USER MANUAL

CPU-301-16
Development Kit

Rev 1 – August 2013 – 110127-50001

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Document Revision History

REVISION	DESCRIPTION	DATE
1	Initial release	August 2013

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Important User Information

In order to lower the risk of personal injury, electric shock, fire, or equipment damage, users must observe the following precautions as well as good technical judgment, whenever this product is installed or used.

All reasonable efforts have been made to ensure the accuracy of this document; however, Eurotech assumes no liability resulting from any error/omission in this document or from the use of the information contained herein.

Eurotech reserves the right to revise this document and to change its contents at any time without obligation to notify any person of such revision or changes.

Safety Notices and Warnings

The following general safety precautions must be observed during all phases of operation, service, and repair of this equipment. Failure to comply with these precautions or with specific warnings elsewhere in this manual violates safety standards of design, manufacture, and intended use of the equipment. Eurotech assumes no liability for the customer's failure to comply with these requirements.

The safety precautions listed below represent warnings of certain dangers of which Eurotech is aware. You, as the user of the product, should follow these warnings and all other safety precautions necessary for the safe operation of the equipment in your operating environment.

Installation in Enclosures

In the event that the product is placed within an enclosure, together with other heat generating equipment, ensure proper ventilation.

Do Not Operate in an Explosive Atmosphere

Do not operate the equipment in the presence of flammable gases or fumes. Operation of any electrical equipment in such an environment constitutes a definite safety hazard.

Alerts that can be found throughout this manual

The following alerts are used within this manual and indicate potentially dangerous situations.

Danger, electrical shock hazard:
Information regarding potential electrical shock hazards:
- Personal injury or death could occur. Also damage to the system, connected peripheral devices, or software could occur if the warnings are not carefully followed.
- Appropriate safety precautions should always be used, these should meet the requirements set out for the environment that the equipment will be deployed in.

Warning:
Information regarding potential hazards:
- Personal injury or death could occur. Also damage to the system, connected peripheral devices, or software could occur if the warnings are not carefully followed.
- Appropriate safety precautions should always be used, these should meet the requirements set out for the environment that the equipment will be deployed in.

Information and/or Notes:
These will highlight important features or instructions that should be observed.

Use an Appropriate Power Supply

- Only start the product with a power supply that conforms to the voltage requirements as specified in Power Supply, page 29. In case of uncertainty about the required power supply, please contact your local Eurotech Technical Support Team.
- Avoid overcharging power-points.

Antistatic Precautions

To avoid damage caused by ESD (Electro Static Discharge), always use appropriate antistatic precautions when handing any electronic equipment.

Life Support Policy

Eurotech products are not authorized for use as critical components in life support devices or systems without the express written approval of Eurotech.

Warranty

For Warranty terms and conditions users should contact their local Eurotech Sales Office.
See Eurotech Worldwide Presence, page 33 for full contact details.

WEEE

The information below is issued in compliance with the regulations as set out in the 2002/96/EC directive, subsequently superseded by 2003/108/EC. It refers to electrical and electronic equipment and the waste management of such products. When disposing of a device, including all of its components, subassemblies, and materials that are an integral part of the product, you should consider the WEEE directive.

This device is marketed after August 13, 2005 and you must separate all of its components when possible and dispose of them in accordance with local waste disposal legislations.

- Because of the substances present in the equipment, improper use or disposal of the refuse can cause damage to human health and to the environment.
- With reference to WEEE, it is compulsory not to dispose of the equipment with normal urban refuse and arrangements should be instigated for separate collection and disposal.
- Contact your local waste collection body for more detailed recycling information.
- In case of illicit disposal, sanctions will be levied on transgressors.

RoHS

This device, including all its components, subassemblies and the consumable materials that are an integral part of the product, has been manufactured in compliance with the European directive 2002/95/EC known as the RoHS directive (Restrictions on the use of certain Hazardous Substances). This directive targets the reduction of certain hazardous substances previously used in electrical and electronic equipment (EEE).

Technical Assistance

If you have any technical questions, cannot isolate a problem with your device, or have any enquiry about repair and returns policies, contact your local Eurotech Technical Support Team.

See Eurotech Worldwide Presence, page 33 for full contact details.

Transportation

When transporting any module or system, for any reason, it should be packed using anti-static material and placed in a sturdy box with enough packing material to adequately cushion it.

> **Warning:**
> Any product returned to Eurotech that is damaged due to inappropriate packaging will not be covered by the warranty.

Conventions

The following table describes the conventions for signal names used in this document.

Convention	Explanation
GND	Digital ground plane
#	Active low signal
_P	Positive signal in differential pair
_N	Negative signal in differential pair

The following table describes the abbreviations for direction and electrical characteristics of a signal used in this document.

Type	Explanation
I	Signal is an input to the system
O	Signal is an output from the system
IO	Signal may be input or output
P	Power and ground
2.5	2.5 V signal level
3.3	3.3 V signal level
5	5 V signal level
A	Analog signal
HDMI	Compliant with High-Definition Multimedia Interface Specification
LVDS	Low Voltage Differential Signalling
MIPI	Compliant with MIPI Specification
NC	No Connection
OD	Open-drain
PCIe	Compliant with PCI Express v2.0 Specification
Reserved	Use is reserved to Eurotech
SATA	Compliant with SATA-2 Specification
USB	Compliant with Universal Serial Bus 2.0 Specification

Some signals include termination on the CPU-301-16 or carrier board. The following table describes the abbreviations that specify the signal termination.

Termination	Explanation
PU	Pull-up resistor to the specified voltage
PD	Pull-down resistor
R	Series resistor
C	Series capacitor

Product Overview

The CPU-301-16 Development Kit provides a development platform for the CPU-301-16 and a reference for custom carrier board design. The kit consists of the following components:

- CPU-301-16 with CPU-301-16 Development Kit carrier board
- 10.4-inch TFT LCD with SVGA resolution (800 x 600, 6-bit color) and cable
- CCFL backlight inverter and cable
- 4-wire resistive touch panel and cable
- SD card
- 12 VDC adapter and AC cord
- Plexiglas mounting

Please make sure you have received all the components before you begin your development. For details about getting started, refer to the *CPU-301-16 Development Kit Quick Start (Eurotech document #110127-5001).*

As a development platform, this kit allows you to become familiar with the CPU-301-16 functionality prior to customization for your specific application. Utilize the development kit to validate your proposed design for both software and hardware. This type of testing also allows you to validate your operating system image with all required drivers loaded.

To provide flexibility and allow development across a broad spectrum of end-use applications, the CPU-301-16 Development Kit carrier board maximizes the CPU-301-16 functionality and implements many industry-standard interfaces. This configuration provides a valuable reference for your application-specific carrier board. Use Eurotech's carrier board as a starting point for your design. Using the same connectivity to the module and the same components will minimize the time spent in debugging your new design.

In addition to the CPU-301-16 Development Kit, Eurotech provides a variety of services to ensure that your CPU-301-16-based product is up and running from the first prototype release. Stay in contact with your sales and support representatives throughout your development cycle to ensure a complete and robust solution with which to move forward.

Block Diagram

The following diagram illustrates the system organization of the CPU-301-16 Development Kit. Functionality provided by the CPU-301-16 is included in the dark blue section, while functionality provided by the carrier board is included in the light blue-gray section. Dotted lines indicate options.
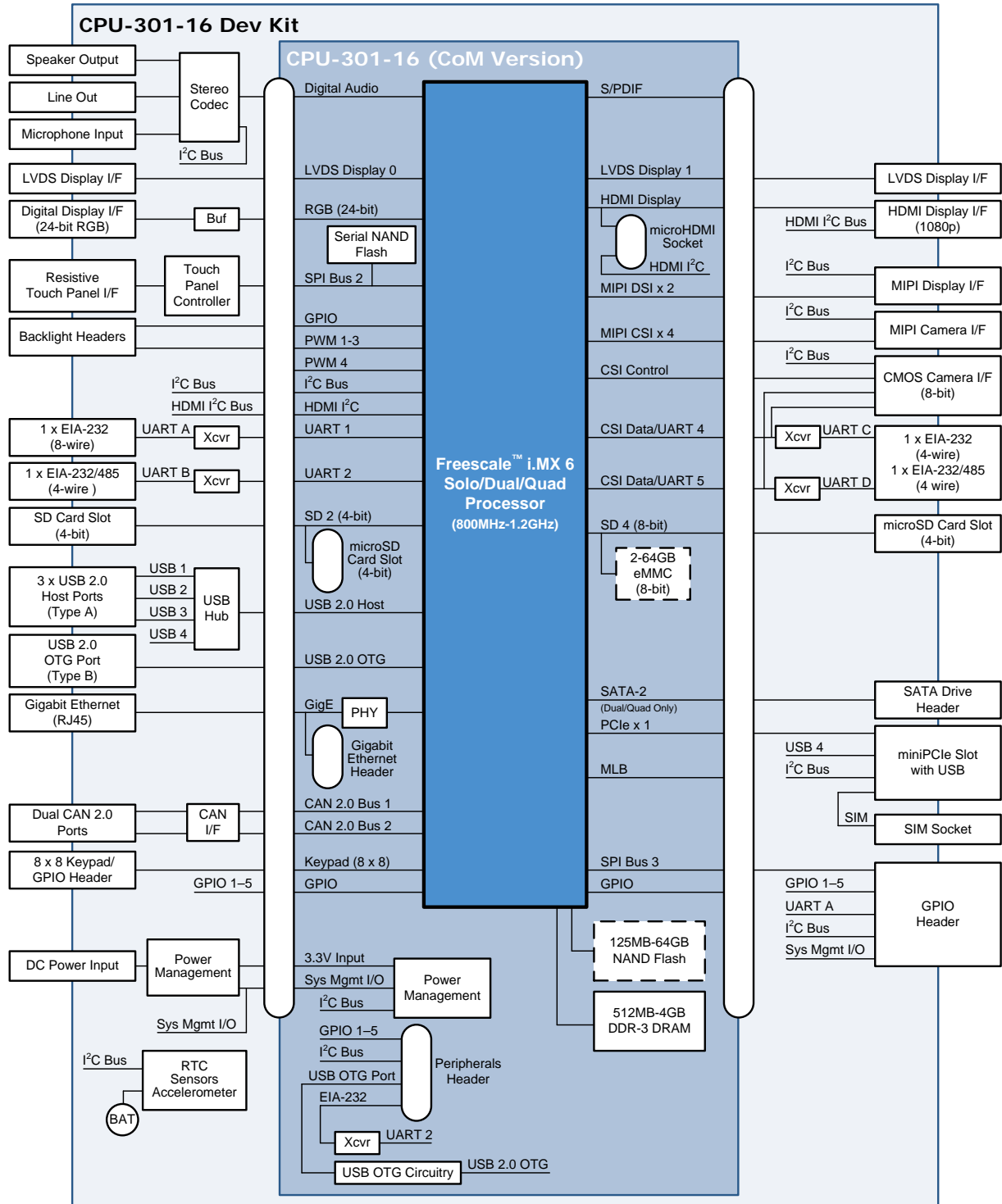

Figure 1.   CPU-301-16 Development Kit Block Diagram

Features

The following table describes the features of the CPU-301-16 Development Kit and how the design partitions these features across the CPU-301-16 and carrier board.

Feature	CPU-301-16	Carrier Board
Processor	Freescale™ i.MX 6Solo, Freescale™ i.MX 6DualLite, Freescale™ i.MX 6Dual, or Freescale™ i.MX 6Quad	Boot mode configuration switches
On-board Memory	DDR-3 DRAM (512MB–4GB) RAW NAND flash device (125MB–64GB) eMMC flash device (2GB–64GB)	
Serial ATA (SATA)	SATA bus (i.MX 6Dual/6Quad)	SATA header with AC coupling and ESD protection
Secure Digital (SD)	SD interface (8-bit) SD interface (4-bit)	microSD socket (4-bit) with power switch SD socket (4-bit) with power switch
PCI Express (PCIe)	PCIe one lane port	Mini PCIe socket (PCIe, I^2C, USB, SIM, LEDs) with AC coupling
Universal Serial Bus (USB)	USB 2.0 host port signals USB 2.0 OTG port signals	USB Hub providing 4 USB host ports 3 x USB 2.0 host socket (USB Type A) with host power supply, current limiter, and over-voltage protection (optional USB host headers) 1 x USB 2.0 OTG port socket (Mini USB Type B) with EMI/ESD protection
Serial Ports	Up to four TTL-level serial ports: 8-wire 4-wire Up to two 4-wire (shared with CMOS Camera)	EIA-232 and EIA-485 transceivers 1 x EIA-232 header, 8-wire (shared with debug port on GPIO header) 1 x EIA-232/485 header, 4-wire 1 x EIA-232 and EIA-232/485 header,4-wire (shared with CMOS Camera)
Ethernet	Gigabit Ethernet with physical layer transceiver	RJ-45 socket with built-in magnetics, integrated termination, and status LEDs
Controller Area Network (CAN)	2 x CAN 2.0 bus signals	2 x CAN 2.0 bus headers with level translator, transceiver, common mode filter, and ESD protection
I^2C Bus	General-purpose I^2C bus with bus master HDMI I^2C bus with bus master	On-board I^2C devices and external connection on GPIO header Included on HDMI Micro socket
SPI Bus	General-purpose SPI bus with bus master	External connection on GPIO header
Display	Support for up to two (i.MX 6Solo/6Dual Lite) or four (i.MX 6Dual/6Quad) simultaneous displays Digital (16-, 18-, or 24-bit RGB) Two LVDS (18- or 24-bit) HDMI v1.4 MIPI DSI, two lanes Backlight control signals	Digital display header with buffers, power switch, termination, and EMI protection 2 x LVDS display headers with power switch and EMI/ESD protection HDMI Micro socket with HDMI Transmitter Port Protection and Interface device MIPI DSI header with EMI/ESD protection 3 x backlight headers for intensity and on/off
Camera Sensors	CMOS Camera (8-bit) MIPI CSI, four lanes	CMOS Camera header with level translator for clock signal and ESD protection MIPI Camera header with level translator for I^2C bus and EMI/ESD protection
User Interface	Touch panel controller SPI bus with bus master 8 x 8 Keypad/GPIO signals	Touch panel header with touch panel controller 8x8 keypad/GPIO header with termination and ESD protection 3 x buttons (Reset, Sleep, and User) 3 x LEDs

Feature	CPU-301-16	Carrier Board
Audio	Digital audio CODEC interface Sony Philips Digital Interconnect Format (S/PDIF)	Stereo CODEC with supporting circuitry for Line output header Speaker header Microphone header
GPIO	5 x GPIO	GPIO header with termination and ESD protection GPIO expansion for LED control
System Monitoring		Temperature, voltage, and current sensors Accelerometer Real-time clock and battery
Power Supply	3.3 V main power input supplied by carrier board Integrated power management	12 V main power input supplied by 100-240 VAC power adapter On-board power supplies and power management Power state LED

Table 1.   CPU-301-16 Development Kit Features

Related Documents

This manual describes the connectivity of Eurotech's carrier board and is intended for software application developers and system integrators.

For instructions to use the development kit, refer to the *CPU-301-16 Development Kit Quick Start (Eurotech #110125-5001).*

For detailed information about the CPU-301-16, refer to the *CPU-301-16 Design-In Guide. (Eurotech #110127-4000).*

Check the Eurotech support site (http://support.eurotech-inc.com/) for errata reports and for the latest releases of these documents.

Connectors, Switches, Jumpers, and Indicators

Identifying Connectors

The following diagram illustrates the location and numbering of the connectors on the carrier board. The CPU-301-16 mates to two docking connectors, J1 and J2, which lie under the module when installed.
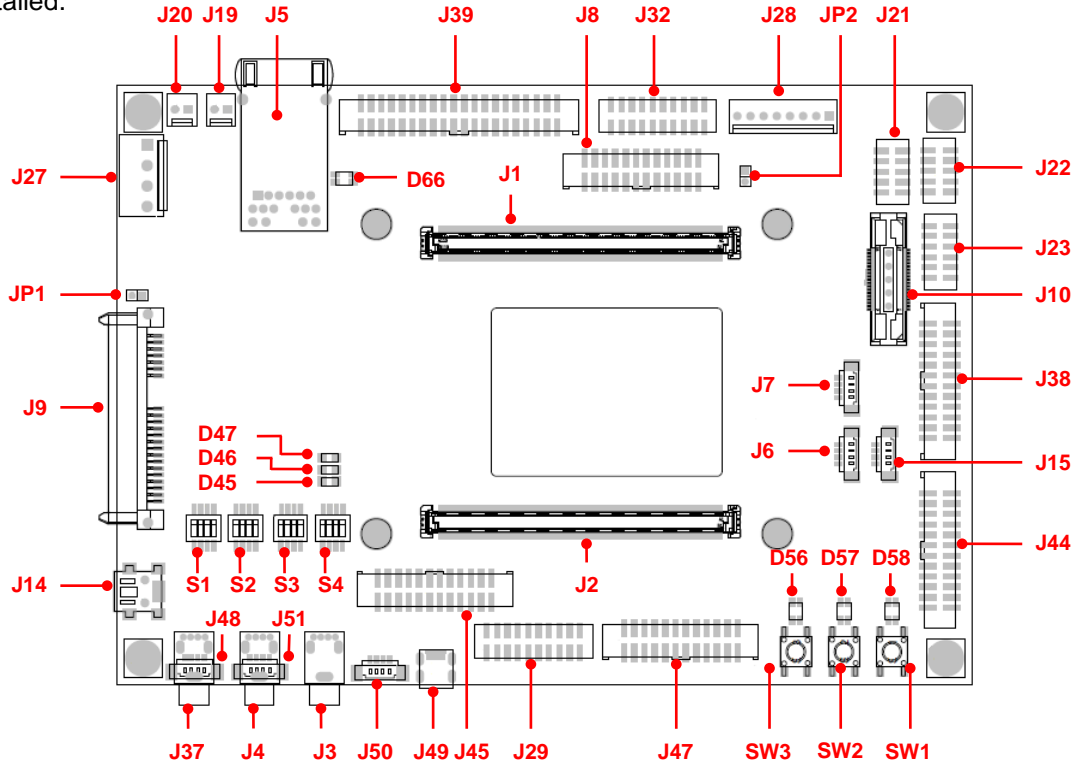
Figure 2.   Connector Location, Top View
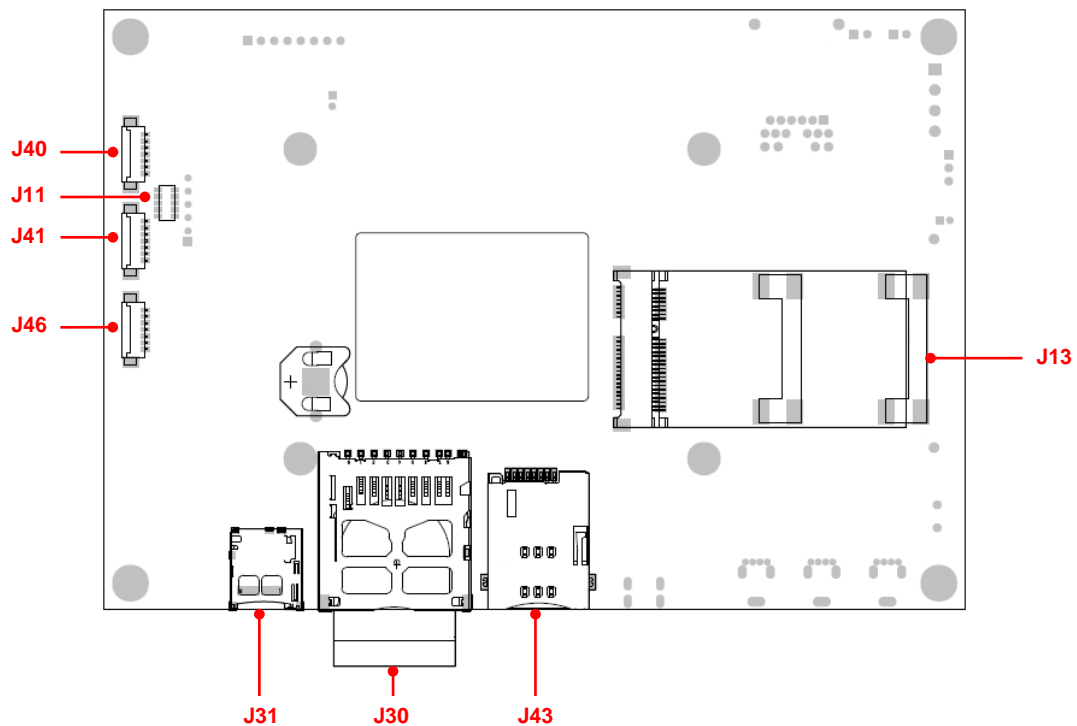
Figure 3.   Connector Location, Bottom View

Switches, Indicators, and Jumpers

This section describes various switches, indicators, and jumpers on the carrier board.

Boot Configuration

S1–S4: Boot Configuration Switches

The configuration switches on the carrier board are used to select a specific boot device using the processor's BOOT_CFG signals when the module is configured for Internal Boot mode. Two jumpers located on the CPU-301-16 module select the boot mode. For a detailed explanation of Boot Mode Configuration, refer to the *CPU-301-16 Design-In Guide*.

The following table describes the mapping of the BOOT_CFG signals to the configuration switches. When the switch is in an open position, the BOOT_CFG signal is a low logic-level. When the switch is in a closed position, the BOOT_CFG signal is a high logic-level.

Switch	Boot Configuration Signal Name
S1 1	BOOT_CFG1_0
S1 2	BOOT_CFG1_1
S1 3	BOOT_CFG1_2
S1 4	BOOT_CFG1_3
S2 1	BOOT_CFG1_4
S2 2	BOOT_CFG1_5
S2 3	BOOT_CFG1_6
S2 4	BOOT_CFG1_7
S3 1	BOOT_CFG2_0
S3 2	BOOT_CFG2_1
S3 3	BOOT_CFG2_2
S3 4	BOOT_CFG2_3
S4 1	BOOT_CFG2_4
S4 2	BOOT_CFG2_5
S4 3	BOOT_CFG2_6
S4 4	BOOT_CFG2_7

Table 2.   Boot Configuration Switches

Default Boot Configuration Setting

The following BOOT CFG signals are set by populating various on-board resistors. The following table describes the default setting. If your application requires different settings, contact your local Eurotech representative.

Boot Configuration Signal Name	Logic-level
BOOT_CFG4_0	High
BOOT_CFG4_1	Low
BOOT_CFG4_2	Low
BOOT_CFG4_3	Low
BOOT_CFG4_4	High
BOOT_CFG4_5	Low
BOOT_CFG4_7	Low

Table 3.   Default Boot Configuration Settings

The following diagram shows the carrier board reference DIP switch settings by boot source.

SD2

S1   S2   S3   S4

SD4

S1   S2   S3   S4

eMMC

S1   S2   S3   S4
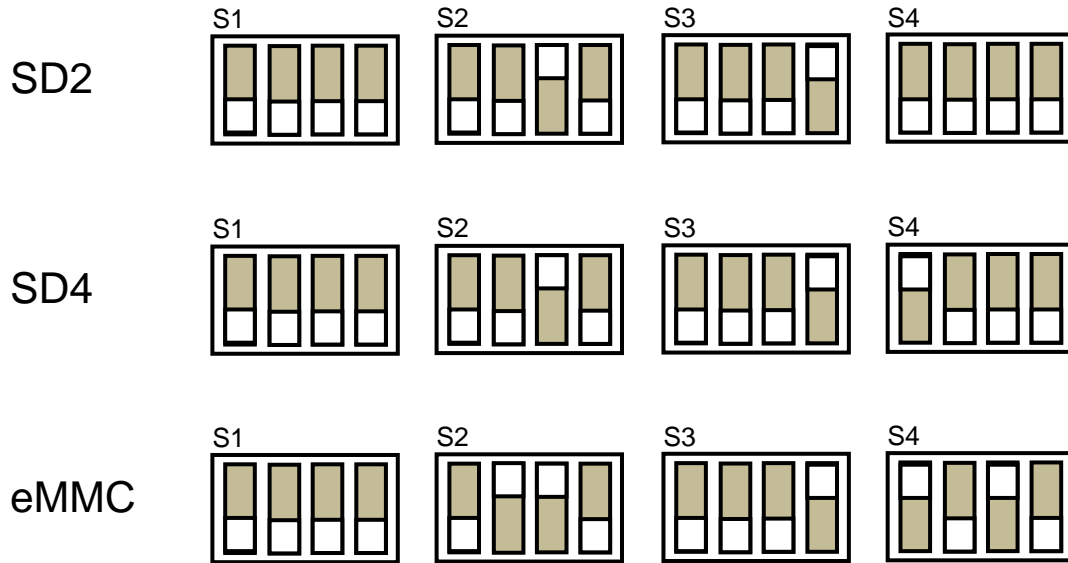
Figure 4.   Carrier Board Reference Dip Switch Settings

Carrier Board Switches

SW1: Reset

SW1 is the reset button for the CPU-301-16 Development Kit. Pressing SW1 initiates a hardware reset of module circuitry including the processor. Press this button to restart the system without cycling power.

SW2: Sleep

SW2 is the sleep button for the CPU-301-16 Development Kit.

SW3: Button

SW3 is a general-purpose button for the CPU-301-16 Development Kit. The output is connected to GPIO6_IO3/GPIO_BUTTON (CPU-301-16 module J1 B30).

Carrier Board LED Indicators

D56: GPIO-controlled LED

The carrier board includes one general-purpose red/green light-emitting diode (LED) that is controlled by GPIO signals from the CPU-301-16 module. The following table describes the mapping of the control signals to the LEDs.

LED	Input	Control Signal
D56	Red	GPIO5_IO16/GPIO_LED_RED (J1 B58)
	Green	GPIO7_IO2/GPIO_LED_GRN (J1 B59)

D57 and D58: I^2C bus-controlled LEDs

The carrier board includes two general-purpose red/green light-emitting diodes (LEDs) that are software-controlled using the I^2C bus. For the I^2C bus address, see General-Purpose I^2C Bus Addresses, page 30. The following table describes the mapping of the control signals to the LEDs.

LED	Input	Control Signal
D57	Red	GPIO Expansion Output 0
	Green	GPIO Expansion Output 1
D58	Red	GPIO Expansion Output 2
	Green	GPIO Expansion Output 3

D66: Power/Sleep LED

The Power/Sleep LED indicates the operational mode and power status as described in the following table.

Color	Mode	Power Status
Green	Run	Power on
Red	Sleep	Power on

D45–D47: Mini PCIe 0 Status LEDs

The three Mini PCIe Status LEDs indicates network connectivity as described in the following table.

LED	Type	Description
D45	Green	Indicates Wireless Personal Area Network (WPAN)
D46	Green	Indicates Wireless Local Area Network (WLAN)
D47	Green	Indicates Wireless Wide Area Network (WWAN)

Ethernet LEDs

The LED on the left side of Ethernet socket J5 indicates connection as follows.

Operation	Speed (Mbps)
On	On indicates an active link
Off	No link

The LED on the right side of Ethernet socket J5 indicates connection and activity as follows.

Operation	Link/Activity
On	Blinking indicates Ethernet activity
Off	No activity

Carrier Board Jumpers

JP1: 5V

Type: 2-post header, 2 mm

Jumper JP1 is reserved for future use.

JP2: Touch Panel Configuration Jumper

Type: 2-post header, 2 mm

Jumper JP2 configures the development kit for support of 4-, 5- and 8-wire touch panels as follows.

Jumper Setting	Configuration
1-2	5-wire only support
NC	4- and 8-wire support (default)

Signal Headers

The following tables describe the electrical signals available on the connectors of the carrier board. Each section provides relevant details about the connector including part numbers, mating connectors, signal descriptions, and references to related sections.

For the location of the connectors, see Identifying Connectors, page 12.

J1: Docking Connector

The CPU-301-16 connector J1 mates to the carrier board connector J1. For details about this connector, refer to the *CPU-301-16 Design-In Guide 110127-4000.*

J2: Docking Connector

The CPU-301-16 connector J2 mates to the carrier board connector J2. For details about this connector, refer to the *CPU-301-16 Design-In Guide 110127-4000.*

J3: USB Host 1

Board connector: USB Type A receptacle, Molex 89485-8000
Mating connector: USB Type A plug

The USB socket J3 provides USB Host 1 supporting the USB 2.0 specification at High Speed (480 Mbps). The connector shield is tied to chassis ground. USB Host 1 is also available on header J50, page 28.

J4: USB Host 2

Board connector: USB Type A receptacle, Molex 89485-8000
Mating connector: USB Type A plug

The USB socket J4 provides USB Host 2 supporting the USB 2.0 specification at High Speed (480 Mbps). The connector shield is tied to chassis ground.

J5: Gigabit Ethernet

Board connector: RJ-45 socket with LEDs, Pulse Engineering JK0-0136NL
Mating connector: RJ-45 plug

Socket J5 provides a direct connection to a Gigabit Ethernet network for 10Base-T, 100Base-TX, and 1000Base-T applications. The connector shield is tied to chassis ground.

J6: Line Out

Board connector: 1x4 shrouded header, 1.25 mm, Molex 53398-0471
Mating connector: Molex 51021-0400 series housing

Header J6 provides a stereo line output.

Pin	Name	Type	Description
1	LINE_OUT_L	AO	Line out 1, left channel
2	LINE_OUT_SENSE	AI	Sense
3	LINE_OUT_R	AO	Line out 1, right channel
4	AUD_AGND2	P	Audio ground

J7: Microphone

Board connector: 1x4 shrouded header, 1.25 mm, Molex 53398-0471
Mating connector: Molex 51021-0400 series housing

Header J7 provides connection to a microphone.

Pin	Name	Type	Description
1	MIC_IN_L	AI	Microphone, left channel
2	AUD_AGND3	P	Audio ground
3	MIC_IN_R	AI	Microphone, right channel
4	AUD_AGND1	P	Audio ground

J8: Keypad

Board connector: 2x12 shrouded header, 2.00 mm, Samtec STMM-112-02-T-D-SM
Mating connector: Samtec TCSD series IDC cable assembly socket

The CPU-301-16 Development Kit provides sixteen signals that can be used to support an 8x8 keypad or as general-purpose inputs and outputs (GPIO). These keypad/GPIO signals are available on connector J8.

Pin	Name	Type	Description
1	GND	P	Ground
2	KP_COL0_OUT	IO	Keypad, Column 0
3	KP_ROW0_OUT	IO	Keypad, Row 0
4	KP_COL1_OUT	IO	Keypad, Column 1
5	KP_ROW1_OUT	IO	Keypad, Row 1
6	KP_COL2_OUT	IO	Keypad, Column 2
7	KP_ROW2_OUT	IO	Keypad, Row 2
8	KP_COL3_OUT	IO	Keypad, Column 3
9	KP_ROW3_OUT	IO	Keypad, Row 3
10	KP_COL4_OUT	IO	Keypad, Column 4
11	GND	P	Ground
12	GND	P	Ground
13	KP_ROW4_OUT	IO	Keypad, Row 4
14	KP_COL5_OUT	IO	Keypad, Column 5
15	KP_ROW5_OUT	IO	Keypad, Row 5
16	KP_COL6_OUT	IO	Keypad, Column 6
17	KP_ROW6_OUT	IO	Keypad, Row 6
18	KP_COL7_OUT	IO	Keypad, Column 7
19	KP_ROW7_OUT	IO	Keypad, Row 7
20	GND	P	Ground
21	GND	P	Ground
22	NC		
23	V_3P3V_SW	PO	Switched 3.3V
24	V_3P3V_SW	PO	Switched 3.3V

J9: SATA

Board connector: 22-position receptacle, 1.27 mm, FCI 10029364-001LF
Mating connector: SATA plug

Header J9 provides connection to a SATA disk drive supporting the Serial ATA II Specification with data transfer rates of up to 3.0 Gbps.

J10: JTAG, CMOS Camera, and GPIO

Board connector: 38-position, MICTOR receptacle, 0.025 inch, AMP 2-5767004-2
Mating connector: AMP MICTOR plug

The CPU-301-16 Development Kit provides a full IEEE1149.1 JTAG port, connection to the CMOS Camera signals, and several GPIO on connector J10.

Pin	Name	Type	Description	(Note 1)
1	NC		No connection	
2	NC		No connection	
3	NC		No connection	
4	NC		No connection	
5	GND	P	Ground	
6	CSI_DATA_EN	O	CMOS Camera, Data enable	J2 B12
7	PULLDN1		Pulldown resistor, 4.7kΩ	
8	PULLDN2		Pulldown resistor, 4.7kΩ	
9	JTAG_RST#	I	JTAG, Reset	J1 A23
10	PULLDN3		Pulldown resistor, 4.7kΩ	
11	JTAG_TDO	O	JTAG, Test Data Out	J1 A26
12	PULLUP1		Pullup resistor, 4.7kΩ to 3.3V	
13	PULLDN4		Pulldown resistor, 10kΩ	
14	PULLUP2		Pullup resistor, 4.7kΩ to 3.3V	
15	JTAG_TCK	I	JTAG, Test Clock	J1 A27
16	UART1_TXD	O	Serial 1, Transmit Data	J1 A6
17	JTAG_TMS	I	JTAG, Test Mode Select	J1 A24
18	KP_ROW7	IO	Keypad, Row 7	J1 B40
19	JTAG_TDI	I	JTAG, Test Data In	J1 A25
20	KP_COL7	IO	Keypad, Column 7	J1 A40
21	JTAG_TRST#	I	JTAG, Test Reset	J1 A22
22	KP_ROW6	IO	Keypad, Row 6	J1 B39
23	UART5_RTS_CSI_DAT18	O	Serial 5, Request To Send / CMOS Camera, Data 18	J2 A18
24	GPIO_USR_0 (GPIO5_IO3)	IO	General user I/O	J1 A54
25	UART4_CTS_CSI_DAT17	I	Serial 4, Clear To Send / CMOS Camera, Data 17	J2 A17
26	KP_ROW5	IO	Keypad, Row 5	J1 B38
27	UART4_RTS_CSI_DAT16	O	Serial 4, Request To Send / CMOS Camera, Data 16	J2 A16
28	GPIO5_IO1/GPIO_nUSB_RST	IO	External USB Hub reset	J1 A52
29	UART5_RXD_CSI_DAT15	I	Serial 5, Receive Data / CMOS Camera, Data 15	J2 A15
30	PULLDN5		Pulldown resistor, 4.7kΩ	
31	UART5_TXD_CSI_DAT14	O	Serial 5, Transmit Data / CMOS Camera, Data 14	J2 A14
32	PULLDN6		Pulldown resistor, 4.7kΩ	
33	UART4_RXD_CSI_DAT13	I	Serial 4, Receive Data / CMOS Camera, Data 13	J2 A13
34	PULLUP3		Pullup resistor, 4.7kΩ to 3.3V	
35	UART4_TXD_CSI_DAT12	O	Serial 4, Transmit Data / CMOS Camera, Data 12	J2 A12
36	CSI_HSYNC	O	CMOS Camera, Horizontal sync	J2 B13
37	UART1_RXD	I	Serial 1, Receive Data	J1 A4
38	CSI_VSYNC	O	CMOS Camera, Vertical sync	J2 B14

Notes:
1. Signals connect directly to the docking connectors specified.

J11: JTAG (Option)

Board connector: 2x5 socket strip, 0.05 inch, Samtec CLP-105-02-L-D-A
Mating connector: Terminal strip

As an option, header J11 can be populated to provide a JTAG connection.

Pin	Name	Type	Description
1	JTAG_RST#	I	JTAG, Reset
2	JTAG_TRST#	I	JTAG, Test Reset
3	JTAG_TMS	I	JTAG, Test Mode Select
4	GND	P	Ground
5	JTAG_TCK	I	JTAG, Test Clock
6	GND	P	Ground
7	JTAG_TDI	I	JTAG, Test Data In
8	GND	P	Ground
9	JTAG_TDO	O	JTAG, Test Data Out
10	V_3P3V	PO	3.3V

J13: Mini PCIe (x1)

Board connector: 52-pin MiniCard, Molex 67910-0001
Mating connector: Mini PCIe card

Socket J13 provides a direct PCIe v2.0, on lane connection to the CPU-301-16 module. The socket accepts Mini PCIe x1 cards and supports a SIM card interface (J43, page 25).

J15: Speaker

Board connector: 1x4 shrouded header, 1.25 mm, Molex 53398-0471
Mating connector: Molex 51021-0400 series housing

Header J15 provides the connection to a stereo line output capable of driving powered speakers.

Pin	Name	Type	Description
1	SPKR_OUT_R_P	AO	Speaker, right channel positive
2	SPKR_OUT_R_N	AO	Speaker, right channel negative
3	SPKR_OUT_L_P	AO	Speaker, left channel positive
4	SPKR_OUT_L_N	AO	Speaker, left channel negative

J14: USB OTG

Board connector: Mini USB Type B receptacle, FCI 10033526-N3215LF
Mating connector: Mini USB Type B plug

The USB socket J14 provides a USB OTG port supporting the USB 2.0 specification at High Speed (480 Mbps). USB functionality is automatically selected by the state of the OTG_ID pin in the cable connection. Generic devices automatically drive the OTG_ID pin to ground to cause the port to assume Host functionality. External host port connections must leave this pin open to cause this port to assume Client functionality.

The connector shield is tied to chassis ground.

J19: CAN

Board connector: 2-pin header, 0.1-inch, Molex 22-23-2021
Mating connector: crimp housing, Molex 22-01-2021

Header J19 supplies a CAN bus supporting the CAN 2.0B Protocol Specification with bit rates up to 1 Mbps.

Pin	Name	Type	Description
1	CAN1_H_OUT	IO	CAN 1
2	CAN1_L_OUT		

J20: CAN

Board connector: 2-pin header, 0.1-inch, Molex 22-23-2021
Mating connector: crimp housing, Molex 22-01-2021

Header J20 supplies a CAN bus supporting the CAN 2.0B Protocol Specification with bit rates up to 1 Mbps.

Pin	Name	Type	Description
1	CAN2_H_OUT	IO	CAN 2
2	CAN2_L_OUT		

J21: Serial A

Board connector: 2x5 header, 2 mm, Molex 87832-1006
Mating connector: Molex 87568 series wire-to-board IDT housing

Header J21 supports a full-feature EIA-232 serial port.

Pin	Name	Type	Description
1	DCD_A	I	Data Carrier Detect
2	DSR_A	I	Data Set Ready
3	RXD_A	I	Receive Data
4	RTS_A	O	Request To Send
5	TXD_A	O	Transmit Data
6	CTS_A	I	Clear To Send
7	DTR_A	O	Data Terminal Ready
8	RI_A	I	Ring Indicator
9	GND	P	Ground
10	NC		

J22: Serial B

Board connector: 2x5 header, 2 mm, Molex 87832-1006
Mating connector: Molex 87568 series wire-to-board IDT housing

Header J22 supports an EIA-232/485 serial port.

Pin	Name	Type	Description	
			EIA-232	EIA-485
1	NC			
2	NC			
3	RXD_485RXN_B	I	Receive Data	Inverting Receive Data
4	RTS_485TXP_B	O	Request To Send	Non-inverting Transmit Data
5	TXD_485TXN_B	O	Transmit Data	Inverting Transmit Data
6	CTS_485RXP_B	I	Clear To Send	Non-inverting Receive Data
7	NC			
8	NC			
9	GND	P	Ground	Ground
10	NC			

J23: Serial C and Serial D

Board connector: 2x6 header, 2 mm, Molex 87832-1222
Mating connector: Molex 87568 series wire-to-board IDT housing

Header J23 supports a 4-wire EIA-232 serial port and an EIA-232/485 serial port.

Pin	Name	Type	Description	
			EIA-232	EIA-485
1	RXD_D	I	Receive Data	
2	RTS_D	O	Request To Send	
3	TXD_D	O	Transmit Data	
4	CTS_D	I	Clear To Send	
5	GND	P	Ground	Ground
6	GND	P	Ground	Ground
7	RXD_485RXN_C	I	Receive Data	Inverting Receive Data
8	RTS_485TXP_C	O	Request To Send	Non-inverting Transmit Data
9	TXD_485TXN_C	O	Transmit Data	Inverting Transmit Data
10	CTS_485RXP_C	I	Clear To Send	Non-inverting Receive Data
11	GND	P	Ground	Ground
12	GND	P	Ground	Ground

J27: DC Power Input

Board connector: 1x4 header, 3.96 mm, AMP 1-1318300-4
Mating connector: AMP 1-1123722-4 crimp housing

Header J27 accepts +12 VDC input power from an external supply such as the AC power adapter included with the CPU-301-16 Development Kit.

Pin	Name	Type	Description
1	GND	P	Ground
2	GND	P	Ground
3	V_IN	PI	Input power (12 V nominal)
4	V_IN	PI	Input power (12 V nominal)

Warning:
Disconnect the power input before removing the module. Removing the module from a powered carrier board may result in damage to both the carrier board and to the module.

J28: Touch Panel (8-wire)

Board connector: 8-pin header, 2.54 mm, Molex 22-11-2082
Mating connector: Molex 22-01-2087 crimp housing

Header J28 supports an 8-wire touch panel. Standard CPU-301-16 Development Kits include a 4-wire touch panel.

Pin	Name	Type	8-Wire	Description
1	MX_LL	AIO	Left	
2	PX_UR	AIO	Right	
3	PY_UL	AIO	Bottom	
4	MY_LR	AIO	Top	Touch panel
5	SXM	AIO	Left sense	
6	SXP	AIO	Right sense	
7	SYM	AIO	Top sense	
8	SYP	AIO	Bottom sense	

J29: LVDS Display 1

Board connector: 2x10 shrouded header, 2.00 mm, Molex 87832-2020
Mating connector: Molex 87568 series wire-to-board IDT housing

Header J29 provides connection to a LVDS display.

Pin	Name	Type	Description
1	V_LVDS1_PWR	PO	Software-controlled 3.3 V
2	V_LVDS1_PWR	PO	Software-controlled 3.3 V
3	LVDS1_OUT_TX0_N	O	LVDS data 0, negative
4	GND	P	Ground
5	GND	P	Ground
6	LVDS1_OUT_TX0_P	O	LVDS data 0, positive
7	LVDS1_OUT_TX1_P	O	LVDS data 1, positive
8	LVDS1_OUT_TX1_N	O	LVDS data 1, negative
9	LVDS1_OUT_TX2_N	O	LVDS data 2, negative
10	GND	P	Ground
11	GND	P	Ground
12	LVDS1_OUT_TX2_N	O	LVDS data 2, negative
13	LVDS1_OUT_CLK_P	O	LVDS clock, positive
14	LVDS1_OUT_CLK_N	O	LVDS clock, negative
15	GND	P	Ground
16	GND	P	Ground
17	LVDS1_OUT_TX3_N	O	LVDS data 3, negative
18	LVDS1_OUT_TX3_P	O	LVDS data 3, positive
19	GND	P	Ground
20	GND	P	Ground

J31: microSD Card

Board connector: microSD card socket, Molex 502570-0893
Mating connector: microSD card

The CPU-301-16 Development Kit provides a microSD card (4-bit) socket on J31 for memory and I/O expansion. Power (3.3 V only) to this socket is software-controlled.

J30: SD Card

Board connector: SD card socket, Molex 67913-0002
Mating connector: SD card

The CPU-301-16 Development Kit provides a SD card (4-bit) socket on J30 for memory and I/O expansion. Power (3.3 V only) to this socket is software-controlled.

J32: LVDS Display 0

Board connector: 2x10 shrouded header, 2.00 mm, Molex 87832-2020
Mating connector: Molex 87568 series wire-to-board IDT housing

Header J32 provides connection to a LVDS display.

Pin	Name	Type	Description
1	V_LVDS0_PWR	PO	Software-controlled 3.3 V
2	V_LVDS0_PWR	PO	Software-controlled 3.3 V
3	LVDS0_OUT_TX0_N	O	LVDS data 0, negative
4	GND	P	Ground
5	GND	P	Ground
6	LVDS0_OUT_TX0_P	O	LVDS data 0, positive
7	LVDS0_OUT_TX1_P	O	LVDS data 1, positive
8	LVDS0_OUT_TX1_N	O	LVDS data 1, negative
9	LVDS0_OUT_TX2_N	O	LVDS data 2, negative
10	GND	P	Ground
11	GND	P	Ground
12	LVDS0_OUT_TX2_N	O	LVDS data 2, negative
13	LVDS0_OUT_CLK_P	O	LVDS clock, positive
14	LVDS0_OUT_CLK_N	O	LVDS clock, negative

Pin	Name	Type	Description
15	GND	P	Ground
16	GND	P	Ground
17	LVDS0_OUT_TX3_N	O	LVDS data 3, negative
18	LVDS0_OUT_TX3_P	O	LVDS data 3, positive
19	GND	P	Ground
20	GND	P	Ground

J37: USB Host 3

Board connector: USB Type A receptacle, Molex 89485-8000
Mating connector: USB Type A plug

The USB socket J37 provides USB Host 3 supporting the USB 2.0 specification at High Speed (480 Mbps). The connector shield is tied to chassis ground.

J38: GPIO

Board connector: 2x12 shrouded header, 2.00 mm, Samtec STMM-112-02-T-D-SM
Mating connector: Samtec TCSD series IDC cable assembly socket

Header J38 provides connections to the debug port, general-purpose I^{2}C bus, general-purpose SPI bus, general-user IO, and power control.

Pin	Name	Type	Description	Comments
1	TXD_B_OUT	O	Debug port, Transmit Data	Note 2, TXD_485TXN_B, J22 5
2	RXD_B_OUT	I	Debug port, Receive Data	Note 2, RXD_485RXN_B, J22 3
3	USR_SCL_OUT	O	I^{2}C clock	Note 2, I2C3_SCL, J1 B8
4	USR_SDA_OUT	IO	I^{2}C data	Note 2, I2C3_SDA, J1 B7
5	SPI3_MISO_OUT	I	SPI 3, Master input	Note 2, SPI3_MISO, J2 A2
6	SPI3_MOSI_OUT	O	SPI 3, Master output	Note 2, SPI3_MOSI, J2 A3
7	SPI3_RDY_OUT	I	SPI 3, Ready	Note 2, SPI3_RDY, J2 A4
8	SPI3_SCLK_OUT	O	SPI 3, Serial clock	Note 2, SPI3_SCLK, J2 A5
9	SPI3_SS0_OUT	O	SPI 3, Chip select 0	Note 2, SPI3_SS0, J2 A6
10	GND	P	Ground	
11	GND	P	Ground	
12	RESET_BTN_OUT	O	Reset	Connects to SW1: Reset, page 14
13	USR_GPIO_0_OUT	IO	General user I/O	Note 3, GPIO5_IO3, J1 A54
14	USR_GPIO_1_OUT	IO	General user I/O	Note 3, GPIO5_IO4, J1 A55
15	USR_GPIO_2_OUT	IO	General user I/O	Note 3, GPIO5_IO5, J1 A56
16	USR_GPIO_3_OUT	IO	General user I/O	Note 3, GPIO5_IO6, J1 A57
17	GND	P	Ground	
18	SLEEP_BTN_OUT	O	Sleep	Connects to SW2: Sleep, page 14
19	PMIC_PWR_CYCLE	I	Power reset	Note 4, PMIC_PWR_CYCLE#, J1 B49
20	GND	P	Ground	
21	ON_STATE	O	Power on	Buffered GPIO_ON_STATE, J1 B87
22	WDOG_TIMEOUT_OUT	O	Watchdog timeout	Note 3, WDOG_TIMEOUT, J1 B89
23	V_3P3V_SW	PO	Switched 3.3V	
24	V_5V_SW	PO	Switched 5V	

Notes:
2. Signal connects to the connector specified through a 22Ω series resistor.
3. Signal connects to the connector specified through a 1kΩ series resistor.
4. Signal connects directly to the docking connectors specified.

J39: Digital Display

Board connector: 2x20 shrouded header, 2.00 mm, Samtec STMM-120-02-T-D-SM
Mating connector: Samtec TCSD series IDC cable assembly socket

To support display devices such as medium resolution LCDs, the CPU-301-16 Development Kit provides a parallel digital display output on header J39.

Pin	Name	Type	Description
1	GND	P	Ground
2	GND	P	Ground
3	PNL_HSYNC	O	Horizontal sync
4	PNL_PIXCLK	O	Pixel clock
5	PNL_VSYNC	O	Vertical sync
6	GND	P	Ground
7	PNL_RED0	O	Red 0
8	PNL_RED1	O	Red 1
9	PNL_RED2	O	Red 2
10	PNL_RED3	O	Red 3
11	PNL_RED4	O	Red 4
12	PNL_RED5	O	Red 5
13	PNL_RED6	O	Red 6
14	PNL_RED7	O	Red 7
15	PNL_GREEN0	O	Green 0
16	PNL_GREEN1	O	Green 1
17	PNL_GREEN2	O	Green 2
18	PNL_GREEN3	O	Green 3
19	PNL_GREEN4	O	Green 4
20	PNL_GREEN5	O	Green 5
21	PNL_GREEN6	O	Green 6
22	PNL_GREEN7	O	Green 7
23	PNL_BLUE0	O	Blue 0
24	PNL_BLUE1	O	Blue 1
25	PNL_BLUE2	O	Blue 2
26	PNL_BLUE3	O	Blue 3
27	PNL_BLUE4	O	Blue 4
28	PNL_BLUE5	O	Blue 5
29	PNL_BLUE6	O	Blue 6
30	PNL_BLUE7	O	Blue 7
31	RGB_PNL_PWR	PO	Software-controlled 3.3V
32	RGB_PNL_PWR	PO	Software-controlled 3.3V
33	PNL_RL	O	4.7kΩ pull-up to RGB_PNL_PWR
34	PNL_UD	O	4.7kΩ pull-up to RGB_PNL_PWR
35	PNL_ENA	O	Enable
36	PNL_CONTRAST	O	4.7kΩ pull-up to RGB_PNL_PWR
37	PNL_LBIAS	O	LCD Bias
38	NC		
39	GND	P	Ground
40	GND	P	Ground

J40: Backlight 0

Board connector: 7-pin header, 1.25 mm, Molex 53261-0771
Mating connector: Molex 51021-0700 crimp housing

Header J40 provides the signals to control a backlight.

Pin	Name	Type	Description
1	V_BL0	PO	Backlight power (12 V nominal)
2	V_BL0	PO	Backlight power (12 V nominal)
3	GND	P	Ground
4	GND	P	Ground
5	nBL0_ON	O	Turns backlight on or off
6	BL_PWM0	O	Controls intensity of the backlight
7	GND	P	Ground

J41: Backlight 1

Board connector: 7-pin header, 1.25 mm, Molex 53261-0771
Mating connector: Molex 51021-0700 crimp housing

Header J41 provides the signals to control a backlight.

Pin	Name	Type	Description
1	V_BL1	PO	Backlight power (12 V nominal)
2	V_BL1	PO	Backlight power (12 V nominal)
3	GND	P	Ground
4	GND	P	Ground
5	nBL1_ON	O	Turns backlight on or off
6	BL_PWM1	O	Controls intensity of the backlight
7	GND	P	Ground

J43: SIM

Board connector: SIM card socket, Molex 47553-001
Mating connector: SIM cards

The carrier board includes a standard Subscriber Identity Module (SIM) socket supporting devices requiring secure subscriber identification. This SIM interface connects to the Mini PCIe socket J13, page 19.

J44: CMOS Camera

Board connector: 2x12 shrouded header, 2.00 mm, Samtec STMM-112-02-T-D-SM
Mating connector: Samtec TCSD series IDC cable assembly socket

To support input from a digital camera, the CPU-301-16 Development Kit provides a parallel CMOS camera port on header J44.

Pin	Name	Type	Description
1	V_2P8V_SW	PO	Switched 2.8V
2	V_1P5V_SW	PO	Switched 1.5V
3	CSI_MCLK_OUT	O	Clock
4	V_1P8V_SW	PO	Switched 1.8V
5	GND	P	Ground
6	V_3P3V_SW	PO	Switched 3.3V
7	CSI0_DAT12_OUT	O	Data 12
8	CSI0_SCL_OUT	O	I^2C clock (Connects to general-purpose I^2C bus)
9	CSI0_DAT13_OUT	O	Data 13
10	CSI0_SDA_OUT	IO	I^2C data (Connects to general-purpose I^2C bus)
11	CSI0_DAT14_OUT	O	Data 14
12	GND	P	Ground
13	CSI0_DAT15_OUT	O	Data 15
14	CSI0_DATA_EN _OUT	O	Data enable
15	CSI0_DAT16_OUT	O	Data 16
16	CSI0_HSYNC_OUT	O	Horizontal sync
17	CSI0_DAT17_OUT	O	Data 17
18	CSI0_VSYNC_OUT		Vertical sync
19	CSI0_DAT18_OUT	O	Data 18
20	CSI0_PIXCLK_OUT	P	Pixel clock
21	CSI0_DAT19_OUT	O	Data 19
22	CSI0_RST_B_OUT	O	Reset
23	GND	P	Ground
24	CSI0_PWM_OUT	O	PWM

J45: MIPI Camera

Board connector: 2x12 shrouded header, 2.00 mm, Samtec STMM-112-02-T-D-SM
Mating connector: Samtec TCSD series IDC cable assembly socket

The CPU-301-16 Development Kit includes a two lane Mobile Industry Processor Interface (MIPI) Camera Serial Interface (CSI) on header J45.

Pin	Name	Type	Description
1	V_2P8V_SW	PO	Switched 2.8V
2	V_1P5V_SW	PO	Switched 1.5V
3	GND	P	Ground
4	V_1P8V_SW	PO	Switched 1.8V
5	CSI_D0P_OUT	O	Data 0 positive
6	V_3P3V_SW	PO	Switched 3.3V
7	CSI_D0M_OUT	O	Data 0 negative
8	CSI_SCL_OUT	O	I^{2}C clock (Connects to general-purpose I^{2}C bus)
9	GND	P	Ground
10	CSI_SDA_OUT	IO	I^{2}C data (Connects to general-purpose I^{2}C bus)
11	CSI_D1P_OUT	O	Data 1 positive
12	GND	P	Ground
13	CSI_D1M_OUT	O	Data 1 negative
14	CSI_RST_B_OUT	O	Reset
15	GND	P	Ground
16	CSI_PWM_OUT	O	PWM
17	CSI_CLK0P_OUT	O	Clock positive
18	GND	P	Ground
19	CSI_CLK0M_OUT	O	Clock negative
20	NC		
21	NC		
22	NC		
23	GND	P	Ground
24	NC		

J46: Backlight 2

Board connector: 7-pin header, 1.25 mm, Molex 53261-0771
Mating connector: Molex 51021-0700 crimp housing

Header J46 provides the signals to control a backlight.

Pin	Name	Type	Description
1	V_BL2	PO	Backlight power (12 V nominal)
2	V_BL2	PO	Backlight power (12 V nominal)
3	GND	P	Ground
4	GND	P	Ground
5	nBL2_ON	O	Turns backlight on or off
6	BL_PWM0	O	Controls intensity of the backlight
7	GND	P	Ground

J47: MIPI Display

Board connector: 2x12 shrouded header, 2.00 mm, Samtec STMM-112-02-T-D-SM
Mating connector: Samtec TCSD series IDC cable assembly socket

The CPU-301-16 Development Kit provides a Mobile Industry Processor Interface (MIPI) Display Serial Interface (DSI) on header J47 supporting displays in handheld or mobile devices.

Pin	Name	Type	Description
1	V_5V_SW	PO	Switched 5V
2	V_3P3V_SW	PO	Switched 3.3V
3	GND	P	Ground
4	NC		
5	DSI_D0P_OUT	O	Data 0 positive
6	GND	P	Ground
7	DSI_D0M_OUT	O	Data 0 negative
8	DSI_SCL_OUT	O	I^2C clock (Connects to general-purpose I^2C bus)
9	GND	P	Ground
10	DSI_SDA_OUT	IO	I^2C data (Connects to general-purpose I^2C bus)
11	DSI_D1P_OUT	O	Data 1 positive
12	GND	P	Ground
13	DSI_D1M_OUT	O	Data 1 negative
14	DSI_RST_B_OUT	O	Reset
15	GND	P	Ground
16	DSI_PWR_EN_OUT	O	Power enable
17	DSI_CLK0P_OUT	O	Clock positive
18	NC		
19	DSI_CLK0M_OUT	O	Clock negative
20	GND	P	Ground
21	GND	P	Ground
22	NC		
23	NC		
24	NC		

J48: USB Host 3 (Option)

Board connector: 1x4 shrouded header, 1.25 mm, Molex 53398-0471
Mating connector: housing, Molex 51021-0400

As an option, header J48 can be populated to provide connection to USB Host 3.

Pin	Name	Type	Description
1	GND	P	Ground
2	HUB3_USB_P_OUT	IO	USB Host 3
3	HUB3_USB_N_OUT		
4	V_5V_HOST3	PO	5 V DC power output

J49: HDMI Display

Board connector: HDMI Micro socket, Molex 46765-2001
Mating connector: HDMI Micro cable assembly

Micro socket J49 provides a standard Micro HDMI connection.

J50: USB Host 1 (Alternate)

Board connector: 1x4 shrouded header, 1.25 mm, Molex 53398-0471
Mating connector: housing, Molex 51021-0400

In addition to USB socket J3, page 16, USB Host 1 is available on header J50.

Pin	Name	Type	Description
1	GND	P	Ground
2	HUB1_USB_P_OUT	IO	USB Host 1
3	HUB1_USB_N_OUT		
4	V_5V_HOST1	PO	5 V DC power output

J51: USB Host 2 (Option)

Board connector: 1x4 shrouded header, 1.25 mm, Molex 53398-0471
Mating connector: housing, Molex 51021-0400

As an option, header J51 can be populated to provide connection to USB Host 2.

Pin	Name	Type	Description
1	GND	P	Ground
2	HUB2_USB_P_OUT	IO	USB Host 2
3	HUB2_USB_N_OUT		
4	V_5V_HOST2	PO	5 V DC power output

System Specifications

Power Supply

The CPU-301-16 Development Kit accepts input power on header J27, page 20.

Symbol	Parameter	Min	Typ.	Max	Units
AC Power Adapter					
V_{OUT}	Supply voltage	6	12	18	V
I_{OUT}			0.6		A

Electrical

This section provides electrical specifications for the CPU-301-16 Development Kit.

GPIO Header

Symbol	Parameter	Min	Typ.	Max	Units
USR_SCL_OUT, USR_SDA_OUT					
$F_{USR\_SCL\_OUT}$	Bus clock		100	400	kHz
R_{PU}	Pull-up resistance (note 5)		10		kΩ
V_{PU}				3.3	V
SPI bus, USR_GPIO_x_OUT (note 6)					
V_{IH}	High-level input voltage	2.3		3.3	V
V_{IL}	Low-level input voltage	0		1	V
V_{OH}	High-level output voltage IOH = -1 mA	3.2			V
V_{OL}	Low-level output voltage IOL = 1 mA			0.15	V
R_{DRV}	Output driver impedance Single-ended		50		Ω

Notes:
5. Pull-up resistors included on module.
6. Specifications per the Freescale Semiconductor i.MX 6Dual/Quad Applications Processor Data Sheet, Rev. 1, 11/2012, Document Number: IMX6DQCEC, www.freescale.com.

USB Host Ports

Symbol	Parameter	Min	Typ.	Max	Units
USB Host Ports					
I_{USB}	USB current			500	mA

Audio Interface

Symbol	Parameter	Min	Typ.	Max	Units
Microphone (note 7)					
V_{IN}	Full scale input voltage		500		mVrms
$Gain_{IN}$	Microphone boost	0		24	dB
R_{IN}	Input impedance		60		kΩ
Line Out (note 7)					
V_{OUT}	Full scale output voltage, 10kΩ/50pF load		0.96		Vrms
Speaker (note 7)					
P_{OUT}	Output power, 4Ω load, 1% Total Harmonic Distortion Plus Noise		1.75		W

Note:
7. Specifications per the Wolfson Microelectronics WM8962 Ultra-Low Power Stereo Codec Production Data, April 2013, Rev 4.1, www.wolfsonmicro.com.

General

This section provides general specifications for the CPU-301-16 Development Kit.

General-Purpose I^{2}C Bus Addresses

Carrier Board I2C Device	Address	Function
Stereo CODEC	0011 0100 0011 0101	Write Read
Accelerometer	0011 1010 0011 1011	Write Read
GPIO Expansion (general-purpose LEDs)	0100 0000 0100 0001	Write Read
Board Voltage and Current Sensor	1000 0010 1000 0011	Write Read
Temperature Sensor	1001 0000 1001 0001	Write Read
Real-time Clock	1101 1110 1101 1111	Write Read
Mini PCIe socket	User-defined	
MIPI Camera	User-defined	
MIPI Display	User-defined	
CMOS Camera	User-defined	

Table 4.   General-purpose I^{2}C Bus Addresses

Appendix A – Reference Information

Product Information

Product notices, updated drivers, support material:
www.eurotech.com

Processor

i.MX 6 Solo/6Dual/6Quad Applications Processors and Power Management Integrated Circuit data sheets:
www.freescale.com

SATA

Serial ATA specification:
www.sata-io.org

USB

Universal Serial Bus specification:
www.usb.org

SD Card

SD Card Association and SDIO specification:
www.sdcard.org

PCI SIG

PCI Express specification:
www.pcisig.com

MDI

Gigabit Ethernet Physical Layer Transceiver and Media Dependent Interface:
www.micrel.com

CAN

CAN specification:
www.semiconductors.bosch.de

I²C Bus

I^2C bus specification:
www.nxp.com

HDMI

HDMI specification:
www.hdmi.org

MIPI

MIPI DSI and MIPI CSI specification:
www.mipi.org

Appendix B – Board Revision

This manual applies to the current revision of the CPU-301-16 Development Kit carrier board as given in the following sections.

For the CPU-301-16 revision history, refer to the *CPU-301-16 Design-In Guide (Eurotech #110127-4000)*.

Identifying the Board Revision

The revision number of the carrier board is printed on the printed wiring board. That number is 170127-500Rx, where "x" is the revision level of the PWB.
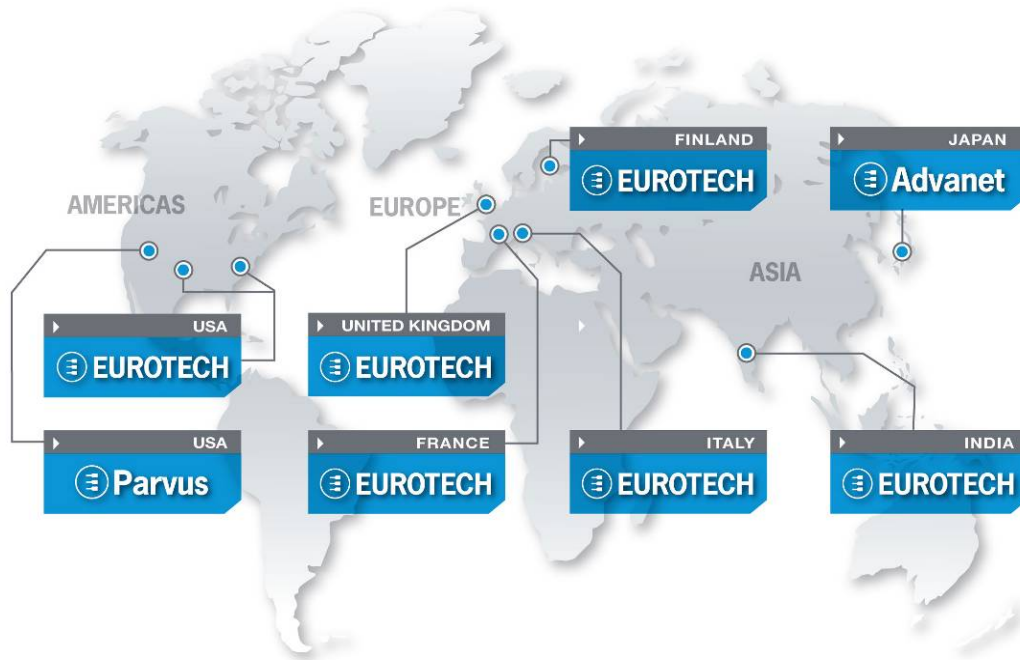
Carrier Board Revision History

The following is an overview of the revisions to the carrier board.

Revision 1

Initial release

Eurotech Worldwide Presence

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USA

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