

<b>ABB</b>	<b>Firmware Release Notes LMT</b>			<b>3KXL140000G0140</b>	
Responsibility: <b>IAMA TC China</b>	Date: <b>2021-09-22</b>	Language: <b>EN</b>	Filing system <b>Alfresco</b>	Revision: <b>00</b>	Page: <b>1/12</b>
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<b>Title</b>	<b>LMT Firmware Release Notes</b>	
<b>Distribution</b>	Development, Product Management, Service, Project Manager	
<b>Author</b>	Panpan Zhang	Date: 2021/09/22
<b>Reviewer</b>		
<b>Approver</b>		
<b>Remarks</b>		

Commented [JL1]: Shall be approved by Design owner

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## 1. Introduction

This document is intended to describe the LMT firmware release changes in detail.

## 2. Documents List

This part describe the firmware format defination in LMT product.

Document Number/Name	Description
3KXL000712U0313_AABBCC_YYYYMMDD_CRC_HASH.bin	LMT CB Bootloader
3KXL000712U0113_AABBCC_YYYYMMDD_CRC_HASH.bin	LMT CB Application
3KXL000712U0213_AABBCC_YYYYMMDD_CRC.bin	LMT CB Bootloader + Application
3KXL000065U0413_AABBCC_YYYYMMDD_CRC_HASH.bin	LMT FE Bootloader
3KXL000065U0213_AABBCC_YYYYMMDD_CRC_HASH.bin	LMT FE Application
3KXL000065U0313_AABBCC_YYYYMMDD_CRC.bin	LMT FE Bootloader + Application
3KXL000065U0513_AABBCC_YYYYMMDD_CRC_HASH.bin	LMT FPGA Application+Lib
3KXL000065U0113_AABBCC_YYYYMMDD_CRC.stp	LMT FPGA Application

## 3. Release History


### ❖ 2021-09-22 Release 00

#### ▪ Version Change Notification

CB board(Smart HMI)	Comments
Subpart version	NA
Module Version	Update from 02.01.03 to 020300
Design Version: Bootloader	Update from 01.00.00 to 010100
Design Version: Application	Update from 02.01.03 to 020300

CB board(TTG HMI)	Comments
Subpart version	NA
Module Version	Update from 02.01.03 to 020200
Design Version: Bootloader	NA
Design Version: Application	Update from 02.01.03 to 020200

FE board	Comments
Subpart version	NA
Module Version	Update from 02.01.02 to 020200
Design Version: Bootloader	Update from 02.01.00 to 020101
Design Version: Application	Update from 02.01.02 to 020202
Design Version: FPGA	Update from 01.00.08 to 020100

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▪ **Released Files:**

CB board (support smart HMI):

File Name	Description
3KXL000712U0113_020300_20210720_D821C92E_d26e75b.bin	LMT CB Application
3KXL000712U0313_010100_20210414_002B6A32_8b4c0b9.bin	LMT CB Bootloader
3KXL000712U0213_020300_20210720_DBF96BA3.mot	LMT CB Bootloader + Application

CB board (support TTG HMI):

File Name	Description
3KXL000712U0113_020200_20210610_FBA4648A_9bf4d2d.bin	LMT CB Application
3KXL000712U0313_010000_20171204_76A284DF_87ca4b1.bin	LMT CB Bootloader
3KXL000712U0213_020200_2210610_00150ADB.mot	LMT CB Bootloader + Application

FE board:

File Name	Description
3KXL000065U0213_020200_20210607_A01843DE_508dd73.bin	LMT FE Application
3KXL000065U0413_020101_20210325_84490EDC_9ed7cb3.bin	LMT FE Bootloader
3KXL000065U0313_020200_20210607_F0957A1B.bin	LMT FE Bootloader + Application
3KXL000065U0513_020100_20200817_B1C740F8_715ee8f.bin	LMT FPGA Application+Lib
3KXL000065U0113_020100_20200817_34B62006.stp	LMT FPGA Application

▪ **Change Reason:**

- 1) linked to GLBCR2011009
- 2) add gain adjust feature, cyber security and bugfixs

▪ **Firmware Changes:**

- 1) CB Application:
  - change the “echo signal lost” from “maintenance” to “failure”; change the default timer to raise “signal lost” from 30 seconds to 1 minute.
  - o Add gain to adjust signal strength in HMI menu and HART command
  - o Add fast menu POL to waveform interface to set the signal polarity
  - o Fix Linearization table bugs in HMI and Factory setup tool
  - o Fix waveform display abnormal: no threshold line and axis scale
  - o Add the cyber security feature:
    - Add menu service account and HART command that disable/enable service user
    - Change user password storage from Hash 32 to SHA 256 algorithm
  - o Fix the bug that reset calibration carry out wrong action
  - o Fix issue that some value range shown in HMI are incorrect
  - o Fix issue that alarm of current out uncertain produce with out of limit or communication error
  - o Fix bug that hardware revision changes after carrying out NV format
  - o Fix issue that level range will be changed once entering the calibrate menu
  - o Fix Chinese language cannot be saved successfully
  - o Fix issue that PV percentage is not matched with level value when linearization enables

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- o Fix issue that safety manual and device implementation are mismatches between for current out readback alarm
- o Extend level range limit to meet more application scenarios
- o Add communication retry times to improve robustness for some special condition
- o Make firmware compatibility with previous firmware revision and hardware revision

2) FE Application:

- o Fix sensor board fault alarm for HFXO issue
- o Add access interface to adjust signal strength and record the gain readback value
- o Fix bug that unreasonable parameter for trim value will cause sensor reference value error
- o Change 3V and 6V power supply monitor mode from single mode to oversample mode
- o Change signal threshold setup from digital potentiometer to FPGA control
- o Add periodically diagnosis for gain read back from digital potentiometer
- o Optimize 1.2V power supply diagnosis to avoid false alarm
- o This change can supports FE hardware revision 02.00.00 and 01.01.00

3) FE Bootloader:

- o Fix bug that will block the programming for FPGA thru JTAG port

4) FE FPGA Application

- o Add the FPGA logic circuit for support threshold value setting thru MCU
- o Add OR gate to block the unexpected TH signal for proper measurement test function
- o Add SAVE\_BLK\_EXTD logic signal to extend blanking factor
- o Use one 17-bit counter directly instead of one 16 bits counter and one 1-bit counter to assembled as one 17-bit counter.
- o Level measurement strategy update: FPGA detects a rising edge of the Zero Crossing signal and the following falling edge of the Threshold signal. MCU will get both of these level detection value and perform a combination algorithm to figure out an effective value for valid level detection
- o Fix bug fixe for measurement task watch dog
- o Change logic schematics to Verilog language for FPGA measurement module design

❖ **2019-12-12 Release H**

▪ **Version Change Notification**


GLBCR1908001. Only updated checksums for FE & FPGA binary releases

▪ **Released Files:**

None.

▪ **Firmware Changes:**

None.

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#### ❖ 2019-09-02 Release G

##### ▪ Version Change Notification

GLBCR1908001.

##### ▪ Released Files:

File Name	Description
3KXL000712U0113_2.1.3_19.08.26.bin	CB Application to on-line update
3KXL000712U0213_2.1.3_19.08.26.bin	For PCBA supplier to off-line programming CB
3KXL000065U0213_2.1.2_19.08.30.bin	For PCBA supplier to off-line programming CB
3KXL000065U0413_2.1.0_19.08.20.bin	FE Bootloader to on-line update
3KXL000065U0313_2.1.2_19.08.30.bin	For PCBA supplier to off-line programming FE MCU
3KXL000065U0513_1_0_8_19.08.20.bin	FE FPGA to on-line update

##### ▪ Firmware Changes:

- 1) CB Application:
  - Fix NV failure issues
  - Fix CB cannot start with FE existing
  - Fix CB not retaining configuration changes after power cycling when sensor configured with temperature
  - Fix CB max & min sensor temperature wrongly stored
  - Fix calibration not precise issue
  - Add the language of Polish
  - Make CB compatible with push button HMI
  - This change supports CB hardware version 1.0.0.
- 2) FE Application:
  - Fix sensor out of limits
  - Enable direct write to objects to write FE
  - Solve issue that current outputs abnormally when a sensor out of limit is detected
  - This change supports FE hardware version 1.0.0 and 1.1.0.
- 3) FE Bootloader:
  - Fix the bug that FE bootloader cannot show the correct version of FPGA after upgrading
  - Remove timeout feature in FE bootloader to avoid firmware damaged
- 4) FE FPGA Application
  - Change the flashing library for FE FPGA to make it not coupling with FE bootloader  
(Precaution: using bootloader to upgrade FPGA to version 1.0.8 requires 3KXL000065U0513\_1\_0\_8\_19.08.20.bin if FE bootloader version is 3KXL000065U0413\_2.1.0\_19.08.20.bin, while it requires

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3KXL000065U0513\_1\_0\_8\_180927.bin if FE bootloader version is  
3KXL000065U0413\_2.0.0\_18.09.29.bin)

#### ❖ 2019-06-12 Release F

##### ▪ Version Change Notification

Required from US Warminster Factory.

##### ▪ Released Files:

File Name	Description
3KXL000712U0113_2.1.2_19.06.12.bin	CB Application to on-line update

##### ▪ Firmware Changes:

- 1) CB Application:
  - Fix the issue that NV data storing does not work if the device is configured as level plus temperature

#### ❖ 2018-11-14 Release E

##### ▪ Version Change Notification

GLBCR1809008.

##### ▪ Released Files:

File Name	Description
3KXL000712U0113_2.1.1_18.11.14.bin	CB Application to on-line update
3KXL000712U0213_2.1.1_18.11.14.bin	For PCBA supplier to off-line programming CB
3KXL000065U0213_2.1.1_18.11.13.bin	FE Application to on-line update
3KXL000065U0313_2.1.1_18.11.13.bin	For PCBA supplier to off-line programming FE MCU

##### ▪ Firmware Changes:

- 1) CB Application:
  - Fix communication error issues
  - This change supports CB hardware version 1.0.0.
- 2) FE Application:
  - Fix sensor board fault issues
  - Fix communication error issues
  - This change supports FE hardware version 1.0.0 and 1.1.0.

#### ❖ 2018-09-30 Release D

##### ▪ Version Change Notification

GLBCR1803008.

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▪ **Released Files:**

File Name	Description
3KXL000065U0213_2.1.1_18.09.30.bin	FE Application to on-line update
3KXL000065U0313_2.1.1_18.09.30.bin	For PCBA supplier to off-line programming FE MCU
3KXL000065U0413_2.0.0_18.09.29.bin	FE Bootloader to on-line update
3KXL000065U0513_1_0_8_180927.bin	FE FPGA to on-line update
3KXL000065U0113_1_0_8_180927.stp	For PCBA supplier to off-line programming FE FPGA

▪ **Firmware Changes:**

- 1) FE Application:
  - Fix sensor board fault issues
  - Add internal data objects to track Sensor Board Fault causes
  - Modify the threshold value which restricts the input of lower trim value
  - Optimize power consumption when measuring current through ADC
  - This change supports FE hardware version 1.0.0 and 1.1.0.
- 2) FE Bootloader:
  - Add FPGA programming feature
  - This change supports FE hardware version 1.0.0 and 1.1.0.
- 3) FE FPGA:
  - Bug fix related to unexceptional level detection signal when the level measurement test implements.

❖ **2018-04-08 Release C**

▪ **Version Change Notification**

GLBCR1803003.

▪ **Released Files:**

File Name	Description
3KXL000712U0113_2.1.0_18.03.14.bin	CB Application to on-line update
3KXL000712U0213_2.1.0_18.04.08.mot	For PCBA supplier to off-line programming CB
3KXL000712U0313_1.0.0_17.12.04.bin	CB Bootloader to on-line update
3KXL000065U0213_2.1.0_18.03.26.bin	FE Application to on-line update
3KXL000065U0313_2.1.0_18.03.26.bin	For PCBA supplier to off-line programming FE MCU



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3KXL000065U0413_1.0.0_17.12.04.bin	FE Bootloader to on-line update
3KXL000065U0113_v_1_0_7_180201.stp	For PCBA supplier to off-line programming FE FPGA

▪ **Firmware Changes:**

- 1) CB Application+Bootloader:
  - Update Signal Polarity Reversal logic when changing mount orientation;
  - Signal Polarity will be reversed each time mount orientation is changed;
  - Enable waveform horizontal scrolling to go below zero;
  - Add support for future hardware version to automatically adjust the vertical scale in the waveform to the correct range;
  - Separate calibration preparation logic from HMI;
  - Change default level limit/ullage limit when changing probe length;
  - Add validation function for sensor calibration;
  - Correct ranges for several data objects;
  - Bug fix related to OS\_Unuse() for resource semaphores with communications;
  - Bug fix related to Level/Interface range update;
  - Bug fix related to 2 float unit direction reversal;
  - Bug fix related to calibration result validation on 2 float unit;
  - Bug fix service port cannot communicate with FE board;
  - This change support CB hardware version 1.0.0.
- 2) FE Application+Bootloader:
  - Remove useless test signal output;
  - Update SRP calculation method;
  - Remove legacy module test code from sensor interface sub-system;
  - Bug fix related to FPGA Measurement test;
  - Bug fix related to FPGA Write Probe Length test.
  - This change support FE hardware version 1.0.0 and 1.1.0.
- 3) FE FPGA:
  - Removed Test Points used for development;
  - Removed reverse function of the data during External Bus Interface Test for SIL Certification;
  - Added Probe Length Read-back Test for SIL Certification;
  - Added FPGA internal watchdog of the Measurement Task for SIL Certification;
  - General cleanup and minor design simplification.

❖ **2017-05-16 Release B**

▪ **Version Change Notification**

ECN1298.

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▪ **Released Files:**

File Name	Description
3KXL000065U0413_0.0.6_17.05.16.bin	FE Bootloader to on-line update
3KXL000065U0213_1.0.2_17.05.16.bin	FE Application to on-line update
3KXL000065U0313_1.0.2_17.05.16.bin	For PCBA supplier to off-line programming FE MCU

▪ **Firmware Changes:**

- 4) FE Application+Bootloader:
  - Use 11 MHz oscillator to clock the UART for the bootloader
  - Change 7 MHz oscillator for waveform scaling to 14 MHz oscillator with proper prescaler selected
  - Modify sensor trimming rules to allow 25% minimum span between trim points
  - Sensor reference point is back-calculated to 0 counts based on trim gain/slope calculation
  - Lower trim value can be up to probe length – 5"
  - Combined image release

❖ **2017-01-16 Release A**

▪ **Version Change Notification**


ECN1272.

▪ **Released Files:**

File Name	Description
3KXL000712U0113_1.0.1_17.01.12.bin	CB Application to on-line update
3KXL000712U0213_1.0.1_17.01.12.mot	For PCBA supplier to off-line programming CB
3KXL000065U0213_1.0.1_17.01.11.bin	FE Application to on-line update
3KXL000065U0313_1.0.1_17.01.11.bin	For PCBA supplier to off-line programming FE MCU

▪ **Firmware Changes:**

- 1) CB Application+Bootloader:
  - Fix software write protect bug
  - Implement software reset to FE on consecutive missed messages
  - Fix diagnostic alarm behavior for current read back hi/lo
- 2) FE Application+Bootloader:
  - Fix median filter bug
  - Fix sensor stuck diagnostic

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#### ❖ 2016-11-18 Release NC

##### ▪ Version Change Notification

ECN1252.

##### ▪ Released Files:

File Name	Description
3KXL000712U0113_1.0.0_16.11.18.bin	CB Application to on-line update
3KXL000712U0213_1.0.0_16.11.18.mot	For PCBA supplier to off-line programming CB
3KXL000712U0313_0.9.5_13.03.25.bin	CB Application to on-line update
3KXL000065U0113_0.3.2_13.08.27.stp	For PCBA supplier to off-line programming FE FPGA
3KXL000065U0213_1.0.0_16.11.17.bin	FE Application to on-line update
3KXL000065U0313_1.0.0_16.11.17.bin	For PCBA supplier to off-line programming FE MCU
3KXL000065U0413_0.0.5_14.05.19.bin	FE Bootloader to on-line update
3KXL000711U0113_0.5.1_16.06.10.a43	HMI Application

##### ▪ Firmware Changes:

Initial release.

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#### 4. Document Revision

Version	Description	Date
NC	Initial version	11/18/16
A	Updated release history for CB & FE updates Updated checksums for FE binaries Moved Release notes from Release History for document to its own section	01/16/17
B	Updated release history for FE firmware Updated checksums for FE binary releases	05/16/17
C	Updated release history for CB & FE firmware Updated checksums for CB & FE binary releases	04/08/18
D	Updated release history for FE & FPGA firmware Updated checksums for FE & FPGA firmware	09/30/18
E	Updated release history for CB & FE firmware Updated release history for CB & FE binary releases	11/14/18
F	Updated release history for CB firmware	06/12/19
G	Updated release history for CB & FE firmware Updated release history for CB & FE binary releases	09/02/19
H	Updated release history for FPGA in v1.0.8 Updated checksums for FE & FPGA binary releases	12/12/19
00	Change to the new release note template Updated release history for CB, FE and FPGA firmware Updated checksums for CB,FE & FPGA binary releases	09/22/21

**Commented [JL2]:** List the change history of the release notes template.  
Please remove this part at the final release notes.