CubeSat_nortos.c File Reference

Source file for CubeSat. More...

```
#include <CubeSat_nortos.h>
#include <stdlib.h>
#include <stdbool.h>
#include <stdint.h>
#include <ti/drivers/rf/RF.h>
#include <ti/drivers/PIN.h>
#include <ti/drivers/Power.h>
#include <ti/drivers/SD.h>
#include <ti/display/Display.h>
#include <ti/devices/DeviceFamily.h>
#include "Board.h"
#include "smartrf_settings/smartrf_settings.h"
#include "easylink/EasyLink.h"
```

Macros

#define	**PAYLOAD_LENGTH**	30
#define	**GROUND_ADDRESS**	0xFF
#define	**RX_TIMEOUT**	500
#define	**BUFFSIZE**	1024
#define	**STARTINGSECTOR**	0
#define	**BYTESPERKILOBYTE**	1024
#define	**WRITEENABLE**	1

Functions

void **driverSetup** ()
Setup LED and display drivers. More...

bool **sdSetup** (int8_t rssi, uint8_t errorCode)
Function to initialise the (micro)SD card driver. More...

bool **sdWrite** (SD_Handle **sdHandle**, int_fast8_t **result**, bool sdFailure)
Write to (micro)SD card and check operation. More...

void **commandRx** ()
Enter RX mode to get commands from ground station. More...

void **groundStationAckTx** ()
Echo the packet from the ground station (ack) More...

void **commandTx** ()
Perform TX command to send commands to femtosat. More...

void **femtosatAckRx** ()
Enter RX mode to receive ack from femtosat. More...

void	**dataTx** () Enter TX mode and send data to ground station. More...
bool	**isPacketCorrect** (EasyLink_RxPacket *rxp, EasyLink_TxPacket *txp) Check that received packet is the same as transmitted packet. More...
void *	**mainThread** (void *arg0)

Variables

static PIN_Handle	**pinHandle**
static PIN_State	**pinState**
static Display_Handle	**display**
SD_Handle	**sdHandle**
unsigned char	**sdPacket** [**BUFFSIZE**]
unsigned char	**cpyBuff** [**BUFFSIZE**]
EasyLink_Params	**easyLinkParams**
EasyLink_RxPacket	**rxPacket** = {{0}, 0, 0, 0, 0, {0}}
EasyLink_TxPacket	**txPacket** = {{0}, 0, 0, {0}}
uint32_t	**absTime**
EasyLink_Status	**result**
static bool	**bBlockTransmit** = false
PIN_Config	**pinTable** []

Detailed Description

Source file for CubeSat.

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Macro Definition Documentation

◆ BUFFSIZE

```
#define BUFFSIZE   1024
```

Buffer size for microSD operations

◆ BYTESPERKILOBYTE

```
#define BYTESPERKILOBYTE   1024
```

Bytes in a kilobyte

◆ GROUND_ADDRESS

```
#define GROUND_ADDRESS   0xFF
```

Ground station address for address filtering

◆ PAYLOAD_LENGTH

```
#define PAYLOAD_LENGTH   30
```

Length of payload in bytes

◆ RX_TIMEOUT

```
#define RX_TIMEOUT   500
```

RX command times out after 500ms

◆ STARTINGSECTOR

```
#define STARTINGSECTOR   0
```

Starting sector to write to/read from

◆ WRITEENABLE

```
#define WRITEENABLE   1
```

Enable/disable writing to microSD without file system

Function Documentation

◆ commandRx()

```
void commandRx (  )
```

Enter RX mode to get commands from ground station.

Returns

none

◆ commandTx()

```
void commandTx (  )
```

Perform TX command to send commands to femtosat.

Returns

none

◆ dataTx()

void dataTx ( )

Enter TX mode and send data to ground station.

Returns

none

◆ driverSetup()

void driverSetup ( )

Setup LED and display drivers.

Returns

none

◆ femtosatAckRx()

void femtosatAckRx ( )

Enter RX mode to receive ack from femtosat.

Returns

none

◆ groundStationAckTx()

void groundStationAckTx ( )

Echo the packet from the ground station (ack)

Returns

none

◆ isPacketCorrect()

```
bool isPacketCorrect ( EasyLink_RxPacket *  rxp,
                       EasyLink_TxPacket *  txp
                     )
```

Check that received packet is the same as transmitted packet.

Parameters

***rxp**	Pointer to RX packet.
***txp**	Pointer to TX packet.

Returns

status Flag pulled low when RX and TX packets are not the same

◆ sdSetup()

```
bool sdSetup ( int8_t   rssi,
               uint8_t  errorCode
             )
```

Function to initialise the (micro)SD card driver.

Parameters

rssi	RSSI value of RF link.
errorCode	Error code of operation.

Returns

sdOpFlag Flag raised when microSD op fails.

◆ sdWrite()

```
bool sdWrite ( SD_Handle  sdHandle,
               int_fast8_t result,
               bool        sdFailure
             )
```

Write to (micro)SD card and check operation.

Parameters

sdHandle	SD driver handle
result	Result of SD driver initialisation

Returns

sdFlag Flag raised in the event of microSD failure.

Variable Documentation

◆ absTime

```
uint32_t absTime
```

Used by RF core to time RF commands

◆ bBlockTransmit

```
bool bBlockTransmit = false
```

static

Flag raised when TX command is to be blocked

◆ cpyBuff

```
unsigned char cpyBuff[BUFFSIZE]
```

Buffer used to check the success of microSD operation

◆ display

Display_Handle display static

Handle for UART display driver

◆ easyLinkParams

EasyLink_Params easyLinkParams

Use this to initialise EasyLink parameters to their default values

◆ pinHandle

PIN_Handle pinHandle static

Handle for pin driver

◆ pinState

PIN_State pinState static

Used for GPIO commands

◆ pinTable

PIN_Config pinTable[]

Initial value:

```
= {
    Board_PIN_LED1 | PIN_GPIO_OUTPUT_EN | PIN_GPIO_LOW | PIN_PUSHPULL | PIN_DRVSTR_MAX,
    Board_PIN_LED2 | PIN_GPIO_OUTPUT_EN | PIN_GPIO_LOW | PIN_PUSHPULL | PIN_DRVSTR_MAX,
    PIN_TERMINATE
}
```

◆ result

EasyLink_Status result

Status of RF command

◆ sdHandle

```
SD_Handle sdHandle
```

Handle for SD driver

◆ sdPacket

```
unsigned char sdPacket[BUFFSIZE]
```

Packet to be stored in microSD card

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