USER'S Manual

MIC-3665A/B

Dual Gigabit Ethernet PMC Function Modules

Advantech CompactPCI™

Modular Industrial Computer

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FCC

This device complies with the requirements in part 15 of the FCC rule：Operation is subject to be following two conditions：

(1）this device may not cause harmful interference

(2）this device must accept any interference received, including interference that may cause undesired operation.

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Product warranty

Advantech warrants to you, the original purchaser, that each of its products will be free from defects in materials and workmanship for one year from the date of purchase.

This warranty does not apply to any products which have been repaired or altered by persons other than repair personnel authorized by Advantech, or which have been subject to misuse, abuse, accident or improper installation. Advantech assumes no liability under the terms of this warranty as a consequence of such events.

Because of Advantech's high quality-control standards and rigorous testing, most of our customers never need to use our repair service. If an Advantech product is defective, it will be repaired or replaced at no charge during the warranty period. For out-of-warranty repairs, you will be billed according to the cost of replacement materials, service time and freight. Please consult your dealer for more details.

If you think you have a defective product, follow these steps:

1. Collect all the information about the problem encountered. For example, CPU speed, Advantech products used, other hardware and software used, etc. Note anything abnormal and list any on-screen messages you get when the problem occurs.
2. Call your dealer and describe the problem. Please have your manual, product, and any helpful information readily available.
3. If your product is diagnosed as defective, obtain an RMA (return merchandise authorization) number from your dealer. This allows us to process your return more quickly.
4. Carefully pack the defective product, a fully-completed Repair and Replacement Order Card and a photocopy proof of purchase date (such as your sales receipt) in a shippable container. A product returned without proof of the purchase date is not eligible for warranty service.
5. Write the RMA number visibly on the outside of the package and ship it prepaid to your dealer.

Packing List

Ensure that the following materials have been received, immediately after opening the box containing your MIC-3665 card:

- One MIC-3665 Dual Gigabit Ethernet PMC card
- One CD-ROM disc containing device drivers
- One warranty certificate
- This user's manual

If any of these items are missing or damaged, contact your distributor or sales representative immediately.

Technical Support and Sales Assistance

If you have a technical question, please visit Advantech's support website, located at: **http://support.advantech.com.tw**. For more information about Advantech's products and sales service, please visit our homepage located at:

http://www.advantech.com.tw

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Introduction

1.1 Description

The MIC-3665 provides dual high performance Gigabit Ethernet interface controller port on a single-wide PMC module. Both RJ-45 and fiber interfaces are available on different modules. The RJ-45 Ethernet network interface complies with the IEEE 802.3 for 10BaseT and 100BaseTx, and IEEE 802.3ab for 1000BaseT over category 5 twisted pair cable. Both full duplex and half duplex modes are available. The MIC-3665 eliminates machine bottlenecks and allows easy migration from existing Category-5 networks to Gigabit Ethernet. Featuring cost-effective and flexible auto-negotiating 10/100/1000 Mbps performance, the MIC-3665 is designed to automatically scale with growing networks. Another choice is Fiber SFP LC Interface based on IEEE 802.3z for 1000Base-X which provides dual integrated low powered MAC/SERDES functionality. The MIC-3665 fiber module alleviates bottlenecks and increases uptime with Gigabit performance in multi-mode fiber-optic networks. The fiber module also delivers high throughput while conserving CPU resources. The MIC-3665 is able to cache up to 64 packet descriptors in a single burst for efficient PCI bandwidth use. A large 64 Kbytes on–chip buffer maintains superior performance as available PCI bandwidth changes. Programmable host memory receiving buffers (256 Bytes to 16 Kbytes) and cache line size (16 Bytes to 256 Bytes) enable efficient use of PCI bandwidth as well, allowing back-to-back transmission with minimum interface latency. It also features a 100BaseTX and 1000BaseT auto-detection CSMA/CD interface controller. It supports a number of sophisticated features, including auto-negotiation, collision detection, link detection, I/O is via one front panel RJ-45 connector. The module is compliant with standard single-wide PMC IEEE P1386.1 and PCI 2.3 specifications.

1.2 Features

•High performance wire speed, each port 1.9 Gb sustained raw throughput over 133/100/66 PCI-X
•One adapter for all common platforms with driver support for Linux and Windows
•Supports 33/66 MHz, 32/64 bit PCI interfaces and 100/133 MHz PCI-X
•Installs in any PCI-capable CompactPCI system with a vacant PMC Mezzanine slot (PMC card)
•Utilizes 3.3 volt power supply and contains onboard power regulators
•Full duplex Gigabit Ethernet Interface over standard CAT-5/CAT-5e cabling
•Complies with all PCI revision 2.3 mechanical and electrical requirements
•Fully IEEE 802.3u, IEEE 802.3ab, 802.3z and IEEE 1386 compliant
•Compatible with all 10/100/1000Base-T/TX hubs, switches and routers
•Link quality monitor evaluates and adjusts to actual line conditions by managing echo and cross-talk cancellation, equalization, timing and skew compensation
•Automatic gain control maximizes signal strength
•Burst rate of up to 256 dwords (1024 bytes) over PCI bus
•Optional jumbo packets, 802.3x full-duplex flow control with automatic pause, 802.1D and 802.1Q priority with multiple priority queues
•10BaseT/100BaseTX/1000BaseT Ethernet port using front panel RJ-45 connector
•1000Base-X Fiber LC interface, single front panel SFP connector
•Single-wide 32/64 bit PMC module
•LED indicators for speed (10/100/1000) and link/activity
•Auto-negotiating protocol selection
•Transmit and receive FIFOs
•Drivers for VxWorks, NetWare (5.1/6.0/6.5), DOS, Novell ODI, OS/2, Linux (kernel 2.4), FreeBSD (Kernel 4.7), Windows® 95/98/NT/2000/XP/2003 (Professional/Server, 32/64 Bit) available

1.3 Specifications

• IEEE 802.3/802.3u 10Base-T/100Base-TX compatible

• IEEE 802.3ab 1000Base-T compatible

• IEEE 802.3z 1000Base-X (1000Base-SX, 1000base-LX) compatible*.

• CompactPCI Mezzanine Specification Revision 1.0

• Complies with PCI Bus Specification 2.3

• **RJ-45 connector:** The RJ-45 connector can use IEEE 802.3 10 Base-T compliant Category 3, 4, or 5 cables. It can only use a Category 5 UTP cable for 100Mbps /1Gbps operation. Select a high-quality brand of Category 5 cable from your local supplier. The maximum length of the cable is 100 meters

• **Fiber SFP (Small Form Factor) connector:** Supports 802.3z (1000Base-X) Fiber transceivers. Both single mode and multimode (1000Base-SX, 1000Base-LX) are supported.

• **Controller chip:** Intel 82546GB

• **Driver support:** VxWorks, NetWare (5.1/6.0/6.5), DOS, Novell ODI, OS/2, Linux (kernel 2.4), FreeBSD (Kernel 4.7), Windows® 95/98/NT/2000/XP/2003 (Professional/Server, 32/64 Bit)

• **Power consumption:** +3.3 V @ 1.0 A (max.)

● **Operating temperature:** 0 ~ 60° C (32 ~ 140° F)

● **Storage temperature:** -20 ~ 70° C (-4 ~ 158° F)

● **Dimensions:** 51 mm x 100 mm (2.0" x 3.9")

● **Weight:** 0.2 kg (0.44 lb)

● **Emissions:** CE mark to CISPR 11 Class A; FCC Class A.

*Agilent® HFBR-57M5AP (1000Base-SX multimode 850nm module) is fully tested, and is suggested for multimode usage.

1.4 Safety Precautions

Follow these simple precautions to protect yourself from harm and your system from damage.

1. To avoid electric shock, always disconnect the power from your system chassis before you work on it. Don't touch any components on the card or other cards while the system is on.
2. Disconnect power before making any configuration changes. The sudden rush of power as you connect a jumper or install a card may damage sensitive electronic components.
3. Always ground yourself to remove any static charge before you touch your CPU card. Be particularly careful not to touch the chip connectors. Modern integrated electronic devices, especially CPUs and memory chips, are extremely sensitive to static electric discharges and fields. Keep the card in its antistatic packaging when it is not installed in the PC, and place it on a static dissipative mat when you are working with it. Wear a grounding wrist strap for continuous protection.

2

Hardware and Drivers Installation

2.1 Initial Inspection

We carefully inspected the MIC-3665 mechanically and electronically before we shipped it. It should be free of marks and scratches and in perfect working order on receipt. As you unpack the MIC-3665, check it for signs of shipping damage (damaged box, scratches, dents, etc.). If it is damaged or fails to meet specifications, notify our service department or your local sales representative immediately. Also notify the carrier that was used to ship the product to your location from our factory or distributor. Retain the shipping carton and packing material for inspection by the carrier. We will make arrangements to repair or replace the unit after an inspection. When you handle the MIC-3665, remove it from its protective packaging by grasping the front metal panel. Keep the anti-vibration packing. Whenever you remove the card from the PC, store it in this package for protection.

Warning! Discharge your body's static electric charge by touching the back of the grounded chassis of the system unit (metal) before handling the board. You should avoid contact with materials that hold a static charge such as plastic, vinyl and Styrofoam. Handle the board only by its edges to avoid static damage to its integrated circuits. Avoid touching the exposed circuit connectors.

2.2 MIC-3665 Connector Locations

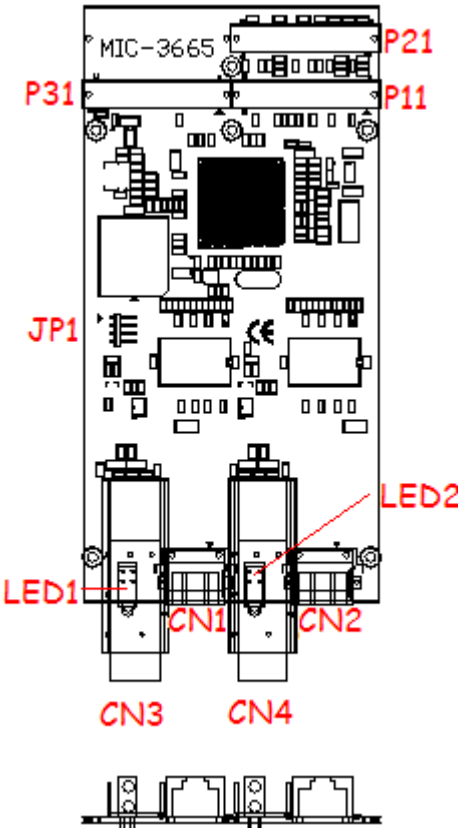


Figure 2-1: MIC-3665 connector locations

- P11/P21/P31: CompactPCI PMC connector
- CN1/CN2: RJ-45 10/100/1000Base-T/TX connector
- CN3/CN4: Fiber LC Interface 1000Base-X connector
- LED1/LED2: LED Activity/Speed (for RJ-45)
- JP1: Pin connector for LED Activity (for Fiber)

2.3 Card Installation

The MIC-3665 is a PCI bus master PMC module. It can be installed only in a CompactPCI™ board which supports PMC interface. Improper installation of a card can easily damage the backplane of the chassis. The MIC-3665 install guide helps you to install and remove the module easily and safely. Follow the procedure below to install the MIC-3665 into a PMC carrier:

To install a card:

1. Shut off the system power
2. Connect the MIC-3665 to the CPU's PCI mezzanine connector and attach it with the four screws.
3. Connect the Ethernet Category 5 cable to the RJ-45 connector (or LC cable to the

Fiber LC Interface) on the front plate.

4. Power up the system

5. Configure your system using the network driver appropriate to your operating system.

2.4 Cable connecting info

2.4.1 Fiber cabling:

Insert the fiber optic cable into the LC type connector so that the self-locking tab clicks into position. Connect the opposite end to a 1000Base-SX switch. Ensure that the TX port of the adapter is connected to the RX port of the switch, and RX to the TX, check the red light from RX port. The maximum length is typical:

Table 2-1: Gigabit Ethernet physical media support

Fiber Core Diameter	Type	Fiber Bandwidth Mhz* km	Distance
62.5/125 um	multi-mode*	160 Mhz * km	2 to 220 m
62.5/125 um	multi-mode	200 Mhz * km	2 to 275 m
50.0/125 um	multi-mode	400 Mhz * km	2 to 500 m
50.0/125 um	multi-mode	500 Mhz * km	2 to 550 m
8.0/125 um	single-mode	500 Mhz * km	5-10 km

* (850 nm Laser for multimode-SX, 1310nm laser for single-mode-LX)

2.4.2 RJ-45 cabling:

Insert the fiber optic cable into the RJ-45 connector so that the self-locking tab clicks into position. The maximum cable length is typically 100 meters.

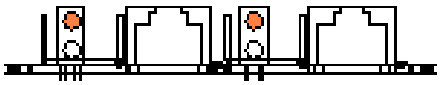
2.5 Front Panel LED Indicators

There are two diagnostic LEDs on the front panel. These LEDs show the operating status of the MIC-3665.

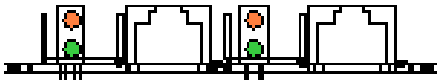
Table 2-2: LED Indicator definitions

	ON	**OFF**
LINK/ ACTIVITY	The link between the hub/switch and adapter is active LED blinks during data transmission	No link between the hub/switch and adapter
SPEED*	RED for 1000Base-T Green for 100Base-TX	Operating in 10Base-T

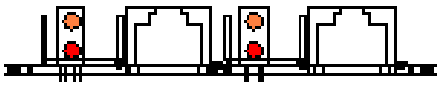
* MIC-3665 Fiber has no “speed” LEDs (only in 1000Base-X)



10Base-T



100Base-TX



1000Base-T

Figure 2-2: MIC-3665 front panel LEDs.

2.6 Drivers/Utilities Installation

The MIC-3665 supports PCI Plug and Play. The BIOS automatically detects the MIC-3665 while booting, and assigns an IRQ level and I/O address. No jumper or switch is required for user configuration. The MIC-3665 uses one Intel 82546GB Gigabit Ethernet controller chip. Thus it is software compatible with Intel's PROSet utility.

- \Intel Ethernet family\Dos: DOS, OS/2, ODI
- \Intel Ethernet family\WinNT: Windows NT 4.0
- \Intel Ethernet family\W98SE: Windows 98 SE/ME
- \Intel Ethernet family\W2k: Windows 2000/XP/2003
- \Intel Ethernet family\W2k3_64: Windows Server 2003 (64Bit Itanium only)
- \Intel Ethernet family\WinNTE: Windows NT Embedded 4.0
- \Intel Ethernet family\WinXPE: Windows XP Embedded
- \Intel Ethernet family\Linux: Linux 2.2.x, 2.4.x, 2.6.x 32/64 Bit
- \Intel Ethernet family\FreeBSD: Kernel 4.5+
- \Intel Ethernet family\Netware: Novell Netware 4.x, 5.1+
- \Intel Ethernet family\Solaris: Solaris 7, 8

*The latest drivers can also be found in Intel’s website
http://developer.intel.com/design/network/drivers/

A

Pin Assignments

APPENDIX

1. RJ-45 pin assignments

The RJ-45 media connector on your card or hub/switch has specific leads that correspond to each of the eight pins on the RJ-45 jack. This cable is responsible for the transmission and reception of all data over the network. Refer to the table and diagram below for the pin assignments.

Table A-1: MIC-3665 RJ-45 pin assignments

Pin Signal Description		
Pin	**1000Base-T**	**100Base-TX, 10Base-T**
1	MDIA[0] +	TX+
2	MDIA[0] -	TX-
3	MDIA[1] +	RX+
6	MDIA[1] -	RX-
4	MDIA[2] +	Reserved
5	MDIA[2] -	Reserved
7	MDIA[3] +	Reserved
8	MDIA[3] +	Reserved

2. PMC pin assignments

Table A-2: MIC-3665 PMC pin assignments

P11 32-bit PCI					
1	NC	TCK	-12V	NC	2
3		GND	INITA#		4
5		INTB#	INTC#	NC	6
7	NC	BUSMODE1#	+5V		8
9	NC	INTD#	PCI-RSVD	NC	10
11		GND	PCI-RSVD	NC	12
13		CLK	GND		14
15		GND	GNT#		16
17		REQ#	+5V		18
19	NC	VIO	AD[31]		20
21		AD[28]	AD[27]		22
23		AD[25]	GND		24
25		GND	C/BE[3]#		26
27		AD[22]	AD[21]		28
29		AD[19]	+5V		30
31	NC	VIO	AD[17]		32
33		FRAME#	GND		34
35		GND	IRDY#		36
37		DEVSEL#	+5V		38
39	NC	GND/PCIXCAP	LOCK#		40
41	NC	SDONE#	SBO#		42
43		PAR	GND		44
45	NC	VIO	AD[15]		46
47		AD[12]	AD[11]		48
49		AD[09]	+5V		50
51		GND	C/BE[0]#		52
53		AD[06]	AD[05]		54
55		AD[04]	GND		56
57	NC	VIO	AD[03]		58
59		AD[02]	AD[01]		60
61		AD[00]	+5V		62
63		GND	REQ64#		64

P21 32-bit PCI					
1	NC	+12V	TRST#	NC	2
3	NC	TMS	TDO	NC	4
5	NC	TDI	GND		6
7		GND	PCI-RSVD	NC	8
9	NC	PCI-RSVD	PCI-RSVD	NC	10
11	NC	BUSMODE2#	+3.3V		12
13		RST#	BUSMODE3#	NC	14
15		3.3V	BUSMODE4#	NC	16
17	NC	PCI-RSVD	GND		18
19		AD[30]	AD[29]		20
21		GND	AD[26]		22
23		AD[24]	3.3V		24
25		IDSEL	AD[23]		26
27		+3.3V	AD[20]		28
29		AD[18]	GND		30
31		AD[16]	C/BE[2]#		32
33		GND	PMC-RSVD	NC	34
35		TRDY#	+3.3V		36
37		GND	STOP#		38
39		PERR#	GND		40
41		+3.3V	SERR#		42
43		C/BE[1]#	GND		44
45		AD[14]	AD[13]		46
47		M66EN	AD[10]		48
49		AD[08]	3.3V		50
51		AD[07]	PMC-RSVD	NC	52
53		+3.3V	PMC-RSVD	NC	54
55	NC	PMC-RSVD	GND		56
57	NC	PMC-RSVD	PMC-RSVD	NC	58
59		GND	PMC-RSVD	NC	60
61		ACK64#	+3.3V		62
63		GND	PMC-RSVD	NC	64

P31 32-bit					
1	NC	PCI-RSVD	GND		2
3		GND	C/BE[7]#		4
5		C/BE[6]#	C/BE[5]#		6
7		C/BE[4]#	GND		8
9	NC	VIO	PAR64		10
11		AD[63]	AD[62]		12
13		AD[61]	GND		14
15		GND	AD[60]		16
17		AD[59]	AD[58]		18
19		AD[57]	GND		20
21	NC	VIO	AD[56]		22
23		AD[55]	AD[54]		24
25		AD[53]	GND		26
27		GND	AD[52]		28
29		AD[51]	AD[50]		30
31		AD[49]	GND		32
33		GND	AD[48]		34
35		AD[47]	AD[46]		36
37		AD[45]	GND		38
39	NC	VIO	AD[44]		40
41		AD[43]	AD[42]		42
43		AD[41]	GND		44
45		GND	AD[40]		46
47		AD[39]	AD[38]		48
49		AD[37]	GND		50
51		GND	AD[36]		52
53		AD[35]	AD[34]		54
55		AD[33]	GND		56
57	NC	VIO	AD[32]		58
59	NC	PCI-RSVD	PCI-RSVD	NC	60
61	NC	PCI-RSVD	GND		62
63		GND	PCI-RSVD	NC	64