Potato Operating System

Generated by Doxygen 1.8.11

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Data Structure Documentation

3.1 ALIAS Struct Reference

A struct to hold command aliases.

Data Fields

- char **c**
- char ∗ **val**

3.1.1 Detailed Description

A struct to hold command aliases.

The ALIAS Struct is a custom struct that is designed to hold aliases for commands

Parameters

c	A string that will hold the initial command name
val	A string pointer that will point to the original command name

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

- mpx_core/modules/m1/commands.c

3.2 COMMAND Struct Reference

A struct to hold commands.

Data Fields

- char ∗ **str**
- int(∗ **func**)(char ∗)

3.2.1 Detailed Description

A struct to hold commands.

The COMMAND Struct is a custom struct that is designed to hold custom commands.

Parameters

str	A string type to hold the name of the command
CommandPointer	A pointer to a command so that we can pass commands

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

- mpx_core/modules/m1/command_handler.c

3.3 control_sequence Struct Reference

A struct to hold key mappings.

```
#include <poll_input.h>
```

Data Fields

- char **code** [8]
- int **id**

3.3.1 Detailed Description

A struct to hold key mappings.

The control_sequence Struct is a custom struct that is designed to hold mappings between control sequence codes used to encode arrow keys. It also holds other special buttons.

Parameters

code	The special keyboard code name
id	The keyboard code value

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

- mpx_core/modules/m1/poll_input.h

3.4 time Struct Reference

A struct to all the time and date elements.

```
#include <time.h>
```

Data Fields

- int **seconds**
- int **minutes**
- int **hours**
- int **day_of_month**
- int **month**
- int **year**

3.4.1 Detailed Description

A struct to all the time and date elements.

The time Struct is a custom struct that is designed to hold all the elements necessary for time and date.

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

- mpx_core/modules/m1/time.h

Chapter 4

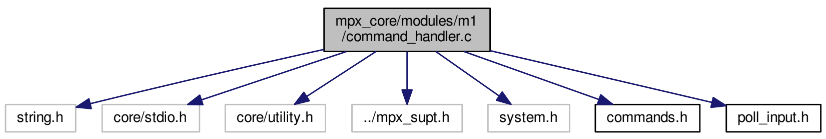
File Documentation

4.1 mpx_core/modules/m1/command_handler.c File Reference

The primary command handler for the Operating System.

```
#include <string.h>
#include <core/stdio.h>
#include <core/utility.h>
#include "../mpx_supt.h"
#include "commands.h"
#include "poll_input.h"
```

Include dependency graph for command_handler.c:



Data Structures

- struct COMMAND

  A struct to hold commands.

Macros

- #define CMDSIZE 100

  The command input buffer.

Functions

- int search_commands (char ∗cmd)

  Finds which command in the global COMMANDS array.
- int command_handler ()

  Entry point for the command handler.

Variables

- COMMAND commands [ ]

  Array of COMMANDS that are supported.

4.1.1 Detailed Description

The primary command handler for the Operating System.

4.1.2 Macro Definition Documentation

4.1.2.1 #define CMDSIZE 100

The command input buffer.

This a macro to store the command input buffer. Here we can change the ammount of characters we allow to be entered into the command handler at once. We currently allow 100 characters.

4.1.3 Function Documentation

4.1.3.1 int search_commands (char ∗ *cmd*)

Finds which command in the global COMMANDS array.

Parameters

cmd	cmd typed by user

4.1.4 Variable Documentation

4.1.4.1 COMMAND commands[ ]

Initial value:

```
= {
  {"help", &cmd_help},
  {"version",&cmd_version},
  {"date",&cmd_date},
  {"time", &cmd_time},
  {"clear", &cmd_clear},
  {NULL, NULL}
}
```

Array of COMMANDS that are supported.

4.2 mpx_core/modules/m1/command_handler.h File Reference

The header file for the command handler for the Operating System.

Functions

- int command_handler ()

  Entry point for the command handler.

4.2.1 Detailed Description

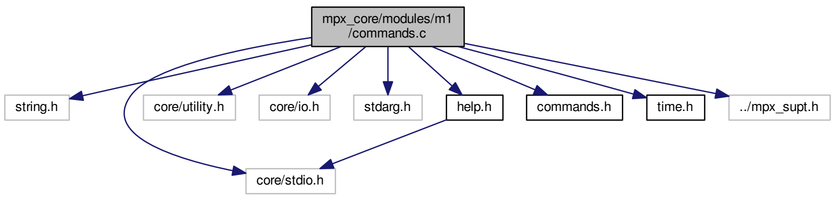
The header file for the command handler for the Operating System.

4.3 mpx_core/modules/m1/commands.c File Reference

This file contains all the commands that will be used by the command handler.

```
#include <string.h>
#include <core/stdio.h>
#include <core/utility.h>
#include <core/io.h>
#include <stdarg.h>
#include "help.h"
#include "commands.h"
#include "time.h"
#include "../mpx_supt.h"
```

Include dependency graph for commands.c:



Data Structures

- struct ALIAS

  A struct to hold command aliases.

Macros

- #define CMDSIZE 100

  The command input buffer.
- #define SUCCESS 0

  Macro to return a 0 on success.
- #define FAILURE -1

  Macro to return a -1 on failure.
- #define MAXPARAMCOUNT 10

The maximum parameters allowed per command.
- #define A_FLAG (1 << 0)
- #define B_FLAG (1 << 1)
- #define C_FLAG (1 << 2)
- #define D_FLAG (1 << 3)
- #define E_FLAG (1 << 4)
- #define F_FLAG (1 << 5)
- #define G_FLAG (1 << 6)
- #define H_FLAG (1 << 7)
- #define I_FLAG (1 << 8)
- #define J_FLAG (1 << 9)
- #define K_FLAG (1 << 10)
- #define L_FLAG (1 << 11)
- #define M_FLAG (1 << 12)
- #define N_FLAG (1 << 13)
- #define O_FLAG (1 << 14)
- #define P_FLAG (1 << 15)
- #define Q_FLAG (1 << 16)
- #define R_FLAG (1 << 17)
- #define S_FLAG (1 << 18)
- #define T_FLAG (1 << 19)
- #define U_FLAG (1 << 20)
- #define V_FLAG (1 << 21)
- #define W_FLAG (1 << 22)
- #define Y_FLAG (1 << 23)
- #define X_FLAG (1 << 24)
- #define Z_FLAG (1 << 25)
- #define alphanum(c) (('a' <= c && c <= 'z') ? c - 'a' : c - 'A')

  A helper macro that will take a letter and return its integer equivelent.

Functions

- int set_flags (char ∗paramstr, int ∗flag, int num_aliases,...)

  Sets flags based on param string, flags and num aliases.
- char ∗ get_pvalue (char c)

  Gets value of specific flag.
- char set_flags_search_alias (char ∗alias, int num_aliases, ALIAS aliases[ ])

  Used as a helper function for set_flags.
- int cmd_help (char ∗params)

  The help command will show a page to assist users with commands.
- int cmd_version (char ∗params)

  The version command will show the version information.
- int cmd_date (char ∗params)

  The date command will do one of two things. Show the current system date Set a new system date.
- int cmd_time (char ∗params)

  The time command will do one of two things. Show the current system time Set a new system time.
- int cmd_clear (char ∗params)

  clears the screen and sets the pointer at home

Variables

- char gparamstr [CMDSIZE]

  A string to hold the command input up to the max command size.
- char ∗ gparams [26]

  Will hold all the string pointers.

4.3.1 Detailed Description

This file contains all the commands that will be used by the command handler.

sets flags based on param string, flags and num aliases

Gets value of specific flag.

Used as a helper function for set_flags.

clears the screen and sets the pointer at home

Parameters

params	param string typed by user

Returns

SUCCESS or FAILURE

Parameters

alias	alias to search for in aliases
num_aliases	number of aliases in aliases
aliases	array of ALIASes to search through

Returns

charachter of flag that it found

Usage: get_pvalue('a');

Parameters

c	character of flag to get the value from

Returns

value after the flag specified

Usage: set_flags(paramstr,&flag,5, 'a',"alpha", 'b',"bravo", 'f',"foxtrot", 'g',"golf", 'r',"whiskey")

Parameters

paramstr	string that each command gets. Typed by the user
flag	pointer to integer flag
num_aliases	number of aliases specified

Returns

success or failure

Note

num_aliases must be the exact number of parameters. In the example, 5

4.3.2 Macro Definition Documentation

4.3.2.1 #define A_FLAG (1 << 0)

cmd_help flags A flag binary bit shift macro

4.3.2.2 #define alphanum(*c*) (('a' <= c && c <= 'z') ? c - 'a' : c - 'A')

A helper macro that will take a letter and return its integer equivelent.

A flag binary bit shift macro This is a helper macro that is used in set_flags and get_gparams. It takes in character and return the integer equivalent of that character.

Parameters

c	The character to be returned as an int

4.3.2.3 #define B_FLAG (1 << 1)

B flag binary bit shift macro

4.3.2.4 #define C_FLAG (1 << 2)

C flag binary bit shift macro

4.3.2.5 #define CMDSIZE 100

The command input buffer.

This a macro to store the command input buffer. Here we can change the ammount of characters we allow to be entered into the command handler at once. We currently allow 100 characters.

4.3.2.6 #define D_FLAG (1 $<<$ 3)

D flag binary bit shift macro

4.3.2.7 #define E_FLAG (1 $<<$ 4)

E flag binary bit shift macro

4.3.2.8 #define F_FLAG (1 $<<$ 5)

F flag binary bit shift macro

4.3.2.9 #define G_FLAG (1 $<<$ 6)

G flag binary bit shift macro

4.3.2.10 #define H_FLAG (1 $<<$ 7)

H flag binary bit shift macro

4.3.2.11 #define I_FLAG (1 $<<$ 8)

I flag binary bit shift macro

4.3.2.12 #define J_FLAG (1 $<<$ 9)

J flag binary bit shift macro

4.3.2.13 #define K_FLAG (1 $<<$ 10)

K flag binary bit shift macro

4.3.2.14 #define L_FLAG (1 $<<$ 11)

L flag binary bit shift macro

4.3.2.15 #define M_FLAG (1 $<<$ 12)

M flag binary bit shift macro

4.3.2.16 #define N_FLAG (1 << 13)

N flag binary bit shift macro

4.3.2.17 #define O_FLAG (1 << 14)

O flag binary bit shift macro

4.3.2.18 #define P_FLAG (1 << 15)

P flag binary bit shift macro

4.3.2.19 #define Q_FLAG (1 << 16)

Q flag binary bit shift macro

4.3.2.20 #define R_FLAG (1 << 17)

R flag binary bit shift macro

4.3.2.21 #define S_FLAG (1 << 18)

S flag binary bit shift macro

4.3.2.22 #define T_FLAG (1 << 19)

T flag binary bit shift macro

4.3.2.23 #define U_FLAG (1 << 20)

U flag binary bit shift macro

4.3.2.24 #define V_FLAG (1 << 21)

V flag binary bit shift macro

4.3.2.25 #define W_FLAG (1 << 22)

W flag binary bit shift macro

4.3.2.26 #define X_FLAG (1 << 24)

X flag binary bit shift macro

4.3.2.27 #define Y_FLAG (1 << 23)

Y flag binary bit shift macro

4.3.2.28 #define Z_FLAG (1 << 25)

Z flag binary bit shift macro

4.3.3 Function Documentation

4.3.3.1 int cmd_clear (char * *params*)

clears the screen and sets the pointer at home

Parameters

params	param string typed by user

Returns

SUCCESS or FAILURE

4.3.3.2 int cmd_date (char * *params*)

The date command will do one of two things. Show the current system date Set a new system date.

The date command can be used to query the systems RTC to display the current date. It can also be used to set the systems RTC to a desired date. There is code to check for illegal dates such as Feb 30 on a non leap year.

Parameters

params	param string typed by user

Returns

The current system date

Warning

The RTC only allows dates between 1700-2999

4.3.3.3 int cmd_help (char ∗ *params*)

The help command will show a page to assist users with commands.

The help command can be called to do one of two things List all the commands that have help pages Request a help page for a certain command

Parameters

params	param string typed by user

Returns

A help page

4.3.3.4 int cmd_time (char ∗ *params*)

The time command will do one of two things. Show the current system time Set a new system time.

The time command can be used to query the systems RTC to display the current time. It can also be used to set the systems RTC to a desired time. There is code to check for illegal times.

Parameters

params	param string typed by user

Returns

The current system time

Note

The time is kept in 24 hour time

4.3.3.5 int cmd_version (char ∗ *params*)

The version command will show the version information.

The version command can be called to display the version information. The shortned return will just show the short version. The long return will include the current module, the version, and the contributing developers

Parameters

params	param string typed by user

Returns

A version page

4.3.3.6 char ∗ get_pvalue (char *c*)

Gets value of specific flag.

Usage: get_pvalue('a');

Parameters

c	character of flag to get the value from

Returns

value after the flag specified

4.3.3.7 int set_flags (char ∗ *paramstr,* int ∗ *flag,* int *num_aliases,* ...)

Sets flags based on param string, flags and num aliases.

Usage: set_flags(paramstr,&flag,5, 'a',"alpha", 'b',"bravo", 'f',"foxtrot", 'g',"golf", 'r',"whiskey")

Parameters

paramstr	string that each command gets. Typed by the user
flag	pointer to integer flag
num_aliases	number of aliases specified

Returns

success or failure

Note

num_aliases must be the exact number of parameters. In the example, 5

4.3.3.8 char set_flags_search_alias (char ∗ *alias,* int *num_aliases,* ALIAS *aliases[ ]*)

Used as a helper function for set_flags.

Parameters

alias	alias to search for in aliases
num_aliases	number of aliases in aliases
aliases	array of ALIASes to search through

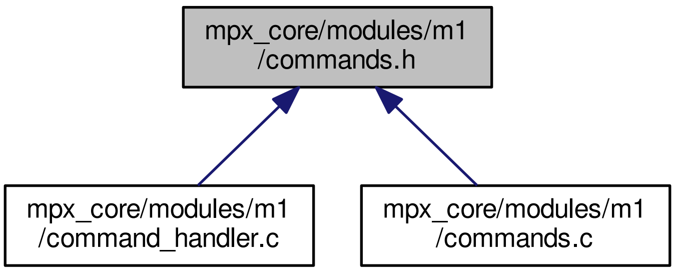
Returns

charachter of flag that it found

4.4 mpx_core/modules/m1/commands.h File Reference

The header file for commands.c.

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


mpx_core/modules/m1 /commands.h
mpx_core/modules/m1 /command_handler.c
mpx_core/modules/m1 /commands.c

Macros

- #define SUCCESS 0

  Macro to return a 0 on success.

Functions

- int cmd_help (char ∗params)

  The help command will show a page to assist users with commands.
- int cmd_version (char ∗params)

  The version command will show the version information.
- int **cmd_shutdown** (char ∗params)
- int cmd_date (char ∗params)

  The date command will do one of two things. Show the current system date Set a new system date.
- int cmd_time (char ∗params)

  The time command will do one of two things. Show the current system time Set a new system time.
- int **cmd_test** (char ∗params)
- int cmd_clear (char ∗params)

  clears the screen and sets the pointer at home

4.4.1 Detailed Description

The header file for commands.c.

4.4.2 Function Documentation

4.4.2.1 int cmd_clear (char ∗ *params*)

clears the screen and sets the pointer at home

Parameters

params	param string typed by user

Returns

SUCCESS or FAILURE

4.4.2.2 int cmd_date (char ∗ *params*)

The date command will do one of two things. Show the current system date Set a new system date.

The date command can be used to query the systems RTC to display the current date. It can also be used to set the systems RTC to a desired date. There is code to check for illegal dates such as Feb 30 on a non leap year.

Parameters

params	param string typed by user

Returns

The current system date

Warning

The RTC only allows dates between 1700-2999

4.4.2.3 int cmd_help (char ∗ *params*)

The help command will show a page to assist users with commands.

The help command can be called to do one of two things List all the commands that have help pages Request a help page for a certain command

Parameters

params	param string typed by user

Returns

A help page

4.4.2.4 int cmd_time (char ∗ *params*)

The time command will do one of two things. Show the current system time Set a new system time.

The time command can be used to query the systems RTC to display the current time. It can also be used to set the systems RTC to a desired time. There is code to check for illegal times.

Parameters

params	param string typed by user

Returns

The current system time

Note

The time is kept in 24 hour time

4.4.2.5 int cmd_version (char ∗ *params*)

The version command will show the version information.

The version command can be called to display the version information. The shortned return will just show the short version. The long return will include the current module, the version, and the contributing developers

Parameters

params	param string typed by user

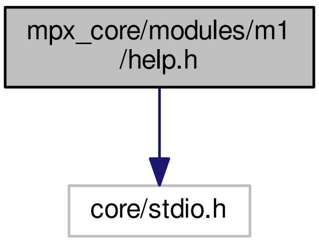
Returns

A version page

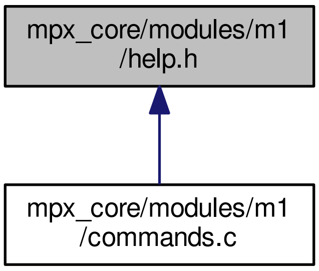
4.5 mpx_core/modules/m1/help.h File Reference

The header file that contains all the macros for the help and version commands.

```
#include <core/stdio.h>
```
Include dependency graph for help.h:



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



Macros

- #define VERSION

    Macro to print the short version.
- #define VERSION_FULL

    Macro to print the full version.
- #define HELP

    Macro to print the list of commands that have help pages.
- #define HELP_HELP

    Macro to print the shortned help page for comamnd help.
- #define HELP_HELP_FULL

    Macro to print the full help page for command help.
- #define HELP_VERSION

    Macro to print the shortned help page for command version.
- #define HELP_VERSION_FULL

    Macro to print the full help page for command version.
- #define HELP_SHUTDOWN

    Macro to print the shortned help page for command shutdown.
- #define HELP_SHUTDOWN_FULL

    Macro to print the full help page for command shutdown.
- #define HELP_DATE

    Macro to print the shortened help page for command date.
- #define HELP_DATE_FULL

    Macro to print the full help page for command date.
- #define HELP_TIME

    Macro to print the shortned help page for command time.
- #define HELP_TIME_FULL

    Macro to print the full help page for command time.

4.5.1 Detailed Description

The header file that contains all the macros for the help and version commands.

4.5.2 Macro Definition Documentation

4.5.2.1 #define HELP

Value:

```
puts(\
      "You can request a help page for the following commands"\
      " using help <cmd name>\n"\
      "\thelp\n"\
      "\tversion\n"\
      "\tshutdown\n"\
      "\tdate\n"\
      "\ttime"\
);
```

Macro to print the list of commands that have help pages.

4.5.2.2 #define HELP_DATE

Value:

```
puts(\
      "Display date."\
      "Use flag [-f | --full] for more information"\
);
```

Macro to print the shortened help page for command date.

4.5.2.3 #define HELP_DATE_FULL

Value:

```
puts(\
        "Usage:\n"\
        "\tdate [-s | --set]\n"\
        "Flags:\n"\
        "\t[-s | --set] - Set the date in DD/MM/YYYY\n"\
        "\t\tWhere all values are integers\n"\
        "Example:\n"\
        "\tdate -s 08/24/1994\n"\
        "\tdate --set 01/01/2019"\
);
```

Macro to print the full help page for command date.

4.5.2.4 #define HELP_HELP

Value:

```
puts(\
  "View help pages for individual commands."\
  " Use flag [-f | --full] for more information"\
);
```

Macro to print the shortned help page for comamnd help.

4.5.2.5 #define HELP_HELP_FULL

Value:

```
puts(\
          "Usage:\n"\
          "\thelp [-c | --command] <command> [-f | --full]\n"\
          "\n"\
          "Flags:\n"\
          "\t[-c | --command] - Show the help page for a certain command\n"\
          "\t[-f | --full] - Show implementation and flags for each command\n"\
          "\t\twith explanations"\
);
```

Macro to print the full help page for command help.

4.5.2.6 #define HELP_SHUTDOWN

Value:

```
puts(\
      "Shutdown the POS System."\
      "Use flag [-f | --full] for more information"\
);
```

Macro to print the shortned help page for command shutdown.

4.5.2.7 #define HELP_SHUTDOWN_FULL

Value:

```
puts(\
        "Usage:\n"\
        "\tshutdown\n"\
        "Flags:\n"\
        "\tNone\n"\
        "Notes:\n"\
        "\tMust confirm with Yes before shutdown"\
);
```

Macro to print the full help page for command shutdown.

4.5.2.8 #define HELP_TIME

Value:

```
puts(\
      "Display time."\
      "Use flag [-f | --full] for more information"\
);
```

Macro to print the shortned help page for command time.

4.5.2.9 #define HELP_TIME_FULL

Value:

```
puts(\
        "Usage:\n"\
        "\tdate [-s | --set]\n"\
        "Flags:\n"\
        "\t[-s | --set] - Set the time in HH:MM:SS\n"\
        "\t\tWhere all values are integers and using 24 hour time\n"\
        "Example:\n"\
        "\ttime -s 12:24:32\n"\
        "\ttime --set 16:02:00"\
);
```

Macro to print the full help page for command time.

4.5.2.10 #define HELP_VERSION

Value:

```
puts(\
      "Display version information."\
      "Use flag [-f | --full] for more information"\
);
```

Macro to print the shortned help page for command version.

4.5.2.11 #define HELP_VERSION_FULL

Value:

```
puts(\
        "Usage:\n"\
        "\tversion [-f | --full]\n"\
        "Flags:\n"\
        "\t[-f | --full] - Show entire verion"\
);
```

Macro to print the full help page for command version.

4.5.2.12 #define VERSION

Value:

```
puts(\
      "Version 1.0"\
);
```

Macro to print the short version.

4.5.2.13 #define VERSION_FULL

Value:

```
puts(\
        "Version 1.0\n"\
        "Module one\n"\
        "Developers:\n"\
        "\tHasan Ibraheem\n"\
        "\tHenry Vos\n"\
        "\tJay Kmetz\n"\
        "\tNicholas Fryer"\
);
```

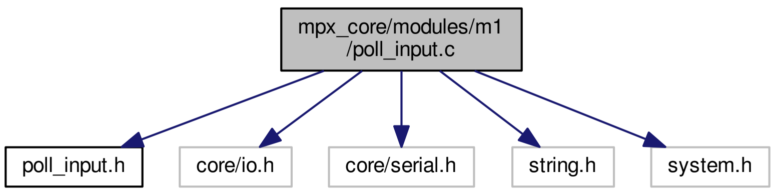
Macro to print the full version.

4.6 mpx_core/modules/m1/poll_input.c File Reference

The polling input file that allows user input.

```
#include "poll_input.h"
#include <core/io.h>
#include <core/serial.h>
#include <string.h>
#include <system.h>
```

Include dependency graph for poll_input.c:



Macros

- #define **BUFFER_LEN** 100

Functions

- int input_available ()

  Checks for input on COM1.
- int wait_for_input (int timeout)

  Loops N times to check for input.
- int get_key ()

  Receives a key press, whether a full control sequence or simple character.
- void move_cursor (int n)

Moves the cursor n characters.
- void print_after_cursor (const char ∗str)

    Prints text after the cursor without moving the cursor.
- void delete_after_cursor ()

    Deletes all text after the cursor.
- void memcpy (char ∗destination, const char ∗source, int n)

    Copies n bytes from one buffer to another.
- int poll_input (char ∗buffer, int ∗length)

    Polls COM1 for input and puts it into buffer.

Variables

- const ControlSequence control_sequences [ ]

    A collection of known control sequences and what they mean.
- const int TOLERANCE = 300

    Maximum amount of NOP cycles that can occur between two inputs from the same control sequence.
- const char ESC = '\x1B'

    The escape character.
- const int ALT_FLAG = 1 << 8

    The bit indicating a key from get_key was held with the ALT key.

4.6.1 Detailed Description

The polling input file that allows user input.

4.6.2 Function Documentation

4.6.2.1 int get_key ( )

Receives a key press, whether a full control sequence or simple character.

Calls inb(COM1) to receive bytes. If a control sequence is detected then it is parsed according to the control_↩ sequences array. If it was just a simple character like the A key. Then the char is sent as an int. Arrow keys and other control sequences are special numbers higher than 255 to differentiate themselves from the regular characters. The KEYS enum shows the special characters

Returns

Returns an int corresponding to the key

4.6.2.2 int input_available ( )

Checks for input on COM1.

Returns

1 if input is available, 0 if it isn't.

4.6.2.3 void memcpy (char ∗ *destination,* const char ∗ *source,* int *n*)

Copies n bytes from one buffer to another.

Parameters

destination	Where to copy the bytes to.
source	Where to copy the bytes from.
n	How many bytes to copy.

4.6.2.4 void move_cursor (int *n*)

Moves the cursor n characters.

Parameters

n	How many characters to move the character, can be negative.

4.6.2.5 int poll_input (char ∗ *buffer,* int ∗ *length*)

Polls COM1 for input and puts it into buffer.

An internal history is kept so the user can go through past commands

Parameters

buffer	a pointer to the buffer to put the user input into
length	a pointer to the length of buffer, will be modified to length of input

Returns

function status

4.6.2.6 void print_after_cursor (const char ∗ *str*)

Prints text after the cursor without moving the cursor.

Parameters

str	A pointer to the string to print out

4.6.2.7 int wait_for_input (int *timeout*)

Loops N times to check for input.

Calls NOP in a while loop at most `timeout` times until it returns.

Parameters

timeout	How many times to loop before we give up

Returns

how many times were left in the timeout

4.6.3 Variable Documentation

4.6.3.1 const ControlSequence control_sequences[ ]

Initial value:

```
= {
  {"A", UP_ARROW},
  {"B", DOWN_ARROW},
  {"C", RIGHT_ARROW},
  {"D", LEFT_ARROW},

  {"1~", HOME},
  {"2~", INSERT},
  {"3~", DELETE},
  {"4~", END},
  {"5~", PAGE_DOWN},
  {"6~", PAGE_UP},

  {"[A", F1},
  {"[B", F2},
  {"[C", F3},
  {"[D", F4},
  {"[E", F5},
  {"17~", F6},
  {"18~", F7},
  {"19~", F8},
  {"20~", F9},
  {"21~", F10},
  {"23~", F11},
  {"24~", F12},

  {"", 0}
}
```

A collection of known control sequences and what they mean.

Control sequences are used to encode special input keys from the keyboard that aren't just a one byte character. They start with ESCAPE [and then a series of characters. This array holds the series of characters that comes after the bracket, along with the corresponding keyboard input. The keyboard inputs are from the KEYS enum.

4.6.3.2 const int TOLERANCE = 300

Maximum amount of NOP cycles that can occur between two inputs from the same control sequence.

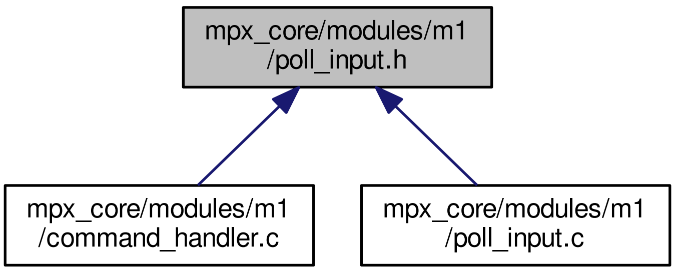
Note

This is entirely arbitrary and was just increased until things stopped being weird.

4.7 mpx_core/modules/m1/poll_input.h File Reference

The header file for the polling input.

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



Data Structures

- struct control_sequence

  A struct to hold key mappings.

Typedefs

- typedef struct control_sequence ControlSequence

  A struct to hold key mappings.

Enumerations

- enum **KEYS** {
  BASE = 1024, **UP_ARROW**, **DOWN_ARROW**, **RIGHT_ARROW**,
  LEFT_ARROW, **HOME**, **INSERT**, **DELETE**,
  END, **PAGE_UP**, **PAGE_DOWN**, **F1**,
  F2, **F3**, **F4**, **F5**,
  F6, **F7**, **F8**, **F9**,
  F10, **F11**, **F12** }

Functions

- int poll_input (char ∗buffer, int ∗length)

  Polls COM1 for input and puts it into buffer.

4.7.1 Detailed Description

The header file for the polling input.

4.7.2 Typedef Documentation

4.7.2.1 typedef struct control_sequence ControlSequence

A struct to hold key mappings.

The control_sequence Struct is a custom struct that is designed to hold mappings between control sequence codes used to encode arrow keys. It also holds other special buttons.

Parameters

code	The special keyboard code name
id	The keyboard code value

4.7.3 Function Documentation

4.7.3.1 int poll_input (char ∗ *buffer,* int ∗ *length*)

Polls COM1 for input and puts it into buffer.

An internal history is kept so the user can go through past commands

Parameters

buffer	a pointer to the buffer to put the user input into
length	a pointer to the length of buffer, will be modified to length of input

Returns

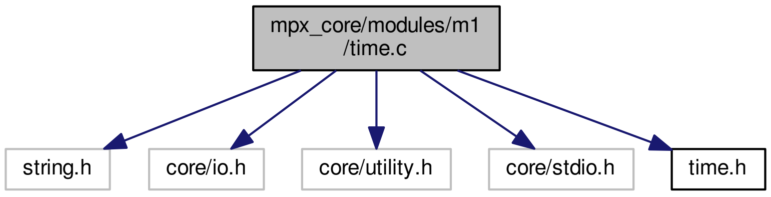
function status

4.8 mpx_core/modules/m1/time.c File Reference

The file that contains all the date and time system functions.

```
#include <string.h>
#include <core/io.h>
#include <core/utility.h>
#include <core/stdio.h>
#include "time.h"
```

Include dependency graph for time.c:



Macros

- #define pull_data(val, loc)

    Macro aquires data from a RTC register and converts the output from BCD to decimal.
- #define decimal_to_bcd(val) ((val/10)<<4 | (val%10))

    Simple macro to convert values into BCD format to write time to the RTC.
- #define neg_safe_set(in, loc)

    Wrties a value to a RTC register.

Functions

- int bcd_to_decimal (int bcd)

    Converts BCD values into decimal.
- void format_time (char ∗dest, time_h ∗time)

    Generates a string with a standard format of time.
- time_h get_current_time ()

    Retrieves the current time in the Real Time Clock(RTC).
- int set_current_time (time_h time)

    Sets the current time in the RTC.

4.8.1 Detailed Description

The file that contains all the date and time system functions.

4.8.2 Macro Definition Documentation

4.8.2.1 #define decimal_to_bcd(*val*) ((val/10)<<4 | (val%10))

Simple macro to convert values into BCD format to write time to the RTC.

This is used to convert a value that could be defined as a literal or calculated by code, into BCD so that writing to the RTC is correct, and that it can keep time. This macro is nested in neg_safe_set.

Parameters

val	The value to be converted into BCD format.

Returns

Returns the BCD of the given value.

4.8.2.2 #define neg_safe_set(*in,* *loc*)

Value:

```
{\
    if (in > -1)\
    {\
        outb(INDEX_REG, loc);\
        outb(DATA_REG, decimal_to_bcd(in));\
    }\
}
```

Wrties a value to a RTC register.

Writes a decimal value to a RTC register. This converts the given value to BCD, and then writes it into the correct data location for the RTC to recognise what is being set. Uses outb to set the location of the data that is being written, and writing the actual data.

Parameters

in	The value that is being written to the RTC.
loc	Type of data being requested, this is using the macros specifed in time.h as YEAR_REG, MONTH_REG, etc.

Returns

void

Warning

Do not use values that are not specifed as 'locations' as the loc field.
'in' should not be BCD, it should be a normal value.

4.8.2.3 #define pull_data(*val,* *loc*)

Value:

```
{\
    outb(INDEX_REG, loc);\
    char temp = inb(DATA_REG);\
    val = bcd_to_decimal(temp);\
    if (val < 0)\
    {\
        puts("\033[31mTIME ERROR: BCD conversion error in "#val".\033[0m");\
        return (time_h){-1,-1,-1,-1,-1,-1};\
    }\
}
```

Macro aquires data from a RTC register and converts the output from BCD to decimal.

This macro is used by the get_time function to aquire the RTC value and convert it into a usable decimal. The data at the location that is specified is written to the given vlaue. The function outb is used to select the type of information that is going to be written to the value, this is years, months, etc.. The bcd to base 2 conversion happens within the bcd_to_decimal macro.

Parameters

val	Value that the requested data is to be stored into. This data must not be a pointer.
loc	Type of data being requested, this is using the macros specifed in time.h as YEAR_REG, MONTH_REG, etc.

Returns

void

Warning

Do not use values that are not specifed as 'locations' as the loc field.

4.8.3 Function Documentation

4.8.3.1 int bcd_to_decimal (int *bcd*)

Converts BCD values into decimal.

This function converts BCD values, to be a more code friendly decimal value.

Parameters

bcd	Value that is in BCD that needs to be a normal decimal value.

Returns

The value of the BCD as an integer.

4.8.3.2 void format_time (char ∗ *dest,* time_h ∗ *time*)

Generates a string with a standard format of time.

Generates a string that contains all the data contained in a time_h. This form shows all data from largest timescale to smallest timescale.

Parameters

dest	Pointer to a string that is large enough to contain the output string
time	Pointer to the time to write into the destination string.

Returns

Return is through the 'dest' pointer.

Note

This is merely a convienience, as it is only an sprintf call.

4.8.3.3 time_h get_current_time ( )

Retrieves the current time in the Real Time Clock(RTC).

Aquires data from the RTC, packaging the data into a time_h struct for ease of use.

Returns

Returns the current time represented as 6 values in a time_h struct.

4.8.3.4 int set_current_time (time_h *time*)

Sets the current time in the RTC.

Uses a time_h struct to set the data members of the RTC. This function also does error checking on valid times, including leap-years, valid days of months, etc., to ensure the given time is valid.

Parameters

time	A time_h struct containing the new time, as defined by the user.

Returns

If the operation was successful in boolean format (1 = true, 0 = false).

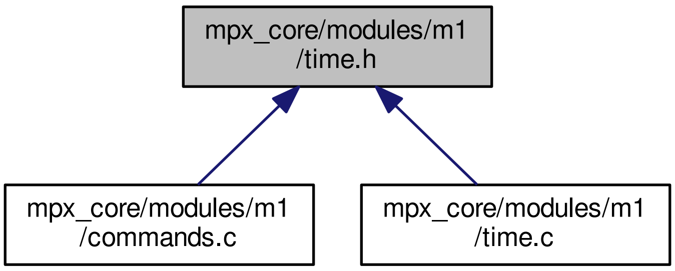
Note

This function also ensures that the date will be set in the correct order within the RTC.
Setting a value in the input struct to a '-1' will skip the value in setting the time. Essentially, keeping the value as it was before. This is demonstrated in the commands.c file.

4.9 mpx_core/modules/m1/time.h File Reference

The header file for the date and time functions.

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


mpx_core/modules/m1 /time.h
mpx_core/modules/m1 /commands.c
mpx_core/modules/m1 /time.c

Data Structures

- struct time

  A struct to all the time and date elements.

Macros

- #define **SECOND_REG** 0x00
- #define **MINUTE_REG** 0x02
- #define **HOUR_REG** 0x04
- #define **DAY_OF_MONTH_REG** 0x07
- #define **MONTH_REG** 0x08
- #define **CENTURY_REG** 0x32
- #define **YEAR_REG** 0x09
- #define **INDEX_REG** 0x70
- #define **DATA_REG** 0x71

Typedefs

- typedef struct time **time_h**

Enumerations

- enum **MONTH** {
  JANUARY = 1, **FEBRUARY**, **MARCH**, **APRIL**,
  MAY, **JUNE**, **JULY**, **AGUST**,
  SEPTEMBER, **OCTOBER**, **NOVEMBER**, **DECEMBER** }

Functions

- void format_time (char ∗dest, time_h ∗t)

  Generates a string with a standard format of time.
- time_h get_current_time ()

  Retrieves the current time in the Real Time Clock(RTC).
- int set_current_time (time_h time)

  Sets the current time in the RTC.
- int bcd_to_decimal (int bcd)

  Converts BCD values into decimal.

4.9.1 Detailed Description

The header file for the date and time functions.

4.9.2 Function Documentation

4.9.2.1 int bcd_to_decimal (int *bcd*)

Converts BCD values into decimal.

This function converts BCD values, to be a more code friendly decimal value.

Parameters

bcd	Value that is in BCD that needs to be a normal decimal value.

Returns

The value of the BCD as an integer.

4.9.2.2 void format_time (char ∗ *dest,* time_h ∗ *time*)

Generates a string with a standard format of time.

Generates a string that contains all the data contained in a time_h. This form shows all data from largest timescale to smallest timescale.

Parameters

dest	Pointer to a string that is large enough to contain the output string
time	Pointer to the time to write into the destination string.

Returns

Return is through the 'dest' pointer.

Note

This is merely a convienience, as it is only an sprintf call.

4.9.2.3 time_h get_current_time ( )

Retrieves the current time in the Real Time Clock(RTC).

Aquires data from the RTC, packaging the data into a time_h struct for ease of use.

Returns

Returns the current time represented as 6 values in a time_h struct.

4.9.2.4 int set_current_time (time_h *time*)

Sets the current time in the RTC.

Uses a time_h struct to set the data members of the RTC. This function also does error checking on valid times, including leap-years, valid days of months, etc., to ensure the given time is valid.

Parameters

time	A time_h struct containing the new time, as defined by the user.

Returns

If the operation was successful in boolean format (1 = true, 0 = false).

Note

This function also ensures that the date will be set in the correct order within the RTC.
Setting a value in the input struct to a '-1' will skip the value in setting the time. Essentially, keeping the value as it was before. This is demonstrated in the commands.c file.

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