Yavin IV Death Star Tracker

V1.2

Generated by Doxygen 1.8.8

Tue Nov 4 2014 15:19:12

Contents

Chapter 1

Todo List

File ConfigRegs18f4520.h

Consider if Watchdog Timer should be enabled for production code, and add WDT management code if so.

Consider if Stack Overflow Reset should be enabled for production code. It may be better not to, as there is no re-entrant or recursive code, or dynamic memory allocation here - if the code loads statically it should run.

Change startup code c016iz.c so that everything (including initialised variables) correctly re-starts if main() ever exits or a BOR or WDT reset occurs.

Global delay (unsigned int t)

Complete, test, debug and document this code!!!

Global range (void)

Read in temperature for US calculation

Global readTempx2 (void)

Test and debug this function

Test and debug this function

Chapter 2

Data Structure Index

2.1 Data Structures

Here are the data structures with brief descriptions:

Chapter 3

File Index

3.1 File List

Here is a list of all files with brief descriptions:

Chapter 4

Data Structure Documentation

4.1 circularBuffer Struct Reference

Stores bytes of data in a circular buffer.

`#include <CircularBuffers.h>`

Data Fields

- unsigned char head
- unsigned char tail
- unsigned char data [BUFFERLENGTH]

4.1.1 Detailed Description

Stores bytes of data in a circular buffer.

typedef of circularBuffer struct

Length: BUFFERLENGTH

Description: Defines a circular buffer in which bytes of data can be placed, or removed at any time in the correct order that they were pushed. The accompanying functionality facilitates all necessary circular buffer related operations. This implementation reduces the buffer length by 1 to differentiate between full and empty states. BUFFERLENGTH can be redefined in individual files to get different buffer lengths

4.1.2 Field Documentation

4.1.2.1 unsigned char data[BUFFERLENGTH]

4.1.2.2 unsigned char head

4.1.2.3 unsigned char tail

The documentation for this struct was generated from the following file:

- Yavin4DefenceSystem/Code/CircularBuffers.h

4.2 Delay Struct Reference

Data Fields

- signed int AzimuthDelay
- signed int InclinationDelay

4.2.1 Detailed Description

File: ADC.c Author: Grant

Description: Contains all the functionality for the Pan Tilt module. All variables and settings concerning the pan tilt module including the current direction, PDM delay info, min and max settings are private to this module. The interface functions allow all valid access to the module.

Duties: -Software interface to the Pan Tilt Module -Moves Pan Tilt -Reads current Pan Tilt position (based on PDM's) -Generate PDM signals

Functions: Local: void validate(unsigned int *delay); Direction delay2Direction(Delay dly); Delay direction2Delay(↩ Direction dir);

Public Interface: void configureBase(void); void move(Direction destination); void increment(Direction difference); void incrementFine(Direction difference); Direction getDir(void); void calibratePanTilt(Direction reference); Direction rawDir(void); char updated(void); void panTiltISR(void); char getMaxAzimuthAngle(void); char getMin↩ AzimuthAngle(void); char getMaxElevationAngle(void); char getMinElevationAngle(void); void setMaxAzimuth↩ Angle(char p_angle); void setMinAzimuthAngle(char p_angle); void setMaxElevationAngle(char p_angle); void set↩ MinElevationAngle(char p_angle);

Created on 16 September 2014, 6:47 PM

4.2.2 Field Documentation

4.2.2.1 signed int AzimuthDelay

4.2.2.2 signed int InclinationDelay

The documentation for this struct was generated from the following file:

- Yavin4DefenceSystem/Code/PanTilt.c

4.3 Direction Struct Reference

Stores an inclination and azimuth.

`#include <Common.h>`

Data Fields

- int azimuth
- int elevation

4.3.1 Detailed Description

Stores an inclination and azimuth.

typedef of Direction struct

Description: A fully defined direction in which to point the pan tilt actuator or any other such purpose

Elements: -Azimuth: Contains the azimuth component of the direction (generally degrees) -Inclination: Contains the inclination component of the direction (generally degrees)

4.3.2 Field Documentation

4.3.2.1 int azimuth

4.3.2.2 int elevation

The documentation for this struct was generated from the following file:

- Yavin4DefenceSystem/Code/Common.h

4.4 menuStruct Struct Reference

Defines a sub menu.

`#include <MenuDefs.h>`

Data Fields

- menuState menuID
- rom char * serialMessage
- rom char * lcdTitleMessage
- int minVal
- int maxVal
- char increment
- voidFunction serialDisplayFunction
- numericInputFunction confirmFunction
- numericInputFunction lcdDisplayFunction
- voidFunction returnToPrevious

4.4.1 Detailed Description

Defines a sub menu.

typedef of menuStruct struct

Description: Stores all data required to define a submenu

Elements:

- menuNum:
- SerialMessage: The message to be displayed on entering the state
- LcdTitleMessage: LCD Message to be displayed on entering the state
- MinVal: The minimum value accepted by the state
- MaxVal: The maximum value accepted by the state
- increment:
- serialDisplayFunction: Function to display result over serial
- confirmFunction: Function to confirm entry
- lcdDisplayFunction: Function to display result on LCD
- returnToPrevious: Function to return to previous menu state

4.4.2 Field Documentation

4.4.2.1 numericInputFunction confirmFunction

4.4.2.2 char increment

4.4.2.3 numericInputFunction lcdDisplayFunction

4.4.2.4 rom char* lcdTitleMessage

4.4.2.5 int maxVal

4.4.2.6 menuState menuID

4.4.2.7 int minVal

4.4.2.8 voidFunction returnToPrevious

4.4.2.9 voidFunction serialDisplayFunction

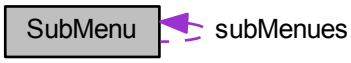
4.4.2.10 rom char* serialMessage

The documentation for this struct was generated from the following file:

- Yavin4DefenceSystem/Code/MenuDefs.h

4.5 SubMenu Struct Reference

Collaboration diagram for SubMenu:



Data Fields

- char serialMessage [MAX_SER_MSG_LEN]
- char lcdMessage [MAX_LCD_MSG_LEN]
- char serialOptions [MAX_NUM_OPTIONS]
- char inptOptions [MAX_NUM_OPTIONS]
- void(* numericFunction)(int)
- void(* defaultFunction)(void)
- struct SubMenu * subMenues

4.5.1 Field Documentation

4.5.1.1 void(* defaultFunction)(void)

4.5.1.2 char inptOptions[MAX_NUM_OPTIONS]

4.5.1.3 char lcdMessage[MAX_LCD_MSG_LEN]

4.5.1.4 void(* numericFunction)(int)

4.5.1.5 char serialMessage[MAX_SER_MSG_LEN]

4.5.1.6 char serialOptions[MAX_NUM_OPTIONS]

4.5.1.7 struct SubMenu* subMenues

The documentation for this struct was generated from the following file:

- Yavin4DefenceSystem/Code/Menusystem2.c

4.6 systemState Struct Reference

Stores the current state of the system.

`#include <Common.h>`

Data Fields

- possible_states current
- possible_states previous

4.6.1 Detailed Description

Stores the current state of the system.

typedef of systemState struct

Description: Stores which state the system is currently in, as defined by the possible_states enumeration. Also stores the previous system state so the system knows if this is the first iteration of the state

4.6.2 Field Documentation

4.6.2.1 possible_states current

4.6.2.2 possible_states previous

The documentation for this struct was generated from the following file:

- Yavin4DefenceSystem/Code/Common.h

4.7 TargetStateData Struct Reference

Stores data about the last target track.

Data Fields

- unsigned bad_dirs: 2
- unsigned out_of_irs: 2
- unsigned good_tracks: 2
- unsigned centre: 2

4.7.1 Detailed Description

Stores data about the last target track.

typedef of targetStateData struct

Description: Stores the number of samples of each type sampled in the previous target track

Elements: -bad_dirs - stores the number of BAD_DIR's sampled - only 3 bits -out_of_irs - Stores the number of OUT_OF_IR's sampled - only 3 bits -good_tracks - Stores the number of GOOD_TRACK's sampled - only 3 bits

4.7.2 Field Documentation

4.7.2.1 unsigned bad_dirs

4.7.2.2 unsigned centre

4.7.2.3 unsigned good_tracks

4.7.2.4 unsigned out_of_irs

The documentation for this struct was generated from the following file:

- Yavin4DefenceSystem/Code/Tracking.c

4.8 TrackingData Struct Reference

Stores the current target information.

`#include <Common.h>`

Data Fields

- unsigned int range
- int azimuth
- int elevation

4.8.1 Detailed Description

Stores the current target information.

typedef of TrackingData struct

Description: Stores distance, azimuth and inclination tracking data to the target. This struct is used by the tracking function and others to communicate the position of the target

4.8.2 Field Documentation

4.8.2.1 int azimuth

4.8.2.2 int elevation

4.8.2.3 unsigned int range

The documentation for this struct was generated from the following file:

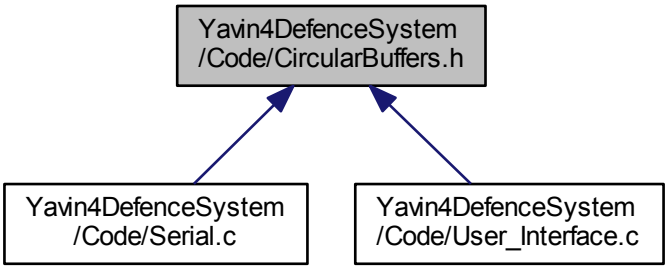
- Yavin4DefenceSystem/Code/Common.h

Chapter 5

File Documentation

5.1 Yavin4DefenceSystem/Code/CircularBuffers.h File Reference

This graph shows which files directly or indirectly include this file:



Data Structures

- struct circularBuffer

  Stores bytes of data in a circular buffer.

Macros

- #define incMod(ptr) if(ptr==BUFFERLENGTH-1) ptr = 0; else ptr++;

  Buffer related macro functionality.
- #define empty(buf) (buf.tail == buf.head)
- #define full(buf) (buf.head == (buf.tail + 1) % BUFFERLENGTH)
- #define peek(buf) buf.data[buf.head]
- #define push(byte, buf) buf.data[buf.tail] = byte; if(full(buf)) incMod(buf.head); incMod(buf.tail)
- #define pop(buf) buf.data[buf.head]; if (!empty(buf)) incMod(buf.head)
- #define init(buf) buf.tail = 0; buf.head = 0
- #define BUFFERLENGTH 80
- #define BUFFERS_H 0

5.1.1 Macro Definition Documentation

5.1.1.1 #define BUFFERLENGTH 80

5.1.1.2 #define BUFFERS_H 0

5.1.1.3 #define empty(*buf*) (buf.tail == buf.head)

5.1.1.4 #define full(*buf*) (buf.head == (buf.tail + 1) % BUFFERLENGTH)

5.1.1.5 #define incMod(*ptr*) if(ptr==BUFFERLENGTH-1) ptr = 0; else ptr++;

Buffer related macro functionality.

File: CircularBuffers.h Author: Grant

Description: Contains Circular Buffer functionality and structure definitions. This allows Circular Buffers to be used in any file by simply including this header. Furthermore, circular buffer functionality can be altered on a program level.

Contains: -Definition of CircularBuffer type -Peek, pop, push and init functionality -Empty, full, queries

Created on 8 October 2014, 10:30 AM

5.1.1.6 #define init(*buf*) buf.tail = 0; buf.head = 0

5.1.1.7 #define peek(*buf*) buf.data[buf.head]

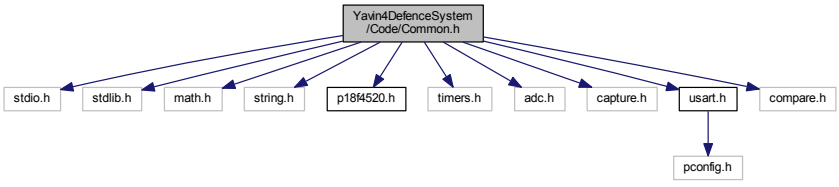
5.1.1.8 #define pop(*buf*) buf.data[buf.head]; if (!empty(buf)) incMod(buf.head)

5.1.1.9 #define push(*byte, buf*) buf.data[buf.tail] = byte; if(full(buf)) incMod(buf.head); incMod(buf.tail)

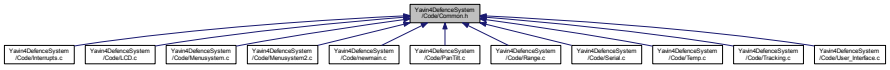
5.2 Yavin4DefenceSystem/Code/Common.h File Reference

```
#include <stdio.h>
#include <stdlib.h>
#include <math.h>
#include <string.h>
#include <p18f4520.h>
#include <timers.h>
#include <adc.h>
#include <capture.h>
#include <usart.h>
#include <compare.h>
```

Include dependency graph for Common.h:



This graph shows which files directly or indirectly include this file:



Data Structures

- struct Direction

  Stores an inclination and azimuth.
- struct TrackingData

  Stores the current target information.
- struct systemState

  Stores the current state of the system.

Macros

- #define MNML
- #define NEXT_STATE(s, state) state.previous = state.current; state.current = s

  Macros to change the state of the system.
- #define NEXT_STATE_PTR(s, state) state->previous = state->current; state->current = s
- #define DIV_2(v) ((v) >> 1)

  Efficient Division macros based on bit shifting, Cannot be used on negative numbers.
- #define DIV_4(v) ((v) >> 2)
- #define DIV_8(v) ((v) >> 3)
- #define DIV_16(v) ((v) >> 4)
- #define DIV_32(v) ((v) >> 5)
- #define DIV_64(v) ((v) >> 6)
- #define DIV_128(v) ((v) >> 7)
- #define DIV_256(v) ((v) >> 8)
- #define DIV_512(v) ((v) >> 9)
- #define DIV_1024(v) ((v) >> 10)
- #define DIV_4096(v) ((v) >> 12)
- #define DIV_65536(v) ((v) >> 16)
- #define SWAP(x, y) (y = (y ^ (x = (x ^ (y = (x ^ y))))))

  Swaps the values in two variables.
- #define ADC_IR_READ 0x01

  ADC Channel Select macros.
- #define ADC_TEMP_READ 0x05
- #define ADC_DIAL_READ 0x09
- #define TX_INT (PIR1bits.TXIF && PIE1bits.TXIE)

  Interrupt macros.
- #define RC_INT (PIR1bits.RCIF && PIE1bits.RCIE)
- #define CCP1_INT (PIR1bits.CCP1IF && PIE1bits.CCP1IE)
- #define CCP2_INT (PIR2bits.CCP2IF && PIE2bits.CCP2IE)
- #define INT0_INT (INTCONbits.INT0IF && INTCONbits.INT0IE)
- #define INT1_INT (INTCON3bits.INT1IF && INTCON3bits.INT1IE)
- #define INT2_INT (INTCON3bits.INT2IF && INTCON3bits.INT2IE)
- #define RB_INT (INTCONbits.RBIF && INTCONbits.RBIE)
- #define TMR2_INT (PIR1bits.TMR2IF && PIE1bits.TMR2IE)
- #define TMR0_INT (INTCONbits.TMR0IF && INTCONbits.TMR0IE)

- #define TMR1_INT (PIR1bits.TMR1IF && PIE1bits.TMR1IE)
- #define TMR3_INT (PIR2bits.TMR3IF && PIE2bits.TMR3IE)
- #define ADC_INT (PIR1bits.ADIF && PIE1bits.ADIE)
- #define SSP_INT (PIR1bits.SSPIF && PIE1bits.SSPIE)
- #define BCL_INT (PIR2bits.BCLIF && PIE2bits.BCLIE)
- #define LVD_INT (PIR2bits.LVDIF && PIE2bits.LVDIE)
- #define CCP1_CLEAR (PIR1bits.CCP1IF = 0)
- #define CCP2_CLEAR (PIR2bits.CCP2IF = 0)
- #define CLOCK 10000000

  Dfine the clock rate and FOSC_4.
- #define FOSC_4 2500000
- #define INT_SETUP()
- #define COMMON_H

Enumerations

- enum TargetState {
  NO_TARGET, OUT_OF_IR, BAD_DIR, GOOD_TRACK,
  CLOSE_RANGE }

  The different types of tracking possible depending on which sensors observe the target.
- enum PanTiltSettings { MAX_AZ, MIN_AZ, MAX_EL, MIN_EL }

  The different PanTilt settings that can be changed.
- enum RangeSettings {
  MAX_RANGE, MIN_RANGE, IR_RATE, US_RATE,
  IR_SAMPLES, US_SAMPLES }

  The different Range settings that can be changed.
- enum escSqnce { CLR_SCN, ERS_LN }

  Available ANSI escape Sequences.
- enum possible_states {
  UNDEF, INIT, SRCH, TRCK,
  MENU, RAW_RANGE_STATE }

  Define the possible states the system can be in.

5.2.1 Macro Definition Documentation

5.2.1.1 #define ADC_DIAL_READ 0x09

5.2.1.2 #define ADC_INT (PIR1bits.ADIF && PIE1bits.ADIE)

5.2.1.3 #define ADC_IR_READ 0x01

ADC Channel Select macros.

5.2.1.4 #define ADC_TEMP_READ 0x05

5.2.1.5 #define BCL_INT (PIR2bits.BCLIF && PIE2bits.BCLIE)

5.2.1.6 #define CCP1_CLEAR (PIR1bits.CCP1IF = 0)

5.2.1.7 #define CCP1_INT (PIR1bits.CCP1IF && PIE1bits.CCP1IE)

5.2.1.8 #define CCP2_CLEAR (PIR2bits.CCP2IF = 0)

5.2.1.9 #define CCP2_INT (PIR2bits.CCP2IF && PIE2bits.CCP2IE)

5.2.1.10 #define CLOCK 10000000

Dfine the clock rate and FOSC_4.

5.2.1.11 #define COMMON_H

5.2.1.12 #define DIV_1024(*v*) ((v) >> 10)

5.2.1.13 #define DIV_128(*v*) ((v) >> 7)

5.2.1.14 #define DIV_16(*v*) ((v) >> 4)

5.2.1.15 #define DIV_2(*v*) ((v) >> 1)

Efficient Division macros based on bit shifting, Cannot be used on negative numbers.

5.2.1.16 #define DIV_256(*v*) ((v) >> 8)

5.2.1.17 #define DIV_32(*v*) ((v) >> 5)

5.2.1.18 #define DIV_4(*v*) ((v) >> 2)

5.2.1.19 #define DIV_4096(*v*) ((v) >> 12)

5.2.1.20 #define DIV_512(*v*) ((v) >> 9)

5.2.1.21 #define DIV_64(*v*) ((v) >> 6)

5.2.1.22 #define DIV_65536(*v*) ((v) >> 16)

5.2.1.23 #define DIV_8(*v*) ((v) >> 3)

5.2.1.24 #define FOSC_4 2500000

5.2.1.25 #define INT0_INT (INTCONbits.INT0IF && INTCONbits.INT0IE)

5.2.1.26 #define INT1_INT (INTCON3bits.INT1IF && INTCON3bits.INT1IE)

5.2.1.27 #define INT2_INT (INTCON3bits.INT2IF && INTCON3bits.INT2IE)

5.2.1.28 #define INT_SETUP( )

Value:

```
INTCONbits.GIEH = 1; \
INTCONbits.GIEL = 1; \
PIR1 = 0; \
PIR2 = 0; \
RCONbits.IPEN = 1; \
IPR1 = 0; \
IPR2 = 0; \
IPR1bits.TXIP = 1; \
IPR2bits.CCP2IP = 1;\
IPR1bits.CCP1IP = 1;
```

5.2.1.29 #define LVD_INT (PIR2bits.LVDIF && PIE2bits.LVDIE)

5.2.1.30 #define MNML

File: Common.h Author: Grant

Description: Contains all program scope definitions, declarations and inclusions. This header should be included in all source files by default.

Contains: -PIC18F family library headers -Direction struct typedef -TrackingData struct typedef -systemState struct typedef -system state macro functionality -TargetState enumeration -Interrupt flag macros -Division macros -Clock frequency definitions -SWAP macro functionality

Created on 11 September 2014, 12:24 PM

5.2.1.31 #define NEXT_STATE(*s, state*) state.previous = state.current; state.current = s

Macros to change the state of the system.

5.2.1.32 #define NEXT_STATE_PTR(*s, state*) state->previous = state->current; state->current = s

5.2.1.33 #define RB_INT (INTCONbits.RBIF && INTCONbits.RBIE)

5.2.1.34 #define RC_INT (PIR1bits.RCIF && PIE1bits.RCIE)

5.2.1.35 #define SSP_INT (PIR1bits.SSPIF && PIE1bits.SSPIE)

5.2.1.36 #define SWAP(*x, y*) (y = (y ^ (x = (x ^ (y = (x ^ y))))))

Swaps the values in two variables.

5.2.1.37 #define TMR0_INT (INTCONbits.TMR0IF && INTCONbits.TMR0IE)

5.2.1.38 #define TMR1_INT (PIR1bits.TMR1IF && PIE1bits.TMR1IE)

5.2.1.39 #define TMR2_INT (PIR1bits.TMR2IF && PIE1bits.TMR2IE)

5.2.1.40 #define TMR3_INT (PIR2bits.TMR3IF && PIE2bits.TMR3IE)

5.2.1.41 #define TX_INT (PIR1bits.TXIF && PIE1bits.TXIE)

Interrupt macros.

5.2.2 Enumeration Type Documentation

5.2.2.1 enum escSqnce

Available ANSI escape Sequences.

Enumerator

CLR_SCN

ERS_LN

5.2.2.2 enum PanTiltSettings

The different PanTilt settings that can be changed.

Enumerator

MAX_AZ

MIN_AZ

MAX_EL

MIN_EL

5.2.2.3 enum possible_states

Define the possible states the system can be in.

Enumerator

UNDEF

INIT

SRCH

TRCK

MENU

RAW_RANGE_STATE

5.2.2.4 enum RangeSettings

The different Range settings that can be changed.

Enumerator

MAX_RANGE

MIN_RANGE

IR_RATE

US_RATE

IR_SAMPLES

US_SAMPLES

5.2.2.5 enum TargetState

The different types of tracking possible depending on which sensors observe the target.

Enumerator

NO_TARGET

OUT_OF_IR

BAD_DIR

GOOD_TRACK

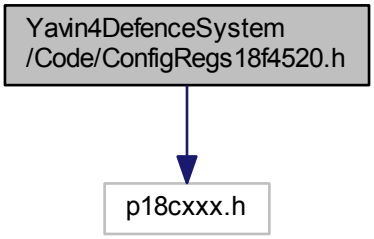
CLOSE_RANGE

5.3 Yavin4DefenceSystem/Code/ConfigRegs18f4520.h File Reference

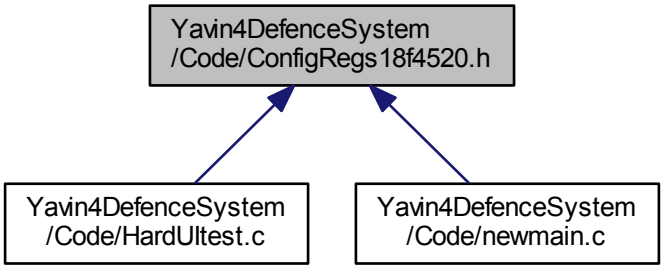
Include file to set the Configuration Bits of a PIC18F4520.

```
#include <p18cxxx.h>
```

Include dependency graph for ConfigRegs18f4520.h:



This graph shows which files directly or indirectly include this file:



5.3.1 Detailed Description

Include file to set the Configuration Bits of a PIC18F4520.

If the macro __DEBUG is defined, the bits are set as appropriate for development and debugging:

- HS Oscillator; Oscillator Switch disabled; Power-On Timer;
- Brown-out Reset disabled;
- Watchdog Timer disabled;
- CCP2 Multiplex disabled;
- Stack Overflow Reset;
- Low-voltage Programming disabled, Debug mode enabled;

- No protection bits set.

If the macro __DEBUG is NOT defined, the bits are set as appropriate for production code release:

- HS Oscillator; Oscillator Switch disabled; Power-On Timer;
- Brown-out Reset enabled at 4.2V;
- Watchdog Timer disabled;
- CCP2 Multiplex disabled;
- Stack Overflow Reset;
- Low-voltage Programming and Debug mode disabled;
- No protection bits set.

Version

0.1 - derived from ConfigRegs18F452.h

Date

28-Aug-2014

Author

David Rye

Note

This file was generated by the compiler from the command line: mcc18 -p18f4520 –help-config > config↩ Reg18F4520.h

Todo Consider if Watchdog Timer should be enabled for production code, and add WDT management code if so.

Todo Consider if Stack Overflow Reset should be enabled for production code. It may be better not to, as there is no re-entrant or recursive code, or dynamic memory allocation here - if the code loads statically it should run.

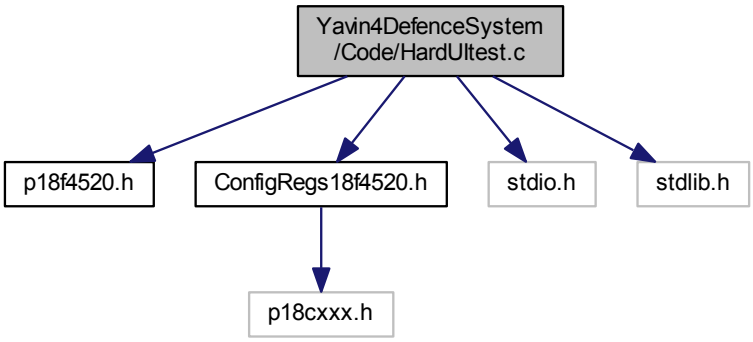
Todo Change startup code c016iz.c so that everything (including initialised variables) correctly re-starts if main() ever exits or a BOR or WDT reset occurs.

5.4 Yavin4DefenceSystem/Code/EEPROM.c File Reference

5.5 Yavin4DefenceSystem/Code/HardUltest.c File Reference

```
#include <p18f4520.h>
#include "ConfigRegs18f4520.h"
#include <stdio.h>
#include <stdlib.h>
```

Include dependency graph for HardUltest.c:



Macros

- #define ADCON0_set 0x41
- #define ADCON1_patch 0x80

Functions

- void PORTconfig (void)
- void LEDselect (char val)
- void setup (void)
- void INTconfig (void)
- void ADconfig (void)
- void ADgo (void)
- void ISR_high_vect (void)
- void ISR_high (void)
- void ISR_low_vect (void)
- void ISR_low (void)
- void main (void)

Variables

- char LEDtest [] ={0x33, 0x66, 0x9A, 0xCE, 0xFF}
- char LEDson [] ={0x00, 0x08, 0x0C, 0x0E, 0x0F}
- char * LEDtestpntr
- char * LEDsonpntr

5.5.1 Macro Definition Documentation

5.5.1.1 #define ADCON0_set 0x41

5.5.1.2 #define ADCON1_patch 0x80

5.5.2 Function Documentation

5.5.2.1 void ADconfig (void)

Patch until error is resolved

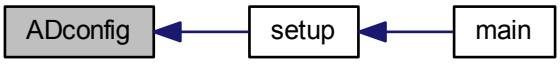
Configure port configuration, all set to

digital I/O, except AN0 use analogue and

use standard vrefs

FOSC/8 and enable conversions

Here is the caller graph for this function:



5.5.2.2 void ADgo (void)

Assign pointer to beginning of array

Assign pointer for LED choice

Begin a conversion

Poll the conversion flag until complete

Loop through the options

If the converted number is less than the

stored reference, turn on corresponging LED

If the correct bin is found, get out of loop

Increment pointers for next case

Here is the caller graph for this function:

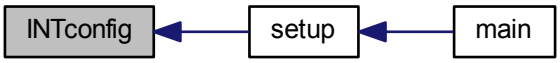
5.5.2.3 void INTconfig (void)

enable RB port change interrupt

Check RBIF for change (at least one) (software cleared=> read or write)

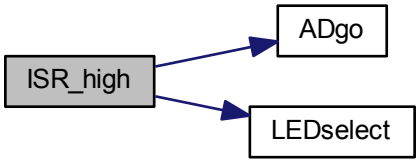
Set pin change as high interrupt

Here is the caller graph for this function:

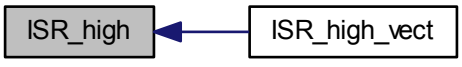


5.5.2.4 void ISR_high (void)

Here is the call graph for this function:

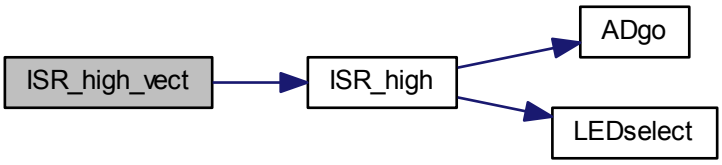


Here is the caller graph for this function:



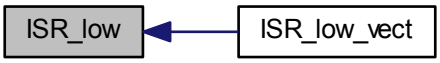
5.5.2.5 void ISR_high_vect (void)

Here is the call graph for this function:



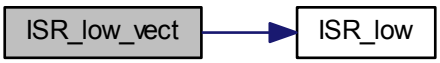
5.5.2.6 void ISR_low (void)

Here is the caller graph for this function:



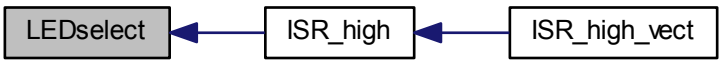
5.5.2.7 void ISR_low_vect (void)

Here is the call graph for this function:



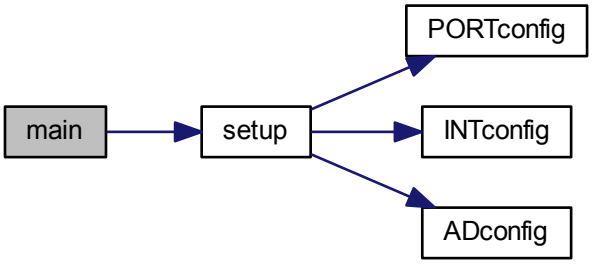
5.5.2.8 void LEDselect (char *val*)

Here is the caller graph for this function:



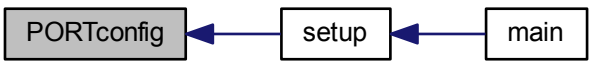
5.5.2.9 void main (void)

Here is the call graph for this function:



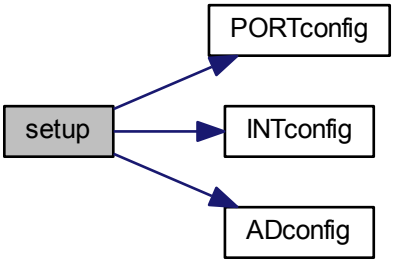
5.5.2.10 void PORTconfig (void)

Here is the caller graph for this function:



5.5.2.11 void setup (void)

Here is the call graph for this function:



Here is the caller graph for this function:

5.5.3 Variable Documentation

5.5.3.1 char LEDson[ ] ={0x00, 0x08, 0x0C, 0x0E, 0x0F}

5.5.3.2 char* LEDsonpntr

5.5.3.3 char LEDtest[ ] ={0x33, 0x66, 0x9A, 0xCE, 0xFF}

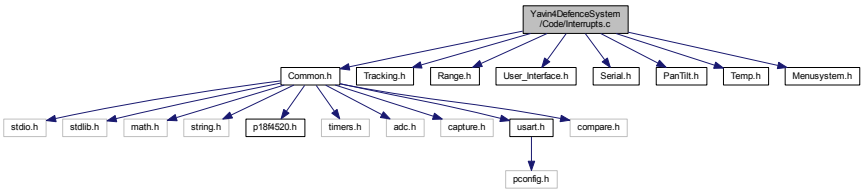
5.5.3.4 char* LEDtestpntr

5.6 Yavin4DefenceSystem/Code/HardUltest.h File Reference

5.7 Yavin4DefenceSystem/Code/Interrupts.c File Reference

```
#include "Common.h"
#include "Tracking.h"
#include "Range.h"
#include "User_Interface.h"
#include "Serial.h"
#include "PanTilt.h"
#include "Temp.h"
#include "Menusystem.h"
```

Include dependency graph for Interrupts.c:



Functions

- void lowISR (void)
- void highISR (void)
- void highVector (void)
- void lowVector (void)

5.7.1 Function Documentation

5.7.1.1 void highISR (void)

Function: highISR(void)

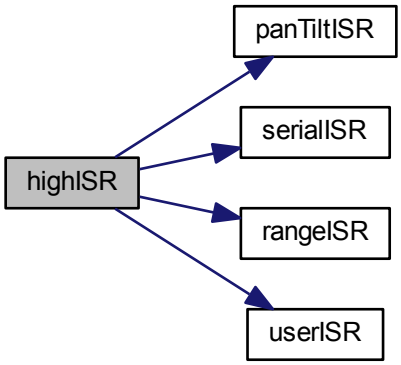
Include: Local to Interrupts.c

Description: Interrupt Service Routine to check what condition initiated a high priority interrupt call, and perform the nessicary action

Arguments: None

Returns: None

Here is the call graph for this function:



Here is the caller graph for this function:

5.7.1.2 void highVector (void)

Function: highVector(void)

Include: Local to Interrupts.c

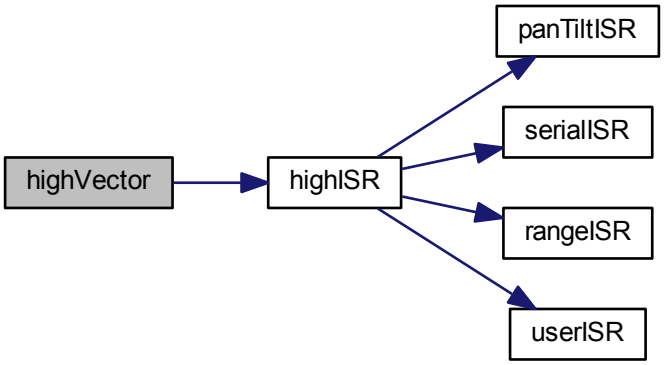
Description: Sends program control to the high priority ISR

Arguments: None

Returns: None

Remarks: This is an interrupt vector, placing a goto in the high priority interrupt table to call the high priority ISR

Here is the call graph for this function:



5.7.1.3 void lowISR (void)

File: Interrupts.c Author: Grant

Description: Contains the interrupt service routines for the system.

Duties: -Handle all interrupts called by the system -Call relevant module service routines

Created on 8 October 2014, 11:27 AM

Function: lowISR(void)

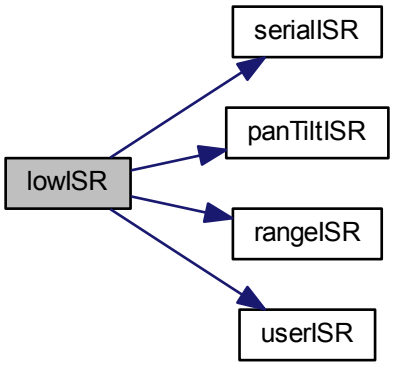
Include: Local to Interrupts.c

Description: Interrupt Service Routine to check what condition initiated a low priority interrupt call, and perform the nessicary action

Arguments: None

Returns: None

Here is the call graph for this function:



Here is the caller graph for this function:

5.7.1.4 void lowVector (void)

Function: lowVector(void)

Include: Local to Interrupts.c

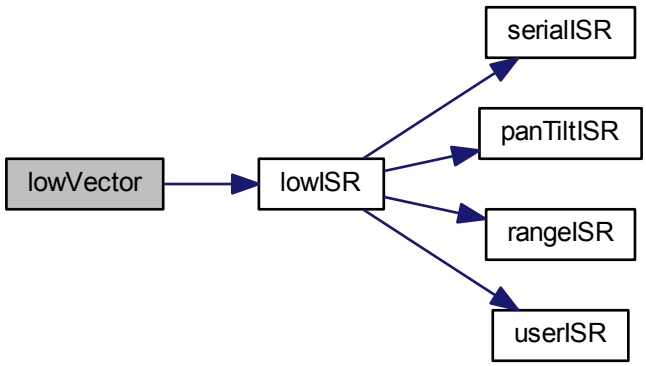
Description: Sends program control to the low priority ISR

Arguments: None

Returns: None

Remarks: This is an interrupt vector, placing a goto in the low priority interrupt table to call the low priority ISR

Here is the call graph for this function:



5.8 Yavin4DefenceSystem/Code/jEEP.h File Reference

Macros

- #define EEPADDRESS 0x00

Functions

- void sendEep (int number, int address)
- int readEep (int address)

5.8.1 Macro Definition Documentation

5.8.1.1 #define EEPADDRESS 0x00

5.8.2 Function Documentation

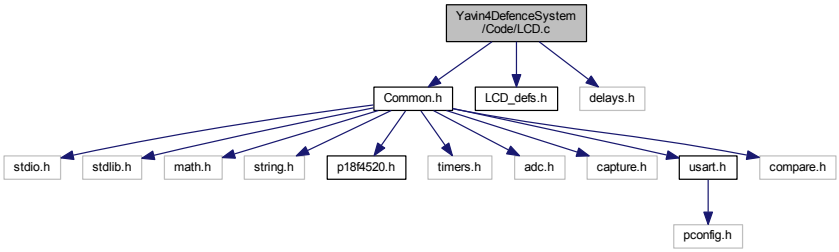
5.8.2.1 int readEep (int *address*)

5.8.2.2 void sendEep (int *number,* int *address*)

5.9 Yavin4DefenceSystem/Code/LCD.c File Reference

```
#include "Common.h"
#include "LCD_defs.h"
#include <delays.h>
```

Include dependency graph for LCD.c:



Functions

- void delay (unsigned int t)

  Include:
- char lcdBusy (void)

  Include:
- void lcdWrite (unsigned char byte, unsigned char mode)

  Include: LCD.h.
- void configLCD (void)

  Initialises the LCD so that it can be used.
- void lcdWriteString (char ∗string, char line)

  Include: LCD.h.
- void lcdWriteChar (char byte, char line, char column)

  Feed character, line (1 or 2), and column(1-16)

5.9.1 Function Documentation

5.9.1.1 void configLCD (void)

Initialises the LCD so that it can be used.

Feed character, line (1 or 2), and column(1-16)

Function: configLCD(void)

Include: LCD.h

Description: Initialises the LCD hardware so that data can be displayed on the LCD in local interface mode

Arguments: None

Returns: None Set data lines to output

Set control lines low

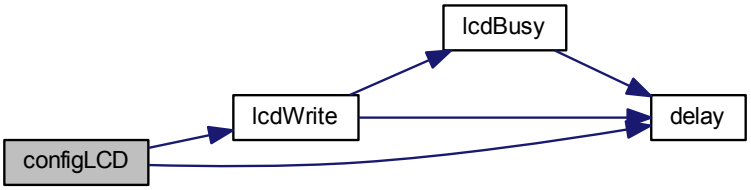
8 bits, 2 lines, 5x7 dots, 0x38

Display on, cursor off, blinking off (Z, 0x0F)

Cursor moves right?, display not shift (Z, 0x04)

Clear display

Here is the call graph for this function:



5.9.1.2 void delay (unsigned int *t*)

Include:

File: User_Interface.c Author:

Description: Contains all the interface to the LCD hardware

Duties: -Interfaces with and controls the LCD -Displays data on the LCD

Todo Complete, test, debug and document this code!!!

Created on 15 September 2014, 1:21 PM

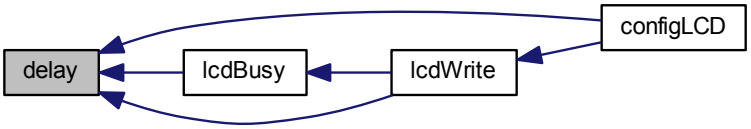
Function: delay(void)

Description:

Arguments: t -

Returns: None

Here is the caller graph for this function:



5.9.1.3 char lcdBusy (void)

Include:

Function: lcdBusy(void)

Description:

Arguments: None

Returns: None Set data lines to input

Set the enable low, ensure clock signal is low

Set RW to read read from LCD

Set the register select to low for instruction

Set the enable high, ensure clock signal is high to allow data transmission

Set control lines to output

Set data lines to output

Set enable low to allow data to flow through

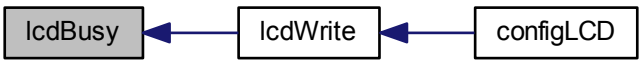
Set control lines to output

Set data lines to output

Set enable low to allow data to flow through

Here is the call graph for this function:

Here is the caller graph for this function:



5.9.1.4 void lcdWrite (unsigned char *byte,* unsigned char *mode*)

Include: LCD.h.

Function: lcdWrite(unsigned char byte, unsigned char mode)

Description:

Arguments: byte - mode -

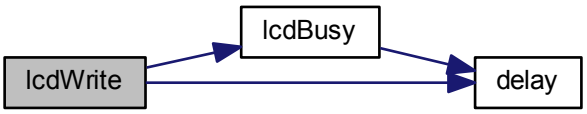
Returns: None Set data lines to output

Write data to data lines

Set clock high

Set clock low

Here is the call graph for this function:



Here is the caller graph for this function:

5.9.1.5 void lcdWriteChar (char *byte,* char *line,* char *column*)

Feed character, line (1 or 2), and column(1-16)

Feed character string, and line (1 or 2)

Function: lcdWriteChar(unsigned char byte, unsigned char line, unsigned char column)

Include: LCD.h

Description: Writes a character to the LCD at a given location

Arguments: byte - byte to write line - line to wrtie to column - column to write in

Returns: NoneFeed character, line (1 or 2), and column(1-16)

5.9.1.6 void lcdWriteString (char * *string,* char *line*)

Include: LCD.h.

Function: lcdWriteString(char *string, unsigned char line)

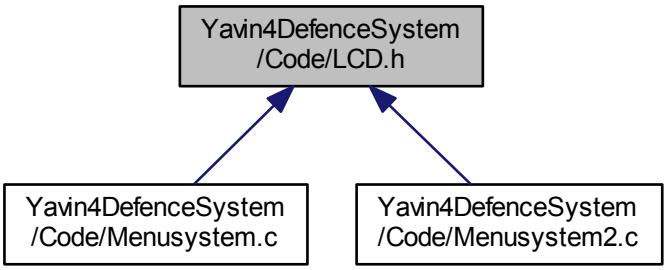
Description: Writes a string to the LCD at the given line

Arguments: string - The string to write line - the line to write to

Returns: NoneFeed character string, and line (1 or 2) Also include information about which row

5.10 Yavin4DefenceSystem/Code/LCD.h File Reference

This graph shows which files directly or indirectly include this file:



Macros

- #define LCD_H

Functions

- void lcdWriteString (char ∗string, char line)

  Include: LCD.h.
- void lcdWriteChar (char byte, char line, char column)

  Feed character string, and line (1 or 2)
- void configLCD (void)

  Feed character, line (1 or 2), and column(1-16)

5.10.1 Macro Definition Documentation

5.10.1.1 #define LCD_H

5.10.2 Function Documentation

5.10.2.1 void configLCD (void)

Feed character, line (1 or 2), and column(1-16)

Function: confiigLCD(void)

Initialises the LCD so that it can be used

Include: LCD.h

Description: Initialises the LCD hardware so that data can be displayed on the LCD in local interface mode

Arguments: None

Returns: None

Feed character, line (1 or 2), and column(1-16)

Function: configLCD(void)

Include: LCD.h

Description: Initialises the LCD hardware so that data can be displayed on the LCD in local interface mode

Arguments: None

Returns: None Set data lines to output

Set control lines low

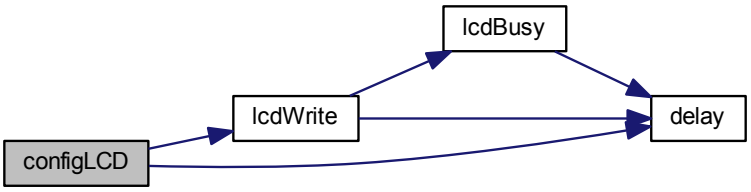
8 bits, 2 lines, 5x7 dots, 0x38

Display on, cursor off, blinking off (Z, 0x0F)

Cursor moves right?, display not shift (Z, 0x04)

Clear display

Here is the call graph for this function:



5.10.2.2 void lcdWriteChar (char *byte,* char *line,* char *column*)

Feed character string, and line (1 or 2)

Function: lcdWriteChar(unsigned char byte, unsigned char line, unsigned char column)

Include: LCD.h

Description: Writes a character to the LCD at a given location

Arguments: byte - byte to write line - line to wrtie to column - column to write in

Returns: None

Feed character string, and line (1 or 2)

Function: lcdWriteChar(unsigned char byte, unsigned char line, unsigned char column)

Include: LCD.h

Description: Writes a character to the LCD at a given location

Arguments: byte - byte to write line - line to wrtie to column - column to write in

Returns: NoneFeed character, line (1 or 2), and column(1-16)

5.10.2.3 void lcdWriteString (char * *string,* char *line*)

Include: LCD.h.

File: LCD.h Author: Grant

Description: Contains the public interface for the LCD module.

Created on 17 September 2014, 9:01 PM

Function: lcdWriteString(char ∗string, unsigned char line)

Description: Writes a string to the LCD at the given line

Arguments: string - The string to write line - the line to write to

Returns: None

Function: lcdWriteString(char ∗string, unsigned char line)

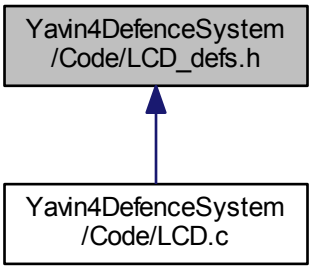
Description: Writes a string to the LCD at the given line

Arguments: string - The string to write line - the line to write to

Returns: NoneFeed character string, and line (1 or 2) Also include information about which row

5.11 Yavin4DefenceSystem/Code/LCD_defs.h File Reference

This graph shows which files directly or indirectly include this file:



Macros

- #define LCD_D0 PORTDbits.RD0
- #define LCD_D1 PORTDbits.RD1
- #define LCD_D2 PORTDbits.RD2
- #define LCD_D3 PORTDbits.RD3
- #define LCD_D4 PORTDbits.RD4
- #define LCD_D5 PORTDbits.RD5
- #define LCD_D6 PORTDbits.RD6
- #define LCD_D7 PORTDbits.RD7
- #define LCD_D0_DIR TRISDbits.RD0
- #define LCD_D1_DIR TRISDbits.RD1
- #define LCD_D2_DIR TRISDbits.RD2
- #define LCD_D3_DIR TRISDbits.RD3
- #define LCD_D4_DIR TRISDbits.RD4
- #define LCD_D5_DIR TRISDbits.RD5
- #define LCD_D6_DIR TRISDbits.RD6
- #define LCD_D7_DIR TRISDbits.RD7
- #define LCD_DATA_LINE PORTD
- #define LCD_DATA_LINE_DIR TRISD

- #define LCD_RS PORTCbits.RC4
- #define LCD_RW PORTCbits.RC5
- #define LCD_E PORTAbits.RA4
- #define LCD_RS_DIR TRISCbits.RC4
- #define LCD_RW_DIR TRISCbits.RC5
- #define LCD_E_DIR TRISAbits.RA4
- #define LCD_INS 0
- #define LCD_DATA 1
- #define LCD_WRITE 0
- #define LCD_READ 1
- #define LCD_CLKLOW 0
- #define LCD_CLKHGH 1
- #define LCD_OFF 0
- #define LCD_ON 1
- #define LCD_INPUT 0xFF
- #define LCD_OUTPUT 0x00
- #define LCD_PIN_INPUT 1
- #define LCD_PIN_OUTPUT 0
- #define DISPCLR 0x01
- #define RTNHOME 0x02
- #define SETENTRYMODE 0x04
- #define ID_CURSL 0x00
- #define ID_CURSR 0x02
- #define SH_DISPNSHIFT 0x00
- #define SH_DISPSHIFT 0x01
- #define DISPOPT 0x08
- #define D_DISPOFF 0x00
- #define D_DISPON 0x04
- #define C_CURSOFF 0x00
- #define C_CURSON 0x02
- #define B_BLINKOFF 0x00
- #define B_BLINKON 0x01
- #define DISPSHIFTCURS 0x10
- #define SC_CURSMOVE 0x00
- #define SC_DISPMOVE 0x08
- #define RL_LFTSHFT 0x00
- #define RL_RGTSHFT 0x04
- #define SETDISPFXN 0x20
- #define DL_4BIT 0x00
- #define DL_8BIT 0x10
- #define N_1LINE 0x00
- #define N_2LINE 0x08
- #define F_5X7DOT 0x00
- #define F_5X10DOT 0x04
- #define SETCGRAMADD 0x40
- #define SETDDRAMADD 0x80
- #define BF_READY 0x00
- #define BF_BUSY 1
- #define LINE1 0x00
- #define LINE2 0x40
- #define LINESTART 0x00
- #define LINEEND 0x0F

5.11.1 Macro Definition Documentation

5.11.1.1 #define B_BLINKOFF 0x00

5.11.1.2 #define B_BLINKON 0x01

5.11.1.3 #define BF_BUSY 1

5.11.1.4 #define BF_READY 0x00

5.11.1.5 #define C_CURSOFF 0x00

5.11.1.6 #define C_CURSON 0x02

5.11.1.7 #define D_DISPOFF 0x00

5.11.1.8 #define D_DISPON 0x04

5.11.1.9 #define DISPCLR 0x01

5.11.1.10 #define DISPOPT 0x08

5.11.1.11 #define DISPSHIFTCURS 0x10

5.11.1.12 #define DL_4BIT 0x00

5.11.1.13 #define DL_8BIT 0x10

5.11.1.14 #define F_5X10DOT 0x04

5.11.1.15 #define F_5X7DOT 0x00

5.11.1.16 #define ID_CURSL 0x00

5.11.1.17 #define ID_CURSR 0x02

5.11.1.18 #define LCD_CLKHGH 1

5.11.1.19 #define LCD_CLKLOW 0

5.11.1.20 #define LCD_D0 PORTDbits.RD0

5.11.1.21 #define LCD_D0_DIR TRISDbits.RD0

5.11.1.22 #define LCD_D1 PORTDbits.RD1

5.11.1.23 #define LCD_D1_DIR TRISDbits.RD1

5.11.1.24 #define LCD_D2 PORTDbits.RD2

5.11.1.25 #define LCD_D2_DIR TRISDbits.RD2

5.11.1.26 #define LCD_D3 PORTDbits.RD3

5.11.1.27 #define LCD_D3_DIR TRISDbits.RD3

5.11.1.28 #define LCD_D4 PORTDbits.RD4

5.11.1.29 #define LCD_D4_DIR TRISDbits.RD4

5.11.1.30 #define LCD_D5 PORTDbits.RD5

5.11.1.31 #define LCD_D5_DIR TRISDbits.RD5

5.11.1.32 #define LCD_D6 PORTDbits.RD6

5.11.1.33 #define LCD_D6_DIR TRISDbits.RD6

5.11.1.34 #define LCD_D7 PORTDbits.RD7

5.11.1.35 #define LCD_D7_DIR TRISDbits.RD7

5.11.1.36 #define LCD_DATA 1

5.11.1.37 #define LCD_DATA_LINE PORTD

5.11.1.38 #define LCD_DATA_LINE_DIR TRISD

5.11.1.39 #define LCD_E PORTAbits.RA4

5.11.1.40 #define LCD_E_DIR TRISAbits.RA4

5.11.1.41 #define LCD_INPUT 0xFF

5.11.1.42 #define LCD_INS 0

5.11.1.43 #define LCD_OFF 0

5.11.1.44 #define LCD_ON 1

5.11.1.45 #define LCD_OUTPUT 0x00

5.11.1.46 #define LCD_PIN_INPUT 1

5.11.1.47 #define LCD_PIN_OUTPUT 0

5.11.1.48 #define LCD_READ 1

5.11.1.49 #define LCD_RS PORTCbits.RC4

5.11.1.50 #define LCD_RS_DIR TRISCbits.RC4

5.11.1.51 #define LCD_RW PORTCbits.RC5

5.11.1.52 #define LCD_RW_DIR TRISCbits.RC5

5.11.1.53 #define LCD_WRITE 0

5.11.1.54 #define LINE1 0x00

5.11.1.55 #define LINE2 0x40

5.11.1.56 #define LINEEND 0x0F

5.11.1.57 #define LINESTART 0x00

5.11.1.58 #define N_1LINE 0x00

5.11.1.59 #define N_2LINE 0x08

5.11.1.60 #define RL_LFTSHFT 0x00

5.11.1.61 #define RL_RGTSHFT 0x04

5.11.1.62 #define RTNHOME 0x02

5.11.1.63 #define SC_CURSMOVE 0x00

5.11.1.64 #define SC_DISPMOVE 0x08

5.11.1.65 #define SETCGRAMADD 0x40

5.11.1.66 #define SETDDRAMADD 0x80

5.11.1.67 #define SETDISPFXN 0x20

5.11.1.68 #define SETENTRYMODE 0x04

5.11.1.69 #define SH_DISPNSHIFT 0x00

5.11.1.70 #define SH_DISPSHIFT 0x01

5.12 Yavin4DefenceSystem/Code/Menu_Strings.h File Reference

Macros

- #define STRINGS_H 0

Variables

- static const rom char newLine [] = "\r\n"
- static const rom char CHOOSE [] = "\n\n\tPlease select your option (eg. 2): \r\n"
- static const rom char menuPrefix3 [] = "\t3:"
- static const rom char menuPrefix4 [] = "\t4:"
- static const rom char menuPrefix5 [] = "\t5:"
- static const rom char menuPrefix8 [] = "\t8:"
- static const rom char goUp [] = "\tReturn to previous menu\r\n"
- static const rom char goUp2 [] = "Press Esc to return to the previous menu.\r\n"
- static const rom char errNumOutOfRange [] = " Error: Please enter a number between "
- static const rom char and [] = " and "
- static const rom char welcome [] = " Welcome to Yavin IV Defence System "
- static const rom char welcomeLcd [] = " Welcome!"
- static const far rom char topOption1 [] = "\t1:\tAutomatic Tracking\r\n"
- static const far rom char topOption2 [] = "\t2:\tAzimuth Options\r\n"
- static const far rom char topOption3 [] = "\t3:\tElevation Options\r\n"
- static const far rom char topOption4 [] = "\t4:\tRange Options\r\n"

- static const far rom char topOption5 [] = "\t5:\tDisplay Current Temperature\r\n"
- static const far rom char topOptionCalTemp [] = "\t6:\tCalibrate the Temperature sensor\r\n"
- static const far rom char topOptionLocal [] = "\t6:\tSwitch to Local mode\r\n"
- static const far rom char topOptionFactory [] = "\t7:\tSwitch to Factory mode\r\n"
- static const far rom char topOptionRemote [] = "\t6:\tSwitch to Remote Serial mode\r\n"
- static const far rom char topOptionRemoteLCD [] = "Switch to Remote"
- static const rom char azMenu [] = "\r\nAzimuth Configuration\r\n"
- static const rom char azMenuLcd [] = "Azimuth Options"
- static const far rom char azOption1 [] = "\t1:\tGo to a specified azimuth angle\r\n"
- static const far rom char azOption2 [] = "\t2:\tSet the minimum azimuth angle\r\n"
- static const far rom char azOption3 [] = "\t3:\tSet the maximum azimuth angle\r\n"
- static const far rom char azOption4 [] = "\t4:\tCalibrate the azimuth motor\r\n"
- static const rom char elMenu [] = "\r\nElevation Configuration\r\n"
- static const rom char elMenuLcd [] = "Elevation Options"
- static const far rom char elOption1 [] = "\t1:\tGo to a specified elevation angle\r\n"
- static const far rom char elOption2 [] = "\t2:\tSet the minimum elevation angle\r\n"
- static const far rom char elOption3 [] = "\t3:\tSet the maximum elevation angle\r\n"
- static const far rom char elOption4 [] = "\t4:\tCalibrate the elevation motor\r\n"
- static const rom char rngMenu [] = "\r\nRange Configuration\r\n"
- static const rom char rngMenuLcd [] = "Range Options"
- static const far rom char rngOption1 [] = "\t1:\tSet the minimum system range\r\n"
- static const far rom char rngOption2 [] = "\t2:\tSet the maximum system range\r\n"
- static const far rom char rngOption3 [] = "\t3:\tView the raw ultrasound and infrared sensor readings\r\n"
- static const far rom char rngOption4 [] = "\t4:\tSet the ultrasound sample rate\r\n"
- static const far rom char rngOption5 [] = "\t5:\tSet the number of ultrasound samples used per estimate\r\n"
- static const far rom char rngOption6 [] = "\t6:\tSet the infrared sample rate\r\n"
- static const far rom char rngOption7 [] = "\t7:\tSet the number of infrared samples used per estimate\r\n"
- static const far rom char showTempLCDTitle [] = "Display Temp"
- static const far rom char showTempLCD [] = "Temp = "
- static const far rom char showTemp1 [] = "\r\n The current temperature is "
- static const far rom char showTemp2 [] = " degrees Celcius. \r\n\n Press Esc to return.\r\n"
- static const far rom char gotoAzAngle [] = "\r\n Enter the azimuth angle in degrees. \r\n"
- static const far rom char gotoAzAngleLCD [] = "Go to Azimuth"
- static const far rom char gotoElAngle [] = "\r\n Enter the elevation angle in degrees. \r\n"
- static const far rom char gotoELAngleLCD [] = "Go to Elevation"
- static const far rom char gotoAngle2 [] = " The current minimum and maximum angles are "
- static const far rom char angleStr [] = "Angle"
- static const far rom char maxAzStr [] = "Max Azimuth"
- static const far rom char maxAzSetStr [] = "Set Max Azimuth"
- static const far rom char maxAz1 [] = " Enter a new maximum azimuth angle: \r\n"
- static const far rom char maxAz3 [] = "\r\n Maximum azimuth angle set to "
- static const far rom char currentMinAngleStr [] = "\r\n The current minimum angle is "
- static const far rom char minAzStr [] = "Min Azimuth"
- static const far rom char minAzSetStr [] = "Set Min Azimuth"
- static const far rom char minAz1 [] = " Enter a new minimum azimuth angle: \r\n"
- static const far rom char minAz3 [] = "\r\n Minimum azimuth angle set to "
- static const far rom char calibrateAngle1 [] = "\r\n Enter the true angle of the current position \r\n"
- static const far rom char maxElStr [] = "Max Elevation"
- static const far rom char maxElSetStr [] = "Set Max Elevation"
- static const far rom char maxEl1 [] = " Enter a new maximum elevation angle: \r\n"
- static const far rom char maxEl3 [] = "\r\n Maximum elevation angle set to "
- static const far rom char minElStr [] = "Min Elevation"
- static const far rom char minElSetStr [] = "Set Min Elevation"
- static const far rom char minEl1 [] = " Enter a new minimum elevation angle: \r\n"
- static const far rom char minEl3 [] = "\r\n Minimum elevation angle set to "

- static const far rom char minRngStr [ ] = "Min Range"
- static const far rom char minRngSetStr [ ] = "Set Min Range"
- static const far rom char minRngSerialStr [ ] = "Enter a new minimum range: \r\n"
- static const far rom char maxRngStr [ ] = "Max Range"
- static const far rom char maxRngSetStr [ ] = "Set Max Range"
- static const far rom char maxRngSerialStr [ ] = "Enter a new minimum range: \r\n"

5.12.1 Macro Definition Documentation

5.12.1.1 #define STRINGS_H 0

5.12.2 Variable Documentation

5.12.2.1 const rom char and[ ] = " and " [static]

5.12.2.2 const far rom char angleStr[ ] = "Angle" [static]

5.12.2.3 const rom char azMenu[ ] = "\r\nAzimuth Configuration\r\n" [static]

5.12.2.4 const rom char azMenuLcd[ ] = "Azimuth Options" [static]

5.12.2.5 const far rom char azOption1[ ] = "\t1:\tGo to a specified azimuth angle\r\n" [static]

5.12.2.6 const far rom char azOption2[ ] = "\t2:\tSet the minimum azimuth angle\r\n" [static]

5.12.2.7 const far rom char azOption3[ ] = "\t3:\tSet the maximum azimuth angle\r\n" [static]

5.12.2.8 const far rom char azOption4[ ] = "\t4:\tCalibrate the azimuth motor\r\n" [static]

5.12.2.9 const far rom char calibrateAngle1[ ] = "\r\n Enter the true angle of the current position \r\n" [static]

5.12.2.10 const rom char CHOOSE[ ] = "\n\n\tPlease select your option (eg. 2): \r\n" [static]

5.12.2.11 const far rom char currentMinAngleStr[ ] = "\r\n The current minimum angle is " [static]

5.12.2.12 const rom char elMenu[ ] = "\r\nElevation Configuration\r\n" [static]

5.12.2.13 const rom char elMenuLcd[ ] = "Elevation Options" [static]

5.12.2.14 const far rom char elOption1[ ] = "\t1:\tGo to a specified elevation angle\r\n" [static]

5.12.2.15 const far rom char elOption2[ ] = "\t2:\tSet the minimum elevation angle\r\n" [static]

5.12.2.16 const far rom char elOption3[ ] = "\t3:\tSet the maximum elevation angle\r\n" [static]

5.12.2.17 const far rom char elOption4[ ] = "\t4:\tCalibrate the elevation motor\r\n" [static]

5.12.2.18 const rom char errNumOutOfRange[ ] = " Error: Please enter a number between " [static]

5.12.2.19 const far rom char gotoAngle2[ ] = " The current minimum and maximum angles are " [static]

5.12.2.20 const far rom char gotoAzAngle[ ] = "\r\n Enter the azimuth angle in degrees. \r\n" [static]

5.12.2.21 const far rom char gotoAzAngleLCD[ ] = "Go to Azimuth" [static]

5.12.2.22 const far rom char gotoElAngle[ ] = "\r\n Enter the elevation angle in degrees. \r\n" [static]

5.12.2.23 const far rom char gotoELAngleLCD[ ] = "Go to Elevation" [static]

5.12.2.24 const rom char goUp[ ] = "\tReturn to previous menu\r\n" [static]

5.12.2.25 const rom char goUp2[ ] = "Press Esc to return to the previous menu.\r\n" [static]

5.12.2.26 const far rom char maxAz1[ ] = " Enter a new maximum azimuth angle: \r\n" [static]

5.12.2.27 const far rom char maxAz3[ ] = "\r\n Maximum azimuth angle set to " [static]

5.12.2.28 const far rom char maxAzSetStr[ ] = "Set Max Azimuth" [static]

5.12.2.29 const far rom char maxAzStr[ ] = "Max Azimuth" [static]

5.12.2.30 const far rom char maxEl1[ ] = " Enter a new maximum elevation angle: \r\n" [static]

5.12.2.31 const far rom char maxEl3[ ] = "\r\n Maximum elevation angle set to " [static]

5.12.2.32 const far rom char maxElSetStr[ ] = "Set Max Elevation" [static]

5.12.2.33 const far rom char maxElStr[ ] = "Max Elevation" [static]

5.12.2.34 const far rom char maxRngSerialStr[ ] = "Enter a new minimum range: \r\n" [static]

5.12.2.35 const far rom char maxRngSetStr[ ] = "Set Max Range" [static]

5.12.2.36 const far rom char maxRngStr[ ] = "Max Range" [static]

5.12.2.37 const rom char menuPrefix3[ ] = "\t3:" [static]

5.12.2.38 const rom char menuPrefix4[ ] = "\t4:" [static]

5.12.2.39 const rom char menuPrefix5[ ] = "\t5:" [static]

5.12.2.40 const rom char menuPrefix8[ ] = "\t8:" [static]

5.12.2.41 const far rom char minAz1[ ] = " Enter a new minimum azimuth angle: \r\n" [static]

5.12.2.42 const far rom char minAz3[ ] = "\r\n Minimum azimuth angle set to " [static]

5.12.2.43 const far rom char minAzSetStr[ ] = "Set Min Azimuth" [static]

5.12.2.44 const far rom char minAzStr[ ] = "Min Azimuth" [static]

5.12.2.45 const far rom char minEl1[ ] = " Enter a new minimum elevation angle: \r\n" [static]

5.12.2.46 const far rom char minEl3[ ] = "\r\n Minimum elevation angle set to " [static]

5.12.2.47 const far rom char minElSetStr[ ] = "Set Min Elevation" [static]

5.12.2.48 const far rom char minElStr[ ] = "Min Elevation" [static]

5.12.2.49 const far rom char minRngSerialStr[ ] = "Enter a new minimum range: \r\n" [static]

5.12.2.50 const far rom char minRngSetStr[ ] = "Set Min Range" [static]

5.12.2.51 const far rom char minRngStr[ ] = "Min Range" [static]

5.12.2.52 const rom char newLine[ ] = "\r\n" [static]

5.12.2.53 const rom char rngMenu[ ] = "\r\nRange Configuration\r\n" [static]

5.12.2.54 const rom char rngMenuLcd[ ] = "Range Options" [static]

5.12.2.55 const far rom char rngOption1[ ] = "\t1:\tSet the minimum system range\r\n" [static]

5.12.2.56 const far rom char rngOption2[ ] = "\t2:\tSet the maximum system range\r\n" [static]

5.12.2.57 const far rom char rngOption3[ ] = "\t3:\tView the raw ultrasound and infrared sensor readings\r\n" [static]

5.12.2.58 const far rom char rngOption4[ ] = "\t4:\tSet the ultrasound sample rate\r\n" [static]

5.12.2.59 const far rom char rngOption5[ ] = "\t5:\tSet the number of ultrasound samples used per estimate\r\n" [static]

5.12.2.60 const far rom char rngOption6[ ] = "\t6:\tSet the infrared sample rate\r\n" [static]

5.12.2.61 const far rom char rngOption7[ ] = "\t7:\tSet the number of infrared samples used per estimate\r\n" [static]

5.12.2.62 const far rom char showTemp1[ ] = "\r\n The current temperature is " [static]

5.12.2.63 const far rom char showTemp2[ ] = " degrees Celcius. \r\n\n Press Esc to return.\r\n" [static]

5.12.2.64 const far rom char showTempLCD[ ] = "Temp = " [static]

5.12.2.65 const far rom char showTempLCDTitle[ ] = "Display Temp" [static]

5.12.2.66 const far rom char topOption1[ ] = "\t1:\tAutomatic Tracking\r\n" [static]

5.12.2.67 const far rom char topOption2[ ] = "\t2:\tAzimuth Options\r\n" [static]

5.12.2.68 const far rom char topOption3[ ] = "\t3:\tElevation Options\r\n" [static]

5.12.2.69 const far rom char topOption4[ ] = "\t4:\tRange Options\r\n" [static]

5.12.2.70 const far rom char topOption5[ ] = "\t5:\tDisplay Current Temperature\r\n" [static]

5.12.2.71 const far rom char topOptionCalTemp[ ] = "\t6:\tCalibrate the Temperature sensor\r\n" [static]

5.12.2.72 const far rom char topOptionFactory[ ] = "\t7:\tSwitch to Factory mode\r\n" [static]

5.12.2.73 const far rom char topOptionLocal[ ] = "\t6:\tSwitch to Local mode\r\n" [static]

5.12.2.74 const far rom char topOptionRemote[ ] = "\t6:\tSwitch to Remote Serial mode\r\n" [static]

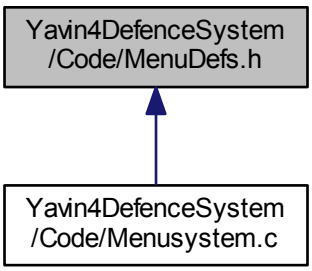
5.12.2.75 const far rom char topOptionRemoteLCD[ ] = "Switch to Remote" [static]

5.12.2.76 const rom char welcome[ ] = " Welcome to Yavin IV Defence System " [static]

5.12.2.77 const rom char welcomeLcd[ ] = " Welcome!" [static]

5.13 Yavin4DefenceSystem/Code/MenuDefs.h File Reference

This graph shows which files directly or indirectly include this file:



Data Structures

- struct menuStruct

  Defines a sub menu.

Macros

- #define FACTORY_SWITCH PORTBbits.RB2
- #define MENU_ISR 0
- #define width 80
- #define height 24
- #define MAX_ANGLE_SUPREMUM 45
- #define MAX_ANGLE_INFIMUM 20
- #define MIN_ANGLE_SUPREMUM -20
- #define MIN_ANGLE_INFIMUM -45
- #define MAX_RANGE_SUPREMUM 3000
- #define MAX_RANGE_INFIMUM 1000
- #define MIN_RANGE_SUPREMUM 600
- #define MIN_RANGE_INFIMUM 300
- #define SAMPLE_PER_AVG_MIN 1
- #define SAMPLE_PER_AVG_MAX 5
- #define CLEAR_SCREEN_STRING "\033[2J\033[0;0H"
- #define CLEAR_LINE_STRING "\033[2K"
- #define SERIAL_CURSOR_OFF "\033[?25l"
- #define SERIAL_CURSOR_ON "\033[?25h"
- #define ERR_NUM_OUT_OF_RANGE -1000
- #define ERR_NOT_NUMERIC -2000
- #define ERR_NO_NUMBER -3000
- #define ESC_PRESSED -4000
- #define MINUS_CHAR 0x2D

Typedefs

- typedef void(* numericInputFunction)(int)
- typedef void(* voidFunction)(void)

Enumerations

- enum menuState {
  TOP_LEVEL, TRACKING, AZ_MENU, AZ_GOTO,
  AZ_MAX, AZ_MIN, AZ_CALIBRATE, EL_MENU,
  EL_GOTO, EL_MAX, EL_MIN, EL_CALIBRATE,
  RANGE_MENU, RANGE_MAX, RANGE_MIN, US_SAMPLE_RATE,
  US_SAMPLE_AVG, IR_SAMPLE_RATE, IR_SAMPLE_AVG, RANGE_RAW,
  CALIBRATE_RANGE, SHOW_TEMP, CALIBRATE_TEMP }
- enum userState { LOCAL, REMOTE, FACTORY }

Variables

- struct menuStruct menuStruct
- const rom char newLine [] = "\r\n"
- const rom char CHOOSE [] = "\tPlease select option (eg. 2)"
- const rom char CHOOSE2 [] = "\tPress Enter to confirm, or Esc to return"
- const rom char menuPrefix3 [] = "3:"
- const rom char menuPrefix4 [] = "4:"
- const rom char menuPrefix5 [] = "5:"
- const rom char menuPrefix8 [] = "8:"
- const rom char goUp [] = "Return to previous menu"
- const rom char goUp2 [] = "Press Esc to return to the previous menu."
- const rom char errStr [] = "Error: "
- const rom char inputNumRangeStr [] = "Please enter a number between "
- const rom char currentValueStr [] = "The current value is: "
- const rom char and [] = " and "
- const rom char AzStr [] = "Azimuth"
- const rom char ElStr [] = "Elevation"
- const rom char RngStr [] = "Range"
- const rom char mmStr [] = "Range (mm)"
- const rom char sampleRate [] = "Sampling Frequency (Hz)"
- const rom char numPerSample [] = "Number of samples per estimate"
- const rom char hz [] = "Hz"
- const rom char tab [] = "\t"
- const rom char title [] = "Welcome to the Yavin IV Defence System!"
- const rom char welcomeLcd [] = "Home Menu"
- const rom char topOption1 [] = "\t1:\tAutomatic Tracking"
- const rom char topOption2 [] = "\t2:\tAzimuth Options"
- const rom char topOption3 [] = "\t3:\tElevation Options"
- const rom char topOption4 [] = "\t4:\tRange Options"
- const rom char topOption5 [] = "\t5:\tDisplay Current Temperature"
- const rom char topOptionCalTemp [] = "\t6:\tCalibrate the Temperature sensor"
- const rom char topOptionLocal [] = "\t6:\tSwitch to Local mode"
- const rom char topOptionForFactory [] = "\t7:\tSwitch to Factory mode"
- const rom char topOptionRemote [] = "\t6:\tSwitch to Remote Serial mode"
- const rom char topOptionRemoteLCD [] = "Switch to Remote"
- const rom char autoSerialMessage [] = "Automatic tracking mode initiated."
- const rom char autoLcdTitle [] = "Auto-tracking"

- const rom char autoSearching [] = "Searching..."
- const rom char set [] = "Set"
- const rom char range_str [] = "Range"
- const rom char goto_str [] = "Go to"
- const rom char Options [] = "Options"
- const rom char azMenu [] = "\r\nAzimuth Configuration\r\n"
- const rom char azMenuLcd [] = "Azimuth Options"
- const rom char azOption1 [] = "\t1:\tGo to a specified azimuth angle"
- const rom char azOption2 [] = "\t2:\tSet the min azimuth angle"
- const rom char azOption3 [] = "\t3:\tSet the max azimuth angle"
- const rom char azOption4 [] = "\t4:\tCalibrate the azimuth motor"
- const rom char elMenu [] = "Elevation Configuration"
- const rom char elMenuLcd [] = "Elevation Options"
- const rom char elOption1 [] = "\t1:\tGo to a specified elevation angle"
- const rom char elOption2 [] = "\t2:\tSet min elevation angle"
- const rom char elOption3 [] = "\t3:\tSet max elevation angle"
- const rom char elOption4 [] = "\t4:\tCalibrate elevation servo"
- const rom char rngMenu [] = "Range Configuration"
- const rom char rngMenuLcd [] = "Range Options"
- const rom char rngOption1 [] = "\t1:\tSet min system range"
- const rom char rngOption2 [] = "\t2:\tSet max system range"
- const rom char rngOption3 [] = "\t3:\tView raw ultrasound and IR sensor data"
- const rom char rngOption4 [] = "\t4:\tSet the ultrasound sample rate"
- const rom char rngOption5 [] = "\t5:\tSet number of ultrasound samples per estimate"
- const rom char rngOption7 [] = "\t6:\tSet number of IR samples per estimate"
- const rom char rngOption8 [] = "\t7:\tCalibrate to a set range"
- const rom char showTempLCDTitle [] = "Display Temp"
- const rom char showTempLCD [] = "Temp = "
- const rom char showTemp1 [] = "Temp: "
- const rom char showTemp2 [] = " deg Celcius. \r\n\n\tPress Esc to return"
- const rom char gotoAzAngle [] = "Enter azimuth angle in degrees"
- const rom char gotoAzAngleLCD [] = "Go to Azimuth"
- const rom char gotoElAngle [] = "Enter elevation angle in degrees"
- const rom char gotoELAngleLCD [] = "Go to Elevation"
- const rom char gotoAngle2 [] = " Current min & max angles: "
- const rom char angleStr [] = "Angle"
- const rom char maxAzStr [] = "Max Azimuth"
- const rom char maxAzSetStr [] = "Set Max Azimuth"
- const rom char maxAz1 [] = "Enter a new max azimuth: "
- const rom char maxAz3 [] = "Max azimuth set to "
- const rom char currentMinAngleStr [] = "Current min "
- const rom char minAzStr [] = "Min Azimuth"
- const rom char minAzSetStr [] = "Set Min Azimuth"
- const rom char minAz1 [] = "Enter a new min azimuth: "
- const rom char minAz3 [] = "Min azimuth set to "
- const rom char calibrateAngle1 [] = "Enter Calibration angles: "
- const rom char maxElStr [] = "Max Elevation"
- const rom char maxElSetStr [] = "Set Max Elevation"
- const rom char maxEl1 [] = "Enter a new max elevation: "
- const rom char maxEl3 [] = "Max elevation set to "
- const rom char minElStr [] = "Min Elevation"
- const rom char minElSetStr [] = "Set Min Elevation"
- const rom char minEl1 [] = "Enter a new min elevation: "
- const rom char minEl3 [] = "Min elevation set to "
- const rom char minRngStr [] = "Min Range"

- const rom char minRngSetStr [] = "Set Min Range"
- const rom char minRngSerialStr [] = "Enter a new min range: (mm)"
- const rom char maxRngStr [] = "Max Range"
- const rom char maxRngSetStr [] = "Set Max Range"
- const rom char maxRngSerialStr [] = "Enter a new max range (mm):"
- const rom char rawRangeStr [] = "Displaying raw range in mm:"
- const rom char rawRangeTitle [] = "Raw Range"
- const rom char calRangeStr [] = "Place an object 500mm away from the sensor and press enter."
- const rom char calRangeTitle [] = "Calibrate Range"
- const rom char calRangeConfirm [] = "Range calibrated"
- const rom char usSampleRateStr [] = "Please enter a sample"
- const rom char usSampleRateTitle [] = "Ultrasound Sample Rate"
- const rom char numSamplesStr [] = "Enter a number of samples to take."
- const rom char numSampleTitle [] = "Num. of Samples"

5.13.1 Macro Definition Documentation

5.13.1.1 #define CLEAR_LINE_STRING "\033[2K"

5.13.1.2 #define CLEAR_SCREEN_STRING "\033[2J\033[0;0H"

5.13.1.3 #define ERR_NO_NUMBER -3000

5.13.1.4 #define ERR_NOT_NUMERIC -2000

5.13.1.5 #define ERR_NUM_OUT_OF_RANGE -1000

5.13.1.6 #define ESC_PRESSED -4000

5.13.1.7 #define FACTORY_SWITCH PORTBbits.RB2

5.13.1.8 #define height 24

5.13.1.9 #define MAX_ANGLE_INFIMUM 20

5.13.1.10 #define MAX_ANGLE_SUPREMUM 45

5.13.1.11 #define MAX_RANGE_INFIMUM 1000

5.13.1.12 #define MAX_RANGE_SUPREMUM 3000

5.13.1.13 #define MENU_ISR 0

5.13.1.14 #define MIN_ANGLE_INFIMUM -45

5.13.1.15 #define MIN_ANGLE_SUPREMUM -20

5.13.1.16 #define MIN_RANGE_INFIMUM 300

5.13.1.17 #define MIN_RANGE_SUPREMUM 600

5.13.1.18 #define MINUS_CHAR 0x2D

5.13.1.19 #define SAMPLE_PER_AVG_MAX 5

5.13.1.20 #define SAMPLE_PER_AVG_MIN 1

5.13.1.21 #define SERIAL_CURSOR_OFF "\033[?25l"

5.13.1.22 #define SERIAL_CURSOR_ON "\033[?25h"

5.13.1.23 #define width 80

5.13.2 Typedef Documentation

5.13.2.1 typedef void(∗ numericInputFunction)(int)

5.13.2.2 typedef void(∗ voidFunction)(void)

5.13.3 Enumeration Type Documentation

5.13.3.1 enum menuState

Enumerator

TOP_LEVEL
TRACKING
AZ_MENU
AZ_GOTO
AZ_MAX
AZ_MIN
AZ_CALIBRATE
EL_MENU
EL_GOTO
EL_MAX
EL_MIN
EL_CALIBRATE
RANGE_MENU
RANGE_MAX
RANGE_MIN
US_SAMPLE_RATE
US_SAMPLE_AVG
IR_SAMPLE_RATE
IR_SAMPLE_AVG
RANGE_RAW
CALIBRATE_RANGE
SHOW_TEMP
CALIBRATE_TEMP

5.13.3.2 enum userState

Enumerator

LOCAL
REMOTE
FACTORY

5.13.4 Variable Documentation

5.13.4.1 const rom char and[ ] = " and "

5.13.4.2 const rom char angleStr[ ] = "Angle"

5.13.4.3 const rom char autoLcdTitle[ ] = "Auto-tracking"

5.13.4.4 const rom char autoSearching[ ] = "Searching..."

5.13.4.5 const rom char autoSerialMessage[ ] = "Automatic tracking mode initiated."

5.13.4.6 const rom char azMenu[ ] = "\r\nAzimuth Configuration\r\n"

5.13.4.7 const rom char azMenuLcd[ ] = "Azimuth Options"

5.13.4.8 const rom char azOption1[ ] = "\t1:\tGo to a specified azimuth angle"

5.13.4.9 const rom char azOption2[ ] = "\t2:\tSet the min azimuth angle"

5.13.4.10 const rom char azOption3[ ] = "\t3:\tSet the max azimuth angle"

5.13.4.11 const rom char azOption4[ ] = "\t4:\tCalibrate the azimuth motor"

5.13.4.12 const rom char AzStr[ ] = "Azimuth"

5.13.4.13 const rom char calibrateAngle1[ ] = "Enter Calibration angles: "

5.13.4.14 const rom char calRangeConfirm[ ] = "Range calibrated"

5.13.4.15 const rom char calRangeStr[ ] = "Place an object 500mm away from the sensor and press enter."

5.13.4.16 const rom char calRangeTitle[ ] = "Calibrate Range"

5.13.4.17 const rom char CHOOSE[ ] = "\tPlease select option (eg. 2)"

5.13.4.18 const rom char CHOOSE2[ ] = "\tPress Enter to confirm, or Esc to return"

5.13.4.19 const rom char currentMinAngleStr[ ] = "Current min "

5.13.4.20 const rom char currentValueStr[ ] = "The current value is: "

5.13.4.21 const rom char elMenu[ ] = "Elevation Configuration"

5.13.4.22 const rom char elMenuLcd[ ] = "Elevation Options"

5.13.4.23 const rom char elOption1[ ] = "\t1:\tGo to a specified elevation angle"

5.13.4.24 const rom char elOption2[ ] = "\t2:\tSet min elevation angle"

5.13.4.25 const rom char elOption3[ ] = "\t3:\tSet max elevation angle"

5.13.4.26 const rom char elOption4[ ] = "\t4:\tCalibrate elevation servo"

5.13.4.27 const rom char ElStr[ ] = "Elevation"

5.13.4.28 const rom char errStr[ ] = "Error: "

5.13.4.29 const rom char goto_str[ ] = "Go to"

5.13.4.30 const rom char gotoAngle2[ ] = " Current min & max angles: "

5.13.4.31 const rom char gotoAzAngle[ ] = "Enter azimuth angle in degrees"

5.13.4.32 const rom char gotoAzAngleLCD[ ] = "Go to Azimuth"

5.13.4.33 const rom char gotoElAngle[ ] = "Enter elevation angle in degrees"

5.13.4.34 const rom char gotoELAngleLCD[ ] = "Go to Elevation"

5.13.4.35 const rom char goUp[ ] = "Return to previous menu"

5.13.4.36 const rom char goUp2[ ] = "Press Esc to return to the previous menu."

5.13.4.37 const rom char hz[ ] = "Hz"

5.13.4.38 const rom char inputNumRangeStr[ ] = "Please enter a number between "

5.13.4.39 const rom char maxAz1[ ] = "Enter a new max azimuth: "

5.13.4.40 const rom char maxAz3[ ] = "Max azimuth set to "

5.13.4.41 const rom char maxAzSetStr[ ] = "Set Max Azimuth"

5.13.4.42 const rom char maxAzStr[ ] = "Max Azimuth"

5.13.4.43 const rom char maxEl1[ ] = "Enter a new max elevation: "

5.13.4.44 const rom char maxEl3[ ] = "Max elevation set to "

5.13.4.45 const rom char maxElSetStr[ ] = "Set Max Elevation"

5.13.4.46 const rom char maxElStr[ ] = "Max Elevation"

5.13.4.47 const rom char maxRngSerialStr[ ] = "Enter a new max range (mm):"

5.13.4.48 const rom char maxRngSetStr[ ] = "Set Max Range"

5.13.4.49 const rom char maxRngStr[ ] = "Max Range"

5.13.4.50 const rom char menuPrefix3[ ] = "3:"

5.13.4.51 const rom char menuPrefix4[ ] = "4:"

5.13.4.52 const rom char menuPrefix5[ ] = "5:"

5.13.4.53 const rom char menuPrefix8[ ] = "8:"

5.13.4.54 struct menuStruct menuStruct

5.13.4.55 const rom char minAz1[ ] = "Enter a new min azimuth: "

5.13.4.56 const rom char minAz3[ ] = "Min azimuth set to "

5.13.4.57 const rom char minAzSetStr[ ] = "Set Min Azimuth"

5.13.4.58 const rom char minAzStr[ ] = "Min Azimuth"

5.13.4.59 const rom char minEl1[ ] = "Enter a new min elevation: "

5.13.4.60 const rom char minEl3[ ] = "Min elevation set to "

5.13.4.61 const rom char minElSetStr[ ] = "Set Min Elevation"

5.13.4.62 const rom char minElStr[ ] = "Min Elevation"

5.13.4.63 const rom char minRngSerialStr[ ] = "Enter a new min range: (mm)"

5.13.4.64 const rom char minRngSetStr[ ] = "Set Min Range"

5.13.4.65 const rom char minRngStr[ ] = "Min Range"

5.13.4.66 const rom char mmStr[ ] = "Range (mm)"

5.13.4.67 const rom char newLine[ ] = "\r\n"

5.13.4.68 const rom char numPerSample[ ] = "Number of samples per estimate"

5.13.4.69 const rom char numSamplesStr[ ] = "Enter a number of samples to take."

5.13.4.70 const rom char numSampleTitle[ ] = "Num. of Samples"

5.13.4.71 const rom char Options[ ] = "Options"

5.13.4.72 const rom char range_str[ ] = "Range"

5.13.4.73 const rom char rawRangeStr[ ] = "Displaying raw range in mm:"

5.13.4.74 const rom char rawRangeTitle[ ] = "Raw Range"

5.13.4.75 const rom char rngMenu[ ] = "Range Configuration"

5.13.4.76 const rom char rngMenuLcd[ ] = "Range Options"

5.13.4.77 const rom char rngOption1[ ] = "\t1:\tSet min system range"

5.13.4.78 const rom char rngOption2[ ] = "\t2:\tSet max system range"

5.13.4.79 const rom char rngOption3[ ] = "\t3:\tView raw ultrasound and IR sensor data"

5.13.4.80 const rom char rngOption4[ ] = "\t4:\tSet the ultrasound sample rate"

5.13.4.81 const rom char rngOption5[ ] = "\t5:\tSet number of ultrasound samples per estimate"

5.13.4.82 const rom char rngOption7[ ] = "\t6:\tSet number of IR samples per estimate"

5.13.4.83 const rom char rngOption8[ ] = "\t7:\tCalibrate to a set range"

5.13.4.84 const rom char RngStr[ ] = "Range"

5.13.4.85 const rom char sampleRate[ ] = "Sampling Frequency (Hz)"

5.13.4.86 const rom char set[ ] = "Set"

5.13.4.87 const rom char showTemp1[ ] = "Temp: "

5.13.4.88 const rom char showTemp2[ ] = " deg Celcius. \r\n\n\tPress Esc to return"

5.13.4.89 const rom char showTempLCD[ ] = "Temp = "

5.13.4.90 const rom char showTempLCDTitle[ ] = "Display Temp"

5.13.4.91 const rom char tab[ ] = "\t"

5.13.4.92 const rom char title[ ] = "Welcome to the Yavin IV Defence System!"

5.13.4.93 const rom char topOption1[ ] = "\t1:\tAutomatic Tracking"

5.13.4.94 const rom char topOption2[ ] = "\t2:\tAzimuth Options"

5.13.4.95 const rom char topOption3[ ] = "\t3:\tElevation Options"

5.13.4.96 const rom char topOption4[ ] = "\t4:\tRange Options"

5.13.4.97 const rom char topOption5[ ] = "\t5:\tDisplay Current Temperature"

5.13.4.98 const rom char topOptionCalTemp[ ] = "\t6:\tCalibrate the Temperature sensor"

5.13.4.99 const rom char topOptionForFactory[ ] = "\t7:\tSwitch to Factory mode"

5.13.4.100 const rom char topOptionLocal[ ] = "\t6:\tSwitch to Local mode"

5.13.4.101 const rom char topOptionRemote[ ] = "\t6:\tSwitch to Remote Serial mode"

5.13.4.102 const rom char topOptionRemoteLCD[ ] = "Switch to Remote"

5.13.4.103 const rom char usSampleRateStr[ ] = "Please enter a sample"

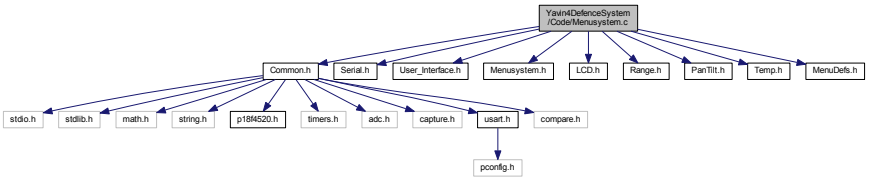
5.13.4.104 const rom char usSampleRateTitle[ ] = "Ultrasound Sample Rate"

5.13.4.105 const rom char welcomeLcd[ ] = "Home Menu"

5.14 Yavin4DefenceSystem/Code/Menusystem.c File Reference

```
#include "Common.h"
#include "Serial.h"
#include "User_Interface.h"
#include "Menusystem.h"
#include "LCD.h"
#include "Range.h"
#include "PanTilt.h"
#include "Temp.h"
#include "MenuDefs.h"
```

Include dependency graph for Menusystem.c:



Functions

- static void sendROM (const rom char ∗romchar)

  Include: Local to Menusystem.c.
- static void clearScreen ()

  Clears the Serial Display.
- static void sendNewLine (char length)

  Include: Local to Menusystem.c.
- static void filler (char length)
- static void errOutOfRange (int lowerBound, int upperBound)
- static char ∗ intToAscii (int num)
- static void autodisp (void)
- int parseNumeric (char ∗number)

  parses user input string into a number
- static int getSerialNumericInput ()

  Waits for input and parses number.
- static void configureTimer0 (void)
- static int getLocalInputMenu (int maxStates, int(∗function)(int))
- static void setValue (int input)
- static void setMenu (struct menuStruct menu)
- static void navigateTopMenu (int inputResult)
- static void noFunctionNumeric (int input)
- static void setCalibrateRange (int num)
- static void noFunction (void)
- static void returnToTopMenu (void)
- static void exitFromTracking (void)
- static void returnToAzMenu (void)
- static void returnToElMenu (void)
- static void returnToRngMenu (void)
- static void navigateAzimuthMenu (int inputResult)
- static void navigateElevationMenu (int inputResult)
- static void navigateRangeMenu (int inputResult)
- static void dispTopOptions (void)
- static void displayMenuSerial ()
- static void dispAzOptions (void)
- static void dispElOptions (void)
- static void dispRngOptions (void)
- static void dispTempSerialMessage (void)
- static void dispSerialMessage (void)
- static void dispSetValueMessage (void)
- static void dispLCDTopMenu (int option)

  LCD Display Functions.

- static void dispLCDAzMenu (int option)
- static void dispLCDElMenu (int option)
- static void dispLCDRngMenu (int option)
- static void dispLCDNum (int option)
- void initialiseMenu (systemState *state)

  Initialises the menu system.
- char checkForSerialInput (void)
- void serviceMenu (void)

  services any user interface with the menu
- void dispTrack (TrackingData target)
- void dispRawRange ()
- void dispSearching ()

Variables

- struct menuStruct topMenu = {TOP_LEVEL, title, welcomeLcd,1, 6, 1, dispTopOptions, navigateTopMenu, 0, noFunction}
- struct menuStruct AzMenu = {AZ_MENU, azMenu, azMenuLcd,1, 6, 1, dispAzOptions, navigateAzimuthMenu, 0, returnToTopMenu}
- struct menuStruct ElMenu = {EL_MENU, elMenu, elMenuLcd,1, 6, 1, dispElOptions, navigateElevationMenu, 0, returnToTopMenu}
- struct menuStruct RangeMenu = {RANGE_MENU, rngMenu, rngMenuLcd,1, 6, 1, dispRngOptions, navigateRangeMenu,0, returnToTopMenu}
- struct menuStruct AzGoto = {AZ_GOTO, gotoAzAngle, gotoAzAngleLCD,MIN_ANGLE_INFIMUM, MAX_ANGLE_SUPREMUM, 5,dispSetValueMessage, setValue, noFunctionNumeric, returnToAzMenu}

  Remote/Local Functions.
- struct menuStruct ElGoto = {EL_GOTO, gotoElAngle, gotoELAngleLCD,MIN_ANGLE_INFIMUM, MAX_ANGLE_SUPREMUM, 5,dispSetValueMessage, setValue, noFunctionNumeric, returnToElMenu}
- struct menuStruct AzMin = {AZ_MIN, minAz1, minAzSetStr,MIN_ANGLE_INFIMUM, MIN_ANGLE_SUPREMUM, 5, dispSetValueMessage, setValue, noFunctionNumeric, returnToAzMenu}
- struct menuStruct AzMax = {AZ_MAX, maxAz1, maxAzSetStr,MAX_ANGLE_INFIMUM, MAX_ANGLE_SUPREMUM, 5, dispSetValueMessage, setValue, noFunctionNumeric, returnToAzMenu}
- struct menuStruct ElMin = {EL_MIN, minEl1, minElSetStr,MIN_ANGLE_INFIMUM, MIN_ANGLE_SUPREMUM, 5, dispSetValueMessage, setValue, noFunctionNumeric, returnToElMenu}
- struct menuStruct ElMax = {EL_MAX, maxEl1, maxElSetStr,MAX_ANGLE_INFIMUM, MAX_ANGLE_SUPREMUM, 5, dispSetValueMessage, setValue, noFunctionNumeric, returnToElMenu}
- struct menuStruct RngMin = {RANGE_MIN, minRngSerialStr, minRngSetStr, MIN_RANGE_INFIMUM, MIN_RANGE_SUPREMUM, 50, dispSetValueMessage, setValue, noFunctionNumeric, returnToRngMenu}
- struct menuStruct RngMax = {RANGE_MAX, maxRngSerialStr, maxRngSetStr, MAX_RANGE_INFIMUM, MAX_RANGE_SUPREMUM, 50, dispSetValueMessage, setValue, noFunctionNumeric, returnToRngMenu}
- struct menuStruct ShowTemp = {SHOW_TEMP, showTempLCDTitle, showTempLCDTitle, 0, 0, 0, dispTempSerialMessage, noFunctionNumeric, noFunctionNumeric, returnToTopMenu}
- struct menuStruct Tracking = {TRACKING, autoSerialMessage, autoLcdTitle, 0, 0, 0, dispSerialMessage, noFunctionNumeric, noFunctionNumeric, exitFromTracking}
- struct menuStruct RawRange
- struct menuStruct NumSamples
- struct menuStruct UsSampleRate
- struct menuStruct calibrateRangeMenu
- struct menuStruct m_currentMenu
- static userState m_userMode
- static systemState * m_trackingState

5.14.1 Function Documentation

5.14.1.1 static void autodisp (void) [static]

5.14.1.2 char checkForSerialInput (void)

Function: checkForSerialInput(void)

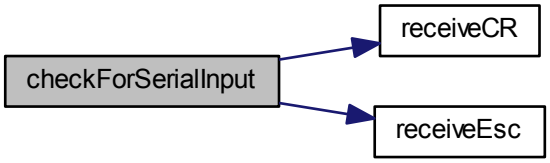
Include: Menusystem

Description: Checks the serial/local buffers for inputs

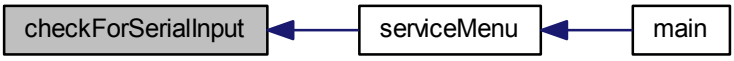
Arguments: None

Returns: 1 if input has been received, 0 otherwise Wait until the receive buffer is no longer empty Indicating that a command has been passed

Here is the call graph for this function:



Here is the caller graph for this function:



5.14.1.3 static void clearScreen ( ) [static]

Clears the Serial Display.

Clears the Serial display

Function: clearScreen(void)

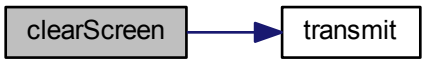
Include: Local to Menusystem.c

: Transmits the given string from ROM over serial

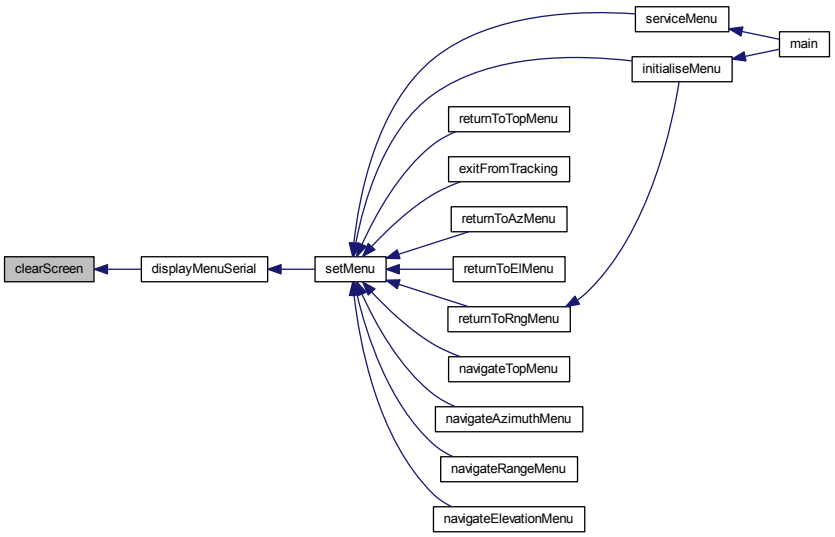
The string to transmit

Returns: None

Here is the call graph for this function:



Here is the caller graph for this function:

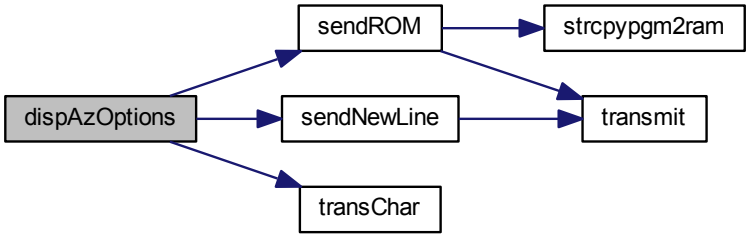


5.14.1.4 static void configureTimer0 (void) [static]

5.14.1.5 static void dispAzOptions ( ) [static]

Display the user options for the Azimuth menu

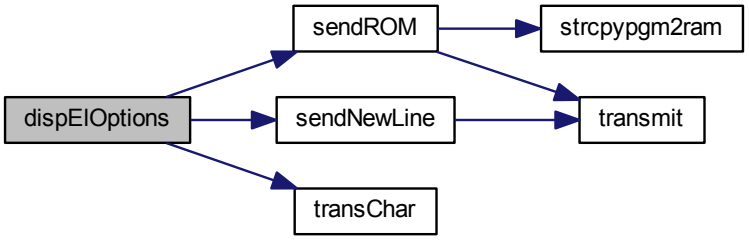
Here is the call graph for this function:



5.14.1.6 static void dispElOptions ( ) [static]

Display the user options for the Azimuth menu

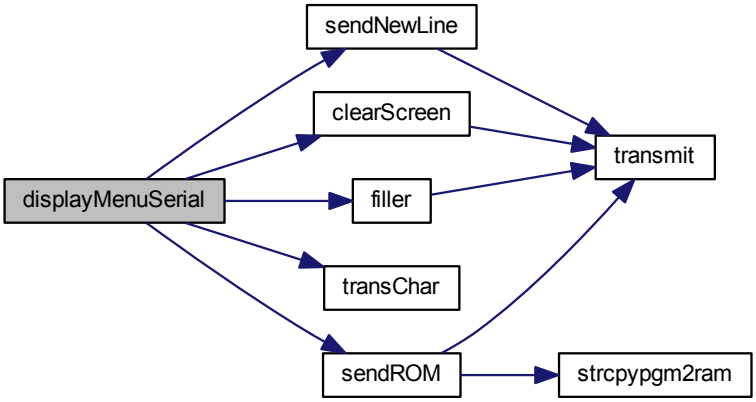
Here is the call graph for this function:



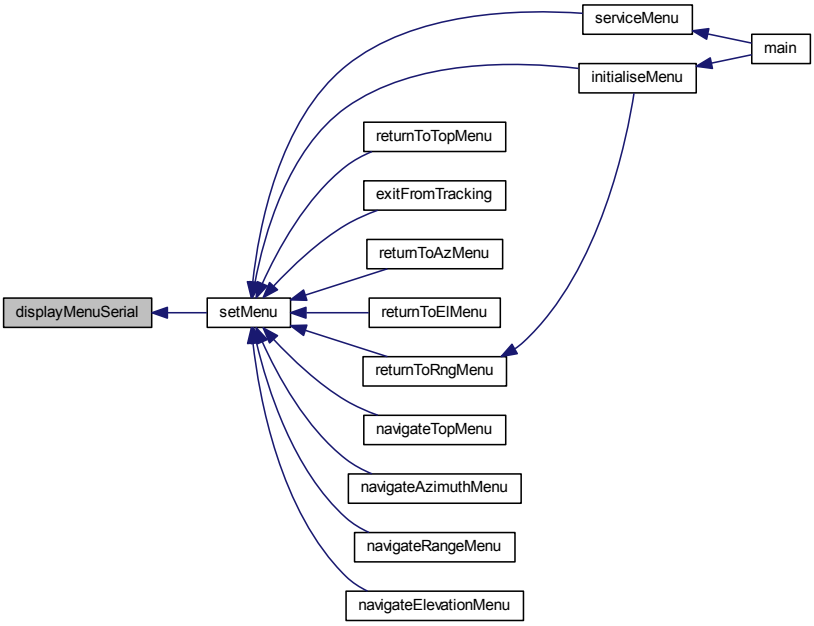
5.14.1.7 static void displayMenuSerial ( ) [static]

Display the current menu Title and other information over serial

Here is the call graph for this function:



Here is the caller graph for this function:



5.14.1.8 static void dispLCDAzMenu (int *option*) [static]

5.14.1.9 static void dispLCDElMenu (int *option*) [static]

5.14.1.10 static void dispLCDNum (int *option*) [static]

5.14.1.11 static void dispLCDRngMenu (int *option*) [static]

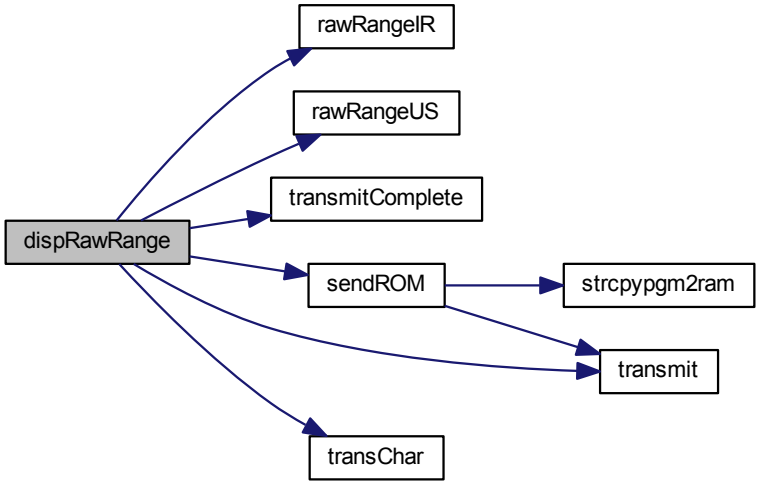
5.14.1.12 static void dispLCDTopMenu (int *option*) [static]

LCD Display Functions.

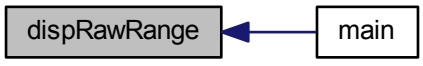
5.14.1.13 void dispRawRange (void)

Displays the Tracking data over serial

Here is the call graph for this function:



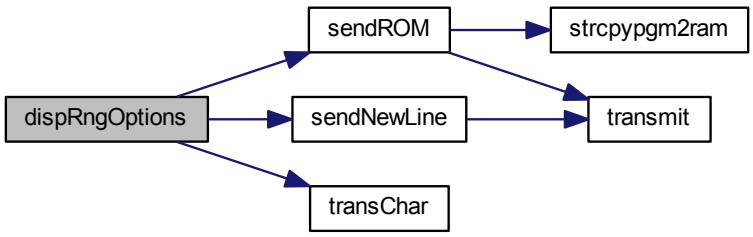
Here is the caller graph for this function:



5.14.1.14 static void dispRngOptions ( ) [static]

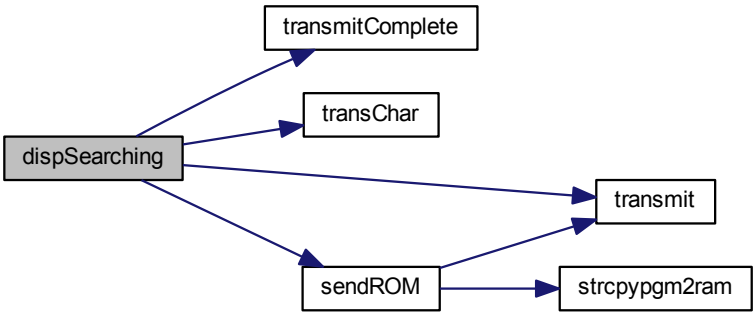
Display the user options for the Azimuth menu

Here is the call graph for this function:

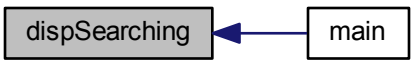


5.14.1.15 void dispSearching (void)

Here is the call graph for this function:



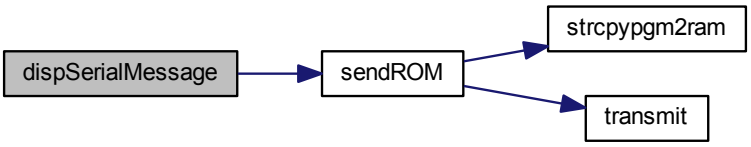
Here is the caller graph for this function:



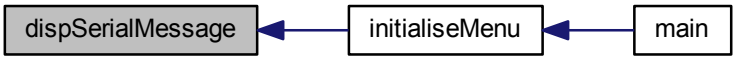
5.14.1.16 static void dispSerialMessage (void) [static]

Display the menu serial message

Here is the call graph for this function:



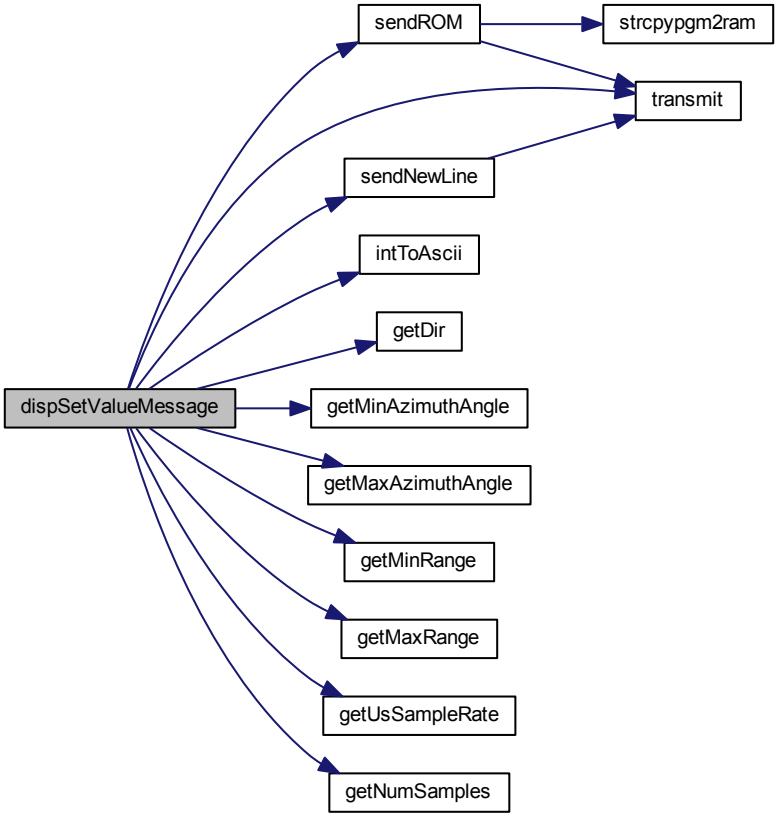
Here is the caller graph for this function:



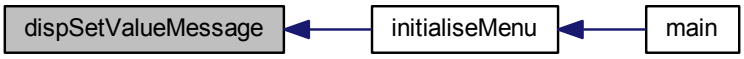
5.14.1.17 static void dispSetValueMessage (void) [static]

Display the menu serial message with the maximum, minimum and current values

Here is the call graph for this function:



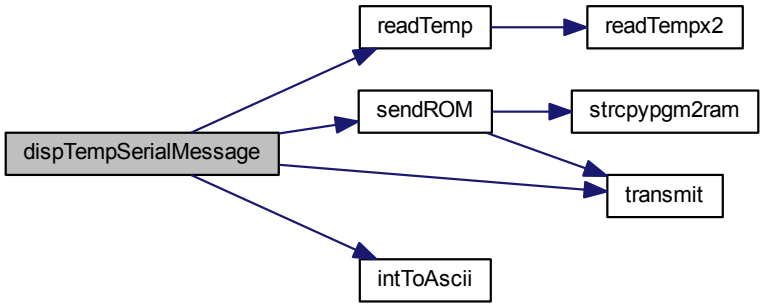
Here is the caller graph for this function:



5.14.1.18 static void dispTempSerialMessage (void) [static]

Display the Show Temperature serial message

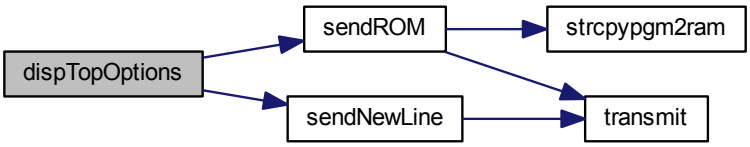
Here is the call graph for this function:



5.14.1.19 static void dispTopOptions (void) [static]

Display the user options for the top level home menu

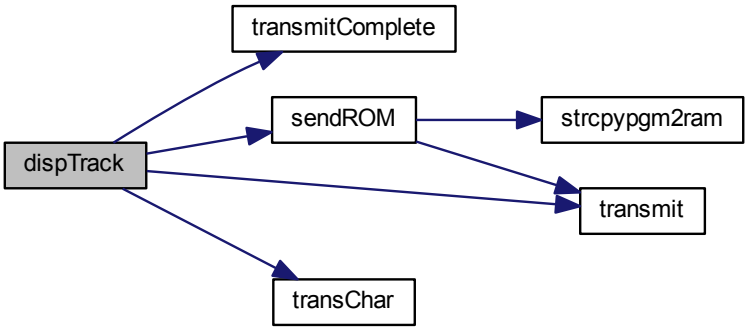
Here is the call graph for this function:



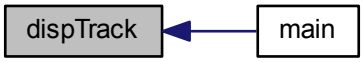
5.14.1.20 void dispTrack (TrackingData *target*)

Displays the Tracking data over serial

Here is the call graph for this function:



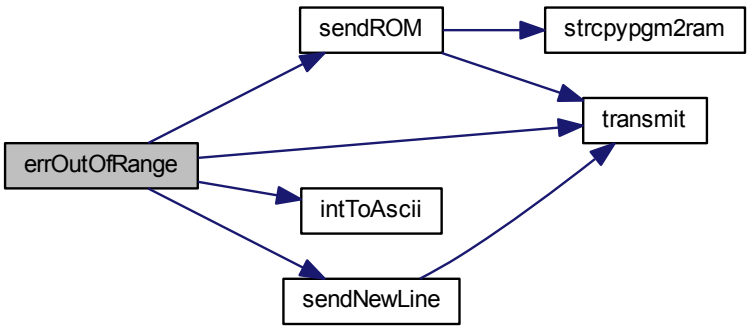
Here is the caller graph for this function:



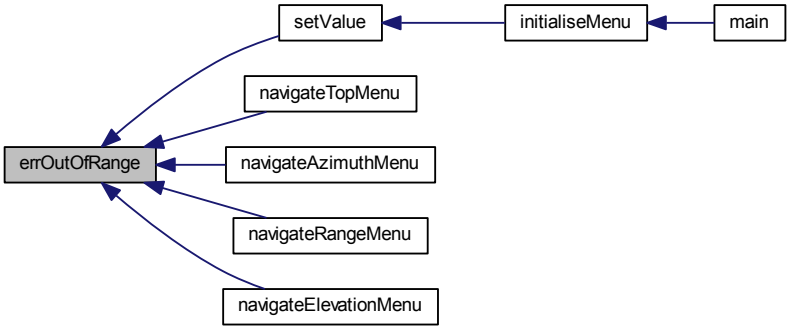
5.14.1.21 static void errOutOfRange (int *lowerBound,* int *upperBound*) [static]

Description: Displays a number out of range error

Here is the call graph for this function:

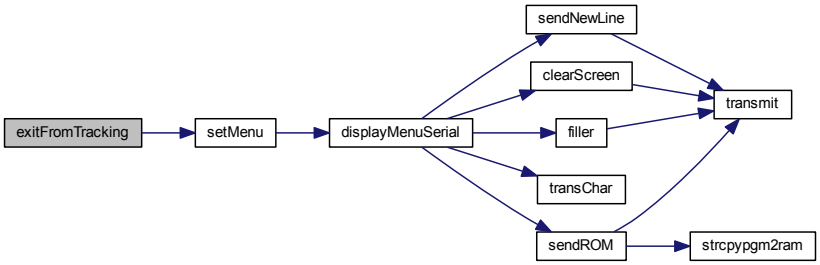


Here is the caller graph for this function:



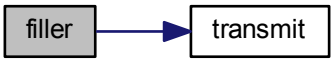
5.14.1.22 static void exitFromTracking (void) [static]

Here is the call graph for this function:

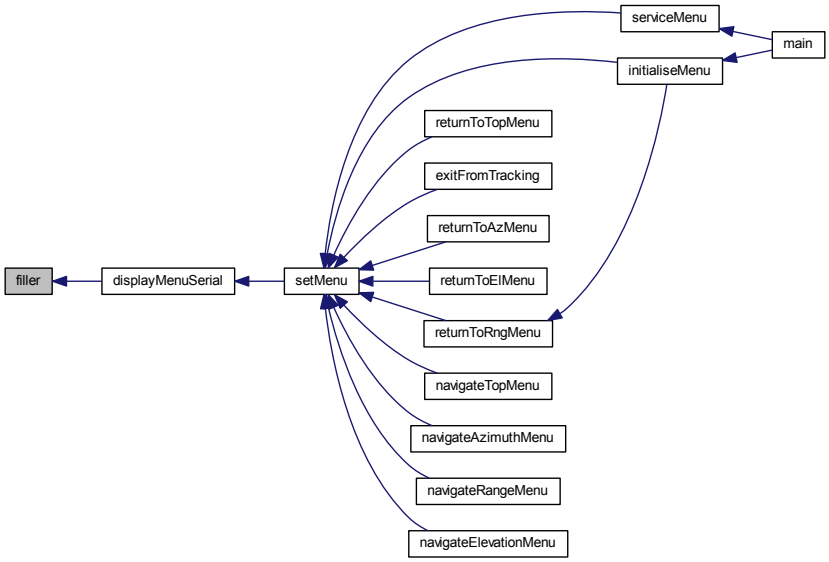


5.14.1.23 static void filler (char *length*) [static]

Here is the call graph for this function:



Here is the caller graph for this function:



5.14.1.24 static int getLocalInputMenu (int *maxStates,* int(∗)(int) *function*) [static]

5.14.1.25 static int getSerialNumericInput ( ) [static]

Waits for input and parses number.

Function: waitForNumericInput

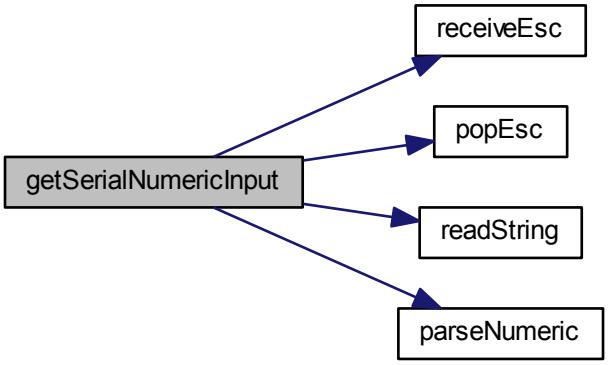
Include:

Description: Waits in a loop for a user command ended with a new line character. Once a command is received, it is converted into the appropriate numeric value that the user has given.

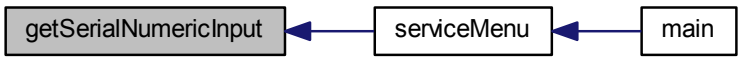
Arguments: None

Returns: The integer result of the string input ERR_NOT_NUMERIC for any non-numeric input ERR_NUM_O↩ UT_OF_RANGE for 0 digits or 5+ digits ESC_PRESSED if escape was pressed Get the input string and store it in

Here is the call graph for this function:



Here is the caller graph for this function:



5.14.1.26 void initialiseMenu (systemState * *state*)

Initialises the menu system.

Function: initialiseMenu(void)

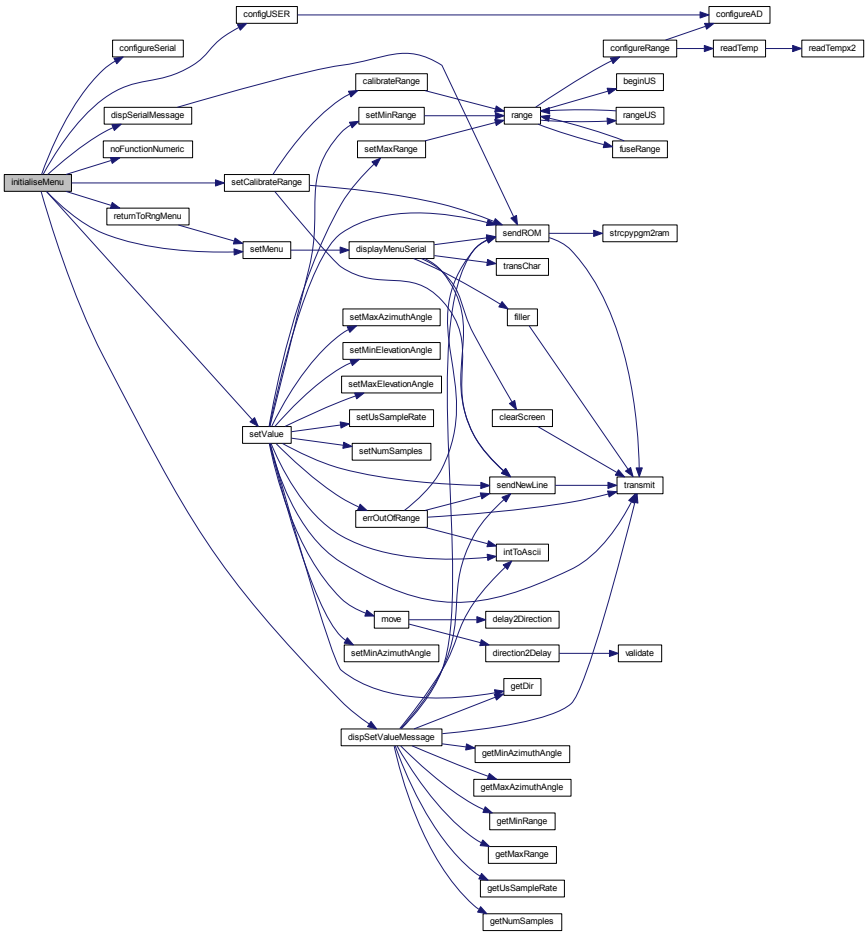
Include: Menusystem.h

Description: initialises the menu system so that it is fully operational

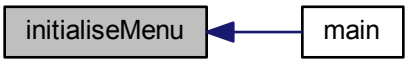
Arguments: None

Returns: None

Here is the call graph for this function:



Here is the caller graph for this function:

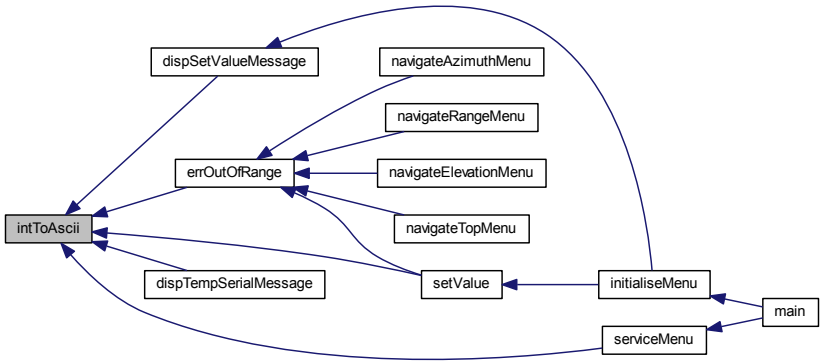


5.14.1.27 static char * intToAscii (int *num*) [static]

Description: Returns the value of the potentiometer on the user interface, given a maximum and minimum value, and the interval between values (eg 10-100 in multiples of 10).

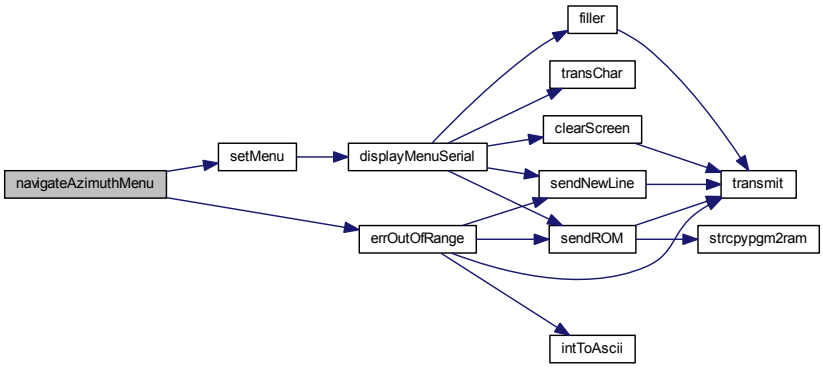
Description: Converts a number to a string Can only print numbers under 8 digits

Here is the caller graph for this function:



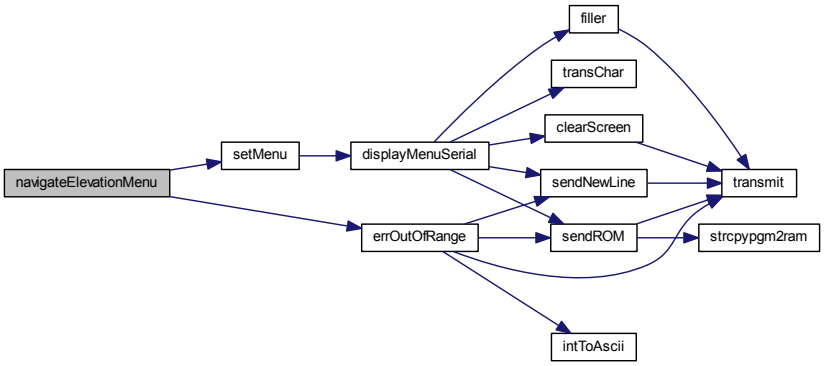
5.14.1.28 static void navigateAzimuthMenu (int *inputResult*) [static]

Here is the call graph for this function:



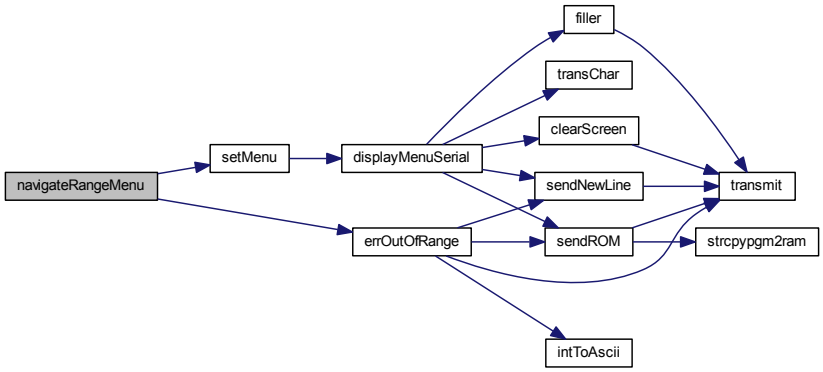
5.14.1.29 static void navigateElevationMenu (int *inputResult*) [static]

Here is the call graph for this function:



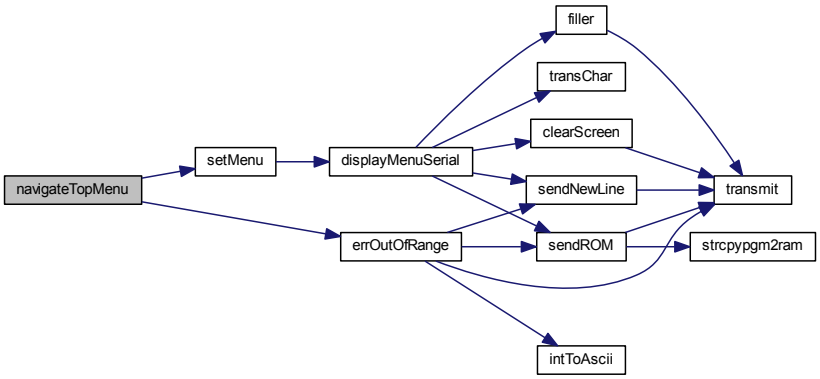
5.14.1.30 static void navigateRangeMenu (int *inputResult*) [static]

Here is the call graph for this function:



5.14.1.31 static void navigateTopMenu (int *inputResult*) [static]

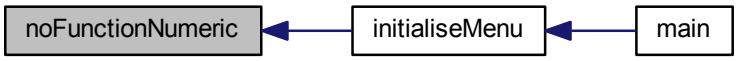
Here is the call graph for this function:



5.14.1.32 static void noFunction (void) [static]

5.14.1.33 static void noFunctionNumeric (int *input*) [static]

Here is the caller graph for this function:



5.14.1.34 static int parseNumeric (char * *number*)

parses user input string into a number

Function: parseNumeric(char *number)

Include:

Description: Converts ASCII input to a number, and records an error for non-numeric input, or if the number is larger than 4 digits. No number used by the user in this program will be larger than 4 digits.

Arguments: The ASCII string to decode

Returns: The integer result of the string ERR_NOT_NUMERIC for any non-numeric input ERR_NUM_OUT_OF_↩ RANGE for 0 digits or 5+ digits

Function: parseNumeric(char *number)

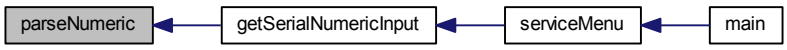
Include:

Description: Calls the function which matches the user input

Arguments: None

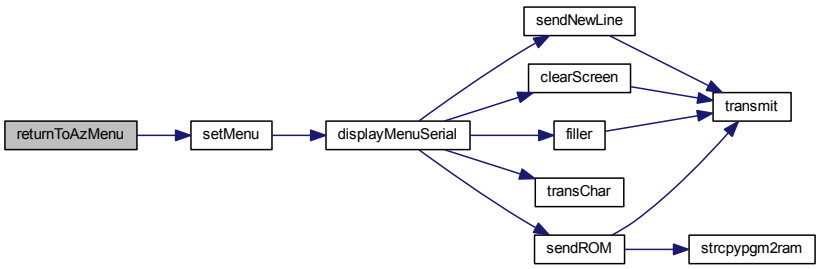
Returns: None

Here is the caller graph for this function:



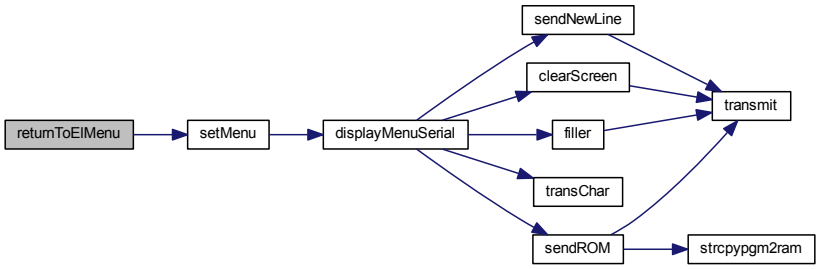
5.14.1.35 static void returnToAzMenu (void) [static]

Here is the call graph for this function:



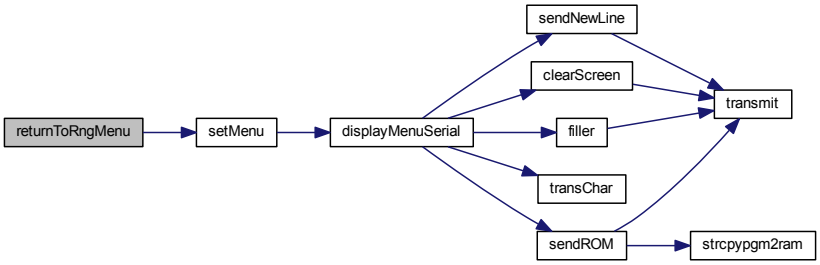
5.14.1.36 static void returnToElMenu (void) [static]

Here is the call graph for this function:

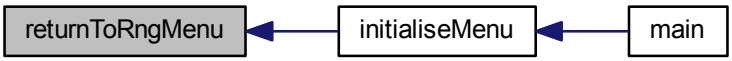


5.14.1.37 static void returnToRngMenu (void) [static]

Here is the call graph for this function:

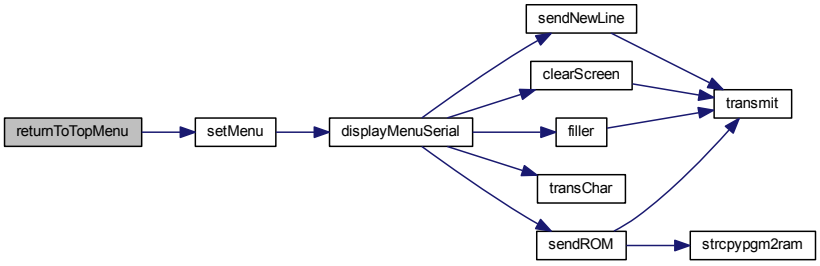


Here is the caller graph for this function:



5.14.1.38 static void returnToTopMenu (void) [static]

Here is the call graph for this function:



5.14.1.39 static void sendNewLine (char *length*) [static]

Include: Local to Menusystem.c.

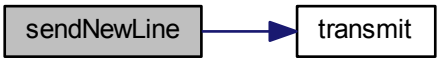
Function: sendNewLine(char length)

: Prints a number of new line (
) charaters.

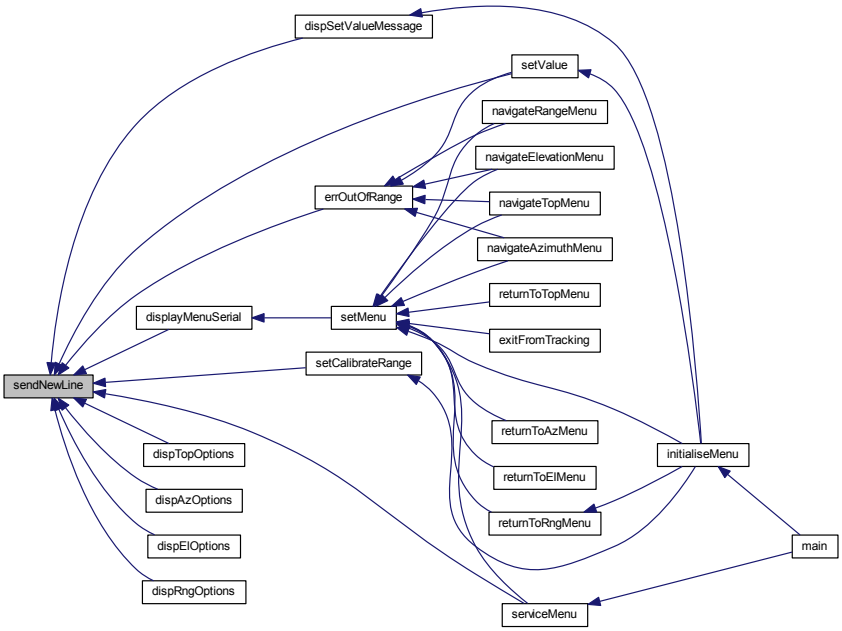
The number of new lines to print

Returns: None

Here is the call graph for this function:



Here is the caller graph for this function:



5.14.1.40 static void sendROM (const rom char * *romchar*) [static]

Include: Local to Menusystem.c.

File: Menusystem.c Author:

Description:

Duties:

Functions:

Created on 16 September 2014, 6:47 PM

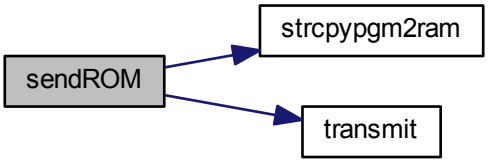
Function: sendROM(void)

: Transmits the given string from ROM over serial

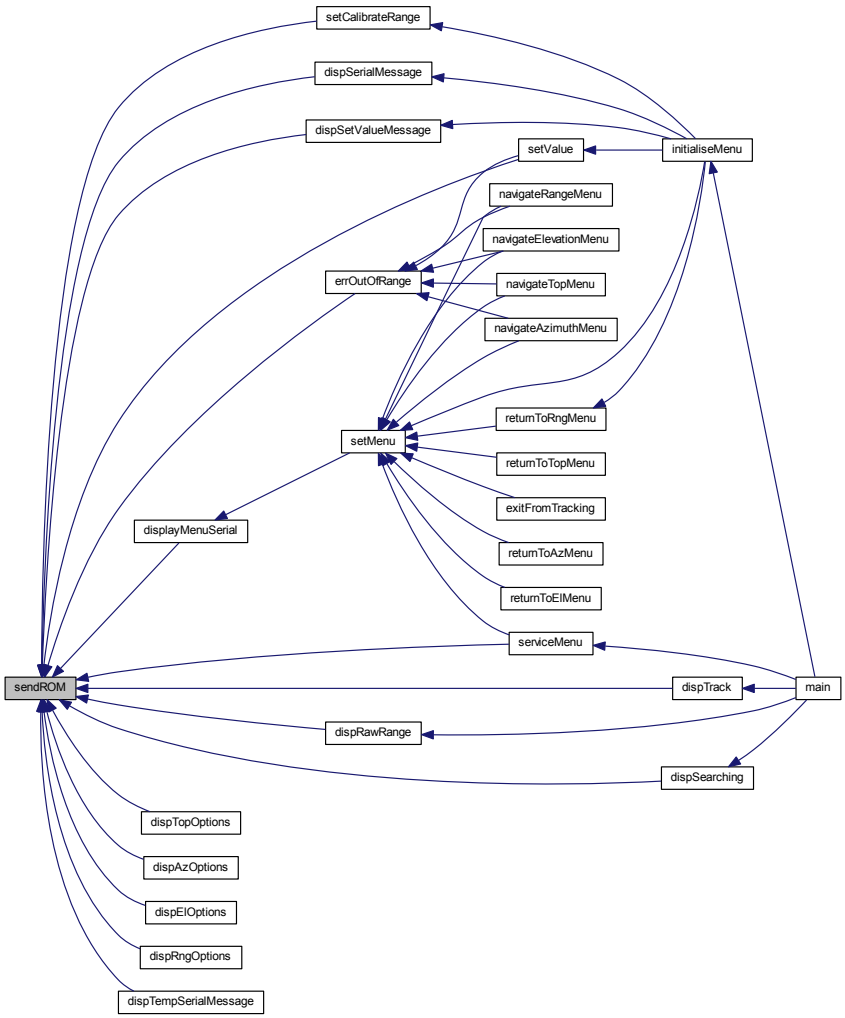
The string to transmit

Returns: None

Here is the call graph for this function:



Here is the caller graph for this function:



5.14.1.41 void serviceMenu (void)

services any user interface with the menu

Function: serviceMenu(void)

Include:

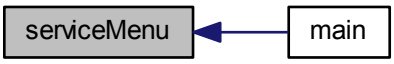
Description: Checks if the user has made any inputs to the system. If not the function simply returns. If they have then it services the inputs, displays the correct outputs and performs the specified actions

Arguments: None

Returns: None If Esc or Back button pressed, return

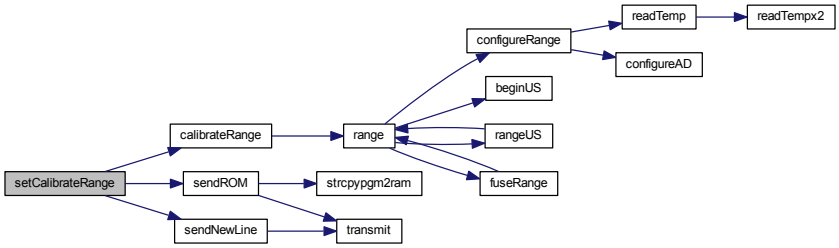
Otherwise Confirm the selection

Here is the caller graph for this function:

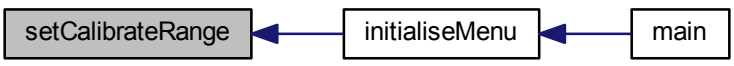


5.14.1.42 static void setCalibrateRange (int *num*) [static]

Here is the call graph for this function:

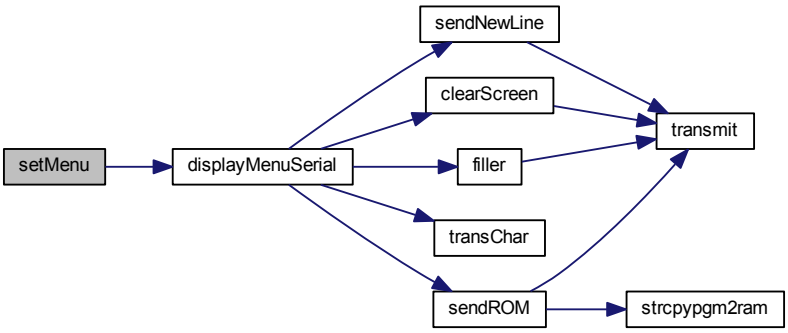


Here is the caller graph for this function:

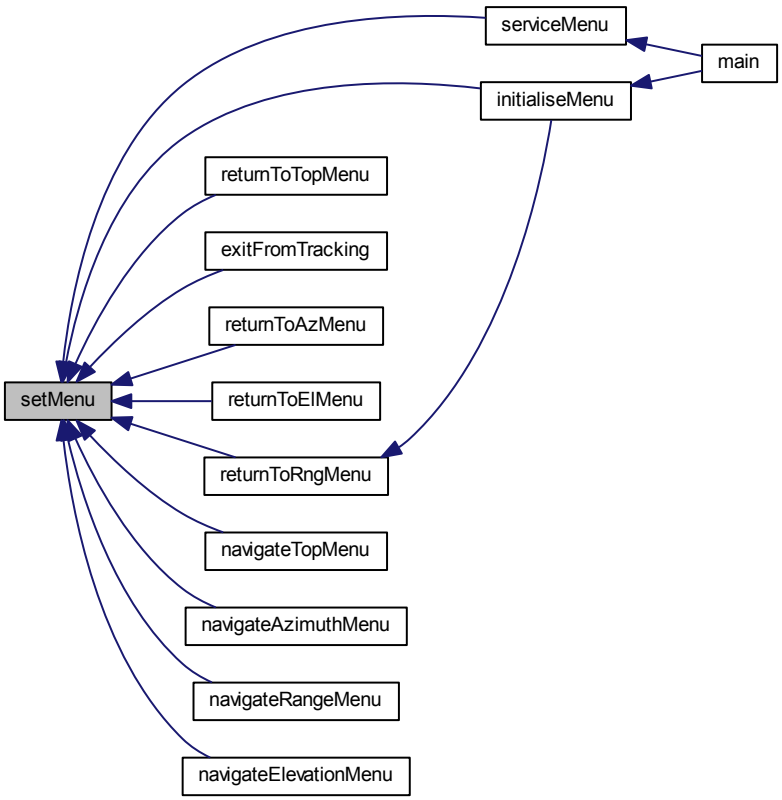


5.14.1.43 static void setMenu (struct menuStruct *menu*) [static]

Here is the call graph for this function:



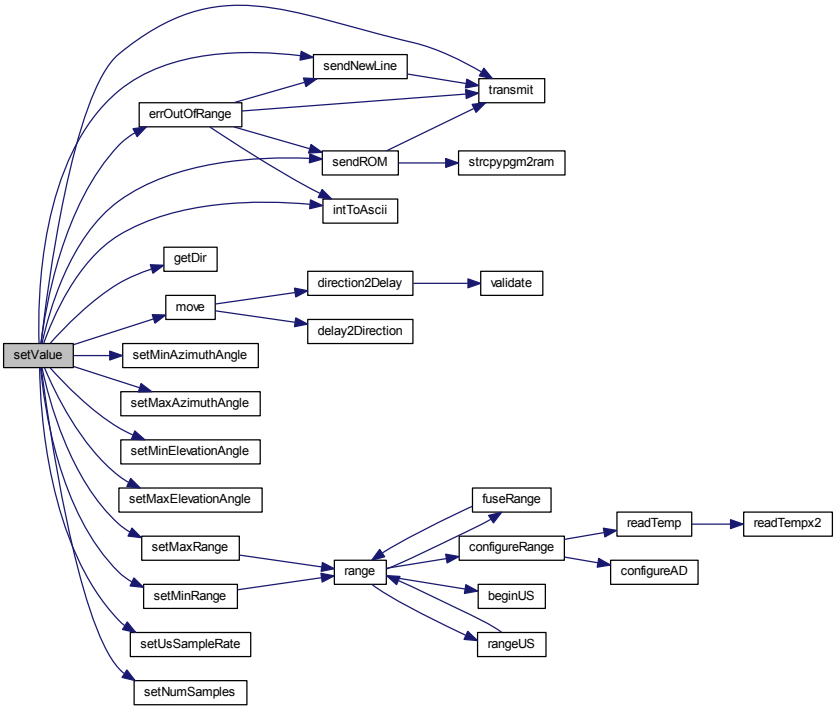
Here is the caller graph for this function:



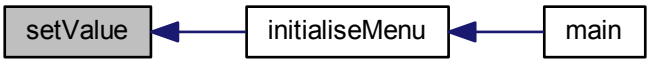
5.14.1.44 static void setValue (int *input*) [static]

Description: General funtion for menus which set values (Such as Set Max Range). This calls the appropriate function, and transmits user messages.

Here is the call graph for this function:



Here is the caller graph for this function:



5.14.2 Variable Documentation

5.14.2.1 struct menuStruct AzGoto = {AZ_GOTO, gotoAzAngle, gotoAzAngleLCD,MIN_ANGLE_INFIMUM, MAX_ANGLE_SUPREMUM, 5,dispSetValueMessage, setValue, noFunctionNumeric, returnToAzMenu}

Remote/Local Functions.

5.14.2.2 struct menuStruct AzMax = {AZ_MAX, maxAz1, maxAzSetStr,MAX_ANGLE_INFIMUM, MAX_ANGLE_SUPREMUM, 5, dispSetValueMessage, setValue, noFunctionNumeric, returnToAzMenu}

5.14.2.3 struct menuStruct AzMenu = {AZ_MENU, azMenu, azMenuLcd,1, 6, 1, dispAzOptions, navigateAzimuthMenu, 0, returnToTopMenu}

5.14.2.4 struct menuStruct AzMin = {AZ_MIN, minAz1, minAzSetStr,MIN_ANGLE_INFIMUM, MIN_ANGLE_SUPREMUM, 5, dispSetValueMessage, setValue, noFunctionNumeric, returnToAzMenu}

5.14.2.5 struct menuStruct calibrateRangeMenu

5.14.2.6 struct menuStruct ElGoto = {EL_GOTO, gotoElAngle, gotoELAngleLCD,MIN_ANGLE_INFIMUM, MAX_ANGLE_SUPREMUM, 5,dispSetValueMessage, setValue, noFunctionNumeric, returnToElMenu}

5.14.2.7 struct menuStruct ElMax = {EL_MAX, maxEl1, maxElSetStr,MAX_ANGLE_INFIMUM, MAX_ANGLE_SUPREMUM, 5, dispSetValueMessage, setValue, noFunctionNumeric, returnToElMenu}

5.14.2.8 struct menuStruct ElMenu = {EL_MENU, elMenu, elMenuLcd,1, 6, 1, dispElOptions, navigateElevationMenu, 0, returnToTopMenu}

5.14.2.9 struct menuStruct ElMin = {EL_MIN, minEl1, minElSetStr,MIN_ANGLE_INFIMUM, MIN_ANGLE_SUPREMUM, 5, dispSetValueMessage, setValue, noFunctionNumeric, returnToElMenu}

5.14.2.10 struct menuStruct m_currentMenu

Global variable with the current menu position

5.14.2.11 systemState* m_trackingState [static]

5.14.2.12 userState m_userMode [static]

Global variable with the current user mode: Local, remote or factory

5.14.2.13 struct menuStruct NumSamples

5.14.2.14 struct menuStruct RangeMenu = {RANGE_MENU, rngMenu, rngMenuLcd,1, 6, 1, dispRngOptions, navigateRangeMenu,0, returnToTopMenu}

5.14.2.15 struct menuStruct RawRange

5.14.2.16 struct menuStruct RngMax = {RANGE_MAX, maxRngSerialStr, maxRngSetStr, MAX_RANGE_INFIMUM, MAX_RANGE_SUPREMUM, 50, dispSetValueMessage, setValue, noFunctionNumeric, returnToRngMenu}

5.14.2.17 struct menuStruct RngMin = {RANGE_MIN, minRngSerialStr, minRngSetStr, MIN_RANGE_INFIMUM, MIN_RANGE_SUPREMUM, 50, dispSetValueMessage, setValue, noFunctionNumeric, returnToRngMenu}

5.14.2.18 struct menuStruct ShowTemp = {SHOW_TEMP, showTempLCDTitle, showTempLCDTitle, 0, 0, 0, dispTempSerialMessage, noFunctionNumeric, noFunctionNumeric, returnToTopMenu}

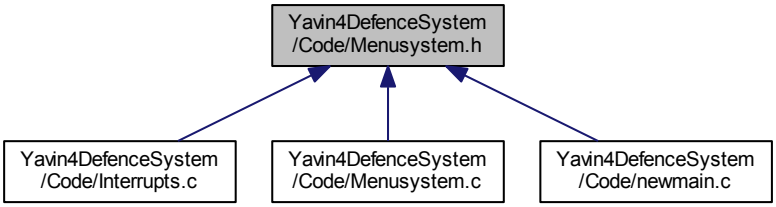
5.14.2.19 struct menuStruct topMenu = {TOP_LEVEL, title, welcomeLcd,1, 6, 1, dispTopOptions, navigateTopMenu, 0, noFunction}

5.14.2.20 struct menuStruct Tracking = {TRACKING, autoSerialMessage, autoLcdTitle, 0, 0, 0, dispSerialMessage, noFunctionNumeric, noFunctionNumeric, exitFromTracking}

5.14.2.21 struct menuStruct UsSampleRate

5.15 Yavin4DefenceSystem/Code/Menusystem.h File Reference

This graph shows which files directly or indirectly include this file:



Functions

- void initialiseMenu (systemState *state)

  Initialises the menu system.
- char checkForSerialInput (void)
- void serviceMenu (void)

  services any user interface with the menu
- void dispTrack (TrackingData target)
- void dispSearching (void)
- void dispRawRange (void)

Variables

- const rom char newLine []
- const rom char CHOOSE []
- const rom char menuPrefix3 []
- const rom char menuPrefix4 []
- const rom char menuPrefix5 []
- const rom char menuPrefix8 []
- const rom char goUp []
- const rom char goUp2 []
- const rom char inputNumRangeStr []
- const rom char and []
- const rom char tab []
- const rom char hz []
- const rom char title []
- const rom char welcomeLcd []
- const rom char topOption1 []

- const rom char topOption2 []
- const rom char topOption3 []
- const rom char topOption4 []
- const rom char topOption5 []
- const rom char topOptionCalTemp []
- const rom char topOptionLocal []
- const rom char topOptionForFactory []
- const rom char topOptionRemote []
- const rom char topOptionRemoteLCD []
- const rom char azMenu []
- const rom char azMenuLcd []
- const rom char azOption1 []
- const rom char azOption2 []
- const rom char azOption3 []
- const rom char azOption4 []
- const rom char elMenu []
- const rom char elMenuLcd []
- const rom char elOption1 []
- const rom char elOption2 []
- const rom char elOption3 []
- const rom char elOption4 []
- const rom char rngMenu []
- const rom char rngMenuLcd []
- const rom char rngOption1 []
- const rom char rngOption2 []
- const rom char rngOption3 []
- const rom char rngOption4 []
- const rom char rngOption5 []
- const rom char rngOption6 []
- const rom char rngOption7 []
- const rom char showTempLCDTitle []
- const rom char showTempLCD []
- const rom char showTemp1 []
- const rom char showTemp2 []
- const rom char gotoAzAngle []
- const rom char gotoAzAngleLCD []
- const rom char gotoElAngle []
- const rom char gotoELAngleLCD []
- const rom char gotoAngle2 []
- const rom char angleStr []
- const rom char maxAzStr []
- const rom char maxAzSetStr []
- const rom char maxAz1 []
- const rom char maxAz3 []
- const rom char currentMinAngleStr []
- const rom char minAzStr []
- const rom char minAzSetStr []
- const rom char minAz1 []
- const rom char minAz3 []
- const rom char calibrateAngle1 []
- const rom char maxElStr []
- const rom char maxElSetStr []
- const rom char maxEl1 []
- const rom char maxEl3 []
- const rom char minElStr []

- const rom char minElSetStr []
- const rom char minEl1 []
- const rom char minEl3 []
- const rom char minRngStr []
- const rom char minRngSetStr []
- const rom char minRngSerialStr []
- const rom char maxRngStr []
- const rom char maxRngSetStr []
- const rom char maxRngSerialStr []

5.15.1 Function Documentation

5.15.1.1 char checkForSerialInput (void)

Function: checkForSerialInput(void)

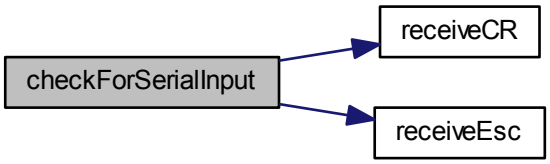
Include: Menusystem

Description: Checks the serial/local buffers for inputs

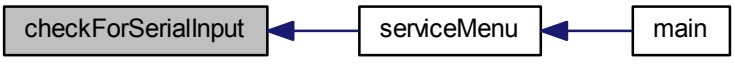
Arguments: None

Returns: 1 if input has been received, 0 otherwise Wait until the receive buffer is no longer empty Indicating that a command has been passed

Here is the call graph for this function:



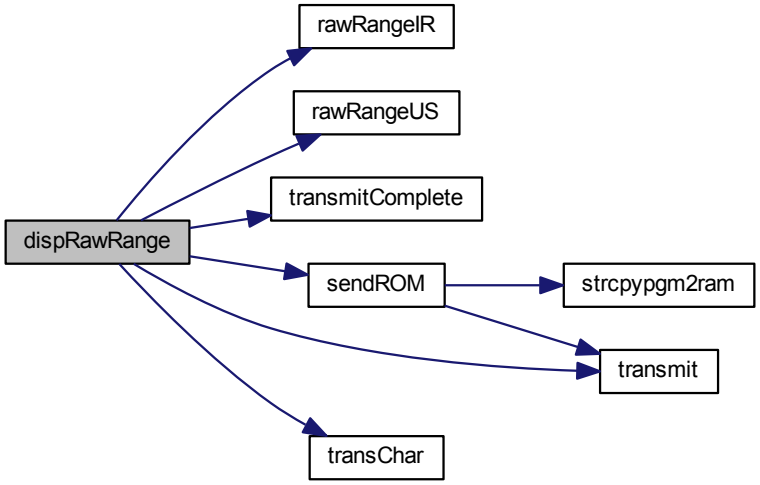
Here is the caller graph for this function:



5.15.1.2 void dispRawRange (void)

Displays the Tracking data over serial

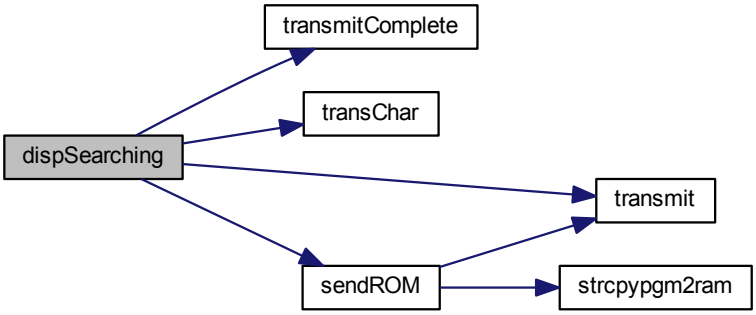
Here is the call graph for this function:



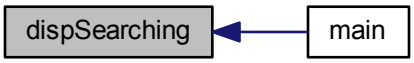
Here is the caller graph for this function:

5.15.1.3 void dispSearching (void)

Here is the call graph for this function:



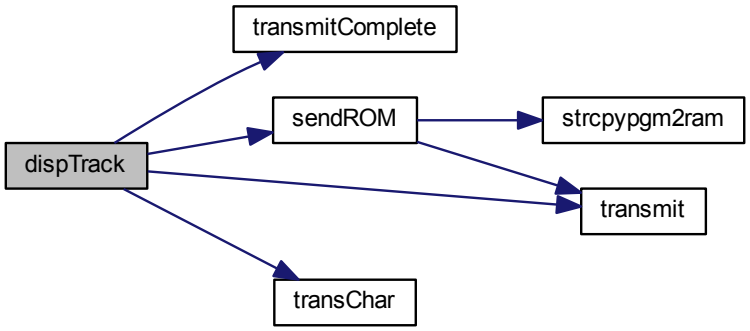
Here is the caller graph for this function:



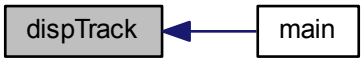
5.15.1.4 void dispTrack (TrackingData *target*)

Displays the Tracking data over serial

Here is the call graph for this function:



Here is the caller graph for this function:



5.15.1.5 void initialiseMenu (systemState * *state*)

Initialises the menu system.

Function: initialiseMenu(systemState *state)

Include: Menusystem.h

Description: initialises the menu system so that it is fully operational

Arguments: state - The current system state

Returns: None

Function: initialiseMenu(void)

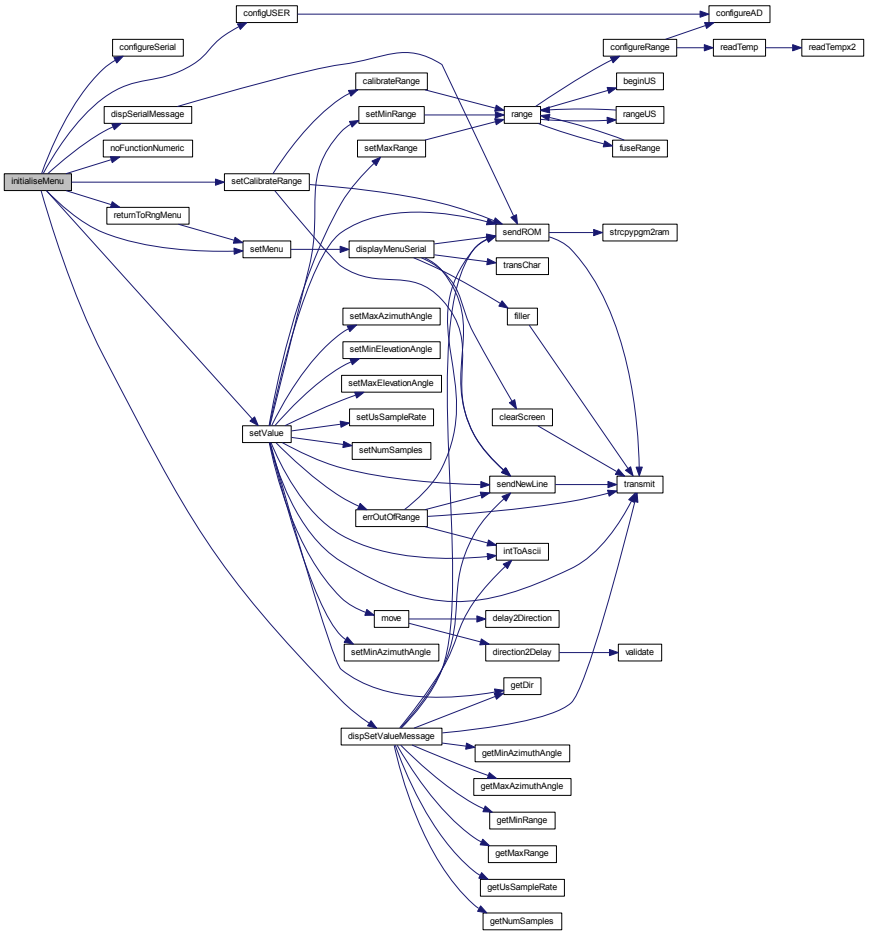
Include: Menusystem.h

Description: initialises the menu system so that it is fully operational

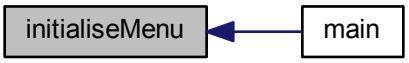
Arguments: None

Returns: None

Here is the call graph for this function:



Here is the caller graph for this function:



5.15.1.6 void serviceMenu (void)

services any user interface with the menu

Function: serviceMenu(void)

Include:

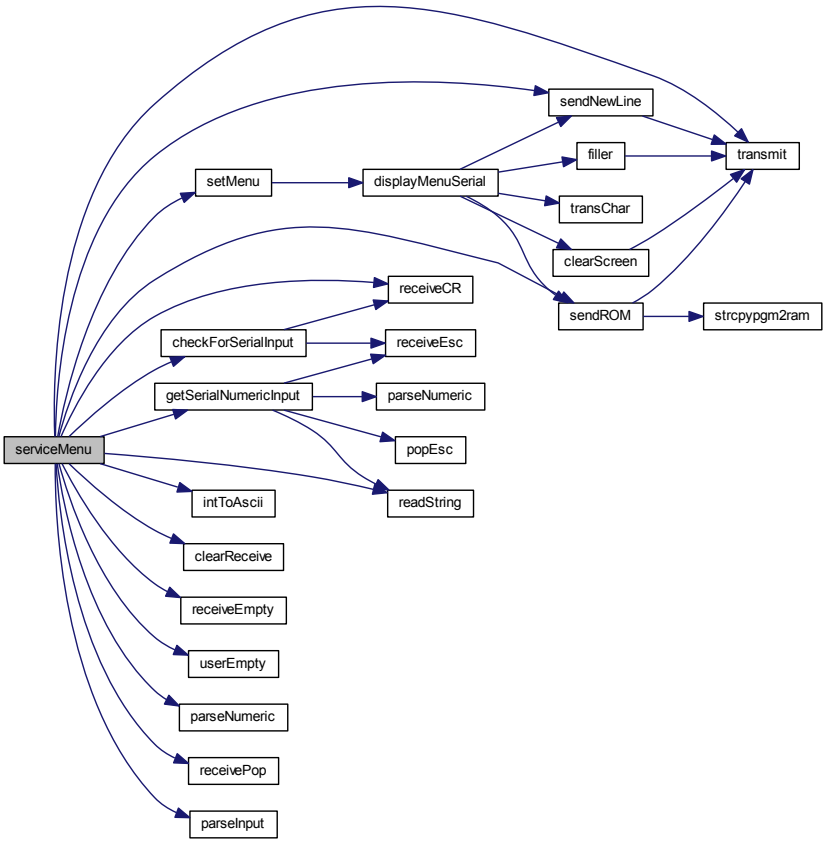
Description: Checks if the user has made any inputs to the system. If not the function simply returns. If they have then it services the inputs, displays the correct outputs and performs the specified actions

Arguments: None

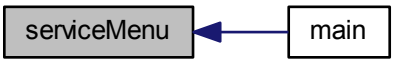
Returns: None If Esc or Back button pressed, return

Otherwise Confirm the selection

Here is the call graph for this function:



Here is the caller graph for this function:



5.15.2 Variable Documentation

5.15.2.1 const rom char and[ ]

5.15.2.2 const rom char angleStr[ ]

5.15.2.3 const rom char azMenu[ ]

5.15.2.4 const rom char azMenuLcd[ ]

5.15.2.5 const rom char azOption1[ ]

5.15.2.6 const rom char azOption2[ ]

5.15.2.7 const rom char azOption3[ ]

5.15.2.8 const rom char azOption4[ ]

5.15.2.9 const rom char calibrateAngle1[ ]

5.15.2.10 const rom char CHOOSE[ ]

5.15.2.11 const rom char currentMinAngleStr[ ]

5.15.2.12 const rom char elMenu[ ]

5.15.2.13 const rom char elMenuLcd[ ]

5.15.2.14 const rom char elOption1[ ]

5.15.2.15 const rom char elOption2[ ]

5.15.2.16 const rom char elOption3[ ]

5.15.2.17 const rom char elOption4[ ]

5.15.2.18 const rom char gotoAngle2[ ]

5.15.2.19 const rom char gotoAzAngle[ ]

5.15.2.20 const rom char gotoAzAngleLCD[ ]

5.15.2.21 const rom char gotoElAngle[ ]

5.15.2.22 const rom char gotoELAngleLCD[ ]

5.15.2.23 const rom char goUp[ ]

5.15.2.24 const rom char goUp2[ ]

5.15.2.25 const rom char hz[ ]

5.15.2.26 const rom char inputNumRangeStr[ ]

5.15.2.27 const rom char maxAz1[ ]

5.15.2.28 const rom char maxAz3[ ]

5.15.2.29 const rom char maxAzSetStr[ ]

5.15.2.30 const rom char maxAzStr[ ]

5.15.2.31 const rom char maxEl1[ ]

5.15.2.32 const rom char maxEl3[ ]

5.15.2.33 const rom char maxElSetStr[ ]

5.15.2.34 const rom char maxElStr[ ]

5.15.2.35 const rom char maxRngSerialStr[ ]

5.15.2.36 const rom char maxRngSetStr[ ]

5.15.2.37 const rom char maxRngStr[ ]

5.15.2.38 const rom char menuPrefix3[ ]

5.15.2.39 const rom char menuPrefix4[ ]

5.15.2.40 const rom char menuPrefix5[ ]

5.15.2.41 const rom char menuPrefix8[ ]

5.15.2.42 const rom char minAz1[ ]

5.15.2.43 const rom char minAz3[ ]

5.15.2.44 const rom char minAzSetStr[ ]

5.15.2.45 const rom char minAzStr[ ]

5.15.2.46 const rom char minEl1[ ]

5.15.2.47 const rom char minEl3[ ]

5.15.2.48 const rom char minElSetStr[ ]

5.15.2.49 const rom char minElStr[ ]

5.15.2.50 const rom char minRngSerialStr[ ]

5.15.2.51 const rom char minRngSetStr[ ]

5.15.2.52 const rom char minRngStr[ ]

5.15.2.53 const rom char newLine[ ]

5.15.2.54 const rom char rngMenu[ ]

5.15.2.55 const rom char rngMenuLcd[ ]

5.15.2.56 const rom char rngOption1[ ]

5.15.2.57 const rom char rngOption2[ ]

5.15.2.58 const rom char rngOption3[ ]

5.15.2.59 const rom char rngOption4[ ]

5.15.2.60 const rom char rngOption5[ ]

5.15.2.61 const rom char rngOption6[ ]

5.15.2.62 const rom char rngOption7[ ]

5.15.2.63 const rom char showTemp1[ ]

5.15.2.64 const rom char showTemp2[ ]

5.15.2.65 const rom char showTempLCD[ ]

5.15.2.66 const rom char showTempLCDTitle[ ]

5.15.2.67 const rom char tab[ ]

5.15.2.68 const rom char title[ ]

5.15.2.69 const rom char topOption1[ ]

5.15.2.70 const rom char topOption2[ ]

5.15.2.71 const rom char topOption3[ ]

5.15.2.72 const rom char topOption4[ ]

5.15.2.73 const rom char topOption5[ ]

5.15.2.74 const rom char topOptionCalTemp[ ]

5.15.2.75 const rom char topOptionForFactory[ ]

5.15.2.76 const rom char topOptionLocal[ ]

5.15.2.77 const rom char topOptionRemote[ ]

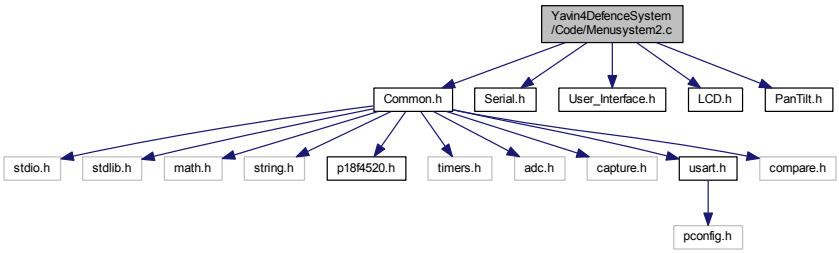
5.15.2.78 const rom char topOptionRemoteLCD[ ]

5.15.2.79 const rom char welcomeLcd[ ]

5.16 Yavin4DefenceSystem/Code/Menusystem2.c File Reference

```
#include "Common.h"
#include "Serial.h"
#include "User_Interface.h"
#include "LCD.h"
#include "PanTilt.h"
```

Include dependency graph for Menusystem2.c:



Data Structures

- struct SubMenu

Macros

- #define MAX_SER_MSG_LEN 30
- #define MAX_LCD_MSG_LEN 20
- #define MAX_NUM_OPTIONS 5

Typedefs

- typedef struct SubMenu SubMenu

Enumerations

- enum MenuLevel { ROOT, SUB, FUNC }

Functions

- static void parseInput (char input)

  parse the user input
- static int parseNumeric (char ∗number)

  parses user input string into a number
- static void stateEntry (void)

  Performs default actions on first entering the state.
- void initialiseMenu (void)

  Initialises the menu system.
- void serviceMenu (void)

  services any user interface with the menu
- void menuISR (void)

  ISR function for the menu subsystem.

Variables

- static SubMenu Min
- static SubMenu Max
- static SubMenu AutoTrack
- static SubMenu ManTrack
- static SubMenu Az
- static SubMenu Elev
- static SubMenu Root
- static MenuLevel level = ROOT
- static SubMenu * test = &Root
- static SubMenu menus [3]

5.16.1 Macro Definition Documentation

5.16.1.1 #define MAX_LCD_MSG_LEN 20

5.16.1.2 #define MAX_NUM_OPTIONS 5

5.16.1.3 #define MAX_SER_MSG_LEN 30

5.16.2 Typedef Documentation

5.16.2.1 typedef struct SubMenu SubMenu

5.16.3 Enumeration Type Documentation

5.16.3.1 enum MenuLevel

Enumerator

ROOT

SUB

FUNC

5.16.4 Function Documentation

5.16.4.1 void initialiseMenu (void)

Initialises the menu system.

Function: initialiseMenu(void)

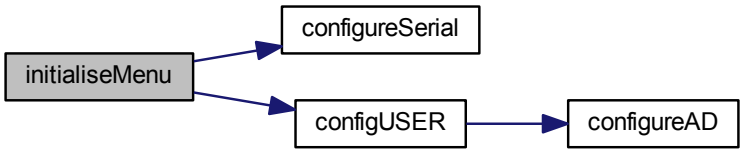
Include: Menusystem.h

Description: initialises the menu system so that it is fully operational

Arguments: None

Returns: None

Here is the call graph for this function:



5.16.4.2 void menuISR (void)

ISR function for the menu subsystem.

Function: menuISR(void)

Include: Menusystem.h

Description: services any interrupts associated with the menu system

Arguments: None

Returns: None

5.16.4.3 static void parseInput (char *input*) [static]

parse the user input

Function: parseInput(char input)

Include: Menusystem.h

Description: services any interrupts associated with the menu system

Arguments: None

Returns: None

Here is the caller graph for this function:

5.16.4.4 static int parseNumeric (char * *number*) [static]

parses user input string into a number

Function: parseNumeric(char *number)

Include:

Description: Calls the function which matches the user input

Arguments: None

Returns: None

Here is the caller graph for this function:

5.16.4.5 void serviceMenu (void)

services any user interface with the menu

Function: serviceMenu(void)

Include:

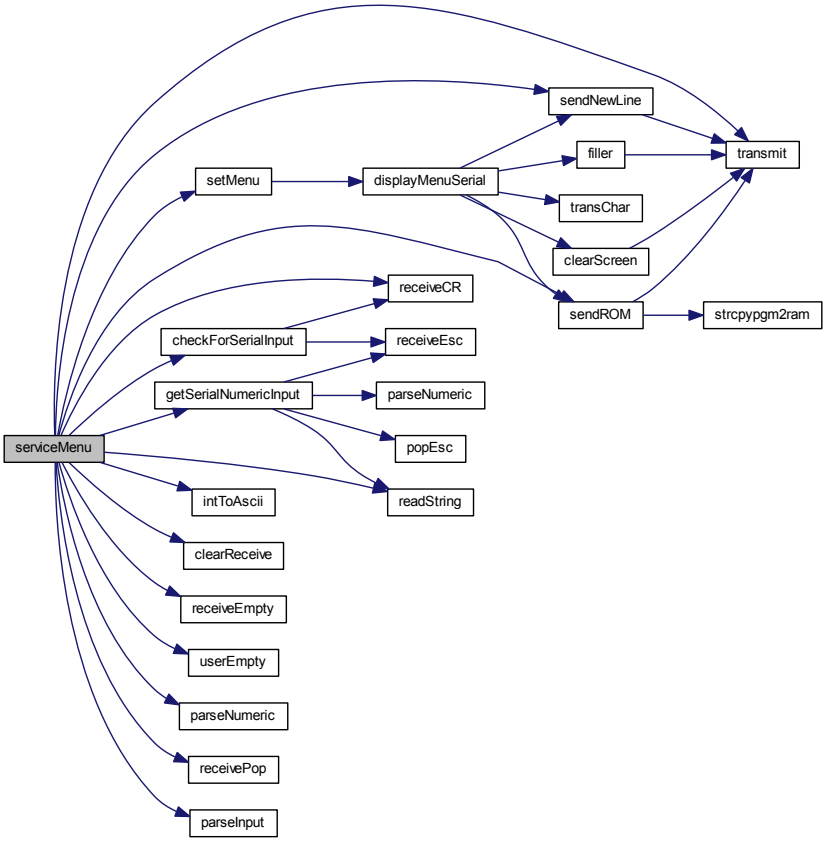
Description: Checks if the user has made any inputs to the system. If not the function simply returns. If they have then it services the inputs, displays the correct outputs and performs the specified actions

Arguments: None

Returns: None If Esc or Back button pressed, return

Otherwise Confirm the selection

Here is the call graph for this function:



5.16.4.6 static void stateEntry (void) [static]

Performs default actions on first entering the state.

Function: stateEntry(void)

Include:

Description:

Arguments: None

Returns: None

Here is the call graph for this function:

5.16.5 Variable Documentation

5.16.5.1 SubMenu AutoTrack [static]

5.16.5.2 SubMenu Az [static]

5.16.5.3 SubMenu Elev [static]

5.16.5.4 MenuLevel level = ROOT [static]

5.16.5.5 SubMenu ManTrack [static]

5.16.5.6 SubMenu Max [static]

5.16.5.7 SubMenu menus[3] [static]

5.16.5.8 SubMenu Min [static]

5.16.5.9 SubMenu Root [static]

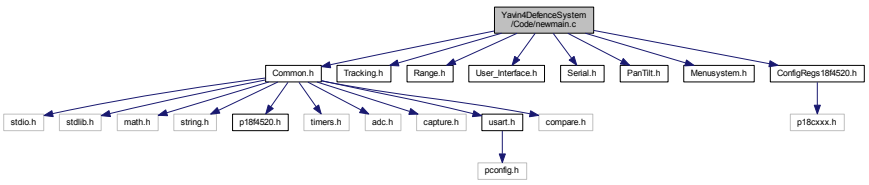
5.16.5.10 SubMenu* test = &Root [static]

5.17 Yavin4DefenceSystem/Code/newfile.h File Reference

5.18 Yavin4DefenceSystem/Code/newmain.c File Reference

```
#include "Common.h"
#include "Tracking.h"
#include "Range.h"
#include "User_Interface.h"
#include "Serial.h"
#include "PanTilt.h"
#include "Menusystem.h"
#include "ConfigRegs18f4520.h"
```

Include dependency graph for newmain.c:



Functions

- static void initialization (systemState *state)
- void main ()

  Program entry point.

5.18.1 Function Documentation

5.18.1.1 static void initialization (systemState * *state*) [static]

File: newmain.c

Author: Grant, Bas, Ayush, Zhenning, Jacob, Alvaro

Description: Controls the main system state of the product based on a state transition type template.

Created on 7 September 2014, 4:12 PM

Function: initialization(systemState *state)

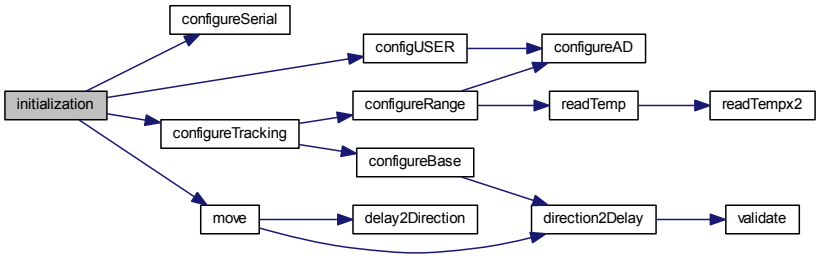
Include: Local to newmain.c

Description: Initializes the system, turns on the sensors and checks if they are ready to begin working

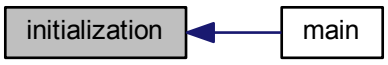
Arguments: state - The current state of the system

Returns: The next system state - At the moment always just transitions to CHECK

Here is the call graph for this function:



Here is the caller graph for this function:



5.18.1.2 void main (void)

Program entry point.

Function: main(void)

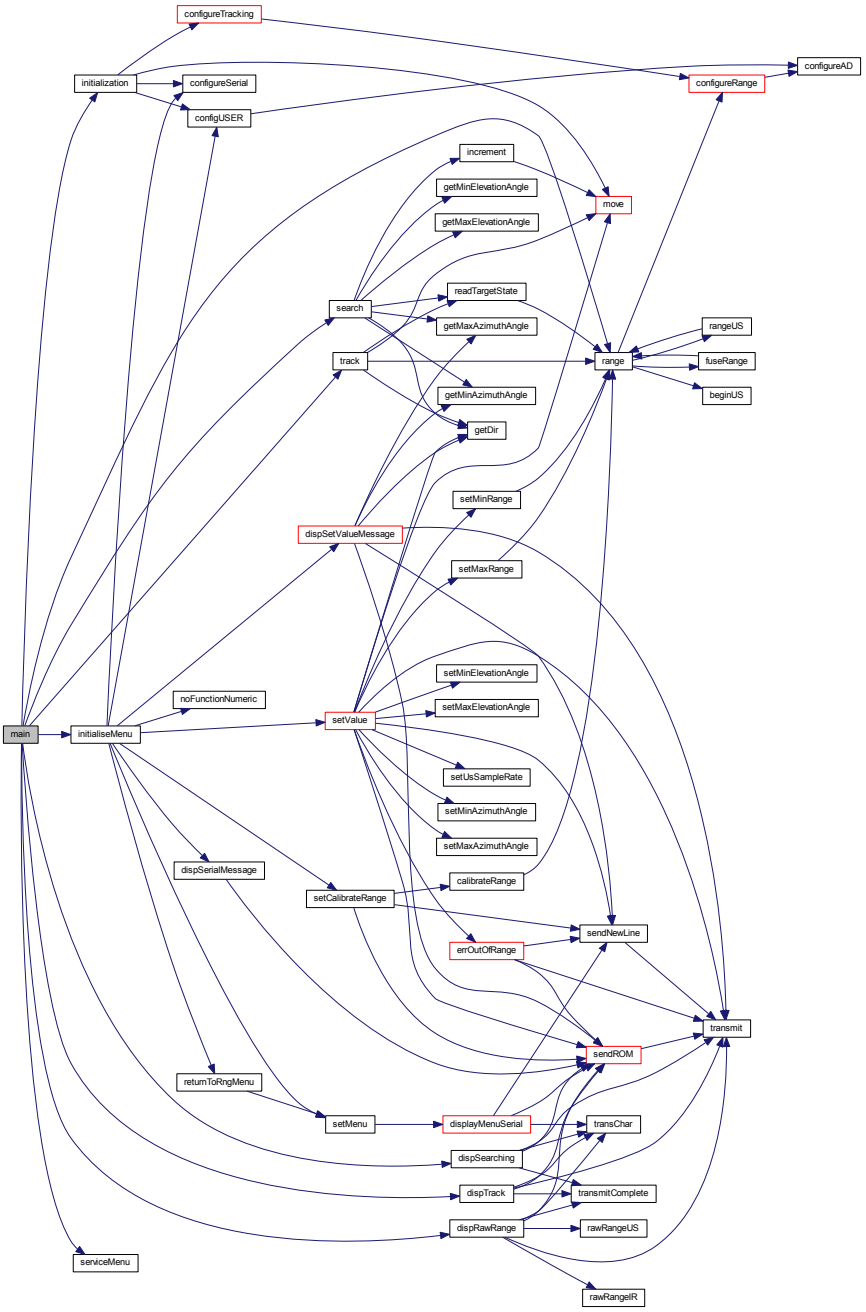
Include: Local to newmain.c

Description: stores the current system state and manages all transitions

Arguments: None

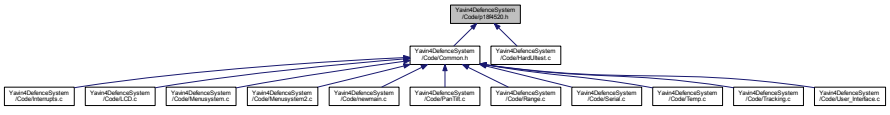
Returns: None

Here is the call graph for this function:



5.19 Yavin4DefenceSystem/Code/p18f4520.h File Reference

This graph shows which files directly or indirectly include this file:



Macros

- #define ACCESS 0
- #define BANKED 1
- #define Nop() {_asm nop _endasm}
- #define ClrWdt() {_asm clrwdt _endasm}
- #define Sleep() {_asm sleep _endasm}
- #define Reset() {_asm reset _endasm}
- #define Rlcf(f, dest, access) {_asm movlb f rlcf f,dest,access _endasm}
- #define Rlncf(f, dest, access) {_asm movlb f rlncf f,dest,access _endasm}
- #define Rrcf(f, dest, access) {_asm movlb f rrcf f,dest,access _endasm}
- #define Rrncf(f, dest, access) {_asm movlb f rrncf f,dest,access _endasm}
- #define Swapf(f, dest, access) {_asm movlb f swapf f,dest,access _endasm }
- #define INTSAVELOCS TBLPTR, TABLAT, PROD

Variables

- volatile near unsigned char PORTA
- union {
  struct {
  unsigned RA0:1
  unsigned RA1:1
  unsigned RA2:1
  unsigned RA3:1
  unsigned RA4:1
  unsigned RA5:1
  unsigned RA6:1
  unsigned RA7:1
  }
  struct {
  unsigned AN0:1
  unsigned AN1:1
  unsigned AN2:1
  unsigned AN3:1
  unsigned T0CKI:1
  unsigned AN4:1
  unsigned OSC2:1
  unsigned OSC1:1
  }
  struct {
  unsigned __pad0__:2
  unsigned VREFN:1
  unsigned VREFP:1
  unsigned __pad1__:1
  unsigned SS:1
  unsigned CLKO:1
  unsigned CLKI:1
  }
  struct {
  unsigned __pad0__:2
  unsigned CVREF:1
  unsigned __pad1__:2
  unsigned NOT_SS:1
  }
  struct {
  unsigned __pad0__:5
  unsigned LVDIN:1

```
    }
    struct {
      unsigned __pad0__:5
               unsigned HLVDIN:1
            }
            struct {
               unsigned __pad0__:4
               unsigned C1OUT:1
               unsigned C2OUT:1
            }
         } PORTAbits
```

- volatile near unsigned char PORTB
- union {
  struct {
  unsigned RB0:1
  unsigned RB1:1
  unsigned RB2:1
  unsigned RB3:1
  unsigned RB4:1
  unsigned RB5:1
  unsigned RB6:1
  unsigned RB7:1
  }
  struct {
  unsigned INT0:1
  unsigned INT1:1
  unsigned INT2:1
  unsigned CCP2:1
  unsigned KBI0:1
  unsigned KBI1:1
  unsigned KBI2:1
  unsigned KBI3:1
  }
  struct {
  unsigned AN12:1
  unsigned AN10:1
  unsigned AN8:1
  unsigned AN9:1
  unsigned AN11:1
  unsigned PGM:1
  unsigned PGC:1
  unsigned PGD:1
  }
  struct {
  unsigned FLT0:1
  }
  } PORTBbits

- volatile near unsigned char PORTC
- union {
  struct {
  unsigned RC0:1
  unsigned RC1:1
  unsigned RC2:1
  unsigned RC3:1
  unsigned RC4:1
  unsigned RC5:1

unsigned RC6:1
unsigned RC7:1
}
struct {
unsigned T1OSO:1
unsigned T1OSI:1
unsigned CCP1:1
unsigned SCK:1
unsigned SDI:1
unsigned SDO:1
unsigned TX:1
unsigned RX:1
}
struct {
unsigned T13CKI:1
unsigned CCP2:1
unsigned __pad0__:1
unsigned SCL:1
unsigned SDA:1
unsigned __pad1__:1
unsigned CK:1
unsigned DT:1
}
struct {
unsigned T1CKI:1
unsigned __pad0__:1
unsigned P1A:1
}
} PORTCbits

- volatile near unsigned char PORTD
- union {
  struct {
  unsigned RD0:1
  unsigned RD1:1
  unsigned RD2:1
  unsigned RD3:1
  unsigned RD4:1
  unsigned RD5:1
  unsigned RD6:1
  unsigned RD7:1
  }
  struct {
  unsigned PSP0:1
  unsigned PSP1:1
  unsigned PSP2:1
  unsigned PSP3:1
  unsigned PSP4:1
  unsigned PSP5:1
  unsigned PSP6:1
  unsigned PSP7:1
  }
  struct {
  unsigned __pad0__:5
  unsigned P1B:1
  unsigned P1C:1
  unsigned P1D:1
  }

} PORTDbits

- volatile near unsigned char PORTE
- union {
  struct {
  unsigned RE0:1
  unsigned RE1:1
  unsigned RE2:1
  unsigned RE3:1
  }
  struct {
  unsigned RD:1
  unsigned WR:1
  unsigned CS:1
  unsigned MCLR:1
  }
  struct {
  unsigned NOT_RD:1
  unsigned NOT_WR:1
  unsigned NOT_CS:1
  unsigned NOT_MCLR:1
  }
  struct {
  unsigned AN5:1
  unsigned AN6:1
  unsigned AN7:1
  unsigned VPP:1
  }
  } PORTEbits

- volatile near unsigned char LATA
- struct {
  unsigned LATA0:1
  unsigned LATA1:1
  unsigned LATA2:1
  unsigned LATA3:1
  unsigned LATA4:1
  unsigned LATA5:1
  unsigned LATA6:1
  unsigned LATA7:1
  } LATAbits

- volatile near unsigned char LATB
- struct {
  unsigned LATB0:1
  unsigned LATB1:1
  unsigned LATB2:1
  unsigned LATB3:1
  unsigned LATB4:1
  unsigned LATB5:1
  unsigned LATB6:1
  unsigned LATB7:1
  } LATBbits

- volatile near unsigned char LATC
- struct {
  unsigned LATC0:1
  unsigned LATC1:1

unsigned LATC2:1
unsigned LATC3:1
unsigned LATC4:1
unsigned LATC5:1
unsigned LATC6:1
unsigned LATC7:1
} LATCbits

- volatile near unsigned char LATD
- struct {
  unsigned LATD0:1
  unsigned LATD1:1
  unsigned LATD2:1
  unsigned LATD3:1
  unsigned LATD4:1
  unsigned LATD5:1
  unsigned LATD6:1
  unsigned LATD7:1
  } LATDbits

- volatile near unsigned char LATE
- struct {
  unsigned LATE0:1
  unsigned LATE1:1
  unsigned LATE2:1
  } LATEbits

- volatile near unsigned char DDRA
- union {
  struct {
  unsigned TRISA0:1
  unsigned TRISA1:1
  unsigned TRISA2:1
  unsigned TRISA3:1
  unsigned TRISA4:1
  unsigned TRISA5:1
  unsigned TRISA6:1
  unsigned TRISA7:1
  }
  struct {
  unsigned RA0:1
  unsigned RA1:1
  unsigned RA2:1
  unsigned RA3:1
  unsigned RA4:1
  unsigned RA5:1
  unsigned RA6:1
  unsigned RA7:1
  }
  } DDRAbits

- volatile near unsigned char TRISA
- union {
  struct {
  unsigned TRISA0:1
  unsigned TRISA1:1
  unsigned TRISA2:1
  unsigned TRISA3:1

unsigned TRISA4:1
unsigned TRISA5:1
unsigned TRISA6:1
unsigned TRISA7:1
}
struct {
unsigned RA0:1
unsigned RA1:1
unsigned RA2:1
unsigned RA3:1
unsigned RA4:1
unsigned RA5:1
unsigned RA6:1
unsigned RA7:1
}
} TRISAbits

- volatile near unsigned char DDRB
- union {
struct {
unsigned TRISB0:1
unsigned TRISB1:1
unsigned TRISB2:1
unsigned TRISB3:1
unsigned TRISB4:1
unsigned TRISB5:1
unsigned TRISB6:1
unsigned TRISB7:1
}
struct {
unsigned RB0:1
unsigned RB1:1
unsigned RB2:1
unsigned RB3:1
unsigned RB4:1
unsigned RB5:1
unsigned RB6:1
unsigned RB7:1
}
} DDRBbits

- volatile near unsigned char TRISB
- union {
struct {
unsigned TRISB0:1
unsigned TRISB1:1
unsigned TRISB2:1
unsigned TRISB3:1
unsigned TRISB4:1
unsigned TRISB5:1
unsigned TRISB6:1
unsigned TRISB7:1
}
struct {
unsigned RB0:1
unsigned RB1:1
unsigned RB2:1
unsigned RB3:1

unsigned RB4:1
unsigned RB5:1
unsigned RB6:1
unsigned RB7:1
}
} TRISBbits

- volatile near unsigned char DDRC
- union {
  struct {
  unsigned TRISC0:1
  unsigned TRISC1:1
  unsigned TRISC2:1
  unsigned TRISC3:1
  unsigned TRISC4:1
  unsigned TRISC5:1
  unsigned TRISC6:1
  unsigned TRISC7:1
  }
  struct {
  unsigned RC0:1
  unsigned RC1:1
  unsigned RC2:1
  unsigned RC3:1
  unsigned RC4:1
  unsigned RC5:1
  unsigned RC6:1
  unsigned RC7:1
  }
  } DDRCbits

- volatile near unsigned char TRISC
- union {
  struct {
  unsigned TRISC0:1
  unsigned TRISC1:1
  unsigned TRISC2:1
  unsigned TRISC3:1
  unsigned TRISC4:1
  unsigned TRISC5:1
  unsigned TRISC6:1
  unsigned TRISC7:1
  }
  struct {
  unsigned RC0:1
  unsigned RC1:1
  unsigned RC2:1
  unsigned RC3:1
  unsigned RC4:1
  unsigned RC5:1
  unsigned RC6:1
  unsigned RC7:1
  }
  } TRISCbits

- volatile near unsigned char DDRD
- union {
  struct {

unsigned TRISD0:1
unsigned TRISD1:1
unsigned TRISD2:1
unsigned TRISD3:1
unsigned TRISD4:1
unsigned TRISD5:1
unsigned TRISD6:1
unsigned TRISD7:1
}
struct {
unsigned RD0:1
unsigned RD1:1
unsigned RD2:1
unsigned RD3:1
unsigned RD4:1
unsigned RD5:1
unsigned RD6:1
unsigned RD7:1
}
} DDRDbits

- volatile near unsigned char TRISD
- union {
  struct {
  unsigned TRISD0:1
  unsigned TRISD1:1
  unsigned TRISD2:1
  unsigned TRISD3:1
  unsigned TRISD4:1
  unsigned TRISD5:1
  unsigned TRISD6:1
  unsigned TRISD7:1
  }
  struct {
  unsigned RD0:1
  unsigned RD1:1
  unsigned RD2:1
  unsigned RD3:1
  unsigned RD4:1
  unsigned RD5:1
  unsigned RD6:1
  unsigned RD7:1
  }
  } TRISDbits

- volatile near unsigned char DDRE
- union {
  struct {
  unsigned TRISE0:1
  unsigned TRISE1:1
  unsigned TRISE2:1
  unsigned __pad0__:1
  unsigned PSPMODE:1
  unsigned IBOV:1
  unsigned OBF:1
  unsigned IBF:1
  }
  struct {

unsigned RE0:1
unsigned RE1:1
unsigned RE2:1
unsigned RE3:1
} DDREbits

- volatile near unsigned char TRISE
- union {
  struct {
  unsigned TRISE0:1
  unsigned TRISE1:1
  unsigned TRISE2:1
  unsigned __pad0__:1
  unsigned PSPMODE:1
  unsigned IBOV:1
  unsigned OBF:1
  unsigned IBF:1
  }
  struct {
  unsigned RE0:1
  unsigned RE1:1
  unsigned RE2:1
  unsigned RE3:1
  }
  } TRISEbits

- volatile near unsigned char OSCTUNE
- union {
  struct {
  unsigned TUN:5
  unsigned __pad0__:1
  unsigned PLLEN:1
  unsigned INTSRC:1
  }
  struct {
  unsigned TUN0:1
  unsigned TUN1:1
  unsigned TUN2:1
  unsigned TUN3:1
  unsigned TUN4:1
  }
  } OSCTUNEbits

- volatile near unsigned char PIE1
- struct {
  unsigned TMR1IE:1
  unsigned TMR2IE:1
  unsigned CCP1IE:1
  unsigned SSPIE:1
  unsigned TXIE:1
  unsigned RCIE:1
  unsigned ADIE:1
  unsigned PSPIE:1
  } PIE1bits

- volatile near unsigned char PIR1
- struct {

unsigned TMR1IF:1
unsigned TMR2IF:1
unsigned CCP1IF:1
unsigned SSPIF:1
unsigned TXIF:1
unsigned RCIF:1
unsigned ADIF:1
unsigned PSPIF:1
} PIR1bits

- volatile near unsigned char IPR1
- struct {
  unsigned TMR1IP:1
  unsigned TMR2IP:1
  unsigned CCP1IP:1
  unsigned SSPIP:1
  unsigned TXIP:1
  unsigned RCIP:1
  unsigned ADIP:1
  unsigned PSPIP:1
  } IPR1bits

- volatile near unsigned char PIE2
- union {
  struct {
  unsigned CCP2IE:1
  unsigned TMR3IE:1
  unsigned HLVDIE:1
  unsigned BCLIE:1
  unsigned EEIE:1
  unsigned __pad0__:1
  unsigned CMIE:1
  unsigned OSCFIE:1
  }
  struct {
  unsigned __pad0__:2
  unsigned LVDIE:1
  }
  } PIE2bits

- volatile near unsigned char PIR2
- union {
  struct {
  unsigned CCP2IF:1
  unsigned TMR3IF:1
  unsigned HLVDIF:1
  unsigned BCLIF:1
  unsigned EEIF:1
  unsigned __pad0__:1
  unsigned CMIF:1
  unsigned OSCFIF:1
  }
  struct {
  unsigned __pad0__:2
  unsigned LVDIF:1
  }
  } PIR2bits

- volatile near unsigned char IPR2
- union {
  struct {
  unsigned CCP2IP:1
  unsigned TMR3IP:1
  unsigned HLVDIP:1
  unsigned BCLIP:1
  unsigned EEIP:1
  unsigned __pad0__:1
  unsigned CMIP:1
  unsigned OSCFIP:1
  }
  struct {
  unsigned __pad0__:2
  unsigned LVDIP:1
  }
  } IPR2bits

- volatile near unsigned char EECON1
- struct {
  unsigned RD:1
  unsigned WR:1
  unsigned WREN:1
  unsigned WRERR:1
  unsigned FREE:1
  unsigned __pad0__:1
  unsigned CFGS:1
  unsigned EEPGD:1
  } EECON1bits

- volatile near unsigned char EECON2
- volatile near unsigned char EEDATA
- volatile near unsigned char EEADR
- volatile near unsigned char RCSTA
- union {
  struct {
  unsigned RX9D:1
  unsigned OERR:1
  unsigned FERR:1
  unsigned ADDEN:1
  unsigned CREN:1
  unsigned SREN:1
  unsigned RX9:1
  unsigned SPEN:1
  }
  struct {
  unsigned __pad0__:3
  unsigned ADEN:1
  }
  } RCSTAbits

- volatile near unsigned char TXSTA
- struct {
  unsigned TX9D:1
  unsigned TRMT:1
  unsigned BRGH:1
  unsigned SENDB:1
  unsigned SYNC:1

unsigned TXEN:1
unsigned TX9:1
unsigned CSRC:1
} TXSTAbits

- volatile near unsigned char TXREG
- volatile near unsigned char RCREG
- volatile near unsigned char SPBRG
- volatile near unsigned char SPBRGH
- volatile near unsigned char T3CON
- union {
  struct {
  unsigned TMR3ON:1
  unsigned TMR3CS:1
  unsigned NOT_T3SYNC:1
  unsigned T3CCP1:1
  unsigned T3CKPS:2
  unsigned T3CCP2:1
  unsigned RD16:1
  }
  struct {
  unsigned __pad0__:2
  unsigned T3SYNC:1
  unsigned __pad1__:1
  unsigned T3CKPS0:1
  unsigned T3CKPS1:1
  }
  } T3CONbits

- volatile near unsigned char TMR3L
- volatile near unsigned char TMR3H
- volatile near unsigned char CMCON
- union {
  struct {
  unsigned CM:3
  unsigned CIS:1
  unsigned C1INV:1
  unsigned C2INV:1
  unsigned C1OUT:1
  unsigned C2OUT:1
  }
  struct {
  unsigned CM0:1
  unsigned CM1:1
  unsigned CM2:1
  }
  } CMCONbits

- volatile near unsigned char CVRCON
- union {
  struct {
  unsigned CVR:4
  unsigned CVRSS:1
  unsigned CVRR:1
  unsigned CVROE:1
  unsigned CVREN:1
  }
  struct {

unsigned CVR0:1
unsigned CVR1:1
unsigned CVR2:1
unsigned CVR3:1
} CVRCONbits

- volatile near unsigned char ECCP1AS
- union {
  struct {
  unsigned PSSBD:2
  unsigned PSSAC:2
  unsigned ECCPAS:3
  unsigned ECCPASE:1
  }
  struct {
  unsigned PSSBD0:1
  unsigned PSSBD1:1
  unsigned PSSAC0:1
  unsigned PSSAC1:1
  unsigned ECCPAS0:1
  unsigned ECCPAS1:1
  unsigned ECCPAS2:1
  }
  } ECCP1ASbits

- union {
  struct {
  unsigned PSSBD:2
  unsigned PSSAC:2
  unsigned ECCPAS:3
  unsigned ECCPASE:1
  }
  struct {
  unsigned PSSBD0:1
  unsigned PSSBD1:1
  unsigned PSSAC0:1
  unsigned PSSAC1:1
  unsigned ECCPAS0:1
  unsigned ECCPAS1:1
  unsigned ECCPAS2:1
  }
  } ECCPASbits

- volatile near unsigned char ECCP1DEL
- union {
  struct {
  unsigned PDC:7
  unsigned PRSEN:1
  }
  struct {
  unsigned PDC0:1
  unsigned PDC1:1
  unsigned PDC2:1
  unsigned PDC3:1
  unsigned PDC4:1
  unsigned PDC5:1
  unsigned PDC6:1

}
} ECCP1DELbits

- volatile near unsigned char PWM1CON
- union {
  struct {
  unsigned PDC:7
  unsigned PRSEN:1
  }
  struct {
  unsigned PDC0:1
  unsigned PDC1:1
  unsigned PDC2:1
  unsigned PDC3:1
  unsigned PDC4:1
  unsigned PDC5:1
  unsigned PDC6:1
  }
  } PWM1CONbits

- volatile near unsigned char BAUDCON
- union {
  struct {
  unsigned ABDEN:1
  unsigned WUE:1
  unsigned __pad0__:1
  unsigned BRG16:1
  unsigned TXCKP:1
  unsigned RXDTP:1
  unsigned RCIDL:1
  unsigned ABDOVF:1
  }
  struct {
  unsigned __pad0__:4
  unsigned SCKP:1
  unsigned __pad1__:1
  unsigned RCMT:1
  }
  } BAUDCONbits

- volatile near unsigned char BAUDCTL
- union {
  struct {
  unsigned ABDEN:1
  unsigned WUE:1
  unsigned __pad0__:1
  unsigned BRG16:1
  unsigned TXCKP:1
  unsigned RXDTP:1
  unsigned RCIDL:1
  unsigned ABDOVF:1
  }
  struct {
  unsigned __pad0__:4
  unsigned SCKP:1
  unsigned __pad1__:1
  unsigned RCMT:1
  }

} BAUDCTLbits

- volatile near unsigned char CCP2CON
- union {
  struct {
  unsigned CCP2M:4
  unsigned DC2B:2
  }
  struct {
  unsigned CCP2M0:1
  unsigned CCP2M1:1
  unsigned CCP2M2:1
  unsigned CCP2M3:1
  unsigned CCP2Y:1
  unsigned CCP2X:1
  }
  struct {
  unsigned __pad0__:4
  unsigned DC2B0:1
  unsigned DC2B1:1
  }
  } CCP2CONbits

- volatile near unsigned CCPR2
- volatile near unsigned char CCPR2L
- volatile near unsigned char CCPR2H
- volatile near unsigned char CCP1CON
- union {
  struct {
  unsigned CCP1M:4
  unsigned DC1B:2
  unsigned P1M:2
  }
  struct {
  unsigned CCP1M0:1
  unsigned CCP1M1:1
  unsigned CCP1M2:1
  unsigned CCP1M3:1
  unsigned CCP1Y:1
  unsigned CCP1X:1
  unsigned P1M0:1
  unsigned P1M1:1
  }
  struct {
  unsigned __pad0__:4
  unsigned DC1B0:1
  unsigned DC1B1:1
  }
  } CCP1CONbits

- volatile near unsigned CCPR1
- volatile near unsigned char CCPR1L
- volatile near unsigned char CCPR1H
- volatile near unsigned char ADCON2
- union {
  struct {
  unsigned ADCS:3
  unsigned ACQT:3

unsigned __pad0__:1
unsigned ADFM:1
}
struct {
unsigned ADCS0:1
unsigned ADCS1:1
unsigned ADCS2:1
unsigned ACQT0:1
unsigned ACQT1:1
unsigned ACQT2:1
}
} ADCON2bits

- volatile near unsigned char ADCON1
- union {
  struct {
  unsigned PCFG:4
  unsigned VCFG:2
  }
  struct {
  unsigned PCFG0:1
  unsigned PCFG1:1
  unsigned PCFG2:1
  unsigned PCFG3:1
  unsigned VCFG0:1
  unsigned VCFG1:1
  }
  } ADCON1bits

- volatile near unsigned char ADCON0
- union {
  struct {
  unsigned ADON:1
  unsigned GO_NOT_DONE:1
  unsigned CHS:4
  }
  struct {
  unsigned __pad0__:1
  unsigned GO:1
  unsigned CHS0:1
  unsigned CHS1:1
  unsigned CHS2:1
  unsigned CHS3:1
  }
  struct {
  unsigned __pad0__:1
  unsigned DONE:1
  }
  struct {
  unsigned __pad0__:1
  unsigned NOT_DONE:1
  }
  struct {
  unsigned __pad0__:1
  unsigned GO_DONE:1
  }
  } ADCON0bits

- volatile near unsigned ADRES
- volatile near unsigned char ADRESL
- volatile near unsigned char ADRESH
- volatile near unsigned char SSPCON2
- union {
  struct {
  unsigned SEN:1
  unsigned RSEN:1
  unsigned PEN:1
  unsigned RCEN:1
  unsigned ACKEN:1
  unsigned ACKDT:1
  unsigned ACKSTAT:1
  unsigned GCEN:1
  }
  struct {
  unsigned __pad0__:1
  unsigned ADMSK1:1
  unsigned ADMSK2:1
  unsigned ADMSK3:1
  unsigned ADMSK4:1
  unsigned ADMSK5:1
  }
  } SSPCON2bits

- volatile near unsigned char SSPCON1
- union {
  struct {
  unsigned SSPM:4
  unsigned CKP:1
  unsigned SSPEN:1
  unsigned SSPOV:1
  unsigned WCOL:1
  }
  struct {
  unsigned SSPM0:1
  unsigned SSPM1:1
  unsigned SSPM2:1
  unsigned SSPM3:1
  }
  } SSPCON1bits

- volatile near unsigned char SSPSTAT
- union {
  struct {
  unsigned BF:1
  unsigned UA:1
  unsigned R_NOT_W:1
  unsigned S:1
  unsigned P:1
  unsigned D_NOT_A:1
  unsigned CKE:1
  unsigned SMP:1
  }
  struct {
  unsigned __pad0__:2
  unsigned R:1
  unsigned __pad1__:2

unsigned D:1
}
struct {
unsigned __pad0__:2
unsigned W:1
unsigned __pad1__:2
unsigned A:1
}
struct {
unsigned __pad0__:2
unsigned NOT_W:1
unsigned __pad1__:2
unsigned NOT_A:1
}
struct {
unsigned __pad0__:2
unsigned R_W:1
unsigned __pad1__:2
unsigned D_A:1
}
struct {
unsigned __pad0__:2
unsigned NOT_WRITE:1
unsigned __pad1__:2
unsigned NOT_ADDRESS:1
}
} SSPSTATbits

- volatile near unsigned char SSPADD
- volatile near unsigned char SSPBUF
- volatile near unsigned char T2CON
- union {
  struct {
  unsigned T2CKPS:2
  unsigned TMR2ON:1
  unsigned T2OUTPS:4
  }
  struct {
  unsigned T2CKPS0:1
  unsigned T2CKPS1:1
  unsigned __pad0__:1
  unsigned T2OUTPS0:1
  unsigned T2OUTPS1:1
  unsigned T2OUTPS2:1
  unsigned T2OUTPS3:1
  }
  struct {
  unsigned __pad0__:3
  unsigned TOUTPS0:1
  unsigned TOUTPS1:1
  unsigned TOUTPS2:1
  unsigned TOUTPS3:1
  }
  } T2CONbits

- volatile near unsigned char PR2
- volatile near unsigned char TMR2
- volatile near unsigned char T1CON

- union {
  struct {
  unsigned TMR1ON:1
  unsigned TMR1CS:1
  unsigned NOT_T1SYNC:1
  unsigned T1OSCEN:1
  unsigned T1CKPS:2
  unsigned T1RUN:1
  unsigned RD16:1
  }
  struct {
  unsigned __pad0__:2
  unsigned T1SYNC:1
  unsigned __pad1__:1
  unsigned T1CKPS0:1
  unsigned T1CKPS1:1
  }
  } T1CONbits

- volatile near unsigned char TMR1L
- volatile near unsigned char TMR1H
- volatile near unsigned char RCON
- union {
  struct {
  unsigned NOT_BOR:1
  unsigned NOT_POR:1
  unsigned NOT_PD:1
  unsigned NOT_TO:1
  unsigned NOT_RI:1
  unsigned __pad0__:1
  unsigned SBOREN:1
  unsigned IPEN:1
  }
  struct {
  unsigned BOR:1
  unsigned POR:1
  unsigned PD:1
  unsigned TO:1
  unsigned RI:1
  }
  } RCONbits

- volatile near unsigned char WDTCON
- union {
  struct {
  unsigned SWDTEN:1
  }
  struct {
  unsigned SWDTE:1
  }
  } WDTCONbits

- volatile near unsigned char HLVDCON
- union {
  struct {
  unsigned HLVDL:4
  unsigned HLVDEN:1
  unsigned IVRST:1

unsigned __pad0__:1
unsigned VDIRMAG:1
}
struct {
unsigned HLVDL0:1
unsigned HLVDL1:1
unsigned HLVDL2:1
unsigned HLVDL3:1
}
struct {
unsigned LVDL0:1
unsigned LVDL1:1
unsigned LVDL2:1
unsigned LVDL3:1
unsigned LVDEN:1
unsigned IRVST:1
}
struct {
unsigned LVV0:1
unsigned LVV1:1
unsigned LVV2:1
unsigned LVV3:1
unsigned __pad0__:1
unsigned BGST:1
}
} HLVDCONbits

- volatile near unsigned char LVDCON
- union {
  struct {
  unsigned HLVDL:4
  unsigned HLVDEN:1
  unsigned IVRST:1
  unsigned __pad0__:1
  unsigned VDIRMAG:1
  }
  struct {
  unsigned HLVDL0:1
  unsigned HLVDL1:1
  unsigned HLVDL2:1
  unsigned HLVDL3:1
  }
  struct {
  unsigned LVDL0:1
  unsigned LVDL1:1
  unsigned LVDL2:1
  unsigned LVDL3:1
  unsigned LVDEN:1
  unsigned IRVST:1
  }
  struct {
  unsigned LVV0:1
  unsigned LVV1:1
  unsigned LVV2:1
  unsigned LVV3:1
  unsigned __pad0__:1
  unsigned BGST:1
  }

} LVDCONbits

- volatile near unsigned char OSCCON
- union {
  struct {
  unsigned SCS:2
  unsigned IOFS:1
  unsigned OSTS:1
  unsigned IRCF:3
  unsigned IDLEN:1
  }
  struct {
  unsigned SCS0:1
  unsigned SCS1:1
  unsigned FLTS:1
  unsigned __pad0__:1
  unsigned IRCF0:1
  unsigned IRCF1:1
  unsigned IRCF2:1
  }
  } OSCCONbits

- volatile near unsigned char T0CON
- union {
  struct {
  unsigned T0PS:3
  unsigned PSA:1
  unsigned T0SE:1
  unsigned T0CS:1
  unsigned T08BIT:1
  unsigned TMR0ON:1
  }
  struct {
  unsigned T0PS0:1
  unsigned T0PS1:1
  unsigned T0PS2:1
  unsigned T0PS3:1
  unsigned __pad0__:2
  unsigned T016BIT:1
  }
  } T0CONbits

- volatile near unsigned char TMR0L
- volatile near unsigned char TMR0H
- near unsigned char STATUS
- struct {
  unsigned C:1
  unsigned DC:1
  unsigned Z:1
  unsigned OV:1
  unsigned N:1
  } STATUSbits

- near unsigned FSR2
- near unsigned char FSR2L
- near unsigned char FSR2H
- volatile near unsigned char PLUSW2
- volatile near unsigned char PREINC2

- volatile near unsigned char POSTDEC2
- volatile near unsigned char POSTINC2
- near unsigned char INDF2
- near unsigned char BSR
- near unsigned FSR1
- near unsigned char FSR1L
- near unsigned char FSR1H
- volatile near unsigned char PLUSW1
- volatile near unsigned char PREINC1
- volatile near unsigned char POSTDEC1
- volatile near unsigned char POSTINC1
- near unsigned char INDF1
- near unsigned char WREG
- near unsigned FSR0
- near unsigned char FSR0L
- near unsigned char FSR0H
- volatile near unsigned char PLUSW0
- volatile near unsigned char PREINC0
- volatile near unsigned char POSTDEC0
- volatile near unsigned char POSTINC0
- near unsigned char INDF0
- volatile near unsigned char INTCON3
- union {
  struct {
  unsigned INT1IF:1
  unsigned INT2IF:1
  unsigned __pad0__:1
  unsigned INT1IE:1
  unsigned INT2IE:1
  unsigned __pad1__:1
  unsigned INT1IP:1
  unsigned INT2IP:1
  }
  struct {
  unsigned INT1F:1
  unsigned INT2F:1
  unsigned __pad0__:1
  unsigned INT1E:1
  unsigned INT2E:1
  unsigned __pad1__:1
  unsigned INT1P:1
  unsigned INT2P:1
  }
  } INTCON3bits

- volatile near unsigned char INTCON2
- union {
  struct {
  unsigned RBIP:1
  unsigned __pad0__:1
  unsigned TMR0IP:1
  unsigned __pad1__:1
  unsigned INTEDG2:1
  unsigned INTEDG1:1
  unsigned INTEDG0:1
  unsigned NOT_RBPU:1
  }

struct {
unsigned __pad0__:7
unsigned RBPU:1
}
} INTCON2bits

- volatile near unsigned char INTCON
- union {
struct {
unsigned RBIF:1
unsigned INT0IF:1
unsigned TMR0IF:1
unsigned RBIE:1
unsigned INT0IE:1
unsigned TMR0IE:1
unsigned PEIE_GIEL:1
unsigned GIE_GIEH:1
}
struct {
unsigned __pad0__:1
unsigned INT0F:1
unsigned T0IF:1
unsigned __pad1__:1
unsigned INT0E:1
unsigned T0IE:1
unsigned PEIE:1
unsigned GIE:1
}
struct {
unsigned __pad0__:6
unsigned GIEL:1
unsigned GIEH:1
}
} INTCONbits

- near unsigned PROD
- near unsigned char PRODL
- near unsigned char PRODH
- volatile near unsigned char TABLAT
- volatile near unsigned short long TBLPTR
- volatile near unsigned char TBLPTRL
- volatile near unsigned char TBLPTRH
- volatile near unsigned char TBLPTRU
- volatile near unsigned short long PC
- volatile near unsigned char PCL
- volatile near unsigned char PCLATH
- volatile near unsigned char PCLATU
- volatile near unsigned char STKPTR
- union {
struct {
unsigned STKPTR:5
unsigned __pad0__:1
unsigned STKUNF:1
unsigned STKFUL:1
}
struct {
unsigned SP0:1

```
        unsigned SP1:1
        unsigned SP2:1
        unsigned SP3:1
            unsigned SP4:1
            unsigned __pad0__:2
            unsigned STKOVF:1
          }
        } STKPTRbits
```

- near unsigned short long TOS
- near unsigned char TOSL
- near unsigned char TOSH
- near unsigned char TOSU

5.19.1 Macro Definition Documentation

5.19.1.1 #define ACCESS 0

5.19.1.2 #define BANKED 1

5.19.1.3 #define ClrWdt( ) {_asm clrwdt _endasm}

5.19.1.4 #define INTSAVELOCS TBLPTR, TABLAT, PROD

5.19.1.5 #define Nop( ) {_asm nop _endasm}

5.19.1.6 #define Reset( ) {_asm reset _endasm}

5.19.1.7 #define Rlcf(*f, dest, access*) {_asm movlb f rlcf f,dest,access _endasm}

5.19.1.8 #define Rlncf(*f, dest, access*) {_asm movlb f rlncf f,dest,access _endasm}

5.19.1.9 #define Rrcf(*f, dest, access*) {_asm movlb f rrcf f,dest,access _endasm}

5.19.1.10 #define Rrncf(*f, dest, access*) {_asm movlb f rrncf f,dest,access _endasm}

5.19.1.11 #define Sleep( ) {_asm sleep _endasm}

5.19.1.12 #define Swapf(*f, dest, access*) {_asm movlb f swapf f,dest,access _endasm }

5.19.2 Variable Documentation

5.19.2.1 unsigned __pad0__

5.19.2.2 unsigned __pad1__

5.19.2.3 unsigned A

5.19.2.4 unsigned ABDEN

5.19.2.5 unsigned ABDOVF

5.19.2.6 unsigned ACKDT

5.19.2.7 unsigned ACKEN

5.19.2.8 unsigned ACKSTAT

5.19.2.9 unsigned ACQT

5.19.2.10 unsigned ACQT0

5.19.2.11 unsigned ACQT1

5.19.2.12 unsigned ACQT2

5.19.2.13 volatile near unsigned char ADCON0

5.19.2.14 volatile { ... } ADCON0bits

5.19.2.15 volatile near unsigned char ADCON1

5.19.2.16 volatile { ... } ADCON1bits

5.19.2.17 volatile near unsigned char ADCON2

5.19.2.18 volatile { ... } ADCON2bits

5.19.2.19 unsigned ADCS

5.19.2.20 unsigned ADCS0

5.19.2.21 unsigned ADCS1

5.19.2.22 unsigned ADCS2

5.19.2.23 unsigned ADDEN

5.19.2.24 unsigned ADEN

5.19.2.25 unsigned ADFM

5.19.2.26 unsigned ADIE

5.19.2.27 unsigned ADIF

5.19.2.28 unsigned ADIP

5.19.2.29 unsigned ADMSK1

5.19.2.30 unsigned ADMSK2

5.19.2.31 unsigned ADMSK3

5.19.2.32 unsigned ADMSK4

5.19.2.33 unsigned ADMSK5

5.19.2.34 unsigned ADON

5.19.2.35 volatile near unsigned ADRES

5.19.2.36 volatile near unsigned char ADRESH

5.19.2.37 volatile near unsigned char ADRESL

5.19.2.38 unsigned AN0

5.19.2.39 unsigned AN1

5.19.2.40 unsigned AN10

5.19.2.41 unsigned AN11

5.19.2.42 unsigned AN12

5.19.2.43 unsigned AN2

5.19.2.44 unsigned AN3

5.19.2.45 unsigned AN4

5.19.2.46 unsigned AN5

5.19.2.47 unsigned AN6

5.19.2.48 unsigned AN7

5.19.2.49 unsigned AN8

5.19.2.50 unsigned AN9

5.19.2.51 volatile near unsigned char BAUDCON

5.19.2.52 volatile { ... } BAUDCONbits

5.19.2.53 volatile near unsigned char BAUDCTL

5.19.2.54 volatile { ... } BAUDCTLbits

5.19.2.55 unsigned BCLIE

5.19.2.56 unsigned BCLIF

5.19.2.57 unsigned BCLIP

5.19.2.58 unsigned BF

5.19.2.59 unsigned BGST

5.19.2.60 unsigned BOR

5.19.2.61 unsigned BRG16

5.19.2.62 unsigned BRGH

5.19.2.63 near unsigned char BSR

5.19.2.64 unsigned C

5.19.2.65 unsigned C1INV

5.19.2.66 unsigned C1OUT

5.19.2.67 unsigned C2INV

5.19.2.68 unsigned C2OUT

5.19.2.69 unsigned CCP1

5.19.2.70 volatile near unsigned char CCP1CON

5.19.2.71 volatile { ... } CCP1CONbits

5.19.2.72 unsigned CCP1IE

5.19.2.73 unsigned CCP1IF

5.19.2.74 unsigned CCP1IP

5.19.2.75 unsigned CCP1M

5.19.2.76 unsigned CCP1M0

5.19.2.77 unsigned CCP1M1

5.19.2.78 unsigned CCP1M2

5.19.2.79 unsigned CCP1M3

5.19.2.80 unsigned CCP1X

5.19.2.81 unsigned CCP1Y

5.19.2.82 unsigned CCP2

5.19.2.83 volatile near unsigned char CCP2CON

5.19.2.84 volatile { ... } CCP2CONbits

5.19.2.85 unsigned CCP2IE

5.19.2.86 unsigned CCP2IF

5.19.2.87 unsigned CCP2IP

5.19.2.88 unsigned CCP2M

5.19.2.89 unsigned CCP2M0

5.19.2.90 unsigned CCP2M1

5.19.2.91 unsigned CCP2M2

5.19.2.92 unsigned CCP2M3

5.19.2.93 unsigned CCP2X

5.19.2.94 unsigned CCP2Y

5.19.2.95 volatile near unsigned CCPR1

5.19.2.96 volatile near unsigned char CCPR1H

5.19.2.97 volatile near unsigned char CCPR1L

5.19.2.98 volatile near unsigned CCPR2

5.19.2.99 volatile near unsigned char CCPR2H

5.19.2.100 volatile near unsigned char CCPR2L

5.19.2.101 unsigned CFGS

5.19.2.102 unsigned CHS

5.19.2.103 unsigned CHS0

5.19.2.104 unsigned CHS1

5.19.2.105 unsigned CHS2

5.19.2.106 unsigned CHS3

5.19.2.107 unsigned CIS

5.19.2.108 unsigned CK

5.19.2.109 unsigned CKE

5.19.2.110 unsigned CKP

5.19.2.111 unsigned CLKI

5.19.2.112 unsigned CLKO

5.19.2.113 unsigned CM

5.19.2.114 unsigned CM0

5.19.2.115 unsigned CM1

5.19.2.116 unsigned CM2

5.19.2.117 volatile near unsigned char CMCON

5.19.2.118 volatile { ... } CMCONbits

5.19.2.119 unsigned CMIE

5.19.2.120 unsigned CMIF

5.19.2.121 unsigned CMIP

5.19.2.122 unsigned CREN

5.19.2.123 unsigned CS

5.19.2.124 unsigned CSRC

5.19.2.125 unsigned CVR

5.19.2.126 unsigned CVR0

5.19.2.127 unsigned CVR1

5.19.2.128 unsigned CVR2

5.19.2.129 unsigned CVR3

5.19.2.130 volatile near unsigned char CVRCON

5.19.2.131 volatile { ... } CVRCONbits

5.19.2.132 unsigned CVREF

5.19.2.133 unsigned CVREN

5.19.2.134 unsigned CVROE

5.19.2.135 unsigned CVRR

5.19.2.136 unsigned CVRSS

5.19.2.137 unsigned D

5.19.2.138 unsigned D_A

5.19.2.139 unsigned D_NOT_A

5.19.2.140 unsigned DC

5.19.2.141 unsigned DC1B

5.19.2.142 unsigned DC1B0

5.19.2.143 unsigned DC1B1

5.19.2.144 unsigned DC2B

5.19.2.145 unsigned DC2B0

5.19.2.146 unsigned DC2B1

5.19.2.147 volatile near unsigned char DDRA

5.19.2.148 volatile { ... } DDRAbits

5.19.2.149 volatile near unsigned char DDRB

5.19.2.150 volatile { ... } DDRBbits

5.19.2.151 volatile near unsigned char DDRC

5.19.2.152 volatile { ... } DDRCbits

5.19.2.153 volatile near unsigned char DDRD

5.19.2.154 volatile { ... } DDRDbits

5.19.2.155 volatile near unsigned char DDRE

5.19.2.156 volatile { ... } DDREbits

5.19.2.157 unsigned DONE

5.19.2.158 unsigned DT

5.19.2.159 volatile near unsigned char ECCP1AS

5.19.2.160 volatile { ... } ECCP1ASbits

5.19.2.161 volatile near unsigned char ECCP1DEL

5.19.2.162 volatile { ... } ECCP1DELbits

5.19.2.163 volatile near unsigned char ECCPAS

5.19.2.164 unsigned ECCPAS0

5.19.2.165 unsigned ECCPAS1

5.19.2.166 unsigned ECCPAS2

5.19.2.167 volatile { ... } ECCPASbits

5.19.2.168 unsigned ECCPASE

5.19.2.169 volatile near unsigned char EEADR

5.19.2.170 volatile near unsigned char EECON1

5.19.2.171 volatile { ... } EECON1bits

5.19.2.172 volatile near unsigned char EECON2

5.19.2.173 volatile near unsigned char EEDATA

5.19.2.174 unsigned EEIE

5.19.2.175 unsigned EEIF

5.19.2.176 unsigned EEIP

5.19.2.177 unsigned EEPGD

5.19.2.178 unsigned FERR

5.19.2.179 unsigned FLT0

5.19.2.180 unsigned FLTS

5.19.2.181 unsigned FREE

5.19.2.182 near unsigned FSR0

5.19.2.183 near unsigned char FSR0H

5.19.2.184 near unsigned char FSR0L

5.19.2.185 near unsigned FSR1

5.19.2.186 near unsigned char FSR1H

5.19.2.187 near unsigned char FSR1L

5.19.2.188 near unsigned FSR2

5.19.2.189 near unsigned char FSR2H

5.19.2.190 near unsigned char FSR2L

5.19.2.191 unsigned GCEN

5.19.2.192 unsigned GIE

5.19.2.193 unsigned GIE_GIEH

5.19.2.194 unsigned GIEH

5.19.2.195 unsigned GIEL

5.19.2.196 unsigned GO

5.19.2.197 unsigned GO_DONE

5.19.2.198 unsigned GO_NOT_DONE

5.19.2.199 volatile near unsigned char HLVDCON

5.19.2.200 volatile { ... } HLVDCONbits

5.19.2.201 unsigned HLVDEN

5.19.2.202 unsigned HLVDIE

5.19.2.203 unsigned HLVDIF

5.19.2.204 unsigned HLVDIN

5.19.2.205 unsigned HLVDIP

5.19.2.206 unsigned HLVDL

5.19.2.207 unsigned HLVDL0

5.19.2.208 unsigned HLVDL1

5.19.2.209 unsigned HLVDL2

5.19.2.210 unsigned HLVDL3

5.19.2.211 unsigned IBF

5.19.2.212 unsigned IBOV

5.19.2.213 unsigned IDLEN

5.19.2.214 near unsigned char INDF0

5.19.2.215 near unsigned char INDF1

5.19.2.216 near unsigned char INDF2

5.19.2.217 unsigned INT0

5.19.2.218 unsigned INT0E

5.19.2.219 unsigned INT0F

5.19.2.220 unsigned INT0IE

5.19.2.221 unsigned INT0IF

5.19.2.222 unsigned INT1

5.19.2.223 unsigned INT1E

5.19.2.224 unsigned INT1F

5.19.2.225 unsigned INT1IE

5.19.2.226 unsigned INT1IF

5.19.2.227 unsigned INT1IP

5.19.2.228 unsigned INT1P

5.19.2.229 unsigned INT2

5.19.2.230 unsigned INT2E

5.19.2.231 unsigned INT2F

5.19.2.232 unsigned INT2IE

5.19.2.233 unsigned INT2IF

5.19.2.234 unsigned INT2IP

5.19.2.235 unsigned INT2P

5.19.2.236 volatile near unsigned char INTCON

5.19.2.237 volatile near unsigned char INTCON2

5.19.2.238 volatile { ... } INTCON2bits

5.19.2.239 volatile near unsigned char INTCON3

5.19.2.240 volatile { ... } INTCON3bits

5.19.2.241 volatile { ... } INTCONbits

5.19.2.242 unsigned INTEDG0

5.19.2.243 unsigned INTEDG1

5.19.2.244 unsigned INTEDG2

5.19.2.245 unsigned INTSRC

5.19.2.246 unsigned IOFS

5.19.2.247 unsigned IPEN

5.19.2.248 volatile near unsigned char IPR1

5.19.2.249 volatile { ... } IPR1bits

5.19.2.250 volatile near unsigned char IPR2

5.19.2.251 volatile { ... } IPR2bits

5.19.2.252 unsigned IRCF

5.19.2.253 unsigned IRCF0

5.19.2.254 unsigned IRCF1

5.19.2.255 unsigned IRCF2

5.19.2.256 unsigned IRVST

5.19.2.257 unsigned IVRST

5.19.2.258 unsigned KBI0

5.19.2.259 unsigned KBI1

5.19.2.260 unsigned KBI2

5.19.2.261 unsigned KBI3

5.19.2.262 volatile near unsigned char LATA

5.19.2.263 unsigned LATA0

5.19.2.264 unsigned LATA1

5.19.2.265 unsigned LATA2

5.19.2.266 unsigned LATA3

5.19.2.267 unsigned LATA4

5.19.2.268 unsigned LATA5

5.19.2.269 unsigned LATA6

5.19.2.270 unsigned LATA7

5.19.2.271 volatile { ... } LATAbits

5.19.2.272 volatile near unsigned char LATB

5.19.2.273 unsigned LATB0

5.19.2.274 unsigned LATB1

5.19.2.275 unsigned LATB2

5.19.2.276 unsigned LATB3

5.19.2.277 unsigned LATB4

5.19.2.278 unsigned LATB5

5.19.2.279 unsigned LATB6

5.19.2.280 unsigned LATB7

5.19.2.281 volatile { ... } LATBbits

5.19.2.282 volatile near unsigned char LATC

5.19.2.283 unsigned LATC0

5.19.2.284 unsigned LATC1

5.19.2.285 unsigned LATC2

5.19.2.286 unsigned LATC3

5.19.2.287 unsigned LATC4

5.19.2.288 unsigned LATC5

5.19.2.289 unsigned LATC6

5.19.2.290 unsigned LATC7

5.19.2.291 volatile { ... } LATCbits

5.19.2.292 volatile near unsigned char LATD

5.19.2.293 unsigned LATD0

5.19.2.294 unsigned LATD1

5.19.2.295 unsigned LATD2

5.19.2.296 unsigned LATD3

5.19.2.297 unsigned LATD4

5.19.2.298 unsigned LATD5

5.19.2.299 unsigned LATD6

5.19.2.300 unsigned LATD7

5.19.2.301 volatile { ... } LATDbits

5.19.2.302 volatile near unsigned char LATE

5.19.2.303 unsigned LATE0

5.19.2.304 unsigned LATE1

5.19.2.305 unsigned LATE2

5.19.2.306 volatile { ... } LATEbits

5.19.2.307 volatile near unsigned char LVDCON

5.19.2.308 volatile { ... } LVDCONbits

5.19.2.309 unsigned LVDEN

5.19.2.310 unsigned LVDIE

5.19.2.311 unsigned LVDIF

5.19.2.312 unsigned LVDIN

5.19.2.313 unsigned LVDIP

5.19.2.314 unsigned LVDL0

5.19.2.315 unsigned LVDL1

5.19.2.316 unsigned LVDL2

5.19.2.317 unsigned LVDL3

5.19.2.318 unsigned LVV0

5.19.2.319 unsigned LVV1

5.19.2.320 unsigned LVV2

5.19.2.321 unsigned LVV3

5.19.2.322 unsigned MCLR

5.19.2.323 unsigned N

5.19.2.324 unsigned NOT_A

5.19.2.325 unsigned NOT_ADDRESS

5.19.2.326 unsigned NOT_BOR

5.19.2.327 unsigned NOT_CS

5.19.2.328 unsigned NOT_DONE

5.19.2.329 unsigned NOT_MCLR

5.19.2.330 unsigned NOT_PD

5.19.2.331 unsigned NOT_POR

5.19.2.332 unsigned NOT_RBPU

5.19.2.333 unsigned NOT_RD

5.19.2.334 unsigned NOT_RI

5.19.2.335 unsigned NOT_SS

5.19.2.336 unsigned NOT_T1SYNC

5.19.2.337 unsigned NOT_T3SYNC

5.19.2.338 unsigned NOT_TO

5.19.2.339 unsigned NOT_W

5.19.2.340 unsigned NOT_WR

5.19.2.341 unsigned NOT_WRITE

5.19.2.342 unsigned OBF

5.19.2.343 unsigned OERR

5.19.2.344 unsigned OSC1

5.19.2.345 unsigned OSC2

5.19.2.346 volatile near unsigned char OSCCON

5.19.2.347 volatile { ... } OSCCONbits

5.19.2.348 unsigned OSCFIE

5.19.2.349 unsigned OSCFIF

5.19.2.350 unsigned OSCFIP

5.19.2.351 volatile near unsigned char OSCTUNE

5.19.2.352 volatile { ... } OSCTUNEbits

5.19.2.353 unsigned OSTS

5.19.2.354 unsigned OV

5.19.2.355 unsigned P

5.19.2.356 unsigned P1A

5.19.2.357 unsigned P1B

5.19.2.358 unsigned P1C

5.19.2.359 unsigned P1D

5.19.2.360 unsigned P1M

5.19.2.361 unsigned P1M0

5.19.2.362 unsigned P1M1

5.19.2.363 volatile near unsigned short long PC

5.19.2.364 unsigned PCFG

5.19.2.365 unsigned PCFG0

5.19.2.366 unsigned PCFG1

5.19.2.367 unsigned PCFG2

5.19.2.368 unsigned PCFG3

5.19.2.369 volatile near unsigned char PCL

5.19.2.370 volatile near unsigned char PCLATH

5.19.2.371 volatile near unsigned char PCLATU

5.19.2.372 unsigned PD

5.19.2.373 unsigned PDC

5.19.2.374 unsigned PDC0

5.19.2.375 unsigned PDC1

5.19.2.376 unsigned PDC2

5.19.2.377 unsigned PDC3

5.19.2.378 unsigned PDC4

5.19.2.379 unsigned PDC5

5.19.2.380 unsigned PDC6

5.19.2.381 unsigned PEIE

5.19.2.382 unsigned PEIE_GIEL

5.19.2.383 unsigned PEN

5.19.2.384 unsigned PGC

5.19.2.385 unsigned PGD

5.19.2.386 unsigned PGM

5.19.2.387 volatile near unsigned char PIE1

5.19.2.388 volatile { ... } PIE1bits

5.19.2.389 volatile near unsigned char PIE2

5.19.2.390 volatile { ... } PIE2bits

5.19.2.391 volatile near unsigned char PIR1

5.19.2.392 volatile { ... } PIR1bits

5.19.2.393 volatile near unsigned char PIR2

5.19.2.394 volatile { ... } PIR2bits

5.19.2.395 unsigned PLLEN

5.19.2.396 volatile near unsigned char PLUSW0

5.19.2.397 volatile near unsigned char PLUSW1

5.19.2.398 volatile near unsigned char PLUSW2

5.19.2.399 unsigned POR

5.19.2.400 volatile near unsigned char PORTA

5.19.2.401 volatile { ... } PORTAbits

5.19.2.402 volatile near unsigned char PORTB

5.19.2.403 volatile { ... } PORTBbits

5.19.2.404 volatile near unsigned char PORTC

5.19.2.405 volatile { ... } PORTCbits

5.19.2.406 volatile near unsigned char PORTD

5.19.2.407 volatile { ... } PORTDbits

5.19.2.408 volatile near unsigned char PORTE

5.19.2.409 volatile { ... } PORTEbits

5.19.2.410 volatile near unsigned char POSTDEC0

5.19.2.411 volatile near unsigned char POSTDEC1

5.19.2.412 volatile near unsigned char POSTDEC2

5.19.2.413 volatile near unsigned char POSTINC0

5.19.2.414 volatile near unsigned char POSTINC1

5.19.2.415 volatile near unsigned char POSTINC2

5.19.2.416 volatile near unsigned char PR2

5.19.2.417 volatile near unsigned char PREINC0

5.19.2.418 volatile near unsigned char PREINC1

5.19.2.419 volatile near unsigned char PREINC2

5.19.2.420 near unsigned PROD

5.19.2.421 near unsigned char PRODH

5.19.2.422 near unsigned char PRODL

5.19.2.423 unsigned PRSEN

5.19.2.424 unsigned PSA

5.19.2.425 unsigned PSP0

5.19.2.426 unsigned PSP1

5.19.2.427 unsigned PSP2

5.19.2.428 unsigned PSP3

5.19.2.429 unsigned PSP4

5.19.2.430 unsigned PSP5

5.19.2.431 unsigned PSP6

5.19.2.432 unsigned PSP7

5.19.2.433 unsigned PSPIE

5.19.2.434 unsigned PSPIF

5.19.2.435 unsigned PSPIP

5.19.2.436 unsigned PSPMODE

5.19.2.437 unsigned PSSAC

5.19.2.438 unsigned PSSAC0

5.19.2.439 unsigned PSSAC1

5.19.2.440 unsigned PSSBD

5.19.2.441 unsigned PSSBD0

5.19.2.442 unsigned PSSBD1

5.19.2.443 volatile near unsigned char PWM1CON

5.19.2.444 volatile { ... } PWM1CONbits

5.19.2.445 unsigned R

5.19.2.446 unsigned R_NOT_W

5.19.2.447 unsigned R_W

5.19.2.448 unsigned RA0

5.19.2.449 unsigned RA1

5.19.2.450 unsigned RA2

5.19.2.451 unsigned RA3

5.19.2.452 unsigned RA4

5.19.2.453 unsigned RA5

5.19.2.454 unsigned RA6

5.19.2.455 unsigned RA7

5.19.2.456 unsigned RB0

5.19.2.457 unsigned RB1

5.19.2.458 unsigned RB2

5.19.2.459 unsigned RB3

5.19.2.460 unsigned RB4

5.19.2.461 unsigned RB5

5.19.2.462 unsigned RB6

5.19.2.463 unsigned RB7

5.19.2.464 unsigned RBIE

5.19.2.465 unsigned RBIF

5.19.2.466 unsigned RBIP

5.19.2.467 unsigned RBPU

5.19.2.468 unsigned RC0

5.19.2.469 unsigned RC1

5.19.2.470 unsigned RC2

5.19.2.471 unsigned RC3

5.19.2.472 unsigned RC4

5.19.2.473 unsigned RC5

5.19.2.474 unsigned RC6

5.19.2.475 unsigned RC7

5.19.2.476 unsigned RCEN

5.19.2.477 unsigned RCIDL

5.19.2.478 unsigned RCIE

5.19.2.479 unsigned RCIF

5.19.2.480 unsigned RCIP

5.19.2.481 unsigned RCMT

5.19.2.482 volatile near unsigned char RCON

5.19.2.483 volatile { ... } RCONbits

5.19.2.484 volatile near unsigned char RCREG

5.19.2.485 volatile near unsigned char RCSTA

5.19.2.486 volatile { ... } RCSTAbits

5.19.2.487 unsigned RD

5.19.2.488 unsigned RD0

5.19.2.489 unsigned RD1

5.19.2.490 unsigned RD16

5.19.2.491 unsigned RD2

5.19.2.492 unsigned RD3

5.19.2.493 unsigned RD4

5.19.2.494 unsigned RD5

5.19.2.495 unsigned RD6

5.19.2.496 unsigned RD7

5.19.2.497 unsigned RE0

5.19.2.498 unsigned RE1

5.19.2.499 unsigned RE2

5.19.2.500 unsigned RE3

5.19.2.501 unsigned RI

5.19.2.502 unsigned RSEN

5.19.2.503 unsigned RX

5.19.2.504 unsigned RX9

5.19.2.505 unsigned RX9D

5.19.2.506 unsigned RXDTP

5.19.2.507 unsigned S

5.19.2.508 unsigned SBOREN

5.19.2.509 unsigned SCK

5.19.2.510 unsigned SCKP

5.19.2.511 unsigned SCL

5.19.2.512 unsigned SCS

5.19.2.513 unsigned SCS0

5.19.2.514 unsigned SCS1

5.19.2.515 unsigned SDA

5.19.2.516 unsigned SDI

5.19.2.517 unsigned SDO

5.19.2.518 unsigned SEN

5.19.2.519 unsigned SENDB

5.19.2.520 unsigned SMP

5.19.2.521 unsigned SP0

5.19.2.522 unsigned SP1

5.19.2.523 unsigned SP2

5.19.2.524 unsigned SP3

5.19.2.525 unsigned SP4

5.19.2.526 volatile near unsigned char SPBRG

5.19.2.527 volatile near unsigned char SPBRGH

5.19.2.528 unsigned SPEN

5.19.2.529 unsigned SREN

5.19.2.530 unsigned SS

5.19.2.531 volatile near unsigned char SSPADD

5.19.2.532 volatile near unsigned char SSPBUF

5.19.2.533 volatile near unsigned char SSPCON1

5.19.2.534 volatile { ... } SSPCON1bits

5.19.2.535 volatile near unsigned char SSPCON2

5.19.2.536 volatile { ... } SSPCON2bits

5.19.2.537 unsigned SSPEN

5.19.2.538 unsigned SSPIE

5.19.2.539 unsigned SSPIF

5.19.2.540 unsigned SSPIP

5.19.2.541 unsigned SSPM

5.19.2.542 unsigned SSPM0

5.19.2.543 unsigned SSPM1

5.19.2.544 unsigned SSPM2

5.19.2.545 unsigned SSPM3

5.19.2.546 unsigned SSPOV

5.19.2.547 volatile near unsigned char SSPSTAT

5.19.2.548 volatile { ... } SSPSTATbits

5.19.2.549 near unsigned char STATUS

5.19.2.550 near { ... } STATUSbits

5.19.2.551 unsigned STKFUL

5.19.2.552 unsigned STKOVF

5.19.2.553 unsigned STKPTR

5.19.2.554 volatile { ... } STKPTRbits

5.19.2.555 unsigned STKUNF

5.19.2.556 unsigned SWDTE

5.19.2.557 unsigned SWDTEN

5.19.2.558 unsigned SYNC

5.19.2.559 unsigned T016BIT

5.19.2.560 unsigned T08BIT

5.19.2.561 unsigned T0CKI

5.19.2.562 volatile near unsigned char T0CON

5.19.2.563 volatile { ... } T0CONbits

5.19.2.564 unsigned T0CS

5.19.2.565 unsigned T0IE

5.19.2.566 unsigned T0IF

5.19.2.567 unsigned T0PS

5.19.2.568 unsigned T0PS0

5.19.2.569 unsigned T0PS1

5.19.2.570 unsigned T0PS2

5.19.2.571 unsigned T0PS3

5.19.2.572 unsigned T0SE

5.19.2.573 unsigned T13CKI

5.19.2.574 unsigned T1CKI

5.19.2.575 unsigned T1CKPS

5.19.2.576 unsigned T1CKPS0

5.19.2.577 unsigned T1CKPS1

5.19.2.578 volatile near unsigned char T1CON

5.19.2.579 volatile { ... } T1CONbits

5.19.2.580 unsigned T1OSCEN

5.19.2.581 unsigned T1OSI

5.19.2.582 unsigned T1OSO

5.19.2.583 unsigned T1RUN

5.19.2.584 unsigned T1SYNC

5.19.2.585 unsigned T2CKPS

5.19.2.586 unsigned T2CKPS0

5.19.2.587 unsigned T2CKPS1

5.19.2.588 volatile near unsigned char T2CON

5.19.2.589 volatile { ... } T2CONbits

5.19.2.590 unsigned T2OUTPS

5.19.2.591 unsigned T2OUTPS0

5.19.2.592 unsigned T2OUTPS1

5.19.2.593 unsigned T2OUTPS2

5.19.2.594 unsigned T2OUTPS3

5.19.2.595 unsigned T3CCP1

5.19.2.596 unsigned T3CCP2

5.19.2.597 unsigned T3CKPS

5.19.2.598 unsigned T3CKPS0

5.19.2.599 unsigned T3CKPS1

5.19.2.600 volatile near unsigned char T3CON

5.19.2.601 volatile { ... } T3CONbits

5.19.2.602 unsigned T3SYNC

5.19.2.603 volatile near unsigned char TABLAT

5.19.2.604 volatile near unsigned short long TBLPTR

5.19.2.605 volatile near unsigned char TBLPTRH

5.19.2.606 volatile near unsigned char TBLPTRL

5.19.2.607 volatile near unsigned char TBLPTRU

5.19.2.608 volatile near unsigned char TMR0H

5.19.2.609 unsigned TMR0IE

5.19.2.610 unsigned TMR0IF

5.19.2.611 unsigned TMR0IP

5.19.2.612 volatile near unsigned char TMR0L

5.19.2.613 unsigned TMR0ON

5.19.2.614 unsigned TMR1CS

5.19.2.615 volatile near unsigned char TMR1H

5.19.2.616 unsigned TMR1IE

5.19.2.617 unsigned TMR1IF

5.19.2.618 unsigned TMR1IP

5.19.2.619 volatile near unsigned char TMR1L

5.19.2.620 unsigned TMR1ON

5.19.2.621 volatile near unsigned char TMR2

5.19.2.622 unsigned TMR2IE

5.19.2.623 unsigned TMR2IF

5.19.2.624 unsigned TMR2IP

5.19.2.625 unsigned TMR2ON

5.19.2.626 unsigned TMR3CS

5.19.2.627 volatile near unsigned char TMR3H

5.19.2.628 unsigned TMR3IE

5.19.2.629 unsigned TMR3IF

5.19.2.630 unsigned TMR3IP

5.19.2.631 volatile near unsigned char TMR3L

5.19.2.632 unsigned TMR3ON

5.19.2.633 unsigned TO

5.19.2.634 near unsigned short long TOS

5.19.2.635 near unsigned char TOSH

5.19.2.636 near unsigned char TOSL

5.19.2.637 near unsigned char TOSU

5.19.2.638 unsigned TOUTPS0

5.19.2.639 unsigned TOUTPS1

5.19.2.640 unsigned TOUTPS2

5.19.2.641 unsigned TOUTPS3

5.19.2.642 volatile near unsigned char TRISA

5.19.2.643 unsigned TRISA0

5.19.2.644 unsigned TRISA1

5.19.2.645 unsigned TRISA2

5.19.2.646 unsigned TRISA3

5.19.2.647 unsigned TRISA4

5.19.2.648 unsigned TRISA5

5.19.2.649 unsigned TRISA6

5.19.2.650 unsigned TRISA7

5.19.2.651 volatile { ... } TRISAbits

5.19.2.652 volatile near unsigned char TRISB

5.19.2.653 unsigned TRISB0

5.19.2.654 unsigned TRISB1

5.19.2.655 unsigned TRISB2

5.19.2.656 unsigned TRISB3

5.19.2.657 unsigned TRISB4

5.19.2.658 unsigned TRISB5

5.19.2.659 unsigned TRISB6

5.19.2.660 unsigned TRISB7

5.19.2.661 volatile { ... } TRISBbits

5.19.2.662 volatile near unsigned char TRISC

5.19.2.663 unsigned TRISC0

5.19.2.664 unsigned TRISC1

5.19.2.665 unsigned TRISC2

5.19.2.666 unsigned TRISC3

5.19.2.667 unsigned TRISC4

5.19.2.668 unsigned TRISC5

5.19.2.669 unsigned TRISC6

5.19.2.670 unsigned TRISC7

5.19.2.671 volatile { ... } TRISCbits

5.19.2.672 volatile near unsigned char TRISD

5.19.2.673 unsigned TRISD0

5.19.2.674 unsigned TRISD1

5.19.2.675 unsigned TRISD2

5.19.2.676 unsigned TRISD3

5.19.2.677 unsigned TRISD4

5.19.2.678 unsigned TRISD5

5.19.2.679 unsigned TRISD6

5.19.2.680 unsigned TRISD7

5.19.2.681 volatile { ... } TRISDbits

5.19.2.682 volatile near unsigned char TRISE

5.19.2.683 unsigned TRISE0

5.19.2.684 unsigned TRISE1

5.19.2.685 unsigned TRISE2

5.19.2.686 volatile { ... } TRISEbits

5.19.2.687 unsigned TRMT

5.19.2.688 unsigned TUN

5.19.2.689 unsigned TUN0

5.19.2.690 unsigned TUN1

5.19.2.691 unsigned TUN2

5.19.2.692 unsigned TUN3

5.19.2.693 unsigned TUN4

5.19.2.694 unsigned TX

5.19.2.695 unsigned TX9

5.19.2.696 unsigned TX9D

5.19.2.697 unsigned TXCKP

5.19.2.698 unsigned TXEN

5.19.2.699 unsigned TXIE

5.19.2.700 unsigned TXIF

5.19.2.701 unsigned TXIP

5.19.2.702 volatile near unsigned char TXREG

5.19.2.703 volatile near unsigned char TXSTA

5.19.2.704 volatile { ... } TXSTAbits

5.19.2.705 unsigned UA

5.19.2.706 unsigned VCFG

5.19.2.707 unsigned VCFG0

5.19.2.708 unsigned VCFG1

5.19.2.709 unsigned VDIRMAG

5.19.2.710 unsigned VPP

5.19.2.711 unsigned VREFN

5.19.2.712 unsigned VREFP

5.19.2.713 near unsigned char W

5.19.2.714 unsigned WCOL

5.19.2.715 volatile near unsigned char WDTCON

5.19.2.716 volatile { ... } WDTCONbits

5.19.2.717 unsigned WR

5.19.2.718 near unsigned char WREG

5.19.2.719 unsigned WREN

5.19.2.720 unsigned WRERR

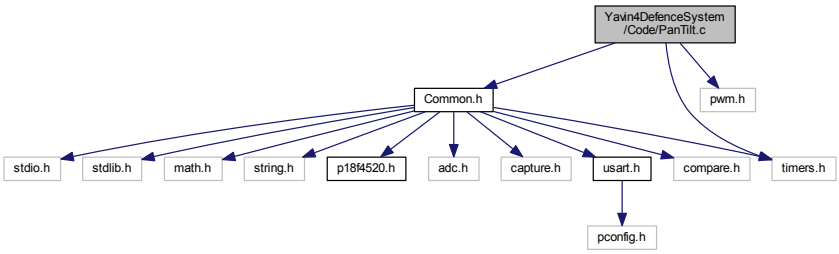
5.19.2.721 unsigned WUE

5.19.2.722 unsigned Z

5.20 Yavin4DefenceSystem/Code/PanTilt.c File Reference

```
#include "Common.h"
#include <pwm.h>
#include <timers.h>
```

Include dependency graph for PanTilt.c:



Data Structures

- struct Delay

Macros

- #define AZ_PWM_PIN PORTCbits.RC0
- #define IN_PWM_PIN PORTCbits.RC1
- #define DUTY_CYCLE_TIME 2500
- #define PWM_PERIOD 50000
- #define PWM_HALF_PERIOD 25000
- #define LATENCY 340
- #define SERVO_INIT() TRISCbits.RC0 = 0; TRISCbits.RC1 = 0; PORTCbits.RC0 = 0; PORTCbits.RC1 = 0

Functions

- static void validate (unsigned int *delay)
- static Direction delay2Direction (Delay dly)
- static Delay direction2Delay (Direction dir)
- void configureBase (void)
- void move (Direction destination)
- void increment (Direction difference)
- void incrementFine (Direction difference)
- Direction getDir (void)
- char getMaxAzimuthAngle (void)
- char getMinAzimuthAngle (void)
- char getMaxElevationAngle (void)
- char getMinElevationAngle (void)
- void setMaxAzimuthAngle (char p_angle)
- void setMinAzimuthAngle (char p_angle)
- void setMaxElevationAngle (char p_angle)
- void setMinElevationAngle (char p_angle)
- void calibratePanTilt (Direction reference)
- void calibratePanTiltRange (Direction reference)
- Direction rawDir (void)
- void panTiltISR (void)
- char updated (void)

Variables

- static Direction calibration_offset = { 0, 3 }
- static Direction arcRange = { 94, 103 }
- static Delay global_delay
- static signed char azimuth_angle_max
- static signed char azimuth_angle_min
- static signed char elevation_angle_max
- static signed char elevation_angle_min
- static Direction current_direction
- static volatile char changed = 0

5.20.1 Macro Definition Documentation

5.20.1.1 #define AZ_PWM_PIN PORTCbits.RC0

5.20.1.2 #define DUTY_CYCLE_TIME 2500

5.20.1.3 #define IN_PWM_PIN PORTCbits.RC1

5.20.1.4 #define LATENCY 340

5.20.1.5 #define PWM_HALF_PERIOD 25000

5.20.1.6 #define PWM_PERIOD 50000

5.20.1.7 #define SERVO_INIT( ) TRISCbits.RC0 = 0; TRISCbits.RC1 = 0; PORTCbits.RC0 = 0; PORTCbits.RC1 = 0

5.20.2 Function Documentation

5.20.2.1 void calibratePanTilt (Direction *reference*)

Function: calibratePanTilt(Direction reference)

Include: PanTilt.h

Description: Calibrates the pan tile mechanism offset so that any future reference to move to the reference value specified in the function call will move the pan tilt back to the current position.

Arguments: reference - A struct containing the azimuth and inclinaion you wish to define as this position.

Returns: None

5.20.2.2 void calibratePanTiltRange (Direction *reference*)

Function: calibratePanTiltRange(Direction reference)

Include: PanTilt.h

Description: Calibrates the pan tile mechanism's range so that any future reference to move to the reference value specified in the function call will move the pan tilt back to the current position.

Arguments: reference - A struct containing the azimuth and inclinaion you wish to define as this position.

Returns: None

5.20.2.3 void configureBase (void)

Function: configureBase(void)

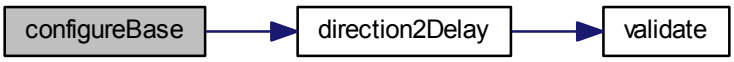
Include: PanTilt.h

Description: Configures the Pan Tilt mechanism for operation

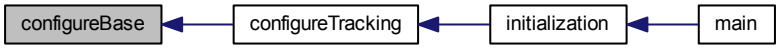
Arguments: None

Returns: None

Here is the call graph for this function:



Here is the caller graph for this function:



5.20.2.4 static Direction delay2Direction (Delay *dly*) [static]

Function: direction2Delay(DirectionState dir)

Include: Local to PanTilt.c

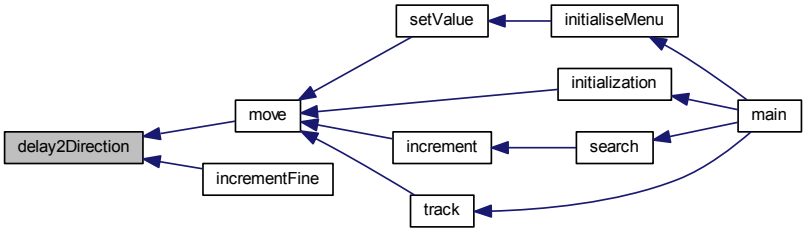
Description: Converts an azimuth and inclination direction into a pwm period

Arguments: dir - Locally defined struct containing the desired Azimuth and Inclination

Returns: Delay - The required PDM delay to move the servos to the given direction

Remark: This function relies on the ARC_RANGE macro being set correctly. This should hold the value of the maximum angle that the servos can be commanded

Here is the caller graph for this function:



5.20.2.5 static Delay direction2Delay (Direction *dir*) [static]

Function: direction2Delay(DirectionState dir)

Include: Local to PanTilt.c

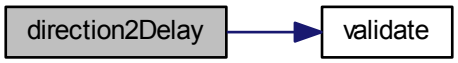
Description: Converts an azimuth and inclination direction into a pwm period

Arguments: dir - Locally defined struct containing the desired Azimuth and Inclination

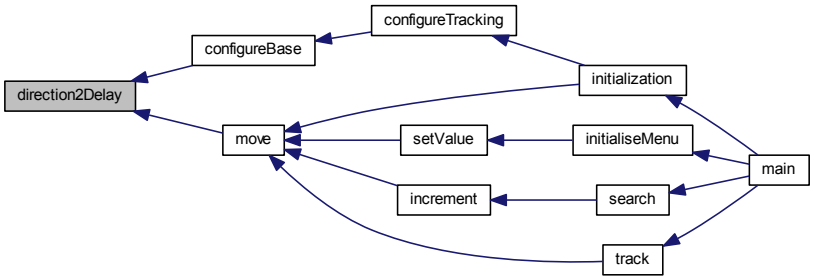
Returns: Delay - The required PDM delay to move the servos to the given direction

Remark: This function relies on the ARC_RANGE macro being set correctly. This should hold the value of the maximum angle that the servos can be commanded

Here is the call graph for this function:



Here is the caller graph for this function:



5.20.2.6 Direction getDir (void)

Function: getDir(void)

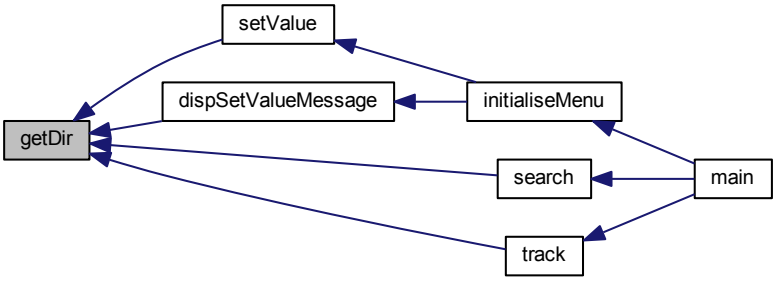
Include: PanTilt.h

Description: returns the current position of the pan tilt mechanism

Arguments: None

Returns: A struct containing the azimuth and inclination

Here is the caller graph for this function:



5.20.2.7 char getMaxAzimuthAngle (void)

Function: getMaxAzimuthAngle(void)

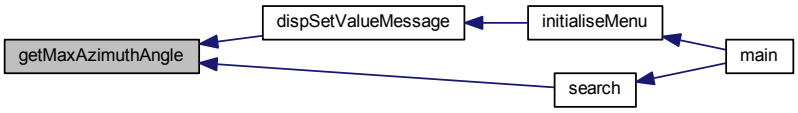
Include: PanTilt.h

Description: returns the maximum angle of the azimuth servo

Arguments: None

Returns: A char with the maximum azimuth angle.

Here is the caller graph for this function:



5.20.2.8 char getMaxElevationAngle (void)

Function: getMaxElevationAngle(void)

Include: PanTilt.h

Description: returns the maximum angle of the elevation servo

Arguments: None

Returns: A char with the maximum elevation angle.

Here is the caller graph for this function:

5.20.2.9 char getMinAzimuthAngle (void)

Function: getMinAzimuthAngle(void)

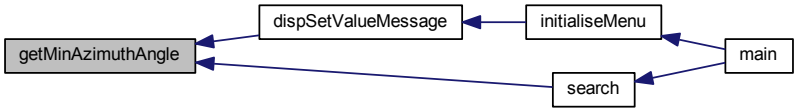
Include: PanTilt.h

Description: returns the minimum angle of the azimuth servo

Arguments: None

Returns: A char with the minimum azimuth angle.

Here is the caller graph for this function:



5.20.2.10 char getMinElevationAngle (void)

Function: getMinElevationAngle(void)

Include: PanTilt.h

Description: returns the minimum angle of the elevation servo

Arguments: None

Returns: A char with the minimum elevation angle.

Here is the caller graph for this function:

5.20.2.11 void increment (Direction *difference*)

Function: increment(Direction difference)

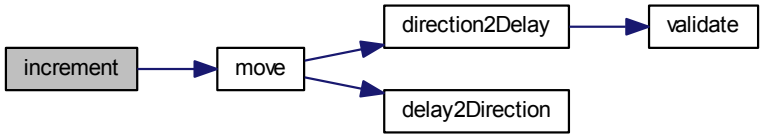
Include: PanTilt.h

Description: Moves the pan tilt actuator to the specified destination

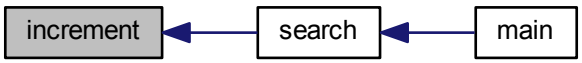
Arguments: destionation - A struct containing the desired azimuth and inclination

Returns: None

Here is the call graph for this function:



Here is the caller graph for this function:



5.20.2.12 void incrementFine (Direction *difference*)

Function: incrementFine(Direction difference)

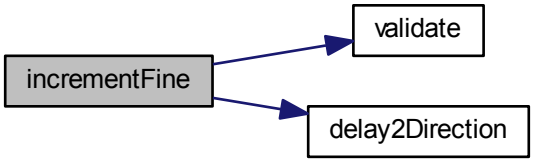
Include: PanTilt.h

Description: Moves the pan tilt actuator to the specified (Relative) destination

Arguments: destionation - A struct containing the desired azimuth and inclination

Returns: None

Here is the call graph for this function:



5.20.2.13 void move (Direction *destination*)

Function: move(Direction destination)

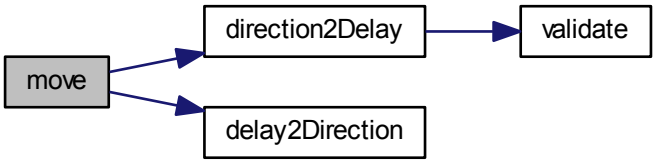
Include: PanTilt.h

Description: Moves the pan tilt actuator to the specified destination

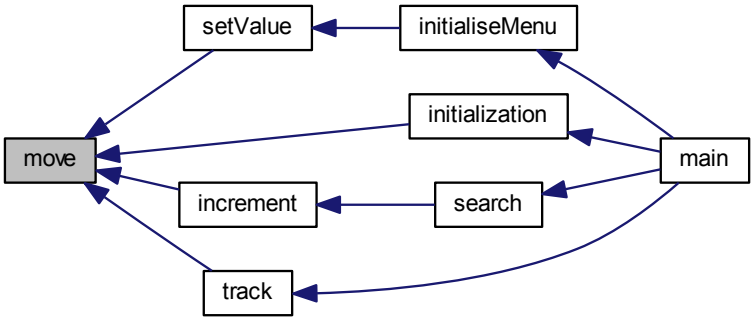
Arguments: destionation - A struct containing the desired azimuth and inclination

Returns: None

Here is the call graph for this function:



Here is the caller graph for this function:



5.20.2.14 void panTiltISR (void)

Function: panTiltISR(void)

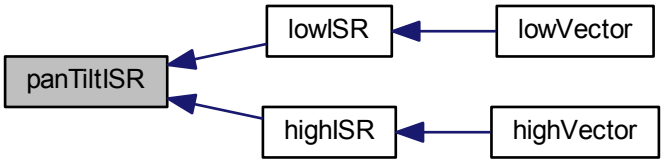
Include: PanTilt.h

Description: Acts as the ISR for the PanTilt module

Arguments: None

Returns: None

Here is the caller graph for this function:



5.20.2.15 Direction rawDir (void)

Function: rawDir(void)

Include: PanTilt.h

Description: returns the current PanTile position without calibrating

Arguments: None

Returns: The position of the pan tilt without any calibration

5.20.2.16 void setMaxAzimuthAngle (char *p_angle*)

Function: setMaxAzimuthAngle(void)

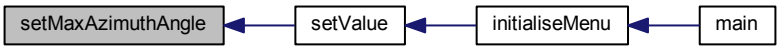
Include: PanTilt.h

Description: sets the maximum angle of the azimuth servo

Arguments: The maximum angle (as char) to set for the azimuth servo

Returns: None.

Here is the caller graph for this function:



5.20.2.17 void setMaxElevationAngle (char *p_angle*)

Function: setMaxElevationAngle(void)

Include: PanTilt.h

Description: sets the maximum angle of the elevation servo

Arguments: The maximum angle (as char) to set for the elevation servo

Returns: None.

Here is the caller graph for this function:

5.20.2.18 void setMinAzimuthAngle (char *p_angle*)

Function: setMinAzimuthAngle(void)

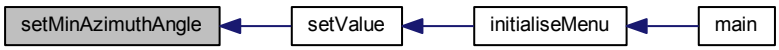
Include: PanTilt.h

Description: sets the minimum angle of the azimuth servo

Arguments: The minimum angle (as char) to set for the azimuth servo

Returns: None.

Here is the caller graph for this function:



5.20.2.19 void setMinElevationAngle (char *p_angle*)

Function: setMinElevationAngle(void)

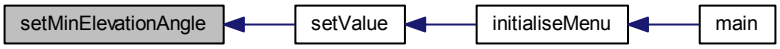
Include: PanTilt.h

Description: sets the minimum angle of the elevation servo

Arguments: The minimum angle (as char) to set for the elevation servo

Returns: None.

Here is the caller graph for this function:



5.20.2.20 char updated (void)

Function: updated(void)

Include: PanTilt.h

Description: returns true if the last move or increment or incrementFine function has taken effect. The new direction is only loaded in at the end of the PDM, so it could take up to 0.02 seconds for the change to take effect.

Arguments: delay - a pointer to the delay variable

Returns: None

5.20.2.21 static void validate (unsigned int * *delay*) [static]

Function: validate(unsigned int *delay)

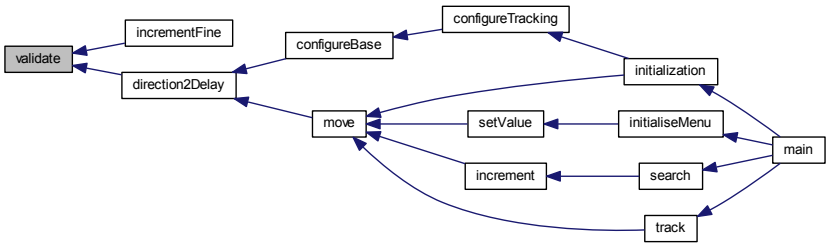
Include: Local to PanTilt.c

Description: Limits the duration of the PDM to between 1000us and 2000us

Arguments: delay - a pointer to the delay variable

Returns: None

Here is the caller graph for this function:



5.20.3 Variable Documentation

5.20.3.1 Direction arcRange = { 94, 103 } [static]

5.20.3.2 signed char azimuth_angle_max [static]

5.20.3.3 signed char azimuth_angle_min [static]

5.20.3.4 Direction calibration_offset = { 0, 3 } [static]

5.20.3.5 volatile char changed = 0 [static]

5.20.3.6 Direction current_direction [static]

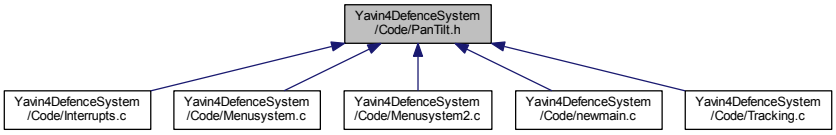
5.20.3.7 signed char elevation_angle_max [static]

5.20.3.8 signed char elevation_angle_min [static]

5.20.3.9 Delay global_delay [static]

5.21 Yavin4DefenceSystem/Code/PanTilt.h File Reference

This graph shows which files directly or indirectly include this file:



Macros

- #define PAN_TILT_ISR CCP2_INT
- #define PANTILT_H

Functions

- void configureBase (void)
- void move (Direction destination)
- void increment (Direction difference)
- void incrementFine (Direction difference)
- Direction getDir (void)
- void calibratePanTilt (Direction reference)
- void calibratePanTiltRange (Direction reference)
- Direction rawDir (void)
- char updated (void)
- void panTiltISR (void)
- char getMaxAzimuthAngle (void)
- char getMinAzimuthAngle (void)
- char getMaxElevationAngle (void)
- char getMinElevationAngle (void)
- void setMaxAzimuthAngle (char p_angle)
- void setMinAzimuthAngle (char p_angle)
- void setMaxElevationAngle (char p_angle)
- void setMinElevationAngle (char p_angle)

5.21.1 Macro Definition Documentation

5.21.1.1 #define PAN_TILT_ISR CCP2_INT

File: PanTilt.h Author: Grant

Description: This file contains the public interface for the PanTile module

Created on 16 September 2014, 6:33 PM

5.21.1.2 #define PANTILT_H

5.21.2 Function Documentation

5.21.2.1 void calibratePanTilt (Direction *reference*)

Function: calibratePanTilt(Direction reference)

Include: PanTilt.h

Description: Calibrates the pan tile mechanism offset so that any future reference to move to the reference value specified in the function call will move the pan tilt back to the current position.

Arguments: reference - A struct containing the azimuth and inclinaion you wish to define as this position.

Returns: None

5.21.2.2 void calibratePanTiltRange (Direction *reference*)

Function: calibratePanTiltRange(Direction reference)

Include: PanTilt.h

Description: Calibrates the pan tile mechanism's range so that any future reference to move to the reference value specified in the function call will move the pan tilt back to the current position.

Arguments: reference - A struct containing the azimuth and inclinaion you wish to define as this position.

Returns: None

5.21.2.3 void configureBase (void)

Function: configureBase(void)

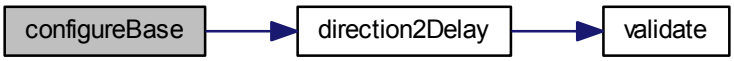
Include: PanTilt.h

Description: Configures the Pan Tilt mechanism for operation

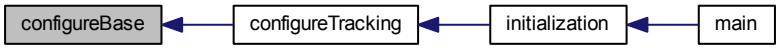
Arguments: None

Returns: None

Here is the call graph for this function:



Here is the caller graph for this function:



5.21.2.4 Direction getDir (void)

Function: getDir(void)

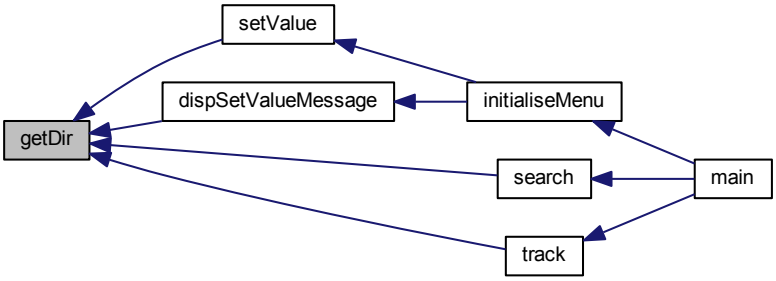
Include: PanTilt.h

Description: returns the current position of the pan tilt mechanism

Arguments: None

Returns: A struct containing the azimuth and inclination

Here is the caller graph for this function:



5.21.2.5 char getMaxAzimuthAngle (void)

Function: getMaxAzimuthAngle(void)

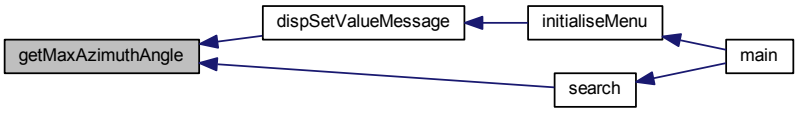
Include: PanTilt.h

Description: returns the maximum angle of the azimuth servo

Arguments: None

Returns: A char with the maximum azimuth angle.

Here is the caller graph for this function:



5.21.2.6 char getMaxElevationAngle (void)

Function: getMaxElevationAngle(void)

Include: PanTilt.h

Description: returns the maximum angle of the elevation servo

Arguments: None

Returns: A char with the maximum elevation angle.

Here is the caller graph for this function:

5.21.2.7 char getMinAzimuthAngle (void)

Function: getMinAzimuthAngle(void)

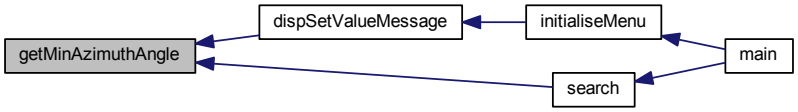
Include: PanTilt.h

Description: returns the minimum angle of the azimuth servo

Arguments: None

Returns: A char with the minimum azimuth angle.

Here is the caller graph for this function:



5.21.2.8 char getMinElevationAngle (void)

Function: getMinElevationAngle(void)

Include: PanTilt.h

Description: returns the minimum angle of the elevation servo

Arguments: None

Returns: A char with the minimum elevation angle.

Here is the caller graph for this function:

5.21.2.9 void increment (Direction *difference*)

Function: increment(Direction difference)

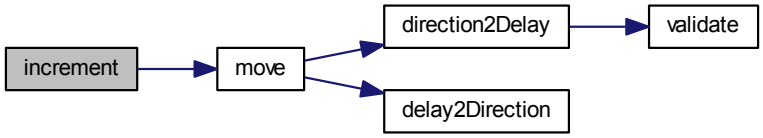
Include: PanTilt.h

Description: Moves the pan tilt actuator to the specified destination

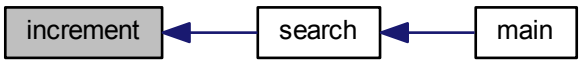
Arguments: destionation - A struct containing the desired azimuth and inclination

Returns: None

Here is the call graph for this function:



Here is the caller graph for this function:



5.21.2.10 void incrementFine (Direction *difference*)

Function: incrementFine(Direction difference)

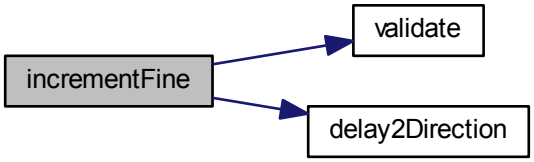
Include: PanTilt.h

Description: Moves the pan tilt actuator to the specified (Relative) destination

Arguments: destionation - A struct containing the desired azimuth and inclination

Returns: None

Here is the call graph for this function:



5.21.2.11 void move (Direction *destination*)

Function: move(Direction destination)

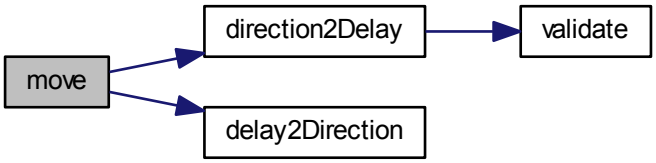
Include: PanTilt.h

Description: Moves the pan tilt actuator to the specified destination

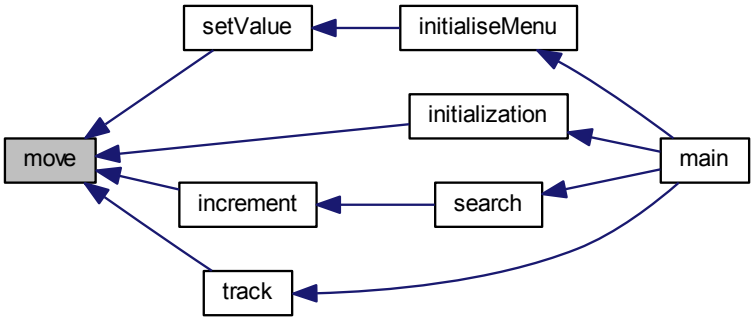
Arguments: destionation - A struct containing the desired azimuth and inclination

Returns: None

Here is the call graph for this function:



Here is the caller graph for this function:



5.21.2.12 void panTiltISR (void)

Function: panTiltISR(void)

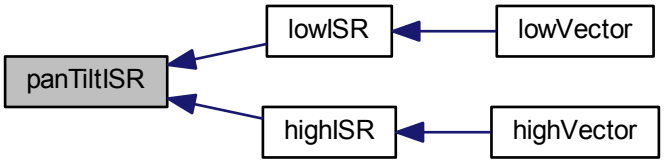
Include: PanTilt.h

Description: Acts as the ISR for the PanTilt module

Arguments: None

Returns: None

Here is the caller graph for this function:



5.21.2.13 Direction rawDir (void)

Function: rawDir(void)

Include: PanTilt.h

Description: returns the current PanTile position without calibrating

Arguments: None

Returns: The position of the pan tilt without any calibration

5.21.2.14 void setMaxAzimuthAngle (char *p_angle*)

Function: setMaxAzimuthAngle(void)

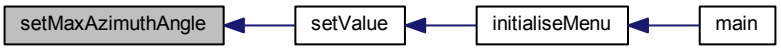
Include: PanTilt.h

Description: sets the maximum angle of the azimuth servo

Arguments: The maximum angle (as char) to set for the azimuth servo

Returns: None.

Here is the caller graph for this function:



5.21.2.15 void setMaxElevationAngle (char *p_angle*)

Function: setMaxElevationAngle(void)

Include: PanTilt.h

Description: sets the maximum angle of the elevation servo

Arguments: The maximum angle (as char) to set for the elevation servo

Returns: None.

Here is the caller graph for this function:

5.21.2.16 void setMinAzimuthAngle (char *p_angle*)

Function: setMinAzimuthAngle(void)

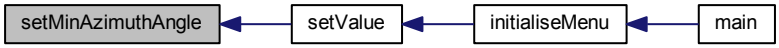
Include: PanTilt.h

Description: sets the minimum angle of the azimuth servo

Arguments: The minimum angle (as char) to set for the azimuth servo

Returns: None.

Here is the caller graph for this function:



5.21.2.17 void setMinElevationAngle (char *p_angle*)

Function: setMinElevationAngle(void)

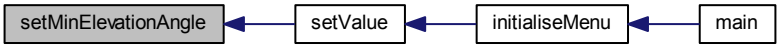
Include: PanTilt.h

Description: sets the minimum angle of the elevation servo

Arguments: The minimum angle (as char) to set for the elevation servo

Returns: None.

Here is the caller graph for this function:



5.21.2.18 char updated (void)

Function: updated(void)

Include: PanTilt.h

Description: returns true if the last move or increment or incrementFine function has taken effect. The new direction is only loaded in at the end of the PDM, so it could take up to 0.02 seconds for the change to take effect.

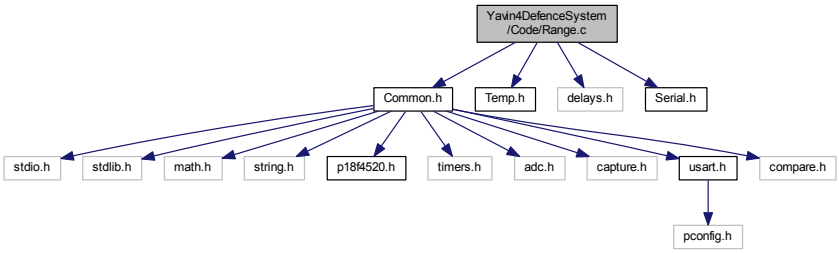
Arguments: delay - a pointer to the delay variable

Returns: None

5.22 Yavin4DefenceSystem/Code/Range.c File Reference

```
#include "Common.h"
#include "Temp.h"
#include <delays.h>
#include "Serial.h"
```

Include dependency graph for Range.c:



Macros

- #define IR_CONV(ad) ((unsigned long)135174 / (ad) - 28)

  Converts AD reading into IR range.
- #define ULTRA_CONV(tme, T) DIV_65536(tme ∗ (unsigned long)(DIV_65536((unsigned long)519078 ∗ T) + (unsigned long)4362)) - 18
- #define INIT_PIN PORTCbits.RC3
- #define INIT_TRIS TRISCbits.RC3
- #define CCP1_INPT TRISCbits.RC2
- #define range_IR sumIR
- #define range_US sumUS

Functions

- static void transRange (unsigned int us, unsigned int ir)
- static void beginUS (void)
- static unsigned int rangeUS (unsigned char temp)
- static unsigned int fuseRange (unsigned int us, unsigned int ir)
- void configureRange (void)
- unsigned int range (void)

  Samples the range.
- void configureAD (void)
- void rangeISR (void)
- unsigned int rangeUltrasonic (void)
- void calibrateRange (unsigned int reference)
- unsigned int rawRangeIR (void)
- unsigned int rawRangeUS (void)
- unsigned int getLastRange (void)

  Samples the range.
- TargetState getTargetState (void)
- TargetState readTargetState (void)
- int getMaxRange (void)
- int getMinRange (void)
- void setMaxRange (int range)
- void setMinRange (int range)
- void setNumSamples (char samples)
- char getNumSamples ()
- void setUsSampleRate (char sampleRate)
- char getUsSampleRate ()

Variables

- static volatile char measuringUS = 0
- static int m_minRange = 300
- static int m_maxRange = 1000
- static unsigned int lastRange = 0
- static unsigned int lastUSRange = 0
- static unsigned int lastIRRange = 0
- static signed int calibration_offset_IR = 0
- static signed int calibration_offset_US = 0
- static char numSamples = 1
- static unsigned char rateUS = 15
- static unsigned int rateIR = 200
- static TargetState current_target_state
- static volatile unsigned int ccp_value

5.22.1 Macro Definition Documentation

5.22.1.1 #define CCP1_INPT TRISCbits.RC2

5.22.1.2 #define INIT_PIN PORTCbits.RC3

5.22.1.3 #define INIT_TRIS TRISCbits.RC3

5.22.1.4 #define IR_CONV(*ad*) ((unsigned long)135174 / (ad) - 28)

Converts AD reading into IR range.

5.22.1.5 #define range_IR sumIR

5.22.1.6 #define range_US sumUS

5.22.1.7 #define ULTRA_CONV(*tme, T*) DIV_65536(tme * (unsigned long)(DIV_65536((unsigned long)519078 * T) + (unsigned long)4362)) - 18

Converts a time delay (in clock cycles) and a temperature into an ultrasonic distance Uses a linear appoximation of the speed of sound to temperature relation, which changes the gradient of the Ultrasonic calibration

5.22.2 Function Documentation

5.22.2.1 static void beginUS (void) [static]

Function: beginUS(void)

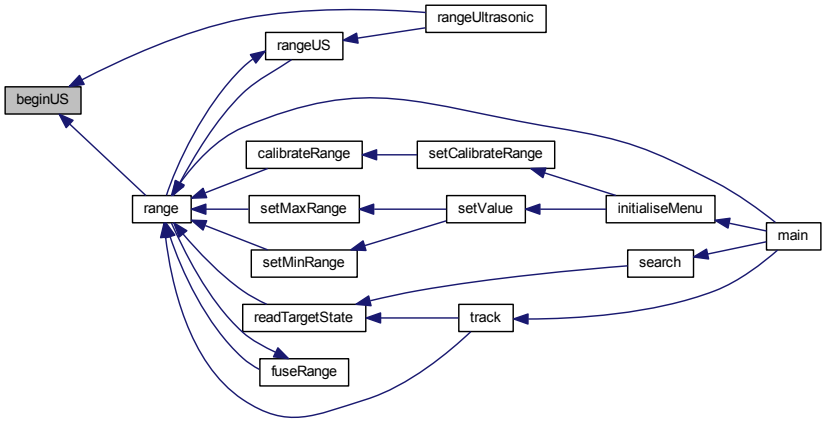
Include: ultrasonic.h

Description: starts a scan on the ultrasonic sensor

Arguments: None

Returns: None

Here is the caller graph for this function:



5.22.2.2 void calibrateRange (unsigned int *reference*)

Function: calibrateRange(unsigned int reference)

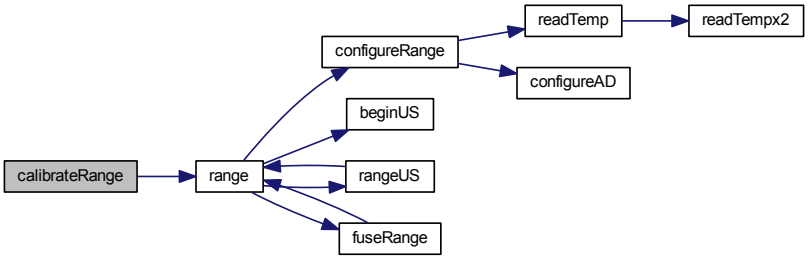
Include:

Description: Calibrates the range of both the IR and ultrasonic sensors based on a given range.

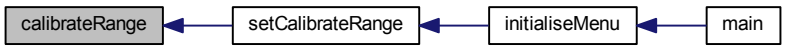
Arguments: reference - The distance in mm to calibrate the current measurements from

Returns: None

Here is the call graph for this function:



Here is the caller graph for this function:



5.22.2.3 void configureAD (void)

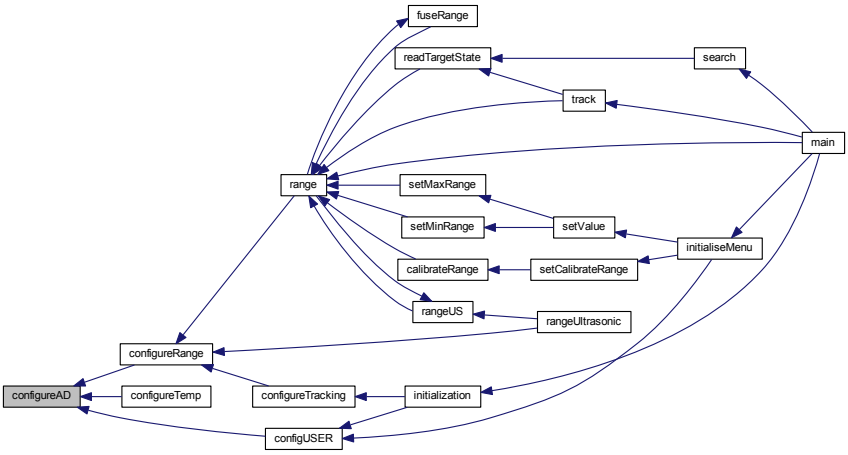
Function: configureAD(void)

Include: Range.h

Description: Configures the ADC, In ADCON1, we set right-justified mode, and select AN0 as the input channel. In ADCON0, we set a sample rate of Fosc/8, select AN0, and enable the ADC. Arguments: None

Returns: None

Here is the caller graph for this function:



5.22.2.4 void configureRange (void)

Function: configureRange(void)

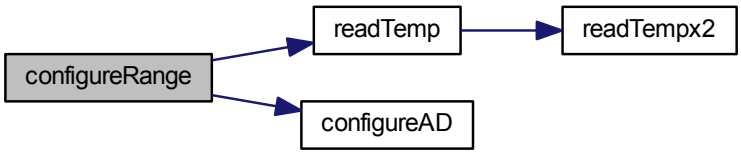
Include: Range.h

Description: Configures the Range module

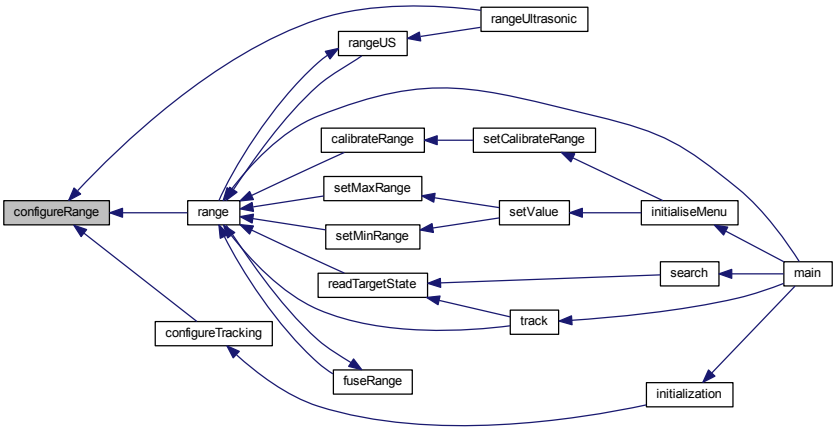
Arguments: None

Returns: None

Here is the call graph for this function:



Here is the caller graph for this function:



5.22.2.5 static unsigned int fuseRange (unsigned int *us*, unsigned int *ir*) [static]

Function: fuseRange(unsigned int us, unsigned int ir)

Include: Range.h

Description: Fuses the IR and Ultrasonic ranges, and sets the target state

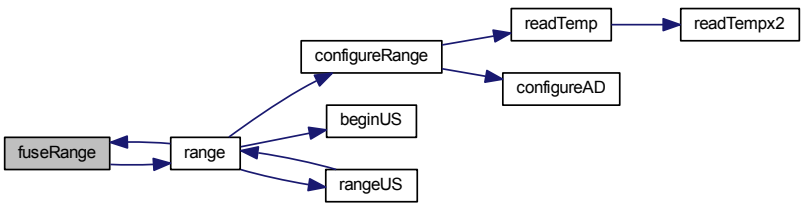
Arguments: us - the Ultrasonic range (mm) ir - the IR range (mm)

Returns: the fused range

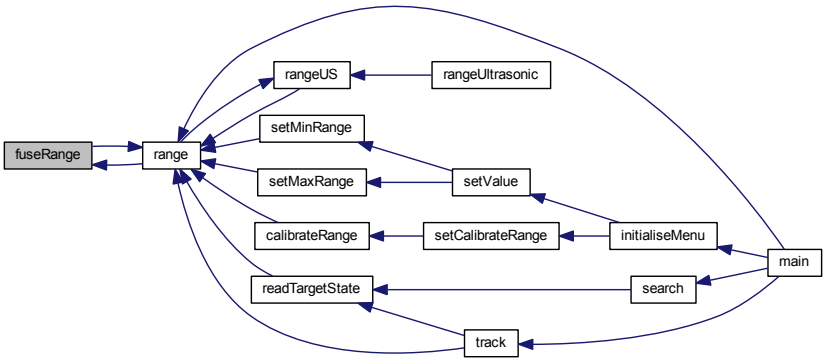
Note: Also sets the current target state based on the reading from both the IR and ultrsonic sensors Implement IR in here a little?

: Report Error?

Here is the call graph for this function:



Here is the caller graph for this function:



5.22.2.6 unsigned int getLastRange (void)

Samples the range.

Function: getLastRange(void)

Include: Range.h

Description: Returns the last range sample, so the data can be used without re-sampling the range finding sensors

Arguments: None

Returns: the last Range sample data

5.22.2.7 int getMaxRange (void)

Function: getMaxRange()

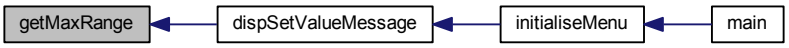
Include: Range.h

Description: Gets the maximum range of the device

Arguments:

Returns: The max range in mm

Here is the caller graph for this function:



5.22.2.8 int getMinRange (void)

Function: getMinRange()

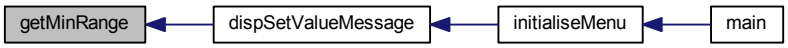
Include: Range.h

Description: Gets the minimum range of the device

Arguments:

Returns: The min range in mm

Here is the caller graph for this function:



5.22.2.9 char getNumSamples ( )

Function: getNumSamples()

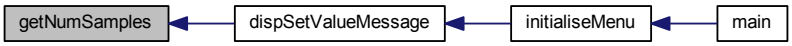
Include: Range.h

Description: Gets the number of samples per range estimate

Arguments: None

Returns: The number of samples

Here is the caller graph for this function:



5.22.2.10 TargetState getTargetState (void)

Function: getTargetState(void)

Include: Range.h

Description: Returns the target state from the last range reading. E.g. Good track, or direction not quite correct as US returned, but IR didn't and was within IR range etc.

Arguments: None

Returns: the target state

5.22.2.11 char getUsSampleRate ( )

Function: getUsSampleRate()

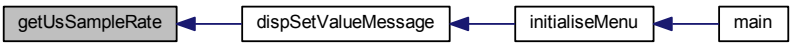
Include: Range.h

Description: Gets the sampling rate of the ultrasonic sensor

Arguments:

Returns: The sampling rate (In Hz)

Here is the caller graph for this function:



5.22.2.12 unsigned int range (void)

Samples the range.

Function: range(void)

Include: Range.h

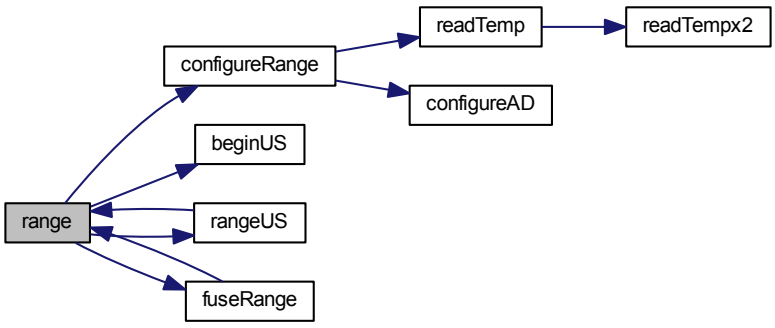
Description: Takes a number of samples of the ultrasonic sensor at a specified rate. Continues to sample the IR sensor at a different rate while sampling the ultrasonic. Then combines the ranges and sets the target state

Arguments: None

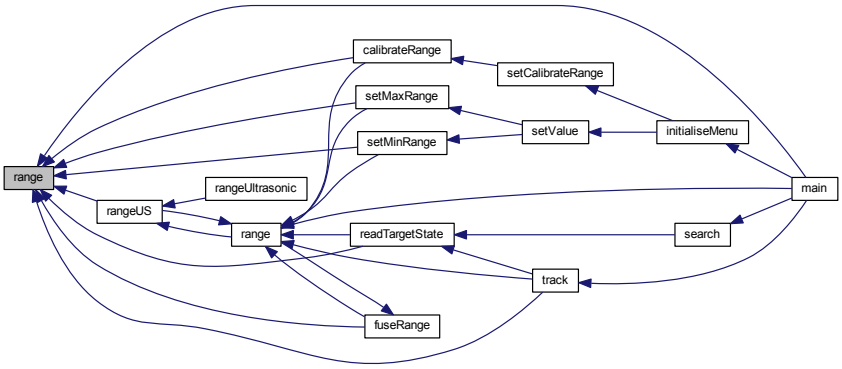
Returns: the range Standard room temperature for now

Todo Read in temperature for US calculation

Here is the call graph for this function:



Here is the caller graph for this function:



5.22.2.13 void rangeISR (void)

Function: rangeISR(void)

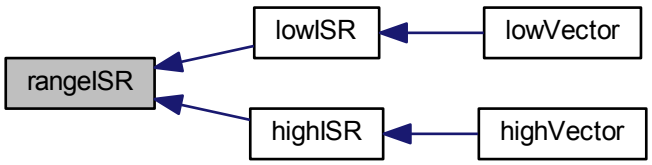
Include: range.h

Description: Called when an range related interrupt is fired, acts as the service routine for the rangefinding module.

Arguments: None

Returns: None

Here is the caller graph for this function:



5.22.2.14 unsigned int rangeUltrasonic (void)

Function: rangeUltrasonic(void)

Include:

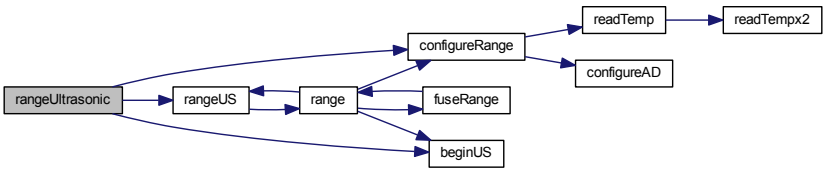
Description: performs an ultrasonic range reading. Pins:

Arguments: None

Returns: the average of the samples

todo remove this function?

Here is the call graph for this function:



5.22.2.15 static unsigned int rangeUS (unsigned char *temp*) [static]

Function: rangeUS(unsigned char temp)

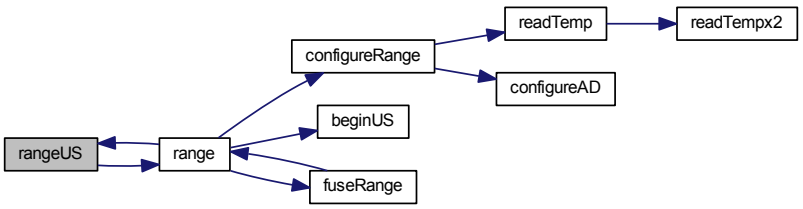
Include: ultrasonic.h

Description: Returns the result of the ultrasonic read (zero if no target found). Will poll until measurement is complete.

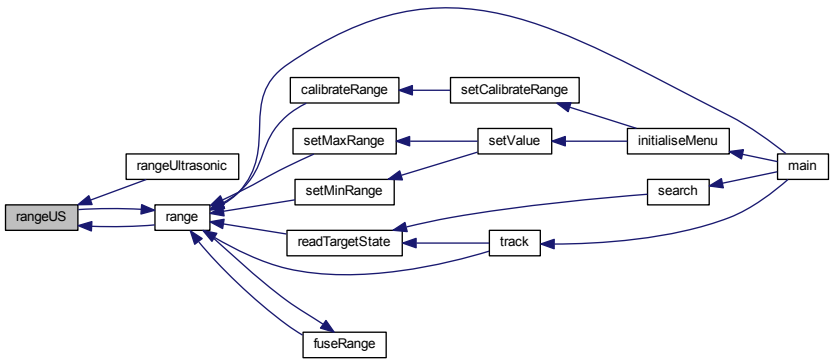
Arguments: tempx2 - 2x the temperature in deg Celsius

Returns: Distance in mm (unsigned int)

Here is the call graph for this function:



Here is the caller graph for this function:



5.22.2.16 unsigned int rawRangeIR (void)

Function: rawRangeIR(void)

Include: Range.h

Description: Returns the last IR range reading

Arguments: None

Returns: the range in mm

Here is the caller graph for this function:

5.22.2.17 unsigned int rawRangeUS (void)

Function: rawRangeUS(void)

Include: Range.h

Description: Returns the last US range reading

Arguments: None

Returns: the range in mm

Here is the caller graph for this function:

5.22.2.18 TargetState readTargetState (void)

Function: readTargetState(void)

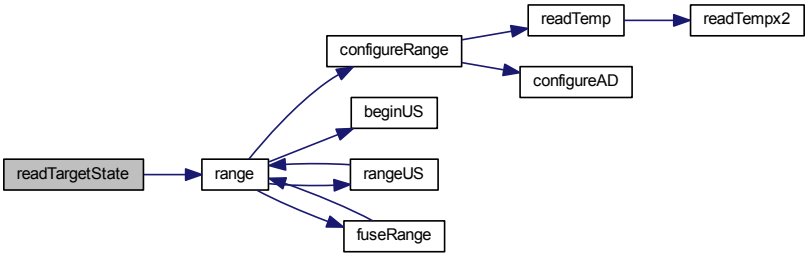
Include: Range.h

Description: Does the same thing as getTargetState, but actually performs a range() read

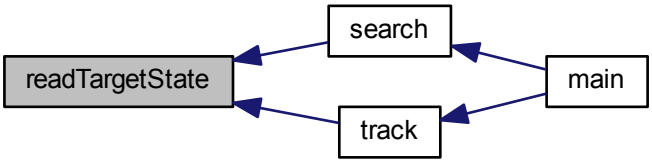
Arguments: None

Returns: the target state

Here is the call graph for this function:



Here is the caller graph for this function:



5.22.2.19 void setMaxRange (int *range*)

Function: setMaxRange()

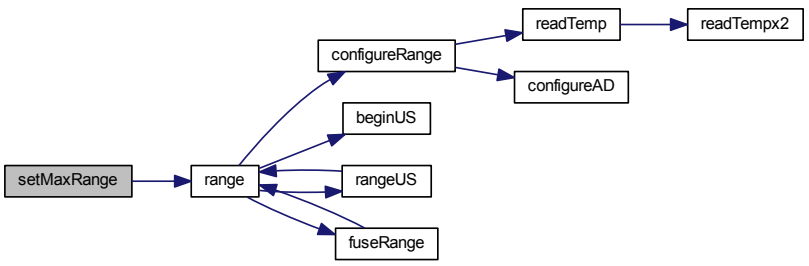
Include: Range.h

Description: Sets the maximum range of the device

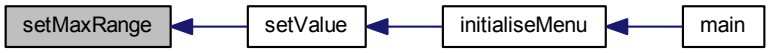
Arguments: range - The max range to set in mm

Returns: N/A

Here is the call graph for this function:



Here is the caller graph for this function:



5.22.2.20 void setMinRange (int *range*)

Function: setMinRange()

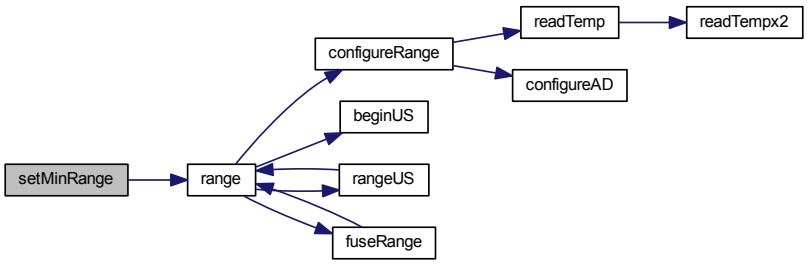
Include: Range.h

Description: Sets the minimum range of the device

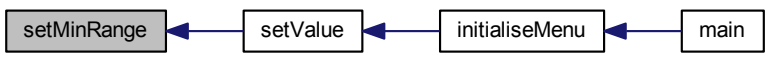
Arguments: range - The max range to set in mm

Returns: N/A

Here is the call graph for this function:



Here is the caller graph for this function:



5.22.2.21 void setNumSamples (char *samples*)

Function: setNumSamples()

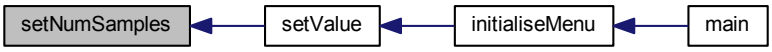
Include: Range.h

Description: sets the number of samples per range estimage

Arguments: the number of samples

Returns: None

Here is the caller graph for this function:



5.22.2.22 void setUsSampleRate (char *sampleRate*)

Function: setUsSampleRate(char sampleRate)

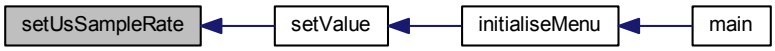
Include: Range.h

Description: Sets the ultrasonic sampling rate

Arguments: the sampling rate in Hz

Returns: None

Here is the caller graph for this function:



5.22.2.23 static void transRange (unsigned int *us,* unsigned int *ir*) [static]

File: Range.c Author: Grant

Description: Contains all the functionality for the range module. All variables and settings concerning the range module including the the max distance, timeouts etc are private to this module. The interface functions allow all valid access to the module.

Duties: -Interface to the IR and Ultrasonic sensors -Read the range from the IR and ultrasonic sensors -Fuse distances from the IR and ultrasonic sensors -Calibrate the IR and ultrasonic sensors

Functions:

Created on 15 September 2014, 11:27 AM

5.22.3 Variable Documentation

5.22.3.1 signed int calibration_offset_IR = 0 [static]

5.22.3.2 signed int calibration_offset_US = 0 [static]

5.22.3.3 volatile unsigned int ccp_value [static]

5.22.3.4 TargetState current_target_state [static]

5.22.3.5 unsigned int lastIRRange = 0 [static]

5.22.3.6 unsigned int lastRange = 0 [static]

5.22.3.7 unsigned int lastUSRange = 0 [static]

5.22.3.8 int m_maxRange = 1000 [static]

5.22.3.9 int m_minRange = 300 [static]

5.22.3.10 volatile char measuringUS = 0 [static]

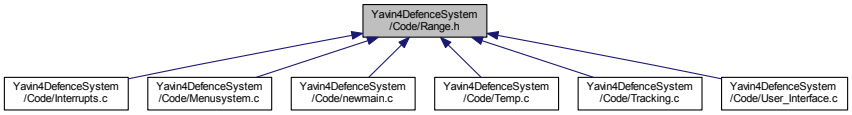
5.22.3.11 char numSamples = 1 [static]

5.22.3.12 unsigned int rateIR = 200 [static]

5.22.3.13 unsigned char rateUS = 15 [static]

5.23 Yavin4DefenceSystem/Code/Range.h File Reference

This graph shows which files directly or indirectly include this file:



Macros

- #define RANGE_INT CCP1_INT | TMR1_INT
- #define RANGE_H

Functions

- void configureRange (void)
- void configureAD (void)
- unsigned int range (void)

  Samples the range.
- unsigned int lastRange (void)

  Samples the range.
- void rangeISR (void)
- void calibrateRange (signed int distance)
- unsigned int rawRangeIR (void)
- unsigned int rawRangeUS (void)
- TargetState getTargetState (void)
- TargetState readTargetState (void)
- void setMaxRange (int range)
- void setMinRange (int range)
- int getMaxRange (void)

- int getMinRange (void)
- char getUsSampleRate ()
- void setUsSampleRate (char samples)
- char getNumSamples ()
- void setNumSamples (char sampleRate)

5.23.1 Macro Definition Documentation

5.23.1.1 #define RANGE_H

5.23.1.2 #define RANGE_INT CCP1_INT | TMR1_INT

File: Range.h Author: Grant

Description: Contains the public interface for the ultrasonic module. This file contains all the external declarations, macros and global variables for using and Interfacing with the Range module.

Created on 15 September 2014, 11:24 AM

5.23.2 Function Documentation

5.23.2.1 void calibrateRange (signed int *distance*)

Function: calibrateRange(unsigned int reference)

Include:

Description: Calibrates the range of both the IR and ultrasonic sensors based on a given range.

Arguments: reference - The distance in mm to calibrate the current measurements from

Returns: None

5.23.2.2 void configureAD (void)

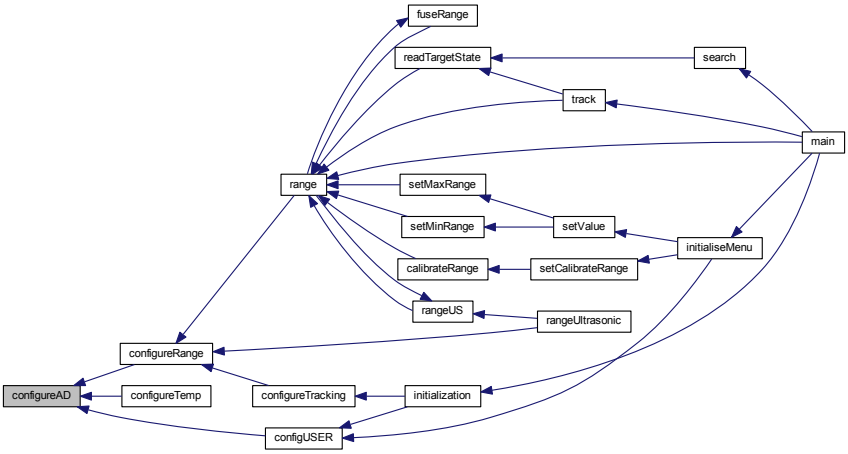
Function: configureAD(void)

Include: Range.h

Description: Configures the ADC, In ADCON1, we set right-justified mode, and select AN0 as the input channel. In ADCON0, we set a sample rate of Fosc/8, select AN0, and enable the ADC. Arguments: None

Returns: None

Here is the caller graph for this function:



5.23.2.3 void configureRange (void)

Function: configureRange(void)

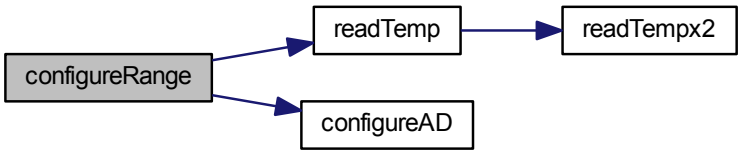
Include: Range.h

Description: Configures the Range module

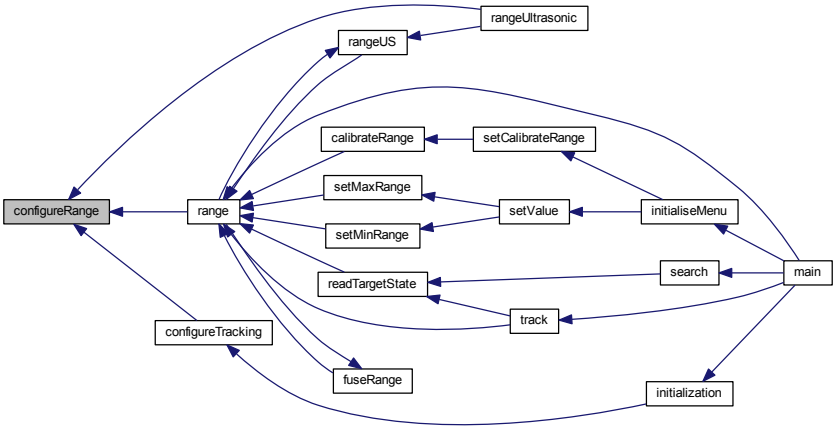
Arguments: None

Returns: None

Here is the call graph for this function:



Here is the caller graph for this function:



5.23.2.4 int getMaxRange (void)

Function: getMaxRange()

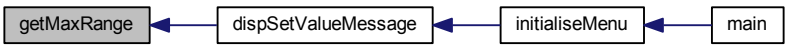
Include: Range.h

Description: Gets the maximum range of the device

Arguments:

Returns: The max range in mm

Here is the caller graph for this function:



5.23.2.5 int getMinRange (void)

Function: getMinRange()

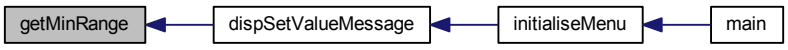
Include: Range.h

Description: Gets the minimum range of the device

Arguments:

Returns: The min range in mm

Here is the caller graph for this function:



5.23.2.6 char getNumSamples ( )

Function: getNumSamples()

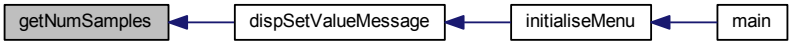
Include: Range.h

Description: Gets the number of samples per range estimate

Arguments: None

Returns: The number of samples

Here is the caller graph for this function:



5.23.2.7 TargetState getTargetState (void)

Function: getTargetState(void)

Include: Range.h

Description: Returns the target state from the last range reading. E.g. Good track, or direction not quite correct as US returned, but IR didn't and was within IR range etc.

Arguments: None

Returns: the target state

5.23.2.8 char getUsSampleRate ( )

Function: getUsSampleRate()

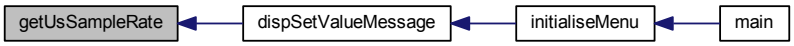
Include: Range.h

Description: Gets the sampling rate of the ultrasonic sensor

Arguments:

Returns: The sampling rate (In Hz)

Here is the caller graph for this function:



5.23.2.9 unsigned int lastRange (void)

Samples the range.

Function: getLastRange(void)

Include: Range.h

Description: Returns the last range sample, so the data can be used without re-sampling the range finding sensors

Arguments: None

Returns: the last Range sample data

5.23.2.10 unsigned int range (void)

Samples the range.

Function: range(void)

Include: Range.h

Description: Takes a number of samples of the ultrasonic sensor at a specified rate. Continues to sample the IR sensor at a different rate while sampling the ultrasonic. Then combines the ranges and sets the target state

Arguments: None

Returns: the range to the target in mm

Function: range(void)

Include: Range.h

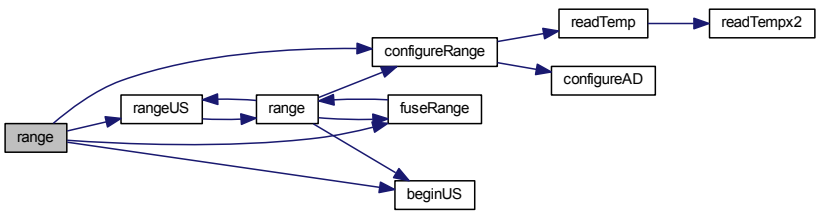
Description: Takes a number of samples of the ultrasonic sensor at a specified rate. Continues to sample the IR sensor at a different rate while sampling the ultrasonic. Then combines the ranges and sets the target state

Arguments: None

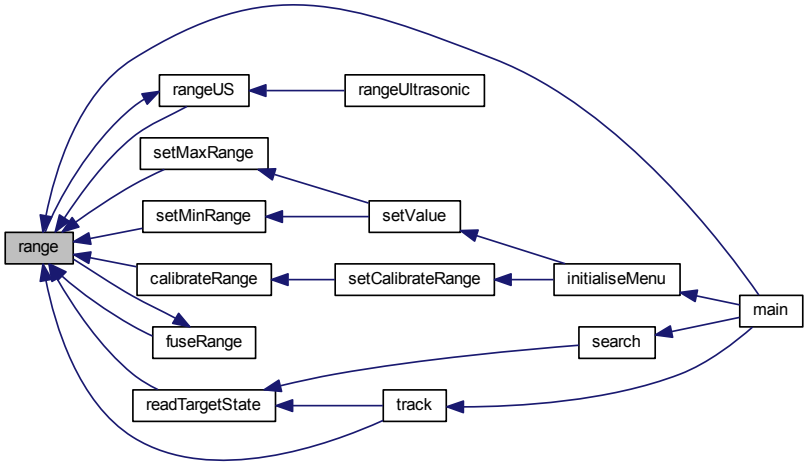
Returns: the range Standard room temperature for now

Todo Read in temperature for US calculation

Here is the call graph for this function:



Here is the caller graph for this function:



5.23.2.11 void rangeISR (void)

Function: rangeISR(void)

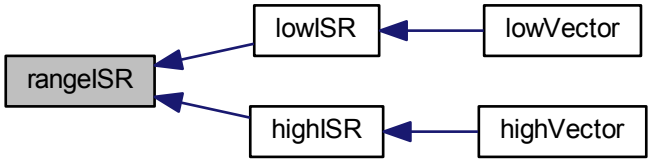
Include: range.h

Description: Called when an range related interrupt is fired, acts as the service routine for the rangefinding module.

Arguments: None

Returns: None

Here is the caller graph for this function:



5.23.2.12 unsigned int rawRangeIR (void)

Function: rawRangeIR(void)

Include: Range.h

Description: Returns the last IR range reading

Arguments: None

Returns: the range in mm

Here is the caller graph for this function:

5.23.2.13 unsigned int rawRangeUS (void)

Function: rawRangeUS(void)

Include: Range.h

Description: Returns the last US range reading

Arguments: None

Returns: the range in mm

Here is the caller graph for this function:

5.23.2.14 TargetState readTargetState (void)

Function: readTargetState(void)

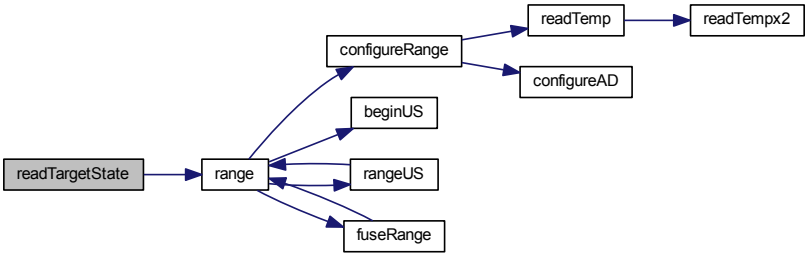
Include: Range.h

Description: Does the same thing as getTargetState, but actually performs a range() read

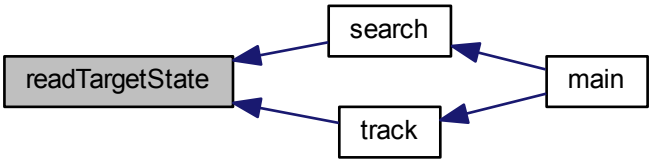
Arguments: None

Returns: the target state

Here is the call graph for this function:



Here is the caller graph for this function:



5.23.2.15 void setMaxRange (int *range*)

Function: setMaxRange()

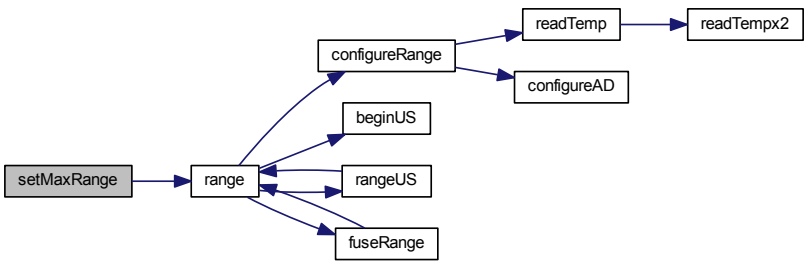
Include: Range.h

Description: Sets the maximum range of the device

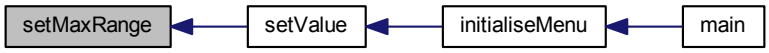
Arguments: range - The max range to set in mm

Returns: N/A

Here is the call graph for this function:



Here is the caller graph for this function:



5.23.2.16 void setMinRange (int *range*)

Function: setMinRange()

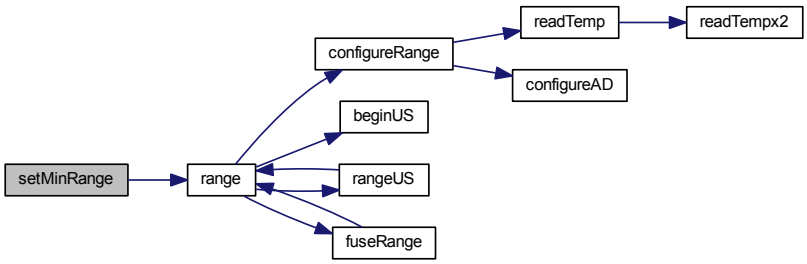
Include: Range.h

Description: Sets the minimum range of the device

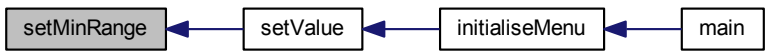
Arguments: range - The max range to set in mm

Returns: N/A

Here is the call graph for this function:



Here is the caller graph for this function:



5.23.2.17 void setNumSamples (char *samples*)

Function: setNumSamples()

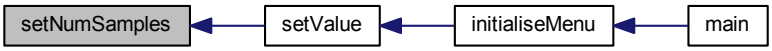
Include: Range.h

Description: sets the number of samples per range estimage

Arguments: the number of samples

Returns: None

Here is the caller graph for this function:



5.23.2.18 void setUsSampleRate (char *sampleRate*)

Function: setUsSampleRate(char sampleRate)

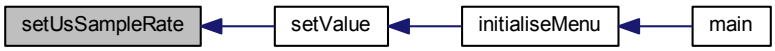
Include: Range.h

Description: Sets the ultrasonic sampling rate

Arguments: the sampling rate in Hz

Returns: None

Here is the caller graph for this function:



5.24 Yavin4DefenceSystem/Code/ROM2RAM.c File Reference

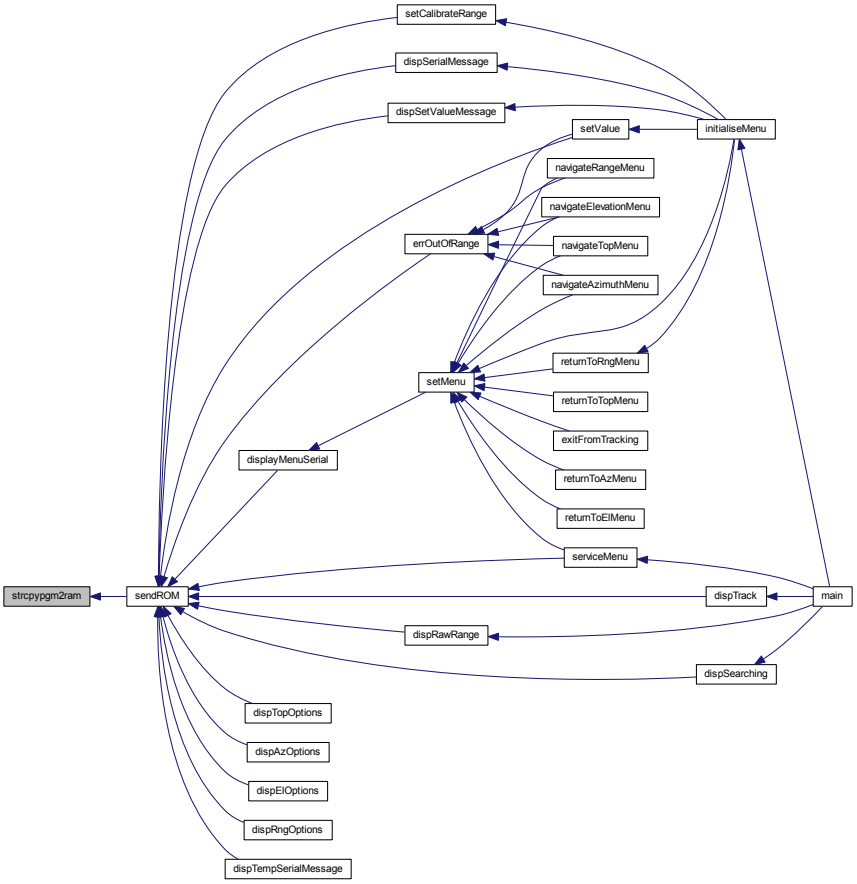
Functions

- char * strcpypgm2ram (auto char *s1, auto const rom char *s2)

5.24.1 Function Documentation

5.24.1.1 char * strcpypgm2ram (auto char * *s1*, auto const rom char * *s2*)

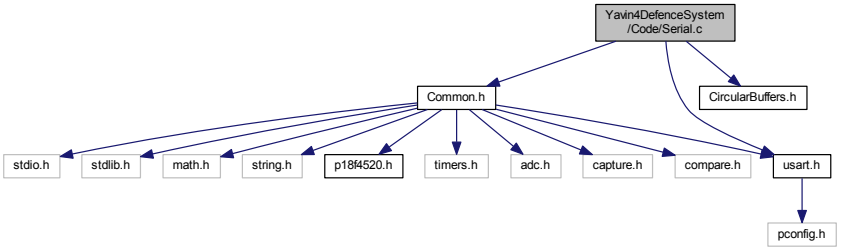
Here is the caller graph for this function:



5.25 Yavin4DefenceSystem/Code/Serial.c File Reference

```
#include "Common.h"
#include <usart.h>
#include "CircularBuffers.h"
```

Include dependency graph for Serial.c:



Macros

- #define TX_INT_CLEAR() PIR1bits.TXIF = 0
- #define RC_INT_CLEAR() PIR1bits.RCIF = 0
- #define TX_INT_ENABLE() TX_INT_CLEAR(); PIE1bits.TXIE = 1
- #define RC_INT_ENABLE() RC_INT_CLEAR(); PIE1bits.RCIE = 1
- #define TX_INT_DISABLE() PIE1bits.TXIE = 0
- #define RC_INT_DISABLE() PIE1bits.RCIE = 0
- #define CR 0x0D
- #define NL 0x0A
- #define ESC 0x1B
- #define TAB 0x09
- #define BS 0x07

Functions

- void configureSerial (void)
- void transmit (char ∗string)
- void transChar (char c)
- char receiveEmpty (void)
- char receivePeek (void)
- char receivePop (void)
- char receiveCR (void)
- char receiveEsc (void)
- void popEsc (void)
- void readString (char ∗string)
- char transmitComplete (void)
- void serialISR (void)
- void clearReceive (void)

Variables

- static volatile circularBuffer receive_buffer
- static volatile circularBuffer transmit_buffer
- static volatile char carriageReturn = 0
- static volatile char escPressed = 0

5.25.1 Macro Definition Documentation

5.25.1.1 #define BS 0x07

5.25.1.2 #define CR 0x0D

5.25.1.3 #define ESC 0x1B

5.25.1.4 #define NL 0x0A

5.25.1.5 #define RC_INT_CLEAR( ) PIR1bits.RCIF = 0

5.25.1.6 #define RC_INT_DISABLE( ) PIE1bits.RCIE = 0

5.25.1.7 #define RC_INT_ENABLE( ) RC_INT_CLEAR(); PIE1bits.RCIE = 1

5.25.1.8 #define TAB 0x09

5.25.1.9 #define TX_INT_CLEAR( ) PIR1bits.TXIF = 0

File: newmain.c Author: Grant

Description: Contains the functionality for the Serial module. All variables and settings concerning the serial module, such as the receive and transmit circular buffers are private to this module. The interface functions allow all valid access to the module.

Duties: -Stores an received characters in the received buffer -Stores any characters to be transmitted -Transmits anything in transmit buffer via interrupts -Accessor functions for using and querying buffers

Functions:

Created on 7 September 2014, 4:12 PM

5.25.1.10 #define TX_INT_DISABLE( ) PIE1bits.TXIE = 0

5.25.1.11 #define TX_INT_ENABLE( ) TX_INT_CLEAR(); PIE1bits.TXIE = 1

5.25.2 Function Documentation

5.25.2.1 void clearReceive (void)

Function: clearReceive(void)

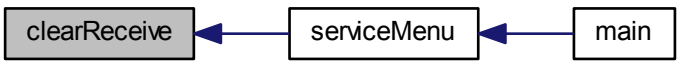
Include: Serial.h

Description: Clears the receive buffer

Arguments: None

Returns: None

Here is the caller graph for this function:



5.25.2.2 void configureSerial (void)

Function: configureSerial(void)

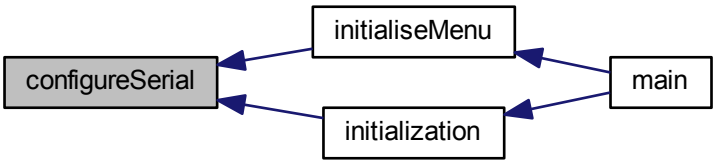
Include: Serial.h

Description: Configures the serial ready for communication

Arguments: None

Returns: None

Here is the caller graph for this function:



5.25.2.3 void popEsc (void)

Function: popEsc(void)

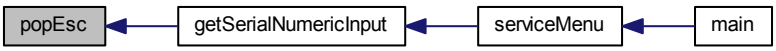
Include:

Description: Processes the Esc command and removes any input before the Esc command.

Arguments: None

Returns: Non-zero if received escape character

Here is the caller graph for this function:



5.25.2.4 void readString (char * *string*)

Function: readString(char *string)

Include: Serial.h

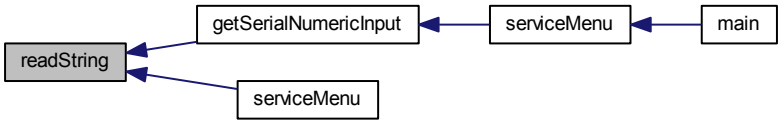
Description: Writes all received data up to a carriage return into given location.

Arguments: string - Pointer to location to store received data

Returns: Received data including the carriage return

Remarks: Make sure that you reserve at least BUFFERLENGTH elements at the location pointed to by string before calling this function.

Here is the caller graph for this function:



5.25.2.5 char receiveCR (void)

Function: receiveCR(void)

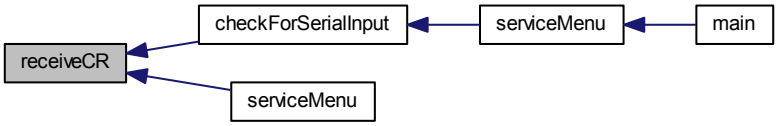
Include: Serial.h

Description: Indicates whether a Carriage Return has been received

Arguments: None

Returns: non-zero if CR has been received, zero otherwise

Here is the caller graph for this function:



5.25.2.6 char receiveEmpty (void)

Function: receiveEmpty(void)

Include: Serial.h

Description: Indicates if the receive buffer is empty

Arguments: None

Returns: returns true if the recieve buffer is empty

Here is the caller graph for this function:

5.25.2.7 char receiveEsc (void)

Function: receiveEsc(void)

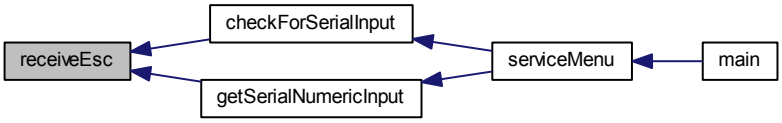
Include:

Description: Indicates whether an Escape character has been received

Arguments: None

Returns: non-zero if the Esc has been received, zero otherwise

Here is the caller graph for this function:



5.25.2.8 char receivePeek (void)

Function: receivePeek(void)

Include: Serial.h

Description: Returns the next character in the receive buffer without removing it from the buffer

Arguments: None

Returns: The next received character

5.25.2.9 char receivePop (void)

Function: receivePop(void)

Include: Serial.h

Description: Pops the next received character from the received buffer

Arguments: None

Returns: The next character from the receive buffer

Here is the caller graph for this function:

5.25.2.10 void serialISR (void)

Function: serialISR(void)

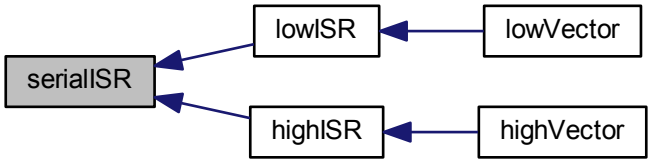
Include: Serial.h

Description: Acts as the interrupt service routine for the serial module

Arguments: None

Returns: None

Here is the caller graph for this function:



5.25.2.11 void transChar (char *c*)

Function: transChar(char c)

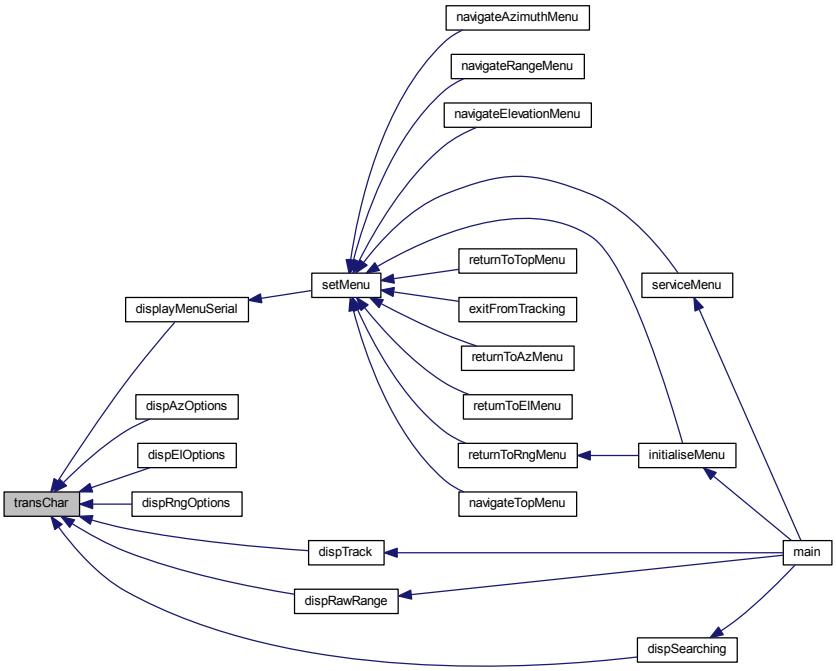
Include: Serial.h

Description: Transmits a single character

Arguments: c - character to transmit

Returns: None

Here is the caller graph for this function:



5.25.2.12 void transmit (char * *string*)

Function: transmit(char *string)

Include: Serial.h

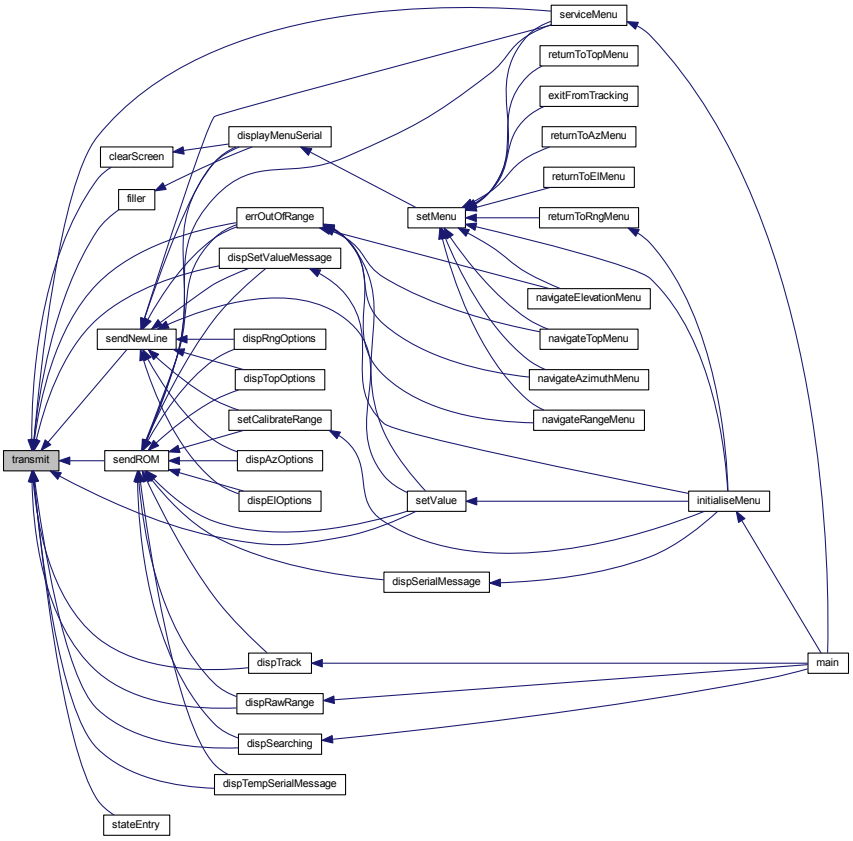
Description: Begins transmitting the string over serial (interrupt driven)

Arguments: string - pointer to the beginning of the string to transmit

Returns: None

NOTE: Must be Null Terminated! Cannot receive a literal.

Here is the caller graph for this function:



5.25.2.13 char transmitComplete (void)

Function: transmitComplete(void)

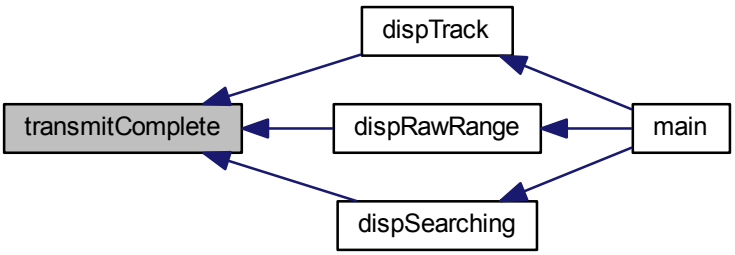
Include: Serial.h

Description: returns non-zero if the message has been completely transmited e.g. if the transmit buffer is empty

Arguments: None

Returns: non-zero if all messages have been transmitted

Here is the caller graph for this function:



5.25.3 Variable Documentation

5.25.3.1 volatile char carriageReturn = 0 [static]

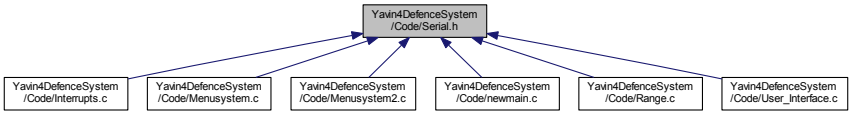
5.25.3.2 volatile char escPressed = 0 [static]

5.25.3.3 volatile circularBuffer receive_buffer [static]

5.25.3.4 volatile circularBuffer transmit_buffer [static]

5.26 Yavin4DefenceSystem/Code/Serial.h File Reference

This graph shows which files directly or indirectly include this file:



Macros

- #define SERIAL_INT (TX_INT || RC_INT)
- #define SERIAL_H

Functions

- void configureSerial (void)
- void serialISR (void)
- void transmit (char *string)
- char transmitComplete (void)
- void transChar (char c)
- char receiveEmpty (void)
- char receivePeek (void)

- char receivePop (void)
- char receiveCR (void)
- char receiveEsc (void)
- void readString (char *string)
- void popEsc (void)
- void clearReceive (void)

5.26.1 Macro Definition Documentation

5.26.1.1 #define SERIAL_H

5.26.1.2 #define SERIAL_INT (TX_INT || RC_INT)

File: Serial.h Author: Grant

Description: Contains the public interface for the serial module. This file contains all the external declarations, macros and global variables for using and Interfacing with the serial module.

Created on 17 September 2014, 3:27 PM

5.26.2 Function Documentation

5.26.2.1 void clearReceive (void)

Function: clearReceive(void)

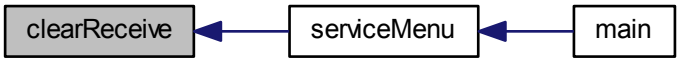
Include: Serial.h

Description: Clears the receive buffer

Arguments: None

Returns: None

Here is the caller graph for this function:



5.26.2.2 void configureSerial (void)

Function: configureSerial(void)

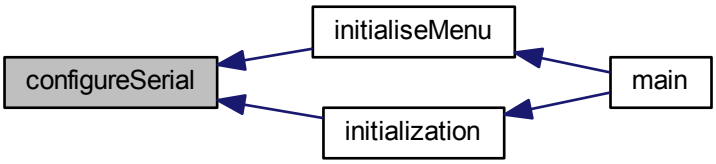
Include: Serial.h

Description: Configures the serial ready for communication

Arguments: None

Returns: None

Here is the caller graph for this function:



5.26.2.3 void popEsc (void)

Function: popEsc(void)

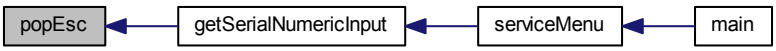
Include:

Description: Processes the Esc command and removes any input before the Esc command.

Arguments: None

Returns: Non-zero if received escape character

Here is the caller graph for this function:



5.26.2.4 void readString (char * *string*)

Function: readString(char *string)

Include: Serial.h

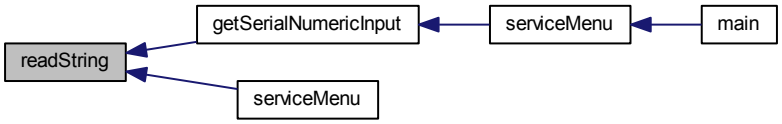
Description: Writes all received data up to a carriage return into given location.

Arguments: string - Pointer to location to store received data

Returns: Received data including the carriage return

Remarks: Make sure that you reserve at least BUFFERLENGTH elements at the location pointed to by string before calling this function.

Here is the caller graph for this function:



5.26.2.5 char receiveCR (void)

Function: receiveCR(void)

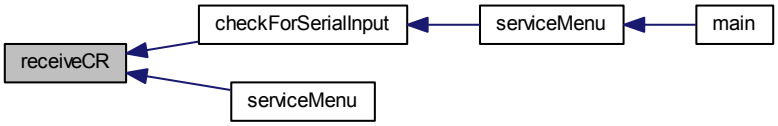
Include: Serial.h

Description: Indicates whether a Carriage Return has been received

Arguments: None

Returns: non-zero if CR has been received, zero otherwise

Here is the caller graph for this function:



5.26.2.6 char receiveEmpty (void)

Function: receiveEmpty(void)

Include: Serial.h

Description: Indicates if the receive buffer is empty

Arguments: None

Returns: returns true if the recieve buffer is empty

Here is the caller graph for this function:

5.26.2.7 char receiveEsc (void)

Function: receiveEsc(void)

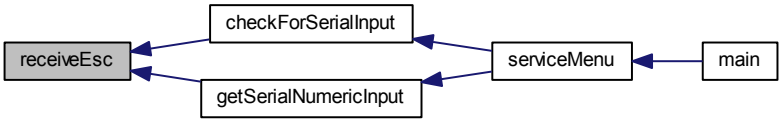
Include:

Description: Indicates whether an Escape character has been received

Arguments: None

Returns: non-zero if the Esc has been received, zero otherwise

Here is the caller graph for this function:



5.26.2.8 char receivePeek (void)

Function: receivePeek(void)

Include: Serial.h

Description: Returns the next character in the receive buffer without removing it from the buffer

Arguments: None

Returns: The next received character

5.26.2.9 char receivePop (void)

Function: receivePop(void)

Include: Serial.h

Description: Pops the next received character from the received buffer

Arguments: None

Returns: The next character from the receive buffer

Here is the caller graph for this function:

5.26.2.10 void serialISR (void)

Function: serialISR(void)

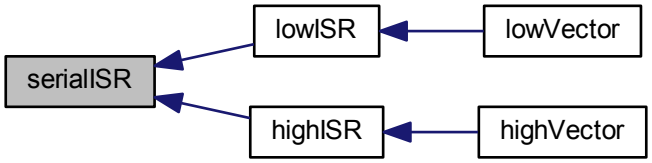
Include: Serial.h

Description: Acts as the interrupt service routine for the serial module

Arguments: None

Returns: None

Here is the caller graph for this function:



5.26.2.11 void transChar (char *c*)

Function: transChar(char c)

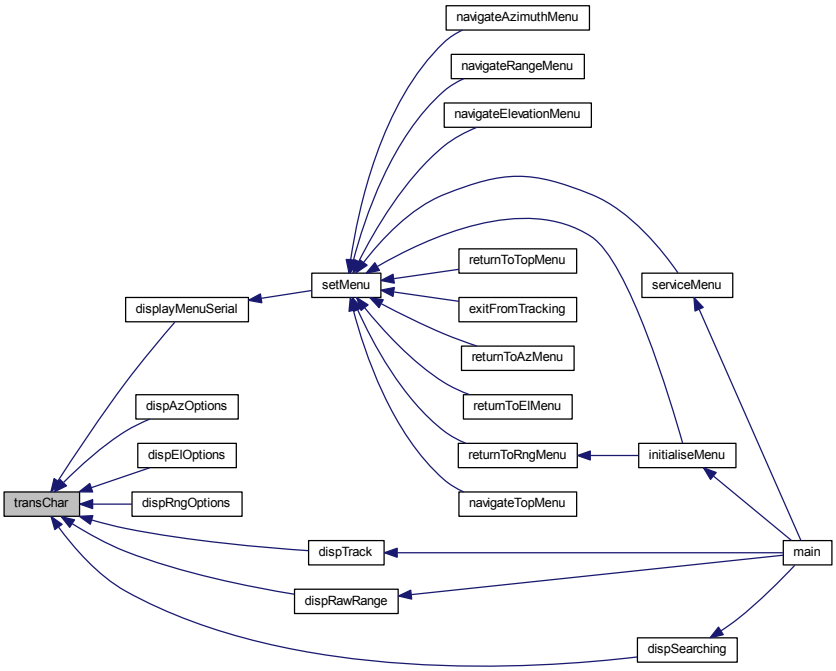
Include: Serial.h

Description: Transmits a single character

Arguments: c - character to transmit

Returns: None

Here is the caller graph for this function:



5.26.2.12 void transmit (char * *string*)

Function: transmit(char *string)

Include: Serial.h

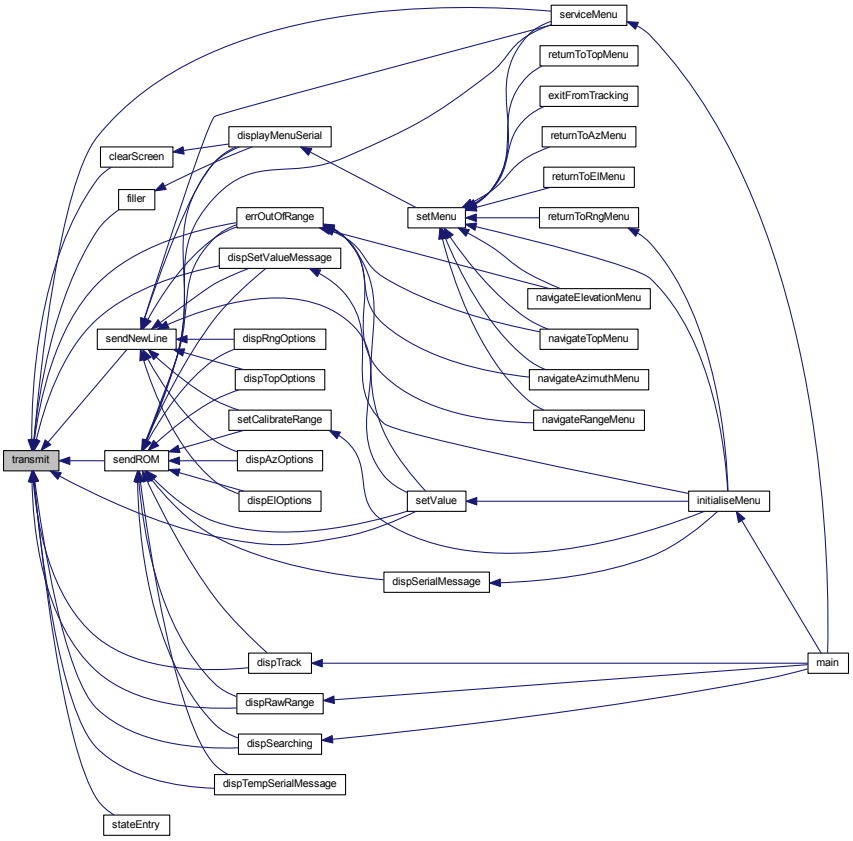
Description: Begins transmitting the string over serial (interrupt driven)

Arguments: string - pointer to the beginning of the string to transmit

Returns: None

NOTE: Must be Null Terminated! Cannot receive a literal.

Here is the caller graph for this function:



5.26.2.13 char transmitComplete (void)

Function: transmitComplete(void)

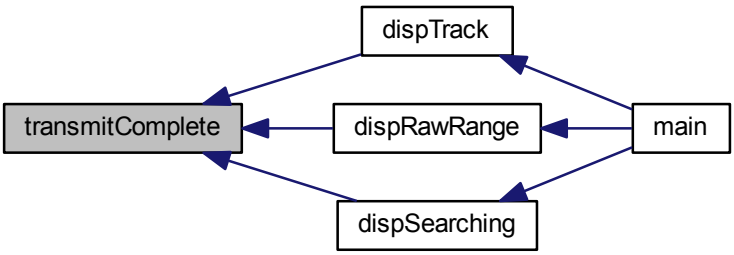
Include: Serial.h

Description: returns non-zero if the message has been completely transmited e.g. if the transmit buffer is empty

Arguments: None

Returns: non-zero if all messages have been transmitted

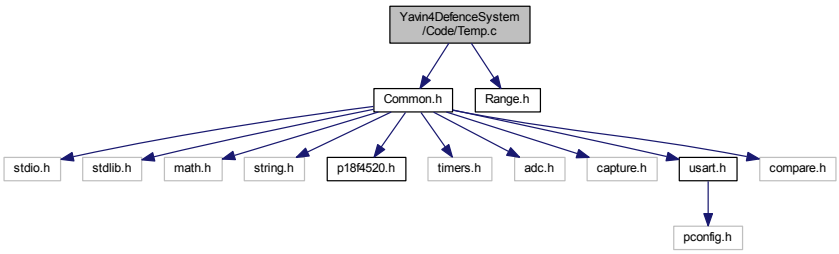
Here is the caller graph for this function:



5.27 Yavin4DefenceSystem/Code/Temp.c File Reference

```
#include "Common.h"
#include "Range.h"
```

Include dependency graph for Temp.c:



Functions

- void configureTemp (void)
- unsigned char readTempx2 (void)
- unsigned char readTemp (void)
- unsigned char rawTemp (void)
- void calibrateTemp (unsigned char reference)
- unsigned char getTemp (void)

Variables

- static signed char calibration_offset = 0
- static unsigned char lastTempx2

5.27.1 Function Documentation

5.27.1.1 void calibrateTemp (unsigned char *reference*)

Function: calibrateTemp(unsigned char reference)

Include: Temp.h

Description: calibrates the temperature sensor by updating the calibration offset variable

Arguments: reference - Reference temperature in deg C

Returns: None

Note: This function does not perform a temperature read, but uses the last value. This is because the readTemp function automatically calibrate.

5.27.1.2 void configureTemp (void)

Function: configureTemp(void)

Include: Temp

Description: Configures the temperature module for use

Arguments: None

Returns: None

Here is the call graph for this function:

5.27.1.3 unsigned char getTemp (void)

Function: calibrationTemp(unsigned char reference)

Include: Temp.h

Description: calibrates the temperature sensor by updating the calibration offset variable

Arguments: reference - Reference temperature in deg C

Returns: None

5.27.1.4 unsigned char rawTemp (void)

Function: rawTemp(void)

Include: Temp.h

Description: Returns the raw (uncalibrated temperature)

Arguments: None

Returns: Temp (in deg celsius) as an unsigned char

5.27.1.5 unsigned char readTemp (void)

Function: readTemp(void)

Include: Temp.h

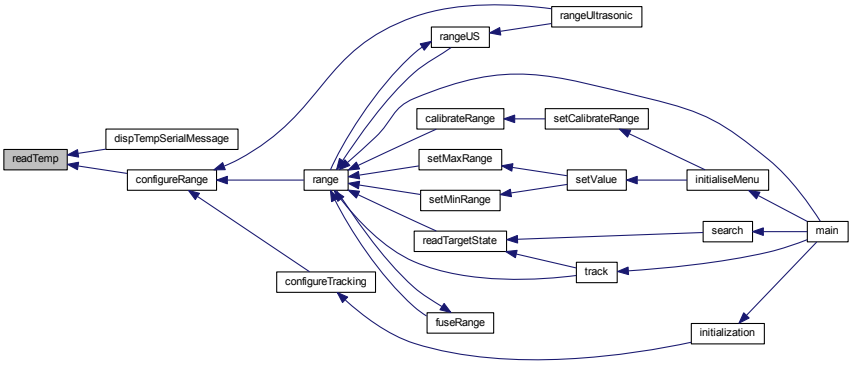
Description: Reads the temperature from the TEMP sensor

Arguments: None

Returns: Temp (in deg celsius) as an unsigned char

Here is the call graph for this function:

Here is the caller graph for this function:



5.27.1.6 unsigned char readTempx2 (void)

Function: readTempx2(void)

Include: Temp.h

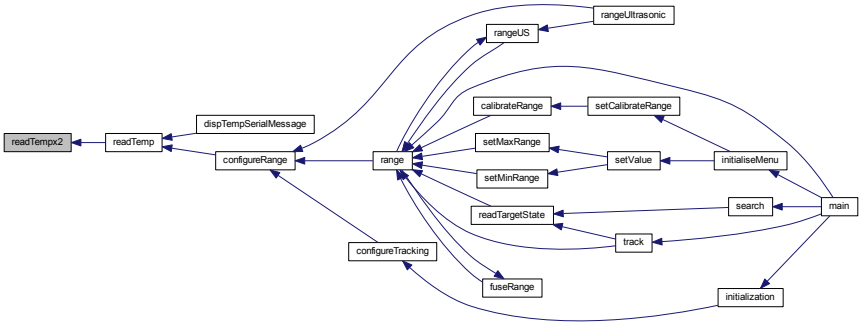
Description: Reads the temperature from the Temp sensor

Arguments: None

Returns: temp x 2 (in deg celsius) as an unsigned char

Todo Test and debug this function

Here is the caller graph for this function:



5.27.2 Variable Documentation

5.27.2.1 signed char calibration_offset = 0 [static]

File: Temp.c Author: Grant

Description: Contains all the functionality for the Temp module.

Duties: -Samples the temperature sensor -Stores the last temperature value -Calibrates the temperature sensor

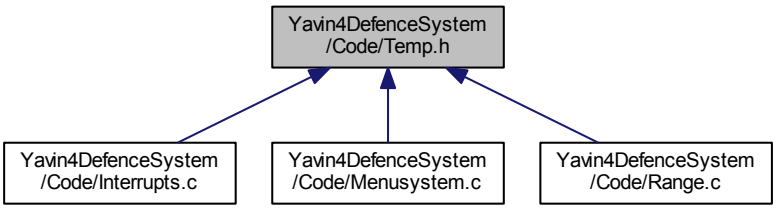
Functions:

Created on 7 September 2014, 4:12 PM

5.27.2.2 unsigned char lastTempx2 [static]

5.28 Yavin4DefenceSystem/Code/Temp.h File Reference

This graph shows which files directly or indirectly include this file:



Macros

- #define TEMP_H

Functions

- void configureTemp (void)

- unsigned char rawTemp (void)
- unsigned char readTemp (void)
- unsigned char readTempx2 (void)
- void calibrateTemp (unsigned char reference)
- unsigned char getTemp (void)

5.28.1 Macro Definition Documentation

5.28.1.1 #define TEMP_H

5.28.2 Function Documentation

5.28.2.1 void calibrateTemp (unsigned char *reference*)

Function: calibrateTemp(unsigned char reference)

Include: Temp.h

Description: calibrates the temperature sensor by updating the calibration offset variable

Arguments: reference - Reference temperature in deg C

Returns: None

Note: This function does not perform a temperature read, but uses the last value. This is because the readTemp function automatically calibrate.

5.28.2.2 void configureTemp (void)

File: Temp.h Author: Grant

Description: Contains all the functionality and variables for the temp module. All unnecessary functions and variables should be shielded from the external program, and interfaced with accessor and mutator functions

Contains: -Configure function -Read temperature functions -Get (last) temperature (read) function -Calibrate Temperature function

Created on 17 September 2014, 2:16 PM

Function: configureTemp(void)

Include: Temp

Description: Configures the temperature module for use

Arguments: None

Returns: None

Function: configureTemp(void)

Include: Temp

Description: Configures the temperature module for use

Arguments: None

Returns: None

Here is the call graph for this function:

5.28.2.3 unsigned char getTemp (void)

Function: calibrationTemp(unsigned char reference)

Include: Temp.h

Description: calibrates the temperature sensor by updating the calibration offset variable

Arguments: reference - Reference temperature in deg C

Returns: None

5.28.2.4 unsigned char rawTemp (void)

Function: rawTemp(void)

Include: Temp.h

Description: Returns the raw (uncalibrated temperature)

Arguments: None

Returns: Temp (in deg celsius) as an unsigned char

5.28.2.5 unsigned char readTemp (void)

Function: readTemp(void)

Include: Temp.h

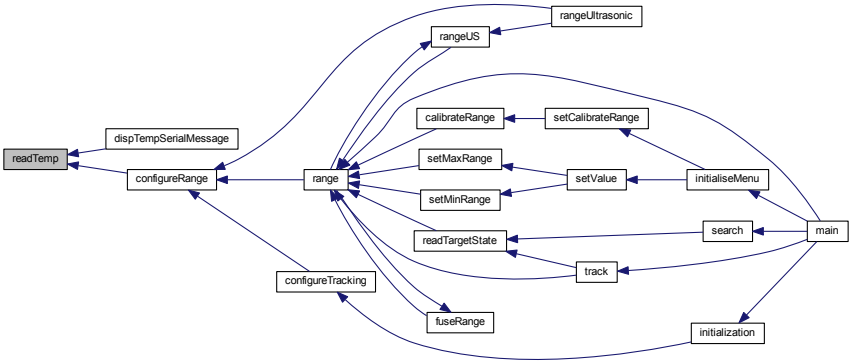
Description: Reads the temperature from the TEMP sensor

Arguments: None

Returns: Temp (in deg celsius) as an unsigned char

Here is the call graph for this function:

Here is the caller graph for this function:



5.28.2.6 unsigned char readTempx2 (void)

Function: readTempx2(void)

Include: Temp.h

Description: Reads the temperature from the Temp sensor

Arguments: None

Returns: temp x 2 (in deg celsius) as an unsigned char

Todo Test and debug this function

Function: readTempx2(void)

Include: Temp.h

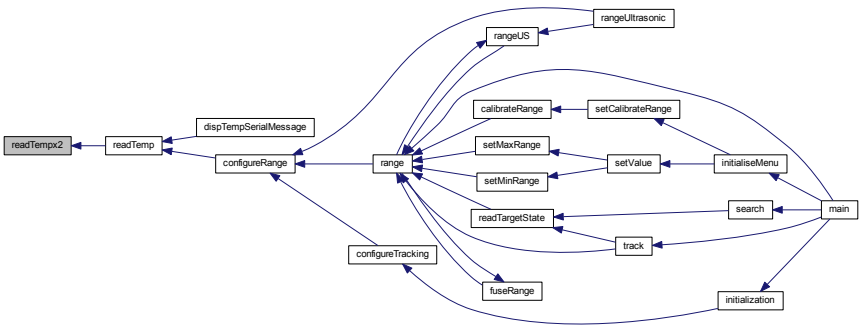
Description: Reads the temperature from the Temp sensor

Arguments: None

Returns: temp x 2 (in deg celsius) as an unsigned char

Todo Test and debug this function

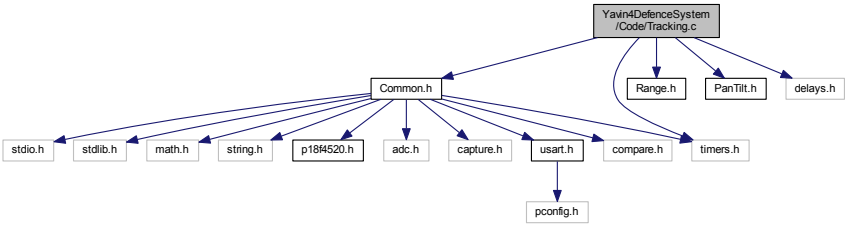
Here is the caller graph for this function:



5.29 Yavin4DefenceSystem/Code/Tracking.c File Reference

```
#include "Common.h"
#include "Range.h"
#include "PanTilt.h"
#include <delays.h>
#include <timers.h>
```

Include dependency graph for Tracking.c:



Data Structures

- struct TargetStateData

  Stores data about the last target track.

Macros

- #define diff 8
- #define TARGET_RAD 30
- #define sampleTargetState weight
- #define TIMER TMR2

Functions

- static char newAngle (char angle, TargetStateData target_data)
- void configureTracking (void)
- void search (systemState ∗state)
- void trackingISR (void)
- TrackingData track (systemState ∗state)
- static Direction prediction (Direction current)

5.29.1 Macro Definition Documentation

5.29.1.1 #define diff 8

File: Tracking.c Author: Grant

Description: Contains all the functionality for the Tracking Module. This module contains the functionality and algorithms used to search for, and track the target. This module makes use of PanTilt, Range and Temp modules, and configures them automatically from a call to configureTrack().

Duties: -Control and coordinate Pan Tilt and range sensors -Implement searching and tracking algorithms -Predict next position of target???

Functions:

Created on 15 September 2014, 1:42 PM

5.29.1.2 #define sampleTargetState weight

5.29.1.3 #define TARGET_RAD 30

5.29.1.4 #define TIMER TMR2

5.29.2 Function Documentation

5.29.2.1 void configureTracking (void)

Function: configureTracking(void)

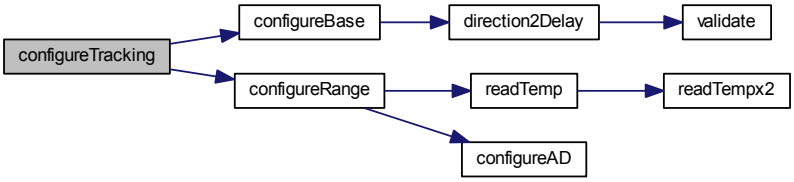
Include: Tracking.h

Description: Configures the System to begin tracking/searching

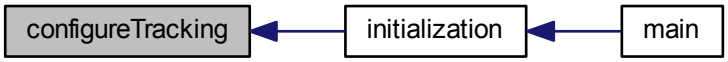
Arguments: None

Returns: None

Here is the call graph for this function:



Here is the caller graph for this function:



5.29.2.2 static char newAngle (char *angle,* TargetStateData *target_data*) [static]

Function: newAngle(void)

Include: Local to Tracking.c

Description: Calculates the new angle offset - So when the target position is better known the sampling locations are more file. Not currently implemented

Arguments: angle - The previous angle

```
target_data - The data from the last target sample
```

Returns: Angle - The new angle to offset the direction

5.29.2.3 static Direction prediction (Direction *current*) [static]

Function: prediction(Direction current)

Include: Local to Tracking.c

Description: Predicts where the object is likely to be found based on previous movement and prediction algorithms. Not currently implemented

Arguments: current - The current position of the target

Returns: Direction - The Predicted likely location

5.29.2.4 void search (systemState * *state*)

Function: search(void)

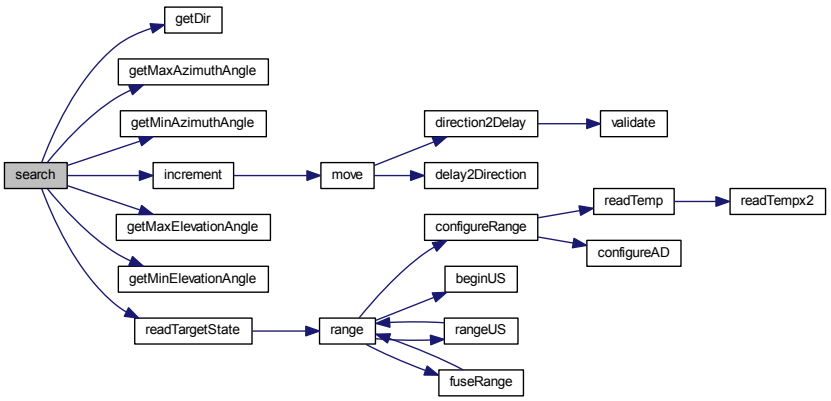
Include: Tracking.h

Description: Performs an incrimental change in position. Local variables store previous movements to create a raster-like search pattern. Then samples the range sensors and determines the next system state.

Arguments: state - a pointer to the current system state

Returns: None

Here is the call graph for this function:



Here is the caller graph for this function:

5.29.2.5 TrackingData track (systemState * *state*)

Function: track(void)

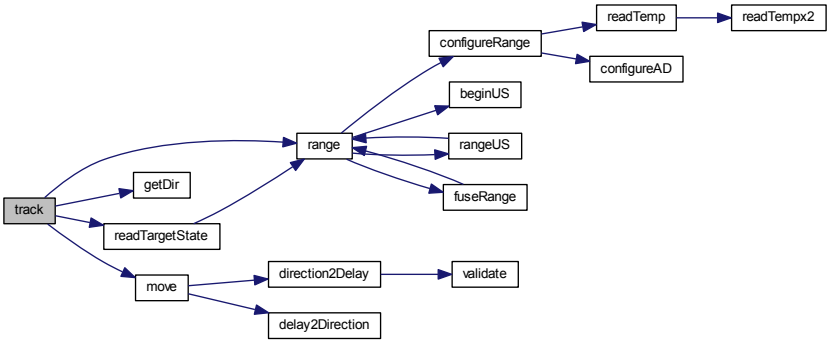
Include: Tracking.h

Description: Takes a number of samples at the previous target location, and several descrete locations around the target location and takes a weighted average based on the sampled signal return

Arguments: state - A pointer to the current system state

Returns: TargetData - The current target information (Azimuth, inclination and range to the target). This information is then used for the Display in the User interface module.

Here is the call graph for this function:



Here is the caller graph for this function:

5.29.2.6 void trackingISR (void)

Function: trackingISR(void)

Include: Tracking.h

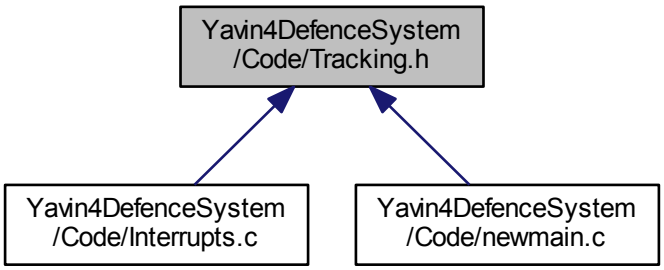
Description: Acts as the Interrupt Service Routine for the Tracking module Not currently implemented

Arguments: None

Returns: None

5.30 Yavin4DefenceSystem/Code/Tracking.h File Reference

This graph shows which files directly or indirectly include this file:



Macros

- #define TRACK_INT 0
- #define TRACK_H

Functions

- void configureTracking (void)
- void search (systemState ∗state)
- TrackingData track (systemState ∗state)
- void trackingISR (void)

5.30.1 Macro Definition Documentation

5.30.1.1 #define TRACK_H

5.30.1.2 #define TRACK_INT 0

File: Tracking.h Author: Grant

Description: Public interface function for the Tracking Module. This module contains the functionality and algorithms used to search for, and track the target. This module makes use of PanTilt, Range and Temp modules, and configures them automatically from a call to configureTrack().

Contains: -Configure tracking -Searching algorithm -Track algorithm

Created on 15 September 2014, 1:41 PM

5.30.2 Function Documentation

5.30.2.1 void configureTracking (void)

Function: configureTracking(void)

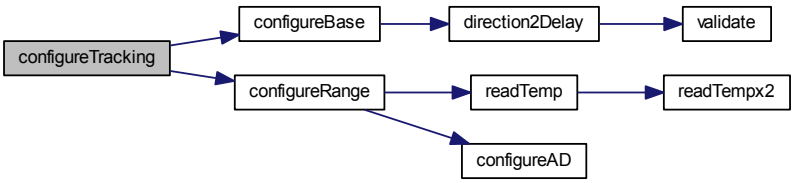
Include: Tracking.h

Description: Configures the System to begin tracking/searching

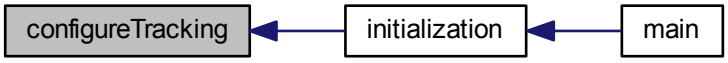
Arguments: None

Returns: None

Here is the call graph for this function:



Here is the caller graph for this function:



5.30.2.2 void search (systemState * *state*)

Function: search(void)

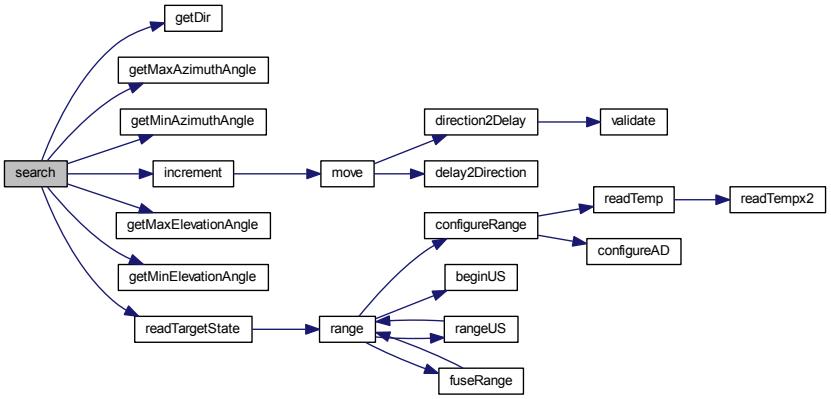
Include: Tracking.h

Description: Performs an incrimental change in position. Local variables store previous movements to create a raster-like search pattern. Then samples the range sensors and determines the next system state.

Arguments: state - a pointer to the current system state

Returns: None

Here is the call graph for this function:



Here is the caller graph for this function:

5.30.2.3 TrackingData track (systemState * *state*)

Function: track(void)

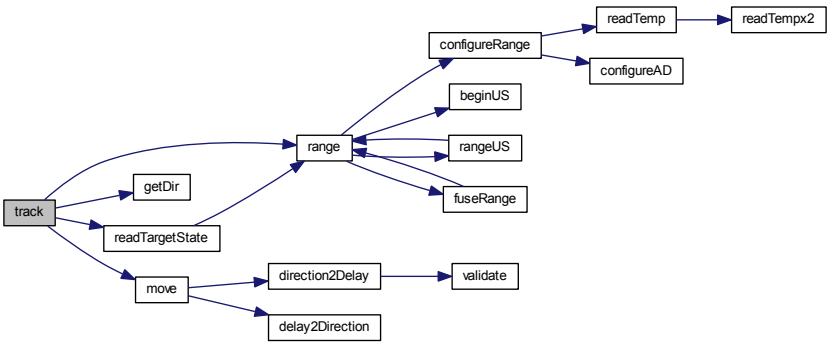
Include: Tracking.h

Description: Takes a number of samples at the previous target location, and several descrete locations around the target location and takes a weighted average based on the sampled signal return

Arguments: state - A pointer to the current system state

Returns: TargetData - The current target information (Azimuth, inclination and range to the target). This information is then used for the Display in the User interface module.

Here is the call graph for this function:



Here is the caller graph for this function:

5.30.2.4 void trackingISR (void)

Function: trackingISR(void)

Include: Tracking.h

Description: Acts as the Interrupt Service Routine for the Tracking module Not currently implemented

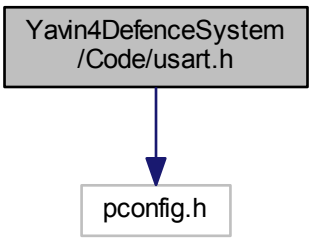
Arguments: None

Returns: None

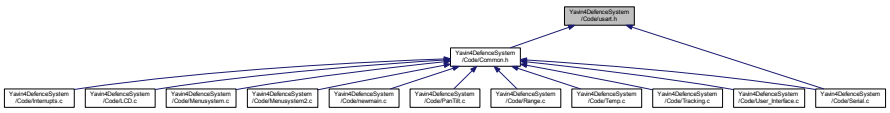
5.31 Yavin4DefenceSystem/Code/usart.h File Reference

```
#include <pconfig.h>
```

Include dependency graph for usart.h:



This graph shows which files directly or indirectly include this file:



Macros

- #define MEM_MODEL far
- #define USART_TX_INT_ON 0b11111111
- #define USART_TX_INT_OFF 0b01111111
- #define USART_RX_INT_ON 0b11111111
- #define USART_RX_INT_OFF 0b10111111
- #define USART_BRGH_HIGH 0b11111111
- #define USART_BRGH_LOW 0b11101111
- #define USART_CONT_RX 0b11111111
- #define USART_SINGLE_RX 0b11110111
- #define USART_SYNC_MASTER 0b11111111
- #define USART_SYNC_SLAVE 0b11111011
- #define USART_NINE_BIT 0b11111111
- #define USART_EIGHT_BIT 0b11111101
- #define USART_SYNCH_MODE 0b11111111
- #define USART_ASYNCH_MODE 0b11111110
- #define USART_ADDEN_ON 0b11111111
- #define USART_ADDEN_OFF 0b11011111
- #define BAUD_IDLE_RX_PIN_STATE_HIGH 0b11011111
- #define BAUD_IDLE_RX_PIN_STATE_LOW 0b11111111
- #define BAUD_IDLE_TX_PIN_STATE_HIGH 0b11101111
- #define BAUD_IDLE_TX_PIN_STATE_LOW 0b11111111

5.31.1 Macro Definition Documentation

5.31.1.1 #define BAUD_IDLE_RX_PIN_STATE_HIGH 0b11011111

5.31.1.2 #define BAUD_IDLE_RX_PIN_STATE_LOW 0b11111111

5.31.1.3 #define BAUD_IDLE_TX_PIN_STATE_HIGH 0b11101111

5.31.1.4 #define BAUD_IDLE_TX_PIN_STATE_LOW 0b11111111

5.31.1.5 #define MEM_MODEL far

5.31.1.6 #define USART_ADDEN_OFF 0b11011111

5.31.1.7 #define USART_ADDEN_ON 0b11111111

5.31.1.8 #define USART_ASYNCH_MODE 0b11111110

5.31.1.9 #define USART_BRGH_HIGH 0b11111111

5.31.1.10 #define USART_BRGH_LOW 0b11101111

5.31.1.11 #define USART_CONT_RX 0b11111111

5.31.1.12 #define USART_EIGHT_BIT 0b11111101

5.31.1.13 #define USART_NINE_BIT 0b11111111

5.31.1.14 #define USART_RX_INT_OFF 0b10111111

5.31.1.15 #define USART_RX_INT_ON 0b11111111

5.31.1.16 #define USART_SINGLE_RX 0b11110111

5.31.1.17 #define USART_SYNC_MASTER 0b11111111

5.31.1.18 #define USART_SYNC_SLAVE 0b11111011

5.31.1.19 #define USART_SYNCH_MODE 0b11111111

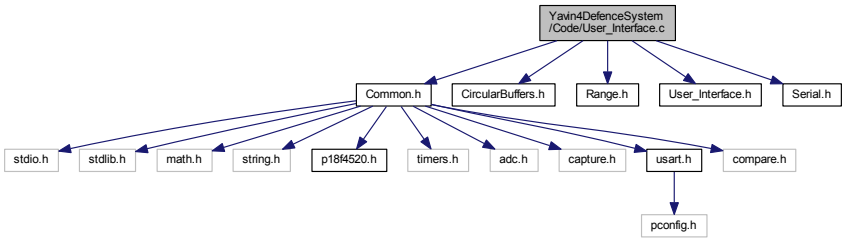
5.31.1.20 #define USART_TX_INT_OFF 0b01111111

5.31.1.21 #define USART_TX_INT_ON 0b11111111

5.32 Yavin4DefenceSystem/Code/User_Interface.c File Reference

```
#include "Common.h"
#include "CircularBuffers.h"
#include "Range.h"
#include "User_Interface.h"
#include "Serial.h"
```

Include dependency graph for User_Interface.c:



Macros

- #define CONFIRM_PRESS INTCONbits.INT0IF
- #define BACK_PRESS INTCON3bits.INT1F
- #define ADC_MAX 1023

Functions

- void display (TrackingData data)
- void userISR (void)
- void configUSER (void)
- unsigned int readDial (unsigned int max)
- unsigned int readDialForMenu (unsigned int max)
- char userEmpty (void)
- char userPop (void)
- char userPeek (void)

Variables

- circularBuffer receive

5.32.1 Macro Definition Documentation

5.32.1.1 #define ADC_MAX 1023

5.32.1.2 #define BACK_PRESS INTCON3bits.INT1F

5.32.1.3 #define CONFIRM_PRESS INTCONbits.INT0IF

File: User_Interface.c Author: Grant

Description: Contains all the functionality for the User_Interface module. Works the same way as the serial module, but for the user interface.

Duties: -Stores any local user input in a receive buffer -Sends display data to the LCD

Created on 15 September 2014, 1:21 PM

5.32.2 Function Documentation

5.32.2.1 void configUSER (void)

Function: configUSER(void)

Include: User_Interface.h

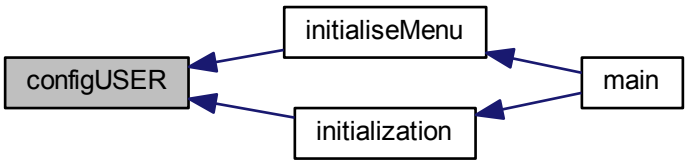
Description: Configures the user interface for use

Arguments: None

Returns: None

Here is the call graph for this function:

Here is the caller graph for this function:



5.32.2.2 void display (TrackingData *data*)

Function: display(TrackingData data)

Include: User_Interface.h

Description: displays the current tracking information

Arguments: data - Struct which contains all known data concerning the The position of the target. A Range of 0 indicates that no target was observed.

Returns: None

5.32.2.3 unsigned int readDial (unsigned int *max*)

Function: readDial(void)

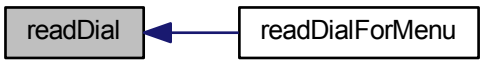
Include:

Description: Read the position of the dial by splitting the value returned from the ADC into even discrete steps based on the given argument. For instance, an input of 7 will return a value from 0 to 7 based on the value found from the potentiometer

Arguments: int max - The number of maximum state to split values into

Returns: The dial position scaled by the maximum number

Here is the caller graph for this function:



5.32.2.4 unsigned int readDialForMenu (unsigned int *max*)

Function: readDialForMEnu(void)

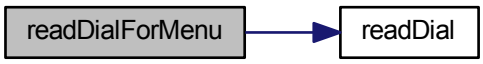
Include:

Description: Read the position of the dial for Navigation menus. Currently unused.

Arguments: None

Returns: Returns a value from 1 to max used in Navigation menus

Here is the call graph for this function:



5.32.2.5 char userEmpty (void)

Function: userEmpty(void)

Include: User_Interface.h

Description: returns non-zero if the user interface buffer is empty (i.e. no user input has been detected)

Arguments: None

Returns: if the user input buffer is empty

Here is the caller graph for this function:

5.32.2.6 void userISR (void)

Function: userISR(void)

Include: User_Interface.h

Description: Acts as the ISR for the User_interface module

Arguments: None

Returns: None

Here is the caller graph for this function:

5.32.2.7 char userPeek (void)

Function: userPeek(void)

Include: User_Interface.h

Description: returns a character in the user_Interface buffer without removing it from the buffer

Arguments: None

Returns: a character in the user interface buffer

5.32.2.8 char userPop (void)

Function: userPop(void)

Include: User_Interface.h

Description: pops a character from the user interface receive buffer

Arguments: None

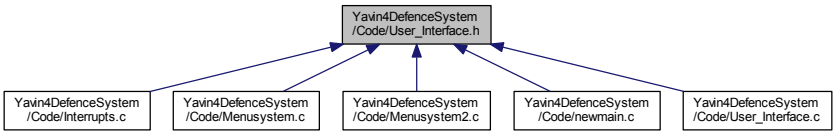
Returns: a character poped from the user Interface buffer

5.32.3 Variable Documentation

5.32.3.1 circularBuffer receive

5.33 Yavin4DefenceSystem/Code/User_Interface.h File Reference

This graph shows which files directly or indirectly include this file:



Macros

- #define USER_INT (RB_INT || INT0_INT || INT1_INT)
- #define CONFIRM_CHAR 0x0D
- #define BACK_CHAR 0x1B
- #define USER_H

Functions

- void display (TrackingData data)
- void userISR (void)
- void configUSER (void)
- char userEmpty (void)
- char userPop (void)
- char userPeek (void)
- unsigned int readDial (unsigned int max)

5.33.1 Macro Definition Documentation

5.33.1.1 #define BACK_CHAR 0x1B

5.33.1.2 #define CONFIRM_CHAR 0x0D

5.33.1.3 #define USER_H

5.33.1.4 #define USER_INT (RB_INT || INT0_INT || INT1_INT)

5.33.2 Function Documentation

5.33.2.1 void configUSER (void)

Function: configUSER(void)

Include: User_Interface.h

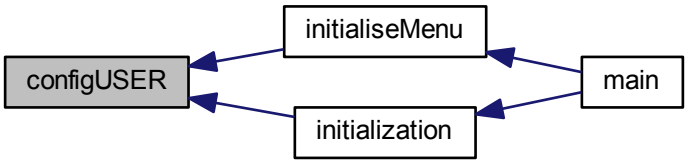
Description: Configures the user interface for use

Arguments: None

Returns: None

Here is the call graph for this function:

Here is the caller graph for this function:



5.33.2.2 void display (TrackingData *data*)

Function: display(TrackingData data)

Include: User_Interface.h

Description: displays the current tracking information

Arguments: data - Struct which contains all known data concerning the The position of the target. A Range of 0 indicates that no target was observed.

Returns: None

5.33.2.3 unsigned int readDial (unsigned int *max*)

Function: readDial(void)

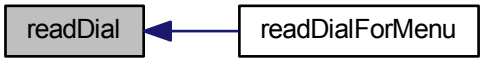
Include:

Description: Read the position of the dial by splitting the value returned from the ADC into even discrete steps based on the given argument. For instance, an input of 7 will return a value from 0 to 7 based on the value found from the potentiometer

Arguments: int max - The number of maximum state to split values into

Returns: The dial position scaled by the maximum number

Here is the caller graph for this function:



5.33.2.4 char userEmpty (void)

Function: userEmpty(void)

Include: User_Interface.h

Description: returns non-zero if the user interface buffer is empty (i.e. no user input has been detected)

Arguments: None

Returns: if the user input buffer is empty

Here is the caller graph for this function:

5.33.2.5 void userISR (void)

Function: userISR(void)

Include: User_Interface.h

Description: Acts as the ISR for the User_interface module

Arguments: None

Returns: None

Here is the caller graph for this function:

5.33.2.6 char userPeek (void)

Function: userPeek(void)

Include: User_Interface.h

Description: returns a character in the user_Interface buffer without removing it from the buffer

Arguments: None

Returns: a character in the user interface buffer

5.33.2.7 char userPop (void)

Function: userPop(void)

Include: User_Interface.h

Description: pops a character from the user interface receive buffer

Arguments: None

Returns: a character poped from the user Interface buffer