1Y Series Documentation

1Y Series User's Reference Manual, Order #13-819

- For All 1Y Series Distribution Matrices

Level Jumper Settings Supplement

- Provides further clarification for the procedure on defining levels

1Y Series Distribution Matrices

User Reference Manual

CPU Version 5.0

Document Version
A4

Notices

No patent liability is assumed with respect to the use of information contained herein.

While every precaution has been taken in the preparation of this publication, AutoPatch assumes no responsibility for error or omissions. No liability is assumed for damages resulting from the use of the information contained herein.

Further, this publication and features described herein are subject to change without notice.

The United States Federal Communications Commission (in 47CFR 15.838) has specified that the following notice be brought to the attention of the users of this product.

Federal Communication Commission Radio Frequency Interference Statement

> "This equipment generates and uses radio frequency energy and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio and television reception. It has been type-tested and found to comply with the limits for a Class B computing device in accordance with the specifications in Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference in a residential installation. However there is no guarantee that interference will not occur in a particular installation. If this equipment causes interference to radio or television reception, which can be determined by turning the equipment on and off, the user is encouraged to try to correct the interference by one or more of the following measures:
>
> - Re-orient the receiving antenna
> - Relocate the matrix with respect to the receiver
> - Move the matrix away from the receiver
> - Plug the distribution matrix into a different outlet so that computer and receiver are on different branch circuits
>
> 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 Commissions to be helpful."

This booklet is available from the US. Government Printing Office, Washington, D.C. 20402, Stock N. 004-000-00345-4.

Use shielded cables. To comply with FCC Class B requirements, all external data interface cables and adapters must be shielded.

AutoPatch 1Y Series Distribution Matrix product specifications are available upon request, or by visiting our website at: http://www.autopatch.com

AutoPatch Statement of Warranty

AutoPatch, a division of XN Technologies, Inc., Cheney, Washington, warrantees that the products manufactured by AutoPatch will be free of defects in materials and workmanship for the lifetime of the product, subject to the following terms and conditions.

Terms and Conditions

1. AutoPatch products are under warranty for a period of five (5) years following the original sales invoice date. The warranty period may be extended to the life of the product provided the warranty card is filled out and returned to AutoPatch. TO VALIDATE THE LIFETIME WARRANTY: THE AutoPatch WARRANTY CARD MUST BE FILLED OUT BY THE DEALER AND RECEIVED BY AutoPatch WITHIN THIRTY (30) DAYS OF THE INSTALLATION OF EQUIPMENT BUT NO LATER THAN ONE (1) YEAR FROM THE ORIGINAL SALES INVOICE DATE. A warranty certificate will be returned to the dealer to verify the warranty period.
2. This Limited Lifetime warranty covers AutoPatch products shipped on or after October 1, 1997. The Limited Lifetime warranty applies to products in the original installation only. If the product is moved to a different installation, the Limited Lifetime warranty will no longer apply and the product warranty will revert tot he original warranty which covers a period of five (5) years following the original sales invoice date.
3. The product lifetime is defined as the period of time from the original sales invoice date to ten (10) years after AutoPatch ceases manufacturing the product model.
4. Warranty repairs are accomplished by returning the subassembly to AutoPatch for repair. If conditions do not permit this procedure, AutoPatch will invoice new or reconditioned (at Auto-Patch's option) replacement parts and ship them to the dealer or to the customer if so directed by written order from the dealer. In that case the replacement will be billed to the customer and the customer may return the failed subassembly within 30 days for credit. See “AutoPatch Returns Policy” in this manual for replacement policies and procedures.
5. **AutoPatch’s liability and Buyer’s remedies under this warranty shall be limited solely to repair, replacement, or credit, at AutoPatch’s option.**
6. The AutoPatch warranty does not apply to any AutoPatch product that has been modified, repaired by an unauthorized agent, or improperly installed, used, or maintained. AutoPatch shall not be liable under any circumstances for consequential or incidental damages including, but not limited to, labor costs or loss of profits arising in connection with the use of or inability to use AutoPatch products.
7. AutoPatch will not be responsible for items damaged during shipment to or from AutoPatch. The shipping carrier is responsible for items damaged during shipment.
8. This warranty is exclusive and in lieu of any other warranty, expressed or implied, including but not limited to any implied merchantability or fitness for a particular purpose. The terms of this warranty are governed by the laws of the state of Washington; certain other states restrict warranty limitations. You may have rights that are not defined herein.
9. This warranty may not be modified except in writing by an authorized AutoPatch officer.

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Introduction

The AutoPatch 1Y Distribution Matrix (1YDM or 1Y) is a signal switching device that can route audio, video, and data signals. The 1YDM can be controlled from a variety of sources, including a control panel on the front of an enclosure (Local X/Y Control Panel), an external controller capable of sending and receiving information via the serial port, or dry contacts (switches that are hard wired to the CPU board of an enclosure and do not require a separate power supply).

1YDM ROM version 5.0 accommodates greater flexibility and expandability than previous ROM versions. The changes that occurred between ROM 3.2B and 5.0 include the following:

- A front panel that accommodates 16 inputs and/or 16 outputs
- I/O Boards that accommodate 16 inputs and/or 16 outputs

The 1YDM was designed to accommodate systems using a limited number of inputs and outputs. The 1Y uses input/output (I/O) boards as the switching point for up to 16 signals. Inputs can only be switched to outputs connected to the same I/O board as the inputs. The configurations (inputs x outputs) available are 4x4, 4x8, 8x8, 12x4, 8x16, 16x8, and 16x16.

The I/O boards can be used separately or together. Level designations on the boards allow you to group the boards together or use them as separate switching environments. The matrix's CPU identifies each board by its level, not its slot in the rear of the enclosure. Four board levels may be specified for each separate distribution matrix. Board levels are part of the identification of signals and allow virtually unlimited vertical expansion of the distribution matrix.

Warning: To avoid ESD (Electrostatic Discharge) damage to sensitive components, make sure you are properly grounded before handling internal boards.

1YDM (ROM version 5.0) specifications are available upon request, or you can see them on our website at: http://www.autopatch.com.

How to Use This Manual

This manual contains six chapters and one appendix. The information in this manual progresses from unpacking and installing your distribution matrix in Chapter 1, to application techniques in Chapter 6. Use the following chapter descriptions to guide you through the manual.

Chapter 1 – Installing the Distribution Matrix

Chapter 1 discusses the materials included in the shipping boxes, what they are used for, and how to install the distribution matrix in many types of environments. The startup sequence of the 1Y is also discussed in this chapter.

Chapter 2 – Operating the Distribution Matrix

The 1YDM is capable of many variations of several basic operations. Chapter 2 explains the basic operations and their variations. It also touches on operating external controllers and it discusses the configuration word.

Chapter 3 – Basic Control Structure Operation Language

Basic Control Structure (BCS) is vital to operating your Distribution Matrix from an external serial controller. BCS is a set of ASCII command codes called Basic Control Structure (BCS). Chapter 3 introduces you to BCS and explains how to use it.

Chapter 4 – Options

The 1YDM has several optional features and can be controlled through different control devices.

Chapter 5 – The Enclosure and Its Parts

The enclosure is the structural basis, or building block, of the 1YDM. An enclosure is a metal chassis that houses the boards the signal cables are connected to and other vital components. Chapter 5 provides a “roadmap” to the important features of 1Y enclosures and a description of the feature functions.

Chapter 6 – Applications

Creatively configuring the 1YDM adds new dimensions to your system. Chapter 6 describes some creative ways to configure the distribution matrix and explains how they work to add flexibility to your system.

Appendix A – AutoPatch Service/Returns Policy

Appendix A presents the AutoPatch Service/Returns Policy. Please note that if you need to return an enclosure, it should be returned in its original shipping box if possible.

Typographical Conventions

In this manual, text conventions are used to designate particular meanings, such as key specifications and particular matrix operations. The convention for X/Y Control Panel keys is initial caps and enclosed in <>'s. For example, "press <Preset>," specifies the key on the control panel labeled PRESET.

Nonspecific procedures or components of the matrix appear in lower case letters. For example, "... to recall a preset, press...," refers to the preset procedure, or "... the matrix would be...," refers to any matrix.

The convention for specific actions or procedures is initial caps and numbered, if possible. For example, "Press <Take> to save Preset 4," or "Matrix 1 controls all R signals."

Notes, warnings, and any text that requires special attention appears in bold. Note or warning paragraphs are indented. Please pay attention to any notes and warnings; they are specifically labeled to designate importance.

Definition of Terms Used in This Manual

Before continuing to read this manual you should understand a few 1YDM terms that are similar to terms for other Y-series products except in their definitions.

Level - The identifying number of an I/O board. More than one board can have the same level, so component signals can be switched at the same time. Level is established by setting the Level pins on the J1 jumper.

Enclosure - A metal chassis that houses I/O boards, a CPU, and a power supply. Enclosures are the structural basis of the matrix. A distribution matrix can have multiple enclosures that can be linked together allowing more input signals to be switched to more output signals.

Distribution Matrix - The distribution matrix, or matrix, is the environment of all signals and the hardware and software necessary to switch these signals. The terms routing switcher, switching matrix, and routing matrix are also used commonly in the audio/video industry to describe a distribution matrix. The distribution matrix facilitates the routing of an input signal to no outputs, all outputs, or any variation of outputs. A matrix must have one or more enclosures.

System - Must have one or more controllers and one or more matrix sets.

Local X/Y Control Panel - The panel on the front of the enclosure that contains keys for entering commands. The input and output keys are used for entering inputs and outputs, and for manipulating the configuration word.

External Controller - An external controller is any device other than the Local X/Y Control Panel that is used to change the input/output configuration. External controllers can be dry contacts, single bus controllers (SBC), or any device that can send and receive ASCII code via the serial port. Examples of external controllers are AutoPatch Single Bus Controllers, third party control systems, or a PC that uses a serial communication program to communicate with the distribution matrix.

Controller - A device that controls the routing of a matrix. A controller can be an X/Y Control Panel (remote or local), external serial communications device (RS-232 or RS-422), or dry contacts.

Technical Support

AutoPatch provides technical support from 6 a.m. to 5 p.m. PST Monday-Friday. Before calling with a question, please consult this manual first. If the manual cannot fully answer your question, call AutoPatch AutoAssist at: (toll free) 800-622-0246, (international) 509-235-2636, through our BBS at 509-235-9258, or at our web site: www.autopatch.com.

Chapter 1—Getting Started

A distribution matrix is a signal switching device that has the ability to route any of its inputs to zero or more of its outputs. A distribution matrix is made of one or more enclosures that can route audio, video, and data signals. The enclosure is the structural basis of a distribution matrix. An enclosure contains a power supply, a CPU board, and the information necessary to route the signals on the I/O boards contained in that enclosure or any linked enclosure. The 1Y Distribution Matrix (1YDM) can be controlled from a variety of sources, including a control panel on the front of an enclosure (Local X/Y Control Panel), an external controller that can send and receive information via the serial port, or dry contacts (switches that are hard wired to the CPU board of an enclosure).

This chapter covers:

- ❑ Unpacking the 1YDM
- ❑ Possible installation sites
- ❑ Linking enclosures
- ❑ Setting Master and Slave Enclosures
- ❑ Defining Levels
- ❑ Attaching Inputs and Outputs
- ❑ Applying Power
- ❑ Startup Sequence
- ❑ Adding Input/Output (I/O) Boards
- ❑ Adjusting Gain Control

1.1 Unpacking the 1YDM

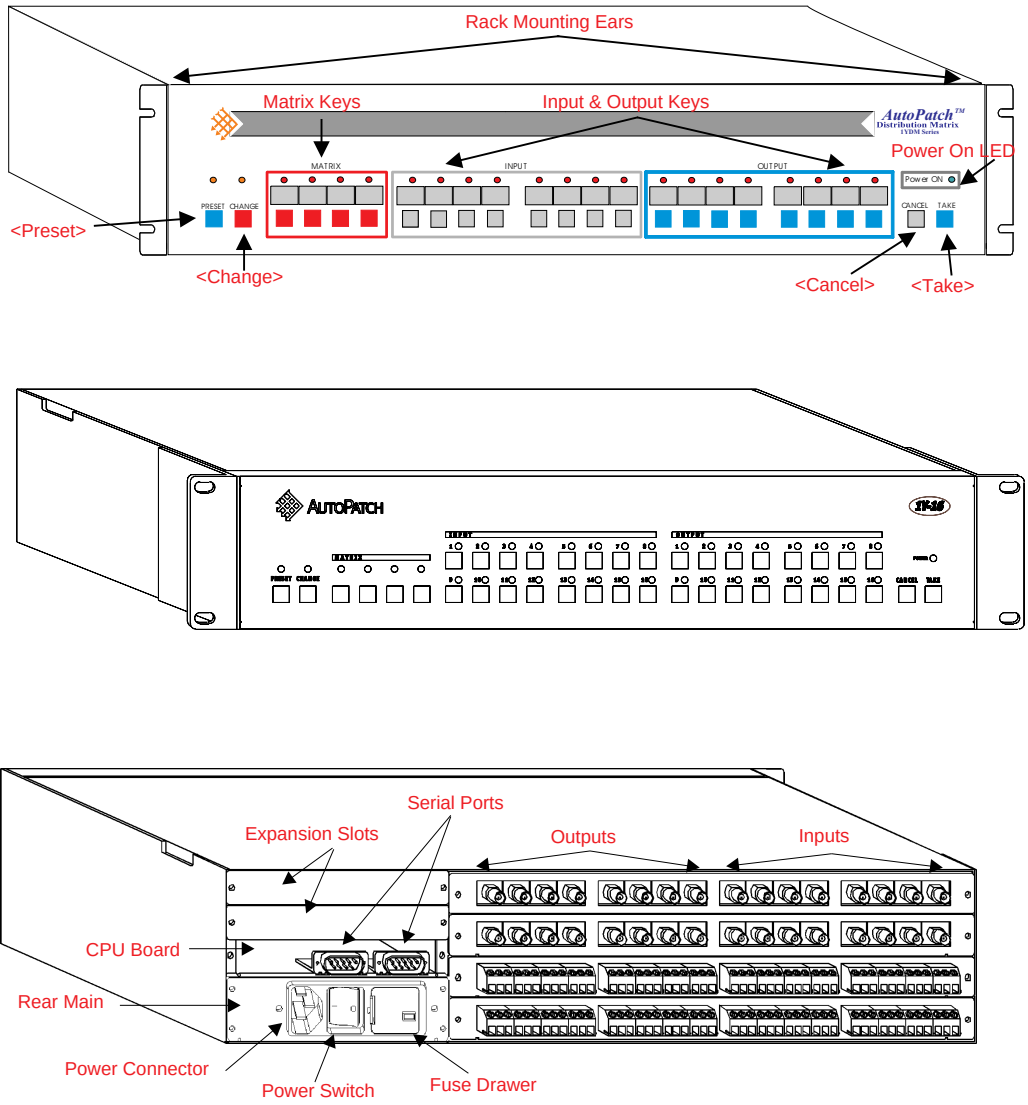


figure 1.1 Standard 1Y X/Y Control Panel (top), 1Y 16x16 X/Y Control Panel (middle), rear view of 1Y (bottom). Your control panel and matrix may differ from those pictured above.

Before opening the shipping boxes, examine them for any signs of damage. If a box is partially crushed or any side has been broken open, notify the shipping agency immediately.

The shipping box containing the master enclosure also holds invoices, instructions, extra fuses, the 1Y Series Distribution Matrices User Reference Manual, the power cord, an extender board and tuning tool, and other enclosure products. If your matrix is comprised of multiple enclosures, each box also contains an inter-enclosure linking cable. The shipping boxes are marked as "Container #_of_." The first blank is for the box number and the second blank is for the total number of boxes in the shipment. The box marked Container #1 holds the master enclosure. A 2 rack unit (4-slot) enclosure weighs approximately 15 lb. After removing the master enclosure from

its box, collect all documentation and envelopes. Keep your shipping boxes in case you need to return the product.

Depending on your matrix, your Local X/Y Control Panel may have a second row of buttons

Note: AutoPatch will not be responsible for damage to returned products incurred during shipping due to insufficient packaging. If requested, AutoPatch will supply a new shipping carton at cost.

1.2 Possible Installation Sites

The 1YDM can be installed in a rack or on a desktop. If you are installing the distribution matrix in a rack, mount it in a standard EIA 19″ (48.26 cm) rack. 4-slot enclosures are 2 rack units (3 in. or 7.62 cm) tall. 6-slot enclosures are 3 rack units (4.75 in. or 12.07 cm) tall. 8-slot enclosures are 4 rack units (6 in. or 15.24 cm) tall.

A distribution matrix with multiple enclosures should be installed in a rack with all the enclosures linked so control information can travel between them.

If your distribution matrix is made of a single enclosure and you wish to install it on a desktop, remove the ears on the sides of the enclosure and place the four rubber pads (included in the shipping container) on the bottom of the enclosure.

To install a matrix in a rack:

1. Place each enclosure in the rack and attach front-mounting screws to hold it firmly in place.
2. Link the enclosures. See section 1.3, “Linking Enclosures.”
3. For each enclosure, ensure that the voltage selector is in the correct position. See section 1.7, “Applying Power.”
4. Attach the input and output signal wires to the rear of the enclosure.
5. Attach power to each enclosure; the distribution matrix performs its startup sequence. See section 1.8, “Startup Sequence.”

1.3 Linking Enclosures

If your distribution matrix is comprised of multiple enclosures, the shipping boxes contain inter-enclosure linking cables. These cables allow a maximum space of 6″ (15.2 cm) between each enclosure. However, with custom-built RS-422 cables, enclosures may be placed as much as one mile (1.6 Km) apart. Linking the enclosures allows control information to travel between them. Call AutoPatch AutoAssist at (toll free) 800-622-0246 or (Int’l) 509-235-2636 for more information about custom linking cables.

When enclosures are linked, one enclosure must be designated as the master enclosure, and the remaining must be designated as slave enclosures (see section 1.4, “Setting Master and Slave Enclosures”). The master enclosure receives all the control information from either an external controller or the Local X/Y Control Panel and uses the enclosure links to pass the appropriate information to the slave enclosures. Although slave enclosures may also communicate with external controllers and poll SBCs, standard operation attaches them to the master enclosure. The master enclosure also initializes the slave enclosures on startup by using the enclosure links.

The serial ports used for linking enclosures are attached to the CPU board on the rear of the enclosure.

To link enclosures:

Make sure serial ports 1 and 2 are set to Normal (00) in the configuration word before linking enclosures, and that the master and slave enclosures are designated (see section 2.6, “Changing the Configuration Word”). Utilizing the serial ports on the CPU board of each enclosure, link them using the supplied serial cable(s). Use serial port 2 for outgoing communications from an enclosure and serial port 1 to receive incoming communications.

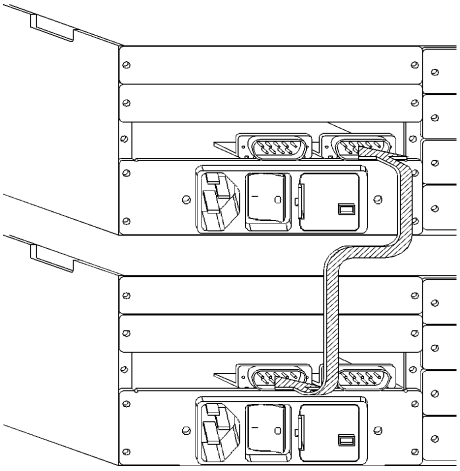


figure 1.1 Link Serial Port 2 to Serial Port 1

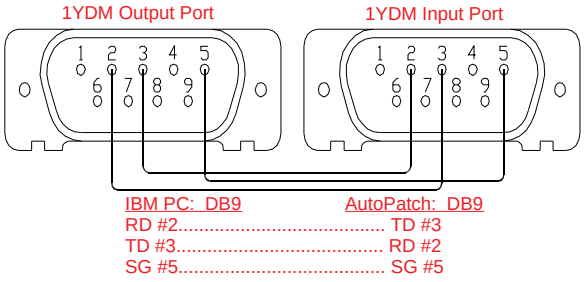


figure 1.2 Construction of 1YDM link cable

To unlink enclosures:

Detach the linking cables from serial ports 1 and 2 on all the enclosures you wish to unlink. If you are using the unlinked enclosure as a stand-alone distribution matrix, set the J3 jumper to the master enclosure setting (see section 1.4, "Setting Master and Slave Enclosures").

1.4 Setting Master and Slave Enclosures

The master enclosure is responsible for checking and initializing the slave enclosures on startup, receiving and distributing commands from external controllers, and polling SBCs. Although slave enclosures may also communicate with external controllers and poll SBCs, standard operation attaches those devices to the master enclosure. In a multi-enclosure distribution matrix, one enclosure must be designated as the master; all others must be designated as slaves.

The setting of the J3 jumper, located on an enclosure's CPU board, determines whether the enclosure is a master or a slave. To designate an enclosure as a master, set the J3 jumper as shown in figure 1.4. To designate an enclosure as a slave, set the J3 jumper as shown in figure 1.5. The J3 jumper is located near the circular silver battery on the CPU board (see figure 2.2 in section 2.5, "Using Presets"). One master enclosure should be present in each distribution matrix.

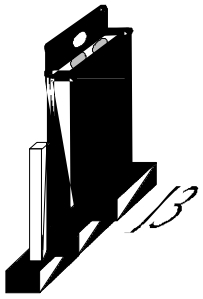


figure 1.3 Jumper setting for master enclosure

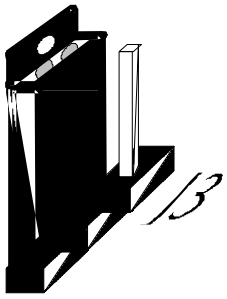


figure 1.4 Jumper setting for slave enclosure

A multi-enclosure distribution matrix should be installed in a rack and all the enclosures must be linked so control information can travel between them. For more information on rack installation, see section 1.2, "Possible Installation Sites."

1.5 Defining Levels

A level is a set of input and output signals. The inputs of one level can be routed to the outputs of that level if they are on the same I/O board. I/O boards do not derive their level number from their position on the rear of the enclosure, their level is established by setting the Level pins on the J1 jumper (see figure 1.6). The levels of all I/O boards are set at the fac-

tory prior to shipping, but they may be changed after installation.

See the Level Jumper Settings Supplement before proceeding with these instructions.

The level number identifies I/O board(s). However, a level number is not confined to only one I/O board; multiple I/O boards can be assigned the same level number. All boards in a distribution matrix assigned the same level number constitute a level. Levels are used to switch component signals, such as RGBS video or stereo audio signals while maintaining breakaway capabilities.

In theory, the distribution matrix is horizontally constrained, but vertically unlimited. There can be no more than four levels in the distribution matrix, but each level can be comprised of an unlimited number of I/O boards. There can be no more than 32 signals per I/O board, and all I/O boards must have one of the following configurations:

4x4, 4x8, 8x4, 8x8, 12x4, 16x8, 8x16, 16x16

Note: A limited number of 8x8, 8x4, and 4x4 Ultra Wide Band boards do not have a level jumper. If you have one of these boards and need to change the level, contact your authorized AutoPatch representative.

Setting the level number of a board:

Warning: To avoid ESD (Electrostatic Discharge) damage to sensitive components, make sure you are properly grounded before handling any boards.

1. Unplug the power cord from the rear of the enclosure.
2. Remove the input and output signal wires from the board to be changed.
3. Unscrew the holding screws from the sides of the I/O board.
4. Remove the I/O board from the enclosure.
5. Using the models in figure 1.6, set the pins to the desired level number.

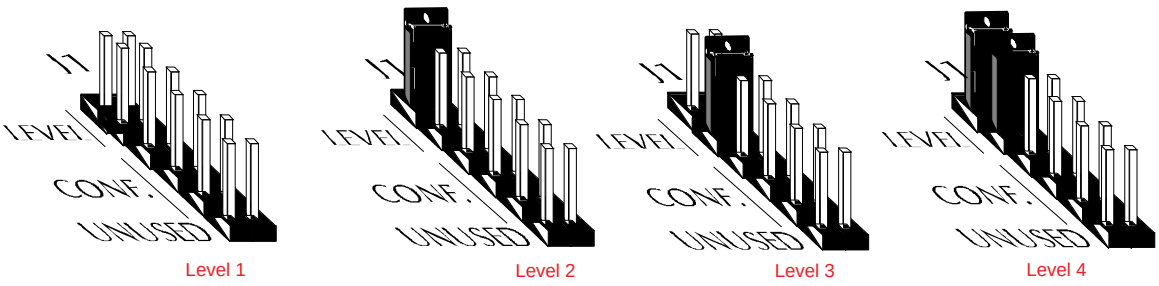


figure 1.6 Settings for level pins on J1 jumper

6. Return the board to its position in the enclosure and reattach all wires and screws. As you insert the board into its slot, push firmly, but do not force the board. If the board resists going into the slot, the pins on the rear of

the board are probably not lined up with the receptor. Realign the pins and try again.

1.6 Attaching Inputs and Outputs

Input and output connectors are located on the rear of 1YDM enclosures. The output connectors are in the two left connector columns (black connectors) and the input connectors are in the two right connector columns (white connectors). The connectors can be either audio or video. Standard 1YDM connectors are 3 block terminal for audio and BNC for video. Although they are not standard connectors, you may specify pluggable audio connectors when ordering your system.

The 3 block terminal audio connectors can be connected properly for differential (balanced) audio signals. If you are using single-ended (unbalanced) audio signals, be sure the negative signals wire is tied to ground. See figure 1.7.

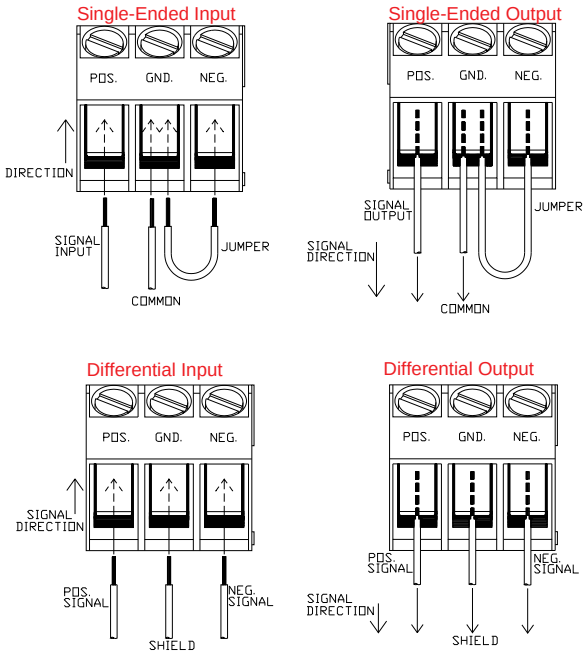


figure 1.7 Single-ended and differential connections

To attach video inputs and outputs

Insert the video cable into the proper input or output connector. To attach standard audio inputs and outputs, unscrew the clamps on the audio connector, insert the proper wire, and screw the wire back in so the clamp is tight and the audio wire makes a proper connection. Figure 1.7 displays examples of single-ended and differential audio inputs and outputs.

Note: To help alleviate low frequency noise problems in audio system twisted pair interconnections, connect the shield at one end only.

1.7 Applying Power

The power connector is located next to the power switch on the rear main of your 1Y enclosure(s). The 1Y also has a voltage selector located inside the fuse drawer. Make sure the selector is on the proper setting for your system. The voltage requirements for each enclosure are 110V +/- 10% or 220V +/- 10% depending on the electrical environment. To change the setting on the selector, insert a flathead screwdriver below the slot on the fuse drawer and flip the tab up to release the drawer. Pull the fuse drawer out; the voltage selector is still in the fuse drawer slot. Place your flathead screwdriver underneath the voltage selector to pull it out. To change the voltage selection rotate the selector 180 degrees and replace it in the fuse drawer slot. Replace the fuse drawer.

Warning: Damage can occur during operation if the voltage selector is set incorrectly.

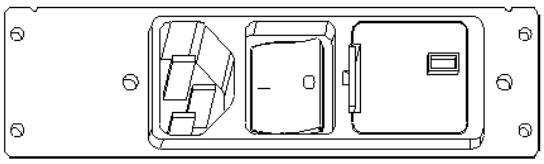


figure 1.7 Rear main, voltage selector is set to 110

Always have all the enclosures in your distribution matrix powered when you are using the system.

After applying power, you can test your I/O connections by making a switch. Refer to section 2.1, “Making a Switch,” for instructions on making a switch.

1.8 Startup Sequence

The startup sequence begins when power is applied to an enclosure. The enclosure(s) is designed to be continuously powered up. The initialization process of the distribution matrix includes: initializing the hardware, searching for I/O boards and their levels, and restoring the previous I/O configuration.

As the CPU searches the I/O boards, it also checks the Control Panel Configuration Scan (CPCS) bit to determine which source to use when configuring the X/Y Control Panel. If the CPCS bit is on, the CPU uses the jumper setting of the first I/O board to determine the configuration of the X/Y Control Panel. If no I/O board is found, the configuration defaults to an 8x8 setting. If the CPCS bit is off, the CPU uses the programmed setting of the Control Panel Configuration (CPC). The CPC is set at the factory to the correct configuration for the board layout of the distribution matrix. To change the setting of the CPC, see section 2.6, “Changing the Configura-

tion Word." These bit settings are not dependent on the presence of an X/Y Control Panel.

After the configuration has been determined, the matrix LEDs illuminate to show the available inputs and outputs. The output LEDs illuminate, and the input LEDs flash four times. Use the illuminated and flashing LEDs to verify the I/O configuration for your distribution matrix.

The final step in the startup sequence is the restoration of the I/O configuration. The nonvolatile RAM of the CPU allows both the current configuration of the 1YDM and the preset tables to be preserved during intentional power down and unexpected power shortages. Upon power up, the 1YDM retrieves the preset tables from RAM and reroutes the last known inputs to their corresponding outputs. On its very first power up, input 1 of each signal type is routed to every output of the same signal type (this is programmed at the factory so you will know the status of the inputs and outputs). For example, if your matrix routes audio signals only, input 1 will be routed to all outputs. If your distribution matrix routes audio and composite video, then the first audio input will be routed to all audio outputs and the first composite video input signals will be routed to all video outputs. After restoring the I/O configuration, the distribution matrix remains in status mode until a key is pressed.

1.9 Adding Input/Output (I/O) Boards

Each 2 rack unit enclosure can contain up to four I/O boards, 3 rack unit enclosure can contain up to six I/O boards, and 4 rack unit enclosures can contain up to eight I/O boards. An enclosure's boards can be any combination of audio or video. The look of the I/O boards varies depending on the type of board and configuration of the inputs and outputs. The inputs and outputs on the board are numbered on the rear of the enclosure. As you look at the rear of the enclosure, the inputs are on the right in white and the outputs are on the left in black.

Each board is a self-contained switching environment because an input can only be switched to an output on the same board. The configuration of the board is the number of inputs and outputs the board contains. I/O boards can have eight possible configurations: 4x4, 4x8, 8x4, 8x8, 12x4, 8x16, 16x8, and 16x16. The I/O configuration is always expressed as IxO (number of inputs by number of outputs).

Although each I/O board is constructed for a specific configuration, the I/O configuration must also be set on the J1 jumper. The J1 jumper is a series of six pairs of pins located towards the left rear corner of the I/O board as it is removed from the enclosure; however, if your system has one of the following I/O configurations – 8x16, 16x8, 16x16 – the J1 jumper is an 8 pin (4 row) header used solely for setting the level. In most cases J1 is used to set the level number and the configu-

ration, which is the number of inputs and outputs on the board.

Note: The J1 jumper is set correctly for each I/O board at the factory.

The I/O boards also have adjustable input impedance and input gain control. For more information on these topic, see section 1.10, “Adjusting Gain Control,” 5.3.2, “Gain Control,” and 5.3.1, “Impedance Jumpers.”

If adding a board that accommodates more than 12 inputs or more than 8 outputs, a new control panel (if a Local X/Y Control Panel is used) is needed. Due to the size of these larger boards one board takes up 2 board slots, reducing the number of boards an enclosure can hold.

To remove an I/O board:

Warning: To avoid ESD (Electrostatic Discharge) damage to sensitive components, make sure you are properly grounded before handling any boards.

1. Unplug the power cord from the rear of the enclosure.
2. Remove the input and output signal wires from the I/O board.
3. Using a Phillips screwdriver, unscrew the holding screws from the sides of the I/O board.
4. Grasp the connectors on the I/O board and pull. The board may be seated snugly; pull firmly but do not bend the board.

To insert an I/O board:

Warning: To avoid ESD (Electrostatic Discharge) damage to sensitive components, make sure you are properly grounded before handling any boards.

1. Line the board up with the I/O board guides on the inner side walls of the enclosure. Carefully push the board all the way in until it snaps into place. If the board resists going in, the card edge connector is not lined up with the receptor. Realign the connector and try again.
2. Insert the holding screws on either side of the board and secure the board to the enclosure.
3. Attach all signal wires.
4. Apply power to the enclosure.

1.10 Adjusting Gain Control

Gain control on audio and video output signals is standard. AutoPatch also offers audio and video boards with input gain control. At the factory, inputs and outputs are set to an overall gain of 1 (unity gain).

An extender board and gain control tool are included with the 1YDM. The extender board plugs into the rear of the I/O board and allows it to be functional while the gain controls

are exposed for tuning and troubleshooting. Each signal's gain control is directly behind the signal connector and is labeled TR#.

The extender board is shipped in the box with the master enclosure. When finished adjusting the gain control, remove the extender board from the I/O board before operating the distribution matrix.

Adjusting the Gain:

Warning: To avoid ESD (Electrostatic Discharge) damage to sensitive components, make sure you are properly grounded before handling internal boards.

1. Unplug the power cord from the rear of the enclosure.
2. Remove the I/O board from the enclosure.
3. Attach the extender board to the pins on the rear of the I/O board.
4. Fit the tab on the extender board into the board guides and slide the board in until the extender board snaps into place.

   With the extender board in place, the I/O board extends far enough past the covering of the enclosure to expose the gain controls.
5. Attach power to the enclosure. The distribution matrix should be in proper working order.
6. While monitoring the desired output signal(s), adjust the gain as necessary.

Note: Only use the extender board while adjusting the gain. Do not continue using the extender board during normal operation.

Chapter 2—Operating the Distribution Matrix

The 1Y Distribution Matrix switches data signals, mono and stereo audio signals, component video signal (i.e., RGB, RGBs, RGBHV, Y/c), and composite video signals (i.e., NTSC, PAL, SECAM). Operations are carried out by a few basic commands that can be implemented using one of many controller options. Please note that unless otherwise specified, all the operations in this chapter are executed using an Auto-Patch X/Y Control Panel.

This chapter covers:

- Making a Switch
- Checking the Status
- Disconnecting a Signal
- Using Presets
- Changing the Configuration Word

2.1 Making a Switch

Switches affect the I/O configuration of one input on one level at a time. A switch command contains the following elements:

<Change><Matrix><Input><Output> <Output> ... <Output><Take>

Change refers to the operation being performed. To identify an operation as a switch, press the Change key at the beginning of the operation.

Matrix identifies the level on which the switch occurs. Each I/O board can be assigned to one of four levels. The number of boards comprising each level can be virtually unlimited. Boards assigned to the same level switch together.

Input and Output identify the signals being modified. Although only one input can be selected, multiple outputs on the same I/O board can be selected.

Take initiates the switch. If you notice an error in your switch sequence before pressing <Take>, press <Cancel> and start over.

Although signals on different boards can be switched simultaneously for component signals, an input signal can only be switched to an output attached to the same I/O board as itself.

To make a switch:

1. Press <Change>; the Change LED illuminates.
2. To select a level, press any Matrix key.
   If desired, you can select multiple levels. If a matrix key is not selected, the specified switch occurs on all levels.
3. To select an input, press any Input key.
4. To select an output, press any Output key. You can select one or multiple outputs that are on the same I/O board as the selected input.
5. Press <Take>; the switch is performed and the 1YDM returns to status mode.
   If desired, steps 3 and 4 can be entered in reverse order.

To make a switch using levels:

It is possible to switch input signals on multiple I/O boards with one switch command by using levels. There are three methods of switching multiple input signals with the 1YDM: setting multiple I/O boards to the same level, specifying multiple levels when defining a switch, and using Level 0 to switch all signals. Setting multiple I/O boards for the same level is the suggested method for switching component signals.

Setting multiple I/O boards for the same level allows groups of signals that belong together (component signals) to be switched together. Some examples of component signals are RGBs video and stereo audio signals. The signals that need to be switched together must be the same input number on each I/O board.

2.2 Checking Status

Checking status makes the CPU display the I/O configuration of a level. Status is the default mode of the 1YDM. Pressing <Cancel> at any time puts the distribution matrix in status mode.

Checking status allows you to monitor your 1Y's I/O configuration and check for user discrepancies. However, status mode displays the I/O configuration of only one input or output at a time.

To check the status:

1. Make sure the distribution matrix is in status mode; press <Cancel> if you are not sure which mode the 1Y is in.

   The distribution matrix is in status mode when only the Power ON and Matrix LED's are illuminated.
2. Press a Matrix key to select a level. The corresponding LED illuminates.

   If no level is selected, the CPU defaults to level 1.
3. To check which outputs an input is routed to, press the input key.

   The outputs receiving that input are illuminated.

4. To check which input is routed to an output, press the output key.

   The input is illuminated.

The distribution matrix remains in status mode after a status check is performed.

2.3 Disconnecting a Signal on a Level

Disconnecting a signal removes the input signal going to an output device(s) without switching a new input signal to it. This operation is different than making a switch. When a signal is disconnected, no other part of the distribution matrix is affected. Disconnecting an input or output breaks the signal connection(s) between the input and the output(s) it is routed to on the specified level.

To disconnect an input or output:

1. Hold down <Cancel> and press <Change>. The Change LED begins flashing.
2. Press a Matrix key to select a level.

   Note: If you do not specify a level, the input or output will be disconnected on all levels.

3. Press the key(s) of either the input(s) or output(s) you want to disconnect.

   Multiple inputs and outputs can be specified. Be aware that specifying an input disconnects it from all outputs; specifying an output disconnects it from its inputs but does not affect any other outputs receiving that input.

4. Press <Take>. The disconnection takes place and the 1YDM returns to status mode.

To check if the output was disconnected from the input:

While in status mode, press the input that was routed to that output. The LED above the disconnected output should remain off.

To disconnect all levels in the distribution matrix:

Hold down <Take> and press <Cancel>. No output keys need to be pressed.

To check if the outputs were disconnected:

While in status mode press any output key. All input LED's should remain off; if they do not, the disconnection did not work.

2.4 Disconnecting a Signal Using QuickDis

You can also disconnect a specified input or output on *all* levels; this is called QuickDis. QuickDis is designed for distribution matrices that switch component signals using multiple I/O boards and multiple levels. If the signals need to be disconnected quickly, all at once, QuickDis is the answer. For example, if a distribution matrix is used to control com-

posite video with breakaway stereo, the enclosure should contain three I/O boards - one video board for the composite video signal and two audio boards, one each for the left and right channel. The video board is set as Level 1. The two audio boards are set as Level 2. To get the maximum effect of configuring the distribution matrix this way, the video and accompanying audio signals should be the same input and output numbers on each level.

Use QuickDis for disconnecting signals on multiple I/O boards that are assigned to different levels. Because it disconnects an input or output on all levels it is easier and quicker than manually disconnecting each signal. All you do is specify the input or output number and all the signals assigned to that number are disconnected.

To execute QuickDis:

Hold down the key of the input or output you want to disconnect and press <Cancel>; the specified input or output is immediately disconnected on all levels.

2.5 Using Presets

Use presets to quickly restore particular I/O configurations. A preset is like a “picture” of a commonly used I/O configuration. When defining a preset, you assign an ID number to the current I/O configuration (including all the levels) of the distribution matrix. The number and the I/O configuration are then stored in the CPU. Restore the I/O configuration at any time by recalling the preset ID number associated with it.

The 1Y distribution matrix can store up to 64 presets. Preset numbers are identified using a combination of the matrix key to select the range and the input and output keys to select the desired number. Figure 2.1 shows the preset identity range of the matrix keys and values of the input/output keys. If your Local X/Y Control Panel has a second row of keys, the top row corresponds to figure 2.1 and the bottom row is not used for preset identification.

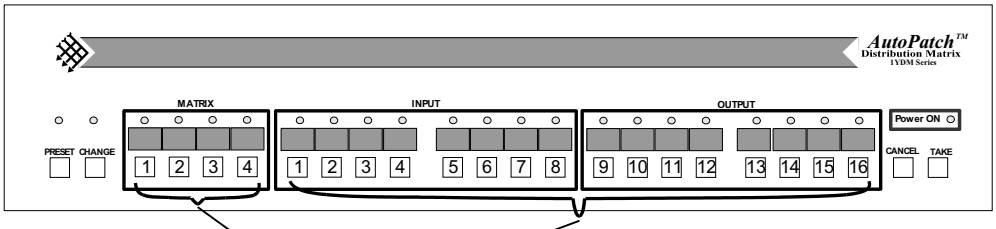


figure 2.1 Value of the I/O keys for preset ID

Making a list of all presets, including a name for each preset. The name should describe the I/O configuration stored in the preset, will help you identify them later.

To store a preset:

1. Configure the inputs and outputs as you want to save them.
2. Press <Preset> twice; the PRESET LED begins flashing, indicating that the distribution matrix is in store preset mode.
3. Press a matrix key and then an input/output key to assign an identity to the current I/O configuration of the distribution matrix.

   For example, to store the current I/O configuration as preset 35, press Matrix key #3 (which sets the range of the input/output keys to 33-48) and then press Input/Output key #3 (preset #35 in the Matrix key #3 I/O key range).

   Caution: When storing a preset, if you assign an identity that was previously assigned to an I/O configuration, the new I/O configuration overwrites the old I/O configuration in memory.

4. Press <Take> to store the preset; the 1YDM returns to status mode.

To recall a preset:

When a preset is recalled, the I/O configuration of the distribution matrix is restored to the state it was in when the preset was saved.

1. Press <Preset>; the PRESET LED illuminates, indicating that the distribution matrix is in preset recall mode.
2. Press the matrix and input/output keys that correspond to the number of the configuration you wish to recall.
3. Press <Take>; the distribution matrix switches to the desired configuration and then returns to status mode.

2.5.1 Dry Contacts and Presets

Presets can also be used with dry contacts. Dry contacts recall presets using digital (TTL) level lines. The dry contact port is a 10-pin single in-line header labeled P1 on the CPU board. It is located between the Power On LED and serial port 1 on the CPU board (see figure 2.2). Single In-line Package (SIP) pins 1-7 are dry contact data lines internally pulled up. Pin 8 is the falling-edge active strobe line. Pin 9 is ground. Preset calculation using dry contacts is performed by taking the two's complement (invert and add 1) of the data presented, in binary, on the dry contact data lines.

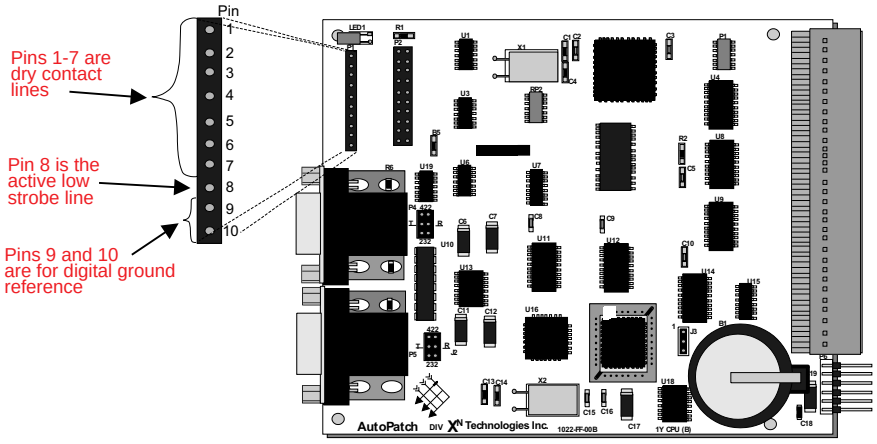


figure 2.2 Dry contact pins on the CPU board

To execute a preset using dry contact control:

1. Select the appropriate number of pins (1-7).
2. Strobe pin 8 to ground (ground is pin 9).

2.6 Changing the Configuration Word

Upon powerup, the 1Y's CPU checks the configuration word, where the settings for the 1Y's adjustable features are stored. Set the adjustable features to create the best switching environment for your system.

This section covers the following features in the configuration word and instructions for changing them.

Control Panel Echo
Serial Status Filter
16x16 Front Panel Installed
Sync Board Enable
Serial Port Settings
SBC Polling Limit
Control Panel Configuration Scan
Control Panel Configuration
Setting the Configuration Word

2.6.1 Control Panel Echo

The control panel echo bit is the first input/output key. It allows the control panel to echo the distribution matrix's operations when it is being controlled from an external controller. This bit does not interrupt serial control operations unless echo is required.

2.6.2 Serial Status Filter

The serial status filter bit is the second input/output key. It allows status communication to go out serial port 1. When this bit is turned off, serial status communication cannot leave serial port 1. This programmable aspect is important when controlling multiple enclosures from an external device because it allows the external controller to retrieve status. To avoid problems with linked enclosures, serial status communication does not leave serial port 2.

2.6.3 16x16 Front Panel Attached

The 16x16 front panel attached bit is the third input/output key. This bit alerts the CPU when a 16x16 front panel is attached to the enclosure.

2.6.4 Sync Board Enable

Section 4.1, "Vertical Interval Sync Expansion Boards," contains a complete explanation of sync boards and suggested applications. If an enclosure contains a sync board, the sync board enable bit must be on for the sync board to work. Only turn this bit on if the enclosure contains a sync board.

Note: If this bit is on and the enclosure does not contain a sync board and a provided sync source, the distribution matrix will not perform switches although it will appear to operate normally without an error reported.

2.6.5 Serial Port 1

Serial Port 1 operation is controlled by the sixth programmable key. The setting for the serial port should be 0, or off, unless you are using SBCs. If you use SBCs with the distribution matrix, you must enable polling for serial port 1 and set the polling range. The CPU polls the SBCs for any switch request. If the CPU finds a change, that switch is made immediately. Refer to section 2.6.7, "Single Bus Controller (SBC) Polling Limit."

2.6.6 Serial Port 2

Serial Port 2 operation is controlled by the seventh programmable key. This bit works the same way as the Serial Port 1 bit, except Serial Port 2 cannot be used with SBCs. Serial Port 2 does not echo commands and is not recommended for use with any external controllers. Serial Port 2 is usually used for looping down to another enclosure in multi-enclosure distribution matrices.

2.6.7 Single Bus Controller (SBC) Polling Limit

The SBC polling limit lets the CPU know how many SBCs to look for when it is polling them. The CPU polls from 1 to whatever limit is set. The SBC polling limit is controlled by the 8-12th programmable keys. Use the following chart to set the bits for the polling limit. A bit set to 1 is on, a bit set to 0 is off. Polling limit must be set before the matrix begins polling SBCs.

Bit Setting					Poll Limit
8th	9th	10th	11th	12th	
0	0	0	0	0	1
1	0	0	0	0	2
0	1	0	0	0	3
1	1	0	0	0	4
0	0	1	0	0	5
1	0	1	0	0	6
0	1	1	0	0	7
1	1	1	0	0	8
0	0	0	1	0	9
1	0	0	1	0	10
0	1	0	1	0	11
1	1	0	1	0	12
0	0	1	1	0	13
1	0	1	1	0	14
0	1	1	1	0	15
1	1	1	1	0	16
0	0	0	0	1	17
1	0	0	0	1	18
0	1	0	0	1	19
1	1	0	0	1	20
0	0	1	0	1	21
1	0	1	0	1	22
0	1	1	0	1	23
1	1	1	0	1	24
0	0	0	1	1	25
1	0	0	1	1	26
0	1	0	1	1	27
1	1	0	1	1	28

0	0	1	1	1	29
1	0	1	1	1	30
0	1	1	1	1	31
1	1	1	1	1	32

2.6.8 Control Panel Configuration Scan (CPCS)

The setting of the Control Panel Configuration Scan (CPCS) determines which source the CPU uses to configure the control panel. The CPCS is controlled by the 13th programmable key. If this bit is on, the CPU uses the jumper setting of the first I/O board found to determine the configuration of the control panel; if no I/O boards are found, the configuration of the control panel is set to 8x8. If the bit is off, the CPU uses the Control Panel Configuration (CPC) setting (see section 2.6.9, “Control Panel Configuration”) to determine the configuration of the control panel.

Bit Setting				Configuration of
3rd	14th	15th	16th	X/Y Control Panel
0	0	0	0	Error
0	1	0	0	4x4
0	0	1	0	4x8
0	1	1	0	8x4
0	0	0	1	8x8
0	1	0	1	12x4
1	0	0	0	Error
1	1	0	0	16x8
1	0	1	0	8x16
1	1	1	0	16x16
1	0	0	1	12x4 (w/16x16 front panel)
1	0	1	1	15x1 (w/16x16 front panel)
1	1	0	1	4x12 (2/16x16 front panel)
0	0	1	1	4x12
0	1	1	1	15x1

Not available

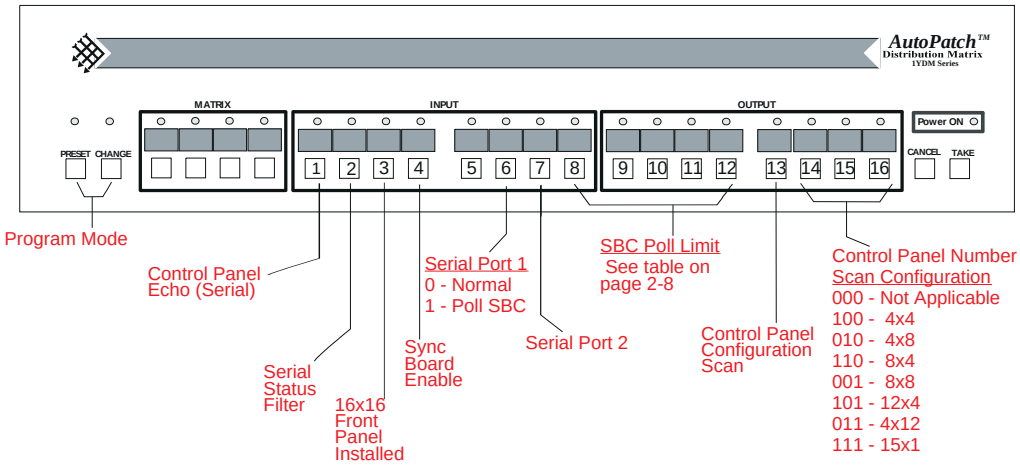


figure 2.3 Bits for the adjustable features of the 1Y

2.6.9 Control Panel Configuration

The Control Panel Configuration (CPC) is controlled by the 3rd, 14th, 15th, and 16th bits and is used to set the configuration of the control panel when the CPCS bit is off. If the CPCS bit (see section 2.6.8) is off, the CPU uses the setting of the 14th, 15th, and 16th bits to configure the control panel. Use the following chart to configure the bits.

2.6.10 Setting the Configuration Word

The configuration word can be set from the control panel or via the serial port from an external controller. This section describes how to set the adjustable features from a control panel. Setting the configuration word from an external controller is discussed in section 3.3, “Changing the Configuration Word Using BCS Commands.”

To set any of the features in the configuration word, place the distribution matrix in program mode by holding down <Change> and pressing <Preset> . Both the change and preset LED's illuminate. Once in program mode, use the 8 Input and 8 Output keys to set the features of the configuration word. To exit program mode, press <Cancel>. Figure 2.3 shows the function of each of the input/output keys in the configuration word.

The configuration word settings are represented in binary form by the LED's above the input and output keys. Each feature of the configuration word can be set by turning one or more bits (input or output keys) on or off. If a bit is on, its LED is illuminated; if a bit is off, its LED is off. Some features, such as setting the SBC polling range or the control panel number scan configuration, require setting multiple bits. For example, if figure 2.3 were to show that the SBC Poll Limit was set to 10, bits 8-12 would be set as 10010 (bit 8 on (1), bit 9 off (0), bit 10 off (0), bit 11 on (1), bit 12 off (0)).

To set the configuration word from an X/Y Control Panel:

1. Place the distribution matrix in program mode by holding down <Change> and pressing <Preset>; the Change and Preset LED's illuminate.
2. Set the bits of the desired feature(s) by pushing the keys (in no particular order). Sections 2.6.1 - 2.6.10 explain each of the features and how to set the bits to achieve the desired results.
3. When you are ready to exit program mode and save the new configuration word, press <Take>; the changes take effect and the distribution matrix returns to status mode.
4. To exit program mode without storing a new configuration, press <Cancel>.

Chapter 3—Programming the Matrix

AutoPatch Distribution Matrices are programmed using a set of ASCII command codes called Basic Control Structure (BCS). BCS can be utilized by any external controller that can send ASCII commands at 9600 BAUD, with 8 data bits, 1 stop bit, and no parity.

BCS commands perform all the operations the control panel offers. The command syntax is designed to parallel the operations of the control panel as closely as possible. Instead of pressing the keys on the control panel, press the keys on the external controller keyboard to achieve the same effect.

Among other things, BCS can be used to make switches, program and recall presets, check the status of the inputs and outputs, and change the configuration word.

This chapter covers:

- Basic Control Structure (BCS) Language
- Entering BCS Commands
- Changing the Configuration Word Using BCS Commands
- BCS Software Handshaking

3.1 Basic Control Structure (BCS) Language

Note: AutoPatch strongly suggests implementing software handshaking as defined in section 3.4, "BCS Software Handshaking."

BCS is a set of alphanumeric characters that allow a PC keyboard or a controlling device to simulate control panel commands. The following table shows the PC key, the simulated control panel function, and a short description of the function. If you use a PC to control your 1YDM, you must use serial communications software.

To understand BCS commands, it is important to understand the 1YDM modes of operation. Two modes are available in the 1YDM, operation and configuration. The operation mode allows commands to be carried out by the distribution matrix. The configuration mode allows editing access to the configuration word.

BCS commands utilize both the operation and the configuration modes of the 1YDM. The modes are distinguished on the control panel of a 1Y by the preset and change LEDs. In configuration mode, both LEDs are on. In operation mode, each LED flashes while its operation is being performed. When us-

ing BCS commands, the modes are distinguished by the character at the front of the command string. Any character other than 'P' signifies operation mode. 'P' precedes new 1YDM configuration word definitions.

Enter the BCS commands in the same sequence you would enter them from the control panel. The control panel LED displays will echo the commands entered from the PC.

3.2 Entering BCS Commands

Entering BCS commands from an external controller keyboard is similar to entering commands from the control panel.

One advantage of using BCS commands is that you can enter multiple commands in the same string. For example, you can recall preset 10 and then switch input 1 to outputs 6, 7, and 8 with one command string. That command string would look like this:

R10TCI1O6 7 8T

All BCS entries must be complete commands. Any incomplete or erroneous commands should be terminated with an 'X' (Cancel) and then retyped. Typing a space does *not* cancel a previous command.

The following table shows examples of commands from an external controller keyboard.

Key	Function	Description
X	Cancel	Cancels the previous incomplete command
T	Take	Executes commands
S	Status	Allows you to check the status of the 1YDM's input and output locations.
L	Level	Level refers to a particular I/O board or group of I/O boards.
C	Change	Change command
I	Input	Input number entry
O	Output	Output number entry
R	Preset	Executes a preset configuration
RR	Define Preset	Allows you to define a preset configuration
' '	Space	A delimiter for separating multiple input and output entries
'0' - '9'	Number	Digits used to define inputs and outputs
D	Disconnect	Disconnects an input or an output

3.3 Changing the Configuration Word Using BCS Commands

Changing the configuration word from an external controller is nearly identical to changing it from a control panel. After typing the BCS program command, 'P,' to place the distribution matrix in program mode, enter either a '1' or '0' for each bit of the configuration word. Entering a '0' turns a bit off; entering a '1' turns a bit on. See section 2.6, "Changing the Configuration Word" for a description of each configuration word bit.

Unlike changing the configuration word of the distribution matrix from the control panel, all 16 bits must be set every time you modify the configuration word.

To change the configuration word:

1. Decide on the setting for each adjustable feature of the distribution matrix.

   For example, set:
   Control Panel Echo on, bit 1 = 1
   Serial Status filter on, bit 2 = 1
   16x16 Front Panel installed off, bit 3 = 0
   Sync board enable on, bit 4 = 1
   Serial port 1 to poll SBCs, bit 6 = 1
   Serial port 2 as normal, bit 7 = 0
   SBC polling limit to 10, bits 8-12 = 10010
   Control Panel Configuration Scan to off, bit 13 = 0
   Control Panel Configuration to 8x8, bits 14-16 = 001

   Note: Serial port 2 cannot be used for polling SBCs, so bit 7 should always be set to '0.'

2. Type 'P,' a '0' or '1' for each bit, and 'T.'
   The command to set the features as described in step 1 looks like this:

   P1101010100100001T

   See below for more examples of configuration words:

   P0111010100101110T

   Control Panel Echo off, bit 1 = 0
   Serial Status filter on, bit 2 = 1
   16x16 Front Panel installed on, bit 3 = 1
   Sync Board Enable on, bit 4 = 1
   Serial Port 1 to poll SBCs, bit 6 = 1
   Serial Port 2 as normal, bit 7 = 0
   SBC polling limit to 10, bits 8-12 = 10010
   Control Panel Configuration Scan to on, bit 13 = 1
   Control Panel Configuration to 8x4, bits 14-16 = 110

P1110000000001001T

Control Panel Echo on, bit 1 = 1
Serial Status filter on, bit 2 = 1
16x16 Front Panel installed on, bit 3 = 1
Sync Board Enable off, bit 4 = 0
Serial Port 1 to normal, bit 6 = 0
Serial Port 2 to normal, bit 7 = 0
SBC polling limit to 1, bits 8-12 = 00000
Control Panel Configuration Scan to on, bit 13 = 1
Control Panel Configuration to 8x8, bits 14-16 = 001

3.4 BCS Software Handshaking

Each character read by the distribution matrix CPU is returned through the serial port. When a switch is completed in hardware, the BCS command 'T' is sent. The external controller should wait until it receives the echoed 'T' back from the CPU before it sends the next command. Waiting for the 'T' command prevents serial buffer overflow.

Chapter 4—Options

The 1YDM is completely customizable. This chapter introduces you to the several feature and control options you have for your 1YDM.

This chapter covers:

- ❑ Vertical Interval Sync Expansion Boards
- ❑ Pluggable Connectors on Audio Boards
- ❑ Front Panel
- ❑ Using External Controllers
- ❑ Using a Dumb Terminal
- ❑ Single Bus Controllers
- ❑ Software

4.1 Vertical Interval Sync Expansion Boards

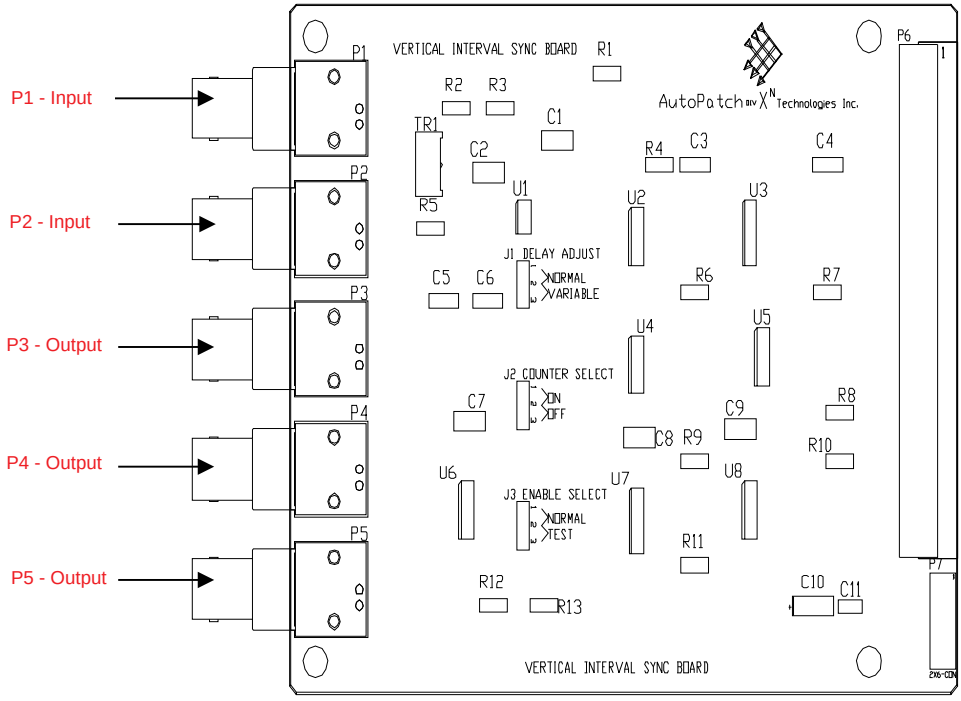


figure 4.1 Vertical Interval Sync Expansion Board (2 rack unit enclosures only)

The Vertical Interval Sync Expansion board (sync board) provides AutoPatch Y-series matrices with complete vertical interval synchronization switching capability. The sync board can utilize a master sync signal by separating the sync from an input signal (such as a composite video input). The sync board can synchronize switching between enclosures.

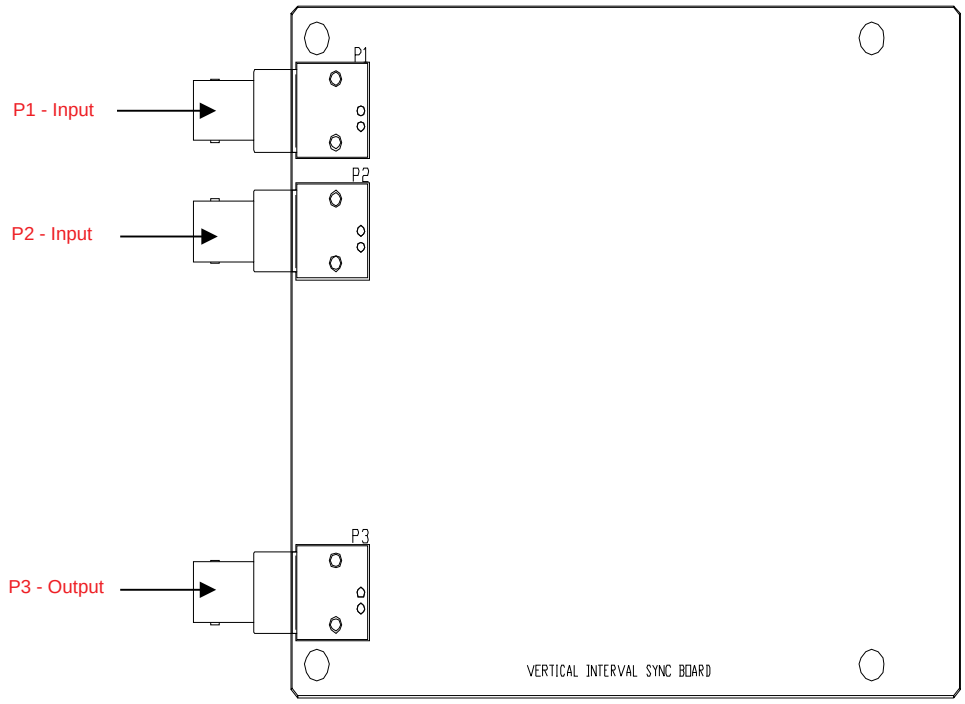


Figure 4.2 Vertical Interval Sync Expansion Board
(3 rack unit and 4 rack unit enclosures only)

The sync board facilitates a variety of operations. The following are some tasks that can be accomplished using the Vertical Interval Sync Expansion board:

Extracting a Master Sync Signal

A system master sync signal can be extracted from any video input signal which contains vertical sync information. A video signal provided to the external sync input (P2 on the board; figures 4.1 and 4.2) is decoded and a TTL vertical sync pulse containing vertical sync information is provided on the composite sync output (P4 on the board; figures 4.1 and 4.2). Any video input signal can be selected as a sync source if one of the video outputs is connected to the external sync input (P2 on the board; figures 4.1 and 4.2).

Synchronizing a Multi-Enclosure Switch

The sync board can be used to orchestrate many I/O boards performing switches simultaneously. Once the sync board is enabled, the next switching pulse detected is routed to the I/O boards for switch execution. The sequence of events for the distribution matrix follows:

First, the master enclosure issues a pending switch command to all boards for execution upon receipt of the sync pulse.

Second, the master enclosure enables the sync board.

Finally, when the next sync pulse is detected by the sync board, the switch command is executed by all boards.

When the sync board is enabled, the sync pulse is also provided to the local sync output (P5 on the sync board; figure 4.1). The master enclosure's local sync output can be used to drive the local sync inputs of several slave enclosures, or they may be daisy-chained by connecting the master enclosure to the local sync input (P1 on the sync board; figures 4.1 and 4.2) of the next slave enclosure, and so on (see figures 4.1 and 4.2).

External Control of Board Ensemble (2 rack unit enclosures only)

You can manually set who or what controls the sync board by setting the J1 jumper on the sync board (see figure 4.1). Pin 1 of the J1 header is processor enable control. Pin 2 is connected to the internal enable circuitry and is pulled to ground by a resistor. Pin 3 is tied up to +5V. Normal operation has pins 1 and 2 connected with a jumper, which allows the CPU to control the board. Leaving the jumper off the J1 header disables the board. You can manually control the board by attaching a normally open switch to pins 2 and 3 of the J1 header. Or, you can digitally control the sync board from an external controller by connecting a TTL signal to pin 2, in which case, a 1 enables the board and a 0 disables it.

4.1.1 Parts of the Sync Board

The following is a description of the important and adjustable parts of the sync board. They fall into two categories, External Connections and On Board Jumper Settings.

4.1.1.1 External Connections

Five external BNC-type connectors (three connectors for 3 rack unit and 4 rack unit enclosures) are attached along the left side of the board, as seen in figures 4.1 and 4.2.

Each of the BNC-type connectors serves a different function. A description of each connector and what each one is used for follows.

P1 – Input (Local Sync); 2, 3, and 4 rack unit enclosures

The local sync input is designed to be connected, by a cable, to the local sync output of another sync board. The local sync input allows the enclosure to be switched on command from the master enclosure. The enclosure performs a switch immediately when it receives an active low TTL-level signal. The signal is echoed out the local sync output connector. A master enclosure can sequence the switching of an entire distribution matrix by either driving all the local sync inputs of the slave enclosures in parallel, or connecting them input to output in a daisy-chain fashion.

P2 – Input (External Sync); 2, 3, and 4 rack unit enclosures

The external sync input connector accepts any of the following signal types:

NTSC composite video

Composite sync type of synchronization

TTL station master synchronization

RGBS group member that contains sync information

The vertical synchronization information is stripped from the signal and is used to generate a local sync command, which is sent to other enclosures at the appropriate time. The local sync command is provided to the local sync output as well. TTL level composite sync output is also generated, depending on the type of external input signal received.

P3 – Output (TTL Vertical Sync); 2, 3, and 4 rack unit enclosures

A TTL level vertical interval sync signal, derived from the external sync input (P2) is output.

P4 – Output (Composite Sync); 2 rack unit enclosures only

A TTL level composite sync signal is derived from the external sync input, if possible. If the external input is a composite NTSC signal, the video portion is removed and the sync portion is output to this connector. Other external sync input signal types are handled in a similar manner, if possible. For example, a TTL vertical interval sync input signal does not contain a composite sync structure, so it is not taken apart because it is the sync signal.

P5 – Output (Local Sync); 2 rack unit enclosures only

The local sync output is designed to be connected to the local sync input of another board. If the board is enabled, the switch sync command signal is echoed out this connector regardless of whether it came from the local sync input, the external input, or was generated internally by the processor.

4.1.2 On Board Jumper Settings

Three 3-position jumpers (J1, J2, and J3; see figure 4.1) are used on the board and are set, according to customer order specifications, at the factory. On all three jumpers, standard operation has pins 1 and 2 connected. Other pin positions allow adjustments to be made for very high frequencies, stand alone operation, and testing.

J1 – Delay Adjust

The standard setting (pins 1 and 2 connected with a jumper) is best for normal operation with NTSC or moderate frequency RGB signals. If the standard delay is not sufficient, rather than using a fixed resistor, move the jumper to connect pins 2 and 3. Connecting pins 2 and 3 selects the potentiometer, TR-1 (see figure 4.3). The delay can then be adjusted using TR-1.

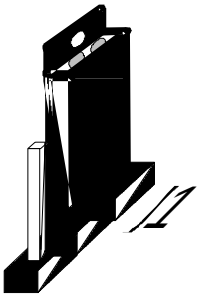


figure 4.3 Delay adjust standard setting

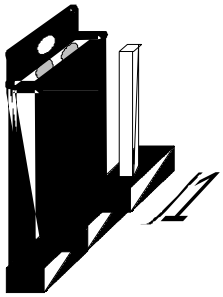


figure 4.4 Potentiometer setting

J2 – Counter Select

The standard setting (pins 1 and 2 connected with a jumper) enables the counter section. During normal operation, the counter is used to determine switch timing. The counter should be used with any signal that contains horizontal sync pulses, such as NTSC, RGB with sync on Green, and similar signals. During normal operation, if the sync input signal does not have a horizontal sync component, the counter has no effect. If a manually selectable time delay is needed (use J1 and TR-1 to select and adjust the time delay) disable the counter section. To disable the counter section, connect pins 2 and 3 of the J2 header with a jumper.

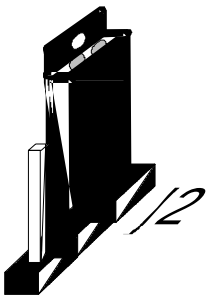


figure 4.5 Counter select on

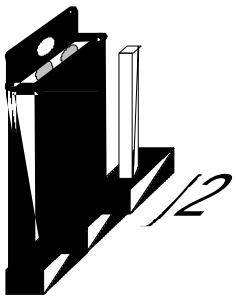


figure 4.6 Counter select off

J3 – Enable Control

The standard setting (pins 1 and 2 connected with a jumper) allows the CPU to control the enabling and disabling of the sync board. Connecting pins 2 and 3 with a jumper disconnects CPU control and allows the board to be enabled manually. Removing the jumper from the J3 header completely disables the sync board. J3 is used primarily for testing, but there may be some applications that require external board enable control. The board is enabled when pin 2 is high, and disabled when pin 2 is low. Since pin 2 is pulled to ground with a resistor, a switch connected between pins 2 and 3 controls board enable mechanically; or a TTL signal can be placed on pin 2 to control board enable digitally.

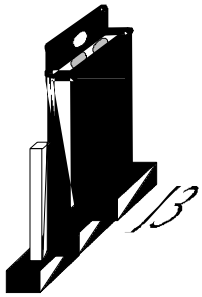


figure 4.7 CPU control enabled

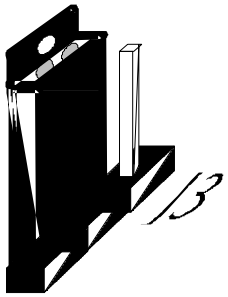


figure 4.8 Manual control enabled

4.1.3 *Installing a Sync Board*

Each enclosure in a distribution matrix can contain one sync board. If you originally ordered sync boards, they are already installed in your enclosures.

To install a sync board:

Warning: To avoid ESD (Electrostatic Discharge) damage to sensitive components, make sure you are properly grounded before handling any boards.

1. Unplug the power cord from the rear of the enclosure.
2. Remove the faceplate from the third expansion slot down from the top of the enclosure.
3. Line up the board with the board guides on the inner side walls of the slot. Make sure the connectors are on the upper side of the board.
4. Carefully push the board all the way in, until it snaps into place. If the board resists going in, the pins are not lined up with the receptor. Realign the pins and try again.
5. Attach the fitted faceplate over the sync board connectors.
6. Once you have added sync boards to all the enclosures that need them, apply power to all enclosures in the distribution matrix.

4.1.4 *Enabling a Sync Board*

After installing your sync board, enable it by turning on bit 4 of the configuration word. For more information on editing the configuration word, see section 2.6, “Changing the Configuration Word.” You can also enable your sync board by attaching a TTL line to pin 2 of the J3 header (digitally enables and disables the board) or connecting a switch between pins 2 and 3 to manually enable and disable the board.

4.2 Pluggable Connectors on Audio Boards

Pluggable connectors are standard for your 1YDM audio boards With the pluggable connectors, each group of four inputs (or outputs) uses a single connector that plugs into a fixed connector on the board.

Pluggable connectors allow connections to be wired into half of the total connector, away from the board, and plugged in later. They also allow audio inputs and outputs to be quickly disconnected from the board if rapid board or connection replacement is desired.

Pluggable connectors are installed on audio boards at the factory when they are ordered.

4.3 Front Panel

The front panel is an optional control panel on the front of an enclosure. You have three front panel options:

Local X/Y Control Panel (three available configurations: 8x8, 12x4, or 16x16)

Remote X/Y Control Unit

Blank Front Panel

4.3.1 *Local X/Y Control Panel*

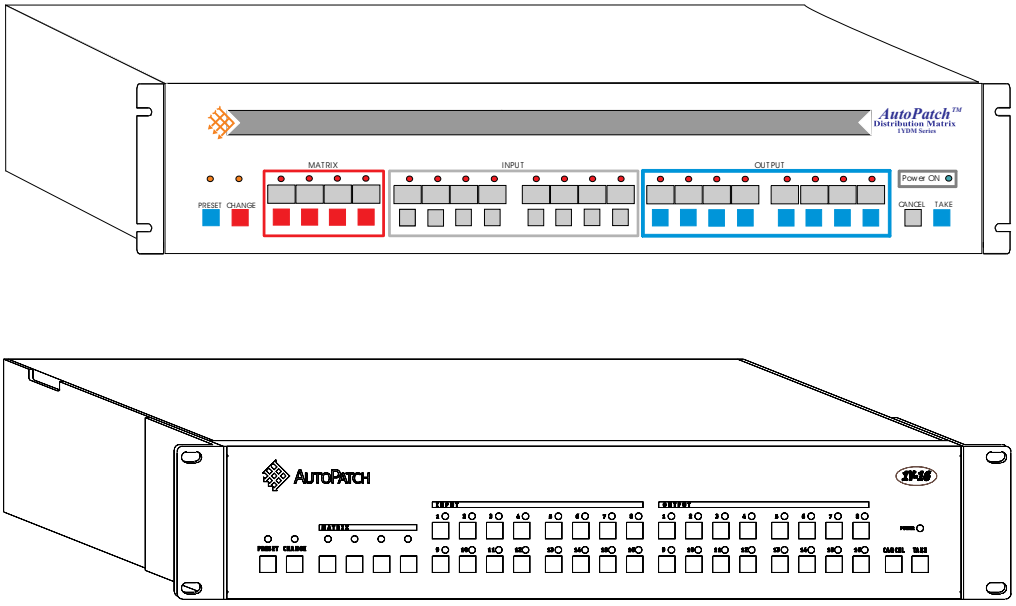


figure 4.9 Standard Local X/Y Control Panel (top), 16x16 Local X/Y Control Panel (bottom). Your enclosure(s) may differ from those shown above.

The Local X/Y Control Panel is a control panel on the front of an enclosure. The 1YDM Local X/Y Control Panel interfaces through the LEDs above the buttons. Different LED combinations have different meanings.

Using a Local X/Y Control Panel on at least one of the enclosures in your distribution matrix (usually the master enclosure) has several advantages. One advantage is the ability to use it for troubleshooting. By using the Local X/Y Control Panel, you can segregate the distribution matrix from the rest of your system for troubleshooting.

The Local X/Y Control Panel can also be used as redundant control. If your main controller fails, you can still control the distribution matrix through the Local X/Y Control Panel.

The Local X/Y Control Panel is easy to use; it is designed with the end user in mind. The keys are designed to make their functions easy to recognize. For example, all the input keys are white and all the output keys are blue.

If you originally ordered a Local X/Y Control Panel, it is already installed on your master enclosure. Otherwise, you must remove the enclosure lid to install a Local X/Y Control Panel.

To remove the enclosure lid:

Warning: To avoid ESD (Electrostatic Discharge) damage to sensitive components, make sure you are properly grounded before opening an enclosure.

1. Disconnect the power from your distribution matrix.
2. Remove the two machine screws furthest toward the back on each side of the enclosure (a total of four screws are removed). See figure 4.10.

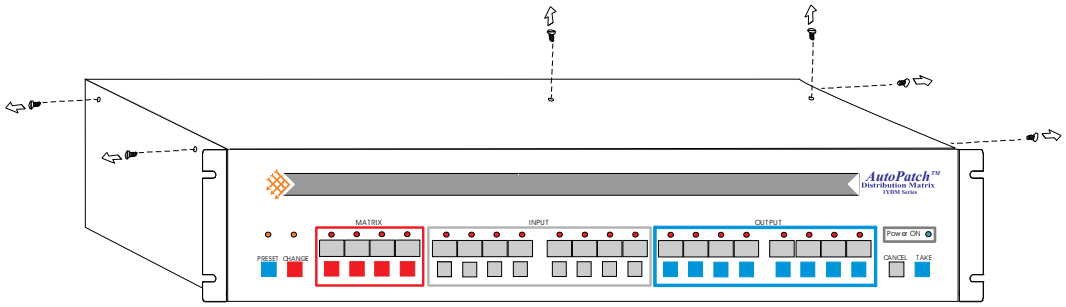


figure 4.10 Removing a 1YDM enclosure lid.

3. Remove the flathead screw from the center of the enclosure lid.
4. Slide the lid toward the front of the enclosure and lift the back of the lid up. The lid should slide out of its grooves.

To install a Local X/Y Control Panel after removing the enclosure lid:

Warning: To avoid ESD (Electrostatic Discharge) damage to sensitive components, make sure you are properly grounded before handling the internal workings of an enclosure.

1. Remove the blank front panel by removing the two screws furthest forward on each side of the enclosure (a total of four screws) and tilting the panel forward. See figure 4.11. You will need a .25 inch open end wrench to remove the nuts from the screws inside the enclosure.

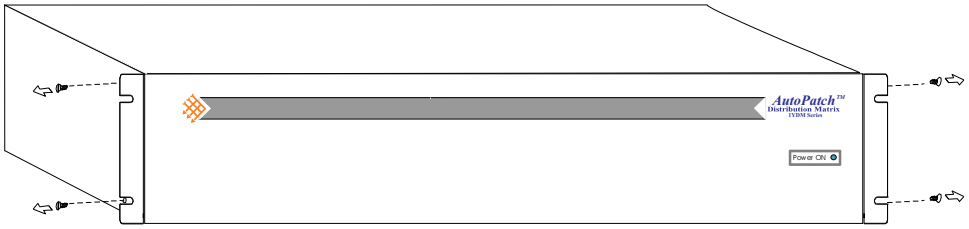


figure 4.11 Removing a blank front panel

2. Align the lip on the bottom of the Local X/Y Control Panel with the groove along the inside bottom of the enclosure and tilt the panel into place.
3. Fasten the Local X/Y Control Panel in place with the screws and nuts that held the blank front panel.
4. Attach the ribbon cable (has a red wire along one side) to the port inside the enclosure. The port is directly above the rear main board. The red wire on the ribbon cable should face the closest enclosure wall at the enclosure port, and should face up at the panel connection.
5. Attach the 5V power cable to the Local X/Y Control Panel instead of the blank front panel (the little bumps on the cable's connector should face up). The other end of this cable is already connected.
6. Replace the enclosure lid and the screws. Make sure the flathead screw goes in the center of the lid.
7. Reconnect power to your distribution matrix.

4.3.2 Remote X/Y Control Unit

A Remote X/Y Control Unit is an X/Y Control Panel that is not in the same location as your distribution matrix. A Remote X/Y Control Unit is mounted on an enclosure that contains minimal components.

A Remote X/Y Control Unit offers all the advantages of a Local X/Y Control Panel with the added benefit of distance. With the Remote X/Y Control Unit, you can control your system or troubleshoot without being in the heart of your system.

Using RS-232 link cable, your remote can be up to 100 feet (32.8 m) from your distribution matrix. Using RS-422 link cable, your remote can be up to .25 mile (400 m) from your distribution matrix.

Installing a Remote X/Y Control Unit is just like linking enclosures in a multi-enclosure distribution matrix.

To install a Remote X/Y Control Unit:

Warning: To avoid ESD (Electrostatic Discharge) damage to sensitive components, make sure you are properly grounded before handling any boards.

1. Detach power from all the enclosures in the distribution matrix.
2. Link the remote front panel to the distribution matrix. See section 1.3, “Linking Enclosures,” for more information on linking enclosures.
3. Ensure that the voltage selectors on the remote and all other enclosures in the distribution matrix are in the correct position.
4. Attach power to each enclosure in the distribution matrix, including the Remote X/Y Control Unit. The distribution matrix goes through its startup sequence.

4.3.3 *Blank Front Panel*

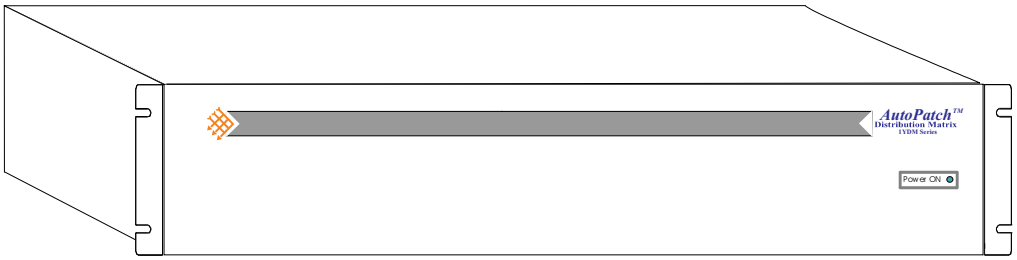


figure 4.12 Blank Front Panel

A blank front panel is an AutoPatch front panel with one indicator LED and no control keys. The blank front panel is the standard panel attached to the front of an enclosure. The only indicator on the blank front panel is the green on/off indicator LED.

The main advantage of a blank front panel is the inability of anyone in direct contact with the distribution matrix to alter any of its settings.

Although a Local X/Y Control Panel is recommended for troubleshooting and redundant control, it is possible to control your 1YDM without an X/Y Control Panel. Several methods for controlling your 1YDM through the serial ports are available. For more information on using an external controller and the types of external controllers available, refer to section 4.4, “Using External Controllers.”

4.4 Using External Controllers

Several options for operating your distribution matrix are available, including using a control panel, an external controller, or dry contacts. An external controller is any device that can send and receive information from the distribution matrix via the serial port (such as a PC). Dry contacts provide physical switches for recalling presets. Any external controller other than Single Bus Controllers (SBC) and dry contacts can program presets.

The 1YDM may be controlled by an external device that can send ASCII code via the serial port; any such device is considered an external controller. Some specific types of external controllers are SBCs, Remote X/Y Control Unit, PC or Macintosh computer, and third party control devices. External controllers must be able to send Basic Control Structure (BCS) commands. A distribution matrix can support only one external controller, although it can have a combination of an external controller and dry contacts.

SBCs come in a choice of two control methods; one allows you to control the input routed to a particular output device, the other allows you to recall presets. Neither type of SBC allows you to store presets.

A Remote X/Y Control Unit may be placed up to 100 feet (using RS-232 communications), or 1000 feet (using RS-422 communications), from the distribution matrix. Remote X/Y Control Units attach to the serial port on the back of the master enclosure in your distribution matrix and behave the same as a Local X/Y Control Panel.

A PC or Macintosh computer can also be used to control your distribution matrix with any program that can transmit at 9600 BAUD and send BCS commands. AutoPatch has several control programs available: YRoute, WinRoute, AutoRoute Event Scheduler, and ScanPatch.

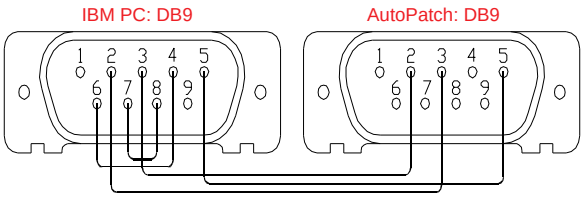
Each type of remote controller is specialized for different types of applications, but they all allow you to access your distribution matrix without being in the heart of your system.

4.4.1 *Attaching an External Controller*

External controllers can be attached to either serial port 1 or serial port 2 of an enclosure in your matrix; serial port 1 of your master enclosure is preferred. Serial port 2 does not echo commands and is not recommended for use with external controllers.

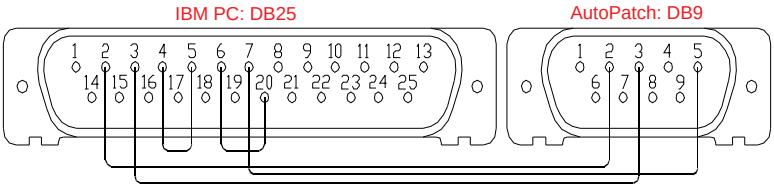
The serial ports can receive three types of communication, RS-232, RS-422, and RS-485. RS-232 and RS-422 are the standard communication protocols used. RS-485 is generally used with SBCs. Unless specifically ordered as another protocol, the supplied serial cable(s) is set for RS-232. The serial port jumpers are also set for the type of communication speci-

fied when the matrix is ordered. All enclosures in the matrix must use the same type of communication.



IBM PC: DB9	AutoPatch: DB9
RD #2	TD #3
TD #3	RD #2
SG #5	SG #5
DSR #6	DTR #4
RTS #7	CTS #8

figure 4.13 232 communications for IBM PC



IBM PC: DB25	AutoPatch: DB9
TD #2	RD #2
RD #3	TD #3
SG #7	SG #5
DSR #6	DTR #20
RTS #4	CTS #5

figure 4.14 232 communications for a 25-pin connector

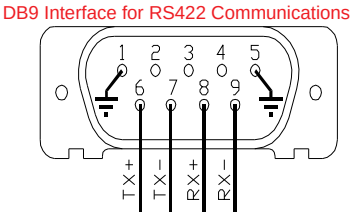


figure 4.15 422 communications

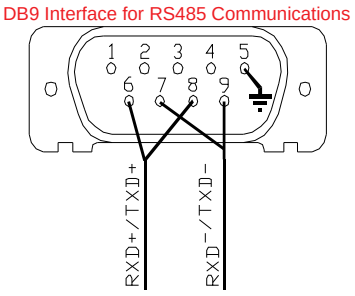
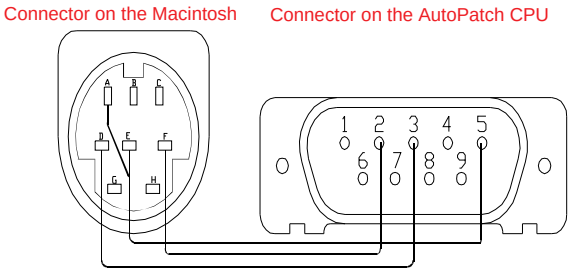


figure 4.16 485 communications



Macintosh PC	AutoPatch: DB9
A & E	5
D	3
F	2

figure 4.17 232 communications for a Macintosh

To attach an external controller to the distribution matrix:

Connect a serial cable between the external controller and one of the serial ports on an enclosure (preferably serial port 1 of the master enclosure). Transmit, receive, and ground must be run from the external controller to the distribution matrix. Since no handshaking is provided by the distribution matrix, make the serial cable connector pinouts as seen in figures 4.13 - 4.17. If multiple enclosures are linked, connect the external controller to the master enclosure using serial port 1. Daisy-chain the rest of the enclosures as shown in figure 1.2, in section 1.3, “Linking Enclosures.”

Before attaching an external controller, the distribution matrix’s configuration word needs to be updated. Detailed information about the configuration word is in section 2.6, “Changing the Configuration Word.”

If you are using SBCs with the distribution matrix, you must allow it to poll all the SBCs. The CPU polls the SBCs for any change requests. If the CPU finds a switch, it is made immediately.

After the serial connections are made and the distribution matrix is powered up, the external controller screen displays the version number, the slots of the enclosure that contain I/O boards, and specific information about those boards. If the message does not appear on the screen, the serial port the external controller is attached to may be set to poll SBCs. Change to Program mode and check the setting of the respective serial port. See figure 2.3, in section 2.6.10, “Setting the Configuration Word,” for further explanation. Also verify communications protocol by checking the jumper on the CPU board.

Your distribution matrix should now be ready to be operated via the serial port.

4.5 *Using a Dumb Terminal*

A dumb terminal is a non-programmable input device that sends ASCII characters to the master enclosure. An example of a dumb terminal is a keyboard attached to the serial port of a 1YDM master enclosure. A dumb terminal could also be a keyboard and monitor, where the keyboard sends the ASCII character and the monitor displays the echo.

When you are using a dumb terminal, the capitalized ASCII character must be sent to the master enclosure. The terminal must transmit at 9600 BAUD with 8 data bits, 1 stop bit, and no parity.

4.6 Single Bus Controllers (SBC)

A Single Bus Controller (SBC) is similar to a specialized external controller. SBCs are not mounted on the enclosure, but they do send and receive communications to and from the enclosure. SBCs are available in two versions of three models. Each model has a different faceplate. Each faceplate holds different keys, so the method of selecting an input or preset differs from model to model. The two version types define the operations you can perform with your SBC(s).

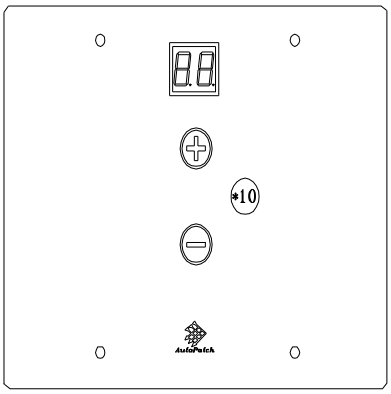


figure 4.18 3-key SBC model

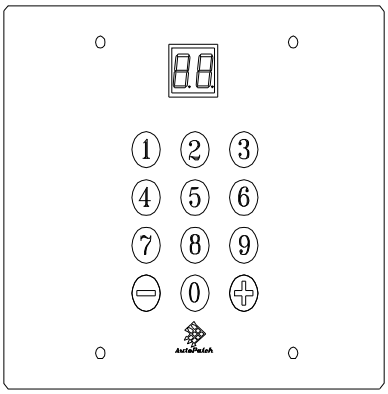


figure 4.19 12-key SBC model

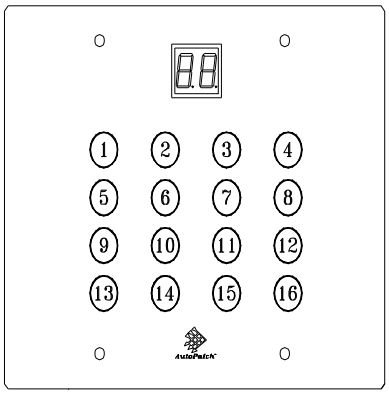


figure 4.20 16-key SBC model

A distribution matrix can intermix SBC models and versions; however, two SBCs connected to the same enclosure cannot have the same identification number.

This section discusses the following:

Versions

Models

Installation

Polling SBCs

4.6.1 *Versions*

Note: There are no physical indicators for differentiating between the C version and the P version of SBCs; but, the versions are *not* interchangeable. The versions can be mixed if properly connected.

The C version of an SBC is tied to a specific output device and controls what input is routed to the device. The output device that the SBC is tied to is specified by the dipswitch setting on the SBCs logic board (the board directly behind the faceplate). This SBC version uses the output connector number (in relation to the enclosure the output is on) as its identification number.

The P version of an SBC is used to recall presets; however, the 16-key model can only recall presets #1-16. The P version of the SBC is not tied to a particular input or output, but it still needs an identification number for polling. This SBC version's identification number is user defined.

4.6.2 *Models*

Each SBC model gives you a different degree of flexibility, depending on your system. The three SBC models are as follows: 3-key, 12-key, and 16-key.

4.6.2.1 The 3-Key

The 3-key SBC is designed for small systems with only a few inputs and/or presets. The three keys on this model are: <+>, <->, and <*10>. Pressing <+> increases the input channel selection or preset selection by one, pressing <-> decreases it by one, and pressing <*10> increases or decreases it by 10 in conjunction with <+> or <->. The 3-key model works well for small systems because of the interval associated with the keys on the keypad. You can quickly change the selection in this model by holding down <+> or <-> and scrolling to the desired number. The number choices are circularly sequential, so if you scroll past the number you want, it comes around again without reversing scroll direction.

4.6.2.2 The 12-Key

The 12-key SBC model is designed for systems with many inputs. This model offers two methods for changing the input channel selection or preset selection: direct access and sequential. The numbered keys on this keypad implement direct access; <+> and <-> allow you to scroll to the number you want to select. The scrolling is circularly sequential, so if you scroll past the number you want, you will return to it without reversing scroll direction.

To make a selection using direct access, use the numbered keys on the keypad. All numbers must be entered as double digits. Single digit entries and entries higher than the highest valid number are ignored. An entry of 00 selects your last valid entry. To cancel an incorrect single digit entry, press <+> or <->; the display returns to your last valid entry.

4.6.2.3 The 16-Key

The 16-key model is designed for systems with 16 or less inputs or presets. The faceplate of this model contains 16 keys that are numbered from 1 to 16. There are no <+> or <-> keys on this model. The 16-key SBC selects inputs or recalls presets with the touch of one key. However, since the only keys on the keypad are numbered 1-16, you can only select an input or preset within that range.

4.6.3 *Installation*

To install an SBC, prepare each enclosure in the distribution matrix to receive a chain of SBCs. Make sure all your wiring is done correctly before mounting your SBC(s).

To prepare the enclosures:

Warning: To avoid ESD (Electrostatic Discharge) damage to sensitive components, make sure you are properly grounded before handling any boards.

1. Set the enclosure's polling range equal to the highest SBC identification number, see section 2.6.7, "Single Bus Controller (SBC) Polling Limit."
2. Set the enclosure's serial port jumpers (J1 and J2 on the CPU board) for RS-422 communications, see figure 4.21.

Note: The communication protocol is RS-485; however, the jumper settings for RS-422 and RS-485 are identical.

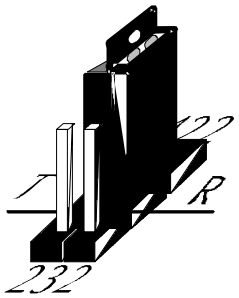


figure 4.21 422 communications jumper setting

3. Wire the enclosure's serial ports for RS-485 standards, see figure 4.22.

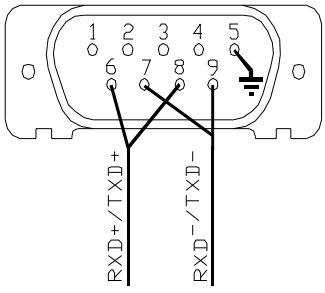


figure 4.22 RS-485 communications pinout

All SBCs that are used with the same enclosure must be linked together in daisy chain fashion. The order of SBC identification numbers in the daisy chain does not matter.

To daisy chain SBCs:

1. Use P1 and P2. (They are two of three blue connectors on the back side of the logic board.) P1 is the exit connector and P2 is the entry connector. See figure 4.23.

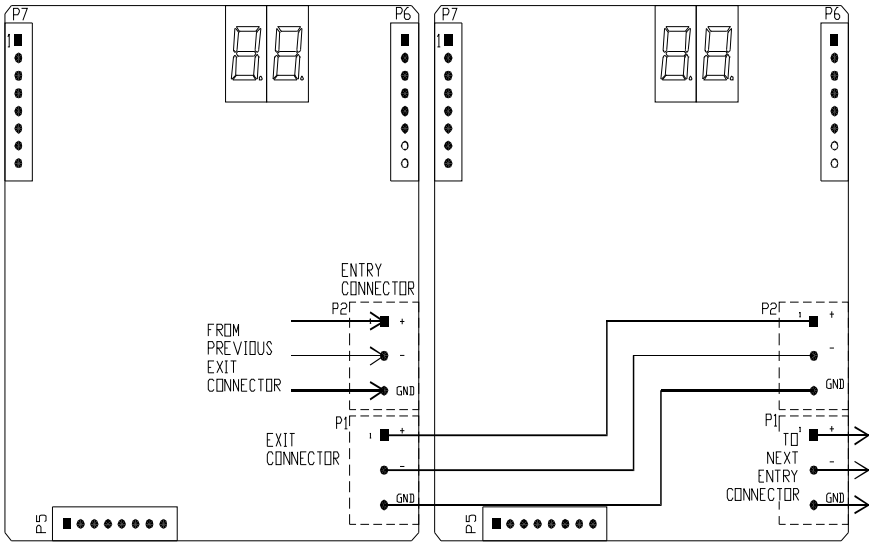


figure 4.23 Beginning connections in an SBC chain

2. Connect a low capacitance cable for EIA RS-485 standard (2 pair twisted 24 gauge/stranded conductors (7x32). e.g., Belden #1419A= NEC:CM PCC FT 1) from the + on the exit connector of the SBC to the + on the entry connector of the next SBC in the chain. Do the same for - and GND.
3. Use figure 4.23 as a guide for linking all SBCs, except the first and final SBCs in the chain.
4. The final SBC in the chain must be terminated with a 120 ohm resistor as shown in figure 4.24.

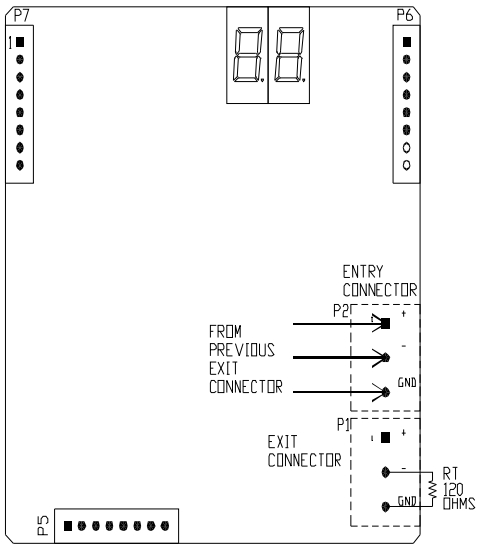


figure 4.24 Final SBC in chain

4.6.3.1 Connecting Power

The power connector is the blue connector on the back of the logic board that has no other blue connectors around it. See figure 4.25. The recommended power for SBCs is 7-12V DC, but regulated 5V DC may also be used. The power regulation jumper is set to accept 7-12V DC. Be sure to provide power sufficient for 160 milliamps per SBC. A 9V wall plug-mounted power transformer is suggested. Call your local dealer for inquiry.

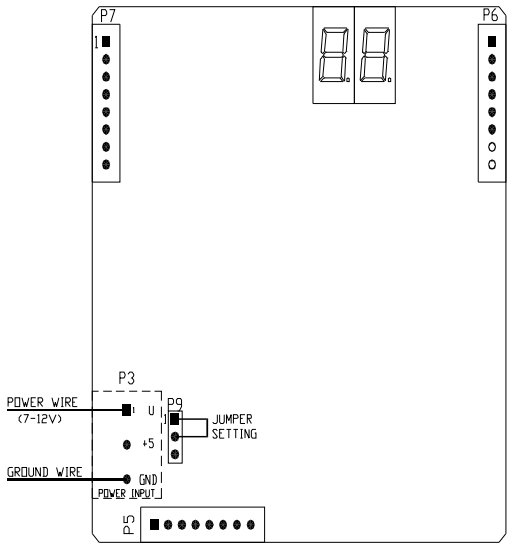


figure 4.25 Connecting power for unregulated power

To connect unregulated DC power to an SBC, unscrew the top and bottom screws on the blue power connector and insert the wires as shown in figure 4.25. To use regulated 5V DC, switch the power regulation jumper before attaching power to the SBC (see figure 4.26). Once the jumper has been set for regulated power, unscrew the middle and bottom screws on the power connector and insert the wire.

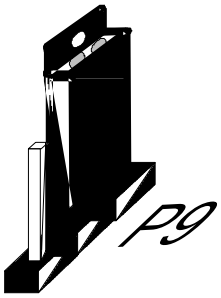


figure 4.26 P9 jumper set for unregulated power

The final step before using an SBC is mounting it in its final location. Make sure all the wiring is done correctly before mounting an SBC in its permanent location.

SBCs are designed to fit in a container the size of a two-gang electrical box (4″x4″x2+″). When mounting an SBC in a gang box, it may be necessary to tilt the SBC at a slight angle to get the circuit board past the tabs.

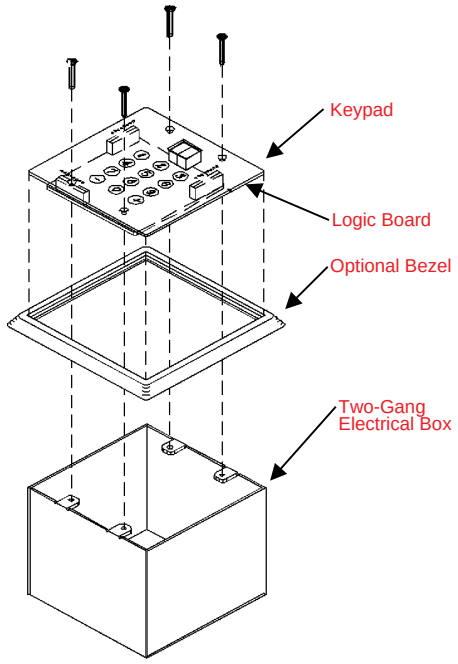


figure 4.27 Mount an SBC in a two-gang box

The following electrical box has been verified by AutoPatch to properly fit AutoPatch SBCs:

Manufacturer: Bowers

Description: Two Gang box

Model #: 132W-½ (the ½ is the diameter of the knock-out hole and can vary per installers requirements)

Dimensions: 4″ square 2 1/8 (30/3 Cu. In. capacity)

Four mounting holes, indicated by blue circles, are provided on every SBC control panel. The holes are not tapped unless tapping is specified when the SBC is ordered. Bezels can also be requested for SBC units.

4.6.4 *Polling Single Bus Controllers*

Setting the polling limit in the configuration word of the master enclosure automatically begins the polling process. If the polling limit is set before you attach SBCs, the distribution matrix is not affected. However, you cannot poll without setting the SBC polling limit.

The SBC polling limit informs the CPU of how many SBCs to look for during polling. The 8th through 12th bits of the configuration word control the polling limit. The CPU polls from 1 to whatever limit is set. For more information about chang-

ing settings in the configuration word, see section 2.6, "Changing the Configuration Word." Use the following chart to set the bits for the polling limit. A bit set to 1 is on, a bit set to 0 is off.

Bit Setting					Poll Limit
8th	9th	10th	11th	12th	
0	0	0	0	0	1
1	0	0	0	0	2
0	1	0	0	0	3
1	1	0	0	0	4
0	0	1	0	0	5
1	0	1	0	0	6
0	1	1	0	0	7
1	1	1	0	0	8
0	0	0	1	0	9
1	0	0	1	0	10
0	1	0	1	0	11
1	1	0	1	0	12
0	0	1	1	0	13
1	0	1	1	0	14
0	1	1	1	0	15
1	1	1	1	0	16
0	0	0	0	1	17
1	0	0	0	1	18
0	1	0	0	1	19
1	1	0	0	1	20
0	0	1	0	1	21
1	0	1	0	1	22
0	1	1	0	1	23
1	1	1	0	1	24
0	0	0	1	1	25
1	0	0	1	1	26
0	1	0	1	1	27
1	1	0	1	1	28
0	0	1	1	1	29
1	0	1	1	1	30
0	1	1	1	1	31
1	1	1	1	1	32

Single enclosure distribution matrices and multi-enclosure matrices poll SBCs in the same manner. There is no difference in the procedure for polling in either distribution matrix system.

4.7 Software

Control software allows a PC to control a distribution matrix through the serial ports. AutoPatch offers control software that executes switches manually and automatically. The manual execution software implements commands when they are entered. The automatic execution software implements commands at the times they are scheduled to be executed. The manual execution software packages are YRoute and WinRoute. The automatic execution software packages are AutoRoute Event Scheduler and ScanPatch.

4.7.1 *YRoute*

YRoute is a DOS-based software package that simulates all configuration operations, except checking the status of an input or output. Operations are implemented by entering the commands (from the top of the screen) at the option? prompt. Before using YRoute, familiarize yourself with the operation of your distribution matrix from the master enclosure Local X/Y Control Panel. YRoute can only be run on a PC that uses RS-232 communications.

Note: Using YRoute requires an RS-232 cable with the handshaking pins shorted. See figures 4.13 - 4.17 in section 4.4.1, “Attaching an External Controller.”

4.7.2 *WinRoute*

WinRoute is a Windows based software package with a customizable graphical interface. Each input and each output is represented by an icon, and connections are represented by lines between inputs and outputs. The icons can be placed in any pattern you desire inside the WinRoute window. For example, the icons can be placed to mimic the physical locations of devices around your office.

Note: WinRoute can only be run on a PC that uses RS-232 communications and runs Windows 3.1 or higher, including Windows 95.

4.7.3 *AutoRoute Event Scheduler*

AutoRoute Event Scheduler is a DOS-based control program that schedules events for matrix processing. Command lines must be entered in the string file, which is scheduled in the event file. The event file is processed by AutoRoute Event Scheduler. Processing the event file allows the software to changed the distribution matrix configuration according to user defined parameters, including command and event timing. AutoRoute Event Scheduler can handle up to 100 events

and 100 strings. The strings can recur in intervals of one second to one year.

Note: AutoRoute Event Scheduler can only be run on a PC that uses RS-232 communications; see figures 4.13 - 4.17 in section 4.4.1, “Attaching an External Controller.”

4.7.4 *ScanPatch*

ScanPatch is a DOS-based control program that cycles I/O configurations. Each output has a set of assigned inputs that are cycled through it. Each ScanPatch session can handle up to 128 outputs, with a set of inputs for each output. Each set can contain no more than 40 inputs. The length of a ScanPatch session can be predefined or you can let it run until you need or want to terminate it.

Note: ScanPatch can only be run on a PC that uses RS-232 communications; see figures 4.13 - 4.17 in section 4.4.1, “Attaching an External Controller.”

Chapter 5—The Enclosure and Its Parts

The enclosure is the structural basis of a distribution matrix. The look of the enclosures in a distribution matrix is dependent on several factors. Those factors include control method, signal type, and I/O configuration. This chapter describes the typical physical features of an enclosure.

This chapter covers:

- Front of an Enclosure
- Rear of an Enclosure
- I/O Boards

5.1 *Front of an Enclosure*

The front panel of the enclosure may be either a Blank Front Panel or an X/Y Control Panel. A system with a Blank Front Panel requires some type of external controlling device. This section describes the features of an X/Y Control Panel. For more information about operating a distribution matrix with a Blank Front Panel, refer to section 4.4, "Using External Controllers."

An X/Y Control Panel is a faceplate containing keys that are used for entering commands to the CPU (see figure 5.1). Although an X/Y Control Panel is optional, we recommend that at least one enclosure in the matrix have one for matrix verification, redundant control, and troubleshooting. If desired, an X/Y Control Panel can be temporarily used and then removed. However, any time an X/Y Control Panel is connected, the Control Panel Configuration Scan (CPCS) bit in the configuration word needs to be changed and then the distribution matrix must be restarted to configure the X/Y Control Panel.

The standard X/Y Control Panel has 24 keys – 16 for the input and output signals, 4 for the level (matrix), and 1 each for the Preset, Change, Cancel, and Take commands.

The 16x16 X/Y Control Panel has 40 keys – 32 for input and output signals, 4 for the level (matrix), and 1 each for the Preset, Change, Cancel, and Take commands.

Depending on the I/O configuration of a distribution matrix, not all input and output keys will function. For example, if the I/O configuration is 8x4, the output keys labeled 13-16 (see figure 5.1) will not function.

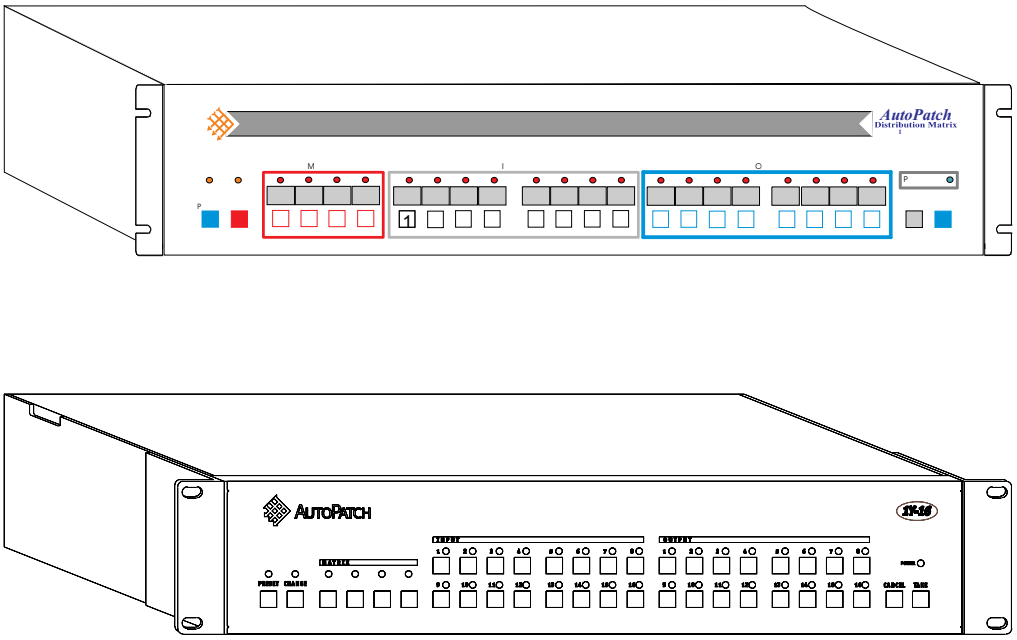


Figure 5.1 Standard 1YDM Local X/Y Control Panel (top), 16x16 1YDM Local X/Y Control Panel (bottom). Your matrix's front panel may differ from those pictured above.

5.1.1 Change Key

<Change> is used for initiating switches in the I/O configuration of a distribution matrix. See section 2.1, "Making a Switch," for instructions on using the Change key.

5.1.2 Preset Key

A preset is a "picture" of an input/output (I/O) configuration. When you define a preset, you assign a preset number to the current I/O configuration and it is stored in the CPU. That I/O configuration, in its entirety, can then be restored at any time by recalling its preset number. The preset key is used for defining and recalling presets. See section 2.5, "Using Presets," for instructions on defining and recalling presets.

5.1.3 Matrix Keys

When making a switch, the matrix keys are used for selecting an I/O board level. The matrix keys are also used for choosing a specific bank of preset numbers when defining or recalling presets.

5.1.4 Input Keys

The Input keys are used for selecting an input during a switch operation and for specifying or recalling a preset number. The Input keys are also used for setting the adjustable features of the distribution matrix. Section 2.6,

"Changing the Configuration Word" discusses the adjustable features these keys can access. When setting the adjustable features, keys are referred to as bits.

5.1.5 Output Keys

The Output keys are used for selecting an output during a change operation and for specifying a preset number when defining or recalling presets. Output keys are also used for setting the adjustable features of the distribution matrix. Section 2.6, "Changing the Configuration Word" discusses the adjustable features these keys can access. When setting the adjustable features, keys are referred to as bits.

5.1.6 Cancel Key

<Cancel> terminates unfinished operations and disconnects inputs and outputs.

5.1.7 Take Key

<Take> executes valid operations. Always be sure to completely specify an operation. If <Take> is pressed before an operation is completely specified, it has the same effect as pressing <Cancel>.

5.2 *Rear of an Enclosure*

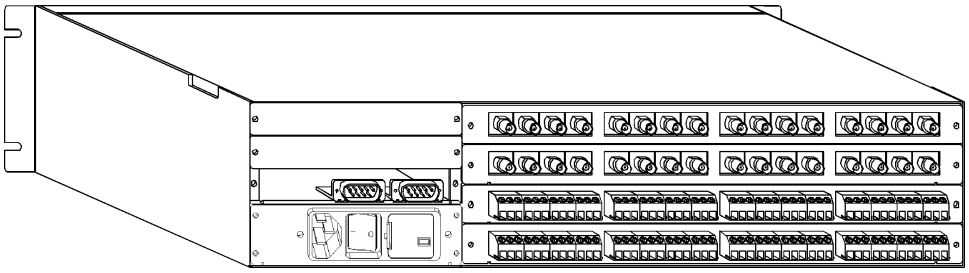


figure 5.1 Rear view of a 1YDM enclosure
3 rack unit and 4 rack unit enclosures not shown.

The rear of an enclosure is where all the physical connections are made. It contains audio and video I/O connectors, expansion slots, the CPU, and the rear main.

5.2.1 Audio and Video I/O Connectors

The audio and video input and output connectors are attached to audio and video I/O boards within the enclosure. The number and type of connectors depends on the number and type of I/O boards. The input and output connectors on the board are numbered right to left on the rear of the enclosure. Looking at the rear of the enclosure, the inputs are on the right in white and the outputs are on the left in black.

5.2.2 Expansion Slots

The expansion slots are above the CPU on the rear of the enclosure and allow the addition of a vertical interval sync expansion board in systems that were originally ordered without one. One slot is used by the CPU board and one can be used for the sync board. An additional expansion slot is available for any future upgrades that may occur. For more information about the Vertical Interval Sync Expansion board, see section 4.1, “Vertical Interval Sync Expansion Boards.”

5.2.3 CPU

The CPU is usually located in the top expansion slot. It has two DB-9 serial ports for linking to other enclosures, receiving communication from Single Bus Controllers (SBC), and communicating with other serial devices, such as a PC.

5.2.4 Rear Main

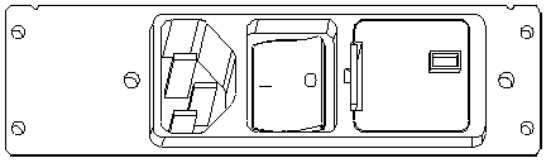


figure 5.2 Rear main

The rear main contains the voltage selector, the fuse, and the power connector.

The voltage selector can be set at 110V or 220V. Make sure the voltage selector of each enclosure is on the correct voltage setting before applying power.

Each enclosure in the distribution matrix contains a 1 amp fuse. To release the fuse, turn the fuse covering counterclockwise.

Power must be applied to all enclosures in the distribution matrix. Since there is no power switch on the enclosures, attaching the power cord to an outlet turns the distribution matrix on. It may be helpful to plug each enclosure into a power strip and then plug the power strip into an outlet.

5.3 I/O Boards

Each 2 rack unit enclosure can contain up to four I/O boards, 3 rack unit enclosures can contain up to six boards, and 4 rack unit enclosures can contain up to eight boards. An enclosure's boards can be any combination of audio and video. Each board has two adjustable features, input impedance and input gain control. Adjust the input impedance using the impedance jumpers.

5.3.1 Impedance Jumpers

1YDM video boards have a two-pin jumper that selects a low or high input impedance. Each input signal has its own jumper located directly behind the signal connector. When the jumper is capped, impedance is 75 ohms. If the jumper is not capped, input impedance is 24K ohms. If your board does not have a jumper, the jumper was replaced by a 0 Ohm resistor and impedance cannot be changed.

5.3.2 Gain Control

Gain control on audio and video output signals is standard. AutoPatch also offers audio and video boards with input gain control. At the factory, inputs and outputs are set to an overall gain of 1 (unity gain).

An extender board and gain control tool are included with the 1YDM. Each signal's gain control is directly behind the signal connector and is labeled TR#.

Chapter 6—Applications

The 1YDM provides several methods to expand system capabilities and overall flexibility. This chapter explores two of these methods by explaining them and going through an example of each. This chapter also explores the possibility of combining the methods and provides examples of them combined.

This chapter covers:

- Paralleling Inputs
- Loop Back
- Further Examples Combining Parallel Inputs and Loop Back

6.1 *Paralleling Inputs*

Each input/output (I/O) board in a 1YDM enclosure is its own switching environment, so the inputs of one board cannot be switched to the outputs of another board. However, paralleling inputs allows any input to switch to any output in the distribution matrix that has an identical signal path. By paralleling inputs, the set of configuration possibilities for the distribution matrix expands to include: 4x12, 8x12, 8x16 (mono audio), 12x8, 8x32 (using 8x16 boards only), and 16x32 (using 16x16 boards only).

To parallel inputs, split an input signal between two or more input connectors. When splitting a *video* input signal, make sure all but one of the video boards in each split set are high impedance. Splitting a single video input signal more than *four* times is *not* recommended. More than four signal splits would be uncontrollable since there are only four levels available on this matrix and a distribution amplifier would be required to boost the signal. See section 5.3.1, "Impedance Jumpers," for more information about setting the impedance. Audio inputs do not require any impedance changes. If your I/O boards do not have impedance jumpers and you are not certain that one of them is high impedance, please contact your authorized AutoPatch dealer.

Note: Set all but one of the video boards to high impedance. Setting all or setting none to high impedance may provide an improper load to the source video device and is not recommended.

When using paralleled inputs and making a switch to outputs beyond #1-8, the outputs must be referenced by level number and output number. For example, if your distribution matrix has an 8x12 configuration and you want to switch Input 7 to Output 10 (see figure 6.1), follow these steps:

1. Press <Change>.
2. Press the level 2 Matrix key (2nd matrix key from the left).
3. Press the Input 7 key (7th input key from the left).
4. Press the Output 2 key (2nd output key from the left).
5. Press <Take>.

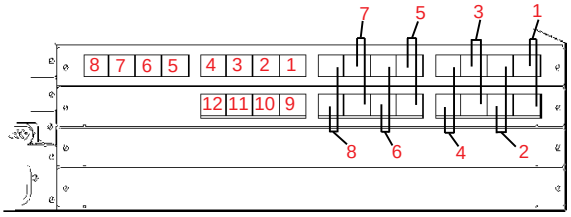


figure 6.1 Paralleled input on an 8x12 configuration

To make the same switch using Basic Control Structure (BCS) commands, the command string would be as follows:

CL2I7O2T (Change Level 2 Input 7 Output 2 Take)

In the above example, the system will not recognize an output identified as #10; it must be identified as Level 2, Output 2.

To parallel inputs:

1. Set each board of a set to a different level number. See section 1.5, “Defining Levels,” for more information about changing the board level.
2. If a video input is being paralleled, set all but one input in the set to high impedance.
3. Split the signal between the appropriate input connectors.

Note: Splitting a signal more than four times requires a distribution amplifier.

4. Switch any paralleled input to any available output located on one of the boards the input is attached to.

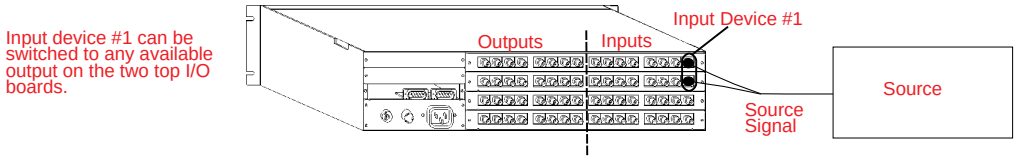


figure 6.2 Split the source signal to parallel inputs

6.1.0.1 *Example of implementing parallel inputs*

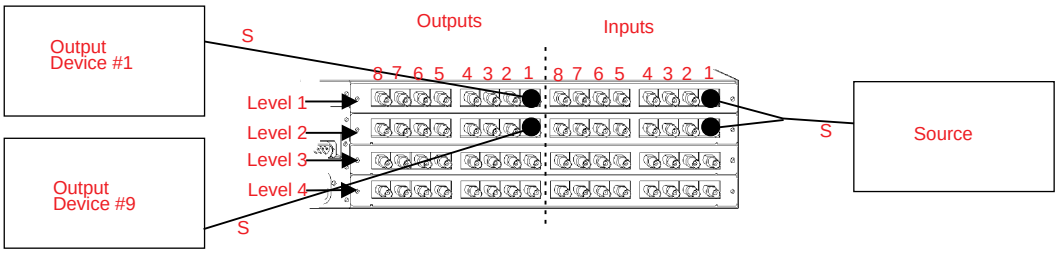


figure 6.3 Parallel inputs example #1

In this example, the signal from the source is split and connected to Level 1 Input 1 and Level 2 Input 1. The signal routes available to get to the output devices are

In: Level 1 Input 1
Out: Level 1 Output 1
From source to Output device #1

In: Level 2 Input 1
Out: Level 2 Output 1
From source to Output device #9

The source signal can be routed through one or both output devices. Each split of the source signal should be treated as a separate input signal.

6.2 *Loop Back*

Loop back is a method that allows mid-switch processing of a signal. The looped signal can be mixed with other signals, have noise extracted from it, or be converted to a different signal type, all within an external processor, before reaching its final destination.

Using loop back, several input signals can be processed, in varying order, by the same external device. You can achieve this by attaching the signals to input connectors on the 1YDM, and attaching the processor to one or more output connectors and one or more input connectors. The signal can then be routed from the matrix, through the processor, and through the matrix again to its final output destination. No new software is required for this application of your 1YDM.

Loop back is highly effective while working with signal modification devices such as line doublers, digital signal processors, video effects, video character devices, and other such equipment.

To implement loop back:

1. Attach the input signal to an input connector on the 1YDM.
2. Attach the input side of the external processing device to an output connector the source input signal can be switched to.
3. Attach the output side of the external processing device to an input connector on the distribution matrix that can be switched to the final destination.

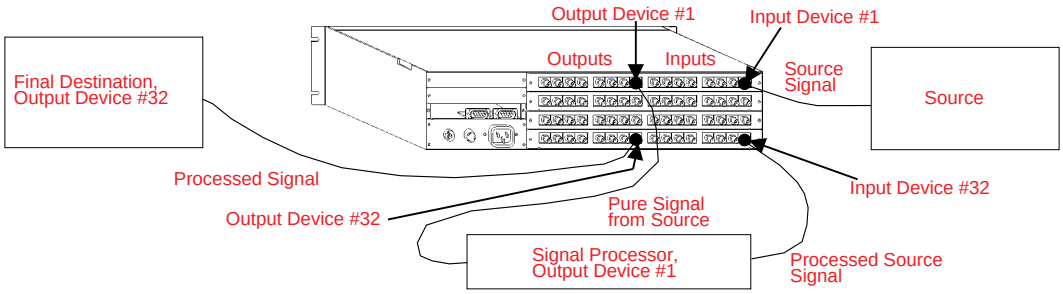


figure 6.4 Basic Loop Back implementation

4. Make the appropriate switches from the X/Y Control Panel or from an external controller. Executing a loop back switch is the same as executing a standard switch; however, to get the signal to its final destination a minimum of two inputs must be switched to a minimum of two outputs.

6.2.0.1 *Example of implementing loop back:*

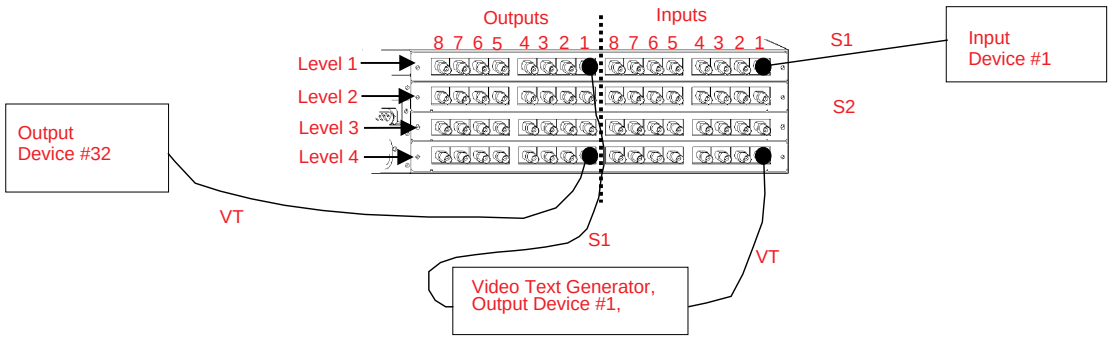


figure 6.5 Loop back example #1

In this example, the available signal path is

In: Level 1 Input 1
Out: Level 1 Output 1 — From source to Video Text Generator

In: Level 4 Input 1
Out: Level 4 Output 1 — From Video Text Generator to Final destination

The switches required to implement this setup are as follows:

From the X/Y Control Panel;

<Change>
Matrix <1>
Input <1>
Output <1>
<Take>

(Level 1 Input #1 is switched to Level 1 Output #1)

<Change>
Matrix <4>
Input <1>
Output <1>
<Take>

(Level 4 Input #1 is switched to Level 4 Output #1)

Using BCS commands, the switches would be as follows:

CL1I1O1TCL4I1O1T

6.3 *Further Examples Combining Parallel Inputs and Loop Back*

More elaborate systems can be designed that make use of parallel inputs and loop back. Together, these two features greatly enhance the versatility of a 1Y distribution matrix.

6.3.0.1 *Example #1, paralleled inputs and one loop back*

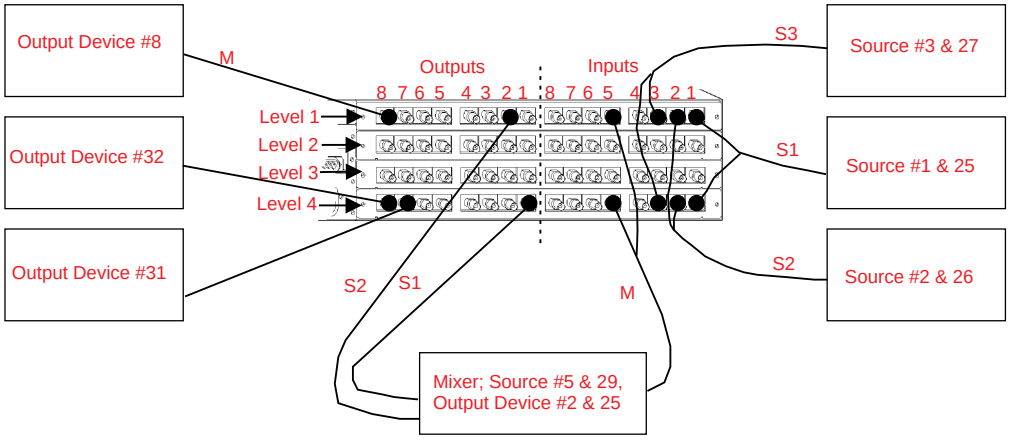


figure 6.6 Paralleled inputs and one loop back

Example #1 uses parallel inputs to increase the flexibility of the loop back configuration. In this example, the significant signal paths can be:

Source 1 (S1)

In: Level 4 Input 1
Out: Level 4 Output 1 — From source #1 to Mixer

Source 2 (S2)

In: Level 1 Input 2
Out: Level 1 Output 2 — From source #2 to Mixer

Mixed Signal (S1 + S2 = M)

In: Level 1 Input 5
Out: Level 1 Output 8 — From mixer to Output device #8

The switches required to implement this setup are as follows:

From the X/Y Control Panel;

<Change>
Matrix <2>
Input <1>
Output <1>
<Take>
(Level 2 Input 1 is switched to Level 2 Output 1)

<Change>
Matrix <1>
Input <2>
Output <2>
<Take>
(Level 1 Input 2 is switched to Level 1 Output 2)

<Change>
Matrix <1>
Input <5>
Output <8>
<Take>
(Level 1 Input 5 is switched to Level 1 Output 8)

Using BCS commands, the switches would be as follows:

CL4I1O1TCL1I2O2TCL1I5O8T

The increased flexibility of the system in example 1 allows a signal to be output as a mixed signal or in its original form. For example, the signal from Source 2 could be sent as S2 to output device 32, as well as be mixed with S1 and sent to output device 8. This type of system can be used for comparing signals and experimenting with signal combinations.

6.3.0.2 *Example #2, Multiple Parallel Inputs and Multiple Loop Backs*

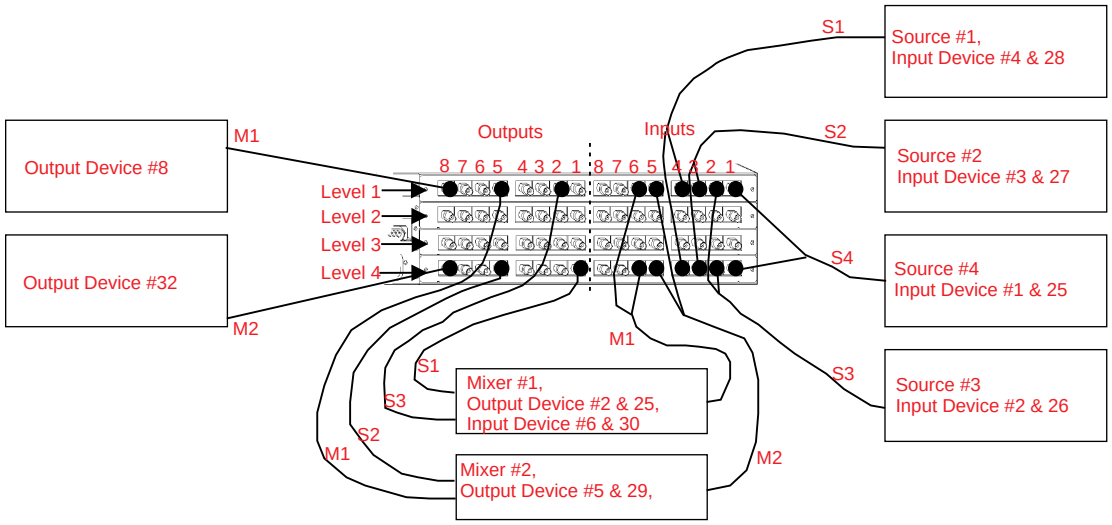


figure 6.7 Multiple parallel inputs and loop backs

Example #2 uses parallel inputs to maximize the versatility of the system.

In this example, Source 1 (S1) connects to Input #4 on Level 1 and Level 4, Source 2 (S2) connects to Input #3 on both levels, Source 3 (S3) connects to Input #2 on both levels, Source 4 (S4) connects to Input #1 on both levels, Mixer #1 (output side) connects to Input #6 on both levels, and Mixer #2 (output side) connects to Input #5 on both levels. There are two output devices, so two basic switches happen in this example. The first switch is the combined signals from S1 and S3 (together they are M1) to output device #8. The second switch is the combined signals M1 and S2 to output device #32.

Source 1 (S1)

In: Level 4 Input 4
Out: Level 4 Output 1 — From source #1 to Mixer #1

In: Level 1 Input 6
Out: Level 1 Output 5
Level 1 Output 8 — From mixer #1 to Mixer #2 as M1 Output device #8 as M1

Source 3 (S3)

In: Level 1 Input 2
Out: Level 1 Output 2 — From source #3 to Mixer #1

In: Level 1 Input 6
Out: Level 1 Output 5
Level 1 Output 8 — From mixer #1 to Mixer #2 as M1 Output device #8 as M1

Source 2 (S2)

In: Level 4 Input 3
Out: Level 4 Output 5
From source #2 to Mixer #2

In: Level 4 Input 5
Out: Level 4 Output 8
From mixer #2 to Output device #32 as M2

Mixed Signal #1 (M1)

(see previous signal paths (S1 & S2) for the origin of M1)

In: Level 1 Input 6
Out: Level 1 Output 8
Level 1 Output 5
From mixer #1 to Output device #8 as M1
Mixer #2 as M1

In: Level 4 Input 5
Out: Level 4 Output 8
From mixer #2 to Output device #32 as M2

The switch commands required to implement these signal paths are as follows:

From the control panel;

<Change>
Matrix <2>
Input <4>
Output <1>
<Take>
(Level 2 Input 4 is switched to Level 2 Output 1)

<Change>
Matrix <1>
Input <2>
Output <2>
<Take>
(Level 1 Input 2 is switched to Level 1 Output 2)

<Change>
Matrix <1>
Input <6>
Output <8>
<Take>
(Level 1 Input 6 is switched to Level 1 Output 8)

<Change>
Matrix <2>
Input <6>
Output <5>
<Take>
(Level 2 Input 6 is switched to Level 2 Output 5)

<Change>
Matrix <1>
Input <3> (Level 1 Input 3 is switched to Level 1 Output 5)
Output <5>
<Take>

<Change>
Matrix <2>
Input <5> (Level 2 Input 5 is switched to Level 2 Output 8)
Output <8>
<Take>

Using BCS commands, these switches would be as follows:

CL4I4O1TCL1I2O2TCL1I6O8TCL4I3O5TCL1I6O5TCL4I5O8T

Appendix A—AutoPatch Service / Returns Policy

A.1 Service

The AutoPatch 1YDM is to be serviced only by AutoPatch authorized service agents.

A.2 Return Authorizations

Except for warranty claims, merchandise will not be accepted for return or exchange after the first thirty (30) days following the invoice date.

Merchandise will not be accepted for any reason without a Return Materials Authorization (RMA) number. Returned items must be shipped prepaid, insured, with the RMA number clearly stated on the outside of each carton and, if possible, in original packing container(s).

> **Note:** AutoPatch will not be responsible for damage incurred in shipping due to insufficient packaging. If requested, AutoPatch will supply a new shipping carton at cost.

Products and parts returned or exchanged for any reason other than warranty purposes are subject to a restocking fee not greater than twenty percent (20%) of the invoiced price, if returned in unused condition.

A.3 Claims for Shipping Damages

Unless otherwise specified, merchandise is normally shipped by Federal Express Economy service. AutoPatch reserves the right to select the final method and carrier for any shipment.

Although we take special care to ensure the safe arrival of all orders, shipping accidents and damage can occur. Shipments are transferred to the appointed carrier in good condition and AutoPatch's liability for the product ceases when the transfer to the carrier is complete. Therefore, claims for damages and shortages must be filed with the transporting company by the receiving company within fifteen (15) days of receipt. Visible damage and shortages must be noted on the freight bill; packaging and contents must be retained for inspection.

A.4 Replacement Policies and Procedures

During the warranty period:

1. Describe the problem to an AutoPatch dealer, regional representative, or the AutoPatch AutoAssist department.
2. Upon verification of a problem that requires factory repairs, an AutoPatch AutoAssist representative will issue a Return Materials Authorization (RMA) number and we will, at no cost, repair or replace the part(s) returned to the factory and return the part(s) to the sending party. If conditions do not permit this procedure, we will invoice new or reconditioned (at AutoPatch's option) replacement part(s) to the dealer and ship the part(s) to the dealer or to the consumer if so directed by written order from the dealer. Unless otherwise instructed in writing by an AutoPatch AutoAssist representative, part(s) replaced under this warranty must be returned to the factory:
   A) within thirty (30) days;
   b) with shipping and insurance costs prepaid;
   c) with the RMA number clearly indicated on the outside of each container;
   d) if possible, in the original shipping container(s)
   e) with a written description of problem.

   If the replaced part(s) are returned within thirty (30) days, we will apply credit to the dealer's account for the total value of part(s) determined defective, plus return shipping costs. Any part(s) received after thirty (30) days or otherwise not in compliance with these requirements may be refused and credit will not be issued.
3. Repaired or replaced part(s) will be warranted for the remainder of the original system warranty period, for the first thirty (30) days following the invoice date, or we will extend the original warranty period by the period of verifiable downtime, whichever provides the greatest benefit.

Following warranty expiration:

1. Call your AutoPatch dealer, area representative, or the AutoPatch AutoAssist department with a description of the problem.
2. Upon verification of a problem that requires factory repairs, an AutoPatch AutoAssist representative will issue a Return Materials Authorization (RMA) number. We will, at nominal cost, invoice the sending party, repair or replace the part(s) returned to the factory and return those part(s) to the sending party. If conditions do not permit this procedure, we will invoice and ship new or reconditioned (at AutoPatch's option) replacement part(s) to the dealer or to the consumer if so directed by written order from the dealer.

3. Post warranty repairs and replacements are warranted for the first thirty (30) days following invoice date.

A.5 Special Notice

AutoPatch reserves the right to modify or discontinue designs, specifications, warranties, and policies without notice. All data with regard to model numbers, series, specifications, and prices in our literature have been thoroughly reviewed and edited. Although we cannot assume responsibility for inadvertent omissions or errors, we sincerely apologize if misunderstandings occur, and we will appreciate your criticism, corrections, and suggestions.

Glossary

Basic Control Structure (BCS) - A string of alphanumeric characters used to serially control the matrix from a PC keyboard. BCS commands can be used to execute any command that can be keyed-in from the control panel.

BAUD rate - The speed that communications travel through the serial port. A 1YDM can send and receive communications at 9600 BAUD.

check sum - A primitive way of error-checking the information sent in a packet. When a packet is uploaded to the matrix, the check sum is the total value of the information in the packet. The program that reads the information in the packet verifies that all the information it received adds up to the check sum. If the check sum equals the sum of the information, all information was received; if the check sum does not equal the sum of the information, something happened when the information was uploaded and the information needs to be uploaded again.

com port - Refers to the communications port, or serial port. The term com port is used in several of the software packages and devices used to control the matrix. There are two com ports on every matrix enclosure.

component signals - Groups of signals that are switched together because each signal carries a necessary component for that group of signals to be recognizable. Some examples of component signals are: RGBS video, RGsB video, Y/c video, and stereo audio. Each signal in a component signal travels through a separate wire or cable, but all signals are switched together so that they arrive at the output device at the same or vitally the same time.

connector assembly - An adapter that allows the audio, video, or data signals to pass from a source device to the input board, or from the output board to the destination device.

distribution matrix - The environment of all signals and the hardware and software necessary to switch these signals. Distribution matrices are also known as routing switchers, routing matrices, and switching matrices.

dry contacts - Provide a method for recalling presets, using digital rather than electrical ports. The dry contact must have switches that provide the hexadecimal value of the preset to be executed. The dry contact module polls the switches and uses the value provided to execute the desired preset.

echo serial command - A feature of the matrix that when turned on, echoes the commands sent to the matrix from an external controller on the control panel screen.

enclosure - An enclosure is a metal chassis which holds input and output boards, a CPU board, and a power supply.

external controller - An external controller can be either dry contacts or any device that can be used to control the matrix via the serial port.

input/output (I/O) configuration - The input/output configuration is the status of all the input and output signals in the matrix (or enclosure, if so specified) at a given time. For example the status of an input signal would be the output signal to which it was routed and the status of an output signal would be the input signal it was receiving.

input/output board - A circuit board that receives video, audio or data signals from outside sources and transmits the signals to outside output devices.

level - The 1YDM uses the term level to refer to an I/O board or a group of I/O boards.

local X/Y control panel - The panel on the front of an enclosure that has buttons and a screen for viewing messages about the distribution matrix. Almost all distribution matrices will have at least one enclosure with a control panel.

inputs and outputs - inputs and outputs are the physical connector locations on the rear of an enclosure.

master enclosure - An enclosure that has its EPLD chip set to 01. This setting, which is done at the factory, identifies this enclosure as the master. Only one enclosure per matrix can be the master enclosure.

module - Also known as a software module. A module is a chunk of software code that allows the matrix to accomplish specific tasks.

input/output configuration - The status of all the input and output signals in the matrix at a given time. For example, the status of an input signal is the output signal to which it is routed and the status of an output signal is the input signal that it receives.

Preset key - The Preset key is used to store the I/O configuration of the matrix. Using the Preset key, up to 64 different I/O configurations can be saved. The Preset key is also used to restore the I/O configurations. The entire matrix can be reconfigured at any time, exactly as it was saved, by recalling an I/O configuration.

RGBS - A four input signal video signal, R = Red, G = Green, B = Blue and S = sync. This signal requires four literal inputs to relay it to an output device.

RGsB - Three component video signal, R = Red, Gs = Green with sync, B = Blue. This signal requires three literal inputs to relay it to an output device.

configuration word - The configuration word is a hexadecimal number that tells the matrix how to: set the BAUD rate, choose the number of SBCs to poll, and whether or not to echo serial commands on the control panel.

serial filter - When turned on, the serial filter changes hexadecimal packets of information, traveling from the CPU of the matrix to an external controller, into more readable ASCII characters.

single bus controllers (SBC) - SBCs are remote controller devices used to control the input to a specified output device.

slave enclosure - Any enclosure in a matrix other than the master enclosure.

software module - A software module is a chunk of software code that allows the matrix to accomplish specific tasks.

strings - Basic Command Structure (BCS) commands are referred to as strings.

switch - Any time that the Change key is used alter the input/output configuration, a switch was done. Switches can be made from the control panel, an external controller, and the packet and string sections of a configuration file. A switch does not include presets.

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Additional Level Information

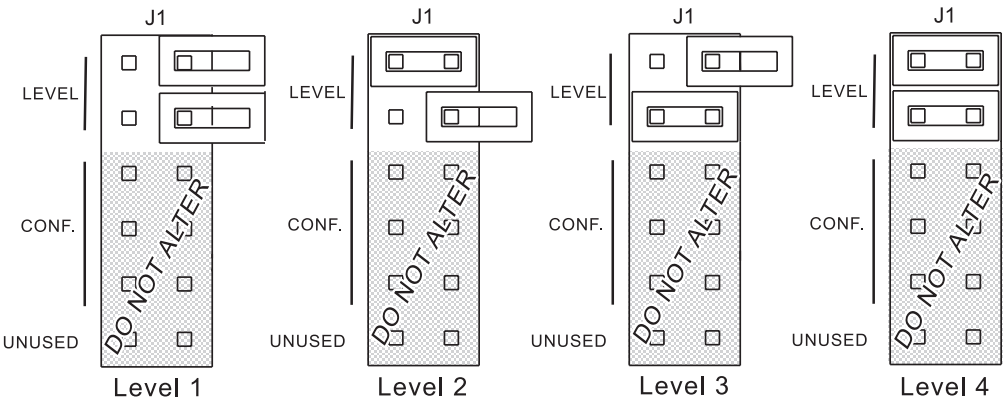
913346

Insert this page between pages 1-6 and 1-7. The Important Note below provides further clarification for the procedure on defining levels in Section 1.5.

Important Note

When defining a level, **DO NOT REMOVE OR ALTER** any of the jumpers on the board other than the level pin jumpers. The placement of the configuration jumpers is dependent on the board configuration. The illustrations do **not** show the configuration pin jumpers in place; however, they are present and should **not** be altered. Altering the configuration pin jumpers **will disable the system**.

If you have questions regarding this task, or any other task, contact Technical Support (for current Technical Support information see below).



Settings for level pins on J1 jumper (replacement illustration for figure 1.6)

Technical Support

AutoPatch provides technical support 24 hours a day, 7 days a week (except for U.S. holidays). Before calling with a question, please consult your documentation. If this binder cannot fully answer your question, have your serial number ready (located on the rear of the enclosure) and call your authorized AutoPatch dealer or call AutoPatch AutoAssist at: (toll free for U.S. and Canada) **800-622-0246** or (international) **509-235-2636**. You can also reach us through our web site: **www.autopatch.com**, or e-mail our AutoPatch Technical Support Specialists at: **support@autopatch.com**

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