break.

void **lv_btnm_set_ctrl_map**(**const** *lv_obj_t* **btnm*, **const** *lv_btnm_ctrl_t ctrl_map*[])
Set the button control map (hidden, disabled etc.) for a button matrix. The control map array will be copied and so may be deallocated after this function returns.

Parameters

- `btnm`: pointer to a button matrix object
- `ctrl_map`: pointer to an array of `lv_btn_ctrl_t` control bytes. The length of the array and position of the elements must match the number and order of the individual buttons (i.e. excludes newline entries). An element of the map should look like e.g.: `ctrl_map[0] = width | LV_BTNM_CTRL_NO_REPEAT | LV_BTNM_CTRL_TGL_ENABLE`

void **lv_btnm_set_pressed(const** *lv_obj_t* *btnm, uint16_t *id*)
Set the pressed button i.e. visually highlight it. Mainly used a when the btnm is in a group to show the selected button

Parameters

- `btnm`: pointer to button matrix object
- `id`: index of the currently pressed button (`LV_BTNM_BTN_NONE` to unpress)

void **lv_btnm_set_style(***lv_obj_t* *btnm, *lv_btnm_style_t type*, **const** lv_style_t *style**)**
Set a style of a button matrix

Parameters

- `btnm`: pointer to a button matrix object
- `type`: which style should be set
- `style`: pointer to a style

void **lv_btnm_set_recolor(const** *lv_obj_t* *btnm, bool *en***)**
Enable recoloring of button's texts

Parameters

- `btnm`: pointer to button matrix object
- `en`: true: enable recoloring; false: disable

void **lv_btnm_set_btn_ctrl(const** *lv_obj_t* *btnm, uint16_t *btn_id*, *lv_btnm_ctrl_t ctrl***)**
Set the attributes of a button of the button matrix

Parameters

- `btnm`: pointer to button matrix object
- `btn_id`: 0 based index of the button to modify. (Not counting new lines)

void **lv_btnm_clear_btn_ctrl(const** *lv_obj_t* *btnm, uint16_t *btn_id*, *lv_btnm_ctrl_t ctrl***)**
Clear the attributes of a button of the button matrix

Parameters

- `btnm`: pointer to button matrix object
- `btn_id`: 0 based index of the button to modify. (Not counting new lines)

void **lv_btnm_set_btn_ctrl_all(***lv_obj_t* *btnm, *lv_btnm_ctrl_t ctrl***)**
Set the attributes of all buttons of a button matrix

Parameters

- `btnm`: pointer to a button matrix object
- `ctrl`: attribute(s) to set from `lv_btnm_ctrl_t`. Values can be ORed.

void **lv_btnm_clear_btn_ctrl_all(***lv_obj_t* *btnm, *lv_btnm_ctrl_t ctrl***)**
Clear the attributes of all buttons of a button matrix

Parameters

- `btnm`: pointer to a button matrix object
- `ctrl`: attribute(s) to set from `lv_btnm_ctrl_t`. Values can be ORed.
- `en`: true: set the attributes; false: clear the attributes

void **lv_btnm_set_btn_width(const** *lv_obj_t* *btnm, uint16_t *btn_id*, uint8_t *width***)**
Set a single buttons relative width. This method will cause the matrix be regenerated and is a relatively expensive operation. It is recommended that initial width be specified using `lv_btnm_set_ctrl_map` and this method only be used for dynamic changes.

Parameters

- `btnm`: pointer to button matrix object
- `btn_id`: 0 based index of the button to modify.
- `width`: Relative width compared to the buttons in the same row. [1..7]

void **lv_btnm_set_one_toggle(***lv_obj_t* *btnm, bool *one_toggle***)**
Make the button matrix like a selector widget (only one button may be toggled at a time).

Toggling must be enabled on the buttons you want to be selected with `lv_btnm_set_ctrl` or `lv_btnm_set_btn_ctrl_all`.

Parameters

- `btnm`: Button matrix object
- `one_toggle`: Whether "one toggle" mode is enabled

const char ****lv_btnm_get_map_array(const** *lv_obj_t* *btnm**)**
Get the current map of a button matrix

Return the current map

Parameters

- `btnm`: pointer to a button matrix object

bool **lv_btnm_get_recolor(const** *lv_obj_t* *btnm**)**
Check whether the button's text can use recolor or not

Return true: text recolor enable; false: disabled

Parameters

- `btnm`: pointer to button matrix object

uint16_t **lv_btnm_get_active_btn(const** *lv_obj_t* *btnm**)**
Get the index of the lastly "activated" button by the user (pressed, released etc) Useful in the the `event_cb` to get the text of the button, check if hidden etc.

Return index of the last released button (LV_BTNM_BTN_NONE: if unset)

Parameters

- `btnm`: pointer to button matrix object

const char ***lv_btnm_get_active_btn_text(const** *lv_obj_t* *btnm**)**
Get the text of the lastly "activated" button by the user (pressed, released etc) Useful in the the `event_cb`

Return text of the last released button (NULL: if unset)

Parameters

- `btnm`: pointer to button matrix object

uint16_t **lv_btnm_get_pressed_btn(const** *lv_obj_t* ***btnm*****)**
Get the pressed button' s index. The button be really pressed by the user or manually set to pressed with `lv_btnm_set_pressed`

Return index of the pressed button (LV_BTNM_BTN_NONE: if unset)

Parameters

- `btnm`: pointer to button matrix object

const char ***lv_btnm_get_btn_text(const** *lv_obj_t* ***btnm*, uint16_t *btn_id*)**
Get the button' s text

Return text of btn_index' button

Parameters

- `btnm`: pointer to button matrix object
- `btn_id`: the index a button not counting new line characters. (The return value of lv_btnm_get_pressed/released)

bool **lv_btnm_get_btn_ctrl(***lv_obj_t* ***btnm*, uint16_t *btn_id*, *lv_btnm_ctrl_t ctrl*)**
Get the whether a control value is enabled or disabled for button of a button matrix

Return true: long press repeat is disabled; false: long press repeat enabled

Parameters

- `btnm`: pointer to a button matrix object
- `btn_id`: the index a button not counting new line characters. (E.g. the return value of lv_btnm_get_pressed/released)
- `ctrl`: control values to check (ORed value can be used)

const lv_style_t ***lv_btnm_get_style(const** *lv_obj_t* ***btnm*, *lv_btnm_style_t type*)**
Get a style of a button matrix

Return style pointer to a style

Parameters

- `btnm`: pointer to a button matrix object
- `type`: which style should be get

bool **lv_btnm_get_one_toggle(const** *lv_obj_t* ***btnm*)**
Find whether "one toggle" mode is enabled.

Return whether "one toggle" mode is enabled

Parameters

- `btnm`: Button matrix object

struct lv_btnm_ext_t

Public Members

const char ****map_p**

lv_area_t ***button_areas**

lv_btnm_ctrl_t ***ctrl_bits**

const lv_style_t ***styles_btn**[**_LV_BTN_STATE_NUM**]

uint16_t **btn_cnt**

uint16_t **btn_id_pr**

uint16_t **btn_id_act**

uint8_t **recolor**

uint8_t **one_toggle**

Calendrier (lv_calendar)

Vue d'ensemble

L'objet calendrier est un calendrier classique qui peut :

- mettre en évidence le jour et la semaine en cours,
- mettre en évidence les dates définies par l'utilisateur,
- afficher le nom des jours,
- aller au mois suivant/précédent en cliquant sur un bouton,
- mettre en évidence le jour cliqué.

To set and get dates in the calendar, the `lv_calendar_date_t` type is used which is a structure with `year`, `month` and `day` fields.

Date courante

To set the current date (today), use the `lv_calendar_set_today_date(calendar, &today_date)` function.

Date affichée

To set the shown date, use `lv_calendar_set_shown_date(calendar, &shown_date)`;

Jours mis en évidence

The list of highlighted dates should be stored in a `lv_calendar_date_t` array loaded by `lv_calendar_set_highlighted_dates(calendar, &highlighted_dates)`.Only the arrays pointer will be saved so the array should be a static or global variable.

Nom des jours

Le nom des jours peut être spécifié avec `lv_calendar_set_day_names(calendar, day_names)` où `day_names` ressemble à `const char * day_names [7] = { "Di", "Lu", ... };`

Nom des mois

Similarly to `day_names`, the name of the month can be set with `lv_calendar_set_month_names(calendar, month_names_array)`.

Styles

You can set the styles with `lv_calendar_set_style(btn, LV_CALENDAR_STYLE_..., &style)`.

- **LV_CALENDAR_STYLE_BG** - Style of the background using the `body` properties and the style of the date numbers using the `text` properties. `body.padding.left/right/bottom` padding will be added on the edges around the date numbers.
- **LV_CALENDAR_STYLE_HEADER** - Style of the header where the current year and month is displayed. `body` and `text` properties are used.
- **LV_CALENDAR_STYLE_HEADER_PR** - Pressed header style, used when the next/prev. month button is being pressed. `text` properties are used by the arrows.
- **LV_CALENDAR_STYLE_DAY_NAMES** - Style of the day names. `text` properties are used by the 'day' texts and `body.padding.top` determines the space above the day names.
- **LV_CALENDAR_STYLE_HIGHLIGHTED_DAYS** - `text` properties are used to adjust the style of the highlights days.
- **LV_CALENDAR_STYLE_INACTIVE_DAYS** - `text` properties are used to adjust the style of the visible days of previous/next month.
- **LV_CALENDAR_STYLE_WEEK_BOX** - `body` properties are used to set the style of the week box.
- **LV_CALENDAR_STYLE_TODAY_BOX** - `body` and `text` properties are used to set the style of the today box.

Evénements

Besides the Generic events, the following Special events are sent by the calendars: **LV_EVENT_VALUE_CHANGED** est envoyé lorsque le mois en cours a changé.

In *Input device related* events, `lv_calendar_get_pressed_date(calendar)` tells which day is currently being pressed or return `NULL` if no date is pressed.

Touches

Aucune *touche* n'est traitée par ce type d'objet.

Apprenez-en plus sur les *touches*.

Exemple

C

Calendar with day select

code

```
#include "lvgl/lvgl.h"

static void event_handler(lv_obj_t * obj, lv_event_t event)
{
    if(event == LV_EVENT_CLICKED) {
        lv_calendar_date_t * date = lv_calendar_get_pressed_date(obj);
        if(date) {
            lv_calendar_set_today_date(obj, date);
        }
    }
}

void lv_ex_calendar_1(void)
{
    lv_obj_t  * calendar = lv_calendar_create(lv_scr_act(), NULL);
    lv_obj_set_size(calendar, 230, 230);
    lv_obj_align(calendar, NULL, LV_ALIGN_CENTER, 0, 0);
    lv_obj_set_event_cb(calendar, event_handler);

    /*Set the today*/
    lv_calendar_date_t today;
    today.year = 2018;
    today.month = 10;
    today.day = 23;

    lv_calendar_set_today_date(calendar, &today);
    lv_calendar_set_showed_date(calendar, &today);

    /*Highlight some days*/
    static lv_calendar_date_t highlihted_days[3];       /*Only it's pointer will be␣
↪saved so should be static*/
```

(continues on next page)

(continued from previous page)

```
    highlihted_days[0].year = 2018;
    highlihted_days[0].month = 10;
    highlihted_days[0].day = 6;

    highlihted_days[1].year = 2018;
    highlihted_days[1].month = 10;
    highlihted_days[1].day = 11;

    highlihted_days[2].year = 2018;
    highlihted_days[2].month = 11;
    highlihted_days[2].day = 22;

    lv_calendar_set_highlighted_dates(calendar, highlihted_days, 3);
}
```

MicroPython

Calendar with day select

code

```
def event_handler(obj, event):
    if event == lv.EVENT.CLICKED:
        date = obj.get_pressed_date()
        if date is not None:
            obj.set_today_date(date)

calendar = lv.calendar(lv.scr_act())
calendar.set_size(230, 230)
calendar.align(None, lv.ALIGN.CENTER, 0, 0)
calendar.set_event_cb(event_handler)
```

(continues on next page)

(continued from previous page)

```
# Set the today
today = lv.calendar_date_t()
today.year = 2018
today.month = 10
today.day = 23

calendar.set_today_date(today)
calendar.set_showed_date(today)

highlihted_days = [
    lv.calendar_date_t({'year':2018, 'month':10, 'day':6}),
    lv.calendar_date_t({'year':2018, 'month':10, 'day':11}),
    lv.calendar_date_t({'year':2018, 'month':11, 'day':22})
]

calendar.set_highlighted_dates(highlihted_days, len(highlihted_days))
```

API

Typedefs

typedef uint8_t **lv_calendar_style_t**

Enums

enum [**anonymous**]

Calendar styles

Values:

LV_CALENDAR_STYLE_BG

Background and "normal" date numbers style

LV_CALENDAR_STYLE_HEADER

LV_CALENDAR_STYLE_HEADER_PR

Calendar header style

LV_CALENDAR_STYLE_DAY_NAMES

Calendar header style (when pressed)

LV_CALENDAR_STYLE_HIGHLIGHTED_DAYS

Day name style

LV_CALENDAR_STYLE_INACTIVE_DAYS

Highlighted day style

LV_CALENDAR_STYLE_WEEK_BOX

Inactive day style

LV_CALENDAR_STYLE_TODAY_BOX

Week highlight style

Functions

lv_obj_t ***lv_calendar_create**(*lv_obj_t* **par*, **const** *lv_obj_t* **copy*)
Create a calendar objects

Return pointer to the created calendar

Parameters

- `par`: pointer to an object, it will be the parent of the new calendar
- `copy`: pointer to a calendar object, if not NULL then the new object will be copied from it

void **lv_calendar_set_today_date**(*lv_obj_t* **calendar*, *lv_calendar_date_t* **today*)
Set the today' s date

Parameters

- `calendar`: pointer to a calendar object
- `today`: pointer to an *`lv_calendar_date_t`* variable containing the date of today. The value will be saved it can be local variable too.

void **lv_calendar_set_showed_date**(*lv_obj_t* **calendar*, *lv_calendar_date_t* **showed*)
Set the currently showed

Parameters

- `calendar`: pointer to a calendar object
- `showed`: pointer to an *`lv_calendar_date_t`* variable containing the date to show. The value will be saved it can be local variable too.

void **lv_calendar_set_highlighted_dates**(*lv_obj_t* **calendar*, *lv_calendar_date_t* *highlighted*[], uint16_t *date_num*)
Set the the highlighted dates

Parameters

- `calendar`: pointer to a calendar object
- `highlighted`: pointer to an *`lv_calendar_date_t`* array containing the dates. ONLY A POINTER WILL BE SAVED! CAN' T BE LOCAL ARRAY.
- `date_num`: number of dates in the array

void **lv_calendar_set_day_names**(*lv_obj_t* **calendar*, **const** char ***day_names*)
Set the name of the days

Parameters

- `calendar`: pointer to a calendar object
- `day_names`: pointer to an array with the names. E.g. `const char * days[7] = {"Sun", "Mon", ...}` Only the pointer will be saved so this variable can' t be local which will be destroyed later.

void **lv_calendar_set_month_names**(*lv_obj_t* **calendar*, **const** char ***month_names*)
Set the name of the month

Parameters

- `calendar`: pointer to a calendar object

- `month_names`: pointer to an array with the names. E.g. `const char * days[12] = {"Jan", "Feb", ...}` Only the pointer will be saved so this variable can't be local which will be destroyed later.

void **lv_calendar_set_style**(*lv_obj_t* **calendar*, *lv_calendar_style_t type*, **const** lv_style_t **style*)

Set a style of a calendar.

Parameters

- `calendar`: pointer to calendar object
- `type`: which style should be set
- `style`: pointer to a style

lv_calendar_date_t ***lv_calendar_get_today_date**(**const** *lv_obj_t* **calendar*)

Get the today' s date

Return return pointer to an *lv_calendar_date_t* variable containing the date of today.

Parameters

- `calendar`: pointer to a calendar object

lv_calendar_date_t ***lv_calendar_get_showed_date**(**const** *lv_obj_t* **calendar*)

Get the currently showed

Return pointer to an *lv_calendar_date_t* variable containing the date is being shown.

Parameters

- `calendar`: pointer to a calendar object

lv_calendar_date_t ***lv_calendar_get_pressed_date**(**const** *lv_obj_t* **calendar*)

Get the the pressed date.

Return pointer to an *lv_calendar_date_t* variable containing the pressed date. `NULL` if not date pressed (e.g. the header)

Parameters

- `calendar`: pointer to a calendar object

lv_calendar_date_t ***lv_calendar_get_highlighted_dates**(**const** *lv_obj_t* **calendar*)

Get the the highlighted dates

Return pointer to an *lv_calendar_date_t* array containing the dates.

Parameters

- `calendar`: pointer to a calendar object

uint16_t **lv_calendar_get_highlighted_dates_num**(**const** *lv_obj_t* **calendar*)

Get the number of the highlighted dates

Return number of highlighted days

Parameters

- `calendar`: pointer to a calendar object

const char ****lv_calendar_get_day_names**(**const** *lv_obj_t* **calendar*)

Get the name of the days

Return pointer to the array of day names

Parameters

- `calendar`: pointer to a calendar object

const char ****lv_calendar_get_month_names(const** *lv_obj_t* ***calendar*)

Get the name of the month

Return pointer to the array of month names

Parameters

- `calendar`: pointer to a calendar object

const lv_style_t ***lv_calendar_get_style(const** *lv_obj_t* ***calendar*, *lv_calendar_style_t* *type*)

Get style of a calendar.

Return style pointer to the style

Parameters

- `calendar`: pointer to calendar object
- `type`: which style should be get

struct lv_calendar_date_t

#include <lv_calendar.h> Represents a date on the calendar object (platform-agnostic).

Public Members

uint16_t **year**

int8_t **month**

int8_t **day**

struct lv_calendar_ext_t

Public Members

lv_calendar_date_t **today**

lv_calendar_date_t **showed_date**

lv_calendar_date_t ***highlighted_dates**

int8_t **btn_pressing**

uint16_t **highlighted_dates_num**

lv_calendar_date_t **pressed_date**

const char ****day_names**

const char ****month_names**

const lv_style_t ***style_header**

const lv_style_t ***style_header_pr**

const lv_style_t ***style_day_names**

const lv_style_t ***style_highlighted_days**

const lv_style_t ***style_inactive_days**

const lv_style_t ***style_week_box**

const lv_style_t ***style_today_box**

Canvas (lv_canvas)

Vue d' ensemble

A Canvas is like an *Image* where the user can draw anything.

Tampon

The Canvas needs a buffer which stores the drawn image. To assign a buffer to a Canvas, use `lv_canvas_set_buffer(canvas, buffer, width, height, LV_IMG_CF_...)`. `buffer` is a static buffer (not just a local variable) to hold the image of the canvas. For example, `static lv_color_t buffer[LV_CANVAS_BUF_SIZE_TRUE_COLOR(width, height)]`. Les macros `LV_CANVAS_BUF_SIZE_...` aident à calculer la taille du tampon pour différents formats de couleur.

The canvas supports all the built-in color formats like `LV_IMG_CF_TRUE_COLOR` or `LV_IMG_CF_INDEXED_2BIT`. See the full list in the Color formats section.

Palette

For `LV_IMG_CF_INDEXED_...` color formats, a palette needs to be initialized with `lv_canvas_set_palette(canvas, 3, LV_COLOR_RED)`. It sets pixels with *index=3* to red.

Dessin

To set a pixel on the canvas, use `lv_canvas_set_px(canvas, x, y, LV_COLOR_RED)`. With `LV_IMG_CF_INDEXED_...` or `LV_IMG_CF_ALPHA_...`, the index of the color or the alpha value needs to be passed as color. E.g. `lv_color_t c; c.full = 3;`

`lv_canvas_fill_bg(canvas, LV_COLOR_BLUE)` remplit tout le canvas en bleu.

Un tableau de pixels peut être copié sur le canvas avec `lv_canvas_copy_buf(canvas, buffer_to_copy, x, y, width, height)`. Le format de couleur du tampon et du canevas doivent correspondre.

Pour dessiner sur le canvas, utilisez

- `lv_canvas_draw_rect(canvas, x, y, width, heigth, &style)`,
- `lv_canvas_draw_text(canvas, x, y, max_width, &style, txt, LV_LABEL_ALIGN_LEFT/CENTER/RIGTH)`,
- `lv_canvas_draw_img(canvas, x, y, &img_src, &style)`,
- `lv_canvas_draw_line(canvas, point_array, point_cnt, &style)`,
- `lv_canvas_draw_polygon(canvas, points_array, point_cnt, &style)`,
- `lv_canvas_draw_arc(canvas, x, y, radius, start_angle, end_angle, &style)`.

Ces fonctions ne peuvent dessiner que dans des tampons `LV_IMG_CF_TRUE_COLOR`, `LV_IMG_CF_TRUE_COLOR_CHROMA_KEYED` et `LV_IMG_CF_TRUE_COLOR_ALPHA`. `LV_IMG_CF_TRUE_COLOR_ALPHA` fonctionne uniquement avec `LV_COLOR_DEPTH 32`.

Rotation

A rotated image can be added to canvas with `lv_canvas_rotate(canvas, &imd_dsc, angle, x, y, pivot_x, pivot_y)`. L'image spécifiée par `img_dsc` est transformé par rotation autour du pivot puis copiée dans le canvas aux coordonnées `x`, `y`. Instead of `img_dsc`, the buffer of another canvas also can be used by `lv_canvas_get_img(canvas)`.

Notez que la rotation d'un canvas ne peut se fairesur lui-même. Vous avez besoin d'une source, image ou canevas, et d'un canvas de destination.

Styles

You can set the styles with `lv_canvas_set_style(btn, LV_CANVAS_STYLE_MAIN, &style)`. `style.image.color` is used to tell the base color with `LV_IMG_CF_ALPHA_...` color format.

Evénements

Seuls les événements génériques sont envoyés par ce type d'objet.

Apprenez-en plus sur les *événements*.

Touches

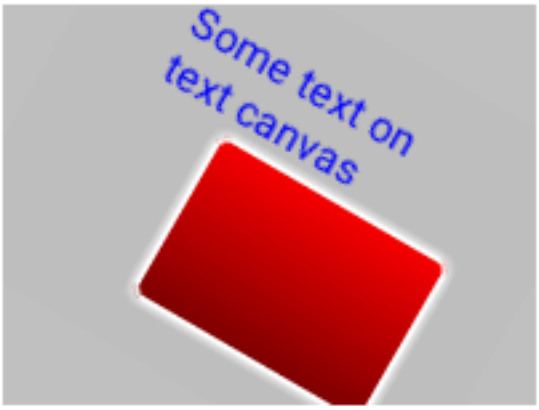
Aucune *touche* n'est traitée par ce type d'objet.

Apprenez-en plus sur les *touches*.

Exemple

C

Drawing on the Canvas and rotate



code

```
#include "lvgl/lvgl.h"

#define CANVAS_WIDTH  200
#define CANVAS_HEIGHT  150

void lv_ex_canvas_1(void)
{
    static lv_style_t style;
    lv_style_copy(&style, &lv_style_plain);
    style.body.main_color = LV_COLOR_RED;
    style.body.grad_color = LV_COLOR_MAROON;
    style.body.radius = 4;
    style.body.border.width = 2;
    style.body.border.color = LV_COLOR_WHITE;
    style.body.shadow.color = LV_COLOR_WHITE;
    style.body.shadow.width = 4;
    style.line.width = 2;
    style.line.color = LV_COLOR_BLACK;
    style.text.color = LV_COLOR_BLUE;

    static lv_color_t cbuf[LV_CANVAS_BUF_SIZE_TRUE_COLOR(CANVAS_WIDTH, CANVAS_
↪HEIGHT)];

    lv_obj_t * canvas = lv_canvas_create(lv_scr_act(), NULL);
    lv_canvas_set_buffer(canvas, cbuf, CANVAS_WIDTH, CANVAS_HEIGHT, LV_IMG_CF_TRUE_
↪COLOR);
    lv_obj_align(canvas, NULL, LV_ALIGN_CENTER, 0, 0);
    lv_canvas_fill_bg(canvas, LV_COLOR_SILVER);

    lv_canvas_draw_rect(canvas, 70, 60, 100, 70, &style);
```

(continues on next page)

(continued from previous page)

```
    lv_canvas_draw_text(canvas, 40, 20, 100, &style, "Some text on text canvas", LV_
↪LABEL_ALIGN_LEFT);

    /* Test the rotation. It requires an other buffer where the orignal image is␣
↪stored.
     * So copy the current image to buffer and rotate it to the canvas */
    lv_color_t cbuf_tmp[CANVAS_WIDTH * CANVAS_HEIGHT];
    memcpy(cbuf_tmp, cbuf, sizeof(cbuf_tmp));
    lv_img_dsc_t img;
    img.data = (void *)cbuf_tmp;
    img.header.cf = LV_IMG_CF_TRUE_COLOR;
    img.header.w = CANVAS_WIDTH;
    img.header.h = CANVAS_HEIGHT;

    lv_canvas_fill_bg(canvas, LV_COLOR_SILVER);
    lv_canvas_rotate(canvas, &img, 30, 0, 0, CANVAS_WIDTH / 2, CANVAS_HEIGHT / 2);
}
```

Transparent Canvas with chroma keying

code

```
#include "lvgl/lvgl.h"

#define CANVAS_WIDTH  50
#define CANVAS_HEIGHT  50

/**
 * Create a transparent canvas with Chroma keying and indexed color format (palette).
 */
void lv_ex_canvas_2(void)
{
```

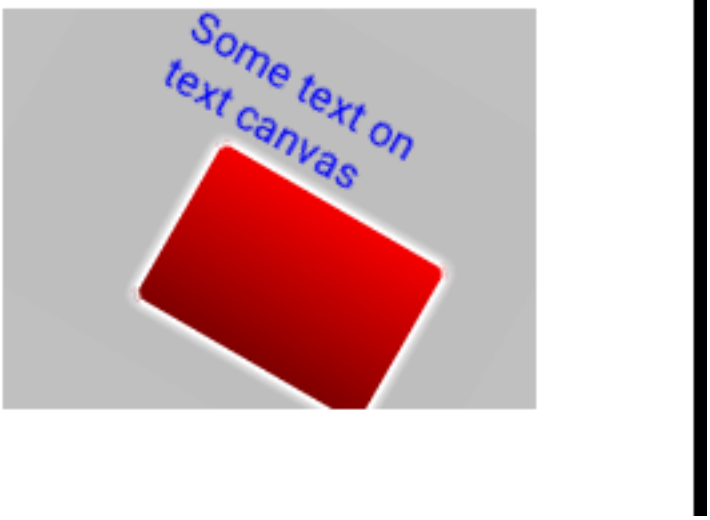
(continues on next page)

(continued from previous page)

```
    /*Create a button to better see the transparency*/
    lv_btn_create(lv_scr_act(), NULL);

    /*Create a buffer for the canvas*/
    static lv_color_t cbuf[LV_CANVAS_BUF_SIZE_INDEXED_1BIT(CANVAS_WIDTH, CANVAS_
↪HEIGHT)];

    /*Create a canvas and initialize its the palette*/
    lv_obj_t * canvas = lv_canvas_create(lv_scr_act(), NULL);
    lv_canvas_set_buffer(canvas, cbuf, CANVAS_WIDTH, CANVAS_HEIGHT, LV_IMG_CF_INDEXED_
↪1BIT);
    lv_canvas_set_palette(canvas, 0, LV_COLOR_TRANSP);
    lv_canvas_set_palette(canvas, 1, LV_COLOR_RED);

    /*Create colors with the indices of the palette*/
    lv_color_t c0;
    lv_color_t c1;

    c0.full = 0;
    c1.full = 1;

    /*Transparent background*/
    lv_canvas_fill_bg(canvas, c1);

    /*Create hole on the canvas*/
    uint32_t x;
    uint32_t y;
    for( y = 10; y < 30; y++) {
        for( x = 5; x < 20; x++) {
            lv_canvas_set_px(canvas, x, y, c0);
        }
    }

}
```

MicroPython

Drawing on the Canvas and rotate



code

```
CANVAS_WIDTH  = 200
CANVAS_HEIGHT = 150

style = lv.style_t()
lv.style_copy(style, lv.style_plain)
style.body.main_color = lv.color_make(0xFF,0,0)
style.body.grad_color = lv.color_make(0x80,0,0)
style.body.radius = 4
style.body.border.width = 2
style.body.border.color = lv.color_make(0xFF,0xFF,0xFF)
style.body.shadow.color = lv.color_make(0xFF,0xFF,0xFF)
style.body.shadow.width = 4
style.line.width = 2
style.line.color = lv.color_make(0,0,0)
style.text.color = lv.color_make(0,0,0xFF)

# CF.TRUE_COLOR requires 4 bytes per pixel
cbuf = bytearray(CANVAS_WIDTH * CANVAS_HEIGHT * 4)

canvas = lv.canvas(lv.scr_act())
canvas.set_buffer(cbuf, CANVAS_WIDTH, CANVAS_HEIGHT, lv.img.CF.TRUE_COLOR)
canvas.align(None, lv.ALIGN.CENTER, 0, 0)
canvas.fill_bg(lv.color_make(0xC0, 0xC0, 0xC0))

canvas.draw_rect(70, 60, 100, 70, style)

canvas.draw_text(40, 20, 100, style, "Some text on text canvas", lv.label.ALIGN.LEFT)

# Test the rotation. It requires an other buffer where the orignal image is stored.
# So copy the current image to buffer and rotate it to the canvas
img = lv.img_dsc_t()
```

(continues on next page)

(continued from previous page)

```
img.data = cbuf[:]
img.header.cf = lv.img.CF.TRUE_COLOR
img.header.w = CANVAS_WIDTH
img.header.h = CANVAS_HEIGHT

canvas.fill_bg(lv.color_make(0xC0, 0xC0, 0xC0))
canvas.rotate(img, 30, 0, 0, CANVAS_WIDTH // 2, CANVAS_HEIGHT // 2)
```

Transparent Canvas with chroma keying

code

```
# Create a transparent canvas with Chroma keying and indexed color format (palette).

CANVAS_WIDTH  = 50
CANVAS_HEIGHT = 50

def bufsize(w, h, bits, indexed=False):
    """this function determines required buffer size
       depending on the color depth"""
    size = (w * bits // 8 + 1) * h
    if indexed:
        # + 4 bytes per palette color
        size += 4 * (2**bits)
    return size

# Create a button to better see the transparency
lv.btn(lv.scr_act())

# Create a buffer for the canvas
cbuf = bytearray(bufsize(CANVAS_WIDTH, CANVAS_HEIGHT, 1, indexed=True))
```

(continues on next page)

(continued from previous page)

```
# Create a canvas and initialize its the palette
canvas = lv.canvas(lv.scr_act())
canvas.set_buffer(cbuf, CANVAS_WIDTH, CANVAS_HEIGHT, lv.img.CF.INDEXED_1BIT)
# transparent color can be defined in lv_conf.h and set to pure green by default
canvas.set_palette(0, lv.color_make(0x00, 0xFF, 0x00))
canvas.set_palette(1, lv.color_make(0xFF, 0x00, 0x00))

# Create colors with the indices of the palette
c0 = lv.color_t()
c1 = lv.color_t()

c0.full = 0
c1.full = 1

# Transparent background
canvas.fill_bg(c1)

# Create hole on the canvas
for y in range(10,30):
    for x in range(5, 20):
        canvas.set_px(x, y, c0)
```

API

Typedefs

typedef uint8_t **lv_canvas_style_t**

Enums

enum [anonymous]

Values:

LV_CANVAS_STYLE_MAIN

Functions

lv_obj_t ***lv_canvas_create**(*lv_obj_t *par*, **const** *lv_obj_t *copy*)

Create a canvas object

Return pointer to the created canvas

Parameters

- `par`: pointer to an object, it will be the parent of the new canvas
- `copy`: pointer to a canvas object, if not NULL then the new object will be copied from it

void **lv_canvas_set_buffer**(*lv_obj_t *canvas*, void *buf*, lv_coord_t *w*, lv_coord_t *h*, *lv_img_cf_t cf*)

Set a buffer for the canvas.

Parameters

- `buf`: a buffer where the content of the canvas will be. The required size is (lv_img_color_format_get_px_size(cf) * w * h) / 8) It can be allocated with `lv_mem_alloc()` or it can be statically allocated array (e.g. static lv_color_t buf[100*50]) or it can be an address in RAM or external SRAM
- `canvas`: pointer to a canvas object
- `w`: width of the canvas
- `h`: height of the canvas
- `cf`: color format. `LV_IMG_CF_...`

void **lv_canvas_set_px**(*lv_obj_t* *canvas, lv_coord_t *x*, lv_coord_t *y*, *lv_color_t* *c*)
Set the color of a pixel on the canvas

Parameters

- `canvas`:
- `x`: x coordinate of the point to set
- `y`: x coordinate of the point to set
- `c`: color of the point

void **lv_canvas_set_palette**(*lv_obj_t* *canvas, uint8_t *id*, *lv_color_t* *c*)
Set the palette color of a canvas with index format. Valid only for `LV_IMG_CF_INDEXED1/2/4/8`

Parameters

- `canvas`: pointer to canvas object
- `id`: the palette color to set:
  - for `LV_IMG_CF_INDEXED1`: 0..1
  - for `LV_IMG_CF_INDEXED2`: 0..3
  - for `LV_IMG_CF_INDEXED4`: 0..15
  - for `LV_IMG_CF_INDEXED8`: 0..255
- `c`: the color to set

void **lv_canvas_set_style**(*lv_obj_t* *canvas, *lv_canvas_style_t* *type*, **const** lv_style_t *style)
Set a style of a canvas.

Parameters

- `canvas`: pointer to canvas object
- `type`: which style should be set
- `style`: pointer to a style

lv_color_t **lv_canvas_get_px**(*lv_obj_t* *canvas, lv_coord_t *x*, lv_coord_t *y*)
Get the color of a pixel on the canvas

Return color of the point

Parameters

- `canvas`:
- `x`: x coordinate of the point to set
- `y`: x coordinate of the point to set

lv_img_dsc_t ***lv_canvas_get_img**(*lv_obj_t* *canvas)*
Get the image of the canvas as a pointer to an `lv_img_dsc_t` variable.

Return pointer to the image descriptor.

Parameters

- `canvas`: pointer to a canvas object

const lv_style_t ***lv_canvas_get_style**(**const** *lv_obj_t* *canvas, *lv_canvas_style_t* type)*
Get style of a canvas.

Return style pointer to the style

Parameters

- `canvas`: pointer to canvas object
- `type`: which style should be get

void **lv_canvas_copy_buf**(*lv_obj_t* *canvas, **const** void *to_copy, lv_coord_t *x*, lv_coord_t *y*, lv_coord_t *w*, lv_coord_t *h*)
Copy a buffer to the canvas

Parameters

- `canvas`: pointer to a canvas object
- `to_copy`: buffer to copy. The color format has to match with the canvas' s buffer color format
- `x`: left side of the destination position
- `y`: top side of the destination position
- `w`: width of the buffer to copy
- `h`: height of the buffer to copy

void **lv_canvas_rotate**(*lv_obj_t* *canvas, *lv_img_dsc_t* *img, int16_t *angle*, lv_coord_t *offset_x*, lv_coord_t *offset_y*, int32_t *pivot_x*, int32_t *pivot_y*)
Rotate and image and store the result on a canvas.

Parameters

- `canvas`: pointer to a canvas object
- `img`: pointer to an image descriptor. Can be the image descriptor of an other canvas too (`lv_canvas_get_img()`).
- `angle`: the angle of rotation (0..360);
- `offset_x`: offset X to tell where to put the result data on destination canvas
- `offset_y`: offset X to tell where to put the result data on destination canvas
- `pivot_x`: pivot X of rotation. Relative to the source canvas Set to `source width / 2` to rotate around the center
- `pivot_y`: pivot Y of rotation. Relative to the source canvas Set to `source height / 2` to rotate around the center

void **lv_canvas_fill_bg**(*lv_obj_t* *canvas, *lv_color_t* color)
Fill the canvas with color

Parameters

- `canvas`: pointer to a canvas

- `color`: the background color

void **lv_canvas_draw_rect**(*lv_obj_t* *canvas, lv_coord_t *x*, lv_coord_t *y*, lv_coord_t *w*, lv_coord_t *h*, **const** lv_style_t *style)

Draw a rectangle on the canvas

Parameters

- `canvas`: pointer to a canvas object
- `x`: left coordinate of the rectangle
- `y`: top coordinate of the rectangle
- `w`: width of the rectangle
- `h`: height of the rectangle
- `style`: style of the rectangle (`body` properties are used except `padding`)

void **lv_canvas_draw_text**(*lv_obj_t* *canvas, lv_coord_t *x*, lv_coord_t *y*, lv_coord_t *max_w*, **const** lv_style_t *style, **const** char *txt, *lv_label_align_t* *align*)

Draw a text on the canvas.

Parameters

- `canvas`: pointer to a canvas object
- `x`: left coordinate of the text
- `y`: top coordinate of the text
- `max_w`: max width of the text. The text will be wrapped to fit into this size
- `style`: style of the text (`text` properties are used)
- `txt`: text to display
- `align`: align of the text (`LV_LABEL_ALIGN_LEFT/RIGHT/CENTER`)

void **lv_canvas_draw_img**(*lv_obj_t* *canvas, lv_coord_t *x*, lv_coord_t *y*, **const** void *src, **const** lv_style_t *style)

Draw an image on the canvas

Parameters

- `canvas`: pointer to a canvas object
- `src`: image source. Can be a pointer an *`lv_img_dsc_t`* variable or a path an image.
- `style`: style of the image (`image` properties are used)

void **lv_canvas_draw_line**(*lv_obj_t* *canvas, **const** lv_point_t *points, uint32_t *point_cnt*, **const** lv_style_t *style)

Draw a line on the canvas

Parameters

- `canvas`: pointer to a canvas object
- `points`: point of the line
- `point_cnt`: number of points
- `style`: style of the line (`line` properties are used)

void **lv_canvas_draw_polygon**(*lv_obj_t* *canvas, **const** lv_point_t *points, uint32_t *point_cnt*, **const** lv_style_t *style)

Draw a polygon on the canvas

Parameters

- `canvas`: pointer to a canvas object
- `points`: point of the polygon
- `point_cnt`: number of points
- `style`: style of the polygon (`body.main_color` and `body.opa` is used)

void **`lv_canvas_draw_arc`**(*lv_obj_t* **canvas*, lv_coord_t *x*, lv_coord_t *y*, lv_coord_t *r*, int32_t *start_angle*, int32_t *end_angle*, **`const`** lv_style_t **style*)

Draw an arc on the canvas

Parameters

- `canvas`: pointer to a canvas object
- `x`: origo x of the arc
- `y`: origo y of the arc
- `r`: radius of the arc
- `start_angle`: start angle in degrees
- `end_angle`: end angle in degrees
- `style`: style of the polygon (`body.main_color` and `body.opa` is used)

`struct lv_canvas_ext_t`

Public Members

lv_img_ext_t **`img`**

lv_img_dsc_t **`dsc`**

Case à cocher (lv_cb)

Vue d'ensemble

Les objets case à cocher sont construits à partir d'un *bouton* en arrière-plan qui contient un second bouton (la marque) et une *étiquette* pour créer une case à cocher classique.

Texte

Le texte peut être modifié par la fonction `lv_cb_set_text(cb, "Nouveau texte")`. Le texte est alloué dynamiquement.

Pour définir un texte statique utilisez `lv_cb_set_static_text(cb, txt)`. De cette façon, seul un pointeur vers `txt` sera sauvegardé et il ne doit pas être désalloué tant que la case à cocher existe.

Cocher/décocher

Vous pouvez manuellement cocher/décocher la case à cocher via `lv_cb_set_checked(cb, true/false)`. La valeur `true` coche la case à cocher, la valeur `false` la décoche.

Désactiver

Pour désactiver la case à cocher utilisez `lv_cb_set_inactive(cb, true)`.

Styles

Les styles de case à cocher peuvent être modifiés avec `lv_cb_set_style(cb, LV_CB_STYLE_..., &style)`.

- **LV_CB_STYLE_BG** - Style d'arrière-plan. Utilise toutes les propriétés `style.body`. Le style de l'étiquette provient de `style.text`. Défaut : `lv_style_transp`.
- **LV_CB_STYLE_BOX_REL** - Style de la marque décochée relâchée. Utilise les propriétés `style.body`. Défaut : `lv_style_btn_rel`.
- **LV_CB_STYLE_BOX_PR** - Style de la marque décochée pressée. Utilise les propriétés `style.body`. Défaut : `lv_style_btn_pr`.
- **LV_CB_STYLE_BOX_TGL_REL** - Style de la marque cochée relâchée. Utilise les propriétés `style.body`. Défaut : `lv_style_btn_tgl_rel`
- **LV_CB_STYLE_BOX_TGL_PR** - Style de la marque cochée pressée. Utilise les propriétés `style.body`. Défaut : `lv_style_btn_tgl_pr`
- **LV_CB_STYLE_BOX_INA** - Style de la marque désactivée. Utilise les propriétés `style.body`. Défaut : `lv_style_btn_ina`

Evénements

Outre les [événements génériques](/overview/event.html #evenements-generiques), les événements spéciaux suivants sont envoyés par les case à cocher :

- **LV_EVENT_VALUE_CHANGED** - Envoyé lorsque le bouton image est basculé.

Notez que les événements génériques liés au périphérique d'entrée (tels que `LV_EVENT_PRESSED`) sont également envoyés dans l'état désactivé. Vous devez vérifier l'état avec `lv_cb_is_inactive(cb)` pour ignorer les événements des cases à cocher désactivées.

Apprenez-en plus sur les *événements*.

Touches

Les *touches* suivantes sont traitées par les 'boutons' :

- **LV_KEY_RIGHT/UP** - Passe à l'état bascule pressé si le mode bascule est actif
- **LV_KEY_LEFT/DOWN** - Passe à l'état bascule relâché si le mode bascule est actif

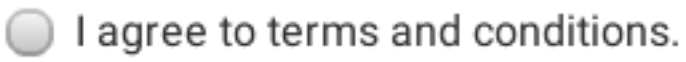
Notez que, comme d'habitude, l'état de `LV_KEY_ENTER` est traduit en `LV_EVENT_PRESSED/PRESSING/RELEASED` etc.

Apprenez-en plus sur les *touches*.

Exemple

C

Simple Checkbox

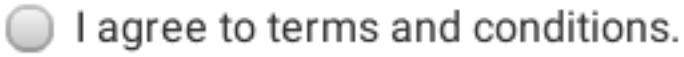


code

```
#include "lvgl/lvgl.h"
#include <stdio.h>

static void event_handler(lv_obj_t * obj, lv_event_t event)
{
    if(event == LV_EVENT_VALUE_CHANGED) {
        printf("State: %s\n", lv_cb_is_checked(obj) ? "Checked" : "Unchecked");
    }
}

void lv_ex_cb_1(void)
{
    lv_obj_t * cb = lv_cb_create(lv_scr_act(), NULL);
    lv_cb_set_text(cb, "I agree to terms and conditions.");
    lv_obj_align(cb, NULL, LV_ALIGN_CENTER, 0, 0);
    lv_obj_set_event_cb(cb, event_handler);
}
```

MicroPython

Simple Checkbox



code

```
def event_handler(obj, event):
    if event == lv.EVENT.VALUE_CHANGED:
        print("State: %s" % ("Checked" if obj.is_checked() else "Unchecked"))

cb = lv.cb(lv.scr_act())
cb.set_text("I agree to terms and conditions.")
cb.align(None, lv.ALIGN.CENTER, 0, 0)
cb.set_event_cb(event_handler)
```

API

Typedefs

typedef uint8_t **lv_cb_style_t**

Enums

enum [anonymous]
Checkbox styles.

Values:

LV_CB_STYLE_BG
Style of object background.

LV_CB_STYLE_BOX_REL
Style of box (released).

LV_CB_STYLE_BOX_PR
Style of box (pressed).

LV_CB_STYLE_BOX_TGL_REL
Style of box (released but checked).

LV_CB_STYLE_BOX_TGL_PR
Style of box (pressed and checked).

LV_CB_STYLE_BOX_INA
Style of disabled box

Functions

lv_obj_t ***lv_cb_create**(*lv_obj_t* **par*, **const** *lv_obj_t* **copy*)
Create a check box objects

Return pointer to the created check box

Parameters

- `par`: pointer to an object, it will be the parent of the new check box
- `copy`: pointer to a check box object, if not NULL then the new object will be copied from it

void **lv_cb_set_text**(*lv_obj_t* **cb*, **const** char **txt*)
Set the text of a check box. `txt` will be copied and may be deallocated after this function returns.

Parameters

- `cb`: pointer to a check box
- `txt`: the text of the check box. NULL to refresh with the current text.

void **lv_cb_set_static_text**(*lv_obj_t* **cb*, **const** char **txt*)
Set the text of a check box. `txt` must not be deallocated during the life of this checkbox.

Parameters

- `cb`: pointer to a check box
- `txt`: the text of the check box. NULL to refresh with the current text.

static void **lv_cb_set_checked**(*lv_obj_t* **cb*, bool *checked*)
Set the state of the check box

Parameters

- `cb`: pointer to a check box object
- `checked`: true: make the check box checked; false: make it unchecked

static void **lv_cb_set_inactive**(*lv_obj_t* **cb*)
Make the check box inactive (disabled)

Parameters

- `cb`: pointer to a check box object

void **lv_cb_set_style**(*lv_obj_t* **cb*, *lv_cb_style_t* *type*, **const** lv_style_t **style*)
Set a style of a check box

Parameters

- `cb`: pointer to check box object
- `type`: which style should be set
- `style`: pointer to a style

const char ***lv_cb_get_text(const** *lv_obj_t* ***cb)**
Get the text of a check box

Return pointer to the text of the check box

Parameters

- `cb`: pointer to check box object

static bool **lv_cb_is_checked(const** *lv_obj_t* ***cb)**
Get the current state of the check box

Return true: checked; false: not checked

Parameters

- `cb`: pointer to a check box object

static bool **lv_cb_is_inactive(const** *lv_obj_t* ***cb)**
Get whether the check box is inactive or not.

Return true: inactive; false: not inactive

Parameters

- `cb`: pointer to a check box object

const lv_style_t ***lv_cb_get_style(const** *lv_obj_t* ***cb**, *lv_cb_style_t* *type*)
Get a style of a button

Return style pointer to the style

Parameters

- `cb`: pointer to check box object
- `type`: which style should be get

struct lv_cb_ext_t

Public Members

lv_btn_ext_t **bg_btn**

lv_obj_t ***bullet**

lv_obj_t ***label**

Graphique (lv_chart)

Vue d'ensemble

Charts consist of the following:

- A background
- Horizontal and vertical division lines
- Data series, which can be represented with points, lines, columns, or filled areas.

Série de données

You can add any number of series to the charts by `lv_chart_add_series(chart, color)`. It allocates data for a `lv_chart_series_t` structure which contains the chosen `color` and an array for the data points.

Type de série

The following **data display types** exist:

- **LV_CHART_TYPE_NONE** - Do not display any data. It can be used to hide a series.
- **LV_CHART_TYPE_LINE** - Draw lines between the points.
- **LV_CHART_TYPE_COL** - Draw columns.
- **LV_CHART_TYPE_POINT** - Draw points.
- **LV_CHART_TYPE_AREA** - Draw areas (fill the area below the lines).
- **LV_CHART_TYPE_VERTICAL_LINE** - Draw only vertical lines to connect the points. Useful if the chart width is equal to the number of points, because it can redraw much faster than the `LV_CHART_TYPE_AREA`.

Vous pouvez spécifier le type de données avec `lv_chart_set_type(chart, LV_CHART_TYPE_...)`. Les types peuvent être combinés par 'OU' (comme `LV_CHART_TYPE_LINE | LV_CHART_TYPE_POINT`).

Modifier le données

Vous avez plusieurs possibilités pour définir les données de la série :

1. Définir les valeurs manuellement dans le tableau comme `ser1->points[3] = 7` et actualiser le graphique avec `lv_chart_refresh(chart)`.
2. Use the `lv_chart_set_next(chart, ser, value)`.
3. Initialiser tous les points avec une valeur donnée : `lv_chart_init_points(chart, ser, value)`.
4. Définir tous les points à partir d' un tableau : `lv_chart_set_points(chart, ser, value_array)`.

Use `LV_CHART_POINT_DEF` as value to make the library skip drawing that point, column, or line segment.

Modes de mise à jour

`lv_chart_set_next` can behave in two ways depending on *update mode*:

- **LV_CHART_UPDATE_MODE_SHIFT** - Shift old data to the left and add the new one o the right.
- **LV_CHART_UPDATE_MODE_CIRCULAR** - Circularly add the new data (Like an ECG diagram).

The update mode can be changed with `lv_chart_set_update_mode(chart, LV_CHART_UPDATE_MODE_...)`.

Nombre de points

Le nombre de points de la série peut être modifié par `lv_chart_set_point_count(chart, point_num)`. La valeur par défaut est 10.

Plage verticale

You can specify the minimum and maximum values in y-direction with `lv_chart_set_range(chart, y_min, y_max)`. The value of the points will be scaled proportionally. The default range is: 0..100.

Quadrillage

Le nombre de lignes horizontales et verticales du quadrillage peut être modifié par `lv_chart_set_div_line_count(chart, hdiv_num, vdiv_num)`. Les valeurs par défaut sont 3 lignes horizontales et 5 lignes verticales.

Apparence de la série To set the **line width** and **point radius** of the series, use the `lv_chart_set_series_width(chart, size)` function. The default value is 2.

The **opacity of the data lines** can be specified by `lv_chart_set_series_opa(chart, opa)`. The default value is `LV_OPA_COVER`.

You can apply a **dark color fade** on the bottom of columns and points by `lv_chart_set_series_darking(chart, effect)` function. The default dark level is `LV_OPA_50`.

Graduation et étiquettes

Ticks and labels beside them can be added.

`lv_chart_set_margin(chart, 20)` needs to be used to add some extra space around the chart for the ticks and texts. Otherwise, you will not see them at all. You may need to adjust the number 20 depending on your requirements.

`lv_chart_set_x_tick_text(chart, list_of_values, num_tick_marks, LV_CHART_AXIS_...)` définit les graduations et les textes sur l'axe des x. `list_of_values` est une chaîne de textes pour les graduations délimités par des `'\n'` (excepté le dernier). P.ex. `const char * list_of_values = "premier\ndeuxième\ntroisième"`. `list_of_values` peut être `NULL`. Si `list_of_values` est défini alors `num_tick_marks` indique le nombre de graduations entre deux étiquettes. Si `list_of_values` est `NULL` alors il spécifie le nombre total de graduations.

Major tick lines are drawn where text is placed, and *minor tick lines* are drawn elsewhere. `lv_chart_set_x_tick_length(chart, major_tick_len, minor_tick_len)` sets the length of tick lines on the x-axis.

The same functions exists for the y axis too: `lv_chart_set_y_tick_text` and `lv_chart_set_y_tick_length`.

Styles

Vous pouvez définir les styles avec `lv_chart_set_style(btn, LV_CHART_STYLE_MAIN, &style)`.

- **style.body** - properties set the background's appearance.
- **style.line** - properties set the division lines' appearance.

- **style.text** - properties set the axis labels' appearance.

Evénements

Seuls les événements génériques sont envoyés par ce type d'objet.

Apprenez-en plus sur les *événements*.

Touches

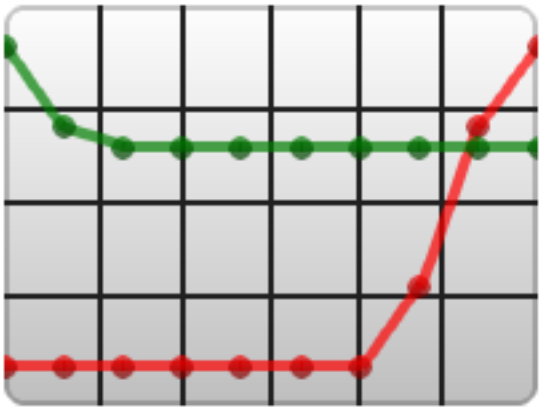
Aucune *touche* n'est traitée par ce type d'objet.

Apprenez-en plus sur les *touches*.

Exemple

C

Line Chart



code

```
#include "lvgl/lvgl.h"

void lv_ex_chart_1(void)
{
    /*Create a chart*/
    lv_obj_t * chart;
    chart = lv_chart_create(lv_scr_act(), NULL);
    lv_obj_set_size(chart, 200, 150);
```

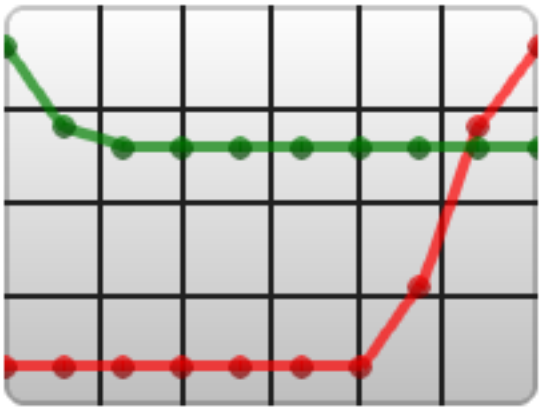
(continues on next page)

(continued from previous page)

```
    lv_obj_align(chart, NULL, LV_ALIGN_CENTER, 0, 0);
    lv_chart_set_type(chart, LV_CHART_TYPE_POINT | LV_CHART_TYPE_LINE);   /*Show␣
↪lines and points too*/
    lv_chart_set_series_opa(chart, LV_OPA_70);                            /*Opacity␣
↪of the data series*/
    lv_chart_set_series_width(chart, 4);                                  /*Line␣
↪width and point radious*/

    lv_chart_set_range(chart, 0, 100);

    /*Add two data series*/
    lv_chart_series_t * ser1 = lv_chart_add_series(chart, LV_COLOR_RED);
    lv_chart_series_t * ser2 = lv_chart_add_series(chart, LV_COLOR_GREEN);

    /*Set the next points on 'dl1'*/
    lv_chart_set_next(chart, ser1, 10);
    lv_chart_set_next(chart, ser1, 10);
    lv_chart_set_next(chart, ser1, 10);
    lv_chart_set_next(chart, ser1, 10);
    lv_chart_set_next(chart, ser1, 10);
    lv_chart_set_next(chart, ser1, 10);
    lv_chart_set_next(chart, ser1, 10);
    lv_chart_set_next(chart, ser1, 30);
    lv_chart_set_next(chart, ser1, 70);
    lv_chart_set_next(chart, ser1, 90);

    /*Directly set points on 'dl2'*/
    ser2->points[0] = 90;
    ser2->points[1] = 70;
    ser2->points[2] = 65;
    ser2->points[3] = 65;
    ser2->points[4] = 65;
    ser2->points[5] = 65;
    ser2->points[6] = 65;
    ser2->points[7] = 65;
    ser2->points[8] = 65;
    ser2->points[9] = 65;

    lv_chart_refresh(chart); /*Required after direct set*/
}
```

MicroPython

Line Chart



code

```
# Create a chart
chart = lv.chart(lv.scr_act())
chart.set_size(200, 150)
chart.align(None, lv.ALIGN.CENTER, 0, 0)
chart.set_type(lv.chart.TYPE.POINT | lv.chart.TYPE.LINE)   # Show lines and points too
chart.set_series_opa(lv.OPA._70)                           # Opacity of the data␣
↪series
chart.set_series_width(4)                                  # Line width and point␣
↪radious

chart.set_range(0, 100)

# Add two data series
ser1 = chart.add_series(lv.color_make(0xFF,0,0))
ser2 = chart.add_series(lv.color_make(0,0x80,0))

# Set points on 'dl1'
chart.set_points(ser1, [10, 10, 10, 10, 10, 10, 10, 30, 70, 90])

# Set points on 'dl2'
chart.set_points(ser2, [90, 70, 65, 65, 65, 65, 65, 65, 65, 65])
```

API

Typedefs

typedef uint8_t **lv_chart_type_t**

typedef uint8_t **lv_chart_update_mode_t**

typedef uint8_t **lv_chart_axis_options_t**

typedef uint8_t **lv_chart_style_t**

Enums

enum [**anonymous**]
Chart types

Values:

LV_CHART_TYPE_NONE = 0x00
Don’ t draw the series

LV_CHART_TYPE_LINE = 0x01
Connect the points with lines

LV_CHART_TYPE_COLUMN = 0x02
Draw columns

LV_CHART_TYPE_POINT = 0x04
Draw circles on the points

LV_CHART_TYPE_VERTICAL_LINE = 0x08
Draw vertical lines on points (useful when chart width == point count)

LV_CHART_TYPE_AREA = 0x10
Draw area chart

enum [**anonymous**]
Chart update mode for `lv_chart_set_next`

Values:

LV_CHART_UPDATE_MODE_SHIFT
Shift old data to the left and add the new one o the right

LV_CHART_UPDATE_MODE_CIRCULAR
Add the new data in a circular way

enum [**anonymous**]
Data of axis

Values:

LV_CHART_AXIS_SKIP_LAST_TICK = 0x00
don’ t draw the last tick

LV_CHART_AXIS_DRAW_LAST_TICK = 0x01
draw the last tick

LV_CHART_AXIS_INVERSE_LABELS_ORDER = 0x02
draw tick labels in an inversed order

enum [**anonymous**]
Values:

LV_CHART_STYLE_MAIN

Functions

LV_EXPORT_CONST_INT(LV_CHART_POINT_DEF)

LV_EXPORT_CONST_INT(LV_CHART_TICK_LENGTH_AUTO)

lv_obj_t ***lv_chart_create**(*lv_obj_t* *par*, **const** *lv_obj_t* *copy*)
Create a chart background objects

Return pointer to the created chart background

Parameters

- `par`: pointer to an object, it will be the parent of the new chart background
- `copy`: pointer to a chart background object, if not NULL then the new object will be copied from it

lv_chart_series_t ***lv_chart_add_series**(*lv_obj_t* *chart*, *lv_color_t* color*)
Allocate and add a data series to the chart

Return pointer to the allocated data series

Parameters

- `chart`: pointer to a chart object
- `color`: color of the data series

void **lv_chart_clear_serie**(*lv_obj_t* *chart*, *lv_chart_series_t* *serie*)
Clear the point of a serie

Parameters

- `chart`: pointer to a chart object
- `serie`: pointer to the chart' s serie to clear

void **lv_chart_set_div_line_count**(*lv_obj_t* *chart*, uint8_t *hdiv*, uint8_t *vdiv*)
Set the number of horizontal and vertical division lines

Parameters

- `chart`: pointer to a graph background object
- `hdiv`: number of horizontal division lines
- `vdiv`: number of vertical division lines

void **lv_chart_set_range**(*lv_obj_t* *chart*, lv_coord_t *ymin*, lv_coord_t *ymax*)
Set the minimal and maximal y values

Parameters

- `chart`: pointer to a graph background object
- `ymin`: y minimum value
- `ymax`: y maximum value

void **lv_chart_set_type**(*lv_obj_t* *chart*, *lv_chart_type_t* type*)
Set a new type for a chart

Parameters

- `chart`: pointer to a chart object
- `type`: new type of the chart (from 'lv_chart_type_t' enum)

void **lv_chart_set_point_count**(*lv_obj_t* *chart, uint16_t *point_cnt*)
Set the number of points on a data line on a chart

Parameters

- `chart`: pointer r to chart object
- `point_cnt`: new number of points on the data lines

void **lv_chart_set_series_opa**(*lv_obj_t* *chart, *lv_opa_t* *opa*)
Set the opacity of the data series

Parameters

- `chart`: pointer to a chart object
- `opa`: opacity of the data series

void **lv_chart_set_series_width**(*lv_obj_t* *chart, lv_coord_t *width*)
Set the line width or point radius of the data series

Parameters

- `chart`: pointer to a chart object
- `width`: the new width

void **lv_chart_set_series_darking**(*lv_obj_t* *chart, *lv_opa_t* *dark_eff*)
Set the dark effect on the bottom of the points or columns

Parameters

- `chart`: pointer to a chart object
- `dark_eff`: dark effect level (LV_OPA_TRANSP to turn off)

void **lv_chart_init_points**(*lv_obj_t* *chart, *lv_chart_series_t* *ser, lv_coord_t *y*)
Initialize all data points with a value

Parameters

- `chart`: pointer to chart object
- `ser`: pointer to a data series on 'chart'
- `y`: the new value for all points

void **lv_chart_set_points**(*lv_obj_t* *chart, *lv_chart_series_t* *ser, lv_coord_t *y_array*[])
Set the value of points from an array

Parameters

- `chart`: pointer to chart object
- `ser`: pointer to a data series on 'chart'
- `y_array`: array of 'lv_coord_t' points (with 'points count' elements)

void **lv_chart_set_next**(*lv_obj_t* *chart, *lv_chart_series_t* *ser, lv_coord_t *y*)
Shift all data right and set the most right data on a data line

Parameters

- `chart`: pointer to chart object
- `ser`: pointer to a data series on 'chart'
- `y`: the new value of the most right data

void **lv_chart_set_update_mode**(*lv_obj_t* *chart, *lv_chart_update_mode_t* update_mode)
Set update mode of the chart object.

Parameters

- `chart`: pointer to a chart object
- `update`: mode

static void **lv_chart_set_style**(*lv_obj_t* *chart, *lv_chart_style_t* type, **const** lv_style_t *style)
Set the style of a chart

Parameters

- `chart`: pointer to a chart object
- `type`: which style should be set (can be only `LV_CHART_STYLE_MAIN`)
- `style`: pointer to a style

void **lv_chart_set_x_tick_length**(*lv_obj_t* *chart, uint8_t major_tick_len, uint8_t minor_tick_len)
Set the length of the tick marks on the x axis

Parameters

- `chart`: pointer to the chart
- `major_tick_len`: the length of the major tick or `LV_CHART_TICK_LENGTH_AUTO` to set automatically (where labels are added)
- `minor_tick_len`: the length of the minor tick, `LV_CHART_TICK_LENGTH_AUTO` to set automatically (where no labels are added)

void **lv_chart_set_y_tick_length**(*lv_obj_t* *chart, uint8_t major_tick_len, uint8_t minor_tick_len)
Set the length of the tick marks on the y axis

Parameters

- `chart`: pointer to the chart
- `major_tick_len`: the length of the major tick or `LV_CHART_TICK_LENGTH_AUTO` to set automatically (where labels are added)
- `minor_tick_len`: the length of the minor tick, `LV_CHART_TICK_LENGTH_AUTO` to set automatically (where no labels are added)

void **lv_chart_set_secondary_y_tick_length**(*lv_obj_t* *chart, uint8_t major_tick_len, uint8_t minor_tick_len)
Set the length of the tick marks on the secondary y axis

Parameters

- `chart`: pointer to the chart
- `major_tick_len`: the length of the major tick or `LV_CHART_TICK_LENGTH_AUTO` to set automatically (where labels are added)
- `minor_tick_len`: the length of the minor tick, `LV_CHART_TICK_LENGTH_AUTO` to set automatically (where no labels are added)

void **lv_chart_set_x_tick_texts**(*lv_obj_t* *chart, **const** char *list_of_values, uint8_t num_tick_marks, *lv_chart_axis_options_t* options)
Set the x-axis tick count and labels of a chart

Parameters

- `chart`: pointer to a chart object
- `list_of_values`: list of string values, terminated with , except the last
- `num_tick_marks`: if list_of_values is NULL: total number of ticks per axis else number of ticks between two value labels
- `options`: extra options

void **lv_chart_set_secondary_y_tick_texts**(*lv_obj_t* *chart, **const** char *list_of_values, uint8_t num_tick_marks, *lv_chart_axis_options_t* options)

Set the secondary y-axis tick count and labels of a chart

Parameters

- `chart`: pointer to a chart object
- `list_of_values`: list of string values, terminated with , except the last
- `num_tick_marks`: if list_of_values is NULL: total number of ticks per axis else number of ticks between two value labels
- `options`: extra options

void **lv_chart_set_y_tick_texts**(*lv_obj_t* *chart, **const** char *list_of_values, uint8_t num_tick_marks, *lv_chart_axis_options_t* options)

Set the y-axis tick count and labels of a chart

Parameters

- `chart`: pointer to a chart object
- `list_of_values`: list of string values, terminated with , except the last
- `num_tick_marks`: if list_of_values is NULL: total number of ticks per axis else number of ticks between two value labels
- `options`: extra options

void **lv_chart_set_margin**(*lv_obj_t* *chart, uint16_t margin)

Set the margin around the chart, used for axes value and ticks

Parameters

- `chart`: pointer to an chart object
- `margin`: value of the margin [px]

lv_chart_type_t **lv_chart_get_type**(**const** *lv_obj_t* *chart)

Get the type of a chart

Return type of the chart (from 'lv_chart_t' enum)

Parameters

- `chart`: pointer to chart object

uint16_t **lv_chart_get_point_cnt**(**const** *lv_obj_t* *chart)

Get the data point number per data line on chart

Return point number on each data line

Parameters

- `chart`: pointer to chart object

lv_opa_t **lv_chart_get_series_opa(const** *lv_obj_t* ***chart)**
Get the opacity of the data series

Return the opacity of the data series

Parameters

- `chart`: pointer to chart object

lv_coord_t **lv_chart_get_series_width(const** *lv_obj_t* ***chart)**
Get the data series width

Return the width the data series (lines or points)

Parameters

- `chart`: pointer to chart object

lv_opa_t **lv_chart_get_series_darking(const** *lv_obj_t* ***chart)**
Get the dark effect level on the bottom of the points or columns

Return dark effect level (LV_OPA_TRANSP to turn off)

Parameters

- `chart`: pointer to chart object

static const lv_style_t ***lv_chart_get_style(const** *lv_obj_t* ***chart,** *lv_chart_style_t* *type)*
Get the style of an chart object

Return pointer to the chart's style

Parameters

- `chart`: pointer to an chart object
- `type`: which style should be get (can be only `LV_CHART_STYLE_MAIN`)

uint16_t **lv_chart_get_margin(***lv_obj_t* ***chart)**
Get the margin around the chart, used for axes value and labels

Parameters

- `chart`: pointer to an chart object
- `return`: value of the margin

void **lv_chart_refresh(***lv_obj_t* ***chart)**
Refresh a chart if its data line has changed

Parameters

- `chart`: pointer to chart object

struct lv_chart_series_t

Public Members

lv_coord_t ***points**

lv_color_t **color**

uint16_t **start_point**

struct lv_chart_axis_cfg_t

Public Members

const char ***list_of_values**

lv_chart_axis_options_t **options**

uint8_t **num_tick_marks**

uint8_t **major_tick_len**

uint8_t **minor_tick_len**

struct lv_chart_ext_t

Public Members

lv_ll_t **series_ll**

lv_coord_t **ymin**

lv_coord_t **ymax**

uint8_t **hdiv_cnt**

uint8_t **vdiv_cnt**

uint16_t **point_cnt**

lv_chart_type_t **type**

lv_chart_axis_cfg_t **y_axis**

lv_chart_axis_cfg_t **x_axis**

lv_chart_axis_cfg_t **secondary_y_axis**

uint16_t **margin**

uint8_t **update_mode**

lv_coord_t **width**

uint8_t **num**

lv_opa_t **opa**

lv_opa_t **dark**

struct *lv_chart_ext_t*::[anonymous] **series**

Conteneur (lv_cont)

Vue d' ensemble

The containers are essentially a **basic object** with some special features.

Mise en page

Vous pouvez appliquer une mise en page aux conteneurs pour disposer automatiquement leurs enfants. L' espacement des éléments provient des propriétés `style.body.padding. ...` . Les options de mise en page possibles sont :

- **LV_LAYOUT_OFF** - Do not align the children.
- **LV_LAYOUT_CENTER** - Align children to the center in column and keep `padding.inner` space between them.
- **LV_LAYOUT_COL_** - Align children in a left-justified column. Keep `padding.left` space on the left, `pad.top` space on the top and `padding.inner` space between the children.
- **LV_LAYOUT_COL_M** - Align children in centered column. Keep `padding.top` space on the top and `padding.inner` space between the children.
- **LV_LAYOUT_COL_R** - Align children in a right-justified column. Keep `padding.right` space on the right, `padding.top` space on the top and `padding.inner` space between the children.
- **LV_LAYOUT_ROW_T** - Align children in a top justified row. Keep `padding.left` space on the left, `padding.top` space on the top and `padding.inner` space between the children.
- **LV_LAYOUT_ROW_M** - Align children in centered row. Keep `padding.left` space on the left and `padding.inner` space between the children.
- **LV_LAYOUT_ROW_B** - Align children in a bottom justified row. Keep `padding.left` space on the left, `padding.bottom` space on the bottom and `padding.inner` space between the children.
- **LV_LAYOUT_PRETTY** - Put as many objects as possible in a row (with at least `padding.inner` space and `padding.left/right` space on the sides). Divide the space in each line equally between the children. Conserve les espaces `padding.top` en haut et `pad.inner` entre les lignes,
- **LV_LAYOUT_GRID** - Similar to `LV_LAYOUT_PRETTY` but not divide horizontal space equally just let `padding.left/right` on the edges and `padding.inner` space between the elements.

Autofit

Container have an autofit feature which can automatically change the size of the container according to its children and/or parent. The following options exist:

- **LV_FIT_NONE** - Do not change the size automatically.
- **LV_FIT_TIGHT** - Shrink-wrap the container around all of its children, while keeping `padding.top/bottom/left/right` space on the edges.
- **LV_FIT_FLOOD** - Set the size to the parent' s size minus `padding.top/bottom/left/right` (from the parent' s style) space.
- **LV_FIT_FILL** - Use `LV_FIT_FLOOD` while smaller than the parent and `LV_FIT_TIGHT` when larger. It will ensure that the container is, at minimum, the size of its parent.

To set the auto fit mode for all directions, use `lv_cont_set_fit(cont, LV_FIT_...)`. To use different auto fit horizontally and vertically, use `lv_cont_set_fit2(cont, hor_fit_type, ver_fit_type)`. To use different auto fit in all 4 directions, use `lv_cont_set_fit4(cont, left_fit_type, right_fit_type, top_fit_type, bottom_fit_type)`.

Styles

You can set the styles with `lv_cont_set_style(btn, LV_CONT_STYLE_MAIN, &style)`.

- **style.body** est utilisé.

Evénements

Only the Generic events are sent by the object type.

Apprenez-en plus sur les *événements*.

Touches

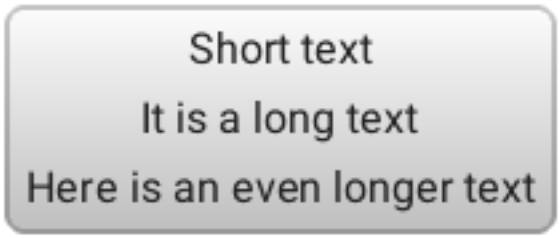
Aucune *touche* n'est traitée par ce type d'objet.

Apprenez-en plus sur les *touches*.

Exemple

C

Container with auto-fit



code

```
#include "lvgl/lvgl.h"

void lv_ex_cont_1(void)
{
    lv_obj_t * cont;

    cont = lv_cont_create(lv_scr_act(), NULL);
    lv_obj_set_auto_realign(cont, true);                    /*Auto realign when the␣
↪size changes*/
    lv_obj_align_origo(cont, NULL, LV_ALIGN_CENTER, 0, 0);  /*This parametrs will be␣
↪sued when realigned*/
    lv_cont_set_fit(cont, LV_FIT_TIGHT);
    lv_cont_set_layout(cont, LV_LAYOUT_COL_M);
```

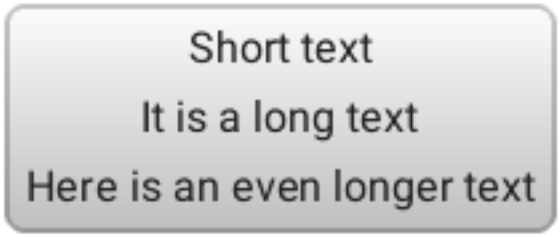
(continues on next page)

(continued from previous page)

```
    lv_obj_t * label;
    label = lv_label_create(cont, NULL);
    lv_label_set_text(label, "Short text");

    label = lv_label_create(cont, NULL);
    lv_label_set_text(label, "It is a long text");

    label = lv_label_create(cont, NULL);
    lv_label_set_text(label, "Here is an even longer text");
}
```

MicroPython

Container with auto-fit



code

```
cont = lv.cont(lv.scr_act())
cont.set_auto_realign(True)                    # Auto realign when the size changes
cont.align_origo(None, lv.ALIGN.CENTER, 0, 0)  # This parametrs will be sued when␣
↪realigned
cont.set_fit(lv.FIT.TIGHT)
cont.set_layout(lv.LAYOUT.COL_M)

label = lv.label(cont)
label.set_text("Short text")

label = lv.label(cont)
label.set_text("It is a long text")

label = lv.label(cont)
label.set_text("Here is an even longer text")
```

API

Typedefs

typedef uint8_t **lv_layout_t**

typedef uint8_t **lv_fit_t**

typedef uint8_t **lv_cont_style_t**

Enums

enum [anonymous]

Container layout options

Values:

LV_LAYOUT_OFF = 0
No layout

LV_LAYOUT_CENTER
Center objects

LV_LAYOUT_COL_L
Column left align

LV_LAYOUT_COL_M
Column middle align

LV_LAYOUT_COL_R
Column right align

LV_LAYOUT_ROW_T
Row top align

LV_LAYOUT_ROW_M
Row middle align

LV_LAYOUT_ROW_B
Row bottom align

LV_LAYOUT_PRETTY
Put as many object as possible in row and begin a new row

LV_LAYOUT_GRID
Align same-sized object into a grid

_LV_LAYOUT_NUM

enum [anonymous]

How to resize the container around the children.

Values:

LV_FIT_NONE
Do not change the size automatically

LV_FIT_TIGHT
Shrink wrap around the children

LV_FIT_FLOOD
Align the size to the parent’ s edge

LV_FIT_FILL
Align the size to the parent' s edge first but if there is an object out of it then get larger

_LV_FIT_NUM

enum [anonymous]
Values:

LV_CONT_STYLE_MAIN

Functions

lv_obj_t ***lv_cont_create**(*lv_obj_t* **par*, **const** *lv_obj_t* **copy*)
Create a container objects

Return pointer to the created container

Parameters

- `par`: pointer to an object, it will be the parent of the new container
- `copy`: pointer to a container object, if not NULL then the new object will be copied from it

void **lv_cont_set_layout**(*lv_obj_t* **cont*, *lv_layout_t layout*)
Set a layout on a container

Parameters

- `cont`: pointer to a container object
- `layout`: a layout from 'lv_cont_layout_t'

void **lv_cont_set_fit4**(*lv_obj_t* **cont*, *lv_fit_t left*, *lv_fit_t right*, *lv_fit_t top*, *lv_fit_t bottom*)
Set the fit policy in all 4 directions separately. It tell how to change the container' s size automatically.

Parameters

- `cont`: pointer to a container object
- `left`: left fit policy from `lv_fit_t`
- `right`: right fit policy from `lv_fit_t`
- `top`: top fit policy from `lv_fit_t`
- `bottom`: bottom fit policy from `lv_fit_t`

static void **lv_cont_set_fit2**(*lv_obj_t* **cont*, *lv_fit_t hor*, *lv_fit_t ver*)
Set the fit policy horizontally and vertically separately. It tells how to change the container' s size automatically.

Parameters

- `cont`: pointer to a container object
- `hor`: horizontal fit policy from `lv_fit_t`
- `ver`: vertical fit policy from `lv_fit_t`

static void **lv_cont_set_fit**(*lv_obj_t* **cont*, *lv_fit_t fit*)
Set the fit policy in all 4 direction at once. It tells how to change the container' s size automatically.

Parameters

- `cont`: pointer to a container object
- `fit`: fit policy from `lv_fit_t`

static void **lv_cont_set_style**(*lv_obj_t* *cont, *lv_cont_style_t* type, **const** lv_style_t *style)

Set the style of a container

Parameters

- cont: pointer to a container object
- type: which style should be set (can be only LV_CONT_STYLE_MAIN)
- style: pointer to the new style

lv_layout_t **lv_cont_get_layout**(**const** *lv_obj_t* *cont)

Get the layout of a container

Return the layout from 'lv_cont_layout_t'

Parameters

- cont: pointer to container object

lv_fit_t **lv_cont_get_fit_left**(**const** *lv_obj_t* *cont)

Get left fit mode of a container

Return an element of lv_fit_t

Parameters

- cont: pointer to a container object

lv_fit_t **lv_cont_get_fit_right**(**const** *lv_obj_t* *cont)

Get right fit mode of a container

Return an element of lv_fit_t

Parameters

- cont: pointer to a container object

lv_fit_t **lv_cont_get_fit_top**(**const** *lv_obj_t* *cont)

Get top fit mode of a container

Return an element of lv_fit_t

Parameters

- cont: pointer to a container object

lv_fit_t **lv_cont_get_fit_bottom**(**const** *lv_obj_t* *cont)

Get bottom fit mode of a container

Return an element of lv_fit_t

Parameters

- cont: pointer to a container object

static const lv_style_t ***lv_cont_get_style**(**const** *lv_obj_t* *cont, *lv_cont_style_t* type)

Get the style of a container

Return pointer to the container' s style

Parameters

- cont: pointer to a container object
- type: which style should be get (can be only LV_CONT_STYLE_MAIN)

struct lv_cont_ext_t

Public Members

uint8_t **layout**

uint8_t **fit_left**

uint8_t **fit_right**

uint8_t **fit_top**

uint8_t **fit_bottom**

Color picker (lv_cpicker)

Overview

The *color picker* object **draws a color band and knob** that enable users to **choose a color' s hue, saturation, and/or value**.

Types of color pickers

The color band of a *color picker* can currently be drawn in two ways:

- As a linear bar (`LV_CPICKER_TYPE_RECT`).
- As a circular ring (`LV_CPICKER_TYPE_DISC`).

You can switch between these modes with `lv_cpicker_set_type(cpicker, type)`.

Notes

In circular mode, the **width and height** of the *color picker* should be the **same**.

Styles

To set the style of a *color picker* object, use `lv_cpicker_set_style(cpicker, LV_CPICKER_STYLE_XXX, &style)`. `XXX` can either be `MAIN` or `INDICATOR`, which represent the color band and knob, respectively.

- **line.width** - the thickness of the color ring (in `DISC` mode)
- **body.[main/grad]_color** - the background color of the color picker

Events

Besides the Generic events the following Special events are sent by color pickers:

- **LV_EVENT_VALUE_CHANGED** - sent when the color changes.

Learn more about *Events*.

Keys

No *Keys* are processed by the object type.

Learn more about *Keys*.

Example

There is no official example available for this object type yet, but here is some sample test code:

```
    const lv_coord_t pickerSize = 200;

        /* Set the style of the color ring */
    static lv_style_t styleMain;
    lv_style_copy(&styleMain, &lv_style_plain);
    styleMain.line.width = 30;
        /* Make the background white */
    styleMain.body.main_color = styleMain.body.grad_color = LV_COLOR_WHITE;

        /* Set the style of the knob */
    static lv_style_t styleIndicator;
    lv_style_copy(&styleIndicator, &lv_style_pretty);
    styleIndicator.body.border.color = LV_COLOR_WHITE;
        /* Ensure that the knob is fully opaque */
    styleIndicator.body.opa = LV_OPA_COVER;
    styleIndicator.body.border.opa = LV_OPA_COVER;

    lv_obj_t * scr = lv_scr_act();

    lv_obj_t * colorPicker = lv_cpicker_create(scr, NULL);
    lv_obj_set_size(colorPicker, pickerSize, pickerSize);
        /* Choose the 'DISC' type */
    lv_cpicker_set_type(colorPicker, LV_CPICKER_TYPE_DISC);
    lv_obj_align(colorPicker, NULL, LV_ALIGN_CENTER, 0, 0);
        /* Set the styles */
    lv_cpicker_set_style(colorPicker, LV_CPICKER_STYLE_MAIN, &styleMain);
    lv_cpicker_set_style(colorPicker, LV_CPICKER_STYLE_INDICATOR, &styleIndicator);
        /* Change the knob's color to that of the selected color */
    lv_cpicker_set_indic_colored(colorPicker, true);
```

API

Typedefs

typedef uint8_t **lv_cpicker_type_t**

typedef uint8_t **lv_cpicker_color_mode_t**

typedef uint8_t **lv_cpicker_style_t**

Enums

enum [anonymous]

Values:

LV_CPICKER_TYPE_RECT

LV_CPICKER_TYPE_DISC

enum [anonymous]
Values:

LV_CPICKER_COLOR_MODE_HUE

LV_CPICKER_COLOR_MODE_SATURATION

LV_CPICKER_COLOR_MODE_VALUE

enum [anonymous]
Values:

LV_CPICKER_STYLE_MAIN

LV_CPICKER_STYLE_INDICATOR

Functions

lv_obj_t ***lv_cpicker_create**(*lv_obj_t* **par*, **const** *lv_obj_t* **copy*)
Create a colorpicker objects

Return pointer to the created colorpicker

Parameters

- `par`: pointer to an object, it will be the parent of the new colorpicker
- `copy`: pointer to a colorpicker object, if not NULL then the new object will be copied from it

void **lv_cpicker_set_type**(*lv_obj_t* **cpicker*, *lv_cpicker_type_t* *type*)
Set a new type for a colorpicker

Parameters

- `cpicker`: pointer to a colorpicker object
- `type`: new type of the colorpicker (from 'lv_cpicker_type_t' enum)

void **lv_cpicker_set_style**(*lv_obj_t* **cpicker*, *lv_cpicker_style_t* *type*, lv_style_t **style*)
Set a style of a colorpicker.

Parameters

- `cpicker`: pointer to colorpicker object
- `type`: which style should be set
- `style`: pointer to a style

bool **lv_cpicker_set_hue**(*lv_obj_t* **cpicker*, uint16_t *hue*)
Set the current hue of a colorpicker.

Return true if changed, otherwise false

Parameters

- `cpicker`: pointer to colorpicker object
- `hue`: current selected hue [0..360]

bool **lv_cpicker_set_saturation**(*lv_obj_t* **cpicker*, uint8_t *saturation*)
Set the current saturation of a colorpicker.

Return true if changed, otherwise false

Parameters

- `cpicker`: pointer to colorpicker object
- `saturation`: current selected saturation [0..100]

bool **lv_cpicker_set_value**(*lv_obj_t* *cpicker, uint8_t *val*)
Set the current value of a colorpicker.

Return true if changed, otherwise false

Parameters

- `cpicker`: pointer to colorpicker object
- `val`: current selected value [0..100]

bool **lv_cpicker_set_hsv**(*lv_obj_t* *cpicker, *lv_color_hsv_t* *hsv*)
Set the current hsv of a colorpicker.

Return true if changed, otherwise false

Parameters

- `cpicker`: pointer to colorpicker object
- `hsv`: current selected hsv

bool **lv_cpicker_set_color**(*lv_obj_t* *cpicker, *lv_color_t* *color*)
Set the current color of a colorpicker.

Return true if changed, otherwise false

Parameters

- `cpicker`: pointer to colorpicker object
- `color`: current selected color

void **lv_cpicker_set_color_mode**(*lv_obj_t* *cpicker, *lv_cpicker_color_mode_t* *mode*)
Set the current color mode.

Parameters

- `cpicker`: pointer to colorpicker object
- `mode`: color mode (hue/sat/val)

void **lv_cpicker_set_color_mode_fixed**(*lv_obj_t* *cpicker, bool *fixed*)
Set if the color mode is changed on long press on center

Parameters

- `cpicker`: pointer to colorpicker object
- `fixed`: color mode cannot be changed on long press

void **lv_cpicker_set_indic_colored**(*lv_obj_t* *cpicker, bool *en*)
Make the indicator to be colored to the current color

Parameters

- `cpicker`: pointer to colorpicker object
- `en`: true: color the indicator; false: not color the indicator

void **lv_cpicker_set_preview**(*lv_obj_t* *cpicker, bool *en*)
Add a color preview in the middle of the DISC type color picker

Parameters

- `cpicker`: pointer to colorpicker object
- `en`: true: enable preview; false: disable preview

lv_cpicker_color_mode_t **lv_cpicker_get_color_mode**(*lv_obj_t* *cpicker)
Get the current color mode.

Return color mode (hue/sat/val)

Parameters

- `cpicker`: pointer to colorpicker object

bool **lv_cpicker_get_color_mode_fixed**(*lv_obj_t* *cpicker)
Get if the color mode is changed on long press on center

Return mode cannot be changed on long press

Parameters

- `cpicker`: pointer to colorpicker object

const lv_style_t ***lv_cpicker_get_style**(**const** *lv_obj_t* *cpicker, *lv_cpicker_style_t* *type*)
Get style of a colorpicker.

Return pointer to the style

Parameters

- `cpicker`: pointer to colorpicker object
- `type`: which style should be get

uint16_t **lv_cpicker_get_hue**(*lv_obj_t* *cpicker)
Get the current hue of a colorpicker.

Return current selected hue

Parameters

- `cpicker`: pointer to colorpicker object

uint8_t **lv_cpicker_get_saturation**(*lv_obj_t* *cpicker)
Get the current saturation of a colorpicker.

Return current selected saturation

Parameters

- `cpicker`: pointer to colorpicker object

uint8_t **lv_cpicker_get_value**(*lv_obj_t* *cpicker)
Get the current hue of a colorpicker.

Return current selected value

Parameters

- `cpicker`: pointer to colorpicker object

lv_color_hsv_t **lv_cpicker_get_hsv**(*lv_obj_t* *cpicker)
Get the current selected hsv of a colorpicker.

Return current selected hsv

Parameters

- `cpicker`: pointer to colorpicker object

lv_color_t **lv_cpicker_get_color**(*lv_obj_t* **cpicker*)
Get the current selected color of a colorpicker.

Return current selected color

Parameters

- `cpicker`: pointer to colorpicker object

bool **lv_cpicker_get_indic_colored**(*lv_obj_t* **cpicker*)
Whether the indicator is colored to the current color or not

Return true: color the indicator; false: not color the indicator

Parameters

- `cpicker`: pointer to colorpicker object

bool **lv_cpicker_get_preview**(*lv_obj_t* **cpicker*)
Whether the preview is enabled or not

Return en true: preview is enabled; false: preview is disabled

Parameters

- `cpicker`: pointer to colorpicker object

struct lv_cpicker_ext_t

Public Members

lv_color_hsv_t **hsv**

lv_style_t ***style**

lv_point_t **pos**

uint8_t **colored**

struct *lv_cpicker_ext_t*::[anonymous] **indic**

uint32_t **last_click_time**

uint32_t **last_change_time**

lv_point_t **last_press_point**

lv_cpicker_color_mode_t **color_mode**

uint8_t **color_mode_fixed**

lv_cpicker_type_t **type**

uint8_t **preview**

Drop-down list (lv_ddlist)

Vue d'ensemble

The drop-down list allows the user to select one value from a list. The drop-down list is closed (inactive) by default. When a drop-down list is inactive, it displays a single value. When activated (by click on the

drop-down list), it displays a list of values from which the user may select one. When the user selects a new value, the drop-down list reverts to the inactive state and displays the new value.

Définir les éléments

The options are passed to the drop-down list as a string with `lv_ddlist_set_options(ddlist, options)`. The options should be separated by `\n`. For example: `"First\nSecond\nThird"`.

Vous pouvez sélectionner un élément manuellement avec `lv_ddlist_set_selected(ddlist, id)`, où *id* est l'index d'un élément.

Obtenir l'élément sélectionné

The get the currently selected option, use `lv_ddlist_get_selected(ddlist)`. It will return the *index* of the selected option.

`lv_ddlist_get_selected_str(ddlist, buf, buf_size)` copies the name of the selected option to a `buf`.

Aligner les éléments

To align the label horizontally, use `lv_ddlist_set_align(ddlist, LV_LABEL_ALIGN_LEFT/CENTER/RIGHT)`.

Hauteur et largeur

By default, the list's height is adjusted automatically to show all options. The `lv_ddlist_set_fix_height(ddlist, height)` sets a fixed height for the opened list. The user can put `0` to use auto height.

The width is also adjusted automatically. To prevent this, apply `lv_ddlist_set_fix_width(ddlist, width)`. The user can put `0` to use auto width.

Barres de défilement

Similarly to *Page* with fix height, the drop-down list supports various scrollbar display modes. It can be set by `lv_ddlist_set_sb_mode(ddlist, LV_SB_MODE_...)`.

Durée d'animation

The drop-down list's open/close animation time is adjusted by `lv_ddlist_set_anim_time(ddlist, anim_time)`. Zero animation time means no animation.

Flèche décorative

A down arrow can be added to the left side of the drop-down list with `lv_ddlist_set_draw_arrow(ddlist, true)`.

Manually open/close

To manually open or close the drop-down list the `lv_ddlist_open/close(ddlist)` function can be used.

Rester ouvert

You can force the drop-down list to **stay opened**, when an option is selected with `lv_ddlist_set_stay_open(ddlist, true)`.

Styles

The `lv_ddlist_set_style(ddlist, LV_DDLIST_STYLE_..., &style)` set the styles of a drop-down list.

- **LV_DDLIST_STYLE_BG** - Style of the background. All `style.body` properties are used. `style.text` is used for the option' s label. Default: `lv_style_pretty`.
- **LV_DDLIST_STYLE_SEL** - Style of the selected option. The `style.body` properties are used. The selected option will be recolored with `text.color`. Default: `lv_style_plain_color`.
- **LV_DDLIST_STYLE_SB** - Style of the scrollbar. The `style.body` properties are used. Default: `lv_style_plain_color`.

Evénements

Besides the Generic events, the following Special events are sent by the drop-down list:

- **LV_EVENT_VALUE_CHANGED** - Sent when the new option is selected.

Apprenez-en plus sur les *événements*.

Touches

Les *touches* suivantes sont traitées par les listes déroulantes :

- **LV_KEY_RIGHT/DOWN** - Select the next option.
- **LV_KEY_LEFT/UP** - Select the previous option.
- **LY_KEY_ENTER** - Apply the selected option (Send `LV_EVENT_VALUE_CHANGED` event and close the drop-down list).

Exemple

C

Simple Drop down list

code

```
#include "lvgl/lvgl.h"
#include <stdio.h>

static void event_handler(lv_obj_t * obj, lv_event_t event)
{
    if(event == LV_EVENT_VALUE_CHANGED) {
        char buf[32];
        lv_ddlist_get_selected_str(obj, buf, sizeof(buf));
        printf("Option: %s\n", buf);
    }
}

void lv_ex_ddlist_1(void)
{

    /*Create a drop down list*/
    lv_obj_t * ddlist = lv_ddlist_create(lv_scr_act(), NULL);
    lv_ddlist_set_options(ddlist, "Apple\n"
            "Banana\n"
            "Orange\n"
            "Melon\n"
            "Grape\n"
            "Raspberry");

    lv_ddlist_set_fix_width(ddlist, 150);
    lv_ddlist_set_draw_arrow(ddlist, true);
    lv_obj_align(ddlist, NULL, LV_ALIGN_IN_TOP_MID, 0, 20);
    lv_obj_set_event_cb(ddlist, event_handler);
}
```

Drop "up" list

code

```
#include "lvgl/lvgl.h"
#include <stdio.h>

/**
 * Create a drop UP list by applying auto realign
 */
void lv_ex_ddlist_2(void)
{

    /*Create a drop down list*/
    lv_obj_t * ddlist = lv_ddlist_create(lv_scr_act(), NULL);
    lv_ddlist_set_options(ddlist, "Apple\n"
            "Banana\n"
            "Orange\n"
            "Melon\n"
            "Grape\n"
            "Raspberry");

    lv_ddlist_set_fix_width(ddlist, 150);
    lv_ddlist_set_fix_height(ddlist, 150);
    lv_ddlist_set_draw_arrow(ddlist, true);

    /* Enable auto-realign when the size changes.
     * It will keep the bottom of the ddlist fixed*/
    lv_obj_set_auto_realign(ddlist, true);

    /*It will be called automatically when the size changes*/
    lv_obj_align(ddlist, NULL, LV_ALIGN_IN_BOTTOM_MID, 0, -20);
}
```

MicroPython

Simple Drop down list

code

```
def event_handler(obj, event):
    if event == lv.EVENT.VALUE_CHANGED:
        option = " "*10 # should be large enough to store the option
        obj.get_selected_str(option, len(option))
        # .strip() removes trailing spaces
        print("Option: \"%s\"" % option.strip())

# Create a drop down list
ddlist = lv.ddlist(lv.scr_act())
ddlist.set_options("\n".join([
                    "Apple",
                    "Banana",
                    "Orange",
                    "Melon",
                    "Grape",
                    "Raspberry"]))

ddlist.set_fix_width(150)
ddlist.set_draw_arrow(True)
ddlist.align(None, lv.ALIGN.IN_TOP_MID, 0, 20)
ddlist.set_event_cb(event_handler)
```

Drop “up” list

code

```
# Create a drop UP list by applying auto realign

# Create a drop down list
ddlist = lv.ddlist(lv.scr_act())
ddlist.set_options("\n".join([
                    "Apple",
                    "Banana",
                    "Orange",
                    "Melon",
                    "Grape",
                    "Raspberry"]))


ddlist.set_fix_width(150)
ddlist.set_fix_height(150)
ddlist.set_draw_arrow(True)

# Enable auto-realign when the size changes.
# It will keep the bottom of the ddlist fixed
ddlist.set_auto_realign(True)

# It will be called automatically when the size changes
ddlist.align(None, lv.ALIGN.IN_BOTTOM_MID, 0, -20)
```

API

Typedefs

typedef uint8_t **lv_ddlist_style_t**

Enums

enum [anonymous]
Values:

LV_DDLIST_STYLE_BG

LV_DDLIST_STYLE_SEL

LV_DDLIST_STYLE_SB

Functions

lv_obj_t ***lv_ddlist_create**(*lv_obj_t* **par*, **const** *lv_obj_t* **copy*)
Create a drop down list objects

Return pointer to the created drop down list

Parameters

- `par`: pointer to an object, it will be the parent of the new drop down list
- `copy`: pointer to a drop down list object, if not NULL then the new object will be copied from it

void **lv_ddlist_set_options**(*lv_obj_t* **ddlist*, **const** char **options*)
Set the options in a drop down list from a string

Parameters

- `ddlist`: pointer to drop down list object
- `options`: a string with ‘’ separated options. E.g. “One\nTwo\nThree”

void **lv_ddlist_set_selected**(*lv_obj_t* **ddlist*, uint16_t *sel_opt*)
Set the selected option

Parameters

- `ddlist`: pointer to drop down list object
- `sel_opt`: id of the selected option (0 ···number of option - 1);

void **lv_ddlist_set_fix_height**(*lv_obj_t* **ddlist*, lv_coord_t *h*)
Set a fix height for the drop down list If 0 then the opened ddlist will be auto. sized else the set height will be applied.

Parameters

- `ddlist`: pointer to a drop down list
- `h`: the height when the list is opened (0: auto size)

void **lv_ddlist_set_fix_width**(*lv_obj_t* **ddlist*, lv_coord_t *w*)
Set a fix width for the drop down list

Parameters

- `ddlist`: pointer to a drop down list
- `w`: the width when the list is opened (0: auto size)

void **lv_ddlist_set_draw_arrow**(*lv_obj_t* **ddlist*, bool *en*)
Set arrow draw in a drop down list

Parameters

- `ddlist`: pointer to drop down list object
- `en`: enable/disable a arrow draw. E.g. "true" for draw.

void **lv_ddlist_set_stay_open**(*lv_obj_t* **ddlist*, bool *en*)
Leave the list opened when a new value is selected

Parameters

- `ddlist`: pointer to drop down list object
- `en`: enable/disable "stay open" feature

static void **lv_ddlist_set_sb_mode**(*lv_obj_t* **ddlist*, *lv_sb_mode_t* *mode*)
Set the scroll bar mode of a drop down list

Parameters

- `ddlist`: pointer to a drop down list object
- `sb_mode`: the new mode from 'lv_page_sb_mode_t' enum

static void **lv_ddlist_set_anim_time**(*lv_obj_t* **ddlist*, uint16_t *anim_time*)
Set the open/close animation time.

Parameters

- `ddlist`: pointer to a drop down list
- `anim_time`: open/close animation time [ms]

void **lv_ddlist_set_style**(*lv_obj_t* **ddlist*, *lv_ddlist_style_t* *type*, **const** lv_style_t **style*)
Set a style of a drop down list

Parameters

- `ddlist`: pointer to a drop down list object
- `type`: which style should be set
- `style`: pointer to a style

void **lv_ddlist_set_align**(*lv_obj_t* **ddlist*, *lv_label_align_t* *align*)
Set the alignment of the labels in a drop down list

Parameters

- `ddlist`: pointer to a drop down list object
- `align`: alignment of labels

const char ***lv_ddlist_get_options**(**const** *lv_obj_t* **ddlist*)
Get the options of a drop down list

Return the options separated by " -s (E.g. "Option1\nOption2\nOption3")

Parameters

- `ddlist`: pointer to drop down list object

uint16_t **lv_ddlist_get_selected**(**const** *lv_obj_t* **ddlist*)
Get the selected option

Return id of the selected option (0 ···number of option - 1);

Parameters

- `ddlist`: pointer to drop down list object

void **lv_ddlist_get_selected_str(const** *lv_obj_t* ***ddlist***, char ****buf***, uint16_t *buf_size***)**
Get the current selected option as a string

Parameters

- `ddlist`: pointer to ddlist object
- `buf`: pointer to an array to store the string
- `buf_size`: size of `buf` in bytes. 0: to ignore it.

lv_coord_t **lv_ddlist_get_fix_height(const** *lv_obj_t* ***ddlist***)
Get the fix height value.

Return the height if the ddlist is opened (0: auto size)

Parameters

- `ddlist`: pointer to a drop down list object

bool **lv_ddlist_get_draw_arrow(***lv_obj_t* ***ddlist***)
Get arrow draw in a drop down list

Parameters

- `ddlist`: pointer to drop down list object

bool **lv_ddlist_get_stay_open(***lv_obj_t* ***ddlist***)
Get whether the drop down list stay open after selecting a value or not

Parameters

- `ddlist`: pointer to drop down list object

static *lv_sb_mode_t* **lv_ddlist_get_sb_mode(const** *lv_obj_t* ***ddlist***)
Get the scroll bar mode of a drop down list

Return scrollbar mode from 'lv_page_sb_mode_t' enum

Parameters

- `ddlist`: pointer to a drop down list object

static uint16_t **lv_ddlist_get_anim_time(const** *lv_obj_t* ***ddlist***)
Get the open/close animation time.

Return open/close animation time [ms]

Parameters

- `ddlist`: pointer to a drop down list

const lv_style_t ***lv_ddlist_get_style(const** *lv_obj_t* ***ddlist***, *lv_ddlist_style_t type***)**
Get a style of a drop down list

Return style pointer to a style

Parameters

- `ddlist`: pointer to a drop down list object
- `type`: which style should be get

lv_label_align_t **lv_ddlist_get_align(const** *lv_obj_t* ***ddlist***)
Get the alignment of the labels in a drop down list

Return alignment of labels

Parameters

- `ddlist`: pointer to a drop down list object

void **lv_ddlist_open**(*lv_obj_t* **ddlist*, *lv_anim_enable_t* *anim*)
Open the drop down list with or without animation

Parameters

- `ddlist`: pointer to drop down list object
- `anim_en`: LV_ANIM_ON: use animation; LV_ANOM_OFF: not use animations

void **lv_ddlist_close**(*lv_obj_t* **ddlist*, *lv_anim_enable_t* *anim*)
Close (Collapse) the drop down list

Parameters

- `ddlist`: pointer to drop down list object
- `anim_en`: LV_ANIM_ON: use animation; LV_ANOM_OFF: not use animations

struct lv_ddlist_ext_t

Public Members

lv_page_ext_t **page**

lv_obj_t ***label**

const lv_style_t ***sel_style**

uint16_t **option_cnt**

uint16_t **sel_opt_id**

uint16_t **sel_opt_id_ori**

uint8_t **opened**

uint8_t **force_sel**

uint8_t **draw_arrow**

uint8_t **stay_open**

lv_coord_t **fix_height**

Jauge (lv_gauge)

Vue d'ensemble

La jauge est semi-circulaire, présente une échelle graduée, des étiquettes et des aiguilles.

Scale

You can use the `lv_gauge_set_scale(gauge, angle, line_num, label_cnt)` function to adjust the scale angle and the number of the scale lines and labels. Les paramètres par défaut sont 220 degrés, 21 graduations et 6 étiquettes.

Aiguilles

The gauge can show more than one needle. Utilisez la fonction `lv_gauge_set_needle_count(gauge, needle_num, color_array)`pour définir le nombre d'aiguilles et un tableau de couleurs pour chaque aiguille. Le tableau doit être une variable statique ou globale car seul son pointeur est sauvegardé.

Vous pouvez utiliser `lv_gauge_set_value(gauge, needle_id, value)` pour définir une aiguille.

Plage

La plage de la jauge peut être spécifiée par `lv_gauge_set_range(gauge, min, max)`. La plage par défaut est 0..100.

Valeur critique

To set a critical value, use `lv_gauge_set_critical_value(gauge, value)`. The scale color will be changed to `line.color` after this value. (default: 80)

Styles

The gauge uses one style at a time which can be set by `lv_gauge_set_style(gauge, LV_GAUGE_STYLE_MAIN, &style)`. The gauge's properties are derived from the following style attributes:

- **body.main_color** - Line's color at the beginning of the scale.
- **body.grad_color** - Line's color at the end of the scale (gradient with main color).
- **body.padding.left** - Line length.
- **body.padding.inner** - Label distance from the scale lines.
- **body.radius** - Radius of needle origin circle.
- **line.width** - Line width.
- **line.color** - Line's color after the critical value.
- **text.font/color/letter_space** - Label attributes.

Evénements

Seuls les événements génériques sont envoyés par ce type d'objet.

Apprenez-en plus sur les *événements*.

Touches

Aucune *touche* n'est traitée par ce type d'objet.

Apprenez-en plus sur les *touches*.

Exemple

C

Simple Gauge

code

```
#include "lvgl/lvgl.h"

void lv_ex_gauge_1(void)
{
    /*Create a style*/
    static lv_style_t style;
    lv_style_copy(&style, &lv_style_pretty_color);
    style.body.main_color = lv_color_hex3(0x666);     /*Line color at the beginning*/
    style.body.grad_color =  lv_color_hex3(0x666);    /*Line color at the end*/
    style.body.padding.left = 10;                      /*Scale line length*/
    style.body.padding.inner = 8 ;                    /*Scale label padding*/
    style.body.border.color = lv_color_hex3(0x333);   /*Needle middle circle color*/
    style.line.width = 3;
    style.text.color = lv_color_hex3(0x333);
    style.line.color = LV_COLOR_RED;                  /*Line color after the critical␣
↪value*/

    /*Describe the color for the needles*/
    static lv_color_t needle_colors[3];
    needle_colors[0] = LV_COLOR_BLUE;
    needle_colors[1] = LV_COLOR_ORANGE;
    needle_colors[2] = LV_COLOR_PURPLE;

    /*Create a gauge*/
    lv_obj_t * gauge1 = lv_gauge_create(lv_scr_act(), NULL);
```

(continues on next page)

(continued from previous page)

```
    lv_gauge_set_style(gauge1, LV_GAUGE_STYLE_MAIN, &style);
    lv_gauge_set_needle_count(gauge1, 3, needle_colors);
    lv_obj_set_size(gauge1, 150, 150);
    lv_obj_align(gauge1, NULL, LV_ALIGN_CENTER, 0, 20);

    /*Set the values*/
    lv_gauge_set_value(gauge1, 0, 10);
    lv_gauge_set_value(gauge1, 1, 20);
    lv_gauge_set_value(gauge1, 2, 30);
}
```

MicroPython

Simple Gauge

code

```
# Create a style
style = lv.style_t()
lv.style_copy(style, lv.style_pretty_color)
style.body.main_color = lv.color_hex3(0x666)     # Line color at the beginning
style.body.grad_color =  lv.color_hex3(0x666)    # Line color at the end
style.body.padding.left = 10                     # Scale line length
style.body.padding.inner = 8                     # Scale label padding
style.body.border.color = lv.color_hex3(0x333)   # Needle middle circle color
style.line.width = 3
style.text.color = lv.color_hex3(0x333)
style.line.color = lv.color_hex3(0xF00)          # Line color after the critical value

# Describe the color for the needles
needle_colors = [
```

(continues on next page)

(continued from previous page)

```
    lv.color_make(0x00, 0x00, 0xFF),
    lv.color_make(0xFF, 0xA5, 0x00),
    lv.color_make(0x80, 0x00, 0x80)
]

# Create a gauge
gauge1 = lv.gauge(lv.scr_act())
gauge1.set_style(lv.gauge.STYLE.MAIN, style)
gauge1.set_needle_count(len(needle_colors), needle_colors)
gauge1.set_size(150, 150)
gauge1.align(None, lv.ALIGN.CENTER, 0, 20)

# Set the values
gauge1.set_value(0, 10)
gauge1.set_value(1, 20)
gauge1.set_value(2, 30)
```

API

Typedefs

typedef uint8_t **lv_gauge_style_t**

Enums

enum [anonymous]

Values:

LV_GAUGE_STYLE_MAIN

Functions

lv_obj_t ***lv_gauge_create**(*lv_obj_t* **par*, **const** *lv_obj_t* **copy*)

Create a gauge objects

Return pointer to the created gauge

Parameters

- `par`: pointer to an object, it will be the parent of the new gauge
- `copy`: pointer to a gauge object, if not NULL then the new object will be copied from it

void **lv_gauge_set_needle_count**(*lv_obj_t* **gauge*, uint8_t *needle_cnt*, **const** *lv_color_t colors*[])

Set the number of needles

Parameters

- `gauge`: pointer to gauge object
- `needle_cnt`: new count of needles
- `colors`: an array of colors for needles (with 'num' elements)

void **lv_gauge_set_value**(*lv_obj_t* **gauge*, uint8_t *needle_id*, int16_t *value*)

Set the value of a needle

Parameters

- `gauge`: pointer to a gauge
- `needle_id`: the id of the needle
- `value`: the new value

static void **lv_gauge_set_range**(*lv_obj_t* *gauge, int16_t *min*, int16_t *max*)
Set minimum and the maximum values of a gauge

Parameters

- `gauge`: pointer to he gauge object
- `min`: minimum value
- `max`: maximum value

static void **lv_gauge_set_critical_value**(*lv_obj_t* *gauge, int16_t *value*)
Set a critical value on the scale. After this value 'line.color' scale lines will be drawn

Parameters

- `gauge`: pointer to a gauge object
- `value`: the critical value

void **lv_gauge_set_scale**(*lv_obj_t* *gauge, uint16_t *angle*, uint8_t *line_cnt*, uint8_t *label_cnt*)
Set the scale settings of a gauge

Parameters

- `gauge`: pointer to a gauge object
- `angle`: angle of the scale (0..360)
- `line_cnt`: count of scale lines. The get a given "subdivision"lines between label, `line_cnt` = (sub_div + 1) * (label_cnt - 1) + 1
- `label_cnt`: count of scale labels.

static void **lv_gauge_set_style**(*lv_obj_t* *gauge, *lv_gauge_style_t* *type*, lv_style_t *style*)
Set the styles of a gauge

Parameters

- `gauge`: pointer to a gauge object
- `type`: which style should be set (can be only `LV_GAUGE_STYLE_MAIN`)
- `style`: set the style of the gauge

int16_t **lv_gauge_get_value**(**const** *lv_obj_t* *gauge, uint8_t *needle*)
Get the value of a needle

Return the value of the needle [min,max]

Parameters

- `gauge`: pointer to gauge object
- `needle`: the id of the needle

uint8_t **lv_gauge_get_needle_count**(**const** *lv_obj_t* *gauge)
Get the count of needles on a gauge

Return count of needles

Parameters

- gauge: pointer to gauge

static int16_t **lv_gauge_get_min_value(const** *lv_obj_t* *lmeter**)**
Get the minimum value of a gauge

Return the minimum value of the gauge

Parameters

- gauge: pointer to a gauge object

static int16_t **lv_gauge_get_max_value(const** *lv_obj_t* *lmeter**)**
Get the maximum value of a gauge

Return the maximum value of the gauge

Parameters

- gauge: pointer to a gauge object

static int16_t **lv_gauge_get_critical_value(const** *lv_obj_t* *gauge**)**
Get a critical value on the scale.

Return the critical value

Parameters

- gauge: pointer to a gauge object

uint8_t **lv_gauge_get_label_count(const** *lv_obj_t* *gauge**)**
Set the number of labels (and the thicker lines too)

Return count of labels

Parameters

- gauge: pointer to a gauge object

static uint16_t **lv_gauge_get_line_count(const** *lv_obj_t* *gauge**)**
Get the scale number of a gauge

Return number of the scale units

Parameters

- gauge: pointer to a gauge object

static uint16_t **lv_gauge_get_scale_angle(const** *lv_obj_t* *gauge**)**
Get the scale angle of a gauge

Return angle of the scale

Parameters

- gauge: pointer to a gauge object

static const lv_style_t ***lv_gauge_get_style(const** *lv_obj_t* *gauge, *lv_gauge_style_t* *type**)**
Get the style of a gauge

Return pointer to the gauge' s style

Parameters

- gauge: pointer to a gauge object
- type: which style should be get (can be only LV_GAUGE_STYLE_MAIN)

struct lv_gauge_ext_t

Public Members

lv_lmeter_ext_t **lmeter**

int16_t ***values**

const *lv_color_t* ***needle_colors**

uint8_t **needle_count**

uint8_t **label_count**

Image (lv_img)

Vue d' ensemble

'Images' are the basic object to display images.

Image source

To provide maximum flexibility, the source of the image can be:

- a variable in the code (a C array with the pixels).
- a file stored externally (like on an SD card).
- a text with *Symbols*.

To set the source of an image, use `lv_img_set_src(img, src)`.

To generate a **pixel array** from a PNG, JPG or BMP image, use the Online image converter tool and set the converted image with its pointer: `lv_img_set_src(img1, &converted_img_var);` To make the variable visible in the C file, you need to declare it with `LV_IMG_DECLARE(converted_img_var)`.

To use **external files**, you also need to convert the image files using the online converter tool but now you should select the binary Output format. Vous devez également utiliser le module de système de fichiers de LittlevGL et enregistrer un pilote avec certaines fonctions pour le fonctionnement de base des fichiers. Allez dans *Système de fichiers* pour en savoir plus. To set an image sourced from a file, use `lv_img_set_src(img, "S:folder1/my_img.bin")`.

You can set a **symbol** similarly to *Labels*. In this case, the image will be rendered as text according to the *font* specified in the style. It enables to use of light-weighted mono-color "letters" instead of real images. You can set symbol like `lv_img_set_src(img1, LV_SYMBOL_OK)`.

Etiquette comme image

Images and labels are sometimes used to convey the same thing. For example, to describe what a button does. Therefore, images and labels are somewhat interchangeable. To handle these images can even display texts by using `LV_SYMBOL_DUMMY` as the prefix of the text. For example, `lv_img_set_src(img, LV_SYMBOL_DUMMY "Some text")`.

Transparence

Les images internes (variables) et externes prennent en charge 2 méthodes de traitement de la transparence :

- **Chrome keying** - Pixels with `LV_COLOR_TRANSP` (*lv_conf.h*) color will be transparent.
- **Alpha byte** - An alpha byte is added to every pixel.

Palette et index alpha

Besides *True color* (RGB) color format, the following formats are also supported:

- **Indexed** - Image has a palette.
- **Alpha indexed** - Only alpha values are stored.

These options can be selected in the font converter. To learn more about the color formats, read the *Images* section.

Coloration

The images can be re-colored in run-time to any color according to the brightness of the pixels. It is very useful to show different states (selected, inactive, pressed, etc.) of an image without storing more versions of the same image. This feature can be enabled in the style by setting `img.intense` between `LV_OPA_TRANSP` (no recolor, value: 0) and `LV_OPA_COVER` (full recolor, value: 255). La valeur par défaut est `LV_OPA_TRANSP`, cette fonctionnalité est donc désactivée.

Taille automatique

It is possible to automatically set the size of the image object to the image source' s width and height if enabled by the `lv_img_set_auto_size(image, true)` function. If *auto-size* is enabled, then when a new file is set, the object size is automatically changed. Later, you can modify the size manually. The *auto-size* is enabled by default if the image is not a screen.

Mosaïque

If the object size is greater than the image size in any directions, then the image will be repeated like a mosaic. It' s a very useful feature to create a large image from only a very narrow source. Par exemple, vous pouvez avoir une image *300 x 1* avec un dégradé spécial et la définir comme fond d' écran à l' aide de la fonction mosaïque.

Décalage

With `lv_img_set_offset_x(img, x_ofs)` and `lv_img_set_offset_y(img, y_ofs)`, you can add some offset to the displayed image. It is useful if the object size is smaller than the image source size. Using the offset parameter a Texture atlas or a "running image" effect can be created by *Animating* the x or y offset.

Styles

The images uses one style at a time which can be set by `lv_img_set_style(lmeter, LV_IMG_STYLE_MAIN, &style)`. All the `style.image` properties are used:

- **image.intense** - Intensity of recoloring (0..255 or *LV_OPA_···*).
- **image.color** - Color for recoloring or color of the alpha indexed images.
- **image.opa** - Overall opacity of image.

When the image object displays a text then `style.text` properties are used. See *Label* for more information.

Le style par défaut des images est *NULL* donc elles **héritent du style du parent**.

Evénements

Seuls les événements génériques sont envoyés par ce type d'objet.

Apprenez-en plus sur les *événements*.

Touches

Aucune *touche* n'est traitée par ce type d'objet.

Apprenez-en plus sur les *touches*.

Exemple

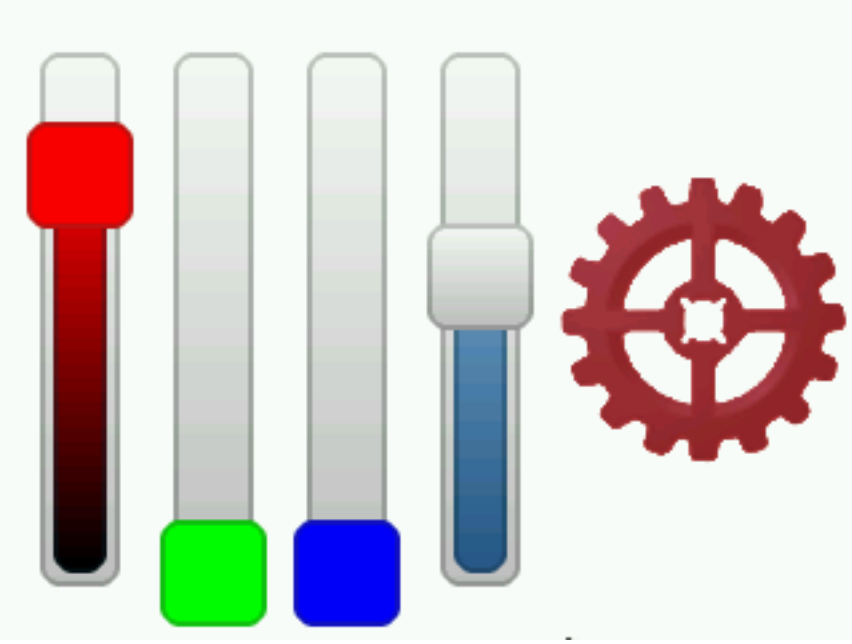
C

Image from variable and symbol

code

```
#include "lvgl/lvgl.h"

LV_IMG_DECLARE(cogwheel);

void lv_ex_img_1(void)
{
    lv_obj_t * img1 = lv_img_create(lv_scr_act(), NULL);
    lv_img_set_src(img1, &cogwheel);
    lv_obj_align(img1, NULL, LV_ALIGN_CENTER, 0, -20);

    lv_obj_t * img2 = lv_img_create(lv_scr_act(), NULL);
    lv_img_set_src(img2, LV_SYMBOL_OK "Accept");
    lv_obj_align(img2, img1, LV_ALIGN_OUT_BOTTOM_MID, 0, 20);
}
```

Image recoloring



code

```
/**
 * @file lv_ex_img_2.c
 *
 */

/*********************
 *      INCLUDES
 *********************/

#include "lvgl/lvgl.h"

/*********************
 *      DEFINES
 *********************/
#define SLIDER_WIDTH 40

/**********************
 *      TYPEDEFS
 **********************/

/**********************
 *  STATIC PROTOTYPES
 **********************/
static void create_sliders(void);
static void slider_event_cb(lv_obj_t * slider, lv_event_t event);

/**********************
 *  STATIC VARIABLES
 **********************/
static lv_obj_t * red_slider, * green_slider, * blue_slider, * intense_slider;
static lv_obj_t * img1;
```

(continues on next page)

(continued from previous page)

```
static lv_style_t img_style;
LV_IMG_DECLARE(cogwheel);

/**********************
 *      MACROS
 **********************/

/**********************
 *   GLOBAL FUNCTIONS
 **********************/

void lv_ex_img_2(void)
{
    /*Create 4 sliders to adjust RGB color and re-color intensity*/
    create_sliders();

    /* Now create the actual image */
    img1 = lv_img_create(lv_scr_act(), NULL);
    lv_img_set_src(img1, &cogwheel);
    lv_obj_align(img1, intense_slider, LV_ALIGN_OUT_RIGHT_MID, 10, 0);

    /* Create a message box for information */
    static const char * btns[] ={"OK", ""};

    lv_obj_t * mbox = lv_mbox_create(lv_scr_act(), NULL);

    lv_mbox_set_text(mbox, "Welcome to the image recoloring demo!\nThe first three␣
↪sliders control the RGB value of the recoloring.\nThe last slider controls the␣
↪intensity.");
    lv_mbox_add_btns(mbox, btns);
    lv_obj_align(mbox, NULL, LV_ALIGN_CENTER, 0, 0);

    /* Save the image's style so the sliders can modify it */
    lv_style_copy(&img_style, lv_img_get_style(img1, LV_IMG_STYLE_MAIN));
}

/**********************
 *   STATIC FUNCTIONS
 **********************/

static void slider_event_cb(lv_obj_t * slider, lv_event_t event)
{
    if(event == LV_EVENT_VALUE_CHANGED) {
        /* Recolor the image based on the sliders' values */
        img_style.image.color = lv_color_make(lv_slider_get_value(red_slider), lv_
↪slider_get_value(green_slider), lv_slider_get_value(blue_slider));
        img_style.image.intense = lv_slider_get_value(intense_slider);
        lv_img_set_style(img1, LV_IMG_STYLE_MAIN, &img_style);
    }
}

static void create_sliders(void)
{
    /* Create a set of RGB sliders */
    /* Use the red one as a base for all the settings */
    red_slider = lv_slider_create(lv_scr_act(), NULL);
```

(continues on next page)

(continued from previous page)

```
    lv_slider_set_range(red_slider, 0, 255);
    lv_obj_set_size(red_slider, SLIDER_WIDTH, 200); /* Be sure it's a vertical slider␣
↪*/

    lv_obj_set_event_cb(red_slider, slider_event_cb);

    /* Create the intensity slider first, as it does not use any custom styles */
    intense_slider = lv_slider_create(lv_scr_act(), red_slider);
    lv_slider_set_range(intense_slider, LV_OPA_TRANSP, LV_OPA_COVER);

    /* Create the slider knob and fill styles */
    /* Fill styles are initialized with a gradient between black and the slider's␣
↪respective color. */
    /* Knob styles are simply filled with the slider's respective color. */
    static lv_style_t slider_red_fill_style, slider_red_knob_style;

    lv_style_copy(&slider_red_fill_style, lv_slider_get_style(red_slider, LV_SLIDER_
↪STYLE_INDIC));
    lv_style_copy(&slider_red_knob_style, lv_slider_get_style(red_slider, LV_SLIDER_
↪STYLE_KNOB));

    slider_red_fill_style.body.main_color = lv_color_make(255, 0, 0);
    slider_red_fill_style.body.grad_color = LV_COLOR_BLACK;

    slider_red_knob_style.body.main_color = slider_red_knob_style.body.grad_color =␣
↪slider_red_fill_style.body.main_color;

    static lv_style_t slider_green_fill_style, slider_green_knob_style;
    lv_style_copy(&slider_green_fill_style, &slider_red_fill_style);
    lv_style_copy(&slider_green_knob_style, &slider_red_knob_style);

    slider_green_fill_style.body.main_color = lv_color_make(0, 255, 0);

    slider_green_knob_style.body.main_color = slider_green_knob_style.body.grad_color␣
↪= slider_green_fill_style.body.main_color;

    static lv_style_t slider_blue_fill_style, slider_blue_knob_style;
    lv_style_copy(&slider_blue_fill_style, &slider_red_fill_style);
    lv_style_copy(&slider_blue_knob_style, &slider_red_knob_style);

    slider_blue_fill_style.body.main_color = lv_color_make(0, 0, 255);

    slider_blue_knob_style.body.main_color = slider_blue_knob_style.body.grad_color =␣
↪slider_blue_fill_style.body.main_color;

    /* Setup the red slider */
    lv_slider_set_style(red_slider, LV_SLIDER_STYLE_INDIC, &slider_red_fill_style);
    lv_slider_set_style(red_slider, LV_SLIDER_STYLE_KNOB, &slider_red_knob_style);

    /* Copy it for the other two sliders */
    green_slider = lv_slider_create(lv_scr_act(), red_slider);
    lv_slider_set_style(green_slider, LV_SLIDER_STYLE_INDIC, &slider_green_fill_
↪style);
    lv_slider_set_style(green_slider, LV_SLIDER_STYLE_KNOB, &slider_green_knob_style);

    blue_slider = lv_slider_create(lv_scr_act(), red_slider);
```

(continues on next page)

(continued from previous page)

```
    lv_slider_set_style(blue_slider, LV_SLIDER_STYLE_INDIC, &slider_blue_fill_style);
    lv_slider_set_style(blue_slider, LV_SLIDER_STYLE_KNOB, &slider_blue_knob_style);

    lv_obj_align(red_slider, NULL, LV_ALIGN_IN_LEFT_MID, 10, 0);

    lv_obj_align(green_slider, red_slider, LV_ALIGN_OUT_RIGHT_MID, 10, 0);

    lv_obj_align(blue_slider, green_slider, LV_ALIGN_OUT_RIGHT_MID, 10, 0);

    lv_obj_align(intense_slider, blue_slider, LV_ALIGN_OUT_RIGHT_MID, 10, 0);
}
```

MicroPython

Image from PNG file

code

```
from imagetools import get_png_info, open_png

# Register PNG image decoder
decoder = lv.img.decoder_create()
decoder.info_cb = get_png_info
decoder.open_cb = open_png

# Create a screen with a draggable image

with open('cogwheel.png','rb') as f:
  png_data = f.read()

png_img_dsc = lv.img_dsc_t({
```

(continues on next page)

(continued from previous page)

```
    'data_size': len(png_data),
    'data': png_data
})

scr = lv.scr_act()

# Create an image on the left using the decoder

# lv.img.cache_set_size(2)
img1 = lv.img(scr)
img1.align(scr, lv.ALIGN.CENTER, 0, -20)
img1.set_src(png_img_dsc)

img2 = lv.img(scr)
img2.set_src(lv.SYMBOL.OK + "Accept")
img2.align(img1, lv.ALIGN.OUT_BOTTOM_MID, 0, 20)
```

API

Typedefs

typedef uint8_t **lv_img_style_t**

Enums

enum [anonymous]

Values:

LV_IMG_STYLE_MAIN

Functions

lv_obj_t ***lv_img_create**(*lv_obj_t* **par*, **const** *lv_obj_t* **copy*)

Create an image objects

Return pointer to the created image

Parameters

- `par`: pointer to an object, it will be the parent of the new button
- `copy`: pointer to a image object, if not NULL then the new object will be copied from it

void **lv_img_set_src**(*lv_obj_t* **img*, **const** void **src_img*)

Set the pixel map to display by the image

Parameters

- `img`: pointer to an image object
- `data`: the image data

void **lv_img_set_auto_size**(*lv_obj_t* **img*, bool *autosize_en*)

Enable the auto size feature. If enabled the object size will be same as the picture size.

Parameters

- `img`: pointer to an image
- `en`: true: auto size enable, false: auto size disable

void **lv_img_set_offset_x**(*lv_obj_t* *img, lv_coord_t x)
Set an offset for the source of an image. so the image will be displayed from the new origin.

Parameters

- `img`: pointer to an image
- `x`: the new offset along x axis.

void **lv_img_set_offset_y**(*lv_obj_t* *img, lv_coord_t y)
Set an offset for the source of an image. so the image will be displayed from the new origin.

Parameters

- `img`: pointer to an image
- `y`: the new offset along y axis.

static void **lv_img_set_style**(*lv_obj_t* *img, *lv_img_style_t* type, **const** lv_style_t *style)
Set the style of an image

Parameters

- `img`: pointer to an image object
- `type`: which style should be set (can be only `LV_IMG_STYLE_MAIN`)
- `style`: pointer to a style

const void ***lv_img_get_src**(*lv_obj_t* *img)
Get the source of the image

Return the image source (symbol, file name or C array)

Parameters

- `img`: pointer to an image object

const char ***lv_img_get_file_name**(**const** *lv_obj_t* *img)
Get the name of the file set for an image

Return file name

Parameters

- `img`: pointer to an image

bool **lv_img_get_auto_size**(**const** *lv_obj_t* *img)
Get the auto size enable attribute

Return true: auto size is enabled, false: auto size is disabled

Parameters

- `img`: pointer to an image

lv_coord_t **lv_img_get_offset_x**(*lv_obj_t* *img)
Get the offset.x attribute of the img object.

Return offset.x value.

Parameters

- `img`: pointer to an image

lv_coord_t **lv_img_get_offset_y**(*lv_obj_t* *img)
Get the offset.y attribute of the img object.

Return offset.y value.

Parameters

- `img`: pointer to an image

static const lv_style_t ***lv_img_get_style**(**const** *lv_obj_t* *img, *lv_img_style_t* type)
Get the style of an image object

Return pointer to the image' s style

Parameters

- `img`: pointer to an image object
- `type`: which style should be get (can be only `LV_IMG_STYLE_MAIN`)

struct lv_img_ext_t

Public Members

const void ***src**

lv_point_t **offset**

lv_coord_t **w**

lv_coord_t **h**

uint8_t **src_type**

uint8_t **auto_size**

uint8_t **cf**

Bouton image (lv_imgbtn)

Vue d' ensemble

The Image button is very similar to the simple 'Button' object. The only difference is that, it displays user-defined images in each state instead of drawing a button. Before reading this section, please read the *Button* section for better understanding.

Images sources

To set the image in a state, use the `lv_imgbtn_set_src(imgbtn, LV_BTN_STATE_..., &img_src)`. The image sources works the same as described in the *Image object* except that, "Symbols" are not supported by the Image button.

If `LV_IMGBTN_TILED` is enabled in *lv_conf.h*, then three sources can be set for each state:

- gauche,
- centre,
- droit.

The *center* image will be repeated to fill the width of the object. Therefore with `LV_IMGBTN_TILED`, you can set the width of the Image button. However, without this option, the width will be always the same as the image source' s width.

Etats

The states also work like with Button object. It can be set with `lv_imgbtn_set_state(imgbtn, LV_BTN_STATE_...)`.

Bascule

La fonctionnalité bascule peut être activée avec `lv_imgbtn_set_toggle(imgbtn, true)`.

Styles

Similar to normal Buttons, Image buttons also have 5 independent styles for the 5 state. You can set them via: `lv_imgbtn_set_style(btn, LV_IMGBTN_STYLE_..., &style)`. The styles use the `style.image` properties.

- **LV_IMGBTN_STYLE_REL** - Style of the released state. Default: `lv_style_btn_rel`.
- **LV_IMGBTN_STYLE_PR** - Style of the pressed state. Default: `lv_style_btn_pr`.
- **LV_IMGBTN_STYLE_TGL_REL** - Style of the toggled released state. Default: `lv_style_btn_tgl_rel`.
- **LV_IMGBTN_STYLE_TGL_PR** - Style of the toggled pressed state. Default: `lv_style_btn_tgl_pr`.
- **LV_IMGBTN_STYLE_INA** - Style of the inactive state. Default: `lv_style_btn_ina`.

When labels are created on a button, it' s a good practice to set the image button' s `style.text` properties too. Because labels have `style = NULL`, by default, they inherit the parent' s (image button) style. Hence you don' t need to create a new style for the label.

Evénements

Beside the Generic events, the following Special events are sent by the buttons:

- **LV_EVENT_VALUE_CHANGED** - Sent when the button is toggled.

Note that, the generic input device related events (like `LV_EVENT_PRESSED`) are sent in the inactive state too. You need to check the state with `lv_btn_get_state(btn)` to ignore the events from inactive buttons.

Apprenez-en plus sur les *événements*.

Touches

Les *touches* suivantes sont traitées par les cases à cocher:

- **LV_KEY_RIGHT/UP** - Go to toggled state if toggling is enabled.
- **LV_KEY_LEFT/DOWN** - Go to non-toggled state if toggling is enabled.

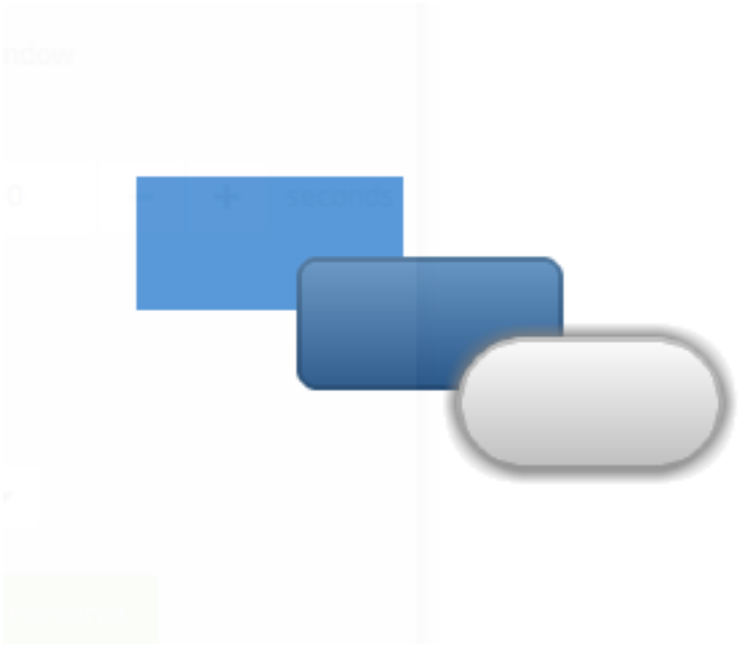
Notez que, comme d' habitude, l' état de `LV_KEY_ENTER` est traduit en `LV_EVENT_PRESSED/PRESSING/RELEASED` etc.

Apprenez-en plus sur les *touches*.

Exemple

C

Base obejcts with custom styles



code

```
#include "lvgl/lvgl.h"

void lv_ex_obj_1(void)
{
    lv_obj_t * obj1;
    obj1 = lv_obj_create(lv_scr_act(), NULL);
    lv_obj_set_size(obj1, 100, 50);
    lv_obj_set_style(obj1, &lv_style_plain_color);
    lv_obj_align(obj1, NULL, LV_ALIGN_CENTER, -60, -30);

    /*Copy the previous object and enable drag*/
    lv_obj_t * obj2;
    obj2 = lv_obj_create(lv_scr_act(), obj1);
    lv_obj_set_style(obj2, &lv_style_pretty_color);
    lv_obj_align(obj2, NULL, LV_ALIGN_CENTER, 0, 0);
    lv_obj_set_drag(obj2, true);

    static lv_style_t style_shadow;
    lv_style_copy(&style_shadow, &lv_style_pretty);
    style_shadow.body.shadow.width = 6;
```

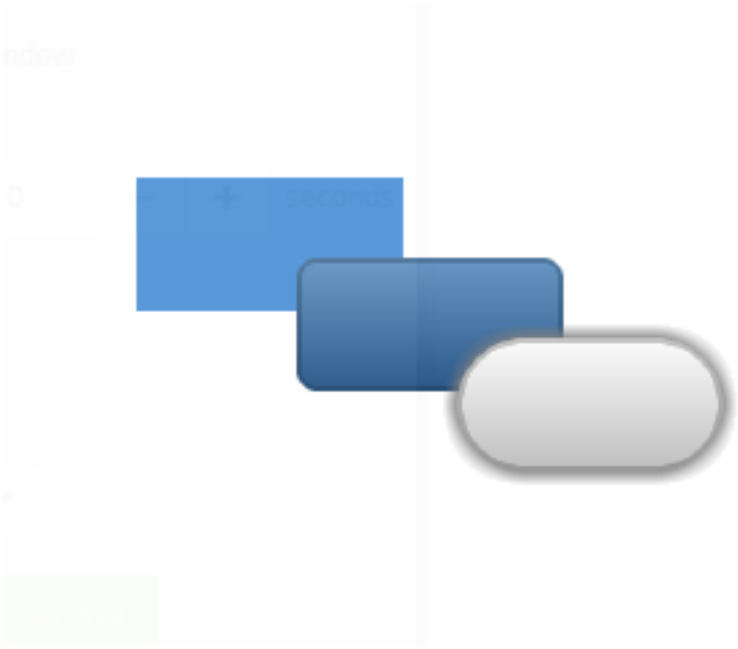
(continues on next page)

(continued from previous page)

```
    style_shadow.body.radius = LV_RADIUS_CIRCLE;

    /*Copy the previous object (drag is already enabled)*/
    lv_obj_t * obj3;
    obj3 = lv_obj_create(lv_scr_act(), obj2);
    lv_obj_set_style(obj3, &style_shadow);
    lv_obj_align(obj3, NULL, LV_ALIGN_CENTER, 60, 30);
}
```

MicroPython

Base obejcts with custom styles



code

```
obj1 = lv.obj(lv.scr_act())
obj1.set_size(100, 50)
obj1.set_style(lv.style_plain_color)
obj1.align(None, lv.ALIGN.CENTER, -60, -30)

# Copy the previous object and enable drag
obj2 = lv.obj(lv.scr_act(), obj1)
obj2.set_style(lv.style_pretty_color)
obj2.align(None, lv.ALIGN.CENTER, 0, 0)
obj2.set_drag(True)

style_shadow = lv.style_t()
lv.style_copy(style_shadow, lv.style_pretty)
style_shadow.body.shadow.width = 6
style_shadow.body.radius = 800 # large enough to make it round
```

(continues on next page)

(continued from previous page)

```
# Copy the previous object (drag is already enabled)
obj3 = lv.obj(lv.scr_act(), obj2)
obj3.set_style(style_shadow)
obj3.align(None, lv.ALIGN.CENTER, 60, 30)
```

API

Typedefs

typedef uint8_t **lv_imgbtn_style_t**

Enums

enum [anonymous]

Values:

LV_IMGBTN_STYLE_REL
Same meaning as ordinary button styles.

LV_IMGBTN_STYLE_PR

LV_IMGBTN_STYLE_TGL_REL

LV_IMGBTN_STYLE_TGL_PR

LV_IMGBTN_STYLE_INA

Functions

lv_obj_t ***lv_imgbtn_create**(*lv_obj_t* **par*, **const** *lv_obj_t* **copy*)
Create a image button objects

Return pointer to the created image button

Parameters

- `par`: pointer to an object, it will be the parent of the new image button
- `copy`: pointer to a image button object, if not NULL then the new object will be copied from it

void **lv_imgbtn_set_src**(*lv_obj_t* **imgbtn*, *lv_btn_state_t* *state*, **const** void **src*)
Set images for a state of the image button

Parameters

- `imgbtn`: pointer to an image button object
- `state`: for which state set the new image (from `lv_btn_state_t`) ‘
- `src`: pointer to an image source (a C array or path to a file)

void **lv_imgbtn_set_src**(*lv_obj_t* **imgbtn*, *lv_btn_state_t* *state*, **const** void **src_left*, **const** void **src_mid*, **const** void **src_right*)
Set images for a state of the image button

Parameters

- `imgbtn`: pointer to an image button object

- `state`: for which state set the new image (from `lv_btn_state_t`) ‘
- `src_left`: pointer to an image source for the left side of the button (a C array or path to a file)
- `src_mid`: pointer to an image source for the middle of the button (ideally 1px wide) (a C array or path to a file)
- `src_right`: pointer to an image source for the right side of the button (a C array or path to a file)

static void **lv_imgbtn_set_toggle**(*lv_obj_t* **imgbtn*, bool *tgl*)
Enable the toggled states. On release the button will change from/to toggled state.

Parameters

- `imgbtn`: pointer to an image button object
- `tgl`: true: enable toggled states, false: disable

static void **lv_imgbtn_set_state**(*lv_obj_t* **imgbtn*, *lv_btn_state_t state*)
Set the state of the image button

Parameters

- `imgbtn`: pointer to an image button object
- `state`: the new state of the button (from lv_btn_state_t enum)

static void **lv_imgbtn_toggle**(*lv_obj_t* **imgbtn*)
Toggle the state of the image button (ON->OFF, OFF->ON)

Parameters

- `imgbtn`: pointer to a image button object

void **lv_imgbtn_set_style**(*lv_obj_t* **imgbtn*, *lv_imgbtn_style_t type*, **const** lv_style_t **style*)
Set a style of a image button.

Parameters

- `imgbtn`: pointer to image button object
- `type`: which style should be set
- `style`: pointer to a style

const void ***lv_imgbtn_get_src**(*lv_obj_t* **imgbtn*, *lv_btn_state_t state*)
Get the images in a given state

Return pointer to an image source (a C array or path to a file)

Parameters

- `imgbtn`: pointer to an image button object
- `state`: the state where to get the image (from `lv_btn_state_t`) ‘

const void ***lv_imgbtn_get_src_left**(*lv_obj_t* **imgbtn*, *lv_btn_state_t state*)
Get the left image in a given state

Return pointer to the left image source (a C array or path to a file)

Parameters

- `imgbtn`: pointer to an image button object
- `state`: the state where to get the image (from `lv_btn_state_t`) ‘

const void ***lv_imgbtn_get_src_middle**(*lv_obj_t *imgbtn*, *lv_btn_state_t state*)*
Get the middle image in a given state

Return pointer to the middle image source (a C array or path to a file)

Parameters

- `imgbtn`: pointer to an image button object
- `state`: the state where to get the image (from `lv_btn_state_t`) ‘

const void ***lv_imgbtn_get_src_right**(*lv_obj_t *imgbtn*, *lv_btn_state_t state*)*
Get the right image in a given state

Return pointer to the left image source (a C array or path to a file)

Parameters

- `imgbtn`: pointer to an image button object
- `state`: the state where to get the image (from `lv_btn_state_t`) ‘

static *lv_btn_state_t* **lv_imgbtn_get_state(const** *lv_obj_t *imgbtn*)
Get the current state of the image button

Return the state of the button (from lv_btn_state_t enum)

Parameters

- `imgbtn`: pointer to a image button object

static bool **lv_imgbtn_get_toggle(const** *lv_obj_t *imgbtn*)
Get the toggle enable attribute of the image button

Return ture: toggle enabled, false: disabled

Parameters

- `imgbtn`: pointer to a image button object

const lv_style_t ***lv_imgbtn_get_style(const** *lv_obj_t *imgbtn*, *lv_imgbtn_style_t type*)
Get style of a image button.

Return style pointer to the style

Parameters

- `imgbtn`: pointer to image button object
- `type`: which style should be get

struct lv_imgbtn_ext_t

Public Members

lv_btn_ext_t **btn**

const void ***img_src**[**_LV_BTN_STATE_NUM**]

const void ***img_src_left**[**_LV_BTN_STATE_NUM**]

const void ***img_src_mid**[**_LV_BTN_STATE_NUM**]

const void ***img_src_right**[**_LV_BTN_STATE_NUM**]

lv_img_cf_t **act_cf**

Clavier (lv_kb)

Vue d' ensemble

The Keyboard object is a special *Button matrix* with predefined keymaps and other features to realize a virtual keyboard to write text.

Modes

Les claviers ont deux modes :

- **LV_KB_MODE_TEXT** - Display letters, number, and special characters.
- **LV_KB_MODE_NUM** - Display numbers, +/- sign, and decimal dot.

To set the mode, use `lv_kb_set_mode(kb, mode)`. The default is *LV_KB_MODE_TEXT*.

Zone de texte

You can assign a *Text area* to the Keyboard to automatically put the clicked characters there. To assign the text area, use `lv_kb_set_ta(kb, ta)`.

The assigned text area' s **cursor can be managed** by the keyboard: when the keyboard is assigned, the previous text area' s cursor will be hidden and the new one will be shown. When the keyboard is closed by the *Ok* or *Close* buttons, the cursor also will be hidden. The cursor manager feature is enabled by `lv_kb_set_cursor_manage(kb, true)`. The default is not managed.

New Keymap

You can specify a new map (layout) for the keyboard with `lv_kb_set_map(kb, map)` and `lv_kb_set_ctrl_map(kb, ctrl_map)`. Learn more about the *Button matrix* object. Keep in mind that, using following keywords will have the same effect as with the original map:

- *LV_SYMBOL_OK* - Apply.
- *SYMBOL_CLOSE* - Close.
- *LV_SYMBOL_LEFT* - Move the cursor left.
- *LV_SYMBOL_RIGHT* - Move the cursor right.
- "*ABC*" - Load the uppercase map.
- "*abc*" - Load the lower case map.
- "*Enter*" - New line.
- "*Bkps*" - Delete on the left.

Styles

The Keyboard work with 6 styles: a background and 5 button styles for each state. You can set the styles with `lv_kb_set_style(btn, LV_KB_STYLE_..., &style)`. The background and the buttons use the `style.body` properties. Les étiquettes utilisent les propriétés `style.text` des styles de boutons.

- **LV_KB_STYLE_BG** - Background style. Uses all `style.body` properties including `padding` Default: `lv_style_pretty`.
- **LV_KB_STYLE_BTN_REL** - Style of the released buttons. Default: `lv_style_btn_rel`.
- **LV_KB_STYLE_BTN_PR** - Style of the pressed buttons. Default: `lv_style_btn_pr`.
- **LV_KB_STYLE_BTN_TGL_REL** - Style of the toggled released buttons. Default: `lv_style_btn_tgl_rel`.
- **LV_KB_STYLE_BTN_TGL_PR** - Style of the toggled pressed buttons. Default: `lv_style_btn_tgl_pr`.
- **LV_KB_STYLE_BTN_INA** - Style of the inactive buttons. Default: `lv_style_btn_ina`.

Evénements

Besides the Generic events, the following Special events are sent by the keyboards:

- **LV_EVENT_VALUE_CHANGED** - Sent when the button is pressed/released or repeated after long press. The event data is set to the ID of the pressed/released button.
- **LV_EVENT_APPLY** - The *Ok* button is clicked.
- **LV_EVENT_CANCEL** - The *Close* button is clicked.

The keyboard has a **default event handler** callback called `lv_kb_def_event_cb`. It handles the button pressing, map changing, the assigned text area, etc. You can completely replace it with your custom event handler however, you can call `lv_kb_def_event_cb` at the beginning of your event handler to handle the same things as before.

Apprenez-en plus sur les *événements*.

Touches

The following *Keys* are processed by the buttons:

- **LV_KEY_RIGHT/UP/LEFT/RIGHT** - To navigate among the buttons and select one.
- **LV_KEY_ENTER** - To press/release the selected button.

Apprenez-en plus sur les *touches*.

Exemples

C

Keyboard with text area

code

```
#include "lvgl/lvgl.h"

void lv_ex_kb_1(void)
{
    /*Create styles for the keyboard*/
    static lv_style_t rel_style, pr_style;

    lv_style_copy(&rel_style, &lv_style_btn_rel);
    rel_style.body.radius = 0;
    rel_style.body.border.width = 1;

    lv_style_copy(&pr_style, &lv_style_btn_pr);
    pr_style.body.radius = 0;
    pr_style.body.border.width = 1;

    /*Create a keyboard and apply the styles*/
    lv_obj_t *kb = lv_kb_create(lv_scr_act(), NULL);
    lv_kb_set_cursor_manage(kb, true);
    lv_kb_set_style(kb, LV_KB_STYLE_BG, &lv_style_transp_tight);
    lv_kb_set_style(kb, LV_KB_STYLE_BTN_REL, &rel_style);
    lv_kb_set_style(kb, LV_KB_STYLE_BTN_PR, &pr_style);

    /*Create a text area. The keyboard will write here*/
    lv_obj_t *ta = lv_ta_create(lv_scr_act(), NULL);
    lv_obj_align(ta, NULL, LV_ALIGN_IN_TOP_MID, 0, 10);
    lv_ta_set_text(ta, "");

    /*Assign the text area to the keyboard*/
    lv_kb_set_ta(kb, ta);
}
```

MicroPython

Keyboard with text area

code

```
# Create styles for the keyboard
rel_style = lv.style_t()
pr_style  = lv.style_t()

lv.style_copy(rel_style, lv.style_btn_rel)
rel_style.body.radius = 0
rel_style.body.border.width = 1

lv.style_copy(pr_style, lv.style_btn_pr)
pr_style.body.radius = 0
pr_style.body.border.width = 1

# Create a keyboard and apply the styles
kb = lv.kb(lv.scr_act())
kb.set_cursor_manage(True)
kb.set_style(lv.kb.STYLE.BG, lv.style_transp_tight)
kb.set_style(lv.kb.STYLE.BTN_REL, rel_style)
kb.set_style(lv.kb.STYLE.BTN_PR, pr_style)

# Create a text area. The keyboard will write here
ta = lv.ta(lv.scr_act())
ta.align(None, lv.ALIGN.IN_TOP_MID, 0, 10)
ta.set_text("")

# Assign the text area to the keyboard
kb.set_ta(ta)
```

API

Typedefs

typedef uint8_t **lv_kb_mode_t**

typedef uint8_t **lv_kb_style_t**

Enums

enum [anonymous]
Current keyboard mode.

Values:

LV_KB_MODE_TEXT

LV_KB_MODE_NUM

LV_KB_MODE_TEXT_UPPER

enum [anonymous]
Values:

LV_KB_STYLE_BG

LV_KB_STYLE_BTN_REL

LV_KB_STYLE_BTN_PR

LV_KB_STYLE_BTN_TGL_REL

LV_KB_STYLE_BTN_TGL_PR

LV_KB_STYLE_BTN_INA

Functions

lv_obj_t ***lv_kb_create**(*lv_obj_t* *par, **const** *lv_obj_t* *copy)
Create a keyboard objects

Return pointer to the created keyboard

Parameters

- `par`: pointer to an object, it will be the parent of the new keyboard
- `copy`: pointer to a keyboard object, if not NULL then the new object will be copied from it

void **lv_kb_set_ta**(*lv_obj_t* *kb, *lv_obj_t* *ta)
Assign a Text Area to the Keyboard. The pressed characters will be put there.

Parameters

- `kb`: pointer to a Keyboard object
- `ta`: pointer to a Text Area object to write there

void **lv_kb_set_mode**(*lv_obj_t* *kb, *lv_kb_mode_t* mode)
Set a new a mode (text or number map)

Parameters

- `kb`: pointer to a Keyboard object

- `mode`: the mode from 'lv_kb_mode_t'

void **lv_kb_set_cursor_manage**(*lv_obj_t* *kb, bool *en*)
Automatically hide or show the cursor of the current Text Area

Parameters

- `kb`: pointer to a Keyboard object
- `en`: true: show cursor on the current text area, false: hide cursor

static void **lv_kb_set_map**(*lv_obj_t* *kb, **const** char *map[])
Set a new map for the keyboard

Parameters

- `kb`: pointer to a Keyboard object
- `map`: pointer to a string array to describe the map. See '*lv_btnm_set_map()*' for more info.

static void **lv_kb_set_ctrl_map**(*lv_obj_t* *kb, **const** *lv_btnm_ctrl_t ctrl_map*[])
Set the button control map (hidden, disabled etc.) for the keyboard. The control map array will be copied and so may be deallocated after this function returns.

Parameters

- `kb`: pointer to a keyboard object
- `ctrl_map`: pointer to an array of `lv_btn_ctrl_t` control bytes. See: `lv_btnm_set_ctrl_map` for more details.

void **lv_kb_set_style**(*lv_obj_t* *kb, *lv_kb_style_t type*, **const** lv_style_t *style)
Set a style of a keyboard

Parameters

- `kb`: pointer to a keyboard object
- `type`: which style should be set
- `style`: pointer to a style

lv_obj_t ***lv_kb_get_ta**(**const** *lv_obj_t* *kb)
Assign a Text Area to the Keyboard. The pressed characters will be put there.

Return pointer to the assigned Text Area object

Parameters

- `kb`: pointer to a Keyboard object

lv_kb_mode_t **lv_kb_get_mode**(**const** *lv_obj_t* *kb)
Set a new a mode (text or number map)

Return the current mode from 'lv_kb_mode_t'

Parameters

- `kb`: pointer to a Keyboard object

bool **lv_kb_get_cursor_manage**(**const** *lv_obj_t* *kb)
Get the current cursor manage mode.

Return true: show cursor on the current text area, false: hide cursor

Parameters

- `kb`: pointer to a Keyboard object

static const char ****lv_kb_get_map_array**(**const** *lv_obj_t* **kb*)
Get the current map of a keyboard

Return the current map

Parameters

- `kb`: pointer to a keyboard object

const lv_style_t ***lv_kb_get_style**(**const** *lv_obj_t* **kb*, *lv_kb_style_t type*)
Get a style of a keyboard

Return style pointer to a style

Parameters

- `kb`: pointer to a keyboard object
- `type`: which style should be get

void **lv_kb_def_event_cb**(*lv_obj_t* **kb*, *lv_event_t event*)
Default keyboard event to add characters to the Text area and change the map. If a custom `event_cb` is added to the keyboard this function be called from it to handle the button clicks

Parameters

- `kb`: pointer to a keyboard
- `event`: the triggering event

struct lv_kb_ext_t

Public Members

lv_btnm_ext_t **btnm**

lv_obj_t ***ta**

lv_kb_mode_t **mode**

uint8_t **cursor_mng**

Etiquette (lv_label)

Vue d'ensemble

A label is the basic object type that is used to display text.

Définir le texte

You can set the text on a label at runtime with `lv_label_set_text(label, "New text")`. It will allocate a buffer dynamically, and the provided string will be copied into that buffer. Therefore, you don't need to keep the text you pass to `lv_label_set_text` in scope after that function returns.

With `lv_label_set_text_fmt(label, "Value: %d", 15)` **printf formatting** can used to set the text.

Labels are able to show text from a **static character buffer** which is NUL-terminated. To do so, use `lv_label_set_static_text(label, char_array)`. In this case, the text is not stored in the dynamic memory and the given buffer is used directly instead. This means that the array can't be a local variable which goes out of scope when the function exits. Constant strings are safe to use with `lv_label_set_static_text` (except when used with `LV_LABEL_LONG_DOTS`, as it modifies the buffer in-place), as they are stored in RO memory, which is always accessible.

You can also use a **raw array** as label text. The array doesn't have to be `\0` terminated. In this case, the text will be saved to the dynamic memory like with `lv_label_set_text`. To set a raw character array, use the `lv_label_set_array_text(label, char_array, size)` function.

Saut de ligne

Line breaks are handled automatically by the label object. You can use `\n` to make a line break. For example: `"line1\nline2\n\nline4"`

Modes d'adaptation au texte

By default, the width of the label object automatically expands to the text size. Otherwise, the text can be manipulated according to several long mode policies:

- **LV_LABEL_LONG_EXPAND** - Expand the object size to the text size (Default)
- **LV_LABEL_LONG_BREAK** - Keep the object width, break (wrap) the too long lines and expand the object height
- **LV_LABEL_LONG_DOTS** - Keep the object size, break the text and write dots in the last line (**not supported when using `lv_label_set_static_text`**)
- **LV_LABEL_LONG_SROLL** - Keep the size and scroll the label back and forth
- **LV_LABEL_LONG_SROLL_CIRC** - Keep the size and scroll the label circularly
- **LV_LABEL_LONG_CROP** - Keep the size and crop the text out of it

You can specify the long mode with `lv_label_set_long_mode(label, LV_LABEL_LONG_...)`

It's important to note that, when a label is created and its text is set, the label's size already expanded to the text size. In addition with the default `LV_LABEL_LONG_EXPAND`, *long mode* `lv_obj_set_width/height/size()` has no effect. So you need to change the *long mode* first and then set the size with `lv_obj_set_width/height/size()`.

Another important note is that **`LV_LABEL_LONG_DOTS` manipulates the text buffer in-place** in order to add/remove the dots. When `lv_label_set_text` or `lv_label_set_array_text` are used, a separate buffer is allocated and this implementation detail is unnoticed. This is not the case with `lv_label_set_static_text`! **The buffer you pass to `lv_label_set_static_text` must be writable if you plan to use `LV_LABEL_LONG_DOTS`.**

Alignement du texte

The label's text can be aligned to the left, right or middle with `lv_label_set_align(label, LV_LABEL_ALIGN_LEFT/RIGHT/CENTER)`.

Vertical alignment is not supported by the label itself; you should place the label inside a larger container and align the whole label object instead.

Dessin d' arrière-plan

Vous pouvez activer le dessin de l' arrière-plan de l' étiquette avec `lv_label_set_body_draw(label, draw)`

L' arrière-plan sera plus grand dans toutes les directions de la valeur de `body.padding.top/bottom/left/right`. However, the background is drawn only "virtually" and doesn' t make the label' s logical coordinates any larger. Therefore when the label is positioned, the label' s coordinates will be taken into account and not background' s.

Coloration du texte

In the text, you can use commands to recolor parts of the text. For example: `"Write a #ff0000 red# word"`. Cette fonctionnalité peut être activée individuellement pour chaque étiquette à l' aide de la fonction `lv_label_set_recolor()`.

Note that, recoloring work only in a single line. Therefore, `\n` should not use in a recolored text or it should be wrapped by `LV_LABEL_LONG_BREAK` else, the text in the new line won' t be recolored.

Très long textes

LittlevGL can efficiently handle very long (> 40k characters) by saving some extra data (~12 bytes) to speed up drawing. To enable this feature, set `LV_LABEL_LONG_TXT_HINT 1` in *lv_conf.h*.

Symboles

The labels can display symbols alongside letters (or on their own). Read the *Font* section to learn more about the symbols.

Styles

The Label uses one style which can be set by `lv_label_set_style(label, LV_LABEL_STYLE_MAIN, &style)`. From the style the following properties are used:

- All properties from `style.text`
- For background drawing `style.body` properties. `padding` will increase the size only visually, the real object' s size won' t be changed.

The labels' default style is `NULL` so they inherit the parent' s style. It' s useful because it allows the parent to set an appropriate text style for any child labels.

Evénements

Seuls les événements génériques sont envoyés par ce type d' objet.

Apprenez-en plus sur les *événements*.

Touches

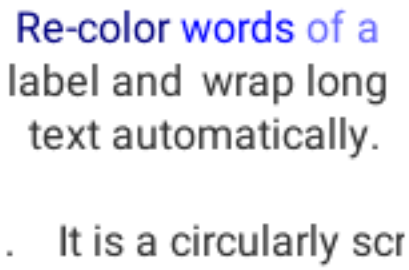
Aucune *touche* n'est traitée par ce type d'objet.

Apprenez-en plus sur les *touches*.

Exemple

C

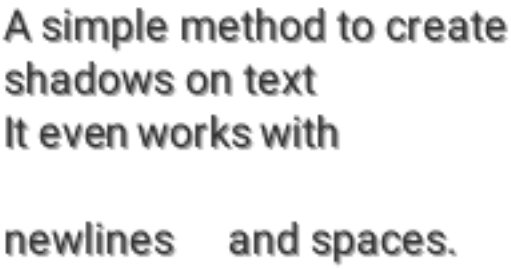
Label recoloring and scrolling



code

```
#include "lvgl/lvgl.h"

void lv_ex_label_1(void)
{
    lv_obj_t * label1 = lv_label_create(lv_scr_act(), NULL);
    lv_label_set_long_mode(label1, LV_LABEL_LONG_BREAK);     /*Break the long lines*/
    lv_label_set_recolor(label1, true);                      /*Enable re-coloring by␣
↪commands in the text*/
    lv_label_set_align(label1, LV_LABEL_ALIGN_CENTER);       /*Center aligned lines*/
    lv_label_set_text(label1, "#000080 Re-color# #0000ff words# #6666ff of a# label "
                              "and  wrap long text automatically.");
    lv_obj_set_width(label1, 150);
    lv_obj_align(label1, NULL, LV_ALIGN_CENTER, 0, -30);

    lv_obj_t * label2 = lv_label_create(lv_scr_act(), NULL);
    lv_label_set_long_mode(label2, LV_LABEL_LONG_SROLL_CIRC);     /*Circular scroll*/
    lv_obj_set_width(label2, 150);
    lv_label_set_text(label2, "It is a circularly scrolling text. ");
    lv_obj_align(label2, NULL, LV_ALIGN_CENTER, 0, 30);
}
```

Text shadow



code

```
#include "lvgl/lvgl.h"

void lv_ex_label_2(void)
{
    /* Create a style for the shadow*/
    static lv_style_t label_style;
    lv_style_copy(&label_style, &lv_style_plain);
    label_style.text.opa = LV_OPA_50;

    /*Create a label for the shadow first (it's in the background) */
    lv_obj_t * shadow_label = lv_label_create(lv_scr_act(), NULL);
    lv_label_set_style(shadow_label, LV_LABEL_STYLE_MAIN, &label_style);

    /* Create the main label */
    lv_obj_t * main_label = lv_label_create(lv_scr_act(), NULL);
    lv_label_set_text(main_label, "A simple method to create\n"
                                  "shadows on text\n"
                                  "It even works with\n\n"
                                  "newlines     and spaces.");

    /*Set the same text for the shadow label*/
    lv_label_set_text(shadow_label, lv_label_get_text(main_label));

    /* Position the main label */
    lv_obj_align(main_label, NULL, LV_ALIGN_CENTER, 0, 0);

    /* Shift the second label down and to the right by 1 pixel */
    lv_obj_align(shadow_label, main_label, LV_ALIGN_IN_TOP_LEFT, 1, 1);
}
```

Align labels

code

```
#include "lvgl/lvgl.h"

static void text_changer(lv_task_t * t);

lv_obj_t * labels[3];

/**
 * Create three labels to demonstrate the alignments.
 */
void lv_ex_label_3(void)
{
    /*`lv_label_set_align` is not required to align the object itslef.
     * It's used only when the text has multiple lines*/

    /* Create a label on the top.
     * No additional alignment so it will be the reference*/
    labels[0] = lv_label_create(lv_scr_act(), NULL);
    lv_obj_align(labels[0], NULL, LV_ALIGN_IN_TOP_MID, 0, 5);
    lv_label_set_align(labels[0], LV_LABEL_ALIGN_CENTER);

    /* Create a label in the middle.
     * `lv_obj_align` will be called every time the text changes
     * to keep the middle position */
    labels[1] = lv_label_create(lv_scr_act(), NULL);
    lv_obj_align(labels[1], NULL, LV_ALIGN_CENTER, 0, 0);
    lv_label_set_align(labels[1], LV_LABEL_ALIGN_CENTER);

    /* Create a label in the bottom.
     * Enable auto realign. */
    labels[2] = lv_label_create(lv_scr_act(), NULL);
    lv_obj_set_auto_realign(labels[2], true);
```

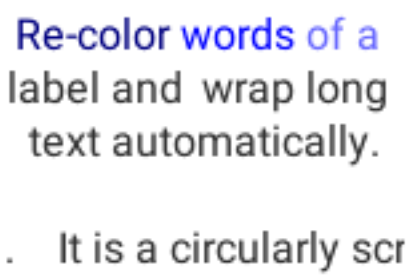
(continues on next page)

(continued from previous page)

```
    lv_obj_align(labels[2], NULL, LV_ALIGN_IN_BOTTOM_MID, 0, -5);
    lv_label_set_align(labels[2], LV_LABEL_ALIGN_CENTER);

    lv_task_t * t = lv_task_create(text_changer, 1000, LV_TASK_PRIO_MID, NULL);
    lv_task_ready(t);
}

static void text_changer(lv_task_t * t)
{
    const char * texts[] = {"Text", "A very long text", "A text with\nmultiple\nlines
↪", NULL};
    static uint8_t i = 0;

    lv_label_set_text(labels[0], texts[i]);
    lv_label_set_text(labels[1], texts[i]);
    lv_label_set_text(labels[2], texts[i]);

    /*Manually realaign `labels[1]`*/
    lv_obj_align(labels[1], NULL, LV_ALIGN_CENTER, 0, 0);

    i++;
    if(texts[i] == NULL) i = 0;

}
```

MicroPython

Label recoloring and scrolling



code

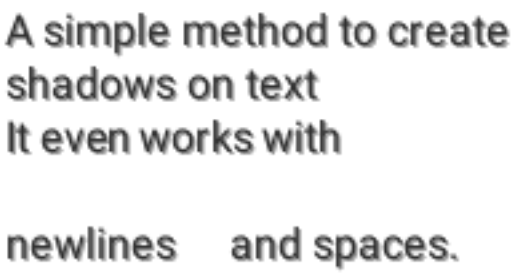
```
label1 = lv.label(lv.scr_act())
label1.set_long_mode(lv.label.LONG.BREAK)     # Break the long lines
```

(continues on next page)

(continued from previous page)

```
label1.set_recolor(True)                      # Enable re-coloring by commands in the␣
↪text
label1.set_align(lv.label.ALIGN.CENTER)       # Center aligned lines
label1.set_text("#000080 Re-color# #0000ff words# #6666ff of a# label " +
                "and  wrap long text automatically.")
label1.set_width(150)
label1.align(None, lv.ALIGN.CENTER, 0, -30)

label2 = lv.label(lv.scr_act())
label2.set_long_mode(lv.label.LONG.SROLL_CIRC)     # Circular scroll
label2.set_width(150)
label2.set_text("It is a circularly scrolling text. ")
label2.align(None, lv.ALIGN.CENTER, 0, 30)
```

Text shadow



code

```
# Create a style for the shadow
label_style = lv.style_t()
lv.style_copy(label_style, lv.style_plain)
label_style.text.opa = lv.OPA._50

# Create a label for the shadow first (it's in the background)
shadow_label = lv.label(lv.scr_act())
shadow_label.set_style(lv.label.STYLE.MAIN, label_style)

# Create the main label
main_label = lv.label(lv.scr_act())
main_label.set_text("A simple method to create\n" +
                    "shadows on text\n" +
                    "It even works with\n\n" +
```

(continues on next page)

(continued from previous page)

```
                                "newlines     and spaces.")

# Set the same text for the shadow label
shadow_label.set_text(main_label.get_text())

# Position the main label
main_label.align(None, lv.ALIGN.CENTER, 0, 0)

# Shift the second label down and to the right by 1 pixel
shadow_label.align(main_label, lv.ALIGN.IN_TOP_LEFT, 1, 1)
```

Align labels

code

```
# Create three labels to demonstrate the alignments.
labels = []

# `lv_label_set_align` is not required to align the object itslef.
# It's used only when the text has multiple lines

# Create a label on the top.
# No additional alignment so it will be the reference
label = lv.label(lv.scr_act())
label.align(None, lv.ALIGN.IN_TOP_MID, 0, 5)
label.set_align(lv.label.ALIGN.CENTER)
labels.append(label)

# Create a label in the middle.
# `lv_obj_align` will be called every time the text changes
# to keep the middle position
label = lv.label(lv.scr_act())
```

(continues on next page)

(continued from previous page)

```
label.align(None, lv.ALIGN.CENTER, 0, 0)
label.set_align(lv.label.ALIGN.CENTER)
labels.append(label)

# Create a label in the bottom.
# Enable auto realign.
label = lv.label(lv.scr_act())
label.set_auto_realign(True)
label.align(None, lv.ALIGN.IN_BOTTOM_MID, 0, -5)
label.set_align(lv.label.ALIGN.CENTER)
labels.append(label)

class TextChanger:
    """Changes texts of all labels every second"""
    def __init__(self, labels,
                 texts=["Text", "A very long text", "A text with\nmultiple\nlines"],
                 rate=1000):
        self.texts = texts
        self.labels = labels
        self.rate = rate
        self.counter = 0

    def start(self):
        lv.task_create(self.task_cb, self.rate, lv.TASK_PRIO.LOWEST, None)

    def task_cb(self, task):
        for label in labels:
            label.set_text(self.texts[self.counter])

        # Manually realaign `labels[1]`
        if len(self.labels) > 1:
            self.labels[1].align(None, lv.ALIGN.CENTER, 0, 0)

        self.counter = (self.counter + 1) % len(self.texts)

text_changer = TextChanger(labels)
text_changer.start()
```

API

Typedefs

typedef uint8_t **lv_label_long_mode_t**

typedef uint8_t **lv_label_align_t**

typedef uint8_t **lv_label_style_t**

Enums

enum [anonymous]

Long mode behaviors. Used in *'lv_label_ext_t'*

Values:

LV_LABEL_LONG_EXPAND
Expand the object size to the text size

LV_LABEL_LONG_BREAK
Keep the object width, break the too long lines and expand the object height

LV_LABEL_LONG_DOT
Keep the size and write dots at the end if the text is too long

LV_LABEL_LONG_SROLL
Keep the size and roll the text back and forth

LV_LABEL_LONG_SROLL_CIRC
Keep the size and roll the text circularly

LV_LABEL_LONG_CROP
Keep the size and crop the text out of it

enum [anonymous]
Label align policy

Values:

LV_LABEL_ALIGN_LEFT
Align text to left

LV_LABEL_ALIGN_CENTER
Align text to center

LV_LABEL_ALIGN_RIGHT
Align text to right

LV_LABEL_ALIGN_AUTO
Use LEFT or RIGHT depending on the direction of the text (LTR/RTL)

enum [anonymous]
Label styles

Values:

LV_LABEL_STYLE_MAIN

Functions

LV_EXPORT_CONST_INT(LV_LABEL_DOT_NUM)

LV_EXPORT_CONST_INT(LV_LABEL_POS_LAST)

LV_EXPORT_CONST_INT(LV_LABEL_TEXT_SEL_OFF)

lv_obj_t ***lv_label_create**(*lv_obj_t* **par*, **const** *lv_obj_t* **copy*)
Create a label objects

Return pointer to the created button

Parameters

- `par`: pointer to an object, it will be the parent of the new label
- `copy`: pointer to a button object, if not NULL then the new object will be copied from it

void **lv_label_set_text**(*lv_obj_t* **label*, **const** char **text*)
Set a new text for a label. Memory will be allocated to store the text by the label.

Parameters

- `label`: pointer to a label object
- `text`: '\0' terminated character string. NULL to refresh with the current text.

void **lv_label_set_text_fmt**(*lv_obj_t* *label, **const** char *fmt, ...)
Set a new formatted text for a label. Memory will be allocated to store the text by the label.

Parameters

- `label`: pointer to a label object
- `fmt`: `printf`-like format

void **lv_label_set_array_text**(*lv_obj_t* *label, **const** char *array, uint16_t size)
Set a new text for a label from a character array. The array don't has to be '\0' terminated. Memory will be allocated to store the array by the label.

Parameters

- `label`: pointer to a label object
- `array`: array of characters or NULL to refresh the label
- `size`: the size of 'array' in bytes

void **lv_label_set_static_text**(*lv_obj_t* *label, **const** char *text)
Set a static text. It will not be saved by the label so the 'text' variable has to be 'alive' while the label exist.

Parameters

- `label`: pointer to a label object
- `text`: pointer to a text. NULL to refresh with the current text.

void **lv_label_set_long_mode**(*lv_obj_t* *label, *lv_label_long_mode_t* long_mode)
Set the behavior of the label with longer text then the object size

Parameters

- `label`: pointer to a label object
- `long_mode`: the new mode from 'lv_label_long_mode' enum. In LV_LONG_BREAK/LONG/ROLL the size of the label should be set AFTER this function

void **lv_label_set_align**(*lv_obj_t* *label, *lv_label_align_t* align)
Set the align of the label (left or center)

Parameters

- `label`: pointer to a label object
- `align`: 'LV_LABEL_ALIGN_LEFT' or 'LV_LABEL_ALIGN_LEFT'

void **lv_label_set_recolor**(*lv_obj_t* *label, bool en)
Enable the recoloring by in-line commands

Parameters

- `label`: pointer to a label object
- `en`: true: enable recoloring, false: disable

void **lv_label_set_body_draw**(*lv_obj_t* *label, bool en)
Set the label to draw (or not draw) background specified in its style's body

Parameters

- `label`: pointer to a label object
- `en`: true: draw body; false: don't draw body

void **lv_label_set_anim_speed**(*lv_obj_t* *label, uint16_t *anim_speed*)
Set the label's animation speed in LV_LABEL_LONG_SROLL/SCROLL_CIRC modes

Parameters

- `label`: pointer to a label object
- `anim_speed`: speed of animation in px/sec unit

static void **lv_label_set_style**(*lv_obj_t* *label, *lv_label_style_t* *type*, **const** lv_style_t *style)
Set the style of an label

Parameters

- `label`: pointer to an label object
- `type`: which style should be get (can be only `LV_LABEL_STYLE_MAIN`)
- `style`: pointer to a style

void **lv_label_set_text_sel_start**(*lv_obj_t* *label, uint16_t *index*)
Set the selection start index.

Parameters

- `label`: pointer to a label object.
- `index`: index to set. `LV_LABEL_TXT_SEL_OFF` to select nothing.

void **lv_label_set_text_sel_end**(*lv_obj_t* *label, uint16_t *index*)
Set the selection end index.

Parameters

- `label`: pointer to a label object.
- `index`: index to set. `LV_LABEL_TXT_SEL_OFF` to select nothing.

char ***lv_label_get_text**(**const** *lv_obj_t* *label)
Get the text of a label

Return the text of the label

Parameters

- `label`: pointer to a label object

lv_label_long_mode_t **lv_label_get_long_mode**(**const** *lv_obj_t* *label)
Get the long mode of a label

Return the long mode

Parameters

- `label`: pointer to a label object

lv_label_align_t **lv_label_get_align**(**const** *lv_obj_t* *label)
Get the align attribute

Return LV_LABEL_ALIGN_LEFT or LV_LABEL_ALIGN_CENTER

Parameters

- `label`: pointer to a label object

bool **lv_label_get_recolor(const** *lv_obj_t* ***label*)**
Get the recoloring attribute

Return true: recoloring is enabled, false: disable

Parameters

- `label`: pointer to a label object

bool **lv_label_get_body_draw(const** *lv_obj_t* ***label*)**
Get the body draw attribute

Return true: draw body; false: don't draw body

Parameters

- `label`: pointer to a label object

uint16_t **lv_label_get_anim_speed(const** *lv_obj_t* ***label*)**
Get the label's animation speed in LV_LABEL_LONG_ROLL and SCROLL modes

Return speed of animation in px/sec unit

Parameters

- `label`: pointer to a label object

void **lv_label_get_letter_pos(const** *lv_obj_t* ***label***, uint16_t *index*, lv_point_t ***pos*)**
Get the relative x and y coordinates of a letter

Parameters

- `label`: pointer to a label object
- `index`: index of the letter [0 ···text length]. Expressed in character index, not byte index (different in UTF-8)
- `pos`: store the result here (E.g. index = 0 gives 0;0 coordinates)

uint16_t **lv_label_get_letter_on(const** *lv_obj_t* ***label***, lv_point_t ***pos*)**
Get the index of letter on a relative point of a label

Return the index of the letter on the 'pos_p' point (E.g. on 0;0 is the 0. letter) Expressed in character index and not byte index (different in UTF-8)

Parameters

- `label`: pointer to label object
- `pos`: pointer to point with coordinates on a the label

bool **lv_label_is_char_under_pos(const** *lv_obj_t* ***label***, lv_point_t ***pos*)**
Check if a character is drawn under a point.

Return whether a character is drawn under the point

Parameters

- `label`: Label object
- `pos`: Point to check for characte under

static const lv_style_t ***lv_label_get_style(const** *lv_obj_t* ***label***, *lv_label_style_t type*)**
Get the style of an label object

Return pointer to the label's style

Parameters

- `label`: pointer to an label object
- `type`: which style should be get (can be only `LV_LABEL_STYLE_MAIN`)

uint16_t **lv_label_get_text_sel_start**(**const** *lv_obj_t* *label)
Get the selection start index.

Return selection start index. `LV_LABEL_TXT_SEL_OFF` if nothing is selected.

Parameters

- `label`: pointer to a label object.

uint16_t **lv_label_get_text_sel_end**(**const** *lv_obj_t* *label)
Get the selection end index.

Return selection end index. `LV_LABEL_TXT_SEL_OFF` if nothing is selected.

Parameters

- `label`: pointer to a label object.

void **lv_label_ins_text**(*lv_obj_t* *label, uint32_t *pos*, **const** char *txt)
Insert a text to the label. The label text can not be static.

Parameters

- `label`: pointer to a label object
- `pos`: character index to insert. Expressed in character index and not byte index (Different in UTF-8) 0: before first char. LV_LABEL_POS_LAST: after last char.
- `txt`: pointer to the text to insert

void **lv_label_cut_text**(*lv_obj_t* *label, uint32_t *pos*, uint32_t *cnt*)
Delete characters from a label. The label text can not be static.

Parameters

- `label`: pointer to a label object
- `pos`: character index to insert. Expressed in character index and not byte index (Different in UTF-8) 0: before first char.
- `cnt`: number of characters to cut

struct lv_label_ext_t
#include <lv_label.h> Data of label

Public Members

char ***text**

char ***tmp_ptr**

char **tmp**[**LV_LABEL_DOT_NUM** + 1]

union *lv_label_ext_t*::[**anonymous**] **dot**

uint16_t **dot_end**

lv_point_t **offset**

lv_draw_label_hint_t **hint**

uint16_t **anim_speed**

uint16_t **txt_sel_start**

uint16_t **txt_sel_end**

lv_label_long_mode_t **long_mode**

uint8_t **static_txt**

uint8_t **align**

uint8_t **recolor**

uint8_t **expand**

uint8_t **body_draw**

uint8_t **dot_tmp_alloc**

LED (lv_led)

Vue d' ensemble

Les LEDs sont des objets rectangulaires (ou circulaires).

Luminosité

Vous pouvez régler leur luminosité avec `lv_led_set_bright(led, bright)`. La luminosité doit être comprise entre 0 (plus sombre) et 255 (plus clair).

Bascule

Use `lv_led_on(led)` and `lv_led_off(led)` to set the brightness to a predefined ON or OFF value. The `lv_led_toggle(led)` toggles between the ON and OFF state.

Styles

Les LEDs utilisent un style qui peut être défini par `lv_led_set_style(led, LV_LED_STYLE_MAIN, &style)`. To determine the appearance, the `style.body` properties are used.

Les couleurs sont assombries et la largeur de l' ombre est réduite lorsque la luminosité est faible et les valeurs nominales sont utilisées à la luminosité 255 afin de simuler un effet d' éclairage.

The default style is: `lv_style_pretty_color`. Note that, the LED doesn' t look like a LED with the default style so you should create your style. See the example below.

Evénements

Seuls les événements génériques sont envoyés par ce type d' objet.

Apprenez-en plus sur les *événements*.

Touches

Aucune *touche* n'est traitée par ce type d'objet.

Apprenez-en plus sur les *touches*.

Exemple

C

LED with custom style

code

```
#include "lvgl/lvgl.h"

void lv_ex_led_1(void)
{
    /*Create a style for the LED*/
    static lv_style_t style_led;
    lv_style_copy(&style_led, &lv_style_pretty_color);
    style_led.body.radius = LV_RADIUS_CIRCLE;
    style_led.body.main_color = LV_COLOR_MAKE(0xb5, 0x0f, 0x04);
    style_led.body.grad_color = LV_COLOR_MAKE(0x50, 0x07, 0x02);
    style_led.body.border.color = LV_COLOR_MAKE(0xfa, 0x0f, 0x00);
    style_led.body.border.width = 3;
    style_led.body.border.opa = LV_OPA_30;
    style_led.body.shadow.color = LV_COLOR_MAKE(0xb5, 0x0f, 0x04);
    style_led.body.shadow.width = 5;

    /*Create a LED and switch it OFF*/
    lv_obj_t * led1  = lv_led_create(lv_scr_act(), NULL);
```

(continues on next page)

(continued from previous page)

```
    lv_led_set_style(led1, LV_LED_STYLE_MAIN, &style_led);
    lv_obj_align(led1, NULL, LV_ALIGN_CENTER, -80, 0);
    lv_led_off(led1);

    /*Copy the previous LED and set a brightness*/
    lv_obj_t * led2  = lv_led_create(lv_scr_act(), led1);
    lv_obj_align(led2, NULL, LV_ALIGN_CENTER, 0, 0);
    lv_led_set_bright(led2, 190);

    /*Copy the previous LED and switch it ON*/
    lv_obj_t * led3  = lv_led_create(lv_scr_act(), led1);
    lv_obj_align(led3, NULL, LV_ALIGN_CENTER, 80, 0);
    lv_led_on(led3);
}
```

MicroPython

LED with custom style

code

```
# Create a style for the LED
style_led = lv.style_t()
lv.style_copy(style_led, lv.style_pretty_color)
style_led.body.radius = 800 # large enough to draw a circle
style_led.body.main_color = lv.color_make(0xb5, 0x0f, 0x04)
style_led.body.grad_color = lv.color_make(0x50, 0x07, 0x02)
style_led.body.border.color = lv.color_make(0xfa, 0x0f, 0x00)
style_led.body.border.width = 3
style_led.body.border.opa = lv.OPA._30
style_led.body.shadow.color = lv.color_make(0xb5, 0x0f, 0x04)
```

(continues on next page)

(continued from previous page)

```
style_led.body.shadow.width = 5

# Create a LED and switch it OFF
led1  = lv.led(lv.scr_act())
led1.set_style(lv.led.STYLE.MAIN, style_led)
led1.align(None, lv.ALIGN.CENTER, -80, 0)
led1.off()

# Copy the previous LED and set a brightness
led2  = lv.led(lv.scr_act(), led1)
led2.align(None, lv.ALIGN.CENTER, 0, 0)
led2.set_bright(190)

# Copy the previous LED and switch it ON
led3  = lv.led(lv.scr_act(), led1)
led3.align(None, lv.ALIGN.CENTER, 80, 0)
led3.on()
```

API

Typedefs

typedef uint8_t **lv_led_style_t**

Enums

enum [anonymous]

Values:

LV_LED_STYLE_MAIN

Functions

lv_obj_t ***lv_led_create**(*lv_obj_t* **par*, **const** *lv_obj_t* **copy*)

Create a led objects

Return pointer to the created led

Parameters

- `par`: pointer to an object, it will be the parent of the new led
- `copy`: pointer to a led object, if not NULL then the new object will be copied from it

void **lv_led_set_bright**(*lv_obj_t* **led*, uint8_t *bright*)

Set the brightness of a LED object

Parameters

- `led`: pointer to a LED object
- `bright`: 0 (max. dark) ···255 (max. light)

void **lv_led_on**(*lv_obj_t* **led*)

Light on a LED

Parameters

- `led`: pointer to a LED object

void **lv_led_off**(*lv_obj_t* **led*)
Light off a LED

Parameters

- `led`: pointer to a LED object

void **lv_led_toggle**(*lv_obj_t* **led*)
Toggle the state of a LED

Parameters

- `led`: pointer to a LED object

static void **lv_led_set_style**(*lv_obj_t* **led*, *lv_led_style_t* *type*, **const** lv_style_t **style*)
Set the style of a led

Parameters

- `led`: pointer to a led object
- `type`: which style should be set (can be only `LV_LED_STYLE_MAIN`)
- `style`: pointer to a style

uint8_t **lv_led_get_bright**(**const** *lv_obj_t* **led*)
Get the brightness of a LEd object

Return bright 0 (max. dark) ···255 (max. light)

Parameters

- `led`: pointer to LED object

static const lv_style_t ***lv_led_get_style**(**const** *lv_obj_t* **led*, *lv_led_style_t* *type*)
Get the style of an led object

Return pointer to the led' s style

Parameters

- `led`: pointer to an led object
- `type`: which style should be get (can be only `LV_CHART_STYLE_MAIN`)

struct lv_led_ext_t

Public Members

uint8_t **bright**

Ligne (lv_line)

Vue d' ensemble

L' objet ligne sert à tracer des lignes droites entre un ensemble de points.

Ensemble de points

Les points doivent être enregistrés dans un tableau `lv_point_t` et transmis à l'objet par la fonction `lv_line_set_points(line, point_array, point_cnt)`.

Dimensionnement automatique

Il est possible de définir automatiquement les dimensions de l'objet ligne en fonction de ses points. Vous pouvez l'activer avec la fonction `lv_line_set_auto_size(line, true)`. Si activé, alors lorsque les points sont définis, la largeur et la hauteur de l'objet seront modifiées en fonction des coordonnées x et y maximales des points. Le *dimensionnement automatique* est activé par défaut.

Y inversé

Par défaut, le point $y == 0$ est en haut de l'objet, mais vous pouvez inverser les coordonnées y avec `lv_line_set_y_invert (line, true)`. Le *y inversé* est désactivé par défaut.

Styles

La ligne utilise un style qui peut être défini par `lv_line_set_style(line, LV_LINE_STYLE_MAIN, &style)` et utilise toutes les propriétés `style.line`.

Evénements

Seuls les événements génériques sont envoyés par ce type d'objet.

Apprenez-en plus sur les *événements*.

Touches

Aucune *touche* n'est traitée par ce type d'objet.

Apprenez-en plus sur les *touches*.

Exemple

C

Simple Line

code

```
#include "lvgl/lvgl.h"

void lv_ex_line_1(void)
{
    /*Create an array for the points of the line*/
    static lv_point_t line_points[] = { {5, 5}, {70, 70}, {120, 10}, {180, 60}, {240, 10} };

    /*Create new style (thick dark blue)*/
    static lv_style_t style_line;
    lv_style_copy(&style_line, &lv_style_plain);
    style_line.line.color = LV_COLOR_MAKE(0x00, 0x3b, 0x75);
    style_line.line.width = 3;
    style_line.line.rounded = 1;

    /*Copy the previous line and apply the new style*/
    lv_obj_t * line1;
    line1 = lv_line_create(lv_scr_act(), NULL);
    lv_line_set_points(line1, line_points, 5);     /*Set the points*/
    lv_line_set_style(line1, LV_LINE_STYLE_MAIN, &style_line);
    lv_obj_align(line1, NULL, LV_ALIGN_CENTER, 0, 0);
}
```

MicroPython

Simple Line

code

```
# Create an array for the points of the line
line_points = [ {"x":5, "y":5},
                {"x":70, "y":70},
                {"x":120, "y":10},
                {"x":180, "y":60},
                {"x":240, "y":10}]

# Create new style (thick dark blue)
style_line = lv.style_t()
lv.style_copy(style_line, lv.style_plain)
style_line.line.color = lv.color_make(0x00, 0x3b, 0x75)
style_line.line.width = 3
style_line.line.rounded = 1

# Copy the previous line and apply the new style
line1 = lv.line(lv.scr_act())
line1.set_points(line_points, len(line_points))      # Set the points
line1.set_style(lv.line.STYLE.MAIN, style_line)
line1.align(None, lv.ALIGN.CENTER, 0, 0)
```

API

Typedefs

typedef uint8_t **lv_line_style_t**

Enums

enum [anonymous]
Values:

LV_LINE_STYLE_MAIN

Functions

lv_obj_t ***lv_line_create**(*lv_obj_t* **par*, **const** *lv_obj_t* **copy*)
Create a line objects

Return pointer to the created line

Parameters

- `par`: pointer to an object, it will be the parent of the new line

void **lv_line_set_points**(*lv_obj_t* **line*, **const** lv_point_t *point_a*[], uint16_t *point_num*)
Set an array of points. The line object will connect these points.

Parameters

- `line`: pointer to a line object
- `point_a`: an array of points. Only the address is saved, so the array can NOT be a local variable which will be destroyed
- `point_num`: number of points in 'point_a'

void **lv_line_set_auto_size**(*lv_obj_t* **line*, bool *en*)
Enable (or disable) the auto-size option. The size of the object will fit to its points. (set width to x max and height to y max)

Parameters

- `line`: pointer to a line object
- `en`: true: auto size is enabled, false: auto size is disabled

void **lv_line_set_y_invert**(*lv_obj_t* **line*, bool *en*)
Enable (or disable) the y coordinate inversion. If enabled then y will be subtracted from the height of the object, therefore the y=0 coordinate will be on the bottom.

Parameters

- `line`: pointer to a line object
- `en`: true: enable the y inversion, false:disable the y inversion

static void **lv_line_set_style**(*lv_obj_t* **line*, *lv_line_style_t type*, **const** lv_style_t **style*)
Set the style of a line

Parameters

- `line`: pointer to a line object
- `type`: which style should be set (can be only `LV_LINE_STYLE_MAIN`)
- `style`: pointer to a style

bool **lv_line_get_auto_size**(**const** *lv_obj_t* **line*)
Get the auto size attribute

Return true: auto size is enabled, false: disabled

Parameters

- `line`: pointer to a line object

bool **lv_line_get_y_invert(const** *lv_obj_t* ***line*)**
Get the y inversion attribute

Return true: y inversion is enabled, false: disabled

Parameters

- `line`: pointer to a line object

static const lv_style_t ***lv_line_get_style(const** *lv_obj_t* ***line*, *lv_line_style_t* *type*)**
Get the style of an line object

Return pointer to the line' s style

Parameters

- `line`: pointer to an line object
- `type`: which style should be get (can be only `LV_LINE_STYLE_MAIN`)

struct lv_line_ext_t

Public Members

const lv_point_t ***point_array**

uint16_t **point_num**

uint8_t **auto_size**

uint8_t **y_inv**

Liste (lv_list)

Vue d' ensemble

Les listes sont construites à partir d' une *page* d' arrière-plan sur laquelle sont placés des *boutons* on it. Les boutons contiennent une *image* comme icône optionnelle (qui peut être un symbole aussi) et une *étiquette*. Lorsque la liste est suffisamment longue, vous pouvez la faire défiler.

Ajouter des boutons

Vous pouvez ajouter de nouveaux éléments de liste avec `lv_list_add_btn(list, &icon_img, "Text")` ou avec symbole `lv_list_add_btn(list, SYMBOL_EDIT, "Edit text")`. Si vous ne souhaitez pas ajouter d' image, utilisez `NULL` comme source d' image. La fonction retourne un pointeur sur le bouton créé pour permettre d' autres configurations.

La largeur des boutons est fixée au maximum de la largeur de l' objet. La hauteur des boutons est ajustée automatiquement en fonction du contenu (*content height* + *padding.top* + *padding.bottom*).

Les étiquettes sont créées avec le mode `LV_LABEL_LONG_SROLL_CIRC` pour faire défiler automatiquement les libellés longs de manière circulaire.

Vous pouvez utiliser `lv_list_get_btn_label(list_btn)` and `lv_list_get_btn_img(list_btn)` pour obtenir le libellé et l' image d' un bouton de liste. Vous pouvez obtenir le texte directement avec `lv_list_get_btn_text(list_btn)`.

Supprimer des boutons

Pour supprimer un élément de la liste, utilisez simplement `lv_obj_del(btn)` sur la valeur de retour de `lv_list_add_btn()`.

Pour vider la liste (supprimer tous les boutons), utilisez `lv_list_clean(list)`

Navigation manuelle

Vous pouvez naviguer manuellement dans la liste avec `lv_list_up(list)` et `lv_list_down(list)`.

Vous pouvez accéder directement à un bouton en utilisant `lv_list_focus(btn, LV_ANIM_ON/OFF)`.

La **durée d'animation** des déplacements haut/bas/accès direct peut être définie via : `lv_list_set_anim_time(list, anim_time)`. Zéro supprime les animations.

Mise en page

Par défaut la liste est verticale. Pour obtenir une liste horizontale, utilisez `lv_list_set_layout(list, LV_LAYOUT_ROW_M)`.

Mise en évidence du bord

L'animation d'un cercle peut être affichée quand la liste atteint les positions supérieure ou inférieure. `lv_list_set_edge_flash(list, en)` active cette fonctionnalité.

Propagation du défilement

Si la liste est créée sur un autre objet défilant (comme une *page*) et que la liste ne peut pas être défilées plus, le **défilement peut être propagé au parent**. De cette manière, le défilement sera poursuivi sur le parent. Cela peut être activé avec `lv_list_set_scroll_propagation(list, true)`.

SI les bouton ont `lv_btn_set_toggle` activé alors `lv_list_set_single_mode(list, true)` est utilisé pour s'assurer qu'un seul bouton ne peut être dans l'état basculé à un instant donné.

Styles

La fonction `lv_list_set_style(list, LV_LIST_STYLE _..., &style)` définit les styles d'une liste.

- **LV_LIST_STYLE_BG** style d'arrière-plan de liste. Valeur par défaut : `lv_style_transp_fit`
- **LV_LIST_STYLE_SCRL** style de la partie défilante. Valeur par défaut : `lv_style_pretty`
- **LV_LIST_STYLE_SB** style de la barre de défilement. Valeur par défaut : `lv_style_pretty_color`. Pour plus de détails voir l'objet *page*
- **LV_LIST_STYLE_BTN_REL** style des boutons relâchés. Valeur par défaut : `lv_style_btn_rel`
- **LV_LIST_STYLE_BTN_PR** style des boutons pressés. Valeur par défaut : `lv_style_btn_pr`
- **LV_LIST_STYLE_BTN_TGL_REL** style des boutons bascules relâchés. Valeur par défaut : `lv_style_btn_tgl_rel`,

- **LV_LIST_STYLE_BTN_TGL_PR** style des boutons bascules pressés. Valeur par défaut : `lv_style_btn_tgl_pr`
- **LV_LIST_STYLE_BTN_INA** style des boutons inactifs. Valeur par défaut : `lv_style_btn_ina`.

Étant donné que *BG* a un style transparent par défaut s'il n'y a que quelques boutons, la liste paraîtra plus courte mais pourra défiler lorsque plusieurs éléments de la liste sont ajoutés.

Pour modifier la hauteur des boutons, ajustez les champs `body.padding.top/bottom` des styles relatifs (`LV_LIST_STYLE_BTN_REL/PR/...`).

Evénements

Seuls les événements génériques sont envoyés par ce type d'objet.

Apprenez-en plus sur les *événements*.

Touches

Les *touches* suivantes sont traitées par les listes :

- **LV_KEY_RIGHT/DOWN** sélectionne le bouton suivant,
- **LV_KEY_LEFT/UP** sélectionne le bouton précédent,

Notez que, comme d'habitude, l'état de `LV_KEY_ENTER` est traduit en `LV_EVENT_PRESSED/PRESSING/RELEASED` etc.

Les boutons sélectionnés sont dans l'état `LV_BTN_STATE_PR/TG_PR`.

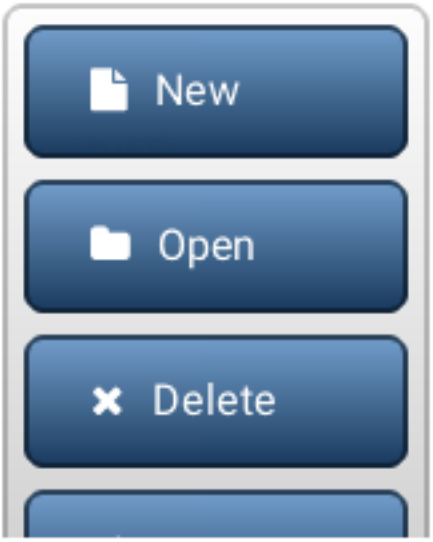
Pour sélectionner manuellement un bouton, utilisez `lv_list_set_btn_selected(list, btn)`. Lorsque la liste est défocalisée et focalisée à nouveau, le dernier bouton sélectionné est restauré.

Apprenez-en plus sur les *touches*.

Exemple

C

Simple List



code

```
#include "lvgl/lvgl.h"
#include <stdio.h>

static void event_handler(lv_obj_t * obj, lv_event_t event)
{
    if(event == LV_EVENT_CLICKED) {
        printf("Clicked: %s\n", lv_list_get_btn_text(obj));
    }
}

void lv_ex_list_1(void)
{
    /*Create a list*/
    lv_obj_t * list1 = lv_list_create(lv_scr_act(), NULL);
    lv_obj_set_size(list1, 160, 200);
    lv_obj_align(list1, NULL, LV_ALIGN_CENTER, 0, 0);

    /*Add buttons to the list*/

    lv_obj_t * list_btn;

    list_btn = lv_list_add_btn(list1, LV_SYMBOL_FILE, "New");
    lv_obj_set_event_cb(list_btn, event_handler);

    list_btn = lv_list_add_btn(list1, LV_SYMBOL_DIRECTORY, "Open");
    lv_obj_set_event_cb(list_btn, event_handler);

    list_btn = lv_list_add_btn(list1, LV_SYMBOL_CLOSE, "Delete");
    lv_obj_set_event_cb(list_btn, event_handler);

    list_btn = lv_list_add_btn(list1, LV_SYMBOL_EDIT, "Edit");
```

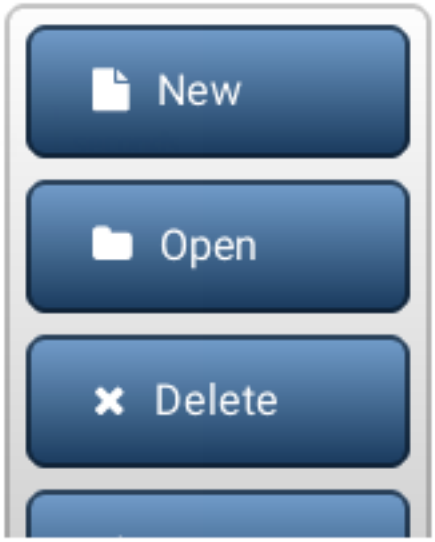
(continues on next page)

(continued from previous page)

```
    lv_obj_set_event_cb(list_btn, event_handler);

    list_btn = lv_list_add_btn(list1, LV_SYMBOL_SAVE, "Save");
    lv_obj_set_event_cb(list_btn, event_handler);
}
```

MicroPython

Simple List



code

```
def event_handler(obj, event):
    if event == lv.EVENT.CLICKED:
        print("Clicked: %s" % lv.list.get_btn_text(obj))

# Create a list
list1 = lv.list(lv.scr_act())
list1.set_size(160, 200)
list1.align(None, lv.ALIGN.CENTER, 0, 0)

# Add buttons to the list

list_btn = list1.add_btn(lv.SYMBOL.FILE, "New")
list_btn.set_event_cb(event_handler)

list_btn = list1.add_btn(lv.SYMBOL.DIRECTORY, "Open")
list_btn.set_event_cb(event_handler)

list_btn = list1.add_btn(lv.SYMBOL.CLOSE, "Delete")
list_btn.set_event_cb(event_handler)
```

(continues on next page)

(continued from previous page)

```
list_btn = list1.add_btn(lv.SYMBOL.EDIT, "Edit")
list_btn.set_event_cb(event_handler)

list_btn = list1.add_btn(lv.SYMBOL.SAVE, "Save")
list_btn.set_event_cb(event_handler)
```

API

Typedefs

typedef uint8_t **lv_list_style_t**

Enums

enum [**anonymous**]

List styles.

Values:

LV_LIST_STYLE_BG
List background style

LV_LIST_STYLE_SCRL
List scrollable area style.

LV_LIST_STYLE_SB
List scrollbar style.

LV_LIST_STYLE_EDGE_FLASH
List edge flash style.

LV_LIST_STYLE_BTN_REL
Same meaning as the ordinary button styles.

LV_LIST_STYLE_BTN_PR

LV_LIST_STYLE_BTN_TGL_REL

LV_LIST_STYLE_BTN_TGL_PR

LV_LIST_STYLE_BTN_INA

Functions

lv_obj_t ***lv_list_create**(*lv_obj_t* **par*, **const** *lv_obj_t* **copy*)

Create a list objects

Return pointer to the created list

Parameters

- `par`: pointer to an object, it will be the parent of the new list
- `copy`: pointer to a list object, if not NULL then the new object will be copied from it

void **lv_list_clean**(*lv_obj_t* **list*)

Delete all children of the scrl object, without deleting scrl child.

Parameters

- `list`: pointer to an object

lv_obj_t ***lv_list_add_btn**(*lv_obj_t* **list*, **const** void **img_src*, **const** char **txt*)
Add a list element to the list

Return pointer to the new list element which can be customized (a button)

Parameters

- `list`: pointer to list object
- `img_fn`: file name of an image before the text (NULL if unused)
- `txt`: text of the list element (NULL if unused)

bool **lv_list_remove**(**const** *lv_obj_t* **list*, uint16_t *index*)
Remove the index of the button in the list

Return true: successfully deleted

Parameters

- `list`: pointer to a list object
- `index`: pointer to a the button's index in the list, index must be 0 <= index < lv_list_ext_t.size

void **lv_list_set_single_mode**(*lv_obj_t* **list*, bool *mode*)
Set single button selected mode, only one button will be selected if enabled.

Parameters

- `list`: pointer to the currently pressed list object
- `mode`: enable(true)/disable(false) single selected mode.

void **lv_list_set_btn_selected**(*lv_obj_t* **list*, *lv_obj_t* **btn*)
Make a button selected

Parameters

- `list`: pointer to a list object
- `btn`: pointer to a button to select NULL to not select any buttons

static void **lv_list_set_sb_mode**(*lv_obj_t* **list*, *lv_sb_mode_t* *mode*)
Set the scroll bar mode of a list

Parameters

- `list`: pointer to a list object
- `sb_mode`: the new mode from 'lv_page_sb_mode_t' enum

static void **lv_list_set_scroll_propagation**(*lv_obj_t* **list*, bool *en*)
Enable the scroll propagation feature. If enabled then the List will move its parent if there is no more space to scroll.

Parameters

- `list`: pointer to a List
- `en`: true or false to enable/disable scroll propagation

static void **lv_list_set_edge_flash**(*lv_obj_t* **list*, bool *en*)
Enable the edge flash effect. (Show an arc when the an edge is reached)

Parameters

- `list`: pointer to a List
- `en`: true or false to enable/disable end flash

static void **lv_list_set_anim_time**(*lv_obj_t* **list*, uint16_t *anim_time*)
Set scroll animation duration on 'list_up()' 'list_down()' 'list_focus()'

Parameters

- `list`: pointer to a list object
- `anim_time`: duration of animation [ms]

void **lv_list_set_style**(*lv_obj_t* **list*, *lv_list_style_t* *type*, **const** lv_style_t **style*)
Set a style of a list

Parameters

- `list`: pointer to a list object
- `type`: which style should be set
- `style`: pointer to a style

void **lv_list_set_layout**(*lv_obj_t* **list*, *lv_layout_t* *layout*)
Set layout of a list

Parameters

- `list`: pointer to a list object
- `layout`: which layout should be used

bool **lv_list_get_single_mode**(*lv_obj_t* **list*)
Get single button selected mode.

Parameters

- `list`: pointer to the currently pressed list object.

const char ***lv_list_get_btn_text**(**const** *lv_obj_t* **btn*)
Get the text of a list element

Return pointer to the text

Parameters

- `btn`: pointer to list element

lv_obj_t ***lv_list_get_btn_label**(**const** *lv_obj_t* **btn*)
Get the label object from a list element

Return pointer to the label from the list element or NULL if not found

Parameters

- `btn`: pointer to a list element (button)

lv_obj_t ***lv_list_get_btn_img**(**const** *lv_obj_t* **btn*)
Get the image object from a list element

Return pointer to the image from the list element or NULL if not found

Parameters

- `btn`: pointer to a list element (button)

lv_obj_t ***lv_list_get_prev_btn**(**const** *lv_obj_t* **list*, *lv_obj_t* **prev_btn*)
Get the next button from list. (Starts from the bottom button)

Return pointer to the next button or NULL when no more buttons

Parameters

- `list`: pointer to a list object
- `prev_btn`: pointer to button. Search the next after it.

lv_obj_t ***lv_list_get_next_btn**(**const** *lv_obj_t* **list*, *lv_obj_t* **prev_btn*)
Get the previous button from list. (Starts from the top button)

Return pointer to the previous button or NULL when no more buttons

Parameters

- `list`: pointer to a list object
- `prev_btn`: pointer to button. Search the previous before it.

int32_t **lv_list_get_btn_index**(**const** *lv_obj_t* **list*, **const** *lv_obj_t* **btn*)
Get the index of the button in the list

Return the index of the button in the list, or -1 of the button not in this list

Parameters

- `list`: pointer to a list object. If NULL, assumes btn is part of a list.
- `btn`: pointer to a list element (button)

uint16_t **lv_list_get_size**(**const** *lv_obj_t* **list*)
Get the number of buttons in the list

Return the number of buttons in the list

Parameters

- `list`: pointer to a list object

lv_obj_t ***lv_list_get_btn_selected**(**const** *lv_obj_t* **list*)
Get the currently selected button. Can be used while navigating in the list with a keypad.

Return pointer to the selected button

Parameters

- `list`: pointer to a list object

lv_layout_t **lv_list_get_layout**(*lv_obj_t* **list*)
Get layout of a list

Return layout of the list object

Parameters

- `list`: pointer to a list object

static *lv_sb_mode_t* **lv_list_get_sb_mode**(**const** *lv_obj_t* **list*)
Get the scroll bar mode of a list

Return scrollbar mode from 'lv_page_sb_mode_t' enum

Parameters

- `list`: pointer to a list object

static bool **lv_list_get_scroll_propagation**(*lv_obj_t* **list*)
Get the scroll propagation property

Return true or false

Parameters

- `list`: pointer to a List

static bool **lv_list_get_edge_flash**(*lv_obj_t* **list*)
Get the scroll propagation property

Return true or false

Parameters

- `list`: pointer to a List

static uint16_t **lv_list_get_anim_time**(**const** *lv_obj_t* **list*)
Get scroll animation duration

Return duration of animation [ms]

Parameters

- `list`: pointer to a list object

const lv_style_t ***lv_list_get_style**(**const** *lv_obj_t* **list*, *lv_list_style_t type*)
Get a style of a list

Return style pointer to a style

Parameters

- `list`: pointer to a list object
- `type`: which style should be get

void **lv_list_up**(**const** *lv_obj_t* **list*)
Move the list elements up by one

Parameters

- `list`: pointer a to list object

void **lv_list_down**(**const** *lv_obj_t* **list*)
Move the list elements down by one

Parameters

- `list`: pointer to a list object

void **lv_list_focus**(**const** *lv_obj_t* **btn*, *lv_anim_enable_t anim*)
Focus on a list button. It ensures that the button will be visible on the list.

Parameters

- `btn`: pointer to a list button to focus
- `anim`: LV_ANOM_ON: scroll with animation, LV_ANIM_OFF: without animation

struct lv_list_ext_t

Public Members

lv_page_ext_t **page**

const lv_style_t ***styles_btn**[**_LV_BTN_STATE_NUM**]

const lv_style_t ***style_img**

uint16_t **size**

uint8_t **single_mode**

lv_obj_t ***last_sel**

lv_obj_t ***selected_btn**

lv_obj_t ***last_clicked_btn**

Compteur (lv_lmeter)

Vue d'ensemble

L'objet compteur est constitué de quelques lignes radiales qui dessinent une graduation.

Définir la valeur

Lors de la définition d'une nouvelle valeur avec `lv_lmeter_set_value(lmeter, new_value)`, la partie proportionnelle de la graduation sera recolorée.

Intervalle et angles

La fonction `lv_lmeter_set_range(lmeter, min, max)` définit l'intervalle du compteur linéaire.

Vous pouvez définir l'angle de la graduation et le nombre de lignes à l'aide de : `lv_lmeter_set_scale(lmeter, angle, line_num)`. L'angle par défaut est 240 et le nombre de ligne par défaut est 31.

Décalage d'angle

Par défaut, l'angle de la graduation est interprété symétriquement à l'axe y. Il en résulte un compteur de ligne "debout". Avec `lv_lmeter_set_angle_offset` un décalage peut être ajouté à l'angle de la graduation. Cela peut être utilisé par exemple pour placer un compteur linéaire d'un quart de cercle dans un coin ou d'un demi-cercle sur le côté droit ou gauche.

Styles

Le compteur utilise un style qui peut être défini par `lv_lmeter_set_style(lmeter, LV_LMETER_STYLE_MAIN, &style)`. Les propriétés du compteur sont dérivées des attributs de style suivants :

- **line.color** la couleur des "lignes inactives" qui sont supérieure à la valeur actuelle
- **body.main_color** couleur de la "ligne active" au début de l'échelle

- **body.grad_color** couleur de la “ligne active” à la fin de la graduation (dégradé avec la couleur principale)
- **body.padding.hor** longueur des lignes
- **line.width** largeur des lignes

Le style par défaut est `lv_style_pretty_color`.

Evénements

Seuls les événements génériques sont envoyés par ce type d’objet.

Apprenez-en plus sur les *événements*.

Touches

Aucune *touche* n’est traitée par ce type d’objet.

Apprenez-en plus sur les *touches*.

Exemple

C

Simple Line meter

code

```c
#include "lvgl/lvgl.h"

void lv_ex_lmeter_1(void)
{
    /*Create a style for the line meter*/
    static lv_style_t style_lmeter;
    lv_style_copy(&style_lmeter, &lv_style_pretty_color);
    style_lmeter.line.width = 2;
    style_lmeter.line.color = LV_COLOR_SILVER;
    style_lmeter.body.main_color = lv_color_hex(0x91bfed);         /*Light blue*/
    style_lmeter.body.grad_color = lv_color_hex(0x04386c);         /*Dark blue*/
    style_lmeter.body.padding.left = 16;                           /*Line length*/

    /*Create a line meter */
    lv_obj_t * lmeter;
    lmeter = lv_lmeter_create(lv_scr_act(), NULL);
    lv_lmeter_set_range(lmeter, 0, 100);                    /*Set the range*/
    lv_lmeter_set_value(lmeter, 80);                        /*Set the current value*/
    lv_lmeter_set_scale(lmeter, 240, 31);                   /*Set the angle and number␣
↪of lines*/
    lv_lmeter_set_style(lmeter, LV_LMETER_STYLE_MAIN, &style_lmeter);          /
↪*Apply the new style*/
    lv_obj_set_size(lmeter, 150, 150);
    lv_obj_align(lmeter, NULL, LV_ALIGN_CENTER, 0, 0);
}
```

MicroPython

Simple Line meter

code

```
# Create a style for the line meter
style_lmeter = lv.style_t()
lv.style_copy(style_lmeter, lv.style_pretty_color)
style_lmeter.line.width = 2
style_lmeter.line.color = lv.color_hex(0xc0c0c0)              # Silver
style_lmeter.body.main_color = lv.color_hex(0x91bfed)         # Light blue
style_lmeter.body.grad_color = lv.color_hex(0x04386c)         # Dark blue
style_lmeter.body.padding.left = 16                           # Line length

# Create a line meter
lmeter = lv.lmeter(lv.scr_act())
lmeter.set_range(0, 100)                    # Set the range
lmeter.set_value(80)                        # Set the current value
lmeter.set_scale(240, 31)                   # Set the angle and number of lines
lmeter.set_style(lv.lmeter.STYLE.MAIN, style_lmeter)          # Apply the new style
lmeter.set_size(150, 150)
lmeter.align(None, lv.ALIGN.CENTER, 0, 0)
```

API

Typedefs

typedef uint8_t **lv_lmeter_style_t**

Enums

enum [anonymous]

Values:

LV_LMETER_STYLE_MAIN

Functions

lv_obj_t ***lv_lmeter_create**(*lv_obj_t *par*, **const** *lv_obj_t *copy*)

Create a line meter objects

Return pointer to the created line meter

Parameters

- `par`: pointer to an object, it will be the parent of the new line meter
- `copy`: pointer to a line meter object, if not NULL then the new object will be copied from it

void **lv_lmeter_set_value**(*lv_obj_t *lmeter*, int16_t *value*)

Set a new value on the line meter

Parameters

- `lmeter`: pointer to a line meter object
- `value`: new value

void **lv_lmeter_set_range**(*lv_obj_t *lmeter*, int16_t *min*, int16_t *max*)

Set minimum and the maximum values of a line meter

Parameters

- `lmeter`: pointer to he line meter object
- `min`: minimum value
- `max`: maximum value

void **lv_lmeter_set_scale**(*lv_obj_t* *lmeter, uint16_t *angle*, uint16_t *line_cnt*)
Set the scale settings of a line meter

Parameters

- `lmeter`: pointer to a line meter object
- `angle`: angle of the scale (0..360)
- `line_cnt`: number of lines

void **lv_lmeter_set_angle_offset**(*lv_obj_t* *lmeter, uint16_t *angle*)
Set the set an offset for the line meter' s angles to rotate it.

Parameters

- `lmeter`: pointer to a line meter object
- `angle`: angle offset (0..360), rotates clockwise

static void **lv_lmeter_set_style**(*lv_obj_t* *lmeter, *lv_lmeter_style_t* *type*, lv_style_t *style*)
Set the styles of a line meter

Parameters

- `lmeter`: pointer to a line meter object
- `type`: which style should be set (can be only `LV_LMETER_STYLE_MAIN`)
- `style`: set the style of the line meter

int16_t **lv_lmeter_get_value**(**const** *lv_obj_t* *lmeter)
Get the value of a line meter

Return the value of the line meter

Parameters

- `lmeter`: pointer to a line meter object

int16_t **lv_lmeter_get_min_value**(**const** *lv_obj_t* *lmeter)
Get the minimum value of a line meter

Return the minimum value of the line meter

Parameters

- `lmeter`: pointer to a line meter object

int16_t **lv_lmeter_get_max_value**(**const** *lv_obj_t* *lmeter)
Get the maximum value of a line meter

Return the maximum value of the line meter

Parameters

- `lmeter`: pointer to a line meter object

uint16_t **lv_lmeter_get_line_count**(**const** *lv_obj_t* *lmeter)
Get the scale number of a line meter

Return number of the scale units

Parameters

- `lmeter`: pointer to a line meter object

uint16_t **lv_lmeter_get_scale_angle(const** *lv_obj_t* *lmeter**)**
Get the scale angle of a line meter

Return angle of the scale

Parameters

- `lmeter`: pointer to a line meter object

uint16_t **lv_lmeter_get_angle_offset(***lv_obj_t* *lmeter**)**
get the set an offset for the line meter.

Return angle offset (0..360)

Parameters

- `lmeter`: pointer to a line meter object

static const lv_style_t ***lv_lmeter_get_style(const** *lv_obj_t* *lmeter, *lv_lmeter_style_t* *type**)**
Get the style of a line meter

Return pointer to the line meter' s style

Parameters

- `lmeter`: pointer to a line meter object
- `type`: which style should be get (can be only `LV_LMETER_STYLE_MAIN`)

struct lv_lmeter_ext_t

Public Members

uint16_t **scale_angle**

uint16_t **angle_ofs**

uint16_t **line_cnt**

int16_t **cur_value**

int16_t **min_value**

int16_t **max_value**

Boîte de message (lv_mbox)

Vue d' ensemble

Les boîtes de message font office de fenêtres contextuelles. Elles sont construites à partir d' un *conteneur* de fond, d' un *label* et d' une *matrice de boutons*.

Le texte sera automatiquement divisé en plusieurs lignes (mode `LV_LABEL_LONG_MODE_BREAK`) et la hauteur sera définie automatiquement pour afficher le texte et les boutons (`LV_FIT_TIGHT` ajustement automatique vertical)-

Définir le texte

Pour définir le texte, utilisez la fonction `lv_mbox_set_text(mbox,"My text")`.

Ajouter des boutons

Pour ajouter des boutons, utilisez la fonction `lv_mbox_add_btns(mbox, btn_str)`. Vous devez spécifier le texte des boutons ainsi `const char * btn_str[] = {"Apply", "Close", ""}`. Pour plus d'informations, consultez la documentation de la *matrice de boutons*.

Fermeture automatique

Avec `lv_mbox_start_auto_close(mbox, delay)` la boîte de message peut être fermée automatiquement après `delay` millisecondes avec une animation. La fonction `lv_mbox_stop_auto_close(mbox)` arrête une fermeture automatique en cours.

La durée de l'animation de fermeture peut être définie par `lv_mbox_set_anim_time(mbox, anim_time)`.

Styles

Utilisez `lv_mbox_set_style(mbox, LV_MBOX_STYLE _..., &style)` pour définir un nouveau style pour un élément de la boîte de message :

- **LV_MBOX_STYLE_BG** spécifie le style du conteneur d'arrière-plan. `style.body` définit l'arrière-plan et `style.label` définit l'apparence du texte. Valeur par défaut : `lv_style_pretty`
- **LV_MBOX_STYLE_BTN_BG** style de l'arrière-plan de la matrice de boutons. Valeur par défaut : `lv_style_trans`
- **LV_MBOX_STYLE_BTN_REL** style des boutons relâchés. Valeur par défaut : `lv_style_btn_rel`
- **LV_MBOX_STYLE_BTN_PR** style des boutons pressés. Valeur par défaut : `lv_style_btn_pr`
- **LV_MBOX_STYLE_BTN_TGL_REL** style des boutons bascules relâchés. Valeur par défaut : `lv_style_btn_tgl_rel`,
- **LV_MBOX_STYLE_BTN_TGL_PR** style des boutons bascules pressés. Valeur par défaut : `lv_style_btn_tgl_pr`
- **LV_MBOX_STYLE_BTN_INA** style des boutons inactifs. Valeur par défaut : `lv_style_btn_ina`.

La hauteur de la zone des boutons est égal à *font height + padding.top + padding.bottom* de `LV_MBOX_STYLE_BTN_REL`.

Evénements

Outre les [événements génériques](/overview/event.html #evenements-generiques), les événements spéciaux suivants sont envoyés par les boîtes de message :

- **LV_EVENT_VALUE_CHANGED** envoyé lorsque le bouton est cliqué. Les données d'événement sont l'ID du bouton cliqué.

La boîte de message a une fonction de rappel par défaut qui la referme lorsqu' un clic est effectué sur un bouton.

Apprenez-en plus sur les *événements*.

Touches

Les *touches* suivantes sont traitées par les boutons :

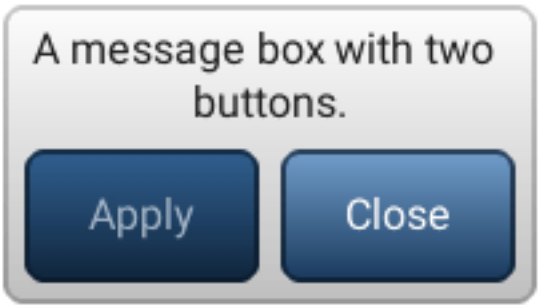
- **LV_KEY_RIGHT/DOWN** sélectionne le bouton suivant,
- **LV_KEY_LEFT/UP** sélectionne le bouton précédent,
- **LV_KEY_ENTER** pour clique le bouton sélectionné.

Apprenez-en plus sur les *touches*.

Exemple

C

Simple Message box



code

```
#include "lvgl/lvgl.h"
#include <stdio.h>

static void event_handler(lv_obj_t * obj, lv_event_t event)
{
    if(event == LV_EVENT_VALUE_CHANGED) {
        printf("Button: %s\n", lv_mbox_get_active_btn_text(obj));
    }
}
```

(continues on next page)

(continued from previous page)

```
void lv_ex_mbox_1(void)
{
    static const char * btns[] ={"Apply", "Close", ""};

    lv_obj_t * mbox1 = lv_mbox_create(lv_scr_act(), NULL);
    lv_mbox_set_text(mbox1, "A message box with two buttons.");
    lv_mbox_add_btns(mbox1, btns);
    lv_obj_set_width(mbox1, 200);
    lv_obj_set_event_cb(mbox1, event_handler);
    lv_obj_align(mbox1, NULL, LV_ALIGN_CENTER, 0, 0); /*Align to the corner*/
}
```

Modal

code

```
/**
 * @file lv_ex_mbox_2.c
 *
 */

/*********************
 *      INCLUDES
 *********************/

#include "lvgl/lvgl.h"


/**********************
 *  STATIC PROTOTYPES
 **********************/
```

(continues on next page)

(continued from previous page)

```
static void mbox_event_cb(lv_obj_t *obj, lv_event_t evt);
static void btn_event_cb(lv_obj_t *btn, lv_event_t evt);

/**********************
 *  STATIC VARIABLES
 **********************/

static lv_obj_t *mbox, *info;

static const char welcome_info[] = "Welcome to the modal message box demo!\n"
                                   "Press the button to display a message box.";

static const char in_msg_info[] = "Notice that you cannot touch "
                                  "the button again while the message box is open.";

/**********************
 *   GLOBAL FUNCTIONS
 **********************/

void lv_ex_mbox_2(void)
{
        /* Create a button, then set its position and event callback */
        lv_obj_t *btn = lv_btn_create(lv_scr_act(), NULL);
        lv_obj_set_size(btn, 200, 60);
        lv_obj_set_event_cb(btn, btn_event_cb);
        lv_obj_align(btn, NULL, LV_ALIGN_IN_TOP_LEFT, 20, 20);

        /* Create a label on the button */
        lv_obj_t *label = lv_label_create(btn, NULL);
        lv_label_set_text(label, "Display a message box!");

        /* Create an informative label on the screen */
        info = lv_label_create(lv_scr_act(), NULL);
        lv_label_set_text(info, welcome_info);
        lv_label_set_long_mode(info, LV_LABEL_LONG_BREAK); /* Make sure text will␣
↪wrap */
        lv_obj_set_width(info, LV_HOR_RES - 10);
        lv_obj_align(info, NULL, LV_ALIGN_IN_BOTTOM_LEFT, 5, -5);

}

/**********************
 *   STATIC FUNCTIONS
 **********************/

static void mbox_event_cb(lv_obj_t *obj, lv_event_t evt)
{
        if(evt == LV_EVENT_DELETE && obj == mbox) {
                /* Delete the parent modal background */
                lv_obj_del_async(lv_obj_get_parent(mbox));
                mbox = NULL; /* happens before object is actually deleted! */
                lv_label_set_text(info, welcome_info);
        } else if(evt == LV_EVENT_VALUE_CHANGED) {
                /* A button was clicked */
                lv_mbox_start_auto_close(mbox, 0);
```

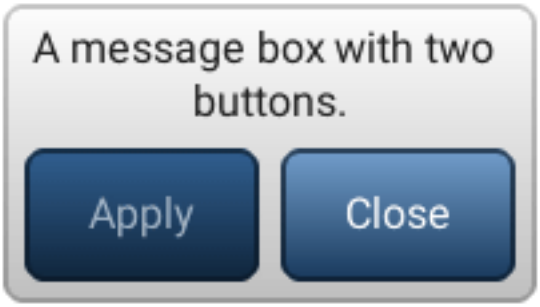
(continues on next page)

(continued from previous page)

```
        }
}

static void btn_event_cb(lv_obj_t *btn, lv_event_t evt)
{
        if(evt == LV_EVENT_CLICKED) {
                static lv_style_t modal_style;
                /* Create a full-screen background */
                lv_style_copy(&modal_style, &lv_style_plain_color);

                /* Set the background's style */
                modal_style.body.main_color = modal_style.body.grad_color = LV_COLOR_
↪BLACK;
                modal_style.body.opa = LV_OPA_50;

                /* Create a base object for the modal background */
                lv_obj_t *obj = lv_obj_create(lv_scr_act(), NULL);
                lv_obj_set_style(obj, &modal_style);
                lv_obj_set_pos(obj, 0, 0);
                lv_obj_set_size(obj, LV_HOR_RES, LV_VER_RES);
                lv_obj_set_opa_scale_enable(obj, true); /* Enable opacity scaling for␣
↪the animation */

                static const char * btns2[] = {"Ok", "Cancel", ""};

                /* Create the message box as a child of the modal background */
                mbox = lv_mbox_create(obj, NULL);
                lv_mbox_add_btns(mbox, btns2);
                lv_mbox_set_text(mbox, "Hello world!");
                lv_obj_align(mbox, NULL, LV_ALIGN_CENTER, 0, 0);
                lv_obj_set_event_cb(mbox, mbox_event_cb);

                /* Fade the message box in with an animation */
                lv_anim_t a;
                lv_anim_init(&a);
                lv_anim_set_time(&a, 500, 0);
                lv_anim_set_values(&a, LV_OPA_TRANSP, LV_OPA_COVER);
                lv_anim_set_exec_cb(&a, obj, (lv_anim_exec_xcb_t)lv_obj_set_opa_
↪scale);
                lv_anim_create(&a);

                lv_label_set_text(info, in_msg_info);
            lv_obj_align(info, NULL, LV_ALIGN_IN_BOTTOM_LEFT, 5, -5);
        }
}
```

MicroPython

Simple Message box



code

```
def event_handler(obj, event):
    if event == lv.EVENT.VALUE_CHANGED:
        print("Button: %s" % lv.mbox.get_active_btn_text(obj))

btns = ["Apply", "Close", ""]

mbox1 = lv.mbox(lv.scr_act())
mbox1.set_text("A message box with two buttons.");
mbox1.add_btns(btns)
mbox1.set_width(200)
mbox1.set_event_cb(event_handler)
mbox1.align(None, lv.ALIGN.CENTER, 0, 0)  # Align to the corner
```

Modal

code

```
welcome_info = "Welcome to the modal message box demo!\nPress the button to display a␣
↪message box."
in_msg_info = "Notice that you cannot touch the button again while the message box is␣
↪open."

class Modal(lv.mbox):
    """mbox with semi-transparent background"""
    def __init__(self, parent, *args, **kwargs):
        # Create a full-screen background
        modal_style = lv.style_t()
        lv.style_copy(modal_style, lv.style_plain_color)
        # Set the background's style
        modal_style.body.main_color = modal_style.body.grad_color = lv.color_make(0,0,
↪0)
        modal_style.body.opa = lv.OPA._50

        # Create a base object for the modal background
        self.bg = lv.obj(parent)
        self.bg.set_style(modal_style)
        self.bg.set_pos(0, 0)
        self.bg.set_size(parent.get_width(), parent.get_height())
        self.bg.set_opa_scale_enable(True)  # Enable opacity scaling for the animation

        super().__init__(self.bg, *args, **kwargs)
        self.align(None, lv.ALIGN.CENTER, 0, 0)

        # Fade the message box in with an animation
        a = lv.anim_t()
        lv.anim_init(a)
        lv.anim_set_time(a, 500, 0)
        lv.anim_set_values(a, lv.OPA.TRANSP, lv.OPA.COVER)
```

(continues on next page)

(continued from previous page)

```
        lv.anim_set_exec_cb(a, self.bg, lv.obj.set_opa_scale)
        lv.anim_create(a)
        super().set_event_cb(self.default_callback)

    def set_event_cb(self, callback):
        self.callback = callback

    def get_event_cb(self):
        return self.callback

    def default_callback(self, obj, evt):
        if evt == lv.EVENT.DELETE:# and obj == self:
            # Delete the parent modal background
            self.get_parent().del_async()
        elif evt == lv.EVENT.VALUE_CHANGED:
            # A button was clicked
            self.start_auto_close(0)
        # Call user-defined callback
        if self.callback is not None:
            self.callback(obj, evt)

def mbox_event_cb(obj, evt):
    if evt == lv.EVENT.DELETE:
        info.set_text(welcome_info)

def btn_event_cb(btn, evt):
    if evt == lv.EVENT.CLICKED:

        btns2 = ["Ok", "Cancel", ""]

        # Create the message box as a child of the modal background
        mbox = Modal(lv.scr_act())
        mbox.add_btns(btns2)
        mbox.set_text("Hello world!")
        mbox.set_event_cb(mbox_event_cb)

        info.set_text(in_msg_info)
        info.align(None, lv.ALIGN.IN_BOTTOM_LEFT, 5, -5)

# Get active screen
scr = lv.scr_act()

# Create a button, then set its position and event callback
btn = lv.btn(scr)
btn.set_size(200, 60)
btn.set_event_cb(btn_event_cb)
btn.align(None, lv.ALIGN.IN_TOP_LEFT, 20, 20)

# Create a label on the button
label = lv.label(btn)
label.set_text("Display a message box!")

# Create an informative label on the screen
info = lv.label(scr)
info.set_text(welcome_info)
info.set_long_mode(lv.label.LONG.BREAK) # Make sure text will wrap
```

(continues on next page)

(continued from previous page)

```
info.set_width(scr.get_width() - 10)
info.align(None, lv.ALIGN.IN_BOTTOM_LEFT, 5, -5)
```

API

Typedefs

typedef uint8_t **lv_mbox_style_t**

Enums

enum [anonymous]

Message box styles.

Values:

LV_MBOX_STYLE_BG

LV_MBOX_STYLE_BTN_BG

Same meaning as ordinary button styles.

LV_MBOX_STYLE_BTN_REL

LV_MBOX_STYLE_BTN_PR

LV_MBOX_STYLE_BTN_TGL_REL

LV_MBOX_STYLE_BTN_TGL_PR

LV_MBOX_STYLE_BTN_INA

Functions

lv_obj_t ***lv_mbox_create**(*lv_obj_t* **par*, **const** *lv_obj_t* **copy*)

Create a message box objects

Return pointer to the created message box

Parameters

- `par`: pointer to an object, it will be the parent of the new message box
- `copy`: pointer to a message box object, if not NULL then the new object will be copied from it

void **lv_mbox_add_btns**(*lv_obj_t* **mbox*, **const** char **btn_mapaction*[])

Add button to the message box

Parameters

- `mbox`: pointer to message box object
- `btn_map`: button descriptor (button matrix map). E.g. a const char *txt[] = { “ok” , “close” , “” } (Can not be local variable)

void **lv_mbox_set_text**(*lv_obj_t* **mbox*, **const** char **txt*)

Set the text of the message box

Parameters

- `mbox`: pointer to a message box
- `txt`: a '\0' terminated character string which will be the message box text

void **lv_mbox_set_anim_time**(*lv_obj_t* *mbox, uint16_t *anim_time*)
Set animation duration

Parameters

- `mbox`: pointer to a message box object
- `anim_time`: animation length in milliseconds (0: no animation)

void **lv_mbox_start_auto_close**(*lv_obj_t* *mbox, uint16_t *delay*)
Automatically delete the message box after a given time

Parameters

- `mbox`: pointer to a message box object
- `delay`: a time (in milliseconds) to wait before delete the message box

void **lv_mbox_stop_auto_close**(*lv_obj_t* *mbox)
Stop the auto. closing of message box

Parameters

- `mbox`: pointer to a message box object

void **lv_mbox_set_style**(*lv_obj_t* *mbox, *lv_mbox_style_t* *type*, **const** lv_style_t *style)
Set a style of a message box

Parameters

- `mbox`: pointer to a message box object
- `type`: which style should be set
- `style`: pointer to a style

void **lv_mbox_set_recolor**(*lv_obj_t* *mbox, bool *en*)
Set whether recoloring is enabled. Must be called after `lv_mbox_add_btns`.

Parameters

- `btnm`: pointer to button matrix object
- `en`: whether recoloring is enabled

const char ***lv_mbox_get_text**(**const** *lv_obj_t* *mbox)
Get the text of the message box

Return pointer to the text of the message box

Parameters

- `mbox`: pointer to a message box object

uint16_t **lv_mbox_get_active_btn**(*lv_obj_t* *mbox)
Get the index of the lastly "activated" button by the user (pressed, released etc) Useful in the the `event_cb`.

Return index of the last released button (LV_BTNM_BTN_NONE: if unset)

Parameters

- `btnm`: pointer to button matrix object

const char ***lv_mbox_get_active_btn_text**(*lv_obj_t* *mbox)**
Get the text of the lastly "activated" button by the user (pressed, released etc) Useful in the the `event_cb`.

Return text of the last released button (NULL: if unset)

Parameters

- `btnm`: pointer to button matrix object

uint16_t **lv_mbox_get_anim_time(const** *lv_obj_t* *mbox**)**
Get the animation duration (close animation time)

Return animation length in milliseconds (0: no animation)

Parameters

- `mbox`: pointer to a message box object

const lv_style_t ***lv_mbox_get_style(const** *lv_obj_t* *mbox, *lv_mbox_style_t* type**)**
Get a style of a message box

Return style pointer to a style

Parameters

- `mbox`: pointer to a message box object
- `type`: which style should be get

bool **lv_mbox_get_recolor(const** *lv_obj_t* *mbox**)**
Get whether recoloring is enabled

Return whether recoloring is enabled

Parameters

- `mbox`: pointer to a message box object

lv_obj_t ***lv_mbox_get_btnm(***lv_obj_t* *mbox**)**
Get message box button matrix

Return pointer to button matrix object

Remark return value will be NULL unless `lv_mbox_add_btns` has been already called

Parameters

- `mbox`: pointer to a message box object

struct lv_mbox_ext_t

Public Members

lv_cont_ext_t **bg**

lv_obj_t ***text**

lv_obj_t ***btnm**

uint16_t **anim_time**

Page (lv_page)

Vue d' ensemble

La page se compose de deux *conteneurs* l' un sur l' autre :

- un **arrière-plan** (ou base)
- un plan supérieur **pouvant défiler**.

L' objet d' arrière-plan peut être référencé comme la page elle-même : `lv_obj_set_width(page, 100)`.

Si vous créez un enfant sur la page, celui-ci sera automatiquement déplacé vers le conteneur pouvant défiler. Si le conteneur pouvant défiler devient plus grand que l' arrière-plan, vous pouvez le faire *défiler en le faisant glisser (comme dans les listes sur les smartphones).

By default, the scrollable' s has `LV_FIT_FILL`auto fit in all directions. It means the scrollable size will be the same as the background' s size (minus the paddings) while the children are in the background. But when an object is positioned out of the background the scrollable size will be increased to involve it.

Barres de défilement

Les barres de défilement peuvent être affichées selon quatre stratégies :

- **LV_SB_MODE_OFF** les barres de défilement ne sont jamais affichées
- **LV_SB_MODE_ON** les barres de défilement sont toujours affichées
- **LV_SB_MODE_DRAG** les barres de défilement sont affichées quand la page est tirée
- **LV_SB_MODE_AUTO** affiche les barres de défilement quand le conteneur est suffisamment grand pour être défilé

Vous pouvez définir la politique d' affichage de la barre de défilement avec : `lv_page_set_sb_mode(page, SB_MODE)`. La valeur par défaut est `LV_SB_MODE_AUTO`.

Objet collé

Vous pouvez coller des enfants à la page. Dans ce cas, vous pouvez faire défiler la page en faisant glisser l' objet enfant. It can be enabled by the `lv_page_glue_obj(child, true)`.

Focus object

You can focus on an object on a page with `lv_page_focus(page, child, LV_ANIM_ON/FF)`. It will move the scrollable container to show a child. The time of the animation can be set by `lv_page_set_anim_time(page, anim_time)` in milliseconds.

Manual navigation

You can move the scrollable object manually using `lv_page_scroll_hor(page, dist)` and `lv_page_scroll_ver(page, dist)`

Edge flash

A circle-like effect can be shown if the list reached the most top/bottom/left/right position. `lv_page_set_edge_flash(list, en)` enables this feature.

Scroll propagation

If the list is created on an other scrollable element (like an other page) and the Page can't be scrolled further the scrolling can be propagated to the parent to continue the scrolling on the parent. It can be enabled with `lv_page_set_scroll_propagation(list, true)`

Scrollable API

There are functions to directly set/get the scrollable's attributes:

- `lv_page_get_scrl()`
- `lv_page_set_scrl_fit/fint2/fit4()`
- `lv_page_set_scrl_width()`
- `lv_page_set_scrl_height()`
- `lv_page_set_scrl_layout()`

Notes

The background draws its border when the scrollable is drawn. It ensures that the page always will have a closed shape even if the scrollable has the same color as the Page's parent.

Styles

Use `lv_page_set_style(page, LV_PAGE_STYLE_..., &style)` to set a new style for an element of the page:

- **LV_PAGE_STYLE_BG** background's style which uses all `style.body` properties (default: `lv_style_pretty_color`)
- **LV_PAGE_STYLE_SCRL** scrollable's style which uses all `style.body` properties (default: `lv_style_pretty`)
- **LV_PAGE_STYLE_SB** scrollbar's style which uses all `style.body` properties. `padding.right/bottom` sets horizontal and vertical the scrollbars' padding respectively and the `padding.inner` sets the scrollbar's width. (default: `lv_style_pretty_color`)

Events

Only the Generic events are sent by the object type.

The scrollable object has a default event callback which propagates the following events to the background object: `LV_EVENT_PRESSED`, `LV_EVENT_PRESSING`, `LV_EVENT_PRESS_LOST`,`LV_EVENT_RELEASED`, `LV_EVENT_SHORT_CLICKED`, `LV_EVENT_CLICKED`, `LV_EVENT_LONG_PRESSED`, `LV_EVENT_LONG_PRESSED_REPEAT`

Learn more about *Events*.

##Keys

The following *Keys* are processed by the Page:

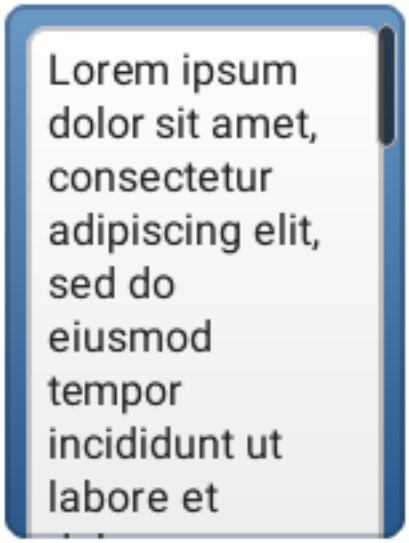
- **LV_KEY_RIGHT/LEFT/UP/DOWN** Scroll the page

Learn more about *Keys*.

Example

C

Page with scrollbar



code

```
#include "lvgl/lvgl.h"

void lv_ex_page_1(void)
{
    /*Create a scroll bar style*/
    static lv_style_t style_sb;
    lv_style_copy(&style_sb, &lv_style_plain);
    style_sb.body.main_color = LV_COLOR_BLACK;
    style_sb.body.grad_color = LV_COLOR_BLACK;
    style_sb.body.border.color = LV_COLOR_WHITE;
    style_sb.body.border.width = 1;
    style_sb.body.border.opa = LV_OPA_70;
    style_sb.body.radius = LV_RADIUS_CIRCLE;
    style_sb.body.opa = LV_OPA_60;
    style_sb.body.padding.right = 3;
    style_sb.body.padding.bottom = 3;
```

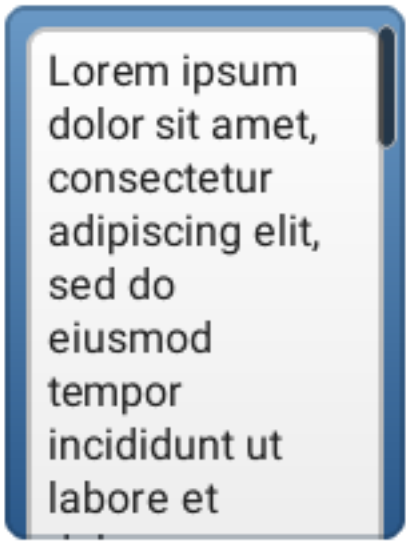
(continues on next page)

(continued from previous page)

```
    style_sb.body.padding.inner = 8;        /*Scrollbar width*/

    /*Create a page*/
    lv_obj_t * page = lv_page_create(lv_scr_act(), NULL);
    lv_obj_set_size(page, 150, 200);
    lv_obj_align(page, NULL, LV_ALIGN_CENTER, 0, 0);
    lv_page_set_style(page, LV_PAGE_STYLE_SB, &style_sb);          /*Set the␣
↪scrollbar style*/

    /*Create a label on the page*/
    lv_obj_t * label = lv_label_create(page, NULL);
    lv_label_set_long_mode(label, LV_LABEL_LONG_BREAK);            /*Automatically␣
↪break long lines*/
    lv_obj_set_width(label, lv_page_get_fit_width(page));          /*Set the label␣
↪width to max value to not show hor. scroll bars*/
    lv_label_set_text(label, "Lorem ipsum dolor sit amet, consectetur adipiscing elit,
↪\n"
                             "sed do eiusmod tempor incididunt ut labore et dolore␣
↪magna aliqua.\n"
                             "Ut enim ad minim veniam, quis nostrud exercitation␣
↪ullamco\n"
                             "laboris nisi ut aliquip ex ea commodo consequat. Duis␣
↪aute irure\n"
                             "dolor in reprehenderit in voluptate velit esse cillum␣
↪dolore\n"
                             "eu fugiat nulla pariatur.\n"
                             "Excepteur sint occaecat cupidatat non proident, sunt in␣
↪culpa\n"
                             "qui officia deserunt mollit anim id est laborum.");
}
```

MicroPython

Page with scrollbar



code

```
# Create a scroll bar style
style_sb = lv.style_t()
lv.style_copy(style_sb, lv.style_plain)
style_sb.body.main_color = lv.color_make(0,0,0)
style_sb.body.grad_color = lv.color_make(0,0,0)
style_sb.body.border.color = lv.color_make(0xff,0xff,0xff)
style_sb.body.border.width = 1
style_sb.body.border.opa = lv.OPA._70
style_sb.body.radius = 800 # large enough to make a circle
style_sb.body.opa = lv.OPA._60
style_sb.body.padding.right = 3
style_sb.body.padding.bottom = 3
style_sb.body.padding.inner = 8        # Scrollbar width

# Create a page
page = lv.page(lv.scr_act())
page.set_size(150, 200)
page.align(None, lv.ALIGN.CENTER, 0, 0)
page.set_style(lv.page.STYLE.SB, style_sb)          # Set the scrollbar style

# Create a label on the page
label = lv.label(page)
label.set_long_mode(lv.label.LONG.BREAK)       # Automatically break long lines
label.set_width(page.get_fit_width())          # Set the label width to max value to␣
↪not show hor. scroll bars
label.set_text("""Lorem ipsum dolor sit amet, consectetur adipiscing elit,
sed do eiusmod tempor incididunt ut labore et dolore magna aliqua.
Ut enim ad minim veniam, quis nostrud exercitation ullamco
laboris nisi ut aliquip ex ea commodo consequat. Duis aute irure
dolor in reprehenderit in voluptate velit esse cillum dolore
eu fugiat nulla pariatur.
```

(continues on next page)

(continued from previous page)

```
Excepteur sint occaecat cupidatat non proident, sunt in culpa
qui officia deserunt mollit anim id est laborum.""")
```

API

Typedefs

typedef uint8_t **lv_sb_mode_t**

typedef uint8_t **lv_page_edge_t**

typedef uint8_t **lv_page_style_t**

Enums

enum [anonymous]

Scrollbar modes: shows when should the scrollbars be visible

Values:

LV_SB_MODE_OFF = 0x0
Never show scrollbars

LV_SB_MODE_ON = 0x1
Always show scrollbars

LV_SB_MODE_DRAG = 0x2
Show scrollbars when page is being dragged

LV_SB_MODE_AUTO = 0x3
Show scrollbars when the scrollable container is large enough to be scrolled

LV_SB_MODE_HIDE = 0x4
Hide the scroll bar temporally

LV_SB_MODE_UNHIDE = 0x5
Unhide the previously hidden scrollbar. Recover it' s type too

enum [anonymous]

Edges: describes the four edges of the page

Values:

LV_PAGE_EDGE_LEFT = 0x1

LV_PAGE_EDGE_TOP = 0x2

LV_PAGE_EDGE_RIGHT = 0x4

LV_PAGE_EDGE_BOTTOM = 0x8

enum [anonymous]

Values:

LV_PAGE_STYLE_BG

LV_PAGE_STYLE_SCRL

LV_PAGE_STYLE_SB

LV_PAGE_STYLE_EDGE_FLASH

Functions

lv_obj_t ***lv_page_create**(*lv_obj_t* **par*, **const** *lv_obj_t* **copy*)
Create a page objects

Return pointer to the created page

Parameters

- `par`: pointer to an object, it will be the parent of the new page
- `copy`: pointer to a page object, if not NULL then the new object will be copied from it

void **lv_page_clean**(*lv_obj_t* **page*)
Delete all children of the scrl object, without deleting scrl child.

Parameters

- `page`: pointer to an object

lv_obj_t ***lv_page_get_scrl**(**const** *lv_obj_t* **page*)
Get the scrollable object of a page

Return pointer to a container which is the scrollable part of the page

Parameters

- `page`: pointer to a page object

uint16_t **lv_page_get_anim_time**(**const** *lv_obj_t* **page*)
Get the animation time

Return the animation time in milliseconds

Parameters

- `page`: pointer to a page object

void **lv_page_set_sb_mode**(*lv_obj_t* **page*, *lv_sb_mode_t* *sb_mode*)
Set the scroll bar mode on a page

Parameters

- `page`: pointer to a page object
- `sb_mode`: the new mode from 'lv_page_sb.mode_t' enum

void **lv_page_set_anim_time**(*lv_obj_t* **page*, uint16_t *anim_time*)
Set the animation time for the page

Parameters

- `page`: pointer to a page object
- `anim_time`: animation time in milliseconds

void **lv_page_set_scroll_propagation**(*lv_obj_t* **page*, bool *en*)
Enable the scroll propagation feature. If enabled then the page will move its parent if there is no more space to scroll.

Parameters

- `page`: pointer to a Page
- `en`: true or false to enable/disable scroll propagation

void **lv_page_set_edge_flash**(*lv_obj_t* **page*, bool *en*)
Enable the edge flash effect. (Show an arc when the an edge is reached)

Parameters

- `page`: pointer to a Page
- `en`: true or false to enable/disable end flash

static void **lv_page_set_scrl_fit4**(*lv_obj_t* **page*, *lv_fit_t left*, *lv_fit_t right*, *lv_fit_t top*, *lv_fit_t bottom*)

Set the fit policy in all 4 directions separately. It tell how to change the page size automatically.

Parameters

- `page`: pointer to a page object
- `left`: left fit policy from `lv_fit_t`
- `right`: right fit policy from `lv_fit_t`
- `top`: bottom fit policy from `lv_fit_t`
- `bottom`: bottom fit policy from `lv_fit_t`

static void **lv_page_set_scrl_fit2**(*lv_obj_t* **page*, *lv_fit_t hor*, *lv_fit_t ver*)

Set the fit policy horizontally and vertically separately. It tell how to change the page size automatically.

Parameters

- `page`: pointer to a page object
- `hot`: horizontal fit policy from `lv_fit_t`
- `ver`: vertical fit policy from `lv_fit_t`

static void **lv_page_set_scrl_fit**(*lv_obj_t* **page*, *lv_fit_t fit*)

Set the fit policyin all 4 direction at once. It tell how to change the page size automatically.

Parameters

- `page`: pointer to a button object
- `fit`: fit policy from `lv_fit_t`

static void **lv_page_set_scrl_width**(*lv_obj_t* **page*, lv_coord_t *w*)

Set width of the scrollable part of a page

Parameters

- `page`: pointer to a page object
- `w`: the new width of the scrollable (it ha no effect is horizontal fit is enabled)

static void **lv_page_set_scrl_height**(*lv_obj_t* **page*, lv_coord_t *h*)

Set height of the scrollable part of a page

Parameters

- `page`: pointer to a page object
- `h`: the new height of the scrollable (it ha no effect is vertical fit is enabled)

static void **lv_page_set_scrl_layout**(*lv_obj_t* **page*, *lv_layout_t layout*)

Set the layout of the scrollable part of the page

Parameters

- `page`: pointer to a page object
- `layout`: a layout from 'lv_cont_layout_t'

void **lv_page_set_style**(*lv_obj_t* *page, *lv_page_style_t* type, **const** lv_style_t *style)
Set a style of a page

Parameters

- page: pointer to a page object
- type: which style should be set
- style: pointer to a style

lv_sb_mode_t **lv_page_get_sb_mode**(**const** *lv_obj_t* *page)
Set the scroll bar mode on a page

Return the mode from 'lv_page_sb.mode_t' enum

Parameters

- page: pointer to a page object

bool **lv_page_get_scroll_propagation**(*lv_obj_t* *page)
Get the scroll propagation property

Return true or false

Parameters

- page: pointer to a Page

bool **lv_page_get_edge_flash**(*lv_obj_t* *page)
Get the edge flash effect property.

Parameters

- page: pointer to a Page return true or false

lv_coord_t **lv_page_get_fit_width**(*lv_obj_t* *page)
Get that width which can be set to the children to still not cause overflow (show scrollbars)

Return the width which still fits into the page

Parameters

- page: pointer to a page object

lv_coord_t **lv_page_get_fit_height**(*lv_obj_t* *page)
Get that height which can be set to the children to still not cause overflow (show scrollbars)

Return the height which still fits into the page

Parameters

- page: pointer to a page object

static lv_coord_t **lv_page_get_scrl_width**(**const** *lv_obj_t* *page)
Get width of the scrollable part of a page

Return the width of the scrollable

Parameters

- page: pointer to a page object

static lv_coord_t **lv_page_get_scrl_height**(**const** *lv_obj_t* *page)
Get height of the scrollable part of a page

Return the height of the scrollable

Parameters

- page: pointer to a page object

static *lv_layout_t* **lv_page_get_scrl_layout(const** *lv_obj_t* ***page*)**
Get the layout of the scrollable part of a page

Return the layout from 'lv_cont_layout_t'

Parameters

- page: pointer to page object

static *lv_fit_t* **lv_page_get_scrl_fit_left(const** *lv_obj_t* ***page*)**
Get the left fit mode

Return an element of `lv_fit_t`

Parameters

- page: pointer to a page object

static *lv_fit_t* **lv_page_get_scrl_fit_right(const** *lv_obj_t* ***page*)**
Get the right fit mode

Return an element of `lv_fit_t`

Parameters

- page: pointer to a page object

static *lv_fit_t* **lv_page_get_scrl_fit_top(const** *lv_obj_t* ***page*)**
Get the top fit mode

Return an element of `lv_fit_t`

Parameters

- page: pointer to a page object

static *lv_fit_t* **lv_page_get_scrl_fit_bottom(const** *lv_obj_t* ***page*)**
Get the bottom fit mode

Return an element of `lv_fit_t`

Parameters

- page: pointer to a page object

const lv_style_t ***lv_page_get_style(const** *lv_obj_t* ***page*, *lv_page_style_t* *type*)**
Get a style of a page

Return style pointer to a style

Parameters

- page: pointer to page object
- type: which style should be get

bool **lv_page_on_edge(***lv_obj_t* ***page*, *lv_page_edge_t* *edge*)**
Find whether the page has been scrolled to a certain edge.

Return true if the page is on the specified edge

Parameters

- page: Page object
- edge: Edge to check

void **lv_page_glue_obj**(*lv_obj_t* *obj, bool *glue*)
Glue the object to the page. After it the page can be moved (dragged) with this object too.

Parameters

- `obj`: pointer to an object on a page
- `glue`: true: enable glue, false: disable glue

void **lv_page_focus**(*lv_obj_t* *page, **const** *lv_obj_t* *obj, *lv_anim_enable_t* *anim_en*)
Focus on an object. It ensures that the object will be visible on the page.

Parameters

- `page`: pointer to a page object
- `obj`: pointer to an object to focus (must be on the page)
- `anim_en`: LV_ANIM_ON to focus with animation; LV_ANIM_OFF to focus without animation

void **lv_page_scroll_hor**(*lv_obj_t* *page, lv_coord_t *dist*)
Scroll the page horizontally

Parameters

- `page`: pointer to a page object
- `dist`: the distance to scroll (< 0: scroll left; > 0 scroll right)

void **lv_page_scroll_ver**(*lv_obj_t* *page, lv_coord_t *dist*)
Scroll the page vertically

Parameters

- `page`: pointer to a page object
- `dist`: the distance to scroll (< 0: scroll down; > 0 scroll up)

void **lv_page_start_edge_flash**(*lv_obj_t* *page)
Not intended to use directly by the user but by other object types internally. Start an edge flash animation. Exactly one `ext->edge_flash.xxx_ip` should be set

Parameters

- `page`:

struct lv_page_ext_t

Public Members

lv_cont_ext_t **bg**

lv_obj_t ***scrl**

const lv_style_t ***style**

lv_area_t **hor_area**

lv_area_t **ver_area**

uint8_t **hor_draw**

uint8_t **ver_draw**

lv_sb_mode_t **mode**

struct *lv_page_ext_t*::[anonymous] **sb**

lv_anim_value_t **state**

uint8_t **enabled**

uint8_t **top_ip**

uint8_t **bottom_ip**

uint8_t **right_ip**

uint8_t **left_ip**

struct *lv_page_ext_t*::[anonymous] **edge_flash**

uint16_t **anim_time**

uint8_t **scroll_prop**

uint8_t **scroll_prop_ip**

Indicateur de chargement (lv_preload)

Vue d'ensemble

L'objet indicateur de chargement est un arc en rotation sur une bordure circulaire.

###Longueur de l'arc La longueur de l'arc peut être ajustée par `lv_preload_set_arc_length(preload, deg)`.

Vitesse de rotation

La vitesse de rotation peut être ajustée par `lv_preload_set_spin_time(preload, time_ms)`.

Types de rotation

Vous pouvez choisir parmi plusieurs types de rotation :

- **LV_PRELOAD_TYPE_SPINNING_ARC** rotation de l'arc avec ralentissement au sommet du cercle
- **LV_PRELOAD_TYPE_FILLSPIN_ARC** rotation de l'arc avec ralentissement au sommet du cercle mais étire également l'arc

Pour appliquer un type, utilisez `lv_preload_set_type(preload, LV_PRELOAD_TYPE_...)`

Direction de rotation

Le sens de rotation peut être changé avec `lv_preload_set_dir(preload, LV_PRELOAD_DIR_FORWARD/BACKWARD)`.

Styles

Vous pouvez définir les styles avec `lv_preload_set_style(btn, LV_PRELOAD_STYLE_MAIN, &style)`. Il décrit à la fois le style de l'arc et celui de la bordure :

- **arc** est décrit par les propriétés `line`
- **border** est décrit par les propriétés `body.border` notamment `body.padding.left/top` pour donner un rayon plus petit à la bordure (le plus petit est utilisé).

Evénements

Seuls les événements génériques sont envoyés par ce type d'objet.

Touches

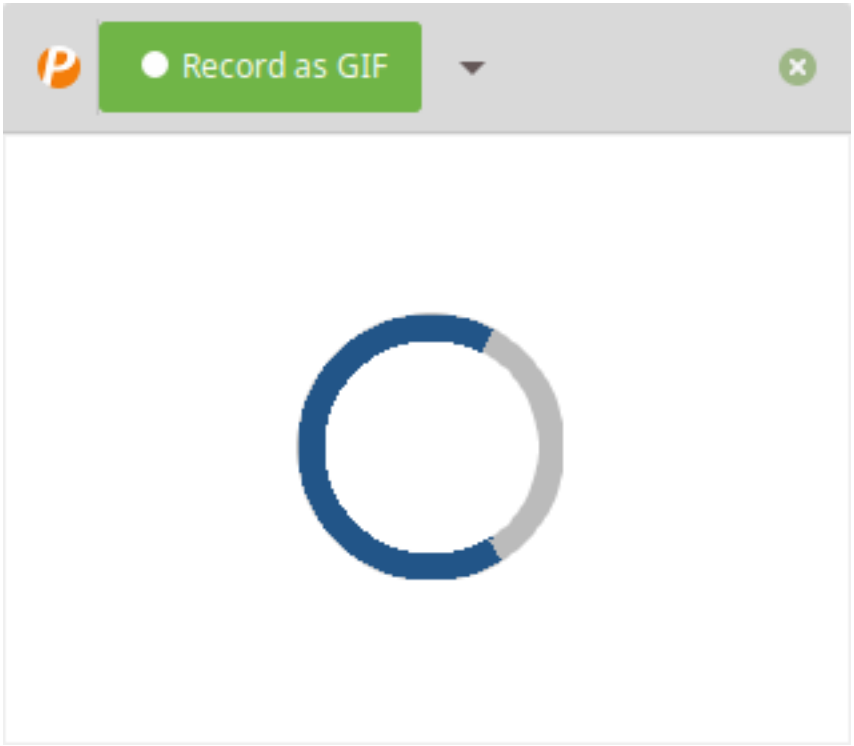
Aucune *touche* n'est traitée par ce type d'objet.

Apprenez-en plus sur les *touches*.

Exemple

C

Preloader with custom style

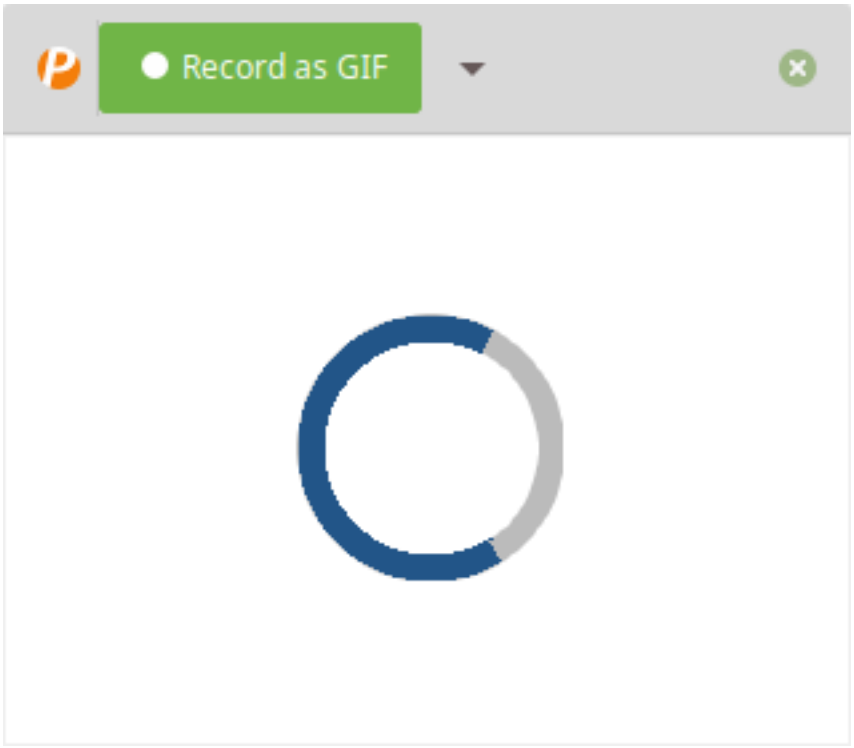


code

```c
#include "lvgl/lvgl.h"

void lv_ex_preload_1(void)
{
    /*Create a style for the Preloader*/
    static lv_style_t style;
    lv_style_copy(&style, &lv_style_plain);
    style.line.width = 10;                          /*10 px thick arc*/
    style.line.color = lv_color_hex3(0x258);        /*Blueish arc color*/

    style.body.border.color = lv_color_hex3(0xBBB); /*Gray background color*/
    style.body.border.width = 10;
    style.body.padding.left = 0;

    /*Create a Preloader object*/
    lv_obj_t * preload = lv_preload_create(lv_scr_act(), NULL);
    lv_obj_set_size(preload, 100, 100);
    lv_obj_align(preload, NULL, LV_ALIGN_CENTER, 0, 0);
    lv_preload_set_style(preload, LV_PRELOAD_STYLE_MAIN, &style);
}
```

MicroPython

Preloader with custom style



code

```python
# Create a style for the Preloader
style = lv.style_t()
```

(continues on next page)

(continued from previous page)

```
lv.style_copy(style, lv.style_plain)
style.line.width = 10                           # 10 px thick arc
style.line.color = lv.color_hex3(0x258)         # Blueish arc color

style.body.border.color = lv.color_hex3(0xBBB) # Gray background color
style.body.border.width = 10
style.body.padding.left = 0

# Create a Preloader object
preload = lv.preload(lv.scr_act())
preload.set_size(100, 100)
preload.align(None, lv.ALIGN.CENTER, 0, 0)
preload.set_style(lv.preload.STYLE.MAIN, style)
```

MicroPython

Pas encore d' exemple.

API

Typedefs

typedef uint8_t **lv_preload_type_t**

typedef uint8_t **lv_preload_dir_t**

typedef uint8_t **lv_preload_style_t**

Enums

enum [anonymous]

Type of preloader.

Values:

LV_PRELOAD_TYPE_SPINNING_ARC

LV_PRELOAD_TYPE_FILLSPIN_ARC

LV_PRELOAD_TYPE_CONSTANT_ARC

enum [anonymous]

Direction the preloader should spin.

Values:

LV_PRELOAD_DIR_FORWARD

LV_PRELOAD_DIR_BACKWARD

enum [anonymous]

Values:

LV_PRELOAD_STYLE_MAIN

Functions

lv_obj_t ***lv_preload_create**(*lv_obj_t* **par*, **const** *lv_obj_t* **copy*)
Create a pre loader objects

Return pointer to the created pre loader

Parameters

- `par`: pointer to an object, it will be the parent of the new pre loader
- `copy`: pointer to a pre loader object, if not NULL then the new object will be copied from it

void **lv_preload_set_arc_length**(*lv_obj_t* **preload*, *lv_anim_value_t deg*)
Set the length of the spinning arc in degrees

Parameters

- `preload`: pointer to a preload object
- `deg`: length of the arc

void **lv_preload_set_spin_time**(*lv_obj_t* **preload*, uint16_t *time*)
Set the spin time of the arc

Parameters

- `preload`: pointer to a preload object
- `time`: time of one round in milliseconds

void **lv_preload_set_style**(*lv_obj_t* **preload*, *lv_preload_style_t type*, **const** lv_style_t **style*)
Set a style of a pre loader.

Parameters

- `preload`: pointer to pre loader object
- `type`: which style should be set
- `style`: pointer to a style

void **lv_preload_set_type**(*lv_obj_t* **preload*, *lv_preload_type_t type*)
Set the animation type of a preloader.

Parameters

- `preload`: pointer to pre loader object
- `type`: animation type of the preload

void **lv_preload_set_dir**(*lv_obj_t* **preload*, *lv_preload_dir_t dir*)
Set the animation direction of a preloader

Parameters

- `preload`: pointer to pre loader object
- `direction`: animation direction of the preload

lv_anim_value_t **lv_preload_get_arc_length**(**const** *lv_obj_t* **preload*)
Get the arc length [degree] of the a pre loader

Parameters

- `preload`: pointer to a pre loader object

uint16_t **lv_preload_get_spin_time**(**const** *lv_obj_t* **preload*)
Get the spin time of the arc

Parameters

- `preload`: pointer to a pre loader object [milliseconds]

const lv_style_t ***lv_preload_get_style**(**const** *lv_obj_t* **preload*, *lv_preload_style_t* *type*)
Get style of a pre loader.

Return style pointer to the style

Parameters

- `preload`: pointer to pre loader object
- `type`: which style should be get

lv_preload_type_t **lv_preload_get_type**(*lv_obj_t* **preload*)
Get the animation type of a preloader.

Return animation type

Parameters

- `preload`: pointer to pre loader object

lv_preload_dir_t **lv_preload_get_dir**(*lv_obj_t* **preload*)
Get the animation direction of a preloader

Return animation direction

Parameters

- `preload`: pointer to pre loader object

void **lv_preload_spinner_anim**(void **ptr*, *lv_anim_value_t* *val*)
Animator function (exec_cb) to rotate the arc of spinner.

Parameters

- `ptr`: pointer to preloader
- `val`: the current desired value [0..360]

struct lv_preload_ext_t

Public Members

lv_arc_ext_t **arc**

lv_anim_value_t **arc_length**

uint16_t **time**

lv_preload_type_t **anim_type**

lv_preload_dir_t **anim_dir**

Roller (lv_roller)

Overview

Roller allows you to simply select one option from more with scrolling. Its functionalities are similar to *Drop down list*.

Set options

The options are passed to the Roller as a string with `lv_roller_set_options(roller, options, LV_ROLLER_MODE_NORMAL/INFINITE)`. The options should be separated by `\n`. For example: `"First\nSecond\nThird"`.

`LV_ROLLER_MODE_INIFINITE` make the roller circular.

You can select an option manually with `lv_roller_set_selected(roller, id)`, where *id* is the index of an option.

Get selected option

The get the currently selected option use `lv_roller_get_selected(roller)` it will return the *index* of the selected option.

`lv_roller_get_selected_str(roller, buf, buf_size)` copy the name of the selected option to `buf`.

Align the options

To align the label horizontally use `lv_roller_set_align(roller, LV_LABEL_ALIGN_LEFT/CENTER/RIGHT)`.

Height and width

You can set the number of visible rows with `lv_roller_set_visible_row_count(roller, num)`

The width is adjusted automatically according to the width of the options. To prevent this apply `lv_roller_set_fix_width(roller, width)`. `0` means to use auto width.

Animation time

When the Roller is scrolled and doesn' t stop exactly on an option it will scroll to the nearest valid option automatically. The time of this scroll animation can be changed by `lv_roller_set_anim_time(roller, anim_time)`. Zero animation time means no animation.

Styles

The `lv_roller_set_style(roller, LV_ROLLER_STYLE_..., &style)` set the styles of a Roller.

- **LV_ROLLER_STYLE_BG** Style of the background. All `style.body` properties are used. `style.text` is used for the option' s label. Default: `lv_style_pretty`
- **LV_ROLLER_STYLE_SEL** Style of the selected option. The `style.body` properties are used. The selected option will be recolored with `text.color`. Default: `lv_style_plain_color`

Events

Besides, the Generic events the following Special events are sent by the Drop down lists:

- **LV_EVENT_VALUE_CHANGED** sent when a new option is selected

Learn more about *Events*.

Keys

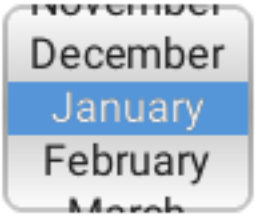
The following *Keys* are processed by the Buttons:

- **LV_KEY_RIGHT/DOWN** Select the next option
- **LV_KEY_LEFT/UP** Select the previous option
- **LY_KEY_ENTER** Apply the selected option (Send `LV_EVENT_VALUE_CHANGED` event)

Example

C

Simple Roller



code

```
#include "lvgl/lvgl.h"
#include <stdio.h>

static void event_handler(lv_obj_t * obj, lv_event_t event)
{
    if(event == LV_EVENT_VALUE_CHANGED) {
```

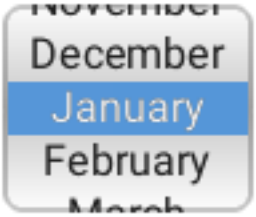
(continues on next page)

(continued from previous page)

```
        char buf[32];
        lv_roller_get_selected_str(obj, buf, sizeof(buf));
        printf("Selected month: %s\n", buf);
    }
}


void lv_ex_roller_1(void)
{
    lv_obj_t *roller1 = lv_roller_create(lv_scr_act(), NULL);
    lv_roller_set_options(roller1,
                          "January\n"
                          "February\n"
                          "March\n"
                          "April\n"
                          "May\n"
                          "June\n"
                          "July\n"
                          "August\n"
                          "September\n"
                          "October\n"
                          "November\n"
                          "December",
                          LV_ROLLER_MODE_INIFINITE);

    lv_roller_set_visible_row_count(roller1, 4);
    lv_obj_align(roller1, NULL, LV_ALIGN_CENTER, 0, 0);
    lv_obj_set_event_cb(roller1, event_handler);
}
```

MicroPython

Simple Roller



code

```
def event_handler(obj, event):
    if event == lv.EVENT.VALUE_CHANGED:
        option = " "*10
        obj.get_selected_str(option, len(option))
        print("Selected month: %s" % option.strip())

roller1 = lv.roller(lv.scr_act())
roller1.set_options("\n".join([
                    "January",
                    "February",
                    "March",
                    "April",
                    "May",
                    "June",
                    "July",
                    "August",
                    "September",
                    "October",
                    "November",
                    "December"]), lv.roller.MODE.INIFINITE)

roller1.set_visible_row_count(4)
roller1.align(None, lv.ALIGN.CENTER, 0, 0)
roller1.set_event_cb(event_handler)
```

API

Typedefs

typedef uint8_t **lv_roller_mode_t**

typedef uint8_t **lv_roller_style_t**

Enums

enum [anonymous]
Roller mode.

Values:

LV_ROLLER_MODE_NORMAL
Normal mode (roller ends at the end of the options).

LV_ROLLER_MODE_INIFINITE
Infinite mode (roller can be scrolled forever).

enum [anonymous]
Values:

LV_ROLLER_STYLE_BG

LV_ROLLER_STYLE_SEL

Functions

lv_obj_t ***lv_roller_create**(*lv_obj_t* **par*, **const** *lv_obj_t* **copy*)
Create a roller object

Return pointer to the created roller

Parameters

- `par`: pointer to an object, it will be the parent of the new roller
- `copy`: pointer to a roller object, if not NULL then the new object will be copied from it

void **lv_roller_set_options**(*lv_obj_t* **roller*, **const** char **options*, *lv_roller_mode_t mode*)
Set the options on a roller

Parameters

- `roller`: pointer to roller object
- `options`: a string with ‘’ separated options. E.g. “One\nTwo\nThree”
- `mode`: `LV_ROLLER_MODE_NORMAL` or `LV_ROLLER_MODE_INFINITE`

void **lv_roller_set_align**(*lv_obj_t* **roller*, *lv_label_align_t align*)
Set the align of the roller’ s options (left, right or center[default])

Parameters

- `roller`: - pointer to a roller object
- `align`: - one of lv_label_align_t values (left, right, center)

void **lv_roller_set_selected**(*lv_obj_t* **roller*, uint16_t *sel_opt*, *lv_anim_enable_t anim*)
Set the selected option

Parameters

- `roller`: pointer to a roller object
- `sel_opt`: id of the selected option (0 ···number of option - 1);
- `anim`: LV_ANOM_ON: set with animation; LV_ANIM_OFF set immediately

void **lv_roller_set_visible_row_count**(*lv_obj_t* *roller, uint8_t *row_cnt*)
Set the height to show the given number of rows (options)

Parameters

- `roller`: pointer to a roller object
- `row_cnt`: number of desired visible rows

static void **lv_roller_set_fix_width**(*lv_obj_t* *roller, lv_coord_t *w*)
Set a fix width for the drop down list

Parameters

- `roller`: pointer to a roller obejct
- `w`: the width when the list is opened (0: auto size)

static void **lv_roller_set_anim_time**(*lv_obj_t* *roller, uint16_t *anim_time*)
Set the open/close animation time.

Parameters

- `roller`: pointer to a roller object
- `anim_time`: open/close animation time [ms]

void **lv_roller_set_style**(*lv_obj_t* *roller, *lv_roller_style_t* *type*, **const** lv_style_t *style)
Set a style of a roller

Parameters

- `roller`: pointer to a roller object
- `type`: which style should be set
- `style`: pointer to a style

uint16_t **lv_roller_get_selected**(**const** *lv_obj_t* *roller)
Get the id of the selected option

Return id of the selected option (0 ···number of option - 1);

Parameters

- `roller`: pointer to a roller object

static void **lv_roller_get_selected_str**(**const** *lv_obj_t* *roller, char *buf, uint16_t *buf_size*)
Get the current selected option as a string

Parameters

- `roller`: pointer to roller object
- `buf`: pointer to an array to store the string
- `buf_size`: size of `buf` in bytes. 0: to ignore it.

lv_label_align_t **lv_roller_get_align**(**const** *lv_obj_t* *roller)
Get the align attribute. Default alignment after _create is LV_LABEL_ALIGN_CENTER

Return LV_LABEL_ALIGN_LEFT, LV_LABEL_ALIGN_RIGHT or LV_LABEL_ALIGN_CENTER

Parameters

- `roller`: pointer to a roller object

static const char ***lv_roller_get_options(const** *lv_obj_t* ***roller**)
Get the options of a roller

Return the options separated by " -s (E.g. "Option1\nOption2\nOption3")

Parameters

- `roller`: pointer to roller object

static uint16_t **lv_roller_get_anim_time(const** *lv_obj_t* ***roller**)
Get the open/close animation time.

Return open/close animation time [ms]

Parameters

- `roller`: pointer to a roller

bool **lv_roller_get_hor_fit(const** *lv_obj_t* ***roller**)
Get the auto width set attribute

Return true: auto size enabled; false: manual width settings enabled

Parameters

- `roller`: pointer to a roller object

const lv_style_t ***lv_roller_get_style(const** *lv_obj_t* ***roller**, *lv_roller_style_t* *type*)
Get a style of a roller

Return style pointer to a style

Parameters

- `roller`: pointer to a roller object
- `type`: which style should be get

struct lv_roller_ext_t

Public Members

lv_ddlist_ext_t **ddlist**

lv_roller_mode_t **mode**

Curseur (lv_slider)

Vue d'ensemble

L'objet curseur ressemble à une *barre* complété par un bouton. Le bouton peut être déplacé pour définir une valeur. Le curseur peut également être vertical ou horizontal.

Valeur et intervalle

Pour définir une valeur initiale, utilisez `lv_slider_set_value(slider, new_value, LV_ANIM_ON/OFF)`. `lv_slider_set_anim_time(slider, anim_time)` définit la durée d'animation en millisecondes.

Pour spécifier l'**intervalle** (valeurs minimum et maximum) la fonction `lv_slider_set_range(slider, min , max)` est utilisée.

Symétrie

Le curseur peut être dessiné symétriquement par rapport à zéro (de zéro vers la gauche ou la droite) si cela est activé par `lv_slider_set_sym(slider, true)`

Placement du bouton

Le bouton peut être placé de deux manières :

- sur l'arrière-plan
- sur les bords aux valeurs minimum/maximum

Utilisez `lv_slider_set_knob_in(slider, true/false)`choisir entre les modes (*knob_in = false* est la valeur par défaut).

Styles

Vous pouvez modifier les styles du curseur avec `lv_slider_set_style(slider, LV_SLIDER_STYLE_..., &style)`.

- **LV_SLIDER_STYLE_BG** style de l'arrière plan. Toutes les propriétés `style.body` sont utilisées. Les valeurs `padding` rendent le bouton plus grand que l'arrière-plan (les valeurs négatives le rendent plus grand)
- **LV_SLIDER_STYLE_INDIC** style de l'indicateur. Toutes les propriétés `style.body` sont utilisées. Les valeurs `padding` rendent l'indicateur plus petit que l'arrière-plan.
- **LV_SLIDER_STYLE_KNOB** style du bouton. Toutes les propriétés `style.body` sont utilisées sauf `padding`.

Evénements

Outre les [événements génériques](/overview/event.html #evenements-generiques), les événements spéciaux suivants sont envoyés par le curseur :

- **LV_EVENT_VALUE_CHANGED** envoyé quand le curseur est déplacé ou modifié avec les touches.

Touches

- **LV_KEY_UP**, **LV_KEY_RIGHT** incrémente la valeur du curseur de 1.
- **LV_KEY_DOWN**, **LV_KEY_LEFT** décrémente la valeur du curseur de 1.

Apprenez-en plus sur les *touches*.

Exemple

C

Slider with custo mstyle

code

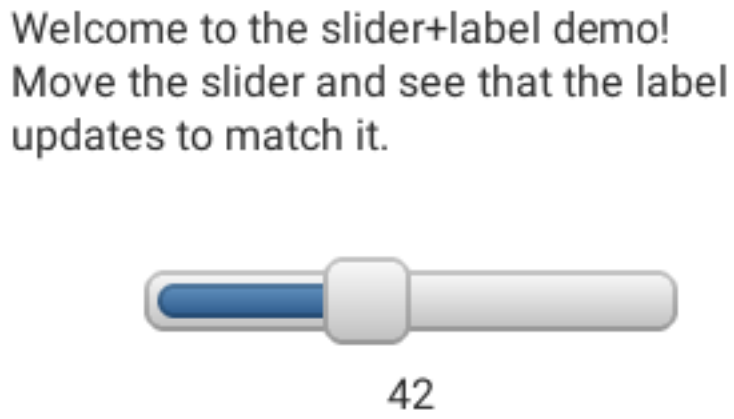
```
#include "lvgl/lvgl.h"
#include <stdio.h>

static void event_handler(lv_obj_t * obj, lv_event_t event)
{
    if(event == LV_EVENT_VALUE_CHANGED) {
        printf("Value: %d\n", lv_slider_get_value(obj));
    }
}


void lv_ex_slider_1(void)
{
    /*Create styles*/
    static lv_style_t style_bg;
    static lv_style_t style_indic;
    static lv_style_t style_knob;

    lv_style_copy(&style_bg, &lv_style_pretty);
    style_bg.body.main_color =  LV_COLOR_BLACK;
    style_bg.body.grad_color =  LV_COLOR_GRAY;
    style_bg.body.radius = LV_RADIUS_CIRCLE;
    style_bg.body.border.color = LV_COLOR_WHITE;
```

(continues on next page)

(continued from previous page)

```
    lv_style_copy(&style_indic, &lv_style_pretty_color);
    style_indic.body.radius = LV_RADIUS_CIRCLE;
    style_indic.body.shadow.width = 8;
    style_indic.body.shadow.color = style_indic.body.main_color;
    style_indic.body.padding.left = 3;
    style_indic.body.padding.right = 3;
    style_indic.body.padding.top = 3;
    style_indic.body.padding.bottom = 3;

    lv_style_copy(&style_knob, &lv_style_pretty);
    style_knob.body.radius = LV_RADIUS_CIRCLE;
    style_knob.body.opa = LV_OPA_70;
    style_knob.body.padding.top = 10 ;
    style_knob.body.padding.bottom = 10 ;

    /*Create a slider*/
    lv_obj_t * slider = lv_slider_create(lv_scr_act(), NULL);
    lv_slider_set_style(slider, LV_SLIDER_STYLE_BG, &style_bg);
    lv_slider_set_style(slider, LV_SLIDER_STYLE_INDIC,&style_indic);
    lv_slider_set_style(slider, LV_SLIDER_STYLE_KNOB, &style_knob);
    lv_obj_align(slider, NULL, LV_ALIGN_CENTER, 0, 0);
    lv_obj_set_event_cb(slider, event_handler);
}
```

Set value with slider



code

```
/**
 * @file lv_ex_slider_2.c
 *
```

(continues on next page)

(continued from previous page)

```
 */

/*********************
 *      INCLUDES
 *********************/

#include "lvgl/lvgl.h"
#include <stdio.h>

/*********************
 *      DEFINES
 *********************/

/**********************
 *      TYPEDEFS
 **********************/

/**********************
 *  STATIC PROTOTYPES
 **********************/

static void slider_event_cb(lv_obj_t * slider, lv_event_t event);

/**********************
 *  STATIC VARIABLES
 **********************/

static lv_obj_t * slider_label;

/**********************
 *      MACROS
 **********************/

/**********************
 *   GLOBAL FUNCTIONS
 **********************/

void lv_ex_slider_2(void)
{
    /* Create a slider in the center of the display */
    lv_obj_t * slider = lv_slider_create(lv_scr_act(), NULL);
    lv_obj_set_width(slider, LV_DPI * 2);
    lv_obj_align(slider, NULL, LV_ALIGN_CENTER, 0, 0);
    lv_obj_set_event_cb(slider, slider_event_cb);
    lv_slider_set_range(slider, 0, 100);

    /* Create a label below the slider */
    slider_label = lv_label_create(lv_scr_act(), NULL);
    lv_label_set_text(slider_label, "0");
    lv_obj_set_auto_realign(slider_label, true);
    lv_obj_align(slider_label, slider, LV_ALIGN_OUT_BOTTOM_MID, 0, 10);

    /* Create an informative label */
    lv_obj_t * info = lv_label_create(lv_scr_act(), NULL);
    lv_label_set_text(info, "Welcome to the slider+label demo!\n"
                            "Move the slider and see that the label\n"
```

(continues on next page)

(continued from previous page)

```
                            "updates to match it.");
    lv_obj_align(info, NULL, LV_ALIGN_IN_TOP_LEFT, 10, 10);
}

/**********************
 *   STATIC FUNCTIONS
 **********************/

static void slider_event_cb(lv_obj_t * slider, lv_event_t event)
{
    if(event == LV_EVENT_VALUE_CHANGED) {
        static char buf[4]; /* max 3 bytes for number plus 1 null terminating byte */
        snprintf(buf, 4, "%u", lv_slider_get_value(slider));
        lv_label_set_text(slider_label, buf);
    }
}
```

MicroPython

Slider with custo mstyle

code

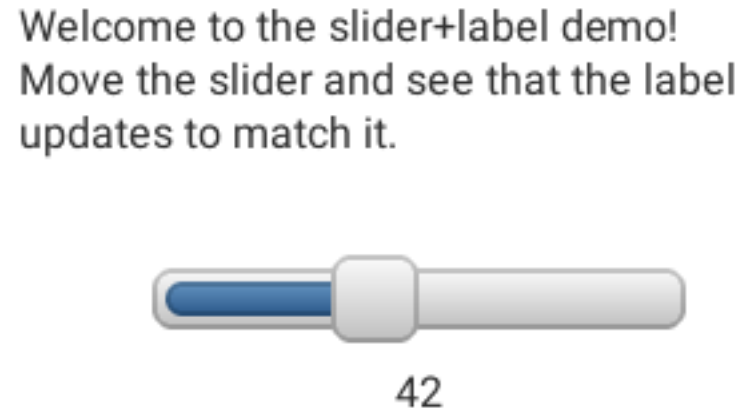
```
def event_handler(obj, event):
    if event == lv.EVENT.VALUE_CHANGED:
        print("Value: %d" % obj.get_value())

# Create styles
style_bg = lv.style_t()
style_indic = lv.style_t()
style_knob = lv.style_t()
```

(continues on next page)

(continued from previous page)

```
lv.style_copy(style_bg, lv.style_pretty)
style_bg.body.main_color =  lv.color_make(0,0,0)
style_bg.body.grad_color =  lv.color_make(0x80, 0x80, 0x80)
style_bg.body.radius = 800 # large enough to make a circle
style_bg.body.border.color = lv.color_make(0xff,0xff,0xff)

lv.style_copy(style_indic, lv.style_pretty_color)
style_indic.body.radius = 800
style_indic.body.shadow.width = 8
style_indic.body.shadow.color = style_indic.body.main_color
style_indic.body.padding.left = 3
style_indic.body.padding.right = 3
style_indic.body.padding.top = 3
style_indic.body.padding.bottom = 3

lv.style_copy(style_knob, lv.style_pretty)
style_knob.body.radius = 800
style_knob.body.opa = lv.OPA._70
style_knob.body.padding.top = 10
style_knob.body.padding.bottom = 10

# Create a slider
slider = lv.slider(lv.scr_act())
slider.set_style(lv.slider.STYLE.BG, style_bg)
slider.set_style(lv.slider.STYLE.INDIC, style_indic)
slider.set_style(lv.slider.STYLE.KNOB, style_knob)
slider.align(None, lv.ALIGN.CENTER, 0, 0)
slider.set_event_cb(event_handler)
```

Set value with slider



code

```
def slider_event_cb(slider, event):
    if event == lv.EVENT.VALUE_CHANGED:
        slider_label.set_text("%u" % slider.get_value())

# Create a slider in the center of the display
slider = lv.slider(lv.scr_act())
slider.set_width(200)
slider.align(None, lv.ALIGN.CENTER, 0, 0)
slider.set_event_cb(slider_event_cb)
slider.set_range(0, 100)

# Create a label below the slider
slider_label = lv.label(lv.scr_act())
slider_label.set_text("0")
slider_label.set_auto_realign(True)
slider_label.align(slider, lv.ALIGN.OUT_BOTTOM_MID, 0, 10)

# Create an informative label
info = lv.label(lv.scr_act())
info.set_text("""Welcome to the slider+label demo!
Move the slider and see that the label
updates to match it.""")
info.align(None, lv.ALIGN.IN_TOP_LEFT, 10, 10)
```

API

Typedefs

typedef uint8_t **lv_slider_style_t**

Enums

enum [anonymous]

Built-in styles of slider

Values:

LV_SLIDER_STYLE_BG

LV_SLIDER_STYLE_INDIC

Slider background style.

LV_SLIDER_STYLE_KNOB

Slider indicator (filled area) style.

Functions

lv_obj_t ***lv_slider_create**(*lv_obj_t* **par*, **const** *lv_obj_t* **copy*)

Create a slider objects

Return pointer to the created slider

Parameters

- `par`: pointer to an object, it will be the parent of the new slider

- `copy`: pointer to a slider object, if not NULL then the new object will be copied from it

static void **lv_slider_set_value**(*lv_obj_t* **slider*, int16_t *value*, *lv_anim_enable_t* *anim*)
Set a new value on the slider

Parameters

- `slider`: pointer to a slider object
- `value`: new value
- `anim`: LV_ANIM_ON: set the value with an animation; LV_ANIM_OFF: change the value immediately

static void **lv_slider_set_range**(*lv_obj_t* **slider*, int16_t *min*, int16_t *max*)
Set minimum and the maximum values of a bar

Parameters

- `slider`: pointer to the slider object
- `min`: minimum value
- `max`: maximum value

static void **lv_slider_set_anim_time**(*lv_obj_t* **slider*, uint16_t *anim_time*)
Make the slider symmetric to zero. The indicator will grow from zero instead of the minimum position.

Parameters

- `slider`: pointer to a slider object
- `en`: true: enable disable symmetric behavior; false: disable

static void **lv_slider_set_sym**(*lv_obj_t* **slider*, bool *en*)
Set the animation time of the slider

Parameters

- `slider`: pointer to a bar object
- `anim_time`: the animation time in milliseconds.

void **lv_slider_set_knob_in**(*lv_obj_t* **slider*, bool *in*)
Set the 'knob in' attribute of a slider

Parameters

- `slider`: pointer to slider object
- `in`: true: the knob is drawn always in the slider; false: the knob can be out on the edges

void **lv_slider_set_style**(*lv_obj_t* **slider*, *lv_slider_style_t* *type*, **const** lv_style_t **style*)
Set a style of a slider

Parameters

- `slider`: pointer to a slider object
- `type`: which style should be set
- `style`: pointer to a style

int16_t **lv_slider_get_value**(**const** *lv_obj_t* **slider*)
Get the value of a slider

Return the value of the slider

Parameters

- `slider`: pointer to a slider object

static int16_t **lv_slider_get_min_value**(**const** *lv_obj_t* **slider*)
Get the minimum value of a slider

Return the minimum value of the slider

Parameters

- `slider`: pointer to a slider object

static int16_t **lv_slider_get_max_value**(**const** *lv_obj_t* **slider*)
Get the maximum value of a slider

Return the maximum value of the slider

Parameters

- `slider`: pointer to a slider object

bool **lv_slider_is_dragged**(**const** *lv_obj_t* **slider*)
Give the slider is being dragged or not

Return true: drag in progress false: not dragged

Parameters

- `slider`: pointer to a slider object

static uint16_t **lv_slider_get_anim_time**(*lv_obj_t* **slider*)
Get the animation time of the slider

Return the animation time in milliseconds.

Parameters

- `slider`: pointer to a slider object

static bool **lv_slider_get_sym**(*lv_obj_t* **slider*)
Get whether the slider is symmetric or not.

Return true: symmetric is enabled; false: disable

Parameters

- `slider`: pointer to a bar object

bool **lv_slider_get_knob_in**(**const** *lv_obj_t* **slider*)
Get the 'knob in' attribute of a slider

Return true: the knob is drawn always in the slider; false: the knob can be out on the edges

Parameters

- `slider`: pointer to slider object

const lv_style_t ***lv_slider_get_style**(**const** *lv_obj_t* **slider*, *lv_slider_style_t type*)
Get a style of a slider

Return style pointer to a style

Parameters

- `slider`: pointer to a slider object
- `type`: which style should be get

struct lv_slider_ext_t

Public Members

lv_bar_ext_t **bar**

const lv_style_t ***style_knob**

int16_t **drag_value**

uint8_t **knob_in**

Spinbox (lv_spinbox)

Vue d' ensemble

The Spinbox contains a number as text which can be increased or decreased by *Keys* or API functions. The Spinbox is a modified *Text area*.

Set format

`lv_spinbox_set_digit_format(spinbox, digit_count, separator_position)` set the format of the number. `digit_count` sets the number of digits. Leading zeros are added to fill the space on the left. `separator_position` sets the number of digit before the decimal point. `0` means no decimal point.

`lv_spinbox_set_padding_left(spinbox, cnt)` add `cnt` "space" characters between the sign an the most left digit.

Value and ranges

`lv_spinbox_set_range(spinbox, min, max)` sets the range of the Spinbox.

`lv_spinbox_set_value(spinbox, num)` sets the Spinbox' s value manually.

`lv_spinbox_increment(spinbox)` and `lv_spinbox_decrement(spinbox)` increments/decrements the value of the Spinbox.

`lv_spinbox_set_step(spinbox, step)` sets the amount to increment decrement.

Style usage

The `lv_spinbox_set_style(roller, LV_SPINBOX_STYLE_..., &style)` set the styles of a Spinbox.

- **LV_SPINBOX_STYLE_BG** Style of the background. All `style.body` properties are used. `style.text` is used for label. Default: `lv_style_pretty`
- **LV_SPINBOX_STYLE_SB** Scrollbar' s style which uses all `style.body` properties. `padding.right/bottom` sets horizontal and vertical the scrollbars' padding respectively and the `padding.inner` sets the scrollbar' s width. (default: `lv_style_pretty_color`)
- **LV_SPINBOX_STYLE_CURSOR** Style of the cursor which uses all `style.body` properties including `padding` to make the cursor larger then the digits.

Events

Besides the Generic events the following Special events are sent by the Drop down lists:

- **LV_EVENT_VALUE_CHANGED** sent when the value has changed. (the value is set as event data as `int32_t`)
- **LV_EVENT_INSERT** sent by the ancestor Text area but shouldn't be used.

Learn more about *Events*.

Keys

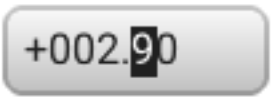
The following *Keys* are processed by the Buttons:

- **LV_KEY_LEFT/RIGHT** With *Keypad* move the cursor left/right. With *Encoder* decrement/increment the selected digit.
- **LY_KEY_ENTER** Apply the selected option (Send `LV_EVENT_VALUE_CHANGED` event and close the Drop down list)
- **LV_KEY_ENTER** With *Encoder* got the net digit. Jump to the first after the last.

Example

C

Simple Spinbox

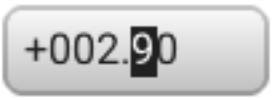


code

```c
#include "lvgl/lvgl.h"
#include <stdio.h>

static void event_handler(lv_obj_t * obj, lv_event_t event)
{
    if(event == LV_EVENT_VALUE_CHANGED) {
        printf("Value: %d\n", lv_spinbox_get_value(obj));
    }
    else if(event == LV_EVENT_CLICKED) {
        /*For simple test: Click the spinbox to increment its value*/
        lv_spinbox_increment(obj);
    }
}

void lv_ex_spinbox_1(void)
{
    lv_obj_t * spinbox;
    spinbox = lv_spinbox_create(lv_scr_act(), NULL);
    lv_spinbox_set_digit_format(spinbox, 5, 3);
    lv_spinbox_step_prev(spinbox);
    lv_obj_set_width(spinbox, 100);
    lv_obj_align(spinbox, NULL, LV_ALIGN_CENTER, 0, 0);
    lv_obj_set_event_cb(spinbox, event_handler);
}
```

MicroPython

Simple Spinbox



code

```
def event_handler(obj, event):
    if event == lv.EVENT.VALUE_CHANGED:
        print("Value: %d" % obj.get_value())
    elif event == lv.EVENT.CLICKED:
        # For simple test: Click the spinbox to increment its value
        obj.increment()

spinbox = lv.spinbox(lv.scr_act())
spinbox.set_digit_format(5, 3)
spinbox.step_prev()
spinbox.set_width(100)
spinbox.align(None, lv.ALIGN.CENTER, 0, 0)
spinbox.set_event_cb(event_handler)
```

API

Typedefs

typedef uint8_t **lv_spinbox_style_t**

Enums

enum [anonymous]

Values:

LV_SPINBOX_STYLE_BG

LV_SPINBOX_STYLE_SB

LV_SPINBOX_STYLE_CURSOR

Functions

lv_obj_t ***lv_spinbox_create**(*lv_obj_t* **par*, **const** *lv_obj_t* **copy*)

Create a spinbox objects

Return pointer to the created spinbox

Parameters

- `par`: pointer to an object, it will be the parent of the new spinbox
- `copy`: pointer to a spinbox object, if not NULL then the new object will be copied from it

static void **lv_spinbox_set_style**(*lv_obj_t* **spinbox*, *lv_spinbox_style_t* *type*, lv_style_t **style*)

Set a style of a spinbox.

Parameters

- `templ`: pointer to template object
- `type`: which style should be set
- `style`: pointer to a style

void **lv_spinbox_set_value**(*lv_obj_t* **spinbox*, int32_t *i*)

Set spinbox value

Parameters

- `spinbox`: pointer to spinbox
- `i`: value to be set

void **lv_spinbox_set_digit_format**(*lv_obj_t* **spinbox*, uint8_t *digit_count*, uint8_t *separator_position*)
Set spinbox digit format (digit count and decimal format)

Parameters

- `spinbox`: pointer to spinbox
- `digit_count`: number of digit excluding the decimal separator and the sign
- `separator_position`: number of digit before the decimal point. If 0, decimal point is not shown

void **lv_spinbox_set_step**(*lv_obj_t* **spinbox*, uint32_t *step*)
Set spinbox step

Parameters

- `spinbox`: pointer to spinbox
- `step`: steps on increment/decrement

void **lv_spinbox_set_range**(*lv_obj_t* **spinbox*, int32_t *range_min*, int32_t *range_max*)
Set spinbox value range

Parameters

- `spinbox`: pointer to spinbox
- `range_min`: maximum value, inclusive
- `range_max`: minimum value, inclusive

void **lv_spinbox_set_padding_left**(*lv_obj_t* **spinbox*, uint8_t *padding*)
Set spinbox left padding in digits count (added between sign and first digit)

Parameters

- `spinbox`: pointer to spinbox
- `cb`: Callback function called on value change event

static const lv_style_t ***lv_spinbox_get_style**(*lv_obj_t* **spinbox*, *lv_spinbox_style_t* *type*)
Get style of a spinbox.

Return style pointer to the style

Parameters

- `templ`: pointer to template object
- `type`: which style should be get

int32_t **lv_spinbox_get_value**(*lv_obj_t* **spinbox*)
Get the spinbox numeral value (user has to convert to float according to its digit format)

Return value integer value of the spinbox

Parameters

- `spinbox`: pointer to spinbox

void **lv_spinbox_step_next**(*lv_obj_t* **spinbox*)
Select next lower digit for edition by dividing the step by 10

Parameters

- `spinbox`: pointer to spinbox

void **lv_spinbox_step_prev**(*lv_obj_t* **spinbox*)
Select next higher digit for edition by multiplying the step by 10

Parameters

- `spinbox`: pointer to spinbox

void **lv_spinbox_increment**(*lv_obj_t* **spinbox*)
Increment spinbox value by one step

Parameters

- `spinbox`: pointer to spinbox

void **lv_spinbox_decrement**(*lv_obj_t* **spinbox*)
Decrement spinbox value by one step

Parameters

- `spinbox`: pointer to spinbox

struct lv_spinbox_ext_t

Public Members

lv_ta_ext_t **ta**

int32_t **value**

int32_t **range_max**

int32_t **range_min**

int32_t **step**

uint16_t **digit_count**

uint16_t **dec_point_pos**

uint16_t **digit_padding_left**

Example

Commutateur (lv_sw)

Vue d' ensemble

Le commutateur peut être utilisé pour activer/désactiver quelque chose. Il ressemble à un petit curseur.

Changer d'état

Pour changer l'état du commutateur

- Cliquer dessus,
- Le faire glisser,
- Utiliser les fonctions `lv_sw_on(sw, LV_ANIM_ON/OFF)`, `lv_sw_off(sw, LV_ANIM_ON/OFF)` ou `lv_sw_toggle(sw, LV_ANOM_ON/OFF)`.

Durée d'animation

La durée des animations quand le commutateur change d'état peut être ajusté avec `lv_sw_set_anim_time(sw, anim_time_ms)`.

Styles

Vous pouvez définir les styles du commutateur avec `lv_sw_set_style(sw, LV_SW_STYLE_..., &style)`.

- **LV_SW_STYLE_BG** style de l'arrière plan. Toutes les propriétés `style.body` sont utilisées. Les valeurs `padding` rendent le commutateur plus petit que le bouton (une valeur négative le rend plus grand).
- **LV_SW_STYLE_INDIC** style de l'indicateur. Toutes les propriétés `style.body` sont utilisées. Les valeurs `padding` rendent l'indicateur plus petit que l'arrière-plan.
- **LV_SW_STYLE_KNOB_OFF** style du bouton lorsque le commutateur est désactivé. Les propriétés `style.body` sont utilisées sauf `padding`.
- **LV_SW_STYLE_KNOB_ON** Style du bouton lorsque le commutateur est activé. Les propriétés `style.body` sont utilisées sauf `padding`.

Evénements

Outre les [événements génériques](/overview/event.html #evenements-generiques), les événements spéciaux suivants sont envoyés par les commutateurs :

- **LV_EVENT_VALUE_CHANGED** envoyé lorsque le commutateur change d'état.

Touches

- **LV_KEY_UP**, **LV_KEY_RIGHT** active le commutateur.
- **LV_KEY_DOWN**, **LV_KEY_LEFT** désactive le commutateur.

Apprenez-en plus sur les *touches*.

Exemple

C

Simple Switch

code

```
#include "lvgl/lvgl.h"
#include <stdio.h>

static void event_handler(lv_obj_t * obj, lv_event_t event)
{
    if(event == LV_EVENT_VALUE_CHANGED) {
        printf("State: %s\n", lv_sw_get_state(obj) ? "On" : "Off");
    }
}

void lv_ex_sw_1(void)
{
    /*Create styles for the switch*/
    static lv_style_t bg_style;
    static lv_style_t indic_style;
    static lv_style_t knob_on_style;
    static lv_style_t knob_off_style;

    lv_style_copy(&bg_style, &lv_style_pretty);
    bg_style.body.radius = LV_RADIUS_CIRCLE;
    bg_style.body.padding.top = 6;
    bg_style.body.padding.bottom = 6;

    lv_style_copy(&indic_style, &lv_style_pretty_color);
    indic_style.body.radius = LV_RADIUS_CIRCLE;
    indic_style.body.main_color = lv_color_hex(0x9fc8ef);
    indic_style.body.grad_color = lv_color_hex(0x9fc8ef);
    indic_style.body.padding.left = 0;
    indic_style.body.padding.right = 0;
    indic_style.body.padding.top = 0;
    indic_style.body.padding.bottom = 0;
```

(continues on next page)

(continued from previous page)

```
    lv_style_copy(&knob_off_style, &lv_style_pretty);
    knob_off_style.body.radius = LV_RADIUS_CIRCLE;
    knob_off_style.body.shadow.width = 4;
    knob_off_style.body.shadow.type = LV_SHADOW_BOTTOM;

    lv_style_copy(&knob_on_style, &lv_style_pretty_color);
    knob_on_style.body.radius = LV_RADIUS_CIRCLE;
    knob_on_style.body.shadow.width = 4;
    knob_on_style.body.shadow.type = LV_SHADOW_BOTTOM;

    /*Create a switch and apply the styles*/
    lv_obj_t *sw1 = lv_sw_create(lv_scr_act(), NULL);
    lv_sw_set_style(sw1, LV_SW_STYLE_BG, &bg_style);
    lv_sw_set_style(sw1, LV_SW_STYLE_INDIC, &indic_style);
    lv_sw_set_style(sw1, LV_SW_STYLE_KNOB_ON, &knob_on_style);
    lv_sw_set_style(sw1, LV_SW_STYLE_KNOB_OFF, &knob_off_style);
    lv_obj_align(sw1, NULL, LV_ALIGN_CENTER, 0, -50);
    lv_obj_set_event_cb(sw1, event_handler);

    /*Copy the first switch and turn it ON*/
    lv_obj_t *sw2 = lv_sw_create(lv_scr_act(), sw1);
    lv_sw_on(sw2, LV_ANIM_ON);
    lv_obj_align(sw2, NULL, LV_ALIGN_CENTER, 0, 50);
}
```

MicroPython

Simple Switch

code

```
def event_handler(obj, event):
    if event == lv.EVENT.VALUE_CHANGED:
        print("State: %s" % ("On" if obj.get_state() else "Off"))

# Create styles for the switch
bg_style = lv.style_t()
indic_style = lv.style_t()
knob_on_style = lv.style_t()
knob_off_style = lv.style_t()

lv.style_copy(bg_style, lv.style_pretty)
bg_style.body.radius = 800
bg_style.body.padding.top = 6
bg_style.body.padding.bottom = 6

lv.style_copy(indic_style, lv.style_pretty_color)
indic_style.body.radius = 800
indic_style.body.main_color = lv.color_hex(0x9fc8ef)
indic_style.body.grad_color = lv.color_hex(0x9fc8ef)
indic_style.body.padding.left = 0
indic_style.body.padding.right = 0
indic_style.body.padding.top = 0
indic_style.body.padding.bottom = 0

lv.style_copy(knob_off_style, lv.style_pretty)
knob_off_style.body.radius = 800
knob_off_style.body.shadow.width = 4
knob_off_style.body.shadow.type = lv.SHADOW.BOTTOM

lv.style_copy(knob_on_style, lv.style_pretty_color)
knob_on_style.body.radius = 800
knob_on_style.body.shadow.width = 4
knob_on_style.body.shadow.type = lv.SHADOW.BOTTOM

# Create a switch and apply the styles
sw1 = lv.sw(lv.scr_act())
sw1.set_style(lv.sw.STYLE.BG, bg_style)
sw1.set_style(lv.sw.STYLE.INDIC, indic_style)
sw1.set_style(lv.sw.STYLE.KNOB_ON, knob_on_style)
sw1.set_style(lv.sw.STYLE.KNOB_OFF, knob_off_style)
sw1.align(None, lv.ALIGN.CENTER, 0, -50)
sw1.set_event_cb(event_handler)

# Copy the first switch and turn it ON
sw2 = lv.sw(lv.scr_act(), sw1)
sw2.on(lv.ANIM.ON)
sw2.align(None, lv.ALIGN.CENTER, 0, 50)
sw2.set_event_cb(lambda o,e: None)
```

API

Typedefs

typedef uint8_t **lv_sw_style_t**

Enums

enum [anonymous]
Switch styles.

Values:

LV_SW_STYLE_BG
Switch background.

LV_SW_STYLE_INDIC
Switch fill area.

LV_SW_STYLE_KNOB_OFF
Switch knob (when off).

LV_SW_STYLE_KNOB_ON
Switch knob (when on).

Functions

lv_obj_t ***lv_sw_create**(*lv_obj_t* **par*, **const** *lv_obj_t* **copy*)
Create a switch objects

Return pointer to the created switch

Parameters

- `par`: pointer to an object, it will be the parent of the new switch
- `copy`: pointer to a switch object, if not NULL then the new object will be copied from it

void **lv_sw_on**(*lv_obj_t* **sw*, *lv_anim_enable_t* *anim*)
Turn ON the switch

Parameters

- `sw`: pointer to a switch object
- `anim`: LV_ANIM_ON: set the value with an animation; LV_ANIM_OFF: change the value immediately

void **lv_sw_off**(*lv_obj_t* **sw*, *lv_anim_enable_t* *anim*)
Turn OFF the switch

Parameters

- `sw`: pointer to a switch object
- `anim`: LV_ANIM_ON: set the value with an animation; LV_ANIM_OFF: change the value immediately

bool **lv_sw_toggle**(*lv_obj_t* **sw*, *lv_anim_enable_t* *anim*)
Toggle the position of the switch

Return resulting state of the switch.

Parameters

- `sw`: pointer to a switch object
- `anim`: LV_ANIM_ON: set the value with an animation; LV_ANIM_OFF: change the value immediately

void **lv_sw_set_style**(*lv_obj_t* *sw, *lv_sw_style_t* type, **const** lv_style_t *style)
Set a style of a switch

Parameters

- sw: pointer to a switch object
- type: which style should be set
- style: pointer to a style

void **lv_sw_set_anim_time**(*lv_obj_t* *sw, uint16_t anim_time)
Set the animation time of the switch

Return style pointer to a style

Parameters

- sw: pointer to a switch object
- anim_time: animation time

static bool **lv_sw_get_state**(**const** *lv_obj_t* *sw)
Get the state of a switch

Return false: OFF; true: ON

Parameters

- sw: pointer to a switch object

const lv_style_t ***lv_sw_get_style**(**const** *lv_obj_t* *sw, *lv_sw_style_t* type)
Get a style of a switch

Return style pointer to a style

Parameters

- sw: pointer to a switch object
- type: which style should be get

uint16_t **lv_sw_get_anim_time**(**const** *lv_obj_t* *sw)
Get the animation time of the switch

Return style pointer to a style

Parameters

- sw: pointer to a switch object

struct lv_sw_ext_t

Public Members

lv_slider_ext_t **slider**

const lv_style_t ***style_knob_off**
Style of the knob when the switch is OFF

const lv_style_t ***style_knob_on**
Style of the knob when the switch is ON (NULL to use the same as OFF)

lv_coord_t **start_x**

uint8_t **changed**

uint8_t **slided**

uint16_t **anim_time**

Table (lv_table)

Vue d' ensemble

Comme d' habitude, les tables sont construites à partir de lignes, de colonnes et de cellules contenant des textes.

L' objet table est très léger, car seuls les textes sont enregistrés. Aucun objet réel n' est créé pour les cellules, elles sont simplement dessinées à la volée.

Llignes et colonnes

Pour définir le nombre de lignes et de colonnes, utilisez `lv_table_set_row_cnt(table, row_cnt)` et `lv_table_set_col_cnt(table, col_cnt)`.

Largeur et hauteur

La largeur des colonnes peut être définie avec `lv_table_set_col_width(table, col_id, width)`. La largeur totale de l' objet table sera définie par la somme des largeurs des colonnes.

La hauteur est calculée automatiquement à partir des styles des cellule (police, marges, etc.) et du nombre de lignes.

Définir la valeur de la cellule

Les cellules peuvent enregistrer uniquement du texte, il est donc nécessaire de convertir les nombres en texte avant de les afficher dans une table.

`lv_table_set_cell_value(table, row, col, "Content")`. Le texte est sauvegardé par la table et peut donc être une variable locale.

Le saut de ligne peut être utilisé dans le texte comme `"Value\n60.3"`.

Alignement

L' alignement du texte dans les cellules peut être ajusté individuellement avec `lv_table_set_cell_align(table, row, col, LV_LABEL_ALIGN_LEFT/CENTER/RIGHT)`.

Type de cellule

Vous pouvez utiliser 4 types de cellules différents. Chacun a son propre style.

Les types de cellules peuvent être utilisés pour ajouter un style différent, par exemple pour :

- en-tête de table
- première colonne

- mise en évidence d' une cellule
- etc

Le type peut être sélectionné avec `lv_table_set_cell_type(table, row, col, type)` `type` peut être 1, 2, 3 ou 4.

Fusionner des cellules

Les cellules peuvent être fusionnées horizontalement avec `lv_table_set_cell_merge_right(table, col, row, true)`. Pour fusionner davantage de cellules adjacentes, appliquez cette fonction à chaque cellule.

Crop text

Par défaut, des retours à la ligne sont insérés pour permettre aux texte de s' inscrire dans la largeur de la cellule, et la hauteur de la cellule est définie automatiquement. Pour désactiver ce comportement et conserver le texte tel qu' il est, activez `lv_table_set_cell_crop(table, row, col, true)`.

Défilement

Pour pouvoir faire défiler la table, placez-la sur une *page*

Styles

Utilisez `lv_table_set_style(table, lv_table_set_style..., &style)` pour définir un nouveau style pour un élément de la table :

- **LV_PAGE_STYLE_BG** style de l' arrière-plan qui utilise toutes les propriétés `style.body` (valeur par défaut : `lv_style_plain_color`).
- **LV_PAGE_STYLE_CELL1/2/3/4** 4 styles pour les 4 types de cellules. Toutes les propriétés `style.body` sont utilisées. (valeur par défaut : `lv_style_plain`).

Evénements

Seuls les événements génériques sont envoyés par ce type d' objet.

Apprenez-en plus sur les *événements*.

Touches

Aucune *touche* n' est traitée par ce type d' objet.

Apprenez-en plus sur les *touches*.

Exemple

C

Simple table

Name	Price
Apple	$7
Banana	$4
Citron	$6

code

```
#include "lvgl/lvgl.h"

void lv_ex_table_1(void)
{
    /*Create a normal cell style*/
    static lv_style_t style_cell1;
    lv_style_copy(&style_cell1, &lv_style_plain);
    style_cell1.body.border.width = 1;
    style_cell1.body.border.color = LV_COLOR_BLACK;

    /*Crealte a header cell style*/
    static lv_style_t style_cell2;
    lv_style_copy(&style_cell2, &lv_style_plain);
    style_cell2.body.border.width = 1;
    style_cell2.body.border.color = LV_COLOR_BLACK;
    style_cell2.body.main_color = LV_COLOR_SILVER;
    style_cell2.body.grad_color = LV_COLOR_SILVER;

    lv_obj_t * table = lv_table_create(lv_scr_act(), NULL);
    lv_table_set_style(table, LV_TABLE_STYLE_CELL1, &style_cell1);
    lv_table_set_style(table, LV_TABLE_STYLE_CELL2, &style_cell2);
    lv_table_set_style(table, LV_TABLE_STYLE_BG, &lv_style_transp_tight);
    lv_table_set_col_cnt(table, 2);
    lv_table_set_row_cnt(table, 4);
    lv_obj_align(table, NULL, LV_ALIGN_CENTER, 0, 0);
```

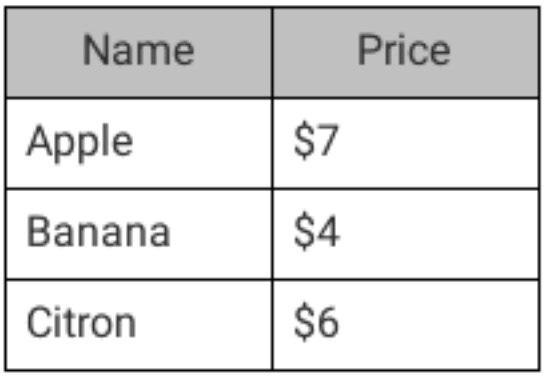
(continues on next page)

(continued from previous page)

```
    /*Make the cells of the first row center aligned */
    lv_table_set_cell_align(table, 0, 0, LV_LABEL_ALIGN_CENTER);
    lv_table_set_cell_align(table, 0, 1, LV_LABEL_ALIGN_CENTER);

    /*Make the cells of the first row TYPE = 2 (use `style_cell2`) */
    lv_table_set_cell_type(table, 0, 0, 2);
    lv_table_set_cell_type(table, 0, 1, 2);

    /*Fill the first column*/
    lv_table_set_cell_value(table, 0, 0, "Name");
    lv_table_set_cell_value(table, 1, 0, "Apple");
    lv_table_set_cell_value(table, 2, 0, "Banana");
    lv_table_set_cell_value(table, 3, 0, "Citron");

    /*Fill the second column*/
    lv_table_set_cell_value(table, 0, 1, "Price");
    lv_table_set_cell_value(table, 1, 1, "$7");
    lv_table_set_cell_value(table, 2, 1, "$4");
    lv_table_set_cell_value(table, 3, 1, "$6");
}
```

MicroPython

Simple table



Name	Price
Apple	$7
Banana	$4
Citron	$6

code

```
# Create a normal cell style
style_cell1 = lv.style_t()
lv.style_copy(style_cell1, lv.style_plain)
```

(continues on next page)

(continued from previous page)

```
style_cell1.body.border.width = 1
style_cell1.body.border.color = lv.color_make(0,0,0)

# Crealte a header cell style
style_cell2 = lv.style_t()
lv.style_copy(style_cell2, lv.style_plain)
style_cell2.body.border.width = 1
style_cell2.body.border.color = lv.color_make(0,0,0)
style_cell2.body.main_color = lv.color_make(0xC0, 0xC0, 0xC0)
style_cell2.body.grad_color = lv.color_make(0xC0, 0xC0, 0xC0)

table = lv.table(lv.scr_act())
table.set_style(lv.table.STYLE.CELL1, style_cell1)
table.set_style(lv.table.STYLE.CELL2, style_cell2)
table.set_style(lv.table.STYLE.BG, lv.style_transp_tight)
table.set_col_cnt(2)
table.set_row_cnt(4)
table.align(None, lv.ALIGN.CENTER, 0, 0)

# Make the cells of the first row center aligned
table.set_cell_align(0, 0, lv.label.ALIGN.CENTER)
table.set_cell_align(0, 1, lv.label.ALIGN.CENTER)

# Make the cells of the first row TYPE = 2 (use `style_cell2`)
table.set_cell_type(0, 0, 2)
table.set_cell_type(0, 1, 2)

# Fill the first column
table.set_cell_value(0, 0, "Name")
table.set_cell_value(1, 0, "Apple")
table.set_cell_value(2, 0, "Banana")
table.set_cell_value(3, 0, "Citron")

# Fill the second column
table.set_cell_value(0, 1, "Price")
table.set_cell_value(1, 1, "$7")
table.set_cell_value(2, 1, "$4")
table.set_cell_value(3, 1, "$6")
```

MicroPython

Pas encore d' exemple.

API

Typedefs

typedef uint8_t **lv_table_style_t**

Enums

enum [anonymous]

Values:

LV_TABLE_STYLE_BG

LV_TABLE_STYLE_CELL1

LV_TABLE_STYLE_CELL2

LV_TABLE_STYLE_CELL3

LV_TABLE_STYLE_CELL4

Functions

lv_obj_t ***lv_table_create**(*lv_obj_t *par*, **const** *lv_obj_t *copy*)
Create a table object

Return pointer to the created table

Parameters

- `par`: pointer to an object, it will be the parent of the new table
- `copy`: pointer to a table object, if not NULL then the new object will be copied from it

void **lv_table_set_cell_value**(*lv_obj_t *table*, uint16_t *row*, uint16_t *col*, **const** char *txt*)
Set the value of a cell.

Parameters

- `table`: pointer to a Table object
- `row`: id of the row [0 .. row_cnt -1]
- `col`: id of the column [0 .. col_cnt -1]
- `txt`: text to display in the cell. It will be copied and saved so this variable is not required after this function call.

void **lv_table_set_row_cnt**(*lv_obj_t *table*, uint16_t *row_cnt*)
Set the number of rows

Parameters

- `table`: table pointer to a Table object
- `row_cnt`: number of rows

void **lv_table_set_col_cnt**(*lv_obj_t *table*, uint16_t *col_cnt*)
Set the number of columns

Parameters

- `table`: table pointer to a Table object
- `col_cnt`: number of columns. Must be < LV_TABLE_COL_MAX

void **lv_table_set_col_width**(*lv_obj_t *table*, uint16_t *col_id*, lv_coord_t *w*)
Set the width of a column

Parameters

- `table`: table pointer to a Table object
- `col_id`: id of the column [0 .. LV_TABLE_COL_MAX -1]
- `w`: width of the column

void **lv_table_set_cell_align**(*lv_obj_t* *table, uint16_t *row*, uint16_t *col*, *lv_label_align_t* *align*)

Set the text align in a cell

Parameters

- `table`: pointer to a Table object
- `row`: id of the row [0 .. row_cnt -1]
- `col`: id of the column [0 .. col_cnt -1]
- `align`: LV_LABEL_ALIGN_LEFT or LV_LABEL_ALIGN_CENTER or LV_LABEL_ALIGN_RIGHT

void **lv_table_set_cell_type**(*lv_obj_t* *table, uint16_t *row*, uint16_t *col*, uint8_t *type*)

Set the type of a cell.

Parameters

- `table`: pointer to a Table object
- `row`: id of the row [0 .. row_cnt -1]
- `col`: id of the column [0 .. col_cnt -1]
- `type`: 1,2,3 or 4. The cell style will be chosen accordingly.

void **lv_table_set_cell_crop**(*lv_obj_t* *table, uint16_t *row*, uint16_t *col*, bool *crop*)

Set the cell crop. (Don't adjust the height of the cell according to its content)

Parameters

- `table`: pointer to a Table object
- `row`: id of the row [0 .. row_cnt -1]
- `col`: id of the column [0 .. col_cnt -1]
- `crop`: true: crop the cell content; false: set the cell height to the content.

void **lv_table_set_cell_merge_right**(*lv_obj_t* *table, uint16_t *row*, uint16_t *col*, bool *en*)

Merge a cell with the right neighbor. The value of the cell to the right won't be displayed.

Parameters

- `table`: table pointer to a Table object
- `row`: id of the row [0 .. row_cnt -1]
- `col`: id of the column [0 .. col_cnt -1]
- `en`: true: merge right; false: don't merge right

void **lv_table_set_style**(*lv_obj_t* *table, *lv_table_style_t* *type*, **const** lv_style_t *style)

Set a style of a table.

Parameters

- `table`: pointer to table object
- `type`: which style should be set
- `style`: pointer to a style

const char ***lv_table_get_cell_value**(*lv_obj_t* *table, uint16_t *row*, uint16_t *col*)

Get the value of a cell.

Return text in the cell

Parameters

- `table`: pointer to a Table object
- `row`: id of the row [0 .. row_cnt -1]
- `col`: id of the column [0 .. col_cnt -1]

uint16_t **lv_table_get_row_cnt**(*lv_obj_t* *table)
Get the number of rows.

Return number of rows.

Parameters

- `table`: table pointer to a Table object

uint16_t **lv_table_get_col_cnt**(*lv_obj_t* *table)
Get the number of columns.

Return number of columns.

Parameters

- `table`: table pointer to a Table object

lv_coord_t **lv_table_get_col_width**(*lv_obj_t* *table, uint16_t *col_id*)
Get the width of a column

Return width of the column

Parameters

- `table`: table pointer to a Table object
- `col_id`: id of the column [0 .. LV_TABLE_COL_MAX -1]

lv_label_align_t **lv_table_get_cell_align**(*lv_obj_t* *table, uint16_t *row*, uint16_t *col*)
Get the text align of a cell

Return LV_LABEL_ALIGN_LEFT (default in case of error) or LV_LABEL_ALIGN_CENTER or LV_LABEL_ALIGN_RIGHT

Parameters

- `table`: pointer to a Table object
- `row`: id of the row [0 .. row_cnt -1]
- `col`: id of the column [0 .. col_cnt -1]

lv_label_align_t **lv_table_get_cell_type**(*lv_obj_t* *table, uint16_t *row*, uint16_t *col*)
Get the type of a cell

Return 1,2,3 or 4

Parameters

- `table`: pointer to a Table object
- `row`: id of the row [0 .. row_cnt -1]
- `col`: id of the column [0 .. col_cnt -1]

lv_label_align_t **lv_table_get_cell_crop**(*lv_obj_t* *table, uint16_t *row*, uint16_t *col*)
Get the crop property of a cell

Return true: text crop enabled; false: disabled

Parameters

- `table`: pointer to a Table object
- `row`: id of the row [0 .. row_cnt -1]
- `col`: id of the column [0 .. col_cnt -1]

bool **lv_table_get_cell_merge_right**(*lv_obj_t* *table, uint16_t *row*, uint16_t *col*)
Get the cell merge attribute.

Return true: merge right; false: don't merge right

Parameters

- `table`: table pointer to a Table object
- `row`: id of the row [0 .. row_cnt -1]
- `col`: id of the column [0 .. col_cnt -1]

const lv_style_t ***lv_table_get_style**(**const** *lv_obj_t* *table, *lv_table_style_t* *type*)
Get style of a table.

Return style pointer to the style

Parameters

- `table`: pointer to table object
- `type`: which style should be get

union lv_table_cell_format_t
#include <lv_table.h> Internal table cell format structure.

Use the `lv_table` APIs instead.

Public Members

uint8_t **align**

uint8_t **right_merge**

uint8_t **type**

uint8_t **crop**

struct *lv_table_cell_format_t*::[**anonymous**] **s**

uint8_t **format_byte**

struct lv_table_ext_t

Public Members

uint16_t **col_cnt**

uint16_t **row_cnt**

char ****cell_data**

const lv_style_t ***cell_style**[**LV_TABLE_CELL_STYLE_CNT**]

lv_coord_t **col_w**[**LV_TABLE_COL_MAX**]

Classeur d' onglets (lv_tabview)

Vue d' ensemble

L' objet classeur d' onglets peut être utilisé pour organiser du contenu dans des onglets.

Ajouter un onglet

Vous pouvez ajouter de nouveaux onglets avec `lv_tabview_add_tab(tabview, "Tab name")`. La fonction retourneun pointeur sur un objet *page* dans lequel vous pouvez ajouter le contenu de l' onglet.

Changer d' onglet

Pour sélectionner un nouvel onglet, vous pouvez :

- Cliquer dessus dans la partie en-tête
- Glisser horizontalement
- Utiliser la fonction `lv_tabview_set_tab_act(tabview, id, LV_ANIM_ON/OFF)`

Le glissement manuel peut être désactivé avec `lv_tabview_set_sliding(tabview, false)`.

Position des boutons d' onglet

Par défaut, les boutons de sélection des onglets sont placés en haut du classeur d' onglets. Cela peut être changé avec `lv_tabview_set_btns_pos(tabview, LV_TABVIEW_BTNS_POS_TOP/BOTTOM/LEFT/RIGHT)`

Notez que vous ne pouvez pas modifier la position de haut ou bas vers gauche ou droite lorsque des onglets sont déjà ajoutés.

Cacher des onglets

Les boutons peuvent être cachés par `lv_tabview_set_btns_hidden(tabview, true)`

Durée d' animation

La durée d'animation est ajustée par `lv_tabview_set_anim_time(tabview, anim_time_ms)`. Cela est utilisé lorsque le nouvel onglet est affiché.

Styles

Utilisez `lv_tabview_set_style(tabview, LV_TABVIEW_STYLE_..., &style)` pour définir un nouveau style pour un élément du classeur d' onglets :

- **LV_TABVIEW_STYLE_BG** arrière-plan principal qui utilise toutes les propriétés `style.body` (valeur par défaut : `lv_style_plain`).

- **LV_TABVIEW_STYLE_INDIC** un fin rectangle pour indiquer l'onglet courant. Utilise toutes les propriétés `style.body`. Sa hauteur provient de `body.padding.inner` (valeur par défaut: `lv_style_plain_color`).
- **LV_TABVIEW_STYLE_BTN_BG** style de l'arrière-plan des boutons d'onglets. Utilise toutes les propriétés `style.body`. La hauteur de l'en-tête sera définie automatiquement en fonction de `body.padding.top/bottom` (valeur par défaut : `lv_style_transp`).
- **LV_TABVIEW_STYLE_BTN_REL** style des boutons d'onglets relâchés. Utilise toutes les propriétés `style.body` (valeur par défaut : `lv_style_tbn_rel`).
- **LV_TABVIEW_STYLE_BTN_PR** style des boutons d'onglets pressés. Utilise toutes les propriétés `style.body` (valeur par défaut : `lv_style_tbn_pr`).
- **LV_TABVIEW_STYLE_BTN_TGL_REL** style des boutons d'onglets sélectionnés relâchés. Utilise toutes les propriétés `style.body` (valeur par défaut : `lv_style_tbn_tgl_rel`).
- **LV_TABVIEW_STYLE_BTN_TGL_PR** style des boutons d'onglets sélectionnés pressés. Utilise toutes les propriétés `style.body` (valeur par défaut : `lv_style_tbn_tgl_pr`).

La hauteur de l'en-tête est calculée ainsi : *font height + padding.top + padding.bottom à partir de LV_TABVIEW_STYLE_BTN_REL + padding.top + padding bottom à partir de LV_TABVIEW_STYLE_BTN_BG*

Evénements

Outre les [événements génériques](/overview/event.html #evenements-generiques), les événements spéciaux suivants sont envoyés par le classeur d'onglets :

- **LV_EVENT_VALUE_CHANGED** envoyé lorsque un nouvel onglet est sélectionné par glissé ou clic sur le bouton d'onglet.

Apprenez-en plus sur les *événements*.

Touches

Les *touches* suivantes sont traitées par le classeur d'onglets :

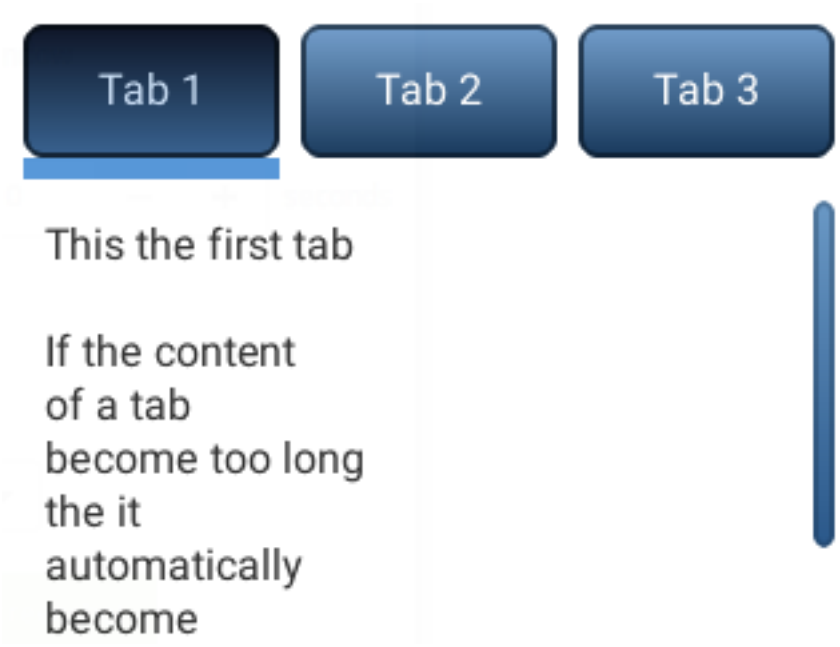
- **LV_KEY_RIGHT/LEFT** sélectionne un onglet.
- **LV_KEY_ENTER** passe à l'onglet sélectionné

Apprenez-en plus sur les *touches*.

Exemple

C

Simple Tabview

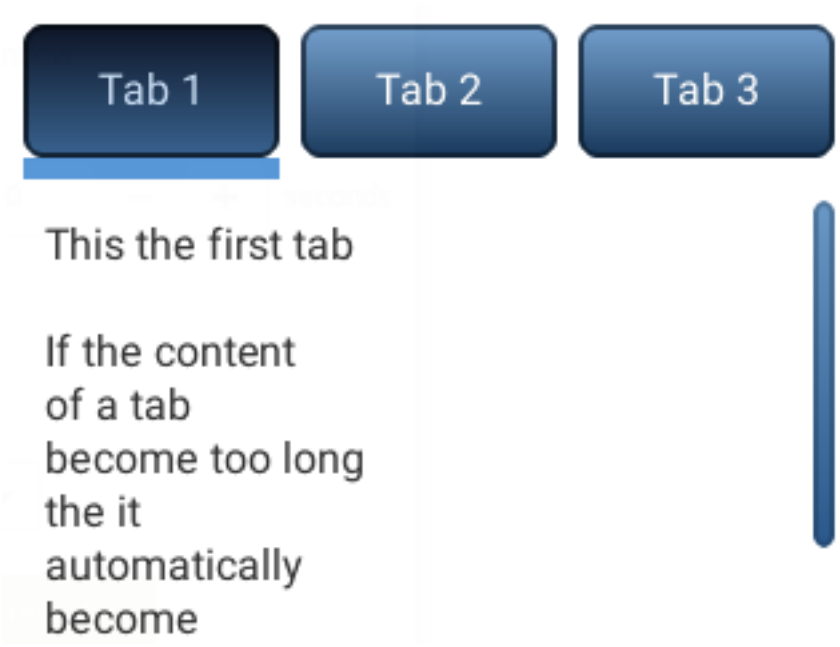


code

```
#include "lvgl/lvgl.h"

void lv_ex_tabview_1(void)
{
    /*Create a Tab view object*/
    lv_obj_t *tabview;
    tabview = lv_tabview_create(lv_scr_act(), NULL);

    /*Add 3 tabs (the tabs are page (lv_page) and can be scrolled*/
    lv_obj_t *tab1 = lv_tabview_add_tab(tabview, "Tab 1");
    lv_obj_t *tab2 = lv_tabview_add_tab(tabview, "Tab 2");
    lv_obj_t *tab3 = lv_tabview_add_tab(tabview, "Tab 3");


    /*Add content to the tabs*/
    lv_obj_t * label = lv_label_create(tab1, NULL);
    lv_label_set_text(label, "This the first tab\n\n"
                             "If the content\n"
                             "of a tab\n"
                             "become too long\n"
                             "the it \n"
                             "automatically\n"
                             "become\n"
                             "scrollable.");

    label = lv_label_create(tab2, NULL);
    lv_label_set_text(label, "Second tab");

    label = lv_label_create(tab3, NULL);
    lv_label_set_text(label, "Third tab");
}
```

MicroPython

Simple Tabview



code

```
# Create a Tab view object
tabview = lv.tabview(lv.scr_act())

# Add 3 tabs (the tabs are page (lv_page) and can be scrolled
tab1 = tabview.add_tab("Tab 1")
tab2 = tabview.add_tab("Tab 2")
tab3 = tabview.add_tab("Tab 3")

# Add content to the tabs
label = lv.label(tab1)
label.set_text("""This the first tab

If the content
of a tab
become too long
the it
automatically
become
scrollable.""")

label = lv.label(tab2)
label.set_text("Second tab")

label = lv.label(tab3)
label.set_text("Third tab")
```

API

Typedefs

typedef uint8_t **lv_tabview_btns_pos_t**

typedef uint8_t **lv_tabview_style_t**

Enums

enum [anonymous]
Position of tabview buttons.

Values:

LV_TABVIEW_BTNS_POS_TOP

LV_TABVIEW_BTNS_POS_BOTTOM

LV_TABVIEW_BTNS_POS_LEFT

LV_TABVIEW_BTNS_POS_RIGHT

enum [anonymous]
Values:

LV_TABVIEW_STYLE_BG

LV_TABVIEW_STYLE_INDIC

LV_TABVIEW_STYLE_BTN_BG

LV_TABVIEW_STYLE_BTN_REL

LV_TABVIEW_STYLE_BTN_PR

LV_TABVIEW_STYLE_BTN_TGL_REL

LV_TABVIEW_STYLE_BTN_TGL_PR

Functions

lv_obj_t ***lv_tabview_create**(*lv_obj_t* **par*, **const** *lv_obj_t* **copy*)
Create a Tab view object

Return pointer to the created tab

Parameters

- `par`: pointer to an object, it will be the parent of the new tab
- `copy`: pointer to a tab object, if not NULL then the new object will be copied from it

void **lv_tabview_clean**(*lv_obj_t* **tabview*)
Delete all children of the scrl object, without deleting scrl child.

Parameters

- `tabview`: pointer to an object

lv_obj_t ***lv_tabview_add_tab**(*lv_obj_t* **tabview*, **const** char **name*)
Add a new tab with the given name

Return pointer to the created page object (lv_page). You can create your content here

Parameters

- `tabview`: pointer to Tab view object where to ass the new tab
- `name`: the text on the tab button

void **lv_tabview_set_tab_act**(*lv_obj_t* *tabview, uint16_t *id*, *lv_anim_enable_t* *anim*)
Set a new tab

Parameters

- `tabview`: pointer to Tab view object
- `id`: index of a tab to load
- `anim`: LV_ANIM_ON: set the value with an animation; LV_ANIM_OFF: change the value immediately

void **lv_tabview_set_sliding**(*lv_obj_t* *tabview, bool *en*)
Enable horizontal sliding with touch pad

Parameters

- `tabview`: pointer to Tab view object
- `en`: true: enable sliding; false: disable sliding

void **lv_tabview_set_anim_time**(*lv_obj_t* *tabview, uint16_t *anim_time*)
Set the animation time of tab view when a new tab is loaded

Parameters

- `tabview`: pointer to Tab view object
- `anim_time`: time of animation in milliseconds

void **lv_tabview_set_style**(*lv_obj_t* *tabview, *lv_tabview_style_t* *type*, **const** lv_style_t *style)
Set the style of a tab view

Parameters

- `tabview`: pointer to a tan view object
- `type`: which style should be set
- `style`: pointer to the new style

void **lv_tabview_set_btns_pos**(*lv_obj_t* *tabview, *lv_tabview_btns_pos_t* *btns_pos*)
Set the position of tab select buttons

Parameters

- `tabview`: pointer to a tab view object
- `btns_pos`: which button position

void **lv_tabview_set_btns_hidden**(*lv_obj_t* *tabview, bool *en*)
Set whether tab buttons are hidden

Parameters

- `tabview`: pointer to a tab view object
- `en`: whether tab buttons are hidden

uint16_t **lv_tabview_get_tab_act**(**const** *lv_obj_t* *tabview)
Get the index of the currently active tab

Return the active tab index

Parameters

- `tabview`: pointer to Tab view object

uint16_t **lv_tabview_get_tab_count(const** *lv_obj_t* ***tabview)**
Get the number of tabs

Return tab count

Parameters

- `tabview`: pointer to Tab view object

lv_obj_t ***lv_tabview_get_tab(const** *lv_obj_t* ***tabview**, uint16_t *id)**
Get the page (content area) of a tab

Return pointer to page (lv_page) object

Parameters

- `tabview`: pointer to Tab view object
- `id`: index of the tab (>= 0)

bool **lv_tabview_get_sliding(const** *lv_obj_t* ***tabview)**
Get horizontal sliding is enabled or not

Return true: enable sliding; false: disable sliding

Parameters

- `tabview`: pointer to Tab view object

uint16_t **lv_tabview_get_anim_time(const** *lv_obj_t* ***tabview)**
Get the animation time of tab view when a new tab is loaded

Return time of animation in milliseconds

Parameters

- `tabview`: pointer to Tab view object

const lv_style_t ***lv_tabview_get_style(const** *lv_obj_t* ***tabview**, *lv_tabview_style_t* *type)**
Get a style of a tab view

Return style pointer to a style

Parameters

- `tabview`: pointer to a ab view object
- `type`: which style should be get

lv_tabview_btns_pos_t **lv_tabview_get_btns_pos(const** *lv_obj_t* ***tabview)**
Get position of tab select buttons

Parameters

- `tabview`: pointer to a ab view object

bool **lv_tabview_get_btns_hidden(const** *lv_obj_t* ***tabview)**
Get whether tab buttons are hidden

Return whether tab buttons are hidden

Parameters

- `tabview`: pointer to a tab view object

struct lv_tabview_ext_t

Public Members

lv_obj_t ***btns**

lv_obj_t ***indic**

lv_obj_t ***content**

const char ****tab_name_ptr**

lv_point_t **point_last**

uint16_t **tab_cur**

uint16_t **tab_cnt**

uint16_t **anim_time**

uint8_t **slide_enable**

uint8_t **draging**

uint8_t **drag_hor**

uint8_t **scroll_ver**

uint8_t **btns_hide**

lv_tabview_btns_pos_t **btns_pos**

Zone de texte (lv_ta)

Vue d' ensemble

The Text Area is a *Page* with a *Label* and a cursor on it. Texts or characters can be added to it. Long lines are wrapped and when the text becomes long enough the Text area can be scrolled-

Ajouter du texte

Vous pouvez insérer du texte ou des caractères à la position du curseur actuel avec :

- `lv_ta_add_char(ta, 'c')`
- `lv_ta_add_text(ta, "insert this text")`

Pour ajouter des caractères étendus comme `'á'`, `'ß'` ou des caractères CJK utilisez `lv_ta_add_text(ta, "á")`.

`lv_ta_set_text(ta, "New text")` change le texte en totalité.

Substitutif

Vous pouvez spécifier un texte de substitution qui s' affiche lorsque la zone de texte est vide avec`lv_ta_set_placeholder_text(ta, "Placeholder text")`

Supprimer un caractère

Pour supprimer un caractère à gauche de la position actuelle du curseur, utilisez `lv_ta_del_char(ta)`. Pour supprimer à droite, utilisez `lv_ta_del_char_forward(ta)`.

Déplacer le curseur

La position du curseur peut être modifiée directement avec `lv_ta_set_cursor_pos(ta, 10)`. La position `0` signifie "avant les premiers caractères ", `LV_TA_CURSOR_LAST`signifie "après le dernier caractère" .

Vous pouvez déplacer le curseur d' un caractère avec

- `lv_ta_cursor_right(ta)`
- `lv_ta_cursor_left(ta)`
- `lv_ta_cursor_up(ta)`
- `lv_ta_cursor_down(ta)`

Si `lv_ta_set_cursor_click_pos(ta, true)`est appelé le curseur se déplacera à la position où la zone de texte a été cliquée.

Types de curseur

Il existe plusieurs types de curseur. Vous pouvez en choisir un avec : `lv_ta_set_cursor_type(ta, LV_CURSOR_...)`

- **LV_CURSOR_NONE** pas de curseur
- **LV_CURSOR_LINE** une simple ligne verticale
- **LV_CURSOR_BLOCK** un rectangle plein sur le caractère courant
- **LV_CURSOR_OUTLINE** une bordure rectangulaire autour du caractère courant
- **LV_CURSOR_UNDERLINE** souligne le caractère courant

Vous pouvez faire un ou logique de n' importe quel type de curseur avec `LV_CURSOR_HIDDEN` pour le masquer temporairement .

La durée de clignotement du curseur peut être réglée avec `lv_ta_set_cursor_blink_time(ta, time_ms)`.

Mode une ligne

La zone de texte peut être configurée en mode une ligne avec `lv_ta_set_one_line(ta, true)`. Dans ce mode, la hauteur est calculée automatiquement pour afficher une seule ligne, les caractères de fin de ligne sont ignorés et le retour à la ligne est désactivé.

Mode mot de passe

La zone de texte gère un mode de mot de passe qui peut être activé avec `lv_ta_set_pwd_mode(ta, true)`.En mode mot de passe, les caractères saisis sont convertis en * après un certain temps ou lorsqu' un nouveau caractère est entré.

En mode mot de passe `lv_ta_get_text(ta)` donne le texte réel et non les astérisques.

La durée de visibilité peut être ajustée avec `lv_ta_set_pwd_show_time(ta, time_ms)`.

Alignement du texte

Le texte peut être aligné à gauche, au milieu ou à droite avec `lv_label_set_align(label, LV_LABEL_ALIGN_LEFT/CENTER/RIGHT)`.

En mode une ligne, le texte ne peut défiler horizontalement que si le texte est aligné à gauche.

Caractères autorisés

Vous pouvez définir une liste de caractères autorisés avec `lv_ta_set_accepted_chars(ta, "0123456789.+-")`. Les autres caractères seront ignorés.

Longueur de texte maximum.

Le nombre maximum de caractères peut être limité avec `lv_ta_set_max_length(ta, max_char_num)`

Très long texte

S' il y a un texte très long dans la zone de texte (> 20000 caractères) le défilement et l' affichage pourraient être lents. Cependant, en activant `LV_LABEL_LONG_TXT_HINT 1` dans *lv_conf.h* cela peut être grandement amélioré. Cela enregistre des informations sur l' étiquette pour accélérer son affichage. En utilisant `LV_LABEL_LONG_TXT_HINT` le défilement et l' affichage sont aussi rapides qu' avec des textes courts "normaux" .

Sélection de texte

Une partie du texte peut être sélectionnée si la fonctionnalité est activée avec `lv_ta_set_text_sel (ta, true)`. Cela fonctionne comme lorsque vous sélectionnez un texte sur votre PC avec votre souris.

Barres de défilement

Les barres de défilement peuvent être affichées selon différentes stratégies définies par `lv_ta_set_sb_mode(ta, LV_SB_MODE_...)`. Apprenez-en plus sur l' objet *page*.

Propagation du défilement

Lorsque la zone de texte défile sur un autre objet défilant (comme une page) et que le défilement a atteint le bord de la zone de texte, le défilement peut être propagé au parent. En d' autres termes, lorsque la zone de texte ne peut continuer à défiler, le parent sera défilé à la place.

Cela peut être activé avec `lv_ta_set_scroll_propagation(ta, true)`.

Apprenez-en plus sur l' objet *page*.

Mise en évidence du bord

Lorsque vous faites défiler la zone de texte jusqu'à une bordure, l'animation d'un cercle peut être affichée si cela est activé avec`lv_ta_set_edge_flash(ta, true)`

Styles

Utilisez `lv_ta_set_style(page, LV_TA_STYLE_..., &style)` pour définir un nouveau style pour un élément de la zone de texte :

- **LV_TA_STYLE_BG** style de l'arrière-plan qui utilise toutes les propriétés `style.body`. L'étiquette utilise `style.label` de ce style (valeur par défaut : `lv_style_pretty`).
- **LV_TA_STYLE_SB** style de la barre de défilement qui utilise toutes les propriétés `style.body` (valeur par défaut : `lv_style_pretty_color`).
- **LV_TA_STYLE_CURSOR** style du curseur. Si `NULL` alors la librairie définit automatiquement un style en fonction de la couleur et de la police de l'étiquette.
  - *LV_CURSOR_LINE*: a `style.line.width` wide line but drawn as a rectangle as `style.body`. `padding.top/left` makes an offset on the cursor
  - *LV_CURSOR_BLOCK*: a rectangle as `style.body` `padding` makes the rectangle larger
  - *LV_CURSOR_OUTLINE*: an empty rectangle (just a border) as `style.body` `padding` makes the rectangle larger
  - *LV_CURSOR_UNDERLINE*: a `style.line.width` wide line but drawn as a rectangle as `style.body`. `padding.top/left` makes an offset on the cursor

Evénements

Outre les [événements génériques](/overview/event.html #evenements-generiques), les événements spéciaux suivants sont envoyés par la zone de texte :

- **LV_EVENT_INSERT** envoyé avant l'insertion d'un caractère. La donnée d'événement est le texte qu'il est prévu d'insérer. `lv_ta_set_insert_replace(ta, "New text")` remplace le texte à insérer. Le nouveau texte ne peut être une variable locale, détruite lorsque la fonction de rappel se termine. `" "` annule l'insertion.
- **LV_EVENT_VALUE_CHANGED** envoyé quand le contenu de la zone de texte a été modifié.

Touches

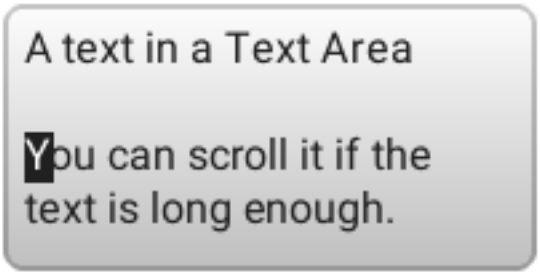
- **LV_KEY_UP/DOWN/LEFT/RIGHT** déplace le curseur
- **Tout caractère** insère le caractère à la position du curseur

Apprenez-en plus sur les *touches*.

Exemple

C

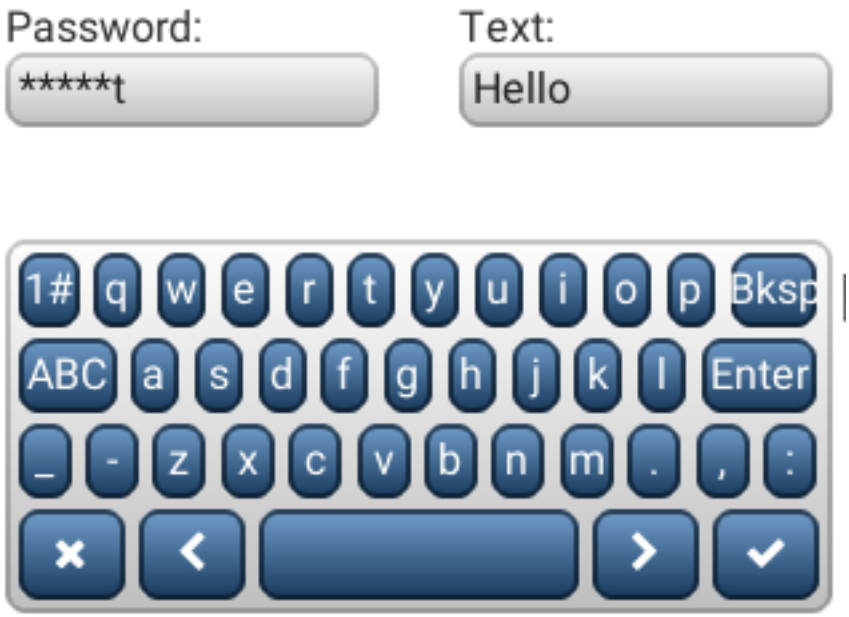
Simple Text area



code

```
#include "lvgl/lvgl.h"
#include <stdio.h>

lv_obj_t * ta1;

static void event_handler(lv_obj_t * obj, lv_event_t event)
{
    if(event == LV_EVENT_VALUE_CHANGED) {
        printf("Value: %s\n", lv_ta_get_text(obj));
    }
    else if(event == LV_EVENT_LONG_PRESSED_REPEAT) {
        /*For simple test: Long press the Text are to add the text below*/
        const char  * txt = "\n\nYou can scroll it if the text is long enough.\n";
        static uint16_t i = 0;
        if(txt[i] != '\0') {
            lv_ta_add_char(ta1, txt[i]);
            i++;
        }
    }
}


void lv_ex_ta_1(void)
{
    ta1 = lv_ta_create(lv_scr_act(), NULL);
    lv_obj_set_size(ta1, 200, 100);
    lv_obj_align(ta1, NULL, LV_ALIGN_CENTER, 0, 0);
    lv_ta_set_cursor_type(ta1, LV_CURSOR_BLOCK);
    lv_ta_set_text(ta1, "A text in a Text Area");    /*Set an initial text*/
    lv_obj_set_event_cb(ta1, event_handler);
}
```

Text are with password field



code

```
/**
 * @file lv_ex_templ.c
 *
 */

/*********************
 *      INCLUDES
 *********************/
#include "lvgl/lvgl.h"
#include <stdio.h>

/*********************
 *      DEFINES
 *********************/

/*********************
 *      TYPEDEFS
 *********************/

/**********************
 *  STATIC PROTOTYPES
 **********************/
static void kb_event_cb(lv_obj_t * event_kb, lv_event_t event);
static void ta_event_cb(lv_obj_t * ta, lv_event_t event);

/**********************
 *  STATIC VARIABLES
 **********************/

static lv_obj_t * kb;
/**********************
```

(continues on next page)

(continued from previous page)

```
 *      MACROS
 **********************/

/**********************
 *   GLOBAL FUNCTIONS
 **********************/

void lv_ex_ta_2(void)
{
    /* Create the password box */
    lv_obj_t * pwd_ta = lv_ta_create(lv_scr_act(), NULL);
    lv_ta_set_text(pwd_ta, "");
    lv_ta_set_pwd_mode(pwd_ta, true);
    lv_ta_set_one_line(pwd_ta, true);
    lv_obj_set_width(pwd_ta, LV_HOR_RES / 2 - 20);
    lv_obj_set_pos(pwd_ta, 5, 20);
    lv_obj_set_event_cb(pwd_ta, ta_event_cb);

    /* Create a label and position it above the text box */
    lv_obj_t * pwd_label = lv_label_create(lv_scr_act(), NULL);
    lv_label_set_text(pwd_label, "Password:");
    lv_obj_align(pwd_label, pwd_ta, LV_ALIGN_OUT_TOP_LEFT, 0, 0);


    /* Create the one-line mode text area */
    lv_obj_t * oneline_ta = lv_ta_create(lv_scr_act(), pwd_ta);
    lv_ta_set_pwd_mode(oneline_ta, false);
    lv_ta_set_cursor_type(oneline_ta, LV_CURSOR_LINE | LV_CURSOR_HIDDEN);
    lv_obj_align(oneline_ta, NULL, LV_ALIGN_IN_TOP_RIGHT, -5, 20);

    /* Create a label and position it above the text box */
    lv_obj_t * oneline_label = lv_label_create(lv_scr_act(), NULL);
    lv_label_set_text(oneline_label, "Text:");
    lv_obj_align(oneline_label, oneline_ta, LV_ALIGN_OUT_TOP_LEFT, 0, 0);

    /* Create a keyboard and make it fill the width of the above text areas */
    kb = lv_kb_create(lv_scr_act(), NULL);
    lv_obj_set_pos(kb, 5, 90);
    lv_obj_set_event_cb(kb, kb_event_cb); /* Setting a custom event handler stops the␣
↪keyboard from closing automatically */
    lv_obj_set_size(kb,  LV_HOR_RES - 10, 140);

    lv_kb_set_ta(kb, pwd_ta); /* Focus it on one of the text areas to start */
    lv_kb_set_cursor_manage(kb, true); /* Automatically show/hide cursors on text␣
↪areas */
}

/**********************
 *   STATIC FUNCTIONS
 **********************/

static void kb_event_cb(lv_obj_t * event_kb, lv_event_t event)
{
    /* Just call the regular event handler */
    lv_kb_def_event_cb(event_kb, event);
```

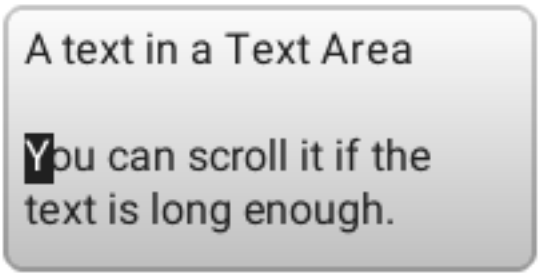
(continues on next page)

(continued from previous page)

```
}
static void ta_event_cb(lv_obj_t * ta, lv_event_t event)
{
    if(event == LV_EVENT_CLICKED) {
        /* Focus on the clicked text area */
        if(kb != NULL)
            lv_kb_set_ta(kb, ta);
    }

    else if(event == LV_EVENT_INSERT) {
        const char * str = lv_event_get_data();
        if(str[0] == '\n') {
            printf("Ready\n");
        }
    }
}
```

MicroPython

Simple Text area



code

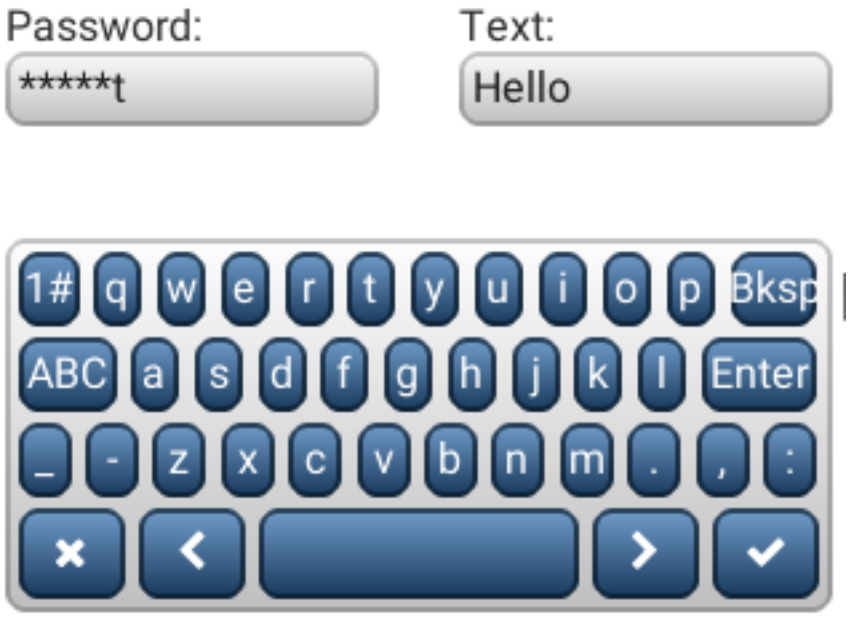
```
def event_handler(obj, event):
    if event == lv.EVENT.VALUE_CHANGED:
        print("Value: %s" % obj.get_text())
    elif event == lv.EVENT.LONG_PRESSED_REPEAT:
        # For simple test: Long press the Text are to add the text below
        ta1.add_text("\n\nYou can scroll it if the text is long enough.\n")

ta1 = lv.ta(lv.scr_act())
```

(continues on next page)

(continued from previous page)

```
ta1.set_size(200, 100)
ta1.align(None, lv.ALIGN.CENTER, 0, 0)
ta1.set_cursor_type(lv.CURSOR.BLOCK)
ta1.set_text("A text in a Text Area")     # Set an initial text
ta1.set_event_cb(event_handler)
```

Text are with password field



code

```
HOR_RES = lv.disp_get_hor_res(lv.disp_get_default())

def kb_event_cb(event_kb, event):
    # Just call the regular event handler
    event_kb.def_event_cb(event)

def ta_event_cb(ta, event):
    if event == lv.EVENT.INSERT:
        # get inserted value
        ptr = lv.C_Pointer()
        ptr.ptr_val = lv.event_get_data()
        if ptr.str_val == "\n":
            print("Ready")
    elif event == lv.EVENT.CLICKED:
        # Focus on the clicked text area
        kb.set_ta(ta)

# Create the password box
pwd_ta = lv.ta(lv.scr_act())
pwd_ta.set_text("");
pwd_ta.set_pwd_mode(True)
pwd_ta.set_one_line(True)
```

(continues on next page)

(continued from previous page)

```
pwd_ta.set_width(HOR_RES // 2 - 20)
pwd_ta.set_pos(5, 20)
pwd_ta.set_event_cb(ta_event_cb)

# Create a label and position it above the text box
pwd_label = lv.label(lv.scr_act())
pwd_label.set_text("Password:")
pwd_label.align(pwd_ta, lv.ALIGN.OUT_TOP_LEFT, 0, 0)

# Create the one-line mode text area
oneline_ta = lv.ta(lv.scr_act(), pwd_ta)
oneline_ta.set_pwd_mode(False)
oneline_ta.set_cursor_type(lv.CURSOR.LINE | lv.CURSOR.HIDDEN)
oneline_ta.align(None, lv.ALIGN.IN_TOP_RIGHT, -5, 20)
oneline_ta.set_event_cb(ta_event_cb)

# Create a label and position it above the text box
oneline_label = lv.label(lv.scr_act())
oneline_label.set_text("Text:")
oneline_label.align(oneline_ta, lv.ALIGN.OUT_TOP_LEFT, 0, 0)

# Create a keyboard and make it fill the width of the above text areas
kb = lv.kb(lv.scr_act())
kb.set_pos(5, 90)
kb.set_event_cb(kb_event_cb) # Setting a custom event handler stops the keyboard from␣
↪closing automatically
kb.set_size(HOR_RES - 10, 140)

kb.set_ta(pwd_ta) # Focus it on one of the text areas to start
kb.set_cursor_manage(True) # Automatically show/hide cursors on text areas
```

API

Typedefs

typedef uint8_t **lv_cursor_type_t**

typedef uint8_t **lv_ta_style_t**

Enums

enum [anonymous]

Style of text area’ s cursor.

Values:

LV_CURSOR_NONE

No cursor

LV_CURSOR_LINE

Vertical line

LV_CURSOR_BLOCK

Rectangle

LV_CURSOR_OUTLINE
Outline around character

LV_CURSOR_UNDERLINE
Horizontal line under character

LV_CURSOR_HIDDEN = 0x08
This flag can be ORed to any of the other values to temporarily hide the cursor

enum [anonymous]
Possible text areas tyles.

Values:

LV_TA_STYLE_BG
Text area background style

LV_TA_STYLE_SB
Scrollbar style

LV_TA_STYLE_CURSOR
Cursor style

LV_TA_STYLE_EDGE_FLASH
Edge flash style

LV_TA_STYLE_PLACEHOLDER
Placeholder style

Functions

LV_EXPORT_CONST_INT(LV_TA_CURSOR_LAST)

lv_obj_t ***lv_ta_create**(*lv_obj_t* *par*, **const** *lv_obj_t* *copy*)
Create a text area objects

Return pointer to the created text area

Parameters

- `par`: pointer to an object, it will be the parent of the new text area
- `copy`: pointer to a text area object, if not NULL then the new object will be copied from it

void **lv_ta_add_char**(*lv_obj_t* *ta*, uint32_t *c*)
Insert a character to the current cursor position. To add a wide char, e.g. 'Á' use 'lv_txt_encoded_conv_wc('Á')'

Parameters

- `ta`: pointer to a text area object
- `c`: a character (e.g. 'a')

void **lv_ta_add_text**(*lv_obj_t* *ta*, **const** char *txt*)
Insert a text to the current cursor position

Parameters

- `ta`: pointer to a text area object
- `txt`: a '\0' terminated string to insert

void **lv_ta_del_char**(*lv_obj_t* *ta*)
Delete a the left character from the current cursor position

Parameters

- `ta`: pointer to a text area object

void **lv_ta_del_char_forward**(*lv_obj_t* *ta)
Delete the right character from the current cursor position

Parameters

- `ta`: pointer to a text area object

void **lv_ta_set_text**(*lv_obj_t* *ta, **const** char *txt)
Set the text of a text area

Parameters

- `ta`: pointer to a text area
- `txt`: pointer to the text

void **lv_ta_set_placeholder_text**(*lv_obj_t* *ta, **const** char *txt)
Set the placeholder text of a text area

Parameters

- `ta`: pointer to a text area
- `txt`: pointer to the text

void **lv_ta_set_cursor_pos**(*lv_obj_t* *ta, int16_t *pos*)
Set the cursor position

Parameters

- `obj`: pointer to a text area object
- `pos`: the new cursor position in character index < 0 : index from the end of the text LV_TA_CURSOR_LAST: go after the last character

void **lv_ta_set_cursor_type**(*lv_obj_t* *ta, *lv_cursor_type_t* *cur_type*)
Set the cursor type.

Parameters

- `ta`: pointer to a text area object
- `cur_type`: element of 'lv_cursor_type_t'

void **lv_ta_set_cursor_click_pos**(*lv_obj_t* *ta, bool *en*)
Enable/Disable the positioning of the the cursor by clicking the text on the text area.

Parameters

- `ta`: pointer to a text area object
- `en`: true: enable click positions; false: disable

void **lv_ta_set_pwd_mode**(*lv_obj_t* *ta, bool *en*)
Enable/Disable password mode

Parameters

- `ta`: pointer to a text area object
- `en`: true: enable, false: disable

void **lv_ta_set_one_line**(*lv_obj_t* *ta, bool *en*)
Configure the text area to one line or back to normal

Parameters

- `ta`: pointer to a Text area object
- `en`: true: one line, false: normal

void **lv_ta_set_text_align**(*lv_obj_t* *ta, *lv_label_align_t* *align*)
Set the alignment of the text area. In one line mode the text can be scrolled only with `LV_LABEL_ALIGN_LEFT`. This function should be called if the size of text area changes.

Parameters

- `ta`: pointer to a text are object
- `align`: the desired alignment from `lv_label_align_t`. (LV_LABEL_ALIGN_LEFT/CENTER/RIGHT)

void **lv_ta_set_accepted_chars**(*lv_obj_t* *ta, **const** char *list)
Set a list of characters. Only these characters will be accepted by the text area

Parameters

- `ta`: pointer to Text Area
- `list`: list of characters. Only the pointer is saved. E.g. "+-.,0123456789"

void **lv_ta_set_max_length**(*lv_obj_t* *ta, uint16_t *num*)
Set max length of a Text Area.

Parameters

- `ta`: pointer to Text Area
- `num`: the maximal number of characters can be added (`lv_ta_set_text` ignores it)

void **lv_ta_set_insert_replace**(*lv_obj_t* *ta, **const** char *txt)
In `LV_EVENT_INSERT` the text which planned to be inserted can be replaced by an other text. It can be used to add automatic formatting to the text area.

Parameters

- `ta`: pointer to a text area.
- `txt`: pointer to a new string to insert. If `""` no text will be added. The variable must be live after the `event_cb` exists. (Should be `global` or `static`)

static void **lv_ta_set_sb_mode**(*lv_obj_t* *ta, *lv_sb_mode_t* *mode*)
Set the scroll bar mode of a text area

Parameters

- `ta`: pointer to a text area object
- `sb_mode`: the new mode from 'lv_page_sb_mode_t' enum

static void **lv_ta_set_scroll_propagation**(*lv_obj_t* *ta, bool *en*)
Enable the scroll propagation feature. If enabled then the Text area will move its parent if there is no more space to scroll.

Parameters

- `ta`: pointer to a Text area
- `en`: true or false to enable/disable scroll propagation

static void **lv_ta_set_edge_flash**(*lv_obj_t* *ta, bool *en*)
Enable the edge flash effect. (Show an arc when the an edge is reached)

Parameters

- `page`: pointer to a Text Area
- `en`: true or false to enable/disable end flash

void **lv_ta_set_style**(*lv_obj_t* *ta, *lv_ta_style_t* type, **const** lv_style_t *style)
Set a style of a text area

Parameters

- `ta`: pointer to a text area object
- `type`: which style should be set
- `style`: pointer to a style

void **lv_ta_set_text_sel**(*lv_obj_t* *ta, bool en)
Enable/disable selection mode.

Parameters

- `ta`: pointer to a text area object
- `en`: true or false to enable/disable selection mode

void **lv_ta_set_pwd_show_time**(*lv_obj_t* *ta, uint16_t time)
Set how long show the password before changing it to '*'

Parameters

- `ta`: pointer to Text area
- `time`: show time in milliseconds. 0: hide immediately.

void **lv_ta_set_cursor_blink_time**(*lv_obj_t* *ta, uint16_t time)
Set cursor blink animation time

Parameters

- `ta`: pointer to Text area
- `time`: blink period. 0: disable blinking

const char ***lv_ta_get_text**(**const** *lv_obj_t* *ta)
Get the text of a text area. In password mode it gives the real text (not '*' s).

Return pointer to the text

Parameters

- `ta`: pointer to a text area object

const char ***lv_ta_get_placeholder_text**(*lv_obj_t* *ta)
Get the placeholder text of a text area

Return pointer to the text

Parameters

- `ta`: pointer to a text area object

lv_obj_t ***lv_ta_get_label**(**const** *lv_obj_t* *ta)
Get the label of a text area

Return pointer to the label object

Parameters

- `ta`: pointer to a text area object

uint16_t **lv_ta_get_cursor_pos**(**const** *lv_obj_t* *ta)
Get the current cursor position in character index

Return the cursor position

Parameters

- `ta`: pointer to a text area object

lv_cursor_type_t **lv_ta_get_cursor_type**(**const** *lv_obj_t* *ta)
Get the current cursor type.

Return element of 'lv_cursor_type_t'

Parameters

- `ta`: pointer to a text area object

bool **lv_ta_get_cursor_click_pos**(*lv_obj_t* *ta)
Get whether the cursor click positioning is enabled or not.

Return true: enable click positions; false: disable

Parameters

- `ta`: pointer to a text area object

bool **lv_ta_get_pwd_mode**(**const** *lv_obj_t* *ta)
Get the password mode attribute

Return true: password mode is enabled, false: disabled

Parameters

- `ta`: pointer to a text area object

bool **lv_ta_get_one_line**(**const** *lv_obj_t* *ta)
Get the one line configuration attribute

Return true: one line configuration is enabled, false: disabled

Parameters

- `ta`: pointer to a text area object

const char ***lv_ta_get_accepted_chars**(*lv_obj_t* *ta)
Get a list of accepted characters.

Return list of accented characters.

Parameters

- `ta`: pointer to Text Area

uint16_t **lv_ta_get_max_length**(*lv_obj_t* *ta)
Set max length of a Text Area.

Return the maximal number of characters to be add

Parameters

- `ta`: pointer to Text Area

static *lv_sb_mode_t* **lv_ta_get_sb_mode**(**const** *lv_obj_t* *ta)
Get the scroll bar mode of a text area

Return scrollbar mode from 'lv_page_sb_mode_t' enum

Parameters

- `ta`: pointer to a text area object

static bool **lv_ta_get_scroll_propagation**(*lv_obj_t* *ta)
Get the scroll propagation property

Return true or false

Parameters

- `ta`: pointer to a Text area

static bool **lv_ta_get_edge_flash**(*lv_obj_t* *ta)
Get the scroll propagation property

Return true or false

Parameters

- `ta`: pointer to a Text area

const lv_style_t ***lv_ta_get_style**(**const** *lv_obj_t* *ta, *lv_ta_style_t* type)
Get a style of a text area

Return style pointer to a style

Parameters

- `ta`: pointer to a text area object
- `type`: which style should be get

bool **lv_ta_text_is_selected**(**const** *lv_obj_t* *ta)
Find whether text is selected or not.

Return whether text is selected or not

Parameters

- `ta`: Text area object

bool **lv_ta_get_text_sel_en**(*lv_obj_t* *ta)
Find whether selection mode is enabled.

Return true: selection mode is enabled, false: disabled

Parameters

- `ta`: pointer to a text area object

uint16_t **lv_ta_get_pwd_show_time**(*lv_obj_t* *ta)
Set how long show the password before changing it to '*'

Return show time in milliseconds. 0: hide immediately.

Parameters

- `ta`: pointer to Text area

uint16_t **lv_ta_get_cursor_blink_time**(*lv_obj_t* *ta)
Set cursor blink animation time

Return time blink period. 0: disable blinking

Parameters

- `ta`: pointer to Text area

void **lv_ta_clear_selection**(*lv_obj_t* *ta)
Clear the selection on the text area.

Parameters

- ta: Text area object

void **lv_ta_cursor_right**(*lv_obj_t* *ta)
Move the cursor one character right

Parameters

- ta: pointer to a text area object

void **lv_ta_cursor_left**(*lv_obj_t* *ta)
Move the cursor one character left

Parameters

- ta: pointer to a text area object

void **lv_ta_cursor_down**(*lv_obj_t* *ta)
Move the cursor one line down

Parameters

- ta: pointer to a text area object

void **lv_ta_cursor_up**(*lv_obj_t* *ta)
Move the cursor one line up

Parameters

- ta: pointer to a text area object

struct lv_ta_ext_t

Public Members

lv_page_ext_t **page**

lv_obj_t ***label**

lv_obj_t ***placeholder**

char ***pwd_tmp**

const char ***accapted_chars**

uint16_t **max_length**

uint16_t **pwd_show_time**

const lv_style_t ***style**

lv_coord_t **valid_x**

uint16_t **pos**

uint16_t **blink_time**

lv_area_t **area**

uint16_t **txt_byte_pos**

lv_cursor_type_t **type**

uint8_t **state**

uint8_t **click_pos**

struct *lv_ta_ext_t*::[**anonymous**] **cursor**

lv_draw_label_txt_sel_t **sel**

uint8_t **text_sel_in_prog**

uint8_t **text_sel_en**

uint8_t **pwd_mode**

uint8_t **one_line**

Mosaïque (lv_tileview)

Vue d'ensemble

La mosaïque est un objet conteneur dans lequel ses éléments, appelés *tuiles*, peuvent être organisés sous forme de grille. En balayant l'utilisateur peut naviguer entre les tuiles.

Si la mosaïque est de la taille de l'écran, elle fournit une interface utilisateur que vous avez peut-être vue sur les montres intelligentes.

Positions valides

Les tuiles ne doivent pas nécessairement former une grille complète où chaque élément existe. La grille peut comporter des trous, mais elle doit être continue, c'est-à-dire qu'il ne peut y avoir une ligne ou une colonne vide.

Avec `lv_tileview_set_valid_positions(tileview, valid_pos_array, array_len)`, les positions valides peuvent être définies. Le défilement ne sera possible que vers ces positions. L'indice `0,0` représente la tuile en haut à gauche. Par exemple `lv_point_t valid_pos_array [] = { { 0, 0 }, { 0, 1 }, { 1, 1 }, { LV_COORD_MIN, LV_COORD_MIN } }` donne une mosaïque en forme de "L". Cela indique qu'il n'y a pas de tuile dans `{ 1,0 }` et que l'utilisateur ne peut donc pas s'y déplacer.

En d'autres termes, `valid_pos_array` indique où se trouvent les tuiles. Il peut être modifié à la volée pour désactiver certaines positions pour des tuiles spécifiques. Par exemple, il peut exister une grille 2 x 2 où toutes les tuiles sont présentes, où la première ligne (y = 0) est la "ligne principale" et la deuxième ligne (y = 1) contient des options pour la tuile située au-dessus. Supposons que le défilement horizontal est possible uniquement dans la ligne principale et impossible entre les options de la deuxième ligne . Dans ce cas, `valid_pos_array` doit être modifié lorsqu'une nouvelle tuile principale est sélectionnée :

- pour la première tuile principale : `{ 0, 0 }, { 0, 1 }, { 1, 0 }` pour désactiver la tuile d'option `{ 1, 1 }`
- pour la deuxième tuile principale : `{ 0, 0 }, { 0, 1 }, { 1, 1 }` pour désactiver la tuile d'option `{ 0, 1 }`

Ajouter un élément

Pour ajouter des éléments, il suffit de créer un objet sur la mosaïque et d'appeler `lv_tileview_add_element(tileview, element)`.

L'élément doit avoir la même taille que la mosaïque et doit être positionné manuellement à la position souhaitée.

La fonctionnalité de propagation de défilement des objets de type page (comme *liste*) peut très bien être utilisée ici. Par exemple, l' utilisateur peut faire défiler les éléments d' une liste et quand le premier ou le dernier élément de la liste est atteint, c' est la mosaïque qui défile à la place.

`lv_tileview_add_element(tileview, element)` devrait être utilisé pour permettre de faire défiler (glisser) la mosaïque par un de ces éléments. Par exemple, s' il y a un bouton sur une tuile, le bouton doit être explicitement ajouté à la mosaïque pour permettre à l' utilisateur de faire défiler la mosaïque avec le bouton.

Cela vaut aussi pour les boutons d' une *liste*. Chaque bouton de la liste et la liste elle-même doivent être ajoutés avec `lv_tileview_add_element`.

Définir la tuile

Pour définir la tuile visible, utilisez `lv_tileview_set_tile_act tileview, x_id, y_id, LV_ANIM_ON/OFF)`.

Durée d' animation

La durée d' animation quand une tuile

- est sélectionnée par `lv_tileview_set_tile_act`
- est légèrement déplacé, puis relâché (revient à la tuile d' origine)
- est déplacé sur plus de la moitié de sa taille, puis relâché (affiche la tuile suivante)

peut être fixée avec `lv_tileview_set_anim_time(tileview, anim_time)`.

Mise en évidence du bord

Un effet de "mise en évidence du bord" peut être ajouté lorsque la mosaïque atteint une position non valide ou une des extrémités lors du défilement.

Utilisez `lv_tileview_set_edge_flash(tileview, true)` pour activer cette fonctionnalité.

Styles

La mosaïque a un seul style qui peut être changé avec `lv_tileview_set_style(slider, LV_TILEVIEW_STYLE_MAIN, &style)`.

- **LV_TILEVIEW_STYLE_MAIN** style de l' arrière plan. Toutes les propriétés `style.body` sont utilisées.

Evénements

Outre les [événements génériques](/overview/event.html #evenements-generiques), les événements spéciaux suivants sont envoyés par la mosaïque :

- **LV_EVENT_VALUE_CHANGED** envoyé quand une nouvelle tuile est affichée par défilement ou appel de la fonction `lv_tileview_set_act`. Les données d' événement sont définies sur l' index de la nouvelle tuile dans `valid_pos_array` (le type est `uint32_t *`).

Touches

- **LV_KEY_UP**, **LV_KEY_RIGHT** incrémente l'index de la tuile de 1.
- **LV_KEY_DOWN**, **LV_KEY_LEFT** décrémente l'index de la tuile de 1.

Apprenez-en plus sur les *touches*.

Exemple

C

Tileview with content

code

```
#include "lvgl/lvgl.h"

void lv_ex_tileview_1(void)
{
    static lv_point_t valid_pos[] = {{0,0}, {0, 1}, {1,1}};
    lv_obj_t *tileview;
    tileview = lv_tileview_create(lv_scr_act(), NULL);
    lv_tileview_set_valid_positions(tileview, valid_pos, 3);
    lv_tileview_set_edge_flash(tileview, true);

    lv_obj_t * tile1 = lv_obj_create(tileview, NULL);
    lv_obj_set_size(tile1, LV_HOR_RES, LV_VER_RES);
    lv_obj_set_style(tile1, &lv_style_pretty);
    lv_tileview_add_element(tileview, tile1);

    /*Tile1: just a label*/
    lv_obj_t * label = lv_label_create(tile1, NULL);
```

(continues on next page)

(continued from previous page)

```
    lv_label_set_text(label, "Tile 1");
    lv_obj_align(label, NULL, LV_ALIGN_CENTER, 0, 0);

    /*Tile2: a list*/
    lv_obj_t * list = lv_list_create(tileview, NULL);
    lv_obj_set_size(list, LV_HOR_RES, LV_VER_RES);
    lv_obj_set_pos(list, 0, LV_VER_RES);
    lv_list_set_scroll_propagation(list, true);
    lv_list_set_sb_mode(list, LV_SB_MODE_OFF);
    lv_tileview_add_element(tileview, list);

    lv_obj_t * list_btn;
    list_btn = lv_list_add_btn(list, NULL, "One");
    lv_tileview_add_element(tileview, list_btn);

    list_btn = lv_list_add_btn(list, NULL, "Two");
    lv_tileview_add_element(tileview, list_btn);

    list_btn = lv_list_add_btn(list, NULL, "Three");
    lv_tileview_add_element(tileview, list_btn);

    list_btn = lv_list_add_btn(list, NULL, "Four");
    lv_tileview_add_element(tileview, list_btn);

    list_btn = lv_list_add_btn(list, NULL, "Five");
    lv_tileview_add_element(tileview, list_btn);

    list_btn = lv_list_add_btn(list, NULL, "Six");
    lv_tileview_add_element(tileview, list_btn);

    list_btn = lv_list_add_btn(list, NULL, "Seven");
    lv_tileview_add_element(tileview, list_btn);

    list_btn = lv_list_add_btn(list, NULL, "Eight");
    lv_tileview_add_element(tileview, list_btn);

    /*Tile3: a button*/
    lv_obj_t * tile3 = lv_obj_create(tileview, tile1);
    lv_obj_set_pos(tile3, LV_HOR_RES, LV_VER_RES);
    lv_tileview_add_element(tileview, tile3);

    lv_obj_t * btn = lv_btn_create(tile3, NULL);
    lv_obj_align(btn, NULL, LV_ALIGN_CENTER, 0, 0);

    label = lv_label_create(btn, NULL);
    lv_label_set_text(label, "Button");
}
```

MicroPython

Tileview with content

code

```
valid_pos = [{"x":0, "y": 0}, {"x": 0, "y": 1}, {"x": 1,"y": 1}]

# resolution of the screen
HOR_RES = lv.disp_get_hor_res(lv.disp_get_default())
VER_RES = lv.disp_get_ver_res(lv.disp_get_default())

tileview = lv.tileview(lv.scr_act())
tileview.set_valid_positions(valid_pos, len(valid_pos))
tileview.set_edge_flash(True)

tile1 = lv.obj(tileview)
tile1.set_size(HOR_RES, VER_RES)
tile1.set_style(lv.style_pretty)
tileview.add_element(tile1)

# Tile1: just a label
label = lv.label(tile1)
label.set_text("Tile 1")
label.align(None, lv.ALIGN.CENTER, 0, 0)

# Tile2: a list
lst = lv.list(tileview)
lst.set_size(HOR_RES, VER_RES)
lst.set_pos(0, VER_RES)
lst.set_scroll_propagation(True)
lst.set_sb_mode(lv.SB_MODE.OFF)
tileview.add_element(lst)

list_btn = lst.add_btn(None, "One")
tileview.add_element(list_btn)
```

(continues on next page)

(continued from previous page)

```
list_btn = lst.add_btn(None, "Two")
tileview.add_element(list_btn)

list_btn = lst.add_btn(None, "Three")
tileview.add_element(list_btn)

list_btn = lst.add_btn(None, "Four")
tileview.add_element(list_btn)

list_btn = lst.add_btn(None, "Five")
tileview.add_element(list_btn)

list_btn = lst.add_btn(None, "Six")
tileview.add_element(list_btn)

list_btn = lst.add_btn(None, "Seven")
tileview.add_element(list_btn)

list_btn = lst.add_btn(None, "Eight")
tileview.add_element(list_btn)

# Tile3: a button
tile3 = lv.obj(tileview, tile1)
tile3.set_pos(HOR_RES, VER_RES)
tileview.add_element(tile3)

btn = lv.btn(tile3)
btn.align(None, lv.ALIGN.CENTER, 0, 0)

label = lv.label(btn)
label.set_text("Button")
```

API

Typedefs

typedef uint8_t **lv_tileview_style_t**

Enums

enum [anonymous]

Values:

LV_TILEVIEW_STYLE_MAIN

Functions

lv_obj_t ***lv_tileview_create**(*lv_obj_t* **par*, **const** *lv_obj_t* **copy*)

Create a tileview objects

Return pointer to the created tileview

Parameters

- `par`: pointer to an object, it will be the parent of the new tileview
- `copy`: pointer to a tileview object, if not NULL then the new object will be copied from it

void **lv_tileview_add_element**(*lv_obj_t* *tileview, *lv_obj_t* *element)
Register an object on the tileview. The register object will able to slide the tileview

Parameters

- `tileview`: pointer to a Tileview object
- `element`: pointer to an object

void **lv_tileview_set_valid_positions**(*lv_obj_t* *tileview, **const** lv_point_t valid_pos[], uint16_t valid_pos_cnt)
Set the valid position' s indices. The scrolling will be possible only to these positions.

Parameters

- `tileview`: pointer to a Tileview object
- `valid_pos`: array width the indices. E.g. `lv_point_t p[] = {{0,0}, {1,0}, {1, 1}`. Only the pointer is saved so can' t be a local variable.
- `valid_pos_cnt`: numner of elements in `valid_pos` array

void **lv_tileview_set_tile_act**(*lv_obj_t* *tileview, lv_coord_t *x*, lv_coord_t *y*, *lv_anim_enable_t* *anim*)
Set the tile to be shown

Parameters

- `tileview`: pointer to a tileview object
- `x`: column id (0, 1, 2···)
- `y`: line id (0, 1, 2···)
- `anim`: LV_ANIM_ON: set the value with an animation; LV_ANIM_OFF: change the value immediately

static void **lv_tileview_set_edge_flash**(*lv_obj_t* *tileview, bool *en*)
Enable the edge flash effect. (Show an arc when the an edge is reached)

Parameters

- `tileview`: pointer to a Tileview
- `en`: true or false to enable/disable end flash

static void **lv_tileview_set_anim_time**(*lv_obj_t* *tileview, uint16_t *anim_time*)
Set the animation time for the Tile view

Parameters

- `tileview`: pointer to a page object
- `anim_time`: animation time in milliseconds

void **lv_tileview_set_style**(*lv_obj_t* *tileview, *lv_tileview_style_t* *type*, **const** lv_style_t *style)
Set a style of a tileview.

Parameters

- `tileview`: pointer to tileview object
- `type`: which style should be set

- `style`: pointer to a style

static bool **lv_tileview_get_edge_flash**(*lv_obj_t* *tileview)
Get the scroll propagation property

Return true or false

Parameters

- `tileview`: pointer to a Tileview

static uint16_t **lv_tileview_get_anim_time**(*lv_obj_t* *tileview)
Get the animation time for the Tile view

Return animation time in milliseconds

Parameters

- `tileview`: pointer to a page object

const lv_style_t ***lv_tileview_get_style**(**const** *lv_obj_t* *tileview, *lv_tileview_style_t* type)
Get style of a tileview.

Return style pointer to the style

Parameters

- `tileview`: pointer to tileview object
- `type`: which style should be get

struct lv_tileview_ext_t

Public Members

lv_page_ext_t **page**

const lv_point_t ***valid_pos**

uint16_t **valid_pos_cnt**

uint16_t **anim_time**

lv_point_t **act_id**

uint8_t **drag_top_en**

uint8_t **drag_bottom_en**

uint8_t **drag_left_en**

uint8_t **drag_right_en**

uint8_t **drag_hor**

uint8_t **drag_ver**

Fenêtre (lv_win)

Vue d'ensemble

Les fenêtres sont l'un des objets les plus complexes du type conteneur. Ils sont construits à partir de deux parties principales :

1. un en-tête *conteneur* en haut
2. une *page* pour le contenu situé sous l'en-tête.

Titre

Sur l'en-tête, il y a un titre qui peut être modifié par : `lv_win_set_title(win, "Nouveau titre")`. Le titre hérite toujours du style de l'en-tête.

Boutons de contrôle

Vous pouvez ajouter des boutons de contrôle à la droite de l'en-tête avec : `lv_win_add_btn(win, LV_SYMBOL_CLOSE)`. Le deuxième paramètre est une *image* source.

`lv_win_close_event_cb` peut être utilisé comme fonction de rappel d'événement pour fermer la fenêtre.

Vous pouvez modifier la taille des boutons de contrôle avec la fonction `lv_win_set_btn_size(win, new_size)`.

Barres de défilement

Le comportement de la barre de défilement peut être défini par `lv_win_set_sb_mode(win, LV_SB_MODE _...)`. Voir [page](/object-types/page pour plus de détails.

Défilement manuel et focus

Pour faire défiler la fenêtre directement, vous pouvez utiliser `lv_win_scroll_hor(win, dist_px)` ou `lv_win_scroll_ver(win, dist_px)`.

Pour que la fenêtre affiche un de ses objets, utilisez `lv_win_focus (win, child, LV_ANIM_ON/OFF)`.

La durée des animations de défilement et de focus peut être ajusté avec `lv_win_set_anim_time(win, anim_time_ms)`.

Mise en page

Pour définir une disposition du contenu, utilisez `lv_win_set_layout (win, LV_LAYOUT_...)`. Voir *conteneur* pour plus de détails.

Styles

Utilisez `lv_win_set_style(win, LV_WIN_STYLE_..., &style)` pour définir un nouveau style pour un élément de la fenêtre :

- **LV_WIN_STYE_BG** arrière-plan principal (l'en-tête et la page de contenu sont placés dessus) qui utilise toutes les propriétés `style.body` (valeur par défaut : `lv_style_plain`)
- **LV_WIN_STYLE_CONTENT** partie déroulante de la page de contenu qui utilise toutes les propriétés `style.body` (valeur par défaut : `lv_style_transp`)

- **LV_WIN_STYLE_SB** le style de la barre de défilement qui utilise toutes les propriétés `style.body`. `body.padding.left/top` définit les marges des barres de défilement et `body.inner.padding` définit la largeur de la barre de défilement (valeur par défaut: `lv_style_pretty_color`)
- **LV_WIN_STYLE_HEADER** style de l'en-tête qui utilise toutes les propriétés `style.body` (valeur par défaut : `lv_style_plain_color`)
- **LV_WIN_STYLE_BTN_REL** style du bouton relâché (sur l'en-tête) qui utilise toutes les propriétés `style.body` (valeur par défaut : `lv_style_btn_rel`)
- **LV_WIN_STYLE_BTN_PR** style du bouton pressé (sur l'en-tête) qui utilise toutes les propriétés `style.body` (valeur par défaut : `lv_style_btn_pr`)

La hauteur de l'en-tête est définie par la plus grande valeur de *hauteur des boutons* (définie par `lv_win_set_btn_size`) et *hauteur de titre* (provenant de `header_style.text.font`), plus les éléments `body.padding.top` et `body.padding.bottom` du style de l'en-tête.

Evénements

Seuls les événements génériques sont envoyés par ce type d'objet.

Apprenez-en plus sur les *événements*.

Touches

Les *touches* suivantes sont traitées par la page :

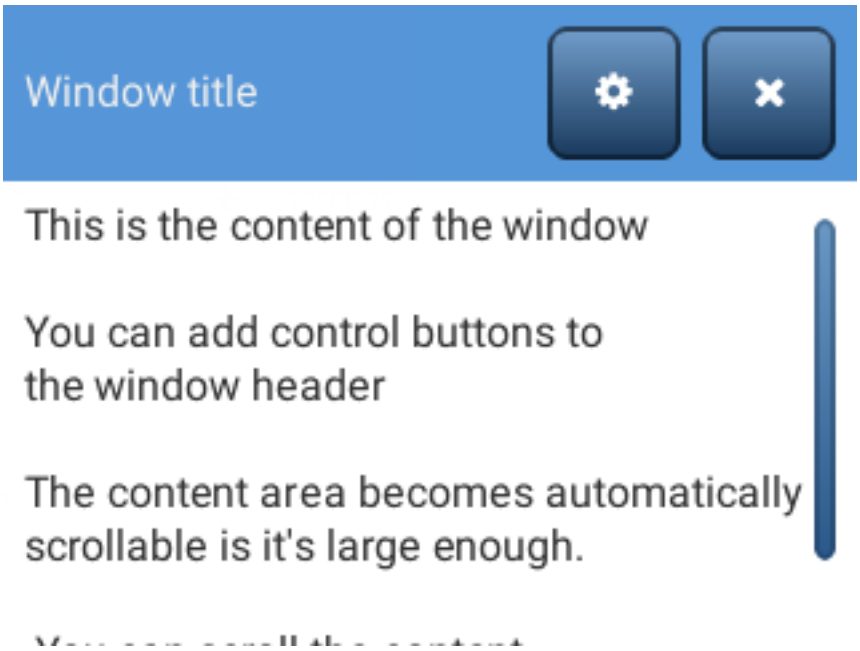
- **LV_KEY_RIGHT/LEFT/UP/DOWN** font défiler la page

Apprenez-en plus sur les *touches*.

Exemple

C

Simple window

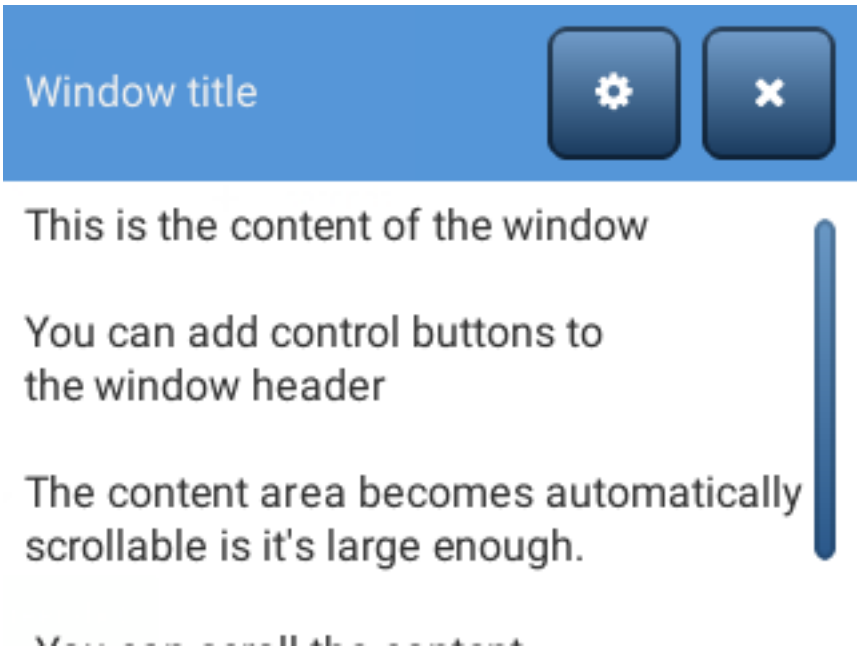


code

```
#include "lvgl/lvgl.h"

void lv_ex_win_1(void)
{
    /*Create a window*/
    lv_obj_t * win = lv_win_create(lv_scr_act(), NULL);
    lv_win_set_title(win, "Window title");                        /*Set the title*/


    /*Add control button to the header*/
    lv_obj_t * close_btn = lv_win_add_btn(win, LV_SYMBOL_CLOSE);           /*Add␣
↪close button and use built-in close action*/
    lv_obj_set_event_cb(close_btn, lv_win_close_event_cb);
    lv_win_add_btn(win, LV_SYMBOL_SETTINGS);        /*Add a setup button*/

    /*Add some dummy content*/
    lv_obj_t * txt = lv_label_create(win, NULL);
    lv_label_set_text(txt, "This is the content of the window\n\n"
                           "You can add control buttons to\n"
                           "the window header\n\n"
                           "The content area becomes automatically\n"
                           "scrollable is it's large enough.\n\n"
                           " You can scroll the content\n"
                           "See the scroll bar on the right!");
}
```

MicroPython

Simple window



code

```
# Create a window
win = lv.win(lv.scr_act())
win.set_title("Window title")                   # Set the title


# Add control button to the header
close_btn = win.add_btn(lv.SYMBOL.CLOSE)        # Add close button and use built-in␣
↪close action
close_btn.set_event_cb(lv.win.close_event_cb)
win.add_btn(lv.SYMBOL.SETTINGS)                 # Add a setup button

# Add some dummy content
txt = lv.label(win)
txt.set_text(
"""This is the content of the window

You can add control buttons to
the window header

The content area becomes automatically
scrollable is it's large enough.

You can scroll the content
See the scroll bar on the right!"""
)
```

API

Typedefs

typedef uint8_t **lv_win_style_t**

Enums

enum [anonymous]
Window styles.

Values:

LV_WIN_STYLE_BG
Window object background style.

LV_WIN_STYLE_CONTENT
Window content style.

LV_WIN_STYLE_SB
Window scrollbar style.

LV_WIN_STYLE_HEADER
Window titlebar background style.

LV_WIN_STYLE_BTN_REL
Same meaning as ordinary button styles.

LV_WIN_STYLE_BTN_PR

Functions

lv_obj_t ***lv_win_create**(*lv_obj_t* **par*, **const** *lv_obj_t* **copy*)
Create a window objects

Return pointer to the created window

Parameters

- `par`: pointer to an object, it will be the parent of the new window
- `copy`: pointer to a window object, if not NULL then the new object will be copied from it

void **lv_win_clean**(*lv_obj_t* **win*)
Delete all children of the scrl object, without deleting scrl child.

Parameters

- `win`: pointer to an object

lv_obj_t ***lv_win_add_btn**(*lv_obj_t* **win*, **const** void **img_src*)
Add control button to the header of the window

Return pointer to the created button object

Parameters

- `win`: pointer to a window object
- `img_src`: an image source ('lv_img_t' variable, path to file or a symbol)

void **lv_win_close_event_cb**(*lv_obj_t* **btn*, *lv_event_t* *event*)
Can be assigned to a window control button to close the window

Parameters

- `btn`: pointer to the control button on teh widows header
- `evet`: the event type

void **lv_win_set_title**(*lv_obj_t* *win, **const** char *title)
Set the title of a window

Parameters

- `win`: pointer to a window object
- `title`: string of the new title

void **lv_win_set_btn_size**(*lv_obj_t* *win, lv_coord_t size)
Set the control button size of a window

Return control button size

Parameters

- `win`: pointer to a window object

void **lv_win_set_content_size**(*lv_obj_t* *win, lv_coord_t w, lv_coord_t h)
Set the size of the content area.

Parameters

- `win`: pointer to a window object
- `w`: width
- `h`: height (the window will be higher with the height of the header)

void **lv_win_set_layout**(*lv_obj_t* *win, *lv_layout_t* layout)
Set the layout of the window

Parameters

- `win`: pointer to a window object
- `layout`: the layout from 'lv_layout_t'

void **lv_win_set_sb_mode**(*lv_obj_t* *win, *lv_sb_mode_t* sb_mode)
Set the scroll bar mode of a window

Parameters

- `win`: pointer to a window object
- `sb_mode`: the new scroll bar mode from 'lv_sb_mode_t'

void **lv_win_set_anim_time**(*lv_obj_t* *win, uint16_t anim_time)
Set focus animation duration on *`lv_win_focus()`*

Parameters

- `win`: pointer to a window object
- `anim_time`: duration of animation [ms]

void **lv_win_set_style**(*lv_obj_t* *win, *lv_win_style_t* type, **const** lv_style_t *style)
Set a style of a window

Parameters

- `win`: pointer to a window object
- `type`: which style should be set

- `style`: pointer to a style

void **lv_win_set_drag**(*lv_obj_t* *win, bool en)
Set drag status of a window. If set to 'true' window can be dragged like on a PC.

Parameters

- `win`: pointer to a window object
- `en`: whether dragging is enabled

const char ***lv_win_get_title**(**const** *lv_obj_t* *win)
Get the title of a window

Return title string of the window

Parameters

- `win`: pointer to a window object

lv_obj_t ***lv_win_get_content**(**const** *lv_obj_t* *win)
Get the content holder object of window (`lv_page`) to allow additional customization

Return the Page object where the window's content is

Parameters

- `win`: pointer to a window object

lv_coord_t **lv_win_get_btn_size**(**const** *lv_obj_t* *win)
Get the control button size of a window

Return control button size

Parameters

- `win`: pointer to a window object

lv_obj_t ***lv_win_get_from_btn**(**const** *lv_obj_t* *ctrl_btn)
Get the pointer of a widow from one of its control button. It is useful in the action of the control buttons where only button is known.

Return pointer to the window of 'ctrl_btn'

Parameters

- `ctrl_btn`: pointer to a control button of a window

lv_layout_t **lv_win_get_layout**(*lv_obj_t* *win)
Get the layout of a window

Return the layout of the window (from 'lv_layout_t')

Parameters

- `win`: pointer to a window object

lv_sb_mode_t **lv_win_get_sb_mode**(*lv_obj_t* *win)
Get the scroll bar mode of a window

Return the scroll bar mode of the window (from 'lv_sb_mode_t')

Parameters

- `win`: pointer to a window object

uint16_t **lv_win_get_anim_time**(**const** *lv_obj_t* *win)
Get focus animation duration

Return duration of animation [ms]

Parameters

- `win`: pointer to a window object

lv_coord_t **lv_win_get_width**(*lv_obj_t* *win)
Get width of the content area (page scrollable) of the window

Return the width of the content area

Parameters

- `win`: pointer to a window object

const lv_style_t ***lv_win_get_style**(**const** *lv_obj_t* *win, *lv_win_style_t* type)
Get a style of a window

Return style pointer to a style

Parameters

- `win`: pointer to a button object
- `type`: which style window be get

static bool **lv_win_get_drag**(**const** *lv_obj_t* *win)
Get drag status of a window. If set to 'true' window can be dragged like on a PC.

Return whether window is draggable

Parameters

- `win`: pointer to a window object

void **lv_win_focus**(*lv_obj_t* *win, *lv_obj_t* *obj, *lv_anim_enable_t* anim_en)
Focus on an object. It ensures that the object will be visible in the window.

Parameters

- `win`: pointer to a window object
- `obj`: pointer to an object to focus (must be in the window)
- `anim_en`: LV_ANIM_ON focus with an animation; LV_ANIM_OFF focus without animation

static void **lv_win_scroll_hor**(*lv_obj_t* *win, lv_coord_t dist)
Scroll the window horizontally

Parameters

- `win`: pointer to a window object
- `dist`: the distance to scroll (< 0: scroll right; > 0 scroll left)

static void **lv_win_scroll_ver**(*lv_obj_t* *win, lv_coord_t dist)
Scroll the window vertically

Parameters

- `win`: pointer to a window object
- `dist`: the distance to scroll (< 0: scroll down; > 0 scroll up)

struct lv_win_ext_t

Public Members

lv_obj_t ***page**

lv_obj_t ***header**

lv_obj_t ***title**

const lv_style_t ***style_btn_rel**

const lv_style_t ***style_btn_pr**

lv_coord_t **btn_size**