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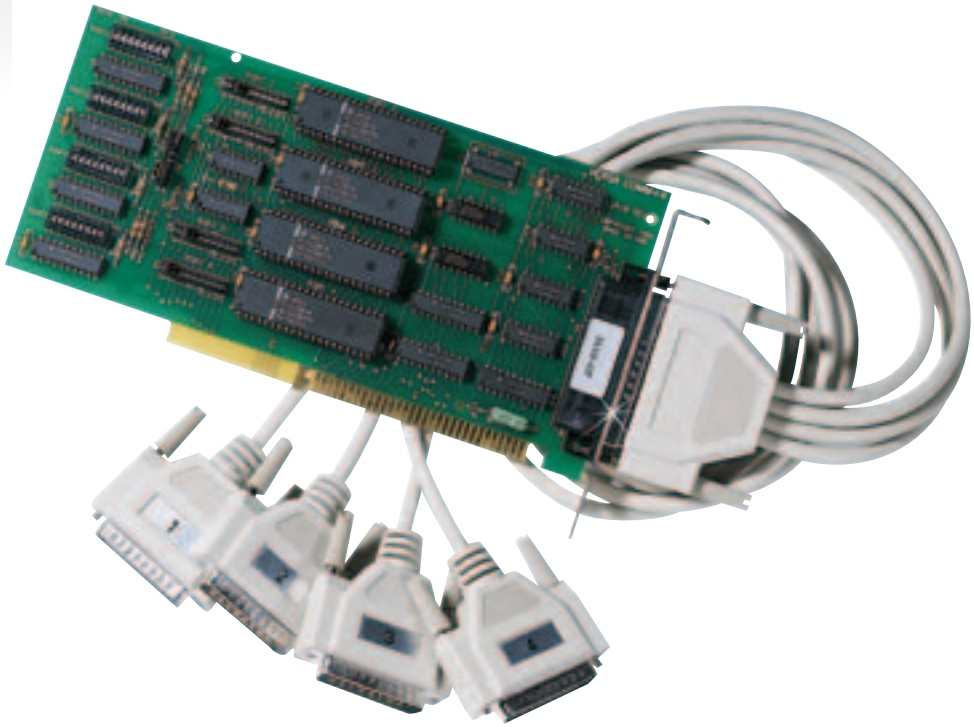
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User's Guide

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OMG-VERSA-COMM4

Four Port ISA RS-232 Interface Board with Extended "AT" Interrupts

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WARNING: These products are not designed for use in, and should not be used for, patient-connected applications.

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Introduction

Overview

The **OMG-VERSA-COMM4** provides the PC with four RS-232 asynchronous ports. The **OMG-VERSA-COMM4** allows for connection to any device utilizing the RS-232 electrical interface, such as modems, data-entry terminals, and plotters.

What's Included

The **OMG-VERSA-COMM4** is shipped with the following items. If any of these items are missing or damaged, contact the supplier.

- **OMG-VERSA-COMM4** Serial I/O Adapter
- "Spider" Cable providing 4 DB-25 connectors.
- Software

Factory Default Settings

The **OMG-VERSA-COMM4** factory default settings are as follows:

Port #	Base Address	IRQ
Port 1	3F8	4
Port 2	2F8	3
Port 3	3E8	4
Port 4	2E8	3

To install the **OMG-VERSA-COMM4** using factory default settings, refer to the Installation section of this manual.

For your reference, record installed **OMG-VERSA-COMM4** settings below:

Port #	Base Address	IRQ
Port 1		
Port 2		
Port 3		
Port 4		

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Card Setup

The **OMG-VERSA-COMM4** contains several jumper straps which must be set for proper operation.

Address Selection

Each port on the **OMG-VERSA-COMM4** occupies 8 consecutive I/O locations. A DIP-switch is used to set the base address for these locations. Be careful when selecting the base address as some selections conflict with existing ports. The following table shows several examples that typically do not cause a conflict. SW4 sets the I/O address for port 1, SW3 sets the address for port 2, SW2 sets the address for port 3 and SW1 sets the address for port 4.

Address	Binary	Switch Position Setting						
Hex	A9 A0	1	2	3	4	5	6	7
280-287	1010000XXX	Off	On	Off	On	On	On	On
2A0-2A7	1010100XXX	Off	On	Off	On	Off	On	On
2E8-2EF	1011101XXX	Off	On	Off	Off	Off	On	Off
2F8-2FF	1011111XXX	Off	On	Off	Off	Off	Off	Off
3E8-3EF	1111101XXX	Off	Off	Off	Off	Off	On	Off
300-307	1100000XXX	Off	Off	On	On	On	On	On
328-32F	1100101XXX	Off	Off	On	On	Off	On	Off
3F8-3FF	1111111XXX	Off	Off	Off	Off	Off	Off	Off

Figure 1 - Address Selection Table

The following illustration shows the correlation between the DIP-switch setting and the address bits used to determine the base address. In the example below, address 300 is selected as a base. Address 300 in binary is XX11 0000 0XXX where X = a non-selectable address bit.

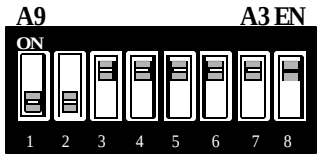


Figure 2 - DIP-Switch Illustration

Note: Setting the switch "On" or "Closed" corresponds to a "0" in the address, while leaving it "Off" or "Open" corresponds to a "1".

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Refer to Appendix A for common address contentions.

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Port Enable / Disable

Each port on the **OMG-VERSA-COMM4** can be enabled or disabled with switch position 8 on the DIP-switch. The port is enabled with the switch "On" or "Closed" and disabled when "Off" or "Open". If any port is disabled, be sure to disable the interrupt request for that port by removing the IRQ jumper.

IRQ Selection

Headers E1, E2, E3 and E4 select the IRQ for each serial port. If COM1: is selected, this jumper must be on the IRQ4 setting. If COM2: is selected, this jumper must be on IRQ3.

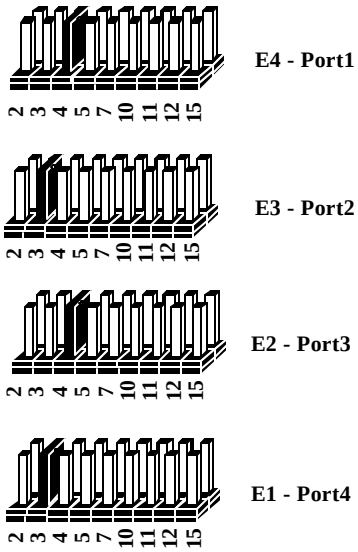


Figure 3 - Headers E1, E2, E3, and E4 (Factory Default)

Note: Most communications software applications default COM3: to IRQ4 and COM4: to IRQ3. This requires the sharing of interrupts between COM1: and COM3:, and between COM2: and COM4:. While this is the default, it is not always the preferred setting. Check your software configuration instructions to determine the most appropriate IRQ selection.

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Interrupt Mode Options

Header E5 selects the interrupt mode for each port. Each port must be set in the correct mode to insure proper installation.

"**N**" indicates the (**N**)ormal, single interrupt per port mode. "**S**" Indicates the (**S**)hared interrupt mode, which allows more than one port to access a single IRQ. Any two or more ports can share a common IRQ by placing the jumpers on the same IRQ setting, and setting the appropriate selections at E5. Consult your particular software for IRQ selection. If no interrupt is desired, remove the jumper. "**M**" indicates the inclusion of a 1K ohm pull-down resistor required on one port when sharing interrupts.

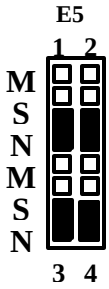


Figure 4 - Header E5, Normal IRQ Mode

Set jumpers to "**S**" for shared interrupt mode on all blocks sharing an IRQ except one. Set that port block for '**M**". This provides the pull-down resistor circuit that makes sharing of IRQs possible. If you are using more than one **OMG-VERSA-COMM4** or a compatible card in a bus you should only have one port set to "**M**". The following example shows all four ports sharing a single IRQ.

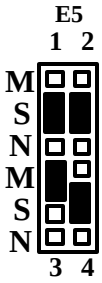


Figure 5 - Header E5, Shared IRQ Mode

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Set jumper to "**S**" if you are using more than one **OMG-VERSA-COMM4** in a bus or you wish to completely remove the pull-down resistor for hardware compatibility. **Setting the board in this configuration when it is not accompanied by a pull-down resistor wi ll prevent the ports from triggering an interrupt**..



Figure 6 - Header E5, Sharing IRQ's with another adapter

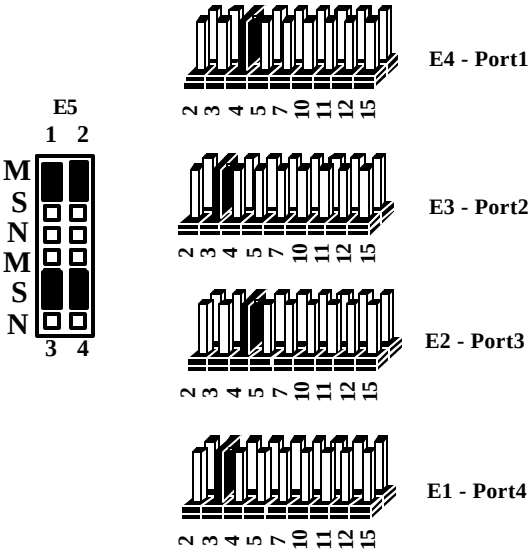


Figure 7 - IRQ Headers E1 - E5 (Factory Default)

The above example shows the correlation between jumper block E5 and the interrupt jumpers (E1-E4). This example shows the **OMG-VERSA-COMM4** shipping configuration with COM1: & COM3: sharing interrupt 4 and COM2: & COM4: sharing interrupt 3.

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Installation

The **OMG-VERSA-COMM4** can be installed in any of the PC expansion slots, but to access the "AT" or (E)ISA IRQ's (10, 11, 12, 15) it must be installed in one of the 16 bit slots. The **OMG-VERSA-COMM4** contains several jumper straps for each port which must be set for proper operation prior to installing the card into the computer.

1. Turn off PC power. Disconnect the power cord.
2. Remove the PC case cover.
3. Locate an available slot and remove the blank metal slot cover.
4. Gently insert the **OMG-VERSA-COMM4** into the slot. Make sure that the adapter is seated properly.
5. Replace the screw.
6. Install the "Spider" Cable
7. Replace the cover.
8. Connect the power cord.

Installation is complete.

Operating System Installation

For Windows Users

Start by choosing **Install Software at the beginning of the CD. Choose Asynchronous COM: Port Software, SeaCOM.**

Other Operating Systems

Refer to the appropriate section of the Serial Utilities Software.

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Technical Description

The **OMG-VERSA-COMM4** provides 4 additional serial ports for terminals, modems, printers, etc. The **OMG-VERSA-COMM4** can be configured as COM1: through COM4:, or as any other I/O address (up to 3FF HEX), providing total compatibility with most communications software and languages. The **OMG-VERSA-COMM4** utilizes the 16550 UART chip. This chip features programmable baud rate, data format, interrupt control and a 16 byte fifo.

Features

- Provides a COM1: through COM4: Turnkey Solution
- Four RS-232 Ports with full modem control signals
- Individually Selectable Addresses
- Selectable/Sharable Interrupts (IRQ's 2(9)-7,10,11,12,& 15)
- 4 DB-25 male connectors provided using the "Spider Cable"

Modem Control Signal Considerations

Some software packages require the use of the modem handshake signals such as CTS or DCD. Refer to your application software manual to determine the requirements for modem control signals. If no requirements are mentioned, a safe configuration is to tie DTR to DSR and DCD, and tie RTS to CTS. This configuration will typically satisfy the modem control signal requirements for most communications software.

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Connector Pin Assignments

RS-232

Signal	Name	Pin #	Mode
GND	Ground	7	
TD	Transmit Data	2	Output
RTS	Request To Send	4	Output
DTR	Data Terminal Ready	20	Output
RD	Receive Data	3	Input
CTS	Clear To Send	5	Input
DSR	Data Set Ready	6	Input
DCD	Data Carrier Detect	8	Input
RI	Ring Indicator	22	Input

Figure 8 - Connector Pin Assignments

Technical Note: Please terminate any control signals that are not going to be used. The most common way to do this is connect RTS to CTS and RI. Also, connect DCD to DTR and DSR. Terminating these pins, if not used, will help insure you get the best performance from your adapter.

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Specifications

Environmental Specifications

Specification	Operating	Storage
Temperature Range	0º to 50º C (32º to 122º F)	-20º to 70º C (-4º to 158º F)
Humidity Range	10 to 90% R.H. Non-Condensing	10 to 90% R.H. Non-Condensing

Manufacturing

- IPC 610-A Class-III standards are adhered to with a 0.1 visual A.Q.L. and 100% Functional Testing.
- All Printed Circuit boards are built to U.L. 94V0 rating and are 100% electrically tested. These printed circuit boards are solder mask over bare copper or solder mask over tin nickel.

Power Consumption

Supply line	+12 VDC	-12 VDC	+5 VDC
Rating	50 mA	50 mA	200 mA

Mean Time Between Failures (MTBF)

Greater than 150,000 hours. (Calculated)

Physical Dimensions

Board length	8.6 inches	(21.84 cm)
Board Height including Goldfingers	4.2 inches	(10.66 cm)
Board Height excluding Goldfingers	3.9 inches	(9.91 cm)

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Appendix A - Troubleshooting

A Serial Utility Diskette is supplied with the adapter and will be used in the troubleshooting procedures. By using this diskette and following these simple steps, most common problems can be eliminated without the need to call Technical Support.

1. Identify all I/O adapters currently installed in your system. This includes your on-board serial ports, controller cards, sound cards etc. The I/O addresses used by these adapters, as well as the IRQ (if any) should be identified.

2. Configure your adapter so that there is no conflict with currently installed adapters. No two adapters can occupy the same I/O address.

3. Make sure the adapter is using a unique IRQ. While the adapter does allow the sharing of IRQ's, many other adapters (i.e. SCSI adapters & on-board serial ports) do not. The IRQ is typically selected via an on-board header block. Refer to the section on Card Setup for help in choosing an I/O address and IRQ.

4. Make sure the adapter is securely installed in a motherboard slot.

5. Use the supplied diskette and User Manual to verify that the adapter is configured correctly. The supplied diskette contains a diagnostic program "SSD" that will verify if an adapter is configured properly. This diagnostic program is written with the user in mind and is easy to use. Refer to the "README" file on the supplied diskette for detailed instructions on using "SSD".

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6. The following are known I/O conflicts:

    - The 278 and 378 settings may conflict with your printer I/O adapter.
    - 3B0 cannot be used if a Monochrome adapter is installed.
    - 3F8-3FF is typically reserved for COM1:
    - 2F8-2FF is typically reserved for COM2:
    - 3E8-3EF is typically reserved for COM3:
    - 2E8-2EF is typically reserved for COM4:

7. Please refer to your included diskette for any post production manual updates and application specific information.

8. Always use the diagnostic software when Troubleshooting a problem. This will eliminate the software issue from the equation.

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Appendix B - How To Get Assistance

Please refer to Troubleshooting Guide prior to calling Technical Support.

1. Begin by reading through the Trouble Shooting Guide in Appendix A. If assistance is still needed please see below.
2. When calling for technical assistance, please have your user manual and current adapter settings. If possible, please have the adapter installed in a computer ready to run diagnostics.
3. Omega Engineering maintains a Home page on the Internet. Our home page address is www.omega.com. The latest software updates, and newest manuals are available via our FTP site that can be accessed from our home page.
4. Technical support is available Monday to Friday from 8:30 a.m. to 6:00 p.m. eastern time. Technical support can be reached at 1-800-DAS-IEEE.

RETURN AUTHORIZATION MUST BE OBTAINED FROM OMEGA BEFORE RETURNED MERCHANDISE WILL BE ACCEPTED. AUTHORIZATION CAN BE OBTAINED BY CALLING OMEGA CUSTOMER SERVICE AND REQUESTING AN AUTHORIZED RETURN (AR) NUMBER.

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Appendix C - Electrical Interface

RS-232

Quite possibly the most widely used communication standard is RS-232. This implementation has been defined and revised several times and is often referred to as RS-232-C/D/E or EIA/TIA-232-C/D/E. It is defined as "*Interface between Data Terminal Equipment and Data Circuit-Terminating Equipment Employing Serial Binary Data Interchange*" The mechanical implementation of RS-232 is on a 25 pin D sub connector. The IBM PC computer defined the RS-232 port on a 9 pin D sub connector and subsequently the EIA/TIA approved this implementation as the EIA/TIA-574 standard. This standard has defined as the "*9-Position Non-Synchronous Interface between Data Terminal Equipment and Data Circuit-Terminating Equipment Employing Serial Binary Data Interchange*". Both implementations are in wide spread use and will be referred to as RS-232 in this document. RS-232 is capable of operating at data rates up to 20 Kbps / 50 ft. The absolute maximum data rate may vary due to line conditions and cable lengths. RS-232 often operates at 38.4 Kbps over very short distances. The voltage levels defined by RS-232 range from -12 to +12 volts. RS-232 is a single ended or unbalanced interface, meaning that a single electrical signal is compared to a common signal (ground) to determine binary logic states. A voltage of +12 volts (usually +3 to +10 volts) represents a binary 0 (space) and -12 volts (-3 to -10 volts) denotes a binary 1 (mark). The RS-232 and the EIA/TIA-574 specification define two types of interface circuits **D**ata **T**erminal **E**quipment (**DTE**) and **D**ata **C**ircuit-Terminating **E**quipment (**DCE**). The adapter is a DTE interface.

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Appendix D - Asynchronous Communications

Serial data communications implies that individual bits of a character are transmitted consecutively to a receiver that assembles the bits back into a character. Data rate, error checking, handshaking, and character framing (start/stop bits) are pre-defined and must correspond at both the transmitting and receiving ends.

Asynchronous communications is the standard means of serial data communication for PC compatibles and PS/2 computers. The original PC was equipped with a communication or COM: port that was designed around an 8250 Universal Asynchronous Receiver Transmitter (UART). This device allows asynchronous serial data to be transferred through a simple and straightforward programming interface. Character boundaries for asynchronous communications are defined by a starting bit followed by a pre-defined number of data bits (5, 6, 7, or 8). The end of the character is defined by the transmission of a pre-defined number of stop bits (usual 1, 1.5 or 2). An extra bit used for error detection is often appended before the stop bits.

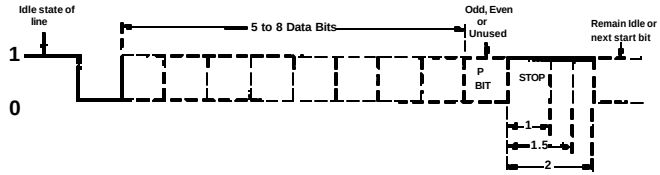
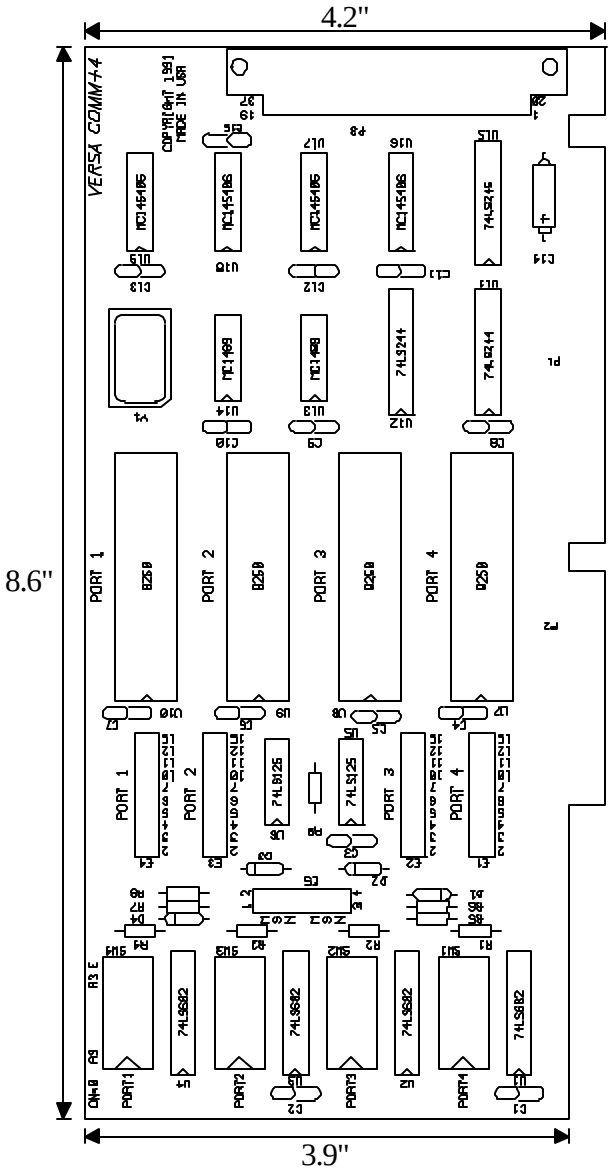


Figure 9 - Asynchronous Communications Bit Diagram

This special bit is called the parity bit. Parity is a simple method of determining if a data bit has been lost or corrupted during transmission. There are several methods for implementing a parity check to guard against data corruption. Common methods are called (E)ven Parity or (O)dd Parity. Sometimes parity is not used to detect errors on the data stream. This is referred to as (N)o parity. Because each bit in asynchronous communications is sent consecutively, it is easy to generalize asynchronous communications by stating that each character is wrapped (framed) by pre-defined bits to mark the beginning and end of the serial transmission of the character. The data rate and communication parameters for asynchronous communications have to be the same at both the transmitting and receiving ends. The communication parameters are baud rate, parity, number of data bits per character, and stop bits (i.e. 9600,N,8,1).

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Appendix E - Silk-Screen



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Appendix F - Compliance Notices

Federal Communications Commission Statement

FCC - This equipment has been tested and found to comply with the limits for Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in such case the user will be required to correct the interference at his own expense.

EMC Directive Statement



Products bearing the CE Label fulfill the requirements of the EMC directive (89/336/EWG) and of the low-voltage directive (73/23/EWG) issued by the European Commission.

To obey these directives, the following European standards must be met:

- **EN55022 Class A** - "Limits and methods of measurement of radio interference characteristics of information technology equipment"

- **EN55024**-'Information technology equipment Immunity characteristics Limits and methods of measurement.

- **EN60950 (IEC950)** - "Safety of information technology equipment, including electrical business equipment"

Always use cabling provided with this product if possible. If no cable is provided or if an alternate cable is required, use high quality shielded cabling to maintain compliance with FCC/EMC directives.

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WARRANTY/DISCLAIMER

OMEGA ENGINEERING, INC. warrants this unit to be free of defects in materials and workmanship for a period of 13 months from date of purchase. OMEGA's WARRANTY adds an additional one (1) month grace period to the normal one (1) year product warranty to cover handling and shipping time. This ensures that OMEGA's customers receive maximum coverage on each product.

If the unit malfunctions, it must be returned to the factory for evaluation. OMEGA's Customer Service Department will issue an Authorized Return (AR) number immediately upon phone or written request. Upon examination by OMEGA, if the unit is found to be defective, it will be repaired or replaced at no charge. OMEGA's WARRANTY does not apply to defects resulting from any action of the purchaser, including but not limited to mishandling, improper interfacing, operation outside of design limits, improper repair, or unauthorized modification. This WARRANTY is VOID if the unit shows evidence of having been tampered with or shows evidence of having been damaged as a result of excessive corrosion; or current, heat, moisture or vibration; improper specification; misapplication; misuse or other operating conditions outside of OMEGA's control. Components which wear are not warranted, including but not limited to contact points, fuses, and triacs.

OMEGA is pleased to offer suggestions on the use of its various products. However, OMEGA neither assumes responsibility for any omissions or errors nor assumes liability for any damages that result from the use of its products in accordance with information provided by OMEGA, either verbal or written. OMEGA warrants only that the parts manufactured by it will be as specified and free of defects. OMEGA MAKES NO OTHER WARRANTIES OR REPRESENTATIONS OF ANY KIND WHATSOEVER, EXPRESS OR IMPLIED, EXCEPT THAT OF TITLE, AND ALL IMPLIED WARRANTIES INCLUDING ANY WARRANTY OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE HEREBY DISCLAIMED. LIMITATION OF LIABILITY: The remedies of purchaser set forth herein are exclusive, and the total liability of OMEGA with respect to this order, whether based on contract, warranty, negligence, indemnification, strict liability or otherwise, shall not exceed the purchase price of the component upon which liability is based. In no event shall OMEGA be liable for consequential, incidental or special damages.

CONDITIONS: Equipment sold by OMEGA is not intended to be used, nor shall it be used: (1) as a "Basic Component" under 10 CFR 21 (NRC), used in or with any nuclear installation or activity; or (2) in medical applications or used on humans. Should any Product(s) be used in or with any nuclear installation or activity, medical application, used on humans, or misused in any way, OMEGA assumes no responsibility as set forth in our basic WARRANTY/DISCLAIMER language, and, additionally, purchaser will indemnify OMEGA and hold OMEGA harmless from any liability or damage whatsoever arising out of the use of the Product(s) in such a manner.

RETURN REQUESTS/INQUIRIES

Direct all warranty and repair requests/inquiries to the OMEGA Customer Service Department. BEFORE RETURNING ANY PRODUCT(S) TO OMEGA, PURCHASER MUST OBTAIN AN AUTHORIZED RETURN (AR) NUMBER FROM OMEGA'S CUSTOMER SERVICE DEPARTMENT (IN ORDER TO AVOID PROCESSING DELAYS). The assigned AR number should then be marked on the outside of the return package and on any correspondence.

The purchaser is responsible for shipping charges, freight, insurance and proper packaging to prevent breakage in transit.

FOR WARRANTY RETURNS, please have the following information available BEFORE contacting OMEGA:

1. Purchase Order number under which the product was PURCHASED,
2. Model and serial number of the product under warranty, and
3. Repair instructions and/or specific problems relative to the product.

FOR NON-WARRANTY REPAIRS, consult OMEGA for current repair charges. Have the following information available BEFORE contacting OMEGA:

1. Purchase Order number to cover the COST of the repair,
2. Model and serial number of the product, and
3. Repair instructions and/or specific problems relative to the product.

OMEGA's policy is to make running changes, not model changes, whenever an improvement is possible. This affords our customers the latest in technology and engineering.

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