ISA104
Backplane
User's Manual

BDM-610020024
Rev. A

ISO9001 and AS9100 Certified

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Backplane
User's Manual

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Revision History

Rev. A New Manual Naming Method

Published by:

RTD Embedded Technologies, Inc.
103 Innovation Blvd.
State College, PA 16803-0906

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Chapter 1 INTRODUCTION

This manual gives information needed to use the ISA104 backplane, which allows the simultaneous use of PC/104 modules and standard ISA bus PC cards.

ISA104 Backplane

The ISA104 backplane was designed to enable you to rapidly create a development or demonstration system for the Real Time Devices cpuModules or other standard PC/104 modules.

Features

- Allows simultaneous use of PC/104 modules and standard PC cards
- Provides connections for a standard PC/AT power supply
- Contains a DC-to-DC converter to generate the Flash EPROM programming voltage
- Includes adapter cables to connect a serial port, parallel port, and keyboard, using standard DB9, DB25, and DIN5 connectors.
- Provides connectors for easily adding a speaker, reset pushbutton, and backup battery for the Solid State Disk and Real Time Clock.

Connectors

The connectors provided on the ISA104 backplane are:

- Power supply
- Serial port
- Parallel port
- Speaker
- Keyboard
- Reset pushbutton
- Backup battery
- PC/104 Bus
- Standard 16-bit ISA slots (four)

Physical Characteristics

- Dimensions 165 x 220 mm, height 16mm
- 4-layer PCB
- 4 standard PC ISA slots
- Operating conditions:
    - temperature: 0 - 75 degrees C
    - relative humidity: 5 - 95%
    - altitude: 0 - 3000m
- Storage temperature: -55 to +85 degrees C

Component Locations

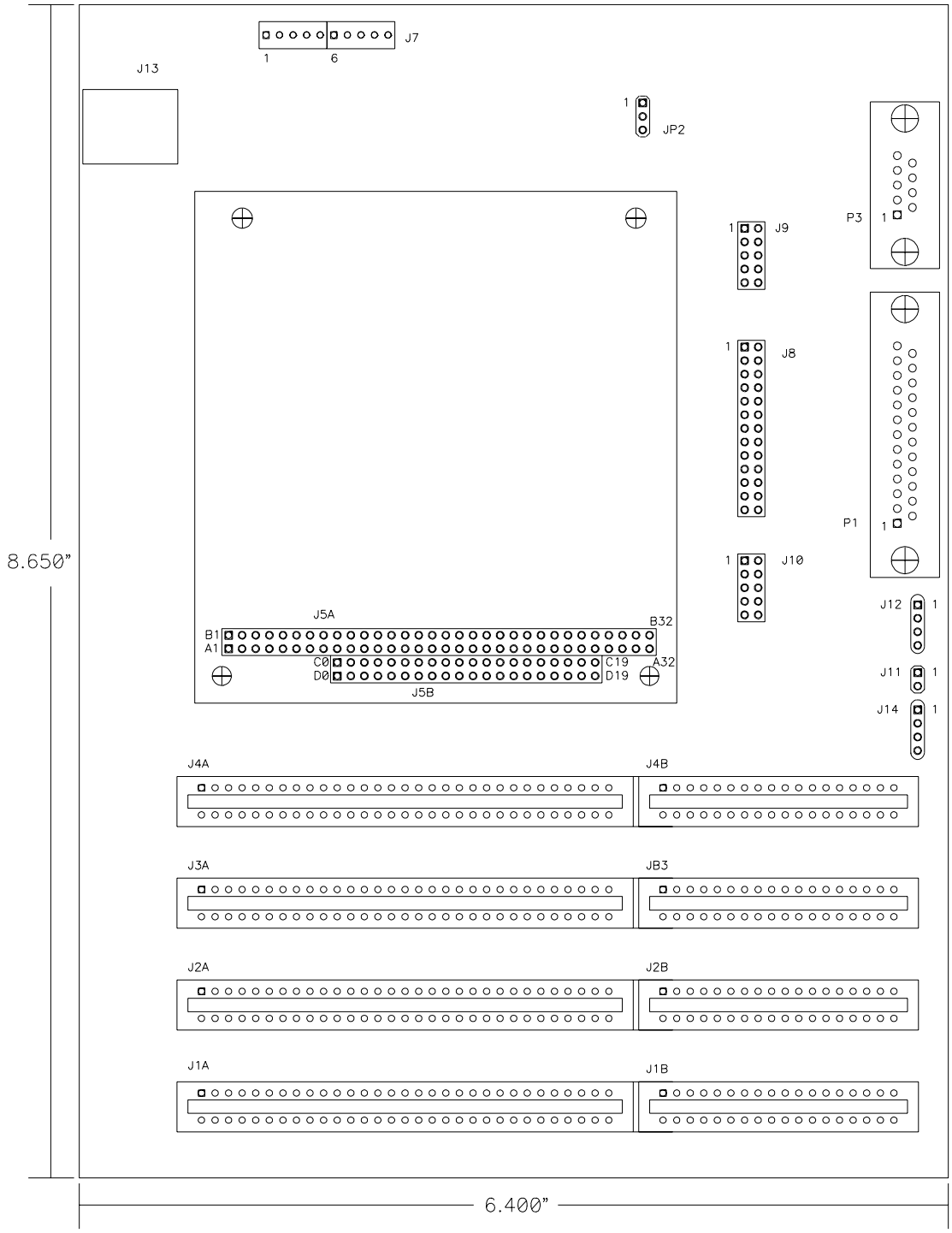


Figure 1 ISA104 Component Locations

Chapter 2 CONNECTORS

Power Supply, J7

Connector J7 allows you to connect a standard PC power supply to power the system.

WARNING: If you improperly apply power, the backplane and any installed PC/104 modules or ISA bus cards will almost certainly be *destroyed*. Please carefully verify power connections to the backplane *before* applying power.

The following table gives the pinout for connector J7:

Table 1-1 Power Supply Connector J7

Pin	Signal
1	NC
2	NC
3	+12V
4	-12V
5	GND
6	GND
7	GND
8	GND
9	-5V
10	+5V
11	+5V
12	+5V

Table 1 Power Supply Connector

Serial Port, P3 and J9

Connector P3 provides a standard DSUB9 serial port connector. Depending on the cpuModule you use, P3 can be used to connect RS232, RS422, or RS485 serial devices. The pins of P3 connect to J9, which is wired to the serial port of the PC/104 cpuModule through a ribbon cable.

When installing a PC/104 cpuModule, connect one end of a 10-pin ribbon cable to J9 of the backplane. Connect the other end of the ribbon cable to the cpuModule serial port connector.

RS232 Operation

The following table gives the pinout of connectors P3 and J9. It also lists the pin functions when used for RS232 operation.

Table 1-2 Serial Port Connector, P3 (RS232)				
Pinout of J9	**Signal**	**Function**	**in/out**	**Pinout of P3**
1	DCD	Data Carrier Detect	in	1
2	DSR	Data Set Ready	in	6
3	Rx	Receive Data	in	2
4	RTS	Request To Send	out	7
5	Tx	Transmit data	out	3
6	CTS	Clear To Send	in	8
7	DTR	Data Terminal Ready	out	4
8	RI	Ring Indicator	in	9
9,10	GND	Signal Ground	--	5

Table 2 Serial Port Connector RS232

RS422 or RS485 Operation

The pinout of RS232 ports on PC/104 cpuModules is fairly standard, but the pinout for RS422 and RS485 ports are not. The following tables illustrate connections for RS422 and RS485 when using our CMi386sx or CMi486slc cpuModules. Your cpuModule may be different, so please verify the connections with your cpuModule manual.

The following table lists the pinout of P3 when used with the CMi386sx/486slc and RS422 devices:

Table 1-3 Serial Port Connector, P3 (RS422)			
P3 Pin	**Signal**	**Function**	**In/out**
1	-TX	Transmit data	out
2	+TX	Transmit Data	out
3	-RX	Receive Data	in
4	+Rx	Receive Data	in
9	GND		
5,6,7,8	--	not connected	--

Table 3 Serial Port Connector RS422

The following table lists the pinout of P3 when used with the CMi386sx/486slc and half-duplex RS485 devices:

Table 1-4 Serial Port Connector, P3 (RS485)		
P3 Pin	**Signal**	**Function**
1	-TX/-RX	Transmit/Receive data
3	+TX/+RX	Transmit/Receive Data
4,5,6,7,8	--	not connected
9	gnd	signal ground

Table 4 Serial Port Connector RS485

Parallel Port, P1 and J8

P1 provides a PC-compatible DSUB25 parallel port connector. The signals on P1 connect to J8, which is tied to the parallel port connector of the PC/104 cpuModule with a ribbon cable.

When installing a PC/104 cpuModule, connect one end of a 26-pin ribbon cable to J8 of the backplane. Connect the other end of the ribbon cable to the cpuModule parallel port connector.

The following table lists the signals on connectors P1 and J8:

Table 1-5 Parallel Port Connectors, P1 and J8

J8 Pin	Signal	Function	in/out	P1 Pin
1	-STB	Strobe Data	out	1
2	-AFD	Autofeed	out	14
3	PD0	LSB of printer Data	out	2
4	-ERR	Printer error	in	15
5	PD1	Parallel Data 1	out	3
6	-INIT	Initialize printer	out	16
7	PD2	Printer Data 2	out	4
8	-SLIN	Select printer	out	17
9	PD3	Printer Data 3	out	5
10	GND	Signal ground	--	18
11	PD4	Printer Data 4	out	6
12	GND	Signal ground	--	19
13	PD5	Printer Data 5	out	7
14	GND	Signal ground	--	20
15	PD6	Printer Data 6	out	8
16	GND	Signal ground	--	21
17	PD7	MSB Printer Data	out	9
18	GND	Signal ground	--	22
19	-ACK	Character accepted	in	10
20	GND	Signal ground	--	23
21	BSY	Busy	in	11
22	GND	Signal ground	--	24
23	PE	Paper End	in	12
24	GND	Signal ground	--	25
25	SLCT	Ready To Receive	in	13
26	GND	Signal ground	--	26

Table 5 Parrallel Port Connector

Multifunction, J10

The Multifunction connector, J10, plugs onto the cpuModule and connects the following cpuModule functions to the ISA104 backplane:

- Speaker output
- Keyboard interface
- System reset input
- Backup battery input
- Flash programming voltage input

When installing a PC/104 cpuModule, connect one end of a 10-pin ribbon cable to J10. Connect the other end of the ribbon cable to the cpuModule Multifunction connector.

The table below gives the pinout of connector J10.

Table 1-6 Multifunction Connector, J10

Pin	Signal	Function	in/out
1	SPKR+	Speaker output +	out
2	SPKR-	Speaker output -	out
3	RESET	External reset	in
4	WD	Watchdog output	out
5	KBD	Keyboard data	in
6	KBC	Keyboard clock	out
7	GND	ground signal	
8	KBP	Keyboard power	out
9	BAT	Backup battery input	in
10	VPP	Flash programming voltage	in

Table 6 Multifunction Connector

Speaker Output, J12

Connector J12 allows connection of an external speaker. The pins of J12 are tied to pins 1 and 2 of Multifunction connector J10.

The following table lists the pinout of J12:

Table 1-7 Speaker Connector J12

Pin	Signal
1	SPKR+
2	NC
3	GND
4	VCC

Table 7 Speaker connector

Keyboard Connector, J13

Connector J13, a five pin DIN connector, allows connection of a PC/XT or AT compatible keyboard. Most of these keyboards have a cable ending in a five pin DIN connector and can therefore be plugged directly into J13. Some newer keyboards have a "mini-DIN" connector and will require an adapter to use J13. The signals of J13 are tied to pins 5 through 8 of the Multifunction connector, J10.

The table below lists the pinout of the Keyboard connector, J13, and the corresponding signals on the Multifunction connector, J10.

Table 1-8 Keyboard connectors, J10 and J13

J10 Pin	Signal	Function	J13 Pin
5	KBD	Keyboard data	2
6	KBC	Keyboard clock	1
7	GND	ground signal	4
8	KBP	Keyboard power	5

Table 8 Keyboard Connector

System Reset Input, J11

Connector J11 allows connection of a normally open (N.O.) pushbutton to reset the system. When pressed, the pushbutton connects pins 3 and 7 of the Multifunction connector, J10.

Backup Battery Input, J14

Connector J14 allows connection of a backup battery, used to preserve the contents of the Solid State Disk and Real Time Clock when system power is removed. The battery voltage used should typically be 3.0 to 3.6 volts; this is the voltage of most lithium batteries used for PC compatible computers. Note that the positive connections of J14 are tied to pin 9 of the Multifunction connector, J10, while the negative connections of J14 are tied to pin 7 of J10.

The following table lists the pinout of connector J14:

Table 1-9 Battery Connector, J14

Pin	Function
1	Battery +
2	Battery -
3	Battery -
4	Battery +

Table 9 Battery connector

PC/104 Bus Connector, J5

Connector J5 provides the PC/104 Bus connections. The connector is divided into two sections, A and B. Section A supplies the XT bus signals, and section B supplies the additional signals neeeded for the AT bus. The functions and definitions of the signals on J5 conform to the IEEE P966 standard for the PC/104 bus.

The following two tables list the pinouts of sections A and B of connector J5:

Table 1-11 PC/104 Bus Connector, J5A		
Pin	**Row A**	**Row B**
1	IOCHCHK*	0V
2	SD7	RESETDRV
3	SD6	+5V
4	SD5	IRQ9
5	SD4	-5V
6	SD3	DRQ2
7	SD2	-12V
8	SD1	ENDXFR*
9	SD0	+12V
10	IOCHRDY	(KEY)
11	AEN	SMEMW*
12	SA19	SMEMR*
13	SA18	IOW*
14	SA17	IOR*
15	SA16	DACK3
16	SA15	DRQ3
17	SA14	DACK1*
18	SA13	DRQ1
19	SA12	REFRESH
20	SA11	SYSCLK
21	SA10	IRQ7
22	SA9	IRQ6
23	SA8	IRQ5
24	SA7	IRQ4
25	SA6	IRQ3
26	SA5	DACK2*
27	SA4	TC
28	SA3	BALE
29	SA2	+5V
30	SA1	OSC
31	SA0	0V
32	0V	0V

Table 10 XT Connector

Table 1-12 PC/104 Bus Connector, J5B		
Pin	**Row C**	**Row D**
1	0V	0V
2	SBHE*	MEMCS16*
3	LA23	IOCS16*
4	LA22	IRQ10
5	LA21	IRQ11
6	LA20	IRQ12
7	LA19	IRQ15
8	LA18	IRQ14
9	LA17	DACK0*
10	MEMR*	DRQ0
11	MEMW*	DACK5*
12	SD8	DRQ5
13	SD9	DACK6*
14	SD10	DRQ6
15	SD11	DACK7*
16	SD12	DRQ7
17	SD13	+5V
18	SD14	MASTER*
19	SD15	0V
20	KEY(nc)	0V

Table 11 AT Connector

ISA Bus Connectors, J1A..J4A and J1B..J4B

Connectors J1 through J4 provide connections for standard 8 or 16-bit ISA bus cards. Section A of each connector provides the 8-bit (XT) bus signals, while section B of each connector provides the additional signals needed for the 16-bit (AT) bus.

The following two tables list the signals on sections A and B of connectors J1 through J4:

Table 1-13 ISA Bus Connectors, J1A - J4A		
Pin	**Row A**	**Row B**
1	IOCHCHK*	0V
2	SD7	RESETDRV
3	SD6	+5V
4	SD5	IRQ9
5	SD4	-5V
6	SD3	DRQ2
7	SD2	-12V
8	SD1	ENDXFR*
9	SD0	+12V
10	IOCHRDY	(KEY)
11	AEN	SMEMW*
12	SA19	SMEMR*
13	SA18	IOW*
14	SA17	IOR*
15	SA16	DACK3
16	SA15	DRQ3
17	SA14	DACK1*
18	SA13	DRQ1
19	SA12	REFRESH
20	SA11	SYSCLK
21	SA10	IRQ7
22	SA9	IRQ6
23	SA8	IRQ5
24	SA7	IRQ4
25	SA6	IRQ3
26	SA5	DACK2*
27	SA4	TC
28	SA3	BALE
29	SA2	+5V
30	SA1	OSC
31	SA0	0V

Table 12 XT Slot Connector

Table 1-14 ISA Bus Connectors, J1B .. J4B		
Pin	**Row C**	**Row D**
1	0V	0V
2	SBHE*	MEMCS16*
3	LA23	IOCS16*
4	LA22	IRQ10
5	LA21	IRQ11
6	LA20	IRQ12
7	LA19	IRQ15
8	LA18	IRQ14
9	LA17	DACK0*
10	MEMR*	DRQ0
11	MEMW*	DACK5*
12	SD8	DRQ5
13	SD9	DACK6*
14	SD10	DRQ6
15	SD11	DACK7*
16	SD12	DRQ7
17	SD13	+5V
18	SD14	MASTER*

Table 13 AT Slot Connector

Chapter 3 OPTIONAL FEATURES

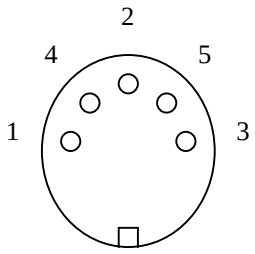
The ISA104 contains provisions for several features which are not normally used. You may add components yourself to add these features, or you may contact the factory for information on adding these features in production.

Mini-DIN Keyboard Connector

The ISA104 may optionally have a five-pin mini-DIN connector installed in location Px. This connector is compatable with PS/2 and some AT keyboards. The pinout of this connector is the same as the regular DIN keyboard connector. Note that the keyboard signals are shared between the regular keyboard connector and the mini-DIN connectors, so you *must not* connect keyboards to both connectors at the same time.

DIN Power Connector

The ISA104 may optionally have a five-pin DIN connector for power supply connection installed in position J15. The pinout of this connector is shown below. Note that power must not be connected to both J7 and J15 at the same time.



VIEW FACING CONNECTOR

Figure 2 DIN Power Connector

Table 1-17 Optional Power Connector, P2	
P2 pin	**Function**
1	Ground
2	Ground
3	+5 VDC
4	-12 VDC
5	+12 VDC

Table 14 Power Connector

Chapter 4 USING THE ISA104 BACKPLANE

Status LEDs

The ISA104 backplane has five LEDs which indicate status of the power supplies. D1 through D4 indicate presence of voltages on the Power Supply Connector, J7, while D5 indicates the status of the Flash Programming Voltage.

The following table lists the meanings of the LEDs:

Table 1-15 Status LEDs	
LED condition	**Meaning**
D1 on	+5V present
D2 on	+12V present
D3 on	-12V present
D4 on	-5V present
D5 on dim	+5V on J10 pin 10
D5 on bright	+12V on J10 pin 10

Table 15 Status LEDs

Flash Programming Supply

The ISA104 backplane contains a DC-to-DC converter which generates Flash Programming Voltage, Vpp, from the backplane's +5 volt supply. This voltage is nominally +12 volts DC. When the Flash Programming Supply is enabled, Vpp is applied to pin 10 of the Multifunction connector, J10.

Jumper JP2 enables and disables the Flash Programming Supply as shown in the table below:

Table 1-16 VPP Enable Jumper, JP2	
JP2 position	**Function**
1-2	VPP Disable
2-3	VPP Enable

Table 16 VPP Enable Connector

Note that the brightness of LED D5 indicates the voltage on the Vpp pin as discussed in the previous section.

Chapter 5 RETURN POLICY AND WARRANTY

Return Policy

If you wish to return a product to the factory for service, please follow this procedure:

Read the Limited Warranty to familiarize yourself with our warranty policy.

Contact the factory for a Return Merchandise Authorization (RMA) number.

Please have the following available:

- Complete board name
- Board serial number
- A detailed description of the board's behavior

List the name of a contact person, familiar with technical details of the problem or situation, **along with their phone and fax numbers, address, and e-mail address** (if available).

List your shipping address!!

Indicate the shipping method you would like used to return the product to you.
We will not ship by next-day service without your pre-approval.

Carefully package the product, using proper anti-static packaging.

Write the RMA number in large (1") letters on the outside of the package.

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