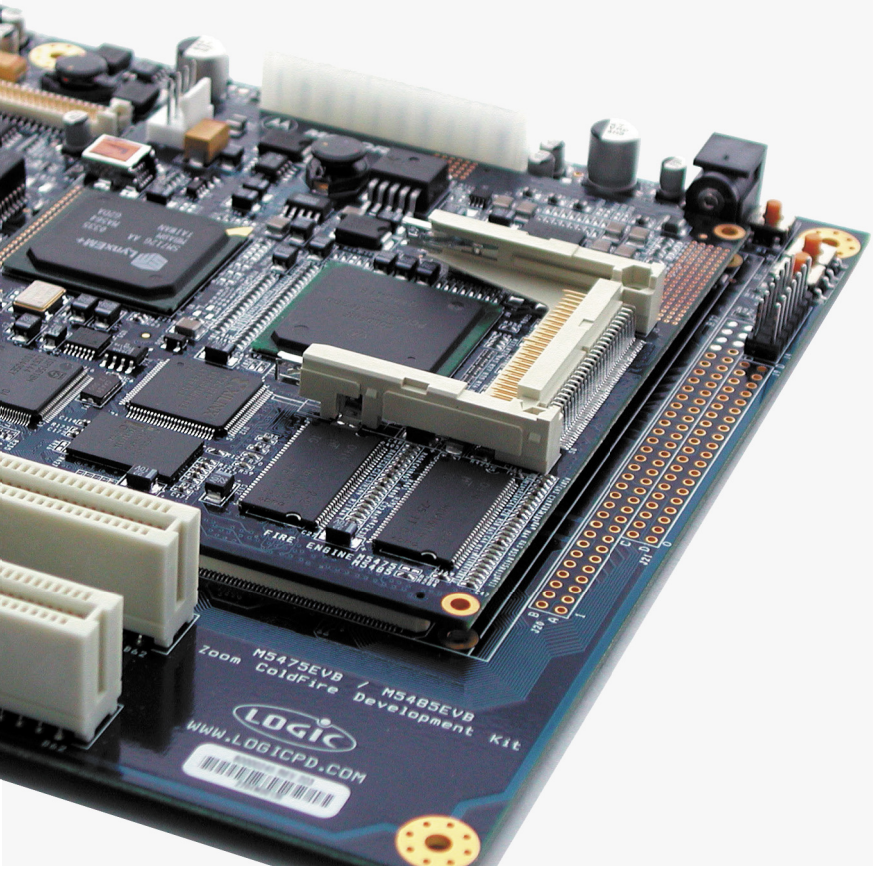
Zoom™

ColdFire Development Kit

Mini-ITX Hardware Specification



developed by LOGIC

Launched by Motorola
freescale semiconductor

REVISION HISTORY

REV	EDITOR	REVISION DESCRIPTION	APPROVAL	DATE
1	Ron Ross	Release	KTL	06/02/04
A	Nathan Kro	Updates for rev A	KTL	07/07/04
B	Nathan Kro	Updated Figure 1.3	KTL	11/04/04
C	Nathan Kro	Updated Section 8	KTL	12/17/04
D	Nathan Kro	Swapped CAN0 and CAN1 signals, removed J18, updated X1-X4 connector diagrams	KTL	04/08/05
E	James Wicks	Improved image quality; edit	JAW	07/06/05

Please check www.logicpd.com for the latest revision of this manual, product change notifications, and additional application notes.

Table of Contents

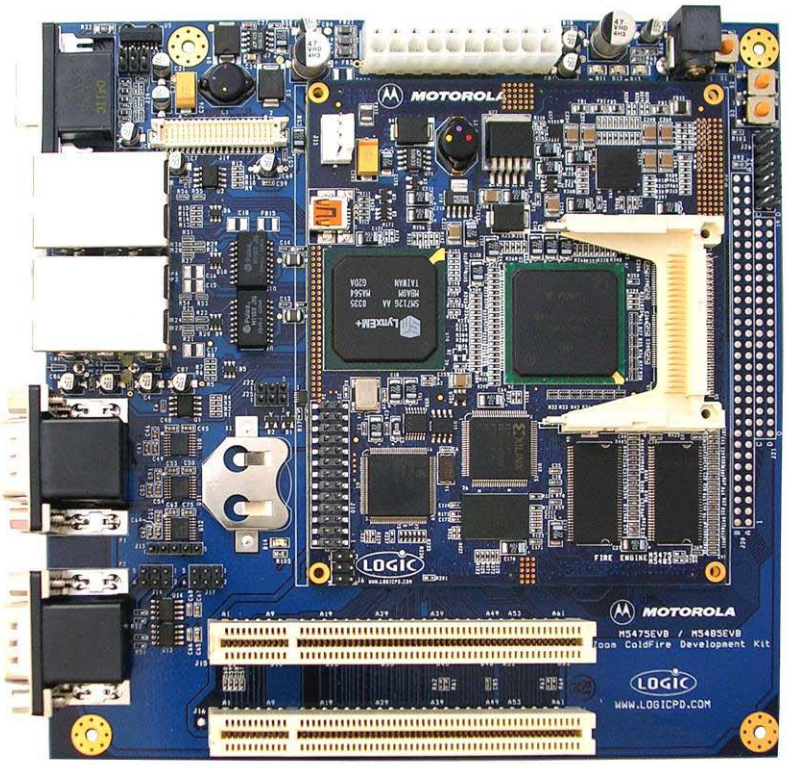
Table of Figures

1 Introduction

1.1 Product Brief

The Zoom™ ColdFire Development Kit is a low-cost Application Development Kit for evaluating the functionality of the ColdFire processor and Fire Engine. This results in an embedded product development cycle with **less time, less cost, less risk ... more innovation.**

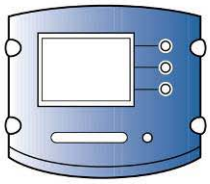
Application development is performed directly on the product-ready Mini-ITX/Fire Engine and software Board Support Packages included in the kit. This enables customers to seamlessly transfer their application code and hardware into production.



Actual Size: 6.7" x 6.7" x 1.3"

MCF547x/8x Fire Engine SOM-ETX

Logic Mini-ITX or Custom Baseboard



Final Product

Fire Engine Included (64MB DDR, 16MB Flash, Graphics Controller, USB Host)
LCD Display Connector Integrated LCD, touch & backlight connector for Zoom Display Kits
VGA CRT Connector
Network Support

- Two RJ45 Ethernet jack connectors (application/debug)

PC Card Expansion

- Two PCI 2.2 slots (32 Bit, 33 or 66MHz, 3.3V)

Serial Ports

- Two 115.2Kbps RS-232 serial ports - Two TTL serial ports

Can 2.0b

- Two ports (MCF548x only)

USB

- Four USB 2.0 High speed Hosts and 1 High speed device (device on Fire Engine ETX module)

SPI

- Onboard header for simple connections to other hardware.

RTC

- RV5C387 real time clock

Software

- LogicLoader™ (bootloader/monitor)
- ARC MQX RTOS[1]
- Motorola dBUG ROM Monitor
- Green Hills Integrity[1]

Mechanical Mini-ITX

- 6.7” (170 mm) long x 6.7” (170 mm) wide x 1.3” (33 mm) high

Cables

- Serial cable (null modem)
- Ethernet Crossover
- 5 volt power supply
- USB Function Cable
- BDM cable

[1] *Third party ports available from Freescale*

1.2 Acronyms

ADC	Analog to Digital Converter
BDM	Background dBUG Mode
BoLo	BootLoader
BSP	Board Support Package
CMOS	Complimentary Metal Oxide Semiconductor
CPLD	Complex Programmable Logic Device
DAC	Digital to Analog Converter
DC	Direct Current
DDR	Double Data Rate
DMA	Direct Memory Access
DRAM	Dynamic Random Access Memory
DSPI	DMA Serial Peripheral Interface
ENDEC	Encoder Decoder
ESD	Electro Static Dissipative
ETX	Embedded Technology Extended
FEC	Fast-Ethernet Controller
FET	Field Effect Transistor
FIFO	First In First Out
FIR	Fast Infrared
GPIO	General Purpose Input Output
IC	Integrated Circuit
I²C	Inter-Integrated Circuit
I/O	Input/Output
IRED	Infrared Device
IRQ	Interrupt Request
LCD	Liquid Crystal Display
LoLo	LogicLoader™
MBAR	Module Base Address Register
MIR	Mid Infrared
MMC	Multimedia Card
NC	No Connect
PC	Personal Computer

PCI	Peripheral Component Interconnect
PHY	Physical Layer
PLL	Phase Lock Loop
PMOS	P Metal Oxide Semiconductor
POTS	Plain Old Telephone System
PSC	Programmable Serial Controller
RTC	Real Time Clock
SDRAM	Synchronous Dynamic Random Access Memory
SIR	Serial Infrared
SoC	System-on-Chip
SOM	System-on-Module
SSP	Synchronous Serial Port
SPI	Standard Programming Interface
TTL	Transistor-Transistor Logic
UART	Universal Asynchronous Receive Transmit
USB	Universal Serial Bus

1.3 Technical Specification

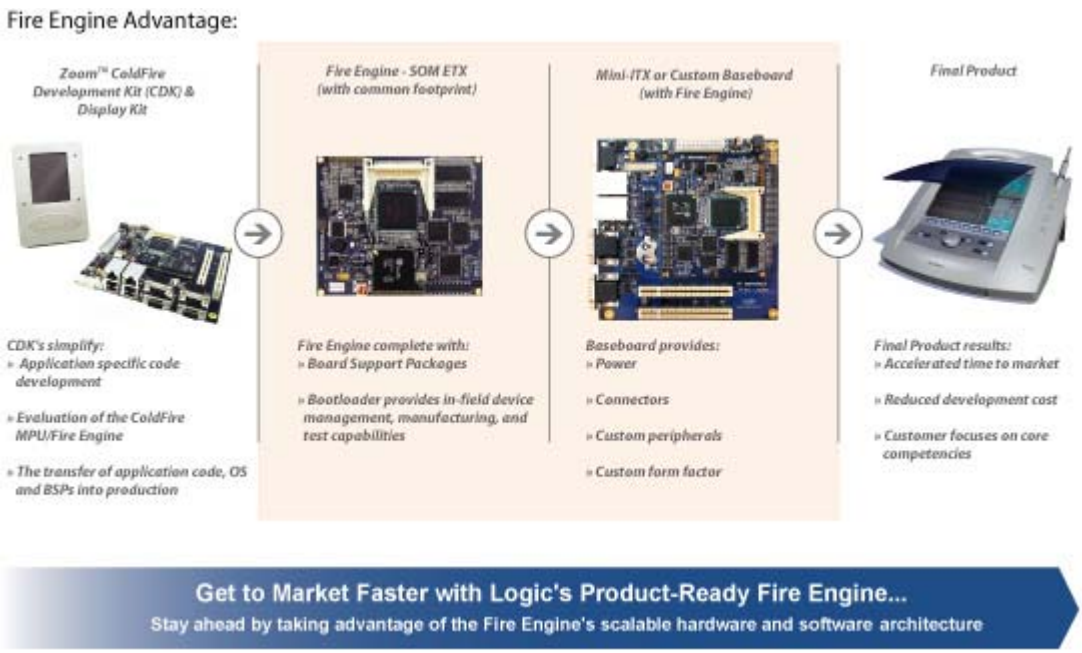
Please refer to the following component specifications and data sheets.

- Freescale ColdFire Microcontroller MCF5475
- Freescale ColdFire Microcontroller MCF5485
- Logic Document: MCF5475/85 Fire Engine Hardware Specification
- Logic Document: Application Note 228: Fire Engine Design Guideline

Note: *All users implementing the Fire Engine module should reference Logic's* Application Note 228: Fire Engine Design Guideline *document.*

For further Freescale documentation please visit: http://www.motorola.com/coldfire.

1.4 Fire Engine Advantages

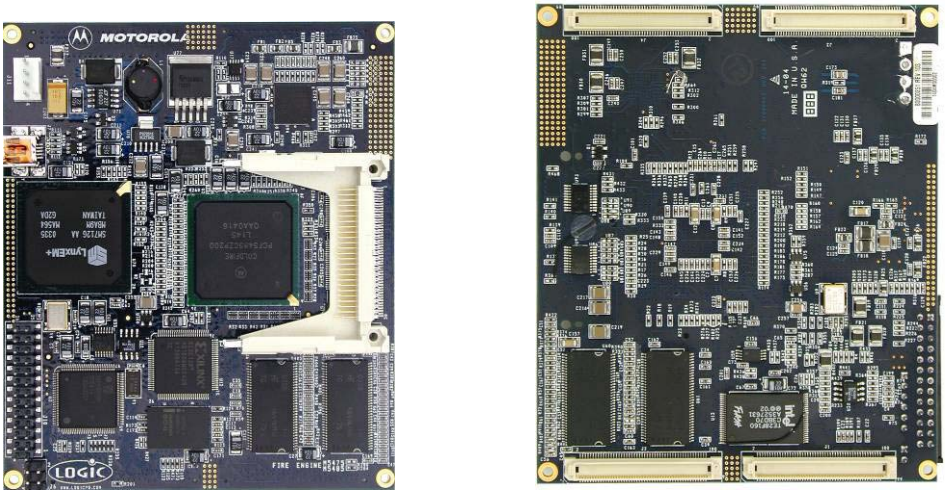


- Logic's Fire Engines accelerate your product's time-to-market, and provide the following advantages:
  - Product Ready Hardware and Software solutions allow immediate application development that results in a shorter product development cycle with less time, less cost, less risk… more innovation.
  - Less time – time to market solution allows software application development to begin immediately
  - Less cost – significantly lowers development cost
  - Less risk – complex portion of design product ready
  - More innovation – Allows you to focus on other aspects of your design
- Common SOM-ETX form factor
  - Easy migration path to new processors and technology
  - Provides a scaleable solution for your product family
  - Extends product life cycle – worry free component obsolescence
- Low Cost Hardware Solution – Custom configurations are available to meet your design requirements and price points.
- Complex portion of the design complete and ready to go.

1.5 Fire Engine Interface

The ETX interface allows for easy migration to new processors and technology. Logic is constantly researching and developing new technologies to improve performance, lower cost, and increase feature capabilities. By using the common ETX footprint, it is possible to take advantage of Logic's work without having to re-spin the old design. Contact Logic sales for more information.

In fact, encapsulating a significant amount of your design onto the Fire Engine reduces any long-term risk of obsolescence. If a component on the Fire Engine design becomes obsolete, Logic will simply design for alternative part that is transparent to your product. Furthermore, Logic tests all Fire Engines prior to delivery, decreasing time-to-market and ensuring a simpler and less costly manufacturing process.



Fire Engine Top View Fire Engine Bottom View

Figure 1.1: Logic's Fire Engine

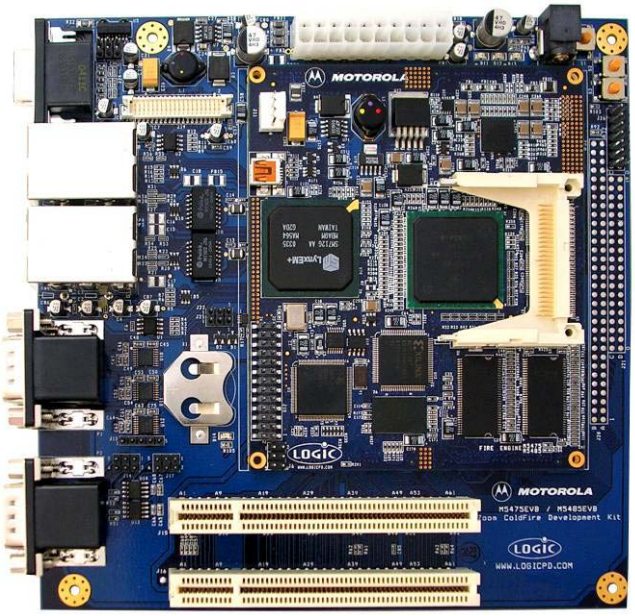


Figure 1.2: Logic's Fire Engine Advantage: ETX Board Installed On Mini-ITX Host Platform

1.6 ITX Block Diagram

The following is a block diagram of the ITX Baseboard showing all major components. In the sections below, each major component will be discussed as it applies to its appropriate external connector.

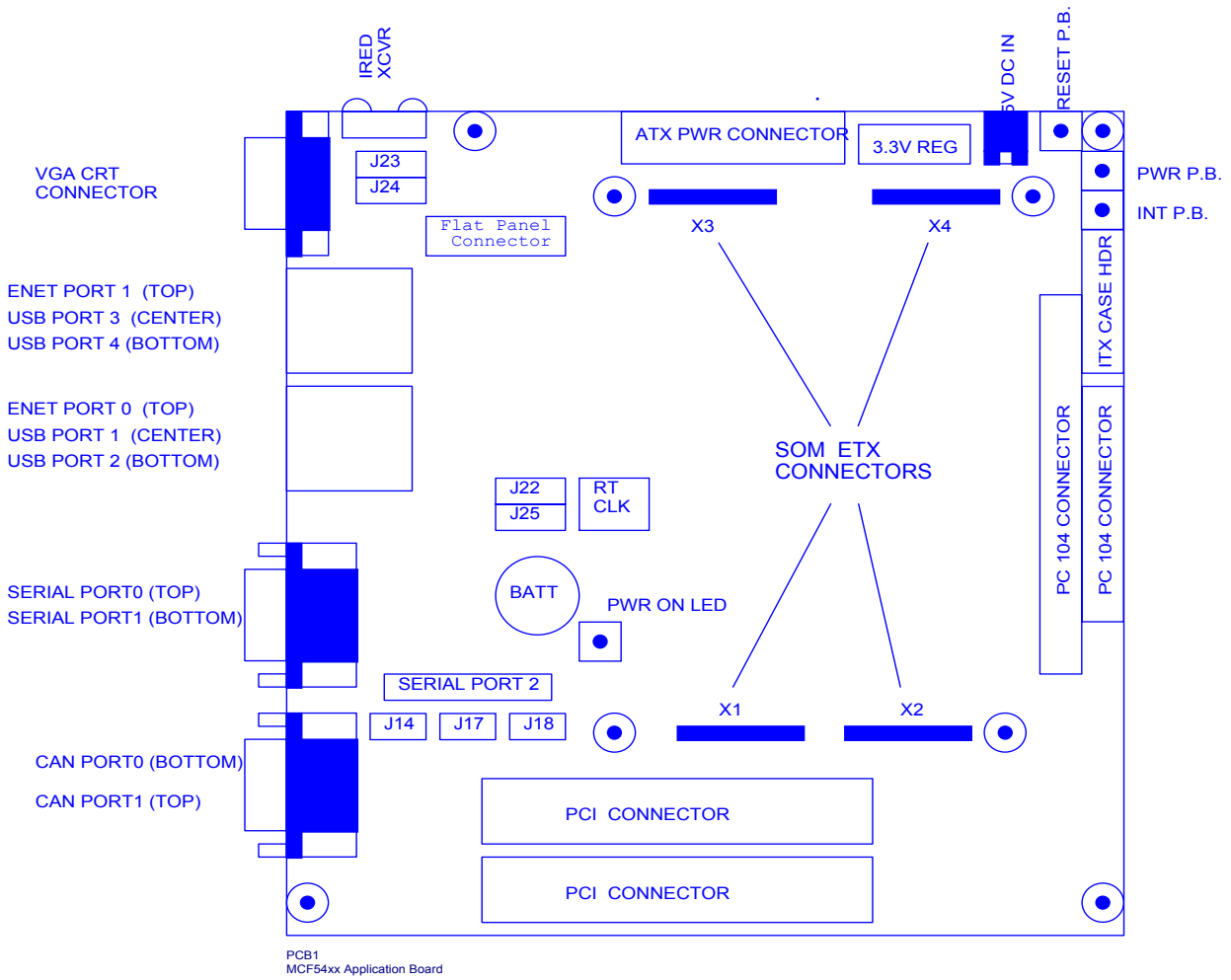


Figure 1.3: ITX Baseboard Block Diagram

2 ITX Baseboard Connectors

This section includes the connectors that accept an ETX Card Engine.

The mechanical characteristics are the ETX standard.

2.1 X1: (J7 on PCB)

The X1 connector is dedicated to the functions of the PCI ports and the USB ports.

The following is the X1 pin out:

	J7		J7
Pin	Signal	Pin	Signal
1	GND	2	GND
3	PCI_CLK3	4	PCI_CLK4
5	GND	6	GND
7	N.C.	8	N.C.
9	PCIREQ4#	10	PCI_BG4#
11	PCI_BG3#	12	3.3V
13	PCIREQ3#	14	N.C.
15	N.C.	16	3.3V
17	N.C.	18	N.C.
19	VCC	20	VCC
21	N.C.	22	N.C.
23	PCI_AD0	24	3.3V
25	PCI_AD1	26	PCI_AD2
27	PCI_AD4	28	PCI_AD3
29	PCI_AD6	30	PCI_AD5
31	PCI_C/BE0#	32	PCI_AD7
33	PCI_AD8	34	PCI_AD9
35	GND	36	GND
37	PCI_AD10	38	N.C.
39	PCI_AD11	40	M66EN
41	PCI_AD12	42	N.C.
43	PCI_AD13	44	N.C.
45	PCI_AD14	46	N.C.
47	PCI_AD15	48	N.C.
49	PCI_C/BE1#	50	N.C.
51	VCC	52	VCC
53	PCI_PAR	54	PCI_SERR#
55	PCI_PERR#	56	N.C.
57	N.C.	58	USB_DM3
59	PCI_LOCK#	60	PCI_DEVSEL#
61	PCI_TRDY#	62	USB_DM4
63	PCI_IRDY#	64	PCI_STOP#
65	PCI_FRAME#	66	USB_DP3
67	GND	68	GND
69	PCI_AD16	70	PCI_C/BE2#

71	PCI_AD17	72	USB_DP4
73	PCI_AD19	74	PCI_AD18
75	PCI_AD20	76	USB_DM1
77	PCI_AD22	78	PCI_AD21
79	PCI_AD23	80	USB_DM2
81	PCI_AD24	82	PCI_C/BE3#
83	VCC	84	VCC
85	PCI_AD25	86	PCI_AD26
87	PCI_AD28	88	USB_DP1
89	PCI_AD27	90	PCI_AD29
91	PCI_AD30	92	USB_DP2
93	PCI_RESET#	94	PCI_AD31
95	INTC#	96	INTD#
97	INTA#	98	INTB#
99	GND	100	GND

The X1 connector is compliant with the ETX standard with an exception of pin 40. M66EN is a signal that allows PCI boards to give notification that they can run at 66MHZ. This replaces the MICIN (Microphone input) signal as identified by the ETX standard.

The schematic diagram of the X1 connector is as shown below:

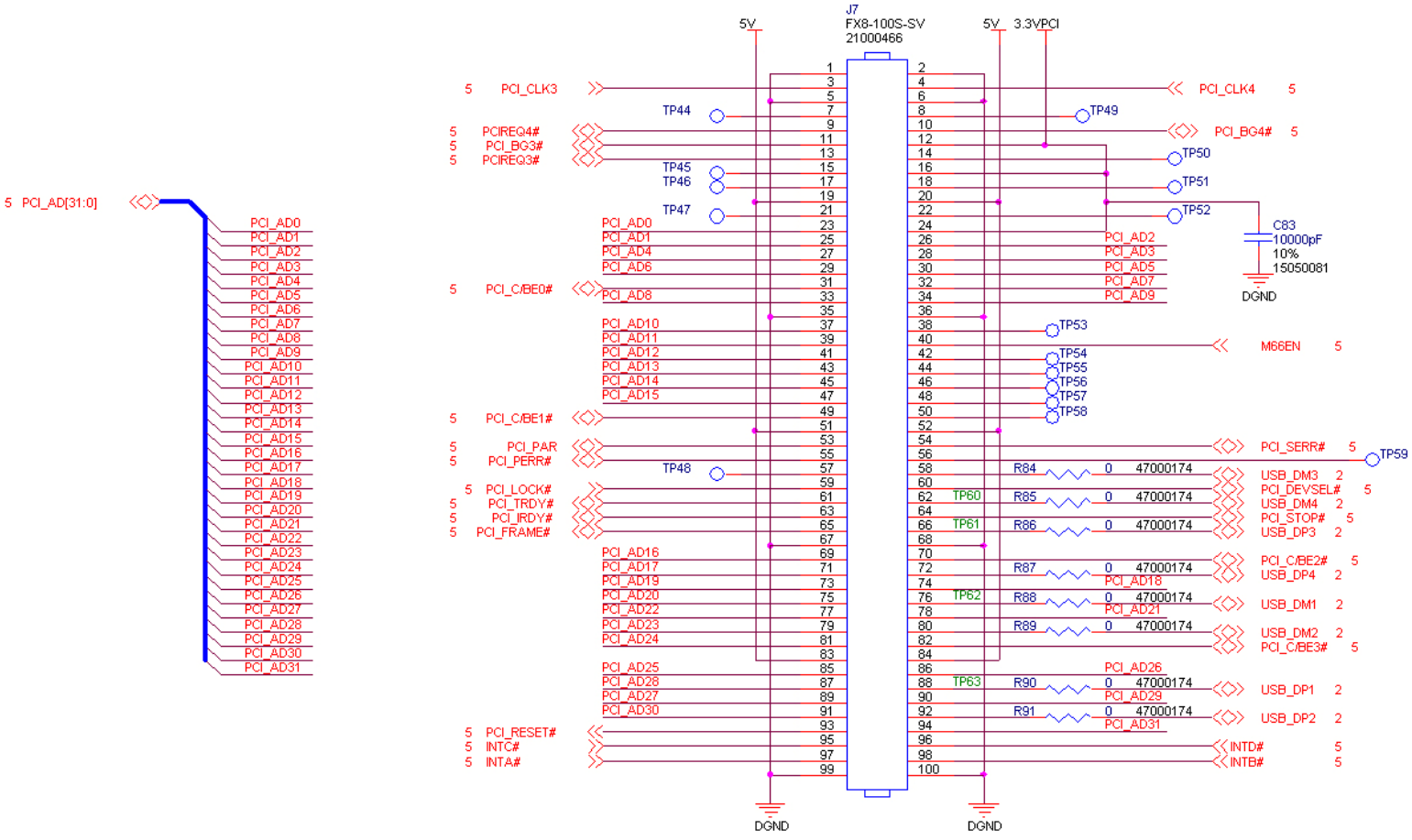


Figure 2.1: X1 Connector

2.2 X2: (J6 on PCB)

This connector is dedicated to ISA functionality.

The following is the X2 pin out:

	J6		J6
Pin	Signal	Pin	Signal
1	GND	2	GND
3	FB_AD30	4	FB_AD31
5	FB_AD29	6	N.C.
7	FB_AD28	8	N.C.
9	FB_AD27	10	N.C.
11	FB_AD26	12	N.C.
13	FB_AD25	14	N.C.
15	FB_AD24	16	N.C.
17	MCF_RW#	18	N.C.
19	MCF_OE#	20	548X_DREQ0#
21	FB_CS3#	22	548X_DACK0#
23	FB_CS4#	24	N.C.
25	FB_CS5#	26	N.C.
27	N.C.	28	N.C.
29	MCF_TA#	30	N.C.
31	N.C.	32	N.C.
33	N.C.	34	N.C.
35	GND	36	GND
37	N.C.	38	N.C.
39	LA_FB_AD0	40	N.C.
41	LA_FB_AD1	42	BALE
43	LA_FB_AD2	44	N.C.
45	LA_FB_AD3	46	N.C.
47	LA_FB_AD4	48	ISA_IRQ0
49	LA_FB_AD5	50	ISA_IRQ1
51	VCC	52	VCC
53	LA_FB_AD6	54	ISA_IRQ2
55	LA_FB_AD7	56	ISA_IRQ3
57	LA_FB_AD8	58	N.C.
59	LA_FB_AD9	60	CLKOUT
61	LA_FB_AD10	62	N.C.
63	LA_FB_AD11	64	548X_DREQ1#
65	LA_FB_AD12	66	548X_DACK1#
67	GND	68	GND
69	LA_FB_AD13	70	N.C.
71	LA_FB_AD14	72	N.C.
73	LA_FB_AD15	74	IORD#
75	LA_FB_AD16	76	IOWR#
77	LA_FB_AD18	78	LA_FB_AD17

79	LA_FB_AD19	80	N.C.
81	IOCHRDY	82	AEN#
83	VCC	84	VCC
85	FB_AD16	86	N.C.
87	FB_AD18	88	FB_AD17
89	FB_AD19	90	N.C.
91	N.C.	92	FB_AD20
93	FB_AD21	94	N.C.
95	FB_AD22	96	FB_AD23
97	N.C.	98	RESET#
99	GND	100	GND

This Connector follows as nearly as possible the ETX standard for providing an ISA interface to the PC104 connectors. The signal names may look different because the first implementation of this interface was using the Freescale MCF5475/85 Fire Engine developed by Logic Product Development. A CPLD is used on the Fire Engine to modify the MCF5475/85 bus timings to meet ISA standards. Differences are denoted by the shaded pins shown above which are additional processor chip selects from the ETX module. Other pins that may be defined in the ETX standard are “N.C.” or Not Connected on this board.

The schematic diagram of the X2 connector is as shown below:

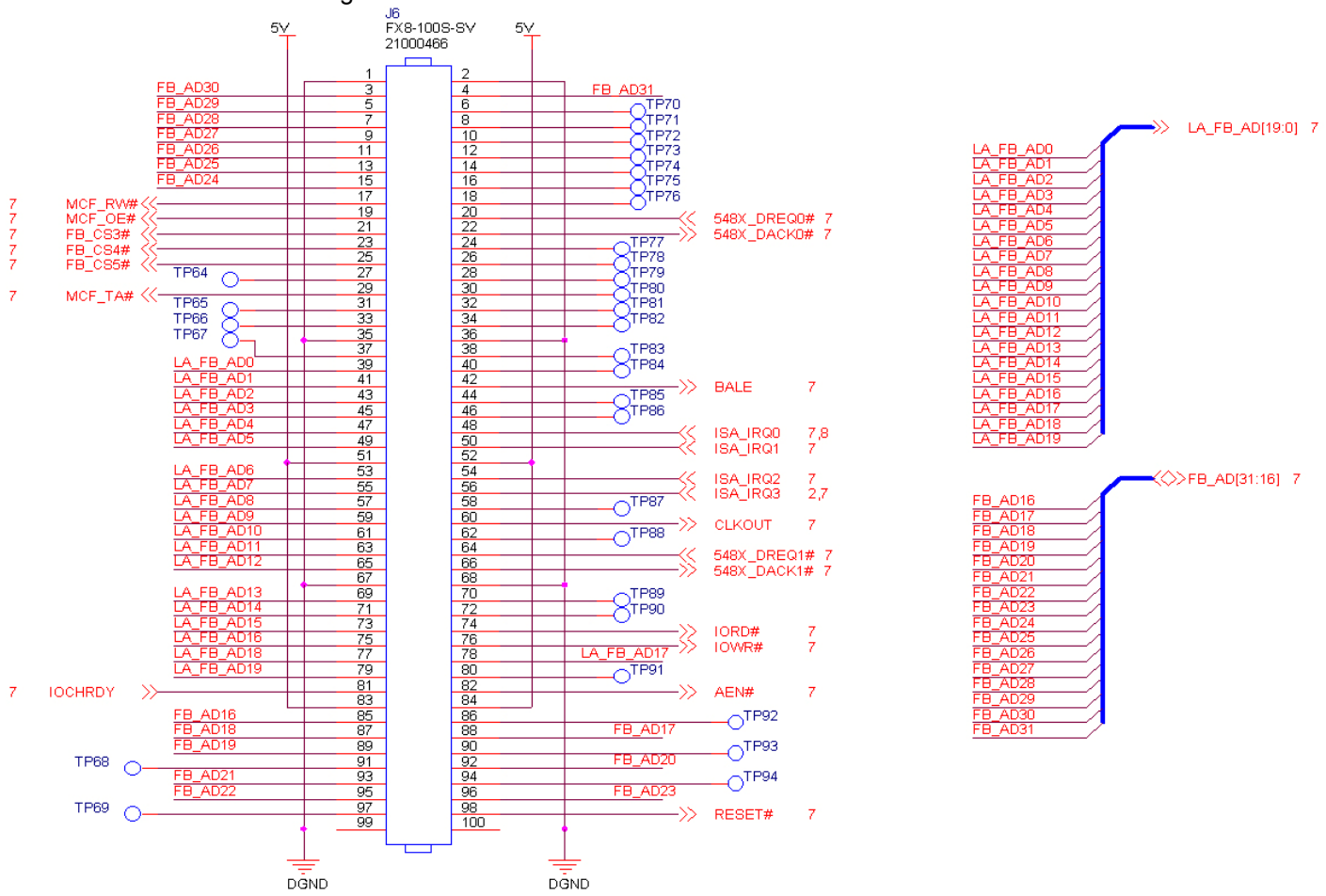


Figure 2.2: X2 Connector

2.3 X3: (J8 on PCB)

This connector is dedicated to Video and Serial ports.

The following is the X3 pin out:

J8		J8	
Pin	Signal	Pin	Signal
1	GND	2	GND
3	CRT_RED	4	CRT_BLUE
5	CRT_HSYNC	6	CRT_GREEN
7	CRT_VSYNC	8	DDC_SCL
9	VID_GND	10	DDC_SDA
11	FP_DATA4	12	FP_SHIFTCLK
13	FP_DATA5	14	FP_DISPLAY_EN
15	GND	16	GND
17	FP_DATA1	18	FP_DATA3
19	FP_DATA0	20	FP_DATA2
21	GND	22	GND
23	FP_DATA10	24	FP_DATA13
25	FP_DATA11	26	FP_DATA12
27	GND	28	GND
29	FP_DATA20	30	FP_DATA9
31	FP_DATA21	32	FP_DATA8
33	GND	34	GND
35	FP_DATA17	36	FP_DATA19
37	FP_DATA16	38	FP_DATA18
39	VCC	40	VCC
41	N.C.	42	FP_VSYNC
43	N.C.	44	FP_EN
45	FP_HSYNC	46	FP_VDDEN
47	N.C.	48	N.C.
49	N.C.	50	N.C.
51	N.C.	52	N.C.
53	VCC	54	GND
55	N.C.	56	N.C.
57	N.C.	58	N.C.
59	PSC2_RXD	60	N.C.
61	PSC2_TXD	62	N.C.
63	PSC1_RXD	64	N.C.
65	GND	66	GND
67	PSC1_RTS#	68	N.C.
69	N.C.	70	N.C.
71	N.C.	72	GND
73	N.C.	74	PSC3_CTS#
75	PSC1_CTS#	76	N.C.
77	PSC1_TXD	78	PSC3_RXD
79	N.C.	80	N.C.
81	VCC	82	VCC
83	PSC0_RXD	84	N.C.

85	PSC0_RTS#	86	PSC3_TXD
87	N.C.	88	N.C.
89	N.C.	90	PSC3_RTS#
91	N.C.	92	N.C.
93	PSC0_CTS#	94	N.C.
95	PSC0_TXD	96	N.C.
97	N.C.	98	N.C.
99	GND	100	GND

The signals highlighted in gray outline the differences from the standard ETX pin out. These include additional video signals and an additional serial port.

The schematic diagram of the X3 connector is as shown below:

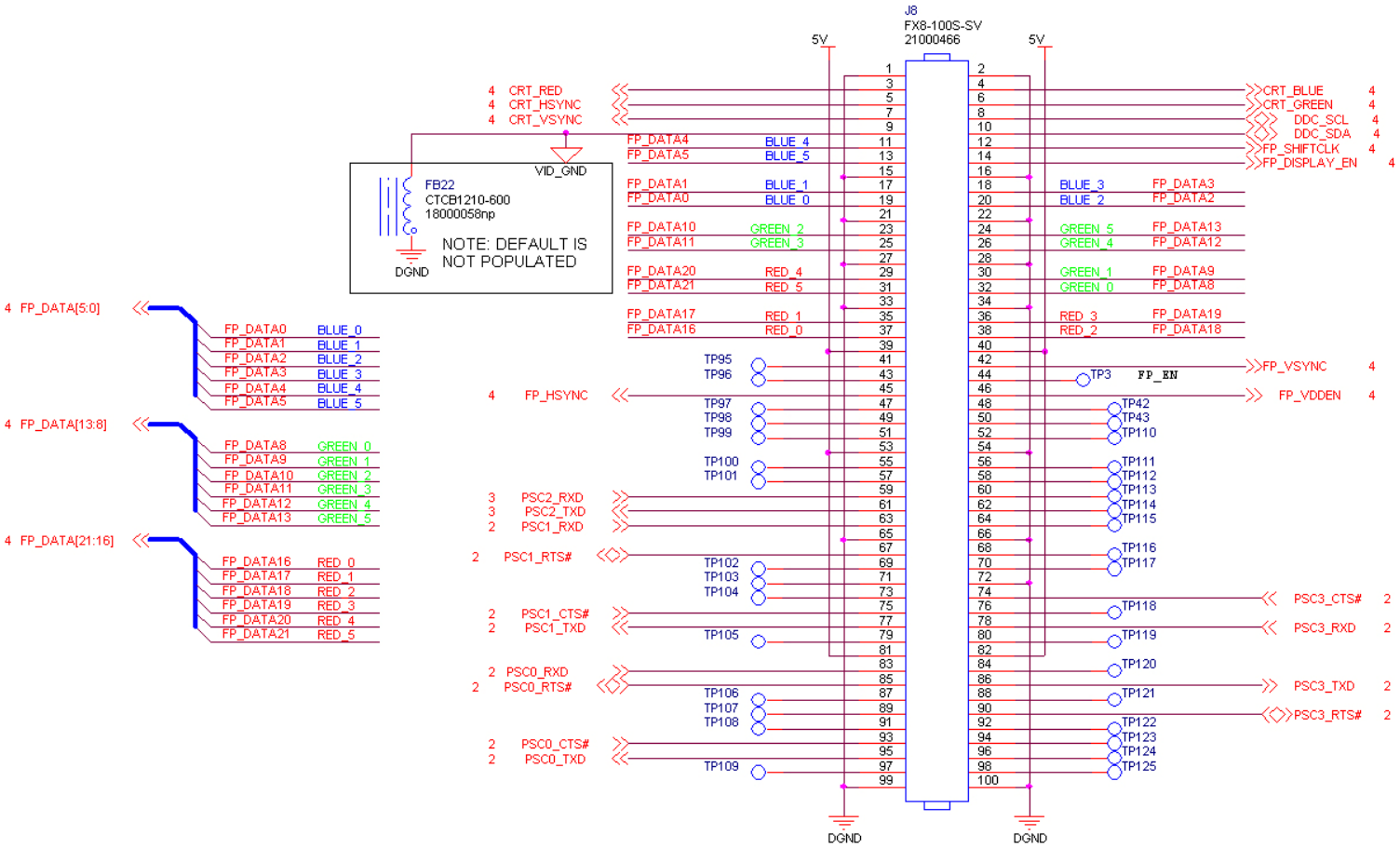


Figure 2.3: X3 Connector

2.4 X4: (J9 on PCB)

This connector is dedicated to the functions of the CAN interface, DSPI, I2C, Ethernet interface, ATX Power Control and Programmable timers.

The following is the X4 pinout:

J9		J9	
Pin	Signal	Pin	Signal
1	GND	2	GND
3	5V_SB	4	DSPISCK
5	PS_ON#	6	DSPI_DIN
7	PWRBTN#	8	DSPI_DOUT
9	N.C.	10	LNKLED2
11	DSPI_CS0	12	ACTLED2
13	DSPI_CS2	14	N.C.
15	N.C.	16	I2C_SCL
17	VCC	18	VCC
19	USB_nOVRC	20	N.C.
21	TOUT1	22	12C_SDA
23	TOUT3	24	N.C.
25	TOUT0	26	N.C.
27	GND	28	N.C.
29	N.C.	30	N.C.
31	N.C.	32	N.C.
33	GND	34	GND
35	N.C.	36	J_FB_AD1
37	PSC2_RTS#	38	J_FB_AD1
39	PSC2_CTS#	40	N.C.
41	N.C.	42	TIN3
43	TIN2	44	N.C.
45	TOUT2	46	N.C.
47	LNKLED1	48	N.C.
49	VCC	50	VCC
51	ACTLED1	52	N.C.
53	N.C.	54	N.C.
55	GND	56	USB1_EN
57	RX-_1	58	N.C.
59	RX+_1	60	N.C.
61	TX-_1	62	USB2_EN
63	TX+_1	64	N.C.
65	GND	66	GND
67	N.C.	68	USB3_EN
69	N.C.	70	N.C.
71	GND	72	N.C.
73	N.C.	74	USB4_EN
75	N.C.	76	N.C.
77	GND	78	N.C.
79	N.C.	80	N.C.
81	VCC	82	VCC

83	N.C.	84	N.C.
85	LAN_GND	86	N.C.
87	N.C.	88	N.C.
89	N.C.	90	N.C.
91	RX-_0	92	N.C.
93	RX+_0	94	N.C.
95	TX-_0	96	N.C.
97	TX+_0	98	BUTTON_MRESET#
99	LAN_GND	100	GND

The shaded pins shown above denote differences between this connector and the ETX standard. These include additional Logic Product Development ETX module supported peripherals. These include a second 10/100 Ethernet port, USB host power enable control, SPI port, and additional GPIO.

The schematic diagram of the X4 connector is as shown below:

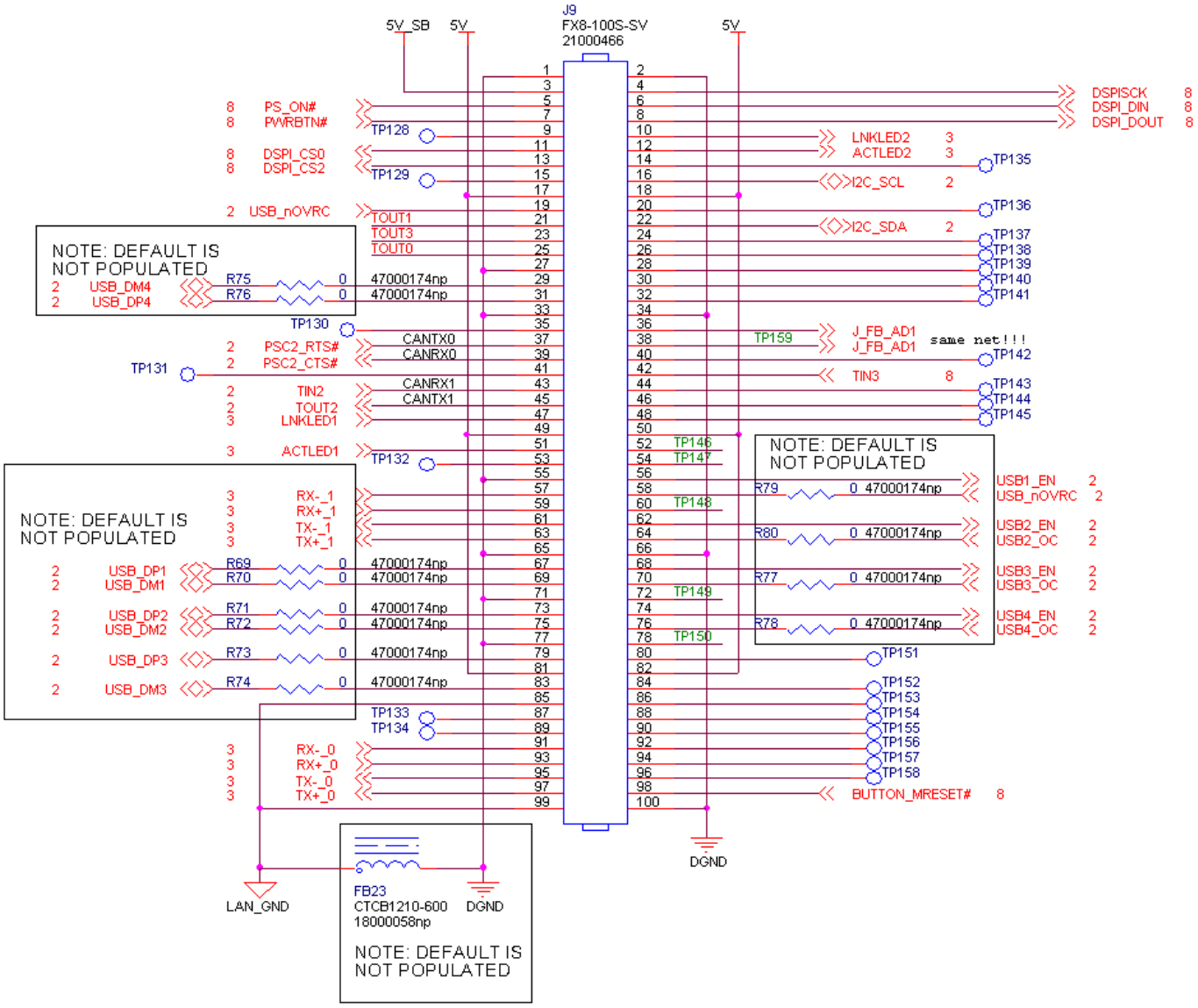


Figure 2.4: X4 Connector

3 Connectors

3.1 USB Connectors

Up to 4 USB ports are available. They are driven from the ETX standard module and the signals are supported through connector X1. The Logic Product Development ETX Fire Engine supports all 4 ports. The connectors used are multifunction USB/Ethernet stacked connectors.

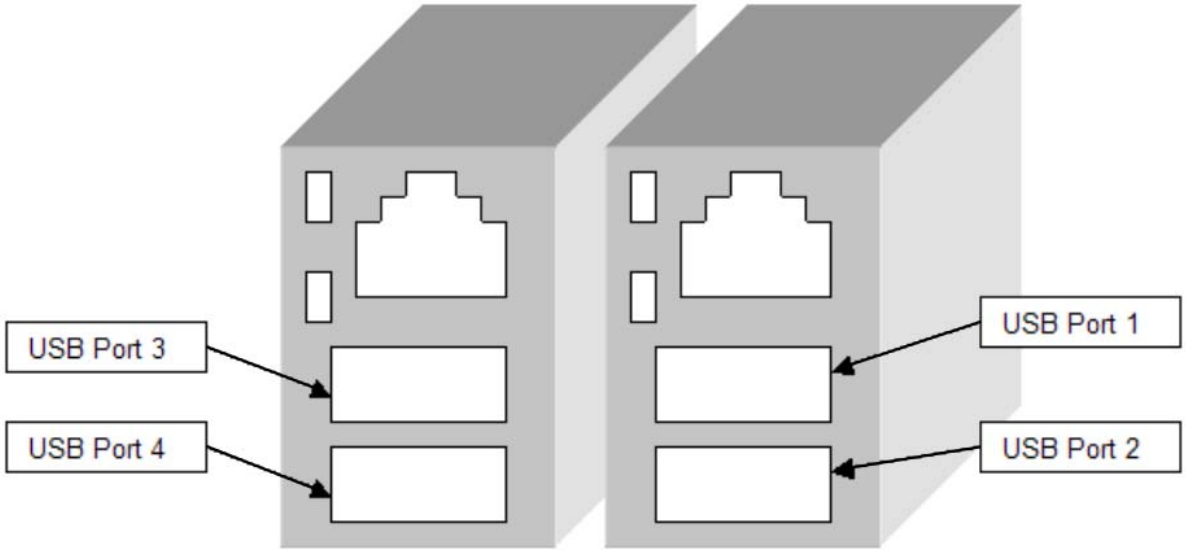


Figure 3.1: USB Connectors

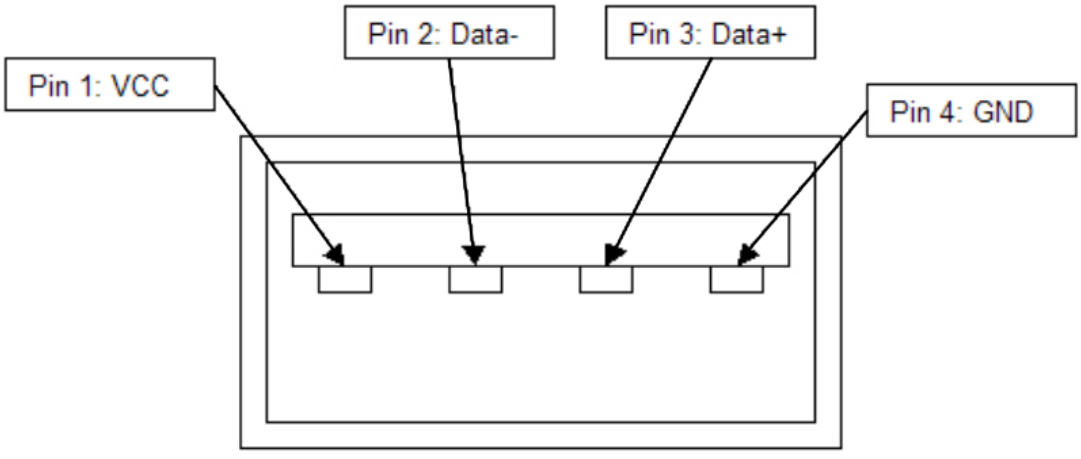


Figure 3.2: Individual USB Port

3.2 Ethernet Connectors

Up to 2 Ethernet ports available from the ETX standard module, which must contain a physical interface (PHY). From the PHY (ETX connector X4), the Ethernet signals go through isolation transformers (magnetics) located in the ITX baseboard, to the standard RJ45 connectors.

Both ports are full-duplex, 10BASE-T/100BASE-TX compatible.

The ETX standard provides support for only 1 Ethernet port. Modifications have been made to the X4 connector so the Logic Product Development ETX Fire Engine is able to support both Ethernet ports. Please see the section on the X4 connector for details.

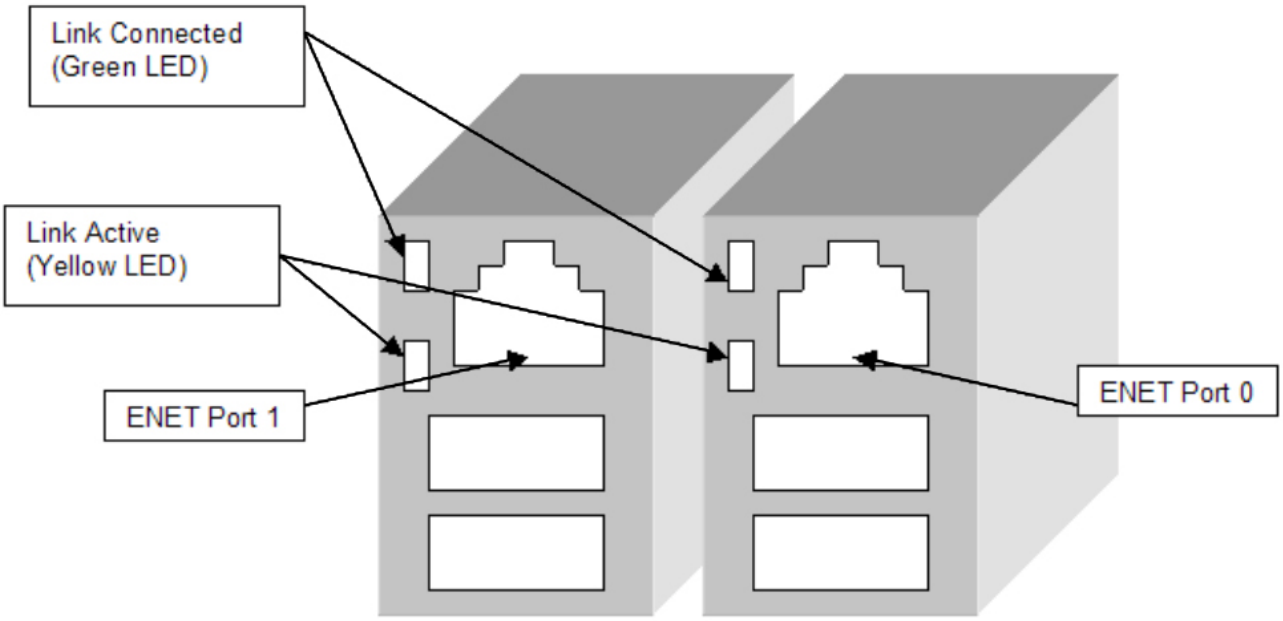


Figure 3.3: Ethernet Connector

3.3 CAN Connectors

Up to 2 Controller Area Network (CAN) interfaces operate from the ETX module through connector X4. The ETX standard does not provide for CAN interfaces. Deviations from the standard were made to accommodate these processor specific supported interfaces. Please refer to the Logic Document: MCF5475/85 Fire Engine Hardware Specification for details.
On the Mini-ITX, Jumpers J14 and J17 are associated with the CAN interface. J14 allows for daisy chaining of CAN devices. When J14 pins 4 and 6 are jumpered, a termination resistor is connected across the differential data lines. This is appropriate for the CAN port when it is at the end of a daisy chain. When J14 pins 4 and 6 are NOT jumpered, there is no termination resistor. This is appropriate for the port being in the middle of the daisy chain. J14 pins 4 and 6 apply to CAN Port 1 and J14 pins 3 and 5 apply to CAN Port 0.

Jumper J17 is not used at this time. Its purpose is to provide enable and disable modes for the CAN transceivers in the event transceivers with those features were implemented.

The ETX standard has no provisions for CAN signals. LogicPD has deviated from this standard in order to provide this feature. Connector X4, Pins 37, 39 ,43 and 45 have been assigned to CANTX0, CANRX0, CANRX1, and CANTX1 respectively. Both CAN ports are supported by Logic Product Development's Fire Engine.

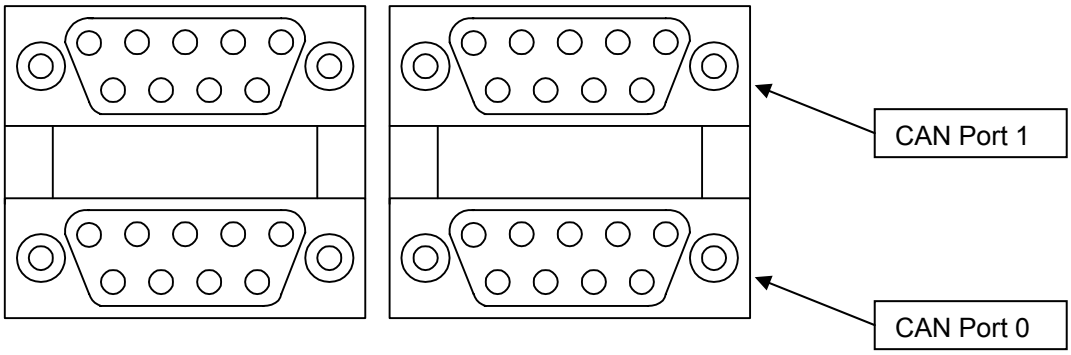


Figure 3.4: CAN Connectors

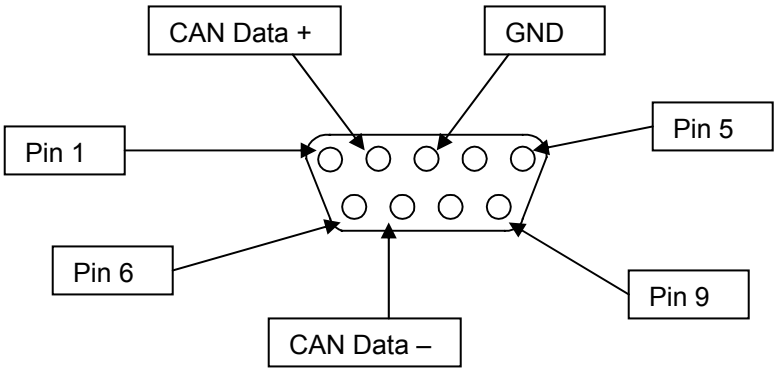


Figure 3.5: Connector Pin-out for the CAN Connector

3.4 RS232 Serial Port Connectors

Three standard RS232 serial serial ports are provided from the ETX Card X3 connector. Support is provided for RTS and CTS on both ports. All signals from the X3 connectors are CMOS logic levels and are converted to RS232 logic levels on the Mini-ITX.

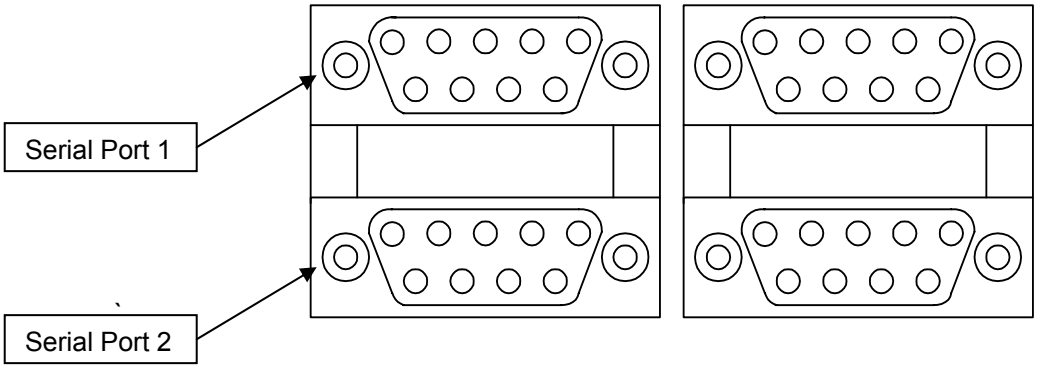


Figure 3.6: Serial Port Connectors

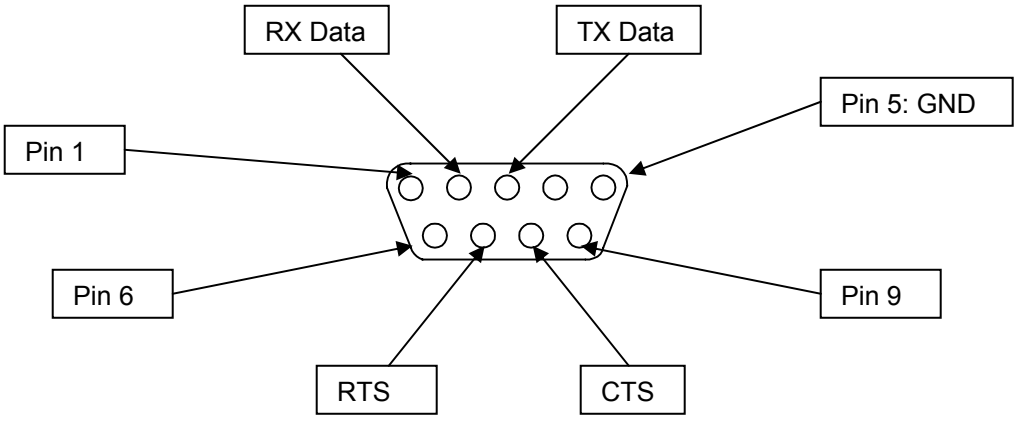


Figure 3.7: Serial Port Connector Pin-out

3.5 Serial Port 3

This port has an RS232 interface but instead of being fitted to a standard DB9 connector, it is connected to a .1 in. spaced 5 pin header. (J13) CMOS level signals from the X3 connector support this interface and are converted to RS232 level signals before being presented to J13.

The signal assignments are as follows:

Pin	Description
1	GND
2	CTS
3	RTS
4	RX Data
5	TX Data

3.5.1 Infra Red Transceiver

The on-board Infrared transceiver is driven by a Serial Controller located on the ETX module using serial port pins from the X3 Connector. The transceiver is the TFDU6102 manufactured by Vishay Semiconductors. It supports 3 modes of operation:

SIR: 2.4Kbps to 115.2 Kbps

MIR: 576 Kbps to 115.2 Kbps

FIR: 4 Mbps

A “Mode” pin is controlled by J23. When there is a jumper from J23 pin 1 to 2, the Mode pin is low and enables slow speed mode (SIR). When there is a jumper from J23 pin 2 to 3, the Mode pin is high and enables high speed mode (MIR and FIR).

An “SD” pin is controlled by J24. Under normal conditions, this pin should be low (Jumper J24 pin 1 to 2.)

For more information, please refer to the Manufacturer’s data sheet: Vishay TFDU6102.

3.6 PCI Connectors

2 PCI connectors are located at J15 and J16. They are industry standard 32-bit, 3.3V only slots. They may run at 25Mhz, 33Mhz, 50Mhz or 66Mhz depending on how the ETX module is configured.

The pin assignments are as shown in the following diagrams:

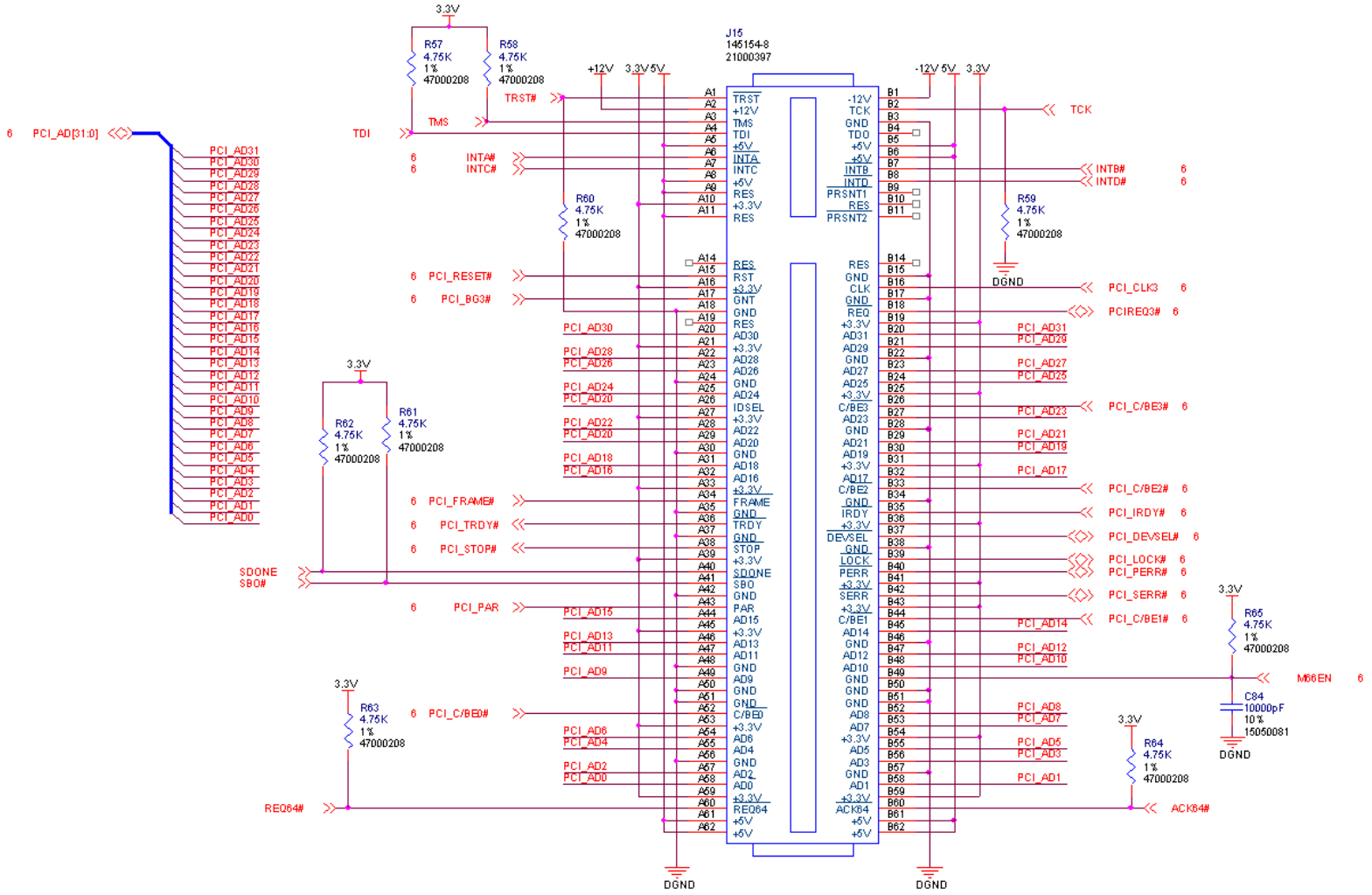


Figure 3.8: PCI Connector J15

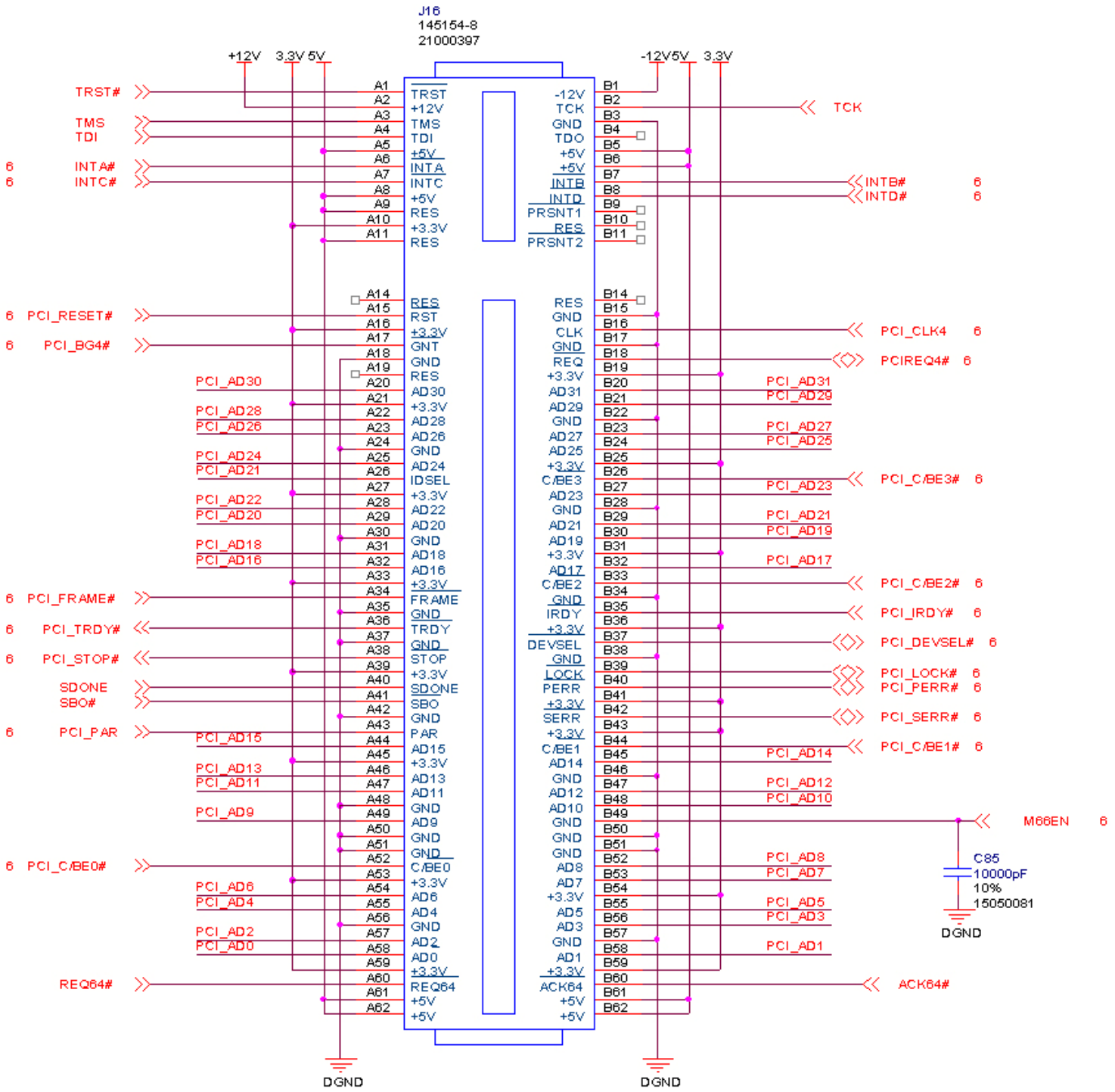


Figure 3.9: PCI Connector J16

3.7 PCI104 Connectors

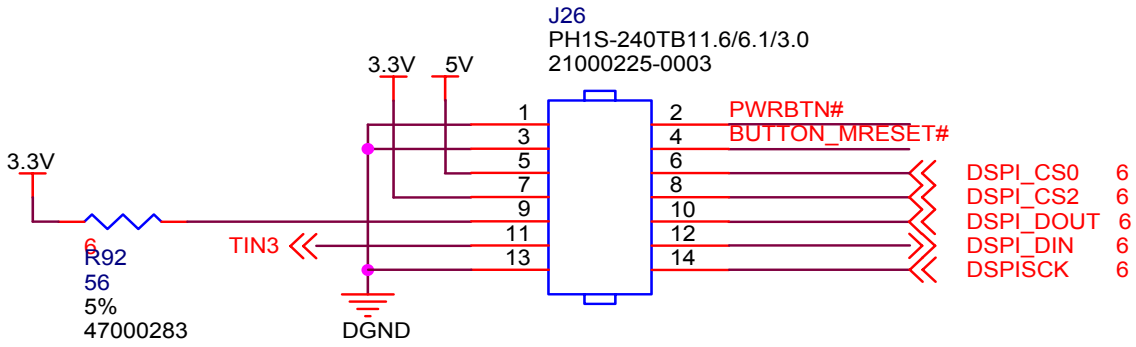
Two Connectors positions, J20, J21 provide connectivity for the Industry Standard PC104 ISA interface.

These are currently unpopulated and reserved for future use. Please contact Logic Product Development for detailed information regarding PC104 implementations.

3.8 Mini-ITX Case Header Connector

A connector, located at J26, provides termination points for auxiliary connectors associated with an ITX case or Chassis. It also provides a DMA Serial Peripheral Interface (DSPI), if available on the ETX module.

The pin out for J26 is presented in the diagram below:



CASE FUNCTION	USE PINS
POWER BUTTON	1, 2
RESET BUTTON	3, 4
POWER LED	9, 13

Figure 3.10: Mini-ITX Case Header Connector

For more information regarding the SPI interface, please refer to Logic Product Development's Fire Engine documentation.

The ETX standard does not provide for DSPI signals. The Mini-ITX board uses pins from the X4 connector to accommodate this feature.

3.9 Digital Video Connectors

There are 2 video connectors available. J19 is an 18 pin TFT Video interface.
A standard VGA CRT Connector is provided at J3.

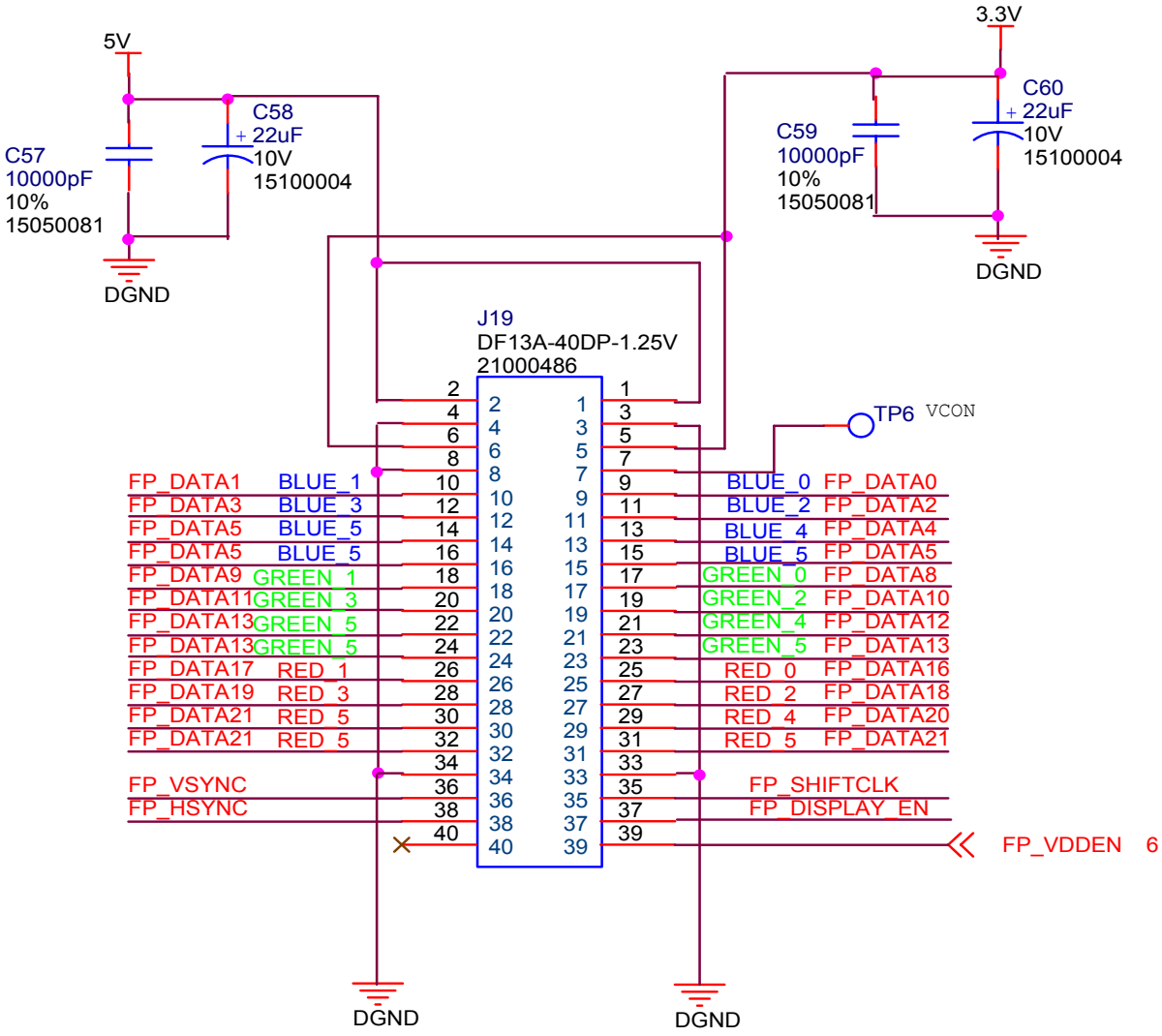


Figure 3.11: TFT Video Connector (J19)

Users can connect to this interface with the mating connector:
Hirose DF13-40DS-1.25C

The above interface is compatible with 3 types of ZOOM Display Kits offered by Logic Product Development:

Freescale Part#	Description
MQVGADK	3.5”, QVGA, TFT
MVGADK	6.4”, VGA, TFT
MSVGA	12.1”, SVGA, TFT

Standard VGA CRT Connector: The J3 VGA CRT connector supports CRT Analog signals to a standard VGA display.

VGA INTERFACE

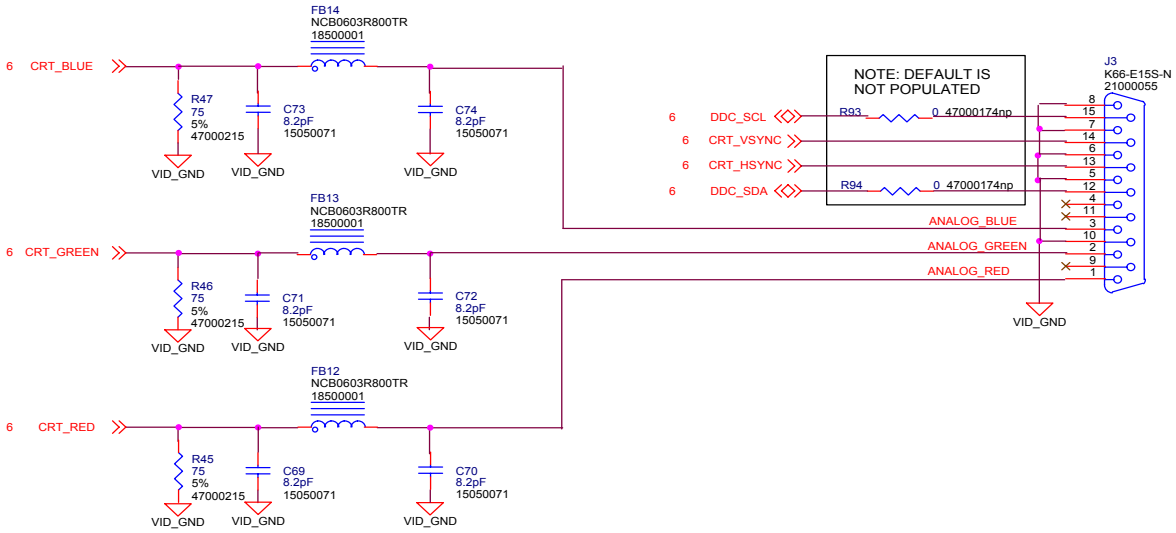


Figure 3.12: VGA CRT Connector

4 Push Buttons and Indicators

1. Master Reset (S1)

This momentary push button causes a System Reset to the ETX board. As an option, this switch can also be used from an ITX chassis by wiring into J26. For more info, see “Connector, Mini-ITX Case Header”.

2. Interrupt (S3)

This momentary push button sends an Interrupt request to the ETX card engine via X2 pin 48. This is an ETX standard pin associated with ISA interrupts.

3. ATX Power Button (S2)

If a standard ATX power supply is used for powering the Mini-ITX, This momentary push button will turn the power on and off. The actual control circuitry must be located on the ETX module. As an option, this switch can also be used from an ITX chassis by wiring into J26. For more info, see “Connector, Mini-ITX Case Header”.

4. Power On Indicator (D14)

This indicator will illuminate when the 3.3V supply is active. An additional pin on the Mini-ITX Case Header connector allows for an external indicator for use on a standard ITX chassis.

5. Miscellaneous Indicators (D11, D12, D13)

These indicators are wired to ETX connector X4 pins 21, 23 and 25. They are current limited and will illuminate whenever the appropriate pin goes to a logic 1 (3.3V)

5 Real Time Clock

The onboard RTC has a battery backup, is controlled via the I2C bus, and has the option of generating interrupts to the ETX board on connector X2 pin 56. This is an ETX standard pin associated with ISA interrupts.

J22 is a 3 pin header type connector that allows access to additional I2C bus components. Its pin description is:

Pin	Signal	Description
1	I2C_SDA	I2C Bus Data Line
2	Gnd	Gnd
3	I2C_SCL	I2C Clock Line

J25 provides the interrupt option. If J25 pin 1 to 2 is jumpered, then the “InterruptA” from the RTC controller chip is connected to the ETX board (X2 pin 56). If J25 pin 2 to 3 is jumpered, no interrupts are connected from the RTC.

6 Jumpers

This is a summary of all the Jumpers available on the ITX baseboard:

Jumper Settings		Function
J17		Not used at this time
J14	Jmp 2-4	CAN Port 0 Non-terminated data line
	Jmp 4-6	CAN Port 0 Terminated data line
J14	Jmp 1-3	CAN Port 1 Non-terminated data line
	Jmp 3-5	CAN Port 1 Terminated data line
J25	Jmp 1-2	RTC Interrupt = IRQ-3
	Jmp 2-3	No RTC interrupt
J24	Jmp 1-2	Infrared Xcvr Normal Mode
	Jmp 2-3	Infrared Xcvr Shutdown Mode
J23	Jmp 1-2	Infrared Xcvr Low Speed Mode
	Jmp 2-3	Infrared Xcvr High Speed Mode

Note: J22 appears to be a jumper but is actually a connector for the I2C bus.

7 Power Supply

7.1 Power Connector

The ITX baseboard may be powered in either of two ways; ATX Power supply or the supplied 5VDC Modular supply.

ATX POWER Supply: A standard 20 pin ATX power supply connector is provided at J10. Its pin configuration is as shown:

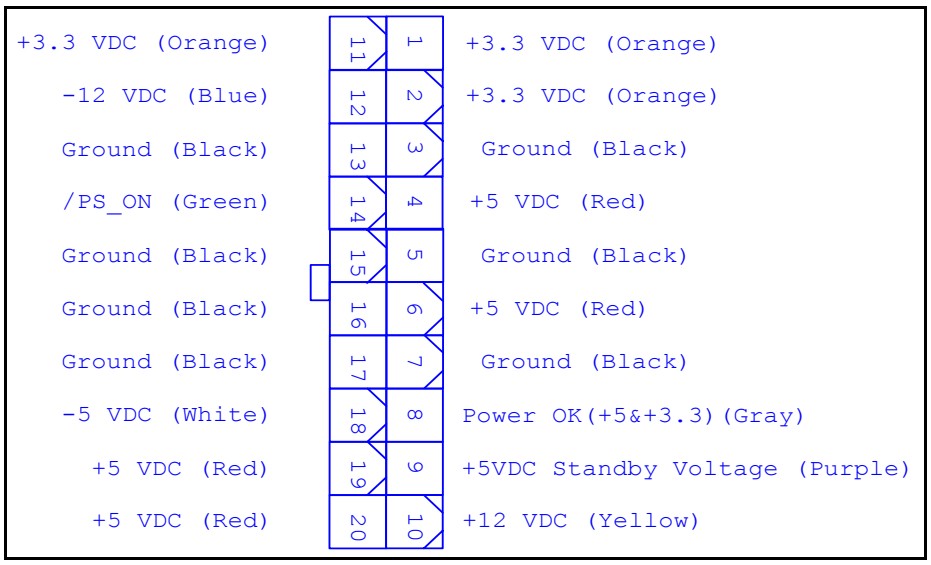


Figure 7.1: Power Connector

From this connector, the +5V is the primary voltage used. The 3.3V is used instead of the voltage regulator. Because of this, the ATX power supply and the 5VDC modular supply should never be plugged in at the same time. The –5V is not used. The +/- 12V is used only on the PCI Slots.

5VDC Modular supply:

J11 is a standard 2.5 mm barrel jack connector, which accepts a standard power supply plug. NOTE: the center post is the +5V and the sleeve is ground.

7.2 Power Supply Requirements

The Mini-ITX baseboard uses power from the +5V on either the ATX connector or the modular power connector. The current requirement for the Mini-ITX board only is <50mA. Depending on the ETX module used, the total current is expected to be approximately 1.5 Amps to 2 Amps. The Mini-ITX baseboard generates its own 3.3V from the +5V supply if the modular jack is used. If the ATX connector is used the 3.3V is supplied by the ATX connector.

The 5VDC modular supply that is provided with the board is a 6 Amp supply for a total of 30 Watts. The PCI specification limits PCI device power consumption to a combined power rail total of 25W per device. The ETX module and Mini ITX power converters share the 5V input which limits the total power shared between both external PCI slots to 20W when using the 5V modular supply assuming the ETX module uses roughly 10W in normal operation. When using the Mini ITX board with external PCI devices, it is recommended that only an ATX power supply be used. The ATX power supply provides the PCI cards with greater power resources. This is the only way that +/- 12V can be provided to the PCI boards if required. The ATX supply also increases the 3.3V power available to the PCI cards to the maximum supported by the ATX supply (maximum of 25W per slot as per the PCI specifications). Care must be taken to ensure that PCI boards that exceed this capability are not used or brown out conditions will occur. Note the Mini-ITX board only provides +5V to the ETX connectors as per the ETX specification.

8 Mechanical Drawing

8.1 Mini-ITX Baseboard

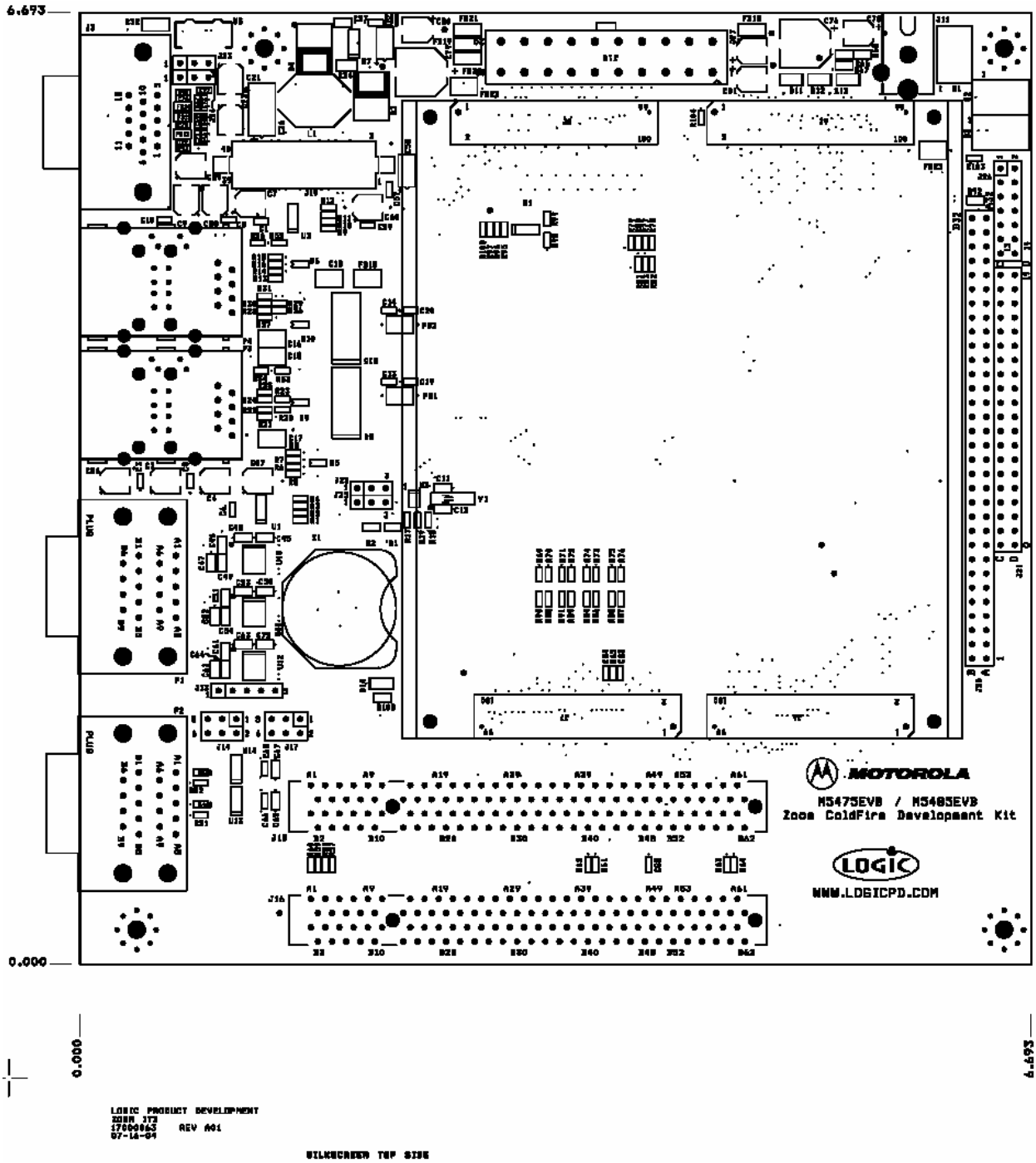


Figure 8.1: Mini-ITX Baseboard

8.2 Mating ETX Footprint

The Fire Engine mating ETX Footprint for the baseboard complies with the following:

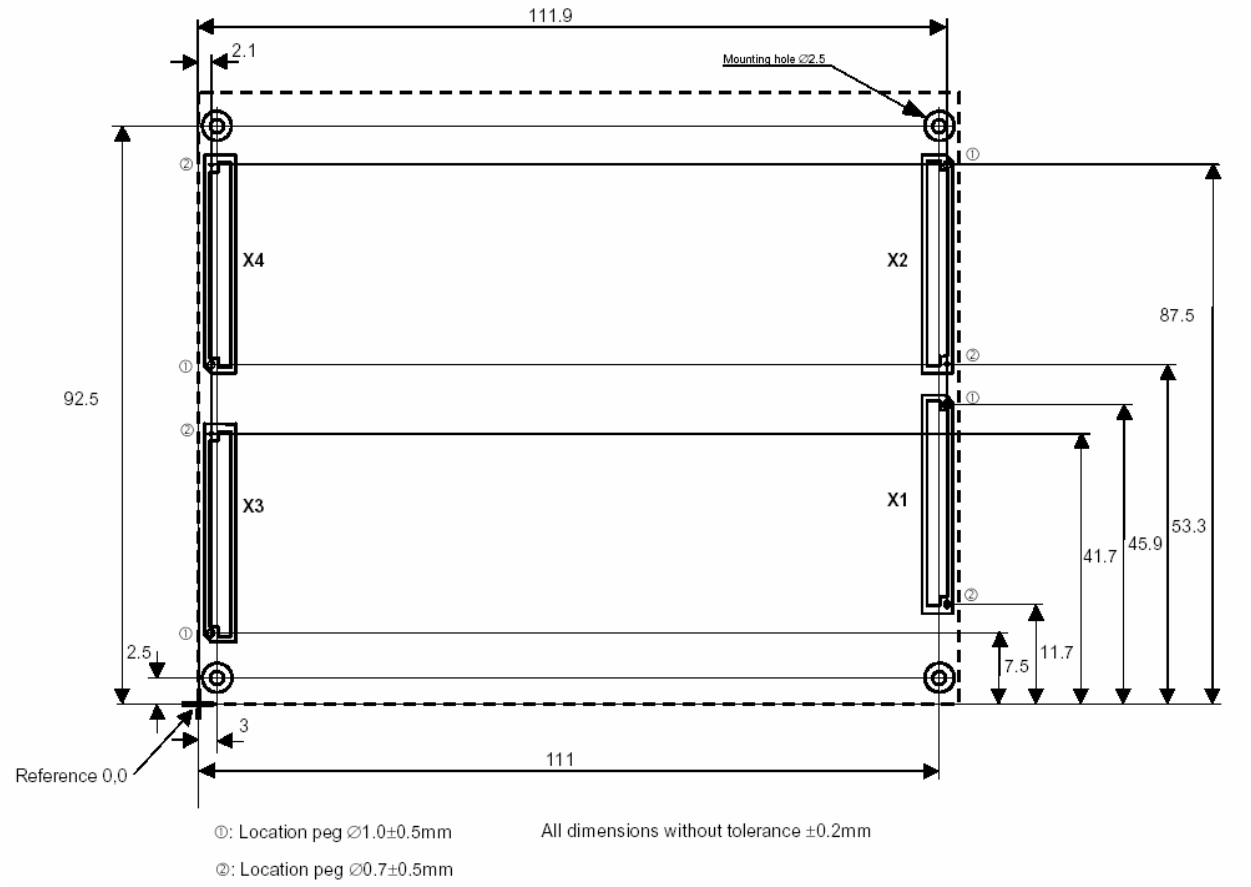


Figure 8.2: Fire Engine Mating ETX Footprint Mechanical Drawing

Note: Dimensions are NOT the same for the ETX footprint. Specifically, the footprints for the top and bottom side connectors have different alignment pin locations. Please refer to the MCF547x/8x Hardware Specification for the mechanical drawing of the ETX footprint.

