Communication Protocol LTR-HMI

(Display Unit of LTR-1200)

1 General Description

1.1 Protocol Specifications

- The used communication protocol is based on the “MeCom Protocol Specification” Document me5117B.
- The Control Interface has to use the ‘#’ as source identifier.
- Refer to the LTR-1200 Data Sheet to see the Basic Concepts of the LTR-1200 Communication

2 TEC-Family Commands

2.1 Set Commands

Command	Mnemonic	Arguments / Description			
		Type	Min	Max	Description
Parameter Value Set	VS				Sets the corresponding Parameter See 3 Service Software Parameters for details
Reset Device	RS	-	-	-	Resets all controllers of the LTR-1200.
Emergency Stop	ES	-	-	-	Disables all Power Outputs immediately and the Error 11 is generated.

2.2 Query Commands

Request	Mnemonic	Description	Server Response	
			Type	**Description**
Firmware Identification String	?IF	Returns the Firmware Identification String	20x 8bit	For HMI-1119: `"8072-HMI SW G01 "` (Filled up with spaces)
Parameter Value Read	?VR	Returns the corresponding Parameter value		See 3 Service Software Parameters for details
Parameter Limit Read	?VL	Returns the corresponding Limits		See 3 Service Software Parameters for details
Bootloader Control	?BC	For Controlling the Bootloader	UINT32	See 4 Bootloader for Details
Bootloader Stream	?BS	Bootloader Data Stream		See 4 Bootloader for Details
Settings Download	?SD	Can be used to download the exported Settings Dump (*.mepar) of the Service Software.		
		One Line of the Settings Dump File (*.mepar)	UINT4	0: Parameter Accepted 1: CRC wrong: Possible causes: • The *.mepar File has been modified • The firmware version is not exactly the same as it was while the *.mepar file has been created • The *.mepar File was created for an other device.

3 Service Software Parameters

3.1 Payload Format description

The Parameter Instance is used to control the TEC Output Channel 1 or 2.
If there is only one instance available, Parameter Instance must be set to 1 (*e.g.* Firmware Version)

3.1.1 Parameter Value Read

Type	**Mnemonic**	**Field 1**	**Field 2**
Query	?VR	UINT16 Parameter ID	UINT8 Parameter Instance

Type	**Field 1**
Response	<defined Format> Parameter Value Or Server Error Code

3.1.2 Parameter Value Set

Type	**Mnemonic**	**Field 1**	**Field 2**	**Field 3**
Query	VS	UINT16 Parameter ID	UINT8 Parameter Instance	<defined Format> Parameter Value

Type	
Response	Normal ACK or Server Error Code

3.1.3 Parameter Limit Read

Type	**Mnemonic**	**Field 1**	**Field 2**
Query	?VL	UINT16 Parameter ID	UINT8 Parameter Instance

Type	**Field 1**	**Field 2**	**Field 3**
Response	0: Float 1: Integer Or Server Error Code	<defined Format> Parameter Min Value	<defined Format> Parameter Max Value

3.2 Parameter list

This capture contains all parameters which can also be accessed by the service software. The order is the same as in the service software. Please refer to LTR-1200 Data Sheet for detailed parameter description.

3.2.1 Common Product Parameters (Read only)

3.2.1.1 Device Identification

ID	Name	Format	Value Range	Description
100	Device Type	INT32	..	1119 → HMI-1119
101	Hardware Version	INT32	..	123 → 1.23
102	Serial Number	INT32	..	
103	Firmware Version	INT32	..	123 → 1.23
104	Device Status	INT32	0 … 5	0: Init 1: Ready 2: Run 3: Error 4: Bootloader 5: Device will Reset within next 200ms 6: Restarting all devices (Next is Status 5)
105	Error Number	INT32	..	
106	Error Instance	INT32		
107	Error Parameter	INT32		
108	Save Data to Flash	INT32	0 … 1	0: Enabled 1: Disabled (All Parameters can then be used as RAM Parameters)
109	Parameter System: Flash Status	INT32	0 … 1	0: All Parameters are saved to Flash 1: Save to flash pending or in progress. (Please do not power off the device now) 2: Saving to Flash is disabled

3.2.2 Tab: Monitor (Read only)

3.2.2.1 Firmware and Hardware Versions

ID	Name	Format	Value Range	Description
1000	Device Type	INT32		1119 → HMI-1119
1001	Serial Number	INT32		
1002	Hardware Version	INT32		
1003	Firmware Version (STM32)	INT32		123 → 1.23
1004	Firmware Build Number	INT32		

3.2.2.2 Power Supplies

ID	Name	Format	Value Range	Description
1010	Driver Input Voltage	FLOAT32	V	
1011	5V Internal Supply	FLOAT32	V	
1012	3.3V Internal Supply	FLOAT32	V	

3.2.2.3 Error Status

ID	Name	Format	Value Range	Description
1020	Error Number	INT32	..	
1021	Error Instance	INT32	..	
1022	Error Parameter	INT32	..	

3.2.3 Tab: Settings

3.2.3.1 Device Address

ID	Name	Format	Value Range	Description
2000	Device Address	INT32	0 … 254	

3.2.3.2 Service Software Default Device

ID	Name	Format	Value Range	Description
2010	Default Route	INT32	0 … 254	

3.2.3.3 Communication Interface Settings

ID	Name	Format	Value Range	Description
2020	RS232 Baud Rate	INT32	4800 … 1M	
2021	RS485 Baud Rate	INT32	4800 … 1M	

3.2.3.4 Digital IO Settings

ID	Name	Format	Value Range	Description
2030	Enable Source	INT32	0 … 1	0: ON (Signal is internal Pulled to high) 1: External (Signal is being taken from the DIG IO Connector)

4 Bootloader

The Bootloader an be controlled over a Control and Stream Command.

It is important to have the correct Command Sequence

1. Activate Bootloader
2. Clear Memory
3. Send Stream
4. ReBoot

If there is an Error restart the Update Process

4.1 Bootloader Control (BC?)

Type	Mnemonic	Field 1
Query	?BC	UINT32 Bootloader Command

Type	Field 1
Response	UINT32 Bootloader Status Or Server Error Code

4.1.1 Bootloader Command

Bit	Description
NoBit	(No bit set) No Operation. Can be used to read only the Bootloader Status
0	Bootloader Activate. Enable the Erase and Write Flash functions
1	Clear Memory. Clears the Update Memory. A response can take up to 8.5s
2	ReBoot. Reboots the Application and start the Update process. Only valid if there is a valid Application in the Update Memory

4.1.2 Bootloader Status

Bit	Description
0	Bootloader is activated and running
1	Memory is cleared
2	Valid Application. There is a Valid Application in the Update Memory
3	Bootloader Error. There is an Error. Wrong Command Sequence, CRC Wrong….

4.2 Bootloader Stream (BS?)

Type	Mnemonic	Field 1
Query	?BS	Data Stream Part of the Hex File

Type	Field 1
Response	UINT32 Bootloader Status Or Server Error Code

4.2.1 Data Stream

The Data Stream command is used to send the Hex File content to the microcontroller.

Add a few Hex File lines to the Payload Filed of the communication protocol frame and remove all '\n' and '\r' from the stream. (The Hex File lines are then only separated by the double dot).

The maximum size of the Payload Field is 512Bytes.

It is recommended to send 10 Hex File Lines in one package. This will not exceed the 512Byte limit.

4.2.2 Bootloader Status

See 4.1.2 Bootloader

5 Change Log

Changed by	Dok	STM32 SW Version	Change Log
16 August 2013	A	1.00	Initial Release