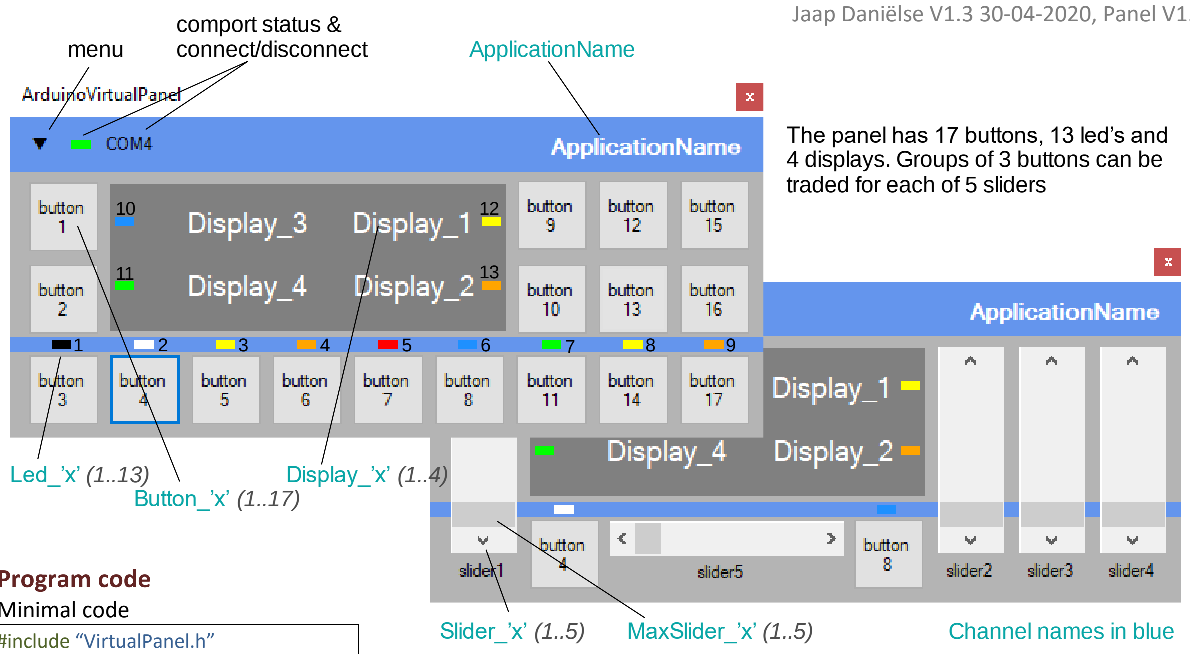
Virtual Panel

Quick Reference

Arduino Experiment Control Panel

Jaap Daniëlse V1.3 30-04-2020, Panel V1.1.x



The panel has 17 buttons, 13 led's and 4 displays. Groups of 3 buttons can be traded for each of 5 sliders

Program code

Minimal code

```
#include "VirtualPanel.h"

void setup ()
{  Panel.begin();    }

void loop ()
{  Panel.receive();  }

// callbackroutine
void PanelCalback (vp_channel event)
{  switch (event)
   {  case channel:
        ...
        break;
} }
```

```
Panel.send (channel, variable*);
Panel.sendf (channel, formatted
string**, format variables ...);
```

* types depending on channel.
** see printf formatting

Main Panel channels/events

send() or sendf() functions.
Receive via PanelCallback() event

ApplicationName — send

char*	appl. name text
color[1]	text color

PanelConnected — receive

void	on connect

Reset — send

void	reset panel

DynamicDisplay — send

bool	activate/ deactivate
int16	delay ms (100-2000)*

Receive

void	on delay freq.

*Default 250ms

UnixTime — send

void	request

receive

uint32	(local) unix time code

Beep — send

void	def: (500 Hz 400 ms)
Int16	Freq. Hz 400 ms
uint32*	Frequency, Duration

* use _Sound helper function:
long _Sound(int freq, int dur)

Button_'x' (1..17) — send

any	button text
color[1]	button text color
size[1]	text size

receive

void	on button click

Slider_'x' (1..5) — send

bool	visible/invisible
char*	slider label text
int16	set (initial) value

receive

int16	value on slider action

MaxSlider_'x' (1..5) — send

int16	maximum value*

* positive only, max 1000

PanelColor — send

color[1]	panel color

Led_'x' (1..13) — send

bool	visible/invisible
color[1]	led color

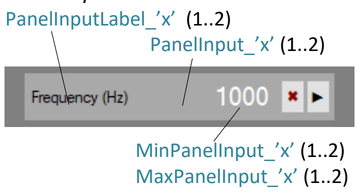
Display_'x' (1..4) — send

any	display as text
color[1]	display text color
size[1]	text size

Receive

void	double click

Panel Input



PanelInput_'x' (1..2) — send

bool	true:static/false:volatile
any	set value

receive

any*	value
void	discard

*Type same as sent type

MinPanelInput_'x' (1..2) — send

num*	min value**

MaxPanelInput_'x' (1..2) — send

num*	max value**

*Int16 int32, float32
** When string: min/max length.

PanelInputLabel_'x' (1..2) — send

any	Input label text

[1] See: *Special strings*

OpenFile_'x' (1..4) send

char*	file path string*

Receive

int23_t	line count if open
void	if file not open

* Complete filespec. opens file directly, else via dialog. *.{ext} specifies type, path only sets dialog path. Create file, no dialog: /c (valid dir. (set).

FileOpenDialogTitle_'x' (1..4) send

char*	set dialog title

ReadLineFile_'x' (1..4) send

void	read next line
int32	set next read line nr.

Receive

char*	line read *
void	end of file

* Truncates to 60 chars.

WriteLineFile_'x' (1..4) send

char*	write next line
int32	set next write line nr.

ClearFile_'x' (1..4) send

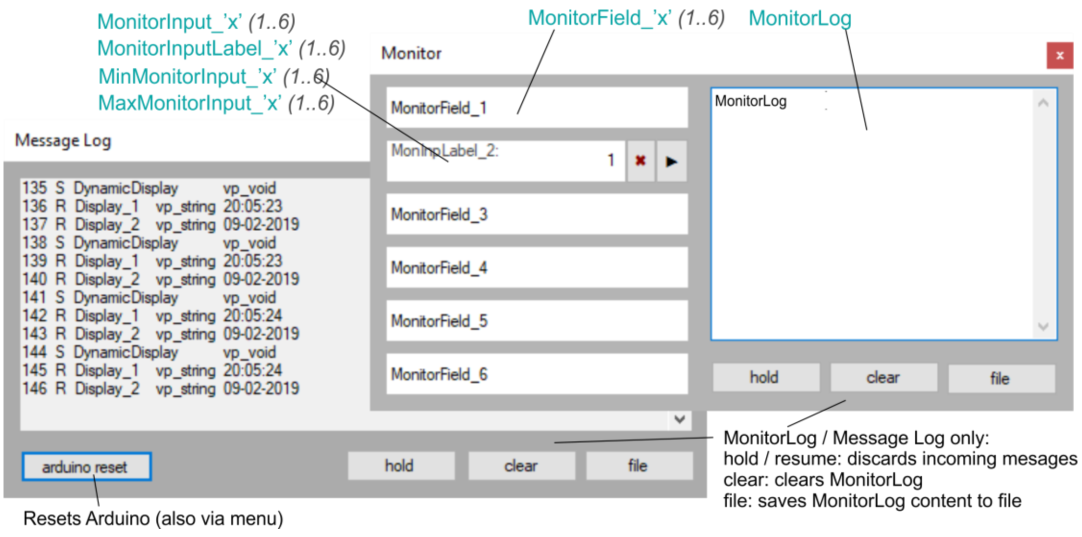
void	clear open file

Message Log Panel

Records panel incoming (R) and panel outgoing (S) messages.

Monitor Panel

Provides a log panel and additional displays and inputs



```
135 S DynamicDisplay      vp_void
136 R Display_1  vp_string 20:05:23
137 R Display_2  vp_string 09-02-2019
138 S DynamicDisplay      vp_void
139 R Display_1  vp_string 20:05:23
140 R Display_2  vp_string 09-02-2019
141 S DynamicDisplay      vp_void
142 R Display_1  vp_string 20:05:24
143 R Display_2  vp_string 09-02-2019
144 S DynamicDisplay      vp_void
145 R Display_1  vp_string 20:05:24
146 R Display_2  vp_string 09-02-2019
```

MonitorLog / Message Log only:
hold / resume: discards incoming mesages
clear: clears MonitorLog
file: saves MonitorLog content to file

Resets Arduino (also via menu)

Message Log

Format:
146 R Display_2 vp_string Test
{MessageNumber} {Send/Receive} {channel} {VarType} {Value}

Monitor channels / events

Monitor send

bool	win. visible/invisible

MonitorField_'x' (1..6) send

any	display as text

MonitorInput_'x' (1..6) send

bool	static/volatile
any*	value

receive

any*	value
void	discard

*Type same as sent type

MonitorInputLabel_'x' (1..2) send

any	Input label text

MinMonitorInput_'x' (1..6) send
MaxMonitorInput_'x' (1..6) send

num*	value

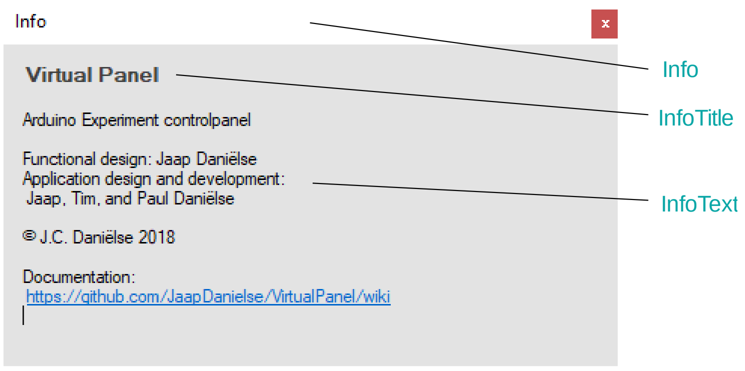
*Int16 int32, float32
When string: min/max length.

MonitorLog send

any	display as text
$CLEAR	clear Log

Info Panel

Application dependent help panel.



Virtual Panel

Arduino Experiment controlpanel

Functional design: Jaap Daniëlse
Application design and development:
Jaap, Tim, and Paul Daniëlse

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Documentation:
https://github.com/JaapDanielse/VirtualPanel/wiki

Info channels/ events

Info send

bool	win. visible/invisible
char*	$CLEAR

InfoTitle send

any*	title text

*Also clears InfoText

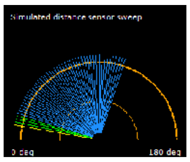
InfoText send

char*	Info text*
$CLEAR	Clears info text

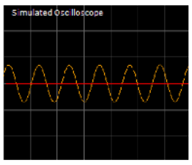
* max 60 char per send.
Can be repeated for larger text

Graph Panel

Graphic display functions (rolling/static graph, draw) panel, including additional labels and buttons.

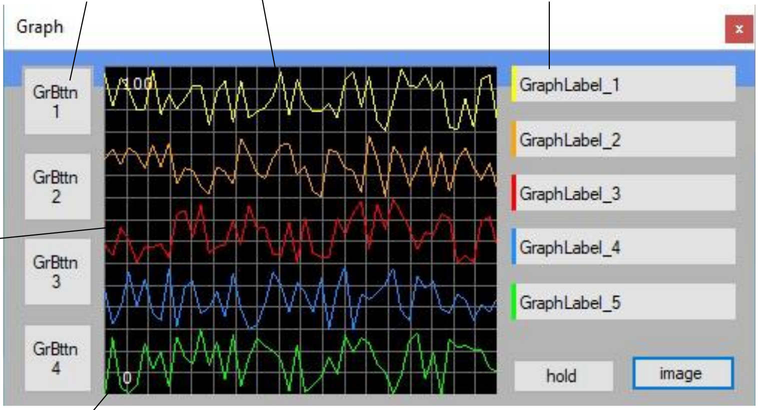


Graph Draw



Static Graph

GraphGrid
GraphDrawLine
GraphDrawPixel
GraphText
GraphClick
GraphRightClick
GraphDoubleClick



RolingGraph

hold / resume: discards incoming mesages
image: saves graph pane content to file

Graph channels/events

Graph — send

bool	win. visible/invisible
char*	$CLEAR

GraphGrid — send

int16	vert. grid count

GraphDrawLine — send

void	line start
uint16²	line point (x,y)
uint32²	line segment (x,y,x',y')
color¹	line color
width¹	line width

GraphDrawPixel — send

uint16²	point (x,y)
color¹	pixel color
width¹	pixel width

GraphDrawCircle — send

params²	circle parameters
color¹	circle color
width¹	circle width

GraphCaption_'x' (1..2) — send

any	Caption text

Graph Panel 255(x) X 220(y)
Actual 263(x) for GraphValue

GraphText — send

color¹	text color
uint16²	point 2 x byte (x,y)
char*	text

GraphValue_'x' (1..5) — send

byte	graph value (0-255)
color¹	graph color
width¹	line width string
type¹	rolling/static
$CLEAR	clear sent values

GraphValueCount_'x' (1..5) — send

int16	hor. value count

¹See: *Special strings*
² See: *Helper functions Draw* _Point, _Line _Circle

GraphButton_'x' (1..4) — send

any	button text
color¹	button color
size¹	text size

receive

void	on button click

GraphClick — receive
GraphRightClick — receive
GraphDoubleClick* — receive

uint16**	click position

* occurs together with GraphClick
**uint 2 x byte (X,Y)
(same as -DrawPixel and -DrawLine)

GraphLabel_'x' (1..5) — send

bool	visible/invisible
any	label text
color¹	color bar color*

* $OFF (color bar invisible)

GraphInput_'x' (1..5) — send

bool	static/volatile
any*	set value

receive

any*	value
void	discard

*Type same as sent type

GraphInputLabel_'x' (1..5) — send

any	Input label text

MinGraphInput_'x' (1..5) — send
MaxGraphInput_'x' (1..5) — send

num*	min/max value

*Int16 int32, float32
When string min/max length.

Data types and Panel Variables

Data types

vp_type::vp_void	void
vp_type::vp_boolean	bool
vp_type::vp_string	char*
vp_type::vp_byte	byte
vp_type::vp_int	int16
vp_type::vp_uint	uint16
vp_type::vp_long	int32
vp_type::vp_ulong	uint32
vp_type::vp_float	float

Event data type received in:

Panel.vpr_type	vpr_type

Panel variables
(Event data received)

Panel.vpr_void	void
Panel.vpr_bool	bool
Panel.vpr_string	char*
Panel.vpr_byte	byte
Panel.vpr_int	int16_t
Panel.vpr_uint	unint16_t
Panel.vpr_long	int32_t
Panel.vpr_ulong	unit32_t
Panel.vpr_float	float32_t

vpr_void DynamicDisplay *(timer)*,
Button, GraphButton *(click)*,
ReadLineFile *(eof)*,
Display *(double click)*, PanelInput,
MonitorInput, GraphInput *(discard)*
vpr_bool OpenFile, WriteLineFile
vpr_string ReadLineFile *(line read)*
vpr_int Slider *(slider value)*
vpr_long UnixTime *(timecode)*
any type PanelInput, MonitorInput ,
GraphInput *(send)*

Code example:

```
if (Panel.vpr_type==vp_type::vp_int)
  MyInt = Panel.vpr_int;
```

Special strings

Color strings

For: ApplicationName, Display, Led, Button, GraphButton, GraphValue, GraphLine, GraphPixel, GraphCircle.

$DELETE*	
$OFF**	⬛
$BLACK	⬛
$GRAY	◼
$PURPLE	🟪
$PINK	🟪
$BLUE	🟦
$GREEN	🟩
$YELLOW	🟨
$ORANGE	🟧
$RED	🟥
$BROWN	🟫
$WHITE	⬜

* draw only ** Led only

Graph Type strings

Set graph type for: GraphValue. Rolling values are added right and move to left. Static waits until all values have been sent then displays.

$ROLING*	Set rolling graph
$STATIC	Set static graph

* default

Pen size strings Draw

Size for: GraphPixel, GraphLine, GraphCircle, GraphValue.

$1PX*	1 pixel
$2PX	2 pixels
$3PX	3 pixels
$4PX	4 pixels

* default

Text attributes/size strings

For: Display, Button, GraphButton.

$SMALL	font size small
$NORMAL*	font size normal
$BIG	font size big
$BOLD	bold text

*Default. Resets bold and big

(Helper) Functions

Panel Delay function

bool Panel.Delay(int16_t milliseconds, bool receive)
Allows to check for incoming messages during delay. If receive is true. Panel receive is called. If an incoming message was detected true is returned.

Helper function Sound

uint32_t _Sound(int freq, int dur)
Combines two int16_t (frequency Hz, duration mS) into one uint32_t.

Helper functions Draw

_Point()
uint16_t _Point(byte x, byte y)
combines 2 bytes into uint16_t (x,y) for a point.
When sent to GraphDrawLine consecutive points are connected in a line.

_Line()
uint32_t _Line(byte Fx, Fy, Tx, Ty)
Combines four bytes into uint32_t (x from, y from, x to, y to)

_Circle()
char * _Circle(byte x, byte y, byte rad, int angle, int arc)
Center (x,y) radius, start angle, radius angle.

_VPoint()/_VLine()/_VCircle()
uint16_t _VPoint(byte x, byte y)
uint32_t _VLine(byte Fx, Fy, Tx, Ty)
char * _VCircle(byte x, byte y, byte rad, int angle, int arc)
Same as _Point, _Line and _Circle but transforms y values from value (0-255) to coordinate (0-220).

Sendf() / Printf formatting

%[flags][width][length]specifier

specifiers (limited list)

%d	signed decimal
%ld	unsigned int32
%u	unsigned decimal
%o	unsigned octal
%x	unsigned hex
%c	character
%s	string

flags

-	left justify
+	force sign
0	pad zero’s

Examples:
Panel.sendf (Display_1, “Test %d”, 10) // output: Test 10
Panel.sendf(Display_1, “Test %03d”, 10) // output: Test 010
Panel.sendf(Display_1, “Test %+d”, 10) // output: Test +10

Helper function Float string

char * _FString(floatNumber, length, decimals);

sendf() float

Float not supported on AVR (Uno, Nano, Mega …)
Use _FString() helper function.
char* _FString(floatNumber, length, decimals); again with Panel.sendf using “%s”

Example:
Panel.sendf(Display_1, “Value %s”, _FString(FloatValue, 5, 2));
Prints FloatValue using 5 chars, 3 of which are a ‘.’ and 2 decimals.

Unicode characters

Using send() or sendf() to send a string, Unicode characters can be used. Simply copy and paste into the string.

F() Macro

In both send() and sendf() the F() macro for strings is allowed. This will force the string to be placed in program memory. (*not Due*)
Example:
Panel.sendf (Display_1,
  F(“Value %d”), 10);