4I60 ETHERNET INTERFACE MANUAL

VERSION 1.1

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HANDLING PRECAUTIONS

STATIC ELECTRICITY

The CMOS integrated circuits on the 4I60 can be damaged by exposure to electrostatic discharges. The following precautions should be taken when handling the 4I60 to prevent possible damage.

A. Leave the 4I60 in its antistatic bag until needed.

B. All work should be performed at an antistatic workstation.

C. Ground equipment into which 4I60 will be installed.

D. Ground handling personnel with conductive bracelet through 1 megohm resistor to ground.

E. Avoid wearing synthetic fabrics, particularly Nylon.

INTRODUCTION

GENERAL

The 4I60 is a high performance PCI 100BaseT Ethernet card in a PC/104-PLUS form factor. PC/104-PLUS is a new embedded system card format that adds a stackable PCI connector to the PC/104 standard.

The 4I60 is a bus mastering PCI Ethernet card using the Digital Semiconductor 21143 Ethernet chip. The bus mastering architecture of the 21143 minimizes CPU involvement in packet transmission and reception. The large receive and transmit FIFOs permit efficient operation even with high system latencies. The 21143 chip was chosen for its high performance, advanced feature set, and wide range of available drivers.

The 4I60 supports full autonegotiation for automatic selection of all twisted media types. Full duplex operation is supported on 100BaseT and 10BaseT modes. The 4I60 is a universal type PC/104-PLUS card and will work with 3.3V and 5V bus systems. Only 5V power is required by the 4I60 (+12V is used only for the AUI connector) Unused circuitry is powered down when not needed, including the on card DC-DC converter. The 100BaseT interface of the PHY is powered down when using 10BaseT.

All options are software selectable except the PCI slot number. A MII compatible connector is available for use with other media types. A socket for a 32 pin boot ROM of up to 256K bytes is provided. 5V flash ROMs, can be used, simplifying software upgrades. Various 4I60 options are available including a lower cost and lower power 10BaseT only model. A low cost external panel mount transceiver option is available for 10Base2 (BNC) operation.

HARDWARE CONFIGURATION

GENERAL

The 4I60 has only one hardware configuration options, the PCI slot number. The PCI slot number option is selected with shorting jumpers placed on three pin headers. In the following discussions, when the words "up", "down" are used it is assumed that the 4I60 card is oriented with its ISA bus connectors J1 and J2 at the bottom edge of the card (nearest the person doing the configuration). In this position the MESA 4I60 text at the top of the card is right side up**.**

DEFAULT CONFIGURATION

The 4I60 card is configured in the following manner when shipped from the factory.

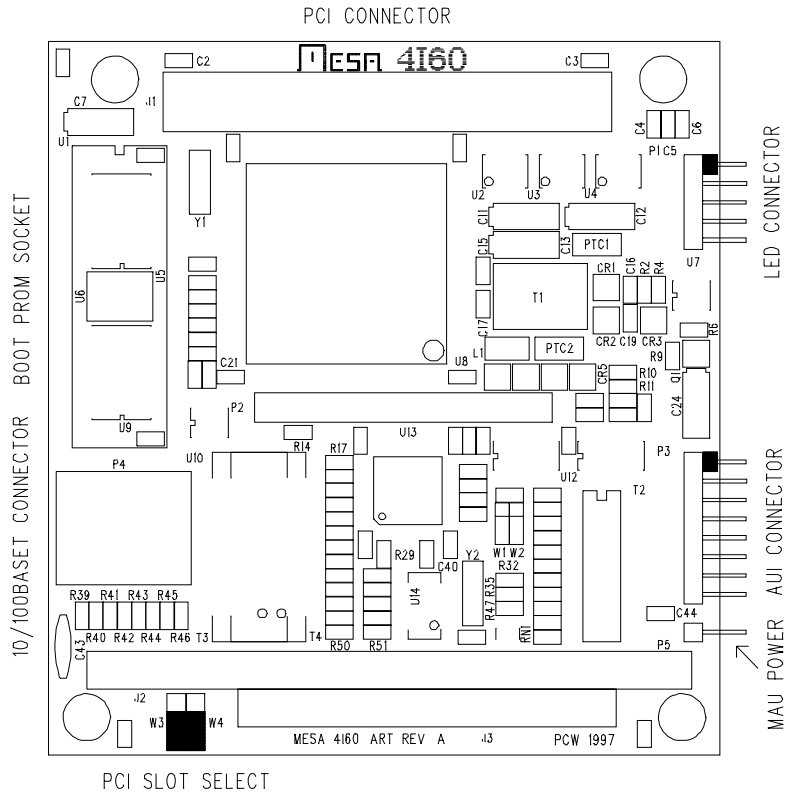| FUNCTION	DEFAULT	JUMPER	POSITION
PCI SLOT SELECT	SLOT	W3/W4	DOWN,DOWN

PC/104-PLUS

The 4I60 is a PC/104-PLUS, PCI only card. This means that even though the PC/104 ISA connector are present, the ISA signals are not used at all on the 4I60. *The 4I60 will only work on PC/104-PLUS CPUs!*

HARDWARE CONFIGURATION

DEFAULT JUMPER SETTINGS

CONNECTOR LOCATIONS

HARDWARE CONFIGURATION

PCI SLOT SELECT

The only hardware selectable option on the 4I60 is the PCI slot number. This is the equivalent to choosing the motherboard slot a standard PCI card is installed into. The slot number also determines the PCI interrupt line driven by the 4I60. Jumpers W3 and W4 determine the PCI slot number: *Each card in the PC/104-PLUS stack must have a different slot number selected.* Some PC/104-PLUS CPUs do not have all 4 slots available for PC/104-PLUS add-in cards. Note that PCI DMA channel 2 is shared by slots 3 and 4. Since the 4I60 is a bus master card it cannot be used in slot 3 if another bus master card is installed in slot 4 and vice versa.

SLOT	DMA	PCI INT	W3	W4
1	REQ0/GNT0	A	DOWN	DOWN
2	REQ1/GNT1	B	DOWN	UP
3	REQ2/GNT2	C	UP	DOWN
4	REQ2/GNT2	D	UP	UP

INTERFACE CONNECTORS

100/10BASET CONNECTOR

The 4I60 may has a 8 pin modular telephone type jack for use with 100/10BaseT twisted pair networks. This connector is marked P4. When twisted pair networks are used, a 100BaseT or 10 BaseT hub must be supplied. You cannot in general simply connect from one interface card to another when twisted pair cable is used.

AUI CONNECTOR

An AUI connector (P3) is provided for connecting to external 10 MBPS transceivers. This connector is a 16 pin header. When a flat cable with a female header at one end, and a female D-SUB connector at the other end is plugged onto the 16 pin header, the D-SUB pinout matches the AUI standard pinout. This flat cable is available from MESA. If you make your own cable, note that pin 16 of the flat cable is not used. The flat cable should be less than one foot long, as it is not a good impedance match to the 78 Ohm twisted pair transceiver cables. 12V power on the AUI connector is directly connected to the PC/104 bus 12V system power. Selection of the AUI interface is a driver option.

EXTERNAL 10BASE2 TRANSCEIVER OPTION

The 4I60 is available with a low cost external 10Base2 transceiver option. This panel mount BNC transceiver allows simple external access to the 10Base2 connector without depending on the PC/104 stack location. This transceiver connects to the 4I60's AUI connector with a 20 pin flat cable and gets its isolated power from the 4I60's DC-DC converter (P5). This flat cable must be 1 foot or shorter in length . When installing the flat cable, make sure that the pin one mark on the cable is aligned with the white dot on connector P3. Selection of the BNC interface is a driver option.

MII CONNECTOR

A 44 pin 2MM connector is provided for connection to a MII paddle board. This connection allows alternate high speed physical media interfaces to be attached to the 4I60. The paddle board adapter is available from MESA.

LED CONNECTOR

P1 is a connector for external status LEDs. It is only functional on the standard 4I60 (not the 4I60-10).

INTERFACE CONNECTORS

AUI CONNECTOR PINOUT:

PIN	FUNCTION	PIN	FUNCTION
1	GND	2	CD-
3	CD+	4	TX-
5	TX+	6	GND
7	GND	8	RX-
9	RX+	10	+12V
11	GND	12	GND
13	NC	14	NC
15	GND	16	NC

LED CONNECTOR PINOUT:

PIN	FUNCTION	PIN	FUNCTION
1	GND	2	GND
3	/SPD LED	4	GND
5	/ACTLED	6	GND
7	/LNKLED	8	GND
9	VCC	10	VCC

INSTALLATION

GENERAL

When the 4I60 has been properly configured for its application, it can be inserted into a PC/104-PLUS stack. The standoffs should then be tightened to secure the 4I60 in its place. When the 4I60 is secured in the stack the I/O connectors can be plugged in from the side.

PC/104-PLUS

Again, the 4I60 is a PC/104-PLUS, PCI only card. This means that even though the PC/104 ISA connector are present, the ISA signals are not used at all on the 4I60. ***The 4I60 will only work on PC/104-PLUS CPUs!***

POWER

The 4I60 gets all of its power from system +5V. +12V power will be required if an external transceiver is used on the AUI connector. This does not apply to the MESA MAU 10Base2 interface which gets its power from a DC-DC converter on the 4I60 card. The 4I60 can be used with 5V and 3.3V PCI bus CPU cards. This voltage selection is automatic.

REFERENCE INFORMATION

SPECIFICATIONS

	MIN	MAX	UNIT	NOTES
POWER SUPPLY				
Voltage	4.5	5.5	V	
4I60 Supply current	----	350	mA	BNC off
4I60 Supply current	----	400	mA	BNC on
4I60-10 Supply current	----	100	mA	BNC off
4I60-10 Supply current	----	250	mA	BNC on
ENVIRONMENTAL:				
Operating temperature range				
-I version	-40	+85	ºC	
-C version	0	+70	ºC	
Relative humidity	0	90	Percent	
				Non-condensing

REFERENCE INFORMATION

WARRANTY

Mesa Electronics warrants the products it manufactures to be free effects in material and workmanship under normal use and service for the period of 2 years from date of purchase. This warranty shall not apply to products which have been subject to misuse, neglect, accident, or abnormal conditions of operation.

In the event of failure of a product covered by this warranty, Mesa Electronics, will repair any product returned to Mesa Electronics within 2 years of original purchase, provided the warrantor's examination discloses to its satisfaction that the product was defective. The warrantor may at its option, replace the product in lieu of repair.

With regard to any product returned within 2 years of purchase, said repairs or replacement will be made without charge. If the failure has been caused by misuse, neglect, accident, or abnormal conditions of operation, repairs will be billed at a nominal cost.

THE FOREGOING WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED. INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTY OF MERCHANTABILITY, FITNESS, OR ADEQUACY FOR ANY PARTICULAR PURPOSE OR USE. MESA ELECTRONICS SHALL NOT BE LIABLE FOR ANY SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, WHETHER IN CONTRACT, TORT, OR OTHERWISE.

If any failure occurs, the following steps should be taken:

1. Notify Mesa Electronics, giving full details of the difficulty. On receipt of this information, service data, or shipping instructions will be forwarded to you.

2. On receipt of the shipping instructions, forward the product, in its original protective packaging, transportation prepaid to Mesa Electronics. Repairs will be made at Mesa Electronics and the product returned transportation prepaid.

REFERENCE INFORMATION

SCHEMATICS