

RealplumPro SDK 1.20 Update User Guide

1 REVISION HISTORY

Table 1 Revision History

Rev #	Date	Action	By
0.3	09/08/2021	First draft	JackPan
0.4	09/10/2021	Fixed PWM setting for LED PN measurement	JackPan
0.41	09/10/2021	Fixed Internal temperature sensor gain	JackPan
0.42	09/10/2021	Fixed Vbatt ADC channel selection	JackPan
1.00	12/09/2021	Add frameld log function, add ls_read_status_ext function, fixed auxPWM dutycycle configuration issues	JackPan
1.01	12/31/2021	Fixed temperature sensor measurement inaccurate issues	JackPan
1.02	01/18/2022	Update LIN stack to V2.04, fix multiPDUs with NAD=0x7F, 0x3D response valid NAD issues.	JackPan
1.03	05/10/2022	Add LIN stack APIs for LIN status management: <ol style="list-style-type: none"> 1. l_u8 ls_clr_save_configuration_flag(void); 2. lin_status_t ls_ifc_read_status(void); 3. l_u8 ls_ifc_clear_error_status(void); 4. l_u8 ls_read_error_code_log(void); 5. l_u8 ls_clr_error_code_log(void); 6. l_u8 ls_read_go_to_sleep_flag(void); 7. l_u8 ls_clr_go_to_sleep_flag(void); 8. l_u8 ls_clr_overrun_flag(void); Add task pending API for task state query: <ol style="list-style-type: none"> 1. uint8_t TM_TaskIsPending(TM_TaskId_t taskId); Add LIN wakeup callback function	JackPan
1.1	9/19/2022	Add physical Intensity APIs: <ol style="list-style-type: none"> 1. CLM_SetXYAbsY 2. CLM_SetAbsLUV 3. CLM_SetSRGBAbsL 	Jack.Pan
1.2	12/26/2022	Fixed ColorMixing possibly no output when target color is close to R(x,y) G(x,y) or B(x,y) of target RGB LED coordinates.	JackPan

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3 CHANGES V1.10

3.1 BUG FIXED

Fixed ColorMixing possibly no output when target color is close to R(x,y) G(x,y) or B(x,y) of target RGB LED coordinates.

Update ColorMixing Library to 2.1.2

3.2 NEW FEATURES

None

4 CHANGES V1.10

4.1 BUG FIXED

None

4.2 NEW FEATURES

1. Add physical intensity APIs for Color consistency display in different modules and environment.

```

184  /*
185  * Set xy absolute physical intensity output for example: P(x,y) = (0.33333,0.33333) x = 0.33333*65536 = 21845, y = 0.33333*65536 = 21845 intensity: lumen or mod
186  * @param [in] temperature: -40-100 in 1C
187  * @param [in] x: 0-65535
188  * @param [in] y: 0-65535
189  * @param [in] intensity: 0-65535, lumen or mod, if intensity value is higher than maximum intensity of the target color, it would display maximum intensity of the target color.
190  * @param [in] transitionTime: 0-65535ms
191  * @return 0
192  */
193  uint8_t CLM_SetXYAbsY(LedNum_t ledIndex, ColorTemperature_t temperature, uint16_t x, uint16_t y, uint16_t intensity, uint16_t transitionTime);
194

```

```

206  /*
207  * Set uv absolute phy intensity output, intensity: lumen or mod
208  * @param [in] temperature: -40-100 in 1C
209  * @param [in] u: 0-1023
210  * @param [in] v: 0-1023
211  * @param [in] intensity: 0-65535, lumen or mod, if intensity value is higher than maximum intensity of the target color, it would display maximum intensity of the target color.
212  * @param [in] transitionTime: 0-65535ms
213  * @return 0
214  */
215  uint8_t CLM_SetAbsUV(LedNum_t ledIndex, ColorTemperature_t temperature, uint16_t u, uint16_t v, uint16_t intensity, uint16_t transitionTime);
216

```

```

231  /*
232  * Set sRGB absolute phy intensity output lumen or mod,
233  * @param [in] temperature: ~40-100 in 1C
234  * @param [in] red: 0-255
235  * @param [in] green: 0-255
236  * @param [in] blue: 0-255
237  * @param [in] intensity: 0-65535, lumen or mod, if intensity value is higher than maximum intensity of the target color, it would display maximum intensity of the target color.
238  * @param [in] transitionTime: 0-65535ms
239  * @return 0
240  */
241  uint8_t CLM_SetSRGBAbsI(LedNum_t ledIndex, ColorTemperature_t temperature, uint8_t red, uint8_t green, uint8_t blue, uint16_t intensity, uint16_t transitionTime);
242

```

2. Add function for bypassing intensity degradation:

```

108  /*
109  * ColorMixing Intensity Degradation enable, there is about 3% Intensity Degradation by default
110  * @param [in] enable: 0U: disable degradation, others: enable degradation
111  * @return 0
112  */
113  uint8_t CLM_SetIntensityDegradation(uint8_t enable);
114
115  /*
116  * Get ColorMixing Intensity Degradation enable state.
117  * @param [in] none
118  * @return 0U: disable degradation, 1U: enable degradation
119  */
120  uint8_t CLM_GetIntensityDegradation(void);
121

```

5 CHANGES V1.03

5.1 BUG FIXED

None

5.2 NEW FEATURES

```

486  /*
487  * Save current LIN Stack parameters such as NAD, PIDs etc. refer to pdsTask for more information.
488  * @param [in] none.
489  * @return 0.
490  */
491  void ls_save_configuration(void);
492
493  /*
494  *
495  */
496  void ls_clr_save_configuration_flag(void);
497

```

```

444- /*
445- *
446- */
447- void ls_read_sys_status(void);
448-
449- /*
450- * Read current error flag and system information, simulate with ls_read_sys_status not don't clear the status
451- * @return:
452- * 1_u8 error_in_respond
453- * 1_u8 success_in_transfer
454- * 1_u8 overrun
455- * 1_u8 goto_sleep
456- * 1_u8 bus_activity
457- * 1_u8 event_trig_frame_collision
458- * 1_u8 save_config
459- * 1_u8 parity_error
460- * 1_u8 pid;
461- */
462- lin_status_t ls_ifc_read_status(void);
463-
464- /*
465- * reset lin error status.
466- * @param [in] errCode.
467- * @return: 0U;
468- */
469- void ls_ifc_clear_error_status(void);
470-

```

```

449 void ls_read_error_code(void);
450
451+ /*
452+ * Read current lin stack communication error reasons, this is only for internal use and don't clear the error log
453+ * @param [in] none.
454+ * @return: (1U << ERROR_BITERR_POS) | (1U << ERROR_OCM_POS) | (1 << ERROR_PARITY_POS) | (1U << ERROR_BITERR_POS) | (1U << ERROR_OCM_POS) | (1 << ERROR_PARITY_POS)
455+ */
456+ void ls_read_error_code_log(void);
457+
458+ /*
459+ * Clear the error code log.
460+ * @param [in] none.
461+ * @return: 0;
462+ */
463+ void ls_clr_error_code_log(void);
464+
465+ /*
466+ * Set LIN hardware reset.
467+ * @param [in] hardwareReset: 0: not set, 1: set.
468+ * @return: 0;
469+ */
470+ void ls_set_32602_hardware_reset(uint8_t hardwareReset);
471+
472+ /*
473+ * Read go_to_sleep flag.
474+ * @param [in] none.
475+ * @return: state: 1: got go_to_sleep command, 0: not got go_to_sleep command
476+ */
477+ void ls_read_go_to_sleep_flag(void);
478+
479+ /*
480+ * Clear go_to_sleep flag.
481+ * @param [in] none.
482+ * @return: 0U;
483+ */
484+ void ls_clr_go_to_sleep_flag(void);
485+
486+ /*
487+ * Clear overrun flag.
488+ * @param [in] none.
489+ * @return: 0U;
490+ */
491+ void ls_clr_overrun_flag(void);
492+
493+ /*
494+ * Internal function declarations
495+ */
496+ void DiagnosticSubscribedCmdsHandle(const DiagReqInfo_t * const frameInfo);
497+ void UnconditionalSubscribedCmdsHandle(LIN_Device_Frame_t const *frame);
498+ void UnconditionalPublishedCmdsISR(LIN_Device_Frame_t *const frame);
499+ void UnconditionalPublishedCmdsTxFinishedISR(uint8_t fid, uint8_t resvd);
500+ void DiagnosticSleepRequestHandle(SleepRequestType_t type);
501+ void BusWakeUpRequestHandle(BusWakeUpRequestResult_t result);
502+ void DiagReqLogPrint(const LIN_Device_Frame_t * const frame);
503+
504+ /*
505+ * LIN command handle callbacks declarations
506+ */
507+ static ls_linsFramesCallback_t linsFramesCallback = {
508+     UnconditionalSubscribedCmdsHandle, /* received data from master */
509+     UnconditionalPublishedCmdsISR, /* send data to master, it's an interrupt function, please fill the data as fast as possible */
510+     UnconditionalPublishedCmdsTxFinishedISR, /* send data to master finished, it's an interrupt function, please fill the data as fast as possible */
511+     DiagnosticSubscribedCmdsHandle, /* Diagnostic single PDU and MultiPDU received from master */
512+     NULL, /* special functional NAD (0x7E) handler */
513+     DiagnosticSleepRequestHandle, /* Diagnostic sleep request from master */
514+     BusWakeUpRequestHandle, /* Get the bus wake up result this would take effects after call API: ls_send_wake_up */
515+     NULL, /* SAE J2602 -1 Configuration Messages */
516+     NULL, /* 5.7.2.5 DMN Based Broadcast Messages */
517+ };
518+
519+ /*
520+ * Received sleep command from lin master or bus idle timeout occurs
521+ */
522+ void DiagnosticSleepRequestHandle(SleepRequestType_t type)
523+ {
524+     /* Set lin to sleep mode */
525+     /* LIN_SetSlaveModuleToSleep(); */
526+     /* Set system to hibernate mode */
527+     PWML_EnterDeepSleepMode();
528+ }
529+
530+ /*
531+ * Received sleep command from lin master or bus idle timeout occurs
532+ */
533+ void DiagnosticSleepRequestHandle(SleepRequestType_t type)
534+ {
535+     ls_clr_go_to_sleep_flag();
536+     /* Set lin to sleep mode */
537+     /* LIN_SetSlaveModuleToSleep(); */
538+     /* Set system to hibernate mode */
539+     PWML_EnterDeepSleepMode();
540+ }

```

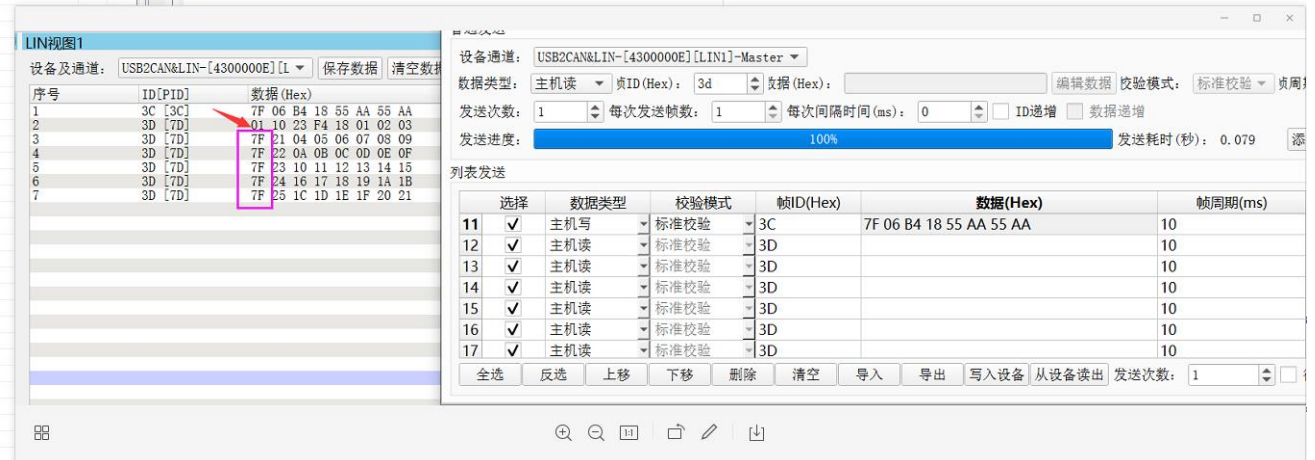
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272+
273+ void UnconditionalPublishedCmdsTxFinishedISR(uint8_t fid, uint8_t resvd)
274+ {
275+     if (fid == UnconditionalCmdsTable[FID_STATUS_FRAME_INDEX].frame_id){
276+         ls_ifc_clear_error_status();
277+         ls_clr_error_code_log();
278+     }
279+ }
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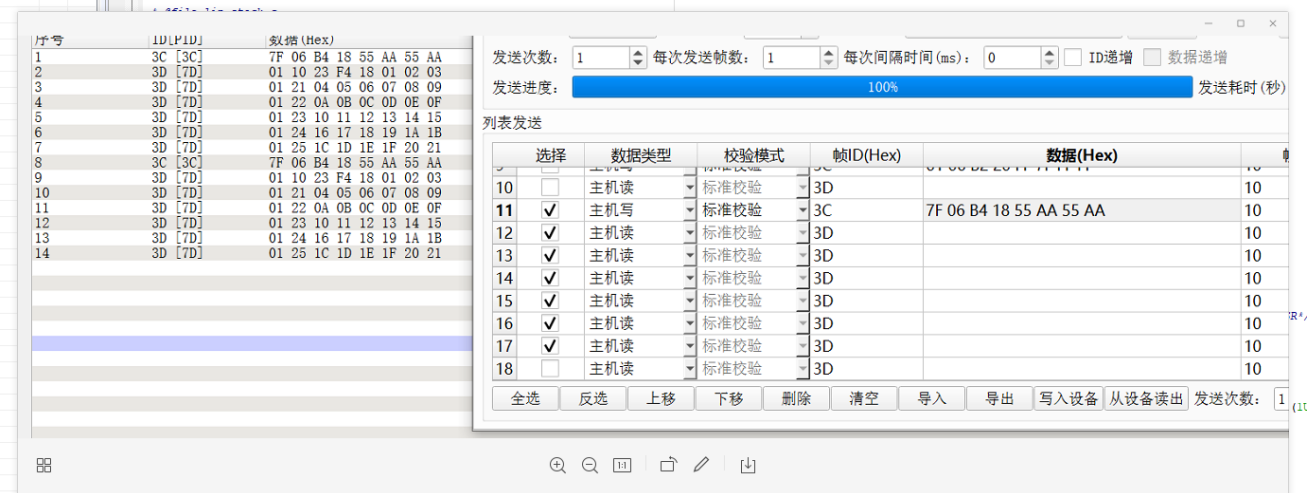
6 CHANGES V1.02

Update LIN stack to V2.04, fix multiPDUs with NAD=0x7F, 0x3D response valid NAD issues.

Before change:



After change:



7 CHANGES V1.01

7.1 BUG FIXED

- 1) Fixed temperature sensor measurement inaccurate issues: increase sampling cycle when select Vtemp channel:

libdev_realplumPro_app.01.01_lin_2.0.3_colorlib_2.0.1:

```
diff --git a/drivers/hal/src/adc_device.c b/drivers/hal/src/adc_device.c
index f2ee729..a67863a 100644
--- a/drivers/hal/src/adc_device.c
+++ b/drivers/hal/src/adc_device.c
@@ -47,9 +47,8 @@ void ADC_Init(AdcMeasureItem_t item, uint8_t channel, LedType_t type, AdcSyncMod
{
    adcMeasParam.item = item;
    adcMeasParam.channel = channel;

    if(item == ADC_MEASURE_ITEM_LED_VBAT_VTEMP){
        ADC_SFRR->CONF_SAMPVCYC = 40U;
    }
    if(item == ADC_MEASURE_ITEM_VBAT_VTEMP){
        ADC_SFRR->CONF_SAMPVCYC = 44U;
    }
    else{
        ADC_SFRR->CONF_SAMPVCYC = 10U;
    }
}

diff --git a/usr/common/measureTask.c b/usr/common/measureTask.c
index c41ab14..fc485a7 100644
--- a/usr/common/measureTask.c
+++ b/usr/common/measureTask.c
...skipping...
commit 84b089f8e4179ba594232d9956b6f40b40d3208 (HEAD -> V3.6)
Author: Jack Pan <jack.pan@indiemicro.com>
Date: Fri Jan 7 15:07:05 2022 +0800

0

diff --git a/drivers/hal/src/adc_device.c b/drivers/hal/src/adc_device.c
index f2ee729..a67863a 100644
--- a/drivers/hal/src/adc_device.c
+++ b/drivers/hal/src/adc_device.c
@@ -47,9 +47,8 @@ void ADC_Init(AdcMeasureItem_t item, uint8_t channel, LedType_t type, AdcSyncMod
{
    adcMeasParam.item = item;
    adcMeasParam.channel = channel;

    if(item == ADC_MEASURE_ITEM_LED_VBAT_VTEMP){
        ADC_SFRR->CONF_SAMPVCYC = 40U;
    }
    if(item == ADC_MEASURE_ITEM_VBAT_VTEMP){
        ADC_SFRR->CONF_SAMPVCYC = 44U;
    }
    else{
        ADC_SFRR->CONF_SAMPVCYC = 10U;
    }
}

diff --git a/usr/common/measureTask.c b/usr/common/measureTask.c
index c41ab14..fc485a7 100644
--- a/usr/common/measureTask.c
+++ b/usr/common/measureTask.c
@@ -148,7 +148,7 @@ void measureParamStart(void)
{
    break;
    case ADC_MEASURE_ITEM_LED_VBAT_VTEMP:
        add_data_to_buff(&adcResult.vChipTemp.currCode, measGeneralAdcCode[0], &adcResult.vChipTemp.count, &adcResult.vChipTemp.buff);
    //
    add_data_to_buff(&adcResult.vChipTemp.currCode, measGeneralAdcCode[0], &adcResult.vChipTemp.count, &adcResult.vChipTemp.buff);
    add_data_to_buff(&adcResult.vBatt.currCode, measGeneralAdcCode[1], &adcResult.vBatt.count, &adcResult.vBatt.buff);
    if (PM_LedIsOn(0) == 0U){
        add_data_to_buff(&adcResult.vLedPn[0][measLedColorNo].currCode, measGeneralAdcCode[2], &adcResult.vLedPn[0][measLedColorNo].count, &adcResult.vLedPn[0][measLedColorNo].buff);
    }
}
```

libdev_realplumPro_app.01.01_lin_2.0.3_colorlib_2.0.1_4leds:

```
diff --git a/drivers/hal/src/pwm_device.c b/drivers/hal/src/pwm_device.c
index d4fd696..d64d174 100644
--- a/drivers/hal/src/pwm_device.c
+++ b/drivers/hal/src/pwm_device.c
@@ -75,6 +75,7 @@ void ADC_Handler(void)
{
    else{
        tempCode = ADC_SFRR->DATA0345;
        battCode = ADC_SFRR->DATA1;
        ADC_SFRR->CONF_SAMPVCYC = 10U;
    }
}

#if LED_NUM == 1U
LedPowerSwitch = 0U;
@@ -174,6 +175,7 @@ void PWM_Handler(void)
{
    ledConvertCount = 0U;
    ADC_SFRR->CONTRL_CHSEQ = (uint8_t)ADC_CH3_THEN_CH1;
    ADC_SFRR->CONF_SAMPVCYC = 40U;
    ledConvert = FALSE;
}
ADC_SFRR->CONTRL_CONVERT = 1U;
```

7.2 NEW FEATURES

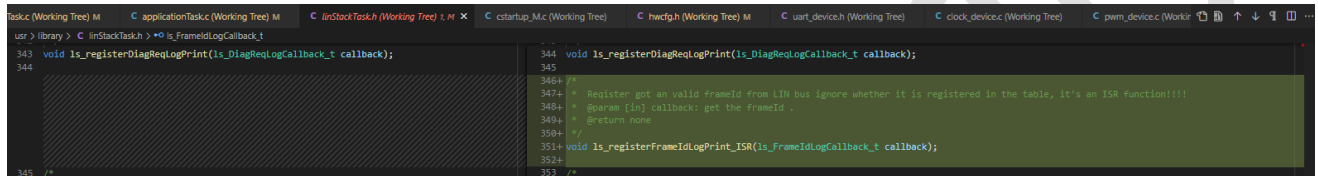
8 CHANGES V1.00

8.1 BUG FIXED

None

8.2 NEW FEATURES

Add Frame ID log function which can be used for time sync when doing the dynamic light sequency.

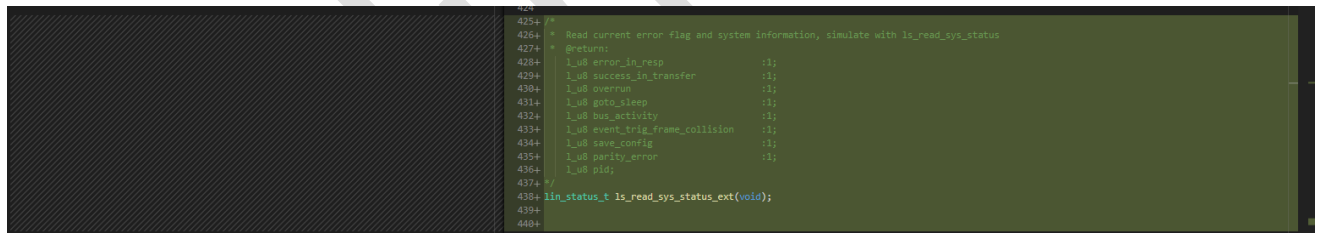


```

343 void ls_registerDiagReqLogPrint(ls_DiagReqLogCallback_t callback);
344
345
346+ /*
347+  * Register got an valid frameId from LIN bus ignore whether it is registered in the table, it's an ISR function!!!!
348+  * @param [in] callback: got the frameId
349+  * @return none
350+  */
351+ void ls_registerFrameIdLogPrint_ISR(ls_FrameIdLogCallback_t callback);
352+
353+ /*
354+  */
355+ */

```

Add an extra error report function which would be easy to be understood through source code, it is the same as function ls_read_sys_status().



```

425+ /*
426+  * Read current error flag and system information, simulate with ls_read_sys_status
427+  * @return:
428+  * 1_u8 error_in_resp      :1;
429+  * 1_u8 success_in_transfer :1;
430+  * 1_u8 overrun           :1;
431+  * 1_u8 goto_sleep        :1;
432+  * 1_u8 bus_activity       :1;
433+  * 1_u8 event_trig_frame_collision :1;
434+  * 1_u8 save_config        :1;
435+  * 1_u8 parity_error       :1;
436+  * 1_u8 pid;
437+  */
438+ lin_status_t ls_read_sys_status_ext(void);
439+
440+
441+ /*

```

9 CHANGES V0.41

9.1 BUG FIXED

Fixed VBATT ADC channel selection:

```
main.c | inslaveTask.c | applicationTask.c | pwm_device.c x
}

/**
 * @brief The instance of PWM device
 */
void PWM_Init(PwmPrescaler_t divide, uint16_t period, uint8_t invertEn)
{
    for (uint8_t i = 0U; i < LED_NUM; i++){
        for (uint8_t channel = 0U; channel < 3U; channel++){
            ledPnCode[i][channel] = INVALID_ADC_CODE;
            ledBattCode[i][channel] = INVALID_ADC_CODE;
            currPwmMatchValue[i][channel] = period;
        }
    }
    battCode = INVALID_ADC_CODE;
    tempCode = INVALID_ADC_CODE;

    PWM_SFRS->BASE.PRESCALESEL = (uint8_t)divide;
    PWM_SFRS->BASE.PERIOD = period;
    IOCTRLA_SFRS->LEDPIN.VFW_ENA = 1U;
    IOCTRLA_SFRS->LEDPIN.SENSE_ENA = 1U;
    for (uint8_t channel = 0U; channel < 3U; channel++){
        IOCTRLA_SFRS->LEDPIN.HWMODE |= (1U << channel);
        PWM_SFRS->INVERT |= (uint32_t)invertEn << channel;
        PWM_SFRS->PULSE[channel].PFALL = period;
        PWM_SFRS->PULSE[channel].PRISE = period;
    }
    PWM_SFRS->INTPWM.ENABLE.BYTE = 0U;
    PWM_SFRS->ENAREQ.ENAREQ = (1U << PWM_CHANNEL_0) | (1U << PWM_CHANNEL_1) | (1U << PWM_CHANNEL_2);
    PWM_SFRS->INTPWM.ENABLE.UPD = (1U << PWM_CHANNEL_0);

    ADC_SFRS->CTRL.CHSEL = (uint8_t)ADC_CH1_SEL_VBAT;
    PWM_SFRS->UPDATE = 1U;
    NVIC_EnableIRQ(PWM_IRQn);
}
```

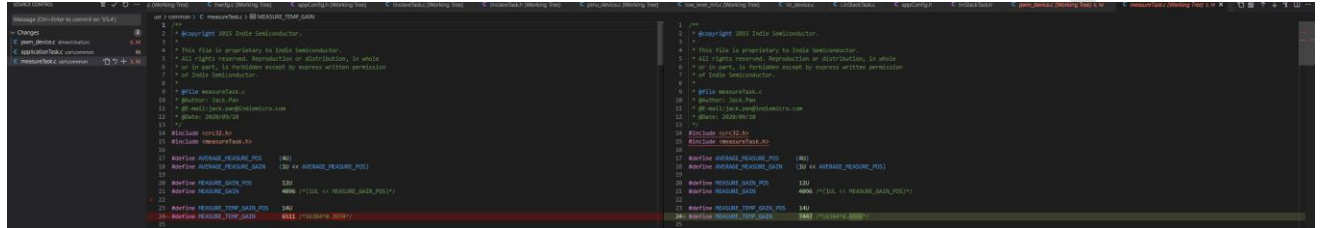
9.2 NEW FEATURES

None

10CHANGES V0.41

10.1BUG FIXED

Fixed internal temperature sensor gain:



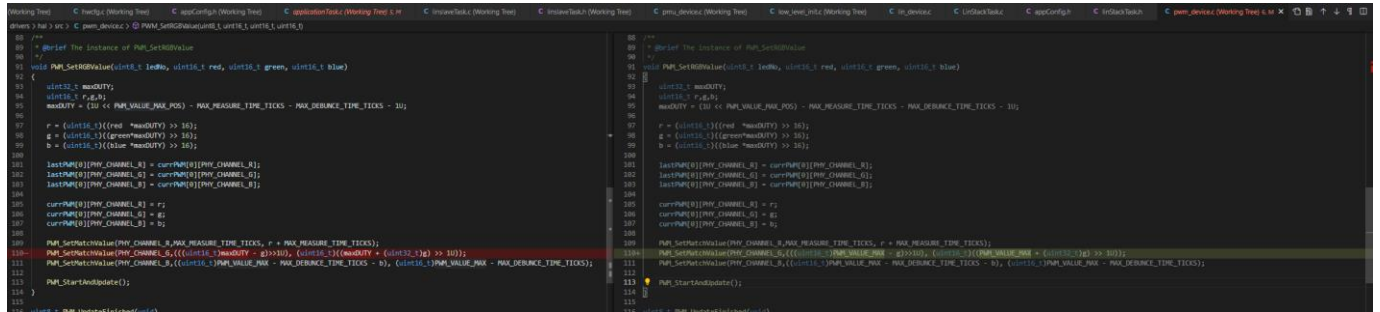
10.2NEW FEATURES

None

11 CHANGES V0.4

11.1 BUG FIXED

Fixed PWM load average issue which would affect LED PN measurement



```

80 //
81 // Brief the instance of Pwm_SetValue
82 //
83 void Pwm_SetValue(uint8_t ledNo, uint8_t red, uint8_t green, uint8_t blue)
84 {
85     uint32_t maxDuty;
86     uint32_t pDuty;
87     maxDuty = (10 << (Pwm_Value_Max_Pos) - Pwm_Measure_Time_Ticks - Pwm_Derance_Time_Ticks - 10);
88     p = (uint16_t)((red * maxDuty) >> 16);
89     g = (uint16_t)((green * maxDuty) >> 16);
90     b = (uint16_t)((blue * maxDuty) >> 16);
91
92     lastPwm[0][Pwm_Channel_R] = currPwm[0][Pwm_Channel_R];
93     lastPwm[0][Pwm_Channel_G] = currPwm[0][Pwm_Channel_G];
94     lastPwm[0][Pwm_Channel_B] = currPwm[0][Pwm_Channel_B];
95
96     currPwm[0][Pwm_Channel_R] = p;
97     currPwm[0][Pwm_Channel_G] = g;
98     currPwm[0][Pwm_Channel_B] = b;
99
100     Pwm_SetMeasure(Pwm_Channel_R, Pwm_Measure_Time_Ticks, p = Pwm_Measure_Time_Ticks);
101     Pwm_SetMeasure(Pwm_Channel_G, ((uint16_t)(maxDuty - g) >> 16), (uint16_t)(maxDuty + (uint32_t)g >> 16));
102     Pwm_SetMeasure(Pwm_Channel_B, ((uint16_t)(maxDuty - b) >> 16), (uint16_t)(maxDuty + (uint32_t)b >> 16));
103
104     Pwm_StartAndUpdate();
105 }
106
107 // End of Pwm_SetValue
108
109 //
110 // Brief the instance of Pwm_SetValue
111 //
112 void Pwm_SetValue(uint8_t ledNo, uint8_t red, uint8_t green, uint8_t blue)
113 {
114     uint32_t maxDuty;
115     uint32_t pDuty;
116     maxDuty = (10 << (Pwm_Value_Max_Pos) - Pwm_Measure_Time_Ticks - Pwm_Derance_Time_Ticks - 10);
117     p = (uint16_t)((red * maxDuty) >> 16);
118     g = (uint16_t)((green * maxDuty) >> 16);
119     b = (uint16_t)((blue * maxDuty) >> 16);
120
121     lastPwm[0][Pwm_Channel_R] = currPwm[0][Pwm_Channel_R];
122     lastPwm[0][Pwm_Channel_G] = currPwm[0][Pwm_Channel_G];
123     lastPwm[0][Pwm_Channel_B] = currPwm[0][Pwm_Channel_B];
124
125     currPwm[0][Pwm_Channel_R] = p;
126     currPwm[0][Pwm_Channel_G] = g;
127     currPwm[0][Pwm_Channel_B] = b;
128
129     Pwm_SetMeasure(Pwm_Channel_R, Pwm_Measure_Time_Ticks, p = Pwm_Measure_Time_Ticks);
130     Pwm_SetMeasure(Pwm_Channel_G, ((uint16_t)(maxDuty - g) >> 16), (uint16_t)(maxDuty + (uint32_t)g >> 16));
131     Pwm_SetMeasure(Pwm_Channel_B, ((uint16_t)(maxDuty - b) >> 16), (uint16_t)(maxDuty + (uint32_t)b >> 16));
132
133     Pwm_StartAndUpdate();
134 }
135
136 // End of Pwm_SetValue
137

```

11.2 NEW FEATURES

None

12CHANGES V0.3

12.1BUG FIXED

None

12.2 NEW FEATURES

1. Add Macro `AUTO_ADDRESSING_EN` for SNPD Option specific LIN slew rate configuration:

```
#include <clock_device.h>
#include <pwm_device.h>
#include <string.h>

#define PRAGMA(x) _Pragma(#x)
#define BEGIN_PACK PRAGMA(pack(push, 1))
#define END_PACK PRAGMA(pack(pop))

#define LIN_STACK_TYPE_LIN2_2A (0U)
#define LIN_STACK_TYPE_SAEJ2602 (1U)
#define LIN_STACK_TYPE_PRIVATE (2U)

#define LIN_STACK_TYPE LIN_STACK_TYPE_LIN2_2A

#define AUTO_ADDRESSING_EN (0U)
```

2. Add Diagnostic Request command(0x3C) monitor callback for adapting user's requirements.

```
linSlaveTask.c * x appConfig.h lin_device.c

void DiagReqLogPrint(const LIN_Device_Frame_t * const frame)
{
}

void LINS_TaskHandler(void)
{
    switch(linsTaskState) {
        case TASK_STATE_ACTIVE:
            break;
        case TASK_STATE_INIT:
            ls_register_services(LIN_PROTOCOL_LIN2_2A, UnconditionalCmdsTable, (1_u8)(sizeof(UnconditionalCmdsTable)/sizeof(LIN_Device_Frame_t)), DIAG_DATA_BUFF_SIZE, &linsFramesCallback);
            (void)ls_set_timeout(N AS, N CR);
            ls_registerDiagReqLogPrint(DiagReqLogPrint);
            /* Note: user please don't change the following glitch configuration!!!! */
            (void)ls_set_lins_rx_glitch_filter_1st(0x00U, 0x08U);
            (void)ls_set_lins_rx_glitch_filter_2nd(0x08U, 0x10U);
            (void)ls_set_lins_rx_glitch_filter_3rd(0x30U, 0x30U);
            (void)l_sys_init();
            linsTaskState = TASK_STATE_ACTIVE;
            break;
        default:
            break;
    }
}
```