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*Customer Service Support System*

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# MP 2008/2208 Documentation

(Cubix Document 776D)

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## MP 2008/2208

### Chapter 1 - Introduction

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## Overview

The Cubix MP 2008 and 2208 Adapters (also referred to as the Cubix MP Series, MP adapter, or MP 2x08), are multiport communications adapters in an AT form factor with an ISA bus connector. The MP adapters provide a state-of-the-art combination of high speed controller and Universal-Asynchronous-Receiver-Transmitters (UARTs) offering system administrators fast and reliable shared serial resources for "port controlled" networks. Using multiple MP adapters in a communications system allows the system administrator to manage a "port pool" of simultaneous dial-in and dial-out asynchronous connections.

Up to fifteen MP adapters may be placed in a single system, provided sufficient slots and power are available. Each MP adapter requires one 16-bit ISA slot.

Cubix Corporation supplies MP Series device drivers which provide access to the MP ports for various communications server platforms. By loading the appropriate driver onto the communications server, the ports on the MP adapter become available.

The heart of the MP 2008 and MP 2208 is the 20 MHZ 80C286 processor with optimized code to move data between the Cubix driver and the 16C550 class UARTs quickly enough to keep the ports operating at their maximum baud rating. The 16C550 UARTs are equipped with buffers to ensure that there will be no overruns or missed characters at full rated speed.

*Note that the MP 2008 supports a maximum of 115,200 Kbps per port while the MP 2208 supports up to 460,800 Kbps per port.*

Both MP Series adapters come with an octopus cable providing eight connections to external RS-232 compatible devices such as modems, multiplexors and mainframe terminal ports.

In addition, an optional eight-port line busy module is available. The line busy module is used to simulate an "off hook" (or line busy) signal when a server or COM port fails (for example, due to a power failure). When the telephone system senses that the line is in use, it automatically routes the call to the next non-busy line.

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## Who Should Use this Manual?

This manual is intended for the network systems administrator, and provides the following information:

- Configuration and installation of the MP Series hardware
- Troubleshooting problems with the MP Series
- MP Series hardware specifications
- Cable information
- Eight-port Line Busy Module installation
- Software drivers theory of operation and installation

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## MP 2008/2208

### Chapter 2 - Hardware Configuration

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This section describes how to configure and install the MP Series hardware.

All MP Series adapter boards have a single switch bank labeled SW1 on the top edge of the adapter, near the end bracket. This switch bank consists of eight switches, numbered one through eight. These switches should only be changed while no power is applied to the MP adapter. **A switch is in the ON position when it is toward the board.**

The switches in bank SW1 set the I/O port address and the logical board number to be used by the MP adapter. Switches 1 and 2 control the I/O port address, while switches 4-8 control the logical board number. **Switch 3 is always ON.**

The default switch settings for SW1 are all ON.

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## Base I/O Address Selection

The MP adapter boards require a series of 16 I/O locations to allow communications between the Cubix software driver and the hardware. Switches 1 and 2 of switch bank SW1 set the base I/O address to be used for this I/O address range. The MP boards support four different I/O address ranges (numbers given in hexadecimal):

**Table 2 - 1 Base I/O Address Selection**

Base I/O Address	Range	S-1	S-2
default 200	200-20F	ON	ON
210	210-21F	ON	OFF
300	300-30F	OFF	ON
310	310-31F	OFF	OFF

Select any base I/O address that does not conflict with other system hardware. Selecting a base I/O address other than the default may affect loading the software driver. Refer to **Appendix D - WorldDesk Comlink Installation** or **Appendix E - Novell/Cubix Connect Installation** for software installation details.

- **Note! ALL MP SERIES ADAPTER BOARDS IN THE SYSTEM MUST USE THE SAME BASE I/O ADDRESS.** Further, I/O addresses used by the MP adapter board must not conflict with the I/O addresses in use by any other system hardware.
-

# Logical Board Number Selection

Each MP Series adapter board installed in a server must be assigned a unique board number among all MP boards in that system. The logical board number is used (along with a port number) to identify individual ports when the software driver is loaded. If two MP Series adapters attempt to use the same logical board number, driver failure will result.

Any board number from zero to fourteen may be selected for use by a board. Assign board numbers sequentially, beginning with board number zero. Switch bank SW1 switches 4-8 are used to set the board number for the hardware. The MP Series software dynamically detects the assigned board numbers. The switch settings for the logical board numbers are listed in Table 2-2.

**Table 2 - 2 Board Number Selection**

Logical Board	S-4	S-5	S-6	S-7	S-8
default 0	ON	ON	ON	ON	ON
1	ON	ON	ON	ON	OFF
2	ON	ON	ON	OFF	ON
3	ON	ON	ON	OFF	OFF
4	ON	ON	OFF	ON	ON
5	ON	ON	OFF	ON	OFF
6	ON	ON	OFF	OFF	ON
7	ON	ON	OFF	OFF	OFF
8	ON	OFF	ON	ON	ON
9	ON	OFF	ON	ON	OFF
10	ON	OFF	ON	OFF	ON
11	ON	OFF	ON	OFF	OFF
12	ON	OFF	OFF	ON	ON
13	ON	OFF	OFF	ON	OFF
14	ON	OFF	OFF	OFF	ON

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## Installation

Before installing an MP adapter board in the system, be sure to turn the system off and disconnect it from the power source. Inserting the MP adapter board into a live server may damage the hardware and injure the installer.

The MP adapter board must be installed in a 16-bit ISA or 32-bit EISA compatible slot. Be sure to observe the overall system power limitations (refer to **Appendix A - Hardware Specifications** for the MP Series power requirements).

After installation in an available slot, use a screw to secure the end bracket of the MP adapter board to the system chassis. Firm installation of the adapter board helps to ensure that loose connections do not cause system unreliability or hardware damage.

Connect the provided communications cable to the MP adapter as shown in Figure 2 - 1. **IT IS VERY IMPORTANT THAT THE HOLD-DOWN SCREWS ON THE CONNECTOR BE FIRMLY ATTACHED TO THE MP ADAPTER.** Failure to observe this requirement often results in misalignment of the connector, and intermittent communications signals which can cause abnormal communications session loss (or inhibition of communications).

Verify the installation and configuration of the MP hardware before powering on the system or proceeding to software installation and configuration.

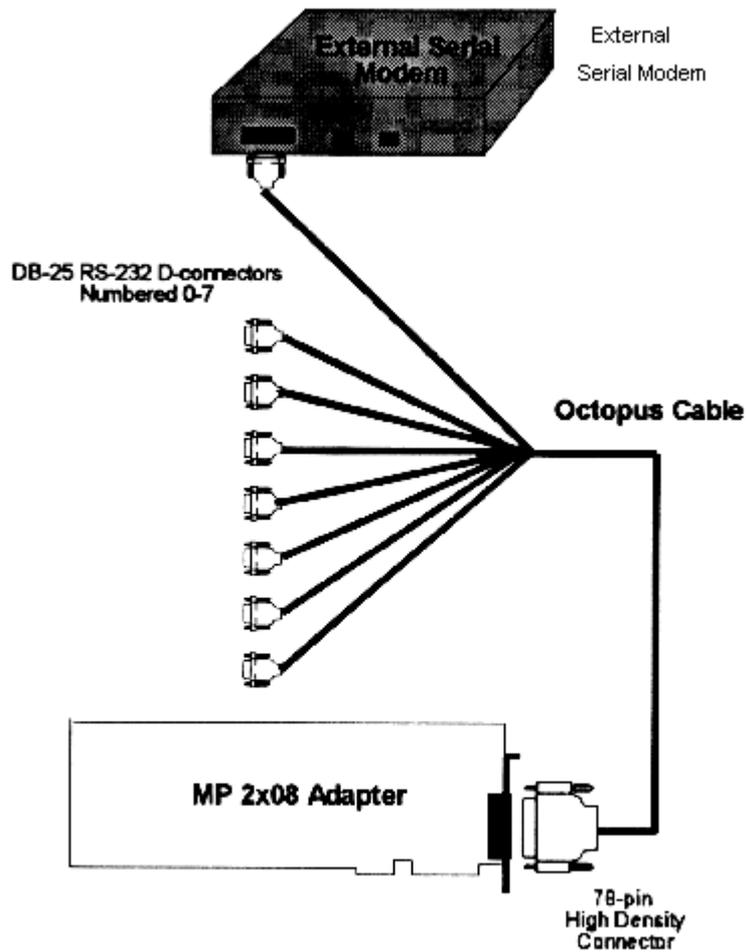


Figure 2 - 1  
Connecting the Communications Cable to the MP Adapter

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## Troubleshooting

The MP adapter provides a rear panel indicator lamp, visible through the bracket, that may be used to confirm that the driver has loaded successfully. The lamp states are:

**OFF SOLID** indicates that the driver is not present; that is, it has not yet been loaded, or it has been unloaded.

**ON/OFF FLASHING** indicates that the driver is present and operating normally.

**ON SOLID** indicates that the board failed self-test or that the software load was unsuccessful.

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## MP 2008\2208

### Appendix B - Cable Specifications

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#### RS-232 Cables

The Cubix MP package includes an "octopus" shielded cable that converts the 78-pin high density connector on the adapter to eight DB-25 male RS-232 D-connectors. All ports are wired as the DTE interface. The pin-outs for the RS-232 connections are standard:

1	Chassis Ground
2	Transmit Data (TxD) output
3	Receive Data (RxD) input
4	Request To Send (RTS) output
5	Clear To Send (CTS) input
6	Data Set Ready (DSR) input
7	Signal Ground (GND)
8	Data Carrier Detect (DCD) input
20	Data Terminal Ready (DTR) output
22	Ring Indicator (RI) input

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#### Connection to Modems

The Octopus Cable shipped with the MP 2x08 adapter connects the MP adapter to external modems. If distances greater than the length of the octopus cable must be accommodated, an additional "straight-through" cable may be connected to the octopus cable's DB-25 RS-232 D-connector then to the modem.

At a minimum, connections should be provided on the pins noted in the RS-232 Cables section above. Connections on all 25 pins are acceptable.

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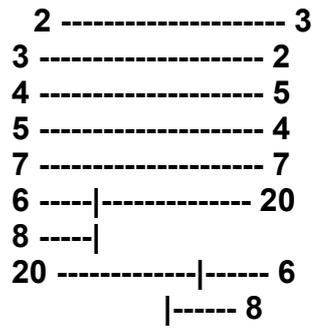
#### Connection to Hosts, Workstations, PCS, or Terminals

Direct connection of the MP adapter's RS-232 ports to hosts, workstations, PCS, or terminals configured as DTE equipment (without an intermediate modem or DCE device) generally requires a "null modem" cable. A "null modem" cable eliminates the need for modems (DCE devices) by crossing RS-232 signal pairs between the two DTE devices, such that each appears to the other as a DCE device.

To connect the MP adapter to another DTE device, connect the octopus cable's 78-pin connector to the MP adapter. Connect the "null-modem" cable (described below) to one of the octopus cable's DB-25 RS-232 D-connectors then connect the null modem cable directly to the DTE device.

To make a "null-modem" cable, use the following connections:

**MP Series Board Other DTE Side**



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## MP 2008/2208

# Appendix C - Line Busy Module Installation

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## Overview

When a server fails (for example, due to a power failure), the DTR signal from the server to the modem will be off (indicating that the DTE is not ready). In such cases, the modem will not answer incoming calls. If the dial in call is received via the telephone network, a modem on the failed server may ring indefinitely, thus blocking other modems from taking the call.

To resolve this problem, it is necessary to present a busy signal on the telephone connection for modems connected to servers that are not ready to accept incoming calls. When the telephone system senses that the line is in use, it automatically routes the call to the next non-busy line in the group. Hence, calls can be automatically rerouted to a functional server.

To provide this capability without sacrificing the ability to use off-the-shelf modems, Cubix offers an external eight-port line busy module.

The line busy module connects to the serial connector between the server\* and the attached modems. It also connects to the telephone cables between the telephone network and the modems. When a non-ready server is detected, the line busy module causes the telephone line to be busy, thus blocking incoming calls and rerouting them to a functional server.

Each line busy module supports up to eight serial COM port connections and can be either rack mounted or installed as a table top unit. When rack mounting, make sure the cabinet supports 19-inch RETMA standards. Instructions for both installations are included in the following sections.

*\*For the sake of demonstration, "server" used within this document is a BC Series Processor with up to 15 MP adapters housed in a Cubix subsystem.*

The ***WorldDesk System Administrator's Guide*** discusses the line busy feature in relation to WorldDesk products.

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## Cables

The following procedure assumes you have at least one MP Series board installed in an Cubix enclosure. Before continuing, make sure the following cables are available:

### ***Standard***

The following cables are required and supplied by Cubix:

- One octopus cable with a male 78-pin connector to eight DB-25 male RS-232 D-connectors. This cable connects from the line busy module to a maximum of eight external modems supporting RS-232

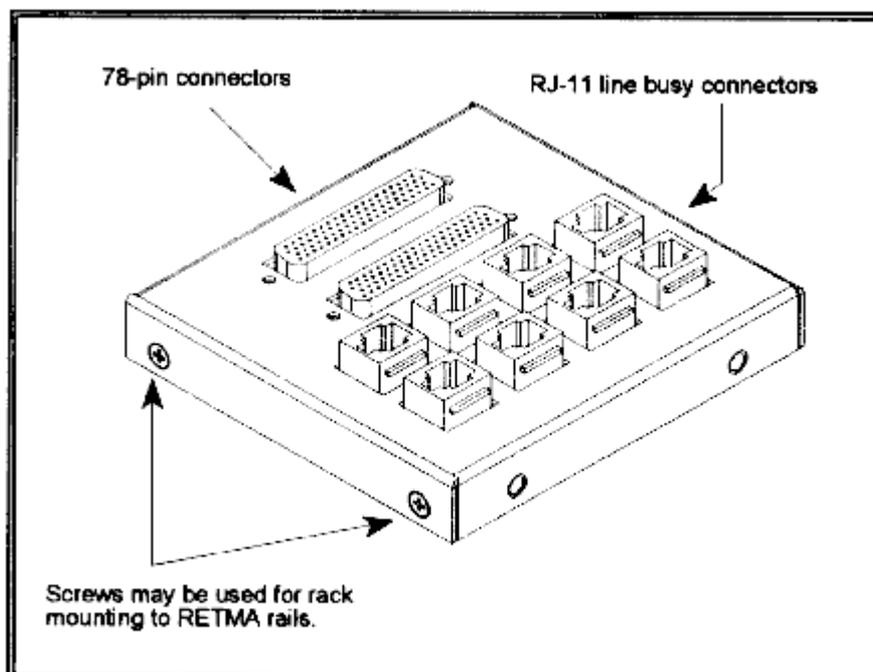
connections. Note that this cable was shipped with the MP adapter. ***Pin-outs for the RS-232 connections are standard. See Table C - 1.***

- One male 78-pin to male 78-pin cable. This cable is shipped as part of the line busy package and connects the MP adapter to the line busy module.

## ***Line Busy and Telco***

"Line busy" and "telco" cables are required to connect the line busy module to the modem's RJ-11 phone and telco connections. One line busy and one telco cable is required for each external modem connection (up to eight are supported.) These cables are not shipped as part of the standard line busy package; however, you may order them from Cubix. Contact our sales department for assistance.

***Figure C-1*** shows the 78-pin and RJ-11 (line busy) connector locations on the Eight-port Line Busy Module. ***Figure C-2*** shows how the line busy module connects to the MP adapter and external modems via the cables described in the previous sections.



**Figure C-1**  
**Line Busy Modula Connector Types**

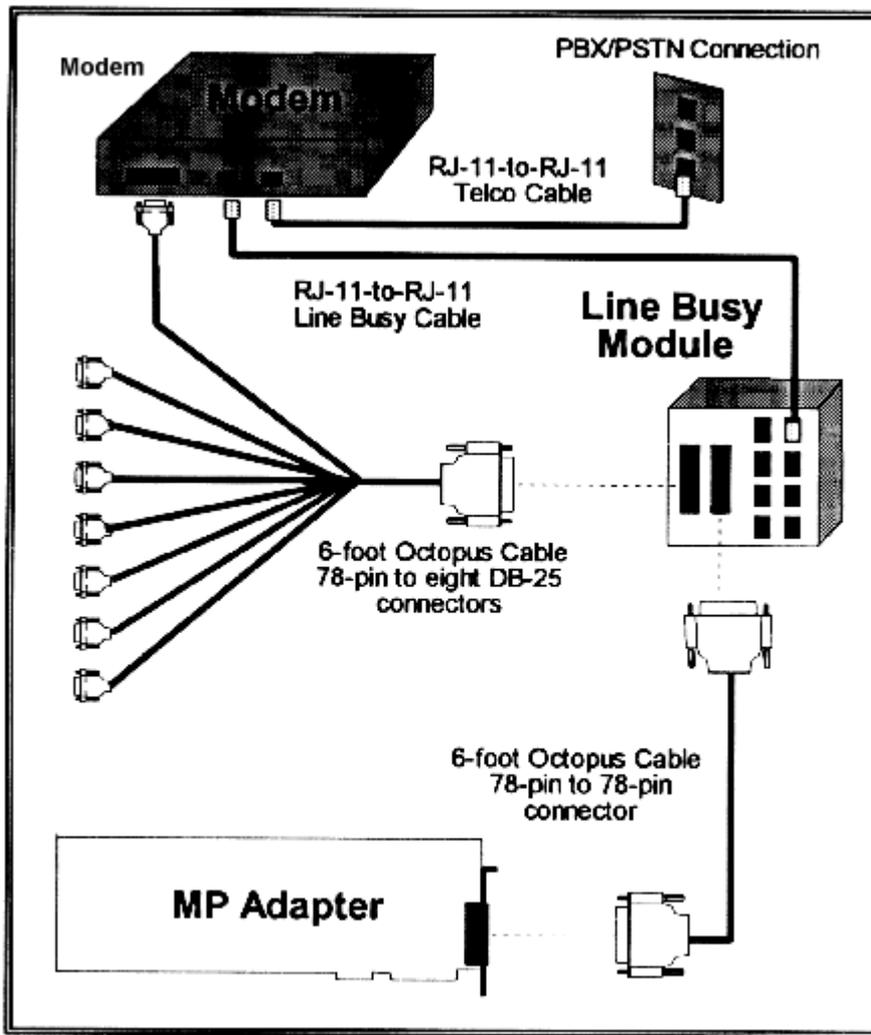


Figure C - 2  
Line Busy Module - Cable Connections

## Table Top Installation

Before beginning, make sure that besides the eight-port line busy module and standard cables, the following items are available:

- telco cables for each modem connected to a PBX or telco wall jack
- line busy cables - one for each modem to which the line busy module is being connected

## Procedure

Before you continue, make sure the MP adapters are installed and the subsystem in which they reside is powered off. Also make sure the modems to which the line busy module is to be connected are powered off.

1. Connect the line busy module to the MP adapter via the male 78-pin-to -78-pin cable (see Figure C-2).
2. Connect one cable end to the line busy module's 78-pin connector.
3. Connect the other end to the MP adapter's 78-pin connector. Connect the line busy module to the external modem's DB-25 serial port via the 78-pin to DB-25 octopus cable. Up to eight modems may be connected to each line busy module.
4. Connect the octopus cable's 78-pin connector to the line busy module's 78-pin connector.

5. Connect the cable's DB-25 connectors to the RS-232 DB-25 connector on the external modems.
6. Connect the line busy module to the phone connection on the external modem via the RJ-11 to RJ-11 line busy cable.
7. Connect one end of the line busy cable to a line busy port on the line busy module. Eight ports numbered 0-7 are available.
8. Connect the other end of the cable to the phone connector on the external modem.
9. Connect the external modem to the telephone wall jack or PBX via the telco cable.
10. Power on the external modems and the Cubix subsystem containing the MP adapters.

## Cabinet Installation

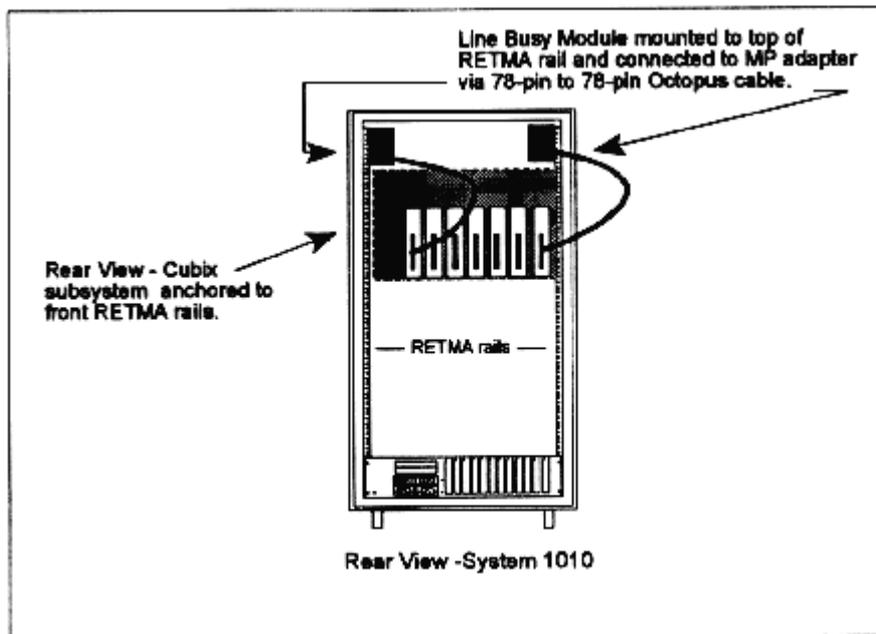
The following instructions assume the line busy module is being rack mounted in a System 1010 rack mount cabinet (along with the Cubix subsystem containing the MP adapters). If not, make sure the rack mount cabinet used complies with 19-inch RETMA standards. *A maximum of two line busy modules may be mounted to a Cubix subsystem. (See Figure C-3 for placement.)*

Before beginning, make sure that the Cubix subsystem and MP adapters are installed. In addition to the eight-port line busy module and standard cables, make sure the following items are available:

- telco cables for each modem connected to a PBX or telco wall jack
- line busy cables - one for each modem to which the line busy module is being connected
- a Philips screwdriver

## Procedure

1. Power off peripherals.
2. Mount the line busy module to the RETMA rail at the very top of the System 1010. See **Figure C - 3**.
3. Use a Philips screwdriver to remove the screws from the line busy module. See **Figure C - 1**.
4. Place the module so that the holes in which the screws insert are aligned with the holes on the RETMA rails.
5. Holding the module in place, insert the screws through the RETMA rail holes. Tighten screws to secure the line busy module to the RETMA rail.
6. Connect the line busy module and cables as described in steps 2 through 5 in the **Table Top Installation** procedure.
7. Power on peripherals.



**Figure C - 3**  
**Mounting the Line Busy Module to RETMA Rails**



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### Appendix D - Cubix WorldDesk Comlink

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Cubix WorldDesk Comlink is a remote node dial-up server software package designed for Novell and Microsoft networks. When used in combination with a Cubix fault tolerant processor running Windows NT, Comlink provides dial-in remote access to the company LAN plus dial-out modem pooling capabilities enabling users to access various information services.

MP2x08 adapters can be used to provide up to 120 serial ports for a single Comlink server when installed in a Cubix ERS/FT II subsystem. Additionally, MP2x08 drivers are automatically loaded as part of the Comlink server setup process.

To learn more about WorldDesk Comlink features and how to install and manage a Comlink server, refer to the following Cubix WorldDesk documents.

- [DOC 823, WorldDesk Quick Start Guide for Comlink Servers](#)
  - [DOC 817, WorldDesk System Administrators Guide](#)
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## MP 2008/2208

### Appendix E - Novell/Cubix Connect

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## Theory of Operation

NetWare Connect operates as an enhanced subset of Novell's file server software (NetWare). NetWare Connect consists of communications software and core elements of NetWare, supplied as "NetWare Runtime", to support NetWare Loadable Modules (NLMs) and the Connect NLMs.

Connect NLMs provide security and form the virtual links between a NetWare service, such as Remote Node Service (RNS) or NASI Connection Services (NCS), and the outside world via an Asynchronous Input/Output (AIO) module. The Cubix supplied driver (AIOCUBIX) provides an interface between this AIO module and the MP adapter.

The MP Series adapter and its associated driver provide the function of moving data to/from the network under control of the Connect software.

The Cubix software driver moves data to/from the MP adapters(s) via the ISA bus in 16-bit "programmed I/O" transfers. The MP adapter has the following for each of the 8 ports:

- 8192 Byte buffers for transmit data
- 8192 Byte buffers for receive data
- "Mailbox" area for status and control information

The MP Adapter's 80C286 20MHz CPU moves data and control/status information to/from the UARTs and the Connect host CPU.

## Software Installation and Configuration

The MP adapter includes an AIO software driver that executes as a NetWare Loadable Module (NLM) in a Novell NetWare server. A NetWare server running the NetWare Connect application is referred to as the Connect server. The MP adapter's NLM, named "AIOCUBIX.NLM", is loaded onto the Connect server.

The MP Series' driver checks for hardware base I/O address conflicts with other types of hardware in the system. If a conflict is detected, another selection is required. Set the hardware switch settings using switches 1 and 2 of switch bank SW1 to match the software options selected.

## Loading the Software Using the Default Hardware Configuration

If the address switches are set to the default hardware configuration (all switches in the ON position), no command line options are necessary to load the AIO driver.

To load the NLM in this configuration, issue the command:

```
load aiocubix
```

at the NetWare server. The driver name, version, and date are displayed.

The AIO driver attempts to locate all MP adapters in the system using the default I/O address. As each adapter is located, a message is displayed that indicates the self-test results and whether or not the adapter was successfully loaded. If all adapters do not load successfully, check the I/O base address settings and refer to the *Troubleshooting* section of **Chapter 2**.

If all adapters pass the self-test and are successfully loaded, the MP Series driver loads and the MP adapter is ready for use.

## Using Non-Default Base I/O Address Configuration

The MP adapter requires a series of 16 consecutive I/O locations beginning with the base I/O address. If non-default settings for the base I/O address are configured (as described in **Chapter 2 - Hardware Configuration**), specify the I/O address when the AIOCUBIX.NLM driver is loaded. Use the command:

```
load aiocubix port=<base I/O address>
```

where <base I/O address> is "200", "210", "300", or "310", corresponding to the settings for switches 1 and 2 of switch bank SW1. Alternatively, omit the <base I/O address>, leaving only the parameter "PORT=", and a prompt including valid I/O addresses will be displayed. I/O addresses already in use by other components in the system are not included in the valid options list.

**ALL MP SERIES ADAPTERS IN THE SYSTEM MUST USE THE SAME BASE I/O ADDRESS.** Further, I/O addresses used by the MP adapter must not conflict the I/O addresses in use by any other hardware in the system.

## MP Adapter Names

The MP adapter automatically sets a default board name of "MP2x08". To override this name, use the command line option "**NAME=<board name>**". For example, the command line:

```
load aiocubix name=my_name
```

establishes MP Series adapters using the name "MY\_NAME". Cubix recommends using the default board name for the MP adapter.

## Unloading the MP Series Driver from Memory

Unload the MP Series AIO driver from memory using the command:

**unload aiocubix**

There are no options for the unload command. Be sure to close any active connections before unloading the MP Series driver.

## Command Line Help

An on-line description of command line options is available for the MP Series AIO driver. Use the command:

**load aiocubix help**

to view this command usage information. Note that the driver is not loaded if command help is requested. The driver must be loaded as described in this appendix.

## Verifying that the Driver has Loaded Successfully

In addition to the messages printed on the system console, the MP adapter provides a rear panel indicator lamp, visible through the bracket, that may be used to confirm that the driver has loaded successfully. The lamp states are:

**OFF SOLID** indicates that the driver is not present; that is, it has not yet been loaded, or it has been unloaded.

**ON/OFF FLASHING** indicates that the driver is present and operating normally.

**ON SOLID** indicates that the board failed self-test or that the software load was unsuccessful.

## Software Specifications

Software Interface	AIO (as an NLM), name=AIOCUBIX.NLM
Unloadable	yes
Bit rates	50, 75, 110, 134.5, 150, 300, 600, 1200, 1800, 2000, 2400, 3600, 4800, 7200, 9600, 19200, 38400, 57600, 115200 (bits per second)
Stop bits	1, 1.5, 2 (as appropriate for character length)
Parity types	none, even, odd, mark, space
Character lengths	5, 6, 7, and 8 bits
Flow control types	none, hardware (RTS/CTS), software (Xon/Xoff), hardware and software
Port deadman timers	supported
RS-232 break signal	generated and detected
Firmware	dynamically loaded from driver software

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