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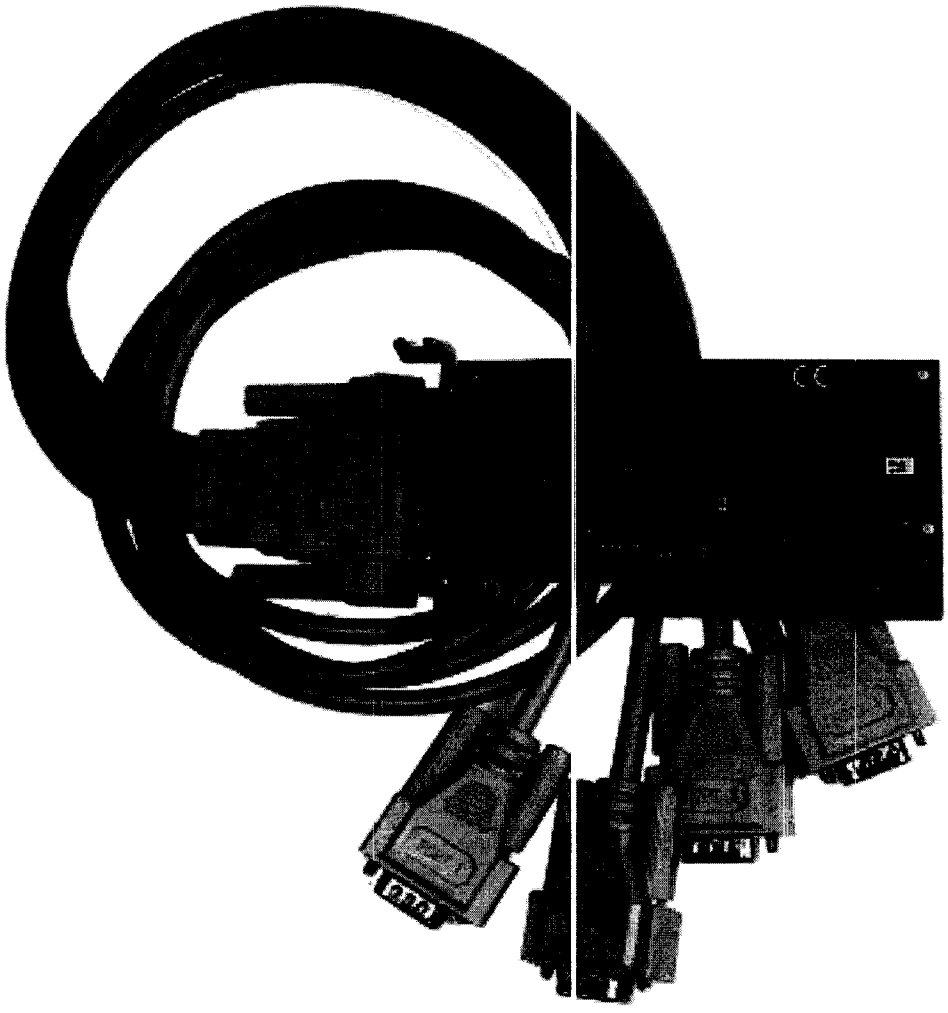
# User's Guide



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# OMG-COMM4-LPCI
# OMG-COMM4-PCI
# Four Port RS-232 Interface Board

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The information contained in this document is believed to be correct, but OMEGA accepts no liability for any errors it contains, and reserves the right to alter specifications without notice.
**WARNING:** These products are not designed for use in, and should not be used for, human applications.

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# Introduction

## Overview

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

The **OMG-COMM4-LPCI** ships with a Low Profile PCI bracket that will only work in a Low Profile PCI slot. If you need a standard size PCI bracket, please order model **OMG-COMM4-PCI**.

## What is Included

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

- **OMG-COMM4-LPCI** Serial I/O Adapter
  Model **OMG-COMM4-LPCI** ships with a Low Profile PCI bracket
  Model **OMG-COMM4-PCI** ships with a standard size PCI bracket
- HDB-44 to Four Connector Fan Out Cable
  OMG-CA199, HDB-44 to four DB-25M fan out cable, ships with **OMG-COMM4-LPCI-DB25**
  OMG-CA200, HDB-44 to four DB-9M fan out cable, ships with **OMG-COMM4-LPCI-DB9**
- SeaCOM Software CD

# Card Setup

## Clock Modes

The **OMG-COMM4-LPCI** employs a unique clocking option that allows the end user to select from divide by 4, and divide by 1 clocking modes. This mode is selected at E1.

To select the Baud rates commonly associated with COM: ports (i.e. 2400, 4800, 9600, 19.2, ... 115.2K Bps) place the jumper in the divide by 4 mode (silk-screen DIV4).

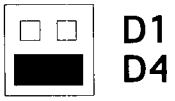



*Figure 1 - Clocking Mode 'Divide By 4'*

To select the maximum data rate (460.8K bps) place the jumper in the divide by 1 (silk-screen DIV1) position.

*Figure 2 - Clocking Mode 'Divide By 1'*

## Baud Rates and Divisors for the 'Div1' mode

The following table shows some common data rates and the rates you should choose to match them if using the adapter in the 'Div1' mode.

| For this Data Rate | Choose this Data Rate |
|---|---|
| 1200 bps | 300 bps |
| 2400 bps | 600 bps |
| 4800 bps | 1200 bps |
| 9600 bps | 2400 bps |
| 19.2K bps | 4800 bps |
| 57.6 K bps | 9600 bps |
| 115.2 K bps | 19.2K bps |
| 230.4K bps | 57.6 K bps |
| 460.8K bps | 115.2 K bps |

If your communications package allows the use of Baud rate divisors, choose the appropriate divisor from the following table:

| For this Data Rate | Choose this Divisor |
|---|---|
| 1200 bps | 384 |
| 2400 bps | 192 |
| 4800 bps | 96 |
| 9600 bps | 48 |
| 19.2K bps | 24 |
| 38.4K bps | 12 |
| 57.6K bps | 8 |
| 115.2K bps | 4 |
| 230.4K bps | 2 |
| 460.8K bps | 1 |

## Address and IRQ selection

The **OMG-COMM4-LPCI** is automatically assigned I/O addresses and IRQs by your motherboard BIOS. Adding or removing other hardware may change the assignment of I/O addresses and IRQs.

# Installation

## Operating System Installation

## Windows 95/98/ME/NT/2000/XP

**Do not install the Adapter in the machine until the software has been fully installed.**

1. Start Windows.
2. Insert the software CD in to your CD drive.
3. If 'Auto-Start' is enabled for this drive the software will automatically launch. Otherwise, point your browser to the 'Index.htm' on the root directory of the CD
4. Select 'Install Software'.
5. Select the Part Number for your adapter from the listing.
6. Select 'Windows 98/ME/2000/XP'. The setup file will automatically detect the operating environment and install the proper components. Next (depending on the OS version) select the 'Run this program from its current location' or 'Open' option. Follow the information presented on the screens that follow.
7. A screen may appear with the declaration: "The publisher cannot be determined due to the problems below: Authenticode signature not found." Please select the 'Yes' button and proceed with the installation. This declaration simply means that the Operating System is not aware of the driver being loaded. It will not cause any harm to your system.
8. During setup the user may specify installation directories and other preferred configurations. This program also adds entries to the system registry that are necessary for specifying the operating parameters for each driver. An uninstall option is also included to remove all registry/INI file entries from the system.

## Linux

Refer to D:\software\seacom\Other\Linux**Linux.serial.readme** (where D: = your CDROM driver letter) found on the software CD. This file contains valuable information on installing your adapter in the various Linux releases. Also in this sub-directory is the **Linux SerialHOWTO.** This series of files explains typical Linux serial implementations, as well as informing the user to Linux syntax and preferred practices.

## QNX

Refer to D:\software\seacom\Other\QNX6**Install.readme** (where D: = your CDROM driver letter) found on the software CD. This file contains valuable information on installing your adapter in the QNX6 Neutrino OS, as well as the files required to ensure a flawless implementation. Also provided on the software CD are implementation instructions for QNX4. These are found in D:\software\seacom\Other\QNX4**QNX_COM.txt.**

## Physical Installation

The adapter can be installed in any 3.3 or 5V PCI expansion slot and contains several jumper straps for each port that must be set for proper.

**Do not install the Adapter in the machine until the software has been fully installed.**

1. **Turn off PC power. Disconnect the power cord.**
2. Remove the PC case cover.
3. Locate an available PCI slot and remove the blank metal slot cover.
4. Gently insert the PCI adapter into the slot. Make sure that the adapter is seated properly.
5. Replace the screw. (This is required to ensure FCC Part 15 compliance.)
6. Install the cable. (OMG-CA199 or OMG-CA200)
7. Replace the cover.
8. Connect the power cord

Installation is finished.

# Technical Description

The **OMG-COMM4-LPCI** utilizes the 16C854 UART. This chip features programmable baud rate, data format, interrupt control and a 128-byte input and output FIFO, and is functionally 4 16C850 UARTs.

## Connector Pin Assignments

### DB-25 Female (RS-232 DTE)

| 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 |

### DB-9 Male (EIA-574 DTE)

| Signal | Name | Pin # | Mode |
|---|---|---|---|
| GND | Ground | 5 | |
| TD | Transmit Data | 3 | Output |
| RTS | Request To Send | 7 | Output |
| DTR | Data Terminal Ready | 4 | Output |
| RD | Receive Data | 2 | Input |
| CTS | Clear To Send | 8 | Input |
| DSR | Data Set Ready | 6 | Input |
| DCD | Data Carrier Detect | 1 | Input |
| RI | Ring Indicator | 9 | Input |

### Card Edge DB-44 Female

| **Port #** | | **1** | **2** | **3** | **4** |
|---|---|---|---|---|---|
| GND | | 17 | 21 | 24 | 28 |
| RD | | 4 | 8 | 12 | 30 |
| RI | | 33 | 37 | 41 | 44 |
| DCD | | 3 | 7 | 11 | 15 |
| DTR | | 32 | 36 | 40 | 43 |
| RTS | | 2 | 6 | 10 | 14 |
| DSR | | 31 | 35 | 39 | 42 |
| TD | | 1 | 5 | 9 | 13 |
| CTS | | 16 | 20 | 23 | 27 |

**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.

# Specifications

## Environmental Specifications

| Specification | Operating | Storage |
|---|---|---|
| Temperature Range | 0° to 70° C (32° to 158° F) | -50° to 105° C (-58° to 221° F) |
| Humidity Range | 10 to 90% R.H. Non-Condensing | 10 to 90% R.H. Non-Condensing |

## Manufacturing

All Printed Circuit boards are built to UL 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 | 60 mA | 100 mA | 250 mA |

## Physical Dimensions

| | | |
|---|---|---|
| Board length | 4.721 inches | (11.99 cm) |
| Board Height including Goldfingers | 2.536 inches | (6.44 cm) |
| Board Height excluding Goldfingers | 2.211 inches | (5.62 cm) |

# Appendix A - Troubleshooting

The Software supplied with the OMG-COMM4-LPCI adapter may be used in the troubleshooting procedures. Using this software and following these simple steps can eliminate most common problems 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 IRQs, many other adapters (i.e. SCSI adapters & on-board serial ports) do not. The IRQ is typically selected by the BIOS or Operating system. Some BIOS setup software will allow changing the IRQ, but others do not. Another method of changing assigned resources is to try changing PCI slots. This will typically cause the BIOS or OS to reassign the resources.

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

5. When running DOS or Windows 3.x refer to the supplied software and this User Manual to verify that the adapter is configured correctly. This software contains a diagnostic program 'SSD' (D:\software\seacom\Other\DOS\DIAG, where D: = the driver letter of your CDROM drive) will verify if an adapter is configured properly. This diagnostic program is written with the user in mind and is easy to use. You can use D:\software\seacom\Other\DOS\PCI\FindPCI.exe to determine resources that have been assigned to your adapter. Make sure that if available, the 'Use Plug-n-Play" option is turned **'OFF'** in your BIOS. Having this option set to **'ON'** in DOS or Windows 3.x will cause erratic operations.

6. For Windows95/98/ME/NT/2000, the diagnostic tool 'WinSSD' is installed in the SeaCOM folder on the Start Menu during the setup process. First find the ports using the Device Manager, then use 'WinSSD' to verify that the ports are functional.

7. Always use the diagnostic software when troubleshooting a problem. This will eliminate any software issues from the equation.

# 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, Inc. maintains a web page on the Internet. Our home page address is http://www.omega.com . The latest software updates, and newest manuals are available via our web site.
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 1-800-872-9436.

**Return Authorization Must Be Obtained From Omega Engineering, Inc. Before Returned Merchandise Will Be Accepted. Authorization Can Be Obtained By Calling Omega Engineering, Inc. And Requesting An Authorized Return (AR) Number.**

# 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 20K bps / 50 ft. The absolute maximum data rate may vary due to line conditions and cable lengths. RS-232 often operates at 38.4K bps 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 (-3to-10 volts) denote 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 OMG-COMM4-LPCI Adapter is a DTE interface.

# 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. A starting bit followed by a pre-defined number of data bits (5, 6, 7, or 8) defines character boundaries for asynchronous communications. The end of the character is defined by the transmission of a pre-defined number of stop bits (usually 1, 1.5 or 2). An extra bit used for error detection is often appended before the stop bits.

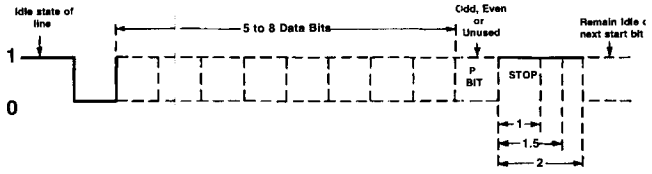
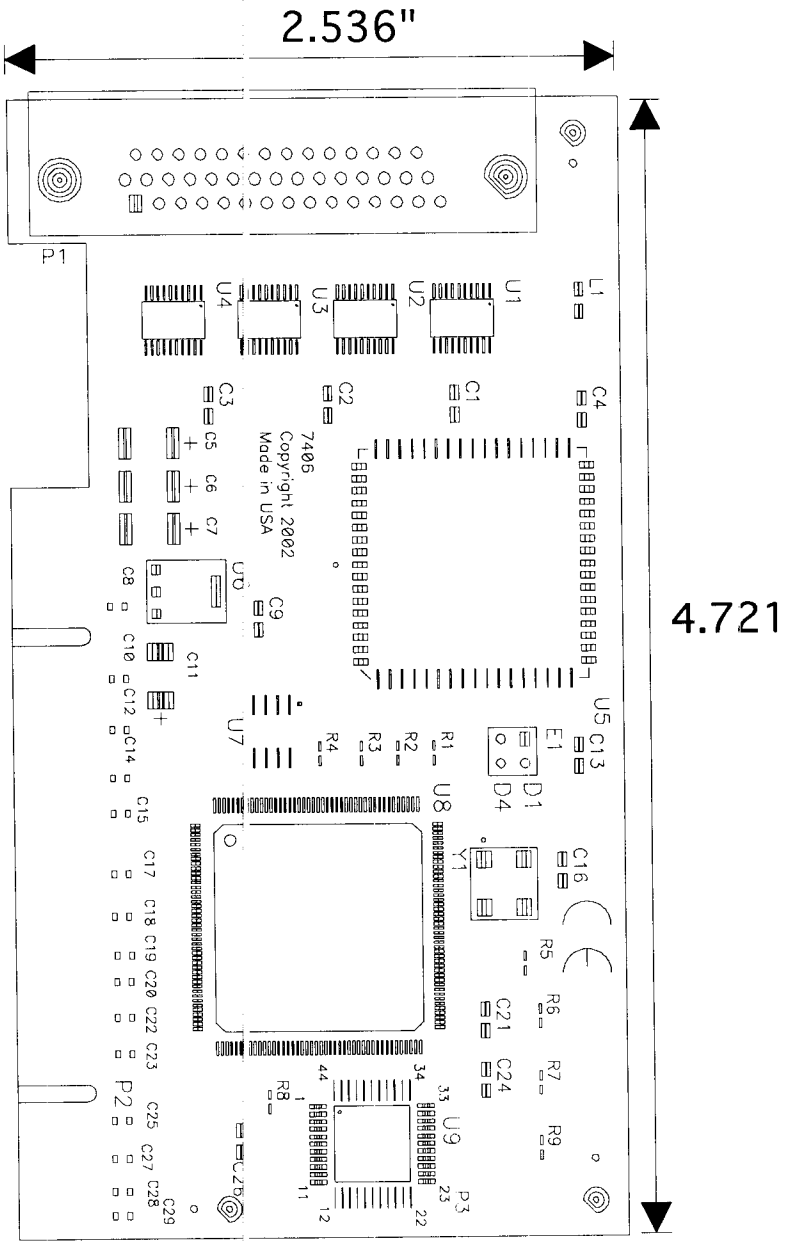



*Figure 3 - Asynchronous Communications Bit Diagram*

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 refereed 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).

# Appendix E - Silk-Screen



# 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 the users expense.

## EMC Directive Statement

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Products bearing the CE Label fulfill the requirements of the EMC directive (89/336/EEC) and of the low-voltage directive (73/23/EEC) 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"

**Warning**

**This is a Class A Product. In a domestic environment, this product may cause radio interference in which case the user may be required to take adequate measures to prevent or correct the interference.**

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 **61 months** from date of purchase. OMEGA's WARRANTY adds an additional one (1) month grace period to the normal **five (5) year product warranty** to cover handling and shipping time. This ensures that OMEGA's customers receive maximum coverage on each product.

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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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