



Product Selection Guide

Product Line – Embedded Networking and Lighting

Contents

1. Abbreviations	3
2. References	4
3. Melexis Softdist Server	4
1. Scope	5
2. CAN Transceiver.....	5
3. LIN Transceiver and System Basis Chips	5
4. Fully integrated LIN products	6
5. General development and EOL tools.....	7
5.1. <i>Software development tools</i>	7
5.2. <i>Hardware development tools.....</i>	8
5.3. <i>Hardware end of line tools</i>	8
6. Project specific tools	9
6.1. <i>MLX80104/5 Tools</i>	9
6.1.1. <i>MLX80104/5 Hardware Tools.....</i>	9
6.1.2. <i>MLX80104/5 Software Tools</i>	10
6.2. <i>MLX80104/5 – development and production kits</i>	11
6.2.1. <i>MLX80104DAG -UniROM development kit.....</i>	11
6.2.2. <i>MLX80105 - Firmware development kit.....</i>	12
6.2.3. <i>MLX80104/5 – PTC04 end of line production kit</i>	13
6.3. <i>MLX81106/07/08/09 & MLX80110 Tools.....</i>	14
6.3.1. <i>MLX81106/07/08/09 & MLX80110 Hardware Tools.....</i>	14
6.3.2. <i>MLX81106/07/08/09 & MLX80110 Software Tools</i>	14
6.4. <i>MLX81106/8 & MLX80110 – development and production kits</i>	15
6.4.1. <i>MLX81106/8 & MLX80110 - Firmware development kit</i>	15
6.4.2. <i>MLX81107/9 - Firmware development kit</i>	16
6.4.3. <i>MLX81106/7/8/9 & MLX80110 – PTC04 end of line production kit</i>	17
6.5. <i>MLX81112/15/20 Tools.....</i>	18
6.5.1. <i>MLX81112/15/20 Hardware Tools</i>	18
6.5.2. <i>MLX81112/15/20 Software Tools</i>	19
6.6. <i>MLX81112/15/20 – development and production kits</i>	20
6.6.1. <i>MLX81112 - Firmware development kit.....</i>	20
6.6.2. <i>MLX81115 - Firmware development kit.....</i>	21
6.6.3. <i>MLX81120 - Firmware development kit.....</i>	22
6.6.4. <i>MLX81112/15/20 – PTC04 end of line production kit.....</i>	23
7. Revision History	24
8. Disclaimer	25

1. Abbreviations

ADC	Analog Digital converter
API	Application Program Interface
ASSP	Application Specific Standard Product
BSM	Bus Shunt Method
CAN	Controller Area Network
CAN FD	CAN with Flexible Data-Rate
CDT	C/C++ Development Tools
CPU	Central Processing Unit
CRC	Cyclic Redundancy Code
DFN	Dual Flat No Leads Package
EEPROM	Electrically Erasable/Programmable Read-Only Memory
EMU	Emulator Device
EOL	End Of Line
EVB	Evaluation Board
FW	Firmware
GCC	GNU Compiler Collection
HV	High Voltage Pin
IC	Integrated Circuit
ID	Identifier
IDE	Integrated Development Environment
INH	Inhibit output for switching external voltage regulators
IO	Input Output
IP	Intellectual Property
IREF	Constant current source output
LDF	LIN Description File
LIN	Local Interconnect Network
LIN-AA	LIN Auto Addressing
LSB	Least Significant Bit
LV	Low Voltage Pin
MCU	Microcontroller Unit
MDL	Module Library
MLX16	Melexis 16-Bit CPU
MPT	Melexis Programmable Toolbox
MSB	Most Significant Bit
MULAN	Melexis dual core 16-Bit-Risc-CPU
MULAN2	Melexis dual core 16-Bit-Risc-CPU with coprocessor
MULAN3	Melexis dual core 16-Bit-Risc-CPU with coprocessor
NVRAM	Non-Volatile Random-Access Memory (EEPROM with separate RAM)
OTP	One-Time Programmable Memory
PCB	Printed Circuit Board
PSF	Product Specific Function Library
PTC04	Programmer for Melexis Devices
PWM	Pulse Width Modulator
QFN	Quad Flat No Leads Package
RAM	Random Access Memory
RGB LED	Consist of one red, one green, and one blue LED
ROM	Read Only Memory
SNPD	Slave Node Position Detection
SMD	Surface Mount Device
SOIC	Small Outline Integrated Circuit Package
UI	User Interface
UniROM	Melexis ready to use LIN Plug and Play solution
USB	Universal Serial Bus
VREG	Voltage regulator output

2. References

Following documents are referred to in this document:

- [1] Data sheet MLX80020
- [2] Data sheet MLX80002/4
- [3] Data sheet MLX80030/31/50/51
- [4] Data sheet TH8056
- [5] Data sheet MLX80070
- [6] Data sheet MLX80104/05
- [7] Data sheet MLX81106/7/8/9 MLX80110
- [8] Data sheet MLX81112
- [9] Data sheet MLX81115
- [10] Data sheet MLX81120
- [11] Application note “MLX80104/5 Software Development Kit Description”
- [12] Application note “MLX81106/7/8/9 Software Development Kit Description”
- [13] Application note “MLX81112/15/20 Software Development Kit Description”
- [14] Application note “MLX80104/5 EOL Programming using the Melexis PTC-04”
- [15] Application note “MLX81106/7/8/9 EOL Programming using the Melexis PTC-04”

3. Melexis Softdist Server

Melexis SoftDist (<https://softdist.melexis.com>) is a software distribution system which allows customers to download documents, development software and other stuff related to Melexis products. In case updates or new items are available a notification email will be send automatically to all subscribers.

It's required to register in order to access the Melexis Softdist server.

In case you are not registered yet, please contact our Direct Sales team and specify which Melexis product you are interested in, in order to create an account and grant access to the correct product specific information:

Europe, Africa	Telephone: +32 13 67 04 95
	Email : sales_europe@melexis.com
Americas	Telephone: +1 248 306 5400
	Email : sales_usa@melexis.com
Asia	Email : sales_asia@melexis.com

1. Scope

This is a product selection guide for the Melexis Product Line – Embedded Networking and Lighting. Beside of the products themselves it includes also a selection guide for the available development tools.

2. CAN Transceiver

Part No.	Description	Supported Standards	INH	Local Wake-Up	Supply Voltage	Temp. Range	Package
TH8056	Single Wire CAN Transceiver	GMW3089 V2.4 J2411	Yes	Yes	5V ... 26.5V	-40 to 125°C	SOIC8 SOIC14
MLX80070	Dual Wire CAN FD Transceiver with Partial Networking	ISO 11898-2 ISO 11898-5 ISO 11898-6	Yes	Yes	4.5V ... 28V	-40 to 150°C	SOIC14 SOIC16

3. LIN Transceiver and System Basis Chips

Part No.	Description	Supported Standards	No. of LIN channels	VREG	INH	RESET Output	Bus Wake-Up	Local Wake-Up	Window Watchdog	Supply Voltage	Temp. Range	Package
MLX80020BA	Enhanced LIN Transceiver	LIN 2.x	1	-	Yes	-	Yes	Yes	-	5V ... 27V	-40 to 125°C	SOIC8
MLX80020BB	Enhanced LIN Transceiver	SAE J2602	1	-	Yes	-	Yes	Yes	-	5V ... 27V	-40 to 125°C	SOIC8
MLX80002	Two Channel LIN Master Transceiver	LIN 2.x SAE J2602	2	-	Yes	-	Yes	Yes	-	5V ... 27V	-40 to 125°C	QFN24 4x4
MLX80004	Four Channel LIN Master Transceiver	LIN 2.x SAE J2602	4	-	Yes	-	Yes	Yes	-	5V ... 27V	-40 to 125°C	QFN24 4x4
MLX80030	LIN System Basis IC	LIN 2.x SAE J2602	1	3.3V / 70mA	-	Yes	Yes	-	-	5V ... 27V	-40 to 125°C	SOIC8
MLX80050	LIN System Basis IC	LIN 2.x SAE J2602	1	5V / 70mA	-	Yes	Yes	-	-	5V ... 27V	-40 to 125°C	SOIC8
MLX80031	Enhanced LIN System Basis IC	LIN 2.x SAE J2602	1	3.3V / 70mA	Yes	Yes	Yes	Yes	Yes	5V ... 27V	-40 to 125°C	QFN20 5x5
MLX80051	Enhanced LIN System Basis IC	LIN 2.x SAE J2602	1	5V / 70mA	Yes	Yes	Yes	Yes	Yes	5V ... 27V	-40 to 125°C	QFN20 5x5

4. Fully integrated LIN products

Part No.	Description	Supported Standards	CPU	Program Memory	EEPROM / NVRAM	RAM	HV IO	LV IO	ADC	PWM	LIN AA	Special Feature	Supply Voltage	Temp. Range	Package	Tools
MLX80104	LIN Switch	LIN 2.x	MULAN	16kB ROM	192Byte	0.5kB	18	-	10bit	8bit	-	2mA IREF Output 8mA pull up/down current	5V ... 18V	-40 to 125°C	QFN28 5x5	FW development kit PTC04 production kit
	LIN IO-Extension	SAE J2602														
MLX80105	LIN Switch	LIN 2.x	MULAN	16kB OTP	192Byte	0.5kB	18	-	10bit	8bit	-	2mA IREF Output 8mA pull up/down current	5V ... 18V	-40 to 125°C	QFN28 5x5	FW development kit PTC04 production kit
	LIN IO-Extension	SAE J2602														
MLX81106	LIN RGB LED	LIN 2.x SAE J2602	MULAN2	24kB FLASH	380Byte	1kB	4	-	10bit	16bit	Yes	LED driver 48mA per IO pin LED diagnostic	5.5V ... 18V	-40 to 125°C	SOIC8	FW development kit PTC04 production kit
	LIN Switch															
	LIN IO-Extension															
MLX81107	LIN RGB LED	LIN 2.x SAE J2602	MULAN2	24kB FLASH	380Byte	1kB	4	8	10bit	16bit	Yes	LED driver 48mA per IO pin LED diagnostic	5.5V ... 18V	-40 to 125°C	QFN20 5x5	FW development kit PTC04 production kit
	LIN Switch															
	LIN IO-Extension															
MLX81108	LIN RGB LED	LIN 2.x SAE J2602	MULAN2	32kB FLASH	380Byte	1kB	4	-	10bit	16bit	Yes	LED driver 48mA per IO pin LED diagnostic	5.5V ... 18V	-40 to 125°C	SOIC8	FW development kit PTC04 production kit
	LIN Switch															
	LIN IO-Extension															
MLX81109	LIN RGB LED	LIN 2.x SAE J2602	MULAN2	32kB FLASH	380Byte	1kB	4	8	10bit	16bit	Yes	LED driver 48mA per IO pin LED diagnostic	5.5V ... 18V	-40 to 125°C	QFN20 5x5	FW development kit PTC04 production kit
	LIN Switch															
	LIN IO-Extension															
MLX80110	LIN RGB LED	LIN 2.x SAE J2602	MULAN2	32kB ROM	380Byte	1kB	4	-	10bit	16bit	Yes	LED driver 48mA per IO pin LED diagnostic	5.5V ... 18V	-40 to 125°C	SOIC8	FW development kit PTC04 production kit
	LIN Switch															
	LIN IO-Extension															
MLX81112	LIN RGB LED	LIN 2.x SAE J2602	MULAN3	32kB FLASH	380Byte	2kB	4	-	10bit	16bit	Yes	LED driver 48mA per IO pin LED diagnostic	5.5V ... 18V	-40 to 125°C	SOIC8	FW development kit PTC04 production kit
	LIN Switch			+												
	LIN IO-Extension			16kB ROM												
MLX81115	Dual LIN RGB LED	LIN 2.x SAE J2602	MULAN3	32kB FLASH	380Byte	2kB	6	-	10bit	16bit	Yes	LED driver 48mA per IO pin LED diagnostic	5.5V ... 18V	-40 to 125°C	DFN12 4x4	FW development kit PTC04 production kit
	LIN Switch			+												
	LIN IO-Extension			16kB ROM												
MLX81120	LIN RGB LED	LIN 2.x SAE J2602	MULAN3	32kB FLASH	380Byte	2kB	4	8	10bit	16bit	Yes	LIN Master Slave Gateway	5.5V ... 18V	-40 to 125°C	DFN12 4x4	FW development kit PTC04 production kit
	LIN Master Slave Gateway			+								LED driver 48mA per IO pin				
	LIN Switch			16kB ROM								LED diagnostic				
	LIN IO-Extension															

5. General development and EOL tools

5.1. Software development tools

Tool	Description
SW16	“Melexis development tools installation package” includes following general development tools: • Melexis Programmer Setup • Melexis Emulator Setup • Melexis MLX16 GCC • Melexis LIN Commander • Melexis LIN PSF • Melexis Generic PSF • Melexis MPT • Melexis MPT LIN UI • Melexis Debugger • Melexis MLX16 CPU Simulator • Melexis FTDI USB Driver • Eclipse CDT • Melexis IDE Plugin • Melexis MLX16 GCC Plugin

Free download available via Melexis Softdist server <https://softdist.melexis.com>

5.2. Hardware development tools

Tool	Description	Picture
Mini E-MLX	Hardware emulator for connection of Emulation PC software to MLX integrated debug Interface, connection to the PC via USB port	
MLX LIN Master	Lin Master for connection of LIN Bus with PC via USB connection	
Master-Interface Cable	Interface Cable to connect LIN Master to Evaluation PCB	

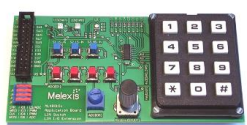
5.3. Hardware end of line tools

Tool	Description	Picture
PTC-04	Programming tool for End Of Line (EOL) programming. Requires additionally one of the following PTC04 daughterboard	
CablePTC04-A3	Interconnecting cable V2.0 PTC-04 ↔ EVB80104-A3 PTC-04 ↔ EVB81107-A1 PTC-04 ↔ EVB81112-A1	

6. Project specific tools

6.1. MLX80104/5 Tools

6.1.1. MLX80104/5 Hardware Tools

Tool	Description	Picture
EVB80104-A1	MLX80104DAG UniROM Evaluation PCB	
EVB80104-A2	MLX80104/5 Software development PCB, Equipped with an MLX80108 software development device	
EVB80104-A3 (samples are not included and needs to be ordered separately)	QFN5x5 Socket Evaluation PCB for the • MLX80104 • MLX80105	
EVB80104-B	Sample Application PCB which can be connected to EVB80104-A1 / EVB80104-A2 and EVB80104-A3	
MLX80104/5	Samples	
PTC04-DB-80104	PTC04 daughter board for the: • MLX80104/5 Needs to be mounted into the PTC-04.	

6.1.2. MLX80104/5 Software Tools

Tool	Description
SW80104-A	"Melexis MLX80104 UniROM Control" PC software for the configuration of MLX80104DAG UniROM via USB LIN Master.
SW80104-B	"MLX80104/5 Tools and Documentation" required for the MLX80105 software development.
SW80104-PTC04	"Melexis MLX80104-05 PTC-04 software package" required for PTC04 EOL programming of the MLX80104/5.

Free downloads available via Melexis Softdist server: <https://softdist.melexis.com>

6.2. MLX80104/5 – development and production kits

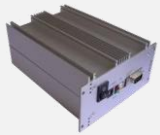
6.2.1. MLX80104DAG -UniROM development kit

Tool	Mandatory	Optional	Remark	Picture
MLX LIN Master	X			
Master Interface Cable	X			
EVB80104-A1	X			
EVB80104-B		X	Instead of the EVB80104-B PCB, it's also possible to use existing Switch modules, which can be connected to the EVB80104-A1 PCB.	
SW80104-A	X		Free download available via Melexis Softdist server: https://softdist.melexis.com	

6.2.2. MLX80105 - Firmware development kit

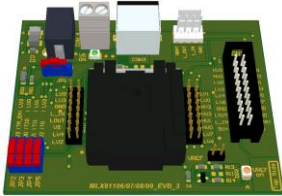
Tool	Mandatory	Optional	Remark	Picture
Mini E-MLX Emulator	X			
MLX LIN Master		X	It can be replaced by any other third party LIN master	
Master Interface Cable		X	It's only required if the MLX LIN Master is used	
EVB80104-A2	X			
EVB80104-A3	X		For software test and programming of the MLX80105 (OTP)	
MLX80105 Samples	X		Required because EVB80104-A3 will be delivered without samples	
EVB80104-B		X	Instead of the EVB80104-B PCB, it's also possible to use existing Switch modules, which can be connected to the EVB80104-A1 PCB.	
SW16	X		Free download available via Melexis Softdist server: https://softdist.melexis.com	
SW80104-B	X		Free download available via Melexis Softdist server: https://softdist.melexis.com	

6.2.3. MLX80104/5 – PTC04 end of line production kit

Tool	Mandatory	Optional	Remark	Picture
PTC-04	X			
PTC04-DB-81104	X			
SW80104-PTC04	X		Free download available via Melexis Softdist server: https://softdist.melexis.com	
CablePTC04-A3		X	Can be used for EOL setup development	
EVB80104-A3		X	Can be used for MLX80105 EOL setup development (Requires CablePTC04-A3)	
MLX80105 Samples		X	Required because EVB80104-A3 will be delivered without samples	

6.3. MLX81106/07/08/09 & MLX80110 Tools

6.3.1. MLX81106/07/08/09 & MLX80110 Hardware Tools

Tool	Description	Picture
EVB81112-A1 (samples are not included and needs to be ordered separately)	SOIC8 Socket Evaluation PCB for the • MLX81106 • MLX81108 • MLX81112 • MLX80110 (replacing the EVB81106-A1)	
EVB81107-A1 (samples are not included and needs to be ordered separately)	QFN5x5 Socket Evaluation PCB for the • MLX81107 • MLX81109	
MLX81106/7/8/9 MLX80110	IC Samples	
PTC04-DB-81106	PTC04 daughter board for the: • MLX81106/7/8/9 • MLX81112/15/20 Needs to be mounted into the PTC-04.	

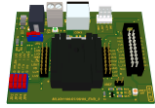
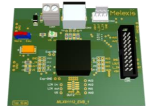
6.3.2. MLX81106/07/08/09 & MLX80110 Software Tools

Tool	Description
SW81107-A	"MLX81106/7/8/9 Tools and Documentation" required for MLX81106/7/8/9 software development
SW811xy-PTC04	"Melexis MULAN2/3 PTC-04 software package" required the for EOL programming of the MLX81106/07/08/09/12/15/20

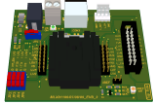
Free downloads available via Melexis Softdist server: <https://softdist.melexis.com>

6.4. MLX81106/8 & MLX80110 – development and production kits

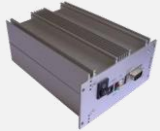
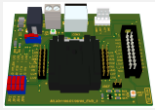
6.4.1. MLX81106/8 & MLX80110 - Firmware development kit

Tool	Mandatory	Optional	Remark	Picture
Mini E-MLX Emulator	X			
MLX LIN Master		X	It can be replaced by any other third party LIN master	
Master Interface Cable		X	It's only required if the MLX LIN Master is used	
EVB81107-A1	X		Proposed for software development because of the fact that the application components and the debug interface can be used at the same time. The developed firmware can be used in the MLX81106/8 without any changes.	
MLX81107/9 Samples	X		Required because EVB81107-A1 will be delivered without samples	
EVB81112-A1	X		for software test and programming of the MLX81106/8 & MLX80110	
MLX81106/8 Samples MLX80110 Samples	X		Required because EVB81112-A1 will be delivered without samples	
SW16	X		Free download available via Melexis Softdist server: https://softdist.melexis.com	
SW81107-A	X		Free download available via Melexis Softdist server: https://softdist.melexis.com	

6.4.2. MLX81107/9 - Firmware development kit

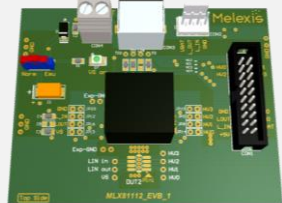
Tool	Mandatory	Optional	Remark	Picture
Mini E-MLX Emulator	X			
MLX LIN Master		X	It can be replaced by any other third party LIN master	
Master Interface Cable		X	It's only required if the MLX LIN Master is used	
EVB81107-A1	X			
MLX81107/9 Samples	X		Required because EVB81107-A1 will be delivered without samples	
SW16	X		Free download available via Melexis Softdist server: https://softdist.melexis.com	
SW81107-A	X		Free download available via Melexis Softdist server: https://softdist.melexis.com	

6.4.3. MLX81106/7/8/9 & MLX80110 – PTC04 end of line production kit

Tool	Mandatory	Optional	Remark	Picture
PTC-04	X			
PTC04-DB-81106	X			
SW811xy-PTC04	X		Free download available via Melexis Softdist server: https://softdist.melexis.com	
CablePTC04-A3		X	Can be used for EOL setup development	
EVB81107-A1		X	Can be used for EOL setup development (Requires CablePTC04-A3)	
MLX81107/9 Samples		X	Required because EVB81107-A1 will be delivered without samples	
EVB81112-A1		X	Can be used for EOL setup development (Requires CablePTC04-A3)	
MLX81106/8 Samples MLX80110 Samples		X	Required because EVB81112-A1 will be delivered without samples	

6.5. MLX81112/15/20 Tools

6.5.1. MLX81112/15/20 Hardware Tools

Tool	Description	Picture
EVB81112-A1 (samples are not included and needs to be ordered separately)	SOIC8 Socket Evaluation PCB for the - MLX81106 - MLX81108 - MLX81112 - MLX80110	 A green printed circuit board (PCB) with a central black integrated circuit (IC) in a SOIC8 package. It features various connectors, including a USB Type-A port, a USB Type-C port, and a D-sub connector. The board is labeled 'Melexis' and 'MLX81112_EVB_1'.
EVB81115-A1 (samples are not included and needs to be ordered separately)	DFN4x4 Socket Evaluation PCB for the MLX81115	 A green printed circuit board (PCB) with a central black integrated circuit (IC) in a DFN4x4 package. It features various connectors, including a USB Type-A port, a USB Type-C port, and a D-sub connector. The board is labeled 'Melexis' and 'MLX81115_EVB_1'.
EVB81120-A1 (samples are not included and needs to be ordered separately)	DFN4x4 Socket Evaluation PCB for the MLX81120	 A green printed circuit board (PCB) with a central black integrated circuit (IC) in a DFN4x4 package. It features various connectors, including a USB Type-A port, a USB Type-C port, and a D-sub connector. The board is labeled 'Melexis' and 'MLX81120_EVB_1'.
EVB81115-A2 (samples are not included and needs to be ordered separately)	QFN20 Socket Evaluation PCB for the MLX81115 EMU Software development Evaluation PCB, equipped with QFN20 5x5 socket for MLX81115 EMU development device	 A green printed circuit board (PCB) with a central black integrated circuit (IC) in a QFN20 package. It features various connectors, including a USB Type-A port, a USB Type-C port, and a D-sub connector. The board is labeled 'Melexis' and 'MLX81115_EMU_EVB_1'.
MLX81112/15/20	Samples	 Two small, square, black integrated circuit (IC) chips, one of which is shown from the top and the other from the bottom.
MLX81115 EMU	Samples – Specific emulator device which must be used for firmware development only	 Two small, square, black integrated circuit (IC) chips, one of which is shown from the top and the other from the bottom.
PTC04-DB-81106	PTC04 daughter board for the: - MLX81106/7/8/9 - MLX81112/15/20 Needs to be mounted into the PTC-04.	 A green printed circuit board (PCB) with various components, including a central black integrated circuit (IC), resistors, and capacitors. It has a D-sub connector on one side and a USB Type-C port on the other. The board is labeled 'PTC04-DB-81106'.

6.5.2. MLX81112/15/20 Software Tools

Tool	Description	Picture
SW81112-A	"MLX81112/15/20 Tools and Documentation" required for MLX81112/15/20 software development.	
SW811xy-PTC04	"Melexis MULAN2/3 PTC-04 software package" required the for EOL programming of the MLX81106/07/08/09/12/15/20	

Free downloads available via Melexis Softdist server: <https://softdist.melexis.com>

6.6. MLX81112/15/20 – development and production kits

6.6.1. MLX81112 - Firmware development kit

Tool	Mandatory	Optional	Remark	Picture
Mini E-MLX Emulator	X			
MLX LIN Master		X	It can be replaced by any other third party LIN master	
Master Interface Cable		X	It's only required if the MLX LIN Master is used	
EVB81115-A2	X		Proposed for software development because of the fact that the application components and the debug interface can be used at the same time. The developed firmware can be used in the MLX81112 without any changes.	
MLX81115 EMU Samples	X		Required because EVB81115-A2 will be delivered without samples	
EVB81112-A1	X		for software test and programming of the MLX81112	
MLX81112 Samples	X		Required because EVB81112-A1 will be delivered without samples	
SW16	X		Free download available via Melexis Softdist server: https://softdist.melexis.com	
SW81112-A	X		Free download available via Melexis Softdist server: https://softdist.melexis.com	

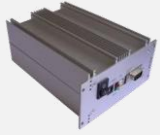
6.6.2. MLX81115 - Firmware development kit

Tool	Mandatory	Optional	Remark	Picture
Mini E-MLX Emulator	X			
MLX LIN Master		X	It can be replaced by any other third party LIN master	
Master Interface Cable		X	It's only required if the MLX LIN Master is used	
EVB81115-A2	X		Proposed for software development because of the fact that the application components and the debug interface can be used at the same time. The developed firmware can be used in the MLX81115 without any changes.	
MLX81115 EMU Samples	X		Required because EVB81115-A2 will be delivered without samples	
EVB81115-A1	X		for software test and programming of the MLX81115	
MLX81115 Samples	X		Required because EVB81115-A1 will be delivered without samples	
SW16	X		Free download available via Melexis Softdist server: https://softdist.melexis.com	
SW81112-A	X		Free download available via Melexis Softdist server: https://softdist.melexis.com	

6.6.3. MLX81120 - Firmware development kit

Tool	Mandatory	Optional	Remark	Picture
Mini E-MLX Emulator	X			
MLX LIN Master		X	It can be replaced by any other third party LIN master	
Master Interface Cable		X	It's only required if the MLX LIN Master is used	
EVB81115-A2	X		Proposed for software development because of the fact that the application components and the debug interface can be used at the same time. The LIN master unit cannot be debugged with this device.	
MLX81115 EMU Samples	X		Required because EVB81115-A2 will be delivered without samples	
EVB81120-A1	X		for software test and programming of the MLX81120	
MLX81120 Samples	X		Required because EVB81120-A1 will be delivered without samples	
SW16	X		Free download available via Melexis Softdist server: https://softdist.melexis.com	
SW81112-A	X		Free download available via Melexis Softdist server: https://softdist.melexis.com	

6.6.4. MLX81112/15/20 – PTC04 end of line production kit

Tool	Mandatory	Optional	Remark	Picture
PTC-04	X			
PTC04-DB-81106	X			
SW811xy-PTC04	X		Free download available via Melexis Softdist server: https://softdist.melexis.com	
CablePTC04-A3		X	Can be used for EOL setup development	
EVB81112-A1		X	Can be used for MLX81112 EOL setup development (Requires CablePTC04-A3)	
MLX81112 Samples		X	Required because EVB81112-A1 will be delivered without samples	
EVB81115-A1		X	Can be used for MLX81115 EOL setup development (Requires CablePTC04-A3)	
MLX81115 Samples		X	Required because EVB81115-A1 will be delivered without samples	
EVB81120-A1		X	Can be used for MLX81120 EOL setup development (Requires CablePTC04-A3)	
MLX81120 Samples		X	Required because EVB81120-A1 will be delivered without samples	

7. Revision History

Version	Changes	Date
001	First Release	21.08.17

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