

# M9.6 SPS STM ATB V1.1001

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## Software Product Specification for the development of an STM ATB

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## 1 Scope

## 1.1 Identification

**STMA-83508** - This document applies to V1.1001 of the software that runs on the Functional Processor and Profibus Processor of the STM ATB.

## 1.2 System overview

**STMA-83509** - An STM is a train protection system which prevents trains from over speeding and/or unauthorized movements. It allows ETCS equipped trains to operate on conventional (non ETCS) lines. An STM ATB is a "Specific Transmission Module" designed and built according to the ERA ERTMS specifications and national requirements for ATB-EG. When integrated with an onboard ETCS system, the combination of STM ATB and the ETCS onboard system ensures all ATB-EG and ATB-Vv functionalities on ATB equipped lines.

## 1.3 Document overview

**STMA-83505** - This document lists the executables provided with the STM ATB. It lists the sources needed to build these executables, instructions on how to build the executables from these sources, and verify that these executables match the provided executables. In addition it describes how to make modifications to the executables.



## 2 References

### STMA-83456 - Reference documents



All the documents references used in this document can be found in the document  [P6.1](#)

[Bibliography](#) available in the Polarion folder  [Processes](#)

### Abbreviations, definitions and terminology

An overview of the abbreviations, definitions and terminology used in this document can be found in document  [P6.2 List of abbreviations, definitions and terms](#) available in the Polarion folder  [Processes](#)

### Requirement identification

The STM ATB project makes use of an automated requirement management system. In this system each requirement has been identified as a work item. Each work item has been automatically assigned with a unique ID, with the format "STMA-<number>". As a result requirement ID's are not in logical order. An overview of all the used STMA-numbers is given in document  [P6.3 Requirement Overview](#) available in the Polarion folder  [Processes](#)

### 3 Requirements.

#### 3.1 Executable software.

**STMA-83459** - The executable software consists of two firmware images:

1. fpmain.bin, to be installed on the Functional Processor,
2. ppmain.bin to be installed on the Profibus Processor.

**STMA-83460** - To verify that these are valid copies compute the md5sum for each of these two. They should match the following:

- 526d2e20d1d8c77b9ccae5e4f2c48419 fpmain.bin
- 48b44f53cf6c67897f7085a0eefbe041 ppmain.bin

#### 3.2 Source Files

**STMA-83461** - The following set of source files are needed to build the two firmware images:

- STMATBV1\_1001.zip
- SW-TM4C-2.1.3.156.exe

### 4 Qualification provisions.

**STMA-83488** - To verify that the firmware images you build from the source files provided in the dossier match the images provided in the dossier follow the steps in section 5.2.2.1.

### 5 Software support information.

**STMA-83486** - This section describes how the software can be reassembled and build from the provided sources and how the software may be modified.

## 5.1 "As built" software design.

**STMA-83490** - The corresponding design for the software can be found in [STMA-14364 - D6.2 SDD System level](#) and the corresponding subdocuments D6.2.x and D6.3.x listed in this document.

## 5.2 Compilation/build procedures.

### 5.2.1 Prerequisites

**STMA-83481** - To build the firmware the following build tools are required:

- Ubuntu 20.04.6 LTS.
- cmake version 3.16.3
- GNU objcopy (GNU Tools for ARM Embedded Processors) 2.26.2.20160923
- GNU strip (GNU Tools for ARM Embedded Processors) 2.26.2.20160923
- GNU Make 4.2.1
- ARM C compiler v16.9.4.LTS
- GCC 9.4.0
- Tivaware 2.1.3.156.

**STMA-83480** - The installation procedures for these tools are described in the following sections.

### 5.2.2 Virtual Machine

**STMA-83476** - The firmware is build using a virtual machine and below is explained step by step how this VM can be build rom scratch. In addition an VM image with the result of these steps is provided in the dossier as the availability of some of the below sources can not be guaranteed.

**STMA-83477** - The procedure assumes VirtualBox is used, however other systems such as QEMU or VM-Ware can be used too.

**STMA-83474** - Download the iso ubuntu-20.04.6-live-server-amd64.iso from <https://ftp.nluug.nl/os/Linux/distr/ubuntu-releases/20.04.6/>

**STMA-83475** - With this create a virtual machine named STM\_20\_04 Type Linux, Version: 64 bits. Give it 2048 MB of memory, and 15 Gig of disk space. Install Ubuntu with default options. Name the machine "builder" and use "developer" as name for the default user.

**STMA-83478** - After the install, reboot and login as developer. Then run:

```
sudo shutdown now
```

**STMA-83479** - Allow ssh access using:

```
vboxmanage modifyvm STM_20_04 --natpf1"SSH,tcp,127.0.0.1,2522,10.0.2.15,22"
```

**STMA-83502** - Where the IP address has been determined from

```
vboxmanage showvminfo STM_20_04 | grep "guest ip"
```

**STMA-83503 - Start the machine with**

```
vboxmanage startvm STM_20_04 --type headless
```

**STMA-83493 - Log in**

```
ssh -p 2522 developer@127.0.0.1
```

**STMA-83494 - And update the system:**

```
sudo apt update
```

```
sudo apt upgrade
```

**STMA-83491 - Install the build tooling**

```
sudo apt install gcc
```

```
sudo apt install cmake
```

```
sudo apt install unzip
```

```
sudo apt install libc6-i386
```

**STMA-83492** - Both firmware images are compiled with the TI ARM C compiler version v16.9.4.LTS.

It can be downloaded from <http://www.ti.com/tool/download/ARM-CGT-16/16.9.4.LTS>

**STMA-83498** - Copy ti\_cgt\_tms470\_16.9.4.LTS\_linux\_installer\_x86.bin to /home/developer

**STMA-83500** - Strip is needed to remove all debugging and symbol information from the images so a proper hash can be computed

to compare the results of two compilations. The strip provided with the TI ARM C compiler does not strip all information so the one from the GNU ARM compiler is used. It can be downloaded from

[https://launchpad.net/gcc-arm-embedded/5.0/5-2016-q3-update/+download/gcc-arm-none-eabi-5\\_4-2016q3-20160926-linux.tar.bz2](https://launchpad.net/gcc-arm-embedded/5.0/5-2016-q3-update/+download/gcc-arm-none-eabi-5_4-2016q3-20160926-linux.tar.bz2)

**STMA-83495** - Copy gcc-arm-none-eabi-5\_4-2016q3-20160926-linux.tar.bz2 to /home/developer

**STMA-83487** - TivaWare includes headers files needed to compile the profibus processor firmware. The STM ATB was developed using the header files provided in . This version is no longer available for download and is therefore provided together with the STM ATB sources. Copy SW-TM4C-2.1.3.156.exe to /home/developer to /home/developer

**STMA-83489** - Copy STMATB-V1.1001.zip to /home/developer

**STMA-83929 - Install TI ARM C compiler**

```
chmod +x ./ti_cgt_tms470_16.9.4.LTS_linux_installer_x86.bin
```

```
sudo ./ti_cgt_tms470_16.9.4.LTS_linux_installer_x86.bin
```

Select as destination directory: /opt/ti/ccsv7/tools/compiler/ti-cgt-arm\_16.9.4.LTS/

**STMA-83484 - Install armgcc**

```
tar -xvf gcc-arm-none-eabi-5_4-2016q3-20160926-linux.tar.bz2
```

```
sudo mkdir -p /opt/Tiva
sudo mv gcc-arm-none-eabi-5_4-2016q3 /opt/Tiva/
```

**STMA-83485 - Install TivaWare**

```
sudo mkdir -p /opt/Tiva/tivaware
sudo cp SW-TM4C-2.1.3.156.exe /opt/Tiva/tivaware
cd /opt/Tiva/tivaware
sudo unzip SW-TM4C-2.1.3.156.exe
```

**STMA-83482 - Build the STM ATB firmware by running:**

```
unzip STMATB-TV1.0001.zip
cd STMATB-TV1.0001/src
./build_all.sh
```

**STMA-83483 - Build results are stored in three directories:**

- ./build\_fp\_uart
- ./build\_pp
- ./build\_x86

**STMA-83499 - The firmware images can be found at:**

- ./build\_fp\_uart/STMATB/functional\_processor/fpmain.bin.
- ./build\_pp/build\_pp/STMATB/profibus\_processor/ppmain.bin

**STMA-83501 - Individual parts can be build using two commands shown in the two work items below.****STMA-83496 - To build the firmware for the Functional Processor**

run:

```
./build_it.sh fp
```

**STMA-83497 - To build the firmware for the Profibus**

Processor run:

```
./build_it.sh pp
```

**5.2.2.1 Verifying the results****STMA-83517 - Run:**

```
md5sum ./build_fp_uart/STMATB/functional_processor/fpmain.bin
md5sum ./build_pp/STMATB/profibus_processor/ppmain.bin
```

**STMA-83518 - These number should match those in shown in STMA-83460.**



### 5.3 Modification procedures.

**STMA-83513** - General instructions on design, coding, and other conventions to be followed can be found in:

Q2.10.1 Workinstruction for software design and development.

**STMA-83514** - A number of parts of the code are generated by code generators. There are generators for:

1. state machine,
2. the mapping of events to measures,
3. encoding en decoding STM packets,
4. hardware configuration

#### 5.3.1 State machine

**STMA-83511** - To add, remove, or modify a state or a transition edit the corresponding .md file that contains the specification for the state machine. Then run

```
./src/generate.sh
```

#### 5.3.2 Mapping of events to measures

**STMA-83512** - To modify the mapping edit

./src/STMATB/functional\_processor/event\_handler/Event\_Measure\_Matrix.csv

and run

```
./src/generate.sh
```

#### 5.3.3 Adding Text Messages

**STMA-83510** - To add text messages, add a new measure in the Event Measure matrix, and start it with the string "Text:". Then run

```
./src/generate.sh
```

#### 5.3.4 Encoding en decoding STM packets

**STMA-83515** - Two modification are possible, to add or remove packet types edit the variable "relevant\_packets\_list" in:

./src/Generators/SubsetEncoderDecoderGenerator/json2stmcode.py

and run

```
./src/generate.sh
```

### 5.3.5 Hardware configuration

**STMA-83516** - The hardware configuration can be modified with HalcoGen. For the development of the STM ATB version 04.07.01 was used. To make changes in the hardware configuration copy the STM ATB sources to a windows machine and open `src/STMATB/hercules_drivers/halcogen/SAP_RM48_Peripherals.hcg` make the changes and regenerate the code.

## 6 Requirements traceability

**STMA-83540** - The following tables show the mapping between source code files and the software modules defined in [STMA-64538 - Functional Processor Application](#) and [STMA-64539 - Profibus Processor Application](#).

**STMA-83550** - Function Processor Application

- `src/STMATB/functional_processor/fpmain.c`

**STMA-83541** - Profibus Processor Application

- `src/STMATB/profibus_processor/ppmain.c`

**STMA-83531** - Module Application Layer

- `src/STMATB/functional_processor/application_layer/apl_module_state.h`
- `src/STMATB/functional_processor/application_layer/apl_getset.c`
- `src/STMATB/functional_processor/application_layer/apl_module.h`
- `src/STMATB/functional_processor/application_layer/apl_module.c`
- `src/STMATB/functional_processor/application_layer/apl_getset.h`
- `src/STMATB/functional_processor/application_layer/subset_decoder_encoder/subset58_bitoperations.h`
- `src/STMATB/functional_processor/application_layer/subset_decoder_encoder/subset58_bitoperations.c`
- `src/STMATB/functional_processor/application_layer/subset_decoder_encoder/subset58_packets.h`
- `src/STMATB/functional_processor/application_layer/subset_decoder_encoder/stm_subset58_msghlayer.h`
- `src/STMATB/functional_processor/application_layer/subset_decoder_encoder/stm_subset58_msghlayer.c`

**STMA-83532** - Module ATBEG+Vv Function

- `src/STMATB/functional_processor/atb/atb_module.h`
- `src/STMATB/functional_processor/atb/atb_module_state.h`

- src/STMATB/functional\_processor/atb/atb\_getset.c
- src/STMATB/functional\_processor/atb/atb\_getset.h
- src/STMATB/functional\_processor/atb/atb\_module.c
- src/STMATB/functional\_processor/atb/atbeg\_sm/isdoatbeg\_sm.h
- src/STMATB/functional\_processor/atb/atbeg\_sm/isdoatbeg\_sm.c
- src/STMATB/functional\_processor/atb/atbeg\_sm/atbeg\_sm\_imp.c
- src/STMATB/functional\_processor/atb/atbeg\_sm/atbeg\_sm\_imp.h
- src/STMATB/functional\_processor/atb/atbeg\_sm/atbeg\_env.h
- src/STMATB/functional\_processor/atb/atbvsm/atbvsm\_env.h
- src/STMATB/functional\_processor/atb/atbvsm/atbvsm\_imp.c
- src/STMATB/functional\_processor/atb/atbvsm/atbvsm\_imp.h
- src/STMATB/functional\_processor/atb/atbvsm/isdoatbvsm.h
- src/STMATB/functional\_processor/atb/atbvsm/isdoatbvsm.c

### **STMA-83529 - Module Basic Software**

- src/STMATB/basic\_software/bs\_do\_nothing.h
- src/STMATB/basic\_software/time\_helper.h
- src/STMATB/basic\_software/bs\_endian.c
- src/STMATB/basic\_software/bs\_queue.c
- src/STMATB/basic\_software/time\_tracking.c
- src/STMATB/basic\_software/bs\_example\_queue.c
- src/STMATB/basic\_software/bs\_assert.c
- src/STMATB/basic\_software/system\_panic.h
- src/STMATB/basic\_software/bs\_endian.h
- src/STMATB/basic\_software/bs\_crc.h
- src/STMATB/basic\_software/bs\_crc.c
- src/STMATB/basic\_software/bs\_hardware\_access.h
- src/STMATB/basic\_software/bs\_queue.h
- src/STMATB/basic\_software/system\_panic.c
- src/STMATB/basic\_software/bs\_example\_queue.h
- src/STMATB/basic\_software/bs\_do\_nothing.c
- src/STMATB/basic\_software/time\_tracking.h
- src/STMATB/basic\_software/hercules/time\_helper.c
- src/STMATB/basic\_software/tiva/time\_helper.c
- src/STMATB/basic\_software/x86/time\_helper.c
- src/STMATB/basic\_software/x86/time\_helper\_ext.h

### **STMA-83530 - Module Common Types**

- src/STMATB/common\_types/stmatb\_bool.h
- src/STMATB/common\_types/stmatb\_conversions.c
- src/STMATB/common\_types/stmatb\_telegram\_queue.c
- src/STMATB/common\_types/stmatb\_message\_queue.c
- src/STMATB/common\_types/stmatb\_telegram.c
- src/STMATB/common\_types/stmatb\_message\_queue.h

- src/STMATB/common\_types/stmatb\_enums.c
- src/STMATB/common\_types/stmatb\_connection\_id.h
- src/STMATB/common\_types/stmatb\_limited\_code\_speed.h
- src/STMATB/common\_types/stmatb\_enums.h
- src/STMATB/common\_types/stmatb\_connection\_id.c
- src/STMATB/common\_types/stmatb\_message.h
- src/STMATB/common\_types/stmatb\_reftime.h
- src/STMATB/common\_types/stmatb\_state\_of\_connections.c
- src/STMATB/common\_types/stmatb\_conversions.h
- src/STMATB/common\_types/stmatb\_state\_of\_connections.h
- src/STMATB/common\_types/stmatb\_disconnect\_etcs.c
- src/STMATB/common\_types/stmatb\_dmi\_texts.c
- src/STMATB/common\_types/stmatb\_limits.h
- src/STMATB/common\_types/stmatb\_def.h
- src/STMATB/common\_types/stmatb\_packet\_queue.c
- src/STMATB/common\_types/stmatb\_connection\_order\_queue.h
- src/STMATB/common\_types/stmatb\_telegram\_queue.h
- src/STMATB/common\_types/stmatb\_limited\_code\_speed.c
- src/STMATB/common\_types/stmatb\_types.c
- src/STMATB/common\_types/stmatb\_connection\_order.c
- src/STMATB/common\_types/stmatb\_dmi\_texts.h
- src/STMATB/common\_types/stmatb\_disconnect\_etcs.h
- src/STMATB/common\_types/stmatb\_version\_info.c
- src/STMATB/common\_types/stmatb\_types.h
- src/STMATB/common\_types/stmatb\_packet.h
- src/STMATB/common\_types/stmatb\_complex.h
- src/STMATB/common\_types/stmatb\_connection\_order.h
- src/STMATB/common\_types/stmatb\_telegram.h
- src/STMATB/common\_types/stmatb\_module\_ids.h
- src/STMATB/common\_types/stmatb\_message.c
- src/STMATB/common\_types/stmatb\_connection\_order\_queue.c
- src/STMATB/common\_types/stmatb\_packet.c
- src/STMATB/common\_types/stmatb\_packet\_queue.h
- src/STMATB/common\_types/stmatb\_reftime.c

#### **STMA-83536 - Module Debug Utils**

- src/STMATB/debug\_utils/bs\_logging.c
- src/STMATB/debug\_utils/du\_udp.h
- src/STMATB/debug\_utils/bs\_logging.h
- src/STMATB/debug\_utils/bs\_print.h
- src/STMATB/debug\_utils/dbg\_pins.h
- src/STMATB/debug\_utils/bs\_read.h
- src/STMATB/debug\_utils/hercules/dbg\_pins.c
- src/STMATB/debug\_utils/hercules/bs\_rtt.c

- src/STMATB/debug\_utils/hercules/bs\_uartio.c
- src/STMATB/debug\_utils/tiva/bs\_no\_io.c
- src/STMATB/debug\_utils/x86/bs\_udpio.c
- src/STMATB/debug\_utils/x86/du\_udp.c
- src/STMATB/debug\_utils/x86/bs\_termio.c

#### **STMA-83538** - Module ATBEG+Vv Decoder

- src/STMATB/functional\_processor/decoder/dec\_module\_state.h
- src/STMATB/functional\_processor/decoder/dec\_getset.h
- src/STMATB/functional\_processor/decoder/decoder\_module.h

#### **STMA-83533** - Module FPDC

- src/STMATB/functional\_processor/fpdc/fpdc\_module\_state.h
- src/STMATB/functional\_processor/fpdc/fpdc\_module.h
- src/STMATB/functional\_processor/fpdc/fpdc\_getset.h
- src/STMATB/functional\_processor/fpdc/fpdc\_getset.c
- src/STMATB/functional\_processor/fpdc/fpdc\_module.c
- src/STMATB/functional\_processor/fpdc/unit\_tests/unittest\_fpdc\_module.c
- src/STMATB/functional\_processor/fpdc/fpdc\_hardware\_helper/fpdc\_hardware\_helper.h
- 
- src/STMATB/functional\_processor/fpdc/fpdc\_hardware\_helper/hercules/fpdc\_hardware\_helper.c
- src/STMATB/functional\_processor/fpdc/fpdc\_hardware\_helper/x86/fpdc\_hardware\_helper.c

#### **STMA-83546** - Module Input Handler

- src/STMATB/functional\_processor/input\_handler/ih\_module.c
- src/STMATB/functional\_processor/input\_handler/ih\_module.h
- src/STMATB/functional\_processor/input\_handler/ih\_constants.h
- src/STMATB/functional\_processor/input\_handler/ih\_getset.h
- src/STMATB/functional\_processor/input\_handler/ih\_module\_state.h
- src/STMATB/functional\_processor/input\_handler/ih\_getset.c
- src/STMATB/functional\_processor/input\_handler/circular\_buffer/uint8\_cbuff.h
- src/STMATB/functional\_processor/input\_handler/circular\_buffer/float\_cbuff.c
- src/STMATB/functional\_processor/input\_handler/circular\_buffer/bool\_cbuff.c
- src/STMATB/functional\_processor/input\_handler/circular\_buffer/uint8\_cbuff.c
- src/STMATB/functional\_processor/input\_handler/circular\_buffer/int16\_cbuff.h
- src/STMATB/functional\_processor/input\_handler/circular\_buffer/complex\_cbuff.h
- src/STMATB/functional\_processor/input\_handler/circular\_buffer/circular\_buffer.c
- src/STMATB/functional\_processor/input\_handler/circular\_buffer/bool\_cbuff.h
- src/STMATB/functional\_processor/input\_handler/circular\_buffer/circular\_buffer.h
- src/STMATB/functional\_processor/input\_handler/circular\_buffer/complex\_cbuff.c
- src/STMATB/functional\_processor/input\_handler/circular\_buffer/float\_cbuff.h
- src/STMATB/functional\_processor/input\_handler/circular\_buffer/int16\_cbuff.c
- src/STMATB/functional\_processor/input\_handler/signal\_analyzer/sa\_module.c
- src/STMATB/functional\_processor/input\_handler/signal\_analyzer/sa\_module.h
- src/STMATB/functional\_processor/input\_handler/signal\_analyzer/sa\_module\_state.h

- src/STMATB/functional\_processor/input\_handler/input\_accumulator/ia\_module.c
- src/STMATB/functional\_processor/input\_handler/input\_accumulator/conversion\_factors.c
- src/STMATB/functional\_processor/input\_handler/input\_accumulator/ia\_module\_state.h
- src/STMATB/functional\_processor/input\_handler/input\_accumulator/ia\_module.h
- src/STMATB/functional\_processor/input\_handler/input\_accumulator/conversion\_factors.h
- src/STMATB/functional\_processor/input\_handler/functional\_tests/ft\_ih\_module.c
- src/STMATB/functional\_processor/input\_handler/signal\_checker/sc\_module\_state.h
- src/STMATB/functional\_processor/input\_handler/signal\_checker/sc\_module.h
- src/STMATB/functional\_processor/input\_handler/signal\_checker/sc\_module.c
- src/STMATB/functional\_processor/input\_handler/atbeg\_filter/atbeg.c
- src/STMATB/functional\_processor/input\_handler/atbeg\_filter/atbeg.h

#### **STMA-83547 - Module FPPP**

- src/STMATB/interfaces/functional\_processor\_profibus\_processor/ptp\_packet.h
- src/STMATB/interfaces/functional\_processor\_profibus\_processor/ptp\_module.h
- src/STMATB/interfaces/functional\_processor\_profibus\_processor/txbuff\_module.c
- src/STMATB/interfaces/functional\_processor\_profibus\_processor/ptp\_getset.c
- src/STMATB/interfaces/functional\_processor\_profibus\_processor/txbuff\_module.h
- src/STMATB/interfaces/functional\_processor\_profibus\_processor/txbuff\_module\_state.h
- src/STMATB/interfaces/functional\_processor\_profibus\_processor/ptp\_module.c
- src/STMATB/interfaces/functional\_processor\_profibus\_processor/rxbuff\_module.h
- src/STMATB/interfaces/functional\_processor\_profibus\_processor/ptp\_module\_state.h
- src/STMATB/interfaces/functional\_processor\_profibus\_processor/rxbuff\_module\_state.h
- 
- src/STMATB/interfaces/functional\_processor\_profibus\_processor/variable\_length\_protocol\_helper.h
- src/STMATB/interfaces/functional\_processor\_profibus\_processor/rxbuff\_module.c
- src/STMATB/interfaces/functional\_processor\_profibus\_processor/variable\_length\_protocol.h
- src/STMATB/interfaces/functional\_processor\_profibus\_processor/variable\_length\_protocol.c
- 
- src/STMATB/interfaces/functional\_processor\_profibus\_processor/hercules/variable\_length\_protocol\_helper.c
- 
- src/STMATB/interfaces/functional\_processor\_profibus\_processor/tiva/variable\_length\_protocol\_helper.c
- src/STMATB/interfaces/functional\_processor\_profibus\_processor/unit\_tests/test\_txbuff.c
- src/STMATB/interfaces/functional\_processor\_profibus\_processor/unit\_tests/test\_rxbuff.c
- 
- src/STMATB/interfaces/functional\_processor\_profibus\_processor/x86/variable\_length\_protocol\_helper.c
- 
- src/STMATB/interfaces/functional\_processor\_profibus\_processor/functional\_tests/ft\_ptp\_module.c

#### **STMA-83544 - Module FPFNC**

- src/STMATB/profibus\_processor/ppfnc/ppfnc\_getset.h

- src/STMATB/profibus\_processor/ppfnc/dpm\_interface\_helper.h
- src/STMATB/profibus\_processor/ppfnc/ppfnc\_module.c
- src/STMATB/profibus\_processor/ppfnc/ppfnc\_getset.c
- src/STMATB/profibus\_processor/ppfnc/ppfnc\_module.h
- src/STMATB/profibus\_processor/ppfnc/ppfnc\_module\_state.h
- src/STMATB/profibus\_processor/ppfnc/serialDPMInterface/OS\_Dependent.c
- src/STMATB/profibus\_processor/ppfnc/serialDPMInterface/OS\_Spi.h
- src/STMATB/profibus\_processor/ppfnc/serialDPMInterface/TKitUser.c
- src/STMATB/profibus\_processor/ppfnc/serialDPMInterface/dpm\_interface\_helper.c
- src/STMATB/profibus\_processor/ppfnc/serialDPMInterface/OS\_Spi.c
- src/STMATB/profibus\_processor/ppfnc/serialDPMInterface/SerialDPMInterface.c
- src/STMATB/profibus\_processor/ppfnc/serialDPMInterface/SerialDPMInterface.h
- src/STMATB/profibus\_processor/ppfnc/functional\_tests/ft\_ppfnc\_module.c

#### **STMA-83545 - Module PPFP**

- src/STMATB/profibus\_processor/ppfp/hm\_module.c
- src/STMATB/profibus\_processor/ppfp/ppfp\_getset.c
- src/STMATB/profibus\_processor/ppfp/ppfp\_module.h
- src/STMATB/profibus\_processor/ppfp/ppfp\_getset.h
- src/STMATB/profibus\_processor/ppfp/ppfp\_module.c
- src/STMATB/profibus\_processor/ppfp/hm\_module.h
- src/STMATB/profibus\_processor/ppfp/ppfp\_module\_state.h
- src/STMATB/profibus\_processor/ppfp/tiva/hm\_helper.c
- src/STMATB/profibus\_processor/ppfp/unit\_tests/test\_ppfp\_module.c
- src/STMATB/profibus\_processor/ppfp/x86/hm\_helper.c
- src/STMATB/profibus\_processor/ppfp/functional\_tests/ppfp\_clock\_dummy.c
- src/STMATB/profibus\_processor/ppfp/functional\_tests/functional\_test\_ppfp\_module.c
- src/STMATB/profibus\_processor/ppfp/functional\_tests/ppfp\_no\_telegrams.c

#### **STMA-83542 - Module FPIO**

- src/STMATB/functional\_processor/fpio/fpio\_module.h
- src/STMATB/functional\_processor/fpio/fpio\_module\_state.h
- src/STMATB/functional\_processor/fpio/fpio\_getset.c
- src/STMATB/functional\_processor/fpio/fpio\_module.c
- src/STMATB/functional\_processor/fpio/fpio\_getset.h
- src/STMATB/functional\_processor/fpio/fpio\_hardware\_helper/fpio\_hardware\_helper.h
- src/STMATB/functional\_processor/fpio/fpio\_hardware\_helper/hercules/fpio\_hardware\_helper.c
- src/STMATB/functional\_processor/fpio/fpio\_hardware\_helper/x86/fpio\_hardware\_helper.c
- src/STMATB/functional\_processor/fpio/fpio\_hardware\_helper/stubs/stub\_eh\_events.c
- 
- src/STMATB/functional\_processor/fpio/fpio\_hardware\_helper/stubs/stub\_fpio\_hardware\_helper.c
- 
- src/STMATB/functional\_processor/fpio/fpio\_hardware\_helper/stubs/stub\_fpio\_hardware\_helper.h

**STMA-83543 - Module Safety Layers**

- src/STMATB/functional\_processor/sl/sl\_error\_tracking.c
- src/STMATB/functional\_processor/sl/sl\_module.c
- src/STMATB/functional\_processor/sl/sl\_xtypes.h
- src/STMATB/functional\_processor/sl/sl\_error\_tracking.h
- src/STMATB/functional\_processor/sl/sl\_module.h
- src/STMATB/functional\_processor/sl/sl\_module\_state.h
- src/STMATB/functional\_processor/sl/sl\_getset.c
- src/STMATB/functional\_processor/sl/sl\_getset.h
- src/STMATB/functional\_processor/sl/telegram\_analysis/sl\_telegram\_base.c
- src/STMATB/functional\_processor/sl/telegram\_analysis/sl\_telegram\_table.h
- src/STMATB/functional\_processor/sl/telegram\_analysis/sl\_telegram\_base.h
- src/STMATB/functional\_processor/sl/telegram\_analysis/sl\_telegram\_table.c
- src/STMATB/functional\_processor/sl/multicast\_processing/mc\_connection\_table.c
- src/STMATB/functional\_processor/sl/multicast\_processing/mc\_module.c
- src/STMATB/functional\_processor/sl/multicast\_processing/mc\_telegram.c
- src/STMATB/functional\_processor/sl/multicast\_processing/mc\_module.h
- src/STMATB/functional\_processor/sl/multicast\_processing/mc\_connection.h
- src/STMATB/functional\_processor/sl/multicast\_processing/mc\_connection.c
- src/STMATB/functional\_processor/sl/multicast\_processing/mc\_connection\_table.h
- src/STMATB/functional\_processor/sl/multicast\_processing/mc\_telegram.h
- src/STMATB/functional\_processor/sl/point\_to\_point\_processing/pp\_connection\_table.h
- src/STMATB/functional\_processor/sl/point\_to\_point\_processing/pp\_telegram.h
- src/STMATB/functional\_processor/sl/point\_to\_point\_processing/pp\_connection.h
- src/STMATB/functional\_processor/sl/point\_to\_point\_processing/pp\_check\_action.h
- src/STMATB/functional\_processor/sl/point\_to\_point\_processing/pp\_module.c
- src/STMATB/functional\_processor/sl/point\_to\_point\_processing/pp\_connection\_table.c
- src/STMATB/functional\_processor/sl/point\_to\_point\_processing/pp\_check\_action.c
- src/STMATB/functional\_processor/sl/point\_to\_point\_processing/pp\_module.h
- src/STMATB/functional\_processor/sl/point\_to\_point\_processing/pp\_telegram.c
- src/STMATB/functional\_processor/sl/point\_to\_point\_processing/pp\_connection.c
- src/STMATB/functional\_processor/sl/local\_reference\_clock/lc\_loc\_ref\_clock.c
- src/STMATB/functional\_processor/sl/local\_reference\_clock/lc\_module.h
- src/STMATB/functional\_processor/sl/local\_reference\_clock/lc\_time\_adjustment\_table.c
- src/STMATB/functional\_processor/sl/local\_reference\_clock/lc\_time\_adjustment\_table.h
- src/STMATB/functional\_processor/sl/local\_reference\_clock/lc\_module.c
- src/STMATB/functional\_processor/sl/local\_reference\_clock/lc\_module\_state.h
- src/STMATB/functional\_processor/sl/local\_reference\_clock/lc\_loc\_ref\_clock.h

**STMA-83537 - Module DRU**

- src/STMATB/functional\_processor/dru/dru\_getset.h
- src/STMATB/functional\_processor/dru/dru\_packet\_factory.c
- src/STMATB/functional\_processor/dru/dru\_getset.c
- src/STMATB/functional\_processor/dru/dru\_stored\_orders.c



- src/STMATB/functional\_processor/dru/dru\_packet\_analyser.c
- src/STMATB/functional\_processor/dru/dru\_module\_state.h
- src/STMATB/functional\_processor/dru/dru\_stored\_orders.h
- src/STMATB/functional\_processor/dru/dru\_packet\_analyser.h
- src/STMATB/functional\_processor/dru/dru\_module.h
- src/STMATB/functional\_processor/dru/dru\_packet\_factory.h
- src/STMATB/functional\_processor/dru/dru\_module.c
- src/STMATB/functional\_processor/dru/dru\_sm/dru\_sm\_imp.c
- src/STMATB/functional\_processor/dru/dru\_sm/dru\_sm\_imp.h
- src/STMATB/functional\_processor/dru/dru\_sm/isdodru\_sm.h
- src/STMATB/functional\_processor/dru/dru\_sm/isdodru\_sm.c
- src/STMATB/functional\_processor/dru/dru\_sm/dru\_env.h

#### **STMA-83539 - Module Output Handler**

- src/STMATB/functional\_processor/output\_handler/odg\_module\_state.h
- src/STMATB/functional\_processor/output\_handler/oh\_module.h
- src/STMATB/functional\_processor/output\_handler/odg\_module.c
- src/STMATB/functional\_processor/output\_handler/pattern\_generator.c
- src/STMATB/functional\_processor/output\_handler/odg\_module.h
- src/STMATB/functional\_processor/output\_handler/adg\_module.h
- src/STMATB/functional\_processor/output\_handler/oh\_module\_state.h
- src/STMATB/functional\_processor/output\_handler/adg\_module.c
- src/STMATB/functional\_processor/output\_handler/pattern\_generator.h
- src/STMATB/functional\_processor/output\_handler/oh\_module.c
- src/STMATB/functional\_processor/output\_handler/adg\_module\_state.h
- src/STMATB/functional\_processor/output\_handler/oh\_getset.c
- src/STMATB/functional\_processor/output\_handler/oh\_getset.h

#### **STMA-83534 - Module STM Layer**

- src/STMATB/functional\_processor/stm/stml\_types.h
- src/STMATB/functional\_processor/stm/stml\_getset.c
- src/STMATB/functional\_processor/stm/stml\_wanted\_connections.c
- src/STMATB/functional\_processor/stm/stml\_module\_state.h
- src/STMATB/functional\_processor/stm/stml\_getset.h
- src/STMATB/functional\_processor/stm/stml\_packet\_factory.h
- src/STMATB/functional\_processor/stm/stml\_module.h
- src/STMATB/functional\_processor/stm/stml\_cabsignals.h
- src/STMATB/functional\_processor/stm/stml\_jru.h
- src/STMATB/functional\_processor/stm/stml\_packet\_factory.c
- src/STMATB/functional\_processor/stm/stml\_cabsignals.c
- src/STMATB/functional\_processor/stm/stml\_module.c
- src/STMATB/functional\_processor/stm/stml\_jru.c
- src/STMATB/functional\_processor/stm/stml\_wanted\_connections.h
- src/STMATB/functional\_processor/stm/dmi\_text\_sm/dmi\_text\_sm\_imp.h

- src/STMATB/functional\_processor/stm/dmi\_text\_sm/isdodmi\_text\_sm.h
- src/STMATB/functional\_processor/stm/dmi\_text\_sm/isdodmi\_text\_sm.c
- src/STMATB/functional\_processor/stm/dmi\_text\_sm/dmi\_text\_sm\_imp.c
- src/STMATB/functional\_processor/stm/dmi\_text\_sm/dmi\_text\_env.h
- src/STMATB/functional\_processor/stm/packet\_analyser/pka\_packet\_extract.h
- src/STMATB/functional\_processor/stm/packet\_analyser/pka\_packet\_extract.c
- src/STMATB/functional\_processor/stm/packet\_analyser/pka\_module.h
- src/STMATB/functional\_processor/stm/packet\_analyser/pka\_module.c
- src/STMATB/functional\_processor/stm/multicast\_sm/stm\_multicast\_env.h
- src/STMATB/functional\_processor/stm/multicast\_sm/stm\_multicast\_sm\_imp.h
- src/STMATB/functional\_processor/stm/multicast\_sm/stm\_multicast\_sm\_imp.c
- src/STMATB/functional\_processor/stm/multicast\_sm/isdostm\_multicast\_sm.c
- src/STMATB/functional\_processor/stm/multicast\_sm/isdostm\_multicast\_sm.h
- src/STMATB/functional\_processor/stm/point\_to\_point\_sm/stm\_connection\_env.h
- src/STMATB/functional\_processor/stm/point\_to\_point\_sm/stm\_connection\_sm\_imp.c
- src/STMATB/functional\_processor/stm/point\_to\_point\_sm/isdostm\_connection\_sm.c
- src/STMATB/functional\_processor/stm/point\_to\_point\_sm/stm\_connection\_sm\_imp.h
- src/STMATB/functional\_processor/stm/point\_to\_point\_sm/isdostm\_connection\_sm.h
- src/STMATB/functional\_processor/stm/atb\_preprocessor/are\_module.c
- src/STMATB/functional\_processor/stm/atb\_preprocessor/are\_module\_state.h
- src/STMATB/functional\_processor/stm/atb\_preprocessor/are\_module.h
- src/STMATB/functional\_processor/stm/stm\_atb\_sm/stm\_atb\_sm\_imp.c
- src/STMATB/functional\_processor/stm/stm\_atb\_sm/isdostm\_atb\_sm.h
- src/STMATB/functional\_processor/stm/stm\_atb\_sm/stm\_atb\_env.h
- src/STMATB/functional\_processor/stm/stm\_atb\_sm/isdostm\_atb\_sm.c
- src/STMATB/functional\_processor/stm/stm\_atb\_sm/stm\_atb\_sm\_imp.h
- src/STMATB/functional\_processor/stm/stm\_internal\_sm/isdostm\_internal\_sm.h
- src/STMATB/functional\_processor/stm/stm\_internal\_sm/stm\_internal\_env.h
- src/STMATB/functional\_processor/stm/stm\_internal\_sm/isdostm\_internal\_sm.c
- src/STMATB/functional\_processor/stm/stm\_internal\_sm/stm\_internal\_sm\_imp.h
- src/STMATB/functional\_processor/stm/stm\_internal\_sm/stm\_internal\_sm\_imp.c
- src/STMATB/functional\_processor/stm/atb\_postprocessor/apo\_module.h
- src/STMATB/functional\_processor/stm/atb\_postprocessor/apo\_module.c
- src/STMATB/functional\_processor/stm/atb\_postprocessor/apo\_module\_state.h

#### **STMA-83535 - Module PPHW**

- src/STMATB/profibus\_processor/pphw/pphw\_module.h
- src/STMATB/profibus\_processor/pphw/tiva/pphw\_module.c

#### **STMA-83528 - Module FPPP**

- src/STMATB/functional\_processor/fppp/fppp\_module.h
- src/STMATB/functional\_processor/fppp/hs\_module.h
- src/STMATB/functional\_processor/fppp/fppp\_getset.h
- src/STMATB/functional\_processor/fppp/fppp\_module\_state.h

- src/STMATB/functional\_processor/fppp/fppp\_module.c
- src/STMATB/functional\_processor/fppp/fppp\_getset.c
- src/STMATB/functional\_processor/fppp/hs\_module.c
- src/STMATB/functional\_processor/fppp/hs\_help/hs\_help.h
- src/STMATB/functional\_processor/fppp/hs\_help/hercules/hs\_help.c
- src/STMATB/functional\_processor/fppp/hs\_help/x86/hs\_help.c
- src/STMATB/functional\_processor/fppp/functional\_tests/fppp\_no\_telegrams.c
- src/STMATB/functional\_processor/fppp/functional\_tests/fppp\_clock\_dummy.c
- src/STMATB/functional\_processor/fppp/functional\_tests/functional\_test\_fppp\_module.c

#### **STMA-83526 - Module FPCC**

- src/STMATB/functional\_processor/fpcc/fpcc\_module\_state.h
- src/STMATB/functional\_processor/fpcc/fpcc\_module.h
- src/STMATB/functional\_processor/fpcc/fpcc\_getset.h
- src/STMATB/functional\_processor/fpcc/fpcc\_getset.c
- src/STMATB/functional\_processor/fpcc/hercules/fpcc\_module.c
- src/STMATB/functional\_processor/fpcc/x86/fpcc\_module.c
- src/STMATB/functional\_processor/fpcc/functional\_tests/test\_fpcc\_module.c
- src/STMATB/functional\_processor/fpcc/fpcc\_hardware\_helper/fpcc\_hardware\_helper.h
- src/STMATB/functional\_processor/fpcc/fpcc\_hardware\_helper/hercules/fpcc\_hardware\_helper.c
- src/STMATB/functional\_processor/fpcc/fpcc\_hardware\_helper/x86/fpcc\_hardware\_helper.c
- src/STMATB/functional\_processor/fpcc/fpcc\_hardware\_helper/stubs/tps\_driver.h
- src/STMATB/functional\_processor/fpcc/fpcc\_hardware\_helper/stubs/tps\_driver.c
- src/STMATB/functional\_processor/fpcc/fpcc\_hardware\_helper/stubs/fpcc\_hardware\_helper.c
- src/STMATB/functional\_processor/fpcc/fpcc\_hardware\_helper/stubs/tps\_types.h
- 
- src/STMATB/functional\_processor/fpcc/fpcc\_hardware\_helper/stubs/fpcc\_hardware\_helper\_stub.h

#### **STMA-83527 - Module Hardware Monitor**

- src/STMATB/functional\_processor/hardware\_monitor/hwm\_getset.c
- src/STMATB/functional\_processor/hardware\_monitor/hwm\_module.h
- src/STMATB/functional\_processor/hardware\_monitor/hwm\_getset.h
- src/STMATB/functional\_processor/hardware\_monitor/hwm\_module\_state.h
- src/STMATB/functional\_processor/hardware\_monitor/hercules/hwm\_module.c
- src/STMATB/functional\_processor/hardware\_monitor/x86/hwm\_module.c
- src/STMATB/functional\_processor/hardware\_monitor/functional\_tests/ft\_inject\_fault.c
- 
- src/STMATB/functional\_processor/hardware\_monitor/functional\_tests/performance\_measurement.c

#### **STMA-83524 - Module Event Handler**

- src/STMATB/functional\_processor/event\_handler/eh\_module.c
- src/STMATB/functional\_processor/event\_handler/eh\_cm\_table.c
- src/STMATB/functional\_processor/event\_handler/eh\_cm\_table.h

- src/STMATB/functional\_processor/event\_handler/eh\_getset.h
- src/STMATB/functional\_processor/event\_handler/eh\_module\_state.h
- src/STMATB/functional\_processor/event\_handler/eh\_events.c
- src/STMATB/functional\_processor/event\_handler/eh\_jru\_packet\_bit\_mapper.c
- src/STMATB/functional\_processor/event\_handler/eh\_getset.c
- src/STMATB/functional\_processor/event\_handler/eh\_flags.h
- src/STMATB/functional\_processor/event\_handler/eh\_event\_measure\_mapper.c
- src/STMATB/functional\_processor/event\_handler/eh\_events.h
- src/STMATB/functional\_processor/event\_handler/eh\_module.h
- src/STMATB/functional\_processor/event\_handler/eh\_jru\_packet\_bit\_mapper.h
- src/STMATB/functional\_processor/event\_handler/eh\_event\_measure\_mapper.h
- src/STMATB/functional\_processor/event\_handler/unit\_tests/unittest\_eh\_module.c
- src/STMATB/functional\_processor/event\_handler/unit\_tests/unittest\_eh\_module\_fwd.c

#### **STMA-83525 - Module FPHW**

- src/STMATB/functional\_processor/fphw/fphw\_module\_state.h
- src/STMATB/functional\_processor/fphw/fphw\_module.h
- src/STMATB/functional\_processor/fphw/fphw\_getset.c
- src/STMATB/functional\_processor/fphw/fphw\_module.c
- src/STMATB/functional\_processor/fphw/fphw\_getset.h
- src/STMATB/functional\_processor/fphw/pin\_controller/pc\_module.h
- src/STMATB/functional\_processor/fphw/pin\_controller/hercules/pc\_module.c
- src/STMATB/functional\_processor/fphw/pin\_controller/x86/pc\_module.c
- src/STMATB/functional\_processor/fphw/functional\_tests/ft\_fphw\_module.c
- src/STMATB/functional\_processor/fphw/functional\_tests/test\_hardware.c

#### **STMA-83522 - Module Scheduler**

- src/STMATB/functional\_processor/scheduler/sch\_wrappers.c
- src/STMATB/functional\_processor/scheduler/sch\_wrappers.h
- src/STMATB/functional\_processor/scheduler/sch\_init.h
- src/STMATB/functional\_processor/scheduler/sch\_init.c
- src/STMATB/functional\_processor/scheduler/sch\_module.c
- src/STMATB/functional\_processor/scheduler/sch\_module\_state.h
- src/STMATB/functional\_processor/scheduler/sch\_constants.h
- src/STMATB/functional\_processor/scheduler/sch\_module.h
- src/STMATB/functional\_processor/scheduler/sch\_types.h
- src/STMATB/functional\_processor/scheduler/normal\_sm/isdonormal\_sm.c
- src/STMATB/functional\_processor/scheduler/normal\_sm/isdonormal\_sm.h
- src/STMATB/functional\_processor/scheduler/normal\_sm/normal\_sm\_imp.c
- src/STMATB/functional\_processor/scheduler/normal\_sm/normal\_env.h
- src/STMATB/functional\_processor/scheduler/normal\_sm/normal\_sm\_imp.h
- src/STMATB/functional\_processor/scheduler/startup\_sm/isdostartup\_sm.c
- src/STMATB/functional\_processor/scheduler/startup\_sm/startup\_sm\_imp.c
- src/STMATB/functional\_processor/scheduler/startup\_sm/startup\_env.h

- src/STMATB/functional\_processor/scheduler/startup\_sm/isdosstartup\_sm.h
- src/STMATB/functional\_processor/scheduler/startup\_sm/startup\_sm\_imp.h
- src/STMATB/functional\_processor/scheduler/check\_transitions/sch\_check\_transitions.c
- src/STMATB/functional\_processor/scheduler/check\_transitions/sch\_check\_transitions.h
- src/STMATB/functional\_processor/scheduler/safe\_sm/isdosafe\_sm.c
- src/STMATB/functional\_processor/scheduler/safe\_sm/safe\_sm\_imp.c
- src/STMATB/functional\_processor/scheduler/safe\_sm/safe\_sm\_imp.h
- src/STMATB/functional\_processor/scheduler/safe\_sm/isdosafe\_sm.h
- src/STMATB/functional\_processor/scheduler/safe\_sm/safe\_env.h
- src/STMATB/functional\_processor/scheduler/sch\_jru/sch\_jru.c
- src/STMATB/functional\_processor/scheduler/sch\_jru/sch\_jru.h

### **STMA-83523 - Hercules Drivers**

- src/STMATB/hercules\_drivers/halcogen/source/pinmux.c
- src/STMATB/hercules\_drivers/halcogen/source/esm.c
- src/STMATB/hercules\_drivers/halcogen/source/sys\_selftest.c
- src/STMATB/hercules\_drivers/halcogen/source/sci.c
- src/STMATB/hercules\_drivers/halcogen/source/sys\_main.c
- src/STMATB/hercules\_drivers/halcogen/source/rti.c
- src/STMATB/hercules\_drivers/halcogen/source/spi.c
- src/STMATB/hercules\_drivers/halcogen/source/sys\_phantom.c
- src/STMATB/hercules\_drivers/halcogen/source/sys\_dma.c
- src/STMATB/hercules\_drivers/halcogen/source/gio.c
- src/STMATB/hercules\_drivers/halcogen/source/sys\_vim.c
- src/STMATB/hercules\_drivers/halcogen/source/sys\_pcr.c
- src/STMATB/hercules\_drivers/halcogen/source/crc.c
- src/STMATB/hercules\_drivers/halcogen/source/dcc.c
- src/STMATB/hercules\_drivers/halcogen/source/halcogen\_helper.c
- src/STMATB/hercules\_drivers/halcogen/source/notification.c
- src/STMATB/hercules\_drivers/halcogen/source/het.c
- src/STMATB/hercules\_drivers/halcogen/source/sys\_pmm.c
- src/STMATB/hercules\_drivers/halcogen/source/default\_handler.c
- src/STMATB/hercules\_drivers/halcogen/source/errata\_SSWF021\_45.c
- src/STMATB/hercules\_drivers/halcogen/source/adc.c
- src/STMATB/hercules\_drivers/halcogen/source/system.c
- src/STMATB/hercules\_drivers/halcogen/source/sys\_startup.c
- src/STMATB/hercules\_drivers/halcogen/source/mibspi.c
- src/STMATB/hercules\_drivers/halcogen/source/can.c
- src/STMATB/hercules\_drivers/halcogen/source/diagnostic\_wrapper.c
- src/STMATB/hercules\_drivers/halcogen/include/sci.h
- src/STMATB/hercules\_drivers/halcogen/include/diagnostic\_wrapper.h
- src/STMATB/hercules\_drivers/halcogen/include/reg\_dcc.h
- src/STMATB/hercules\_drivers/halcogen/include/halcogen\_asm\_helper.h

- src/STMATB/hercules\_drivers/halcogen/include/reg\_esm.h
- src/STMATB/hercules\_drivers/halcogen/include/lin.h
- src/STMATB/hercules\_drivers/halcogen/include/mdio.h
- src/STMATB/hercules\_drivers/halcogen/include/MemMap.h
- src/STMATB/hercules\_drivers/halcogen/include/sys\_vim.h
- src/STMATB/hercules\_drivers/halcogen/include/usbdevicepriv.h
- src/STMATB/hercules\_drivers/halcogen/include/errata\_SSWF021\_45.h
- src/STMATB/hercules\_drivers/halcogen/include/fee\_interface.h
- src/STMATB/hercules\_drivers/halcogen/include/usbdcdc.h
- src/STMATB/hercules\_drivers/halcogen/include/Device\_RM48.h
- src/STMATB/hercules\_drivers/halcogen/include/reg\_vim.h
- src/STMATB/hercules\_drivers/halcogen/include/dcc.h
- src/STMATB/hercules\_drivers/halcogen/include/reg\_pinmux.h
- src/STMATB/hercules\_drivers/halcogen/include/reg\_i2c.h
- src/STMATB/hercules\_drivers/halcogen/include/sys\_pmm.h
- src/STMATB/hercules\_drivers/halcogen/include/usblib.h
- src/STMATB/hercules\_drivers/halcogen/include/sys\_mpu.h
- src/STMATB/hercules\_drivers/halcogen/include/system.h
- src/STMATB/hercules\_drivers/halcogen/include/Device\_header.h
- src/STMATB/hercules\_drivers/halcogen/include/i2c.h
- src/STMATB/hercules\_drivers/halcogen/include/sys\_dma.h
- src/STMATB/hercules\_drivers/halcogen/include/usb\_serial\_structs.h
- src/STMATB/hercules\_drivers/halcogen/include/reg\_lin.h
- src/STMATB/hercules\_drivers/halcogen/include/emacs.h
- src/STMATB/hercules\_drivers/halcogen/include/reg\_pbist.h
- src/STMATB/hercules\_drivers/halcogen/include/hw\_mdio.h
- src/STMATB/hercules\_drivers/halcogen/include/reg\_mibspi.h
- src/STMATB/hercules\_drivers/halcogen/include/phy\_dp83640.h
- src/STMATB/hercules\_drivers/halcogen/include/ti\_fee\_cfg.h
- src/STMATB/hercules\_drivers/halcogen/include/reg\_pmm.h
- src/STMATB/hercules\_drivers/halcogen/include/usbdevice.h
- src/STMATB/hercules\_drivers/halcogen/include/reg\_rti.h
- src/STMATB/hercules\_drivers/halcogen/include/errata\_SSWF021\_45\_defs.h
- src/STMATB/hercules\_drivers/halcogen/include/reg\_sci.h
- src/STMATB/hercules\_drivers/halcogen/include/usb.h
- src/STMATB/hercules\_drivers/halcogen/include/htu.h
- src/STMATB/hercules\_drivers/halcogen/include/pinmux.h
- src/STMATB/hercules\_drivers/halcogen/include/reg\_adc.h
- src/STMATB/hercules\_drivers/halcogen/include/reg\_het.h
- src/STMATB/hercules\_drivers/halcogen/include/reg\_stc.h
- src/STMATB/hercules\_drivers/halcogen/include/sys\_pcr.h
- src/STMATB/hercules\_drivers/halcogen/include/reg\_flash.h
- src/STMATB/hercules\_drivers/halcogen/include/sys\_common.h
- src/STMATB/hercules\_drivers/halcogen/include/can.h

- src/STMATB/hercules\_drivers/halcogen/include/usbcdc.h
- src/STMATB/hercules\_drivers/halcogen/include/spi.h
- src/STMATB/hercules\_drivers/halcogen/include/adc.h
- src/STMATB/hercules\_drivers/halcogen/include/default\_handler.h
- src/STMATB/hercules\_drivers/halcogen/include/reg\_spi.h
- src/STMATB/hercules\_drivers/halcogen/include/reg\_gio.h
- src/STMATB/hercules\_drivers/halcogen/include/sys\_pmu.h
- src/STMATB/hercules\_drivers/halcogen/include/reg\_can.h
- src/STMATB/hercules\_drivers/halcogen/include/hw\_emac\_ctrl.h
- src/STMATB/hercules\_drivers/halcogen/include/gio.h
- src/STMATB/hercules\_drivers/halcogen/include/reg\_tcr.h
- src/STMATB/hercules\_drivers/halcogen/include/usb-ids.h
- src/STMATB/hercules\_drivers/halcogen/include/rti.h
- src/STMATB/hercules\_drivers/halcogen/include/diagnostic\_result.h
- src/STMATB/hercules\_drivers/halcogen/include/Device\_types.h
- src/STMATB/hercules\_drivers/halcogen/include/reg\_efc.h
- src/STMATB/hercules\_drivers/halcogen/include/reg\_htu.h
- src/STMATB/hercules\_drivers/halcogen/include/hw\_usb.h
- src/STMATB/hercules\_drivers/halcogen/include/reg\_system.h
- src/STMATB/hercules\_drivers/halcogen/include/esm.h
- src/STMATB/hercules\_drivers/halcogen/include/sys\_core.h
- src/STMATB/hercules\_drivers/halcogen/include/std\_nhet.h
- src/STMATB/hercules\_drivers/halcogen/include/ti\_fee.h
- src/STMATB/hercules\_drivers/halcogen/include/reg\_pcr.h
- src/STMATB/hercules\_drivers/halcogen/include/crc.h
- src/STMATB/hercules\_drivers/halcogen/include/mibspi.h
- src/STMATB/hercules\_drivers/halcogen/include/hal\_stdtypes.h
- src/STMATB/hercules\_drivers/halcogen/include/reg\_dma.h
- src/STMATB/hercules\_drivers/halcogen/include/het.h
- src/STMATB/hercules\_drivers/halcogen/include/halcogen\_helper.h
- src/STMATB/hercules\_drivers/halcogen/include/sys\_selftest.h
- src/STMATB/hercules\_drivers/halcogen/include/ti\_fee\_types.h
- src/STMATB/hercules\_drivers/halcogen/include/hw\_reg\_access.h
- src/STMATB/hercules\_drivers/halcogen/include/reg\_crc.h
- src/STMATB/hercules\_drivers/halcogen/include/hw\_emac.h

#### **STMA-83548 - Companion Chip Driver**

- src/STMATB/hercules\_drivers/hal/sl\_reg\_pmm.h
- src/STMATB/hercules\_drivers/hal/reg\_bitdefn\_pcr.h
- src/STMATB/hercules\_drivers/hal/reg\_bitdefn\_sci.h
- src/STMATB/hercules\_drivers/hal/sl\_reg\_mibspi.h
- src/STMATB/hercules\_drivers/hal/sl\_reg\_gio.h
- src/STMATB/hercules\_drivers/hal/reg\_bitdefn\_adc.h

- src/STMATB/hercules\_drivers/hal/reg\_bitdefn\_ccmr4f.h
- src/STMATB/hercules\_drivers/hal/reg\_bitdefn\_lin.h
- src/STMATB/hercules\_drivers/hal/reg\_bitdefn\_etc.h
- src/STMATB/hercules\_drivers/hal/sl\_reg\_sci.h
- src/STMATB/hercules\_drivers/hal/sl\_reg\_lin.h
- src/STMATB/hercules\_drivers/hal/reg\_bitdefn\_f021flash.h
- src/STMATB/hercules\_drivers/hal/sl\_sys\_common.h
- src/STMATB/hercules\_drivers/hal/sl\_reg\_adc.h
- src/STMATB/hercules\_drivers/hal/reg\_bitdefn\_pbist.h
- src/STMATB/hercules\_drivers/hal/reg\_bitdefn\_dma.h
- src/STMATB/hercules\_drivers/hal/sl\_reg\_etc.h
- src/STMATB/hercules\_drivers/hal/reg\_bitdefn\_htu.h
- src/STMATB/hercules\_drivers/hal/sl\_reg\_scm.h
- src/STMATB/hercules\_drivers/hal/reg\_bitdefn\_tcmram.h
- src/STMATB/hercules\_drivers/hal/reg\_bitdefn\_vim.h
- src/STMATB/hercules\_drivers/hal/reg\_bitdefn\_can.h
- src/STMATB/hercules\_drivers/hal/reg\_bitdefn\_esm.h
- src/STMATB/hercules\_drivers/hal/reg\_bitdefn\_ccmr5f.h
- src/STMATB/hercules\_drivers/hal/sl\_reg\_dcc.h
- src/STMATB/hercules\_drivers/hal/sl\_reg\_epc.h
- src/STMATB/hercules\_drivers/hal/sl\_reg\_l2ramw.h
- src/STMATB/hercules\_drivers/hal/sl\_reg\_het.h
- src/STMATB/hercules\_drivers/hal/sl\_sys\_vim.h
- src/STMATB/hercules\_drivers/hal/reg\_bitdefn\_epc.h
- src/STMATB/hercules\_drivers/hal/sl\_reg\_htu.h
- src/STMATB/hercules\_drivers/hal/sl\_hal\_stdtypes.h
- src/STMATB/hercules\_drivers/hal/sl\_reg\_pbist.h
- src/STMATB/hercules\_drivers/hal/reg\_bitdefn\_sdcmmr.h
- src/STMATB/hercules\_drivers/hal/sl\_reg\_stc.h
- src/STMATB/hercules\_drivers/hal/reg\_bitdefn\_rti.h
- src/STMATB/hercules\_drivers/hal/reg\_bitdefn\_mibspi.h
- src/STMATB/hercules\_drivers/hal/reg\_bitdefn\_pmm.h
- src/STMATB/hercules\_drivers/hal/sl\_reg\_dma.h
- src/STMATB/hercules\_drivers/hal/reg\_bitdefn\_system.h
- src/STMATB/hercules\_drivers/hal/sl\_reg\_flash.h
- src/STMATB/hercules\_drivers/hal/sl\_reg\_spi.h
- src/STMATB/hercules\_drivers/hal/sl\_reg\_system.h
- src/STMATB/hercules\_drivers/hal/reg\_bitdefn\_dcc.h
- src/STMATB/hercules\_drivers/hal/reg\_bitdefn\_iomm.h
- src/STMATB/hercules\_drivers/hal/reg\_bitdefn\_gio.h
- src/STMATB/hercules\_drivers/hal/reg\_bitdefn\_stc.h
- src/STMATB/hercules\_drivers/hal/reg\_bitdefn\_het.h
- src/STMATB/hercules\_drivers/hal/sl\_reg\_pcr.h
- src/STMATB/hercules\_drivers/hal/sl\_reg\_rti.h



- src/STMATB/hercules\_drivers/hal/sl\_reg\_esm.h
- src/STMATB/hercules\_drivers/hal/sl\_reg\_sdcmmr.h
- src/STMATB/hercules\_drivers/hal/reg\_bitdefn\_l2ramw.h
- src/STMATB/hercules\_drivers/hal/sl\_reg\_can.h
- src/STMATB/hercules\_drivers/hal/sl\_reg\_tcram.h
- src/STMATB/hercules\_drivers/hal/sl\_reg\_vim.h
- src/STMATB/hercules\_drivers/hal/reg\_bitdefn\_scm.h
- src/STMATB/hercules\_drivers/tps/tps\_interface.h
- src/STMATB/hercules\_drivers/tps/tps\_driver.h
- src/STMATB/hercules\_drivers/tps/tps\_config.h
- src/STMATB/hercules\_drivers/tps/tps\_driver.c
- src/STMATB/hercules\_drivers/tps/tps\_debugsupport.c
- src/STMATB/hercules\_drivers/tps/tps\_debugsupport.h
- src/STMATB/hercules\_drivers/tps/tps\_interface.c
- src/STMATB/hercules\_drivers/tps/tps\_types.h
- src/STMATB/hercules\_drivers/tps/tps\_priv.h

#### **STMA-83549 - Tiva Drivers**

- src/STMATB/tiva\_drivers/tivastart/reduced\_sysctl.c
- src/STMATB/tiva\_drivers/tivastart/pin\_map.h
- src/STMATB/tiva\_drivers/tivastart/hw\_timer.h
- src/STMATB/tiva\_drivers/tivastart/uart.h
- src/STMATB/tiva\_drivers/tivastart/hw\_memmap.h
- src/STMATB/tiva\_drivers/tivastart/reduced\_timer.c
- src/STMATB/tiva\_drivers/tivastart/tm4c123gh6pz\_startup\_ccs.c
- src/STMATB/tiva\_drivers/tivastart/reduced\_ssi.c
- src/STMATB/tiva\_drivers/tivastart/timer.h
- src/STMATB/tiva\_drivers/tivastart/reduced\_gpio.c
- src/STMATB/tiva\_drivers/tivastart/tm4c123gh6pz\_startup\_ccs.h
- src/STMATB/tiva\_drivers/tivastart/reduced\_uart.c
- src/STMATB/tiva\_drivers/tivastart/gpio.h
- src/STMATB/tiva\_drivers/tivastart/sysctl.h
- src/STMATB/tiva\_drivers/tivastart/ssi.h
- src/STMATB/tiva\_drivers/netx/cifXFunctions.c
- src/STMATB/tiva\_drivers/netx/Hilmd5.c
- src/STMATB/tiva\_drivers/netx/cifXInterrupt.c
- src/STMATB/tiva\_drivers/netx/cifXInit.c
- src/STMATB/tiva\_drivers/netx/cifXDownload.c
- src/STMATB/tiva\_drivers/netx/cifXEndianness.c
- src/STMATB/tiva\_drivers/netx/cifXHWFunctions.c
- src/STMATB/tiva\_drivers/netx/include/WarmstartFile.h
- src/STMATB/tiva\_drivers/netx/include/cifXErrors.h
- src/STMATB/tiva\_drivers/netx/include/cifXToolkit.h
- src/STMATB/tiva\_drivers/netx/include/netx50\_romloader\_dpm.h

- src/STMATB/tiva\_drivers/netx/include/OS\_Dependent.h
- src/STMATB/tiva\_drivers/netx/include/HilFileHeaderV3.h
- src/STMATB/tiva\_drivers/netx/include/cifXHWFunctions.h
- src/STMATB/tiva\_drivers/netx/include/netx51\_romloader\_dpm.h
- src/STMATB/tiva\_drivers/netx/include/rcX\_Public.h
- src/STMATB/tiva\_drivers/netx/include/ModuleLoader\_Public.h
- src/STMATB/tiva\_drivers/netx/include/ProfibusDI\_diag.h
- src/STMATB/tiva\_drivers/netx/include/ProfibusDI\_BusParameter.h
- src/STMATB/tiva\_drivers/netx/include/ProfibusDI\_Functionlist.h
- src/STMATB/tiva\_drivers/netx/include/NetX\_RegDefs.h
- src/STMATB/tiva\_drivers/netx/include/TLR\_CustomCompiler.h
- src/STMATB/tiva\_drivers/netx/include/ProfibusDI\_Public.h
- src/STMATB/tiva\_drivers/netx/include/ProfibusDI\_error.h
- src/STMATB/tiva\_drivers/netx/include/Hilmd5.h
- src/STMATB/tiva\_drivers/netx/include/TLR\_Types.h
- src/STMATB/tiva\_drivers/netx/include/cifXUser.h
- src/STMATB/tiva\_drivers/netx/include/rcX\_User.h
- src/STMATB/tiva\_drivers/netx/include/OS\_Includes.h
- src/STMATB/tiva\_drivers/netx/include/NetX\_ROMLoader.h
- src/STMATB/tiva\_drivers/netx/include/HilPCIDefs.h
- src/STMATB/tiva\_drivers/netx/include/cifXEndianness.h
- src/STMATB/tiva\_drivers/netx/include/HilFileHeader.h