### **GroundStation\_nortos.c File Reference**

```
Source file that allows communication between ground station and CubeSat. More...
```

```
#include <GroundStation_nortos.h>
#include <stdio.h>
#include <stdib.h>
#include <ti/drivers/pin/PINCC26XX.h>
#include <ti/drivers/Power.h>
#include <ti/drivers/rf/RF.h>
#include <ti/drivers/timer/GPTimerCC26XX.h>
#include <ti/display/Display.h>
#include <ti/devices/DeviceFamily.h>
#include <ti/drivers/UART.h>
#include <unistd.h>
#include "Board.h"
#include "smartrf_settings/smartrf_settings.h"
#include "easylink/EasyLink.h"
```

#### **Functions**

```
void displaySetup ()
Setup display driver. More...

void uartDisplaySetup ()
Setup UART display driver. More...

void timerSetup ()
Setup GP timer. More...

void timerStart ()
Start the timer. More...

void timerEnd ()
Stop the timer and close the driver This also displays the timer value in milliseconds. More...

bool inputErrors (char userEntry, Entry_Type entryType)
Handle errors in user entry. More...

void uartWriteSimple (UART_Handle uartHandle, char *string, int stringSize)
Perform UART write with error checking. More...
```

void userEntryCompile ()

void uartReadSimple (int status)

Perform UART read with error checking. More...

Process the data entered by the user. More...

Setup packet to be sent to CubeSat. More...

void rfPacketSetup (uint8 t commandNumber, uint8 t sleepTime, uint8 t femtoAddress)

char **userInput** (char \*message, int messageSize)
Display start-up prompts to user. More...

#### **Variables**

void \* mainThread (void \*arg0)

EasyLink_Params	easyLinkParams
uint32_t	absTime
EasyLink_TxPacket	<b>txPacket</b> = {{0}, 0, 0, {0}}
EasyLink_RxPacket	rxPacket = {{0}, 0, 0, 0, 0, {0}}
EasyLink_Status	result
uint8_t	femtoAddr
bool	receptionFlag
static PIN_Handle	pinHandle
static PIN_State	pinState
static Display_Handle	display
static GPTimerCC26XX_Handle	timerHandle
static UART_Handle	uartHandle
static UART_Params	uartParams
static GPTimerCC26XX_Params	timerParams
static GPTimerCC26XX_Value	timerValue
PIN_Config	pinTable []

### **Detailed Description**

Source file that allows communication between ground station and CubeSat.

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#### **Author**

Aymen Benylles

#### **Date**

30/12/2020

### **Function Documentation**

cubeSatAckRx() bool cubeSatAckRx ( ) Switch to receive mode for ack from CubeSat. Returns ackFlag

cubeSatTx() void cubeSatTx ( ) Transmit command(s) to CubeSat. Returns none

## dataRx()

void dataRx (bool ackFlag)

Switch to receive mode for data from CubeSat.

#### **Returns**

none

## displaySetup()

void displaySetup ( )

Setup display driver.

#### Returns

none

## femtosatStatusDisplay()

Display the status of the femtosat to the user via UART display.

#### **Parameters**

femtoRssi RSSI value for CubeSay-femtosat link statusByte Byte containing status of femtosat reception femtoAddr Address of femtosat

#### **Returns**

none

# • inputErrors()

## isPacketCorrect()

userErrorFlag Flag raised when user makes an invalid input

Check ack packet from CubeSat is correct.

#### **Parameters**

\*rxp received packet

\*txp transmitted packet

#### **Returns**

status

## rfPacketSetup()

Setup packet to be sent to CubeSat.

#### **Returns**

none

### timerEnd()

void timerEnd ( )

Stop the timer and close the driver This also displays the timer value in milliseconds.

Returns
none

• timerSetup()

void timerSetup ( )

Setup GP timer.

Returns
 none

◆ timerStart()
void timerStart ( )
Start the timer.
Returns
none

◆ uartDisplaySetup()
 void uartDisplaySetup()
 Setup UART display driver.
 Returns
 none

uartReadSimple()

void uartReadSimple (int status)

Perform UART read with error checking.

#### **Parameters**

status Status of read operation

#### Returns

none

## uartWriteSimple()

```
void uartWriteSimple ( UART_Handle uartHandle, char * string, int stringSize
```

Perform UART write with error checking.

#### Returns

none

## userEntryCompile()

void userEntryCompile ( )

Process the data entered by the user.

#### Returns

none

## userInput()

#### Returns

userEntry Character entered by user

### Variable Documentation

absTime

uint32 t absTime

Variable the RF core uses to time commands

femtoAddr

uint8\_t femtoAddr

Address of femtosatellite message is being sent to

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
}
```

### receptionFlag

bool receptionFlag

Flag raised if femtosatellite has received commands

### • result

EasyLink\_Status result

Status of each RF command

### rxPacket

EasyLink\_RxPacket rxPacket = {{0}, 0, 0, 0, 0, {0}}

Packet received from CubeSat

### txPacket

EasyLink\_TxPacket txPacket = {{0}, 0, 0, {0}}

Packet transmitted to CubeSat

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