

ZLE60400

User Guide

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1.0 Description

The ZLE60400 card provides ATCA and microTCA system interconnect in a hot pluggable, standard Advanced Mezzanine Card form factor.

The card features two (2) Zarlink ZL60304 4-port optical transceivers for electro-optical conversion of the AMC signals for transmission up to 100 meters over widely available parallel ribbon fiber. The card delivers up to 25 Gbps of bandwidth across eight individual ports operating at 3.125 Gbps.

The ZL60304 optical devices, which provide these connections, are stateless with regard to the connection. They have no SERDES clock inputs and perform no SRIO lane training. What arrives at the optical input is passed to the corresponding SRIO lane, and vice versa.

If two ZLE60400 cards are used to connect switches on two carrier board devices, the switches on those carriers will be training against each other as if the ZLE60400 cards and optical cables were not present.

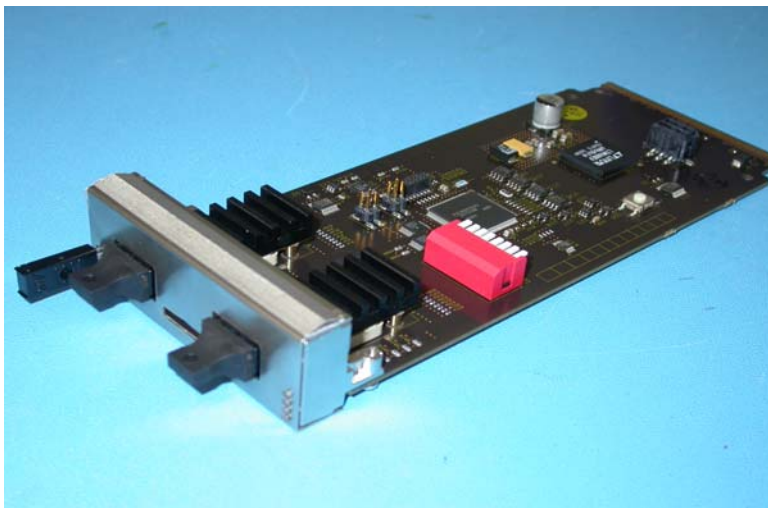


Figure 1 - ZLE60400 Board

1.1 Device Placement

Refer to Figure 2 for location of the devices referenced below:

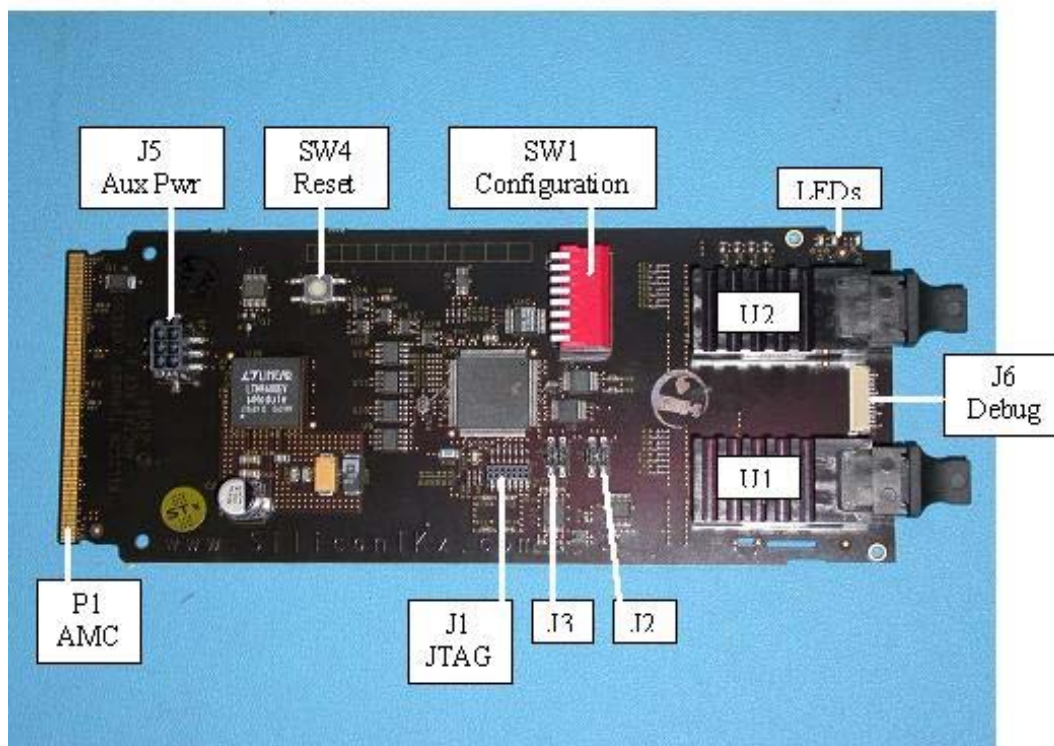


Figure 2 - ZLE60400 Layout

1.1.1 P1-AMC Card Edge

The AMC card edge connector (P1) is to the left in this figure. P1 is inserted into the socket on a carrier board to provide power and signals. The complete details of the AMC connector are beyond the scope of this document (refer to Appendix A for pin-outs). The main connections used by this board include:

- Hot swapping, variable pad lengths
- Power management, +3.3 volts on one pin, (always on)
- Target power, 12 volts on several pins, switched on after I²C messaging
- Logic to allow the carrier board to detect insertion
- Logic to allow the carrier board to reset the inserted card
- An I²C bus to allow the carrier board and inserted card to exchange configuration, status and command messages
- Global address detection logic used to assign an I²C address to the inserted card based on the carrier board socket used
- AMC ports 4-7 connected to the U1 Zarlink device
- AMC ports 8-11 connected to the U2 Zarlink device

1.2 Switches

Switches SW1, SW3 and SW4 will be explained in detail in this section.

1.2.1 SW1- ZL60304 Configuration

Each of the ZL60304s have configuration options. If the bypass jumper (connector J2, pin 3 to 4) is present, these switches control the configuration options.

Table 1 details the settings for the appropriate Zarlink device.

Normal operating position for these switches are 2 and 6 down and 3, 4, 7 and 8 up.

1.2.2 SW3- Handle

This switch is mechanically extended from the front panel to the board. See Figure 1, as switch is on the front panel. SW3 provides a direct input to the MMC. During normal operation, the end-user would use this switch to signal an intention to remove the card from a carrier board. The MMC would notify the carrier board and all use of the card would be terminated. Target power would be shut off and the carrier board would send a message back to the MMC (which would continue to run on management power) telling it to indicate shutdown by use of the LEDs.

This function is currently not implemented in this release of MMC software.

1.2.3 SW4- Manual Reset

SW4 is a manual push-button located in the upper rear portion of the board. After power on, the MMC and ZL60304 devices are reset automatically. Pressing this button causes another reset. The effects are identical to those caused by the AMC ENABLE signal.

Switch	Down/closed	Up/open
1	Not connected	Not connected
2	U1 TX-DIS false	U1 TX-DIS true
3	U1 SQ_EN false	U1 SQ_EN true
4	U1 RX_EN false	U1 RX_EN true
5	Not connected	Not connected
6	U2 TX-DIS false	U2 TX-DIS true
7	U2 SQ_EN false	U2 SQ_EN true
8	U2 RX_EN false	U2 RX_EN true

Table 1 - Switch 1 Settings

1.3 Connectors

1.3.1 J6 - Debug Connector

This connector provides a front panel connection to the MMC serial port and auxiliary ZL60304 pins. The MMC software configures the serial port to operation at 38,400 8N1. The auxiliary ZL60304 pins are not defined at this time.

Table 2 below defines the signals available at the Debug connector.

Pin #	Signal	Pin #	Signal
1	GND	7	U2-E10
2	U1-F10	8	U2-D10
3	U1-E10	9	GND
4	U1-D10	10	Serial in
5	GND	11	Serial out
6	U2-F10	12	GND

Table 2 - J6 Debug Connector

1.3.2 J2 - Jumpers

These jumpers control the MMC flash write enable and MMC bypass mode. When bypass is active, the MMC cannot control the ZL60304 reset or configuration signals.

Pin #	Jumper	No Jumper
1 & 2	MMC flash read only	MMC flash is read and write
3 & 4	MMC bypass active	MMC has ZL reset and configuration control

Table 3 - J2 Jumper Settings

1.3.3 J3 - Jumpers

These jumpers provide a MMC software option bit and control the EEPROM write enable.

Pin #	Jumper	No Jumper
1 & 2	Option = 0	Option = 1
3 & 4	EEPROM is read and write	EEPROM is read only

Table 4 - J3 Jumper Settings

1.3.4 J1 - MMC JTAG

MMC Software is installed using the JTAG signals at this connector. The JTAG chain consists of only the MMC device.

CAUTION: Failure to follow this caution may result in possible damage to the board.

The arrangement of this table matches what is seen if looking at the top side of the card with the AMC edge seen in Figure 2.

Pin #	Signal	Pin #	Signal
2	GND	1	TCK (in)
4	GND	3	TRST_N (in)
6	GND	5	TDO (out)
8	IPMI_3V3	7	card_RESET (in)
10	GND	9	TMS (in)
12	MD2N_VCC (in)	11	TDI (in)
14	GND	13	RESET_detect (out)

Table 5 - J1 Jumper Settings

1.3.5 J5 - AUX Power

In normal operation, power is provided through the AMC edge connector. The J5 connector allows the card to be operated without a carrier board during debug/testing,

MMC software development or the set up of MMC configuration application programs.

CAUTION: Failure to follow this caution may result in possible damage to the board.

Do not use this connector when the card is connected to a carrier board via the AMC edge connector.

CAUTION: Failure to follow this caution may result in possible damage to the board.

Do not power the card with target 12 volts on and without management 3.3 volts.

CAUTION: Failure to follow this caution may result in possible damage to the board.

The arrangement of this table matches what is seen if looking at the top side of the card with the AMC edge seen in Figure 2.

Pin #	Power & Control	Pin #	Power & Control
4	GND	1	GND
5	Management 3.3 volts	2	ENABLE_N
6	Target 12 volts	3	Target 12 volts

Table 6 - J5 Pinouts

The card may be powered with only management 3.3 volts. This mimics the condition of a card that has been inserted into a carrier board but has not yet received its target power.

The card may be reset by raising then lowering ENABLE_N. This mimics the carrier board's ability to reset the card via the AMC IPMI interface. During debug, pin 2 must be pulled to GND.

2.0 ZLE60400 Hardware Design& Architecture

2.1 General Description

Some of the features of the ZLE60400 are:

- 2 ZL60304 4-port optical transceivers
- Interoperability
 - RapidIO
- 25 Gbps total bandwidth
- JTAG interface
- MMC control for IPMI
- Local power option for stand alone operation
- Half/full height, single width size AMC slot

2.2 Physical Specifications

Board Size	180 mm x 74 mm
Power Requirement	12 vDC
Operating Temperature	
• Standard version	0 - 50°C
• Extended version	TBD
Standards Compliance	AMC.0
	AMC.1
	AMC.4
Weight	425 g
RoHS	Compliant

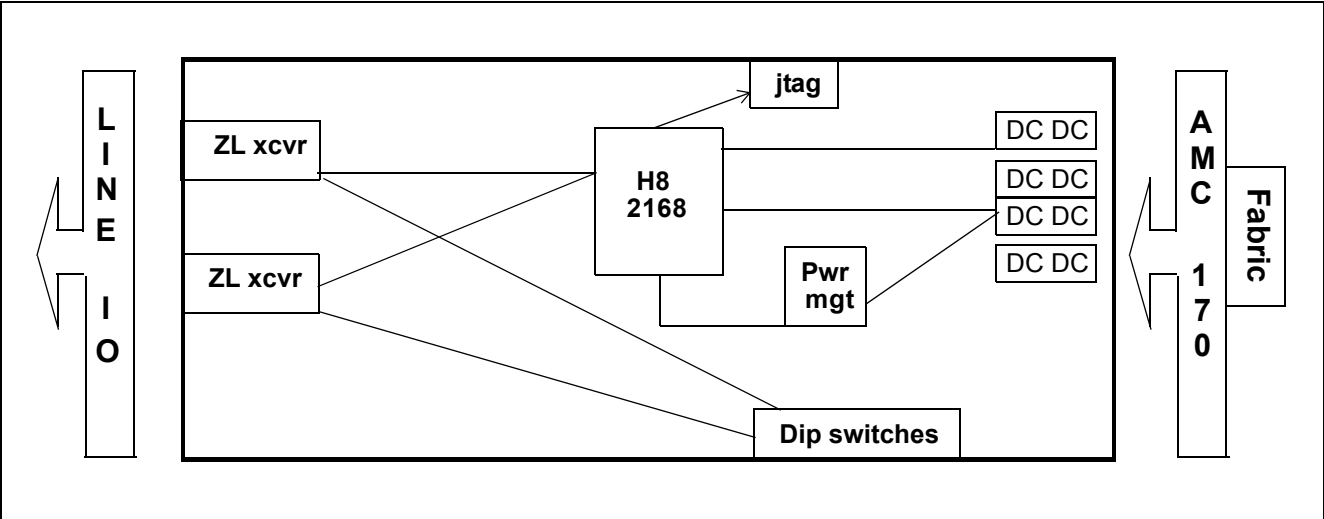


Figure 3 - Block Diagram of the ZLE60400 Board

2.3 MMC Subsystem

The MMC Subsystem monitors temperature, voltage levels and the state of the global address pins. This data is periodically outputted on the serial port. The format of these messages is detailed in Appendix C.

At this time the software does not provide support for the IPMI functionality (configuration, status, command messages) and does not support the configuration of the ZL60304 devices. A carrier board must ignore the lack of I²C messages and unconditionally activate the target power, 12 volts.

In the absence of software to control the device configurations, the Zarlink card should be configured as follows:

Connector J2 (pins)	Jumper Present
3 to 4	MMC bypass is active

SW4 DIP Switch	Position
1	Not connected
2	Down - U1 TX_DIS false
3	Up - U1 SQ_EN true
4	Up - U1 RX_EN true
5	Not connected
6	Down - U2 TX_DIS false
7	Up - U2 SQ_EN true
8	Up - U2 RX_EN true

2.4 Supplied and Optional Accessories

The following items are supplied with each ZLE60400 card. Notify Zarlink immediately if any of the items listed below are not received.

- Serial "Y" Cable
- CD - containing manual and schematic

The following items are available as optional accessories and can be purchased separately.

RapidFET software - the leader in RapidIO configuration and management solutions.

www.fetacorp.com

- AMC8548 PowerPC AMC card with optional LRDK (Linux RapidIO Development Kit) for Open source Linux-complete toolkit with phone support and no license
- AMC Breakout board- provides AMC to SMA signals
- AMC Loopback board- allows for AMC port testing
- SSRP - switchless carrier reference platform for compliance testing (RIOLAB)

Contact STx for availability and pricing.

www.silicontkx.com

3.0 ZLE60400 Connectivity & Configuration

This section contains general set-up information about the ZLE60400 Advance Mezzanine Card. Refer to Figure 2 for jumper and switch locations.

3.1 Field Configuration

3.1.1 Bypass (MMC control disable)

When the bypass jumper J2 pins 3 to 4 is present the MMC and ZL60304 are reset after power on. The TX_EN is true and the SW1 dip switches control TX_DIS, SQ_EN and RX_EN.

When the bypass jumper is absent, the MMC has reset and configuration control of the signals. Without MMC intervention, the Zarlink devices may not come out of reset.

3.1.2 Spare

The presents of jumper J3 pins 1 & 2, provides a direct input to the MMC. Its function depends on the version of MMC software.

3.1.3 MMC Flash Write Enable (NOT)

The presents of jumper J2 pins 3 & 4 disables the MMC Flash from being written to.

3.1.4 EERPOM Write Enable

The presents of jumper J3 pins 3 & 4 enables the EEPROM so that it can be written to.

3.1.5 SW1 Dip Switches

If the bypass jumper is present (J2 pin 3 to 4), then these switches control the configuration options of the ZL60304 devices. A switch in the down position (toward the card) is in the closed position.

Switch	Down/closed	Up/open
1	Not connected	Not connected
2	U1 TX-DIS false	U1 TX-DIS true
3	U1 SQ-EN false	U1 SQ_EN true
4	U1 RX-EN false	U1 RX_EN true
5	Not connected	Not connected
6	U2 TX-DIS false	U2 TX-DIS true
7	U2 SQ-EN false	U2 SQ_EN true
8	U2 RX_EN false	U2 RX_EN true

Table 7 - Switch 1 Settings

4.0 ZLE60400 Schematic

The ZLE60400 design can be customized for optimal flexibility and custom interfaces so the embedded systems engineer can obtain a lower overall parts costs using a variety of fixed and user selectable options.

These options inherently are contained in connectors and jumpers.

The schematic provides guidelines for using the installed and user modifiable options available on the present design as well as suggestions on customer designs that are available on request.

Appendix A

AMC.0 Pin Naming Convention

The Basic Connector only connects to contact fingers on Component Side 1; the Extended AMC Connector connects to both sides of the AMC Module PCB. Compared to the Extended Connector, the Basic Connector provides a cost advantage for the connector and saves real estate on the Carrier board.

AMC Connector contact definitions have been made such that the indispensable connections are implemented in the Basic Side. Connections for additional differential pair signals have been implemented in the Extended Side, they are only available in the Extended Connectors. The Basic Connectors have been designated as B and AB, while the Extended Connectors have been designated as B+ and A+B+.

Basic Side (AMC Module Component Side 1)	
Power	2, 9, 18, 27, 42, 57, 72, 84
Ground	1, 7, 10, 13, 16, 19, 22, 25, 28, 31, 34, 37, 40, 43, 46, 49, 52, 55, 58, 61, 64, 67, 70, 73, 76, 79, 82, 85
General purpose	3, 4, 5, 6, 8, 17, 26, 41, 56, 71, 83
Differential pairs	11/12, 14/15, 20/21, 23/24, 29/30, 32/33, 35/36, 38/39, 44/45, 47/48, 50/51, 53/54, 59/60, 62/63, 65/66, 68/69, 74/75, 77/78, 80/81

Functional contact list: Basic Side

Extended Side (AMC Module Component Side 2)	
Power	none
Ground	86, 89, 92, 95, 98, 101, 104, 107, 110, 113, 116, 119, 122, 125, 128, 131, 134, 137, 140, 143, 146, 149, 152, 155, 158, 161, 164, 170
General purpose	165, 166, 167, 168, 169
Differential pairs	87/88, 90/91, 93/94, 96/97, 99/100, 102/103, 105/106, 108/109, 111/112, 114/115, 117/118, 120/121, 123/124, 126/127, 129/130, 132/133, 135/136, 138/139, 141/142, 144/145, 147/148, 150/151, 153/154, 156/157, 159/160, 162/163

Functional contact list: Extended Side

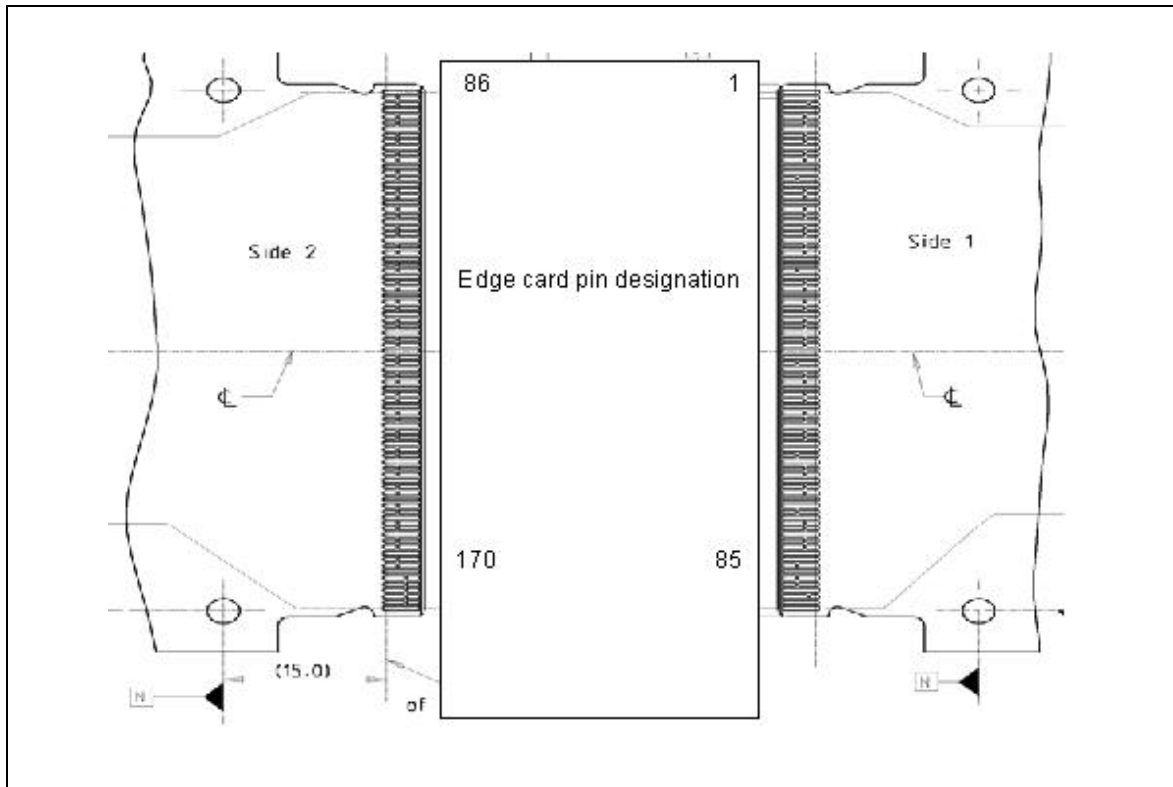


Figure 4 - AMC Edge Card Pin Location

Appendix B

References

Zarlink ZL 60304 data sheet (www.zarlink.com)

AMC.0 - Advanced Mezzanine Card specifications (www.picmg.org)

AMC.4 - Serial RIO on AMC (www.picmg.org)

IPMI - Intelligent Platform Management Interface (www.intel.com/design/servers/ipmi)

STX ZLE60400 schematic and layout

Appendix C

MMC Serial Port Diagnostic Messages

This message is printed once per second. Numbers are in hex format.

H07 L00 Z00 SW-open T1I=23 T1E=80 T2I=1F T2E=80 00 82 81

- "H07 L00 Z00" is the global address status
- "SW-open" is the state of switch SW3, the handle switch
- "T1I=23 T1E=80 T2I=1F T2E=80" are the internal and external temperature sensor readings in degrees Celsius. "80" means there was an error reading the sensor.
- "00 82 81" are the voltage readings, GND, $\frac{1}{2}$ of IPMI_3v3, $\frac{1}{2}$ of 3v3 relative to IPMI_3v3.

The readings in this example are: not inserted in a carrier board, handle open, 350C/error/310C/error, and half voltages of just over 1.65 volts.



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