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SBus Serial Ports User's Manual

MAGMA

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Declaration of Conformity

Manufacturer's Name:	Mesa Ridge Technologies, Inc. d.b.a. MAGMA
Manufacturer's Address:	9918 Via Pasar San Diego, CA 92126 USA

Declares that the product:

Type of Equipment:	Communications Option Cards
Product Name:	MAGMA Serial Ports
Model Number:	4 Sp, 8 Sp, 16 Sp, 4 DMA Sp, 16 DMA Sp, 4 Sync Sp, 16 Sync Sp
Original Manufacture Year:	1992

conforms to the following European Union Council Directives and Standards;

EMC Directive (89/336/EEC):

EN 50081-1 (1992) - incorporating the following:

EN 55022 (1994)/CISPR-22 (1993) Class "A"

EN 50082-1 (1992) - incorporating the following:

IEC 801-2 (1991)

IEC 801-3 (1984)

IEC 1000-4-3 (1995)

IEC 801-4 (1988)

Additional Information:

The above product complies with the requirements of the EMC Directive 89/336/EEC.

I, the undersigned, hereby declare that the equipment specified above conforms to the above Directive(s) and Standard(s)

Paul D. Smith

VP Engineering

San Diego, California, January 25, 2000

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The Following Information is Required by the FCC

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received including interference that may cause undesired operation.

FCC Class A Notice

If your system is FCC Class A, the following applies:

Note - This equipment has been tested and found to comply with the limits for a 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 in which case the user will be required to correct the interference at his own expense.

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Quality & Service

Product Warranty

MAGMA board level products are warranted against defects in materials or workmanship for a period of three years from the date of shipment to the original purchaser. PCI Expansion Systems are warranted for a period of one year. Any products found to be defective in material or workmanship will be repaired or replaced promptly.

Products that have been modified will not be covered under this warranty.

Lifetime Harsh Environment Warranty

Any MAGMA product, which is damaged due to misuse, may be replaced for only 50% of the current list price. I/O boards face some harsh environments, some harsher than the boards are designed to withstand. When that happens, just return the board with an order for its replacement at only 50% of the current list price. MAGMA does not need to profit from your misfortune.

The replacement discount from list price is based on the current U.S.A. list prices. If prices go down or costs go up in the future, the replacement discount may be adjusted to reflect current conditions, but you have our pledge that it will always be as fair as possible. The Harsh Environment Warranty is honored worldwide, at fixed U.S.A. prices.

30 Day Money Back Guarantee

Any single standard MAGMA manufactured product may be returned within 30 days of purchase for a full refund of the price paid for the product being returned (must be in new condition in the original packaging). If you are not satisfied, or chose the wrong product by mistake, you do not have to keep it. Please call for an RMA number first.

Free Technical Assistance

MAGMA is dedicated to providing competent, responsive technical support both before and after the sale. We have staffed our support department with professional software and hardware engineers and given them the finest tools. MAGMA provides unlimited support to all customers for the life of all products purchased.

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Warranty & Repair in Seven Days

Any MAGMA product returned for repair under warranty will be repaired and shipped within 1 week unless it is necessary for a Technical Support Engineer to contact you and discuss the repair. Repaired products are returned by the same shipping method as they are received. Please call for an RMA number first.

Advanced Replacement

MAGMA will replace a product prior to receiving the defective product from the customer. Advanced replacements are available upon credit approval or by providing a VISA, MasterCard or American Express card number as security for the returned product. The cost for this service is a $50 advanced replacement charge, plus freight.

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About This Manual

This User's Manual is designed to supplement your system documentation while installing and using the MAGMA 4 SP, 8 Sp, 16 Sp, 4 DMA Sp, 16 DMA Sp, 4 Sync Sp, 16 Sync Sp, MaxPort 64 Sp or MaxPort 128 Sp. The manual is divided into chapters that are organized so you can easily locate the information you need to install the MAGMA products in your SPARC computer. The chapters are

Chapter 1: Introduction

This chapter details the performance specifications of your MAGMA product, provides pre-installation information and cautions, and provides a parts inventory and installation tool requirements.

Chapter 2: Hardware Installation

Provides installation procedures for all Sun computers.

Chapter 3: Software Installation

Provides installation information for SunOS 4.1.x and Solaris 2.x.

Chapter 4: Peripheral Installation Under SunOS 4.1.x

Provides information for adding modems and printers under SunOS 4.1.x.

Chapter 5: Peripheral Installation Under Solaris 2.x

Provides information for adding modems and printers under Solaris 2.x.

Chapter 6: Synchronous Interface Option

Provides installation information for the synchronous driver package.

Chapter 7: Device Names

Provides detailed information about device name,setport and CBAUD.

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Chapter 8: Cabling Information

Provides information on cabling configurations and how to order cables from MAGMA.

Chapter 9: How to Get More Help

Provides information on where to go for current drivers and how to contact Technical Support at MAGMA.

Please review this manual completely before installing your new MAGMA product. The manual provides information specific to installing and operating the MAGMA SBus Serial Port Boards. You should review and be familiar with your system documentation.

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Safety Summary

Read the following precautions to prevent injury to you or damage to the equipment.

After performing software and hardware shutdown, do NOT unplug the AC power cord from the power receptacle. The power cord should be left plugged in to a grounded power outlet whenever installing or removing circuit cards to prevent electrostatic damage to the system components.

This will mean that even though the power switch is turned off, AC power is still present inside the chassis.

To prevent personal injury, keep hands and jewelry away from all internal components on your workstation and expansion enclosure.

Additionally:

- Handle circuit cards by their non-conducting edges only.
- Place a rubber mat underneath your computer and expansion unit or wear a grounding wrist strap whenever working inside an open computer.
- Install circuit cards as soon as they are removed from their protective anti-static packaging and do not leave them exposed.
- If you must put the card down, place it on the anti-static packaging or rubber mat.
- Avoid cutting yourself on any sharp edges that may be present within the workstation or expansion unit.

Never modify or remove the radio frequency interference shielding from your workstation or expansion unit. To do so may cause your installation to produce emissions that could interfere with other electronic equipment in the area of your system.

Throughout the manual, notes, cautions and warnings are used to highlight procedures that have potential to cause personal injury or damage to the equipment. These indicators will appear as follows:

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NOTE

An amplifying or explanatory comment related to procedural steps or text.

CAUTION

Used to indicate and prevent the following procedure or step from causing damage to the equipment.

WARNING

Used to indicate and prevent the following step from causing injury.

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Chapter One Introduction

The MAGMA 4 Sp, 8 Sp and 16 Sp

The MAGMA 4 Sp, 8 Sp and 16 Sp are single width SBus expansion boards with four, eight or sixteen high-speed asynchronous serial ports with full modem control. The products feature:

- a design based on the Cirrus Logic CD-1400 Serial/Parallel Asynchronous Communications Engine,
- 12 byte FIFO buffers for each port's transmitter and receiver that minimize the number of interrupts the CPU must service,
- fully automatic XON/XOFF and/or RTS/CTS flow control,
- data transfer rates up to 256Kbps on each port simultaneously, or 460Kbps maximum on one port, and
- support for SunOS 4.1.x and Solaris 2.x.

The MAGMA 4 DMA Sp and 16 DMA Sp

The MAGMA 4 DMA Sp and 16 DMA Sp are single width SBus expansion boards with four or sixteen high-speed Direct Memory Access (DMA) asynchronous serial ports with full modem control. The products feature:

- a design based on the Cirrus Logic CD-2400 Multiprotocol Communications Controller,
- Direct Memory Access (DMA) to move up to 1Kb of data between each port and host memory without CPU intervention,
- fully automatic XON/XOFF and/or RTS/CTS flow control,
- data transfer rates up to 460Kbps on one port or 256Kbps on each port, and
- support for SunOS 4.1.x and Solaris 2.x.

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The MAGMA 4 Sync Sp and 16 Sync Sp

The MAGMA 4 Sync Sp and 16 Sync Sp are single width SBus expansion boards with four or sixteen high-speed Direct Memory Access (DMA) synchronous/asynchronous serial ports. The products feature:

- a design based on the Cirrus Logic CD-2400 Multiprotocol Communications Controller,
- Direct Memory Access (DMA) to move up to 1Kb of data between each port and host memory without CPU intervention,
- data transfer rates up to 256Kbps,
- support for Solaris 2.3 or above, and
- support for External and Internal clock sources.

The MAGMA MaxPort 64 Sp and MaxPort 128 Sp

The MAGMA MaxPort Sp is a rack-mount subsystem featuring 64 or 128 high-speed 128,000bps asynchronous serial ports all with full modem control. TheMaxPort Sp requires only one SBus slot and is designed to be located up to 200 feet from the computer. The product features:

- a design based on the Cirrus Logic CD-1400 Serial/Parallel Asynchronous Communications Engine,
- 12 byte FIFO buffers for each port's transmitter and receiver that minimize the number of interrupts the CPU must service,
- fully automatic XON/XOFF and/or RTS/CTS flow control,
- data transfer rates up to 128Kbps full-duplex per line, and
- support for SunOS 4.1.x and Solaris 2.x.

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Pre-Installation Information

Before you install your new MAGMA product you should perform the following steps:

- inventory the shipping carton contents for all of the required parts (refer to Parts List),
- gather all of the necessary tools required for installation (refer to Tools Required for Installation), and
- read all applicable parts of this manual.

Parts List

The following parts are provided:

4 Sp

1 – Circuit Board
2 – 3.5" Diskettes (Solaris Drivers & Utilities)
1 – User's Manual (this document)

8 Sp

1 – Circuit Board
1 – Breakout Cable with DB-25 Connectors
2 – 3.5" Diskettes (Solaris Drivers & Utilities)
1 – User's Manual (this document)

16 Sp, 16 DMA Sp, 16 Sync SP

1 – Circuit Board
1 – Breakout Box
1 – Breakout Box Bracket
2 – 3.5" Diskettes (Solaris Drivers & Utilities)
1 – User's Manual (this document)

MaxPort 64 or 128 Sp

1 – Circuit Board
1 – Host Interface Card and Interface Cable
1 – Power Cable
2 – 3.5" Diskettes (Solaris Drivers & Utilities)
1 – User's Manual (this document)

Tools Required for Installation

In order to complete the installation, you will need the following tools:

1 - Phillips Head Screwdriver

1 - Flat Head Screwdriver (for cable connections)

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NOTE

You should keep all of the shipping materials from the card just in case you need to send it back to MAGMA for repair at some time in the future. The shipping box/bag is designed for the protection of your card investment.

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Chapter Two Hardware Installation

Follow the instructions for installing SBus cards in your owner's guide.

NOTE

When installing the MAGMA 16 DMA Sp or 16 Sp in a SPARC 4, 5, 10, 20, 1000 - 8000 or 6xx system, replace the screws noted in your *SPARCstation Hardware Owner's Guide* with the two longer screws supplied with the MAGMA product. These 2.5M x 8mm long screws will provide easier assembly for the MAGMA 16 DMA Sp or 16 Sp than the shorter, standard SPARCstation chassis screws. Be sure to retain and use the rectangular washers that come with the SPARCstation.

NOTE

When installing the MAGMA 16 Sync Sp in your system, remove and store the SBus slot cover plate with its two mounting screws and two rectangular washers.

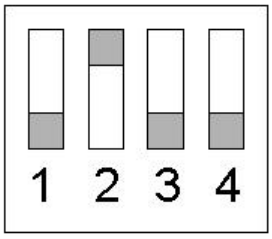
Install the 16 Sync Sp into the SBus slot. On the outside of the computer, fit the milled nut plate over the connector on the 16 Sync Sp, [flat side against the connector face]. Install two M3 x 8mm long pan head screws into the recesses of the nut plate and into the connector on the 16 Sync Sp. This will lock the 16 Sync Sp into the system's chassis.

Push the 16 Sync Sp breakout box onto the 16 Sync Sp's connector, and tighten the breakout box knurled screws. Once the screws are snug the box is firmly attached and the system's cover may be reinstalled.

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DIP Switches

A four-position Dual In-line Package (DIP) switch can be found on some MAGMA cards. These switches are set at the factory. **No change is needed**. The default setting is DIP switch 2 up (on) and DIP switches 1, 3 and 4 down (off), as illustrated in the figure below.



Breakout Box and Connector

MAGMA 4 Sp and 4 DMA Sp

The MAGMA 4 Sp and 4 DMA Sp have 4 RJ-45 connectors attached at the rear of the card. (See Figure 1 for correct port and pin numbering.)

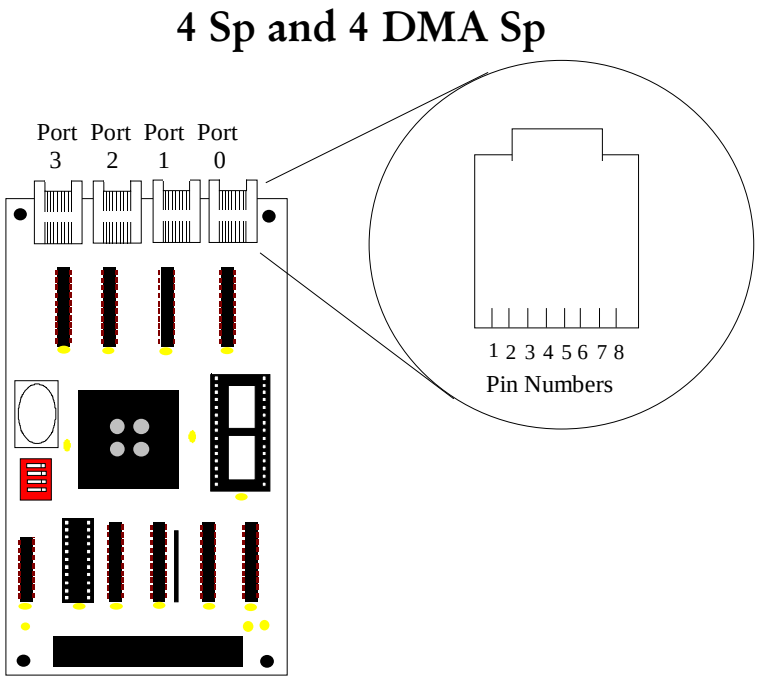


FIGURE 1

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MAGMA 8 Sp

The MAGMA 8 Sp uses a breakout cable which connects to the back of the MAGMA 8 Sp card by attaching the connector on the breakout cable to the connector on the MAGMA 8 Sp and tightening the thumb screws.

MAGMA 16 DMA Sp and 16 Sp

The MAGMA 16 DMA Sp and 16 Sp use a breakout box (See Figure 2). To install the breakout box use the following steps:

16 Sp and 16 DMA Sp Breakout Box

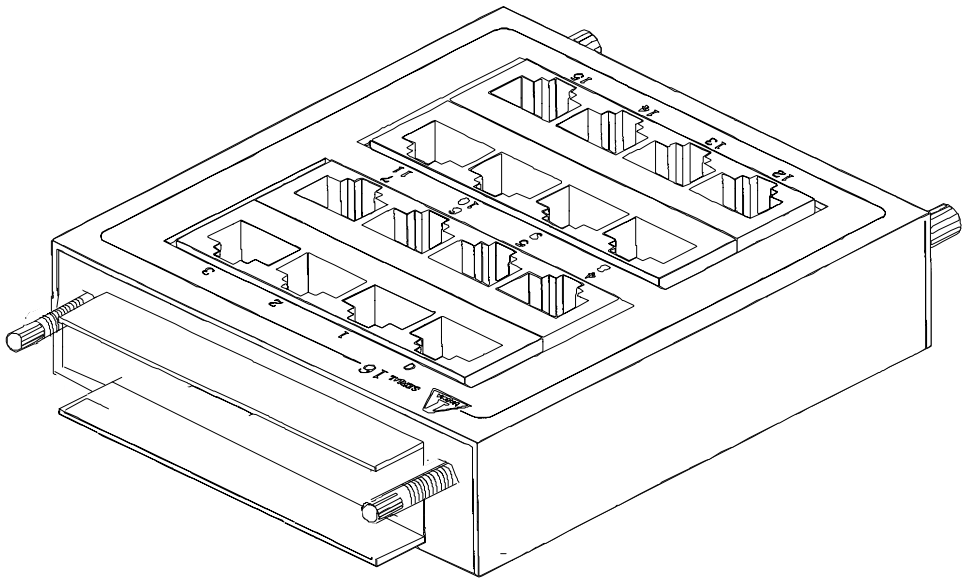


FIGURE 2

Locate the breakout box bracket. This bracket is installed on the inner surface of the back panel around the slot that you will use for the MAGMA 16 DMASp or 16 Sp (See Figure 3).

NOTE

On SPARC 4, 5, 10, 20, 1000 - 8000 and 6xx systems you will have to remove the tabs from the top of the bracket.

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Installing the Bracket

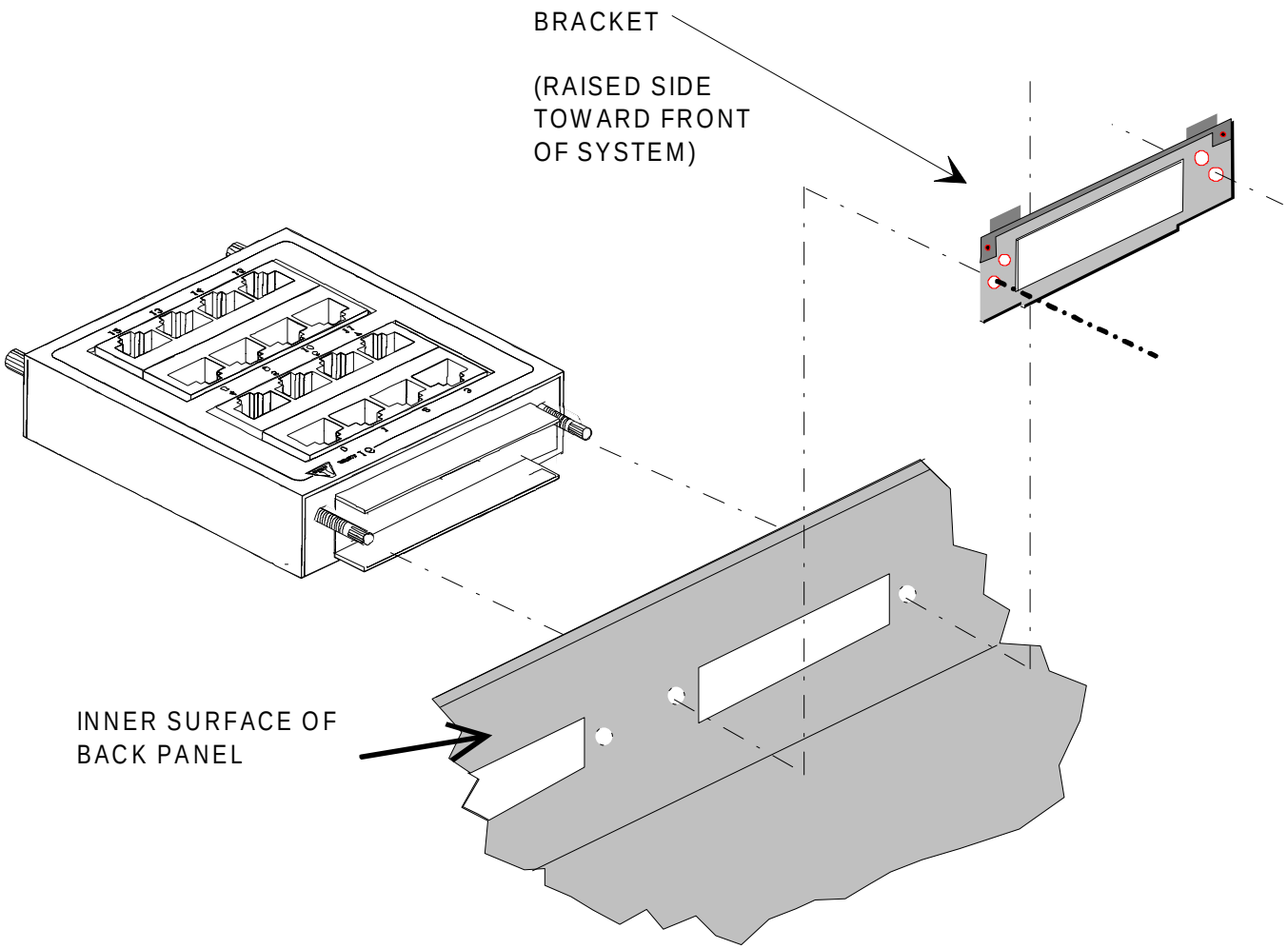


FIGURE 3

Install the bracket so that the side with the screw heads is facing towards the rear of the system unit. Hold the bracket with your fingers through the bracket; lift the bracket so that the bracket tabs fit into the upper SBus chassis slots for this card. Rotate the bracket at the bottom, easing the bracket over the slot tabs of the system chassis, and very firmly seat the bracket into the EMI metal screen. The bracket should be fitted very snugly against the inside of the system's chassis.

Next, install the 16 DMA Sp or 16 Sp board into the system. Hold the MAGMA board horizontally above the SBus location and look from the rear of the system to align the connector for the board with the opening of the already installed bracket. Gently feed the connector through the bracket opening. Finally, seat the board into the system by

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carefully mating the SBus connector for the 16 DMA Sp or 16 Sp onto the SBus connector on the system board and press down firmly and evenly.

Plug breakout box into connector on the MAGMA 16 and tighten thumbscrews until snug.

MAGMA 16 Sync Sp

Before installing the MAGMA 16 Sync Sp in your system, remove and store the SBus slot cover plate with its two mounting screws and two rectangular washers.

The MAGMA 16 Sync Sp also uses a breakout box (See Figure 4). To install the breakout box use the following steps:

16 Sync Sp Breakout Box

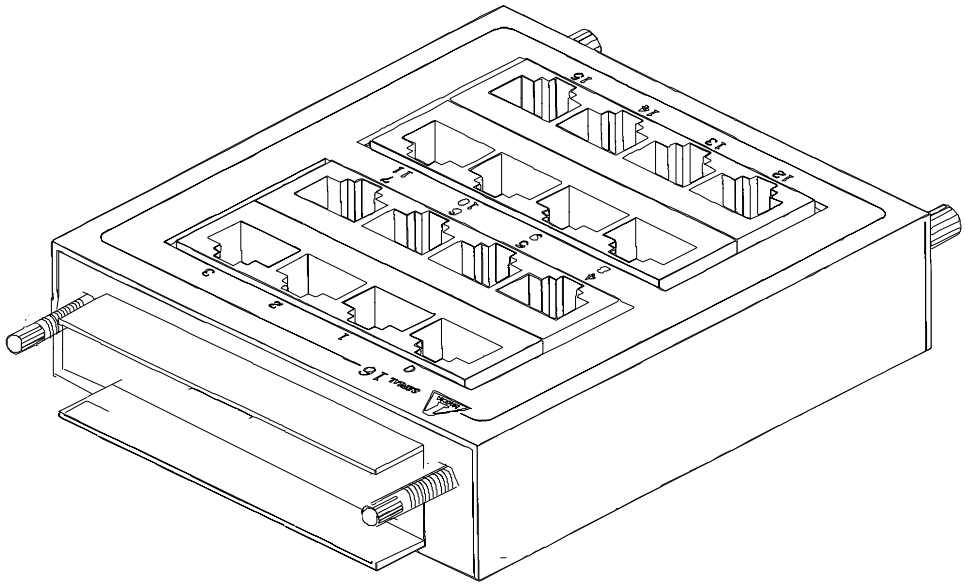


FIGURE 4

NOTE

On SPARC 4, 5, 10, 20, 1000 - 8000 and 6xx systems you will have to remove the tabs from the top of the bracket.

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Install the 16 Sync Sp board into the system. Hold the MAGMA board horizontally above the SBus location and look from the rear of the system to align the connector for the board with the opening in the rear of the chassis. Feed the connector through the slot opening in the back of the chassis. Finally, seat the board into the system by carefully mating the SBus connector for the 16 Sync Sp onto the SBus connector on the system board and press down firmly and evenly.

On the outside of the computer, fit the milled nut plate over the connector on the 16 Sync Sp [flat side against the connector face]. Install two M3 x 8mm long pan head screws into the recessed holes of the nut plate and into the connector on the 16 Sync Sp. This will lock the 16 Sync Sp into the system's chassis.

Push the 16 Sync Sp breakout box onto the 16 Sync Sp's connector, and tighten the breakout box knurled screws. Once the screws are snug, the box is firmly attached and the system's cover may be reinstalled.

MAGMA MaxPort 64 Sp and MaxPort 128 Sp

Your MaxPort Sp consists of 64 or 128 serial ports installed in a chassis. The following simple steps will allow you to access these ports.

- Follow the instructions at the beginning of this Chapter to install the Host Interface Card in your SPARCstation.
- Before powering on the SPARCstation, connect one end of the Host Interface Cable to the end of the connector on the back of the MaxPort Sp chassis and the other end to the external connector on the Host Interface Card.
- Power on your system in the following sequence monitor, external devices, MaxPort Sp, SPARCstation.
- Install the MAGMA Allin1 Sp driver according to the instructions in Chapter 3.

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Chapter Three Software Installation

NOTE

You should complete installation of your MAGMA hardware before installing the software driver. If you don't, the driver cannot be loaded into the kernel and you will get error messages.

Refer to Chapter 7 for device names.

Installation on SunOS 4.1.x

Introduction

The **MAGMA Sp driver for SunOS 4.1.x** supports all of the MAGMA Sp products including the Parallel Sp, Dual Parallel Sp, 4 Sp, 8 Sp, 16 Sp, 4 DMA Sp, 16 DMA Sp, LC 2+1 Sp, 2+1 Sp, 4+1 Sp, 8+2 Sp, and MaxPort 64 Sp, and MaxPort 128 Sp devices. The install script need only be run once on a system with one of the listed MAGMA Spcards installed in the computer. From then on, the driver will configure itself and all devices for any combination of MAGMA Sp boards. This keeps the kernel size and processing down while system efficiency is increased.

Requirements

You will need to obtain the SunOS driver in one of the following ways:

- Download the driver from our web site – www.magma.com/support/download.htm,
- Request a disk from our Support Department by calling 858-530-2511 or e-mailing support@magma.com, or
- If necessary, call or e-mail our Support Department to request a CD-ROM.

Installation for Downloaded or CD-ROM Files

1. Make sure the MAGMA board is installed in the machine. Login to your system as root.
2. Back up your system and save copies of critical files before you proceed.

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3. For CD-ROM versions, mount the CD-ROM to your system, if this has not already been done.

4. For FTP downloads, uncompress the file before extraction as it is in a compressed format when you download it from our board:
```
uncompress 4.1.4patch5_sunos.tar.Z
```

5. Change to your TMP subdirectory:
```
cd /tmp
```

6. Extract the installation files from the CD-ROM or the FTP download location on your machine:
```
tar xvfp 4.1.4patch5_sunos.tar
```

7. Run the installation script and respond to the questions:
```
./MAGMA_INSTALL
```

Floppy Diskette Installation

1. Insert the floppy labeled *ALLIN1 Sp driver for SunOS 4.1.x* in the diskette drive.

2. Change to the `/tmp` directory:
```
cd /tmp
```

NOTE

If your root file system is getting full, any empty directory on any mounted file system will do.

3. Extract the installation files from the floppy:
```
# tar xvfp /dev/rfd0
```

4. Run the installation script and respond to the questions:
```
./MAGMA_INSTALL
```

5. Under SunOS 4.1.x, the install script will put the software in `/etc/MAGMA/Sp` and load the driver module into the kernel dynamically. No kernel reconfiguration is

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necessary. The install script will modify `/etc/rc.local` to load the driver every time you reboot the system.

Installation on Solaris 2.x

Introduction

The **MAGMA Sp driver for Solaris 2.x** supports all of the MAGMA Sp products including the Parallel Sp, Dual Parallel Sp, 4 Sp, 8 Sp, 16 Sp, 4 DMA Sp, 16 DMA Sp, 4 Sync Sp, 16 Sync Sp, LC 2+1 Sp, 2+1 Sp, 4+1 Sp, 8+2 Sp, and MaxPort 64 Sp. Once the driver is installed, adding additional MAGMA boards is simply done by installing the hardware and powering up the system. The install script need only be run one time with the first MAGMA Sp board installed. From then on, the driver will configure itself and all devices for any combination of MAGMA Sp boards. This keeps the kernel size and processing down while system efficiency is increased.

Installation

1. Make sure the MAGMA card is installed. Login to your system as `root`.

2. Back up your system and save copies of critical files before you proceed.

3. Insert the floppy labeled *ALLIN1 Sp Driver for Solaris 2.x* in the diskette drive.

4. Change to the `/var/spool/pkg` directory:

```
# cd /var/spool/pkg
```

5. Extract the installation files from the floppy:

```
# volcheck
# tar xvfp /vol/dev/aliases/floppy0
```

6. Install the driver using the `pkgadd` command:

```
# /usr/sbin/pkgadd MAGMAsp
```

The MAGMA software is in Solaris package format called **MAGMAsp**. The install script will add this package to your system using `pkgadd` command. A startup script is added to load the driver every time you reboot the system.

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Verifying Installation

To verify that installation is complete, type the following:

(SunOS 4.1.x) `# modstat`

(Solaris 2.x) `# pkginfo -l MAGMAsp`

Uninstall the Software

To uninstall the MAGMA software from your system, type the following:

(SunOS 4.1.x) `# /etc/MAGMA/Sp/uninstall_MAGMA_Sp`

(Solaris 2.x) `# /usr/sbin/pkgrm MAGMAsp`

`# rm -r /var/spool/pkg/MAGMAsp`

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Chapter Four Peripheral Installation under SunOS 4.1.x

This chapter introduces the general steps of connecting peripherals to MAGMA serial ports. For more details, please read the Sun System and Network Administration Manual. Before proceeding further, make sure you have completed the software installation. To verify that the MAGMA module has been loaded to the kernel, do:

```
# modstat
```

Adding Terminals to Your System

To use a typical terminal (Wyse-50) connected to your MAGMA board, perform the following:

1. Connect the terminal with a null modem cable (see Chapter8 Cabling Information).

2. Turn on the terminal and access the terminal's setup menu (refer to your terminal user's manual for information on accessing the setup menu).

3. Set up the terminal as follows:

   - Wyse-50 emulation mode
   - 7 data bits per character
   - 1 stop bit
   - Even parity
   - 9600 baud
   - XON/XOFF enabled

4. Edit `/etc/ttytab` to include the following line (assuming that the terminal is hooked to serial line 0, ttym00):

   ```
   ttym00 "/usr/etc/getty std.9600" wyse50 on local
   ```

5. Then type the following to start the login process:

   ```
   # kill -1 1
   ```


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Adding Modems to Your System

Modems are wired as Data Communication Equipment (DCE) devices. To connect a modem to a MAGMA serial port, you need an RS-232 8-wire cable that has pins 2 through 8 and pin 20 wired straight through (see Chapter8 Cabling Information).

Modem Settings

For dial-out, the modem factory setting should operate properly. For dial-in, set your modem as follows:

- Enable auto answer (`ATS0=1`).
- Set Normal CD operations (`AT&C1`).
- Set Normal DTR operations (`AT&D2`).
- Enable RTS/CTS hardware flow control.
- Disable software (XON/XOFF) flow control.
- Fix the DTE rate between the modem and the serial port. It should be the same as the MAGMA port speed.
- Turn the local echo off (`ATE0`).
- Suppress the result code (`ATQ1`).
- Last, save your settings into the `NVRAM`.

We cannot guarantee that these `AT` commands apply for all modems. Always double-check these commands in the modem manufacturer's manual.

Dial-out Only

Setting for Dial-out: tip is a good program to start with. All you need is to modify/add an entry in the `/etc/remote` file. Your entry may look like this:

```
mymodem:\ dv=/dev/cum00:br#38400:el=^C^S^Q^U^D:ie=%$:oe=^D:
```

Tip to the modem by typing `tip mymodem`. You should see the word `connected.` Type `AT` and your modem should respond with an `OK`. You can dial a phone number by typing `ATDT1234567`.

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Note

Never use **tip** in `cmdtool`. Use `shelltool` instead.

To take advantage of the high-speed modems on today's market, the MAGMA serial port is capable of baud rates up to 128000bps. However, SunOS 4.1.x does not recognize baud rates higher than 38400bps. To use higher baud rates, you can either use the setport utility (see page 34) or use the CBAUD mapping (see page 33) as follows:

For 57600bps,

```
fastmodem:\:dv=/dev/cum00:br#75:el=^C^S^Q^U^D:ie=%$:oe=^D:
```

For 115200bps,

```
fastmodem:\:dv=/dev/cum00:br#1800:el=^C^S^Q^U^D:ie=%$:oe=^D:
```

Dial-in Only

Edit the `/etc/ttytab.` This file specifies which serial ports will have a login process. For example:

```
ttym00  "/usr/etc/getty dial.38400"  dialup   on  remote
```

Next, edit the `/etc/gettytab.` Add:

```
dial.38400|38400-baud:\:sp#38400:p8:pd:
dial.57600|38400-baud:\:sp#57600:p8:pd:
```

Finally, you must notify `init` to start the login process by typing:

```
# kill -1 1
```

Adding Printers to Your System

Cables

Connect the printer to the serial port with a three-wire cable. Read the printer manufacturer's manual. If the printer is a DTE device, use a null modem cable. Null modem cables have line 7 wired straight through and lines 2 and 3 swapped so that

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proper transmit and receive signals are communicated between two DTE devices. If the printer is a DCE device, then connect 2, 3 and 7 straight through.

To test if your cable works, send something over the serial line to the printer using `cat`. For example, if the printer is attached to `/dev/ttym00`

```
# (stty 9600 ; cat /etc/remote) > /dev/ttym00
```

If the file prints out correctly, the cable, the printer and the driver are working properly. The next step is to set up the printer with the `lpr` spooler.

lpr Spooler

Printers are typically driven by the `lpr` spooler. Connecting the printer will require modifications to the `/etc/printcap` file. The following are examples of entries in the `/etc/printcap.` Refer to your printer manual for details on transmission characteristics.

A typical 9,600 baud serial printer using 8bits/char, no parity, 1 stop bit, XON/XOFF flow control connected to serial port 0, ttym00:

```
lp:\
    :lp=/dev/ttym00:br#9600\
    :lf=/usr/adm/lpd-errs:\
    :xc#0177777:xs#040040:\
    :sd= /var/spool/lpd:\
    :ms=-opost,cs8,ignpar,ixon:\
    :sh:
```


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Chapter Five Peripheral Installation under Solaris 2.x

This chapter introduces the general steps of connecting peripherals to MAGMA serial ports under Solaris 2.x. Sun provides a window GUI called `admintool`, which allows you to set up networks, logins and printers on your Solaris 2.X system. We highly recommend you use `admintool.` If `Openwindows` is not available to you, we provide a sample script, `modemsetup`, located in `/opt/MAGMA_Sp/bin` for your reference. While by no means complete, this should give some guidance on configuring the port monitor with SAF commands. Also, read the Solaris System and Network Administration Manual for more information. Before you attach equipment to the serial port, make sure you have completed the software installation. To verify that the MAGMA module has been loaded into the kernel, do:

```
# modinfo | grep mh
```

Adding Terminals to Your System

- Assume you want to connect a terminal to the first MAGMA serial port (`/dev/term/0`). You need a null modem cable (see Chapter 8 Cabling Information).
- Use the **Serial Port Manager** to modify port 0 to Hardwire. Choose `ttymon0` instead of `zsmon` as the service tag. The baud rate should be the same as the terminal.
- Within seconds after clicking the `apply` button, a login prompt will appear on the terminal screen.

Adding Modems to Your System

Modems are wired as Data Communication Equipment (DCE) devices. To connect a modem to a MAGMA serial port, you need a RS-232 8-wire cable that has pins 2 through 8 and pin 20 wired straight through (see Chapter8 Cabling Information).

Modem Settings

For dial-out, the modem factory setting should operate properly. For dial-in, set your modem as follows:

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- Enable auto answer (ATS0=1).
- Set Normal CD operations (AT&C1).
- Set Normal DTR operations (AT&D2).
- Enable RTS/CTS hardware flow control.
- Disable software (XON/XOFF) flow control.
- Fix the DTE rate between the modem and the serial port. It should be the same as the MAGMA port speed.
- Turn the local echo off (ATE0).
- Suppress the result code (ATQ1).
- Last, save your settings into the NVRAM.

We cannot guarantee that these AT commands apply for all modems. Always double-check these commands with the modem manufacturer's manual.

Dial-out Only

Setting for Dial-out: `tip` is a good program to start with. All you need is to modify/add an entry in the `/etc/remote` file. Your entry may look like this:

```
mymodem:\  :dv=/dev/cua/0:br#38400:el=^C^S^Q^U^D:ie=%$:oe=^D:
```

Tip to the modem by typing `tip mymodem`. You should see the word `connected.` Type AT and your modem should respond with an OK. You can dial a phone number by typing ATDT1234567.

Note

Never use **tip** in `cmdtool`. Use `shelltool` instead.

To take advantage of the high-speed modems on today's market, the MAGMA serial port is capable of baud rates up to 128000bps. However, Solaris 2.0 through Solaris 2.4 does not recognize baud rates higher than 38400bps. To use higher baud rates, you can either use the setport utility (see page 34) or use the CBAUD mapping (see page 33) as follows:

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For 57600bps,

```
fastmodem:\  :dv=/dev/cua/0:br#75:el=^C^S^Q^U^D:ie=%$:oe=^D:
```

For 115200bps,

```
fastmodem:\  :dv=/dev/cua/0:br#1800:el=^C^S^Q^U^D:ie=%$:oe=^D:
```

Dial-in Only or Bi-directional

- Run Solaris `admintool` and open the **Serial Port Manager**.
- Assume you want to set up the first port (`/dev/term/0`) for dial in at 38400bps. Use the Serial Port Manager to modify port 0 for "dial-in only" or "bi-directional". Use `ttymon0` instead of `zsmon` as the service tag. Set the baud rate to 38400bps. Click `apply`. The DTR light on your modem should turn on.
- Dial in from another machine. Your modem should answer the call and spawn a login shell.
- With high-speed serial connections, we recommend you lock the modem's serial port speed (also called the DTE speed). In our example, you need to lock the modem DTE speed to 38400bps.

Adding Printers to Your System

Use the Solaris `admintool` to configure your printer. You will need to collect some information regarding your printer and the MAGMA device that you will be connecting to your printer. First of all, you need to know the device name. For a MAGMA serial device, you will be looking at an entry like `"/dev/term/?"`. Next, you will need to know if your printer is supported by System V.

All Postscript compatible printers are supported in Solaris 2.x. You need to define your printer as either PS (normal postscript) or PSR (postscript reverse). For all other printers, please try to find your printer entry in the directory `/usr/share/lib/terminfo/.` This directory contains a lot of sub-directories with `terminfo` entries for the most popular terminals and printers.

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To check if a printer entry is available, try:

```
tput -T <terminal-or-printer-name> longname
```

To check the information in the entry you found, try:

```
infocmp <terminal-or-printer-name>
```

Now you can bring up `admintool` and select printer setup. Pull down the menu for adding a local printer and fill in all the fields with the information that you have gathered.

Printer Cables

Connect the printer to the workstation with a three-wire cable. Read the printer manufacturer's printer manual. If the printer is a DTE device, use a null modem cable. Null modem cables have line 7 wired straight through and lines 2 and 3 swapped so that proper transmit and receive signals are communicated between two DTE devices. If the printer is a DCE device, then connect 2, 3, and 7 straight through.

To test if your cable works, send something over the serial line to the printer using `cat`. For example, if the printer is attached to `/dev/term/0`, type:

```
# (stty 9600 < /dev/term/0; cat /etc/remote) > /dev/term/0
```

Printing ASCII Files

To set up a LaserJet II/III compatible printer (PCL4/PCL5 compatible) to print ASCII files (non-PCL graphic files), you need to tell the printer to do the `opost` with `onlcr` itself. In other words, you need to tell the printer to do the "NL" to "NL,CR" translation. If the printer setup does not print text files properly, try this:

```
# cd/usr/share/lib/terminfo/h/
# infocmp hplaser > junk
```

Use your favorite editor to edit the file `"junk"` and find the entry `"is2".` Change `"is2"` from `"/EE/E&k0G"` to `"/EE/E&k2G".` This sends an escape sequence to the printer to tell it to do the "NL" to "NL,CR" translation itself. You can customize your entry to send whatever escape you need.

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Next, recompile the `terminfo` entry for your printer with `tic:`

```
# tic junk
```

Printing PCL Graphics Files

If you need to send PCL graphic files to your printer, you will need to modify the interface file `"/etc/lp/interfaces/ <printer-name>".` Make sure your printer is not set up to do "NL" to "NL,CR" translation itself, otherwise, it won't work.

- Edit the file and search for a line starting with `stty=`
- Change the line to stty="-opost"
- Next, find the line starting with badfileyet=
- Add the following above the line you just found: `stty ${stty} 0<&1 1>/dev/null 2>&5`
- Save the file and you should now have a printer entry that will print PCL or other general graphic files.

If you still can't get a perfect PCL file printout from your printer, check your printer entry in the `/usr/share/lib/terminfo`. You need to tell the printer NOT to do the "NL" to "NL,CR" translation.

For example,

```
# cd/usr/share/lib/terminfo/h/
# infocmp hplaser > junk
```

Use your favorite editor to edit the file `"junk"` and find the entry `"is2".` Change `"is2"` from `"/EE/E&k2G"` to `"/EE/E&k0G".` This sends an escape sequence to the printer to tell it not to translate the "NL" to "NL,CR". You can customize your entry to send whatever escape you need.

Next, recompile the `terminfo` entry for your printer with `tic:`

```
# tic junk
```


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Getting Rid of Banner Pages

If you want to set up your printer not to print a banner, you need to edit the interface file. The interface file for your printer is:

```
"/etc/lp/interfaces/<printer-name>"
```

Edit the file and search for a line starting with `nobanner=`

```
Change the no to a yes and save the file.
```


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Chapter Six Synchronous Interface Option

Running the MAGMA 4 or 16 Sync Sp ports in synchronous mode requires installing the MAGMA synchronous driver package, `MAGMAsync.` This option allows for any combination of synchronous and asynchronous ports to be concurrently used concurrently. The synchronous interface is provided by the `cdh` driver.

NOTE

Use of the synchronous interface requires pre-installation of the asynchronous driver, `MAGMAsp.`

The `cdh` driver is a loadable STREAMS pseudo-driver that implements the sending and receiving of data packets as HDLC frames over MAGMA Sync Sp serial lines. The `cdh` driver is accessed via the `/dev/cdh*` devices, and was designed to provide a native `zsh(7)` interface. As such, it should provide the same compatibility to the SunLink WAN options as do the native ports in synchronous mode.

The driver software is provided on a 3.5-inch diskette in tar format. Installing the software is as simple as un-taring the disk and typing `"pkgadd".`

Installation

The MAGMA asynchronous driver, MAGMA Allin1 Sp, must be installed before the `MAGMAsync` package can be installed. Please make sure that the `MAGMAsp` package is installed on your system BEFORE attempting to install this package. You can use the following command to determine if the `MAGMAsp` package is present:

```
# pkginfo MAGMAsp
```

This should return something of the form:

```
system   MAGMAsp   MAGMA Sp Driver release X.X
```

The `MAGMAsync` distribution media is a 3.5-inch diskette in tar format. To read this distribution onto the target system, do the following:

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1. Insert the release diskette into the appropriate drive.

2. Log into the target system as root.

3. Change directory to `/var/spool/pkg`

```
# cd /var/spool/pkg
```

4. Inform the volume manager:

```
# volcheck
```

5. Untar the disk:

```
# tar xvf /vol/dev/aliases/floppy0
```

You should now have the subdirectory `MAGMAsync,` which is the install package for this release.

To install the packages, use the `pkgadd` command `(pkgadd(1M))`:

```
# /usr/sbin/pkgadd MAGMAsync
```

If SunLink X.25 software is already installed on the target system, the `MAGMAsync` package installation will ask if you would like to use the MAGMA synchronous ports for X.25 links. If you answer Yes then the appropriate SunLink configuration files will be modified to include the `/dev/cdh` devices as potential WAN links.

If the SunLink X.25 packages are not already installed, this step will be skipped. Therefore, if you want to run the SunLink X.25 over the MAGMA ports you should `pkgadd` the SunLink package first.

Please note that only SunLink X.25 versions 8.0.1 and later are supported with this release.

The MAGMA synchronous driver was designed to mimic the native Sun `zsh` driver, hence, `"man zsh"` will tell you most of what you want to know about the `/dev/cdh` ports. `"man cdh"` will tell you the rest.

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Cabling Requirements

CAUTION

You MUST use special RJ50 cables for both the 4 Sync Sp and 16 Sync Sp breakouts. Use of an 8-pin RJ45 cable will damage the RJ50 connector. You must also be careful to use the RJ50 synchronous cables for synchronous configured ports, and RJ50 asynchronous cables for asynchronous configured ports. And, yes, we are sorry about this.

50 Pin Identification (Plug End)

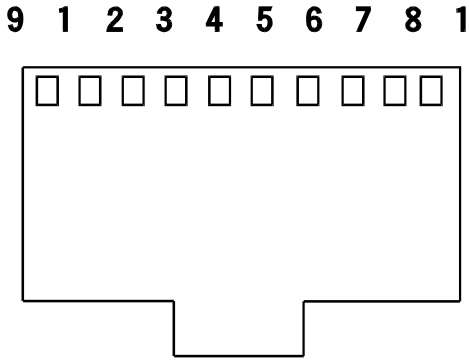


FIGURE 5

DB25 Pin Identification

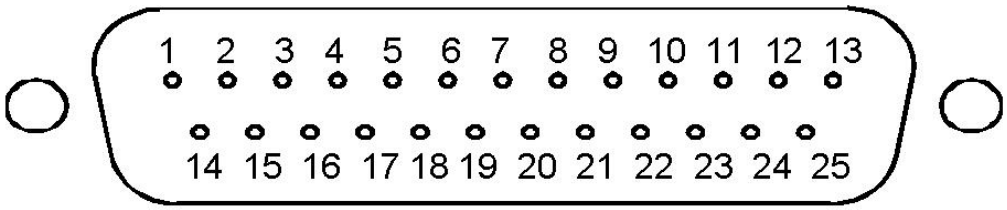


FIGURE 6

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Straight Through Asynchronous Adapter Wiring

Signal		Pin Numbers	
Name	Mnemonic	RJ-50	DB-25 Male
Transmit Data	TX	2	2
Receive Data	RX	3	3
Request to Send	RTS	1	4
Clear to Send	CTS	5	5
Data Set Ready	DSR	6	6
Signal Return	ground	7	7
Carrier Detect	CD	8	8
Data Terminal Ready	DTR	4	20
Receive Clock	RX Clock	9	15
Transmit Clock	TX Clock	10	17

TABLE 1

Straight Through Synchronous Adapter Wiring

Signal		Pin Numbers	
Name	Mnemonic	RJ-50	DB-25 Male
Transmit Data	TX	2	2
Receive Data	RX	3	3
Request to Send	RTS	4	4
Clear to Send	CTS	5	5
Data Set Ready	DSR	6	6
Signal Return	Ground	7	7
Carrier Detect	CD	8	8
Data Terminal Ready	DTR	1	20
Receive Clock	RX Clock	9	17
Transmit Clock	TX Clock	10	15

TABLE 2

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From The Man Page

The cdh module is a loadable STREAMS driver that implements the sending and receiving of data packets as HDLC frames over synchronous serial lines. The module is designed to emulate the native zsh driver. See zsh(7) for a full description of the interface. The following will describe specifics of the MAGMAcdh devices.

The cdh?? devices provide up to sixteen HDLC ports.

The cdh?? ports support several options for clock sourcing and data encoding. Both the transmit and receive clock sources can be set to be the external Transmit Clock (TRxC), external Receive Clock (RTxC), or the internal Baud Rate Generator (BRG). The cdh?? devices do not support the Digital Phase Lock Loop (DPLL) option.

When using the BRG as a clock source, a baud rate between 300bps and 256Kbps must be specified. As the driver must translate this value to a 16-bit time constant, the actual line speed may vary slightly from that requested. If an exact baud rate is required that cannot be obtained to the required tolerance, an external clock source must be selected.

The cdh ports can also be configured to provide, receive and transmit clock signals. This is accomplished by setting the CONN_TXCOUT bit in the sm_config field of the scc_mode structure. To use this option, the application must use the cd_sync.h file provided by MAGMA. Use of this feature requires a special cable which crosses pin 20 (RS-232 DTR) with pins 15 and 17 (TxC and RxC). Furthermore, use of this option will disable the (DTR) signal. Typically this option will be used when the cdh device must be configured as a DCE providing clocks to the remote.

The local loopback option is supported for testing and diagnostic purposes. See syncloop(1M). The cdh ports do not support the local echo option.

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Chapter Seven Device Names

Device Names under SunOS 4.1.x

MAGMA ports use a simple naming convention. Up to 127 ports can be installed in a single SPARC system. For additional ports, contact MAGMA.

There are two types of ports: serial ports and dial-out ports.

Port Type	Port Name Prefix
serial	ttym
dial-out	

Each port is identified by a two character numeric field added to the port name prefix. The first numeric character is the Sp board number in the system. The second character is the port number on the board. The numeric characters are in hex representation and range from "00", board 0 port 0, to "fe", board 16 port 15.

Examples:

Port Name	Description
ttym00	First serial port on the first MAGMA Sp board
cum14	The dial-out port name for the fifth serial port on the second MAGMA Sp board

Port names are set up in the `/dev` directory automatically at boot time. If you add MAGMA Sp boards or change the slot locations of your MAGMA Sp boards, the port names are automatically updated to reflect the latest configuration.

We suggest that you install MAGMA Sp boards starting in the lowest available slot and work up to the higher numbered slots. If you install boards in this manner, the port names of the previously installed boards will not change.

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MAGMA 4 Sp/8 Sp/16 Sp Port Names

	1st board	2nd board	3rd board
serial port 0	ttym00	ttym10	ttym20
serial port 1	ttym01	ttym11	ttym21
serial port 2	ttym02	ttym12	ttym22
serial port 3	ttym03	ttym13	ttym23

MAGMA 8 Sp/16 Sp Port Names

	1st board	2nd board	3rd board
serial port 4	ttym04	ttym14	ttym24
serial port 5	ttym05	ttym15	ttym25
serial port 6	ttym06	ttym16	ttym26
serial port 7	ttym07	ttym17	ttym27

MAGMA 16 Sp Port Names

	1st board	2nd board	3rd board
serial port 8	ttym08	ttym18	ttym28
serial port 9	ttym09	ttym19	ttym29
serial port a	ttym0a	ttym1a	ttym2a
serial port b	ttym0b	ttym1b	ttym2b
serial port c	ttym0c	ttym1c	ttym2c
serial port d	ttym0d	ttym1d	ttym2d
serial port e	ttym0e	ttym1e	ttym2e
serial port f	ttym0f	ttym1f	ttym2f

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Device Names under Solaris 2.x

The system creates symbolic links from `/dev/term/{?}, /dev/cua/{?}` to the `/devices/sbus/...` directory. Solaris 2.x supports 1023 serial ports.

```
/dev/term/?        for serial devices

/dev/cua/?         for serial call-out devices
```

If you have a 4 or 16 Sync Sp board, the synchronous serial devices are:

```
/dev/cdh?          for synchronous devices
```

High Speed Operation

When receiving data at high speed it is possible to lose characters because the CPU is overloaded.

If you are operating your ports at speeds higher than 38.4Kbps or are experiencing receiver data losses, you must use flow control. All MAGMA Sp boards support RTS/CTS flow control. Please check your device (modem, xterminal,terminal) manual for instructions on how to enable RTS/CTS flow control.

CBAUD

The following CBAUD settings differ from Sun's to allow use of higher speeds available to the MAGMA Sp boards. (For speeds above 38,400bps set your peripheral to RTS/CTS flow control.):

CBAUD	ACTUAL SPEED
50	56,000bps
75	57,600bps
134	64,000bps
200	76,800bps
1800	115,200bps

MAGMA driver versions later than 4.0 support the Solaris 2.5 extended baud rates.

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Setport Utility

Each port can be forced to remain at given `stty` settings (baud rate, word size, parity, etc.) independently of the current port `stty` settings. This is done using a utility we call **`setport`** which is provided on your MAGMA distribution diskette. To read what `setport` can do, enter the command `setport` and a couple of man pages will be displayed. The important thing here is that `setport` offers a more convenient and stable way to configure MAGMA ports than using normal system configuration methods. **We recommend using `setport` rather than selecting the little used baud rate values above** to achieve higher bit rates and hardware flow control. For example, leave `ttytab, gettytab` or Serial Manager (Solaris 2.x) at 9,600bps and interface to a modem at 57,600bps by entering the following:

(SunOS 4.1.x)

```
# /etc/MAGMA/Sp/setport cum00 57600 cs8 -parenb crtscts
```

(Solaris 2.x)

```
# /opt/MAGMA_Sp/bin/setport cua/0 57600 cs8 -parenb crtscts
```

This will set the ports `/dev/ttym00` and `/dev/cum00` to 57,600bps, 8 bits, no parity with CTS/RTS hardware handshaking, even though the system sees the ports as 9,600bps. The port's speed determines the throughput, not the system settings.

To display the current setport settings on the first MAGMA port, type:

```
# /etc/MAGMA/Sp/setport cum00     (SunOS 4.1.x)
# /opt/MAMGA_Sp/bin/setport cua/0 (Solaris 2.x)
```

To reset the port to system `stty` settings, type:

```
# /etc/MAGMA/Sp/setport cum00 reset
# /opt/MAMGA_Sp/bin/setport cua/0 reset
```

We suggest putting `setport` commands in your `rc.local` (`/etc/rc.d`) directory in Solaris, see "`man rc`") so the ports will be configured while booting. Changes to `stty` settings using system utilities will not change the current `setport` settings on the port.

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Setport Options

48 – 256000	Set baud rate to the number given.
[-]parenb	Enables parity generation and detection. With '-', disable the parity generation.
[-]parodd	Select odd parity. With '-', select even parity
cs5 - cs8	Select character size from 5 to 8.
[-]cstopb	Uses one stop bits per character. With '-', use two stop bits per character.
[-]crtscts	Enable RTS/CTS hardware flow control.
[-]ignbrk	Ignores break on input. With '-', does not ignore break.
[-]brkint 0,1	Signals interrupt on break. With '-', does not signal interruption break. 0 or no digit: Interrupts on the start of break only. 1: Interrupt on the end of break and send an MBREAK upstream.
[-]ignpar 0-2	Ignores parity errors. With '-', does not ignore parity errors. 0 or no digit: Normal inpck, ignpar and parmrk flags will be in effect. 1: All parity, overflow and frame errors will be treated as good data (only REV F and later CD1400 chips) and system inpck, ignpar and parmrk flags will be ignored
[-]istrip	Strips input characters to seven bits. With '-', does not.
[-]inlcr	Maps Newline to Carriage Return on input. With '-', does not.
[-]igncr	Ignore carriage-return on input. With '-', does not.
[-]icrnl	Maps carriage-return to Newline on input.
[-]ixon	Enables START/STOP output control. With '-', disable
[-]ixany	Allows any character to restart output. With '-', does not.
[-]ixoff nnmm	nn is the receive fifo level range from 1-11 that will cause receive interrupts. mm is the receive fifo level range from 00-12 that will cause Request To Send (RTS) line to be dropped to stop the remote transmission to our receiver. mm must be at least one greater than nn. For example, `setport cum00 ixoff 709` generates receive interrupts when 7 characters are available in the fifo and drop the RTS when the fifo has 9 characters Note: ixoff differs from system ixoff in that the fifo threshhold must be provided and has no effect on system queue full/empty conditions. Specifying ixoff will automatically set crtscts flowcontrol unless mm is 00.
[-]hangup	Send a hangup signal if carrier drops. With '-', does not.

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Chapter Eight Cabling Information

WARNING

MAGMA's RJ-45 Pin Number Configuration does not conform to the EIA Standards for RJ-45 cables. You may find MAGMA's RJ-45 pin-out is reversed.

Signal Names and Pin Number Assignments

Table 3 describes the standard signal names and their pin assignments for the DB-25 and RJ-45 connector configuration.

Signal Names and Pin Assignments

Signal		Pin Numbers	
Name	Mnemonic	DB-25	RJ-45
Transmit Data	TX	2	2
Receive Data	RX	3	3
Request to Send	RTS	4	1
Clear to Send	CTS	5	5
Data Set Ready	DSR	6	6
Signal Return	ground	7	7
Carrier Detect	CD	8	8
Data Terminal Ready	DTR	20	4

TABLE 3

Figure 7 shows the connector pin identification for the DB-25 male connector. Pin numbers are mirrored (numbered right to left) for the DB-25 female connector.

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DB-25 Male Pin Identification

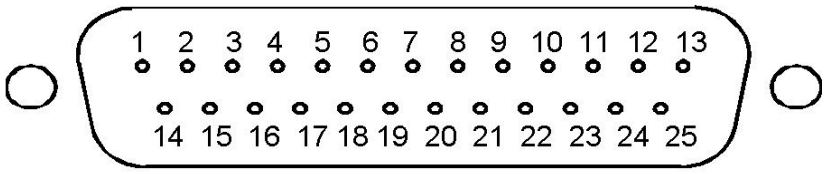


FIGURE 7

Figure 8 shows the connector pin identification for the RJ-45 male connector.

RJ-45 Pin Identification

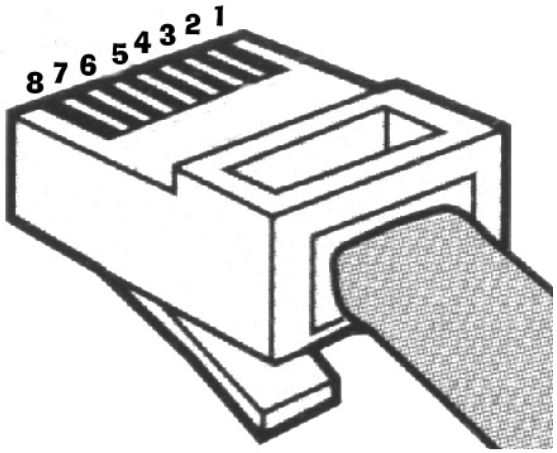


FIGURE 8

Typical Cables

Of the serial devices that you might connect (modems, terminals, printers, and plotters), modems require a straight through cable pin 1 to 1, pin 2 to 2, etc.; while terminals, printers and plotters will generally require a null modem cable: pin 2 to pin 3, pin 3 to pin 2, etc.

The minimum signals required to connect a serial device to a port are: TX, RX, and ground. This form of cable is sometimes called a "three-wire" connection and is useful for simple serial devices that run at bit rates of 9600bps and lower. Because a three-wire connection allows only software (or "in-band") flow control and not the faster and more reliable hardware (or "out-of-band") flow control, MAGMA does not recommend their use.

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Software flow control relies on the transmission/reception of XON and XOFF characters within the data stream (hence the name "in-band" flow control). In-band flow control is prone to data overruns at speeds higher than 9600bps. By contrast, hardware flow control relies on signals that are not a part of the data stream being transmitted or received (hence the name "out-of-band" flow control). High-speed terminal or other serial devices (19200bps up to 128000bps) and all modems will require hardware flow control signals.

Note that software flow control and hardware flow control are not mutually exclusive. Both may be used, simultaneously, on a serial device. When used together, the combination of hardware and software flow control results in the best possible performance from your serial devices and ports.

DB-25 Cable Configurations

Figure 9 is a standard null modem cable design that allows software and hardware handshaking using the RTS signal from the peripheral. This cable is typically used to connect a MAGMA port to a high-speed serial device such as a terminal or serial communications line that uses RTS/CTS hardware handshaking for flow control.

DB-25 to DB-25 Null Modem (RTS) Configuration

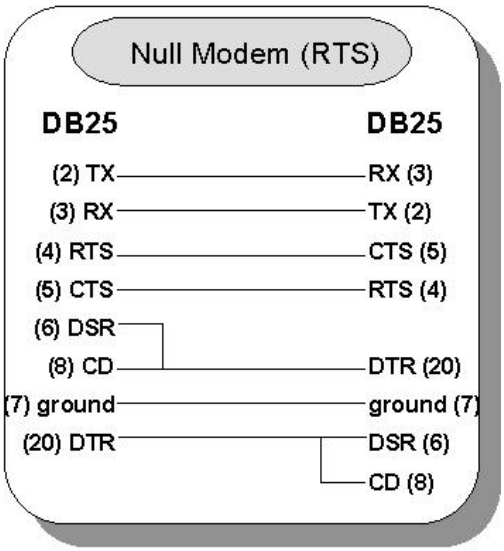


FIGURE 9

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Many printers rely on software handshaking (XON/OFF) for flow control but use the hardware Data Terminal Ready (DTR) line to indicate that the printer is not ready when it is off-line, out of paper or in some other error state.

If the printer does not transmit an XOFF character when it enters one of these states, the RTS null modem cable shown above will not work.

Figure 10 is a null modem cable design that allows software handshaking and DTR hardware handshaking. This cable is typically used for hooking up a MAGMA port to a laser printer that uses DTR handshaking only.

DB-25 to DB-25 Null Modem (DTR) Configuration

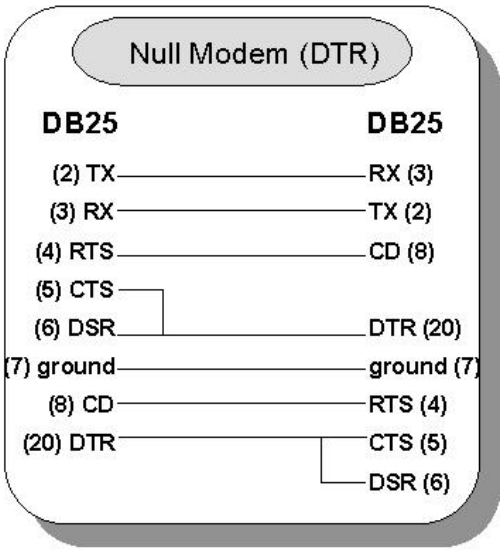


FIGURE 10

You should consult your device manual to determine what pin connections are required.

A "gender changer" or other connector converter may be required to connect a serial device to a MAGMA serial card. For instance, connecting the communications port of a typical personal computer to a MAGMA port would require a null modem cable having a DB9 connector at the PC end and a DB-25 at the MAGMA serial end.

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RJ-45 Cable Configurations

Figure 11 is a standard null modem cable design that allows software and hardware handshaking using the RTS signal from the peripheral. This cable is typically used to connect a MAGMA port to a high-speed serial device such as a terminal or serial communications line that uses RTS/CTS hardware handshaking for flow control.

RJ-45 to RJ-45 Null Modem (RTS) Configuration

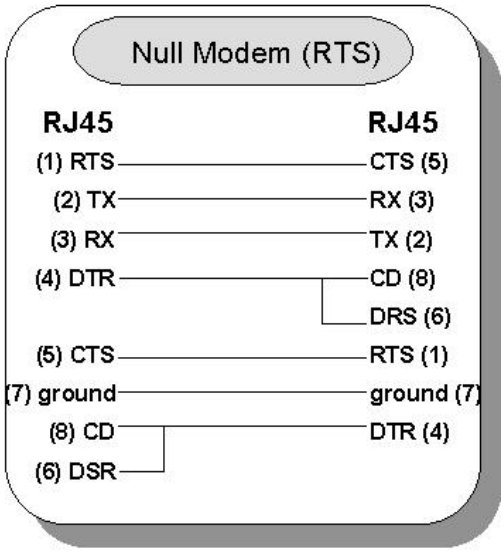


FIGURE 11

DB-25 to RJ-45 Cable Configurations

To connect a serial device to a MAGMA port, a converter may be required. Figure 12 and Figure 13 depict the cabling wiring for RJ-45 to DB-25 null modem and straight through.

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RJ-45 to DB-25 Null Modem (RTS) Configuration

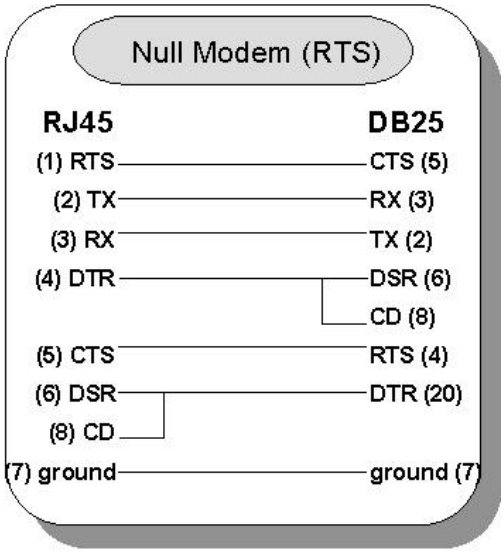


FIGURE 12

RJ-45 to DB-25 Null Modem (RTS) Configuration

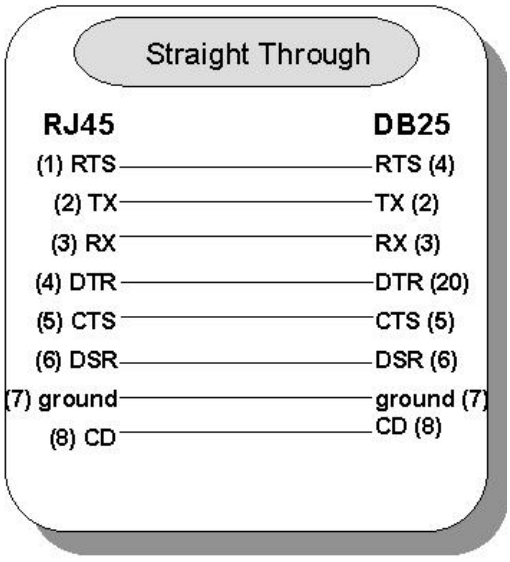


FIGURE 13

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Ordering Cables

RJ-45 Cables

RJ-45 cables for connecting serial devices to MAGMA serial multiplexors. To connect to a DB-25 connector, use the RJ-45 to DB-25 adapter below.

Part Number	Description	Price
RJ45-4	4' 8-wire modular cable	$2
RJ45-10	10' 8-wire modular cable	$4
RJ45C-x	Custom length (specify length as "x" in part number)	$10+$0.20/foot

DB-25 Adapters

DB-25 adapters mate with RJ-45 cables to present a DB-25 interface to the device. Both straight through adapters and null modem adapters are available. The DB-25 connectors are male only.

Part Number	Description	Price
ADAPT-ST	Straight through adapter for modems	$7
ADAPT-NULL	Null modem adapter for terminals, printers, plotters, etc.	$7

Cable/Adapter Sets

Buy cables bundled with adapters and get a price savings.

Part Number	Description	Price
SET4-NULL-4	4 null modem adapters and 4 4' RJ-45 cables	$32
SET4-ST-4	4 straight through adapters and 4 4' RJ-45 cables	$32
SET8-NULL-4	8 null modem adapters and 8 4' RJ-45 cables	$64
SET8-ST-4	8 straight through adapters and 8 4' RJ-45 cables	$64

To order cables contact MAGMA at (858) 530-2511, e-mail sales@magma.com or visit our web site at http://www.magma.com

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Chapter Nine How to Get More Help

Contacting Technical Support

For a quick response, send an e-mail to **support@magma.com** with a detailed description of your problem or visit our web site at **http://www.magma.com/support.htm**. Our support department can also be reached by fax at (858) 530-2733 or by phone at (858) 530-2511. Support is available Monday through Friday, 8:00 AM to 5:00 PM PST.

When contacting MAGMA Technical Support, please be sure to include the following information:

Name	Product Name
Company Name	Serial Number
Phone Number	Computer Make
Fax Number	Computer Model
E-mail Address	Operating System and Version
	Description of the Problem

Frequently Asked Questions

You can visit the MAGMA Technical Support FAQ pages on the Internet at **http://www.magma.com/support.htm**.

Driver Updates

MAGMA provides free driver upgrades. Upgrades can be downloaded via the Internet. Visit our web site at **http://www.magma.com/support.htm.**

Returning Merchandise to MAGMA

If factory service is required, a Service Representative will give you a Return Merchandise Authorization (RMA) number. Put this number and your return address on the shipping label when you return the item(s) for service. **MAGMA will return any product that is not accompanied by an RMA**

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number. Please note that MAGMA will not accept COD packages, so be sure to return the product freight and duties-paid.

Ship the well-packaged product to the address below:

MAGMA
RMA # _____
9918 Via Pasar
San Diego, CA 92126

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