

Application Note for E909.05 and E909.6 for HALIOS tools 4.0

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Chapter 1

Application Note for E909.05 and E909.6 for HALIOS tools File Index

1.1 Application Note for E909.05 and E909.6 for HALIOS tools File List

Here is a list of all documented files with brief descriptions:

main.c (Application example to demonstrate the usage of the HALIOS tools library (lib_haliostools) for HALIOS IC E909.05 and E909.06)	3
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Chapter 2

Application Note for E909.05 and E909.6 for HALIOS tools File Documentation

2.1 main.c File Reference

Application example to demonstrate the usage of the HALIOS tools library (lib_haliostools) for HALIOS IC E909.05 and E909.06.

```
#include "firmware.h"  
#include "main.h"  
#include "user_space.h"  
#include "haliostools.h"  
#include "usb.h"
```

Defines

- #define `USB_PIN` BIT1

Functions

- const uint16_t `gui_applicationVersion` `__attribute__((section(".application_version")))`
- void `isr_gpio_falling` (void)
- void `isr_wakeup` (void)
- int `main` (int argc, char *argv[])

Variables

- volatile uint16_t `gui_doUsb` = 1
- volatile uint16_t `gui_measurement` = 0
- const char `gArc_project_number` [] = "0908503"

2.1.1 Detailed Description

Application example to demonstrate the usage of the HALIOS tools library (lib_haliostools) for HALIOS IC E909.05 and E909.06.

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Changed: 2008-12-03 Reworked documentation

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Changed: 2010-05-28 Reworked for firmware V4.0

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Date:

Changed: 2010-05-31 Reworked for firmware V4.0

Author:

Markus Kilian, Mechaless Systems GmbH

Date:

Changed: 2010-08-12 Initialization for LevelSwitch module added.

Author:

Markus Kilian, Mechaless Systems GmbH

Date:

Changed: 2010-09-14 Makro request for __cpluplus added. Firmware now runs with c++.

Id

[main.c](#),v 1.3 2011/03/17 15:38:14 mki Exp

Definition in file [main.c](#).

2.1.2 Define Documentation

2.1.2.1 #define USB_PIN BIT1

Define the hardware input pin which is connected to IC Max3420 for USB-request. For base-board its always GPIO_1

Definition at line 82 of file main.c.

2.1.3 Function Documentation

2.1.3.1 `const uint16_t gui_applicationVersion __attribute__((section(".application_version")))`

Set a project application version number. Set to a fix area at FLASH to make possible read out in output file and verify the flashed code.

2.1.3.2 void isr_gpio_falling (void)

Interrupt function Falling edge at Pin 1 is a USB-request from Master

```

**/
  if (P0NEDGE_STAT & USB_PIN)
  {
    gui_doUsb = 1;
    g_status0.wakeupEnd = 1;

  }

  P0NEDGE_CLR = 0x3F;
/**

```

Definition at line 88 of file main.c.

References gui_doUsb, and USB_PIN.

2.1.3.3 void isr_wakeup (void)

Interrupt function Wakeup occurred - Set wuakeupEnd and do a measurement

Definition at line 107 of file main.c.

References gui_measurment.

2.1.3.4 int main (int argc, char * argv[])

main

Parameters:

← *argc* dummy parameter

← *argv* dummy parameter

```

**/
uint16_t ui_cnt;
loopConf_t t_loopConf;

/* variables for filter and calibration functions */
uint16_t ui_filtervalue, ui_quiescent;
uint16_t ui_autocatch = 0;
uint16_t ui_quis_min;
Calib_Result_t t_calib_result = Calib_Nothing_Done;
uint16_t ui_lastCalibTimestamp[LOOPMAXCOUNT];
uint16_t ui_oldCalTime = 0;

```

```
/**
 * Initializes the HALIOS SFRs and set up the basic functions of hardware.
 * @n It is recommend to call this function as first call.
 *
 * @post The system is configured:
 * - The trimmvalues are read from InfoBlock and set to
 *   mclk and wkclk (only at (E909.05)
 * - Following interrupts are enabled:
 *   - HALIOS measurement ready
 *   - wakeup timer
 * - Following GPIO settings are used:
 *   - The RDY_PIN will set as output,
 *     if no readypin is needed set RDY_PIN as 0
 * - Wakup timer enabled and set to 10 ms, used for sample time
 * - One HALIOS loop enabled and set up (one LED against compensator).
 *
 * @param [in] BIT0 Set a GPIO as trigger pin for measurement, use only one bit.
 *             If not needed set to 0.
 */
haliosInitialize(BIT0);

/**
 * Set the projectnumber (eight characters) to g_sfr.project_number to make
 * readable about the constant reading mechanism @ref paramCheckSfr.
 *
 * @param[in]   gArc_project_number Pointer to a string. The maximum numbers of eight ch
 */
paramSetProjectNr((uint8_t*)(gArc_project_number));

/** Setup the register of the watchdog timer0.
 *
 * Configure the watchdog in milliseconds (ms).
 *
 * @param[in] 500 Watchdogtime in ms.
 * @n Must be smaller than 500 seconds (s)!
 * @n Higher Values will ignore and set to 500 s
 */
deviceSetWatchdogTime (500UL);

/** set IO port function to GPIO for all pins */
POCFG = 0;

/**
 * Define which communication device will be used and enable or disable the
 * related interrupts.
 * @n This function is optional. If this function is not called, communication
 * devices set all to off.
 *
 * @param[in] DEVCOM_I2C set communication to I2C
 * - For no communication device use (@ref DEVCOM_NO_COMM)
```

```

* - For I2C (@ref DEVCOM_I2C)
* - For SPI (@ref DEVCOM_SPI).
* - For SPI and I2C (@ref DEVCOM_I2C | @ref DEVCOM_SPI)
*/
deviceSetCommDevice(DEVCOM_I2C);

/**
* Call this function to show the last reset reason at a pin
* by a significant bit pattern.
* @n This function is optional. Use only if you don't want to
* do your own fail state.
* @n
* @n Count the blink sequence of the output pin:
* - 4 times blinking: watchdog reset
* - 5 times blinking: CPU register parity error
* - 6 times blinking: FLASH uncorrectable bit error
* - 7 times blinking: RAM perity error
* - 8 times blinking: Trap
* @n @n
* @param[in] outputPin Define the pin which should do the failState show
* @param[in] inputPin Define the pin which break the failState show.
*
* Set to 0 if now break is required
*/
failState(BIT2, BIT3);

/**
* Compute the checksum over all words in "Parameter FLASH Area".
* If the Checksum proofs "Valid Data", data is copied from the
* "Parameter FLASH Area" into RAM.
*
* @return
* - -1: No valid data found.
* - else: Number of copied words.
*/
if (deviceRestore() == -1)
{
    /**
    * Set the sample time in milli seconds. The wakeup timer
    * of the Analog Control Module is used for the timing.
    * Depending on the communication device the micro-controller
    * switches to STANDBY or STOP mode.
    *
    * @note time in milli seconds, must be between 2 and 32, only even
    * values are accepted. (See also description of the Analog Control Module).
    */
    paramSetSampleTime(8);

    /**
    * Set the amount of active loops.
    *
    * @param[in] count Amount of active loops. @a count must be less or equal to

```

```
* @ref LOOPMAXCOUNT.
* @return An element of the @a HaliosCode enumeration:
*     - HALIOS_OK: No error occurred
*     - HALIOS_PARAM: Wrong parameter for count passed.
*/
haliosSetLoopCount(8);

/**
* Configuration of the 1st loop.
* This is an example how to use type loopConf_t for loop configuration.
* The values are indices for the LED current of the ASIC.
*/
t_loopConf.loopNr = 0;
t_loopConf.ledConf = H_LED3B | H_LED5A | H_AON | H_ACCON;
t_loopConf.phaseA.range = 10;
t_loopConf.phaseA.offset = 22;
t_loopConf.phaseB.range = 15;
t_loopConf.phaseB.offset = 15;
t_loopConf.iConfC = 0;
t_loopConf.DC_offset = 0;
t_loopConf.PreAmp = 0;
t_loopConf.ClockConf = 0;

/**
* Store the configuration data into the virtuel loops at SFR by using
* a struct @ref LoopConf.
*
* @param[in] t_LoopConfig The LED and current configuration.
*
* @return An element of the @ref HaliosCode enumeration:
*     - HALIOS_OK: No error occurred
*     - HALIOS_PARAM: Wrong parameter in @a t_LoopConfig passed.
*/
haliosLoopInit(t_loopConf);

/**
* Store the configuration data into the virtuel loops at SFR by direct access.
*
* @note No validation check will done. It is recomment to use
* the function @ref haliosLoopInit.
*
* @param[in] loopNr 0 .. @ref LOOPMAXCOUNT
* @param[in] ledConf LED and measurement configuration.
* @param[in] iClockConf Measurement Configuration HALIOS Clock
* @param[in] iConfA Current configuration for phase A.
* @param[in] iConfB Current configuration for phase B.
* @param[in] iConfC Current configuration for the compensator offset.
* @param[in] iPreAmp Preamplifier Configuration
*/
haliosLoopInitialize(1, 20993, 0, 875, 495, 27, 0);
haliosLoopInitialize(2, 20996, 0, 810, 495, 25, 0);
```

```

haliosLoopInitialize(3, 21056, 0, 908, 495, 29, 0);
haliosLoopInitialize(4, 21077, 0, 3, 1023, 127, 0);
haliosLoopInitialize(5, 20993, 0, 287, 31, 127, 0);
haliosLoopInitialize(6, 21077, 0, 259, 1023, 127, 0);
haliosLoopInitialize(7, 20993, 0, 127, 31, 127, 0);

/**
 * Set System Status to be used for @ref deviceWaitForTimer during wait
 * until timer has elapsed or a interrupt wakes up the system.
 * @n This function is optional. If not called system status is STANDBY.
 * @n
 * @param[in] SystemStatus Selects system mode for deviceWaitForTimer
 * - DEVSET_RUN: Keep System in RUN Mode in deviceWaitForTimer
 * - DEVSET_STANDBY: Switch to STANDBY Mode in deviceWaitForTimer
 * - DEVSET_STOP: Switch to STOP Mode in deviceWaitForTimer
 * - DEVSET_OFF: Switch to OFF Mode in deviceWaitForTimer
 *
 * Keep in mind that spi-usb communication only works in RUN and in STANDBY mode.
 */
deviceSetSystemStatus(DEVSET_STANDBY);

/** Settings for filter and calibration in the user space */
paramSetValue(RAM_FILT_BORDER, HALIOS_FILT_8); /* filter depth */
paramSetValue(RAM_FILT_BREAK, 10); /* filter break */
paramSetValue(RAM_CAL_TUBE, 32); /* tube around target value */
paramSetValue(RAM_CAL_TIME, 16); /* time for calibration */
paramSetValue(RAM_CAL_DCNT, 8); /* value for movement detection with l
paramSetValue(RAM_CAL_TARGET_VALUE, 100); /* target value for calibration */

/** Set quiescent-value for the loops */
for (ui_cnt = 0; ui_cnt < haliosGetLoopCount(); ui_cnt++)
    paramSetValue(RAM_QUIESCENT_LOOP0 + (ui_cnt * BLOCK_SIZE), paramGetValue(RAM_C

/** Switch Calibration
 * Application options are:
 * CAL_START - calibration on start up
 * CAL_TIME - calibration for time
 * CAL_AUTO_CATCH - enable autocatch function
 */
paramSetValue(RAM_CAL_SETUP, ( CAL_START | CAL_TIME | CAL_AUTO_CATCH));

/** Set the time (maximum time, some USB controller call more
than this value!) the PC requests for new values. */
paramSetValue(RAM_USB_CALL_TIME, 8);
}

/**
 * Check the contents of SFR and does any special functions.
 * If the content of a SFR register has changed the new values will be copied
 * into the corresponding firmware functions or corresponding hardware registers.

```

```
* - Set size of SFR and user space to address @ref BUFFSIZE at SFR
* - Set constant reading values to SFR controlled by @ref READ_CONST_CMD
* - Set systemStatus
* - Set Communication device
* - Set sampletime
* - Use spezial functions (use careful)
* - Set main clock (ANALOG_MCLK) (Only E909.05)
* - Set wakeup clock (ANALOG_WKCLK) (Only E909.05)
* - Set HALIOS frequency (Only E909.06)
* - Set number of Loops to g_sfr.loopCount
*/
paramCheckSfr();

/** Set GPIO 2..5 as output pins */
PODIR &= ~(BIT2 | BIT3 | BIT4 | BIT5);

/**
 * @brief Function o init the HALIOS tools
 *
 * Initialize the structures for filtering and calibration.
 */
init_haliostools();

/**
 * Initialize the LevelSwitch with standard values
 */
deviceLevelSwitchInit(RAM_LEVEL_SWITCH);

/**
 * @brief Warmup the HALIOS loops.
 *
 * Function from HALIOS Tools. Do some measurements for each loop to ensure
 * that the measuerment counter has reached its actual value.
 *
 * @param[in] times How many times to start an empty measurement to warm up the
 *               loops:
 *               - HALIOS_WARMUP_FULL: 6 tines for a full range of 1024 steps
 *               - HALIOS_WARMUP_HALF: 3 times for a half range of 512 steps
 */
haliosWarmup(HALIOS_WARMUP_FULL);

/**
 * Force a calibration for each active loop.
 */
if (paramGetValue(RAM_CAL_SETUP) & CAL_START)
{
    for (ui_cnt = 0; ui_cnt < paramGetSFR(LOOPCOUNT); ++ui_cnt)
    {
        t_calib_result = haliosCompCalib(ui_cnt, haliosGetResult(ui_cnt), \
            paramGetValue(RAM_CAL_TARGET_VALUE),
            paramGetValue(RAM_CAL_TUBE), 0, 1023);
    }
}
```

```

        paramSetValue( ((ui_cnt * BLOCK_SIZE) + RAM QUIESCENT_LOOP0), g_calib[ui_cnt].
    }
}

for(ui_cnt = 0; ui_cnt < LOOPMAXCOUNT; ui_cnt++)
{
    /* Initialize the last calibration-time-stamp variable for calibration */
    ui_lastCalibTimestamp[ui_cnt] = 0;
}

#if (USB != USB_OFF)
/**
 * Initialize the SPI module and the MAX3420E SPI-USB bridge.
 *
 * @post GPIO 2..5 configured for SPI
 */
usbInitialize(USB_PART_ON, USB_PIN, paramGetValue(RAM_USB_CALL_TIME));

/* set interrupt for falling signal on the interrupt request pin */
PONEDGE_EN |= USB_PIN;
/* set interrupt mask for falling signal on a GPIO */
IRQ_MASK_H |= VBH_GPIO_FALLING;
#endif

/** Set application bit and Version */
g_sfr.inst_libs |= BIT15;
deviceCheckVersion(BIT15, gui_applicationVersion);

/**
 *
 * Do the measurement in an endless loop
 *
 */
while (1)
{
    /**
     * Start and retrigger the watchdog timer. This is an inline function.
     *
     * @note At E909.06: After first call of watchdog it is not possible
     * to disable the watchdog or change the watchdog time.
     *
     */
    KICKDOG();

    /**
     * Check the contents of SFR and does any special functions.
     * If the content of a SFR register has changed the new values will be copied
     * into the corresponding firmware functions or corresponding hardware registers.
     * - Set size of SFR and user space to address @ref BUFFSIZE at SFR
     * - Set constant reading values to SFR controled by @ref READ_CONST_CMD
     * - Set systemStatus
    */
}

```

```

* - Set Communication device
* - Set sampletime
* - Use spezial functions (use careful)
* - Set main clock (ANALOG_MCLK) (Only E909.05)
* - Set wakeup clock (ANALOG_WKCLK) (Only E909.05)
* - Set HALIOS frequency (Only E909.06)
* - Set number of Loops to g_sfr.loopCount
*/
paramCheckSfr();

if (gui_measurment == 1)
{
    gui_measurment = 0;

    /**
    * Do the HALIOS measurement of all configurated loops.
    * - Enable the analog part
    * - Start one Warmup to engage the analog part
    * - Start the configured measurements
    * - disable the analog part
    * - count up the @ref TIME_STAMP
    *
    * When haliosMeasure() is called with parameter HALIOS_RDYON,
    * the configured PIN in haliosInitialize() will be switched on
    * when entering the haliosMeasure() function,
    * and will be switched off when haliosMeasure() is left.
    *
    * @param[in] readyPin @ref HaliosCode
    *             - @ref HALIOS_RDYON GPIO is used as ready pin.
    *             - @ref HALIOS_RDYOFF GPIO is not used as ready pin.
    */
    haliosMeasure(HALIOS_RDYON);

    /**
    * Filter the loops and check the calibration.
    */
    ui_autocatch = 0;
    for (ui_cnt = 0; ui_cnt < paramGetSFR(LOOPCOUNT); ++ui_cnt)
    {
        /**
        * @brief Filter the loop with a low pass filter.
        *
        * @param[in] loopNr      Number of the loop (0 .. LOOPCOUNT).
        * @param[in] border3db  The 3dB border of the low pass filter.
        * @param[in] filterBreak If the derivation of the raw loop value is high
        *                       than filterBreak the filtered value is omitted
        *                       the raw loop value will be written to loopFilt
        *                       negative value for filterBreak disables the fi
        *                       break mechanism.
        *
        */
    }
}

```

```

    * @return      filter_value the software filtered value
    */
    ui_filtervalue = haliosFilterLoop(ui_cnt, \
        (HALIOS_FILT)paramGetValue(RAM_FILT_BORDER), \
        paramGetValue(RAM_FILT_BREAK));

    /** Set filtervalue to user space */
    paramSetValue( (RAM_FILT_LOOP0 + (ui_cnt * BLOCK_SIZE)) , ui_filtervalue);

    if (paramGetValue(RAM_CAL_SETUP) & CAL_TIME)
    {
        /**
        * When the autocatch function cause a calibration it sets the time for
        * So this forces a calibration immediately.
        * The variable ui_lastCalibTimestamp prevents that autocatch enforces
        * That's necessary because if no sensor is connected or the optical c
        * value is below quiescent value and probably around zero.
        */
        if (paramGetValue(RAM_CAL_SETUP) & CAL_AUTO_CATCH)
        {
            if ( paramGetValue(RAM_QUIESCENT_LOOP0 + (ui_cnt * BLOCK_SIZE)) <=
                {
                    ui_quis_min = paramGetValue(RAM_QUIESCENT_LOOP0 + (ui_cnt * BL
                }
            else
            {
                ui_quis_min = paramGetValue(RAM_QUIESCENT_LOOP0 + (ui_cnt * BL
            }

            /**
            * Force calibration when current value
            * is below saved quiescent value
            */
            if ((ui_autocatch == 0) && ((ui_filtervalue < ui_quis_min) || (ui_c
                && (ui_lastCalibTimestamp[ui_cnt] > 50))
            {
                ui_autocatch = 1;
                ui_oldCalTime = paramGetValue(RAM_CAL_TIME);
                paramSetValue(RAM_CAL_TIME, 0);
                ui_lastCalibTimestamp[ui_cnt] = 0;
            }
            else if ((ui_lastCalibTimestamp[ui_cnt] <= 50) \
                && ((ui_filtervalue < ui_quis_min) || (ui_quis_min == 0)))
            {
                ui_lastCalibTimestamp[ui_cnt]++;
            }
            else if ((ui_lastCalibTimestamp[ui_cnt] != 0) && (ui_filtervalue >
            {
                ui_lastCalibTimestamp[ui_cnt] = 0;
            }
        }
    }

```

```

/**
 * @brief
 * Calibrate the passed loop. This function counts the calls for each loop.
 * The function checks if a movement can be detected. In case of a movement
 * the counter will reset. If no movement for countEnd has been detected the
 * function checks if the loop is in the tube around the target value (target value + tube).
 * If the loop is outside the tube the compensator offset will be changed
 * to reach the target value again. In case of a balanced loop the
 * compensator offset from both sender and receiver will be influenced.
 * This is important when a static object has been detected or the optical
 * axis of the sensor has changed.
 *
 * @param[in] nr          number of the loop (0 .. LOOPCOUNT)
 * @param[in] loopValue   actual value of the signal
 * @param[in] target      target value for the idle loop
 * @param[in] tube        If the loop is within the tube borders (target
 *                        < loopValue < target+tube) then the actual
 *                        value is fetched as the new reference value. If the
 *                        derivation is smaller than maxDCnt. If the
 *                        value is outside the calibration tube the
 *                        compensator offset current is calibrated.
 * @param[in] countEnd    If the loop value is count times between target
 *                        and target+tube then a new reference value is detected.
 *                        If count is zero the function immediately starts
 *                        calibration.
 * @param[in] maxDCnt     If the derivation is greater than maxDCnt then the
 *                        calibration is aborted and counter gets a new value.
 */
t_calib_result = haliosCompCalib(ui_cnt, ui_filtvalue, \
    paramGetValue(RAM_CAL_TARGET_VALUE), \
    paramGetValue(RAM_CAL_TUBE), \
    ((uint32_t)(paramGetValue(RAM_CAL_TIME)) * 100), \
    paramGetValue(RAM_CAL_DCNT));

/** Save the new quiescent value to user space */
if (t_calib_result != Calib_Nothing_Done)
{
    paramSetValue(RAM_QUIESCENT_LOOP0 + (ui_cnt * BLOCK_SIZE), g_calib_result);
}

/** Set calibTime to old value */
if (ui_oldCalTime != 0)
{
    paramSetValue(RAM_CAL_TIME, ui_oldCalTime);
    ui_oldCalTime = 0;
}
} /* calibration time */

/** Compute amplitude for the loop */
ui_quiescent = paramGetValue(RAM_QUIESCENT_LOOP0 + (ui_cnt * BLOCK_SIZE));

```

```
if (ui_filtvalue > ui_quiescent)
{
    paramSetValue( RAM_AMPLITUDE_LOOP0 + (ui_cnt * BLOCK_SIZE)
, (ui_filtvalue - ui_quiescent) );
}
else
{
    paramSetValue( RAM_AMPLITUDE_LOOP0 + (ui_cnt * BLOCK_SIZE) , 0);
}

    /* filter loops and check calibration */

    /**
 * This function switches an output pin on or off in dependence of
 * the loop value of the assigned loop. There are four LevelSwitch
 * modules. Each of these modules could be configured separately:
 * - Assign a loop to the module
 * - Define a high and a low treshhold
 *
 * @note    startAddress    Start for parameter in User_space
 *
 * @note    return    Error code:
 * - 0: No error
 * - 1: Border is not set
 * - 2: Border is out of range
 */
    paramSetValue(RAM_LEVEL_SWITCH_RETURN, \
deviceLevelSwitch(RAM_LEVEL_SWITCH));

    /**
 * If USB is switched on the output pins from MAX3420 are used.
 * Otherwise the GPIO from HALIOS IC are used.
 */
#if (USB != USB_OFF)
    /* output pins from max3420 are used */
    wreg(rGPIO, paramGetValue(RAM_LEVEL_SWITCH_RESULT));
#else
    /* IO2..5 are used */
    P0OUT = (P0OUT & 0xffc3) | paramGetValue(RAM_LEVEL_SWITCH_RESULT) << 2;
#endif
    } /* if measuerment */

#if (USB != USB_OFF)

    /**
 * If Interrupt falling edge was caused by Pin 1 do a USB transfer
 */
    if (gui_doUsb == 1)
    {
```

```
    /**
    *   If USB-request occurred during a measurement
    *   clear the wakeupEnd flag
    */
    g_status0.wakeupEnd = 0;

    gui_doUsb = 0;

    /** Do transmission */
    usbHacoHandleIrqs();
}
#endif

/**
 *   Wait until the timer has elapsed.
 */
deviceWaitForTimer();

/**
```

Definition at line 120 of file main.c.

References CAL_AUTO_CATCH, CAL_START, CAL_TIME, gArc_project_number, gui_doUsb, gui_measurment, and USB_PIN.

2.1.4 Variable Documentation

2.1.4.1 volatile uint16_t [gui_doUsb](#) = 1

Global variable for communication between Interrupt and USB-Part in main

Definition at line 54 of file main.c.

2.1.4.2 volatile uint16_t [gui_measurment](#) = 0

Global variable for synchronize the measueremt with configured sample time

Definition at line 60 of file main.c.

2.2 main.h File Reference

Defines

- #define APPLICATION_VERSION 103UL
- #define USB_OFF 1
- #define USB_HACO 2
- #define USB_MOUSE 3
- #define USB_KEYB 4
- #define USB USB_HACO
- #define LIN_OFF 0
- #define LIN_ON 1
- #define LIN LIN_OFF
- #define CAL_OFF 0
- #define CAL_START BIT0
- #define CAL_TIME BIT1
- #define CAL_AUTO_CATCH BIT2

2.2.1 Detailed Description

Header file for the example application.

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Date:

Created: 2007-03-13

Author:

Roland Muenzer, Media System Consulting

Date:

Changed: 2008-11-26 added comments, added missing include "firmware.h"

Author:

Florian Degler, Mechaless Systems GmbH

Date:

Changed: 2010-05-28 Reworked for firmware V4.0

Author:

Markus Kilian, Mechaless Systems GmbH

Date:

Changed: 2010-05-31 Reworked for firmware V4.0 added comments, removed obsolete include "firmware.h"

Author:

Markus Kilian, Mechaless Systems GmbH

Date:

Changed: 2010-07-13 Due to compatibility for GCC firmware library 4.01 available. Application version set to 1.01.

Author:

Markus Kilian, Mechaless Systems GmbH

Date:

Changed: 2010-08-12 Application version set to 1.02 Firmware library updated to 4.03 HALIOS tools library updated to 4.01

Author:

Markus Kilian, Mechaless Systems GmbH

Date:

Changed: 2011-03-17 Application version set to 1.03 Firmware library updated to 4.05 HALIOS tools library updated to 4.04 USB library updated to 4.01

Definition in file [main.h](#).

2.2.2 Define Documentation

2.2.2.1 #define APPLICATION_VERSION 103UL

Version number for the application.

Definition at line 38 of file main.h.

2.2.2.2 #define USB_OFF 1

Standalone application, no USB support.

Definition at line 41 of file main.h.

2.2.2.3 #define USB_HACO 2

USB support for the MAX3420E USB-SPI bridge, e.g. like on the E909.05A baseboard.

Definition at line 47 of file main.h.

2.2.2.4 #define USB USB_HACO

Software switch to choose between standalone mode and USB support.

Definition at line 52 of file main.h.

2.2.2.5 #define LIN_OFF 0

Definitions for LIN module

Keep in mind: LIN can only be used with E909.06

Definition at line 60 of file main.h.

2.2.2.6 #define CAL_OFF 0

Bit definitions for calibration

Definition at line 68 of file main.h.

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