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# 19" Rack Mount
# SCSI Drive Chassis

## Product P/N
## 330140/160/170

**Manual P/N 340350 REV C**

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Revision Date: October 10, 1997

Includes:
Installation Specification
Operation
Maintenance Information

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## Introduction

The Macrolink SCSI Drive Chassis supports up to three full-height or six half-height SCSI interface devices in various combinations in a 5-1/4 inch high by 19 inch wide (13.34 by 48.26 cm) RETMA rack mountable enclosure. Front panel access is provided for up to four removable media devices. The SCSI chassis supports single-ended and differential connections and is available with either SCSI Narrow or SCSI Wide interface connectors.

The SCSI Chassis provides a 250 Watt supply for powering the drives, filtered forced air cooling, a front panel power switch and indicator light, and AC mains input filtering with a removable power cord. The Macrolink SCSI chassis is certified as Class A compliant by the FCC and is listed by UL, UL Canada, and TÜV for safety. It has been granted CE certification as well.

This manual describes the installation and operation of the Macrolink SCSI Chassis for fixed mounted devices, part number 330160 (Figure 1), the SCSI Chassis with High-Cycle (HC) series removable drive modules, part number 330140 (Figures 2 & 3), and the SCSI Chassis with Low-Cycle (LC) series removable drive modules, part number 330170 (Figure 4).

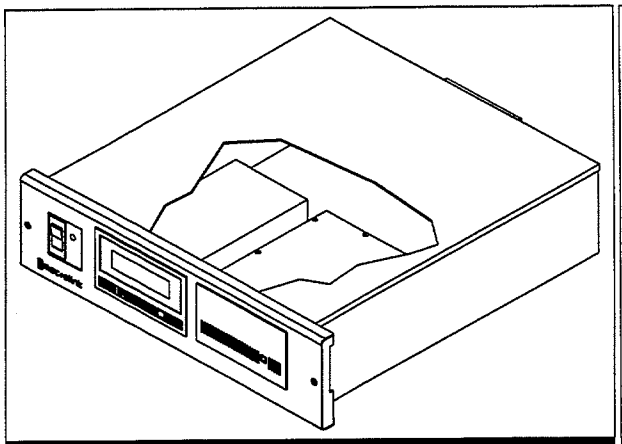


Figure 1 – Fixed Mounting

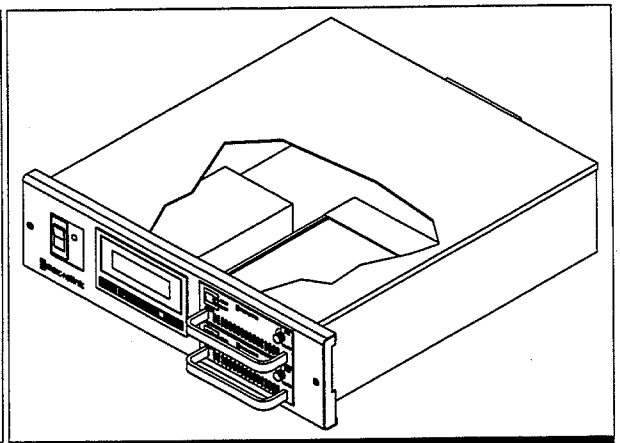


Figure 2 – Two Removable Modules

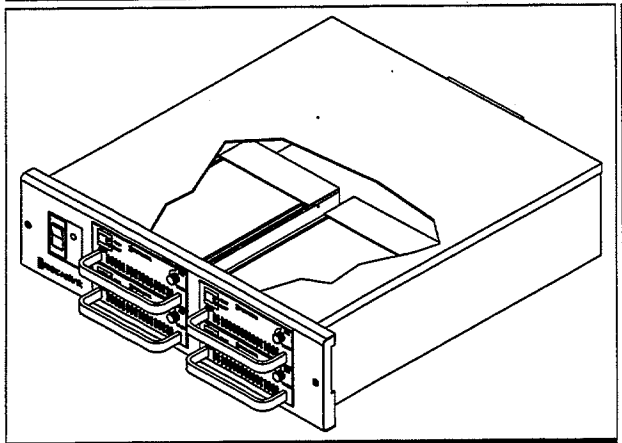


Figure 3 – Four Removable Modules

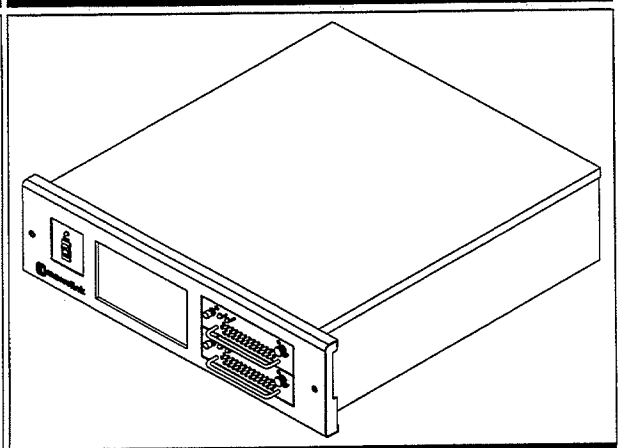


Figure 4 – Two LC Removable Modules

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## Removable Drive Modules

The Macrolink SCSI chassis is available with the hot-swap SCSI DisConnect™ Removable Drive Module system, which allows drives to be removed from the chassis without turning off the power and without disrupting activity on the SCSI bus. These High Cycle count (HC) series modules use military-grade gold plated connectors rated for over 100,000 insertion/removal cycles. Modules are available complete with high-performance disk, tape, and floppy devices already installed.

The SCSI DisConnect™ system significantly simplifies maintenance. A faulty drive can be replaced with zero system downtime. A disk or tape module containing diagnostics can easily be moved from system to system. Removable modules also provide enhanced data security. At the end of the day, modules can be removed from the chassis and locked in a data vault.

For their protection, the drives are shock isolated and completely enclosed inside a ruggedized case (except the front face of tape and floppy devices). A cooling air path is provided through the module. Carbon-fiber impregnated slides quickly drain any accumulated static charge when the module is inserted. The module is secured in the chassis by a rugged thumbscrew assembly.

An HC-series removable drive module is illustrated in Figure 5. An HC-series module with a front panel Write Protect switch is illustrated in Figure 6. The drive installed in this module must support write protect for this feature to be active. An HC-series removable floppy module is illustrated in Figure 7. Most digital audio tape (DAT) data drives will fit in this same module.

A Low-Cycle (LC) version of the SCSI DisConnect™ Removable Drive Module system is also available. LC modules support disk drives only and are rated for 1,000+ insertion/removal cycles. LC and HC series modules are not interchangeable. An LC-series removable drive module is illustrated in Figure 8.

## Multi-Host Access

The design of the Macrolink SCSI chassis allows devices installed within it to be accessed from more than one computer. This is known as multi-host access. A typical application is two systems booting a common operating system and sharing the same data, such as an inventory database. Another common application is a high throughput transaction processing system, where a second system is kept powered up as an online hot spare that can be switched over in a matter of seconds.

An important consideration is that no unpowered devices may be attached to an active SCSI bus. This means that if, for example, two computers are attached to one SCSI chassis and one system needs to be taken down for maintenance or repair, the computer being powered down needs to be isolated from the rest of the SCSI bus. An unpowered controller or device attached to the SCSI bus will cause the signals to assume an undefined state, and prevent any other controller or device from accessing the bus.

To address this, the SCSI Chassis can be equipped with the Macrolink Inline SCSI Disconnect™ product, which is used as an electronic switch to isolate the chassis from the SCSI bus. These 4-¼" square boards mount in a dedicated area within the chassis and connect between the external SCSI bus connectors and the internal SCSI bus. The Inline SCSI Disconnect™ is fully compatible with the SCSI Disconnect™ removable module system.

The Inline SCSI Disconnect™ is available in a version that converts single-ended SCSI signals to the differential SCSI interface. This allows the higher data reliability and longer cable length (up to 80 feet/25 metres) advantages of the differential interface, while using lower cost single-ended peripherals in the chassis.

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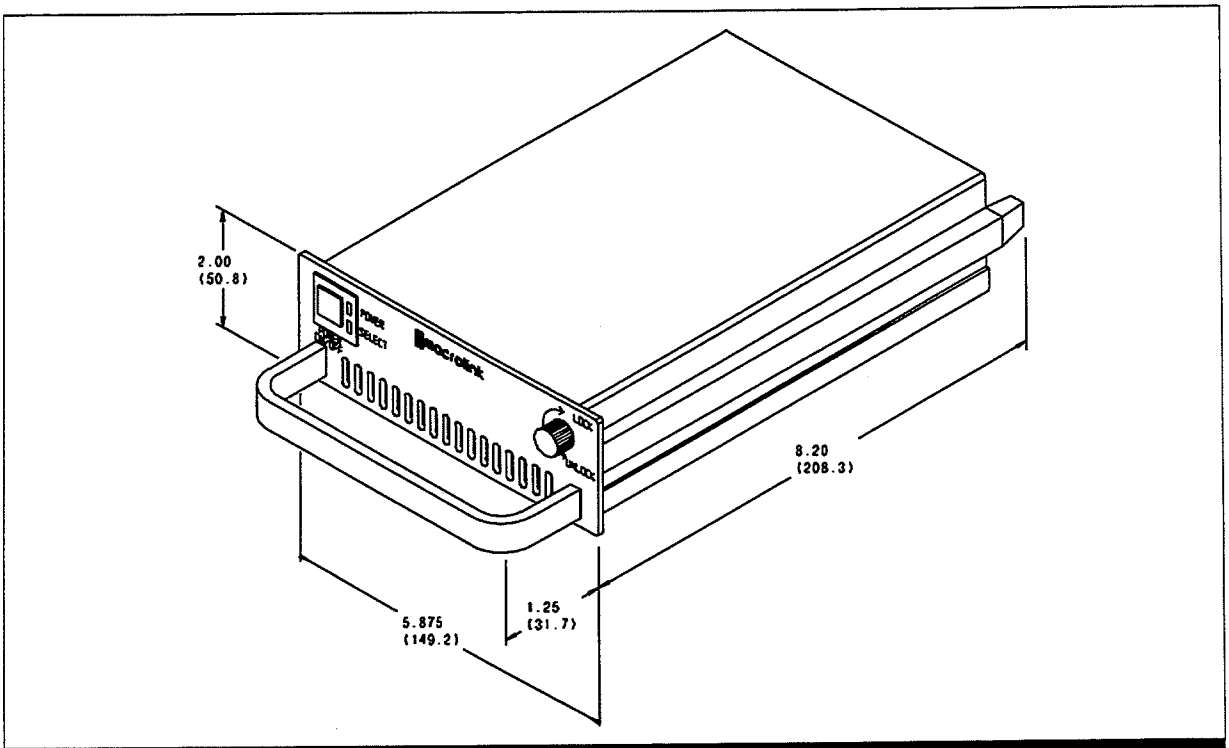



Figure 5 – Removable Disk Module

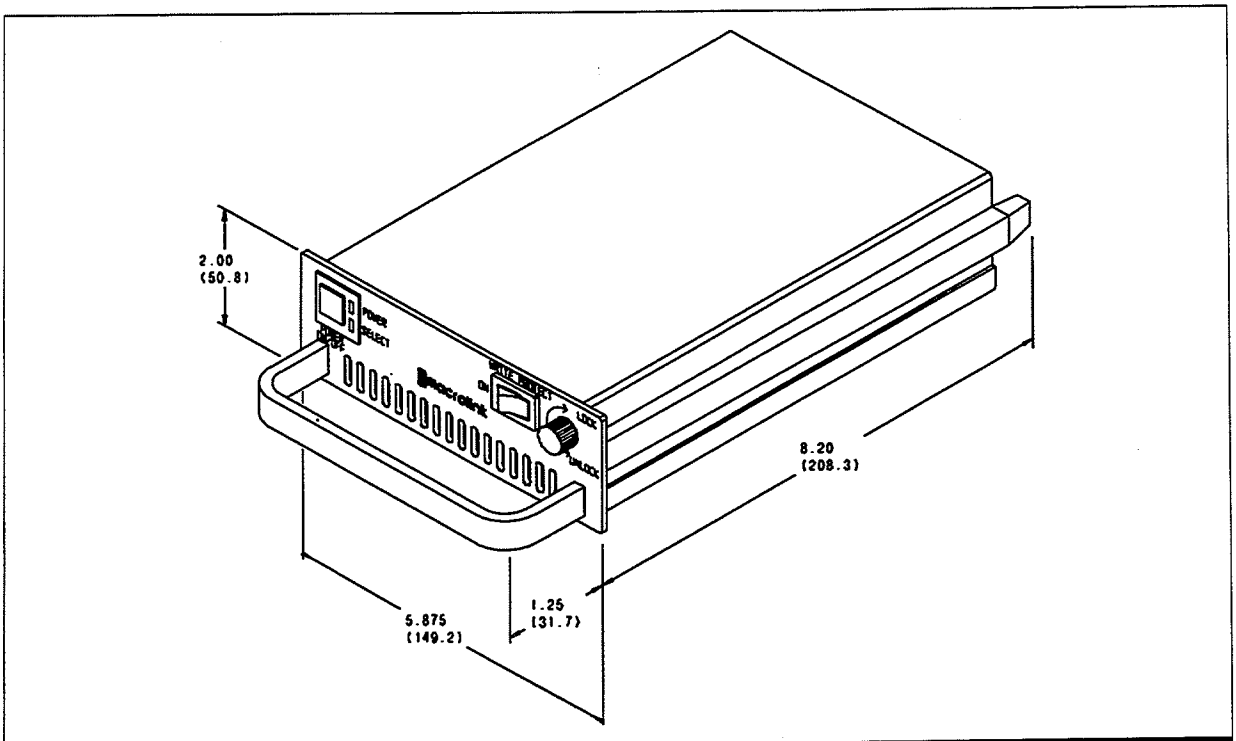



Figure 6 – Removable Disk Module with Write Protect

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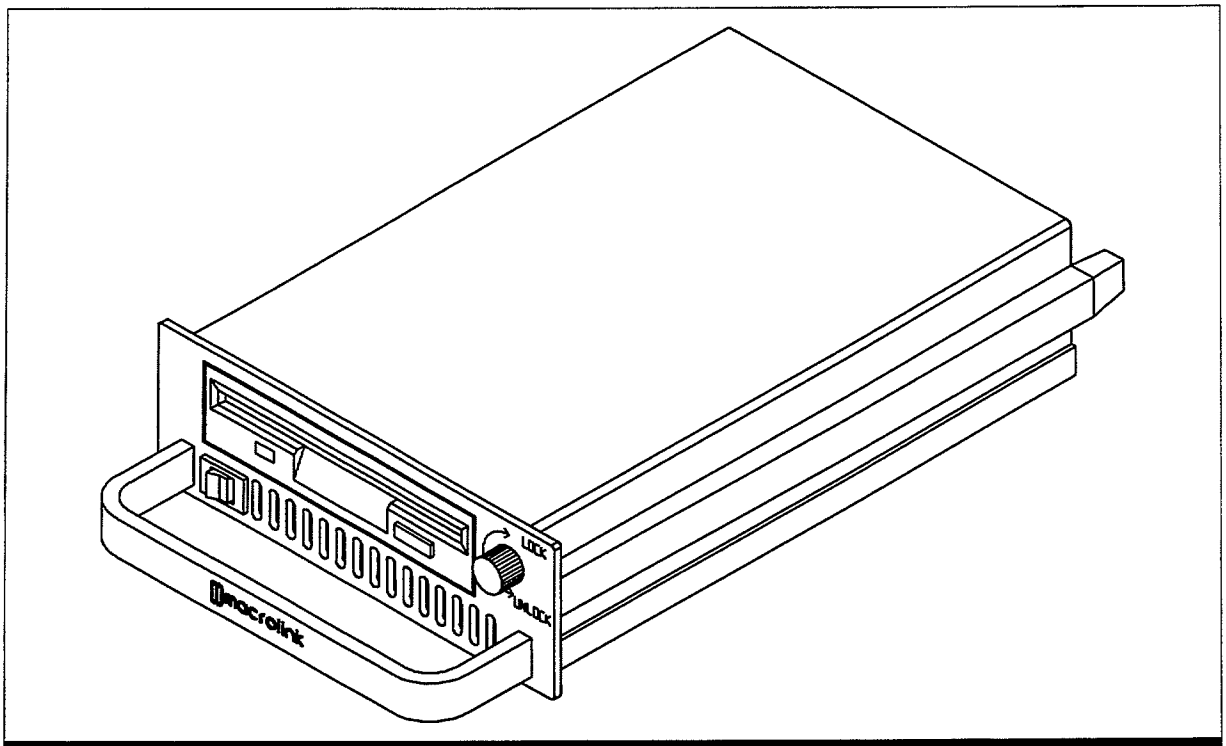



**Figure 7 – Removable floppy/DAT drive module**

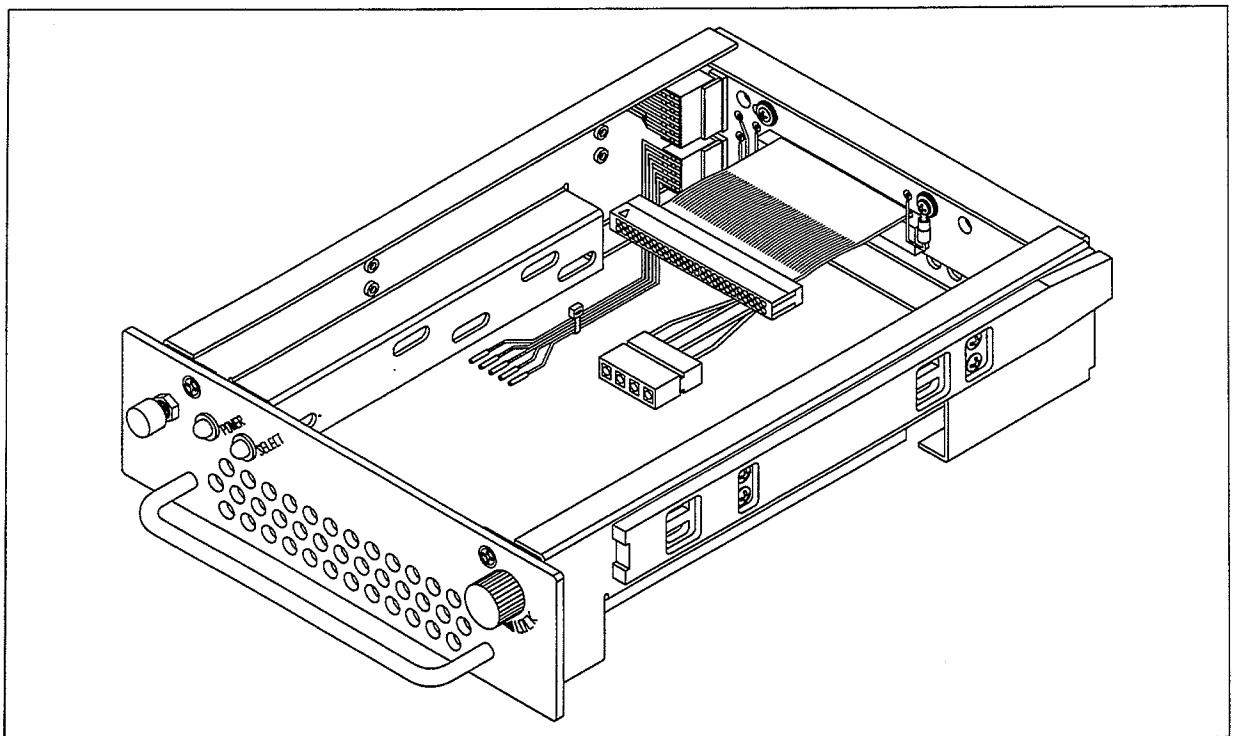



**Figure 8 – LC Drive Module, without a drive installed**

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## French Translations Of Key Safety Information

- Voir la notice d'installation avent de raccorder au réseau.
- Attention: Ne pas utiliser à l'extérieur de l'équipement.
- Attention: Couper le courant avant l'entretien.
- Attention: Un circuit de terre continu est essentiel en vue du fonctionnement sécuritaire de l'appareil. Ne jamais metre l'appareil en marche lorsque le conducteur de mise a la terre est débranche.
- Pour adapter l'appareil à la tension du réseau, consulter la notice d'installation.

## Unpacking The Chassis

The Macrolink SCSI Chassis is shipped in a container that includes the following:

- ❑ Drive chassis (includes power supply, cooling fan, and internal SCSI cable.)
- ❑ A.C. power cord.
- ❑ Chassis slide kit P/N 310117.
- ❑ Installation/Operation manual P/N 340350, which you are now reading.

Additionally, each basic (no drives installed) chassis includes one each of drive mounting bracket kit P/N 310118 and full height cover plate kit P/N 310119. Optional accessories such as external SCSI interface cables and removable drive modules may be shipped in a separate container.

Open the shipping carton and remove the chassis from the packaging material. Check the contents of the carton against the packing list attached to the outside of the shipping container. Inspect all parts carefully for damage. If any shipping damage has occurred, request that the carrier's agent inspect the damage and file a claim with the carrier. Claims MUST be filed within seven days of receipt of the shipment. If there are any discrepancies between the invoice and the received material, notify your point of purchase (Macrolink or your Macrolink distributor) immediately. All claims for shortage or damage must be made within seven days of receipt of shipment. The packaging material should be retained for future use in shipping, storing, or moving of the chassis.

If you ordered a chassis complete with drives from Macrolink, they were installed, configured, and tested at the factory to provide you with a system ready to use as soon as it is removed from the box. Check the packaging material carefully for additional documentation that may have been included with the system.

## Installing The Chassis

Installation of the chassis can be broken down into the following steps. These steps are detailed in the sections that follow:

- ❑ Configure the devices. Set the SCSI ID and any other options.
- ❑ Mount the devices in the chassis or install them into removable modules.
- ❑ Set the voltage input select switch to the proper position. Do not plug in the power cord until the switch setting has been verified.
- ❑ Install the chassis. When selecting a mounting location for the chassis, make sure there will be adequate room for the interface cables, and if the cabinet has a door, that it will it clear the chassis when closed. The chassis air flow requirement is approximately 130 cfm.
- ❑ Install the interface cables and SCSI bus terminators.

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## SCSI ID

Each device on the SCSI bus, including the controller ("host adapter"), is addressed through the means of an ID code. This SCSI ID number normally is user-configurable and must be unique for each device. SCSI ID numbers for narrow ("8-bit") devices range from 0 to 7. ID 7 has the highest priority on the SCSI bus and is usually assigned to the controller. Wide SCSI allows up to 16 device IDs. To maintain compatibility with narrow devices that may share the same bus, ID 7 still has the highest priority, followed by 6 through 0, then 15 through 8.

Macrolink suggests assigning SCSI IDs in ascending order, starting from 0. For fixed mounted devices, consult the drive's installation manual for directions on setting the SCSI ID. Some operating systems have predesignated IDs assigned to specific devices, such as ID 3 for a tape drive. Consult your user documentation.

For chassis equipped with the Macrolink SCSI DisConnect™ Removable Drive Module system, the SCSI ID is set on the receiver, not the drive. The HC receiver module is equipped with a pushwheel rotary switch. Pushing the "+" button at the bottom of the switch increments the SCSI ID. Pressing the "–" button at the top of the switch decrements the ID. See Figure 9. Note: The ID switch on the SCSI Wide version of the SCSI DisConnect™ receiver uses the single character hexadecimal digits A through F to represent IDs 10 through 15, respectively.

The LC receiver module uses jumpers to set the SCSI ID. Refer to the table on the next page and to Figure 10 to configure an LC-series receiver.

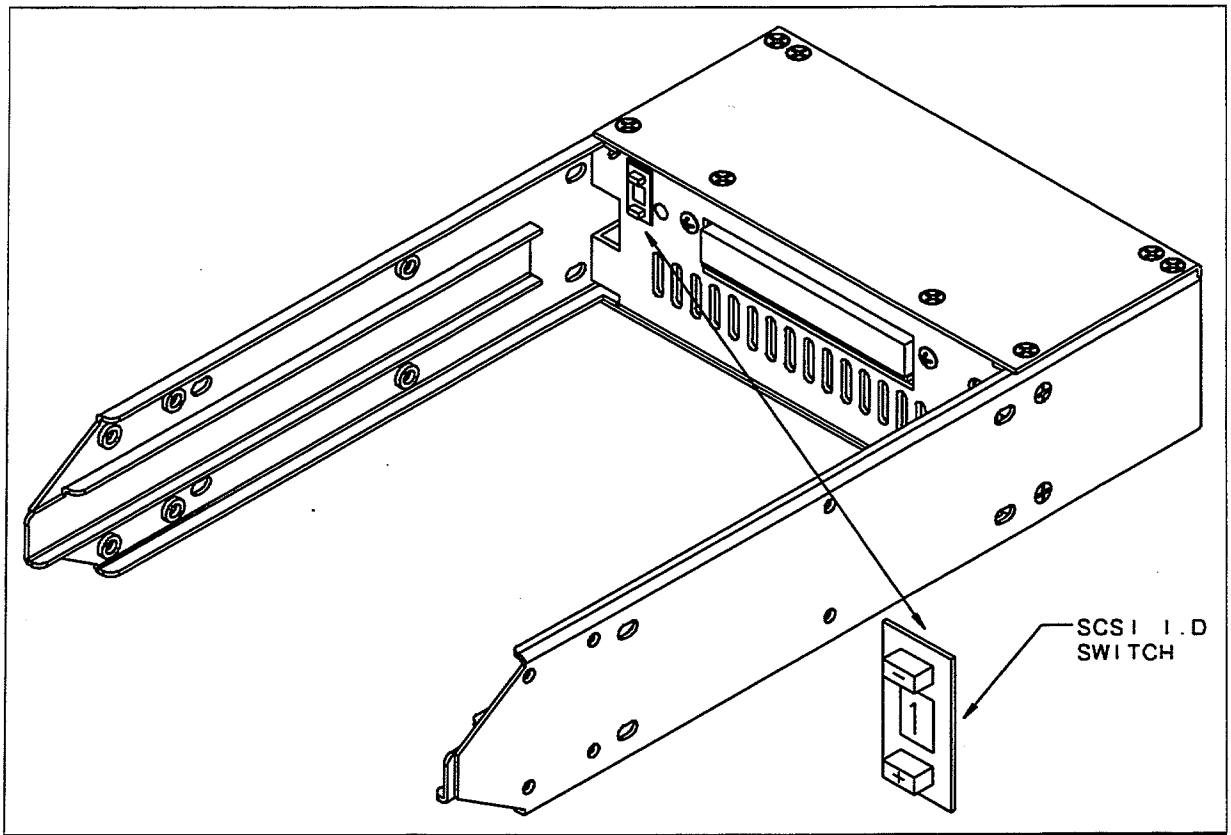



**Figure 9 – HC-Series SCSI DisConnect™ ID switch**

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## LC Receiver Configuration

| LC Receiver Configuration Jumpers | | | | | |
|---|---|---|---|---|---|
| Setting | ID4 | ID2 | ID1 | TPR | TDA |
| SCSI ID = 0 | — | — | — | | |
| SCSI ID = 1 | — | — | ● | | |
| SCSI ID = 2 | — | ● | — | | |
| SCSI ID = 3 | — | ● | ● | | |
| SCSI ID = 4 | ● | — | — | | |
| SCSI ID = 5 | ● | — | ● | | |
| SCSI ID = 6 | ● | ● | — | | |
| SCSI ID = 7 | ● | ● | ● | | |
| Supply Terminator Power to the SCSI bus ✦ | | | | ● | |
| Don't Supply Terminator Power to the SCSI bus | | | | — | |
| Disable on-board SCSI bus terminators ✦ | | | | | ● |
| Enable on-board SCSI bus terminators | | | | | — |
| ● = Jumper Installed — = Jumper Removed ✦ = Default Setting | | | | | |

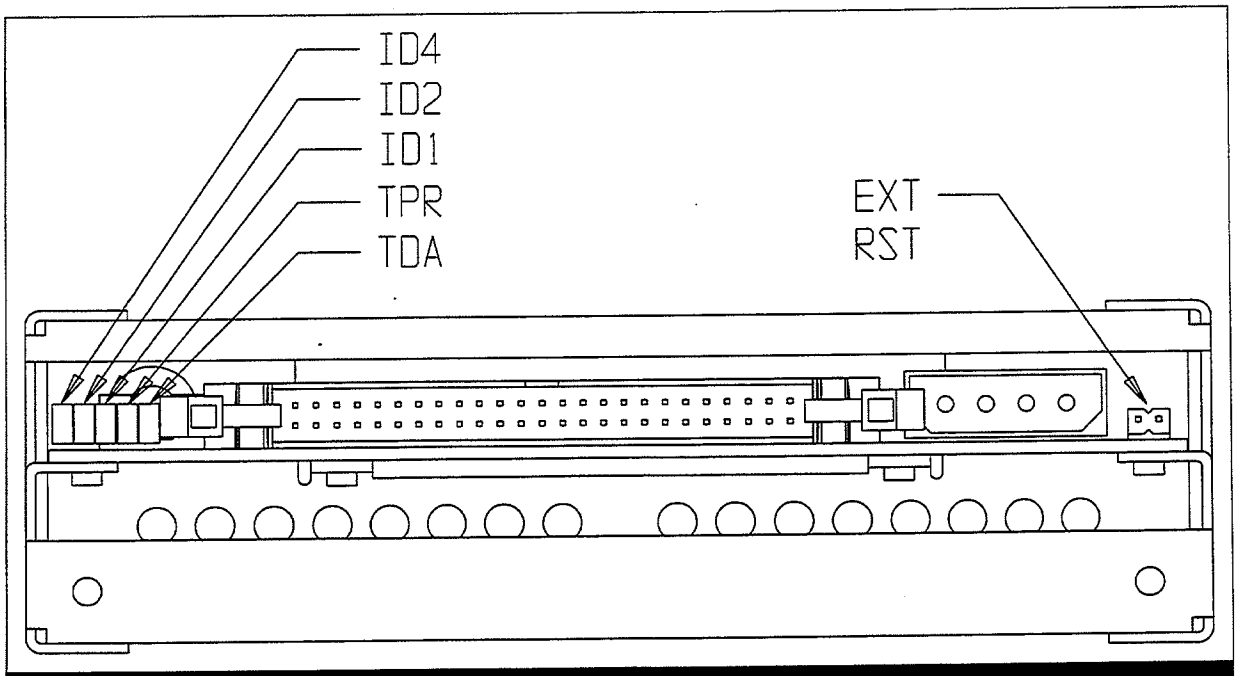



**Figure 10 – LC Receiver configuration jumpers**

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## Drive Installation

### ⚠ WARNING! ⚠

***INSTALLING OR REPLACING DRIVES IN THE CHASSIS REQUIRES THAT THE TOP COVER BE REMOVED, EXPOSING THE POWER SUPPLY AND HIGH VOLTAGES THAT COULD CAUSE INJURY, SEVERE BURNS, OR DEATH. TURN OFF THE CHASSIS AND UNPLUG THE POWER CORD BEFORE REMOVING THE TOP COVER. REPLACE THE TOP COVER BEFORE PLUGGING THE POWER CORD BACK IN.***

If you purchased a chassis and will be installing your own drives, you will need to use a Macrolink part number 310118 drive mounting kit. The kit contains the following:

- ❑ One (1) right side mounting bracket, part number 310086-01.
- ❑ One (1) left side mounting bracket, part number 310086-02.
- ❑ Eight (8) #6-32 x ¼" pan head screws.
- ❑ Four (4) #6 split lock washers.
- ❑ Four (4) #6 flat washers.

The Macrolink SCSI chassis is designed to accommodate drives using 5-¼" form factor mounting. 3-½" form factor drives will require an adapter kit. These kits are available from Macrolink, part number U10000-00.

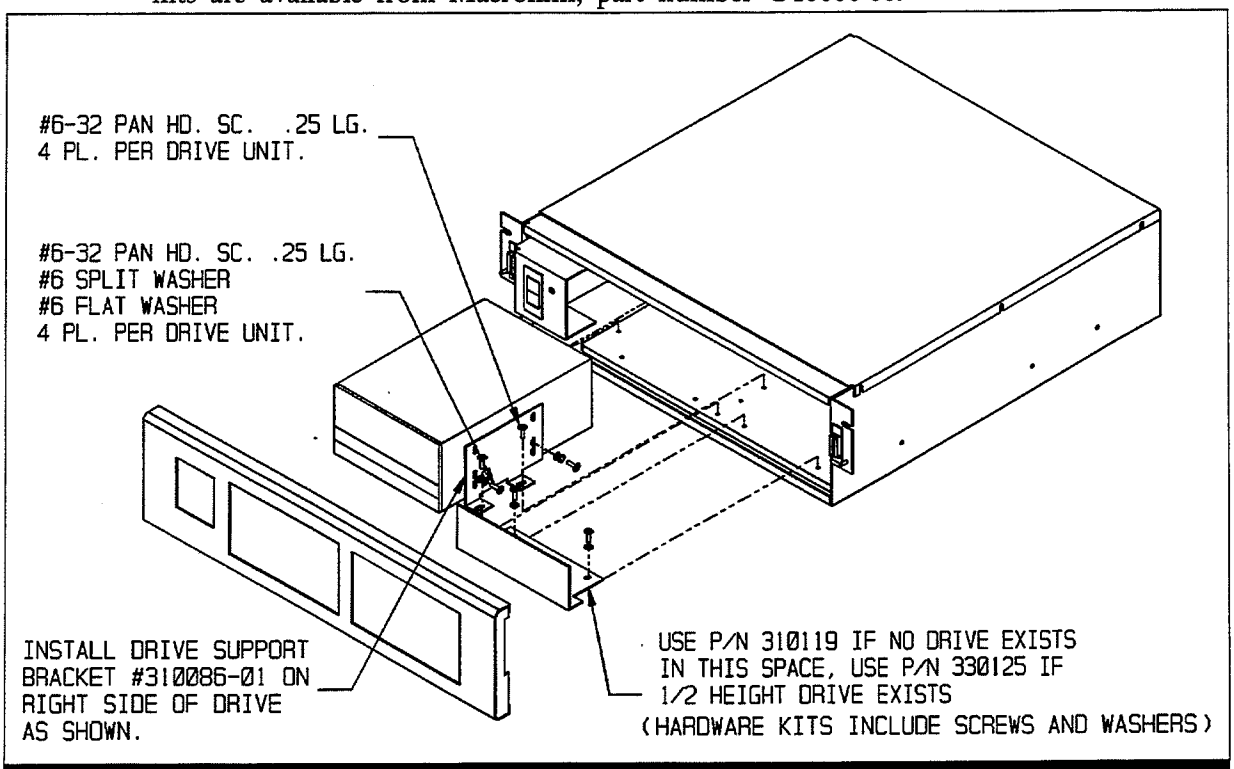



**Figure 11 – Drive installation**

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Set the SCSI ID and disable SCSI bus termination on the drive (See *SCSI Bus Termination* on Page 13). Referring to Figure 11, mount the right side bracket (310086-01) to the drive using two #6-32 x ¼" screws, two #6 split lock washers, and two #6 flat washers. Mount the left side bracket (310086-02) in the same manner. The brackets are slotted to allow vertical positioning of the drive.

Remove the top cover of the chassis by loosening the three Phillips-head screws on each side. The screws do not need to be removed. Lift up on the cover near the rear of the chassis and slide it back until it can be removed. Mount the drive in the chassis using four #6-32 x ¼" screws. Align the drive bezel within the chassis front panel opening. Install the part number 310119 or 330125 cover plates in the unused front panel openings as needed.

The 4 pin D.C. power connectors have a chamfered edge to prevent improper insertion. Select an available power connector and insert it fully into the connector on the drive.

The internal SCSI interface cable has polarized connectors to prevent improper insertion. Not all peripherals have polarization keys, so proper cable orientation must be verified. Pin 1 of the internal cable is generally noted by an arrow or similar indicator on the connector, and a color stripe or similar indicator on the cable. Consulting the device's documentation, align pin 1 of the cable with pin one on the device and insert the connector fully.

## Input Voltage Selection

**⚠⚠ WARNING! ⚠⚠**

***NEVER CONNECT A CHASSIS SET FOR 115 VOLT OPERATION TO A 230 VOLT SOURCE. THE POWER SUPPLY WILL BE DESTROYED.***

The SCSI Chassis is normally set for 115 volt operation. If a 230 volt input will be used, locate the voltage select switch on the rear of the chassis beneath the AC power input connector and slide it to the 230V position. See Figure 12.

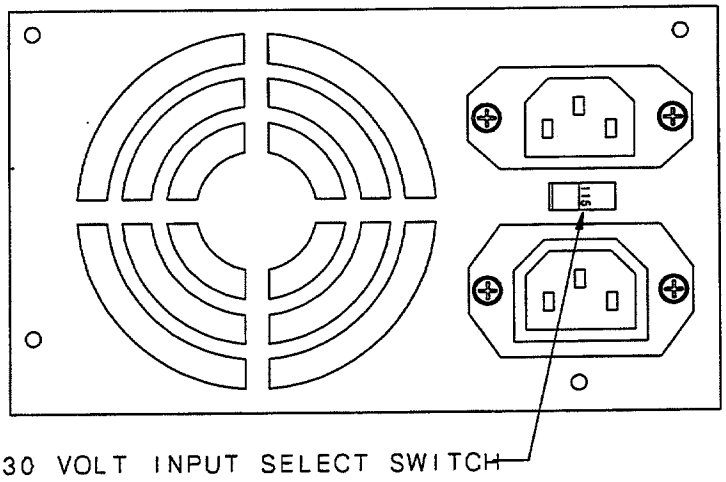



**Figure 12 – Input voltage select switch**

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## Chassis Installation

The Macrolink SCSI chassis mounts in a standard 19 inch (48.26 cm) width RETMA style cabinet in 5-¼ inches (13.34 cm) of vertical space. A slide rail kit is provided to mount the chassis in the cabinet. The kit includes the following:

- ❑ Two (2) side-independent slide assemblies.
- ❑ Two (2) slide extensions.
- ❑ Ten (10) #8-32 x 3/8" pan head machine screws.
- ❑ Six (6) #8 serrated lock washers.
- ❑ Four (4) #8 split lock washers.
- ❑ Four (4) #8-32 hex nuts.
- ❑ Ten (10) #10-24 x 3/8" self-tapping screws.

The chassis front bezel is secured by two flat-head captive screws on the front panel. Loosen the screws and pull the bezel out of its retaining clips. Separate the chassis mount component from the remainder of each slide. Referring to the installation drawing in Figure 13, attach the slides to the chassis using three #8-32 x 3/8 pan head screws and three #8 serrated lock washers on each side.

Using two #8-32 x 3/8 pan head screws, two #8 split lock washers, and two #8-32 hex nuts per side, loosely attach the slide extension to the cabinet mount portion of the slides. The slides and extensions have mounting ears attached at right angles. Locate the area in the cabinet where the chassis will mount. Be sure the slots in the mounting ears will line up with the mounting holes in the cabinet. Using two #10-32 x 3/8 hex washer head screws each for the front and rear, attach the slide to the cabinet. Tighten the slide extension attaching screws.

Slide the chassis into the cabinet. Secure the chassis mounting ears to the cabinet using one 10-32 x 3/8 self-tapping screw per side. Replace the bezel on the front of the chassis. Tighten the screws which secure the bezel to the chassis.

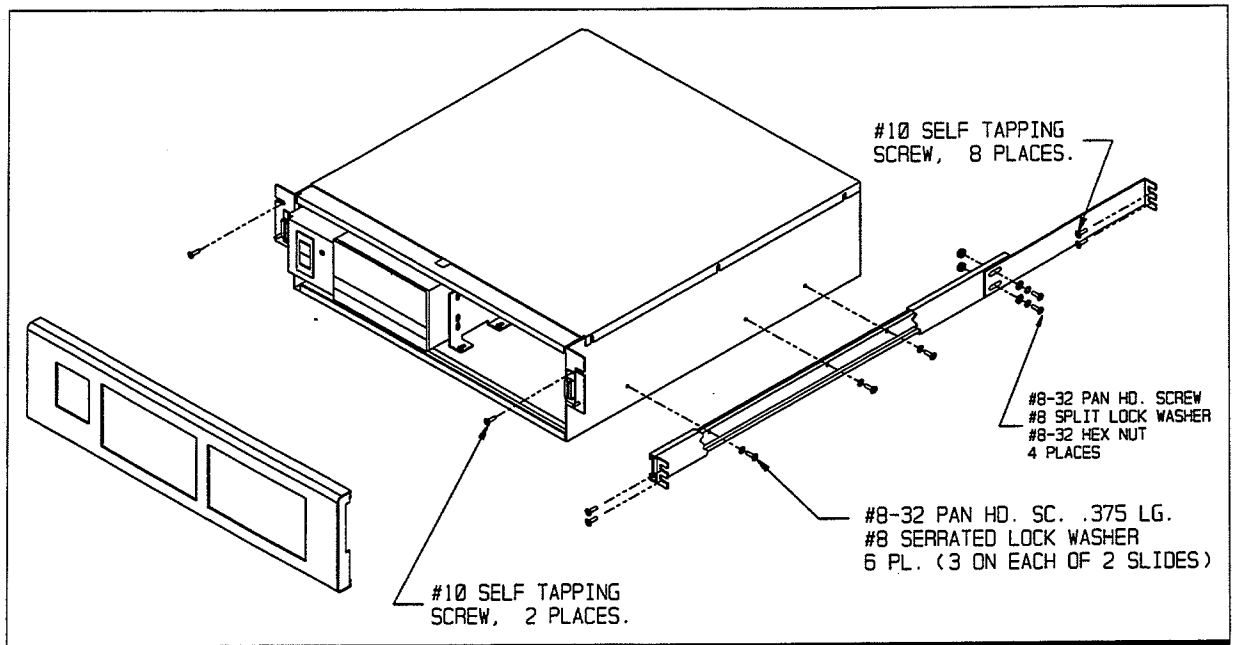



**Figure 13 – Slide rail mounting detail**

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# SCSI Interface Cabling

The maximum cumulative cable length for single-ended interface connections is 6 metres, or about 19.6 feet. The maximum cumulative cable length for differential interface connections is 25 metres, or about 81.25 feet. The internal cable used in the SCSI chassis is about 3.5 metres (5 feet) long. This length must be subtracted from the above figures when calculating allowable cable lengths between the computer and the chassis. Interface cable installation will vary according to your application. The sections that follow present a basic installation guide.

The SCSI chassis can be ordered with several different types of interface connectors. The most popular are the 50-pin Centronics style for SCSI narrow applications, and the high-density 50 and 68-pin connectors for SCSI Fast and Fast/Wide applications. Contact Macrolink for more information.

## Single Host Installations

A chassis configured for use with a single host will have two SCSI bus connectors on the rear panel. Connect one end of the interface cable to the SCSI controller (host adapter). The controller must have SCSI bus termination enabled (see *SCSI Bus Termination* on Page 13). Connect the opposite end of the interface cable to either connector on the SCSI chassis. Install an appropriate terminator on the remaining SCSI bus connector for the chassis end of the SCSI bus.

Additional chassis may be daisy-chained to the first chassis. Move the SCSI bus terminator to the last chassis and install appropriate interconnect cables. Keep the SCSI cable length limitations in mind when connecting additional chassis.

## Multi-Host Installations

Chassis configured for multi-host installations will have two or four SCSI bus connectors on the rear panel. Two interface cables are required. For chassis with only two SCSI bus connectors, connect one end of each interface cable to each SCSI controller (host adapter). The controllers must have SCSI bus termination enabled (see *SCSI Bus Termination* on Page 13). Connect the opposite end of each interface cable to either connector of the SCSI chassis. The chassis will not have a terminator installed because the bus is terminated on each end by the controllers.

Multi-host configured chassis equipped with Inline SCSI Disconnect™ boards will have four SCSI bus connectors on the rear panel. Two interface cables and two chassis-mounted terminators are required. Both controllers must have SCSI bus termination enabled (see *SCSI Bus Termination* on Page 13). Connect one end of one interface cable to one of the SCSI controllers. Connect the opposite end of the first interface cable to either of the two 'Port A' (upper) connectors on the SCSI chassis. Connect the second interface cable to either of the two 'Port B' (lower) connectors on the SCSI chassis. Install terminators on the remaining two connectors. For purposes of calculating cable length, there is a two foot internal cable for each SCSI bus in a chassis equipped with Inline SCSI Disconnect™ boards.

Multi-host connected chassis may be daisy chained in the same manner as single-host chassis. Keep the maximum cable length and termination issues in mind when installing additional chassis.

## Concurrent Computer System Installations

The external SCSI interface cable must be grounded at the point where it exits the cabinet in a Concurrent Computer system. This is required to prevent excessive radio frequency emissions. Strip off the shrink tubing that is located

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approximately 54" from the controller end of the cable to expose the cable shield. Secure this exposed portion of the cable shield under the clamp on the system I/O panel as shown in Figure 14.

## SCSI Bus Termination

The SCSI bus must be terminated at both its origin point, usually the controller, and at its end point, usually the SCSI chassis. The Macrolink SCSI chassis internal cable is of the "pass-thru" design, with two connectors provided on the rear panel. The signals enter through one rear panel connector, go to all of the internal drive connectors, and exit through the second rear panel connector. This second connector is where the SCSI bus terminator is installed, thus placing it at the physical end of the bus. There must be no other terminators installed on the bus. Terminators suitable for use with your chassis are available from Macrolink.

Some devices are supplied by the manufacturer with SCSI bus termination enabled. The terminators must be disabled on all devices before they are installed in the chassis. Consult the installation manual supplied with your drive.

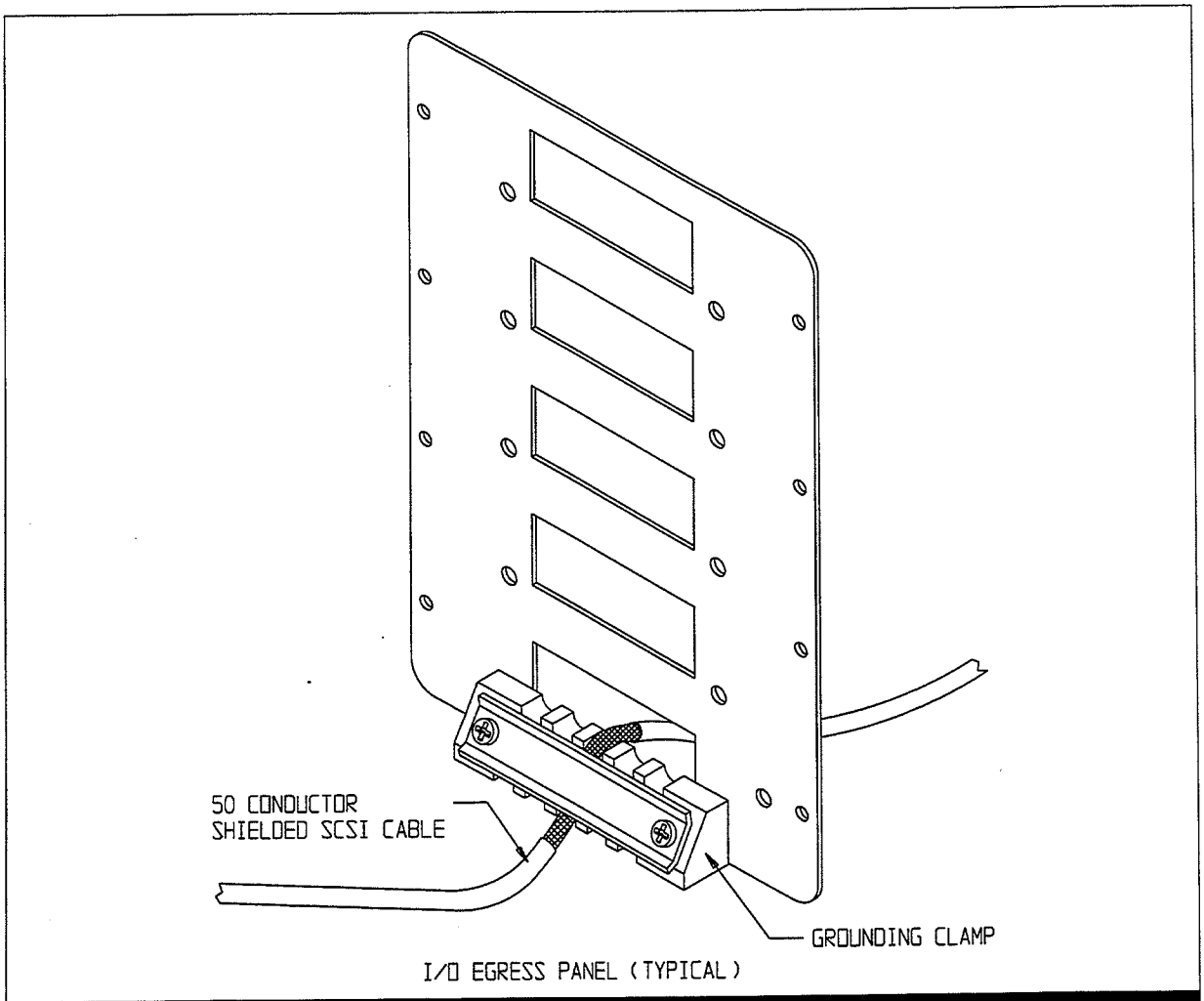



**Figure 14 – Concurrent system interface cable grounding**

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# Operation

The Macrolink SCSI Drive Chassis is designed to provide power, cooling, and convenient mounting for up to six SCSI interface devices. Operation of the chassis is very basic and consists of controlling the power to the drives installed within it.

Power is controlled by the front panel MAINS switch. Pressing the top portion of the switch causes power to be applied, which will be noted by illumination of the MAINS indicator. Pressing the bottom portion of the switch causes power to be removed. Operation at this point will depend on the types of devices installed. Consult the manuals supplied with your drives for more information.

## Removable Drive Module Operation

**⚠ WARNING! ⚠**

***ALLOW THE DISK DRIVE TO COME TO A COMPLETE STOP BEFORE REMOVING IT FROM THE CHASSIS.***

It takes ten seconds **or more** for the platters in a disk drive to stop rotating after power has been removed. While the platters are rotating, any movement of the drive may cause strain on the bearings due to gyroscopic forces. Premature bearing wear leads to **head crashes** and **permanent data loss**. This damage may be considered abuse by the manufacturer and may not be covered under warranty.

Macrolink SCSI Disconnect™ removable drive modules are equipped with a power switch and LED power and activity indicators on the front panel. The momentary action POWER switch controls the application of power to the drive module. Press the button once to apply power, which will be noted by illumination of the POWER indicator. Press the button again to remove power. The SELECT indicator lights whenever the device is being accessed. When power to the chassis is turned on, all removable modules will have power applied to them.

The module is held in place by a thumbscrew assembly. To remove a drive module, press the POWER switch on the module and note that the POWER indicator turns off. Wait for the platters to stop rotating (see warning above). Rotate the LOCK/UNLOCK knob counterclockwise until it releases, about five turns. Grasp the handle and pull the module out from the chassis. When replacing a module, slide it into the receiver until the face is flush with the chassis. Rotate the LOCK/UNLOCK knob clockwise until it is snug, being careful not to overtighten it. Press the POWER switch and note that the POWER indicator lights.

Safety circuitry senses an attempt to remove a module without turning it off and interrupts power before the electrical connection can be broken. Additional drive-protecting features include high-quality carbon fiber impregnated slides, which quickly drain away any accumulated static charge when the module is inserted.

A drawing is included at the end of the manual to assist in the installation and removal of drives in a module. It contains physical mounting instructions. Since electrical connections vary from drive to drive, you will need to consult the device's installation manual for assistance when installing the connectors.

Drive modules are interchangeable between different chassis of the same type (HC modules install in any HC receiver-equipped chassis), but are not cross compatible (LC modules will not fit in HC-series receivers and vice-versa).

A snap-in filler plate, Macrolink part number 311035, is available to cover the opening of an HC removable module receiver when a module is not installed.

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## Multi-Host Operation

The design of the Macrolink SCSI chassis allows devices installed within it to be accessed from more than one computer. This is known as multi-host access. An important consideration is that no unpowered devices may be attached to an active SCSI bus. This means that if, for example, two computers are attached to one SCSI chassis and one system needs to be taken down for maintenance or repair, the computer being powered down needs to be isolated from the rest of the SCSI bus. An unpowered controller or device attached to the SCSI bus will cause the signals to assume an undefined state, and prevent any other controller or device from accessing the bus.

To solve this problem, the SCSI Chassis can be equipped with the Macrolink Inline SCSI Disconnect™ product, which is used as an electronic switch to isolate two SCSI busses. These 4-¼" square boards mount in a dedicated area within the chassis. They connect between the external SCSI connectors and the internal SCSI bus. The Inline SCSI Disconnect™ is available in a version that converts single-ended SCSI signals to differential interface. This allows the use of longer cables (up to 80 feet/25 metres), while allowing lower cost, more readily available single-ended peripherals to be used in the chassis. The Inline SCSI Disconnect™ is fully compatible with the SCSI Disconnect™ removable drive module system.

Chassis equipped with Inline SCSI Disconnect™ boards have additional switches on the control panel, as shown in Figure 15. A three position switch is used to control each SCSI port on the chassis. When the switch is set to the ENABLE position, a data path is established between the selected port, the peripherals within the chassis, and the second port, if it is enabled. In the OFF position, the selected SCSI port is isolated from the peripherals and any other ports. When the port is isolated, cables can be disconnected, the host computer's power can be cycled, etc., without having any impact on operation of the peripherals or second host system. An illustration of this operation appears in Figure 16.

The Inline SCSI Disconnect™ boards draw their power from the SCSI Chassis. The isolation feature of the SCSI Disconnect™ boards is not active when the chassis power is turned off.

### Remote Control

The third position on the SELECT switch, marked AUTO, is used to allow the isolation function to be controlled from a remote point. Chassis fitted with the Inline SCSI Disconnect™ have DB-9 type connectors on the rear panel that are wired to an opto-isolator circuit on the SCSI Disconnect™ board. The pinout is shown in Figure 17. When the circuit is complete, the SCSI busses will be connected. The opto-isolator LED may be powered from the chassis supplied +5 volt and ground return lines (DB-9 connector pins 1 & 2) or from an external +5 volt DC source. Example connections are shown in Figure 18.

The DB-9 Remote connectors can be used to simplify wiring in a multiple chassis configuration. A multi-chassis A/B example is presented in Figure 19. For clarity, the SCSI cabling is not shown. In this application, computer system A is actively accessing the devices in the SCSI chassis. System B is an online backup. If a failure occurs in system A, all of the SCSI devices can be switched over to system B by a single switch. An automated system that switches the systems over when a failure is detected can be implemented in the same manner.

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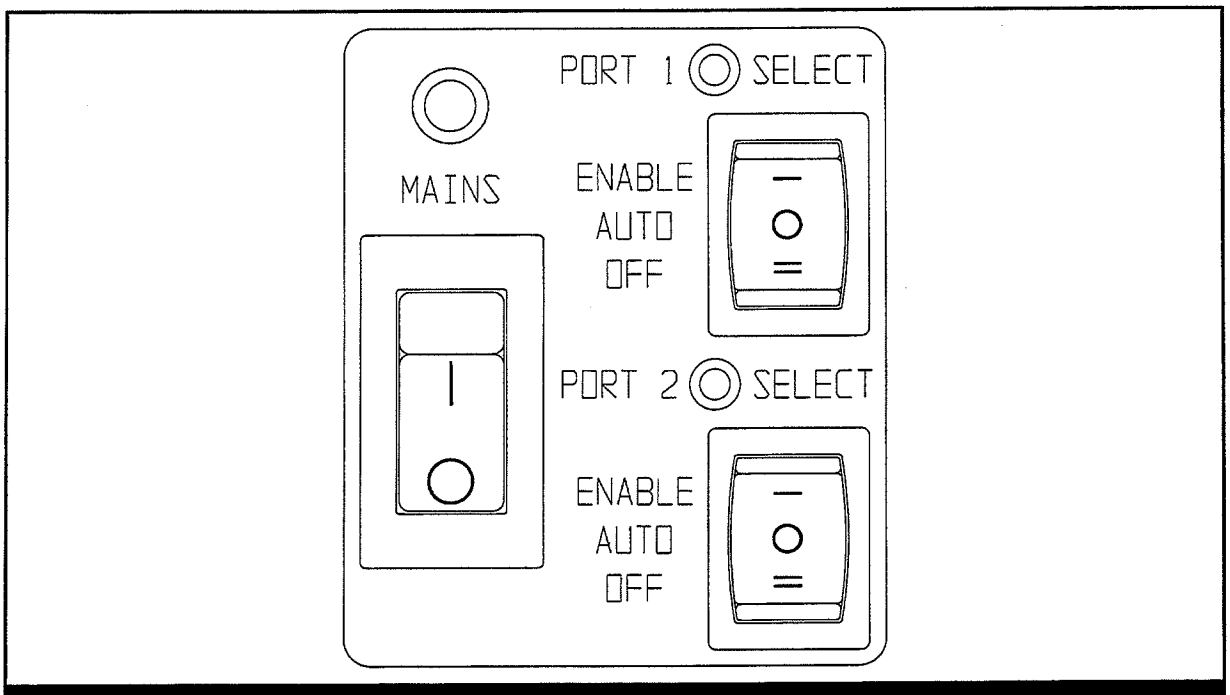



Figure 15 – Inline SCSI DisConnect™ control panel

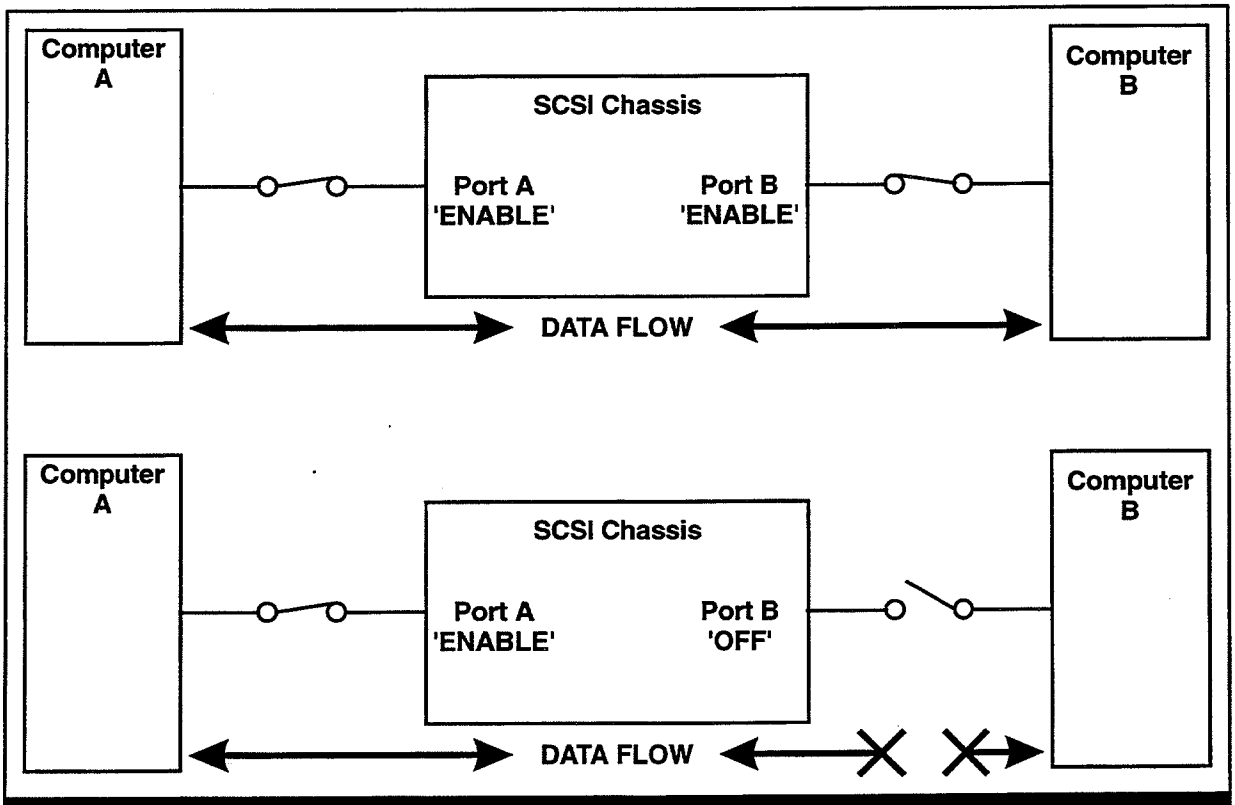



Figure 16 – Inline SCSI DisConnect™ operation

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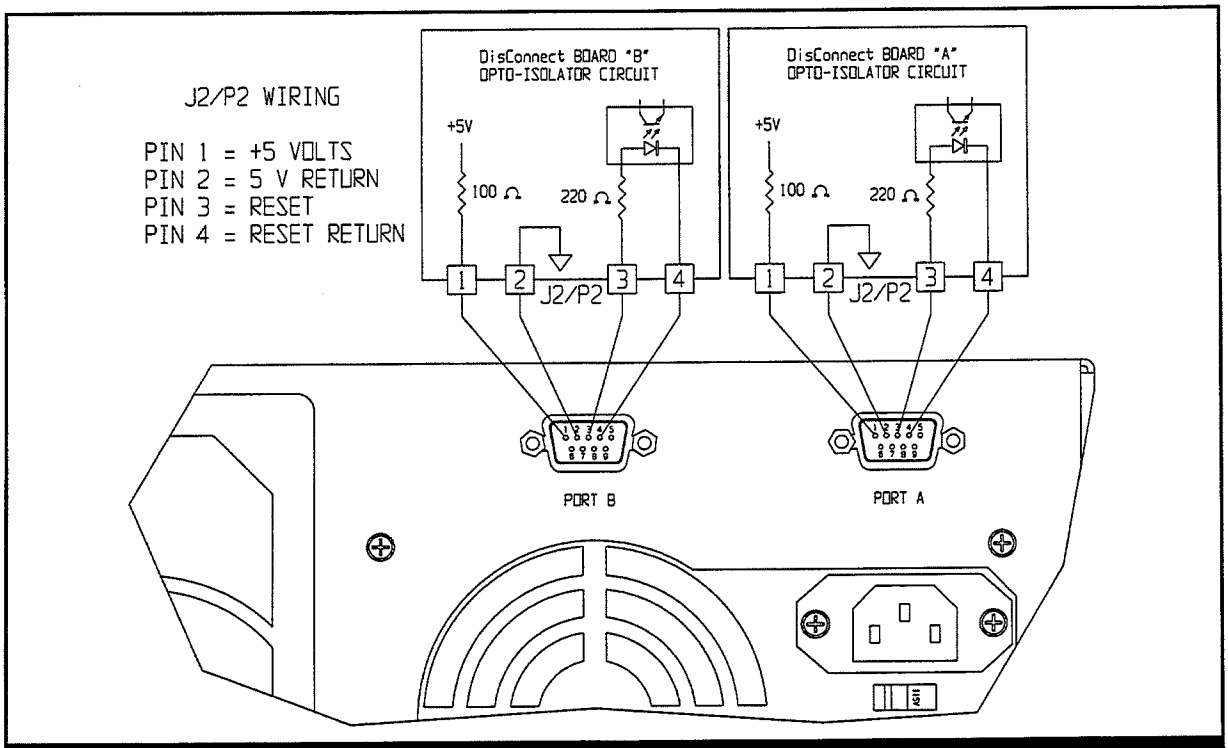



**Figure 17 – Remote control connector wiring**

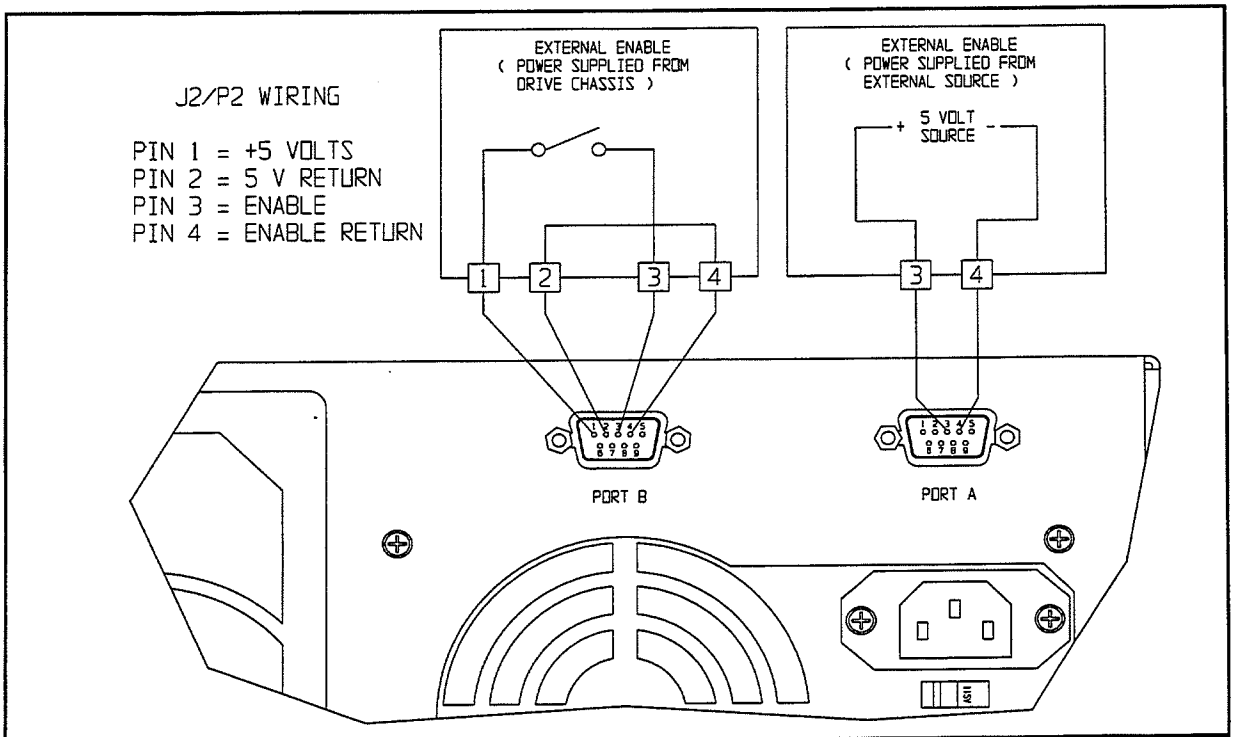



**Figure 18 – Remote control connection examples**

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## SCSI Disk Formatting

**⚠ WARNING! ⚠**

***NEVER INTERRUPT A SCSI DISK DRIVE WHILE IT IS FORMATTING.***

The format process of a SCSI interface disk is controlled by its microprocessor and requires little host system intervention. All formatting chores, including defect alternation, are handled by the drive. The only action the host computer needs to take is setting up a small parameter block and passing it to the drive. This parameter block establishes characteristics of the drive such as its block (sector) size. Next, the drive is passed a command telling it to begin its internal formatting sequence. Formatting time of SCSI interface disks is about 20 minutes per Gigabyte of capacity.

Reformatting of a SCSI interface disk is rarely necessary, unless a characteristic of the drive such as the block size must be changed. If you must reformat a SCSI disk drive, be sure that the process will not be interrupted. This includes attempting to perform data transfers to or from the device, or turning off the power. The drive will be "confused" because it will not have the proper drive geometry information recorded on the disc. This will result in a drive that cannot be accessed. At this point, the only way the drive can be restored is to return it to the manufacturer for repair.

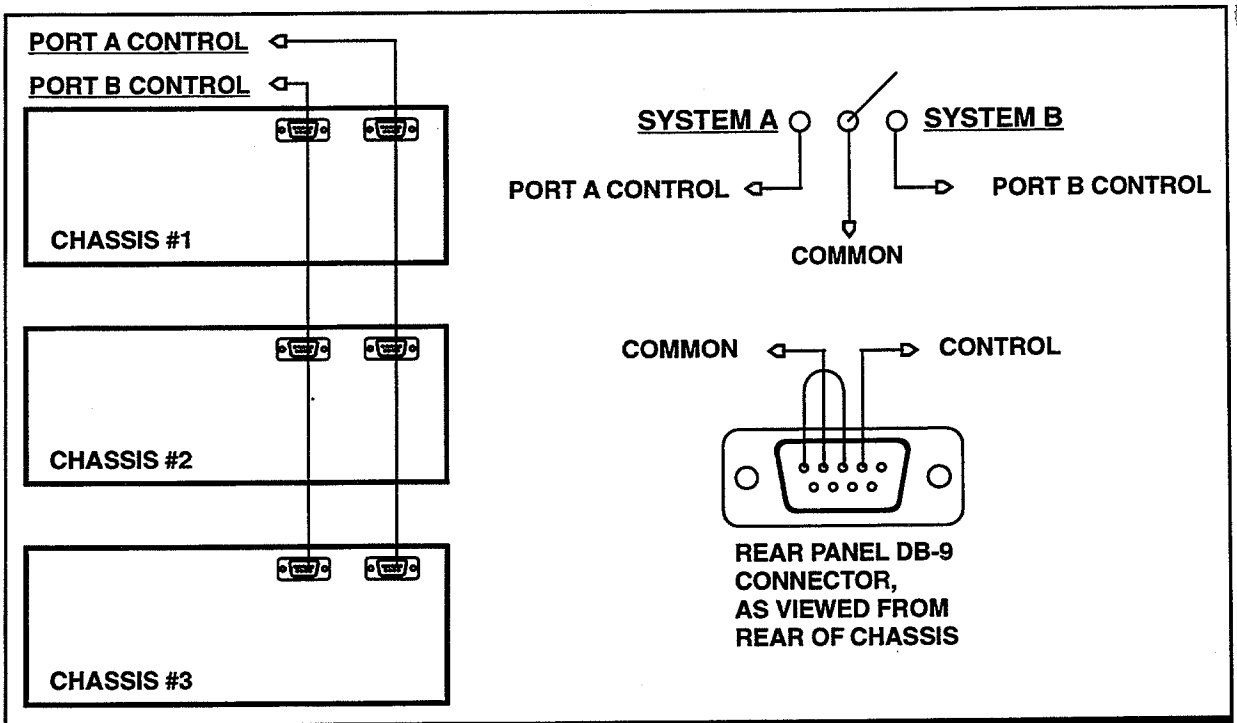



**Figure 19 – Remote control application example**

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# Maintenance

The Macrolink SCSI Drive Chassis requires a minimum of maintenance since it contains very few moving parts. The chassis uses an air filter media made from polyurethane foam that should be periodically inspected and cleaned whenever it appears dirty. The filter can be serviced by removing the snap on guard and filter retainer on the outside of the fan motor. Clean by vacuuming or by washing in mild soapy water. If washed, allow the filter to dry thoroughly before replacing it.

Maintenance on the power supply is limited to verifying proper voltage output under normal load conditions and should be performed after installation or replacement of devices within the chassis.

Module maintenance consists of verifying that the modules slide smoothly in and out of the receiver frame without binding. No lubrication is required or recommended. Worn rails should be replaced; contact Macrolink for replacement rails.

For maintenance information on the installed devices, consult their individual product manuals.

## Power Supply Verification

**⚠ WARNING! ⚠**

***VERIFICATION OF THE POWER SUPPLY REQUIRES OPERATION OF THE CHASSIS WITH THE TOP COVER REMOVED, EXPOSING THE POWER SUPPLY AND HIGH VOLTAGES THAT COULD CAUSE INJURY, SEVERE BURNS, OR DEATH. USE EXTREME CAUTION WHEN WORKING AROUND THE POWER SUPPLY.***

Using an accurate digital voltmeter measure the 5 volt output on one of the power connectors as follows: Connect the Positive (+) meter lead to drive connector pin number 4 (red wire, plus 5 volts). Connect the Negative (–) meter lead to drive connector pin number 3 (black wire, ground return). The 5 volt output should be within +/– .15 volts.

Verify the 12 volt output by connecting the meter leads to one of the power connectors as follows: Connect the Positive (+) meter lead to Pin number 1 (yellow wire, plus 12 volts). Connect the Negative meter lead to Pin number 2 (black wire, ground return). The 12 volt output should be within +/– .50 volts.

The power supply is not user-adjustable. A power supply that is not within specification should be replaced.

### Important

***REPLACE THE TOP COVER IMMEDIATELY AFTER VERIFYING THE POWER SUPPLY VOLTAGES.***

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## Returning Products For Repair

Before returning a product for repair, you must first obtain a Return Material Authorization (RMA) number from Macrolink. This number must appear on the outside of the shipping container. Products returned without an RMA number will be refused. When requesting an RMA number, please be prepared to provide the following information:

- ❑ Product name or part number.
- ❑ Serial number.
- ❑ Failure description. An inspection fee may be assessed on items returned without an adequate failure description.

Shipping expenses to Macrolink are to be paid by the customer. Macrolink will pay for standard return shipping for products under warranty.

## FCC Compliance

This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with this instruction manual, may cause interference to radio and television reception. This equipment has been tested and found to comply with the limits for a Class A computing device in accordance with the specifications in Subpart J of Part 15 of the FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference requiring the user, at the user's own expense, to take whatever measures may be necessary to correct the interference.

If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference in one or more of the following ways:

If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, you should try to correct the interference using one or more of the following measures:

1. Reorient the receiving antenna.
2. Relocate the computer with respect to the receiver.
3. Move the computer away from the receiver.
4. Plug the computer into a different outlet, so that the computer and receiver are on different circuit branches.
5. Ensure that the mounting screws, attachment connector screws, and grounding connections are securely tightened.
6. Ensure that good quality, shielded and grounded cables are used for data communications.

If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions. The user may find the booklet *How To Identify And Resolve Radio-TV Interference Problems* prepared by the Federal Communications Commission helpful. This booklet is available from the U.S. Government Printing Office, Washington, D.C. 20420, Stock No. 004-000-0345-4.

To ensure compliance with FCC regulations, only the Macrolink supplied interconnect cable should be used. Other cables may allow excessive RF radiation.

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# Specifications

## Physical

### Dimensions

Chassis: 19 inches (48.26 cm) wide, 5.25 inches (13.34 cm) high, 18.25 inches (46.35 cm) deep, excluding cables. The front panel depth is 1.25 inches (3.18 cm).

Removable Modules: 5.875 inches (14.92 cm) wide, 2 inches (5.1 cm) high, 8.2 inches (20.83 cm) deep, 1.25 inch (3.18 cm) handle protrusion.

### Weight

Chassis and accessories: 28 pounds (12.7 kg), less drives or modules.

Removable Modules: 1.5 pounds (.68 kg), less drive.

### Mounting

Horizontal, removable slide, mounts in cabinets with a 19 inch (48.26 cm) RETMA rail width. The slides supplied with the chassis can be used in cabinets with a 22 or 28 inch (55.88 or 71.12 cm) depth RETMA rail spacing.

## Electrical

### Power Supply

Switch selectable, 115/230V, 60/50 Hz, 7/4 Amps input. 5 volts @ 26 amps, 12 volts @ 9 Amps, 250 watt maximum output. Power for the drives is supplied by four standard 4-pin polarized connectors.

### Interface Connectors

The SCSI chassis is equipped with a pass-thru internal cable assembly consisting of two rear panel interface connectors and three 50 pin IDC style connectors for connection to the peripherals. Other configurations are available, including separate SCSI busses. Contact Macrolink for details.

## Environmental

The environmental conditions shown are for a chassis minus drives. Refer to the individual drive specifications for their environmental restrictions.

### Operating Temperature

Minimum 32° F (0° C), maximum 122° F (50° C).

### Humidity

95% relative, non condensing.

### Cooling

12 volt, 100 CFM fan with filter for chassis. Internal fan on power supply.

## Certification

The Macrolink SCSI chassis is certified as Class A compliant by the FCC. It is listed by UL, UL Canada, and TÜV for safety. CE certification has been granted.

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