

Catalyst XL

Development Kit

Rev D – August 2011 - 110122-3001D

Disclaimer

The information in this document is subject to change without notice and should not be construed as a commitment by any Eurotech company. While reasonable precautions have been taken, Eurotech assumes no responsibility for any error that may appear in this document.

Trademarks

All product or service names are the property of their respective owners.

Revision History

<i>Issue no.</i>	<i>Date</i>	<i>Comments</i>
1	Feb-2008	Preliminary release
2	Mar-2008	Style and formatting updates
3	Apr-2008	System specifications and signal types added
4	Jan-2009	Style and formatting updates Revision B carrier board updates Connector J26 and J27 changes
A	Feb-2010	Catalyst Module XL information added Development kit component list updated Section for Synchronous DRAM updated TPM supported as optional feature IDE/PATA disk drive is optional Notation for I ² C bus and SMBus addresses corrected Backlight and IDE_PATADET signals clarified ATX power supply no longer supported ACPI power state table updates Touch panel header J26 updated Appendix E: Maintenance Port added
B	Jul-2010	Catalyst Module XL updates ESF section added Hard drive cable length recommendation added Reference for installing/removing module added Display subsystem section updated Specification tables for I ² C bus and SMBus added Eurotech contact information updated
C	Dec-2010	Carrier board configuration section added Mounting information added Development kit component list updated Name change to Catalyst XL
D	Aug-2011	References to programmer reference documents added PCIe, USB, and serial port mapping added Details about display adapter, reset signals, and on/off button added IrDA no longer supported

Contents

Introduction.....	6
Block Diagram	7
Features	8
Carrier Board Detection	10
Related Documents	10
Handling Your Board Safely	11
Conventions.....	11
Software Specification.....	13
Operating System Support.....	13
BIOS.....	13
Software Development Kit.....	13
Everyware™ Software Framework	13
Hardware Specification	14
Processor	14
Memory.....	14
Synchronous DRAM.....	14
Non-volatile Memory	14
External Memory Interfaces	15
Communications	16
PCI Express.....	16
USB	17
Secure Digital and MultiMediaCard	18
I ² C Bus.....	18
System Management Bus	19
Serial Ports	20
Display and User Interface.....	21
LVDS Display and Backlight Control.....	21
User Interface	22
Catalyst Module Display Adapter.....	22
Serial Digital Video	22
Inputs and Outputs.....	22
Low Pin Count Bus.....	23
Reset Signals.....	23
General-Purpose Inputs and Outputs	24
Carrier Board Super I/O Controller	24
System Monitoring	25
Audio Interface.....	26
Power and Power Management.....	26
Power Supply Architecture	27
ACPI Power Management States	27
Mechanical.....	28
Mechanical Drawing.....	28
Mounting Holes	29
Installing and Removing the Catalyst XL	30

Connectors, Switches, Jumpers, and Indicators.....	31
Identifying Connectors	31
Switches, Jumpers, and Indicators.....	32
SW1: Reset.....	32
SW2: On/Off.....	32
S1: Radio Disable	32
J13: PCIe Switch EEPROM.....	32
Carrier Board LED Indicators	33
Display Adapter LED Indicators.....	34
Signal Headers	34
J1: Docking Connector: Data.....	34
J2: Docking Connector: Power	34
J3: USB Host 0 and USB Host 1	35
J4: USB Host 2 and USB Host 3	35
J6: USB Host/Client	36
J5: USB Host/Client Jumper	36
J7: SDIO Peripheral Development.....	37
J8: IDE/PATA Interface	38
J10: SDVO Socket	38
J11: LVDS Display & Backlight	39
J12: PCIe 0 (x1)	41
J14: PCIe 1 (x1)	41
J15: PCIe 2 (x1)	41
J16: Mini PCIe 0 with UIM	41
J17: Mini PCIe 1.....	42
J18: Secondary Audio Codec	42
JP1: Secondary Audio Codec Jumper	43
J19: S/PDIF (optional).....	43
J20: Stereo Line Input, Microphone Input, and Headphone Output.....	44
J22: Digital Microphone.....	44
J23: Stereo Line Out 1.....	45
J26: Touch Panel (4- or 5-wire).....	45
J27: Touch Panel (8-wire).....	46
J25: Touch Panel Jumper	46
J28: ATX Power Supply Input.....	46
J29: DC Power Input	46
J30: JTAG	47
J31: Disk Drive Power Out	47
J32: SMBus.....	48
J33: I ² C Bus	48
J34: PS/2 Keyboard & Mouse	48
J35: Tachometer 1.....	49
J36: Tachometer 2.....	49
J37: Serial 6	49
J41: Serial 6 Receive Termination Jumper.....	50
J42: Serial 6 Transmit Termination Jumper	50

J38: Serial 4	50
J43: Serial 4 Receive Termination Jumper.....	50
J44: Serial 4 Transmit Termination Jumper.....	51
J39: Serial 5.....	51
J45: Serial 5 Receive Termination Jumper.....	51
J46: Serial 5 Transmit Termination Jumper.....	51
J40: Serial 2.....	52
J47: Serial 2 Receive Termination Jumper.....	52
J48: Serial 2 Transmit Termination Jumper.....	52
J50: SIM.....	52
J51: SD/MMC 0.....	53
J52: SD/MMC 1.....	54
J53: Stereo Line Out 0	55
J54: Microphone.....	55
J55: Front Panel.....	56
P1: Serial 1 and Serial 3.....	57
J57: Serial 1 and Serial 3 Control Jumper	57
P2: Maintenance Port.....	58
U24: LPC Bus	59
U27: GPIO	60
U47: I/O Expansion	61
System Specification.....	62
Performance	62
Power Supply.....	62
Electrical	63
I ² C Bus.....	63
SMBus	63
Touch Panel Controller.....	63
Reset Signals.....	64
I/O Expansion Port.....	64
Embedded Controller	65
Super I/O Controller	65
Intel High Definition Audio	66
Audio Codec	66
General.....	67
Crystal Frequencies	67
Real-Time Clock.....	67
Environmental.....	67
Appendix A – Reference Information.....	68
Appendix B – RoHS Compliance	70
Appendix C – Board Revision	71
Appendix D – Frequently Asked Questions.....	72
Appendix E – Maintenance Port.....	73
Eurotech Worldwide Presence.....	74

Introduction

The Catalyst XL Development Kit provides a development platform for the Catalyst XL and a reference for custom carrier board design. The kit consists of the following components:

- Catalyst XL Development Kit carrier board with Catalyst XL
- Catalyst Module Display Adapter
- PCIe Gigabit Ethernet card
- 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
- Black DB9FF cable (for maintenance port P2 only)
- Null modem cable (for Wind River Linux Development Kit only)
- Windows® CE Pro / Windows Embedded Standard or Wind River Linux (LiveUSB) operating system
- FreeDOS USB flash drive
- 12 VDC adapter and AC cord
- Plexiglas mounting
- Stylus and screen cleaning cloth
- Windows CE Pro / Windows Embedded Standard Development Kit Quick Start (Eurotech document #110122-3004) or Wind River Linux (LiveUSB) Development Kit Quick Start (Eurotech document #110122-3006)

Please make sure you have received **all** the components before you begin your development. For details about getting started, refer to the quick start included with your kit.

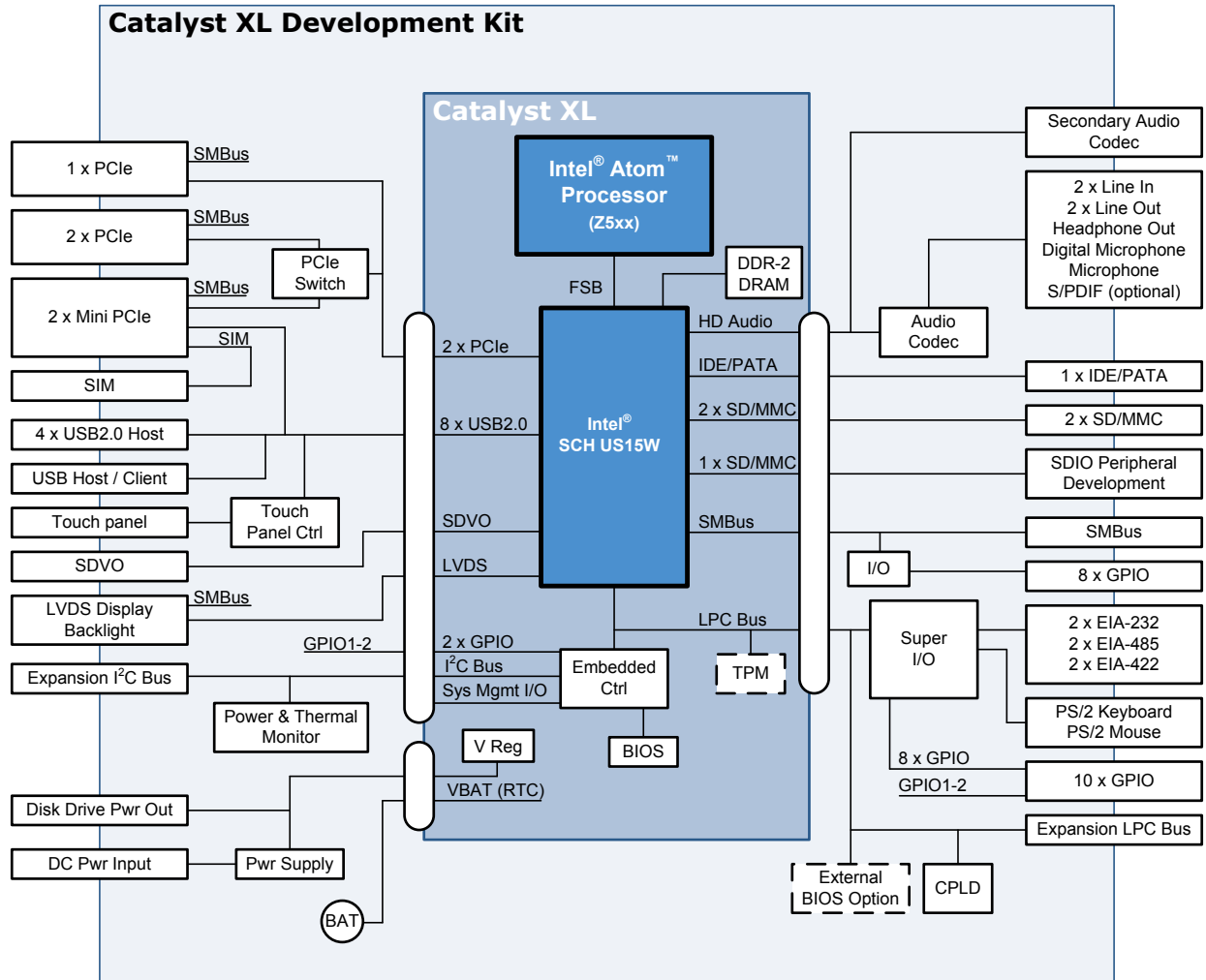
As a development platform, this kit allows you to become familiar with the Catalyst XL functionality prior to customization for your specific application. Utilize the development kit to validate your proposed design for both software and hardware. For example, if a USB device is to be used on USB port 6, test that device by connecting it to USB port 6 on the development kit running your application. 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 carrier board maximizes the Catalyst XL 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 Catalyst XL Development Kit, Eurotech provides a variety of services to ensure that your Catalyst XL-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 Catalyst XL Development Kit. Notice that the data connector on the Catalyst XL has been divided into two sections for this illustration. Functionality provided by the Catalyst XL is included in the dark blue section, while functionality provided by the carrier board is included in the light blue-gray section. Dotted lines indicates options.



Features

Processor

- Intel® Atom™ processor Z5xxP/PT
- Clock rates of 1.1 GHz , 1.33 GHz, or 1.6 GHz
- Intel® System Controller Hub US15WP/PT
- Front side bus from 400 MHz to 533 MHz

Integrated System Functions

- Embedded Controller
- Trusted Platform Management (optional)

Memory

- 512 MB, 1 GB, or 2 GB DDR-2 DRAM
- Integrated system BIOS with external BIOS option
- Battery-backed real-time clock
- External memory support
 - IDE/PATA disk drive
 - USB disk drive
 - SD/MMC card
 - PCIe x1 or Mini PCIe card

Communications

- Three PCI Express one lane (PCIe x1) slots
- Two Mini PCI Express slots (PCIe, SMBus, USB)
- Five USB 2.0 ports
 - Two host ports operating at low, full, and high speeds
 - Two host ports operating at high speed only
 - One host/client port operating at high speed
- Low Pin Count (LPC) bus
- Six serial ports
 - Two EIA-232, 9-wire
 - Two EIA-422
 - Two EIA-485
- Two Secure Digital and MultiMediaCard (SD/MMC) sockets
- SDIO Peripheral Development interface
- System Management Bus (SMBus)
- I²C bus with I²C master device

User Interface and Display

- Two independent display outputs
 - LVDS with resolutions up to 1366 x 768 at 85 Hz, 8-bit color per lane
 - Serial Digital Video with resolutions up to 1280 x 1024 at 85 Hz, full color
- 10.4-inch TFT LCD with SVGA resolution (800 x 600), 6-bit color
- Catalyst Module Display Adapter
- Resistive touch panel (4-, 5-, or 8-wire options)
- CCFL backlight inverter with control signals for intensity and on/off
- PS/2 keyboard and mouse support

Inputs and Outputs

- Eighteen general-purpose inputs and outputs

Audio Interface

- Intel® High Definition Audio compatible codec
 - Two stereo line inputs
 - Two stereo line outputs
 - Stereo headphone output
 - Stereo microphone input
 - Digital microphone input
 - S/PDIF output (optional)
- Secondary audio codec expansion support

Power Supply

- 100-240 VAC power adapter supplying 12 V main power input
- Auxiliary power output for external peripheral devices
- ACPI power management
- Real-time power monitoring

Carrier Board Detection

The Catalyst XL conforms to the same footprint as other Eurotech modules. However, the modules are not pin-compatible. Each module has a unique pinout on connector J1 providing different feature sets. When installed in a carrier board, the Catalyst XL reads J1 pin B103 to determine the configuration of the carrier board. The Catalyst XL Development Kit carrier board connects this input to ground.



Warning:

Install Catalyst XL modules or other compatible modules only in carrier boards designed for the Catalyst XL. Installing incompatible modules may result in damage to the carrier board and module.

If J1 pin B103 is not connected to ground on the carrier board, the Catalyst XL will not boot.

For full details about compatibility between modules, see the technical bulletin for your module.

Related Documents

This manual describes how the Catalyst XL integrates with Eurotech's carrier board to provide a development platform and reference design for your specific application. It complements the information provided in the *Catalyst XL Design-In Guide* and is intended for software application developers, system integrators, and hardware design engineers.

The following documents are also important resources for developing applications for the Catalyst XL.

Document	
Catalyst XL Design-In Guide	110123-3003
Catalyst Development Kit Carrier Reference Schematic	110122-3002
Catalyst Development Kit Carrier Reference BOM	110122-3003
Catalyst XL CE Pro WES Development Kit Quick Start	110122-3004
Catalyst XL LiveUSB Development Kit Quick Start	110122-3006
Catalyst XL Carrier Board Routing Guidelines	110122-2004
Catalyst Module Installation and Removal	110122-2014
Catalyst System Management Programmer Reference	110122-2021
Catalyst SMBus Programmer Reference	110122-2022
Catalyst I ² C Bus Programmer Reference	110122-2023
Catalyst Module Display Adapter User Manual	110122-4000

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

Handling Your Board Safely

Anti-Static Handling

The Catalyst XL Development Kit contains CMOS devices that could be damaged by electrostatic discharge (ESD). Observe industry-standard electronic handling procedures when handling the board. Where possible, work on a grounded anti-static mat. At a minimum, touch an electrically grounded object before handling the board or touching any components on the board.

Packaging

Please ensure that, should a system need to be returned to Eurotech, it is adequately packed, preferably in the original packing material.

Electromagnetic Compatibility



The Catalyst XL is classified as a component with regard to the European Community Electromagnetic Compatibility (EMC) regulations. Because Eurotech supplies only the single-board computer and not fully integrated systems, Eurotech cannot provide meaningful system-level emissions test results. It is the responsibility of the user to ensure that systems using the module are compliant with the appropriate EMC standards.

RoHS Compliance

The European RoHS Directive (Restriction on the use of certain Hazardous Substances – Directive 2002/95/development system) limits the amount of six specific substances within the composition of the product. The Catalyst XL fully complies with the RoHS directive. A full *RoHS Compliance Materials Declaration Form* for the Catalyst XL is included as [Appendix B – RoHS Compliance](#), page 70. Further information regarding RoHS compliance is available on the Eurotech web site at www.eurotech.com.

Conventions

The following table lists the symbols used in this document.

Symbol	Explanation
	Note – information that requires your attention
	Warning – proceeding with a course of action may damage your equipment or result in loss of data

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

Convention	Explanation
GND	Digital ground plane
#	Active low signal
+	Positive signal in differential pair
-	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
A	Analog signal
OD	Open-drain
CMOS	3.3 V CMOS
LVTTL	Low Voltage TTL
3.3	3.3 V signal levels
5	5 V signal level
HDA	High Definition Audio, 3.3 V (default) or 1.5 V signal
LVDS	Low Voltage Differential Signaling
nc	No connection
reserved	Use is reserved to Eurotech

Some signals include termination on the Catalyst XL or carrier board. The following table describes the abbreviations for signal termination used in this document.

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

Software Specification

Eurotech provides an application-ready platform including BIOS, operating system, and development environment. This section gives a brief description of the software support available for the Catalyst XL Development Kit. For additional details, contact your local Eurotech representative.

Operating System Support

The Catalyst XL Development Kit is compatible with the following operating systems:

- Windows® XP Professional
- Windows XP Embedded
- Windows Embedded Standard
- Windows CE Pro 6.0
- Wind River Linux 3.0
- Select real-time operating systems

For details about available support of each operating system, contact your local Eurotech representative.

BIOS

The Catalyst XL incorporates a custom system BIOS developed by Eurotech.

Software Development Kit

Eurotech has developed a Software Development Kit (SDK) and its Application Programming Interface (API) for the following functions:

- System Management
- SMBus
- I²C bus

For details about the availability of these SDKs, contact your local Eurotech representative.

Everyware™ Software Framework

Everyware Software Framework (ESF) is an inclusive software framework that puts a middleware layer between the operating system and the OEM application. It provides industry-standard interfaces that shorten development time, simplify coding, and allow software to be ported from one Eurotech hardware platform to another. The Catalyst XL supports ESF; however, the standard Catalyst XL Development Kit does not include ESF. If your application requires ESF, contact your local Eurotech representative. Information about ESF is available at <http://esf.eurotech.com>.

Hardware Specification

Processor

The Catalyst XL provides the processing power on the development kit. This high-performance, low-power module uses an integrated two-chip solution comprised of the Intel Atom processor Z5xxP/PT and Intel System Controller Hub US15WP/PT. The following sections describe how the features of the Catalyst XL work in conjunction with the carrier board to provide a complete out-of-the-box development platform.

The module is available in various versions based on the following features:

- Processor speed
- On-module DRAM
- Operating temperature

For the various performance variants, see [Performance](#), page 62.

For a detailed description of the Catalyst XL, refer to the *Catalyst XL Design-In Guide* (Eurotech document #110123-3003).

Memory

The Catalyst XL combined with a carrier board provides a variety of storage capabilities. The following sections describe the different types of memory supported by the Catalyst XL Development Kit.

Synchronous DRAM

Double Data Rate Synchronous DRAM (DDR-2) is used on the Catalyst XL for system main memory and frame buffer memory. Modules are available with 512 MB, 1 GB, or 2 GB DDR-2 DRAM. The data bus supports 64-bit accesses with a maximum burst bandwidth of 4.2 GB/s (8 B @ 533 MHz). The memory bus operates at the same frequency as the front side bus.

The Intel Atom processor supports unified memory architecture in which the integrated 2D/3D graphics controller memory is “unified” with the system main memory. The default frame buffer is 4 MB with options in the BIOS Setup for selecting an 8 MB option. Extended graphics memory space is available up to 256 MB. The graphics driver controls this size based on usage.

Non-volatile Memory

The Catalyst XL includes non-volatile memory for system BIOS storage and a real-time clock (RTC) functionality. The system BIOS options include an on-module system BIOS memory with an external BIOS device supported on the carrier board.

BIOS and Configuration Data

A serial interface flash memory device on the module stores the BIOS boot firmware, BIOS Setup settings, and module configuration data. Standard configuration is 1 MB. The flash device performs logically as a firmware hub (FWH) and connects to the on-module embedded controller using a serial peripheral interface (SPI). This system BIOS memory supports pre-programmability at the device level, in-circuit programming on module, and updates using a run-time flash utility. In addition, programmable write protection is available using multiple flash sectors.

As an alternate FWH implementation, the Catalyst XL Development Kit includes an external BIOS option on the carrier board. The external device connects to the LPC bus.

Real-Time Clock

The Catalyst XL includes a RTC function. It retains the system date and time when the system is powered down as long as the 3.3 V “always” power or backup power is provided to the module. To supply backup power, the carrier board includes a long-life 3 V battery. For general specifications, see [Real-Time Clock](#), page 67.

External Memory Interfaces

Four types of external memory interfaces provide mass storage options for the Catalyst XL Development Kit. The carrier board includes an IDE/PATA header, two SD/MMC sockets, four USB host ports, three PCIe sockets, and two Mini PCIe sockets that can connect external memory to the system.

For additional details about the signals provided by the Catalyst XL, including specific routing guidelines and design constraints, refer to the *Catalyst XL Design-In Guide* (Eurotech document #110123-3003).

IDE/PATA Disk Drive

IDE/Parallel ATA (PATA) disk drives provide removable storage in a wide variety of capacities. The Catalyst XL Development Kit supports an optional 2.5-inch IDE/PATA magnetic or solid-state disk drive on header [J8](#), page 38. This capability can be a cost-effective means to expand system storage.

Standard, 40-conductor IDE cables will work reliably for data transfer rates through UDMA 2. If your application requires higher data transfer rates, use the 80-conductor/40-pin ribbon cables that interleave grounded conductors between each of the IDE signals. These cables are available from computer retailers. For best performance, also consider using the shortest cable that is practical in your installation.

SD/MMC Card

You can use a SD/MMC card in one of two SD/MMC sockets provided on the carrier board: J51 and J52. For details about using the SD/MMC sockets, see [Secure Digital and MultiMediaCard](#), page 18.

USB Mass Storage Device

A USB mass storage device can connect to one of four USB host ports on the carrier board: dual sockets J3 and J4. For a description of these ports, see [USB](#), page 17.

PCIe or Mini PCIe Card

A PCIe x1 or Mini PCIe memory card can provide additional memory on the development kit. Three PCIe sockets and two Mini PCIe sockets are available on the carrier board. For a description of the PCI Express capability, see [PCI Express](#), page 16.

Communications

The Catalyst XL Development Kit implements several industry-standard interfaces allowing development across a broad spectrum of end-use applications. These interfaces include PCIe, Mini PCIe, USB, serial, SD/MMC, I²C bus, and SMBus. The following sections describe these interfaces.

For additional details about the signals provided by the Catalyst XL, including specific routing guidelines and design constraints, refer to the *Catalyst XL Design-In Guide* (Eurotech document #110123-3003).

PCI Express

A key capability of the development kit is its PCI Express (PCIe) connectivity. The carrier board provides three PCIe sockets and two Mini PCIe sockets. Each slot supports 2.5 Gbps bandwidth in each direction.

One PCIe socket connects directly to the Catalyst XL, while the remaining two PCIe sockets and two Mini PCIe sockets route through a PCIe switch located on the carrier board. The PLX Technology PEX 8505 is a 5-lane, 5-port PCIe switch. This switch connects directly to the Catalyst XL and provides the four additional PCIe ports on the carrier board.

The following table describes the PCIe connectivity on the carrier board.

Carrier Board Connector	Carrier Board PCIe Slot	Catalyst XL PCIe Slot	Intel SCH US15W PCIe Port	PCIe Switch Port
J12	PCIe 0 (x1)	1	1	
	(PCIe Switch)	2	2	0
J14	PCIe 1 (x1)			1
J15	PCIe 2 (x1)			2
J16	Mini PCIe 0			3
J17	Mini PCIe 1			4

USB

The Catalyst XL Development Kit includes seven Universal Serial Bus (USB) ports. The following table describes the mapping of the Catalyst XL USB ports on the module and the carrier board.

Carrier Board Connector	Carrier Board USB Port (note 1)	Catalyst XL USB Port
J3 A	Host 0	0
J3 B	Host 1	1
J6	Host/Client	2
J16 (Mini PCIe 0)	Host 3	3
	(Touch Panel Controller)	4
J17 (Mini PCIe 1)	Host 5	5
J4 A	Host 2	6
J4 B	Host 3	7

Notes:

- Host 0, Host 1, Host 3, and Host 5 support the USB 2.0 specification operating at low (1.5 Mbps), full (12 Mbps) and high (480 Mbps) speeds.
USB client port operates at high speed only.
Host 2 and Host 3 operate at high speed only.

USB Host Ports

Connectors and support circuitry including power switch, current limiter circuit, common mode chokes, and over-current protection are included on the carrier board for the USB host ports on J3, J4, and J6. The USB protocol allows client devices to negotiate the power they need from 100 mA to 500 mA in 100 mA increments. The development kit supplies 5 V power to each USB host port through a power switch with over-current detection. Any USB client device that has USB drivers installed on the Catalyst XL can connect directly to the system using these sockets. The Catalyst XL manages the USB host ports.

The USB host port signals on J16 and J17 route directly from the Catalyst XL to the Mini PCIe sockets on the carrier board. The carrier board does not include additional support circuitry for these USB host ports.

USB Host/Client Port

The USB signals provided on socket J6, page 36 support a USB 2.0 host or USB 2.0 client port operating at high speed only. Circuitry supporting both modes of operation is included on the carrier board with jumper J5 selecting the mode.

USB client devices are self-powered or can receive power from the host computer. Since the USB cable does not power the development kit, it does not need a power input. However, the USB input power is used to sense when a USB cable is connected. Jumper J5 selects the mode of operation of socket J6 by providing a DC power output for host mode or a DC power sense input for client mode.

Secure Digital and MultiMediaCard

The Catalyst XL includes three Secure Digital and MultiMediaCard (SD/MMC) interfaces for memory and I/O expansion. On the carrier board, two of the three interfaces are available on socket **J51**, page 53 and socket **J52**, page 54. Power to these sockets is software-controlled.

The SD/MMC interfaces provide 4-bit operation and support the following specifications:

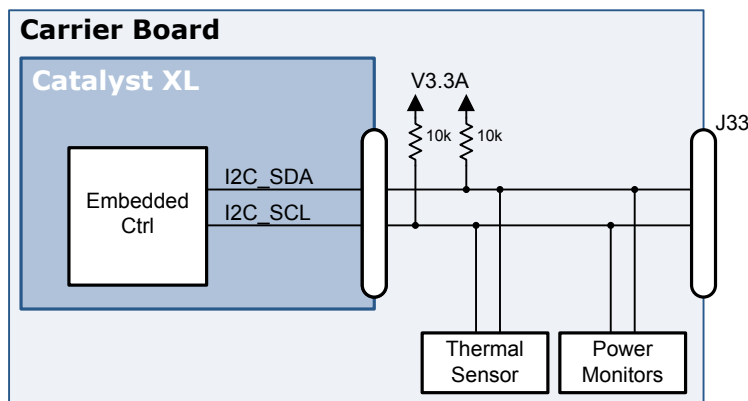
- MMC 4.0 specification allowing clock frequencies up to 48 MHz and bus widths of 1 or 4 bits
- SDIO 1.1 specification allowing clock frequencies up to 24 MHz and bus widths of 1 or 4 bits

The third SD/MMC interface is connected to **J7**, page 37 and enables Secure Digital (SDIO) peripheral development of customer unique add-in cards.

I²C Bus

I²C bus (Inter-IC) is a multi-master, "two-wire" synchronous serial bus for communications between integrated circuits (ICs) and for addressing peripherals in a system. The development kit includes an I²C bus with the Catalyst XL acting as the bus master.

The following diagram illustrates the I²C architecture on the Catalyst XL Development Kit.



The carrier board provides termination on the I²C bus and an external connection on header **J33**, page 48. Power all devices connected to this bus using the 3.3 V "Always" (V3.3A) power or isolate the devices from the bus when powered off. When possible, use the SMBus to communicate with devices on the carrier board instead of the I²C bus. For electrical specifications, see [I²C Bus](#), page 63.

A thermal sensor and power monitors, also located on the carrier board, connect to the I²C bus and provide hardware monitoring. For additional details, see [System Monitoring](#), page 25.

The following table lists the addresses of the I²C devices on the carrier board.

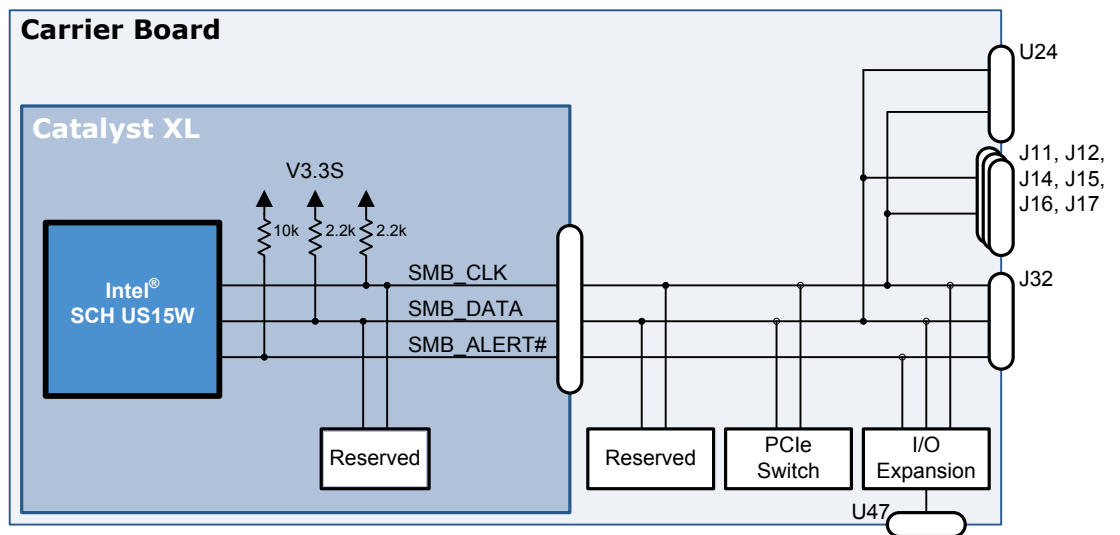
Device	Address	Function
Thermal Sensor	1001 0000	Write
	1001 0001	Read
V3.3 Power Monitor	1000 0000	Write
	1000 0001	Read
V5S Power Monitor	1000 0010	Write
	1000 0011	Read
V3.3S Power Monitor	1000 1000	Write
	1000 1001	Read
V5A Power Monitor	1000 1010	Write
	1000 1011	Read
V3.3A Power Monitor	1000 1100	Write
	1000 1101	Read

The Catalyst I²C bus API provides a software interface for controlling the I²C bus. For details about this API, refer to the *Catalyst I²C Bus Programmer Reference* (Eurotech document #110122-2031).

System Management Bus

System Management Bus (SMBus) follows the same operating principles as I²C. Similar to I²C, SMBus is a “two-wire” interface allowing multiple devices to communicate with each other. The development kit includes a SMBus supporting the System Management Bus (SMBus) Specification, Version 1.0 with hardware alerting on the SMBus using the I/O signal SMB_ALERT#. The Intel SCH US15W on the Catalyst XL acts as bus master.

The following diagram illustrates the SMBus architecture on the development kit.



The carrier board provides an external connection to the SMBus on header J32, page 48. Power all devices connected to this bus using the V3.3S power or isolate the devices from the bus when powered off. Notice that the Catalyst XL includes pull-up resistors to V3.3S on the SMBus.



Note: The SMBus is not compatible with all I²C devices. Review the device data sheet carefully before connecting an I²C device to the SMBus.

The following table lists the addresses of the SMBus devices on the Catalyst XL and the carrier board.

Device	Address	Function
Catalyst XL		
Reserved	0101 0010	Write
	0101 0011	Read
Reserved	1101 0010	Write
	1101 0011	Read
Carrier Board		
I/O Expansion	0100 0000	Write
	0100 0001	Read
Reserved	1101 0100	Write
	1101 0101	Read
PCIe Switch	1110 0000	Write
	1110 0001	Read

Serial Ports

The carrier board includes a Super I/O Controller that is connected to the Catalyst XL using the LPC Bus. This device provides six serial ports for general-purpose serial communication as described in the following table.

Carrier Board Connector	Carrier Board Serial Port	Super I/O Controller Serial Port	Communications
P1 A	Serial 1	1	EIA-232, 9-wire
J40	Serial 2	2	EIA-422
P1 B	Serial 3	3	EIA-232, 9-wire
J38	Serial 4	4	EIA-485
J39	Serial 5	5	EIA-422
J37	Serial 6	6	EIA-485

Display and User Interface

The Catalyst XL Development Kit is a complete out-of-the-box development platform including a display subsystem and a Serial Digital Video Out (SDVO) output for a secondary display. The display subsystem consists of the following components:

- 10.4-inch TFT LCD with SVGA resolution (800 x 600), 6-bit color, and cable
- 4-wire resistive touch panel and cable
- CCFL backlight inverter and cable
- Catalyst Module Display Adapter
- Display cable

The following sections provide an overview of the display subsystem. For a complete description, refer to the *Catalyst Module Display Adapter User Manual (Eurotech document #110122-4000)*.

LVDS Display and Backlight Control

The display is driven by an LVDS display output from the Catalyst XL, in conjunction with the Catalyst Module Display Adapter. This output consists of four LVDS data pairs, as well as an LVDS pixel clock. The Catalyst XL supports 18-bit and 24-bit color; however, standard Catalyst Module Display Adapters support only 18-bit color. Additional signals from the module include the discrete signal L_VDDEN that controls power to the display and an I²C bus (L_DDC_DATA, L_DDC_CLK) for communication with the LCD Display Data Channel (DDC).

To control the display subsystem's backlight inverter, the Catalyst XL drives three backlight control signals and an I²C bus (L_CTLB_DATA, L_CTLA_CLK) for communication with the backlight. The following table describes the backlight control signals.

Signal	J11 Pin	Type	Description
L_BKLTCTL	A26	O-PWM	Controls the intensity of the backlight
L_BKLTEN	A29	O	Turns power to the backlight on or off
L_BKLTSEL	A25	O	Selects backlight control (PWM vs. I ² C)

The LVDS display output and backlight control signals are provided on socket J11, page 39 on the carrier board. This Eurotech-specific socket mates with the display adapter mates and provides an interface between the carrier board and display subsystem.

User Interface

Touch Panel

To drive the resistive touch panel, the carrier board includes a USB touch panel controller and separate analog multiplexer. This circuitry supports 4-, 5-, and 8-wire resistive touch panels. The pinout for header [J26](#), page [45](#) easily interfaces to 4- and 5-wire touch panels, while the pinout for header [J27](#), page [46](#) is suited for 8-wire touch panels. Standard Catalyst XL Development Kits include a 4-wire touch panel. The touch panel signals are routed from header J27 on the carrier board through the display adapter to the touch panel. For electrical specifications, see [Touch Panel Controller](#), page [63](#).

Carrier Board PS/2 Support

The Catalyst XL Development Kit supports a direct connection to a PS/2 mouse and keyboard using the dedicated keyboard/mouse interface of the Super I/O Controller. Connect these devices to socket [J34](#), page [48](#).

Catalyst Module Display Adapter

The Catalyst Module Display Adapter (display adapter) is a custom board that provides the interface between the Catalyst XL and the LVDS display, touch panel, and backlight inverter. Its card edge connector mates to the Eurotech-specific socket J11 on the carrier board. An LVDS buffer/repeater with configurable pre-emphasis is included on the display adapter to boost the data and pixel clock signals from the Catalyst XL enabling transmission over the display cable. The maximum cable length is 24 inches for controlled impedance cables that target $97 \Omega \pm 20\%$. The display cable should not introduce major impedance discontinuities that cause signal reflections.

In addition, the adapter includes an on-board power switch and fuse control power to the display, $2.2k\Omega$ pull-up resistors to V3.3S on the LCD DDC I²C bus (L_DDC_CLK and L_DDC_DATA), and $4.7k\Omega$ pull-up resistors to V3.3S on the Backlight I²C bus (L_CTLA_CLK and L_CTLB_DATA). For a complete description, refer to the *Catalyst Module Display Adapter User Manual (Eurotech document #110122-4000)*.

Serial Digital Video

In addition to the LVDS display output, the Catalyst XL Development Kit drives a secondary display on its Serial Digital Video Out (SDVO). This secondary output is available on [J10](#), page [38](#) and supports external devices that convert the SDVO protocol to DVI, HDMI, LVDS Analog-CRT, and TV-Out interfaces.

Contact your local Eurotech technical support for recommended Intel/HP SDVO cards.

Inputs and Outputs

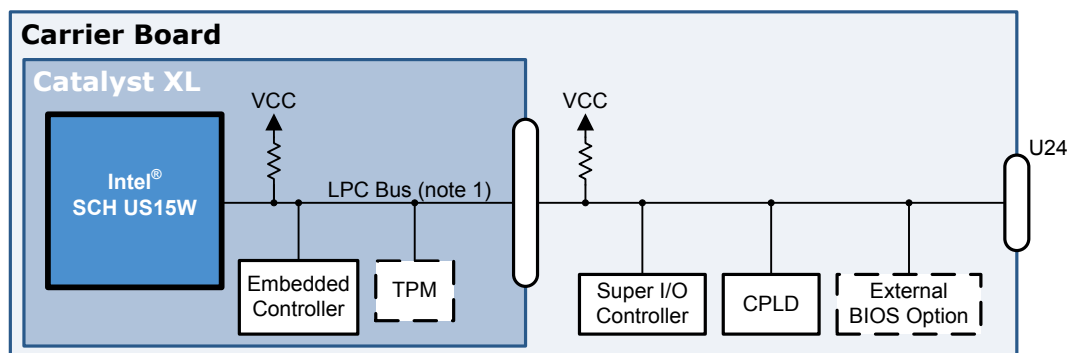
Several signals on the Catalyst XL Development Kit support I/O expansion and system management. The Catalyst XL provides a Low Pin Count bus supporting legacy I/O capabilities and GPIO; while the carrier board includes a Super I/O Controller on the LPC bus and additional GPIO.

For additional details about the signals provided by the Catalyst XL, including specific routing guidelines and design constraints, refer to the *Catalyst XL Design-In Guide* (Eurotech document #110123-3003).

Low Pin Count Bus

In response to the transition from ISA-based systems, the Low Pin Count (LPC) bus provides a migration path for legacy I/O capabilities. This bus enables general-purpose I/O expansion and provides communication to low-bandwidth devices. For this purpose, the Catalyst XL Development Kit supplies a LPC bus supporting the LPC 1.1 Specification. On the Catalyst XL, this bus connects to the Intel SCH US15W, the embedded controller, and optional TPM. On the carrier board, the LPC bus provides general-purpose expansion and connects to an external BIOS option, CPLD, and a Super I/O Controller. The LPC bus signals are available externally on U24, page 59.

The following diagram illustrates the LPC bus architecture on the development kit.



Note:

1. For details about the termination on individual signals, refer to the Catalyst XL Design-In Guide (Eurotech document #110123-3003) and U24, page 59.

Reset Signals

Two signals, BUF_RESET# and SWX_RESET#, force a hard reset of the Catalyst XL Development Kit. The carrier board buffers the system reset (RESET#, J1 B56) from the Catalyst XL and uses this buffered signal, BUF_RESET#, to reset all devices on the carrier board and several external peripherals. BUF_RESET# acts as a power-on reset forcing a complete system hardware reset and ensuring proper reset timing and logic synchronization. BUF_RESET# is available on J11, page 39, J12, page 41, J14, page 41, J15, page 41, J16, page 41, J17, page 42, and U24, page 59.

The input signal SWX_RESET# connects to the on-board reset switch SW1, page 32 and is also available on header J55, page 56 for connection to an external switch. This signal drives the Catalyst XL front panel reset input (FP_RESET#, J1 A59). The FP_RESET# signal initiates a hardware reset including the Intel Atom processor and Intel SCH US15W. However, do not use this signal as a power-on reset. For electrical specifications, see [Reset Signals](#), page 64.

General-Purpose Inputs and Outputs

The Catalyst XL Development Kit includes eighteen GPIO signals. The following table describes the GPIO signals.

Header	# of GPIO	Device	Electrical Specifications
U47	8	I/O expansion port	I/O Expansion Port, page 64
U27	2	Embedded Controller	Embedded Controller, page 65
	8	Super I/O Controller	Super I/O Controller, page 65

The I/O expansion port on header U47 is implemented by a NXP PCA9554 device and is software-controlled using the SMBus. The GPIO are programmed as inputs at power up. For the SMBus address, see [System Management Bus](#), page 19.

Carrier Board Super I/O Controller

On the carrier board, a Super I/O Controller connects to the LPC bus and provides system I/O control. This device's runtime registers control various discrete I/O on the carrier board. The following table lists the controls that are specific to the Catalyst XL Development Kit.

GPIO	Name	Type	Description
GP30	LVDS_PRESENT#	I	Indicates that the display adapter is installed in J11
GP34	SLOT1_PRESENT	I	Indicates that a card is installed in J14
GP36	H_INIT#	O	Initiates a soft reset of the module (For details, contact Eurotech)
GP37	SLOT2_PRESENT	I	Indicates that a card is installed in J15
GP40	IDE_PATADET	I	Indicates 40 or 80 conductor IDE cable
GP42	PCIE_WAKE#	I	Supports WAKE# functionality
GP60	SLP_LED	O	Control for external LED connection on J55
GP62	UART1_SHUTDOWN	O	Used in conjunction with J57 to control the Serial 1 transceiver
GP63	UART3_SHUTDOWN	O	Used in conjunction with J57 to control the Serial 3 transceiver
GP66	Reserved		

For detailed information about the control of the Super I/O Controller including a memory map, refer to the SMSC SCH3116 datasheet available at www.smssc.com.

System Monitoring

Both the Catalyst XL and devices on the carrier board perform system monitoring of temperature, voltage, and power. This section describes how the development kit uses each of these capabilities.

Temperature Monitoring

On the Catalyst XL, the embedded controller performs temperature monitoring by measuring the temperatures on the Intel Atom processor die and near the memory chips. The carrier board includes three temperature sensors that are accessible using the Super I/O Controller hardware monitoring registers.

The following table identifies these sensors and their location on the carrier board.

Sensor	Location
Internal	Internal to the Super I/O Controller
Remote 1 (Q61)	Component side near center of the PWB
Remote 2 (Q62)	Component side near Super I/O Controller

For external cooling applications or motor control, the Super I/O Controller includes two tachometer inputs and two pulse width modulation (PWM) outputs. These signals are available on header [J35](#), page [49](#) and header [J36](#), page [49](#).

In addition to the temperature monitoring capabilities of the Super I/O Controller, the carrier board includes a National Semiconductor LM75. The LM75 is a temperature sensor, Delta-Sigma analog-to-digital converter, and digital over-temperature detector. This device is access-able using the embedded controller I²C bus and drives the thermal monitor LED D29. For the I²C bus address of the LM75, see [I²C Bus](#), page [18](#).

Voltage Monitoring

In addition to temperature monitoring, the embedded controller performs voltage monitoring of the input power and on-module voltage regulators. On the carrier board, the Super I/O Controller also provides the capability to monitor voltages generated on the carrier board. Four analog inputs to the Super I/O Controller monitor the on-board voltages as described in the following table.

Super I/O Controller Input	On-board Voltage
VCCP_IN	V1.8S
+2.5V_IN	V3.3S
+12V_IN	V12S
+5V_IN	V5S

Power Monitoring

Power consumption varies based on the actual application. Several factors including level of processor activity and peripheral connections affect the total power consumption of a system. The Catalyst XL Development Kit includes power monitoring circuitry that allows the actual current draw of the system to be measured in real-time. Five Texas Instruments INA209 power monitor devices connect to the embedded controller I²C bus.

Each device monitors one of the five voltages supplied to the module on docking connector J2, page 34. For details about addressing these devices, see I²C Bus, page 18.

Audio Interface

The Catalyst XL Development Kit offers a variety of audio inputs and outputs supporting a wide range of applications. On the Catalyst XL, the Intel SCH US15W provides an Intel High Definition Audio (Intel HD Audio) interface that implements high quality audio in an embedded environment. The Intel HD Audio specification defines a uniform interface between a host computer and audio codec, specifying register control, physical connectivity, programming model, and codec architectural components. This Intel HD Audio interface connects to an IDT 92HD71B8 4-channel audio codec located on the carrier board and is available to a secondary codec on header J18, page 42.

The Catalyst XL supports 3.3 V or 1.5 V signaling levels. Standard Catalyst XL Development Kits are configured for 3.3 V. Contact your local Eurotech technical support if your application requires 1.5 V.

The development kit provides the following audio inputs and outputs:

- J19: S/PDIF, page 43 (optional)
- J20: Stereo Line Inputs and Headphone, page 44
- J22: Digital Microphone, page 44
- J23: Stereo Line Out 1, page 45
- J53: Stereo Line Out 0, page 55
- J54: Microphone, page 55

For electrical specifications, see [Audio Codec](#), page 66.

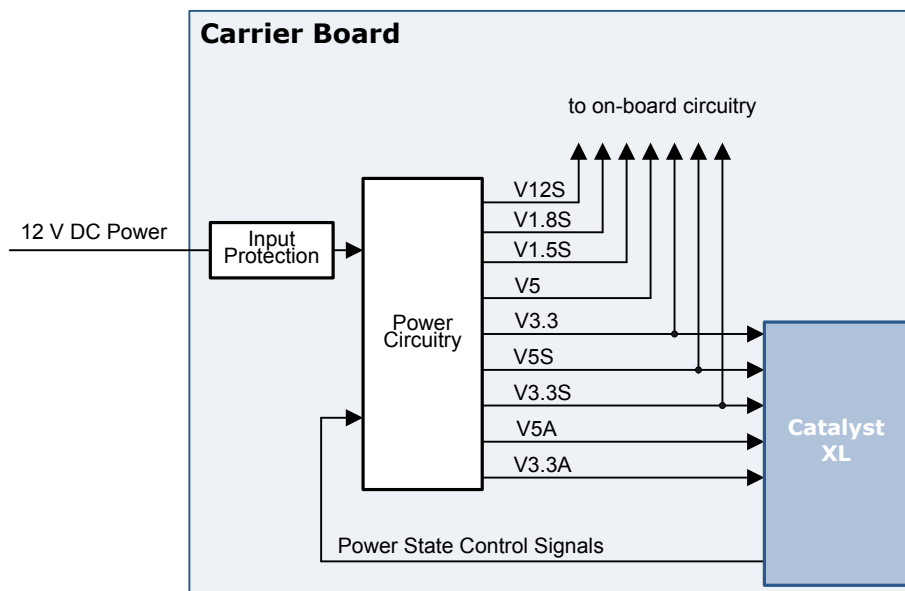
Power and Power Management

Power and power management are especially critical on the Catalyst XL Development Kit. The Catalyst XL has very specific power and power-on sequence requirements in order to power-up and operate correctly. If the system does not meet the module's requirements, the module will not boot.

The following sections provide an overview of the Catalyst XL power requirements. For a complete description, refer to the *Catalyst XL Design-In Guide (Eurotech document #110123-3003)*. Custom carrier boards must implement the exact power supply sequencing described in the design-in guide.

Power Supply Architecture

The following diagram illustrates the power supply architecture of the Catalyst XL Development Kit. Notice that voltages ending with an “A” indicate “always” power (power states S0, S3, S4, and S5), voltages with no suffix indicate primary power (power states S0 and S3), and voltages ending with an “S” indicate normal operating power (power state S0).



The architecture of the power supply partitions power distribution across the Catalyst XL and the carrier board. Power jack **J29**, page 46 accepts +12 VDC input power from an external supply such as the AC power adapter included with the Catalyst XL Development Kit. The maximum main input voltage is limited by input protection.

The development kit can selectively turn off power to various subsystems. This load-shedding feature can significantly reduce power consumption. Applications and the operating system determine how selective power management is utilized.

The following are the subsystems that can be disabled selectively:

- User Interface (LVDS Display, Touch Panel, and Backlight)
- SD/MMC sockets
- SDIO Peripheral Development socket

ACPI Power Management States

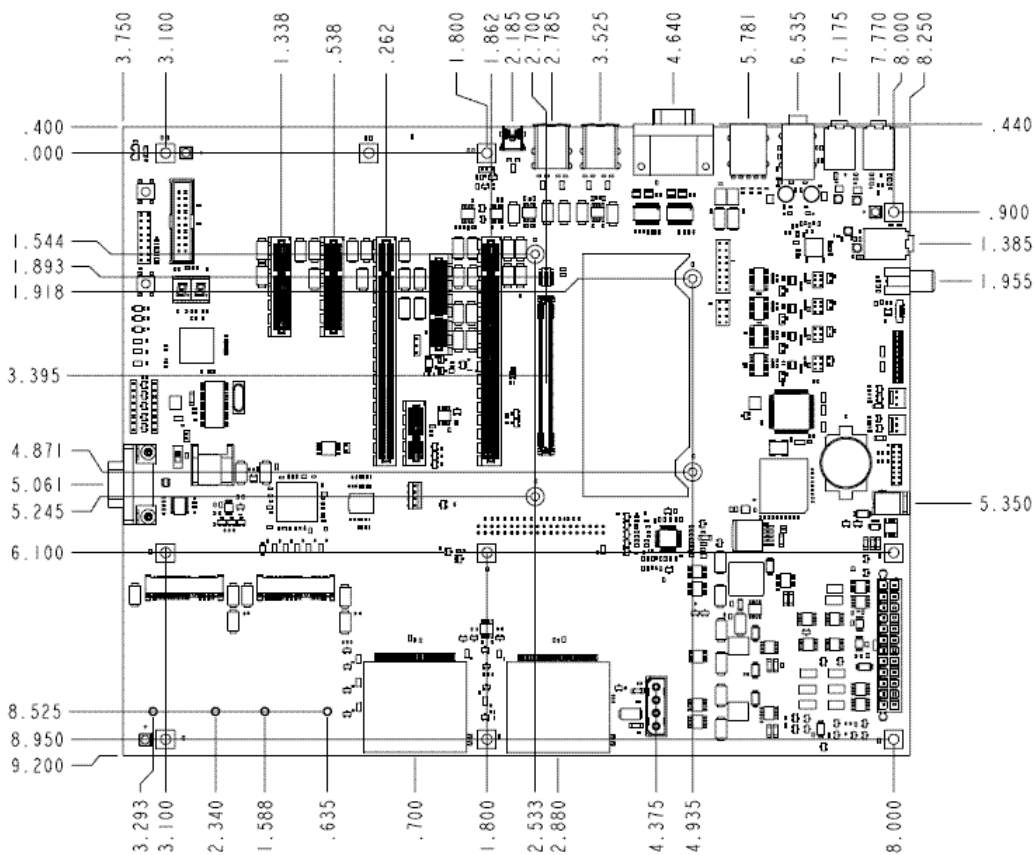
The Catalyst XL supports the Advanced Configuration and Power Interface (ACPI) specification which defines the low power states for ACPI-compliant systems. This capability allows the Catalyst XL to cycle into power saving states. Wake events transition the Catalyst XL from a low-power state back to full operation. For specific information about power management on the Catalyst XL, refer to the *Catalyst XL Design-In Guide* (Eurotech document #110123-3003).

Mechanical

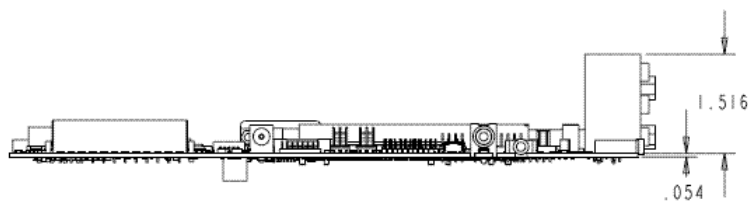
Mechanical Drawing

The following mechanical drawings specify the dimensions of the carrier board, as well as locations of key components on the board. All dimensions are in inches.

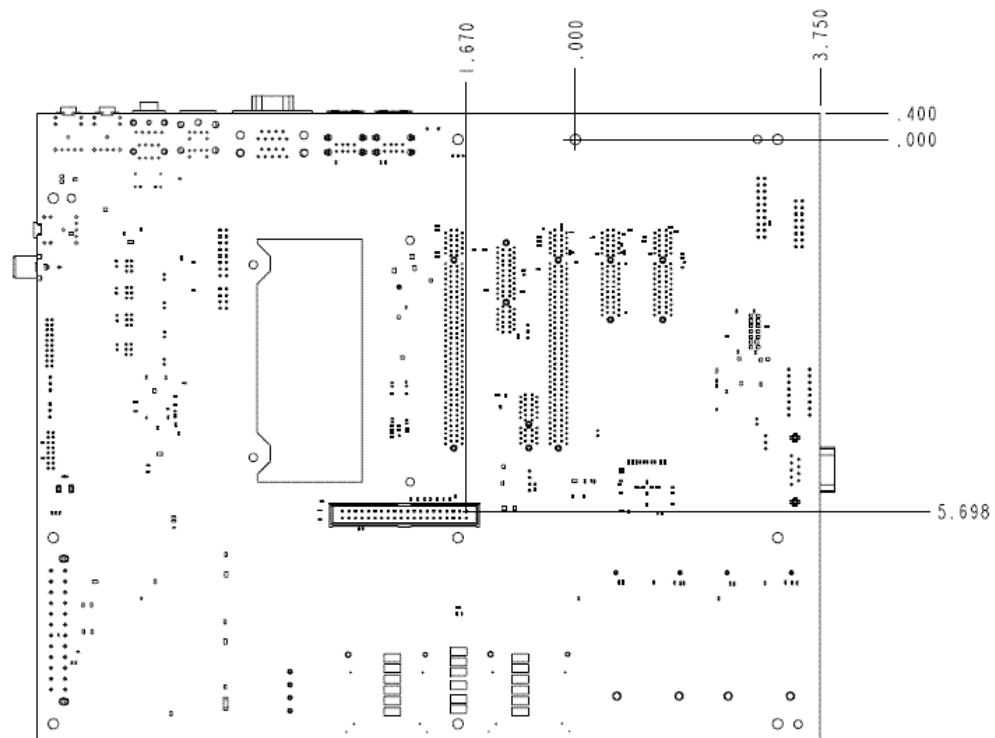
The first view illustrates the component side of the carrier board.



The next diagram illustrates the side view of the carrier board.



The final view illustrates the underside of the carrier board. Notice header J8 is located on the underside.



Mounting Holes

The carrier board includes three sets of mounting holes that enable the following mountings:

- Catalyst XL to carrier board (MH11 - MH14)
- Carrier board to enclosure (MH5 – MH10)
- Carrier board to enclosure along I/O panel (MH1 – MH4)

The mounting holes for the Catalyst XL and carrier board connect electrically to the ground plane, while the mounting holes along the I/O panel connect electrically to chassis ground. The ground plane and chassis ground are electrically connected. All connections are made using 600 Ω inductors.

Per IPC-A-610D section 4.2.3, secure the board to standoffs using a flat washer against the board with a split washer on top between the flat washer and the screw head or nut. Do not use toothed star washers, as they cut into the plating and laminations of the board over time and will not produce an attachment that will withstand vibration and thermal cycling.

Installing and Removing the Catalyst XL

The Catalyst XL connects to the carrier board through two connectors that are in line with each other. A high-density, stacking board-to-board connector carries the data signals, while a smaller 2x7-pin 1 mm-pitch connector carries power. When fully connected, these fine pitch connectors provide reliable and durable connection. However, care is required when removing or installing the module onto the carrier board. If correct procedures for installation and removal are not followed, damage to the connectors and/or the connector pins can result.

For detailed procedures to install a module onto or remove a module from a carrier board, refer to the *Catalyst Module Installation and Removal (Eurotech document #110122-2014)*. Download this document from the Eurotech support site (<http://support.eurotech-inc.com/>, topic 2778).

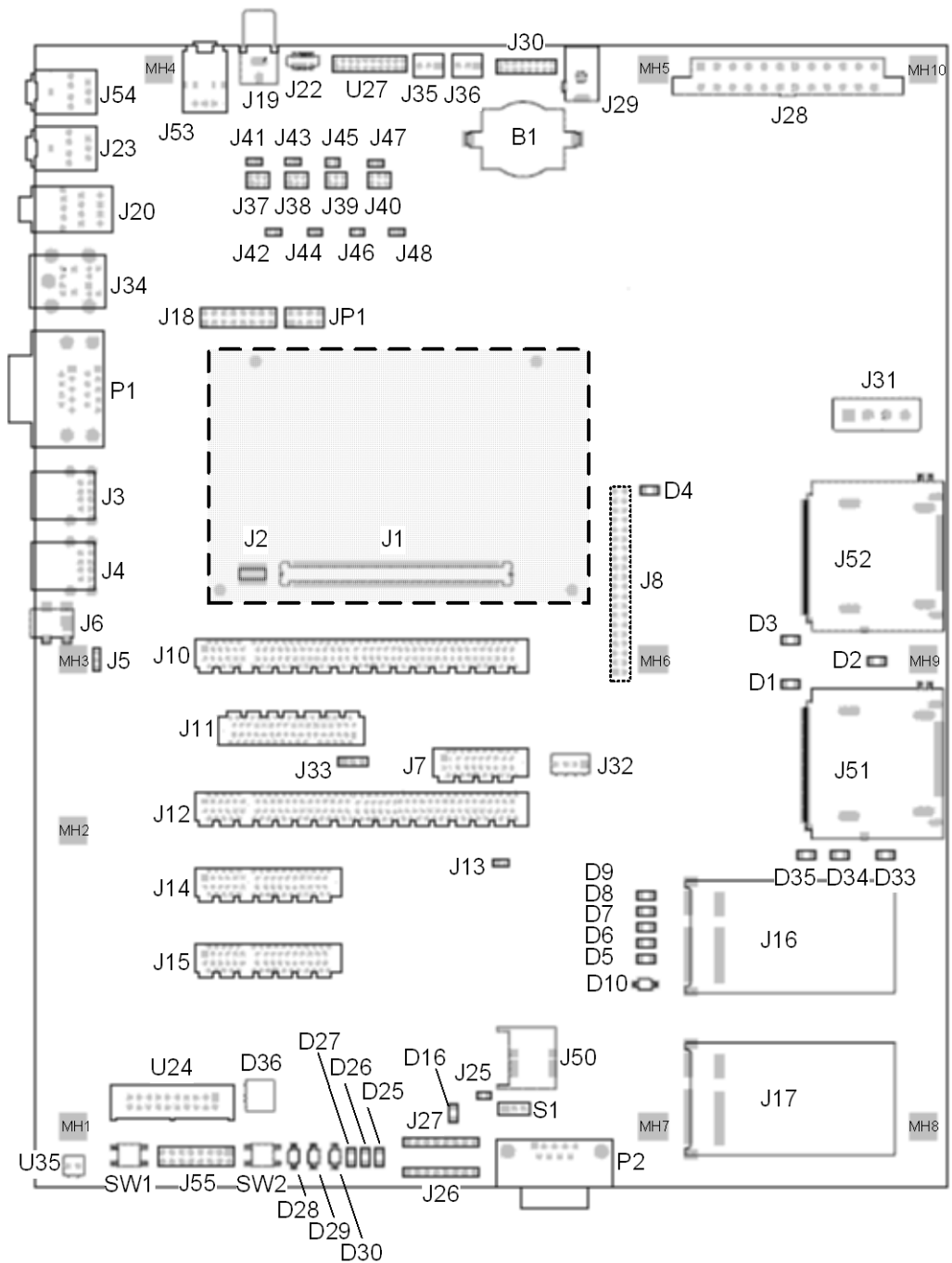


Important! Observe industry-standard electronic handling procedures when handling the module. Eurotech recommends using a grounded wrist strap and heel strap. The connectors expose signals on the system bus that do not have ESD protection.

Connectors, Switches, Jumpers, and Indicators

Identifying Connectors

The following diagram illustrates the location of key components on the Catalyst XL Development Kit. The Catalyst XL is located in the center of the carrier board indicated by a shaded area. Two docking connectors, J1 and J2, lie under the module. Header J8 is populated on the underside and is indicated with a dashed line border.



Switches, Jumpers, and Indicators

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

SW1: Reset

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

In addition, this switch connects to the front panel reset signal, SWX_RESET# (J55 pin 7) allowing connection of an external reset switch.

SW2: On/Off

SW2 is the On/Off button for the Catalyst XL Development Kit. SW2 turns power used for normal operation on and off. The following table defines the functionality of the power button.

PWR_BUTTON#	Operation
Momentary assertion (less than 4 seconds)	From shutdown, initiates a power-up sequence to full operation. From full operation, initiates an orderly shutdown sequence and turns off power.
Press and hold (greater than 4 seconds)	Initiates a “4 second over-ride” and turns off power without notification to the operating system.

Switch SW2 also connects to the front panel power signal, SWX_ONOFF# (J55 pin 6) allowing connection of an external on/off switch.

S1: Radio Disable

S1 is a one-position slide switch that controls the radio operation of a wireless communications add-in card connected to J16, page 41.

Switch setting	Configuration
On (toward pin 3)	Radio disabled
Off (toward pin 1)	Radio enabled (default)

J13: PCIe Switch EEPROM

Type: 2-post header, 2 mm

Jumper J13 enables configuration of the carrier board PCIe switch using a serial EEPROM.

Jumper setting	Configuration
1-2	Serial EEPROM output connects to PCIe switch data out
nc	10kΩ pull-up resistor on PCIe switch data out (default)

Carrier Board LED Indicators

The carrier board has sixteen green light-emitting diodes (LEDs) and three red LEDs to indicate system operation. The tables provided in this section describe the LED functionalities.

D1-D3: SD/MMC LEDs

LED	Type	Description
D1	green	On indicates activity on SD/MMC socket J51
D2	green	On indicates activity on SD/MMC socket J52
D3	green	On indicates activity on the SDIO Peripheral Development interface

D4: IDE/PATA LED

LED	Type	Description
D4	green	Blinking indicates activity on IDE/PATA header J8

D5-D10: PCIe Switch LEDs

LED	Type	Description
D5	green	On indicates PCIe connection between module and carrier board PCIe switch
D6	green	On indicates a connection on the PCIe 1 slot J14
D7	green	On indicates a connection on the PCIe 2 slot J15
D8	green	On indicates a connection on the Mini PCIe 0 slot J16
D9	green	On indicates a connection on the Mini PCIe 1 slot J17
D10	red	On indicates a fatal error

D16: Touch Panel LED

LED	Type	Description
D16	green	Blinking indicates activity on the touch panel

D25-D27: Power LEDs

LED	Type	Description
D25	green	On indicates normal operating power (V3.3S)
D26	green	On indicates primary supply voltage (V3.3)
D27	green	On indicates power is connected (V3.3A)

D28-D29: Thermal Monitoring LEDs

LED	Type	Description
D28	red	On indicates a SIO thermal alert
D29	red	On indicates a carrier thermal alert

D33-D35: Mini PCIe 0 Status LEDs

LED	Type	Description
D33	green	Indicates Wireless Personal Area Network (WPAN)
D34	green	Indicates Wireless Local Area Network (WLAN)
D35	green	Indicates Wireless Wide Area Network (WWAN)

D36: Port 80 Status Display

D36 displays the Port 80 POST codes from the Catalyst XL.

Display Adapter LED Indicators

The display adapter, installed in J11, has two green light-emitting diodes (LEDs) to indicate system operation. The tables provided in this section describe the LED functionalities.

D1: Backlight On LED

This LED indicates the status of the backlight power on the display adapter.

LED	Type	Description
D1	green	On indicates backlight power on

D2: Power On LED

This LED indicates when power is applied to the display adapter.

LED	Type	Description
D2	green	On indicates 3.3 V on the display adapter power

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 31.

J1: Docking Connector: Data

The Catalyst XL connector J1 mates to the carrier board connector J1. Most data signals are provided on this docking connector.

J2: Docking Connector: Power

The Catalyst XL receives the power input and controls for interfacing with an external power supply on this docking connector.

J3: USB Host 0 and USB Host 1

Board connector: USB Type A dual receptacle, Molex 67298-3091

Mating connector: USB Type A plug

The carrier board includes four USB 2.0 host ports with dual socket J3 providing Host 0 and Host 1. These two ports support USB 2.0 high, full, and low speed devices. The connector shield is tied to chassis ground. For further details, see [USB](#), page 17.

Socket	Pin	Name	Type	Description
A	1	USB_HOST0_PWR	PO	5 V DC power output
	2	USB_HOST0-	IO	USB Host 0
	3	USB_HOST0+		
	4	GND	P	Ground
B	1	USB_HOST1_PWR	PO	5 V DC power output
	2	USB_HOST1-	IO	USB Host 1
	3	USB_HOST1+		
	4	GND	P	Ground

J4: USB Host 2 and USB Host 3

Board connector: USB Type A dual receptacle, Molex 67298-3091

Mating connector: USB Type A plug

The carrier board includes four USB 2.0 host ports with dual socket J4 providing Host 2 and Host 3. These two ports support USB 2.0 high speed devices only. The connector shield is tied to chassis ground. For further details, see [USB](#), page 17.

Socket	Pin	Name	Type	Description
A	A1	USB_HOST2_PWR	PO	5 V DC power output
	A2	USB_HOST2-	IO	USB Host 2
	A3	USB_HOST2+		
	A4	GND	P	Ground
B	B1	USB_HOST3_PWR	PO	5 V DC power output
	B2	USB_HOST3-	IO	USB Host 3
	B3	USB_HOST3+		
	B4	GND	P	Ground

J6: USB Host/Client

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

Mating connector: Mini USB Type B plug

The USB signals located on socket J6 support a USB 2.0 host or USB 2.0 client port. Jumper J5 selects the operation of this port. The connector shield is tied to chassis ground. For further details, see [USB](#), page 17.

Pin	Name	Type	Description	
			USB Host (default)	USB Client
1	USBPWR_CLIENT	PIO	5 V DC output	DC power input
2	USB_PORT-	IO	USB Host	USB Client
3	USB_PORT+			
4	nc			
5	GND	P	Ground	Ground



Warning: Socket J6 pin 1 is a power input or power output based on jumper J5. Check the jumper setting before connecting a USB device to this port.

J5: USB Host/Client Jumper

Type: 3-post header, 2 mm

Jumper J5 selects the configuration of the USB Host/Client port as shown in the following table.

Jumper setting	Mode	Configuration of J6, pin 1
1-2	USB Client	DC power input (used to sense connection)
2-3	USB Host	DC power output (default)
nc		No power connection

J7: SDIO Peripheral Development

Board connector: PCIe x1 socket, Molex 87715-9006

Mating connector: Custom development cards

The SD/MMC signals connected to the PCIe-style socket J7 enable Secure Digital (SDIO) peripheral development of customer unique add-in cards. For further details, see [Secure Digital and MultiMediaCard](#), page 18.



Warning: Socket J7 does not support the standard PCIe pin out. Install custom SDIO Peripheral Development cards only.

Pin	Name	Type	Termination	Description
A1	GND	P		Ground
A2	nc			
A3	nc			
A4	GND	P		Ground
A5	SD2_CD#	I-LVTTL	PU 10kΩ V3.3S	SDIO card detect
A6	nc			
A7	nc			
A8	nc			
A9	SD2_VDD	PO		Software-controlled 3.3 V
A10	SD2_VDD	PO		Software-controlled 3.3 V
A11	SD2_DATA0	IO-LVTTL	R 48Ω	SDIO data 0
A12	GND	P		Ground
A13	SD2_DATA4	IO-LVTTL	R 48Ω	SDIO data 4
A14	SD2_DATA5	IO-LVTTL	R 48Ω	SDIO data 5
A15	GND	P		Ground
A16	SD2_DATA6	IO-LVTTL	R 48Ω	SDIO data 6
A17	SD2_DATA7	IO-LVTTL	R 48Ω	SDIO data 7
A18	GND	P		Ground
B1	nc			
B2	nc			
B3	nc			
B4	GND	P		Ground
B5	SD2_CLK	O-LVTTL	R 48Ω	SDIO clock
B6	SD2_CMD	IO-LVTTL	R 48Ω PU 40kΩ V3.3S	SDIO command indicator
B7	GND	P		Ground
B8	SD2_VDD	P		Software-controlled 3.3 V

Pin	Name	Type	Termination	Description
B9	nc			
B10	nc			
B11	SD2_WP	I-LVTTL		SDIO write protect
B12	SD2_DATA3	IO-LVTTL	R 48Ω	SDIO data 3
B13	GND	P		Ground
B14	SD2_DATA1	IO-LVTTL	R 48Ω	SDIO data 1
B15	SD2_DATA2	IO-LVTTL	R 48Ω	SDIO data 2
B16	GND	P		Ground
B17	SLOT_PRESENCE	I	PU 10kΩ V_ON	Card present
B18	GND	P		Ground

J8: IDE/PATA Interface

Board connector: 2x20 shrouded header, 0.1-inch, Neltron 2316S-40G-F1

Mating connector: 40-pin IDE socket

Header J8 conforms to the PATA Standard supporting an optional 2.5-inch PATA magnetic or solid-state disk drive. For a description of the external memory interfaces available on the Catalyst XL Development Kit, see [External Memory Interfaces](#), page 15.

J10: SDVO Socket

Board connector: PCIe x16 socket, Molex 87715-9306

Mating connector: Intel/HP SDVO cards

In addition to the LVDS display output, the Catalyst XL Development Kit provides a secondary display output on SDVO socket J10. For further details, see [Serial Digital Video](#), page 22.



Warning: Socket J10 does not support the standard PCIe pinout. Install recommended Intel/HP SDVO cards only.

J11: LVDS Display & Backlight

Board connector: PCIe x4 socket, Molex 87715-9106

Mating connector: Custom display adapter card

Socket J11 is a Eurotech-specific socket that includes the LVDS display and backlight control signals. The display adapter included with the Catalyst XL Development Kit mates to socket J11 and provides an interface between the module and display subsystem. For further details, see [LVDS Display and Backlight Control](#), page 21.



Warning: Socket J11 is a Eurotech-specific socket. Install the Catalyst Module Display Adapter in this socket only.

Pin	Name	Type	Termination	Description
A1	GND	P		Ground
A2	V12S	PO		12 V power
A3	V12S	PO		12 V power
A4	GND	P		Ground
A5	nc			
A6	nc			
A7	nc			
A8	nc			
A9	V3.3S	PO		Normal operating 3.3 V
A10	V3.3S	PO		Normal operating 3.3 V
A11	BUF_RESET#	O	PD 100k Ω	Buffered reset
A12	GND	P		Ground
A13	LVDS_CLK+	O-LVDS		LVDS clock
A14	LVDS_CLK-	O-LVDS		LVDS clock
A15	GND	P		Ground
A16	L_DDC_CLK	O-LVTTL		LCD DDC I ² C clock
A17	L_DDC_DATA	IO-LVTTL		LCD DDC I ² C data
A18	GND	P		Ground
A19	nc			
A20	GND	P		Ground
A21	L_CTLA_CLK	O-LVTTL		Backlight I ² C clock
A22	L_CTLB_DATA	IO-LVTTL		Backlight I ² C data
A23	GND	P		Ground
A24	GND	P		Ground
A25	L_BKLTSEL	O		Selects backlight control
A26	L_BKLTCTL	O-PWM		Controls backlight intensity
A27	GND	P		Ground

Pin	Name	Type	Termination	Description
A28	GND	P		Ground
A29	L_BKLTEN	O		Turns power to the backlight on or off
A30	L_VDDEN	O-LVTTL		LCD power enable
A31	GND	P		Ground
A32	nc			
B1	V12S	PO		12 V power
B2	V12S	PO		12 V power
B3	V12S	PO		12 V power
B4	GND	P		Ground
B5	SMB_CLK	O-LVTTL	PU 2.2k Ω V3.3S	SMBus clock
B6	SMB_DATA	IO-LVTTL	PU 2.2k Ω V3.3S	SMBus data
B7	GND	P		Ground
B8	V3.3S	PO		Normal operating 3.3 V
B9	nc			
B10	nc			
B11	LVDS_PRESENT	I-3.3	PU 10k Ω V3.3S	Display adapter detect (Super I/O GP30)
B12	V5S	PO		Normal operating 5 V
B13	GND	P		Ground
B14	LVDS_DATA0+	O-LVDS		LVDS data 0
B15	LVDS_DATA0-	O-LVDS		LVDS data 0
B16	GND	P		Ground
B17	SLOT_PRESENCE	I	PU 10k Ω V_ON	Card present
B18	GND	P		Ground
B19	LVDS_DATA1+	O-LVDS		LVDS data 1
B20	LVDS_DATA1-	O-LVDS		LVDS data 1
B21	GND	P		Ground
B22	GND	P		Ground
B23	LVDS_DATA2+	O-LVDS		LVDS data 2
B24	LVDS_DATA2-	O-LVDS		LVDS data 2
B25	GND	P		Ground
B26	GND	P		Ground
B27	LVDS_DATA3+	O-LVDS		LVDS data 3
B28	LVDS_DATA3-	O-LVDS		LVDS data 3
B29	GND	P		Ground
B30	nc			
B31	SLOT_PRESENCE	I	PU 10k Ω V_ON	Card present
B32	GND	P		Ground

J12: PCIe 0 (x1)

Board connector: PCIe x16 socket, Molex 87715-9306

Mating connector: PCIe card

Socket J12 provides a direct PCIe x1 connection to the Catalyst XL. The socket accepts x1, x4, x8, and x16 cards. However, it automatically negotiates down to an x1 lane. PCIe 0 does not support the optional JTAG signals. For further details, see [PCI Express](#), page 16.

J14: PCIe 1 (x1)

Board connector: PCIe x4 socket, Molex 87715-9106

Mating connector: PCIe card

The carrier board includes a 5-lane, 5-port PCIe switch for expanded PCIe capability. Socket J14 connects to this switch providing PCIe 1. The socket accepts x1 and x4 cards. However, it automatically negotiates down to an x1 lane. PCIe 1 does not support the optional JTAG signals. For further details, see [PCI Express](#), page 16.

J15: PCIe 2 (x1)

Board connector: PCIe x4 socket, Molex 87715-9106

Mating connector: PCIe card

The carrier board includes a 5-lane, 5-port PCIe switch for expanded PCIe capability. Socket J15 connects to the switch providing PCIe 2. The socket accepts x1 and x4 cards. However, it automatically negotiates down to an x1 lane. PCIe 2 does not support the optional JTAG signals. For further details, see [PCI Express](#), page 16.

J16: Mini PCIe 0 with UIM

Board connector: 52-pin MiniCard, Molex 67910-0001

Mating connector: Mini PCIe card

The carrier board includes a 5-lane, 5-port PCIe switch for expanded PCIe capability. Socket J16 connects to this switch providing Mini PCIe 0. For further details, see [PCI Express](#), page 16. Socket J16 supports an UIM interface which also connects to socket J50, radio operation of a wireless communications add-in card, and status indicators. For details about control of the radio operation, see [S1](#), page 32. For details about the three status indicators, see [Carrier Board LED Indicators](#), page 33.

J17: Mini PCIe 1

Board connector: 52-pin MiniCard, Molex 67910-0001

Mating connector: Mini PCIe card

The carrier board includes a 5-lane, 5-port PCIe switch for expanded PCIe capability. Socket J17 connects to this switch providing Mini PCIe 1. For further details, see [PCI Express](#), page 16. Unlike socket J16, socket J17 does not support a UIM interface, radio operation of a wireless communication add-in card, and status indicators.

J18: Secondary Audio Codec

Board connector: 2x8 header, 0.1-inch, Samtec HMTSW-108-07-LD-200

Mating connector: Samtec HCSD series socket

The Intel HD Audio interface included on the Catalyst XL supports up to two audio codecs. The primary codec is populated on the carrier board, while header J18 provides a connection to an external secondary codec. For further details, see [Audio Interface](#), page 26.

Pin	Name	Type	Termination	Description
1	GND	P		Ground
2	nc			
3	V3.3	PO		3.3 V primary supply voltage
4	nc			
5	nc			
6	HDA_SD11	I-HDA		Serial audio data in 1
7	V12S	PO		12 V power
8	reserved			
9	V3.3	P		3.3 V primary supply voltage
10	HDA_SDATA_OUT	O-HDA	R 33 Ω	Serial audio data out
11	GND	P		Ground
12	HDA_SYNC_OUT	O-HDA	R 33 Ω	Audio frame sync
13	DVDD_IO	PO		Reference voltage
14	HDA_RST_OUT#	O-HDA	R 33 Ω	Audio reset
15	GND	P		Ground
16	HDA_CLK_OUT	O-HDA	R 33 Ω	Audio bit clock

JP1: Secondary Audio Codec Jumper

Type: 2x4 header, 0.1-inch

Jumper JP1 provides additional signals for the secondary codec.

Pin	Name	Type	Termination	Description
1	HDA_PWRDN_NET	O	PD 10k Ω	Audio power down
2	HDA_SPKR	O-HDA		PC beep audio
3	GND	P		Ground
4	V5	PO		5 V primary supply
5	V3.3S	PO		Normal operating 3.3 V
6	nc			
7	HDA_DOCK_RST#	O-HDA		Audio docking function reset
8	HDA_DOCK_EN#	O-HDA		Audio docking function enable

J19: S/PDIF (optional)

Board connector: RCA jack, right angle, CUI Inc RCJ-041

Mating connector: RCA plug

Socket J19 provides an optional Sony/Philips Digital Interconnect Format (S/PDIF) output for connectivity to consumer electronic equipment. For further details, see [Audio Interface](#), page 26.

Pin	Name	Type	Description
1	GND	P	Ground
2	SPDIF	O	S/PDIF

J20: Stereo Line Input, Microphone Input, and Headphone Output

Board connector: 3.5 mm stereo jack, stacked, Kycon STX-4335-5BGP-S1

Mating connector: 3.5 mm stereo plug

Socket J20 provides direct connections to two stereo line inputs and one headphone output. The shell of the socket is connected to chassis ground. For further details, see [Audio Interface](#), page 26.

Socket	Pin	Name	Type	Description
Top, Blue	32	LINE_IN1_R	AI	Line in 1 (Port C)
	35	LINE_IN1_L		
Center, Green	22	HDPHONE_R	AO	Headphone (Port A)
	25	HDPHONE_L		
Bottom, Pink	2	LINE_IN0_R	AI	Line in 0 (Microphone) (Port B)
	5	LINE_IN0_L		
	1	GND_HDA	P	Audio ground

J22: Digital Microphone

Board connector: 6-pin FFC/FPC connector, 0.5 mm, Molex 52559-0672

In addition to the analog microphone input, the codec included on the carrier board supports a digital microphone input on socket J22. For further details, see [Audio Interface](#), page 26.

Pin	Name	Type	Description
1	DMIC_CLK	O	Digital microphone clock
2	GND	P	Ground
3	V_DMIC	PO	Digital microphone power (default 3.3 V)
4	DMIC0	I	Digital microphone channel 0
5	GND	P	Ground
6	DMIC1	I	Digital microphone channel 1

J23: Stereo Line Out 1

Board connector: 3.5 mm stereo phone jack, Kobiconn 161-3503-EX

Mating connector: 3.5 mm stereo phone plug

Socket J23 provides the connection to one stereo line output capable of driving powered speakers. For further details, see [Audio Interface](#), page 26.

Pin	Name	Type	Description
1	GND_HDA	P	Audio ground
2	LINE_OUT1_L	AO	Line out 1, left channel (Port D)
3	nc		
4	nc		
5	LINE_OUT1_R	AO	Line out 1, right channel (Port D)
6	nc		
7	GND_HDA	P	Audio ground
8	SENSE_A_PD	AI	Detects a connection on Port D

J26: Touch Panel (4- or 5-wire)

Board connector: 8-pin header, 0.1-inch, Samtec HMTSW-108-07-L-S-200

Mating connector: Samtec HCSS series socket

Header J26 supplies the signals for a 4- or 5-wire touch panel. Standard Catalyst XL Development Kits include a 4-wire touch panel. For further details, see [User Interface](#), page 22.

Pin	Name	Type	4-Wire	4-Wire (Alt)	5-Wire	5-Wire (Alt)	Description
1	TC0	AIO		Left	UR		Touch panel
2	TC1	AIO		Right	UL		
3	TC2	AIO		Top	Wiper		
4	TC4	AIO	Bottom	Bottom	LL	LL	
5	TC3	AIO	Right		LR	UL	
6	TC2	AIO	Top			Wiper	
7	TC1	AIO	Left			LR	
8	TC0	AIO				UR	

J27: Touch Panel (8-wire)

Board connector: 8-pin header, 0.1-inch, Samtec HMTSW-108-07-L-S-200

Mating connector: Samtec HCSS series socket

Header J27 supports an 8-wire touch panel by adding sense lines to the excite lines. Standard Catalyst XL Development Kits include a 4-wire touch panel. For further details, see [User Interface](#), page 22.

Pin	Name	Type	8-Wire	Description
1	TC2	AIO	Bottom	Touch panel
2	SY+	AIO	Bottom sense	
3	SX+	AIO	Right sense	
4	TC0	AIO	Right	
5	TC4	AIO	Top	
6	SY-	AIO	Top sense	
7	SX-	AIO	Left sense	
8	TC1	AIO	Left	

J25: Touch Panel Jumper

Type: 2-post header, 2 mm

Jumper J25 configures the development kit for support of 4-, 5- and 8-wire touch panels.

Jumper setting	Configuration
1-2	4-, 5-, and 8-wire support (default)
nc	8-wire only support

J28: ATX Power Supply Input

The ATX power supply input is no longer supported.

J29: DC Power Input

Board connector: power jack, 2.1 mm x 5.5 mm, CUI Inc PJ-202AH

Mating connector: 2.1 mm power supply plug

Power jack J29 accepts +12 VDC input power from an external supply such as the AC power adapter included with the development kit. The power input is on the center pin. For details about the power supply architecture, see [Power Supply Architecture](#), page 27.



Warning: Disconnect the power input before removing the Catalyst XL. Removing the module from a powered carrier board may result in damage to both the carrier board and to the module. For detailed instructions for removing the module, refer to the *Catalyst Module Installation and Removal* (Eurotech document #110122-2014).

J30: JTAG

Board connector: 2x8 socket, 2 mm, Samtec SQT-108-01-L-D

Mating connector: Samtec TCMD series IDC assembly

The Catalyst XL Development Kit provides a full IEEE1149.1 JTAG port for factory test and for board-level software debugging; otherwise, the JTAG port is not supported for application use.

Pin	Name	Type	Description
1	JTAG_TRST#	I	
2	JTAG_TMS	I	
3	GND	P	
4	JTAG_TDI	I	
5	JTAG_TCK	I	
6	JTAG_VREF3.3V	PO	
7	GND	P	
8	JTAG_TDO	O	JTAG interface
9	nc		
10	nc		
11	nc		
12	JTAG_VREF5V	PO	
13	nc		
14	nc		
15	nc		
16	GND	P	

J31: Disk Drive Power Out

Board connector: 4-pin header, 0.2-inch, Molex 15-24-4449

Mating connector: Molex 15-24-4048 crimp housing

Header J31 supplies power to an optional external disk drive used for mass storage in the Catalyst XL Development Kit.



Warning: J31 provides output power only. Do not connect to an input power source.

Pin	Name	Type	Description
1	V12S	PO	12 V power
2	GND	P	Ground
3	GND	P	Ground
4	V5S	PO	5 V normal operating power

J32: SMBus

Board connector: 4-pin shrouded header, 0.1-inch, FCI 69167-104

Mating connector: PV CTW housings and contacts

The SMBus provides I/O expansion capabilities on header J32. Use this interface to communicate with external devices. For further details, see [System Management Bus](#), page 19.

Pin	Name	Type	Termination	Description
1	SMB_DATA	IO-LVTTL	PU 2.2kΩ V3.3S	SMBus data
2	SMB_CLK	O-LVTTL	PU 2.2kΩ V3.3S	SMBus clock
3	SMB_ALERT#	IO-LVTTL	PU 10kΩ V3.3S	SMBus interrupt
4	GND	P		Ground



Note: The SMBus is not compatible with all I²C devices. Review the device data sheet carefully before connecting an I²C device to the SMBus.

J33: I²C Bus

Board connector: 3-pin header, 0.1-inch, Samtec HMTSW-103-07-L-S-200-LL

Mating connector: Samtec HCSS series socket

Header J33 provides an external connection to the I²C bus of the Catalyst XL embedded controller. For further details, see [I²C Bus](#), page 18.

Pin	Name	Type	Termination	Description
1	I2C_SDA	IO	PU 10kΩ V3.3A	I ² C bus data
2	I2C_SCL	O	PU 10kΩ V3.3A	I ² C bus clock
3	GND	P		Ground

J34: PS/2 Keyboard & Mouse

Board connector: double-stacked Mini-DIN socket, Kycon KMDGX-6SG/P-S4N

Mating connector: Mini-DIN plug

The Catalyst XL Development Kit supports a PS/2 keyboard and PS/2 mouse on socket J34. The connector shield is tied to chassis ground. For further details, see [User Interface](#), page 22.

Socket	Description
Top	PS/2 Mouse
Bottom	PS/2 Keyboard

J35: Tachometer 1

Board connector: 3-pin header, 0.1-inch, Molex 22-23-2031

Mating connector: Molex 22-01-2031 crimp terminal housing

Two tachometer outputs are available on header J35 and header J36 for motor control or external cooling applications. For further details, see [Temperature Monitoring](#), page 25.

Pin	Name	Type	Description
1	TACH1	O	Tachometer 1
2	V12S	PO	12 V power
3	TACH1_PWR	AO	Switched adjustable control 1

J36: Tachometer 2

Board connector: 3-pin header, 0.1-inch, Molex 22-23-2031

Mating connector: Molex 22-01-2031 crimp terminal housing

Two tachometer outputs are available on header J35 and header J36 for motor control or external cooling applications. For further details, see [Temperature Monitoring](#), page 25.

Pin	Name	Type	Description
1	TACH2	O	Tachometer 2
2	V12S	PO	12 V power
3	TACH2_PWR	AO	Switched adjustable control 2

J37: Serial 6

Board connector: 2x3 header, 2 mm, Samtec TMM-103-03-T-D

Mating connector: Samtec TCSD series socket

Header J37 supports an EIA-485 serial port. For further details, see [Serial Ports](#), page 20.

Pin	Name	Type	Description
1	RX6+	I	Non-inverting Receive Data 6
2	RX6-	I	Inverting Receive Data 6
3	COM_GND6	P	Ground (through ferrite bead)
4	TX6+	O	Non-inverting Transmit Data 6
5	TX6-	O	Inverting Transmit Data 6
6	GND	P	Ground

J41: Serial 6 Receive Termination Jumper

Type: 2-post header, 2 mm

Jumper J41 provides termination across the inverting and non-inverting receive lines.

Jumper setting	Configuration
1-2	121 Ω termination resistor
nc	No termination (default)

J42: Serial 6 Transmit Termination Jumper

Type: 2-post header, 2 mm

Jumper J42 provides termination across the inverting and non-inverting transmit lines.

Jumper setting	Configuration
1-2	121 Ω termination resistor
nc	No termination (default)

J38: Serial 4

Board connector: 2x3 header, 2 mm, Samtec TMM-103-03-T-D

Mating connector: Samtec TCSD series socket

Header J38 supports an EIA-485 serial port. For further details, see [Serial Ports](#), page 20.

Pin	Name	Type	Description
1	RX4+	I	Non-inverting Receive Data 4
2	RX4-	I	Inverting Receive Data 4
3	COM_GND4	P	Ground (through ferrite bead)
4	TX4+	O	Non-inverting Transmit Data 4
5	TX4-	O	Inverting Transmit Data 4
6	GND	P	Ground

J43: Serial 4 Receive Termination Jumper

Type: 2-post header, 2 mm

Jumper J43 provides termination across the inverting and non-inverting receive lines.

Jumper setting	Configuration
1-2	121 Ω termination resistor
nc	No termination (default)

J44: Serial 4 Transmit Termination Jumper

Type: 2-post header, 2 mm

Jumper J44 provides termination across the inverting and non-inverting transmit lines.

Jumper setting	Configuration
1-2	121Ω termination resistor
nc	No termination (default)

J39: Serial 5

Board connector: 2x3 header, 2 mm, Samtec TMM-103-03-T-D

Mating connector: Samtec TCSD series socket

Header J39 supports an EIA-422 serial port. For further details, see [Serial Ports](#), page 20.

Pin	Name	Type	Description
1	RX5+	I	Non-inverting Receive Data 5
2	RX5-	I	Inverting Receive Data 5
3	COM_GND5	P	Ground (through ferrite bead)
4	TX5+	O	Non-inverting Transmit Data 5
5	TX5-	O	Inverting Transmit Data 5
6	GND	P	Ground

J45: Serial 5 Receive Termination Jumper

Type: 2-post header, 2 mm

Jumper J45 provides termination across the inverting and non-inverting receive lines.

Jumper setting	Configuration
1-2	121Ω termination resistor
nc	No termination (default)

J46: Serial 5 Transmit Termination Jumper

Type: 2-post header, 2 mm

Jumper J46 provides termination across the inverting and non-inverting transmit lines.

Jumper setting	Configuration
1-2	121Ω termination resistor
nc	No termination (default)

J40: Serial 2

Board connector: 2x3 header, 2 mm, Samtec TMM-103-03-T-D

Mating connector: Samtec TCSD series socket

Header J40 supports an optional EIA-422 serial port. For further details, see [Serial Ports](#), page 20.

Pin	Name	Type	Description
1	RX2+	I	Non-inverting Receive Data 2
2	RX2-	I	Inverting Receive Data 2
3	COM_GND2	P	Ground (through ferrite bead)
4	TX2+	O	Non-inverting Transmit Data 2
5	TX2-	O	Inverting Transmit Data 2
6	GND	P	Ground

J47: Serial 2 Receive Termination Jumper

Type: 2-post header, 2 mm

Jumper J47 provides termination across the inverting and non-inverting receive lines.

Jumper setting	Configuration
1-2	121Ω termination resistor
nc	No termination (default)

J48: Serial 2 Transmit Termination Jumper

Type: 2-post header, 2 mm

Jumper J46 provides termination across the inverting and non-inverting transmit lines.

Jumper setting	Configuration
1-2	121Ω termination resistor
nc	No termination (default)

J50: SIM

Board connector: Slide-in SIM card socket, AVX 00-9162-006-206-175

Mating connector: Micro SIM cards

The carrier board includes a standard Subscriber Identity Module (SIM) socket supporting handheld devices requiring secure subscriber identification.

J51: SD/MMC 0

Board connector: SD/MMC socket, Molex 48071-1001

Mating connector: SD/MMC card

The Catalyst XL Development Kit provides SD/MMC socket J51 for memory and I/O expansion. Notice that only the SD/MMC functions are supported this socket. For further details, see [Secure Digital and MultiMediaCard](#), page 18.

Pin	Name	Type	Description
8	SD0_DATA2	IO	SD/MMC0 data 2
11	SD0_DATA3	IO	SD/MMC0 data 3
15	SD0_CMD	IO	SD/MMC0 command
19	GND	P	Ground
21	SD0_VDD	PO	Software-controlled 3.3 V
25	SD0_CLK	O	SD/MMC0 clock
29	GND	P	Ground
32	SD0_DATA0	IO	SD/MMC0 data 0
34	SD0_DATA1	IO	SD/MMC0 data 1
44	GND	P	Ground
44a	GND	P	Ground
45	SD0_WP#	I	SD/MMC0 write protect
46	GND	P	Ground
46a	GND	P	Ground
47	SD0_CD#	I	SD/MMC0 card detect
50	reserved		

J52: SD/MMC 1

Board connector: SD/MMC socket, Molex 48071-1001

Mating connector: SD/MMC card

The Catalyst XL Development Kit provides SD/MMC socket J52 for memory and I/O expansion. Notice that only the SD/MMC functions are supported this socket. For further details, see [Secure Digital and MultiMediaCard](#), page 18.

Pin	Name	Type	Description
8	SD1_DATA2	IO	SD/MMC1 data 2
11	SD1_DATA3	IO	SD/MMC1 data 3
15	SD1_CMD	IO	SD/MMC1 command
19	GND	P	Ground
21	SD1_VDD	P	Software-controlled 3.3 V
25	SD1_CLK	O	SD/MMC1 clock
29	GND	P	Ground
32	SD1_DATA0	IO	SD/MMC1 data 0
34	SD1_DATA1	IO	SD/MMC1 data 1
44	GND	P	Ground
44a	GND	P	Ground
45	SD1_WP#	I	SD/MMC1 write protect
46	GND	P	Ground
46a	GND	P	Ground
47	SD1_CD#	I	SD/MMC1 card detect
50	SD1_CD#	I	SD/MMC1 card detect

J53: Stereo Line Out 0

Board connector: 3.5 mm stereo phone jack, Kobiconn 161-3503-EX

Mating connector: 3.5 mm stereo phone plug

Socket J53 provides the connection to one stereo line output capable of driving powered speakers. For further details, see [Audio Interface](#), page 26.

Pin	Name	Type	Description
1	GND_HDA	P	Audio ground
2	LINE_OUT0_L	AO	Line out 0, left channel (Port F)
3	nc		
4	nc		
5	LINE_OUT0_R	AO	Line out 0, right channel (Port F)
6	nc		
7	GND_HDA	P	Audio ground
8	SENSE_B_PPF	AI	Detects a connection on Port F

J54: Microphone

Board connector: 3.5 mm stereo phone jack, Kobiconn 161-3503-EX

Mating connector: 3.5 mm stereo phone plug

Socket J54 provides the connection for a microphone. For further details, see [Audio Interface](#), page 26.

Pin	Name	Type	Description
1	GND_HDA	P	Audio ground
2	MIC_L	AI	Microphone, left channel (Port E)
3	nc		
4	nc		
5	MIC_R	AI	Microphone, right channel (Port E)
6	nc		
7	GND_HDA	P	Audio ground
8	SENSE_B_PE	AI	Detects a connection on Port E

J55: Front Panel

Board connector: 16-pin header, 0.1-inch, Samtec HTSW-116-07-F-D

Mating connector: Samtec HCSD series socket

Header J55 allows connections of external switches and LEDs to the carrier board.

Pin	Name	Type	Termination	Description
1	FRONT1	O	PU 332 Ω V5S 470pF to GND	Front 1
2	FRONT2	O	PU 332 Ω V5A 470pF to GND	Front 2
3	IDE_PDACTIVE#	O	470pF to GND	IDE drive active
4	GND	P		Ground
5	GND	P		Ground
6	SWX_ONOFF#	IO-5	PU 10k Ω V5A 470pF to GND	Front panel power button (PWR_BUTTON#)
7	SWX_RESET#	OD-3.3	PU 10k Ω V3.3S 470pF to GND	Front panel reset switch (FP_RESET#)
8	GND	P		Ground
9	V5	PO		5 V primary supply voltage
10	nc			
11	nc			
12	GND	P		Ground
13	GND	P		Ground
14	nc			
15	SLP_LED	O-3.3		External LED control (Super I/O GP60)
16	V5	PO		5 V primary supply voltage

P1: Serial 1 and Serial 3

Board connector: DB-9 plug-over-plug, Tyco 1734280-3

Mating connector: DB-9 socket

The dual plug P1 supports two full-feature EIA-232 serial ports. The connector shield is tied to chassis ground. For further details, see [Serial Ports](#), page 20.

Plug	Pin	Name	Type	Description
Top	B1	DCD3	I	Data Carrier Detect 3
	B2	RXD3	I	Receive Data 3
	B3	TXD3	O	Transmit Data 3
	B4	DTR3	O	Data Terminal Ready 3
	B5	GND_COM1_3	P	Ground (through ferrite bead)
	B6	DSR3	I	Data Set Ready 3
	B7	RTS3	O	Request To Send 3
	B8	CTS3	I	Clear To Send 3
	B9	RIB3	I	Ring Indicator 3
Bottom	A1	DCD1	I	Data Carrier Detect 1
	A2	RXD1	I	Receive Data 1
	A3	TXD1	O	Transmit Data 1
	A4	DTR1	O	Data Terminal Ready 1
	A5	GND_COM1_3	P	Ground (through ferrite bead)
	A6	DSR1	I	Data Set Ready 1
	A7	RTS1	O	Request To Send 1
	A8	CTS1	I	Clear To Send 1
	A9	RIB1	I	Ring Indicator 1

J57: Serial 1 and Serial 3 Control Jumper

Type: 2-post header, 2 mm

Both Serial 1 and Serial 3 are driven by a Sipex SP3243 transceiver. These EIA-232 transceivers include automatic shutdown circuitry that allows the device to automatically shutdown, saving power when an EIA-232 cable is disconnected or a connected peripheral is turned off.



Note: If two connected serial ports enable automatic shutdown, neither port will turn on. Disable automatic shutdown if your device connects to another device that also uses automatic shutdown of the serial port.

Jumper J57 and the signal UARTx_SHUTDOWN control the operation of each EIA-232 transceiver. The on-board Super I/O Controller drives the signals UART1_SHUTDOWN and UART2_SHUTDOWN. For further details about these signals, see [Carrier Board Super I/O Controller](#), page 24.

The following table describes the operation of the EIA-232 transceivers.

UARTx_SHUTDOWN	J57	Signal at Rcvr Input	Transceiver Operation
Logic level low	nc (default) or 1-2	yes or no	Shutdown mode Drivers are shut down
Logic level high	nc (default)	yes or no	Automatic shutdown circuitry is disabled Drivers remain active
Logic level high	1-2	yes	Automatic shutdown circuitry enabled Normal operation
Logic level high	1-2	no	Automatic shutdown circuitry enabled Drivers are shut down

P2: Maintenance Port

Board connector: DB-9 plug, Tyco 5747840-4

Mating connector: DB-9 socket

Connector P2 provides a serial maintenance port for the Catalyst XL embedded controller. The connector shield is tied to chassis ground. This maintenance serial port is extremely important in bring-up of a new carrier board design, troubleshooting, and software debug. For additional information about using this port, see [Appendix E – Maintenance Port](#), page 73.



Note: The pinout of P2 does not follow the EIA-232 standard. The signals on pin 2 and pin 3 should be swapped for a standard DB-9 plug. If you are directed to use this port, use a gender changer or create a custom cable. Refer to forum topic 2556.

Pin	Name	Type	Description
1	nc		
2	DEBUG_TX	O	Transmit Data
3	DEBUG_RX	I	Receive Data
4	nc		
5	GND	P	Ground
6	nc		
7	nc		
8	nc		
9	nc		

U24: LPC Bus

Board connector: 2x10 shrouded header, 0.1-inch, Adam Tech BHR20VUA

Mating connector: IDC socket

The LPC bus is available for general-purpose I/O expansion on header U24. For further details, see [Low Pin Count Bus](#), page 23.

Pin	Name	Type	Termination	Description
1	reserved			
2	GND	P		Ground
3	LPC_FRAME#	O-LVTTL	PU 10k Ω V3.3S	LPC bus frame sync
4	nc			
5	BUF_RESET#	O-3.3	PD 100k Ω	Buffered reset
6	V5S	PO		Normal operating 5 V
7	LPC_AD3	IO-LVTTL	PU 5k Ω V3.3S	LPC address/data 3
8	LPC_AD2	IO-LVTTL	PU 5k Ω V3.3S	LPC address/data 2
9	V3.3S	PO		Normal operating 3.3 V
10	LPC_AD1	IO-LVTTL	PU 5k Ω V3.3S	LPC address/data 1
11	LPC_AD0	IO-LVTTL	PU 5k Ω V3.3S	LPC address/data 0
12	GND	P		Ground
13	SMB_CLK	O-LVTTL	PU 2.2k Ω V3.3S	SMBus clock
14	SMB_DATA	IO-LVTTL	PU 2.2k Ω V3.3S	SMBus data
15	V3.3	PO		3.3 V primary supply
16	LPC_SERIRQ	IO-LVTTL	PU 5k Ω V3.3S	LPC serial interrupt
17	GND	P		Ground
18	LPC_CLKRUN#	IO-LVTTL	PU 8.25k Ω V3.3S	Initiates active clock output from LPC bus master
19	LPCPD#	O		Indicates an in-process system power state change
20	nc			

U27: GPIO

Board connector: 2x10 terminal strip, 2 mm, Samtec TMM-110-03-T-D

Mating connector: Samtec TCSD series socket

The Catalyst XL Development Kit includes ten GPIO signals on header U27. Ten pull-up resistors connect to U27 for termination of each GPIO. Two GPIOs connect directly to the Catalyst XL embedded controller, while the remaining eight GPIOs connect to the Super I/O Controller located on the carrier board. For further details, see [General-Purpose Inputs and Outputs](#), page 24.

Pin	Name	Pin	Type	Description
1	GPIO1		IO-CMOS	Embedded controller GPIO
3	GPIO2		IO-CMOS	
	PU1	2		100kΩ pull-up resistor to V3.3S
	PU2	4		
5	GPIO3		IO-3.3	Super I/O Controller GPIO
7	GPIO4		IO-3.3	
9	GPIO5		IO-3.3	
11	GPIO6		IO-3.3	
13	GPIO7		IO-3.3	
15	GPIO8		IO-3.3	
17	GPIO9		IO-3.3	
19	GPIO10		IO-3.3	
	PU3	6		100kΩ pull-up resistor to V3.3
	PU4	8		
	PU5	10		
	PU6	12		
	PU7	14		
	PU8	16		
	PU9	18		
	PU10	20		

U47: I/O Expansion

Board connector: 2x10 terminal strip, 2 mm, Samtec TMM-110-03-T-D

Mating connector: Samtec TCSD series socket

The carrier board includes an I/O expansion port on header U47 providing eight GPIO signals that are accessible using the SMBus. Eight pull-up resistors connect to U47 for termination of each GPIO. For further details, see [General-Purpose Inputs and Outputs](#), page 24.

Pin	Name	Pin	Type	Description
1	GPIO11		IO-CMOS	I/O Expansion GPIO
3	GPIO12		IO-CMOS	
5	GPIO13		IO-CMOS	
7	GPIO14		IO-CMOS	
9	GPIO15		IO-CMOS	
11	GPIO16		IO-CMOS	
13	GPIO17		IO-CMOS	
15	GPIO18		IO-CMOS	
17	nc			
19	nc			
	PU11	2		10kΩ pull-up resistor to V3.3S
	PU12	4		
	PU13	6		
	PU14	8		
	PU15	10		
	PU16	12		
	PU17	14		
	PU18	16		
	V3.3S	18	PO	Normal operating 3.3 V
	GND	20	P	Ground

System Specification

Performance

The Catalyst XL Development Kit carrier board is compatible with all versions of the Catalyst XL allowing several performance variants. The following table specifies the processor performance.

Parameter	Min	Typ.	Max	Units
Processor operating frequency (note 1)			1.6	GHz
Processor operating frequency (note 2)	1.1		1.33	GHz
Front side bus clock	400		533	MHz
Front side bus width		64		bit

Notes:

- Specifications are for the module operating at commercial temperatures (0°C to 70°C).
- Specifications are for the module operating at industrial temperatures (-40°C to +85°C).

Power Supply

The Catalyst XL Development Kit accepts input power on jack J29, page 46. For details about the power supply architecture, see [Power Supply Architecture](#), page 27.

Symbol	Parameter	Min	Typ.	Max	Units
AC Power Adapter					
V _{OUT}	Supply voltage		12		V
I _{OUT}				5	A
System Power Outputs					
V3.3	Primary supply voltage	3.135	3.3	3.465	V
V3.3A	“Always” power	3.135	3.3	3.465	V
V3.3S	Normal operating power	3.135	3.3	3.465	V
V5A	“Always” power	4.75	5.0	5.25	V
V5S	Normal operating power	4.75	5.0	5.25	V
V12S			12		V
V_ON			12		V
SWX_ONOFF# (note 4)					
V _{IH}	High-level input voltage	2.5	5		V
V _{IL}	Low-level input voltage			1.0	V
R _{PU}	Pull-up resistance		10		kΩ
V _{PU}			5		V

Notes:

- SWX_ONOFF# connects to the Catalyst XL signal PWR_BUTTON# through a 0Ω resistor on the carrier board. The module includes a pull-up resistor to V5A.

Electrical

This section provides electrical specifications for the Catalyst XL Development Kit. For additional details about termination of individual signals, see the signal connectors in [Signal Headers](#), page 34.

I²C Bus

The Catalyst XL Development Kit includes an external connection to the I²C bus on connector [J33](#), page 48. For a description of this bus, see [I²C Bus](#), page 18.

Symbol	Parameter	Min	Typ.	Max	Units
I2C_SDA, I2C_SCL (note 5)					
F _{I2C_SCL}	Bus clock	100		400	kHz
R _{PU}	Pull-up resistance		10		kΩ
V _{PU}			3.3		V

Notes:

- I2C_SDA and I2C_SCL include pull-up resistors to V3.3A on the carrier board.

SMBus

The Catalyst XL Development Kit includes an external connection to the SMBus on connector [J32](#), page 48. For a description of this bus, see [System Management Bus](#), page 19.

Symbol	Parameter	Min	Typ.	Max	Units
SMB_CLK, SMB_DATA (note 6)					
R _{PU}	Pull-up resistance on SMB_CLK, SMB_DATA		2.2		kΩ
V _{PU}			3.3		V
SMB_ALERT# (note 6)					
R _{PU}	Pull-up resistance on SMB_ALERT#		10		kΩ
V _{PU}			3.3		V

Notes:

- SMB_CLK, SMB_DATA, and SMB_ALERT# include pull-up resistors to V3.3S on the Catalyst XL.

Touch Panel Controller

A Hampshire TSHARC USB controller and separate analog multiplexer included on the carrier board drives a resistive touch panel on header [J26](#), page 45 or header [J27](#), page 46. Standard systems include a 4-wire touch panel. All touch-panel signals include protection diodes. For a description of this interface, see [User Interface](#), page 22.

Symbol	Parameter	Min	Typ.	Max	Units
VDD	Supply voltage		5.0		V

Reset Signals

The Catalyst XL Development Kit includes two reset signals. For a description of these signals, see [Reset Signals](#), page 23.

Symbol	Parameter	Min	Typ.	Max	Units
BUF_RESET#					
V_{OH}	High-level output voltage $I_{OH} = -24 \text{ mA}$, $V_{CC} = 3.3 \text{ V}$	2.2	3.3		V
V_{OL}	Low-level output voltage $I_{OL} = 24 \text{ mA}$, $V_{CC} = 3.3 \text{ V}$			0.55	V
R_{PU}	Pull-down resistance		100		$k\Omega$
V_{PU}		0			V
SWX_RESET# (note 7)					
V_{IH}	High-level input voltage	2.0	3.3		V
V_{IL}	Low-level input voltage			0.8	V
R_{PU}	Pull-up resistance		10		$k\Omega$
V_{PU}			3.3		V

Notes:

- SWX_RESET# connects to the Catalyst XL signal FP_RESET# through a 0Ω resistor on the carrier board. The module includes debounce circuitry and a pull-up resistor to V3.3S.

I/O Expansion Port

An I/O expansion port provides eight GPIO on header U47, page 61. These GPIOs are implemented by a NXP PCA9554 device and are software-controlled using the SMBus. The GPIO are programmed as inputs at power up. For a description of these GPIOs, see [General-Purpose Inputs and Outputs](#), page 24.

Symbol	Parameter	Min	Typ.	Max	Units
GPIO11-18 (note 8)					
V_{IH}	High-level input voltage	2.0	3.3		V
V_{IL}	Low-level input voltage			0.8	V
V_{OH}	High-level output voltage $I_{OH} = -8 \text{ mA}$, $V_{DD} = 3.0 \text{ V}$	2.6			V
V_{OL}	Low-level output voltage $I_{OL} = 8 \text{ mA}$, $V_{DD} = 3.0 \text{ V}$			0.5	V

Notes:

- Specifications per the NXP PCA9554 Product data sheet, Rev. 07 – 13 November 2006.

Embedded Controller

The embedded controller located on the Catalyst XL provides two external GPIO signals on header **U27**, page 60. For a description of these GPIOs, see [General-Purpose Inputs and Outputs](#), page 24.

Symbol	Parameter	Min	Typ.	Max	Units
GPIO1-2 (note 9)					
V _{IH}	High-level input voltage	1.7	3.3		V
V _{IL}	Low-level input voltage			0.8	V
V _{OH}	High-level output voltage I _{OH} = -0.1 mA, V _{CC} = 3.3 V	V _{CC} -0.2			V
V _{OL}	Low-level output voltage I _{OL} = 0.1 mA, V _{CC} = 3.3 V			0.2	V

Notes:

- Specifications per the Altera MAX II Device Handbook, August 2009 (MII5V1-3.3).

Super I/O Controller

The SMSC SCH3116 Super I/O Controller supports common I/O capabilities on the development kit that include several discrete I/O, a P/S2 keyboard, and P/S2 mouse. The I/O signals include SLP_LED, LVDS_PRESENT, and GPIO3-10.

The signal SLP_LED controls an external LED and is available on **J55**, page 56. The signal LVDS_PRESENT detects if the display adapter is installed in socket **J11**, page 39, and header **U27**, page 60 provides the GPIOs.

Socket **J34**, page 48 provides direct connections to a PS/2 keyboard and PS/2 mouse.

Symbol	Parameter	Min	Typ.	Max	Units
SLP_LED					
V _{OH}	High-level output voltage I _{OH} = -6 mA	2.4	3.3		V
V _{OL}	Low-level output voltage I _{OL} = 12 mA			0.4	V
GPIO3-10, LVDS_PRESENT					
V _{IH}	High-level input voltage	2.0	3.3		V
V _{IL}	Low-level input voltage			0.8	V
V _{OH}	High-level output voltage I _{OH} = -4 mA	2.4			V
V _{OL}	Low-level output voltage I _{OL} = 8 mA			0.4	V
PS/2 Keyboard and Mouse					
V _{IH}	High-level input voltage	2.0			V
V _{IL}	Low-level input voltage			0.8	V

Intel High Definition Audio

The Catalyst XL Development Kit provides a connection to an external codec that complies with the Intel High Definition Audio Specification Revision 1.0.

Symbol	Parameter	Min	Typ.	Max	Units
HDA (note 10)					
V_{CC}	Supply voltage		3.3		V
V_{IH}	High-level input voltage	$0.65 V_{CC}$			V
V_{IL}	Low-level input voltage			$0.35 V_{CC}$	V
V_{OH}	High-level output voltage $I_{OH} = -500 \mu A$	$0.9 V_{CC}$			V
V_{OL}	Low-level output voltage $I_{OL} = 1500 \mu A$			$0.10 V_{CC}$	V
F_{HDA_SDIx}	Data rate		24		Mbps

Note:

- Specifications per the Intel High Definition Audio Specification Revision 1.0.

Audio Codec

The IDT 92HD71B8 4-channel HD audio codec provides the audio interface for the Catalyst XL Development Kit. This audio codec supports three audio inputs and three audio outputs on socket J20, page 44, socket J23, page 45, socket J53, page 55, and socket J54, page 55. In addition, the codec provides an optional S/PDIF output on J19, page 43 and a digital microphone input on J22, page 44. For a description of this interface, see [Audio Interface](#), page 26.

Symbol	Parameter	Min	Typ.	Max	Units
D_{VDD}	Codec digital supply voltage		3.3		V
A_{VDD}	Codec analog supply voltage		3.3		V
f_s	Sample rate		192		kHz
---	A/D sample resolution		24		bit
Line In					
V_{IN}	Full scale input voltage	0.707	1.03		V_{rms}
$Gain_{IN}$	Microphone boost	0		30	dB
R_{IN}	Input impedance		50		$k\Omega$
C_{IN}	Input capacitance		15		pF
Line Out					
V_{OUT}	Full scale output voltage, 10k Ω load	0.707	0.758		V_{rms}
Headphone					
P_{UT}	Headphone output, 32 Ω load	31	42		mW (peak)
Digital Microphone (note 11)					
V_{V_DMIC}		1.8	3.3	3.3	V
F_{DMIC_CLK}			2.352		MHz

Notes:

- Power for the digital microphone, V_{DMIC} , is dependent on the digital microphone selected. The carrier board supports 1.8 V or 3.3 V. Standard Catalyst XL Development Kits are configured for 3.3 V. Contact your local Eurotech representative if your application requires 1.8 V.

General

This section provides general specifications for the Catalyst XL Development Kit.

Crystal Frequencies

Agencies certifying the Catalyst XL for compliance for radio-frequency emissions typically need to know the frequencies of on-system oscillators. The following table lists the frequencies of all crystals on the Catalyst XL and carrier board.

Crystals	Device	Typ.	Units
Catalyst XL			
X1	RTC	32.768	kHz
X2	Clock Generator	14.31818	MHz
X4	Embedded Controller	14.7456	MHz
Carrier Board			
OS1	Super I/O Controller	14.31818	MHz
X1	Touch Panel Controller	4.000	MHz

Real-Time Clock

The Intel SCH US15W provides a RTC function on the Catalyst XL that retains the system date and time. To supply backup power when the power input is disconnected, the carrier board includes a long-life battery. For a description of the RTC function, see [Non-volatile Memory](#), page 14.

Parameter	Typ.	Units
Accuracy per month @ 25°C	+/-55	sec
Battery	3	V
Operating temperature	-30 to +80	°C

Environmental

The Catalyst XL is designed to meet the environmental specifications listed in the following table. For additional details about the module, refer to the *Catalyst XL Design-In Guide* (Eurotech document #110123.3003).

Parameter	Min	Typ.	Max	Units
Commercial operating temperature	0		+70	°C
Industrial operating temperature (note 12)	-40		+85	°C
Storage temperature	-40		+85	°C
Relative humidity, non-condensing	5		95	%

Notes:

12. The Catalyst XL operates in the industrial temperature range at 1.1 GHz and 1.33GHz.

Appendix A – Reference Information

Product Information

Product notices, updated drivers, support material:

www.eurotech.com

Intel

Information about the Intel products, Intel High Definition Audio specification, and LPC bus specification:

www.intel.com

Trusted Computing Group

Trusted Computer Group specifications:

www.trustedcomputinggroup.org

USB

Universal Serial Bus specification and product information:

www.usb.org

SDIO Card

SD Card Association and SDIO specification:

www.sdcard.org

MMC Card

MultiMediaCard specification:

www.jedec.org

PCI SIG

PCI Express specification:

www.pcisig.com

PLX Technology

Information about the PCI Express switch:

www.plxtech.com

I²C Bus

I²C bus specification and information about the I/O expansion port:
www.nxp.com

SMBus

SMBus specification:
www.smbus.org

SMSC

Information about the Super I/O Controller:
www.smsc.com

National Semiconductor

Information about the LM75 temperature sensor:
www.national.com

TI

Information about the INA209 current/power monitor:
www.ti.com

IDT

Information about the HD audio codec:
www.idt.com

ACPI Specification

Information about the ACPI specification:
www.acpi.info

Appendix B – RoHS Compliance

EUROTECH

The Restriction of the use of certain Hazardous Substances (RoHS) Directive came into force on 1st July 2006. This product shall be designed using RoHS compliant components, and manufactured to comply with the RoHS Directive.

Eurotech has based its material content knowledge on a combination of information provided by third parties and auditing our suppliers and sub-contractor's operational activities and arrangements. This information is archived within the associated Technical Construction File. Eurotech has taken reasonable steps to provide representative and accurate information, though may not have conducted destructive testing or chemical analysis on incoming components and materials.

Additionally, packaging used by Eurotech for its products complies with the EU Directive 2004/12/development system in that the total concentration of the heavy metals cadmium, hexavalent chromium, lead and mercury do not exceed 100ppm.

Appendix C – Board Revision

This manual applies to the current revision of the Catalyst XL Development Kit carrier board as given in the following sections. For the Catalyst XL revision history, refer to the *Catalyst XL Design-In Guide (Eurotech document #110123-3003)*.

Identifying the Board Revision

The revision number of the carrier board is printed on the underside of the printed wiring board. That number is 170122-300Rx, 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

Revision A

Improved manufacturability

Revision B

New Features

Adds power monitoring circuitry

Adds eight additional GPIOs on header U47

Changes

Adds pull down on JTAG_TRST#

Swaps left and right signals on socket J20

Disables D33, D34, and D35 when no card is installed in socket J16

Adds jumper J56 for CPLD revision indication

Replaces thermal sensor with LM75 device

Adds jumper J57 to enable or disabled EIA-232 transceivers

No longer supports D30 and Thermometer Alert 2

No longer supports ATX power supply input

Appendix D – Frequently Asked Questions

Catalyst XL Development Kits are designed to get the developer up and running quickly.

To use the system, simply plug the power supply into the receptacle on the system.

The following are some of the most commonly asked questions about development kits:

Q: When I plug in power, my screen is white and nothing comes up on it.

A: Check the connector seating. The LCD connector may have come loose in shipping. Press it firmly into the display and reapply power to your system.

Q: Do I need to observe any ESD precautions when working with the system?

A: Yes. Where possible, work on a grounded anti-static mat. At a minimum, touch an electrically grounded object before handling the board or touching any components on the board.

Q: Who can I call if I need help developing my application?

A: Eurotech provides technical support to get your development kit running. For customers who establish a business relationship with Eurotech, we provide support to develop applications and drivers.

Q: Is there online support?

A: Yes. Information about the Catalyst XL is available on the Eurotech support site at <http://www.eurotech.com>.

Q: Can I upgrade the version of the operating system?

A: Yes. Eurotech provides regular operating system updates on its developers' web site. For operating systems not maintained by Eurotech, contact the operating system vendor.

Q: I would like to interface to a different display. How can I do this?

A: Eurotech may have already interfaced to the display of which you are interested. Consult your local Eurotech technical support for availability.

Appendix E – Maintenance Port

The serial port located on connector P2, page 58 is not available for application use. This port is intended for maintenance functions such as reprogramming the embedded controller, troubleshooting, and software debug. If you are directed to use this port when working with Eurotech staff, use the information provided in this appendix to connect the port to your computer.

Cable Connection

Connect any available serial port of your computer to connector P2 on your development kit. Use the DB9FF gender changer supplied with the Catalyst XL Development Kit or create a custom cable using the information given on page 58.

Port Settings

Use a terminal emulation application such as HyperTerminal or TeraTerm to access the maintenance port. Configure the port settings as follows:

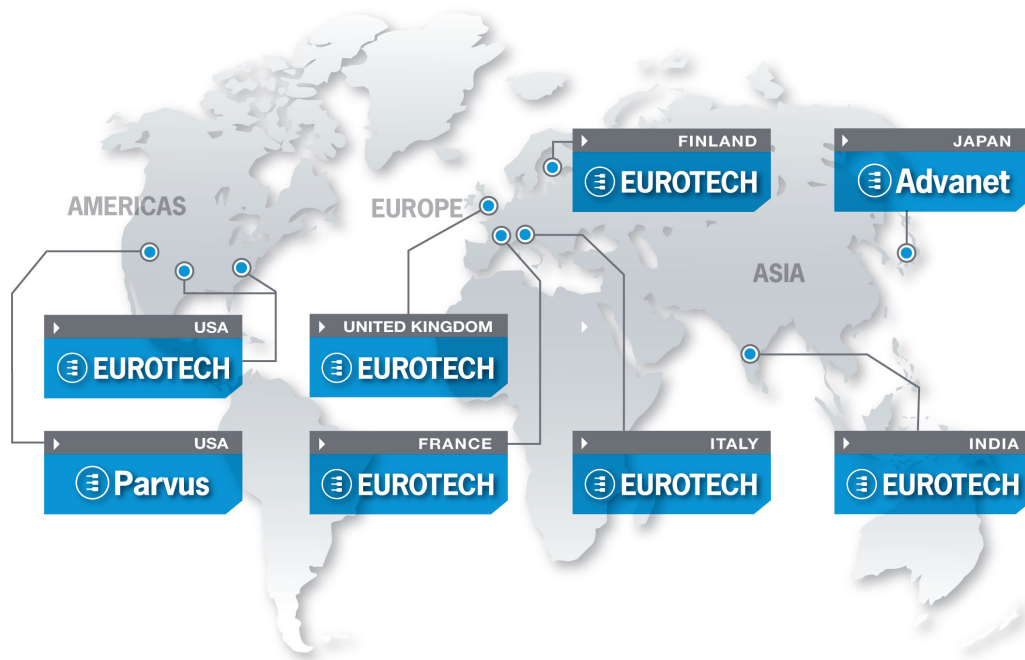
- Baud: 57600 bps
- Data bits: 8
- Parity: None
- Stop Bits: 1
- Flow control: none

Port Output

Connect power to the carrier board. The power LED D27 lights, and the following text is displayed on the terminal.

```
EUROTECH, INC.  
Catalyst Core Module: Embedded Controller Firmware  
Copyright (c) 2007 EuroTech, Inc. All rights reserved.  
=====
```

Eurotech Worldwide Presence



AMERICAS

USA



EUROTECH

Toll free +1 888.941.2224
 Tel. +1 301.490.4007
 Fax +1 301.490.4582
 E-mail: sales.us@eurotech.com
 E-mail: support.us@eurotech.com
 Web: www.eurotech-inc.com

PARVUS

Tel. +1 800.483.3152
 Fax +1 801.483.1523
 E-mail: sales@parvus.com
 E-mail: tsupport@parvus.com
 Web: www.parvus.com

EUROPE

Italy

EUROTECH

Tel. +39 0433.485.411
 Fax +39 0433.485.499
 E-mail: sales.it@eurotech.com
 E-mail: support.it@eurotech.com
 Web: www.eurotech.com

United Kingdom

EUROTECH

Tel. +44 (0) 1223.403410
 Fax +44 (0) 1223.410457
 E-mail: sales.uk@eurotech.com
 E-mail: support.uk@eurotech.com
 Web: www.eurotech.com

France

EUROTECH

Tel. +33 04.72.89.00.90
 Fax +33 04.78.70.08.24
 E-mail: sales.fr@eurotech.com
 E-mail: support.fr@eurotech.com
 Web: www.eurotech.com

Finland

EUROTECH

Tel. +358 9.477.888.0
 Fax +358 9.477.888.99
 E-mail: sales.fi@eurotech.com
 E-mail: support.fi@eurotech.com
 Web: www.eurotech.com

ASIA

Japan

ADVANET

Tel. +81 86.245.2861
 Fax +81 86.245.2860
 E-mail: sales@advanet.co.jp
 E-mail: tsupport@advanet.co.jp
 Web: www.advanet.co.jp

India

EUROTECH

Tel. +91 80.43.35.71.17
 E-mail: sales.in@eurotech.com
 E-mail: support.in@eurotech.com
 Web: www.eurotech.com

To find your nearest contact refer to: www.eurotech.com/contacts



www.eurotech.com

EUROTECH HEADQUARTERS

Via Fratelli Solari 3/a

33020 Amaro (Udine) – ITALY

Phone: +39 0433.485.411

Fax: +39 0433.485.499

For full contact details go to: www.eurotech.com/contacts