MicroSys

Getting Started

EvalKit SBC-LS1043

1st edition

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1. Introduction

1.1 Short Description

The SBC-LS1043 EvalKit is a small computer system consisting of the MPX-LS1043A module, based on a MCU within the NXP LS10x3 family, and the CRX05 carrier board.

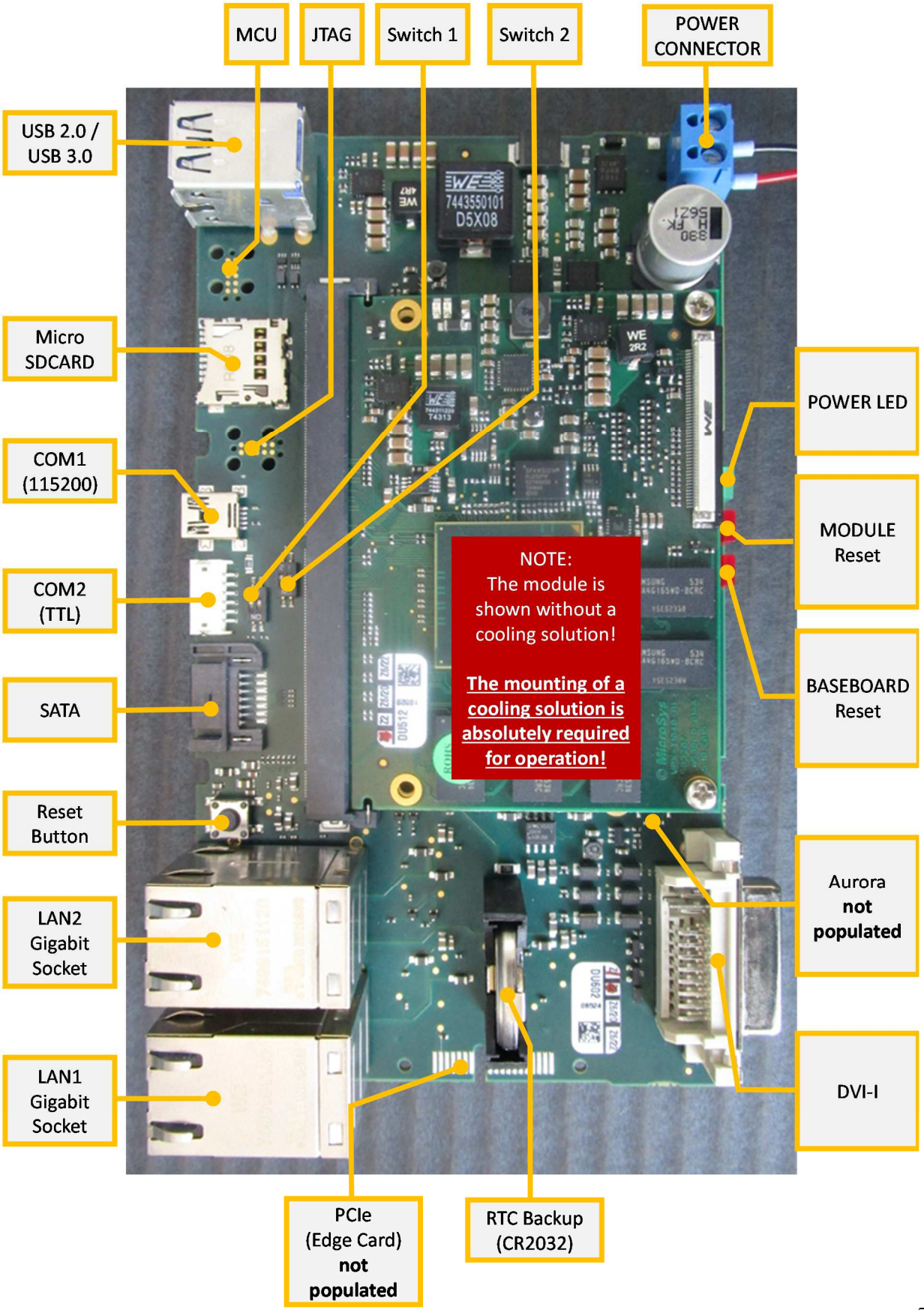
This document gives you an overview on the board's connectors and how to take the first steps on the initial setup.

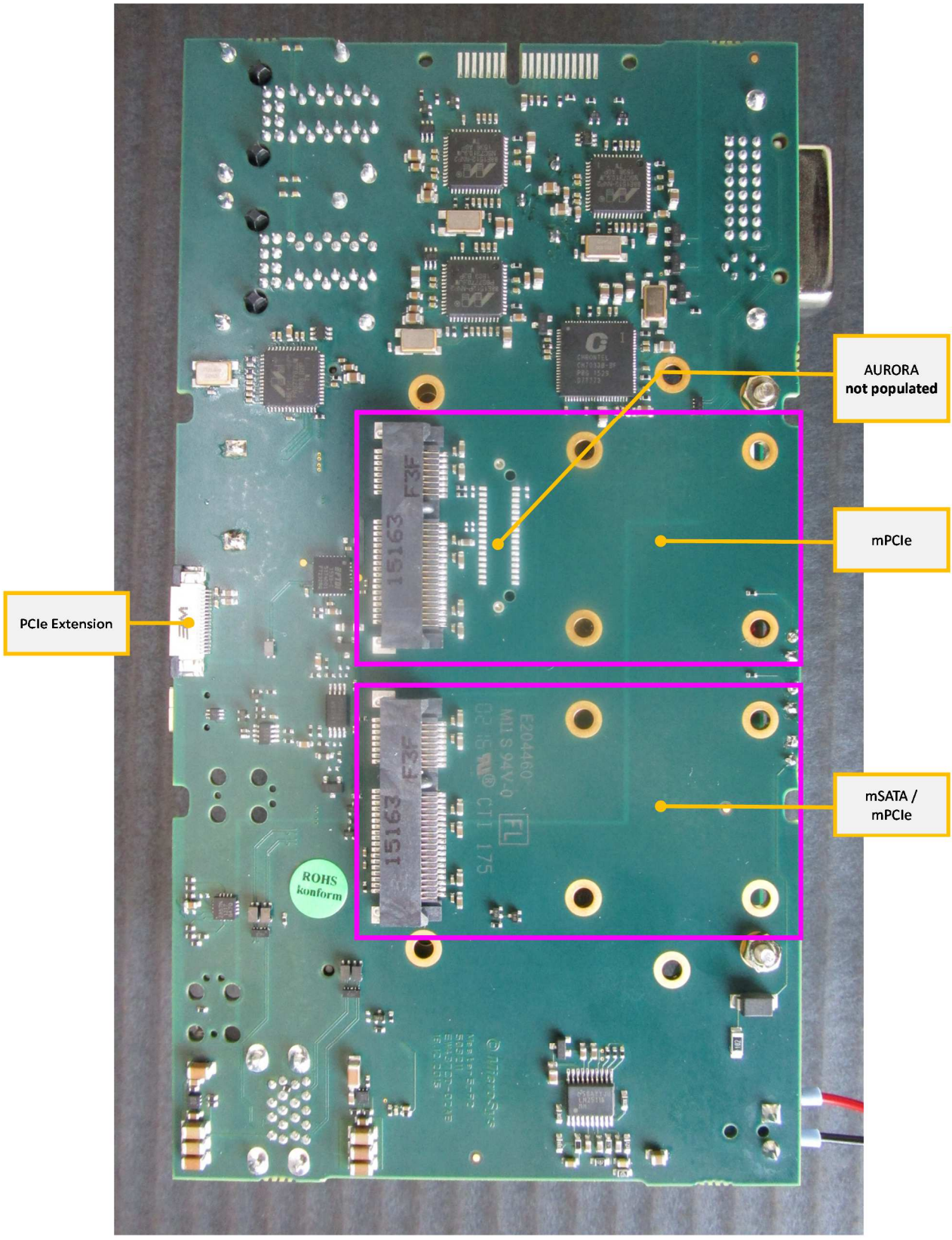
1.2 Shipping List

The SBC-LS1043EvalKit package contains the following items:

- The SBC-LS1043 system, mounted with cooling solution
- Power Supply 12 V DC stabilized / 2 A
- Cable adapter for the power supply
- USB cable type A – mini B
- Micro-SD-Card with U-Boot and root file system

2. Overview of the SBC-LS1043 EvalKit Assembly





3. Connector Pinouts:

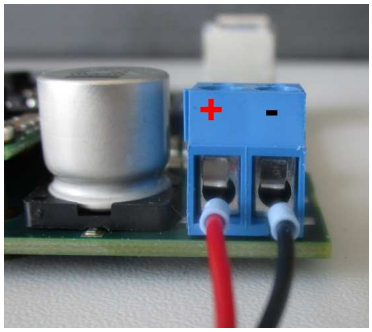
On the EvalKit the following connectors are available with their respective pin-outs:

3.1.1 Power Connector

The EvalKit is designed to work within 7-24V DC (+/- 10%)

Version 1 of the CRX05 carrierboard is populated with a pressure clamp.

Manufacturer:	Würth Elektronik
Type:	691 101 710 002

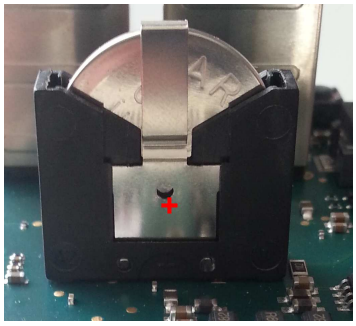


Pin:		
1	„+“	VCC (7-24V)
2	„-“	GND

3.1.2 RTC Backup Battery

The RTC Backup Battery holder is designed for CR2032 batteries.

Manufacturer:	Renata Batteries
Type:	VBH2032-1

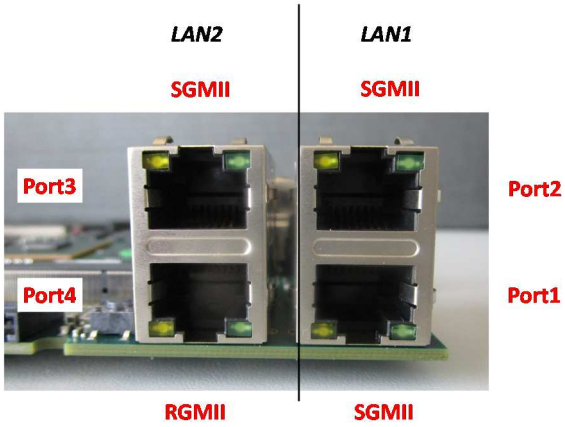


3.1.3 LAN 1 / LAN2

The EvalKit has a maximum of three supported Gigabit LAN ports. **Port 2 is not supported in combination with the MPX-LS1043A module.** These ports are distributed over two connectors named LAN1 and LAN2 with integrated magnetics.

The following picture shows the front view of the two connectors as placed on the CRX05 baseboard.

Manufacturer:	Würth Elektronik
Type:	749 915 1120



Port	T1042
1	DTSEC9
2	---
3	DTSEC2
4	DTSEC3

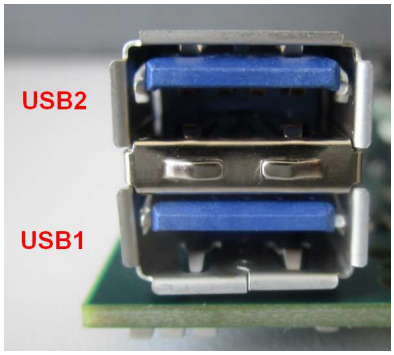
The LAN Sockets have a standard layout for GBit Ethernet, i.e. the pairs are 1-2, 3-6, 4-5 and 7-8.

Pin:	
1	D-A+
2	D-A-
3	D-B+
4	D-C+
5	D-C-
6	D-B-
7	D-D+
8	D-D-

3.1.4 USB2.0 / USB3.0

The CRX05 carrier board provides two USB ports. Depending on the module both USB2.0 and USB3.0 modes are supported. The MPX-LS1043 module also supports super-speed.

Manufacturer:	Würth Elektronik
Type:	692 141 030 100



Pin:	USB-1	USB-2
1	Vbus+	Vbus+
2	D-	D-
3	D+	D+
4	GND	GND
5	SSRX-	SSRX-
6	SSRX+	SSRX+
7	GND	GND
8	SSTX-	SSTX-
9	SSTX+	SSTX+

Note: e.g. SSTX+ denotes an output of the connector.

3.1.5 SATA

The MPX-LS1043A module DOES NOT support SATA on the following connector. SATA is only available via the mSATA slot

Manufacturer:	3M
Type:	5607-4200-SH

The SATA connector has a standard layout.

Pin:	
1	GND
2	A+
3	A-
4	GND
5	B-
6	B+
7	GND

3.1.6 COM1

The first COM port is used for the debug interface. The serial port is converted to USB and therefore available on an USB mini connector.

115200 baud, 8N1

Manufacturer:	Würth Elektronik
Type:	651 005 161 21

Pin:	
1	Vbus+
2	D-
3	D+
4	ID
5	GND

3.1.7 COM2

The second COM port is available with TTL signals. In order to have RS-232, for example, additional transceivers are necessary. They are not implemented on the CRX05 carrierboard.

Manufacturer:	Würth Elektronik
Type:	648 106 131 822

Pin:	
1	+3.3V
2	RXD
3	TXD
4	RTS#
5	CTS#

Note: e.g. TXD denotes an output of the connector. RXD is an input to the module.

3.1.8 Micro-SD Card Slot

The EvalKit has a Micro-SD slot. It is a push-push type with top mount contacts. That means the Micro-SD card has to be inserted with its contacts facing downwards.

Manufacturer:	Yamaichi Electronics
Type:	PJS-008-2130-0

Pin:	
1	DAT2
2	CD/DAT3
3	CMD
4	+3.3V
5	CLK
6	GND
7	DAT0
8	DAT1
9	CD#

3.1.9 MCU Connector

The MCU connector is not intended for customer's use. For details please contact MicroSys.

Manufacturer:	Tag-Connect
Type:	TC2050-IDC-FP

Pin:	
1	Please contact MicroSys
2	
3	
4	
5	
6	
7	
8	
9	
10	

3.1.10 JTAG Connector

The JTAG connector provides JTAG signals. For interfacing standard debugger pinouts an additional adapter is necessary.

Manufacturer:	Tag-Connect
Type:	TC2050-IDC-FP

Pin:	
1	TMS
2	HRST#
3	+1,8V
4	TRST#
5	TDO
6	TCK
7	GND
8	PRST#
9	TDI
10	-

3.1.11 DVI-I

The MPX-LS1043A module DOES NOT support DVI/RGB

Manufacturer:	Yamaichi Electronics
Type:	DVIS-029T-002-BS1

Pin:	
1	TMDS2-
2	TMDS2+
3	Shield
4	TMDS4-
5	TMDS4+
6	DDC-SCL
7	DDC-SDA
8	Analog VSync
9	TMDS1-
10	TMDS1+
11	Shield
12	TMDS3-
13	TMDS3+
14	+5V
15	GND
16	Hotplug detect
17	TMDS0-
18	TMDS0+
19	Shield
20	TMDS5-
21	TMDS5+

22	Shield
23	TMDSCK+
24	TMDSCK-
C1	Analog Red
C2	Analog Green
C3	Analog Blue
C4	Analog HSync
C5	GND

3.1.12 PCIe Edge Card

The EvalKit has an optional connector for PCIe x1 edge cards. The slot has a standard PCIe layout for plug-in PCIe cards which do not need the 12V supply.

In case the 12V supply is necessary it has to be supplied directly to the card.

The EvalKit does not provide 12V to the optional PCIe Edge Card slot

The Edge Card connector is not populated by default

Manufacturer:	FCI
Type:	10025026-1

Pin:			Pin:
a1	PRSNT1#	+12V	b1
a2	+12V	+12V	b2
a3	+12V	+12V	b3
a4	GND	GND	b4
a5	TCK	SMCLK	b5
a6	TDI	SMDAT	b6
a7	TDO	GND	b7
a8	TMS	+3.3V	b8
a9	+3.3V	TRST#	b9
a10	+3.3V	+3.3V	b10
a11	PERST#	WAKE#	b11
a12	GND	RSVD1	b12
a13	REFCLK+	GND	b13
a14	REFCLK-	PET0+	b14
a15	GND	PET0-	b15
a16	PER0+	GND	b16
a17	PER0-	PRSNT2#	b17
a18	GND	GND	b18

3.1.13 PCIe Extension Connector

The PCIe Extension Connector provides the basic PCIe signals. Depending on the module and software configuration the data signals can also be used for other interfaces according to the SERDES configuration of the respective module.

Manufacturer:	Würth Elektronik
Type:	687 118 140 22

Pin:	
1	+3.3V
2	+3.3V
3	+3.3V
4	+1.5V
5	GND
6	REFCLK-
7	REFCLK+
8	GND
9	SRD-RX0-
10	SRD-RX0+
11	GND
12	SRD-TX0-
13	SRD-TX0+
14	GND
15	I2C-SCL
16	I2C-SDA
17	GND
18	PERST#

3.1.14 Mini-PCIe Slot

Manufacturer:	Tyco
Type:	2041119-1

Pin:			Pin:
1	WAKE#	+3.3Vaux	2
3	COEX1	GND	4
5	COEX2	+1.5V	6
7	CLKREQ#	UIM-PWR	8
9	GND	UIM-DAT	10
11	REFCLK-	UIM-CLK	12
13	REFCLK+	UIM-RST	14
15	GND	UIM-VPP	16
MECHANICAL KEY			
17	Reserved	GND	18
19	Reserved	WDIS#	20
21	GND	PERST#	22
23	PER0-	+3.3Vaux	24
25	PER0+	GND	26
27	GND	+1.5V	28
29	GND	SMB-CLK	30
31	PET0-	SMB-DAT	32
33	PET0+	GND	34
35	GND	USB-D-	36
37	GND	USB-D+	38
39	+3.3Vaux	GND	40
41	+3.3Vaux	LED-WWAN#	42
43	GND	LED_WLAN#	44

45	Reserved	LED_WPAN#	46
47	Reserved	+1.5V	48
49	Reserved	GND	50
51	Reserved	+3.3Vaux	52

3.1.15 Mini-PCIe Slot / mSATA Slot

The second slot can hold both mSATA cards and mPCIe cards. This depends on the SERDES configuration setup. The MPX-LS1043A module supports both card types, **but different software initializations are needed.**

Manufacturer:	Tyco
Type:	2041119-1

Pin:			Pin:
1	WAKE#	+3.3Vaux	2
3	COEX1	GND	4
5	COEX2	+1.5V	6
7	CLKREQ#	UIM-PWR	8
9	GND	UIM-DAT	10
11	REFCLK-	UIM-CLK	12
13	REFCLK+	UIM-RST	14
15	GND	UIM-VPP	16
MECHANICAL KEY			
17	Reserved	GND	18
19	Reserved	WDIS#	20
21	GND	PERST#	22
23	PER0+	+3.3Vaux	24
25	PER0-	GND	26
27	GND	+1.5V	28
29	GND	SMB-CLK	30
31	PET0-	SMB-DAT	32
33	PET0+	GND	34
35	GND	USB-D-	36
37	GND	USB-D+	38

39	+3.3Vaux	GND	40
41	+3.3Vaux	LED-WWAN#	42
43	GND	LED_WLAN#	44
45	Reserved	LED_WPAN#	46
47	Reserved	+1.5V	48
49	Reserved	GND	50
51	Reserved	+3.3Vaux	52

3.1.16 Aurora

The Aurora connectors are not populated by default

The Aurora interface is not supported by the MPX-LS1043A module

Manufacturer:	Samtec
Type:	ASP-137973-01

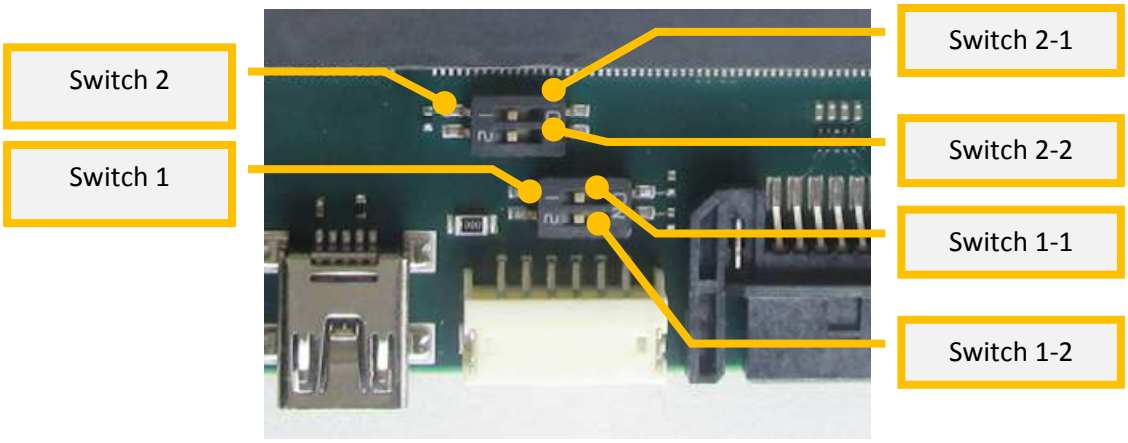
Pin:			Pin:
1	TX0+	VREF (1,8V)	2
3	TX0-	TCK	4
5	GND	TMS	6
7	TX1+	TDI	8
9	TX1-	TDO	10
11	GND	TRST#	12
13	TX2+	HALT#	14
15	TX2-	EVTI#	16
17	GND	EVTO#	18
19	TX3+	GEN_IO3	20
21	TX3-	RST#	22
23	GND	GND	24
25	TX4+	CLK+	26
27	TX4-	CLK-	28
29	GND	GND	30
31	TX5+	RDY#	32
33	TX5-	HRST#	34

The module standard does not provide all signals which are necessary for the Aurora interface. Additional signals are available on the following connector. For more information please contact MicroSys.

Manufacturer:	JST
Type:	SM06B-XSRS-ETB

Pin:	
1	HALT#
2	EVTI#
3	EVTO#
4	-
5	-
6	-

3.1.17 Switch 1 / Switch 2



The position of the switches may vary depending on the module mounted on the CRX05 carrierboard. Please refer to the module's manual for the correct boot mode settings

Switch 1: (settings for MPX-LS1043A module)

Boot Device	Switch 1-1	Switch 1-2
-	OFF	OFF
NAND boot	OFF	**ON**
µSD-Card boot	**ON**	OFF
-	**ON**	**ON**

In order to change the boot mode first set the switch to the correct position and then perform a power cycle

Switch 2:

2-1	**ON**	Watchdog enabled
	OFF	Watchdog disabled
2-2	**ON**	EEPROM on I2C1: address 0x57
	OFF	EEPROM on I2C1: address 0x55

4. Specification

4.1 Power Supply

The EvalKit requires a power supply with the following rating:

Voltage: **12 V DC, stabilized**, (+) on center pole of the connector, GND on shaft

Current: **min. 2 A**

4.2 Environmental Requirements:

Operating Temperature	0 ° C to +70 ° C
Relative Humidity	0 to 95 % (non-condensing)
Storage Temperature	-40 ° C to + 85 ° C

4.3 Hints for unpacking, handling and storing

- Avoid touching areas of integrated circuitry.
- Unit should only be placed on a static-free conductive surface
- Unit must only be transported using anti-static bags or MicroSys shipping carton
- Packing should be saved if unit needs to be reshipped or returned
- When the unit needs to be stored, it should be placed in a moist free, dust free environment. The storage temperatures and humidity specifications are shown in chapter 1

5. Installation

5.1 Items required for EvalKit operation

For operation of the EvalKit, the following items are required.

– Adequate power supply (see section 3.1 for ratings)

– Terminal output via USB cable (type A – mini B):

- **115200 baud**
- **8 databits**
- **no parity**
- **1 stop bit**

- For operation within a network (LAN): 1x RJ45 cable connected to local network
- Correct boot devices chosen (see section 3.1.17 for the position of the switches)
- Software prepared

5.2 Points to be observed

The operating temperature must never exceed its specified range.

GUARANTEE IS VOID IF UNIT IS OPERATED

OUT OF ITS SPECIFICATIONS!

5.3 Connections

- Connect a USB cable to COM1 connector.
- Connect a LAN cable to Port3 of LAN2 connector (RJ45).
- Connect the power supply to the Power Connector. The board starts automatically
- Launch the terminal with the settings mentioned under 5.4

5.4 Serial Console Parameters

When connecting to the serial port, use the following parameters:

Baudrate:	115200 Bd
Data Bits:	8
Parity:	None
Stop Bits:	1

6. Operation

6.1 Boot Options

The MPX-LS1043A module has two possible sources to boot from, which are selectable by switch 1

(see section 3.1.17)

On delivery, the unit is equipped with a U-Boot in NAND Flash. An additional µSD-Card with U-Boot and filesystem is also delivered.
By this measure, the other U-Boot not currently in use can always serve as a backup boot option, in case the default U-Boot should be destroyed for some reason.

6.2 Board startup

When power is supplied the system will start.

On startup, U-Boot will come up similar to the following:

*(**Note:** Exact output may vary, depending on U-Boot and MPX-LS1043 module versions in use.)*

```
U-Boot SPL 2015.01QorIQ-SDK-V1.7+g503273b (Mar 08 2016 - 15:16:10)
Initializing DDR....


U-Boot 2015.01QorIQ-SDK-V1.7+g503273b (Mar 08 2016 - 15:16:10)

Clock Configuration:
       CPU0(A53):1400 MHz  CPU1(A53):1400 MHz  CPU2(A53):1400 MHz
       CPU3(A53):1400 MHz
       Bus:      400  MHz  DDR:      1600 MT/s  FMAN:     700  MHz
Reset Configuration Word (RCW):
       00000000: 0810000e 0c000000 00000000 00000000
       00000010: 33550002 00000002 60040000 41002000
       00000020: 00000000 00000000 00000000 01036ffc
       00000030: 00000000 00181000 00000096 00000001
```

```
Board: MPXLS1043, boot from SD
I2C:   ready
DRAM:  Detected UDIMM Fixed DDR on board
1 GiB (DDR4, 32-bit, CL=11, ECC on)
Using SERDES1 Protocol: 13141 (0x3355)
fman_port_enet_if:71: port(FM1_DTSEC3) is OK
fman_port_enet_if:77: port(FM1_DTSEC4) is OK
Flash: 0 Bytes
NAND:  0 MiB
MMC:   FSL_SDHC: 0
PCIe1: disabled
PCIe2: Root Complex no link, regs @ 0x3500000
PCIe3: Root Complex x1 gen1, regs @ 0x3600000
     01:00.0    - 8086:08b3 - Network controller
PCIe3: Bus 00 - 01
In:    serial
Out:   serial
Err:   serial
Net:
MMC read: dev # 0, block # 2080, count 128 ...
Fman1: Uploading microcode version 106.4.15
FM1@DTSEC2, FM1@DTSEC3, FM1@DTSEC9
```

6.3 Linux

For detailed setup instructions, refer to the text document “linux-3.19.3-mpxls1043.txt” delivered in the "Linux" directory along with the unit!

7. Known Issues

There are currently no known issues.

8. Document History

Date	Version	Change Description
2016-06-27	First Edition	Initial Version