Stepper motor controller

1.0

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Chapter 1

Todo List

Global Home (void)
it doesnt work as espected

Chapter 2

Module Index

2.1 Modules

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Chapter 3

Data Structure Index

3.1 Data Structures

Here are the data structures with brief descriptions:

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Motion

This structure defines the current step execution status. This structure is used for the timmer interrupting and in the comments for initializing the spin 76

Motor_Parameters

This structure defines types for motor parameters This type is used for declaration of three structures that are for the motor paramenters used for timmer, the real parameters of the motor and the working parameters that have been already calculated according to the microstep mode . . 77

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4.1 File List

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Chapter 5

Module Documentation

5.1 config Library

General macros for port manipolation and port naming.

Macros

- #define check_pin(PINx, PINxn) (PINx & (1 << PINxn))
- #define CHECKPIN(x, y) ((x&(1<<y))!=0?1:0)
- #define clr_bit(byte, bit) byte &= ~(1 << bit)
- #define clr_port(PORTx, PORTxn) PORTx &= ~(1 << PORTxn)
- #define DDECAY DDRC
- #define DDIR_485 DDRB
- #define DDIRECTION DDRB
- #define DECAY PC1
- #define DENABLE_STEPPER DDRD
- #define DFAULT DDRB
- #define DHOME DDRC
- #define DIR_485 PB0
- #define DIRECTION PB2
- #define DMISO DDRB
- #define DMODE0 DDRC
- #define DMODE1 DDRC
- #define DMODE2 DDRC
- #define DMOSI DDRB
- #define DRXD DDRD
- #define DSCL DDRB
- #define DSTEP DDRC
- #define DTXD DDRD
- #define ENABLE_STEPPER PD5
- #define false 1!=1
- #define FAULT PB1
- #define HOME PC2
- #define IDECAY PINC
- #define IDIR_485 PINB
- #define IDIRECTION PINB
- #define IENABLE_STEPPER PIND
- #define IFAULT PINB
- #define IHOME PINC

- #define IMISO PINB
- #define IMODE0 PINC
- #define IMODE1 PINC
- #define IMODE2 PINC
- #define IMOSI PINB
- #define IRXD PIND
- #define ISCL PINB
- #define ISTEP PINC
- #define ITXD PIND
- #define MISO PB4
- #define MODE0 PC3
- #define MODE1 PC4
- #define MODE2 PC5
- #define MOSI PB3
- #define PDECAY PORTC
- #define PDIR_485 PORTB
- #define PDIRECTION PORTB
- #define PENABLE_STEPPER PORTD
- #define PFAULT PORTB
- #define PHOME PORTC
- #define PMISO PORTB
- #define PMODE0 PORTC
- #define PMODE1 PORTC
- #define PMODE2 PORTC
- #define PMOSI PORTB
- #define PRXD PORTD
- #define PSCL PORTB
- #define PSTEP PORTC
- #define PTXD PORTD
- #define RXD PD0
- #define SCL PB5
- #define set_as_input(DDRx, DDxn) DDRx &= ~(1 << DDxn)
- #define set_as_output(DDRx, DDxn) DDRx |= (1 << DDxn)
- #define set_bit(byte, bit) byte |= (1 << bit)
- #define set_port(PORTx, PORTxn) PORTx |= (1 << PORTxn)
- #define STEP PC0
- #define true 1==1
- #define TXD PD1

5.1.1 Detailed Description

General macros for port manipolation and port naming.

```
#include <config.h>
```

Defines simple macros for setting bits and bytes for manipolating DRV8825

Author

Bilyana Borisova bibishte@gmail.com

5.1.2 Macro Definition Documentation

5.1.2.1 #define check_pin(*PINx, PINxn*) (PINx & (1 << PINxn))

Test whether bit `PINxn` in IO register `PINx` is set. This will return a 0 if the port pin is driven low, and non-zero if the pin is driven high.

Definition at line 72 of file config.h.

5.1.2.2 #define CHECKPIN(*x, y*) ((x&(1<<y))!=0?1:0)

Definition at line 74 of file config.h.

5.1.2.3 #define clr_bit(*byte, bit*) byte &= ~(1 << bit)

Definition at line 44 of file config.h.

5.1.2.4 #define clr_port(*PORTx, PORTxn*) PORTx &= ~(1 << PORTxn)

Write logic zero bit `PORTxn` in IO register `PORTx`. When the pin is configured as an output pin, the port pin is driven low (zero).

Definition at line 66 of file config.h.

5.1.2.5 #define DDECAY DDRC

Definition at line 134 of file config.h.

5.1.2.6 #define DDIR_485 DDRB

Definition at line 138 of file config.h.

5.1.2.7 #define DDIRECTION DDRB

Definition at line 137 of file config.h.

5.1.2.8 #define DECAY PC1

Definition at line 92 of file config.h.

5.1.2.9 #define DENABLE_STEPPER DDRD

Definition at line 129 of file config.h.

5.1.2.10 #define DFAULT DDRB

Definition at line 124 of file config.h.

5.1.2.11 #define DHOME DDRC

Definition at line 121 of file config.h.

5.1.2.12 #define DIR_485 PB0

Definition at line 96 of file config.h.

5.1.2.13 #define DIRECTION PB2

Definition at line 95 of file config.h.

5.1.2.14 #define DMISO DDRB

Definition at line 123 of file config.h.

5.1.2.15 #define DMODE0 DDRC

Definition at line 131 of file config.h.

5.1.2.16 #define DMODE1 DDRC

Definition at line 132 of file config.h.

5.1.2.17 #define DMODE2 DDRC

Definition at line 133 of file config.h.

5.1.2.18 #define DMOSI DDRB

Definition at line 136 of file config.h.

5.1.2.19 #define DRXD DDRD

Definition at line 120 of file config.h.

5.1.2.20 #define DSCL DDRB

Definition at line 122 of file config.h.

5.1.2.21 #define DSTEP DDRC

Definition at line 135 of file config.h.

5.1.2.22 #define DTXD DDRD

Definition at line 130 of file config.h.

5.1.2.23 #define ENABLE_STEPPER PD5

Definition at line 87 of file config.h.

5.1.2.24 #define false 1!=1

Definition at line 162 of file config.h.

5.1.2.25 #define FAULT PB1

Definition at line 82 of file config.h.

5.1.2.26 #define HOME PC2

Definition at line 79 of file config.h.

5.1.2.27 #define IDECAY PINC

Definition at line 155 of file config.h.

5.1.2.28 #define IDIR_485 PINB

Definition at line 159 of file config.h.

5.1.2.29 #define IDIRECTION PINB

Definition at line 158 of file config.h.

5.1.2.30 #define IENABLE_STEPPER PIND

Definition at line 150 of file config.h.

5.1.2.31 #define IFAULT PINB

Definition at line 146 of file config.h.

5.1.2.32 #define IHOME PINC

Definition at line 143 of file config.h.

5.1.2.33 #define IMISO PINB

Definition at line 145 of file config.h.

5.1.2.34 #define IMODE0 PINC

Definition at line 152 of file config.h.

5.1.2.35 #define IMODE1 PINC

Definition at line 153 of file config.h.

5.1.2.36 #define IMODE2 PINC

Definition at line 154 of file config.h.

5.1.2.37 #define IMOSI PINB

Definition at line 157 of file config.h.

5.1.2.38 #define IRXD PIND

Definition at line 142 of file config.h.

5.1.2.39 #define ISCL PINB

Definition at line 144 of file config.h.

5.1.2.40 #define ISTEP PINC

Definition at line 156 of file config.h.

5.1.2.41 #define ITXD PIND

Definition at line 151 of file config.h.

5.1.2.42 #define MISO PB4

Definition at line 81 of file config.h.

5.1.2.43 #define MODE0 PC3

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5.1.2.44 #define MODE1 PC4

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5.1.2.45 #define MODE2 PC5

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5.1.2.46 #define MOSI PB3

Definition at line 94 of file config.h.

5.1.2.47 #define PDECAY PORTC

Definition at line 113 of file config.h.

5.1.2.48 #define PDIR_485 PORTB

Definition at line 117 of file config.h.

5.1.2.49 #define PDIRECTION PORTB

Definition at line 116 of file config.h.

5.1.2.50 #define PENABLE_STEPPER PORTD

Definition at line 108 of file config.h.

5.1.2.51 #define PFAULT PORTB

Definition at line 103 of file config.h.

5.1.2.52 #define PHOME PORTC

Definition at line 100 of file config.h.

5.1.2.53 #define PMISO PORTB

Definition at line 102 of file config.h.

5.1.2.54 #define PMODE0 PORTC

Definition at line 110 of file config.h.

5.1.2.55 #define PMODE1 PORTC

Definition at line 111 of file config.h.

5.1.2.56 #define PMODE2 PORTC

Definition at line 112 of file config.h.

5.1.2.57 #define PMOSI PORTB

Definition at line 115 of file config.h.

5.1.2.58 #define PRXD PORTD

Definition at line 99 of file config.h.

5.1.2.59 #define PSCL PORTB

Definition at line 101 of file config.h.

5.1.2.60 #define PSTEP PORTC

Definition at line 114 of file config.h.

5.1.2.61 #define PTXD PORTD

Definition at line 109 of file config.h.

5.1.2.62 #define RXD PD0

Definition at line 78 of file config.h.

5.1.2.63 #define SCL PB5

Definition at line 80 of file config.h.

5.1.2.64 #define set_as_input(*DDRx, DDxn*) DDRx &= ~(1 << DDxn)

Write logical zero bit `DDxn` in IO register `DDRx`. This will configure Pxn as an input pin.

Definition at line 54 of file config.h.

5.1.2.65 #define set_as_output(*DDRx, DDxn*) DDRx |= (1 << DDxn)

Write logical one bit `DDxn` in IO register `DDRx`. This will configure Pxn as an output pin.

Definition at line 49 of file config.h.

5.1.2.66 #define set_bit(*byte, bit*) byte |= (1 << bit)

Definition at line 43 of file config.h.

5.1.2.67 #define set_port(*PORTx, PORTxn*) PORTx |= (1 << PORTxn)

Write logic one bit `PORTxn` in IO register `PORTx`. When the pin is configured as an output pin, the port pin is driven high (one).

Definition at line 60 of file config.h.

5.1.2.68 #define STEP PC0

Definition at line 93 of file config.h.

5.1.2.69 #define true 1==1

Definition at line 161 of file config.h.

5.1.2.70 #define TXD PD1

Definition at line 88 of file config.h.

5.2 DRV8825 Library

Driver for stepper motor controller based on DRV8825 by Texas Instruments.

Enumerations

- enum decay_type { SLOW_DECAY, FAST_DECAY, AUTO_DECAY }

  Type for decay status.
- enum mode_type { MODE_FULL_STEP, MODE_HALF_STEP, MODE_QUATER_STEP, MODE_8_MICROSTEP, MODE_16_MICROSTEP, MODE_32_MICROSTEP }

  Type for mode status.
- enum step_type { STEP_COUNTER_CLOCKWISE, STEP_CLOCKWISE }

  Type for the direction status.

Functions

- void CalWorkParam (void)
- void Count_Step (step_type step, uint64_t step_count)
- void Decay (decay_type decay)
- void Disabled_Stepper (void)
- void Enable_Stepper (void)
- decay_type Get_Decay (void)
- mode_type Get_Mode (void)
- uint8_t Get_Start (void)
- uint16_t Get_Steps_revol (void)
- uint16_t GetAcceleration (void)
- uint16_t GetCurrentSpeed (void)
- uint16_t GetMaxSpeed (void)
- uint16_t GetMinSpeed (void)
- uint16_t GetRealAcc (void)
- uint16_t GetRealMaxSpeed (void)
- uint16_t GetRealMinSpeed (void)
- uint64_t HelperRtoT (uint64_t)
- uint64_t HelperTtoR (uint64_t)
- uint8_t Home (void)
- void InitStepper (void)
- void Mode (mode_type mode)
- void RealToTime (void)
- void Set_Steps_revol (uint16_t step_rev)
- void SetAcceleration (uint16_t accel)
- void SetCurrentSpeed (uint16_t spd)
- void SetMaxSpeed (uint16_t spd)
- void SetMinSpeed (uint16_t spd)
- void SetRealAcc (uint16_t realacc)
- void SetRealMaxSpeed (uint16_t maxspd)
- void SetRealMinSpeed (uint16_t minspd)
- void Step (step_type step)
- void Stop_Motion_fast (void)
- void Stop_Motion_normal (void)
- void store (void)
- void TimeToReal (void)
- void Way_Speed (step_type step)

5.2.1 Detailed Description

Driver for stepper motor controller based on DRV8825 by Texas Instruments.

```
#include <drv_8825.h>
```

This modul contains basic functions for controlling stepper motor with the Texas Instruments DRV8825

Note

Typical application based on DRV8825

Author

Bilyana Borisova bibishte@gmail.com

5.2.2 Enumeration Type Documentation

5.2.2.1 enum decay_type

Type for decay status.

Defines the status of the decay modes.

Enumerator

SLOW_DECAY Status for setting slow decay.

FAST_DECAY Status for setting fast decay.

AUTO_DECAY Status for setting auto decay.

Definition at line 52 of file drv_8825.h.

```
52              {SLOW_DECAY,        /**< Status for setting slow decay. */
53          FAST_DECAY,             /**< Status for setting fast decay. */
54          AUTO_DECAY              /**< Status for setting auto decay. */
55          } decay_type;
```

5.2.2.2 enum mode_type

Type for mode status.

Defines the status of the modes.

Enumerator

MODE_FULL_STEP Status for setting the full step mode.

MODE_HALF_STEP Status for setting the half step mode.

MODE_QUATER_STEP Status for setting the quater step mode.

MODE_8_MICROSTEP Status for setting the 8 microstep mode.

MODE_16_MICROSTEP Status for setting the 16 microstep mode.

MODE_32_MICROSTEP Status for setting the 32 microstep mode.

Definition at line 62 of file drv_8825.h.

```
62              {MODE_FULL_STEP,    /**< Status for setting the full step mode. */
63          MODE_HALF_STEP,         /**< Status for setting the half step mode. */
64          MODE_QUATER_STEP,       /**< Status for setting the quater step mode. */
65          MODE_8_MICROSTEP,       /**< Status for setting the 8 microstep mode. */
66          MODE_16_MICROSTEP,      /**< Status for setting the 16 microstep mode. */
67          MODE_32_MICROSTEP       /**< Status for setting the 32 microstep mode. */
68          } mode_type;
```

5.2.2.3 enum step_type

Type for the direction status.

Defines the direction:clockwise or counter clock wise.

Enumerator

STEP_COUNTER_CLOCKWISE Status for setting the clockwise direction.

STEP_CLOCKWISE Status for setting the counter clockwise direction.

Definition at line 75 of file drv_8825.h.

```
75              {STEP_COUNTER_CLOCKWISE,    /**< Status for setting the clockwise
       direction. */
76          STEP_CLOCKWISE                  /**< Status for setting the counter clockwise
       direction. */
77          } step_type;
```

5.2.3 Function Documentation

5.2.3.1 void CalWorkParam (void)

Calculates the maximum, minimum and the acceleration for the different step modes.

Returns

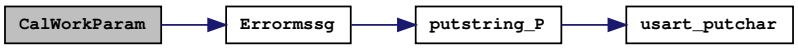
void

Definition at line 723 of file drv_8825.c.

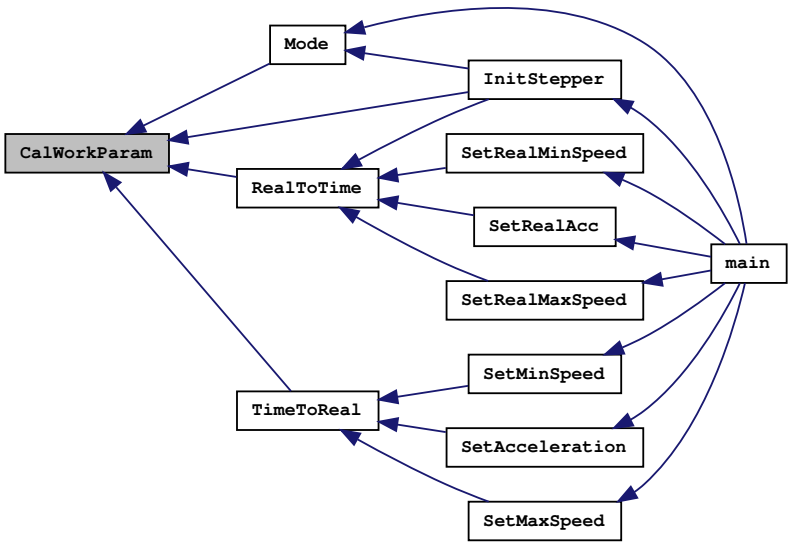
```
724 {
725     switch ( CurrentMode )
726     {
727         case MODE_FULL_STEP:
728             WorkingParam.MaxSpeed = TimeParam.
      MaxSpeed;
729             WorkingParam.MinSpeed = TimeParam.
      MinSpeed;
730             WorkingParam.Acceleration = TimeParam.
      Acceleration;
731             break;
732
733         case MODE_HALF_STEP:
734             WorkingParam.MaxSpeed = TimeParam.
      MaxSpeed >> 1;
735             WorkingParam.MinSpeed = TimeParam.
      MinSpeed >> 1;
736             WorkingParam.Acceleration = TimeParam.
      Acceleration >> 1;
737             break;
738
739
740         case MODE_QUATER_STEP:
741             WorkingParam.MaxSpeed = TimeParam.
      MaxSpeed >> 2;
742             WorkingParam.MinSpeed = TimeParam.
      MinSpeed >> 2;
743             WorkingParam.Acceleration = TimeParam.
      Acceleration >> 2;
744             break;
745
746         case MODE_8_MICROSTEP:
747             WorkingParam.MaxSpeed = TimeParam.
      MaxSpeed >> 3;
748             WorkingParam.MinSpeed = TimeParam.
      MinSpeed >> 3;
749             WorkingParam.Acceleration = TimeParam.
      Acceleration >> 3;
750             break;
751
752
753         case MODE_16_MICROSTEP:
754             WorkingParam.MaxSpeed = TimeParam.
```

```
    MaxSpeed >> 4;
755             WorkingParam.MinSpeed = TimeParam.
    MinSpeed >> 4;
756             WorkingParam.Acceleration = TimeParam.
    Acceleration >> 4;
757             break;
758
759
760         case MODE_32_MICROSTEP:
761             WorkingParam.MaxSpeed = TimeParam.
    MaxSpeed >> 5;
762             WorkingParam.MinSpeed = TimeParam.
    MinSpeed >> 5;
763             WorkingParam.Acceleration = TimeParam.
    Acceleration >> 5;
764             break;
765
766         default:
767             Errormssg( );
768
769             break;
770     }
771 }
```

Here is the call graph for this function:



Here is the caller graph for this function:



5.2.3.2 void Count_Step (step_type *step*, uint64_t *step_count*)

Initializes the presented steps and calculates the steps for acceleration, deacceleration and the steps for constant speed

See Also

step_type

Parameters

step	the first argument.
step_count	the second argument.

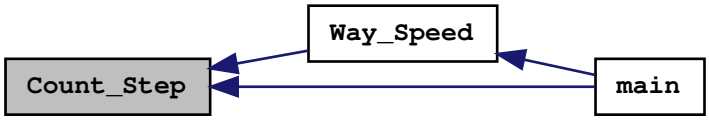
Returns

void

Definition at line 297 of file drv_8825.c.

```
298 {
299
300     uint16_t y;
301     StepDir = step;
302
303
304     y = ( WorkingParam.MinSpeed - WorkingParam.
      MaxSpeed ) / WorkingParam.Acceleration;
305     y = y << 1;
306     if ( y < step_count )
307     {
308         Motion.StepsAccel = y >> 1;
309         Motion.StepsDeaccel = Motion.StepsAccel;
310         Motion.StepsConstSpeed = step_count - ( Motion.
      StepsAccel + Motion.StepsDeaccel );
311
312     } else
313     {
314         Motion.StepsConstSpeed = 0;
315         Motion.StepsAccel = step_count >> 1;
316         Motion.StepsDeaccel = Motion.StepsAccel;
317         if ( ( step_count & 1 ) )
318         {
319             Motion.StepsAccel++;
320         }
321
322     }
323     clr_bit( TCCR1B, CS10 );
324     set_bit( TCCR1B, CS11 );
325     clr_bit( TCCR1B, CS12 );
326     TCNT1 = 65535 - WorkingParam.MinSpeed;
327     Motion.CurrentSpeed = WorkingParam.MinSpeed;
328     set_bit( TIMSK, TOIE1 );
329
330 }
```

Here is the caller graph for this function:



5.2.3.3 void Decay (decay_type *decay*)

Function that sets the decay type.

See Also

decay_type

Parameters

decay	the first argument.

Returns

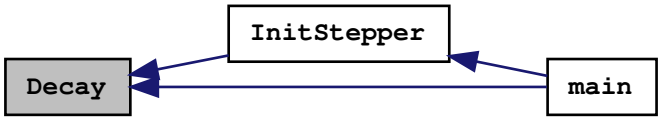
void

Definition at line 185 of file drv_8825.c.

```
186 {
187     CurrentDecay = decay;
188     store( );
189     if ( decay == FAST_DECAY )
190     {
191         set_as_output( DDECAY, DECAY );
192         set_bit( PDECAY, DECAY );
193         return;
194     }
195
196     if ( decay == SLOW_DECAY )
197     {
198         set_as_output( DDECAY, DECAY );
199         clr_bit( PDECAY, DECAY );
200         return;
201     }
202
203     set_as_input( DDECAY, DECAY );
204     clr_bit( PDECAY, DECAY );
205 }
```

Here is the call graph for this function:

Here is the caller graph for this function:



5.2.3.4 void Disabled_Stepper (void)

Function that disables the stepper motor.

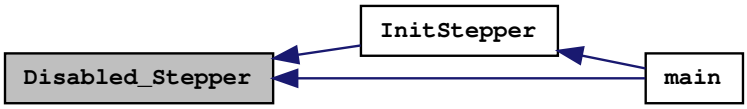
Returns

void

Definition at line 173 of file drv_8825.c.

```
174 {
175     set_bit( PENABLE_STEPPER, ENABLE_STEPPER );
176     ModeStart = 0;
177 }
```

Here is the caller graph for this function:



5.2.3.5 void Enable_Stepper (void)

Function that enables the stepper motor.

Returns

void

Definition at line 163 of file drv_8825.c.

```
164 {
165     clr_bit( PENABLE_STEPPER, ENABLE_STEPPER );
166     ModeStart = 1;
167 }
```

Here is the caller graph for this function:

5.2.3.6 decay_type Get_Decay (void)

Reads the setted decay.

See Also

decay_type

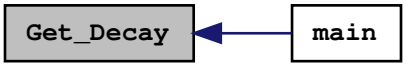
Returns

decay_type

Definition at line 395 of file drv_8825.c.

```
396 {
397     return CurrentDecay;
398 }
```

Here is the caller graph for this function:



5.2.3.7 mode_type Get_Mode (void)

Reads the setted mode.

See Also

mode_type

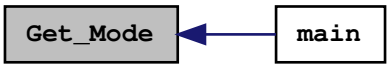
Returns

mode_type

Definition at line 405 of file drv_8825.c.

```
406 {
407     return CurrentMode;
408 }
```

Here is the caller graph for this function:



5.2.3.8 uint8_t Get_Start (void)

Returns the mode.

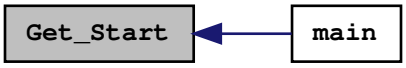
Returns

uint8_t

Definition at line 414 of file drv_8825.c.

```
415 {
416     return ModeStart;
417 }
```

Here is the caller graph for this function:



5.2.3.9 uint16_t Get_Steps_revol (void)

Gets the steps per revolution.

See Also

StepsPerRev

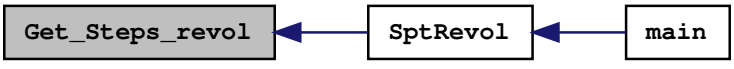
Returns

uint16_t

Definition at line 545 of file drv_8825.c.

```
546 {
547     return StepsPerRev;
548 }
```

Here is the caller graph for this function:



5.2.3.10 uint16_t GetAcceleration (void)

Reads the setted acceleration.

See Also

TimeParam.Acceleration

Returns

uint16_t

Definition at line 445 of file drv_8825.c.

```
446 {
447     return TimeParam.Acceleration;
448 }
```

Here is the caller graph for this function:

5.2.3.11 uint16_t GetCurrentSpeed (void)

Reads the current speed.

See Also

TimeParam.CurrentSpeed

Returns

uint16_t

Definition at line 456 of file drv_8825.c.

```
457 {
458     return Motion.CurrentSpeed;
459 }
```

5.2.3.12 uint16_t GetMaxSpeed (void)

Reads the setted maximum speed..

See Also

TimeParam.MaxSpeed

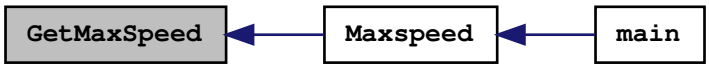
Returns

uint16_t

Definition at line 424 of file drv_8825.c.

```
425 {
426     return TimeParam.MaxSpeed;
427 }
```

Here is the caller graph for this function:



5.2.3.13 uint16_t GetMinSpeed (void)

Reads the setted minimum speed.

See Also

TimeParam.MinSpeed

Returns

uint16_t

Definition at line 435 of file drv_8825.c.

```
436 {
437     return TimeParam.MinSpeed;
438 }
```

Here is the caller graph for this function:

5.2.3.14 uint16_t GetRealAcc (void)

Gets the real acceleration.

See Also

RealSpeed.Acceleration

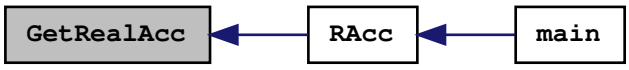
Returns

uint16_t

Definition at line 613 of file drv_8825.c.

```
614 {
615     return RealSpeed.Acceleration;
616 }
```

Here is the caller graph for this function:



5.2.3.15 uint16_t GetRealMaxSpeed (void)

Gets the real maximum speed.

See Also

RealSpeed.MaxSpeed

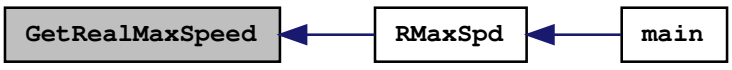
Returns

uint16_t

Definition at line 592 of file drv_8825.c.

```
593 {
594     return RealSpeed.MaxSpeed;
595 }
```

Here is the caller graph for this function:



5.2.3.16 uint16_t GetRealMinSpeed (void)

Gets the real minimum speed.

See Also

RealSpeed.MinSpeed

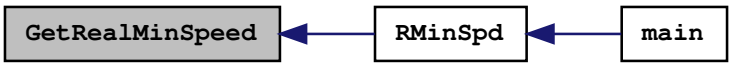
Returns

uint16_t

Definition at line 603 of file drv_8825.c.

```
604 {
605     return RealSpeed.MinSpeed;
606 }
```

Here is the caller graph for this function:



5.2.3.17 uint64_t HelperRtoT (uint64_t *in*)

Helper of the function RealToTime

See Also

RealToTime

Parameters

in	the first argument.

Returns

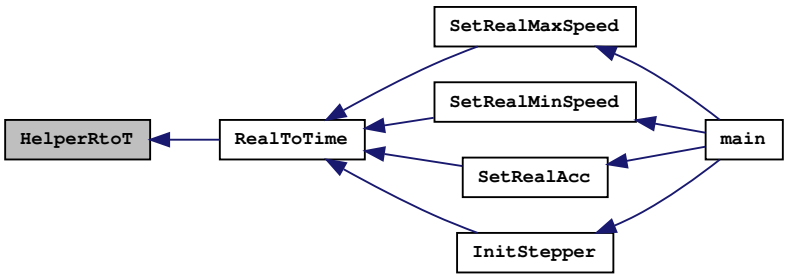
uint64_t

Definition at line 838 of file drv_8825.c.

```
839 {
840     uint64_t revpermin;
841 
842 /*
843     revpermin = in;
844     revpermin = revpermin*StepsPerRev;
845     revpermin = revpermin / 60;
846     revpermin = 1000000000 / revpermin;
847     revpermin = revpermin / PERTMR;
848 */
849 revpermin=TIMERCONST/(in*StepsPerRev);
850     if ( revpermin < 65500 )
851     {
852         return revpermin;
```

```
853     }
854     else
855     {
856         return  65500;
857     }
858 }
```

Here is the caller graph for this function:



5.2.3.18 uint64_t HelperTtoR (uint64_t *in*)

Helper of the function TimeToReal

See Also

TimeToReal

Parameters

in	the first argument.

Returns

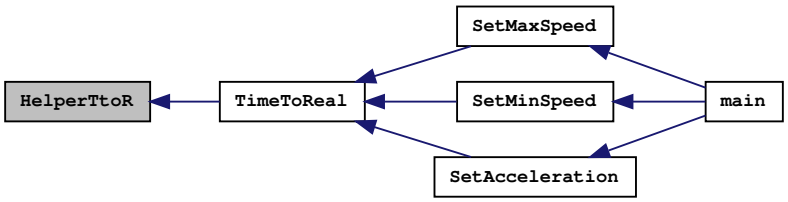
uint64_t

Definition at line 867 of file drv_8825.c.

```
868 {
869     uint64_t r;
870 
871     //const uint64_t l=1000000000*60;
872 
873     r=TIMERCONST/(in*StepsPerRev);
874 
875 /*
876     r = in;
877 
878 
879 
880     r = r * PERTMR;
881     r = r*StepsPerRev;
882     r = 10000000000 / r;
883     r = r * 6;
884 
885 */
886 
887 
888 
889     if ( r > 1 )
890     {
891         return r;
```

```
892     } else
893     {
894         return 1;
895         //putstring_P( PSTR( "Target MaxSpeed\r" ) );
896     }
897
898 }
```

Here is the caller graph for this function:



5.2.3.19 uint8_t Home (void)

The home of the motor.

Todo it doesnt work as espected

See Also

step_type

Returns

uint8_t

Definition at line 376 of file drv_8825.c.

```
377 {
378     int16_t i;
379
380     for ( i = 0; i < 128; i++ )
381     {
382         Step(STEP_COUNTER_CLOCKWISE);
383         if ( !(check_pin( IHOME, HOME )) )
384             return true;
385     }
386     return false;
387 }
```

Here is the call graph for this function:

5.2.3.20 void InitStepper (void)

Initialize the DRV232.

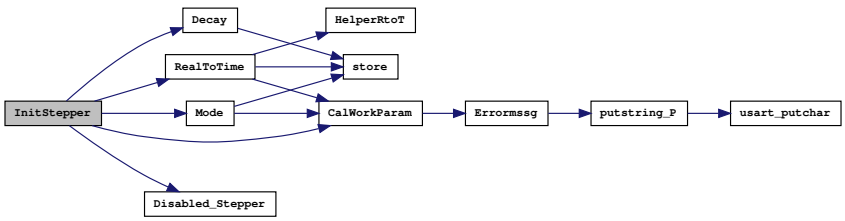
Returns

void

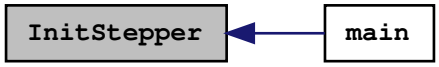
Definition at line 778 of file drv_8825.c.

```
779 {
780     RealSpeed.MaxSpeed = eeprom_read_word( ( uint16_t * ) ( 0 ) );
781     RealSpeed.MinSpeed = eeprom_read_word( ( uint16_t * ) ( 2 ) );
782     RealSpeed.Acceleration = eeprom_read_word( ( uint16_t * ) ( 4 ) );
783     StepsPerRev = eeprom_read_word( ( uint16_t * ) ( 6 ) );
784     CurrentMode = eeprom_read_byte( ( uint8_t * ) ( 8 ) );
785     CurrentDecay = eeprom_read_byte( ( uint8_t * ) ( 9 ) );
786     if ( ( RealSpeed.MaxSpeed == 0 ) || ( RealSpeed.
      MaxSpeed == 0xffff ) )
787     {
788         RealSpeed.MaxSpeed = 300;
789         Decay( AUTO_DECAY );
790         Mode( MODE_FULL_STEP );
791     }
792
793     if ( ( RealSpeed.MinSpeed == 0 ) || ( RealSpeed.
      MinSpeed == 0xffff ) )
794     {
795         RealSpeed.MinSpeed = 10;
796     }
797
798     if ( ( RealSpeed.Acceleration == 0 ) || ( RealSpeed.
      Acceleration == 0xffff ) )
799     {
800         RealSpeed.Acceleration = 100;
801     }
802
803     if ( ( StepsPerRev == 0 ) || ( StepsPerRev == 0xffff ) )
804     {
805         StepsPerRev = 400;
806     }
807
808     Disabled_Stepper( );
809     Decay( CurrentDecay );
810     Mode( CurrentMode );
811     RealToTime( );
812     CalWorkParam( );
813 }
```

Here is the call graph for this function:



Here is the caller graph for this function:



5.2.3.21 void Mode (mode_type *mode*)

Function that sets the mode.

See Also

mode_type

Parameters

mode	the first argument.

Returns

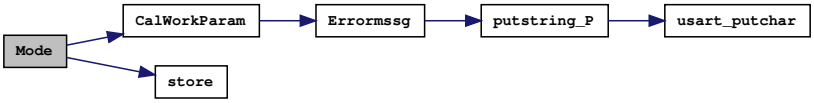
void

Definition at line 215 of file drv_8825.c.

```
216 {
217     CurrentMode = mode;
218     CalWorkParam( );
219     store( );
220 
221     if ( mode == MODE_FULL_STEP )
222     {
223         clr_bit( PMODE0, MODE0 );
224         clr_bit( PMODE1, MODE1 );
225         clr_bit( PMODE2, MODE2 );
226     }
227 
228     if ( mode == MODE_HALF_STEP )
229     {
230         set_bit( PMODE0, MODE0 );
231         clr_bit( PMODE1, MODE1 );
232         clr_bit( PMODE2, MODE2 );
233     }
234 
235     if ( mode == MODE_QUATER_STEP )
236     {
237         clr_bit( PMODE0, MODE0 );
238         set_bit( PMODE1, MODE1 );
239         clr_bit( PMODE2, MODE2 );
240     }
241 
242     if ( mode == MODE_8_MICROSTEP )
243     {
244         set_bit( PMODE0, MODE0 );
245         set_bit( PMODE1, MODE1 );
246         clr_bit( PMODE2, MODE2 );
247     }
248 
249     if ( mode == MODE_16_MICROSTEP )
250     {
251         clr_bit( PMODE0, MODE0 );
252         clr_bit( PMODE1, MODE1 );
253         set_bit( PMODE2, MODE2 );
254     }
255 
```

```
256     if ( mode == MODE_32_MICROSTEP )
257     {
258         set_bit( PMODE0, MODE0 );
259         clr_bit( PMODE1, MODE1 );
260         set_bit( PMODE2, MODE2 );
261     }
262
263 }
```

Here is the call graph for this function:



Here is the caller graph for this function:

5.2.3.22 void RealToTime (void)

Calculates the real speed to the timmer speed.

Returns

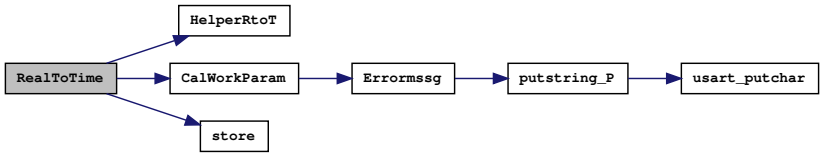
void

Definition at line 622 of file drv_8825.c.

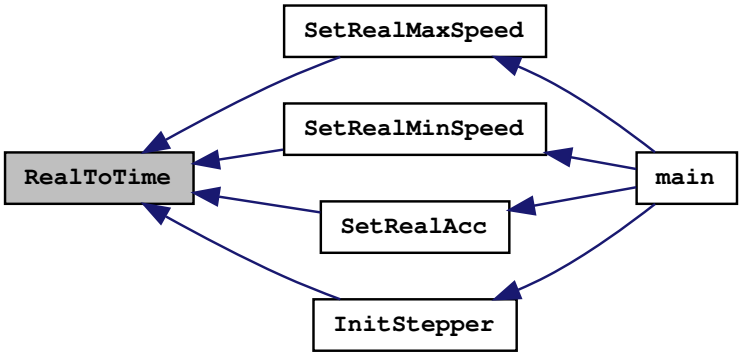
```
623 {
624
625     uint16_t revpermin;
626     TimeParam.MaxSpeed=HelperRtoT(RealSpeed.
      MaxSpeed);
627     TimeParam.MinSpeed=HelperRtoT(RealSpeed.
      MinSpeed);
628
629     revpermin = ( TimeParam.MinSpeed - TimeParam.
      MaxSpeed ) / RealSpeed.Acceleration;
630
631     //putstring_P( PSTR( "acc=" ) );
632     //putstring( int_to_string( ( uint64_t ) ( revpermin ) ) );
633     //putstring_P( PSTR( "\r" ) );
634
635     if ( revpermin < 1 )
636     {
637         TimeParam.Acceleration = 1;
638         //  putstring_P( PSTR( "Acc  low\r" ) );
639     } else
640     {
```

```
641         TimeParam.Acceleration = revpermin;
642     }
643
644     CalWorkParam( );
645     store( );
646 }
```

Here is the call graph for this function:



Here is the caller graph for this function:



5.2.3.23 void Set_Steps_revol (uint16_t *step_rev*)

Sets the steps per revolution.

See Also

StepsPerRev

Parameters

step_rev	the first argument.

Returns

void

Definition at line 535 of file drv_8825.c.

```
536 {
537     StepsPerRev = step_rev;
538 }
```

Here is the caller graph for this function:

5.2.3.24 void SetAcceleration (uint16_t *accel*)

Function that sets the acceleration.

See Also

TimeParam.Acceleration

Parameters

accel	the first argument.

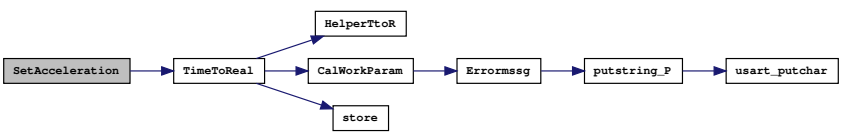
Returns

void

Definition at line 153 of file drv_8825.c.

```
154 {
155     TimeParam.Acceleration = accel;
156     TimeToReal( );
157 }
```

Here is the call graph for this function:



Here is the caller graph for this function:

5.2.3.25 void SetCurrentSpeed (uint16_t *spd*)

Sets the current speed.

See Also

Motion.CurrentSpeed

Parameters

spd	the first argument.

Returns

void

Definition at line 468 of file drv_8825.c.

```
469 {
470     Motion.CurrentSpeed = spd;
471 }
```

5.2.3.26 void SetMaxSpeed (uint16_t *spd*)

Function that sets the maximum speed.

See Also

TimeParam.MaxSpeed

Parameters

spd	the first argument.

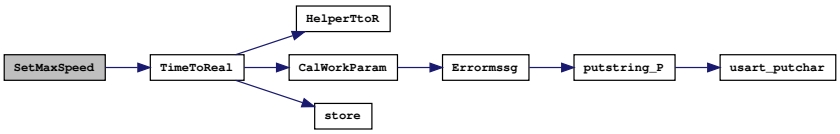
Returns

void

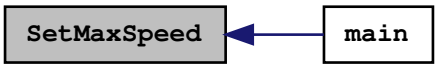
Definition at line 128 of file drv_8825.c.

```
129 {
130     TimeParam.MaxSpeed = spd;
131     TimeToReal( );
132 }
```

Here is the call graph for this function:



Here is the caller graph for this function:



5.2.3.27 void SetMinSpeed (uint16_t *spd*)

Function that sets the minimum speed.

See Also

TimeParam.MinSpeed

Parameters

spd	the first argument.

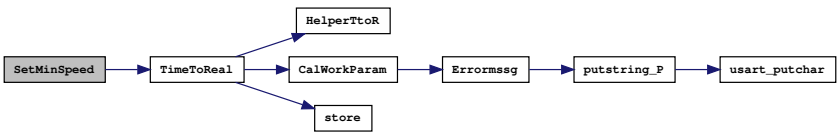
Returns

void

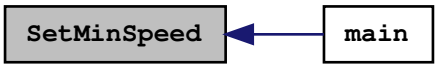
Definition at line 141 of file drv_8825.c.

```
142 {
143     TimeParam.MinSpeed = spd;
144     TimeToReal( );
145 }
```

Here is the call graph for this function:



Here is the caller graph for this function:



5.2.3.28 void SetRealAcc (uint16_t *realacc*)

Sets the real acceleration.

See Also

RealSpeed.Acceleration

Parameters

realacc	the first argument.

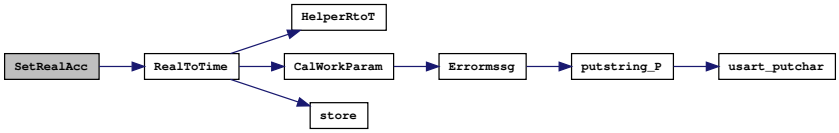
Returns

void

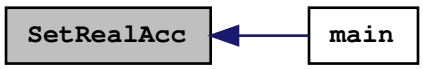
Definition at line 581 of file drv_8825.c.

```
582 {
583     RealSpeed.Acceleration = realacc;
584     RealToTime( );
585 }
```

Here is the call graph for this function:



Here is the caller graph for this function:



5.2.3.29 void SetRealMaxSpeed (uint16_t *maxspd*)

Sets the real maximum speed.

See Also

RealSpeed.MaxSpeed

Parameters

maxspd	the first argument.

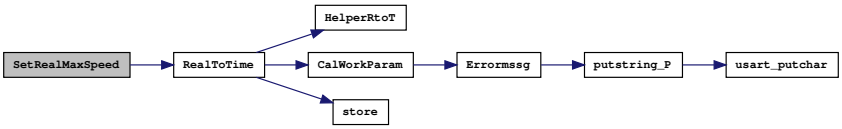
Returns

void

Definition at line 557 of file drv_8825.c.

```
558 {
559     RealSpeed.MaxSpeed = maxspd;
560     RealToTime( );
561 }
```

Here is the call graph for this function:



Here is the caller graph for this function:

5.2.3.30 void SetRealMinSpeed (uint16_t *minspd*)

Sets the real minimum speed.

See Also

RealSpeed.MinSpeed

Parameters

minspd	the first argument.

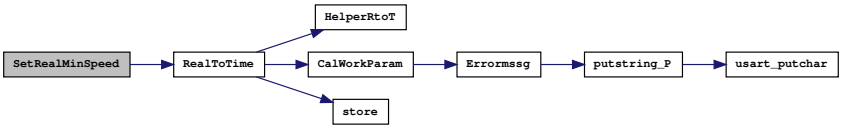
Returns

void

Definition at line 569 of file drv_8825.c.

```
570 {
571     RealSpeed.MinSpeed = minspd;
572     RealToTime( );
573 }
```

Here is the call graph for this function:



Here is the caller graph for this function:

5.2.3.31 void Step (step_type *step*)

Performs single step.

See Also

step_type

Parameters

step	the first argument.

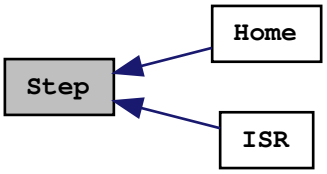
Returns

void

Definition at line 272 of file drv_8825.c.

```
273 {
274     if ( step == STEP_CLOCKWISE )
275     {
276         set_bit( PDIRECTION, DIRECTION );
277 
278     } else
279     {
280         clr_bit( PDIRECTION, DIRECTION );
281     }
282     set_bit( PSTEP, STEP );
283     _delay_us( 2 );
284     clr_bit( PSTEP, STEP );
285     _delay_us( 2 );
286 }
```

Here is the caller graph for this function:



5.2.3.32 void Stop_Motion_fast (void)

Stops the movement without deacceleration at the end.

Returns

void

Definition at line 361 of file drv_8825.c.

```
362 {
363     ConstSpd = 0;
364     Motion.StepsAccel = 0;
365     Motion.StepsConstSpeed = 0;
366     Motion.StepsDeaccel = 0;
367 }
```

Here is the caller graph for this function:

5.2.3.33 void Stop_Motion_normal (void)

Stops the movement with deacceleration at the end.

Returns

void

Definition at line 349 of file drv_8825.c.

```
350 {
351     ConstSpd = 0;
352     Motion.StepsAccel = 0;
353     Motion.StepsConstSpeed = 0;
354 }
```

Here is the caller graph for this function:

5.2.3.34 void store (void)

Calculates the real maximum speed,real minimum speed, real acceleration, steps per revolution, current mode and the current decay.

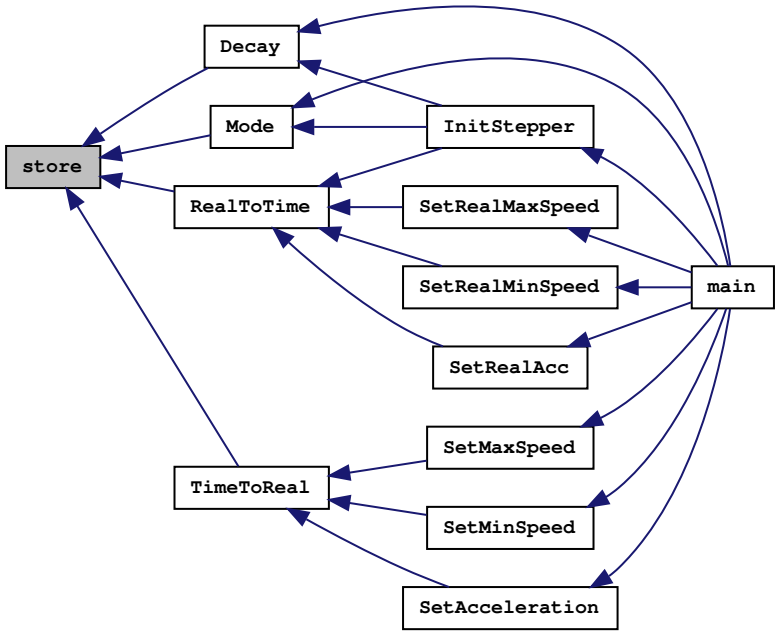
Returns

void

Definition at line 820 of file drv_8825.c.

```
821 {
822     eeprom_write_word( ( uint16_t * ) ( 0 ), RealSpeed.MaxSpeed );
823     eeprom_write_word( ( uint16_t * ) ( 2 ), RealSpeed.MinSpeed );
824     eeprom_write_word( ( uint16_t * ) ( 4 ), RealSpeed.Acceleration );
825     eeprom_write_word( ( uint16_t * ) ( 6 ), StepsPerRev );
826     eeprom_write_byte( ( uint8_t * ) ( 8 ), CurrentMode );
827     eeprom_write_byte( ( uint8_t * ) ( 9 ), CurrentDecay );
828
829
830 }
```

Here is the caller graph for this function:



5.2.3.35 void TimeToReal (void)

Calculates the timmer speed to the real speed.

Returns

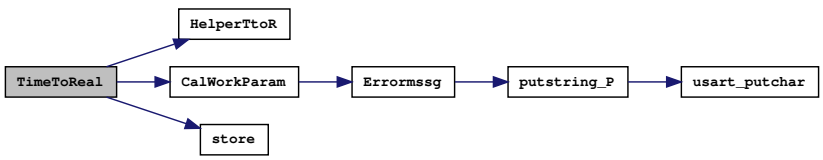
void

Definition at line 652 of file drv_8825.c.

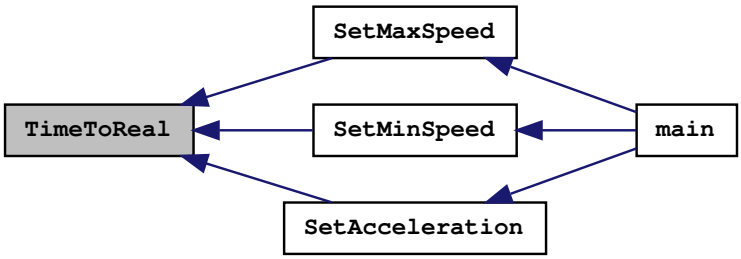
```
653 {
654     uint16_t r;
655     RealSpeed.MaxSpeed=HelperTtoR(TimeParam.
    MaxSpeed);
656     RealSpeed.MinSpeed=HelperTtoR(TimeParam.
    MinSpeed);
657
```

```
658 /*
659
660
661     //const uint64_t l=1000000000*60;
662
663     r = TimeParam.MaxSpeed;
664
665     r = r * PERTMR;
666     r = r*StepsPerRev;
667     r = 10000000000 / r;
668     r = r * 6;
669
670
671
672
673     if ( r > 1 )
674     {
675         RealSpeed.MaxSpeed = r;
676     } else
677     {
678         RealSpeed.MaxSpeed = 1;
679         //putstring_P( PSTR( "Target MaxSpeed\r" ) );
680     }
681
682
683     r = TimeParam.MinSpeed;
684     r = r * PERTMR;
685     r = r*StepsPerRev;
686     r = 60000000000 / r;
687     //r=r*6;
688
689
690     if ( r > 1 )
691     {
692         RealSpeed.MinSpeed = r;
693     } else
694     {
695         RealSpeed.MinSpeed = 1;
696         //putstring_P( PSTR( "Target Minspeed\r" ) );
697     }
698
699 */
700
701     r = ( TimeParam.MinSpeed - TimeParam.MaxSpeed ) /
      TimeParam.Acceleration;
702
703     if ( r < 1 )
704     {
705         RealSpeed.Acceleration = 1;
706         //putstring_P( PSTR( "Acc low\r" ) );
707     } else
708     {
709         RealSpeed.Acceleration = r;
710     }
711
712     CalWorkParam( );
713     store( );
714 }
```

Here is the call graph for this function:



Here is the caller graph for this function:



5.2.3.36 void Way_Speed (step_type *step*)

Movement with constant speed and constant rPM

See Also

step_type

Parameters

step	the first argument.

Returns

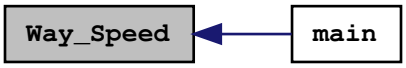
void

Definition at line 339 of file drv_8825.c.

```
340 {
341     ConstSpd = 1;
342     Count_Step( step, 60000 );
343 }
```

Here is the call graph for this function:

Here is the caller graph for this function:



5.3 main Library

This turns on the motor and directly goes in the continuos loop for controlling it.

Functions

- void Init_Input_Output (void)
- void test (void)

5.3.1 Detailed Description

This turns on the motor and directly goes in the continuos loop for controlling it.

```
#include <main.h>
```

This turns on the motor and directly goes in the continuos loop for controlling it.

Note

this is whear all the magic happens

Author

Bilyana Borisova bibishte@gmail.com

5.3.2 Function Documentation

5.3.2.1 void Init_Input_Output (void)

Initial initialisation of input and output of microcontroller

Returns

void

Definition at line 561 of file main.c.

```
562 {
563     //input init
564 
565     set_as_input( DRXD, RXD );
566     set_as_input( DHOME, HOME );
567     set_as_input( DSCL, SCL );
568     set_as_input( DMISO, MISO );
569     set_as_input( DFAULT, FAULT );
570 
571     set_bit( PRXD, RXD );
572     set_bit( PSCL, SCL );
573     set_bit( PMISO, MISO );
574     set_bit(PHOME, HOME);
575 
576     //output init
577 
578     set_as_output( DENABLE_STEPPER, ENABLE_STEPPER );
579     set_as_output( DTXD, TXD );
580     set_as_output( DMODE0, MODE0 );
581     set_as_output( DMODE1, MODE1 );
582     set_as_output( DMODE2, MODE2 );
583     set_as_input( DDECAY, DECAY );
584     set_as_output( DSTEP, STEP );
585     set_as_output( DMOSI, MOSI );
586     set_as_output( DDIRECTION, DIRECTION );
587     set_as_output( DDIR_485, DIR_485 );
588 
```

```
589     set_bit( PENABLE_STEPPER, ENABLE_STEPPER );
590     clr_bit( PMODE0, MODE0 );
591     clr_bit( PMODE1, MODE1 );
592     clr_bit( PMODE2, MODE2 );
593     clr_bit( PDECAY, DECAY );
594     clr_bit( PDIRECTION, DIRECTION );
595     set_bit( PDIR_485, DIR_485 );
596
597 }
```

Here is the caller graph for this function:

5.3.2.2 void test (void)

Just for testing

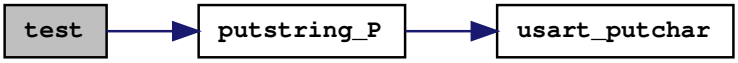
Returns

void

Definition at line 603 of file main.c.

```
604 {
605     putstring_P( PSTR( "Test?" ) );
606
607 }
```

Here is the call graph for this function:



Here is the caller graph for this function:

5.4 messages Library

This module contains functions that are printing messages.

Functions

- void Acc (void)
- void ADec (void)
- void Errormssg (void)
- void FDec (void)
- void Fstep (void)
- void HStep (void)
- void M16Step (void)
- void M32Step (void)
- void M8Step (void)
- void Maxspeed (void)
- void Minspeed (void)
- void Qstep (void)
- void RAcc (void)
- void RMaxSpd (void)
- void RMinSpd (void)
- void SDec (void)
- void SptRevol (void)
- void Stop (void)

5.4.1 Detailed Description

This module contains functions that are printing messages.

```
#include <messages.h>
```

This module contains functions that are printing stuff

Note

Typical functions that are saving me memory.

Author

Bilyana Borisova bibishte@gmail.com

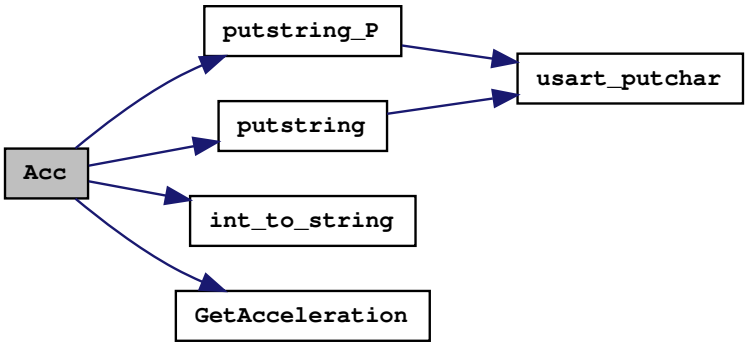
5.4.2 Function Documentation

5.4.2.1 void Acc (void)

Definition at line 77 of file messages.c.

```
78 {
79     putstring_P( PSTR( "Acc=" ) );
80     putstring( int_to_string( ( uint64_t ) (
      GetAcceleration( ) ) ) );
81     putstring_P( PSTR( "\r" ) );
82 }
```

Here is the call graph for this function:



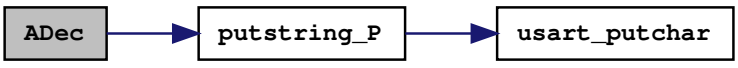
Here is the caller graph for this function:

5.4.2.2 void ADec (void)

Definition at line 42 of file messages.c.

```
43 {
44     putstring_P( PSTR( "ADec\r" ) );
45 }
```

Here is the call graph for this function:



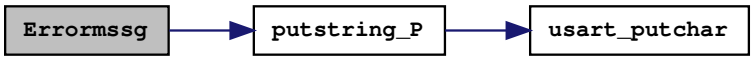
Here is the caller graph for this function:

5.4.2.3 void Errormssg (void)

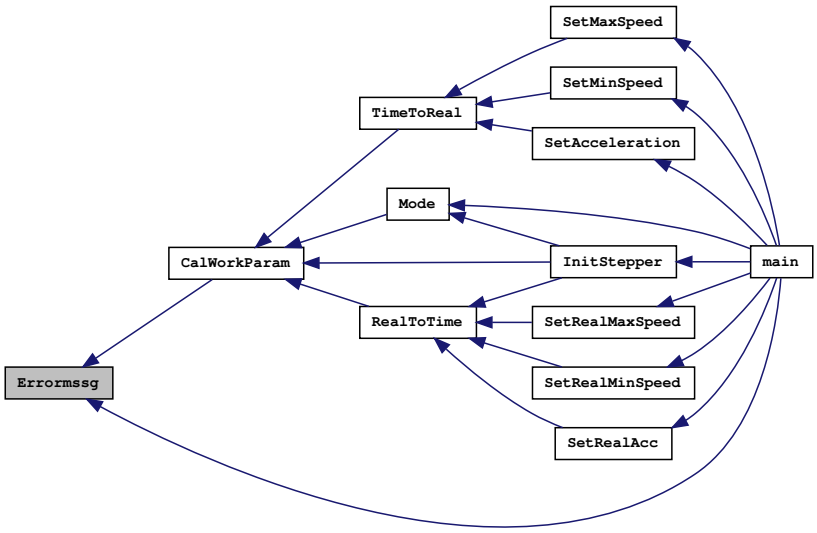
Definition at line 91 of file messages.c.

```
92 {
93     putstring_P( PSTR( "ERROR\r" ) );
94 }
```

Here is the call graph for this function:



Here is the caller graph for this function:

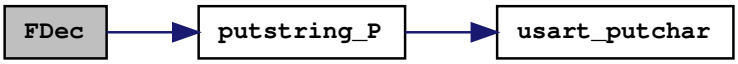


5.4.2.4 void FDec (void)

Definition at line 37 of file messages.c.

```
38 {
39     putstring_P( PSTR( "FDec\r" ) );
40 }
```

Here is the call graph for this function:



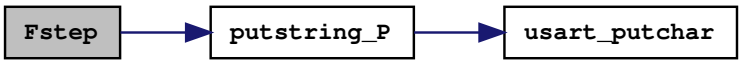
Here is the caller graph for this function:

5.4.2.5 void Fstep (void)

Definition at line 47 of file messages.c.

```
48 {
49     putstring_P( PSTR( "full step\r" ) );
50 }
```

Here is the call graph for this function:



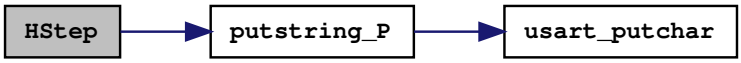
Here is the caller graph for this function:

5.4.2.6 void HStep (void)

Definition at line 52 of file messages.c.

```
53 {
54     putstring_P( PSTR( "half step\r" ) );
55 }
```

Here is the call graph for this function:



Here is the caller graph for this function:

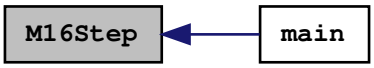
5.4.2.7 void M16Step (void)

Definition at line 67 of file messages.c.

```
68 {
69     putstring_P( PSTR( "16 microsteps\r" ) );
70 }
```

Here is the call graph for this function:

Here is the caller graph for this function:



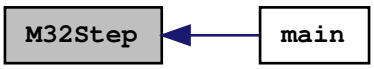
5.4.2.8 void M32Step (void)

Definition at line 72 of file messages.c.

```
73 {
74     putstring_P( PSTR( "32 microsteps\r" ) );
75 }
```

Here is the call graph for this function:

Here is the caller graph for this function:

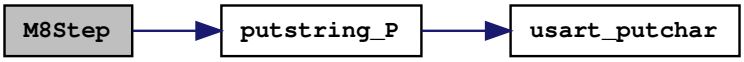


5.4.2.9 void M8Step (void)

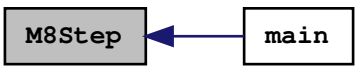
Definition at line 62 of file messages.c.

```
63 {
64     putstring_P( PSTR( "8 microsteps\r" ) );
65 }
```

Here is the call graph for this function:



Here is the caller graph for this function:

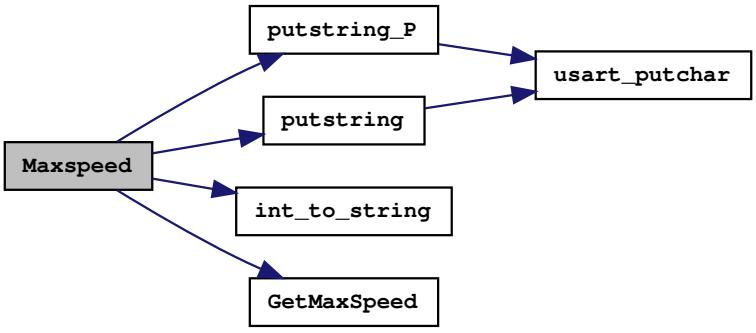


5.4.2.10 void Maxspeed (void)

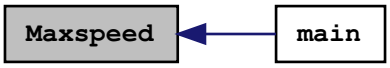
Definition at line 96 of file messages.c.

```
97 {
98     putstring_P( PSTR( "MaxSPD=" ) );
99     putstring( int_to_string( ( uint64_t ) ( GetMaxSpeed( ) ) ) );
100     putstring_P( PSTR( "\r" ) );
101 }
```

Here is the call graph for this function:



Here is the caller graph for this function:

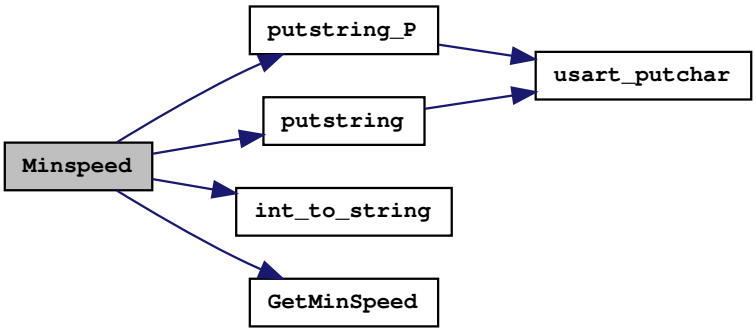


5.4.2.11 void Minspeed (void)

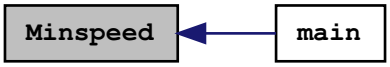
Definition at line 84 of file messages.c.

```
85 {
86     putstring_P( PSTR( "MinSPD=" ) );
87     putstring( int_to_string( ( uint64_t ) ( GetMinSpeed( ) ) ) );
88     putstring_P( PSTR( "\r" ) );
89 }
```

Here is the call graph for this function:



Here is the caller graph for this function:

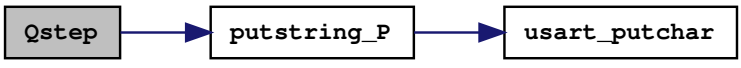


5.4.2.12 void Qstep (void)

Definition at line 57 of file messages.c.

```
58 {
59     putstring_P( PSTR( "quater step\r" ) );
60 }
```

Here is the call graph for this function:



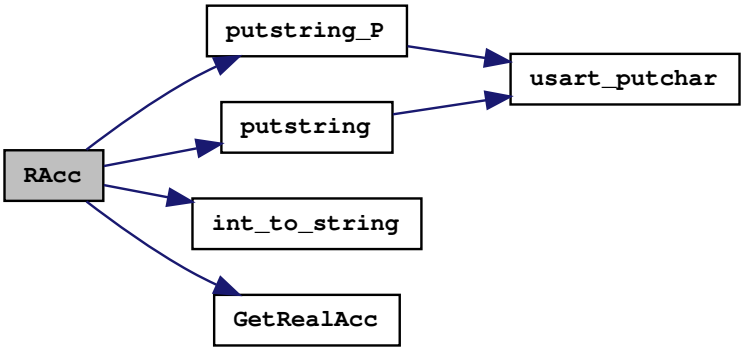
Here is the caller graph for this function:

5.4.2.13 void RAcc (void)

Definition at line 124 of file messages.c.

```
125 {
126     putstring_P( PSTR( "RAcc=" ) );
127     putstring( int_to_string( ( uint16_t ) ( GetRealAcc( ) ) ) );
128     putstring_P( PSTR( "\r" ) );
129 }
```

Here is the call graph for this function:



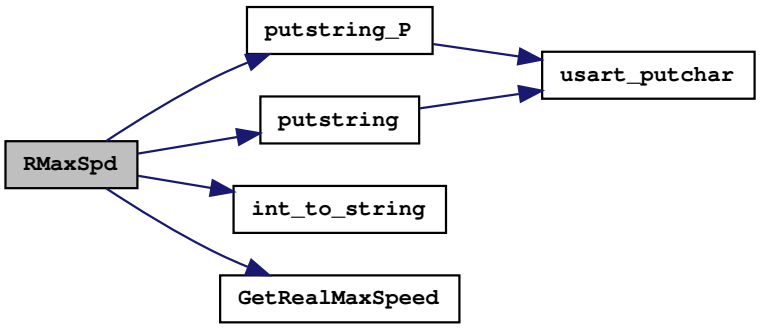
Here is the caller graph for this function:

5.4.2.14 void RMaxSpd (void)

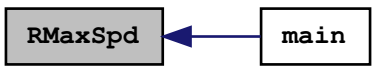
Definition at line 117 of file messages.c.

```
118 {
119     putstring_P( PSTR( "RMaxSPD=" ) );
120     putstring( int_to_string( ( uint64_t ) (
      GetRealMaxSpeed( ) ) ) );
121     putstring_P( PSTR( "\r" ) );
122 }
```

Here is the call graph for this function:



Here is the caller graph for this function:

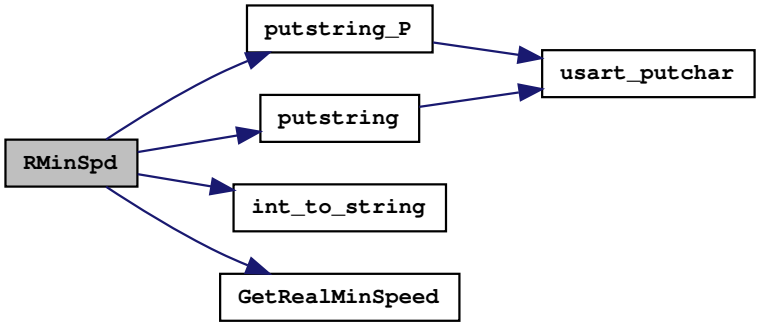


5.4.2.15 void RMinSpd (void)

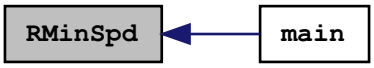
Definition at line 110 of file messages.c.

```
111 {
112     putstring_P( PSTR( "RMinSpd=" ) );
113     putstring( int_to_string( ( uint16_t ) (
      GetRealMinSpeed( ) ) ) );
114     putstring_P( PSTR( "\r" ) );
115 }
```

Here is the call graph for this function:



Here is the caller graph for this function:

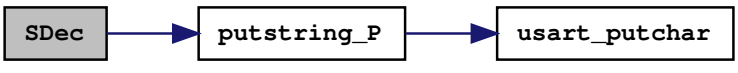


5.4.2.16 void SDec (void)

Definition at line 32 of file messages.c.

```
33 {
34     putstring_P( PSTR( "SDec\r" ) );
35 }
```

Here is the call graph for this function:



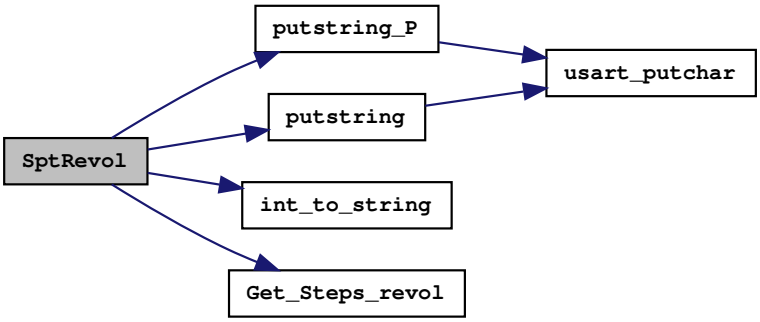
Here is the caller graph for this function:

5.4.2.17 void SptRevol (void)

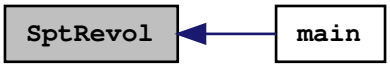
Definition at line 103 of file messages.c.

```
104 {
105     putstring_P( PSTR( "SPR=" ) );
106     putstring( int_to_string( ( uint16_t ) (
      Get_Steps_revol( ) ) ) );
107     putstring_P( PSTR( "\r" ) );
108 }
```

Here is the call graph for this function:



Here is the caller graph for this function:

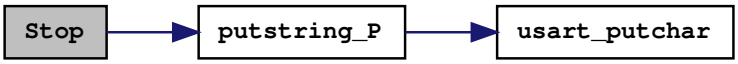


5.4.2.18 void Stop (void)

Definition at line 131 of file messages.c.

```
132 {
133     putstring_P( PSTR( "Stop" ) );
134 }
```

Here is the call graph for this function:



Here is the caller graph for this function:

5.5 UART Library

Interrupt UART library using the built-in UART with transmit and receive circular buffers.

Macros

- #define USART_BAUD_SELECT(baudRate, xtalCpu) ((xtalCpu)/((baudRate)∗16l)-1)

  USART Baudrate Expression.
- #define USART_BAUD_SELECT_DOUBLE_SPEED(baudRate, xtalCpu) (((xtalCpu)/((baudRate)∗8l)-1)|0x8000)

  USART Baudrate Expression for ATmega double speed mode.
- #define VEOL (char) 0x0d

Functions

- int usart_getchar (FILE ∗stream)

  Get received byte from ringbuffer.
- void usart_init (unsigned int)

  Initialize USART and set baudrate.
- int usart_putchar (char c, FILE ∗stream)

  Put byte to ringbuffer for transmitting via UART.

5.5.1 Detailed Description

Interrupt UART library using the built-in UART with transmit and receive circular buffers.

```
#include <usart.h>
```

This library can be used to transmit and receive data through the built in UART.

An interrupt is generated when the UART has finished transmitting or receiving a byte. The interrupt handling routines use circular buffers for buffering received and transmitted data.

The UART_RX_BUFFER_SIZE and UART_TX_BUFFER_SIZE constants define the size of the circular buffers in bytes. Note that these constants must be a power of 2. You may need to adapt this constants to your target and your application by adding CDEFS += -DUART_RX_BUFFER_SIZE=nn -DUART_RX_BUFFER_SIZE=nn to your Makefile.

Note

Based on Atmel Application Note AVR306

Author

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5.5.2 Macro Definition Documentation

5.5.2.1 #define USART_BAUD_SELECT(*baudRate, xtalCpu*) ((xtalCpu)/((baudRate)∗16l)-1)

USART Baudrate Expression.

Parameters

xtalcpu	system clock in Mhz, e.g. 4000000L for 4Mhz
baudrate	baudrate in bps, e.g. 1200, 2400, 9600

Definition at line 87 of file usart.h.

5.5.2.2 #define USART_BAUD_SELECT_DOUBLE_SPEED(*baudRate, xtalCpu*) (((xtalCpu)/((baudRate)∗8l)-1)|0x8000)

USART Baudrate Expression for ATmega double speed mode.

Parameters

xtalcpu	system clock in Mhz, e.g. 4000000L for 4Mhz
baudrate	baudrate in bps, e.g. 1200, 2400, 9600

Definition at line 93 of file usart.h.

5.5.2.3 #define VEOL (char) 0x0d

End of line character.

Definition at line 98 of file usart.h.

5.5.3 Function Documentation

5.5.3.1 int usart_getchar (FILE ∗ *stream*)

Get received byte from ringbuffer.

Returns in the lower byte the received character and in the higher byte the last receive error. UART_NO_DATA is returned when no data is available.

Parameters

void	

Returns

lower byte: received byte from ringbuffer
higher byte: last receive status

- **0** successfully received data from UART
- **UART_NO_DATA**
  no receive data available
- **UART_BUFFER_OVERFLOW**
  Receive ringbuffer overflow. We are not reading the receive buffer fast enough, one or more received character have been dropped
- **UART_OVERRUN_ERROR**
  Overrun condition by UART. A character already present in the UART UDR register was not read by the interrupt handler before the next character arrived, one or more received characters have been dropped.
- **UART_FRAME_ERROR**
  Framing Error by UART

Read byte from ring buffer

Parameters

FILE	stream

Returns

byte from ring buffer

Definition at line 128 of file usart.c.

```
129 {
130     uint8_t c;
131 
132     if (usart_rx.fillcount == 0)
133         return EOF;
134 
135     if (usart_rx.nlines == 0)
136         return EOF;
137 
138     c = usart_rx.data[usart_rx.tail];
139     usart_rx.tail = (usart_rx.tail + 1) & (usart_rx.
      size - 1);
140 
141     //Disable RXC interrupt to run next lines atomic
142     UCSR0B &= ~(1 << RXCIE0);
143     usart_rx.fillcount--;
144 
145     //Behavior similar to Unix stty ICRNL
146     if (c == VEOL)
147     {
148         c = '\n';
149         usart_rx.nlines--;
150     }
151 
152     //Enable RXC interrupt
153     UCSR0B |= (1 << RXCIE0);
154 
155     return c;
156 }/* usart_getchar */
```

5.5.3.2 void usart_init (unsigned int *baudrate*)

Initialize USART and set baudrate.

Parameters

baudrate	Specify baudrate using macro UART_BAUD_SELECT()

Returns

none

Initialize USART and set baudrate Baudrate using macro USART_BAUD_SELECT()

Parameters

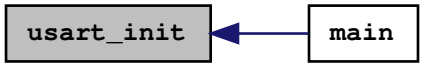
baudrate	

Definition at line 69 of file usart.c.

```
70 {
71     ATOMIC_BLOCK(ATOMIC_RESTORESTATE)
72     {
73         usart_rx.data = brx;
74         usart_rx.size = BSIZE;
75         usart_rx.head = 0;
76         usart_rx.tail = 0;
77         usart_rx.fillcount = 0;
78         usart_rx.nlines = 0;
79 
80         usart_tx.data = btx;
81         usart_tx.size = BSIZE;
```

```
82          usart_tx.head = 0;
83          usart_tx.tail = 0;
84          usart_tx.fillcount = 0;
85          usart_tx.nlines = 0;
86
87          /* Set baud rate */
88          if (baudrate & 0x8000)
89          {
90              UCSR0A = (1 << U2X0); //Enable 2x speed
91              baudrate &= ~0x8000;
92          }
93          UBRR0H = (unsigned char) (baudrate >> 8);
94          UBRR0L = (unsigned char) baudrate;
95
96 #if (USART0_TYPE) == 485

97
98 #if  defined(__AVR_ATmega8__)  || defined(__AVR_ATmega16__) || defined(__AVR_ATmega32__) \

99   || defined(__AVR_ATmega323__)

100         PORTD |= (1 << PD0); //pull-up RX0
101 #elif defined(__AVR_ATmega162__)

102         PORTB |= (1 << PB2); //pull-up RX1
103 #else

104 #error "RX port is not internally pulled up"

105 #endif

106
107         //Receiver output enable
108         transmitter0_disable();
109         set_as_output(DDRB, transceiver0);
110
111         //Enable USART0 receiver and transmitter, receive complete
112         //and transmit complete interrupt.
113         UCSR0B = (1 << RXCIE0) | (1 << TXCIE0) | (1 << RXEN0) | (1 <<
      TXEN0);
114 #else

115         /* Enable USART receiver and transmitter and receive complete interrupt */
116         UCSR0B = (1 << RXCIE0) | (1 << RXEN0) | (1 << TXEN0);
117 #endif

118         /* Set frame format: asynchronous, 8data, no parity, 1stop bit */
119         UCSR0C = (1 << URSEL0) | (1 << UCSZ01) | (1 << UCSZ00);
120     }
121 }/* usart_init */
```

Here is the caller graph for this function:



5.5.3.3 int usart_putchar (char *c*, FILE * *stream*)

Put byte to ringbuffer for transmitting via UART.

Parameters

data	byte to be transmitted

Returns

none

Write byte to ring buffer for transmitting via USART

Parameters

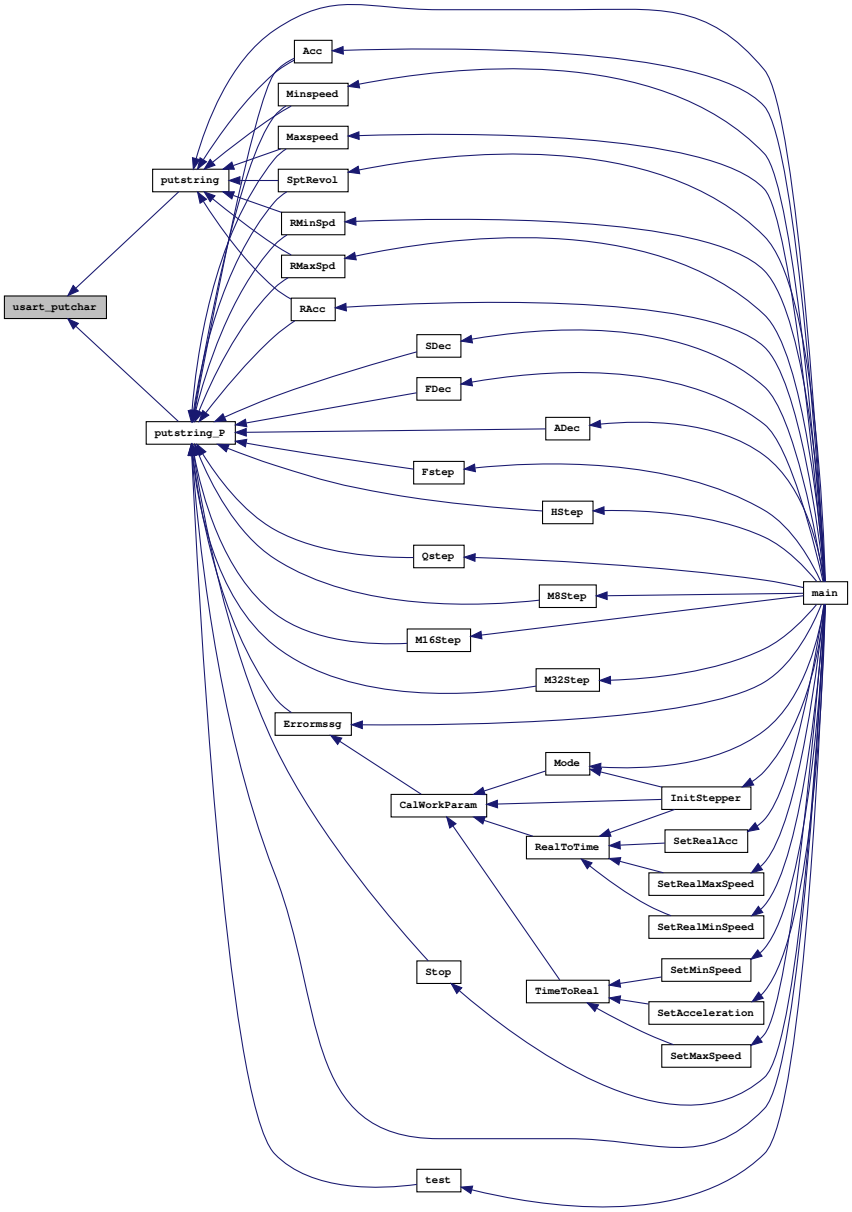
c	byte to be transmitted
stream	

Returns

Definition at line 164 of file usart.c.

```
165 {
166 #if (USART0_TYPE) == 485

167     //Driver output enable
168     transmitter0_enable();
169 #endif

170
171     if (c == '\n')
172         c = VEOL;
173
174     while (usart_tx.fillcount == usart_tx.size)
175         ; //wait for free space in buffer
176
177     usart_tx.data[usart_tx.head] = c;
178     usart_tx.head = (usart_tx.head + 1) & (usart_tx.
      size - 1);
179
180     //Disable UDRE interrupt to run next lines atomic
181     UCSR0B &= ~(1 << UDRIE0);
182
183     usart_tx.fillcount++;
184
185     //Enable UDRE interrupt
186     UCSR0B |= (1 << UDRIE0);
187
188     return 0;
189 }/* usart_putchar */
```

Here is the caller graph for this function:



5.6 utils Library

This module contains functions that are converting ASCI to uint64_t.

Functions

- uint64_t ConvertASCItouint64 (char *in)
- char * int_to_string (uint64_t i)
- void putstring (const char *putc)
- void putstring_P (const char *putc)

5.6.1 Detailed Description

This module contains functions that are converting ASCI to uint64_t.

```
#include <utils.h>
```

This module contains functions that are converting ASCI to uint64_t

Note

Typical functions that are saving me memory.

Author

Bilyana Borisova bibishte@gmail.com

5.6.2 Function Documentation

5.6.2.1 uint64_t ConvertASCItouint64 (char * *in*)

Function that converts ASCI to uint64_t

Parameters

in	the first argument.

Returns

uint64_t

Definition at line 45 of file utils.c.

```
46 {
47     char *b;
48     uint64_t c=0;
49     uint64_t multi=1;
50 
51     b = in;
52 
53     while ( ( (*b > 47) && (*b < 58 )) || ( *b == 32 ) || ( *b == 46 ) || ( *b ==44 ) )
54     {
55         b++;
56     }
57 
58     while(b>=in)
59     {
60         if(( (*b > 47) && (*b < 58 )))
61         {
62             c=c+multi*(*b-'0');
63             multi=multi*10;
64         }
```

```
65
66          b--;
67      }
68      return c;
69  }
```

Here is the caller graph for this function:

5.6.2.2 char* int_to_string (uint64_t *i*)

Function that converts intiger to string.

Parameters

t	the first argument.

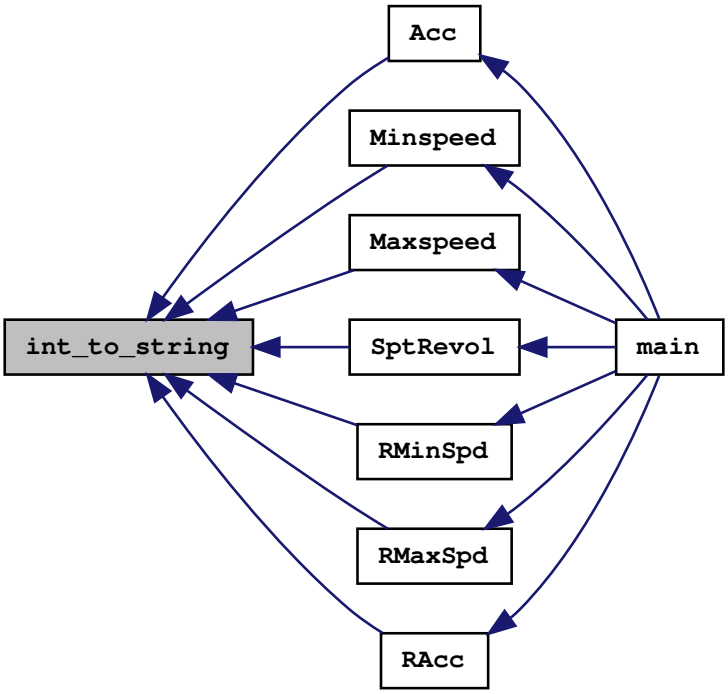
Returns

char

Definition at line 76 of file utils.c.

```
77  {
78      unsigned char temp;
79      unsigned char s = 0,t = 0;
80      if(i==0)
81      {
82          buf[0]='0';
83          buf[1]=0;
84          return buf;
85      }
86      while(i) {
87          buf[s++] = i % 10 + '0';
88          i /= (uint64_t)(10);
89      }
90      buf[s] = 0;
91      s--1;
92      for(;t<s;t++,s--) {
93          temp = buf[s];
94          buf[s]=buf[t];
95          buf[t] = temp;
96      }
97      return buf;
98  }
```

Here is the caller graph for this function:



5.6.2.3 void putstring (const char * *putc*)

Function that reaplaces the printf for uint64_t.

Parameters

putc	the first argument.

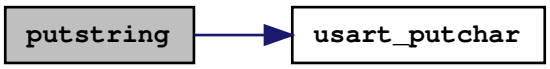
Returns

void

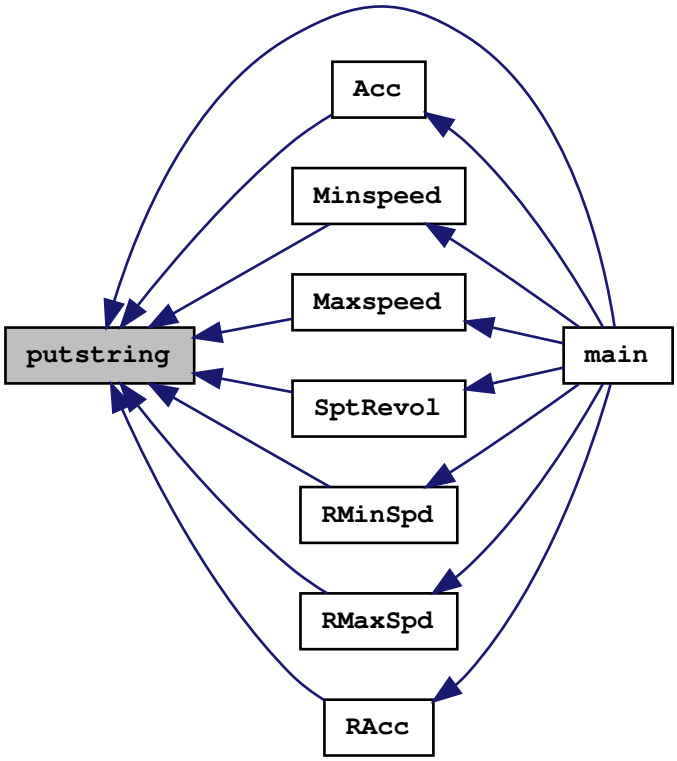
Definition at line 105 of file utils.c.

```
106 {
107     const char *p;
108     p=putc;
109     while (*p!=0)
110     {
111         usart_putchar(*p, stdout);
112         p++;
113     }
114
115     return;
116 }
```

Here is the call graph for this function:



Here is the caller graph for this function:



5.6.2.4 void putstring_P (const char * *putc*)

Function that reaplaces the printf from Programme memmory space.

Parameters

putc	the first argument.

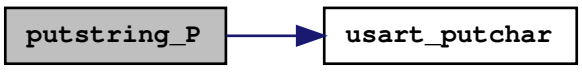
Returns

void

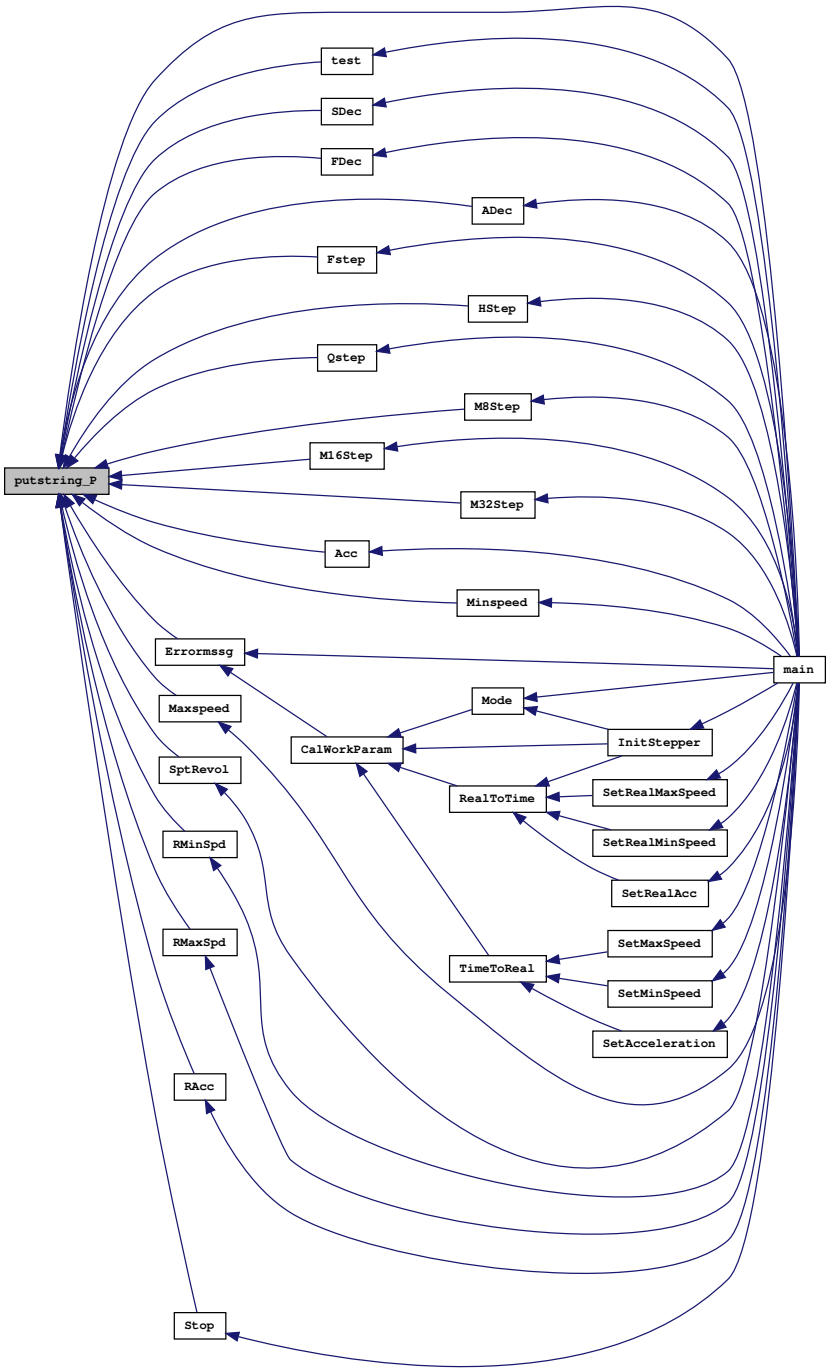
Definition at line 124 of file utils.c.

```
125 {
126     while (pgm_read_byte ( putc )!=0)
127     {
128         usart_putchar(pgm_read_byte ( putc ), stdout);
129         putc++;
130     }
131 
132     return;
133 }
```

Here is the call graph for this function:



Here is the caller graph for this function:

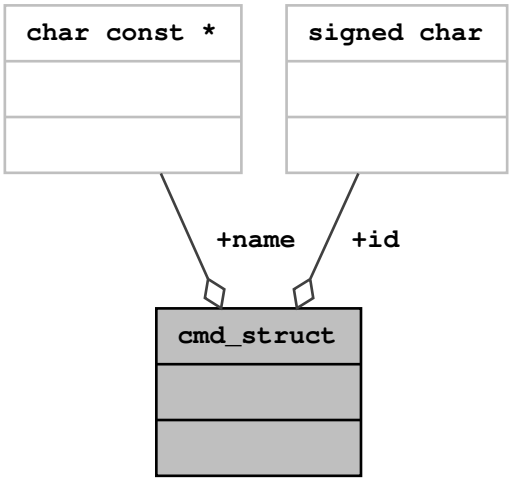


Chapter 6

Data Structure Documentation

6.1 cmd_struct Struct Reference

Collaboration diagram for cmd_struct:



Data Fields

- signed char id
- char const * name

6.1.1 Detailed Description

Definition at line 13 of file interpreter.c.

6.1.2 Field Documentation

6.1.2.1 signed char cmd_struct::id

Definition at line 15 of file interpreter.c.

6.1.2.2 char const* cmd_struct::name

Definition at line 16 of file interpreter.c.

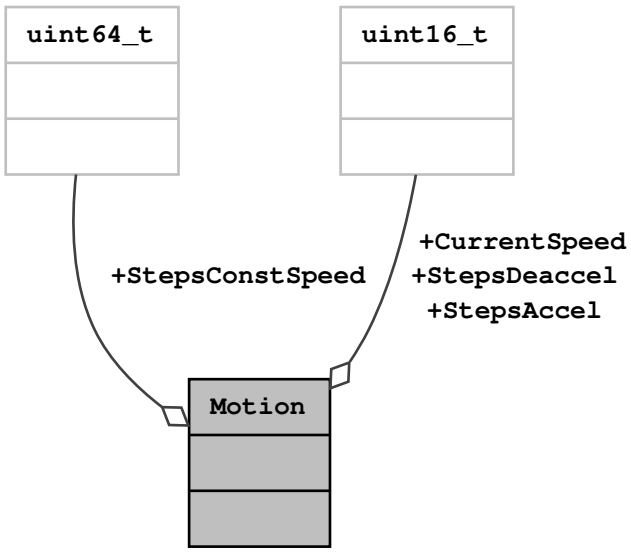
The documentation for this struct was generated from the following file:

- interpreter.c

6.2 Motion Struct Reference

This structure defines the current step execution status. This structure is used for the timmer interrupting and in the comments for initializing the spin.

Collaboration diagram for Motion:



Data Fields

- uint16_t CurrentSpeed
- uint16_t StepsAccel
- uint64_t StepsConstSpeed
- uint16_t StepsDeaccel

6.2.1 Detailed Description

This structure defines the current step execution status. This structure is used for the timmer interrupting and in the comments for initializing the spin.

Definition at line 73 of file drv_8825.c.

6.2.2 Field Documentation

6.2.2.1 Motion::CurrentSpeed

Member 'CurrentSpeed' defines current speed saved in the timmer

Definition at line 78 of file drv_8825.c.

6.2.2.2 Motion::StepsAccel

Member 'StepsAccel' defines the remaining steps for acceleration process

Definition at line 75 of file drv_8825.c.

6.2.2.3 Motion::StepsConstSpeed

Member 'StepsConstSpeed' defines remaining steps for constant speed

Definition at line 76 of file drv_8825.c.

6.2.2.4 Motion::StepsDeaccel

Member 'StepsDeaccel' defines the remaining steps for deacceleration

Definition at line 77 of file drv_8825.c.

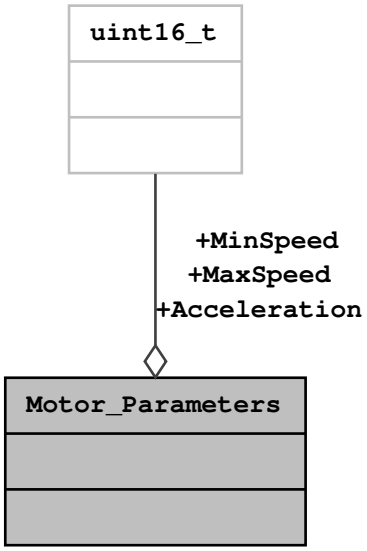
The documentation for this struct was generated from the following file:

- drv_8825.c

6.3 Motor_Parameters Struct Reference

This structure defines types for motor parameters This type is used for declaration of three structures that are for the motor paramenters used for timmer, the real parameters of the motor and the working parameters that have been already calculated according to the microstep mode.

Collaboration diagram for Motor_Parameters:



Data Fields

- uint16_t Acceleration
- uint16_t MaxSpeed
- uint16_t MinSpeed

6.3.1 Detailed Description

This structure defines types for motor parameters This type is used for declaration of three structures that are for the motor paramenters used for timmer, the real parameters of the motor and the working parameters that have been already calculated according to the microstep mode.

Definition at line 52 of file drv_8825.c.

6.3.2 Field Documentation

6.3.2.1 Motor_Parameters::Acceleration

Member 'Acceleration' defines the step of acceleration

Definition at line 56 of file drv_8825.c.

6.3.2.2 Motor_Parameters::MaxSpeed

Member 'MaxSpeed' defines the maximum allowed speed

Definition at line 54 of file drv_8825.c.

6.3.2.3 Motor_Parameters::MinSpeed

Member 'MinSpeed' defines the minimum allowed speed

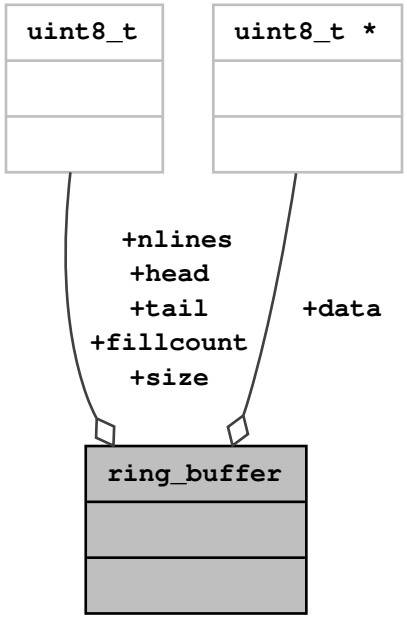
Definition at line 55 of file drv_8825.c.

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

- drv_8825.c

6.4 ring_buffer Struct Reference

Collaboration diagram for ring_buffer:



Data Fields

- uint8_t * data
- uint8_t fillcount
- uint8_t head
- uint8_t nlines
- uint8_t size
- uint8_t tail

6.4.1 Detailed Description

Definition at line 39 of file usart.c.

6.4.2 Field Documentation

6.4.2.1 uint8_t* ring_buffer::data

Definition at line 41 of file usart.c.

6.4.2.2 uint8_t ring_buffer::fillcount

Definition at line 45 of file usart.c.

6.4.2.3 uint8_t ring_buffer::head

Definition at line 43 of file usart.c.

6.4.2.4 uint8_t ring_buffer::nlines

Definition at line 46 of file usart.c.

6.4.2.5 uint8_t ring_buffer::size

Definition at line 42 of file usart.c.

6.4.2.6 uint8_t ring_buffer::tail

Definition at line 44 of file usart.c.

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

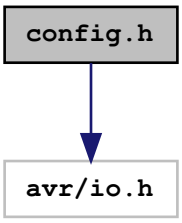
- usart.c

Chapter 7

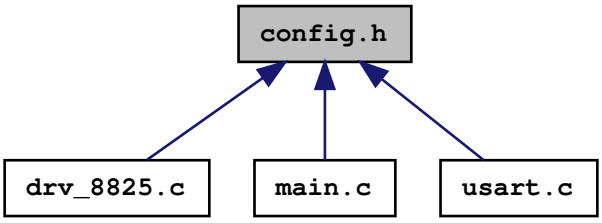
File Documentation

7.1 config.h File Reference

`#include <avr/io.h>`
Include dependency graph for config.h:



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



Macros

- #define check_pin(PINx, PINxn) (PINx & (1 << PINxn))

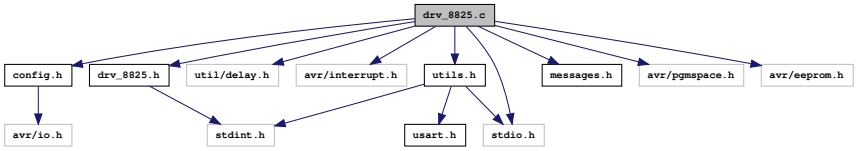
- #define CHECKPIN(x, y) ((x&(1<<y))!=0?1:0)
- #define clr_bit(byte, bit) byte &= ~(1 << bit)
- #define clr_port(PORTx, PORTxn) PORTx &= ~(1 << PORTxn)
- #define DDECAY DDRC
- #define DDIR_485 DDRB
- #define DDIRECTION DDRB
- #define DECAY PC1
- #define DENABLE_STEPPER DDRD
- #define DFAULT DDRB
- #define DHOME DDRC
- #define DIR_485 PB0
- #define DIRECTION PB2
- #define DMISO DDRB
- #define DMODE0 DDRC
- #define DMODE1 DDRC
- #define DMODE2 DDRC
- #define DMOSI DDRB
- #define DRXD DDRD
- #define DSCL DDRB
- #define DSTEP DDRC
- #define DTXD DDRD
- #define ENABLE_STEPPER PD5
- #define false 1!=1
- #define FAULT PB1
- #define HOME PC2
- #define IDECAY PINC
- #define IDIR_485 PINB
- #define IDIRECTION PINB
- #define IENABLE_STEPPER PIND
- #define IFAULT PINB
- #define IHOME PINC
- #define IMISO PINB
- #define IMODE0 PINC
- #define IMODE1 PINC
- #define IMODE2 PINC
- #define IMOSI PINB
- #define IRXD PIND
- #define ISCL PINB
- #define ISTEP PINC
- #define ITXD PIND
- #define MISO PB4
- #define MODE0 PC3
- #define MODE1 PC4
- #define MODE2 PC5
- #define MOSI PB3
- #define PDECAY PORTC
- #define PDIR_485 PORTB
- #define PDIRECTION PORTB
- #define PENABLE_STEPPER PORTD
- #define PFAULT PORTB
- #define PHOME PORTC
- #define PMISO PORTB
- #define PMODE0 PORTC
- #define PMODE1 PORTC
- #define PMODE2 PORTC

- #define PMOSI PORTB
- #define PRXD PORTD
- #define PSCL PORTB
- #define PSTEP PORTC
- #define PTXD PORTD
- #define RXD PD0
- #define SCL PB5
- #define set_as_input(DDRx, DDxn) DDRx &= ~(1 << DDxn)
- #define set_as_output(DDRx, DDxn) DDRx |= (1 << DDxn)
- #define set_bit(byte, bit) byte |= (1 << bit)
- #define set_port(PORTx, PORTxn) PORTx |= (1 << PORTxn)
- #define STEP PC0
- #define true 1==1
- #define TXD PD1

7.2 drv_8825.c File Reference

```
#include "drv_8825.h"
#include "config.h"
#include <util/delay.h>
#include <avr/interrupt.h>
#include <stdio.h>
#include "utils.h"
#include "messages.h"
#include <avr/pgmspace.h>
#include <avr/eeprom.h>
```

Include dependency graph for drv_8825.c:



Data Structures

- struct Motion

  This structure defines the current step execution status. This structure is used for the timmer interrupting and in the comments for initializing the spin.

- struct Motor_Parameters

  This structure defines types for motor parameters This type is used for declaration of three structures that are for the motor paramenters used for timmer, the real parameters of the motor and the working parameters that have been already calculated according to the microstep mode.

Macros

- #define PERTMR 723
- #define TIMERCONST 82987552

Typedefs

- typedef struct Motor_Parameters Motor_Parameters

Functions

- void CalWorkParam (void)
- void Count_Step (step_type step, uint64_t step_count)
- void Decay (decay_type decay)
- void Disabled_Stepper (void)
- void Enable_Stepper (void)
- decay_type Get_Decay (void)
- mode_type Get_Mode (void)
- uint8_t Get_Start (void)
- uint16_t Get_Steps_revol (void)
- uint16_t GetAcceleration (void)
- uint16_t GetCurrentSpeed (void)
- uint16_t GetMaxSpeed (void)
- uint16_t GetMinSpeed (void)
- uint16_t GetRealAcc (void)
- uint16_t GetRealMaxSpeed (void)
- uint16_t GetRealMinSpeed (void)
- uint64_t HelperRtoT (uint64_t in)
- uint64_t HelperTtoR (uint64_t in)
- uint8_t Home (void)
- void InitStepper (void)
- ISR (TIMER1_OVF_vect)
- void Mode (mode_type mode)
- void RealToTime (void)
- void Set_Steps_revol (uint16_t step_rev)
- void SetAcceleration (uint16_t accel)
- void SetCurrentSpeed (uint16_t spd)
- void SetMaxSpeed (uint16_t spd)
- void SetMinSpeed (uint16_t spd)
- void SetRealAcc (uint16_t realacc)
- void SetRealMaxSpeed (uint16_t maxspd)
- void SetRealMinSpeed (uint16_t minspd)
- void Step (step_type step)
- void Stop_Motion_fast (void)
- void Stop_Motion_normal (void)
- void store (void)
- void TimeToReal (void)
- void Way_Speed (step_type step)

Variables

- static volatile uint8_t ConstSpd
- static volatile decay_type CurrentDecay
- static volatile mode_type CurrentMode
- static volatile uint8_t ModeStart
- static volatile struct Motion Motion
- static volatile Motor_Parameters RealSpeed
- static volatile step_type StepDir
- static volatile uint16_t StepsPerRev
- static volatile Motor_Parameters TimeParam
- static volatile Motor_Parameters WorkingParam

7.2.1 Macro Definition Documentation

7.2.1.1 #define PERTMR 723

Defines the Timer

Definition at line 37 of file drv_8825.c.

7.2.1.2 #define TIMERCONST 82987552

Calculate the Timer Constant

Definition at line 38 of file drv_8825.c.

7.2.2 Typedef Documentation

7.2.2.1 typedef struct Motor_Parameters Motor_Parameters

7.2.3 Function Documentation

7.2.3.1 ISR (TIMER1_OVF_vect)

Interrupt sours routine.Makes a step and then loads the next value of the timmer

Definition at line 477 of file drv_8825.c.

```
478 {
479     if ( ConstSpd == 1 )
480     {
481         Motion.StepsConstSpeed++;
482     }
483     if ( Motion.StepsAccel > 0 )
484     {
485         if ( Motion.CurrentSpeed > WorkingParam.
      Acceleration )
486         {
487             Motion.CurrentSpeed = Motion.CurrentSpeed -
      WorkingParam.Acceleration;
488         } else
489         {
490             Motion.CurrentSpeed = WorkingParam.
      MaxSpeed;
491         }
492 
493         if ( Motion.CurrentSpeed < WorkingParam.
      MaxSpeed )
494         {
495             Motion.CurrentSpeed = WorkingParam.
      MaxSpeed;
496         }
497         TCNT1 = 0 - Motion.CurrentSpeed;
498         Step( StepDir );
499         Motion.StepsAccel--;
500 
501         return;
502     }
503 
504     if ( Motion.StepsConstSpeed > 0 )
505     {
506         Motion.StepsConstSpeed--;
507         TCNT1 = 0 - WorkingParam.MaxSpeed;
508         Step( StepDir );
509 
510         return;
511     }
512 
513 
514     if ( Motion.StepsDeaccel > 0 )
515     {
516         Motion.StepsDeaccel--;
517         Motion.CurrentSpeed = Motion.CurrentSpeed +
      WorkingParam.Acceleration;
518         TCNT1 = 0 - Motion.CurrentSpeed;
```

```
519         Step( StepDir );
520
521         return;
522     }
523
524     clr_bit( TIMSK, TOIE1 );
525     TCNT1 = 65535 - WorkingParam.MinSpeed;
526 }
```

Here is the call graph for this function:

7.2.4 Variable Documentation

7.2.4.1 volatile uint8_t ConstSpd [static]

Flag used for constant speed mode.

Definition at line 97 of file drv_8825.c.

7.2.4.2 volatile decay_type CurrentDecay [static]

Store the current decay mode.

Definition at line 102 of file drv_8825.c.

7.2.4.3 volatile mode_type CurrentMode [static]

Store the current step mode.

Definition at line 106 of file drv_8825.c.

7.2.4.4 volatile uint8_t ModeStart [static]

Flog for enable and disable stepper motor

Definition at line 110 of file drv_8825.c.

7.2.4.5 volatile struct Motion Motion [static]

7.2.4.6 volatile Motor_Parameters RealSpeed [static]

This is used for calculating the timer values. This is the real speed of the motor.

Definition at line 93 of file drv_8825.c.

7.2.4.7 volatile step_type StepDir [static]

Flag for stepper direction.

Definition at line 114 of file drv_8825.c.

7.2.4.8 volatile uint16_t StepsPerRev [static]

Motor parameter - Steps per revolution.

Definition at line 119 of file drv_8825.c.

7.2.4.9 volatile Motor_Parameters TimeParam [static]

This is used for calculating the timer values for full step mode.

Definition at line 85 of file drv_8825.c.

7.2.4.10 volatile Motor_Parameters WorkingParam [static]

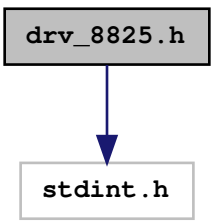
This is used for the timmer and it is calculated based on the mode.

Definition at line 89 of file drv_8825.c.

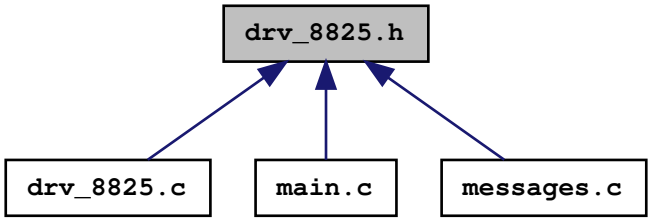
7.3 drv_8825.h File Reference

```
#include <stdint.h>
```

Include dependency graph for drv_8825.h:



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



Enumerations

- enum decay_type { SLOW_DECAY, FAST_DECAY, AUTO_DECAY }

  Type for decay status.
- enum mode_type {
  MODE_FULL_STEP, MODE_HALF_STEP, MODE_QUATER_STEP, MODE_8_MICROSTEP,
  MODE_16_MICROSTEP, MODE_32_MICROSTEP }

  Type for mode status.
- enum step_type { STEP_COUNTER_CLOCKWISE, STEP_CLOCKWISE }

  Type for the direction status.

Functions

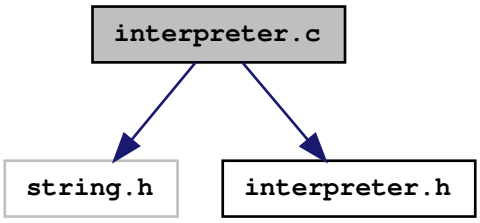
- void CalWorkParam (void)
- void Count_Step (step_type step, uint64_t step_count)
- void Decay (decay_type decay)
- void Disabled_Stepper (void)
- void Enable_Stepper (void)
- decay_type Get_Decay (void)
- mode_type Get_Mode (void)
- uint8_t Get_Start (void)
- uint16_t Get_Steps_revol (void)
- uint16_t GetAcceleration (void)
- uint16_t GetCurrentSpeed (void)
- uint16_t GetMaxSpeed (void)
- uint16_t GetMinSpeed (void)
- uint16_t GetRealAcc (void)
- uint16_t GetRealMaxSpeed (void)
- uint16_t GetRealMinSpeed (void)
- uint64_t HelperRtoT (uint64_t)
- uint64_t HelperTtoR (uint64_t)
- uint8_t Home (void)
- void InitStepper (void)
- void Mode (mode_type mode)
- void RealToTime (void)
- void Set_Steps_revol (uint16_t step_rev)
- void SetAcceleration (uint16_t accel)

- void SetCurrentSpeed (uint16_t spd)
- void SetMaxSpeed (uint16_t spd)
- void SetMinSpeed (uint16_t spd)
- void SetRealAcc (uint16_t realacc)
- void SetRealMaxSpeed (uint16_t maxspd)
- void SetRealMinSpeed (uint16_t minspd)
- void Step (step_type step)
- void Stop_Motion_fast (void)
- void Stop_Motion_normal (void)
- void store (void)
- void TimeToReal (void)
- void Way_Speed (step_type step)

7.4 interpreter.c File Reference

```
#include <string.h>
#include "interpreter.h"
```

Include dependency graph for interpreter.c:



Data Structures

- struct cmd_struct

Functions

- char get_cmd_id (char *name)
- char const * get_cmd_name (char id)

Variables

- struct cmd_struct cmd_tbl []

7.4.1 Function Documentation

7.4.1.1 char get_cmd_id (char * *name*)

Parameters

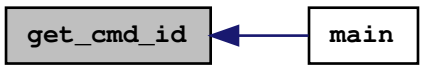
name	

Returns

Definition at line 60 of file interpreter.c.

```
61 {
62     unsigned char i = 0;
63
64     if (name[0] == 0)
65         return -2;
66
67     for (i = 0; cmd_tbl[i].id != -1; i++)
68         if (!strncmp(name, cmd_tbl[i].name,strlen(cmd_tbl[i].name)))
69             return cmd_tbl[i].id;
70
71     return -1;
72 }
```

Here is the caller graph for this function:



7.4.1.2 char const* get_cmd_name (char *id*)

Parameters

id	

Returns

command name or NULL if not found

Definition at line 79 of file interpreter.c.

```
80 {
81     unsigned char i;
82
83     for (i = 0; cmd_tbl[i].id != -1; i++)
84         if (id == cmd_tbl[i].id)
85             return cmd_tbl[i].name;
86
87     return NULL;
88 }
```

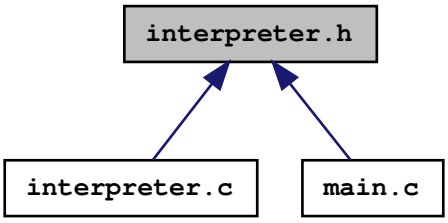
Here is the caller graph for this function:

7.4.2 Variable Documentation

7.4.2.1 struct cmd_struct cmd_tbl[ ]

7.5 interpreter.h File Reference

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



Enumerations

- enum {
  VERSION, HELP, TEST, SET_DEC_SLOW,
  SET_DEC_FAST, SET_DEC_AUTO, SET_MODE_FULL, SET_MODE_HALF,
  SET_MODE_QUATER, SET_MODE_8, SET_MODE_16, SET_MODE_32,
  SET_HOME, SET_ACC, SET_MIN_SPEED, SET_MAX_SPEED,
  SET_STP_REV, SET_R_MIN_SPD, SET_R_MAX_SPD, SET_R_ACC,
  GET_ACC, GET_MIN_SPEED, GET_MAX_SPEED, GET_STP_REV,
  GET_R_MIN_SPD, GET_R_MAX_SPD, GET_R_ACC, ENABLE,
  DISABLE, GOTO, STOPN, STOPF,
  CONSTSPD, STATUS }

Functions

- char get_cmd_id (char ∗)
- char const ∗ get_cmd_name (char)

7.5.1 Enumeration Type Documentation

7.5.1.1 anonymous enum

Enumerator

VERSION

HELP

TEST

SET_DEC_SLOW

SET_DEC_FAST

SET_DEC_AUTO

SET_MODE_FULL

SET_MODE_HALF

SET_MODE_QUATER

SET_MODE_8

SET_MODE_16

SET_MODE_32

SET_HOME

SET_ACC

SET_MIN_SPEED

SET_MAX_SPEED

SET_STP_REV

SET_R_MIN_SPD

SET_R_MAX_SPD

SET_R_ACC

GET_ACC

GET_MIN_SPEED

GET_MAX_SPEED

GET_STP_REV

GET_R_MIN_SPD

GET_R_MAX_SPD

GET_R_ACC

ENABLE

DISABLE

GOTO

STOPN

STOPF

CONSTSPD

STATUS

Definition at line 11 of file interpreter.h.

```
11      {
12    VERSION,
13    HELP,
14    TEST,
15    SET_DEC_SLOW,
16    SET_DEC_FAST,
17    SET_DEC_AUTO,
18    SET_MODE_FULL,
```

```
19      SET_MODE_HALF,
20      SET_MODE_QUATER,
21      SET_MODE_8,
22      SET_MODE_16,
23      SET_MODE_32,
24      SET_HOME,
25      SET_ACC,
26      SET_MIN_SPEED,
27      SET_MAX_SPEED,
28      SET_STP_REV,
29      SET_R_MIN_SPD,
30      SET_R_MAX_SPD,
31      SET_R_ACC,
32      GET_ACC,
33      GET_MIN_SPEED,
34      GET_MAX_SPEED,
35      GET_STP_REV,
36      GET_R_MIN_SPD,
37      GET_R_MAX_SPD,
38      GET_R_ACC,
39      ENABLE,
40      DISABLE,
41      GOTO,
42      STOPN,
43      STOPF,
44      CONSTSPD,
45      STATUS
46
47 };
```

7.5.2 Function Documentation

7.5.2.1 char get_cmd_id (char * *name*)

Parameters

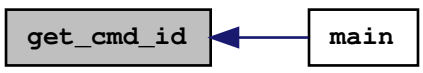
name	

Returns

Definition at line 60 of file interpreter.c.

```
61 {
62      unsigned char i = 0;
63
64      if (name[0] == 0)
65          return -2;
66
67      for (i = 0; cmd_tbl[i].id != -1; i++)
68          if (!strncmp(name, cmd_tbl[i].name,strlen(cmd_tbl[i].name)))
69              return cmd_tbl[i].id;
70
71      return -1;
72 }
```

Here is the caller graph for this function:



7.5.2.2 char const* get_cmd_name (char *id*)

Parameters

id	

Returns

command name or NULL if not found

Definition at line 79 of file interpreter.c.

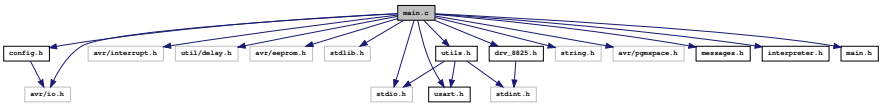
```
80 {
81     unsigned char i;
82 
83     for (i = 0; cmd_tbl[i].id != -1; i++)
84         if (id == cmd_tbl[i].id)
85             return cmd_tbl[i].name;
86 
87     return NULL;
88 }
```

Here is the caller graph for this function:

7.6 main.c File Reference

```
#include <avr/io.h>
#include <avr/interrupt.h>
#include <util/delay.h>
#include <avr/eeprom.h>
#include <stdlib.h>
#include <stdio.h>
#include <string.h>
#include <avr/pgmspace.h>
#include "usart.h"
#include "messages.h"
#include "interpreter.h"
#include "config.h"
#include "drv_8825.h"
#include "utils.h"
#include "main.h"
```

Include dependency graph for main.c:



Macros

- #define F_CPU 11059200UL

  define CPU frequency in Mhz here if not defined in Makefile
- #define USART_BAUD_RATE 115200

  115200 baud

Functions

- void Init_Input_Output (void)
- int16_t main (void)

  main loop
- void test (void)

Variables

- FILE usart_str

7.6.1 Macro Definition Documentation

7.6.1.1 #define F_CPU 11059200UL

define CPU frequency in Mhz here if not defined in Makefile

Definition at line 46 of file main.c.

7.6.1.2 #define USART_BAUD_RATE 115200

115200 baud

Definition at line 50 of file main.c.

7.6.2 Function Documentation

7.6.2.1 int16_t main (void)

main loop

Definition at line 62 of file main.c.

```
63 {
64     char message[32]; // 1 byte + for string termination
65
66     int8_t cmd;
67     const char *cptr;
68     char * pch;
69     uint64_t ch;
70     uint8_t i;
71
72
73     SFIOR &= 0xfb; //11111011 -> PUD=0
74     /*
75      * Set ports data direction

76      */
77     Init_Input_Output( );
78
79     usart_init( USART_BAUD_SELECT( USART_BAUD_RATE,
       F_CPU ) );
80
81
82
```

```
83      /*
84       * now enable interrupt, since USART library is interrupt controlled
85       */
86      sei( );
87      stdout = stdin = &usart_str;
88
89      _delay_ms( 100 );
90
91
92      InitStepper();
93
94
95      for (;; )
96      {
97
98          if ( ( cptr = fgets( message, sizeof message - 1, stdin ) ) )
99          {
100
101
102             cmd = get_cmd_id( message );
103
104             switch ( cmd )
105             {
106                 case VERSION:
107                     putstring_P( PSTR( "1.0\r" ) );
108                     break;
109
110
111                 case HELP:
112                     //  putstring_P( PSTR( "help?\r" ) );
113
114                     i = 0;
115
116                     do
117                     {
118                         cptr = get_cmd_name( i++ );
119                         if ( cptr )
120                         {
121                             putstring( cptr );
122                             putstring_P( PSTR( "\r" ) );
123                         }
124                     }
125                     while ( cptr );
126
127                     break;
128
129                 case TEST:
130                     test( );
131                     break;
132
133                 case SET_DEC_SLOW:
134                     Decay( SLOW_DECAY );
135                     SDec( );
136                     break;
137
138                 case SET_DEC_FAST:
139                     Decay( FAST_DECAY );
140                     FDec( );
141                     break;
142
143                 case SET_DEC_AUTO:
144                     Decay( AUTO_DECAY );
145                     ADec( );
146                     break;
147
148                 case SET_MODE_FULL:
149                     Mode( MODE_FULL_STEP );
150                     Fstep( );
151                     break;
152
153                 case SET_MODE_HALF:
154                     Mode( MODE_HALF_STEP );
155                     HStep( );
156                     break;
157
158                 case SET_MODE_QUATER:
159                     Mode( MODE_QUATER_STEP );
160                     Qstep( );
161                     break;
162
163                 case SET_MODE_8:
164                     Mode( MODE_8_MICROSTEP );
165                     M8Step( );
166                     break;
167
168                 case SET_MODE_16:
```

```
169                     Mode( MODE_16_MICROSTEP );
170                     M16Step( );
171                     break;
172 
173                 case SET_MODE_32:
174                     Mode( MODE_32_MICROSTEP );
175                     M32Step( );
176                     break;
177 
178                 case SET_HOME:
179                     //              putstring("home%d\r", Home());
180                     putstring_P( PSTR( "home " ) );
181                     if ( !(check_pin( IHOME, HOME )) )
182                     {
183                         putstring_P( PSTR( "TRUE" ) );
184                     } else
185                     {
186                         putstring_P( PSTR( "FALSE" ) );
187                     }
188                     //              putstring(ConvertASCItouint64(Home()));
189                     putstring_P( PSTR( "\r" ) );
190 
191                     break;
192 
193                 case SET_ACC:
194                     pch = strstr( message, "=" );
195                     if ( pch != NULL )
196                     {
197                         pch = strstr( pch, "=" );
198                         ch = ConvertASCItouint64( pch + 1 );
199                         if ( ch > 0 )
200                         {
201                             SetAcceleration( ch );
202                             Acc( );
203                             break;
204                         } else
205                         {
206                             Errormssg( );
207                             break;
208                         }
209                     }
210                     break;
211 
212                 case SET_MIN_SPEED:
213                     pch = strstr( message, "=" );
214                     if ( pch != NULL )
215                     {
216                         pch = strstr( pch, "=" );
217                         ch = ConvertASCItouint64( pch + 1 );
218                         if ( ch > 0 )
219                         {
220                             SetMinSpeed( ch );
221                             Minspeed( );
222                             break;
223                         } else
224                         {
225                             Errormssg( );
226                             break;
227                         }
228                     }
229                     break;
230 
231                 case SET_MAX_SPEED:
232                     pch = strstr( message, "=" );
233                     if ( pch != NULL )
234                     {
235                         pch = strstr( pch, "=" );
236                         ch = ConvertASCItouint64( pch + 1 );
237                         if ( ch > 0 )
238                         {
239                             SetMaxSpeed( ch );
240                             Maxspeed( );
241                             break;
242                         } else
243                         {
244                             Errormssg( );
245                             break;
246                         }
247                     }
248                     break;
249 
250                 case SET_STP_REV:
251 
252                     pch = strstr( message, "=" );
253                     if ( pch != NULL )
254                     {
255                         pch = strstr( pch, "=" );
```

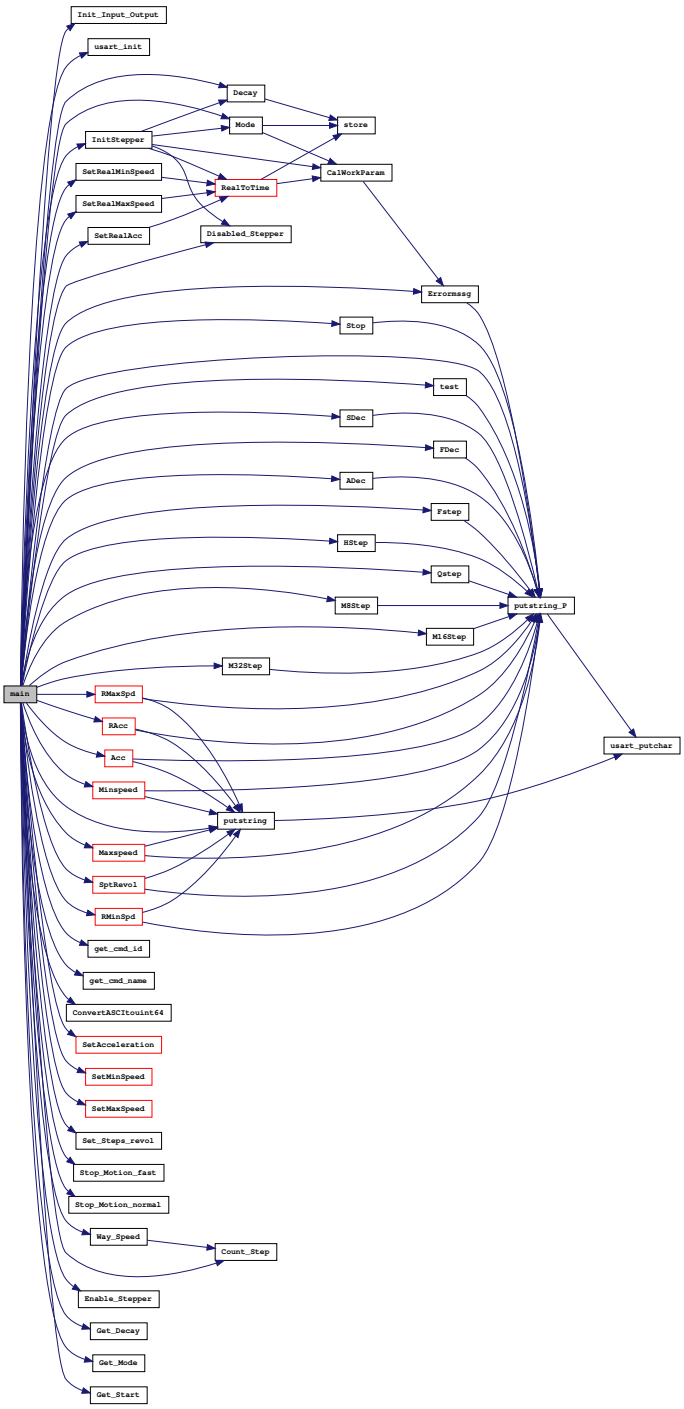
```
256                         ch = ConvertASCItouint64( pch + 1 );
257                         if ( ch > 0 )
258                         {
259                             Set_Steps_revol( ch );
260                             SptRevol();
261                             break;
262                         }
263                         else
264                         {
265                             Errormssg( );
266                             break;
267                         }
268                     }
269 
270                     break;
271 
272                 case SET_R_MIN_SPD:
273 
274                     pch = strstr( message, "=" );
275                     if ( pch != NULL )
276                     {
277                         //pch = strstr( pch, "=" );
278                         ch = ConvertASCItouint64( pch + 1 );
279                         if ( ch > 0 )
280                         {
281                             SetRealMinSpeed( ch );
282                             RMinSpd();
283                             break;
284                         }
285                         else
286                         {
287                             Errormssg( );
288                             break;
289                         }
290                     }
291 
292                     break;
293 
294                 case SET_R_MAX_SPD:
295 
296                     pch = strstr( message, "=" );
297                     if ( pch != NULL )
298                     {
299                         pch = strstr( pch, "=" );
300                         ch = ConvertASCItouint64( pch + 1 );
301                         if ( ch > 0 )
302                         {
303 
304 
305                             SetRealMaxSpeed( ch );
306                             RMaxSpd();
307                             break;
308                         }
309                         else
310                         {
311                             Errormssg( );
312                             break;
313                         }
314                     }
315 
316                     break;
317 
318 
319                 case SET_R_ACC:
320 
321                     pch = strstr( message, "=" );
322                     if ( pch != NULL )
323                     {
324                         pch = strstr( pch, "=" );
325                         ch = ConvertASCItouint64( pch + 1 );
326                         if ( ch > 0 )
327                         {
328                             SetRealAcc( ch );
329                             RAcc();
330                             break;
331                         } else
332                         {
333                             Errormssg( );
334                             break;
335                         }
336                     }
337 
338                     break;
339 
340 
341                 case GET_ACC:
342                     Acc( );
```

```
343                     break;
344
345                 case GET_MIN_SPEED:
346                     Minspeed( );
347                     break;
348
349                 case GET_MAX_SPEED:
350                     Maxspeed( );
351                     break;
352
353
354                 case GET_STP_REV:
355                     SptRevol();
356                     break;
357
358
359                 case GET_R_MIN_SPD:
360                     RMinSpd();
361                     break;
362
363                 case GET_R_MAX_SPD:
364                     RMaxSpd();
365                     break;
366
367                 case GET_R_ACC:
368                     RAcc();
369                     break;
370
371
372
373                 case STOPF:
374                     Stop_Motion_fast();
375                     Stop();
376                     break;
377
378                 case STOPN:
379                     Stop_Motion_normal();
380                     Stop();
381                     break;
382
383                 case CONSTSPD:
384                     pch = strstr( message, "clock" );
385                     if ( pch != NULL )
386                     {
387                         Way_Speed(STEP_CLOCKWISE);
388                             putstring_P( PSTR( "DONE\r " ) );
389                             break;
390
391                     }
392
393                     pch = strstr( message, "against" );
394                     if ( pch != NULL )
395                     {
396
397                             Way_Speed( STEP_COUNTER_CLOCKWISE );
398                             putstring_P( PSTR( "DONE\r" ) );
399                             break;
400                     }
401
402                     Errormssg();
403                     break;
404
405
406                 case ENABLE:
407                     Enable_Stepper( );
408                     //putstring_P( PSTR( "Enable\r" ) );
409                     break;
410
411                 case DISABLE:
412                     Disabled_Stepper( );
413                     //putstring_P( PSTR( "Disable\r" ) );
414                     break;
415
416
417
418
419
420                 case GOTO:
421                     pch = strstr( message, "clock" );
422                     if ( pch != NULL )
423                     {
424                         pch = strstr( pch, " " );
425                         ch = ConvertASCItouint64( pch );
426
427                         if ( ch > 0 )
428                         {
429                             Count_Step( STEP_CLOCKWISE, ch );
```

```
430 /*
431                             putstring_P( PSTR( "DONE " ) );
432                             putstring( int_to_string( ch ) );
433                             putstring_P( PSTR( " steps\r" ) );
434 */
435                             break;
436                         } else
437                         {
438                             Errormssg( );
439                             break;
440                         }
441                     }
442 
443                     pch = strstr( message, "against" );
444                     if ( pch != NULL )
445                     {
446                         pch = strstr( pch, " " );
447                         ch = ConvertASCItouint64( pch );
448                         if ( ch > 0 )
449                         {
450                             Count_Step( STEP_COUNTER_CLOCKWISE, ch );
451 /*
452                             putstring_P( PSTR( "DONE " ) );
453                             putstring( int_to_string( ch ) );
454                             putstring_P( PSTR( " steps\r" ) );
455 */
456                             break;
457                         } else
458                         {
459                             Errormssg( );
460                             break;
461                         }
462                     }
463                     break;
464 
465                 case STATUS:
466                     switch ( Get_Decay( ) )
467                     {
468                         case SLOW_DECAY:
469                             SDec( );
470                             break;
471 
472                         case FAST_DECAY:
473                             FDec( );
474                             break;
475 
476                         case AUTO_DECAY:
477                             ADec( );
478                             break;
479 
480                         default:
481                         {
482                             //putstring_P( PSTR( "Not set decay\r" ) );
483                             break;
484                         }
485                     }
486 
487                     switch ( Get_Mode( ) )
488                     {
489                         case MODE_FULL_STEP:
490                             Fstep( );
491                             break;
492 
493                         case MODE_HALF_STEP:
494                             HStep( );
495                             break;
496 
497                         case MODE_QUATER_STEP:
498                             Qstep( );
499                             break;
500 
501                         case MODE_8_MICROSTEP:
502                             M8Step( );
503                             break;
504 
505                         case MODE_16_MICROSTEP:
506                             M16Step( );
507                             break;
508 
509                         case MODE_32_MICROSTEP:
510                             M32Step( );
```

```
511                             break;
512
513                         default:
514                         {
515                             //putstring_P( PSTR( "Not set mode\r" ) );
516                             break;
517                         }
518
519                     }
520
521
522                     if ( Get_Start( ) )
523                     {
524                         //putstring_P( PSTR( "Enable\r" ) );
525                     }
526                     else
527                     {
528                         //putstring_P( PSTR( "Disable\r" ) );
529                     }
530
531                     break;
532
533
534
535
536
537
538
539                 default:
540
541                     if ( ( cmd < 0 ) && ( !( ( message[0] == 0x0d ) || ( message[0] == 0x0a ) ) ) )
542                         putstring_P( PSTR( "Comand not implement\r" ) );
543                     break;
544
545             } //switch (cmd)
546         } //if (USART_RxEOL > 0)
547
548
549
550
551     } //for (;;)
552
553     return 0;
554 } //End int main(void)
```

Here is the call graph for this function:



7.6.3 Variable Documentation

7.6.3.1 FILE usart_str

Initial value:

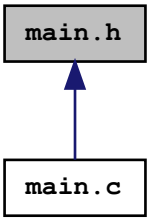
```
=
    FDEV_SETUP_STREAM( usart_putchar, usart_getchar, _FDEV_SETUP_RW )
```

Set function for standart IO getchart and putchart from UART library

Definition at line 56 of file main.c.

7.7 main.h File Reference

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



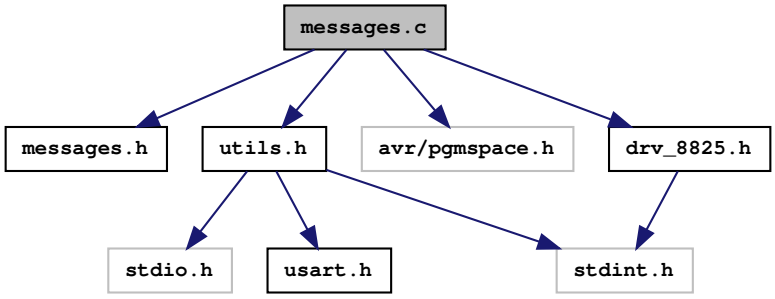
Functions

- void Init_Input_Output (void)
- void test (void)

7.8 messages.c File Reference

```
#include "messages.h"
#include "utils.h"
#include <avr/pgmspace.h>
#include "drv_8825.h"
```

Include dependency graph for messages.c:

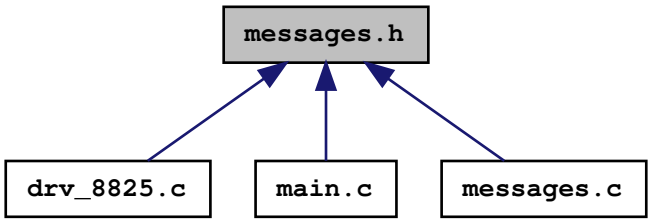


Functions

- void Acc (void)
- void ADec (void)
- void Errormssg (void)
- void FDec (void)
- void Fstep (void)
- void HStep (void)
- void M16Step (void)
- void M32Step (void)
- void M8Step (void)
- void Maxspeed (void)
- void Minspeed (void)
- void Qstep (void)
- void RAcc (void)
- void RMaxSpd (void)
- void RMinSpd (void)
- void SDec (void)
- void SptRevol (void)
- void Stop (void)

7.9 messages.h File Reference

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



Functions

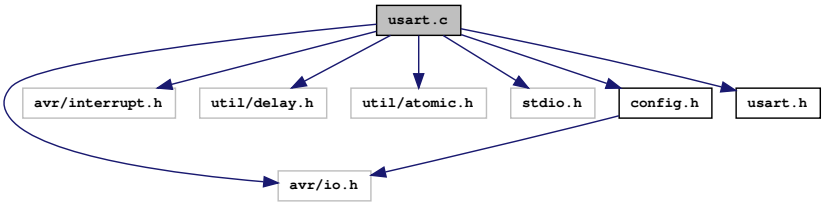
- void Acc (void)
- void ADec (void)
- void Errormssg (void)
- void FDec (void)
- void Fstep (void)
- void HStep (void)
- void M16Step (void)
- void M32Step (void)
- void M8Step (void)
- void Maxspeed (void)
- void Minspeed (void)

- void Qstep (void)
- void RAcc (void)
- void RMaxSpd (void)
- void RMinSpd (void)
- void SDec (void)
- void SptRevol (void)
- void Stop (void)

7.10 usart.c File Reference

```
#include <avr/io.h>
#include <avr/interrupt.h>
#include <util/delay.h>
#include <util/atomic.h>
#include <stdio.h>
#include "config.h"
#include "usart.h"
```

Include dependency graph for usart.c:



Data Structures

- struct ring_buffer

Macros

- #define B1SIZE 32
- #define BSIZE 32

Typedefs

- typedef struct ring_buffer ring_buffer_t

Functions

- ISR (USART0_RXC_vect)
- ISR (USART0_UDRE_vect)
- int usart_getchar (FILE *stream)

  Get received byte from ringbuffer.
- void usart_init (unsigned int baudrate)

  Initialize USART and set baudrate.
- int usart_putchar (char c, FILE *stream)

  Put byte to ringbuffer for transmitting via UART.

Variables

- static uint8_t brx [BSIZE]
- static uint8_t btx [BSIZE]
- volatile ring_buffer_t usart_rx
- volatile ring_buffer_t usart_tx

7.10.1 Macro Definition Documentation

7.10.1.1 #define B1SIZE 32

Definition at line 37 of file usart.c.

7.10.1.2 #define BSIZE 32

Definition at line 36 of file usart.c.

7.10.2 Typedef Documentation

7.10.2.1 typedef struct ring_buffer ring_buffer_t

7.10.3 Function Documentation

7.10.3.1 ISR (USART0_RXC_vect)

USART0 Receive Complete interrupt

Definition at line 195 of file usart.c.

```
196 {
197     uint8_t data;
198 
199     data = UDR0;
200 
201     if (usart_rx.fillcount < usart_rx.size)
202     {
203         if (data == VEOL)
204             usart_rx.nlines++;
205 
206         usart_rx.data[usart_rx.head] = data;
207 
208         usart_rx.head = (usart_rx.head + 1) & (usart_rx.
    size - 1);
209         usart_rx.fillcount++;
210     }
211     else
212     {
213         //The Buffer is full! clear it
214         usart_rx.head = 0;
215         usart_rx.tail = 0;
216         usart_rx.fillcount = 0;
217         usart_rx.nlines = 0;
218 
219         /* Wait for empty transmit buffer */
220         while (!(UCSR0A & (1 << UDRE0)))
221             ;
222         UDR0 = 'B';
223         while (!(UCSR0A & (1 << UDRE0)))
224             ;
225         UDR0 = 'O';
226         while (!(UCSR0A & (1 << UDRE0)))
227             ;
228         UDR0 = 'F';
229         while (!(UCSR0A & (1 << UDRE0)))
230             ;
231         UDR0 = VEOL;
232         //TODO Software flow control XON/XOFF.
     http://www-user.tu-chemnitz.de/~heha/hs_freeware/terminal/terminal.htm
233         //SBUF = 0x13; //Pause transmission. Send XOFF character
```

```
234     }
235 }
```

7.10.3.2 ISR (USART0_UDRE_vect)

USART0 Data Register Empty interrupt Called when the USART is ready to transmit the next byte

Definition at line 242 of file usart.c.

```
243 {
244     if (usart_tx.fillcount > 0)
245     {
246         UDR0 = usart_tx.data[usart_tx.tail];
247 
248         usart_tx.tail = (usart_tx.tail + 1) & (usart_tx.
      size - 1);
249         usart_tx.fillcount--;
250     }
251     else
252     {
253         /* tx buffer empty, disable UDRE interrupt */
254         UCSR0B &= ~(1 << UDRIE0);
255     }
256 }
```

7.10.4 Variable Documentation

7.10.4.1 uint8_t brx[BSIZE] [static]

Definition at line 52 of file usart.c.

7.10.4.2 uint8_t btx[BSIZE] [static]

Definition at line 53 of file usart.c.

7.10.4.3 volatile ring_buffer_t usart_rx

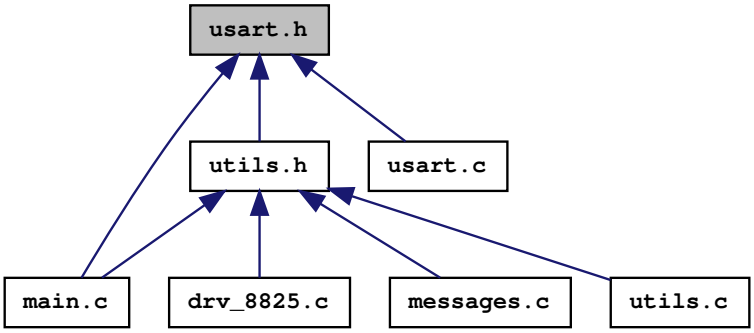
Definition at line 55 of file usart.c.

7.10.4.4 volatile ring_buffer_t usart_tx

Definition at line 54 of file usart.c.

7.11 usart.h File Reference

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



Macros

- #define USART_BAUD_SELECT(baudRate, xtalCpu) ((xtalCpu)/((baudRate)∗16l)-1)

  USART Baudrate Expression.
- #define USART_BAUD_SELECT_DOUBLE_SPEED(baudRate, xtalCpu) (((xtalCpu)/((baudRate)∗8l)-1)|0x8000)

  USART Baudrate Expression for ATmega double speed mode.
- #define VEOL (char) 0x0d

Functions

- int usart_getchar (FILE ∗stream)

  Get received byte from ringbuffer.
- void usart_init (unsigned int)

  Initialize USART and set baudrate.
- int usart_putchar (char c, FILE ∗stream)

  Put byte to ringbuffer for transmitting via UART.

7.12 usartm8.h File Reference

Macros

- #define DOR0 DOR
- #define FE0 FE
- #define MPCM0 MPCM
- #define RXB80 RXB8
- #define RXC0 RXC
- #define RXCIE0 RXCIE
- #define RXEN0 RXEN
- #define TXB80 TXB8

- #define TXC0 TXC
- #define TXCIE0 TXCIE
- #define TXEN0 TXEN
- #define U2X0 U2X
- #define UBRR0H UBRRH
- #define UBRR0L UBRRL
- #define UBRR0L UBRRL
- #define UCPOL0 UCPOL
- #define UCSR0A UCSRA
- #define UCSR0B UCSRB
- #define UCSR0C UCSRC
- #define UCSZ00 UCSZ0
- #define UCSZ01 UCSZ1
- #define UCSZ02 UCSZ2
- #define UDR0 UDR
- #define UDRE0 UDRE
- #define UDRIE0 UDRIE
- #define UMSEL0 UMSEL
- #define UPE0 PE
- #define UPM00 UPM0
- #define UPM01 UPM1
- #define URSEL0 URSEL
- #define URSEL0 URSEL
- #define USART0_RXC_vect USART_RXC_vect
- #define USART0_TXC_vect USART_TXC_vect
- #define USART0_UDRE_vect USART_UDRE_vect
- #define USARTXXX_H_ "usartm8.h"
- #define USBS0 USBS

7.12.1 Macro Definition Documentation

7.12.1.1 #define DOR0 DOR

Definition at line 47 of file usartm8.h.

7.12.1.2 #define FE0 FE

Definition at line 46 of file usartm8.h.

7.12.1.3 #define MPCM0 MPCM

Definition at line 50 of file usartm8.h.

7.12.1.4 #define RXB80 RXB8

Definition at line 59 of file usartm8.h.

7.12.1.5 #define RXC0 RXC

Definition at line 43 of file usartm8.h.

7.12.1.6 #define RXCIE0 RXCIE

Definition at line 53 of file usartm8.h.

7.12.1.7 #define RXEN0 RXEN

Definition at line 56 of file usartm8.h.

7.12.1.8 #define TXB80 TXB8

Definition at line 60 of file usartm8.h.

7.12.1.9 #define TXC0 TXC

Definition at line 44 of file usartm8.h.

7.12.1.10 #define TXCIE0 TXCIE

Definition at line 54 of file usartm8.h.

7.12.1.11 #define TXEN0 TXEN

Definition at line 57 of file usartm8.h.

7.12.1.12 #define U2X0 U2X

Definition at line 49 of file usartm8.h.

7.12.1.13 #define UBRR0H UBRRH

Definition at line 32 of file usartm8.h.

7.12.1.14 #define UBRR0L UBRRL

Definition at line 33 of file usartm8.h.

7.12.1.15 #define UBRR0L UBRRL

Definition at line 33 of file usartm8.h.

7.12.1.16 #define UCPOL0 UCPOL

Definition at line 70 of file usartm8.h.

7.12.1.17 #define UCSR0A UCSRA

Definition at line 30 of file usartm8.h.

7.12.1.18 #define UCSR0B UCSRB

Definition at line 29 of file usartm8.h.

7.12.1.19 #define UCSR0C UCSRC

Definition at line 28 of file usartm8.h.

7.12.1.20 #define UCSZ00 UCSZ0

Definition at line 69 of file usartm8.h.

7.12.1.21 #define UCSZ01 UCSZ1

Definition at line 68 of file usartm8.h.

7.12.1.22 #define UCSZ02 UCSZ2

Definition at line 58 of file usartm8.h.

7.12.1.23 #define UDR0 UDR

Definition at line 31 of file usartm8.h.

7.12.1.24 #define UDRE0 UDRE

Definition at line 45 of file usartm8.h.

7.12.1.25 #define UDRIE0 UDRIE

Definition at line 55 of file usartm8.h.

7.12.1.26 #define UMSEL0 UMSEL

Definition at line 64 of file usartm8.h.

7.12.1.27 #define UPE0 PE

Definition at line 48 of file usartm8.h.

7.12.1.28 #define UPM00 UPM0

Definition at line 66 of file usartm8.h.

7.12.1.29 #define UPM01 UPM1

Definition at line 65 of file usartm8.h.

7.12.1.30 #define URSEL0 URSEL

Definition at line 63 of file usartm8.h.

7.12.1.31 #define URSEL0 URSEL

Definition at line 63 of file usartm8.h.

7.12.1.32 #define USART0_RXC_vect USART_RXC_vect

Definition at line 35 of file usartm8.h.

7.12.1.33 #define USART0_TXC_vect USART_TXC_vect

Definition at line 36 of file usartm8.h.

7.12.1.34 #define USART0_UDRE_vect USART_UDRE_vect

Definition at line 37 of file usartm8.h.

7.12.1.35 #define USARTXXX_H_ "usartm8.h"

Definition at line 18 of file usartm8.h.

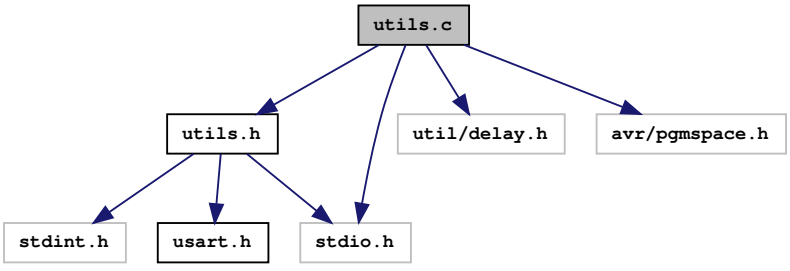
7.12.1.36 #define USBS0 USBS

Definition at line 67 of file usartm8.h.

7.13 utils.c File Reference

```
#include "utils.h"
#include <stdio.h>
#include <util/delay.h>
#include <avr/pgmspace.h>
```

Include dependency graph for utils.c:



Functions

- uint64_t ConvertASCItouint64 (char *in)
- char * int_to_string (uint64_t i)
- void putstring (const char *putc)
- void putstring_P (const char *putc)

Variables

- static char buf [20]

7.13.1 Variable Documentation

7.13.1.1 char buf[20] [static]

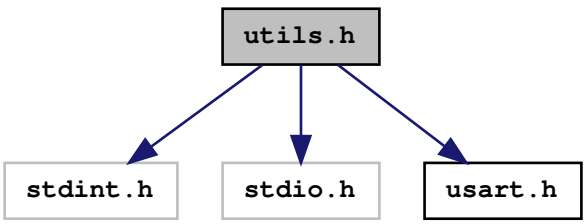
Temporarry buffer for converting uint64_t to string

Definition at line 37 of file utils.c.

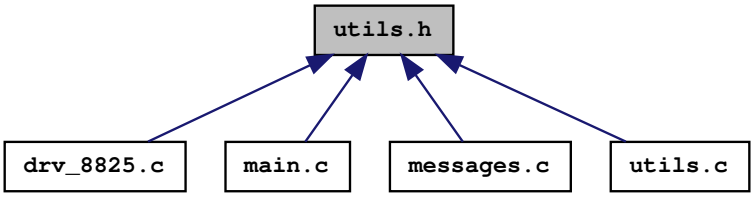
7.14 utils.h File Reference

```
#include <stdint.h>
#include <stdio.h>
#include "usart.h"
```

Include dependency graph for utils.h:



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



Functions

- uint64_t ConvertASCItouint64 (char ∗in)
- char ∗ int_to_string (uint64_t i)
- void putstring (const char ∗putc)
- void putstring_P (const char ∗putc)