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Communications
Computer Intelligence
Integration

Installation Guide

for the

FDDI Adapter

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Document prepared by C²I² Systems, Cape Town

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3rd Official Release (October 2002)

This edition applies to the C^2I^2 Systems product family of FDDI and CDDI network interface cards. Contents are subject to change.

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Abbreviations and Acronyms

In this manual, the following abbreviations for the product names are used:

- *SAS adapter* for C^2I^2 Systems FDDI / CDDI NICs designed for single attachment to the FDDI network
- *DAS adapter* for C^2I^2 Systems FDDI / CDDI NICs designed for dual attachment to the FDDI network
- *Fiber adapter* for C^2I^2 Systems FDDI NICs designed for fiber optic cabling
- *Copper adapter* for C^2I^2 Systems CDDI NICs designed for copper cabling
- *Transceiver* is the receptacle (and its electronic components) on the adapter for the connection to the network. Network interface cards for fiber cabling use "fiber optic transceivers".
- *LCF* is a standardized low cost fiber optic cable type. Different from MIC cable (supporting two optic connections per cable), it supports single fiber optic connection.
- *ST connector* is an industrialized type fiber optic cable connector.
- *PMC FDDI DAS ST* is the standard FDDI network interface card available from C^2I^2 Systems.
- *PMC FDDI DAS ST-1* is the modified / relaid out ST transceiver option, specifically developed for DY4 Systems.
- *PMC CDDI DAS HR10* is the copper twisted pair transceiver option.
- *PC104 FDDI DAS* is the standard FDDI PC-104 network interface card available from C^2I^2 Systems.
- *SAC* is a Single Attachment Concentrator.
- *DAC* is a Dual Attachment Concentrator.
- *OBS* is an Optical Bypass Switch.

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Notices

References in this publication to C^2I^2 Systems products, programs, or services do not imply that C^2I^2 Systems intends to make these available in all countries in which C^2I^2 Systems operates. Any reference to a C^2I^2 Systems product, program, or service is not intended to state or imply that only C^2I^2 Systems product, program, or service may be used. Any functionally equivalent product, program, or service that does not infringe on any of C^2I^2 Systems intellectual property rights may be used instead of the C^2I^2 Systems product, program, or service. Evaluation and verification of operation in conjunction with other products, except those expressly designated by C^2I^2 Systems are the user's responsibility.

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Note: Warranty is void if the material is damaged due to electrostatic discharge problems or bad packaging.

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1. Applicable / Reference Documents

1.1 Industry Standards Reflected in This Product

1.1.1 Safety Standards: IEC950, EN60950, UL1950, and CSA950.
1.1.2 This product is intended for use in equipment with *Safety Extra Low Voltage* supplies (Reference 2.10.1 in IEC950).

1.2 Related Manuals

Other publications related to this adapter are:

1.2.1 CCII/FDDI/6-MAN/001, entitled User Manual for the C²I² Systems' PMC FDDI END VxWorks Driver
1.2.2 CCII/FDDI/6-MAN/003, entitled Generic User Manual for the C²I² Systems' PMC FDDI BIT Application
1.2.3 The reference manual shipped with your computer

For assistance in obtaining C^2I^2 Systems manuals, contact us at the above support number.

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2. General Information

The PMC FDDI adapters attach host carrier cards to 100 Mbps Fiber Distributed Data Interface (FDDI) networks using fiber optic cable.

The PMC CDDI adapters attach host carrier cards to 100 Mbps Copper Distributed Data Interface (CDDI) networks using copper twisted pair cable.

At present, the range of C^2I^2 Systems FDDI and CDDI adapters covers the PMC (PCI Mezzanine Connector) and the PCI-104 bus architecture.

2.1 The Adapter Kit

The adapter kit consists of the following items:

- Cardboard package
- Static protective bag
- The adapter
- A paper envelope containing several diskettes (e.g., Installation diskettes)
- This Installation Guide
- If any item is missing or damaged, contact C^2I^2 Systems.

Please refer to the Release Notes for detailed current information on delivered diskettes.

2.2 Handling Instructions

Caution: Static electricity can damage the adapter



- Do not open the static-protective package containing the adapter until you are prompted to do so.
- Follow strict anti-static handling procedures, failure to do may result in damage to the adapter.

Use must be made of an anti-static station and grounding wrist strap when handling the FDDI adapter.

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2.3 What You Need to Install the Adapter

Cables:

Fiber

- Fiber optic FDDI SAS adapter: One duplex optic fiber patch lead or two optic fiber cables with FDDI ST connectors.
- Fiber optic FDDI DAS adapter: Two duplex optic fiber patch leads or four optic fiber cables with FDDI ST connectors.



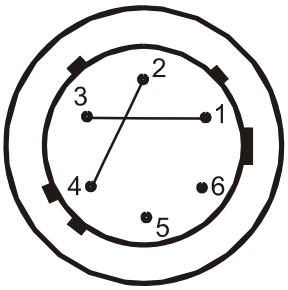
Figure 1 : ST Connector

Copper

- Twisted pair CDDI SAS adapter: One twisted pair patch lead with HR10A connectors. Testing of transceivers will also require one HR10A wrap plug (see Figure 3).
- Twisted pair CDDI DAS adapter: Two twisted pair patch leads with HR10A connectors. Testing of transceivers will also require two HR10A wrap plugs (see Figure 3).



Figure 2 : HR10A Connector



Connector as seen from front (socket) side.

Figure 3 : HR10A Wrap Plug

Note: **These cables are not provided with the adapter. Contact your network administrator for assistance in selecting the correct cable.**

PMC

- A host carrier card equipped with at least one empty PMC expansion slot.

PC/104

- A stable PC/104 system.

Note: **The host carrier card should be correctly configured before you proceed with the adapter installation. Refer to the host carrier cards' installation manual.**

- The Reference Manual shipped with your host carrier card.

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- The Driver Installation Diskette that was delivered with the FDDI adapter (when requested).
- This Installation Guide.
- At least one of the operating systems supported by the host carrier card and the FDDI adapter drivers. For a full listing of OS's and drivers supported please refer to the installation disks and/or the web site located at (http://www.ccii.co.za/).

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3. Installation of the Adapter

3.1 Installation Overview

If you are testing a previously installed adapter, skip to Step 5 on Page 6. The installation of the adapter requires the completion of the following steps:

- Prepare the host processor for installation of a PMC or PC-104 card according to the host processor's installation instructions.
- Install the adapter in the empty expansion slot.
- Reinstall the host carrier card and reconnect the cables.
- Restart and configure the host carrier card.
- Connect loop-back cables / wrap plugs for transceiver tests.
- Test the adapter.
- Attach the adapter to your network.

Each of these steps is described in detail in the sections that follow.

3.2 Step 1. Prepare the Host Carrier Card

Refer to host carrier card's installation manual for gaining access to a spare PMC slot.

Continue with Step 2.

3.3 Step 2. Install the Adapter in an Expansion Slot

Refer to host carrier card's installation manual.

Continue with Step 3.

3.4 Step 3. Reinstall the Host Carrier Card and Reconnect the Cables

Follow the instructions in the section of your equipment's reference manual that describes the computer installation.

To reconnect the cables you have disconnected in Step 1, follow the instructions given in the Safety Information chapter in the beginning of this manual. Do not connect the FDDI / CDDI cables at this time. Leave the computer power OFF, and continue with Step 4.

3.5 Step 4. Restart and Configure the Host Carrier Card

Refer to host carrier card's installation manual.

Continue with Step 5.

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3.6 Step 5. Connect Loop-Back Cables / Wrap Plugs for Transceiver Tests

There are two ways to test the adapter:

- A test with loop-back covering all devices including the transceiver.
- A test without loop-back covering all devices except the transceiver.

If loop-back testing is not required, then continue with Step 6.

Fiber SAS

Connect a ST cable as shown in Figure 4. You may have to remove process plugs from the transceiver if the board is being used for the first time.

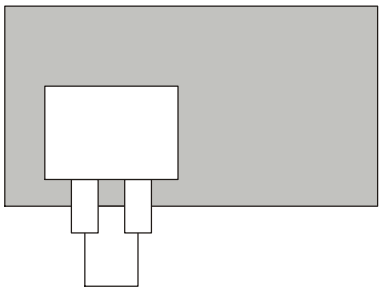


Figure 4 : FDDI SAS Loop-Back

Fiber DAS

Connect two ST cables as shown in Figure 5. You may have to remove process plugs from the transceivers if the board is being used for the first time.

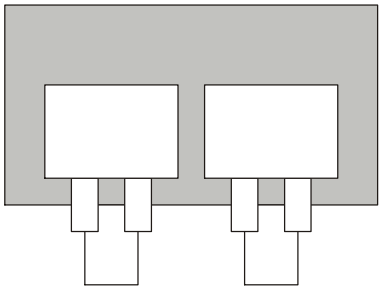


Figure 5 : FDDI DAS Loop-Back

Copper SAS

Connect a single HR10A wrap plug (shown in Figure 3).

Copper DAS

Connect two HR10A wrap plugs (shown in Figure 3).

Continue with Step 6.

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3.7 Step 6. Test the Adapter

The test executable is available for DOS (SKFPDIAG.EXE) and VxWorks (ccFdBit.a).

To run the VxWorks test software, follow the instructions in the *User Manual for the C²I² Systems' PMC FDDI VxWorks BIT Application*, then skip to Step 7.

To test the adapter using DOS, follow these steps:

1. Boot with DOS and wait until the operating system is loaded and the DOS prompt is displayed on the screen. If you are not able to initiate DOS or if the DOS prompt does not appear, check your configuration.

2. Insert the Driver Installation Diskette (that has been delivered with the adapter) in diskette drive A.

3. For PMC adapters, type in

```
cd a:  [Press <Enter>]
SKFPDIAG [Press <Enter>]
```

4. When the Main Menu of the diagnostic program is displayed, select by using the arrow keys to highlight the option and pressing the <Enter> key.

"Diagnostics" if you want to perform the test without loop-back or

"Diagnostics with Loop-back" if you want to perform the test with loop-back

Several tests are performed. This will take 1 to 4 minutes. After all the tests are run, a message is displayed.

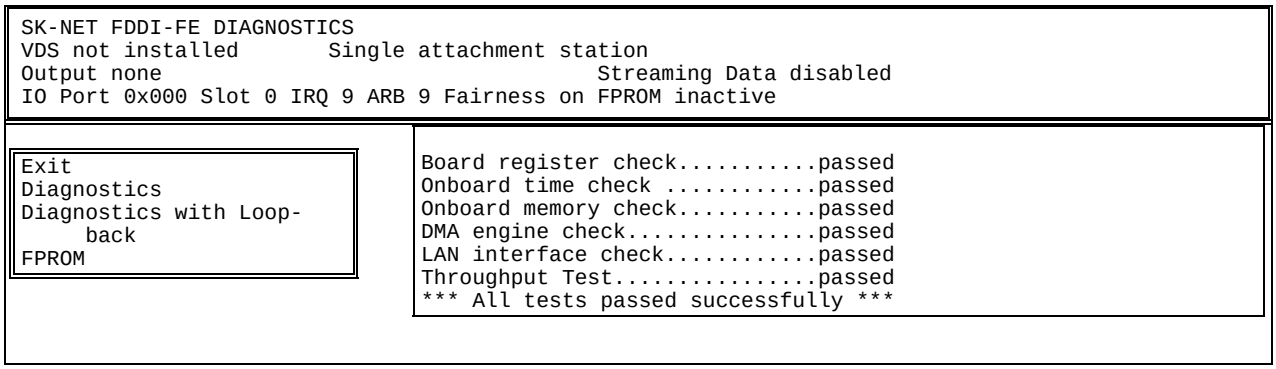


Figure 6 : Typical Message Screen of the Diagnostic Program

If an error occurs, follow the instructions given in the message displayed on the screen. Please check configuration and run the test again.

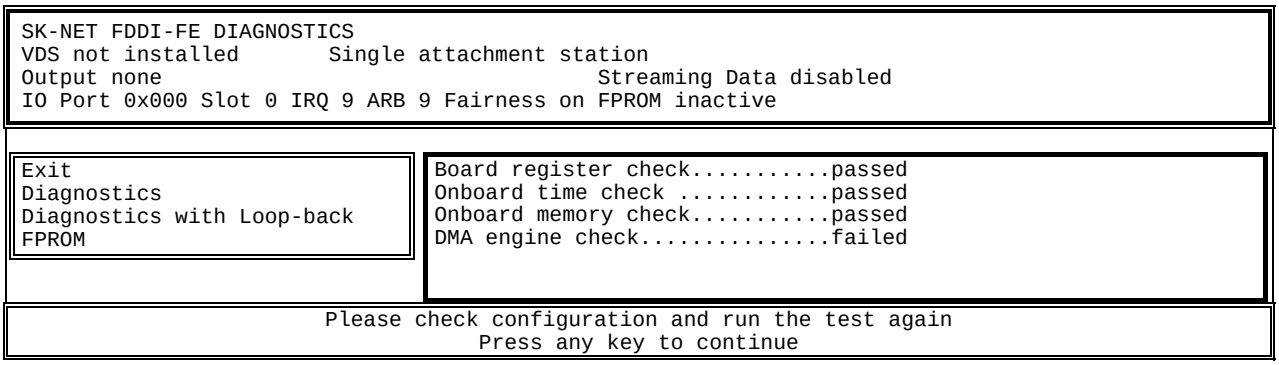


Figure 7 : Typical Error Message Screen of the Diagnostic Program

Press any key to continue.

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If all tests pass, continue with Step 7.

3.7.1 If a Test Fails

If an error message instructs you to reset the adapter, follow the procedure listed below:

1. Turn off the computer.
2. Repeat "Step 1. Remove the Cover from the Computer ".
3. Make sure that the adapter is completely seated. You do not have to remove the adapter. Just lift the adapter so that the adapter connector and the connector on the PMC Host Carrier Card are clear of each other. Press firmly on the adapter until it is seated correctly. Verify that you have followed the instructions for Steps 3 and 4 of Chapter 2.
4. Return to Step 5 of the Installation procedure to repeat the test. If the problem persists, contact C^2I^2 Systems.
5. To quit the Diagnostics Program, select the Exit bar in the Main Menu and press the <Enter> key.
6. If applicable, remove the wrap plug. Reconnect the cable to the network.
7. If you do not intend to connect the system to the FDDI network right now, reinsert the process plug into the optic transceiver. The process plug will protect the optic transceiver from dust accumulation.

Continue with Step 7.

3.8 Step 7. Attach the Adapter to Your Network

The SAS adapter supports single attachment to a concentrator.

The DAS adapter supports either dual attachment to the main ring path or dual homing to one or two FDDI / CDDI concentrators.

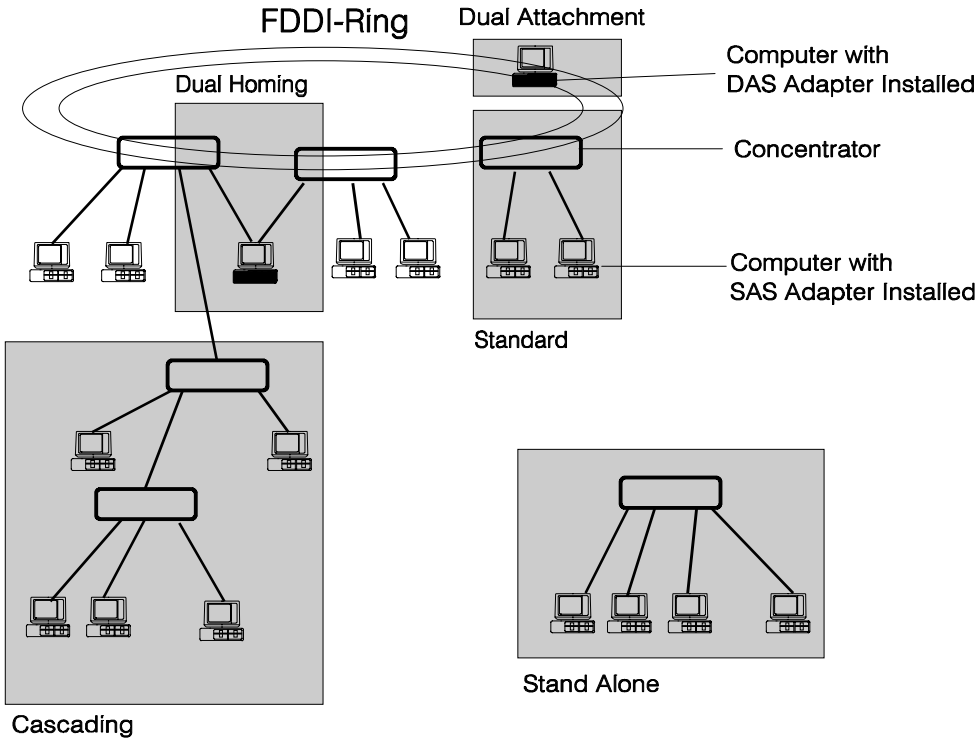


Figure 8 : FDDI Network Topology Options

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3.8.1 Connection Types

There are three basic connection types that can be mixed and matched in the same network.

3.8.1.1 Dual Attachment to the Dual Ring

Class A devices can be connected directly to the FDDI / CDDI dual ring. A device connected to both rings is called 'dual attached'. Since each ring has a transmit and a receive line, there are two transmit paths and two receive paths to the dual attached device (DAS or DAC in Figure 8). Because of the redundant data paths, dual attachment offers fault tolerance.

3.8.1.2 Single Attachment to a Concentrator

Class B devices connect point to point to a concentrator. This connection type is called 'single attached'. For single attached devices, the concentrator acts as the central hub.

When SASs are connected to a single concentrator, the concentrator is said to be non-attached or stand-alone. In this situation, the dual ring is collapsed into the concentrator.

Both SASs and SACs can be single attached.

3.8.1.3 Dual Homing

Dual homing is a connection type for a Class A device where it connects to two different concentrators. The connection to one concentrator is the primary connect and is active; the connection to the other concentrator is for backup purposes and inactive. Since each connection to the concentrator has a send and a receive path, there are two transmit paths out of and two receive paths into the dual homed device. Because of the redundant data paths, dual attachment offers fault tolerance.

Both DASs and DACs can be dual homed.

When concentrators are connected to another concentrators building a tree below the dual ring, it is called 'cascading'. Cascading applies to both single attached and dual homed concentrators off the dual ring.

3.8.2 Port Types (A, B, M and S)

The ports on the various FDDI / CDDI devices are given logical designations. There are four port types in FDDI / CDDI: A, B, M (Master) and S (Slave).

Device Type	Ports (Qty)
DAS	A & B (1 each)
DAC	A & B (1 each) M (1 or more)
SAS	S (1)
SAC	S (1) M (1 or more)
Stand Alone Concentrator	M (multiple)

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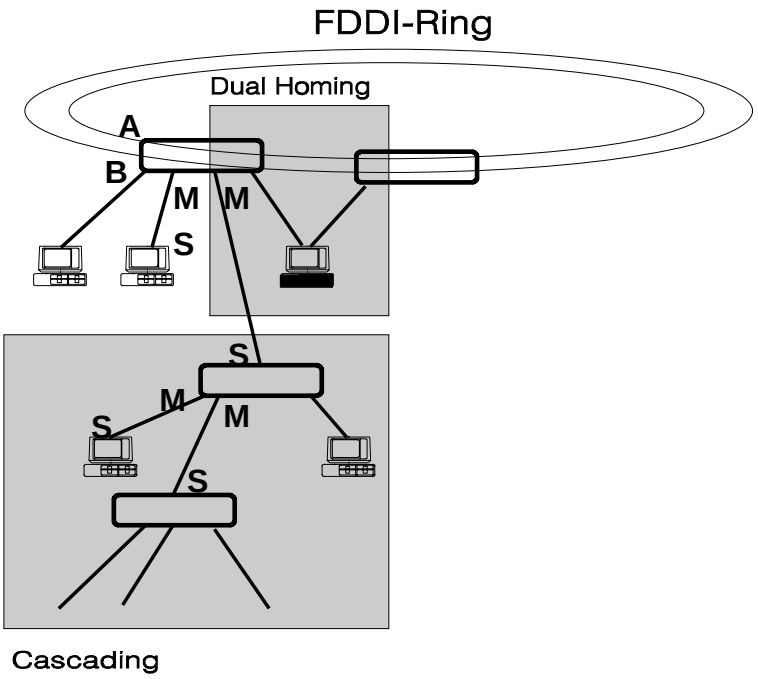


Figure 9 : FDDI Port / Transceiver Types

3.8.2.1 Port Usage in Dual Attached Connection

For a Class A device on the dual ring, the A port connects to the B port of the upstream neighbour and the B port connects to the A port of the downstream neighbour. This 'daisy chaining' of devices continues around the ring.

For dual attached devices on the dual ring, the function of the A and B ports is described in the following table.

Dual Attached Device Port	Function
A	Primary Ring In Secondary Ring Out
B	Primary Ring Out Secondary Ring In

3.8.2.2 Port Usage in Single Attached Connection

In single attached devices, the S (Slave) port connects to an M (Master) port on the concentrator

3.8.2.3 Port Usage in Dual Homed Connection

For dual homed Class A devices, the A port connects to an M port on one concentrator and the B port connects to an M port on another concentrator.

For dual homed devices, the function of the A and B ports is described in the table below.

Dual Homed Device Port	Function
A	Secondary Connection
B	Primary Connection

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3.8.3 Connector Layout

3.8.3.1 PMC FDDI DAS ST

Figure 10 shows the location of network connectors on the PMC FDDI DAS ST, as seen from the component side of the board. Figure 11 shows the connectors as seen from the front.

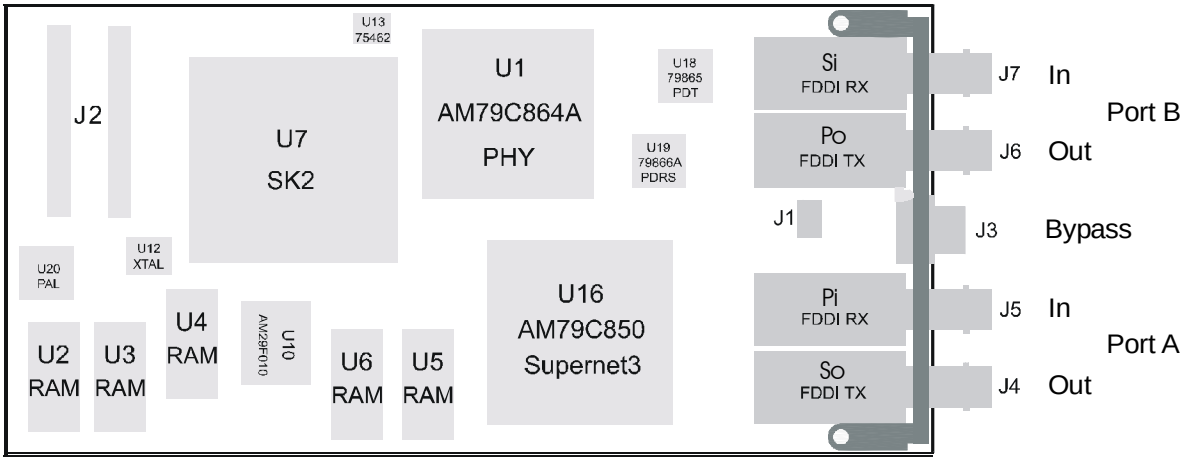


Figure 10 : PMC FDDI DAS ST Connector Locations

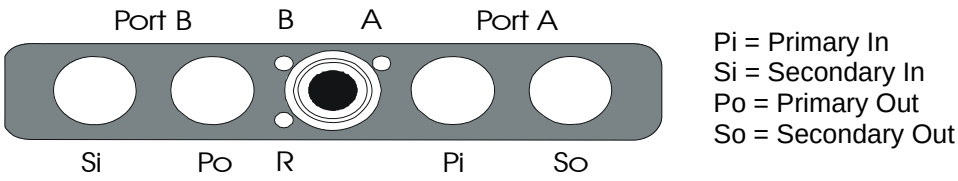


Figure 11 : PMC FDDI DAS ST Front Panel Port Layout

Refer to Appendix B for Optical Bypass Pin-outs.

3.8.3.2 PMC FDDI DAS ST-1

Figure 12 shows the location of network connectors on the PMC FDDI DAS ST-1, as seen from the track side of the board.

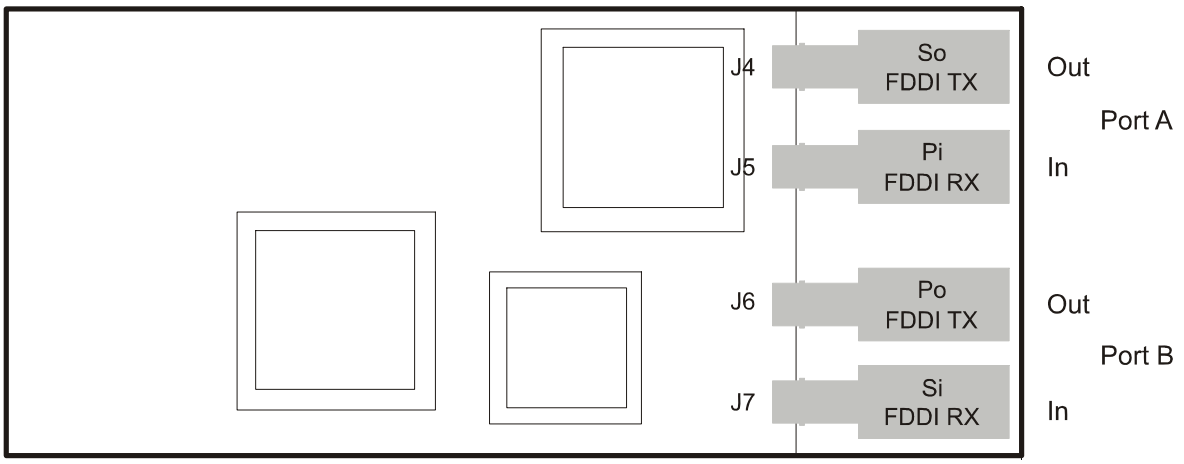


Figure 12 : PMC FDDI DAS ST-1 Connector Layout

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Caution: Power must be off when attaching the FDDI connectors.

- Power must be off as there is a risk of causing a short due to the proximity of the FDDI connector metal shell to the electronics.

3.8.3.3 PMC CDDI DAS HR10

Figure 13 shows the location of network connectors on the PMC CDDI DAS HR10, as seen from the component side of the board. Figure 14 shows the connectors as seen from the front.

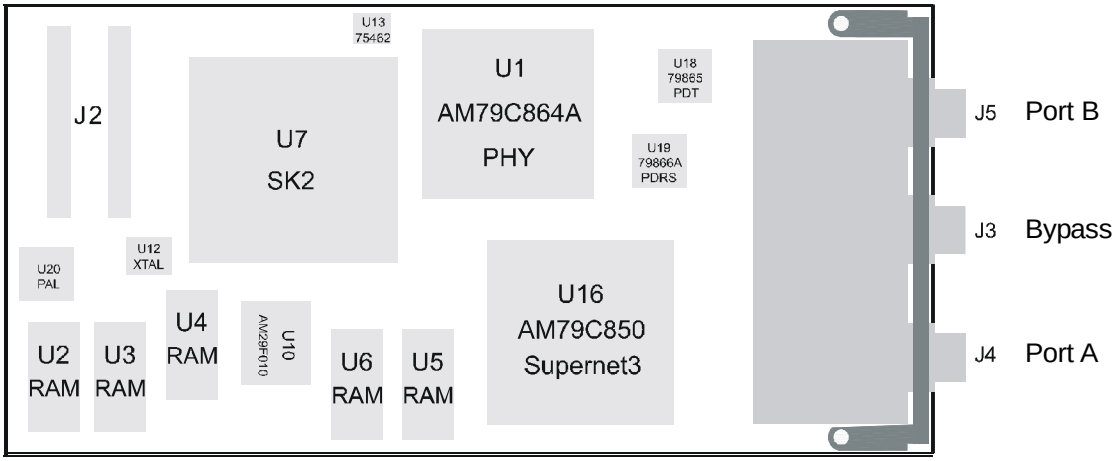


Figure 13 : PMC CDDI DAS HR10 Connector Layout

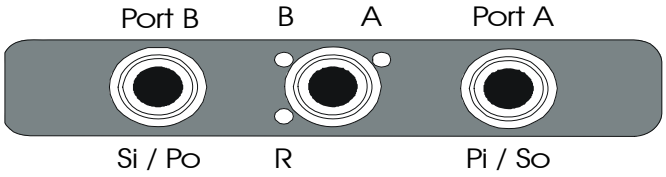


Figure 14 : PMC CDDI DAS HR10 Front Panel Port Layout

Refer to Appendix B for Port and Optical Pin-outs.

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3.8.3.4 PC104

Figure 15 shows the layout of the PC-104 board.

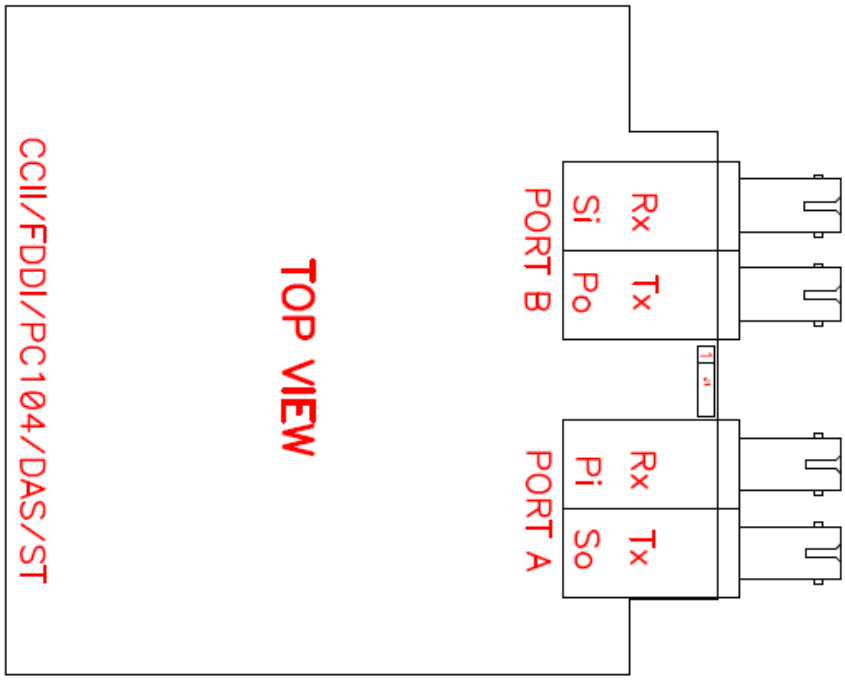


Figure 15 : PC104 Layout

Optical Bypass Switch (OBS)

Connector Pin Assignments

1	OBS Switch
2	OBS Vcc
3	OBS Available
4	GND

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4. Installation of the Protocol Drivers

For the DOS protocol drivers, complete installation instructions are given in readme files on the Installation Diskettes. Look for the .TXT files stored in the sub-directory of the corresponding driver on the Installation Diskettes.

Installation instructions for the VxWorks protocol drivers are in the *User Manual for the C²I² Systems' PMC FDDI 4.3 BSD VxWorks Driver*.

Once the driver is installed and loaded, the adapter is ready for use.

Use the following table to determine the status of your network connection:

Note: With a SAS adapter, the DAS LED does not apply in the following table.

SAS		DAS	Explanation
Green (B)	Yellow (R)	Green (A)	
Off	Off	Off	Driver not loaded, card not operational.
Off	On	Off	Station management code is running, adapter is not connected to the network (for example, cable is disconnected).
On	Off	Off	SAS: adapter is ready for use (connected to network and operational). PMC DAS: adapter active at port B
Off	Off	On	SAS: driver not loaded, card not operational. PMC DAS: adapter active at port A
On	Off	On	Adapter is ready for use (connected to network and operational).

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5. Glossary

For detailed information on acronyms and definitions please refer to the C^2I^2 Systems Web site located at: http://www.ccii.co.za/

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Appendix A

A.1 Data Sheet

Part Numbers	CCII/FDDI/PMC/DAS/ST/COM CCII/FDDI/PMC/DAS/ST/MIL CCII/FDDI/PMC/DAS/ST-1/COM CCII/FDDI/PMC/DAS/ST-1/MIL CCII/CDDI/PMC/DAS/HR10/COM CCII/CDDI/PMC/DAS/HR10/MIL
Bus Interface	32-bit PCI-Bus electrical, complies to PCI Rev 2.1 PMC form-factor, complies to CMC IEEE P1386.1
Network Interface (Fiber)	ANSI X3T9.5 and X3T12 compatible
LAN Controller	AMD Supernet 3
RAM	128 kBytes CMOS static
Flash EPROM	128 kBytes
I/O Addresses	Automatic by PCI V2.1 Plug and Play assigned to the slot
Interrupts	PCI INT A (depending on host carrier card PMC slot)
DMA	Automatic depending on PCI slot
Arbitration Level	---
Timer	3 channels @ 6,25 MHz max.
Dimensions	149 mm x 74 mm x 13,5 mm
Power Requirements	< 1,45 A @ 5 V
Environmental Specifications	-15 C to +75 C (operating) -40 C to +75 C (storage) 95% non-condensing relative humidity Shock 6 g peak amplitude, 11 ms duration, half sine wave pulse
Drivers	Refer to http://www.ccii.co.za/ for driver support.
Supporting Tools	Refer to http://www.ccii.co.za/ for support tools.

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Appendix B

Optical Bypass Switch Receptacle

Pin 1: VCC
Pin 2: VCC
Pin 3: Switch secondary ring
Pin 4: Switch primary ring
Pin 5: Ground
Pin 6: Switch Present

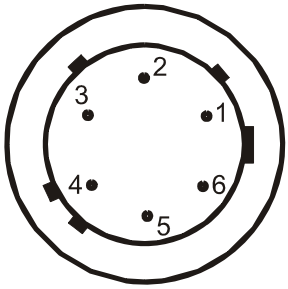


Figure 16 : Optical Bypass Interface

Front-panel CDDI Board Receptacle

Pin 1: TxD+
Pin 2: TxD-
Pin 3: RxD+
Pin 4: RxD-
Pin 5: Not connected
Pin 6: Not connected

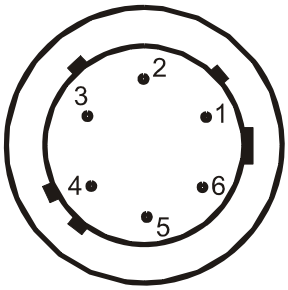


Figure 17 : CDDI Receptacle

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