Embedded Computing for
Business-Critical Continuity™

COMX-P2020 COM Express Module

Installation and Use

P/N: 6806800K97C

December 2010

EMERSON
Network Power

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About this Manual

Overview of Contents

This manual is divided into the following chapters and appendices.

- *Introduction* gives an overview of the features of the product, standard compliances, mechanical data, ordering information, and board identification.
- *Hardware Preparation and Installation* outlines the installation requirements, hardware accessories, switch settings, and installation procedures.
- *Controls, LEDs, and Connectors* describes external interfaces of the board. This includes connectors and LEDs.
- *Functional Description* includes a block diagram and functional description of major components of the product.
- *Firmware Upgrade* describes the procedures in upgrading the firmware.
- *Operating System and Driver Support* lists the drivers and operating systems supported by the product.
- *Related Documentation* provides a listing of related product documentation, manufacturer's documents, and industry standard specifications.
- *Safety Notes* summarizes the safety instructions in the manual.
- *Sicherheitshinweise* is a German translation of the Safety Notes chapter.

Abbreviations

This document uses the following abbreviations:

Abbreviation	Definition
A	Amps
BGA	Ball Grid Array
COM	Communications
COM-E	Computer-on-Module Express
COP	Common On-chip Processor
CPU	Central Processing Unit

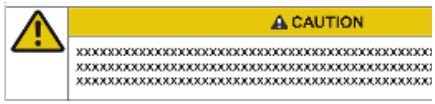
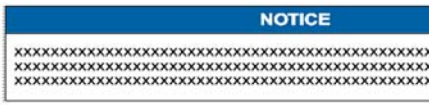
Abbreviation	Definition
CRC	Cyclic Redundancy Check
DDR	Double Data Rate
oC	Degrees Celsius
DRAM	Dynamic Random Access Memory
DUART	Dual Universal Asynchronous Receiver/Transmitter
ECC	Error Correction Code
EEPROM	Electrically Erasable Programmable Read-Only Memory
EPROM	Erasable Programmable Read-Only Memory
F/W	Firmware
GB	Giga Bytes
GbE	Gigabit Ethernet
Gbit	Gigabit
RGMII	Reduce Gigabit Media Independent Interface
H/W	Hardware
I/O	Input/Output
IEEE	Institute of Electrical and Electronics Engineers
I2C	Inter IC
JTAG	Joint Test Access Group
KB	Kilo Bytes
LED	Light Emitting Diode
MB	Mega Bytes
Mbit	Megabit
MBLT	Multiplexed Block Transfer
Mbps	Megabits Per Second
MHz	Megahertz
MTBF	Mean Time Between Failure
OS	Operating System
PCI-X	Peripheral Component Interconnect -X

Abbreviation	Definition
PIC	Programmable Interrupt Controller
PLL	Phase-Locked Loop
POR	Power-On Reset
PRD	Product Requirements Document
RAM	Random Access Memory
RGMII	Reduced Gigabit Media Independent Interface
ROM	Read-Only Memory
RTBI	Reduced Ten Bit Interface
RTC	Real-Time Clock
RTM	Rear Transition Module
SATA	Serial AT Attachment
SDRAM	Synchronous Dynamic Random Access Memory
SMT	Surface Mount Technology
SODIMM	Small-Outline Dual In-line Memory Module
S/W	Software
USB	Universal Serial Bus
V	Volts
W	Watts

Conventions

The following table describes the conventions used throughout this manual.

Notation	Description
0x00000000	Typical notation for hexadecimal numbers (digits are 0 through F), for example used for addresses and offsets
0b0000	Same for binary numbers (digits are 0 and 1)
bold	Used to emphasize a word
`Screen`	Used for on-screen output and code related elements or commands in body text
`Courier + Bold`	Used to characterize user input and to separate it from system output
Reference	Used for references and for table and figure descriptions
File > Exit	Notation for selecting a submenu
<text>	Notation for variables and keys
[text]	Notation for software buttons to click on the screen and parameter description
...	Repeated item for example node 1, node 2, ..., node 12
. . .	Omission of information from example/command that is not necessary at the time being
..	Ranges, for example: 0..4 means one of the integers 0,1,2,3, and 4 (used in registers)
|	Logical OR

Notation	Description
	Indicates a hazardous situation which, if not avoided, could result in death or serious injury
	Indicates a hazardous situation which, if not avoided, may result in minor or moderate injury
	Indicates a property damage message
	No danger encountered. Pay attention to important information

Summary of Changes

The table below lists all the revisions implemented in this manual.

Part Number	Publication Date	Description
6806800K97C	December 2010	Updated Chapter 6, *Firmware Upgrade, on page 83* Updated *Supported Operating Systems* on page 89
6806800K97B	December 2010	Updated *DIP Switch Setting* on page 57
6806800K97A	November 2010	GA version

1.1 Features

COMX-P2020 COM Express Module is a COM Express module based on the Freescale P2020 processor. COM Express is an industry-standard embedded computer module defined by PICMG.

The following table summarizes the features of COMX-P2020.

Table 1-1 COMX-P2020 Features Summary

Function	Features
Processor	● Freescale P2020 Processor – Designed for P1020/P1011/P1021/P1012 with no validation – Dual e500v2 Core, 800MHz to 1.2GHz clock frequency – Power consumption of less than 8W at 1.2GHz – 32-KB instruction and 32-KB data first-level cache (L1) for each core – 512-KB second-level cache (L2) with ECC – 64-bit DDR2/DDR3 controller with ECC supports data rate up to 800Mbps/pin – 31x31 mm 689-pin wirebond power-BGA – 45 nm SOI process technology
Memory	● Supports 2GB DDR3 667MT/s DDR3+ECC arranged in two ranks on one slot
SD Card	● 2 GB MicroSD Card on module ● SDHC signals routed to the COM-E connector ● Storage for bootloader and OS
UART	Two full-function UARTs
Video	● XGI Z11M supports up to 1280x1024x32@85NI ● Connected to the CPU through the PCI-E x1 lane #0 ● Include VGA, LVDS interface
Ethernet	Three 10/100/1000Base-T Ethernet interface routed to COM-E connectors
USB	Four USB2.0 ports routed to the COM-E connector

Table 1-1 COMX-P2020 Features Summary (continued)

Function	Features
PCI Express	One PCI-E 1.0 and one x2 PCI-E 1.0 (@2.5 GT/s) ports routed to the COM-E connectors.
Boot Loader	Features U-boot
I2C	Four ports
JTAG	JTAG connector on module

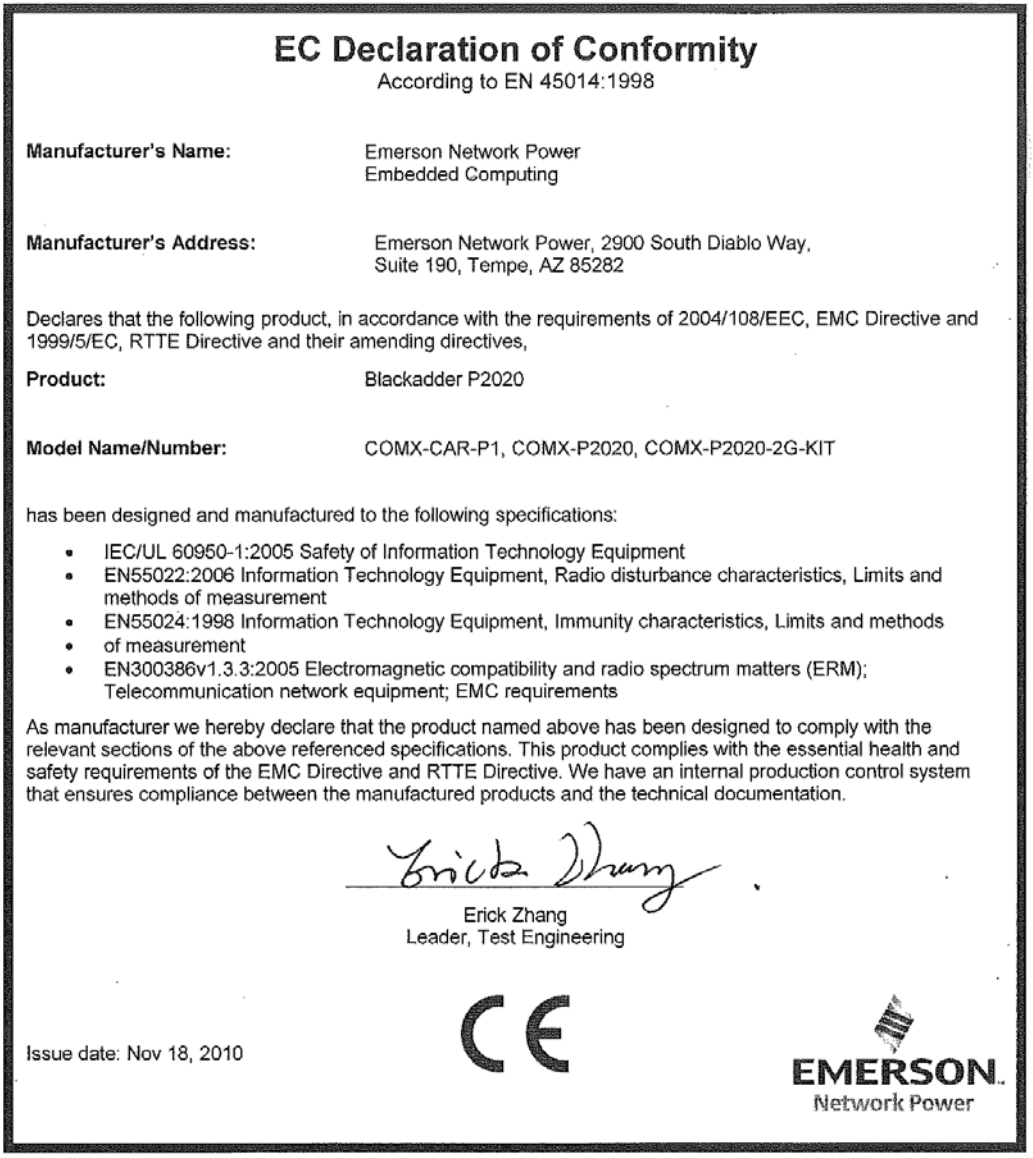
1.2 Standard Compliances

This product meets the following standards:

Table 1-2 Standard Compliances

Standard	Description
UL/CSA 60950-1 EN 60950-1 IEC 60950-1 CB Scheme	Legal safety requirements
FCC 47 CFR Part 15 Subpart B (US), Class A EN55022 Class A (EU) AS/NZS CISPR 22 Class A (Australia/New Zealand) VCCI Class A (Japan)	EMC requirements (legal) on system level (predefined Emerson system)

Figure 1-1 Declaration of Conformity



EC Declaration of Conformity

According to EN 45014:1998

Manufacturer's Name: Emerson Network Power
Embedded Computing

Manufacturer's Address: Emerson Network Power, 2900 South Diablo Way,
Suite 190, Tempe, AZ 85282

Declares that the following product, in accordance with the requirements of 2004/108/EEC, EMC Directive and 1999/5/EC, RTTE Directive and their amending directives,

Product: Blackadder P2020

Model Name/Number: COMX-CAR-P1, COMX-P2020, COMX-P2020-2G-KIT

has been designed and manufactured to the following specifications:

- IEC/UL 60950-1:2005 Safety of Information Technology Equipment
- EN55022:2006 Information Technology Equipment, Radio disturbance characteristics, Limits and methods of measurement
- EN55024:1998 Information Technology Equipment, Immunity characteristics, Limits and methods
- of measurement
- EN300386v1.3.3:2005 Electromagnetic compatibility and radio spectrum matters (ERM); Telecommunication network equipment; EMC requirements

As manufacturer we hereby declare that the product named above has been designed to comply with the relevant sections of the above referenced specifications. This product complies with the essential health and safety requirements of the EMC Directive and RTTE Directive. We have an internal production control system that ensures compliance between the manufactured products and the technical documentation.

Erick Zhang
Leader, Test Engineering

Issue date: Nov 18, 2010

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1.3 Mechanical Data

1.3.1 COMX-P2020 Mechanical Data

Figure 1-2 COMX-P2020 Mechanical Dimensions (Top and Side View)

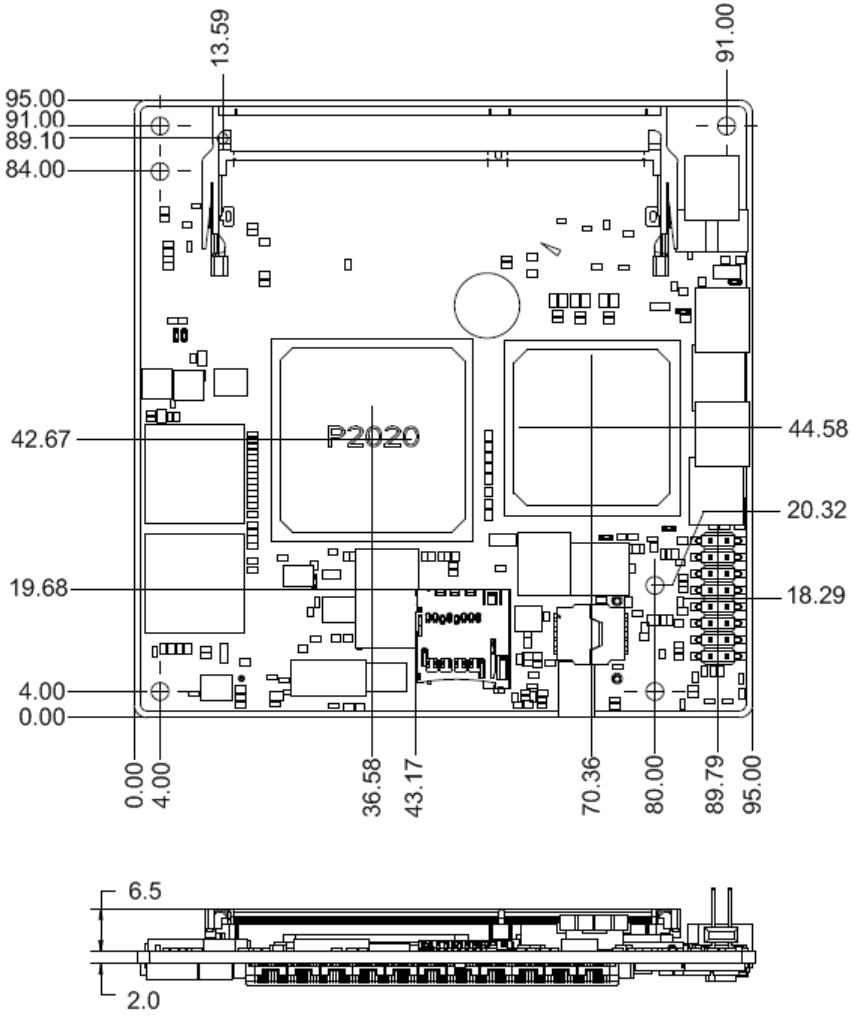


Table 1-3 Mechanical Data

Feature	Value
Dimensions	COM Express basic form factor: 95 mm x 95 mm
Weight	73.0 g

1.3.2 Heat Spreader Mechanical Data

Figure 1-3 Heat Spreader Mechanical Dimensions (Front and Side View)

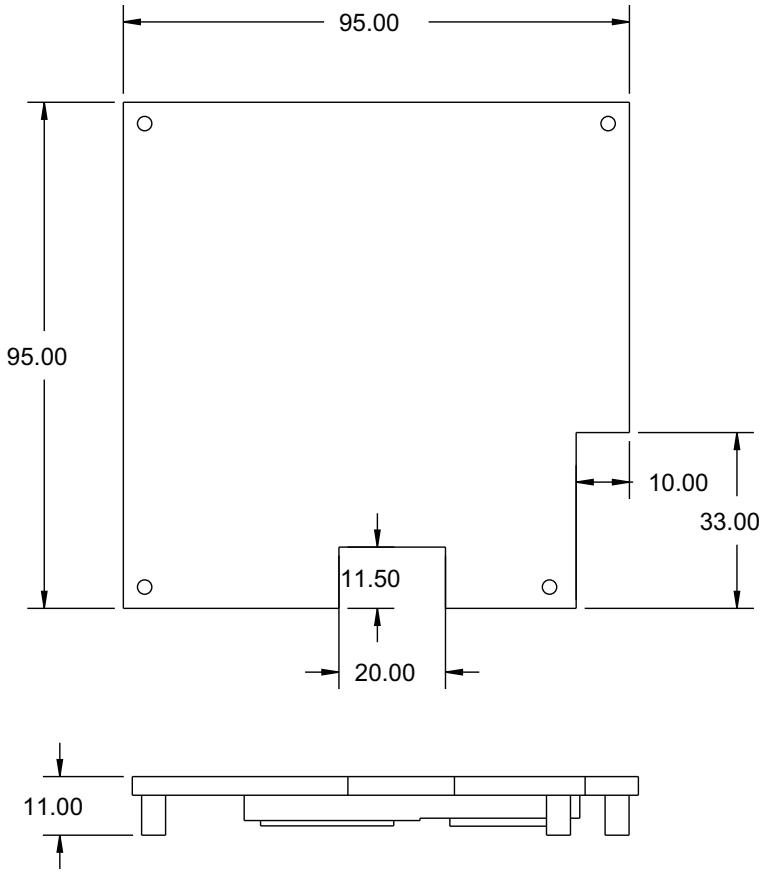
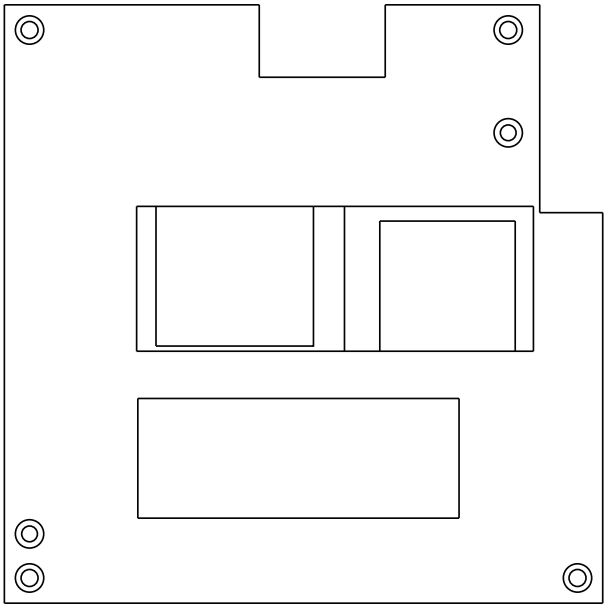


Figure 1-4 Heat Spreader (Rear View)



1.3.3 Cooler Mechanical Data

Figure 1-5 Cooler Mechanical Dimensions (Front and Side View)

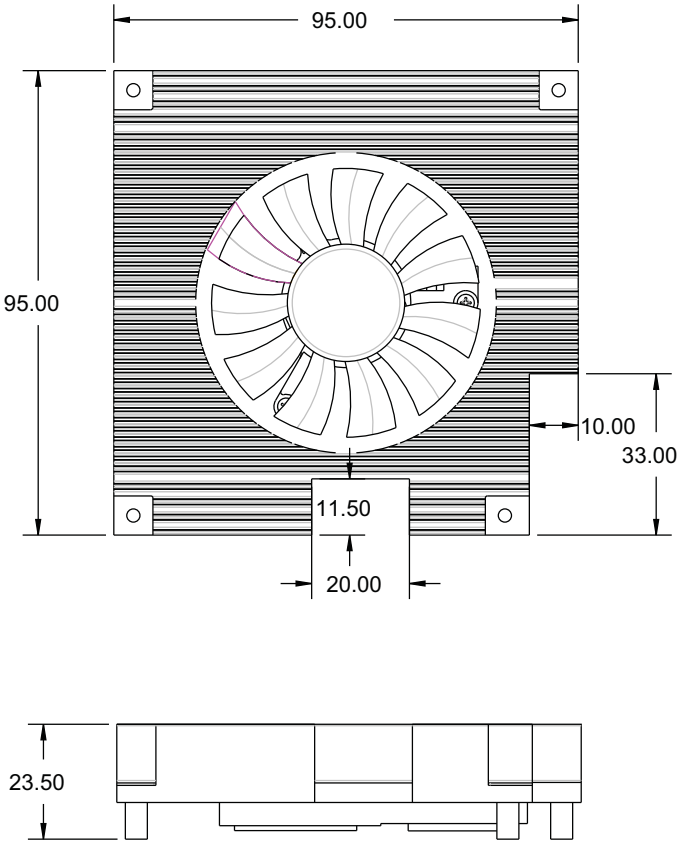
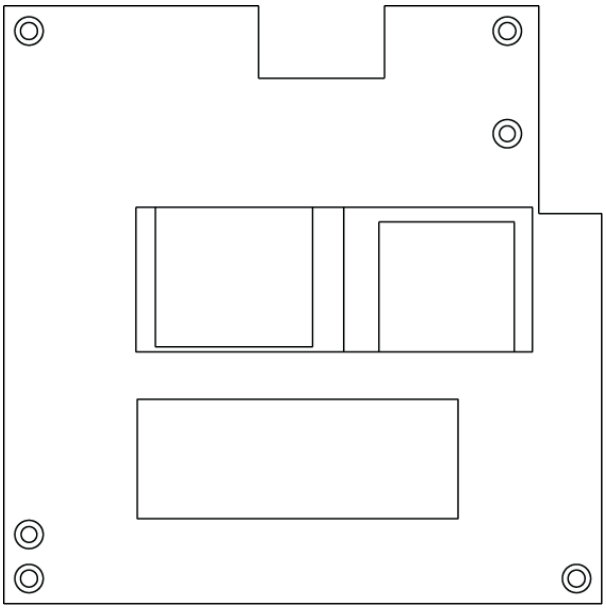


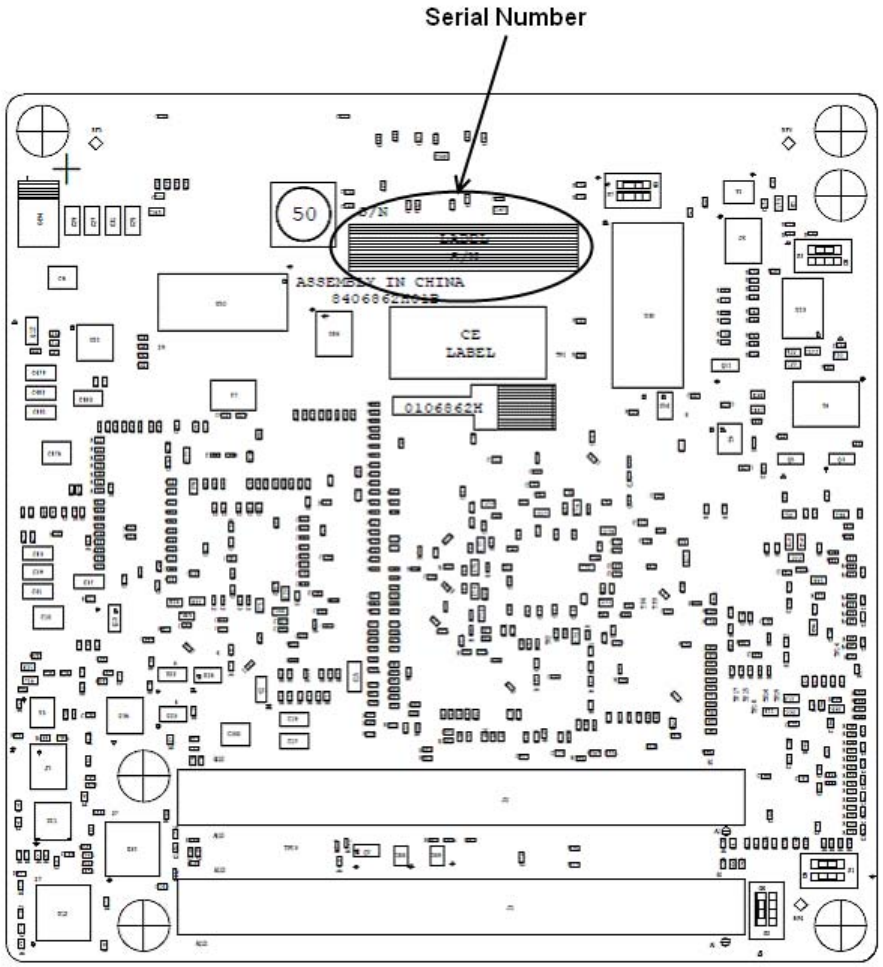
Figure 1-6 Cooler (Rear View)



1.4 Board Identification

This section shows the serial number and its location on the board.

Figure 1-7 Serial Number Location



1.5 Ordering Information

1.5.1 Supported Board Models

The following table lists the product variants that are available upon release of this publication.

Table 1-4 Available Board Variants

Order Number	Description
COMX-P2020	COMX-P2020 COM Express module
COMX-P2020-2G-KIT	COMX-P2020 COM Express module, 2 GB memory, heatsink

For availability of other variants, consult your local Emerson sales representative.

1.5.2 Board Accessories

The following table lists the board accessories that are available upon release of this publication.

Table 1-5 Available Board Accessories

Order Number	Description
COMX-P2020-HTSNK	Cooler for COMX-P2020 COM Express module
COMX-P2020-HSP	Heat spreader for COMX-P2020 COM Express module

For availability of other board accessories, consult your local Emerson sales representative.

2.1 Environmental and Power Requirements

2.1.1 Environmental Requirements

The following table lists the environmental requirements that the board must meet when operated in your particular system configuration.

Operating temperatures refer to the temperature of the air circulating around the board and not to the component temperature.

NOTICE

Product Damage
High humidity and condensation on surfaces cause short circuits.
Do not operate the system outside the specified environmental limits. Make sure the product is completely dry and there is no moisture on any surface before applying power.

Table 2-1 Environmental Requirements

Requirement	Operating	Non-Operating
Cooling Method	Forced-air	
Temp Cycle Class	-40°C to 85°C:500 cyc	
Temperature	0°C to 55 °C	-40°C to 85°C
Humidity	10 to 90% Non-condensing	-
Vibration	0.01g^2/Hz at 5-500 Hz Random vibration	
Shock	20 g 11 ms sine or saw	-
Altitude	-60 to 4000 m ASL	

2.1.2 Thermal Requirements

Table 2-2 Critical Temperature Spots for COMX-P2020

Component Identifier	Heat Dissipation Power (W)	Maximum Allowable Temperature (°C)
CPU-P2020	6.9	Tjmax = 125
GPU-XGI-Z11M	3.093	Tcmax = 110

Contact your Emerson sales representative for current information on the detailed thermal information including airflow and resistance of the module.

NOTICE

System Overheating
Cooling Vents
Improper cooling can lead to system damage and can void the manufacturer's warranty. To ensure proper cooling and undisturbed airflow through the system do not obstruct the ventilation openings of the system. Make sure that the fresh air supply is not mixed with hot exhaust from other devices.

⚠ CAUTION

Personal Injury
During operation, hot surfaces may be present on the heat sinks and the components of the product.
To prevent injury from hot surface do not touch any of the exposed components or heatsinks on the product when handing. Use the handle and face plate, where applicable, or the board edge when removing the product from the enclosure.

2.1.3 Power Requirements

The default power input setting for COMX-P2020 is 12 V (11.4 - 12.6).

Table 2-3 Module Total Power Consumption

Voltage	+12V POWER
Power consumption	12 W (when idle in Linux)

2.2 Default Settings

The following table shows the default settings of COMX-P2020 COM-E module:

Table 2-4 Default Settings

Component	Value
COM-E Power Input	12 V (11.4-12.6)
CPU (speed)	1.2 GHz
Memory (speed)	667 MHz
PCI-E	PCIE 2(x1)(2.5Gbps) SerDes lane 1
	PCIE 3(x2)(2.5Gbps) SerDes lane 2-3

2.3 Unpacking and Inspecting the Module

NOTICE

Damage of Circuits
Electrostatic discharge and incorrect installation and removal of the product can damage circuits or shorten its life.
Before touching the product make sure that you are working in an ESD-safe environment or wear an ESD wrist strap or ESD shoes. Hold the product by its edges and do not touch any components or circuits.

Shipment Inspection

1. Verify that you have received all items of your shipment:
   - Printed *Quick Start Guide* and *Safety Notes*
   - COMX-P2020 COM Express Module
2. Check for damage and report any damage or differences to customer service.
3. Remove the desiccant bag shipped together with the product.

NOTICE

Environmental Damage
Improperly disposing of used products may harm the environment.
Always dispose of used products according to your country's legislation and manufacturer's instructions.

2.4 Preparing the Installation Environment

Before you install or replace components, pay attention to the following:

- Wear an ESD-preventive wrist strap to prevent the static electricity from damaging the device.
- Keep the area where the components reside clean and keep the components away from heat-generating devices, such as radiator.
- Ensure that your sleeves are tightened or rolled up above the elbow. For safety purposes, it is not recommended to wear jewelry, watch, glasses with metal frame, or clothes with metal buttons.
- Do not exert too much force, or insert or remove the components forcibly. Avoid damage to the components or plug-ins.
- **Confirm the feasibility of the operation**
  There are available spare parts of the components to be installed or replaced in the equipment warehouse. When the available spare parts are lacking, contact Emerson Network Power for help in time. For details on how to get help from Emerson Network Power, visit http://www.emersonnetworkpower.com/embeddedcomputing.
  Make sure that the new components are in good condition, without defects such as oxidation, chemical corrosion, missing components, or transportation damage.
  By reading this document, you are familiar with how to install and replace the component and master the skills required by the operation.
- **Check the environment**
  Make sure that the power supply, temperature, and humidity meet the operating requirements for the board and its components. For details, refer to the respective system documentation.
- **Prepare the parts and the tools**
  Prepare the components to be installed or replaced.
  When you hold or transport the components, use the special antistatic package. Prepare the cross screwdriver, screws, plastic supports, cooling gel, and ESD-preventive wrist strap.
- **Confirm installation or changing position**
  Confirm the position where COMX-P2020 COM Express Module will be installed.
- If a serious problem occurs and cannot be solved when you install or replace the component, contact Emerson Network Power for technical support.

2.5 Installing and Removing the Memory Module

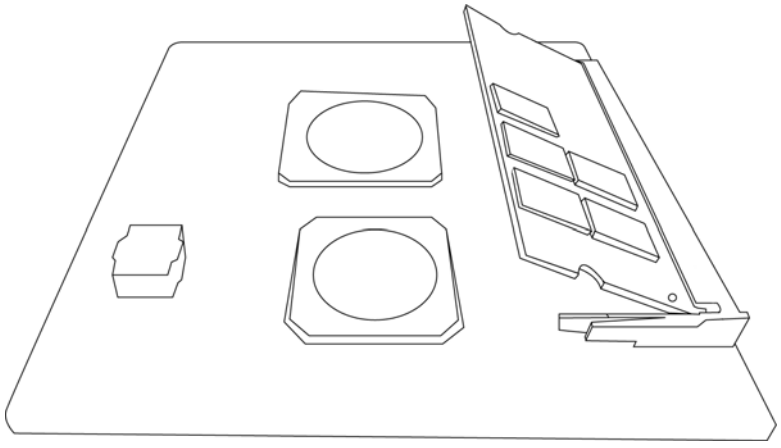
There is one 204-pin SOUDIMM slot on the COMX-P2020 COM Express Module.

NOTICE

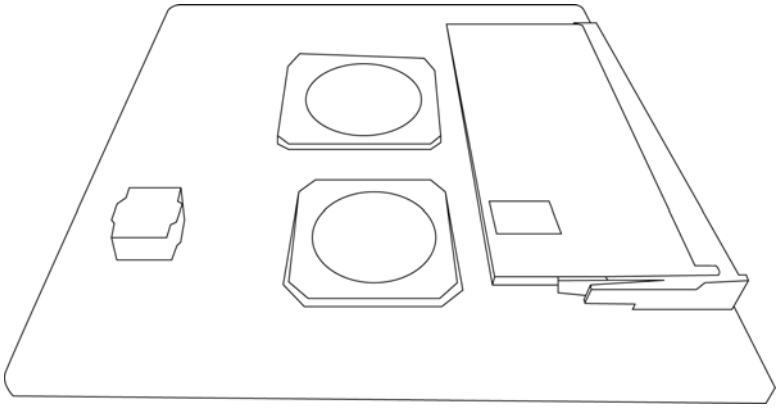
Pin Damage
Forcing the module into the system may damage connector pins.
If the module hangs during insertion, pull it out and insert it again.

Installing a Memory Module

1. Wear the ESD-preventive wrist strap.
2. Lay the COM-E module where the SOUDIMM is to be installed on the antistatic desktop.
3. Take the SOUDIMM out of the antistatic package, holding it by the edges.
4. Line up the notch located on the row of the metal pins at the bottom of the module with the key in the SOUDIMM slot on the COM-E module.
5. Insert the SOUDIMM in a slantwise position or at a 45-degree angle to slide the memory module into place.



6. Press down on the memory module against the COM-E module until you hear it snap into place. The module must be properly aligned before you press it down into its final position. You can remove the module from the socket and reinstall it if you cannot press it down into its final position.



Removing a Memory Module

1. Wear the ESD-preventive wrist strap.
2. Release the module from the slot by pushing the spring latches on either side of the module outward.
3. Lift the module from the COM-E Module.

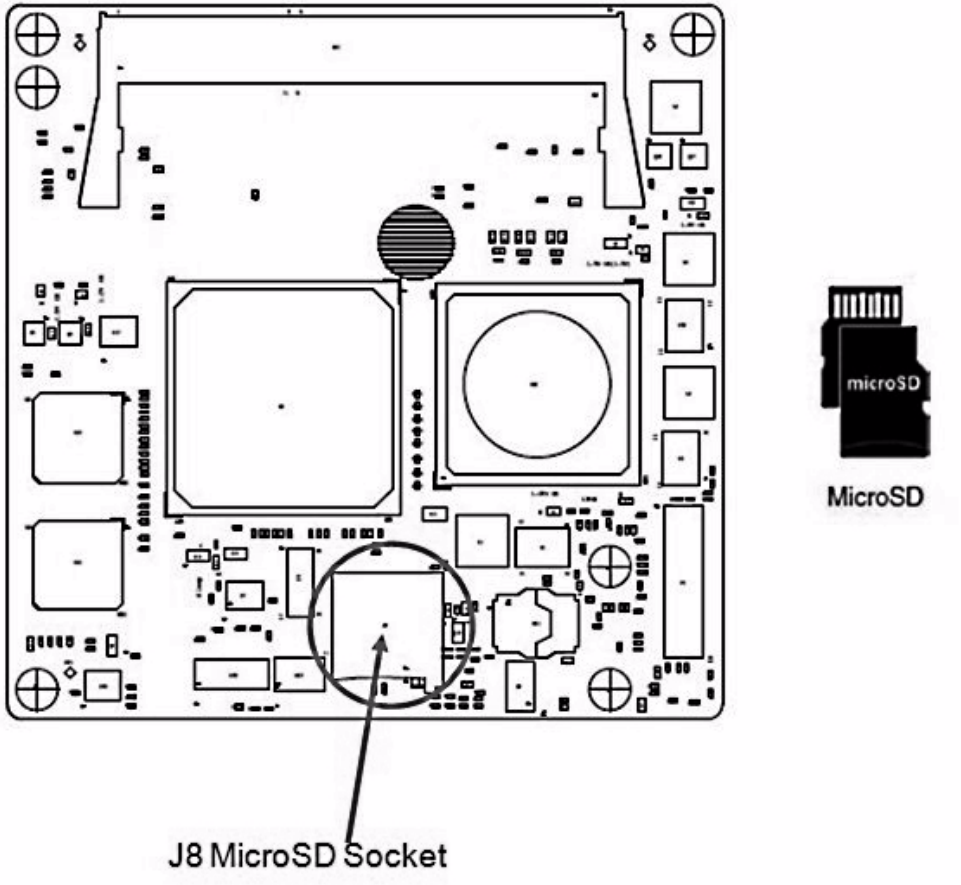
NOTICE

Damage of the Product and Additional Devices and Modules
Incorrect installation or removal of additional devices or modules damages the product or the additional devices or modules.
Before installing or removing additional devices or modules, read the respective documentation and use appropriate tools.

2.6 Installing the MicroSD Card

COMX-P2020 COM Express Module has an on-module MicroSD card slot with a 2 GB MicroSD card installed.

Figure 2-1 MicroSD Card Slot



Installing the MicroSD Card

1. Insert the MicroSD card to the MicroSD socket.
2. Make sure that the metallic contact point of the MicroSD card and the MicroSD socket are lined up correctly.

2.7 Installing and Removing the Heat Spreader/Cooler

Installing the Heat Spreader/Cooler

1. Check the thermal interface material pads on the heat spreader/cooler. Make sure the pads are aligned to their corresponding components on the COMX-P2020 COM Express module.
2. Align the standoffs of the heat spreader/cooler with the screw holes on the COMX-P2020 COM Express module.
3. Hold the heat spreader/cooler and COMX-P2020 COM Express module.
4. From the backside of COMX-P2020 COM Express module, use two screws to fasten the module to the heat spreader/cooler through two internal mounting holes.

Removing the Heat Spreader/Cooler

1. Loosen and remove the two pieces of screws that attach the heat spreader/cooler to the COMX-P2020 COM Express module.
2. While holding the edges, pull the heat spreader/cooler from the COMX-P2020 COM Express module.

2.8 Installing and Removing the Module on the Carrier Board

The assembled COM Express module with the attached heat spreader/ cooler is attached to a carrier board.

Installing the COM Express Module on the Carrier Board

1. Line up the board-to-board connector of the COMX-P2020 COM Express Module assembly with the board-to-board connector of the carrier board.
2. Make sure that the interconnectors are properly aligned and that the bottom surface of the COMX-P2020 COM Express Module have contact with the four standoffs on carrier board.
3. From the topside of the COMX-P2020 COM Express Module assembly, locate the screw holes on heat spreader/cooler.
4. Use the screws to fasten the COMX-P2020 COM Express Module assembly to the carrier board.

Removing the COM Express Module from the Carrier Board

1. From the topside of the COMX-P2020 COM Express Module assembly, locate the four screws that connect the COMX-P2020 COM Express Module assembly to the carrier board.
2. Loosen and remove the screws.
3. While holding the edges, pull the COMX-P2020 COM Express Module from the carrier board.

3.1 Board Layout

Figure 3-1 COMX-P2020 COM Express Module Components

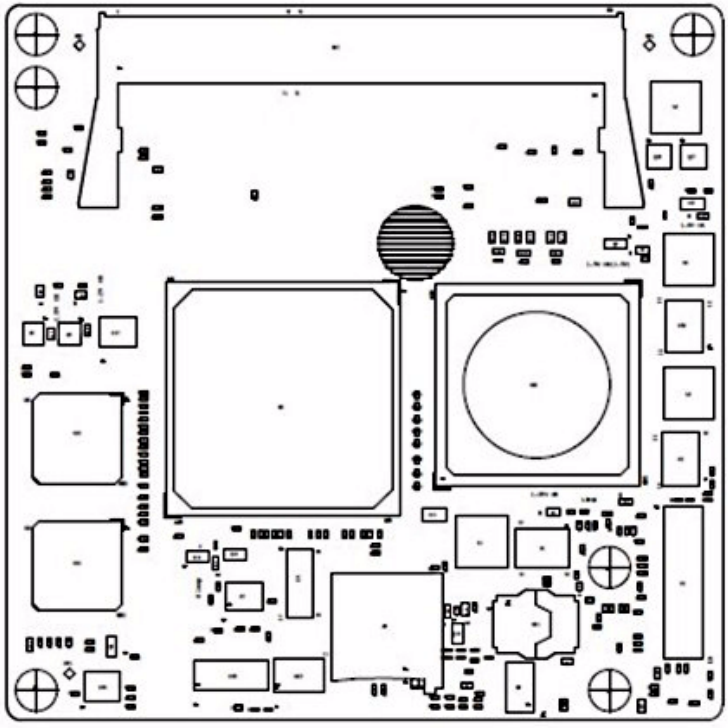
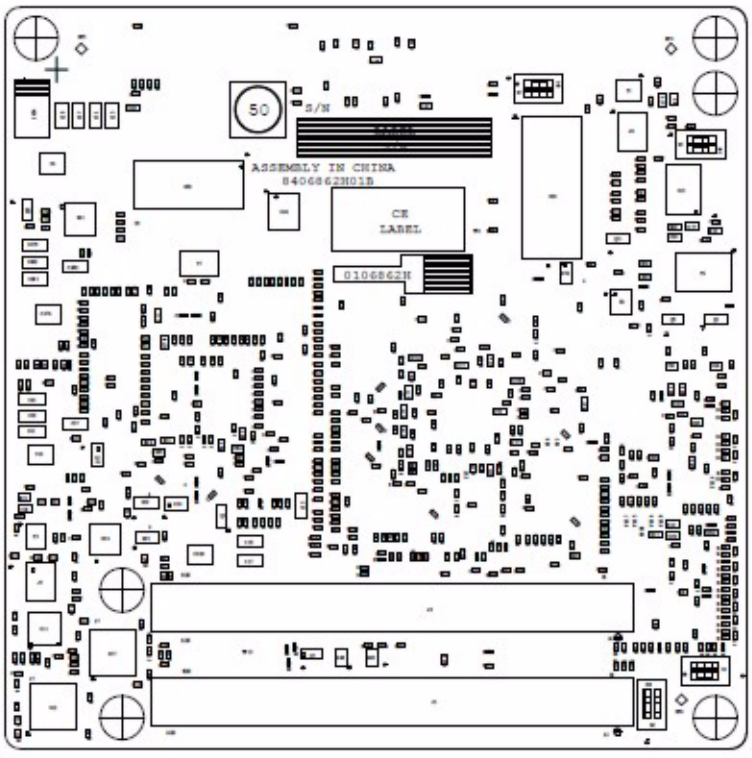


Figure 3-2 COMX-P2020 COM Express Module Components (Rear View)



3.2 Connectors and Switches

3.2.1 COM Express Connector

The following two tables provide the pin out for the Freescale type COM-E module.

The first column shows the default signal names while the succeeding columns show the differences in values.

Table 3-1 COM Express Connector

	Type FSL	Differences on 2020/2010	Differences on 1020/1011	Dfferences on 1021/1012
	Row A			
A1	GND			
A2	GBE0_MDI3-			
A3	GBE0_MDI3+			
A4	GBE0_LINK100#			
A5	GBE0_LINK1000#			
A6	GBE0_MDI2-			
A7	GBE0_MDI2+			
A8	GBE0_LINK#			
A9	GBE0_MDI1-			
A10	GBE0_MDI1+			
A11	GND			
A12	GBE0_MDI0-			
A13	GBE0_MDI0+			
A14	GBE0_CTREF			
A15	SUS_S3#	RSVD	RSVD	RSVD
A16	SATA0_TX+	RSVD	RSVD	RSVD
A17	SATA0_TX-	RSVD	RSVD	RSVD
A18	SUS_S4#	RSVD	RSVD	RSVD
A19	SATA0_RX+	RSVD	RSVD	RSVD
A20	SATA0_RX-	RSVD	RSVD	RSVD
A21	GND			
A22	SATA2_TX+	RSVD	RSVD	RSVD
A23	SATA2_TX-	RSVD	RSVD	RSVD

Table 3-1 COM Express Connector (continued)

	Type FSL	Differences on 2020/2010	Differences on 1020/1011	Dfferences on 1021/1012
A24	SUS_S5#	RSVD	RSVD	RSVD
A25	SATA2_RX+	RSVD	RSVD	RSVD
A26	SATA2_RX-	RSVD	RSVD	RSVD
A27	BATLOW#	RSVD	RSVD	RSVD
A28	(S)ATA_ACT#	RSVD	RSVD	RSVD
A29	AC/HAD_SYNC	RSVD	RSVD	RSVD
A30	AC/HAD_RST#	RSVD	RSVD	RSVD
A31	GND			
A32	AC/HAD_BITCLK	RSVD	RSVD	RSVD
A33	AC/HAD_SDOUT	RSVD	RSVD	RSVD
A34	BIOS_DIS0#			
A35	THERMTRIP#	RSVD	RSVD	RSVD
A36	USB6-	RSVD		
A37	USB6+			
A38	USB_6_7_OC#			
A39	USB4-			
A40	USB4+			
A41	GND			
A42	USB2-			
A43	USB2+			
A44	USB_2_3_OC#			
A45	USB0-			
A46	USB0+			
A47	VCC_RTC			
A48	EXCD0_PERST#	RSVD	RSVD	RSVD
A49	EXCD0_CPPE#	RSVD	RSVD	RSVD

Table 3-1 COM Express Connector (continued)

	Type FSL	Differences on 2020/2010	Differences on 1020/1011	Dfferences on 1021/1012
A50	LPC_SERIRQ	RSVD	RSVD	RSVD
A51	GND			
A52	SERDES_TX5+	RSVD	RSVD	RSVD
A53	SERDES_TX5-	RSVD	RSVD	RSVD
A54	SD_DATA0			
A55	SERDES_TX4+	PCIE_TX1_P	PCIE_TX1_P	PCIE_TX1_P
A56	SERDES_TX4-	PCIE_TX1_N	PCIE_TX1_N	PCIE_TX1_N
A57	GND			
A58	SERDES_TX3+	RSVD	RSVD	RSVD
A59	SERDES_TX3-	RSVD	RSVD	RSVD
A60	GND			
A61	SERDES_TX2+	RSVD	RSVD	RSVD
A62	SERDES_TX2-	RSVD	RSVD	RSVD
A63	SD_DATA1			
A64	SERDES_TX1+	RSVD	RSVD	RSVD
A65	SERDES_TX1-	RSVD	RSVD	RSVD
A66	GND			
A67	SD_DATA2			
A68	SERDES_TX0+	RSVD	RSVD	RSVD
A69	SERDES_TX0-	RSVD	RSVD	RSVD
A70	GND			
A71	LVDS_A0+			
A72	LVDS_A0-			
A73	LVDS_A1+			
A74	LVDS_A1-			
A75	LVDS_A2+			

Table 3-1 COM Express Connector (continued)

	Type FSL	Differences on 2020/2010	Differences on 1020/1011	Dfferences on 1021/1012
A76	LVDS_A2-			
A77	LVDS_VDD_EN			
A78	LVDS_A3+			
A79	LVDS_A3-			
A80	GND			
A81	LVDS_A_CK+			
A82	LVDS_A_CK-			
A83	LVDS_I2C_CK			
A84	LVDS_I2C_DAT			
A85	SD_DATA3			
A86	KBD_RST#	RSVD	RSVD	RSVD
A87	KBD_A20GATE	RSVD	RSVD	RSVD
A88	SERDES_CK_REF+			
A89	SERDES_CK_REF-			
A90	GND			
A91	SPI_CS0#			
A92	SPI_MISO			
A93	SD_CLK			
A94	SPI_CLK			
A95	SPI_MOSI			
A96	GND			
A97	VCC_12V			
A98	VCC_12V			
A99	VCC_12V			
A100	GND			
A101	VCC_12V			

Table 3-1 COM Express Connector (continued)

	Type FSL	Differences on 2020/2010	Differences on 1020/1011	Dfferences on 1021/1012
A102	VCC_12V			
A103	VCC_12V			
A104	VCC_12V			
A105	VCC_12V			
A106	VCC_12V			
A107	VCC_12V			
A108	VCC_12V			
A109	VCC_12V			
A110	GND			
	Row B			
B1	GND			
B2	GBE0_ACT#			
B3	1588_CLK_OUT			
B4	1588_PULSE_OUT1			
B5	1588_PULSE_OUT2			
B6	1588_ALARM_OUT1			
B7	1588_ALARM_OUT2			
B8	1588_TRIG_IN1			
B9	1588_TRIG_IN2			
B10	1588_CLK_IN			
B11	GND			
B12	PWRBTN#	RSVD	RSVD	RSVD
B13	SMB_CK	RSVD	RSVD	RSVD
B14	SMB_DAT	RSVD	RSVD	RSVD
B15	SMB_ALERT#	RSVD	RSVD	RSVD

Table 3-1 COM Express Connector (continued)

	Type FSL	Differences on 2020/2010	Differences on 1020/1011	Dfferences on 1021/1012
B16	SATA1_TX+	RSVD	RSVD	RSVD
B17	SATA1_TX-	RSVD	RSVD	RSVD
B18	SUS_STAT#	RSVD	RSVD	RSVD
B19	SATA1_RX+	RSVD	RSVD	RSVD
B20	SATA1_RX-	RSVD	RSVD	RSVD
B21	GND			
B22	SATA3_TX+	RSVD	RSVD	RSVD
B23	SATA3_TX-	RSVD	RSVD	RSVD
B24	PWR_OK	RSVD	RSVD	RSVD
B25	SATA3_RX+	RSVD	RSVD	RSVD
B26	SATA3_RX-	RSVD	RSVD	RSVD
B27	WDT	RSVD	RSVD	RSVD
B28	AC/HAD_SDIN2	RSVD	RSVD	RSVD
B29	AC/HAD_SIN1	RSVD	RSVD	RSVD
B30	AC/HAD_SIN0	RSVD	RSVD	RSVD
B31	GND			
B32	SPKR	RSVD	RSVD	RSVD
B33	I2C_CK			
B34	I2C_DAT			
B35	THRM#	RSVD	RSVD	RSVD
B36	USB7-	RSVD		
B37	USB7+			
B38	USB_4_5_OC#			
B39	USB5-			
B40	USB5+			
B41	GND			

Table 3-1 COM Express Connector (continued)

	Type FSL	Differences on 2020/2010	Differences on 1020/1011	Dfferences on 1021/1012
B42	USB3-			
B43	USB3+			
B44	USB_0_1_OC#			
B45	USB1-			
B46	USB1+			
B47	EXCD1_PERST#	RSVD	RSVD	RSVD
B48	EXCD1_CPPE#	RSVD	RSVD	RSVD
B49	SYS_RESET#			
B50	CB_RESET#			
B51	GND			
B52	SERDES_RX5+	RSVD	RSVD	RSVD
B53	SERDES_RX5-	RSVD	RSVD	RSVD
B54	SD_CMD			
B55	SERDES_RX4+	PCIE_RX1_P	PCIE_RX1_P	PCIE_RX1_P
B56	SERDES_RX4-	PCIE_RX1_N	PCIE_RX1_N	PCIE_RX1_N
B57	SD_WP			
B58	SERDES_RX3+	RSVD	RSVD	RSVD
B59	SERDES_RX3-	RSVD	RSVD	RSVD
B60	GND			
B61	SERDES_RX2+	RSVD	RSVD	RSVD
B62	SERDES_RX2-	RSVD	RSVD	RSVD
B63	SD_CD#			
B64	SERDES_RX1+	RSVD	RSVD	RSVD
B65	SERDES_RX1-	RSVD	RSVD	RSVD
B66	WAKE0#	RSVD	RSVD	RSVD
B67	WAKE1#	RSVD	RSVD	RSVD

Table 3-1 COM Express Connector (continued)

	Type FSL	Differences on 2020/2010	Differences on 1020/1011	Dfferences on 1021/1012
B68	SERDES_RX0+	RSVD	RSVD	RSVD
B69	SERDES_RX0-	RSVD	RSVD	RSVD
B70	GND			
B71	LVDS_B0+	RSVD	RSVD	RSVD
B72	LVDS_B0-			
B73	LVDS_B1+			
B74	LVDS_B1-			
B75	LVDS_B2+			
B76	LVDS_B2-			
B77	LVDS_B3+			
B78	LVDS_B3-			
B79	LVDS_BKLT_EN			
B80	GND			
B81	LVDS_B_CK+	RSVD	RSVD	RSVD
B82	LVDS_B_CK-	RSVD	RSVD	RSVD
B83	LVDS_BKLT_CTRL			
B84	VCC_5V_SBY			
B85	VCC_5V_SBY			
B86	VCC_5V_SBY			
B87	VCC_5V_SBY			
B88	SPI_CS1#			
B89	VGA_RED			
B90	GND			
B91	VGA_GRN			
B92	VGA_BLU			
B93	VGA_HSYNC			

Table 3-1 COM Express Connector (continued)

	Type FSL	Differences on 2020/2010	Differences on 1020/1011	Dfferences on 1021/1012
B94	VGA_VSYNC			
B95	VGA_I2C_CK			
B96	VGA_I2C_DAT			
B97	CE_PB31	RSVD	RSVD	CE_PB31
B98	CE_PA22	RSVD	RSVD	CE_PA22
B99	CE_PA23	RSVD	RSVD	CE_PA23
B100	GND			
B101	VCC_12V			
B102	VCC_12V			
B103	VCC_12V			
B104	VCC_12V			
B105	VCC_12V			
B106	VCC_12V			
B107	VCC_12V			
B108	VCC_12V			
B109	VCC_12V			
B110	GND			
	Row C			
C1	GND (FIXED)			
C2	GBE1_ACT#			
C3	GBE1_MDI3-			
C4	GBE1_MDI3+			
C5	GBE1_LINK100#			
C6	GBE1_MDI2-			
C7	GBE1_MDI2+			

Table 3-1 COM Express Connector (continued)

	Type FSL	Differences on 2020/2010	Differences on 1020/1011	Dfferences on 1021/1012
C8	GBE1_LINK1000#			
C9	GBE1_MDI1-			
C10	GBE1_MDI1+			
C11	GND (FIXED)			
C12	GBE1_MDI0-			
C13	GBE1_MDI0+			
C14	GBE1_LINK#			
C15	DDI1_PAIR6+/RSVD/ User Display	RSVD	RSVD	RSVD
C16	DDI1_PAIR6- /RSVD/User Display	RSVD	RSVD	RSVD
C17	CE_PB12 / LGPL0	RSVD	RSVD	CE_PB12
C18	CE_PB13 / LGPL1	RSVD	RSVD	CE_PB13
C19	SERDES_RX6+	RSVD	RSVD	RSVD
C20	SERDES_RX6-	RSVD	RSVD	RSVD
C21	GND			
C22	SERDES_RX7+	RSVD	RSVD	RSVD
C23	SERDES_RX7-	RSVD	RSVD	RSVD
C24	DDI1_HPD/RSVD/Us er Display	RSVD	RSVD	RSVD
C25	DDI1_PAIR4+/RSVD/ User Display	RSVD	RSVD	RSVD
C26	DDI1_PAIR4- /RSVD/User Display	RSVD	RSVD	RSVD
C27	DDI1_AUX+/RSVD/ User Display	RSVD	RSVD	RSVD
C28	DDI1_AUX- /RSVD/User Display	RSVD	RSVD	RSVD

Table 3-1 COM Express Connector (continued)

	Type FSL	Differences on 2020/2010	Differences on 1020/1011	Dfferences on 1021/1012
C29	DDI1_PAIR5+/RSVD/ User Display	RSVD	RSVD	RSVD
C30	DDI1_PAIR5- /RSVD/User Display	RSVD	RSVD	RSVD
C31	GND			
C32	U0_TXD			
C33	U0_RXD			
C34	U0_CTS			
C35	U0_RTS			CE_PB17?
C36	U1_TXD			CE_PB16?
C37	U1_RXD			? CE_PB14
C38	U1_CTS			? CE_PB15
C39	U1_RTS			
C40	MDIO1 (clause 22)			
C41	GND			
C42	U2_TXD/User Defined	RSVD	RSVD	CE_PB24
C43	U2_RXD/User Defined	RSVD	RSVD	CE_PB25
C44	U2_CTS/User Defined	RSVD	RSVD	CE_PB26
C45	U2_RTS/User Defined	RSVD	RSVD	CE_PB27
C46	U3_TXD/User Defined	RSVD	RSVD	CE_PB28
C47	U3_RXD/User Defined	RSVD	RSVD	CE_PA5
C48	U3_CTS/User Defined	RSVD	RSVD	CE_PA6

Table 3-1 COM Express Connector (continued)

	Type FSL	Differences on 2020/2010	Differences on 1020/1011	Dfferences on 1021/1012
C49	U3_RTS/User Defined	RSVD	RSVD	CE_PA7
C50	MDC1 (clause 22)	MDC1	MDC1	MDC1
C51	GND			
C52	SERDES_RX16+	PCIE_RX2_P	PCIE_RX2_P	PCIE_RX2_P
C53	SERDES_RX16-	PCIE_RX2_N	PCIE_RX2_N	PCIE_RX2_N
C54	TYPE0#	TYPE0#	TYPE0#	TYPE0#
C55	SERDES_RX17+	PCIE_RX3_P	PCIE_RX3_P	PCIE_RX3_P
C56	SERDES_RX17-	PCIE_RX3_N	PCIE_RX3_N	PCIE_RX3_N
C57	TYPE1#	TYPE1#	TYPE1#	TYPE1#
C58	SERDES_RX18+	RSVD	RSVD	RSVD
C59	SERDES_RX18-	RSVD	RSVD	RSVD
C60	GND			
C61	SERDES_RX19+	RSVD	RSVD	RSVD
C62	SERDES_RX19-	RSVD	RSVD	RSVD
C63	MDIO2 (clause 22 or 45)	RSVD	RSVD	RSVD
C64	GND			
C65	SERDES_RX20+	RSVD	RSVD	RSVD
C66	SERDES_RX20-	RSVD	RSVD	RSVD
C67	CE_PA12 / LAD00	RSVD	RSVD	CE_PA12
C68	SERDES_RX21+	RSVD	RSVD	RSVD
C69	SERDES_RX21-	RSVD	RSVD	RSVD
C70	GND (FIXED)			
C71	SERDES_RX22+	RSVD	RSVD	RSVD
C72	SERDES_RX22-	RSVD	RSVD	RSVD

Table 3-1 COM Express Connector (continued)

	Type FSL	Differences on 2020/2010	Differences on 1020/1011	Dfferences on 1021/1012
C73	DDI1_CTRLDATA/RSVD/User Display	RSVD	RSVD	RSVD
C74	SERDES_RX23+	RSVD	RSVD	RSVD
C75	SERDES_RX23-	RSVD	RSVD	RSVD
C76	GND			
C77	CE_PA13 / LGPL2	RSVD	RSVD	CE_PA13
C78	SERDES_RX24+	RSVD	RSVD	RSVD
C79	SERDES_RX24-	RSVD	RSVD	RSVD
C80	GND (FIXED)			
C81	CE_PA15 / LGPL3	RSVD	RSVD	CE_PA15
C82	CE_PA16 / LGPL4			CE_PA16
C83	IRQ01			
C84	GND			
C85	IRQ02			
C86	CE_PA17 / IRQ_IN3	RSVD	RSVD	CE_PA17
C87	GND			
C88	CE_PA25 / GPI0	RSVD	RSVD	CE_PA25
C89	CE_PA26 / GPI1	RSVD	RSVD	CE_PA26
C90	GND (FIXED)			
C91	CE_PA27 / GPI2	RSVD	RSVD	CE_PA27
C92	CE_PA28 / GPI3	RSVD	RSVD	CE_PA28
C93	GND			
C94	CE_PB1	RSVD	RSVD	CE_PB1
C95	CE_PB2	RSVD	RSVD	CE_PB2
C96	GND			
C97	CE_PB3	RSVD	RSVD	CE_PB3
C98	SP_CS2#	SP_CS2#	SP_CS2#	SP_CS2#

Table 3-1 COM Express Connector (continued)

	Type FSL	Differences on 2020/2010	Differences on 1020/1011	Dfferences on 1021/1012
C99	SP_CS3#	SP_CS3#	SP_CS3#	SP_CS3#
C100	GND (FIXED)			
C101	SGMII_CLK+	RSVD	RSVD	RSVD
C102	SGMII_CLK-	RSVD	RSVD	RSVD
C103	GND			
C104	VCC_12V			
C105	VCC_12V			
C106	VCC_12V			
C107	VCC_12V			
C108	VCC_12V			
C109	VCC_12V			
C110	GND			
	Row D			
D1	GND (FIXED)			
D2	GBE2_ACT#			
D3	GBE2_MDI3-			
D4	GBE2_MDI3+			
D5	GBE2_LINK100#			
D6	GBE2_MDI2-			
D7	GBE2_MDI2+			
D8	GBE2_LINK1000#			
D9	GBE2_MDI1-			
D10	GBE2_MDI1+			
D11	GND (FIXED)			
D12	GBE2_MDI0-			

Table 3-1 COM Express Connector (continued)

	Type FSL	Differences on 2020/2010	Differences on 1020/1011	Dfferences on 1021/1012
D13	GBE2_MDI0+			
D14	GBE2_LINK#			
D15	IRQ_OUT_B			
D16	IRQ00			
D17	CE_PA0 / LCLK0	RSVD	RSVD	CE_PA0
D18	CE_PA1 / LCLK1	RSVD	RSVD	CE_PA1
D19	SERDES_TX6+	RSVD	RSVD	RSVD
D20	SERDES_TX6-	RSVD	RSVD	RSVD
D21	GND			
D22	SERDES_TX7+	RSVD	RSVD	RSVD
D23	SERDES_TX7-	RSVD	RSVD	RSVD
D24	CE_PA2 / LCS0_B	RSVD	RSVD	CE_PA2
D25	CE_PA3 / LCS1_B	RSVD	RSVD	CE_PA3
D26	DDI1_PAIR0+/RSVD/ User Display	RSVD	RSVD	RSVD
D27	DDI1_PAIR0- /RSVD/User Display	RSVD	RSVD	RSVD
D28	CE_PB18 / LAD00	RSVD	RSVD	CE_PB18
D29	DDI1_PAIR1+/RSVD/ User Display	RSVD	RSVD	RSVD
D30	DDI1_PAIR1- /RSVD/User Display	RSVD	RSVD	RSVD
D31	GND			
D32	DDI1_PAIR2+/RSVD/ User Display	RSVD	RSVD	RSVD
D33	DDI1_PAIR2- /RSVD/User Display	RSVD	RSVD	RSVD
D34	CE_PB19 / LAD01	RSVD	RSVD	CE_PB19
D35	CE_PB20 / LAD02	RSVD	RSVD	CE_PB20

Table 3-1 COM Express Connector (continued)

	Type FSL	Differences on 2020/2010	Differences on 1020/1011	Dfferences on 1021/1012
D36	DDI1_PAIR3+/RSVD/ User Display	RSVD	RSVD	RSVD
D37	DDI1_PAIR3- /RSVD/User Display	RSVD	RSVD	RSVD
D38	TDM_CLK_Tx0/SSI_ TCK0/User Defined	RSVD	TDM_CLK_Tx0	CE_PB11
D39	TDM_CLK_Rx0/SSI_ RCK0/User Defined	RSVD	TDM_CLK_Rx0	CE_PB10
D40	TDM_TxD0/SSI_TXD 0/User Defined	RSVD	TDM_TxD0	CE_PB4
D41	GND			
D42	TDM_RxD0/SSI_RXD 0/User Defined	RSVD	TDM_RxD0	CE_PB5
D43	TDM_TxFS0/SSI_TFS 0/User Defined	RSVD	TDM_TxFS0	CE_PB6
D44	TDM_RxFS0/SSI_RFS 0/User Defined	RSVD	TDM_RxFS0	CE_PB7
D45	SSI_TCK1/TDM_CLK _Tx1/User Defined	RSVD	RSVD	CE_PC0
D46	SSI_RCK1/TDM_CLK _Rx1/User Defined	RSVD	RSVD	CE_PA4
D47	SSI_TXD1/TDM_TxD 1/User Defined	RSVD	RSVD	CE_PA8
D48	SSI_RXD1/TDM_RxD 1/User Defined	RSVD	RSVD	CE_PA9
D49	SSI_TFS1/TDM_TxFS 1/User Defined	RSVD	RSVD	CE_PA10
D50	SSI_RFS1/TDM_RxFS 1/User Defined	RSVD	RSVD	CE_PA11
D51	GND			
D52	SERDES_TX16+	PCIE_TX2_P	PCIE_TX2_P	PCIE_TX2_P

Table 3-1 COM Express Connector (continued)

	Type FSL	Differences on 2020/2010	Differences on 1020/1011	Dfferences on 1021/1012
D53	SERDES_TX16-	PCIE_TX2_N	PCIE_TX2_N	PCIE_TX2_N
D54	TYPE3#	Type3#	Type3#	Type3#
D55	SERDES_TX17+	PCIE_TX3_P	PCIE_TX3_P	PCIE_TX3_P
D56	SERDES_TX17-	PCIE_TX3_N	PCIE_TX3_N	PCIE_TX3_N
D57	TYPE2#	TYPE2#	TYPE2#	TYPE2#
D58	SERDES_TX18+	RSVD	RSVD	RSVD
D59	SERDES_TX18-			
D60	GND (FIXED)			
D61	SERDES_TX19+	RSVD	RSVD	RSVD
D62	SERDES_TX19-			
D63	MDC2 (Clause 45)	RSVD	RSVD	RSVD
D64	LP_TAMPER_DET_BAT	N/A	N/A?	N/A
D65	SERDES_TX20+	RSVD	RSVD	RSVD
D66	SERDES_TX20-			
D67	GND			
D68	SERDES_TX21+	RSVD	RSVD	RSVD
D69	SERDES_TX21-			
D70	GND (FIXED)			
D71	SERDES_TX22+	RSVD	RSVD	RSVD
D72	SERDES_TX22-			
D73	DDI1_CTRLCLK/RSVD/User Display	RSVD	RSVD	RSVD
D74	SERDES_TX23+	RSVD	RSVD	RSVD
D75	SERDES_TX23-			
D76	GND			
D77	CE_PA14 / LWE0_B	RSVD	RSVD	CE_PA14

Table 3-1 COM Express Connector (continued)

	Type FSL	Differences on 2020/2010	Differences on 1020/1011	Dfferences on 1021/1012
D78	SERDES_TX24+	RSVD	RSVD	RSVD
D79	SERDES_TX24-			
D80	GND			
D81	CE_PA20	RSVD	RSVD	CE_PA20
D82	CE_PA21	RSVD	RSVD	CE_PA21
D83	CE_PA18	RSVD	RSVD	CE_PA18
D84	GND			
D85	CE_PA19	RSVD	RSVD	CE_PA19
D86	CE_PA24	RSVD	RSVD	CE_PA24
D87	GND			
D88	CE_PA29 / GPO0	RSVD	RSVD	CE_PA29
D89	CE_PA30 / GPO1	RSVD	RSVD	CE_PA30
D90	GND			
D91	CE_PA31 / GPO2	RSVD	RSVD	CE_PA31
D92	CE_PB0	RSVD	RSVD	CE_PB0
D93	GND			
D94	CE_PB8	RSVD	RSVD	CE_PB8
D95	CE_PB9	RSVD	RSVD	CE_PB9
D96	GND			
D97	CE_PB21	RSVD	RSVD	CE_PB21
D98	CE_PB22	RSVD	RSVD	CE_PB22
D99	CE_PB23	RSVD	RSVD	CE_PB23
D100	GND (FIXED)			
D101	CE_PB29	RSVD	RSVD	CE_PB29
D102	CE_PB30	RSVD	RSVD	CE_PB30
D103	GND			

Table 3-1 COM Express Connector (continued)

	Type FSL	Differences on 2020/2010	Differences on 1020/1011	Dfferences on 1021/1012
D104	VCC_12V			
D105	VCC_12V			
D106	VCC_12V			
D107	VCC_12V			
D108	VCC_12V			
D109	VCC_12V			
D110	GND			

3.2.2 Default Switch Settings

3.2.2.1 DIP Switch Setting

Table 3-2 DIP Switch Setting

s2_23	s2_14	s1_23	s1_14	Description
ON	ON	ON	ON	Boot from PCI-E 1
ON	ON	ON	OFF	Boot from PCI-E 2
ON	ON	OFF	ON	Boot from SRIO 1
ON	ON	OFF	OFF	Boot from SRIO 2
ON	OFF	ON	ON	Boot from DDR
ON	OFF	ON	OFF	Boot from PCI-E 3
ON	OFF	OFF	ON	Boot from SPI
ON	OFF	OFF	OFF	Boot from SDHC (Default)
OFF	ON	ON	ON	Boot from 8-bit NADFLASH small page
OFF	ON	ON	OFF	Reserved
OFF	ON	OFF	ON	Boot from 8-bit NADFLASH large page

Table 3-2 DIP Switch Setting (continued)

s2_23	s2_14	s1_23	s1_14	Description
OFF	ON	OFF	OFF	Reserved
OFF	OFF	ON	ON	Reserved
OFF	OFF	ON	OFF	Boot from 8-bit NOR Flash
OFF	OFF	OFF	ON	Boot from 16-bit NOR Flash
OFF	OFF	OFF	OFF	Boot from 16-bit NOR Flash

Table 3-3 s3_23 Settings

s3_23	Description
OFF	SPI Flash on the module disabled(Default)
ON	SPI Flash on the module enabled

Table 3-4 s3_14 Settings

s3_14	Description
OFF	SerDes #2 switch to COM-E PCI-E #2 (Default)
ON	SerDes #2 switch to GEPHY

To load Linux in the MicroSD, the following switches (s7_14 and s7_23) must be switched on. Otherwise, Linux boot up will fail.

```
Kernel panic - not syncing: VFS: Unable to mount root fs on unknown-
block(179,2)
Rebooting in 180 seconds..
```

Table 3-5 s7_23 Settings

s7_23	Description
OFF	SD card write-disabled on the module (Default)
ON	SD card write-enabled on the module

Table 3-6 s7_14 Settings

s7_14	Description
OFF	SD card write-disabled on the carrier board (Default)
ON	SD card write-enabled on the carrier board

3.2.2.2 PHY Address Settings

Table 3-7 PHY Address Settings

PHY	Description
P2020 Internal TBI PHY	0X1F
GEPHY #1 (U14)	0X00 0X01
GEPHY #2 (U15)	0X02

3.2.2.3 I2C Bus #1 Address setting

Table 3-8 I2C Bus #1 Address setting

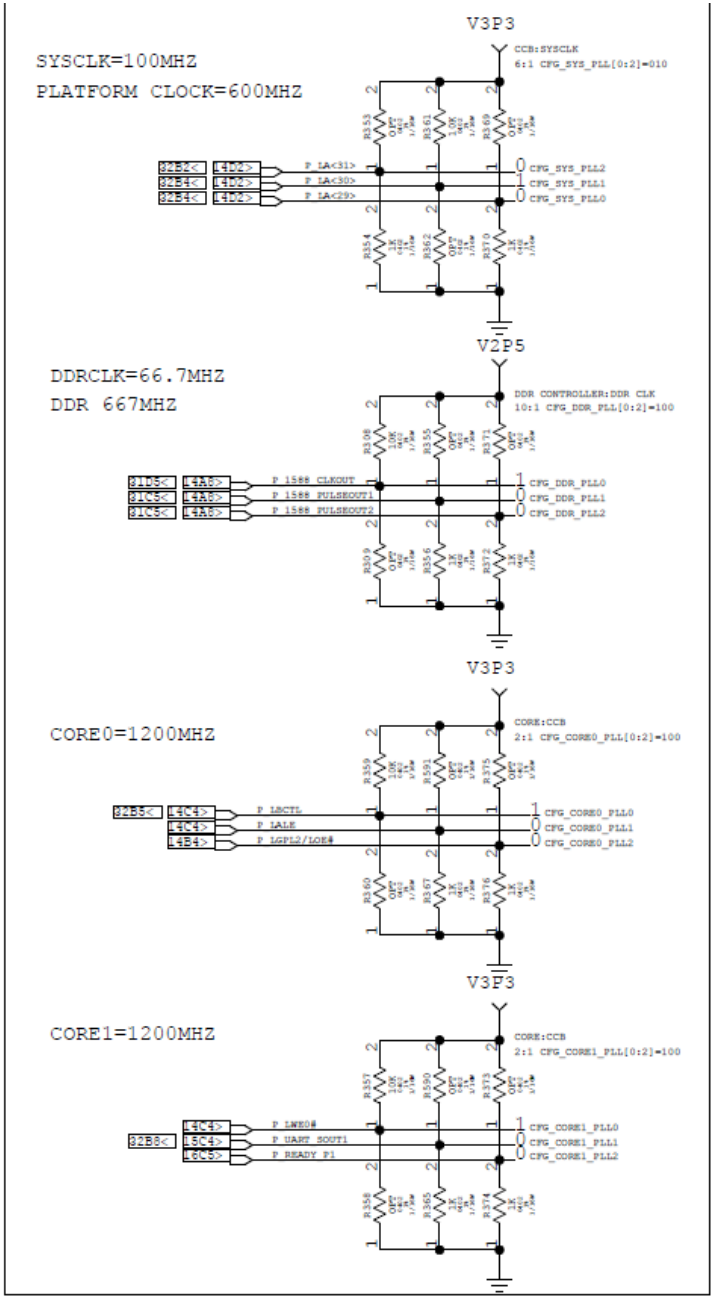
IIC1	Address
IIC EEPROM (U7)	0XA0 (Strapping)
IIC MUX (U45)	0XE0
IIC EEPROM (U53)	0XA8 (Module type)
USB HUB2 (U37)	0X58 (NC)

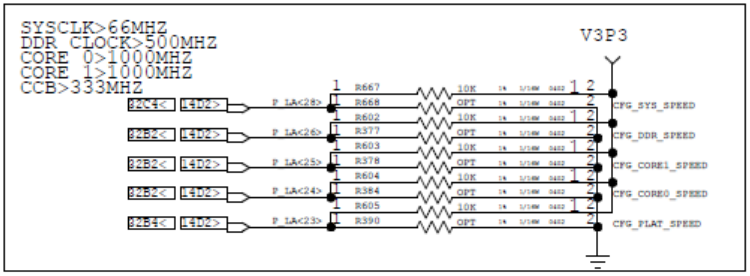
3.2.2.4 I2C Bus #2 Address setting

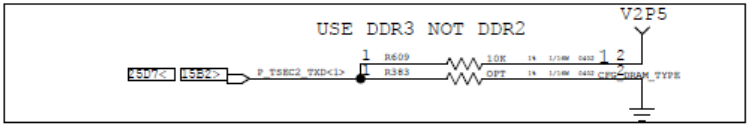
Table 3-9 I2C Bus #2 Address setting

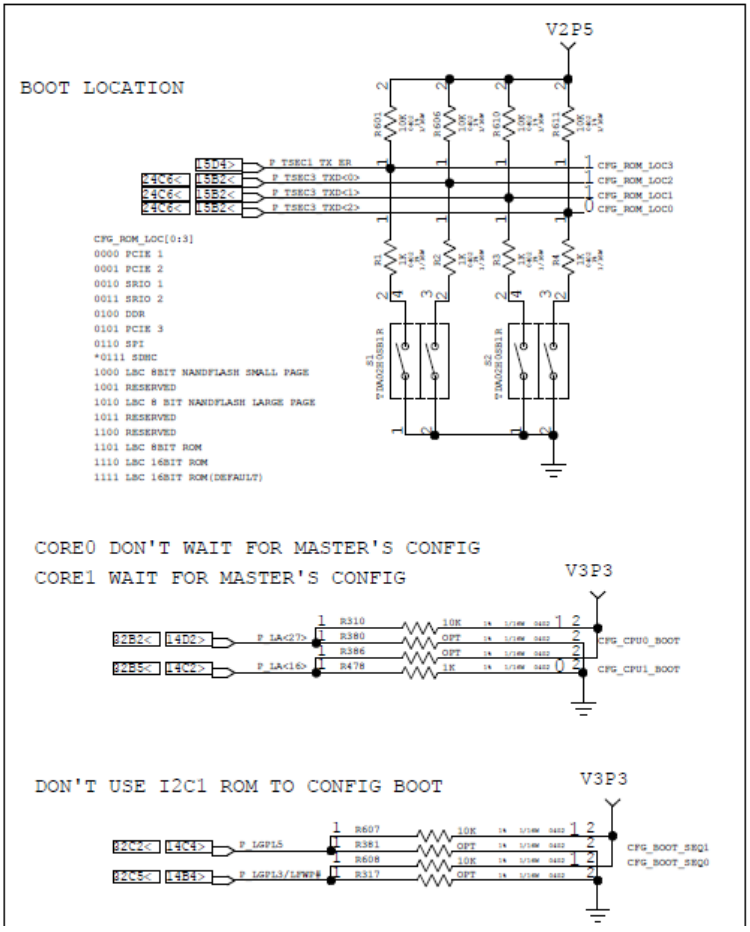
IIC2	Address
LM75 (U17)	0X90
DDR3 (XJ1)	0XA6 0X66 0X36
RTC (U30)	0XD0
USB HUB1 (U12)	0X58 (NC)

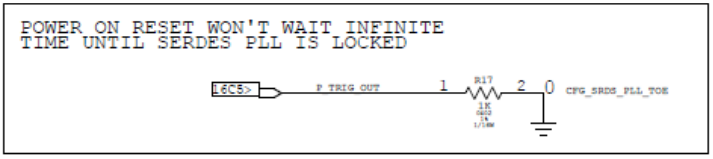
3.2.2.5 Other Pin Strap Settings

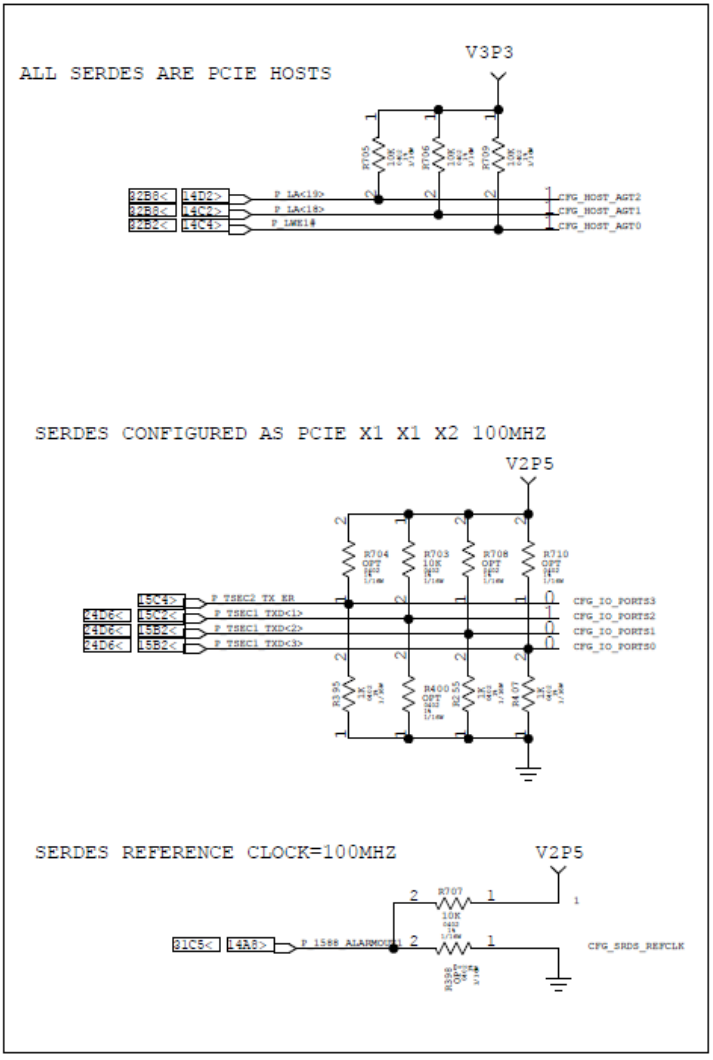

V3P3
SYSCLK=100MHZ
PLATFORM CLOCK=600MHZ
CCB:SYSCLK
6:1 CFG_SYS_PLL[0:2]=010
P_LA<31>
P_LA<30>
P_LA<29>
CFG_SYS_PLL2
CFG_SYS_PLL1
CFG_SYS_PLL0
V2P5
DDRCLK=66.7MHZ
DDR 667MHZ
DDR CONTROLLER:DDR CLK
10:1 CFG_DDR_PLL[0:2]=100
P_1588_CLKOUT
P_1588_PULSEOUT1
P_1588_PULSEOUT2
CFG_DDR_PLL0
CFG_DDR_PLL1
CFG_DDR_PLL2
V3P3
CORE0=1200MHZ
CORE:CCB
2:1 CFG_CORE0_PLL[0:2]=100
P_LBCTL
P_ALE
P_LGPL2/LOE#
CFG_CORE0_PLL0
CFG_CORE0_PLL1
CFG_CORE0_PLL2
V3P3
CORE1=1200MHZ
CORE:CCB
2:1 CFG_CORE1_PLL[0:2]=100
P_LWE0#
P_UART_SOUT1
P_READY_P1
CFG_CORE1_PLL0
CFG_CORE1_PLL1
CFG_CORE1_PLL2

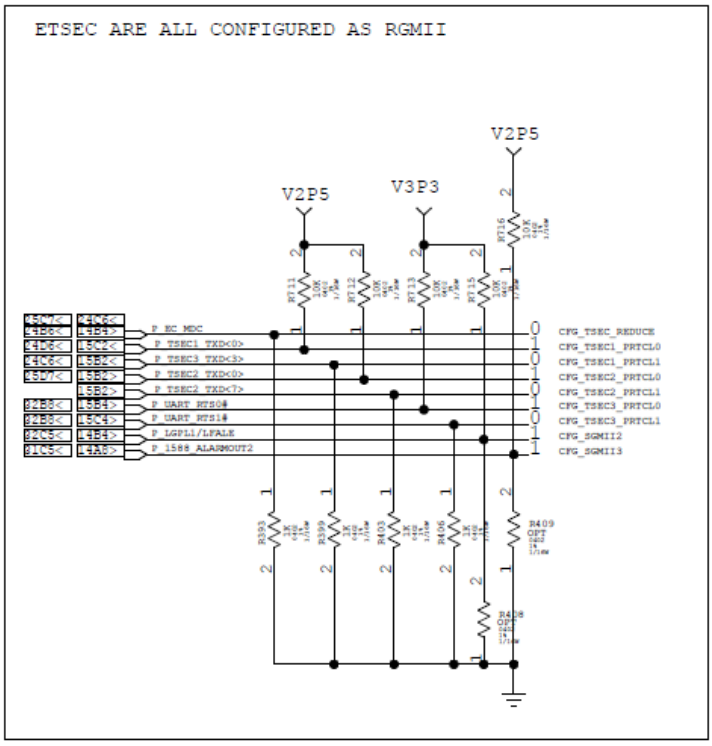

SYSCLK>66MHZ
DDR CLOCK>500MHZ
CORE 0>1000MHZ
CORE 1>1000MHZ
CCB>333MHZ
V3P3
CFG_SYS_SPEED
CFG_DDR_SPEED
CFG_CORE1_SPEED
CFG_CORE0_SPEED
CFG_PLAT_SPEED

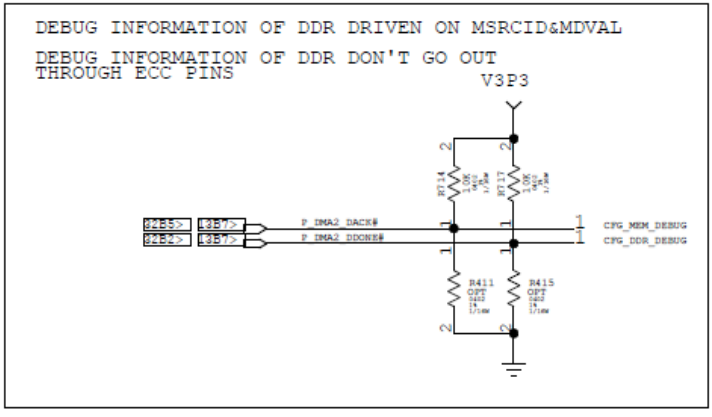

USE DDR3 NOT DDR2
V2P5

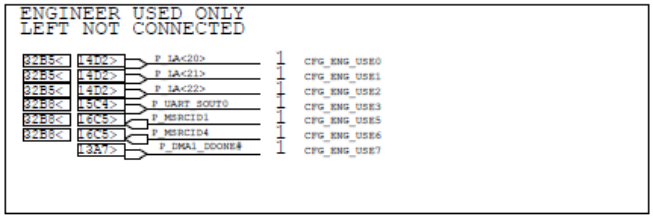

V2P5
BOOT LOCATION
CFG_ROM_LOC3
CFG_ROM_LOC2
CFG_ROM_LOC1
CFG_ROM_LOC0
CFG_ROM_LOC[0:3]
0000 PCIE 1
0001 PCIE 2
0010 SRIO 1
0011 SRIO 2
0100 DDR
0101 PCIE 3
0110 SPI
*0111 SDHC
1000 LBC 8BIT NANDFLASH SMALL PAGE
1001 RESERVED
1010 LBC 8 BIT NANDFLASH LARGE PAGE
1011 RESERVED
1100 RESERVED
1101 LBC 8BIT ROM
1110 LBC 16BIT ROM
1111 LBC 16BIT ROM(DEFAULT)
CORE0 DON'T WAIT FOR MASTER'S CONFIG
CORE1 WAIT FOR MASTER'S CONFIG
V3P3
CFG_CPU0_BOOT
CFG_CPU1_BOOT
DON'T USE I2C1 ROM TO CONFIG BOOT
V3P3
CFG_BOOT_SEQ1
CFG_BOOT_SEQ0

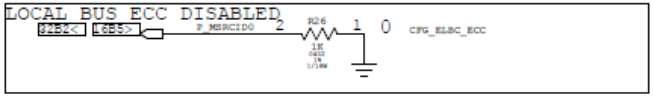

POWER ON RESET WON'T WAIT INFINITE
TIME UNTIL SERDES PLL IS LOCKED
P_TRIG_OUT
R17
CFG_SRDS_PLL_TOK

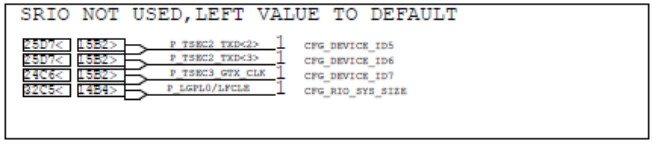

ALL SERDES ARE PCIE HOSTS
V3P3
P_LAc19>
P_LAc18>
P_LWE1#
CFG_HOST_AGT2
CFG_HOST_AGT1
CFG_HOST_AGT0
SERDES CONFIGURED AS PCIE X1 X1 X2 100MHZ
V2P5
P_TSEC2_TX_ER
P_TSEC1_TXD<1>
P_TSEC1_TXD<2>
P_TSEC1_TXD<3>
CFG_IO_PORTS3
CFG_IO_PORTS2
CFG_IO_PORTS1
CFG_IO_PORTS0
SERDES REFERENCE CLOCK=100MHZ
V2P5
P_1588_ALARMOUT1
CFG_SRDS_REFCLK

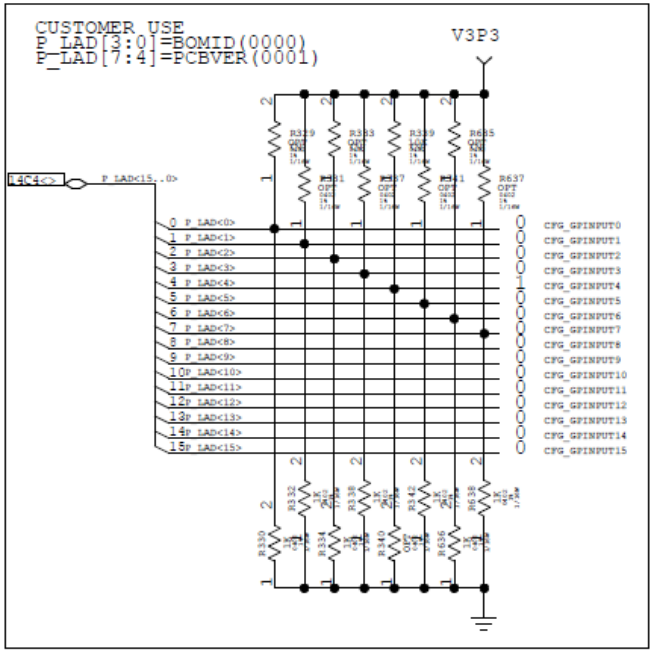

ETSEC ARE ALL CONFIGURED AS RGMII
V2P5
V2P5
V3P3
P_EC_MDC
P_TSEC1_TXD<0>
P_TSEC3_TXD<3>
P_TSEC2_TXD<0>
P_TSEC2_TXD<7>
P_UART_RTS0#
P_UART_RTS1#
P_LGPL1/LFALE
P_1588_ALARMOUT2
CFG_TSEC_REDUCE
CFG_TSEC1_PRTCL0
CFG_TSEC1_PRTCL1
CFG_TSEC2_PRTCL0
CFG_TSEC2_PRTCL1
CFG_TSEC3_PRTCL0
CFG_TSEC3_PRTCL1
CFG_SGMII2
CFG_SGMII3


DEBUG INFORMATION OF DDR DRIVEN ON MSRCID&MDVAL
DEBUG INFORMATION OF DDR DON'T GO OUT
THROUGH ECC PINS
V3P3
P_DMA2_DACK#
P_DMA2_DDONE#
CFG_MEM_DEBUG
CFG_DDR_DEBUG


ENGINEER USED ONLY
LEFT NOT CONNECTED
P_LA<20>
P_LA<21>
P_LA<22>
P_UART_SOUT0
P_MSRCID1
P_MSRCID4
P_DMA1_DDONE#
CFG_ENG_USE0
CFG_ENG_USE1
CFG_ENG_USE2
CFG_ENG_USE3
CFG_ENG_USE5
CFG_ENG_USE6
CFG_ENG_USE7


LOCAL BUS ECC DISABLED
P_MSRCID0
R26
CFG_ELBC_ECC


SRIO NOT USED,LEFT VALUE TO DEFAULT
P_TSEC2_TXD<2>
P_TSEC2_TXD<3>
P_TSEC3_GTX_CLK
P_LGPL0/LFCLE
CFG_DEVICE_ID5
CFG_DEVICE_ID6
CFG_DEVICE_ID7
CFG_RIO_SYS_SIZE


CUSTOMER USE
P_LAD[3:0]=BOMID(0000)
P_LAD[7:4]=PCBVER(0001)
V3P3
P_LAD<15..0>
P_LAD<0>
P_LAD<1>
P_LAD<2>
P_LAD<3>
P_LAD<4>
P_LAD<5>
P_LAD<6>
P_LAD<7>
P_LAD<8>
P_LAD<9>
P_LAD<10>
P_LAD<11>
P_LAD<12>
P_LAD<13>
P_LAD<14>
P_LAD<15>
CFG_GPINPUT0
CFG_GPINPUT1
CFG_GPINPUT2
CFG_GPINPUT3
CFG_GPINPUT4
CFG_GPINPUT5
CFG_GPINPUT6
CFG_GPINPUT7
CFG_GPINPUT8
CFG_GPINPUT9
CFG_GPINPUT10
CFG_GPINPUT11
CFG_GPINPUT12
CFG_GPINPUT13
CFG_GPINPUT14
CFG_GPINPUT15

3.2.3 Debug Ports

3.2.3.1 P1 JTAG

The 16-PIN JTAG header support standard JTAG signals: TCK, TMS, TDO, TDI, TRST(COP_TRST#).
JTAG also supports these extra signals: CKSTP_IN to stop processor core and CKSTP_OUT# to get CORE status.

Table 3-10 CPU Debug (P1)

Pin	Signal	Pin	Signal
1	JTAG_TDO	2	NC
3	JTAG_TDI	4	COP_TRST#
5	COP_RUNSTOP	6	COP_VSENSE
7	JTAG_TCK	8	P_CKSTP_IN#
9	JTAG_TMS	10	NC
11	COP_SRST#	12	GND
13	COP_HRST#	14	NC
15	P_CKSTP_OUT#	16	GND

Table 3-11 GE PHY Debug (Test Point14-19)

Test Point	Signal
TP14	JTAG_GE1_TDO_GE2_TDI
TP15	JTAG_GE1_TDI
TP16	JTAG_GE2_TDO
TP17	JTAG_GE_TCK
TP18	JTAG_GE_TMS
TP19	JTAG_GE_TRST#

3.2.4 Switches and LEDs for Debug Use

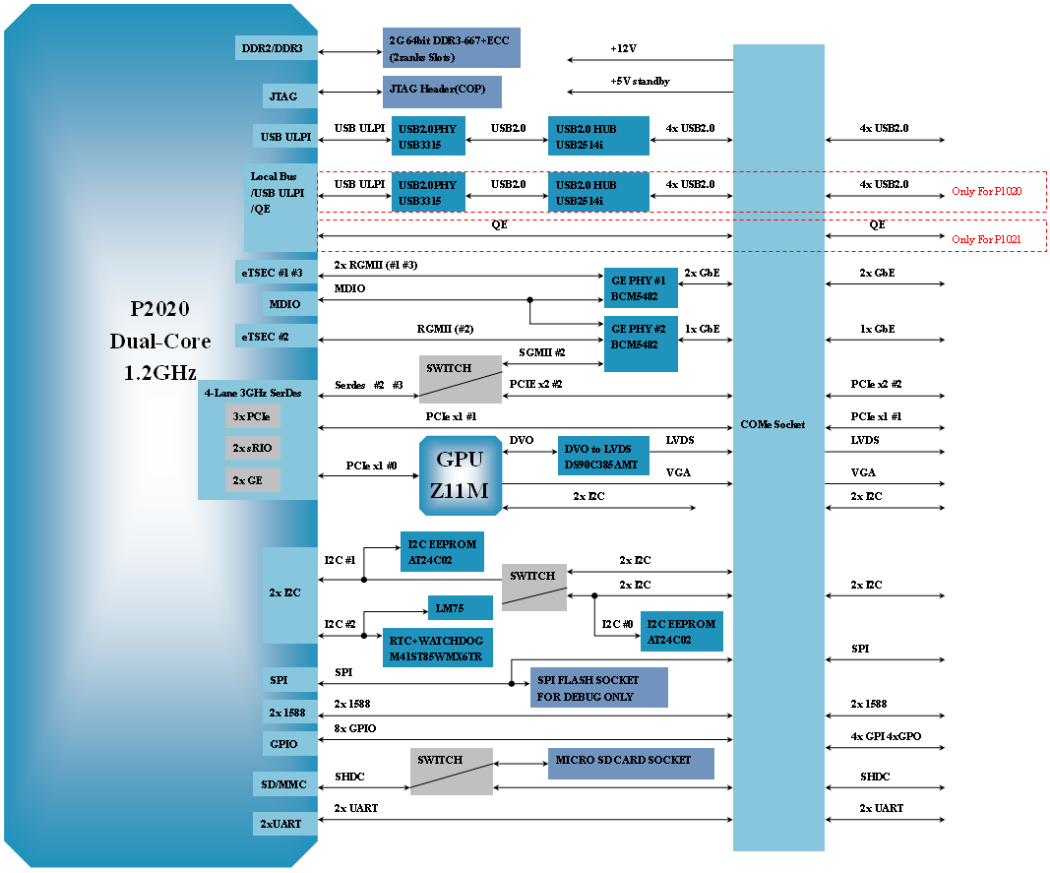
Programmers can use the switch and LEDs for debugging.

Table 3-12 Debug Switches

S3_23	Description
OFF	Disable SPI flash on module
ON	Enable SPI flash on module (default)

4.1 Block Diagram

Figure 4-1 Block Diagram



4.2 Processor

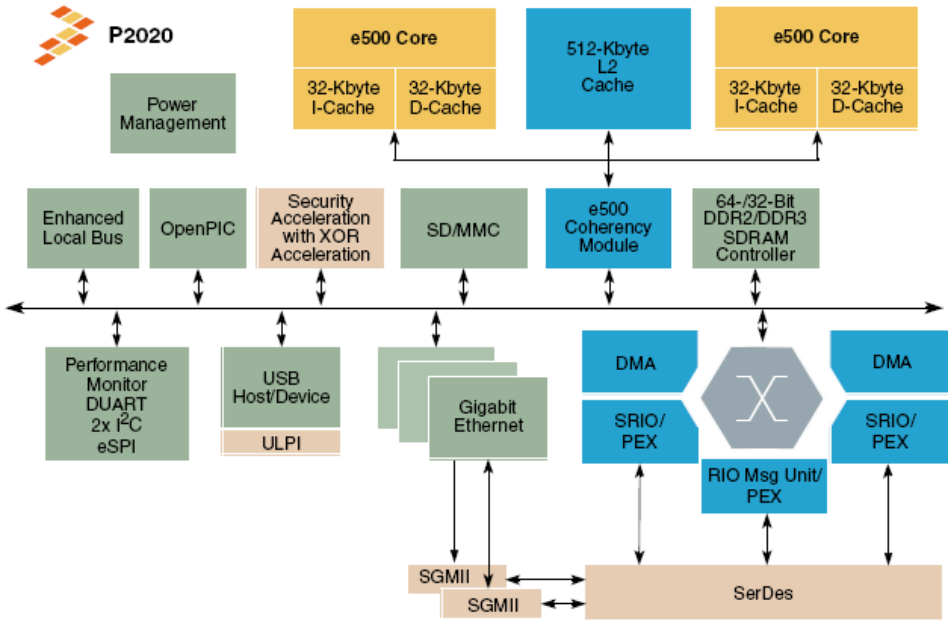
COMX-P2020 supports the Freescale P2020 processor. The module is also compatible with the P2010/P1020/P1011/P1021/P1012 processors. P2020 includes the following features:

- Dual e500v2 Core, 800MHz to 1.2 GHz clock frequency
- Power consumption of less than 8 W at 1.2 GHz
- 32 KB instruction and 32 KB data first-level cache (L1) for each core
- 512 KB second-level cache (L2) with ECC
- 64 bit DDR2/DDR3 controller with ECC supports data rate of up to 800 Mbps per pin
- 31x31 mm 689-pin wirebond power-BGA
- 45 nm SOI process technology

Each e500 core complex contains a separate 32-KB, eight-way set associative level 1 (L1) instruction and data caches to provide the execution units and registers rapid access to instructions and data. The 32 KB cache is divided into eight ways and 128 sets, so there is a total of 1024 blocks. The size of each block is eight words (32 bytes).

The integrated L2 Cache/SRAM can be configured as Cache or SRAM. For COMX-P2020, it is configured as 512 KB L2 cache that is organized as 2048 eight way sets of 32 byte cache lines based on 36 bit physical addresses.

Figure 4-2 P2020 Processor Block Diagram



4.3 Memory

The U-boot will configure the memory controller with the fixed parameter instead of SPD information on the SOUDIMM.

4.3.1 SDRAM

COMX-P2020 only supports 2 GB DDR3 667 MT/s DDR3+ECC arranged in two ranks in one slot.

4.3.2 SD Card

COMX-P2020 has a microSD card slot on-module with a 2 GB SD card installed. The SD card stores the Bootloader and the Operating System.

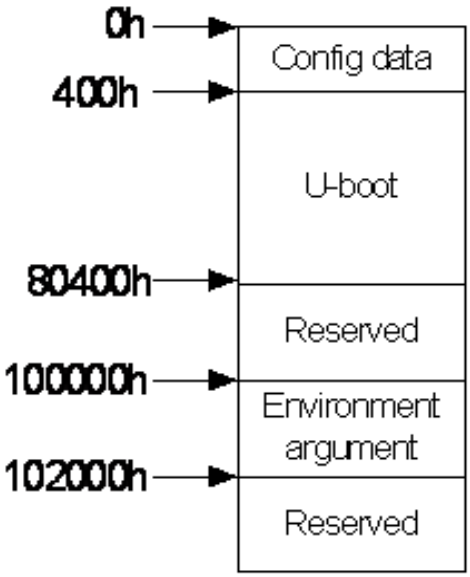
The eSDHC acts as a bridge, passing host bus transactions to SD/MMC cards by sending commands and performing data accesses to or from the cards. It handles the SD/MMC protocol at the transmission level.

4.3.3 SPI Flash

COMX-P2020 has an SPI socket on-module with a 4 MB SPI Flash installed. The U-Boot is installed in the SPI flash on module.

The flash was divided into 3 areas: configure data, U-boot, and Environment argument area.

Figure 4-3 SPI Area for U-boot



4.3.4 EEPROM

COMX-P2020 uses two 256x8(2 Kb) I2C EEPROM for boot up configuration.

4.4 Video

COMX-P2020 has an on-board GPU Z11M which supports the following:

- VGA
- LVDS (requires an external DVO to LVDS transmitter)

GPU Z11M integrates a PCI-E 1x controller and a 64-bit 2D graphics engine. It also has a 4Mx16bit DDR memory.

4.5 I2C

4.5.1 I2C Bus

There are two inter-IC (IIC or I2C) bus interfaces implemented on this device. All of the interfaces will operate at the master mode.

4.5.2 I2C EEPROM

There are two I2C EEPROMs AT24C02B which are located on I2C#1. One is for ID EEPROM (storing board serial number, MAC address etc.) and the other is for Processor EEPROM (storing processor ID etc). Their I2C addresses are 0xA0 and 0xA8 separately. To access Processor EEPROM, the I2C switch must connect MUX_I2C#0.

4.5.3 PCA9545

The PCA9545 is a quad bi-directional translating switch controlled using the I2C bus.The I2C addressof PCA9545 is E0. The SCL/SDA upstream pair fans out to four downstream pairs or channels. Any individual SCx/SDx channel or combination of channels can be selected, determined by the contents of the programmable control register.

4.5.4 DDR3 SPD

The DDR3 SOUDIMM connects I2C#2 with the address: 0xA6h, 0x66h, 0x36h. For COMX-P2020 just support booting from MicroSD Card or SPI Flash, the memory controller must be initialized before COMX-P2020 copies the U-boot image from the media to memory and jump to the U-boot start entry.

4.5.5 RTC and Watchdog Timer

The M41ST85WMX6TR has an internal quartz-controlled oscillator with a frequency of 32.768 kHz and error not exceeding +/-35 ppm, which equates to +/-1.53 minutes per month. The internal circuit can be set to get a precision of +/-2ppm (please refer to datasheet for details), which equates to +/-5.25 seconds per month.

M41ST85WMX6TR contains the century, year, month, date, day, hour, minutes, second, and tenths/hundredths of a second in a 24-hour BCD format.

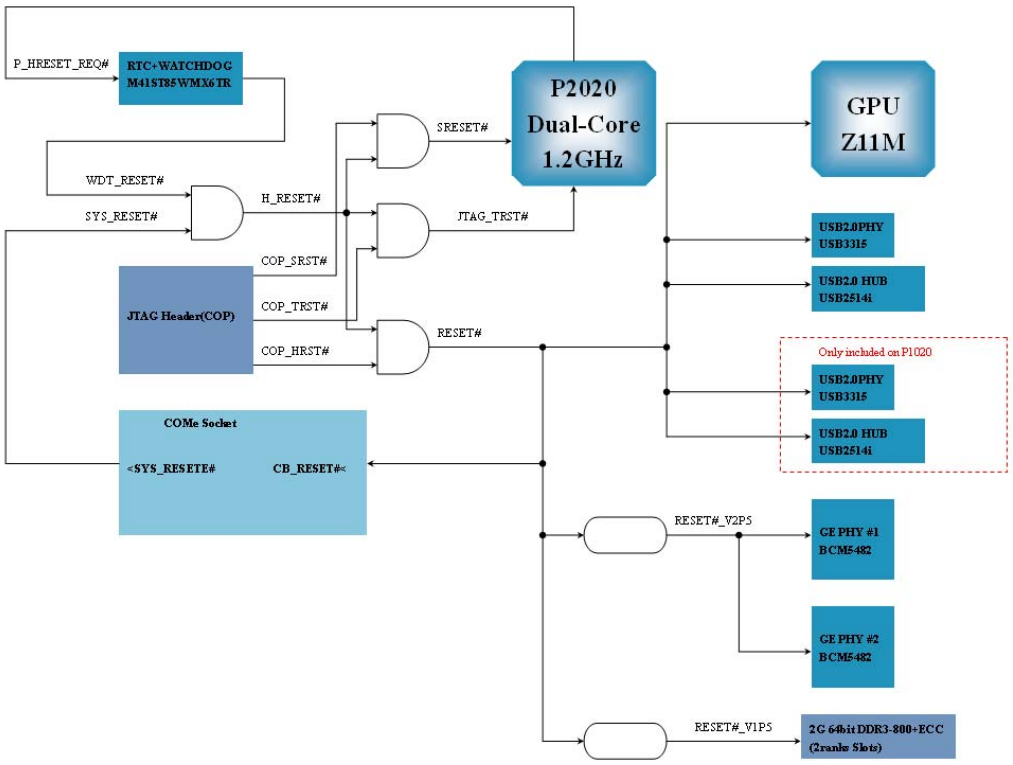
M41ST85WMX6TR contains an internal watchdog. The watchdog can be fed through the I2C or WDI pin. The watchdog is turned off by default.

4.6 Reset Logic

M41ST85WMX6TR will pull H_RESET# low when the VCC is below Vpfd=2.6V, thus realizing the power fail reset function and power-on reset.

P_HRESET_REQ# is sent to M41ST85WMX6TR's RSTIN2_N, which needs a minimum 100ms of low voltage level to trigger reset. This is critical because the software programmer may neglect this and fail in resetting the circuit.

Figure 4-4 Reset Logic



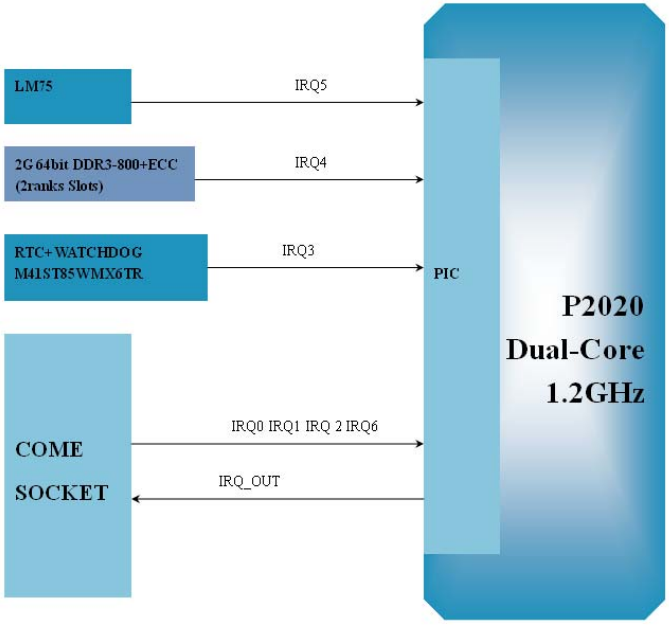
4.7 LM75CIM-3

The LM75 is a temperature sensor which can assert interrupt through IRQ5. There are four data registers in the LM75 which are selected by the Pointer register.

4.8 Interrupt Logic

P2020 has a programmable interrupt controller, which conforms to OpenPIC architecture.

Figure 4-5 Interrupt Logic



4.9 JTAG

COMX-P2020 supports JTAG for CPU and GE PHY debugging. See *Debug Ports* on page 66 for the debug ports pinout.

4.10 GPIO

There are total 14 GPIO PIN used at COMX-P2020; GPIO8 and GPIO9 are used for SDHC function.

Table 4-1 GPIO Description

Name	Intput/ Output	Reset Value	Description
GPIO 0	Input		connected to the COM-E carrier board
GPIO 1	Input		connected to the COM-E carrier board
GPIO 2	Input		connected to the COM-E carrier board
GPIO 3	Input		connected to the COM-E carrier board
GPIO 4	Output	0	connected to the COM-E carrier board
GPIO 5	Output	0	connected to the COM-E carrier board
GPIO 6	Output	0	connected to the COM-E carrier board
GPIO 7	Output	0	connected to the COM-E carrier board
GPIO 8			Multiplex as SDHC_CD: which is used to check if the SD insert or not.
GPIO 9			Multiplex as SDHC_WP: which is used to check the SD is write protect or not.
GPIO 10	Output	0	can be used to clear WDT timer. If the pin is set to 1, the WDT timer will be cleared.
GPIO 11	Input		connected to the COM-E carrier board
GPIO 12	Output	1	If this pin is set to 1, and s3[14] is set to OFF, then Serdes#2 is switch to COMe PCI #2; If this pin is set to 0, or s3[14] is set to ON, then Serdes#2 is switch to GEPHY2. For COMX-P2020, GPIO[12] must be set to 1 and s3[14] must be set to OFF.
GPIO 13	Input		connected to the COM-E carrier board
GPIO 14	Input		connected to the COM-E carrier board
GPIO 15	Input		connected to the COM-E carrier board

4.11 UART

The COMX-P2020 COM Express Module consists of two universal asynchronous receiver/transmitters (UARTs). The UARTs act independently. Each UART is clocked by the platform clock (600MHz). The DUART programming model is compatible with the PC16552D.

U-boot will use the following parameters to initialize the UARTs:

Table 4-2 Initialization Parameters

Parameter	Value
Baud rate	115200
Data bit	8
Parity	None
Stop bit	1
CCB Clock	400 MHz
Divisor most and least significant byte registers	CCB Clock / Baud rate / 16 = 326
Internal interrupt number	26

4.12 USB

P2020 implements a dual-role (DR) USB module. This module is connected to USB2514i which can provide 4 downstream ports. The DR module can act as a device or host controller, while in this case, it is configured as a host controller, and it can support at most six bidirectional USB endpoints.

4.13 PCI Express

There are three PCI Express on COMX-P2020 . The PCI Express are configured as:

PCI Express 1 x1 (2.5 Gbps) SerDes lane 0

PCI Express 2 x1 (2.5 Gbps) > SerDes lane 1

PCI Express 3 x2 (2.5 Gbps) SerDes lanes 2-3

PCI Express 1 is connected to GPU Z11M. The other two are connected to the carrier board

4.14 Ethernet (eTSEC)

COMX-P2020 provides three enhanced three-speed Ethernet controllers (eTSECs) which interface to 10 Mbps, 100 Mbps, and 1 Gbps Ethernet/IEEE 802.3 networks. The Ethernet controllers are connected to 2 BCM5482.Each BCM5482 can provide two Ethernet transceivers designed for 1000 Mbps, 100Mbps and 10 Mbps applications. All of the PHYs are configured with: Auto-Negotiations Enable, Full-duplex modes by default.

5.1 Memory Map

The U-boot uses a 32-bit effective address and a 32-bit physical address. The memory map is listed below:.

Table 5-1 Memory Map

Address#	Effective Base Address	Physical Base Address	Size	Description
1.	0000 0000	0000 0000	8000 0000 - 2GB	DDR3 Memory
2.	8000 0000	8000 0000	2000 0000 - 512MB	PCIE3 MEM
3.	A000 0000	A000 0000	2000 0000 - 512MB	PCIE2 MEM
4.	C000 0000	C000 0000	2000 0000 - 512MB	PCIE1 MEM
5.	FFC0 0000	FFC0 0000	0001 0000 - 64K	PCIE3 MEM
6.	FFC1 0000	FFC1 0000	0001 0000 - 64K	PCIE2 MEM
7.	FFC2 0000	FFC2 0000	0001 0000 - 64K	PCIE1 MEM
8.	FFD0 0000	FFD0 0000	0000 4000 - 16K	L1 Cache(Initial RAM)
9.	FFE0 0000	FFE0 0000	0010 0000 - 1MB	CCSR
10.	FFFF F000	FFFF F000	0000 1000 - 4KB	BOOT PAGE

5.2 IRQ Distribution

Table 5-2 IRQ Distribution

IRQ#	Description
CPU_IRQ6	to COM-E connectors
CPU_IRQ5	LM75 IRQ output
CPU_IRQ4	SO-UDIMM_EVENT
CPU_IRQ3	RTC IRQ output
CPU_IRQ2	to COM-E connectors
CPU_IRQ1	to COM-E connectors

Table 5-2 IRQ Distribution

IRQ#	Description
CPU_IRQ0	to COM-E connectors

5.3 Registers

Please see the respective datasheets of the devices for the registers.

6.1 Upgrade Procedure

6.1.1 Host Setup

Host setup is very critical in upgrading the firmware. The following instructions are generic, and have been tested at RHEL 4.6 and RHEL 5.3 - 32 bit. Your system may be different and the commands should be adjusted accordingly.

1. Turn off the firewall for tftp to work. Type iptables -F or setup at the command line.
2. All the operators on the host side should be ordinary users which have "sudo" privilege with NO password. To obtain "sudo" privilege, the operator should login as root, and run "visudo" and add the below line at the end.
   Example:
   ```
   ec7987 ALL=(ALL)     NOPASSWD: ALL
   ```
3. Setting up the tftp service:
   1. Create the /local/tftpboot/COMX-P2020/current directory at host, and copy the release file: COMX-P2020.bsp.tar.gz to the directory: /local/tftpboot/COMX-P2020/current

      ```
      [percy@localhost current]$ sudo chmod 777 /local/tftpboot/COMX-
      P2020/current
      [percy@localhost current]$ ls -al COMX-P2020.bsp.tar.gz
      -rwxr--r-- 1 percy percy 462501957 Dec  9 14:57 COMX-P2020.bsp.tar.gz
      [percy@localhost current]$
      ```

   2. Extract all the BSP targets from the COMX-P2020.bsp.tar.gz:

      ```
      [percy@localhost current]$ tar zxvf COMX-P2020.bsp.tar.gz
      [percy@localhost current]$ ls -al
      total 910224
      drwxr-xr-x 2 percy percy      4096 Dec 10 09:37 .
      drwxrwxr-x 8 percy percy      4096 Dec  9 18:07 ..
      -rw-r--r-- 1 percy percy      9824 Dec  9 14:51 comx.dtb
      ```

```
-rwxr--r-- 1 percy percy 462501957 Dec  9 14:57 COMX-P2020.bsp.tar.gz
-r-xr-xr-x 1 percy percy      5771 Dec  9 12:57 make_sd.sh
-rw-r--r-- 1 percy percy 110443332 Dec  9 14:53 rootfs-dev.ext2.img
-rw-r--r-- 1 percy percy 107400408 Dec  9 14:54 rootfs-LRFS.tar.gz
-rw-r--r-- 1 percy percy   3872536 Dec  9 14:51 rootfs-min.ext2.img
-rw-r--r-- 1 percy percy 200253398 Dec  9 14:55 rootfs-nfs.tar.gz
-rw-r--r-- 1 percy percy  42137827 Dec  9 14:51 rootfs-usr.ext2.img
-rwxr-xr-x 1 percy percy    524288 Dec  9 14:40 u-boot-sd.bin
-rw-r--r-- 1 percy percy    525312 Dec  9 14:39 u-boot-spi.bin
-rw-r--r-- 1 percy percy   3416506 Dec  9 14:51 uImage
 [percy@localhost current]$
```

3. Edit /etc/xinetd.d/tftp to enable tftp, here we set the tftp directory to /local/tftpboot:

```
service tftp
{
        socket_type             = dgram
        protocol                = udp
        wait                    = yes
        user                    = root
        server                  = /usr/sbin/in.tftpd
        server_args             = -s /local/tftpboot
        disable                 = no
        per_source              = 11
        cps                     = 100 2
        flags                   = IPv4
}
```

4. Start the tftp servers at the host:

```
[percy@localhost COMX-P2020]$sudo /sbin/service xinetd start
Stopping xinetd: [  OK  ]
Starting xinetd: [  OK  ]
```

6.1.2 Upgrade MicroSD Card

This device should be pre-programmed with a USB reader at Linux host.

1. Insert the MicroSD card to a USB reader.
2. Connect the USB reader to the host.
3. Check the device name for the USB reader. The following command shows that the device name for USB reader is /dev/sdb.

```
[percy@localhost current]$ ls -al /dev/sd*
brw-r----- 1 root disk 8,  0 Dec  2 17:16 /dev/sda
brw-r----- 1 root disk 8,  1 Dec  2 17:17 /dev/sda1
brw-r----- 1 root disk 8,  2 Dec  2 17:16 /dev/sda2
brw-r----- 1 root disk 8, 16 Dec  2 18:43 /dev/sdb
[percy@localhost current]$ sudo fdisk -l /dev/sdb

Disk /dev/sdb: 2002 MB, 2002780160 bytes
62 heads, 62 sectors/track, 1017 cylinders
Units = cylinders of 3844 * 512 = 1968128 bytes

   Device Boot      Start         End      Blocks   Id  System
```

4. Run the script make_sd.sh to program the SD card with the BSP targets as below:

```
[percy@localhost COMX-P2020]$ sudo ./make_sd.sh /dev/sdb
```

Normally, the program process will last for 3-5 minutes. If the SD card is upgraded successfully, the following information should be shown as below:

```
Program SD successfully, first partition size = 300 MByte,  cost time:
198 seconds
```

Otherwise, the SD card has failed to be programmed.

5. The second parameter of the script: make_sd.sh can be used to change the size of first partition. To change the size of the first partition to 250M, you can run the script as below:

```
[percy@localhost COMX-P2020]$ sudo ./make_sd.sh /dev/sdb 250
……
Program SD successfully, first partition size = 250 MByte,  cost time:
171 seconds
```

The size of the first partition should be greater than 160M, and less than 2000M, or the script will show input parameter error.

6.1.3 Upgrade SPI Flash

1. Attach the board's first Ethernet port (eTSEC1) to the host using a network cable. Assuming that the IP address of the host is 192.168.0.197, and IP Address for board is 192.168.0.253.
2. Attach the board's first serial port (UART0) to the host using a serial port cable. The serial port of the host can be set with the following parameters:

   Baud rate= 115200; Data bits = 8; Parity = None; Stop bits = 1; Flow Control = None
3. Power on the board. Normally, the following information can be seen at the terminal of the host:

```
U-Boot 2009.11-V100B09 (Sep 24 2010 - 17:19:44)

CPU0:  P2020E, Version: 2.0, (0x80ea0020)
Core:  E500, Version: 5.0, (0x80211050)
Clock Configuration:
```

```
       CPU0:1200 MHz, CPU1:1200 MHz,
       CCB:400  MHz,
       DDR:400  MHz (800 MT/s data rate) (Asynchronous), LBC:25   MHz
L1:    D-cache 32 kB enabled
       I-cache 32 kB enabled
I2C:   ready
SPI:   ready
DRAM:   2 GB
L2:    512 KB enabled
MMC:  FSL_ESDHC: 0
*** Warning - bad CRC, using default environment

EEPROM: NXID v0

    PCIE3 connected to Slot0 as Root Complex (base addr ffe08000)
    PCIE3 on bus 00 - 00

    PCIE2 connected to Slot 1 as Root Complex (base addr ffe09000)
    PCIE2 on bus 01 - 01

    PCIE1 connected to Slot 2 as Root Complex (base addr ffe0a000)
    Current Status: LSR-11, LTSSM-16, PEX width-x1, Clock-2.5GT/s
              Scanning PCI bus 03
        03  00  18ca  0027  0300  00
    PCIE1 on bus 02 - 03

In:    serial
Out:   serial
Err:   serial
Net:   eTSEC1, eTSEC2, eTSEC3
Hit any key to stop autoboot:  0
=>
```

4. Set the u-Boot environment variables for the network settings through the terminal:

```
=> setenv ethaddr 00:01:af:12:23:01
=> setenv ipaddr 192.168.0.253
=> setenv netmask 255.255.255.0
=> setenv gatewayip 192.168.0.1
=> setenv serverip 192.168.0.197
=> setenv ethact eTSEC1
=> ping 192.168.0.197
Enet starting in 100BT/FD
```

```
Speed: 100, full duplex
Using eTSEC1 device
host 192.168.0.197 is alive
```

5. Set the U-Boot environment variables for upgrade files and upgrade the SPI Flash. This step may take up to 1 minute.

```
=> setenv tftppath COMX-P2020/current
=> setenv uboot_spi u-boot-spi.bin
=> run upgradespi
4096 KiB S25FL032A(P) at 0:0 is now current device
Enet starting in 100BT/FD
Speed: 100, full duplex
Using eTSEC1 device
TFTP from server 192.168.0.197; our IP address is 192.168.0.250
Filename 'COMX-P2020/current/u-boot-spi.bin'.
Load address: 0x1000000
Loading: #################################
done
Bytes transferred = 525312 (80400 hex)
=>
```

Operating System and Driver Support

7.1 Supported Operating Systems

This module supports the following operating systems:

- Linux (published by Emerson)
  Publicly available Linux with Emerson's patches. Includes the following:
  - U-boot (Based on public version: u-boot-2009.11 [Dec 15 2009])
  - Linux Kernel (Based on public version: 2.6.32)
  - File system

7.2 Supported Drivers

Table 7-1 Driver Controller Table

	Linux (published by Emerson)
Chipset	Yes
Graphic	Yes
LAN	Yes

Related Documentation

A.1 Emerson Network Power - Embedded Computing Documents

The publications listed below are referenced in this manual. You can obtain electronic copies of Emerson Network Power - Embedded Computing publications by contacting your local Emerson sales office. For released products, you can also visit our Web site for the latest copies of our product documentation.

1. Go to www.emersonnetworkpower.com/embeddedcomputing.
2. Under **Resources**, click **Technical Documentation**.
3. Enter the manual you are looking for in the search. Use either the publication number or the complete name of the product to search for available manuals.

Table A-1 Emerson Network Power - Embedded Computing Publications

Document Title	Publication Number
COMX-P2020 BSP User Guide.doc	6806800L84
COMX-P2020 Quick Start Guide	6806800K98
COMX-P2020 Safety Notes	6806800K99

Safety Notes

This section provides warnings that precede potentially dangerous procedures throughout this manual. Instructions contained in the warnings must be followed during all phases of operation, service, and repair of this equipment. You should also employ all other safety precautions necessary for the operation of the equipment in your operating environment. Failure to comply with these precautions or with specific warnings elsewhere in this manual could result in personal injury or damage to the equipment.

Emerson intends to provide all necessary information to install and handle the product in this manual. Because of the complexity of this product and its various uses, we do not guarantee that the given information is complete. If you need additional information, ask your Emerson representative.

The product has been designed to meet the standard industrial safety requirements. It must only be used in its specific area of office telecommunication industry, industrial control, and development. It must not be used in safety critical components, life supporting devices or on aircraft.

Only personnel trained by Emerson or persons qualified in electronics or electrical engineering are authorized to install, remove or maintain the product. The information given in this manual is meant to complete the knowledge of a specialist and must not be used as replacement for qualified personnel.

Keep away from live circuits inside the equipment. Operating personnel must not remove equipment covers. Only factory authorized service personnel or other qualified service personnel is allowed to remove equipment covers for internal subassembly or component replacement or any internal adjustment.

This product operates with dangerous voltages that can cause injury or death. Use extreme caution when handling, testing, and adjusting this equipment and its components.

Operation

Product Damage
High humidity and condensation on surfaces cause short circuits.
Do not operate the product outside the specified environmental limits. Make sure the product is completely dry and there is no moisture on any surface before applying power.

Installation

Damage of Circuits
Electrostatic discharge and incorrect installation and removal of the product can damage circuits or shorten their life.
Before touching the product make sure that your are working in an ESD-safe environment or wear an ESD wrist strap or ESD shoes. Hold the product by its edges and do not touch any components or circuits.

Damage of the Product and Additional Devices and Modules
Incorrect installation or removal of additional devices or modules damages the product or the additional devices or modules.
Before installing or removing additional devices or modules, read the respective documentation and use appropriate tools.

Pin Damage
Forcing the module into the system may damage the connector pins.
If the module hangs during insertion, pull it out and insert it again.

Environment

Environmental Damage
Improperly disposing of used products may harm the environment.
Always dispose of used products according to your country's legislation and manufacturer's instructions.

Sicherheitshinweise

This section provides a German translation of the Safety Notes.

Dieses Kapitel enthält Hinweise, die potentiell gefährlichen Prozeduren innerhalb dieses Handbuchs vorrangestellt sind. Beachten Sie unbedingt in allen Phasen des Betriebs, der Wartung und der Reparatur des Systems die Anweisungen, die diesen Hinweisen enthalten sind. Sie sollten außerdem alle anderen Vorsichtsmaßnahmen treffen, die für den Betrieb des Systems innerhalb Ihrer Betriebsumgebung notwendig sind. Wenn Sie diese Vorsichtsmaßnahmen oder Sicherheitshinweise, die an anderer Stelle diese Handbuchs enthalten sind, nicht beachten, kann das Verletzungen oder Schäden am System zur Folge haben.

Emerson ist darauf bedacht, alle notwendigen Informationen zum Einbau und zum Umgang mit dem System in diesem Handbuch bereit zu stellen. Da es sich jedoch bei dem System um ein komplexes Produkt mit vielfältigen Einsatzmöglichkeiten handelt, können wir die Vollständigkeit der im Handbuch enthaltenen Informationen nicht garantieren. Falls Sie weitere Informationen benötigen sollten, wenden Sie sich bitte an die für Sie zuständige Geschäftsstelle von Emerson.

Das Produkt erfüllt die für die Industrie geforderten Sicherheitsvorschriften und darf ausschließlich für Anwendungen in der Telekommunikationsindustrie, im Zusammenhang mit Industriesteuerungen und in der Entwicklung verwendet werden. Es darf nicht in sicherheitskritischen Anwendungen, lebenserhaltenden Geräten oder in Flugzeugen verwendet werden.

Einbau, Wartung und Betrieb dürfen nur von durch Emerson ausgebildetem oder im Bereich Elektronik oder Elektrotechnik qualifiziertem Personal durchgeführt werden. Die in diesem Handbuch enthaltenen Informationen dienen ausschließlich dazu, das Wissen von Fachpersonal zu ergänzen, können dieses jedoch nicht ersetzen.

Halten Sie sich von stromführenden Leitungen innerhalb des Systems fern. Entfernen Sie auf keinen Fall die Systemabdeckung. Nur werksseitig zugelassenes Wartungspersonal oder anderweitig qualifiziertes Wartungspersonal darf die Systemabdeckung entfernen, um Systemkomponenten zu ersetzen oder andere Anpassungen vorzunehmen.

Installieren Sie keine Ersatzteile oder führen Sie keine unerlaubten Veränderungen am System durch, sonst verfällt die Garantie. Wenden Sie sich für Wartung oder Reparatur bitte an die für Sie zuständige Geschäftsstelle von Emerson. So stellen Sie sicher, dass alle sicherheitsrelevanten Aspekte beachtet werden.

Emerson und unsere Zulieferer unternehmen größte Anstrengungen um sicherzustellen, dass sich Pins und Stecker von Boards vor dem Verlassen der Produktionsstätte in einwandfreiem Zustand befinden. Verbogene Pins, verursacht durch fehlerhafte Installation oder durch Installation von Boards mit beschädigten Steckern kann die durch Emerson gewährte Garantie für Boards und Backplanes erlöschen lassen.

Dieses Produkt wird mit gefährlichen Spannungen betrieben, die zu Verletzungen und Tod führen können. Seien Sie im Umgang mit dem Produkt und beim Testen und Anpassen des Produktes und seiner Komponenten äußerst vorsichtig.

Betrieb

Beschädigung des Systems
Hohe Luftfeuchtigkeit und Kondensat auf den Oberflächen der Produkte kann zu Kurzschlüssen führen.
Betreiben Sie die Produkte nur innerhalb der angegebenen Grenzwerte für die relative Luftfeuchtigkeit und Temperatur und stellen Sie vor dem Einschalten des Stroms sicher, dass sich auf den Produkten kein Kondensat befindet.

System Installation

Beschädigung von Schaltkreisen
Elektrostatische Entladung und unsachgemäßer Ein- und Ausbau des Produktes kann Schaltkreise beschädigen oder ihre Lebensdauer verkürzen.
Bevor Sie das Produkt oder elektronische Komponenten berühren, vergewissern Sie sich, daß Sie in einem ESD-geschützten Bereich arbeiten.

Beschädigung des Produktes und der Zusatzmodule
Fehlerhafter Ein- oder Ausbau von Zusatzmodulen führt zu Beschädigung des Produktes oder der Zusatzmodule.
Lesen Sie deshalb vor dem Ein- oder Ausbau von Zusatzmodulen die Dokumentation und benutzen Sie angemessenes Werkzeug.

Umweltschutz

Umweltverschmutzung
Falsche Entsorgung der Produkte schadet der Umwelt.
Entsorgen Sie alte Produkte gemäß der in Ihrem Land gültigen Gesetzgebung und den Empfehlungen des Herstellers.

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