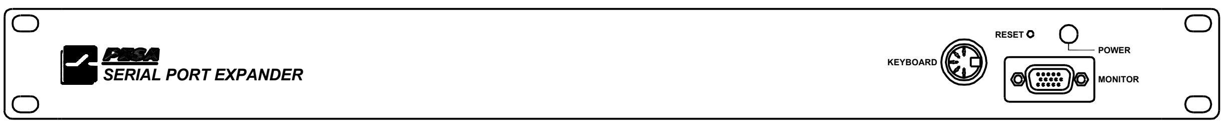

Serial Port Expander

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Figures

Tables

Chapter 1 – Introduction

General

This manual provides instructions for the installation, operation, and maintenance of the PESA Serial Port Expander.

Safety Warnings

Safety warnings, and other important information, are emphasized in three ways:

WARNING

Warning statements identify conditions or practices that could result in personal injury or loss of life.

CAUTION

Caution statements identify conditions or practices that could result in damage to equipment.

NOTE

Notes add emphasis to information that is important for the correct installation, operation, or maintenance of the equipment.

Product Description

The PESA Serial Port Expander is intended to expand the number of RS-232 or RS-422 ports normally available on PESA controllers utilizing CPU Link Protocol No. 1. It is designed to route data from multiple control systems to a single PESA controller.

The Serial Port Expander can accept input from any number of serial ports. These ports can be configured as either RS-232 or RS-422 ports. In addition, it can accept input from TCP/IP connections. The software supports multiple connections to a single TCP/IP port.

The Serial Port Expander is configurable via hardware jumpers and a software configuration file. The hardware jumpers are used to strap each serial port for either RS-232 or RS-422 operation. Once strapped, a software configuration file specifies which serial port is the output port and which serial port(s) are the input ports. It also specifies the parameters associated with each port, such as baud rate, parity, etc. Finally, the software configuration file specifies the TCP/IP port number to be used for incoming connections.

Limitations

NOTE

Operation of the Serial Port Expander is subject to the limitations described below. Users are advised to carefully read this section prior to installing this equipment.

This product is intended for limited expansion of CPU link ports. It is especially effective for low bandwidth use of the CPU link ports. The higher the bandwidth need of the external clients, the lower the effectiveness of the expander.

This product works only with the CPU Link Protocol No. 1. It does not work with any of the expanded or asynchronous PESA protocols. It does not work with many of the extensions to Protocol No.1 that are supported by the 3300/3500/3500Plus controllers. Applications such as Win3300, Win3500 or Win3500Plus will not operate if connected through the serial port expander.

This product has the potential to concentrate large amounts of data onto a single CPU Link. It would be very easy to overload the CPU link, and is up to the user to prevent this from happening and take corrective action should such a situation arise.

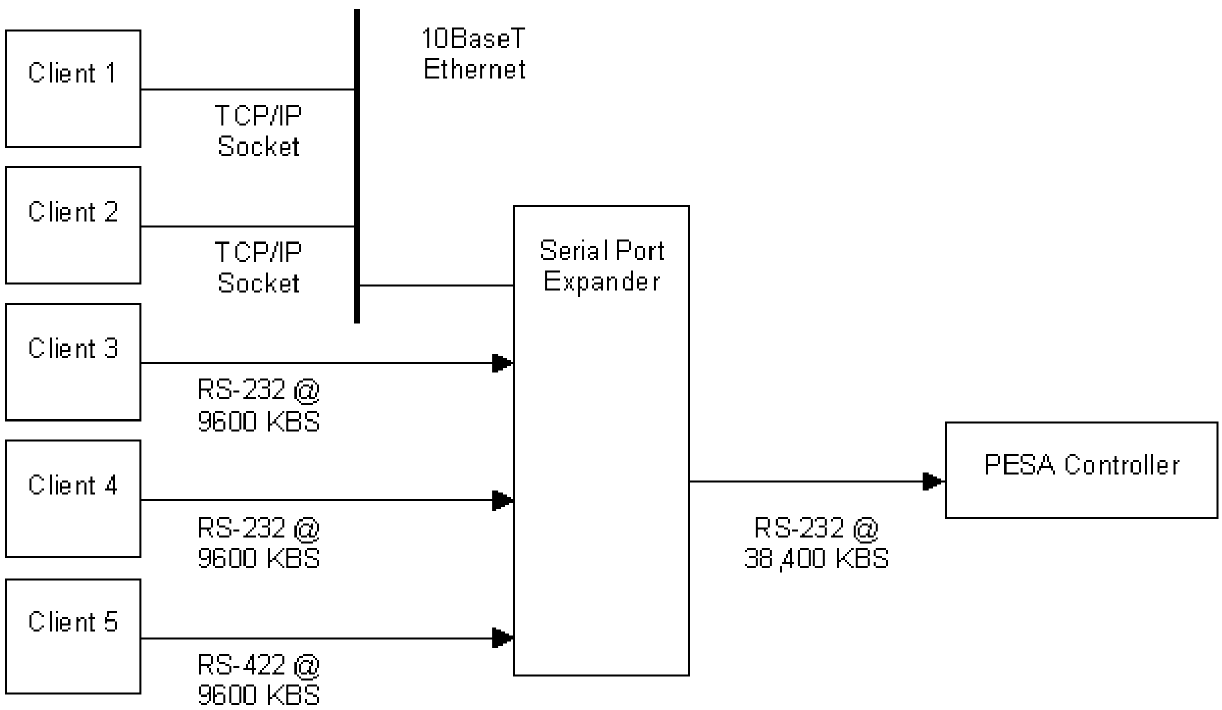

Figure 1. System Level Block Diagram, Single Output

Specifications

General

Operational Environment

Temperature .... 0-40°C
Humidity .... 0-90% Non-Condensing

Physical Characteristics

Height .... 1.75 in (44 mm) (1 Rack Unit)
Width .... 19.00 in (483 mm)
Depth .... 12.25 in (311 mm)
Weight .... 10.1 lb (4.6 kg)

Power

Input .... Auto-Ranging: 90-260 VAC, 47-63 Hz
Input Connector IEC 320 Receptacle
Power Consumption 132VA

IEC 320 Line Cords

US
- Part Number 81-9028-0403-0
- Connectors .... IEC 320-C13 to NEMA 5-15P

UK
- Part Number 81-9028-TBD-0
- Connectors .... IEC 320-C13 to BS 1363A

Euro
- Part Number 81-9028-0411-0
- Connectors .... IEC 320-C13 to CEE 7/7 Schuko

Chapter 2 – Installation

Shipping Damage Inspection

Immediately upon receipt, all shipping containers should be inspected for damage caused in transit. If any damage is noted, save all packing material and contact both PESA and the carrier as soon as possible.

Unpacking

CAUTION

This equipment contains static sensitive devices. A grounded wrist strap and mat should be used when handling the internal circuit cards.

Carefully unpack the equipment and compare the parts received against the packing list and Table 1. If any parts appear to be missing, please contact PESA immediately.

Table 1. Equipment List

Part No. Description	Quantity Required
Part No. 81-9065-2312-0 Serial Port Expander	1 ea
Part No. 81-9065-2307-0 CD, PESA Product Manuals	1 ea
Part No. 81-9028-0393-0 Serial Cable, Null Modem, 10’	Note 1
Part No. 81-9028-0400-0 Serial Cable, AT Modem, 6’	Note 1
Part No. 81-9028-0403-0 Line Cord, U.S., IEC 320-C13 to NEMA 5-15P	Note 1
Part No. 81-9028-0411-0 Line Cord, Euro., IEC 320-C13 to CEE 7/7 Schuko	Note 1
Note 1: This item is optional or may be ordered in varying quantities. Please consult your purchase order to verify that you have received the correct quantity.	

Installation Location

WARNING

For safety reasons, this equipment must be located near the socket-outlet or power strip so that the AC line cord plugs are easily accessible (EN60950:1992 §1.7.2).

This equipment is designed to be installed in a standard 19-inch equipment rack located in an environment conforming to the specifications shown in “Operational Environment” on page 3. Each unit should be located as close as possible to its associated equipment to minimize cable runs.

Consideration should be given to the connection of this equipment to the supply circuit and the effect that possible overloading could have on overcurrent protection circuits and supply wiring. Refer to the nameplate ratings when addressing this concern.

Installation in Equipment Rack

This equipment is designed to be installed in a standard 19-inch equipment rack. Sufficient space must be provided behind the equipment racks to allow for control, signal, and power cables. All panel mounting holes should be utilized and mounting hardware tightened securely.

Install the equipment into the rack as follows:

1. Insert the panel assembly into the equipment rack and support the bottom of the panel assembly until all mounting screws have been installed and properly tightened.
2. Install the bottom two panel mounting screws.
3. Install the top two panel mounting screws.
4. Install any remaining panel mounting screws.
5. Tighten all of the panel mounting screws until they are secure.

Interface Connections

For reasons of personal safety, and to prevent damage to the equipment or cables, the following guidelines should be followed when connecting cables to this equipment:

1. Install the equipment in the rack before connecting cables.
2. All cables should be carefully strain relieved to prevent connector separation.
3. To the extent possible, separate control, signal, and power cables to minimize crosstalk and interference.
4. The liberal use of nylon cable ties to secure cables to the rack is encouraged. This will minimize the amount of force transmitted to the equipment and help route cables away from hazardous areas.
5. Route cables away from walk areas to avoid creating a safety hazard.

Interface connections are made at both the front and rear of this equipment as shown in Figure 2 and Figure 3.

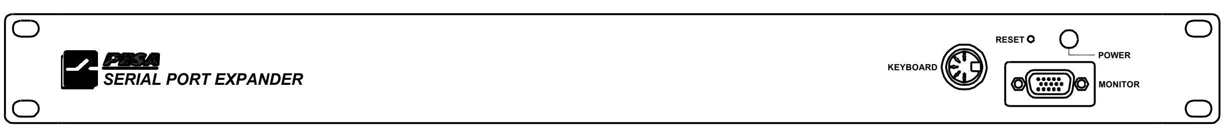

Figure 2. Serial Port Expander Front View

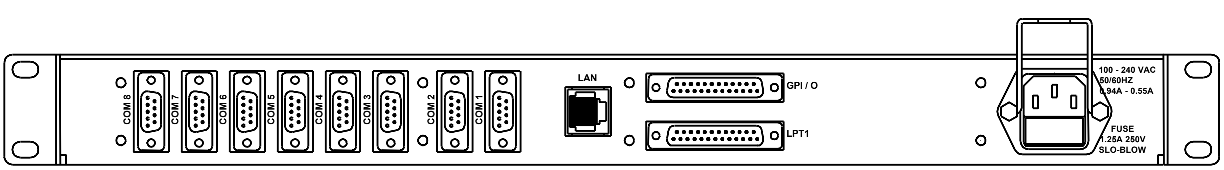

Figure 3. Serial Port Expander Rear View

Serial Connector Pin Assignments

There are eight serial connectors on the back of the chassis. The signals present on each connector vary depending on whether the hardware has been configured for RS-232 or RS-422 communication. See "Configuring Serial Port Hardware" on page 8 for more information.

Table 2. Serial Connector Pin Assignments

Pin	RS-232	RS-422
1	CD (Carrier Detect)	
2	RX (Receive Data)	TX+ (High)
3	TX (Transmit Data)	TX- (Low)
4	DTR (Data Terminal Ready)	
5	GND (Signal Ground)	GND
6	DSR (Data Set Ready)	RX+ (High)
7	RTS (Request to Send)	RX- (Low)
8	CTS (Clear to Send)	
9	RI (Ring Indicator)	

Connecting to a PESA Controller

The cable which connects the Serial Port Expander to the PESA Controller varies depending on whether the port has been configured as an RS-232 port or an RS-422 port.

For an RS-232 port a standard null-modem cable is required. These may be obtained at most computer supply shops. A 10 ft. cable may be purchased directly from PESA by referencing Part No. 81-9028-0393-0. They may also be fabricated in-house. The schematic for this cable is shown in Figure 4.

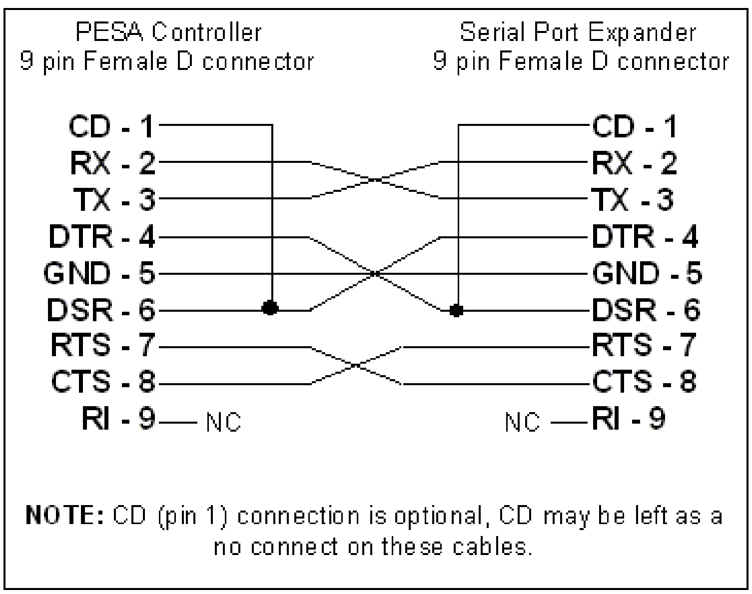

Figure 4. RS-232 Cable Diagram

To connect the Serial Port Expander to the CPU Link Port of the router controller using RS-422 communications, the cable shown in Figure 5 should be used.

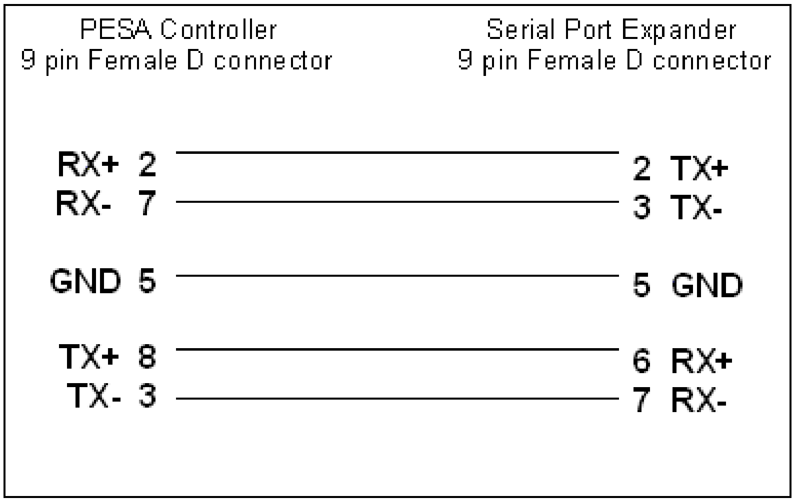

Figure 5. RS-422 Cable Diagram

Connecting to an External Control System

Connecting an external control system to the Serial Port Expander requires the proper cable. The pin assignments for the Serial Port Expander are shown in Table 2.

If the external control system is a standard PC architecture, a null-modem cable is required to connect the PC to the Serial Port Expander. Refer to Figure 4 for the cable diagram.

Power Connections

WARNING

Always use a grounded AC receptacle to avoid a potentially lethal shock hazard in the event of an equipment power line fault.

Switch and Jumper Settings

Configuring Serial Port Hardware

The serial port hardware may be configured for either RS-232 or RS-422 communications. The exceptions are COM3 and COM4, which are hardwired for RS-232 communication, and may not be changed.

To change COM port hardware, it is necessary to install and/or remove jumper blocks and IC's. The following tables define the jumper blocks and the IC's that must be installed and/or removed.

To change the hardware configuration of COM1 and COM2, it is necessary to manipulate the jumper blocks and IC's on the motherboard. It will be necessary to remove the PC-COM4A multi-serial adapter card to gain access to these jumper blocks and IC's.

To change the hardware configuration of COM5 through COM8, the jumper blocks and IC's are located on the PC-COM4A multi-serial adapter card.

There are two ICs that must be removed and/or installed as required. The first is a standard 74ALS176 (75176). The 74ALS176 may be obtained from any electronics distributor or supplier, or may be obtained directly from PESA Switching Systems by referencing Part No. 81-9016-0688-0.

The second IC is an RS-232 driver chip made by Maxim, part number is MAX208CNG. By default, these chips are installed on all production boards. If removed, they should be saved for future use.

The following tables define the hardware configuration for each port.

Table 3. Com Port 1 Jumpers

Jumper Block and IC	RS-232	RS-422
J8	All open	All open
J10	All open	Pins 1-2
U3	MAX208 Installed	Removed
U4	Removed	74ALS176 Installed
U8	Removed	74ALS176 Installed

Table 4. Com Port 2 Jumpers

Jumper Block and IC	RS-232	RS-422
J9	All open	All open
J11	All open	Pins 1-2
U5	MAX208 Installed	Removed
U6	Removed	74ALS176 Installed
U9	Removed	74ALS716 Installed

Table 5. Com Port 5 Jumpers

Jumper Block and IC	RS-232	RS-422
J2	All open	All open
U6	MAX208 Installed	Removed
U3	Removed	74ALS176 Installed
U4	Removed	74ALS176 Installed

Table 6. Com Port 6 Jumpers

Jumper Block and IC	RS-232	RS-422
J5	All open	All open
U13	MAX208 Installed	Removed
U10	Removed	74ALS176 Installed
U14	Removed	74ALS176 Installed

Table 7. Com Port 7 Jumpers

Jumper Block and IC	RS-232	RS-422
J4	All open	All open
U11	MAX208 Installed	Removed
U9	Removed	74ALS176 Installed
U12	Removed	74ALS176 Installed

Table 8. Com Port 8 Jumpers

Jumper Block and IC	RS-232	RS-422
J1	All open	All open
U5	MAX208 Installed	Empty
U1	Empty	74ALS176 Installed
U2	Empty	74ALS176 Installed

Factory Configuration

The following are set by the factory during the production process.

IRQ and Address Settings

Table 9. Factory Settings, IRQ and Address

COM	IRQ	Address
1	4	0x3F8
2	3	0x2F8
3	5	0x3E8
4	9	0x2E8
5	7	0x160
6	11	0x168
7	5	0x170
8	3	0x178

LBC-586 Plus Motherboard Jumpers:

Port 1 = COM1 (RS-232)

U3 = MAX208 Installed

U4, U8 = Removed

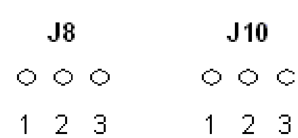

Figure 6. Factory Settings, Com 1 Jumpers

Port 2 = COM2 (RS-232)

U5 = MAX208 Installed

U6, U9 = Removed

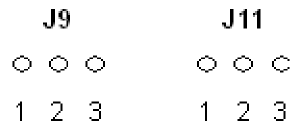

Figure 7. Factory Settings, Com 2 Jumpers

PC-COM4A Multi-Serial Adapter Card Jumpers:

Port 1 = COM5

U6 = MAX208 Installed

U3, U4 = Removed

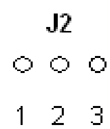

Figure 8. Factory Settings, Com 5 Jumpers

Port 2 = COM6

U13 = MAX208 Installed

U10, U14 = Removed

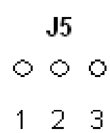

Figure 9. Factory Settings, Com 6 Jumpers

Port 3 = COM7

U11 = MAX208 Installed

U19, U11 = Removed

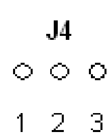

Figure 10. Factory Settings, Com 7 Jumpers

Port 4 = COM8

U5 = MAX208 Installed

U1, U2 = Removed

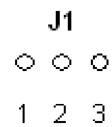

Figure 11. Factory Settings, Com 8 Jumpers

Interrupts

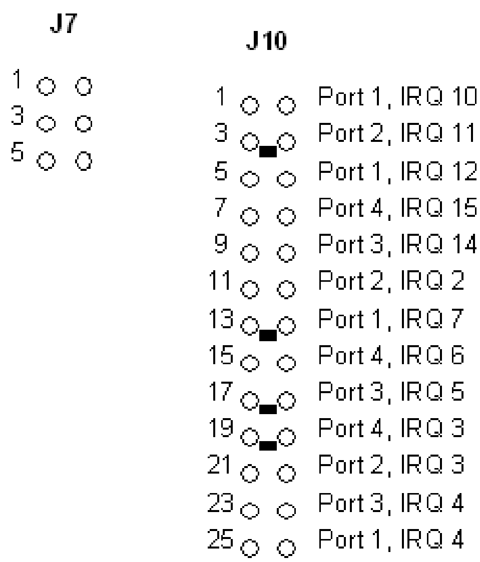

Figure 12. Factory Settings, Interrupt Jumpers

Interrupt Termination

Terminate the interrupts for 1st and 2nd channels.

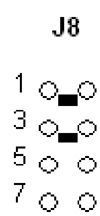

Figure 13. Factory Settings, Interrupt Termination Jumpers

Address Decode

Map 4

- Port 1 (com5) address = 0x160 to 0x167
- Port 2 (com6) address = 0x168 to 0x16f
- Port 3 (com7) address = 0x170 to 0x177
- Port 4 (com8) address = 0x178 to 0x17f

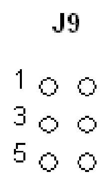

Figure 14. Factory Settings, Address Decode Jumpers

Chapter 3 – Operation

If specified when ordered, the switches and jumpers on the subassemblies will already be properly configured. Otherwise, please refer to Switch and Jumper Settings on page 8.

Theory of Operation

The Serial Port Expander is a software process running under the Linux operating system. When the software is started, it reads the configuration file and configures the serial and/or TPC/IP ports accordingly. It then enters an idle state, waiting on input from any of it’s input ports (serial and/or TCP/IP). Once the first byte has been received on an input port, the software grants that port exclusive access to the output port until the transaction has been completed. After the transaction is complete, it then enters the idle state waiting for the next byte of data to arrive on any of it’s input ports.

The CPU Link Protocol is an ASCII based protocol. All messages are composed of ASCII characters, terminated with a <CR><LF> sequence. It is knowledge of this protocol which allows the Serial Port Expander to control the flow of data to/from the many ports.

When the first byte of data is received on an input port, the software will recognize this and immediately grant exclusive access to the output port. All data present on the input port will be echoed to the output port until a <CR><LF> sequence is detected. This allows a complete and uninterrupted message to be sent to the PESA controller. When the <CR><LF> sequence is detected on the input stream, the software will then enter a second state in which data is automatically routed in reverse, from the PESA controller to the input port. This allows the PESA controller to send a complete and uninterrupted reply to the port that initiated the transaction. All data from the controller port will be sent back to the input port until a <CR><LF> sequence is detected. This terminates the transaction, and the software waits for the next byte of data to arrive on any port.

The ports are buffered, such that data sent on any port is not lost. This means that if one port has been granted exclusive access to the output port, and data should arrive on another input port, that data that arrives on the second input port will not be lost. Rather, it will be buffered until the first transaction is complete, at which time the second input port will be granted exclusive access to the output port. The ports are not prioritized, they are handle on a first-come/first-served basis.

There is a worst-case condition where a device could send a single byte of data to the Serial Port Expander and then fail. The Serial Port Expander would recognize that an input port had data and would grant exclusive access to the output port. While a single input port has exclusive access to the output port, other input ports are effectively locked out. Since the failed device would never send a <CR>LF> sequence, the other input ports would never be able to access the output port. To prevent this situation, a 10-second timeout has been implemented in the software. The timer is started upon receipt of the first bye of data from an input port. If the entire transaction (message and reply) is not complete within 10 seconds, the software will be forced back into the idle state. This guarantees that a failed device cannot “lock out” other input devices for more than 10 seconds.

The software is capable of accepting input from any serial port or a TCP/IP socket. Multiple connections to a single TCP/IP socket can be made. Each connection will be treated as an individual connection, allowing complete and uninterruptible transactions for each socket.

Each instance of the software can only support one output port. It is possible to run two instances of the software (with unique configuration files) such that each process is serving one output port. In this manner, it is possible to control two CPU Links from one Serial Port Expander chassis. The serial ports can be configured in any fashion. For example, it is possible to configure two processes, each with three input ports and one output port. It is also possible to configure two processes, one with five input ports and another with one input port. See “Software Configuration” on page 16 for details on the configuration file, and “Configuring for Multiple Output Ports” on page 17 for details on using multiple output ports.

Software Configuration

The configuration file **expander.conf** is an ASCII text file which is used to configure the software. It specifies which ports are to be used as inputs and outputs, as well as the communication parameters of each port, such as baud rate, data bits, parity, etc. It also specifies the TCP/IP socket on which to accept connections from remote control systems.

There may be only one output port. There may be as many input ports as the hardware will support. Each port is configured individually. To change the default configuration requires that the text file be edited with some text editor. The following is a sample configuration file.

> **NOTE**
>
> The configuration file is case-sensitive. All entries use lower case for the alpha characters A-Z. For correct operation it is imperative that lower case characters be used.

```
#
# output to CPU Link port
# format:
#   output <com_port> <baud> <parity> <databits> <stopbits>
<handshake>
# where:
#   com_port     = com1, com2, …, com8
#   baud         = 1200, 2400, 4800, 9600, 19200, 38400
#   parity       = n, e, o
#   databits     = 6, 7, 8
#   stopbits     = 1, 2
#   hw_handshake = on, off
#
output com1 38400 n 8 2 on

#
# serial input ports
# any number of input ports are possible if supporting H/W exists
# format:
#   input <com_port> <baud> <parity> <databits> <stopbits>
<handshake>
# where:
#   com_port     = com1, com2, …, com8
#   baud         = 1200, 2400, 4800, 9600, 19200, 38400
#   parity       = n, e, o
#   databits     = 6, 7, 8
#   stopbits     = 1, 2
#   hw_handshake = on, off
#
input com2 38400 n 8 1 on
input com3 38400 n 8 1 on
input com4 38400 n 8 1 on

#
# tcp/ip clients connect on this port
#
tcp_port 4000
```

Configuring for Multiple Output Ports

The default configuration supports only a single output port. However, it is possible to support two or more output ports by running two or more instances of the application. Doing so requires that two configuration files be prepared, and that each instance of the application be told which configuration to use.

As an example, assume that two output ports are required. Doing so requires two instances of the application. Assume that one instance will use the configuration file **expander1.conf** and the other instance will use the configuration file **expander2.conf**.

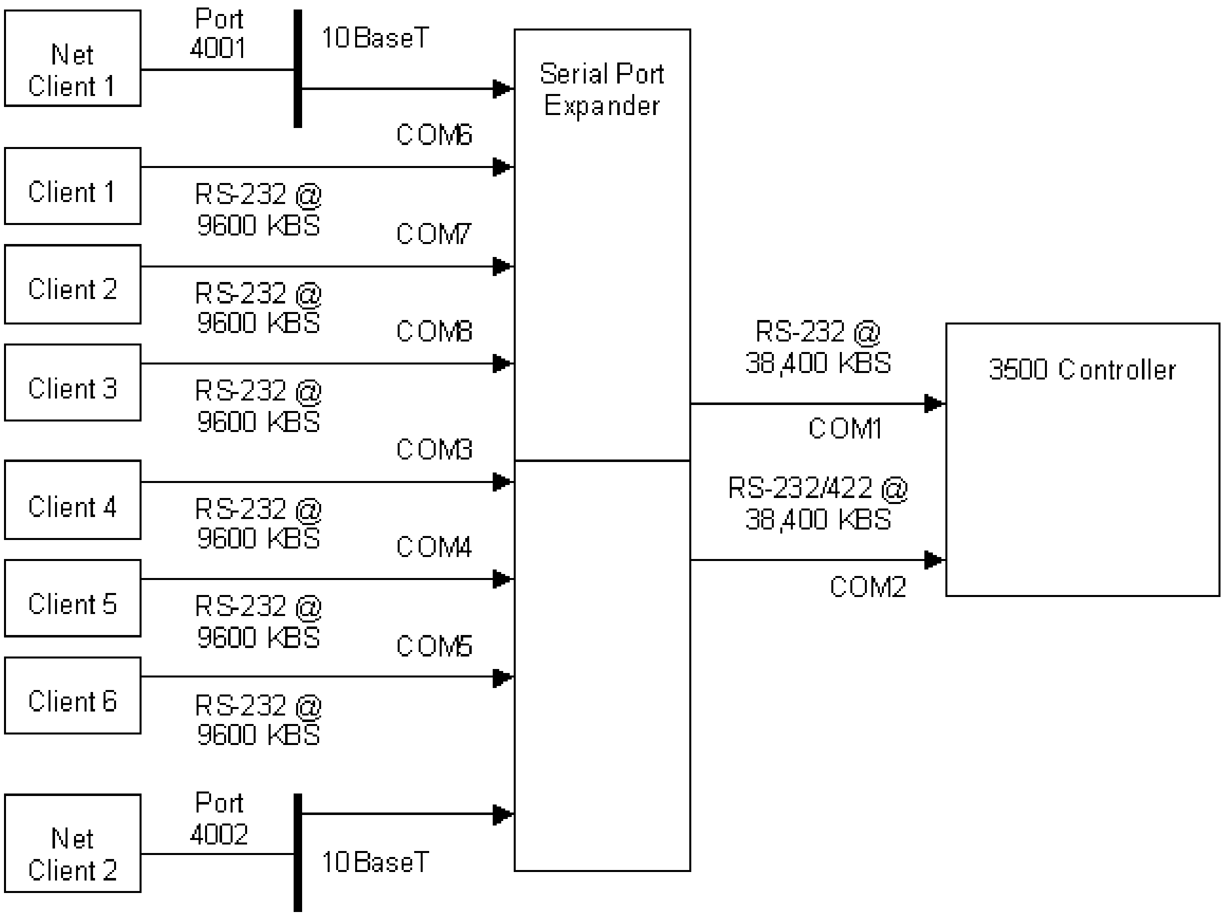

Figure 15. System Level Block Diagram, Multiple Outputs

The first step is to prepare the two configuration files. The file **expander1.conf** will specify that COM1 is the output port and COM6, COM7, and COM8 are the input ports. Also, this configuration file specifies that TCP/IP port 4001 is to be used for incoming TCP/IP connections.

The second configuration file **expander2.conf** specifies that COM3 is the output port, while COM2, COM3, and COM4 are the input ports. Additionally, this file specifies that TCP/IP port 4002 is to be used for incoming TCP/IP connections.

NOTE

When this technique is used, serial ports and TCP/IP ports may not be shared among processes. For example, it is not possible to use COM6 as an input port in both processes. It is also not possible to use port 4000 as an input port in both processes. Should such a situation actually occur, it is entirely unpredictable as to which process would receive the data from the port, and in fact it is very probable that each process would receive only a portion of the entire message.

expander1.conf

```
#
# output to CPU Link port
# format:
#   output <com_port> <baud> <parity> <databits> <stopbits>
<handshake>
# where:
#   com_port     = com1, com2, …, com8
#   baud         = 1200, 2400, 4800, 9600, 19200, 38400
#   parity       = n, e, o
#   databits     = 6, 7, 8
#   stopbits     = 1, 2
#   hw_handshake = on, off
#
output com1 38400 n 8 2 on

# serial input ports
# any number of input ports are possible if supporting H/W exists
# format:
#   input <com_port> <baud> <parity> <databits> <stopbits>
<handshake>
# where:
#   com_port     = com1, com2, …, com8
#   baud         = 1200, 2400, 4800, 9600, 19200, 38400
#   parity       = n, e, o
#   databits     = 6, 7, 8
#   stopbits     = 1, 2
#   hw_handshake = on, off
#
input com6 9600 n 8 1 on
input com7 9600 n 8 1 on
input com8 9600 n 8 1 on

# tcp/ip clients connect on this port
#
tcp_port 4001
```

expander2.conf

```
#
# output to CPU Link port
# format:
```

```
#   output <com_port> <baud> <parity> <databits> <stopbits>
<handshake>
# where:
#   com_port     = com1, com2, …, com8
#   baud         = 1200, 2400, 4800, 9600, 19200, 38400
#   parity       = n, e, o
#   databits     = 6, 7, 8
#   stopbits     = 1, 2
#   hw_handshake = on, off
#
output com2 38400 n 8 2 on

# serial input ports
# any number of input ports are possible if supporting H/W exists
# format:
#   input <com_port> <baud> <parity> <databits> <stopbits>
<handshake>
# where:
#   com_port     = com1, com2, …, com8
#   baud         = 1200, 2400, 4800, 9600, 19200, 38400
#   parity       = n, e, o
#   databits     = 6, 7, 8
#   stopbits     = 1, 2
#   hw_handshake = on, off
#
input com3 9600 n 8 1 on
input com4 9600 n 8 1 on
input com5 9600 n 8 1 on

# tcp/ip clients connect on this port
#
tcp_port 4002
```

Once the files are prepared, it will be necessary to invoke two instances of the application. The startup file **/etc/rc.d/rc.expander** is the file that starts the serial port expander upon bootup. It will be necessary to edit this file to start two instances of the application. The **pico** text editor may be used to edit the startup file. The following is an example of invoking the **pico** text editor on the startup file:

```
cd  /etc/rc.d
pico  rc.expander
```

Once the editor has been started, it will be necessary to modify the contents of the file. The following is an example of what the file should look like to start two instances of the serial port expander. Note the use of the "-f" command line switch which tells each instance of the serial port expander to use a different configuration file:

```
#!/bin/sh
echo 'Starting PESA Serial Port Expander'
hdparm -u1 /dev/hda
cd /pesa/expander
./expander –f expander1.conf &
./expander –f expander2.conf &
echo 'Done'
```

The system should then be rebooted to cause the two processes to be started. To properly restart the system, enter:

```
shutdown –r now
```

After the system reboots, there should be two instances of the process running, each controlling a unique set of serial ports. This may be verified by using the **ps** (process status) command and making sure that two instances of expander appear in the output. Use the following command to insure that two instances have been started:

```
ps –A | grep expander
```

Logon

To logon to the Linux system, use the following login and password:

```
user = root
password = pesa123
```

Serial Port Expander Protocol

Once configured, the external control system should send and receive data as defined in the PESA CPU Link Protocol #1 document (81-9059-0314-0). No additional protocol is imposed by this product.

Chapter 4 – Maintenance and Repair

Periodic Maintenance

CAUTION

This equipment contains static sensitive devices. A grounded wrist strap and mat should be used when handling the internal circuit cards.

Repair

Before attempting to repair this equipment, please consult your warranty documents and the PESA Customer Service Department. Unauthorized repairs may void your warranty.

CAUTION

The PC boards in this equipment may contain Surface Mount Technology components. Special tools are required to replace these components without causing damage to adjacent areas.

Failure to consult with Customer Service before attempting to repair these boards may void your warranty.

Replacement Parts

Only parts of the highest quality have been used in the design and manufacture of this equipment. If the inherent stability and reliability are to be maintained, replacement parts must be of the same high quality. Please consult our Customer Service Department before installing any parts not purchased from PESA.

Factory Service

Before returning any equipment to our factory for service or repair, please contact our Customer Service Department for an RMA number.

PESA Documents

IL35-TBD	Drawing Tree, Serial Port Expander
81-9062-0407-0	Specification, CPU Link Protocol No. 1 (P1)
81-9062-0408-0	Specification, CPU Link Protocol No. 1 Extensions (P1E)

Glossary

Revised: 05-02-01

NOTE

Entries in this glossary that relate to specific system controller features, are made with reference to the PESA 3500Plus (v3.0).

AES/EBU Audio

Informal name for a digital audio standard established jointly by the Audio Engineering Society (www.aes.org) and the European Broadcasting Union (www.ebu.ch).

All Call

A diagnostic procedure that causes a single physical input to be switched to a range of physical outputs, for a specified component, with a single command.

Example: Assume the existence of component RED spanning physical inputs 1 through 6 and physical outputs 1 through 6. All call can be used to switch physical input 3 to physical outputs 2 through 6 with a single command.

See also: Diagonal.

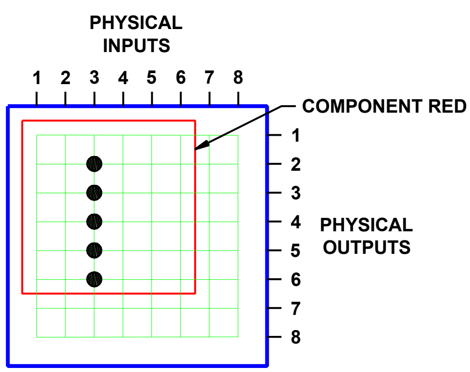

Figure 16. All Call

ANSI

American National Standards Institute (www.ansi.org).

Baud

The number of times a communication signal changes state (voltage, frequency, etc.) in one second.

Generally, only one bit of information is encoded in each change of state for signals operating below 300 baud. At these speeds, baud equals the number of bits transmitted per second.

At 300 baud and above, communications standards generally allow more than one bit to be encoded in each change of state. For example, modems operating at 1200 bits per second, and conforming to the Bell 212A standard, operate at 300 baud using a modulation technique called phase modulation that transmits four bits per baud. At these speeds, data transmission rates are usually expressed in bits per second (b/s) rather than baud.

Baud was originally a unit of telegraph signaling speed, set at one Morse code dot per second. It was proposed at the International Telegraph Conference of 1927, and named after French Engineer J.M.E. Baudot (1845-1903).

Black Burst

A composite color video signal that has sync, color burst, and black video. It is used to synchronize other video sources to the same sync and color information.

See also: House Sync.

Block

A group of contiguous crosspoints in a routing switcher that form the smallest unit on which confidence is checked.

Because of the nature of the circuits involved, individual crosspoints cannot be checked to see if they are operating correctly. Instead, the control circuitry shared by groups of crosspoints is monitored. These groups of crosspoints, called blocks, vary in size according to product type. Block size for RM5 routing switchers is 8 inputs by 2 outputs and block size for PRC routing switchers is 8 inputs by 8 outputs. If any block gives a confidence error, all crosspoints in that block are assumed to be non-functional.

Block Checking

The continuous, sequential monitoring of confidence for each block in a routing switcher.

Block checking occurs automatically and continuously but can be disabled for troubleshooting purposes.

Blocked Destination

See: Source Block.

Blocked Source

See: Source Block.

Breakaway Switch

A switch where multiple sources are switched to a single destination on multiple levels.

Example: Assume the existence of sources VTR1 and VTR2, and destination MON1, defined on levels VIDEO and AUDIO. If VTR1 is switched to MON1 on the VIDEO level, and VTR2 is switched to MON1 on the AUDIO level, a breakaway switch has been taken.

Table 10. Breakaway Switch

Destination	Source	
	Level: VIDEO	Level: AUDIO
MON1	VTR1	VTR2

See also: Follow Switch.

Category

Entities used to construct source, destination , and reentry names.

Categories provide an easy means of classifying and grouping switching system devices.

Example: The categories VTR, 1, 2, and 3 can be used to construct the source names VTR1, VTR2, and VTR3.

Category names:

1. Shall be created using only the following characters:
   - Upper case letters A through Z
   - Lower case letters A through Z if enabled in the control system software
   - Numbers 0 through 9
   - The following special characters: space (   ), hyphen-minus (-), exclamation mark (!), ampersand (&), plus sign (+), equals sign (=), commercial at (@), and low line (_)
2. Shall contain a minimum of one, and a maximum of eight characters.
3. Shall not begin with a space. However, they may end with a space, have embedded spaces, and consist of a single space.
4. Shall be unique in the universe of category names.

Chop

To rapidly switch two different video signals into a monitor or other piece of test equipment. This is done to compare some signal characteristic, usually for quality control.

Chop Rate

The parameter used to control the switching rate when chopping two signals. The signal switching rate is determined as follows:

$$\frac{\text{Video Frame Rate (frames/s)}}{\text{Chop Rate}} = \text{Signal Switching Rate (switches/s)}$$

Figure 17. Chop Rate

For example, a chop rate of 1 used with NTSC signals (30 Frames/Second) will cause the signals to be switched 30 times per second. A chop rate of 60 used with the same signals will cause them to be switched every two seconds.

Component

The most basic signal element that can be switched by a single crosspoint. For example, in RGB video, “Red”, “Green”, and “Blue” are components; in stereo audio, “Left” and “Right” are components.

In Matrix Space, components of like type are usually grouped together into rectangular matrices of crosspoints having contiguous inputs and outputs. These matrices are also referred to as components and are grouped together into levels.

Figure 18 shows a 2x2 RGB video level (VID) consisting of three components (RED, GRN, and BLU).

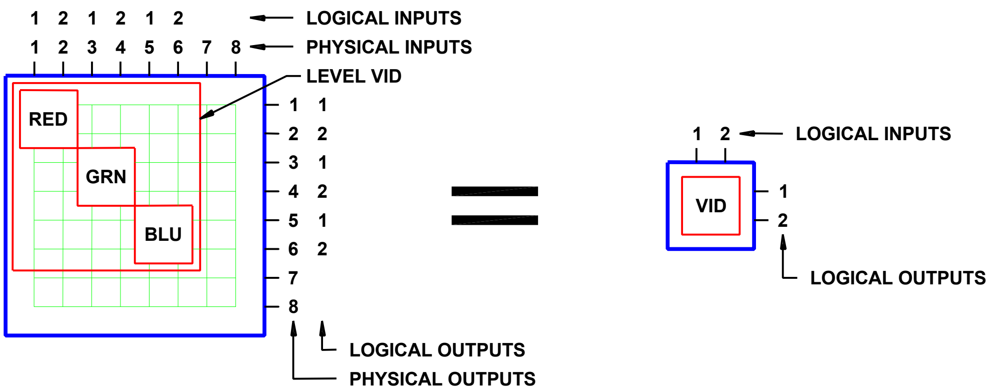

Figure 18. Component

As a general rule, users control the switching of levels, but component switching is handled automatically by the switching system. As shown in Figure 18, a user can specify a single logical switch, such as VID Input 1 to VID Output 2. This would result in the control system software taking three physical switches by activating crosspoints (1,2), (3,4), and (5,6).

Component names are one to eight characters in length and are constructed using uppercase letters, numbers, and spaces. The first character must be a letter.

Composite Video

A type of video signal that contains luminance, chrominance, blanking, and synchronizing information. NTSC, PAL, and SECAM are composite video signals, as opposed to RGB video which is not.

See also: Vertical Sync Signal.

Confidence

A property of a block that indicates whether or not the circuitry controlling the crosspoints in the block is functioning correctly.

When block checking determines that a block is not functioning correctly, the block is said to have a confidence error.

Confidence Error

See Confidence.

Configuration

A collection of system definitions that define the environment in which the system controller operates.

Each configuration is stored as a collection of files (.dbf or .txt) in a separate folder.

Configuration names may contain up to 32 alphanumeric characters.

Configuration Lock

A security measure enabled when a configuration is being uploaded or downloaded.

A configuration lock is used to ensure that only one user at a time may download a configuration to the controller.

Control Panel

See: Panel.

CPU Link

A bi-directional communication interface. A CPU link has two components: a serial port (either RS-232 or RS-422), and a protocol to govern how the port is used.

Crosspoint

The circuitry and components on a printed circuit board that constitute a single physical switch.

See also: Physical Switch.

Data Key

A user configurable control panel key, whose assigned function is used when the panel is in any mode except Salvo Select Mode.

Many control panels have user configurable keys. Each key can be assigned two functions, one as a data key and one as a salvo key. When the keys are pressed, the data key functions are used except when the panel is in salvo mode.

Data Key List

A named list of the functions assigned to each data key on a panel.

Multiple panels may share a data key list as long as they are the same type of panel. Different panel types may not use the same data key list.

Data key list names are one to eight characters in length and are constructed using uppercase letters, numbers, and spaces. The first character must be a letter.

Default Destination

The destination for which status will be displayed when power is applied to a panel, or when a new configuration is downloaded to the controller.

Although not mandatory, it is recommended that a default destination be selected for each panel.

Destination

One or more logical outputs (limited to one per level), on one or more levels, that are switched together as a group.

Destination names may be created by using categories, and:

1. Shall be created using only the following characters:
   - Upper case letters A through Z
   - Lower case letters A through Z if enabled in the control system software
   - Numbers 0 through 9
   - The following special characters: space (   ), hyphen-minus (-), exclamation mark (!), ampersand (&), plus sign (+), equals sign (=), commercial at (@), and low line (_)
2. Shall contain a minimum of one, and a maximum of eight characters.
3. Shall not begin with a space. However, they may end with a space, have embedded spaces, and consist of a single space.

4. Shall be unique in the universe of destination and reentry names.

See also: Category.

Destination Block

See: Source Block.

Destination Group

See: Destination.

Destination Include List

A named list of the destinations a specific control panel is authorized to control.

A destination include list may be shared by multiple panels.

The default destination assigned to a panel may be controlled even if it is not on the destination include list.

Destination include list names are one to eight characters in length and are constructed using uppercase letters, numbers, and spaces. The first character must be a letter.

Destination Number

A number assigned to each destination by the controller and used by CPU Protocol 1.

Destination numbers are also assigned to reentries.

Destination Status

See: Status.

Diagonal

A diagnostic procedure that causes a range of physical inputs to be switched to a range of physical outputs, in a diagonal pattern starting from a specified coordinate and continuing until the either the inputs or outputs are exhausted, for a specified component, with a single command.

Example: Assume the existence of component RED spanning physical inputs 1 through 6 and physical outputs 1 through 6 on a routing switcher. A diagonal with a starting input of 2 and a starting output of 1 would cause the following physical switches to be taken: (2,1), (3,2), (4,3), (5,4), and (6,5).

See also: All Call.

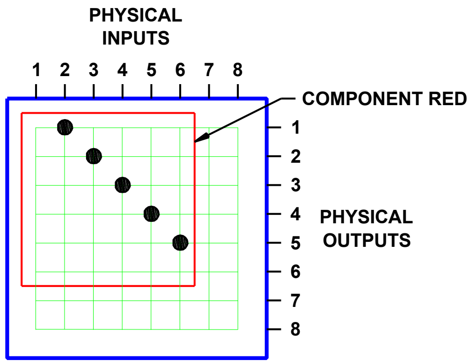

Figure 19. Diagonal

EIA

Electronic Industries Alliance (www.eia.org).

Follow Switch

A switch where a single source is switched to a single destination on all levels. An abbreviated form of audio-follow-video switch.

Example: Assume the existence of source VTR1 and destination MON1 defined on levels VIDEO and AUDIO. If VTR1 is switched to MON1 on both the VIDEO level and AUDIO level, a follow switch has been taken.

This is the most common manner in which switches are taken on a routing switcher.

Table 11. Follow Switch

Destination	Source	
	Level: VIDEO	Level: AUDIO
MON1	VTR1	VTR1

See also: Breakaway Switch.

House Black

See: House Sync.

House Sync

A composite color video signal that has sync, color burst, and black video. It is used to synchronize video sources, and other equipment, to the same sync and color information.

Index

Obsolete. Prior to 3500Plus v3.0, indices were numbers used with categories to construct source, destination, and reentry names.

See also: Category.

Input Offset

In matrix space, the amount by which the origin of a component on strobe x, is offset from the origin of strobe x, measured along the input axis.

The coordinates of crosspoints in matrix space are determined by the strobe they reside on, and their input and output numbers. They are given in the form (input,output) on strobe x. The origin of a component (a matrix of crosspoints) is designated by the point that falls nearest the origin of its strobe (1,1). In Figure A below, the 3x4 component bounded by coordinates (3,2), (5,2), (5,5), and (3,5) has its origin at (3,2).

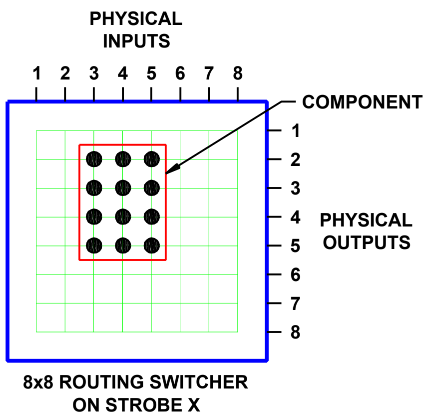

Figure 20. Input Offset, Single Routing Switcher

Input offset is the amount by which the origin of a component is offset from the origin of its strobe, measured along the input axis. A component whose origin coincides with that of its strobe (1,1) will have an input offset of 0. The component shown in Figure 20 has an input offset of 2.

When multiple routing switchers are assigned to the same strobe, the input and output connectors are renumbered to provide a unique coordinate for each crosspoint. Crosspoint coordinates are then determined in the same manner as above. The component shown in Figure 21 has its origin at (12,7) and an input offset of 11.

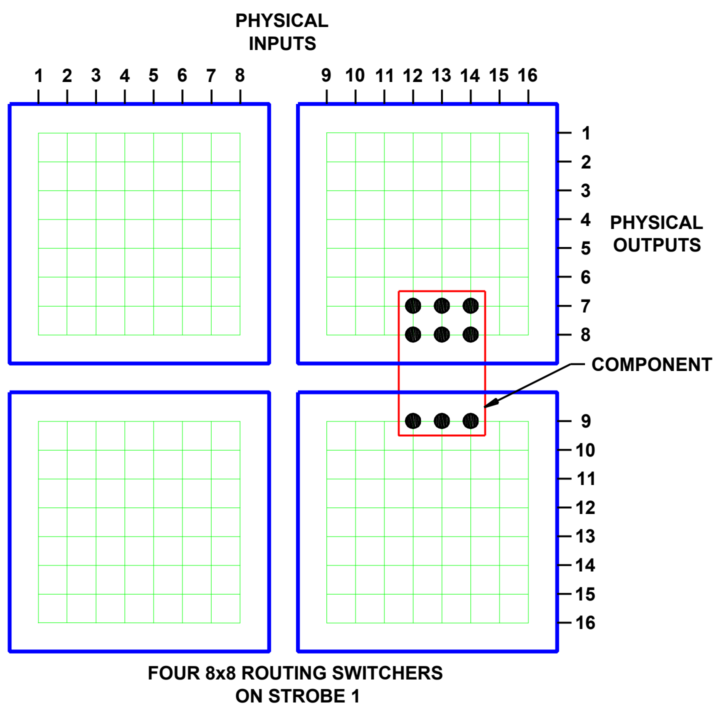

Figure 21. Input Offset, Multiple Routing Switchers

Level

A group of related components that are switched together.

A level is sometimes referred to as a level of control and is the basic granularity seen by a user. The components that comprise a level will always be switched together except when performing diagnostic operations.

Figure 22 shows a 2x2 RGB video level made up of three components, “RED”, “GRN”, and “BLU”, all of which are switched together at the same time.

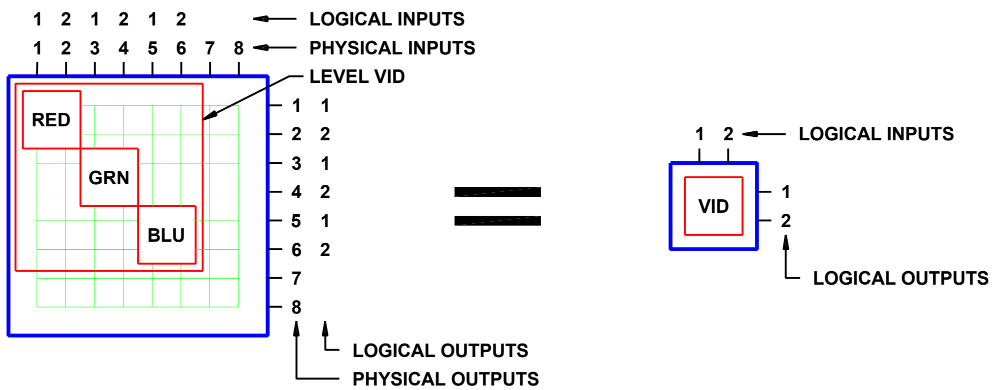

Figure 22. Level

As a general rule, users control the switching of levels, but component switching is handled automatically by the switching system. As shown in Figure 22, a user can specify a single logical switch, such as VID Input 1 to VID Output 2. This would result in the control system software taking three physical switches by activating crosspoints (1,2), (3,4), and (5,6).

Level names are one to eight characters in length and are constructed using uppercase letters, numbers, and spaces. The first character must be a letter.

Level Order

A property assigned to a level that controls the order of display when levels are displayed on a control panel, or addressed in CPU link protocols.

Levels of Control List

A named list of the levels a specific control panel is authorized to control.

Multiple panels may share a levels of control list.

Levels of control list names are one to eight characters in length and are constructed using uppercase letters, numbers, and spaces. The first character must be a letter.

Local Modem

A modem connected to a PC running control system software such as Win3500Plus.

See also: Remote Modem.

Lock

A property placed on a destination that prevents all panels and ports from taking a switch on that destination, including the panel or port that locked it.

Locks may be cleared by any panel or port that has the same requester code and lock priority as the panel that locked the destination, that has a higher lock priority, or that has a lock priority of 0 (zero).

See also: Lock Priority, Protect.

Lock Priority

A property of panels and ports that allows them to be grouped with other panels or ports for the purpose of establishing lock and protect authority.

The lower the lock priority number, the higher the priority. Panel lock priorities not explicitly defined automatically default to “0” which gives absolute authority to clear any lock or protect on the system.

See also: Lock, Protect.

Logical Input

One or more physical inputs that are switched together as a group.

Logical inputs and outputs are switched level-by-level. Since each level may have more than one component, switching a single logical input or output may involve switching more than one physical input or output.

For example, a RGB input signal represents three physical inputs because it is connected to three input connectors on the routing switcher. However, since all three components (R, G, and B) are switched together as a level, it is a single logical input.

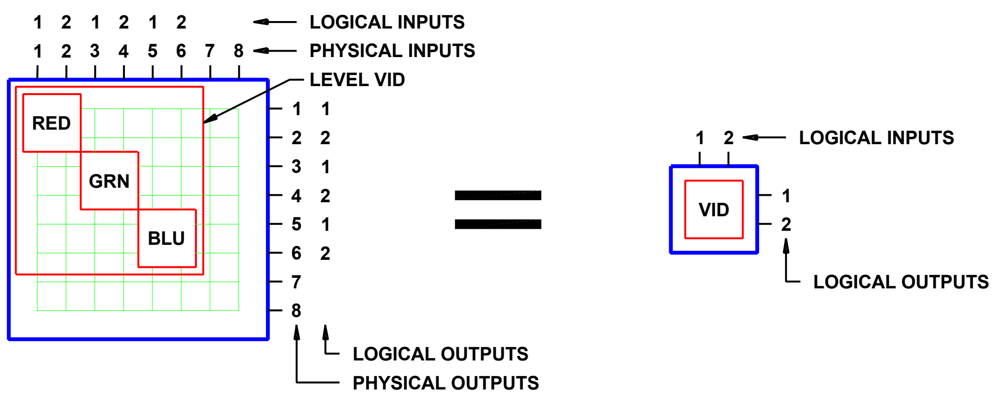

Figure 23. Logical Input

Logical inputs are numbered sequentially, level-by-level, beginning with 1. Input numbers are assigned in the same order as the physical inputs to the component(s) of the level. Since a routing switcher may be configured to have more than one level, it may have more than one logical input designated as number 1. However, within each level, every logical input will have a unique number. Logical outputs are numbered in the same manner. Logical input/output numbering is handled automatically by the control system software as components are configured.

See also: Physical Input.

Logical Output

See: Logical Input.

Logical Switch

The control system software command that switches a logical input to a logical output.

See also: Physical Switch.

Matrix Breakup

The division of a single physical matrix into one or more components.

Matrix breakup allows complex signal types to reside within a single physical matrix. For example, a video matrix is often broken into R, G, and B components.

Matrix breakup is a software function handled by the control system software.

Matrix Space

A three-dimensional mathematical model of the crosspoints in a switching system.

The coordinates of crosspoints in matrix space are given in the form (input,output) on strobe x.

When a switching system is physically made up of only one routing switcher, the crosspoint coordinates are the same as the input and output connector numbers, and the resulting matrix space has only two dimensions. For example, the coordinates of the crosspoint indicated in Figure 24 is (4,2) on strobe 1.

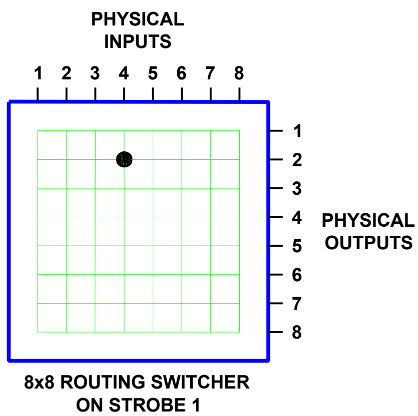

Figure 24. Matrix Space, One Routing Switcher on One Strobe

Two-dimensional matrix space can also be composed of the crosspoints located in multiple routing switchers. The input and output connectors on the additional routing switchers are renumbered as required to ensure that each crosspoint can be identified by a unique (input,output) coordinate. When switching systems are constructed in this manner, matrix space size is no longer constrained by routing switcher size. The switching system shown in Figure 25 consists of four 8x8 routing switchers assigned to the same strobe. The coordinates of the indicated crosspoint are (12,14) on strobe 1.

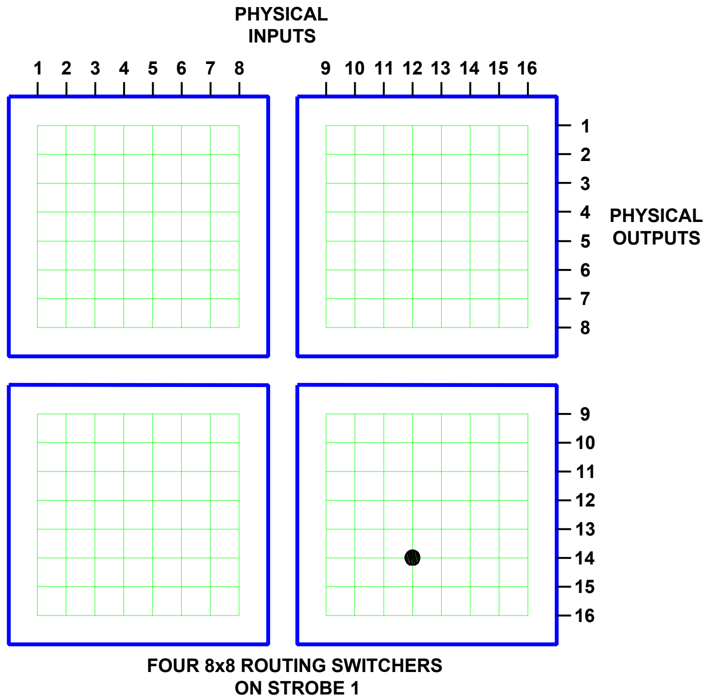

Figure 25. Matrix Space, Four Routing Switchers on One Strobe

Strobe numbers are used to introduce a third dimension into matrix space. Every routing switcher in a switching system is assigned to a strobe. In systems using more than one strobe (and, therefore having three-dimensional matrix space), crosspoint coordinates are given in the form (input,output) on strobe x. In Figure 26, the coordinates of the indicated crosspoint in the left routing switcher are (4,2) on strobe 1. The coordinates of the crosspoint on the right are (4,2) on strobe 2.

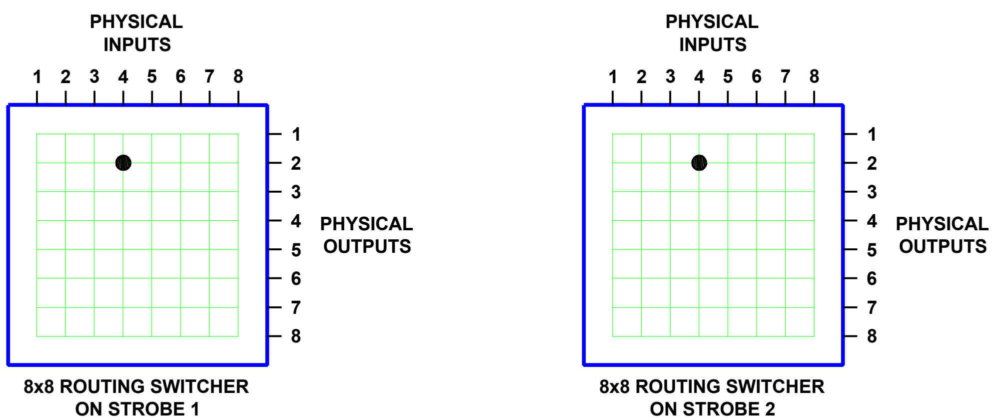

Figure 26. Matrix Space, Two Routing Switchers on Two Strobes

NTSC

National Television Standards Committee. The NTSC was responsible for setting television and video standards in the United States. The NTSC standard for television defines a composite video signal with a refresh rate of 60 half-frames (interlaced) per second. Each frame contains 525 lines and can contain 16 million different colors.

See also: PAL, SECAM.

Output Offset

In matrix space, the amount by which the origin of a component on strobe x, is offset from the origin of strobe x, measured along the output axis.

The coordinates of crosspoints in matrix space are determined by the strobe they reside on, and their input and output numbers. They are given in the form (input,output) on strobe x. The origin of a component (a matrix of crosspoints) is designated by the point that falls nearest the origin of its Strobe (1,1). In Figure 27 below, the 3x4 Component bounded by coordinates (3,2), (5,2), (5,5), and (3,5) has its origin at (3,2).

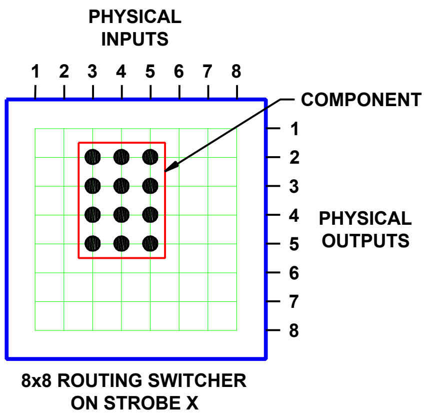

Figure 27. Output Offset, Single Routing Switcher

Output offset is the amount by which the origin of a component is offset from the origin of its strobe, measured along the output axis. A component whose origin coincides with that of its strobe (1,1) will have an output offset of 0. The component shown in Figure 27 has an output offset of 1.

When multiple routing switchers are assigned to the same strobe, the input and output connectors are renumbered to provide a unique coordinate for each crosspoint. Crosspoint coordinates are then determined in the same manner as above. The component shown in Figure 28 has its origin at (12,7) and an output offset of 6.

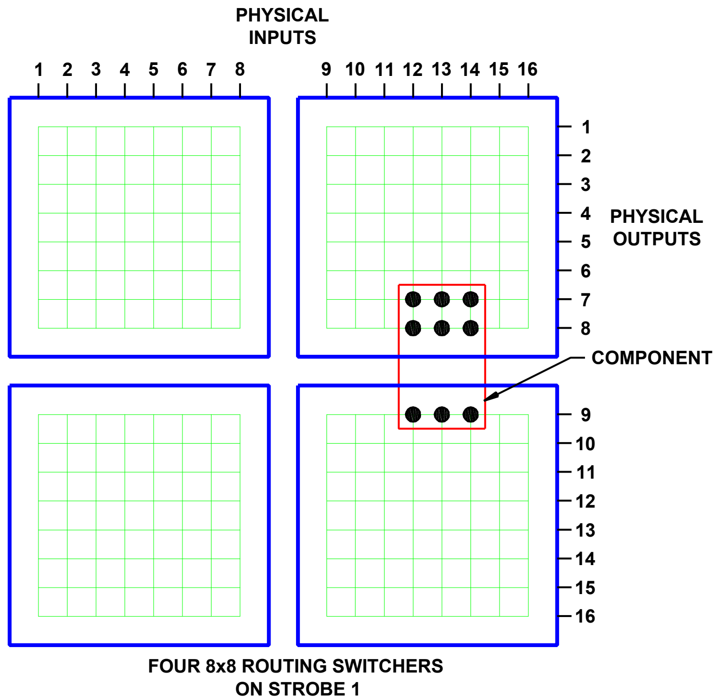

Figure 28. Output Offset, Multiple Routing Switchers

PAL

Phase Alternating Line, the dominant television standard in Europe. The United States uses a different standard, NTSC. Whereas NTSC delivers 525 lines of resolution at 60 half-frames per second, PAL delivers 625 lines at 50 half-frames per second.

See also: NTSC, SECAM.

Panel

A user interface, usually mounted in a standard 19” rack, containing alphanumeric displays, push buttons, LEDs, etc. Sometimes referred to as a control panel.

A panel is used to control a switching system by taking switches, obtaining status, etc.

Panel names are one to eight characters in length and are constructed using uppercase letters, numbers, and spaces. The first character must be a letter.

Panel Address

A unique identifier, set by DIP switch on every panel, that allows the system controller to differentiate between panels.

Panel Name

An optional identifier for a control panel.

Individual panels are identified by panel address. Because of this, a panel name is not required when configuring a panel.

Panel names are one to eight characters in length and are constructed using uppercase letters, numbers, and spaces. The first character must be a letter.

Password

Each User Account and Configuration may be protected with an eight-character, upper case, alphanumeric password.

PC

Personal computer. Typically used to run control system software such as Win3500Plus.

PESA control system software is designed to operate on any IBM® compatible personal computer (AT® or later) with a Microsoft Windows™ operating system (3.1, 95, 98, or NT).

Physical Input

The electrical signal coming from a device connected to an input connector on a routing switcher.

Physical inputs and outputs are the electrical signals passing through the input and output connectors of a routing switcher. Each connector represents one input or output.

For example, a RGB input signal would represent three physical inputs since it would be connected to three input connectors on the routing switcher.

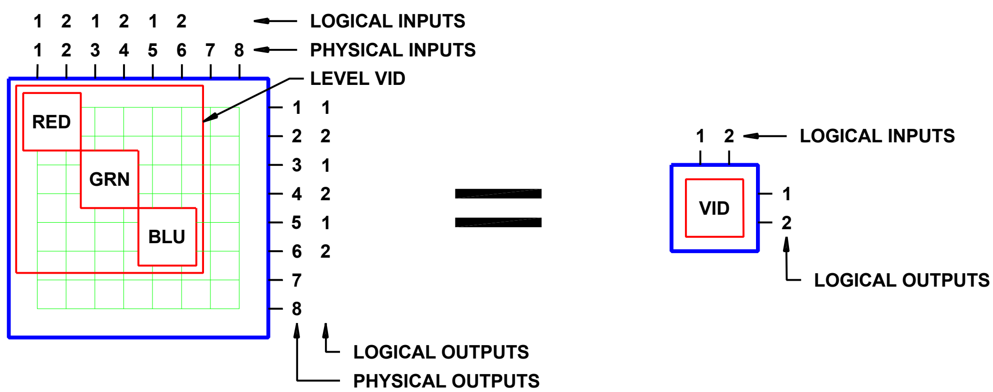

Figure 29. Physical Input

Physical inputs are numbered sequentially beginning with 1, and have the same number as the corresponding input connector on the routing switcher. This includes connectors that have been renumbered with input offset when multiple routing switchers have a common strobe. Physical outputs are numbered in the same manner.

See also: Logical Input.

Physical Switch

The hardware that switches a physical input to a physical output. Sometimes referred to as a crosspoint.

See also: Logical Switch, Crosspoint.

Physical Output

See: Physical Input.

Port

A serial communication bus interface connector on a system controller.

Port names are one to eight characters in length and are constructed using uppercase letters, numbers, and spaces. The first character must be a letter. Port names are optional because a port is identified by its address.

PRC Device

A device designed to be compatible with the PESA Routing Control protocol (PRC).

Ocelot, Cougar, Jaguar, Tiger, and Cheetah routing switchers are PRC devices.

See also: RM5 Device.

Protect

A property placed on a destination that prevents all panels and ports from taking a switch on that destination, unless taken from a panel or port that has the same requester code as the panel or port that protected it.

Destination protection may be cleared by any panel or port that has the same requester code and lock priority as the panel or port that protected the destination, that has a higher lock priority, or that has a lock priority of 0 (zero).

See also: Lock, Lock Priority, Requester Code.

Protect Priority

See: Lock Priority.

Protocol

The format to be used when sending data between two devices.

Protocol names are one to eight characters in length and are constructed using uppercase letters, numbers, and spaces. The first character must be a letter.

Readback

Information received from a routing switcher reporting which physical input is currently switched to a specified physical output.

To ensure that the configuration in the controller, and the actual state of the physical switches in a routing switcher agree, the routing switcher can be made to read back the status of each physical output. Where the routing switcher reports a different physical input from that expected by the controller, a readback error is declared.

Readback Error

See Readback.

Reentry

An entity that exists as both a source and destination at the same time, whose function is to facilitate switching a single source to multiple destinations, with a single logical switch.

Reentries are virtual entities that exist in the control software only. Their creation and use does not require any physical modification to the switching system hardware.

Example: Assume the existence of source SRC1 and destinations DST1, DST2, and DST3. Reentry REENT1 is created and switched to the three destinations. With a single logical switch, SRC1 can now be switched to REENT1 and the signal will arrive at all three destinations at the same time.

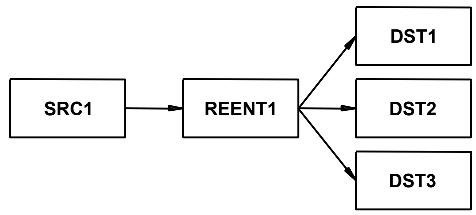

Figure 30. Reentry

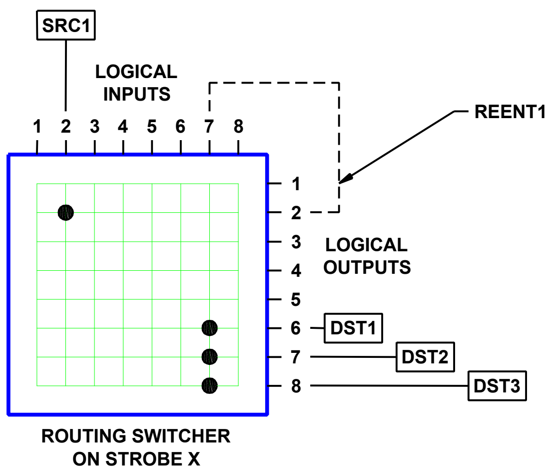

Figure 31. Reentry

A reentry is assigned both a source number and a destination number.

Reentry names may be created by using categories, and:

1. Shall be created using only the following characters:
   - Upper case letters A through Z
   - Lower case letters A through Z if enabled in the control system software
   - Numbers 0 through 9
   - The following special characters: space (   ), hyphen-minus (-), exclamation mark (!), ampersand (&), plus sign (+), equals sign (=), commercial at (@), and low line (_)
2. Shall contain a minimum of one, and a maximum of eight characters.
3. Shall not begin with a space. However, they may end with a space, have embedded spaces, and consist of a single space.
4. Shall be unique in the universe of source, destination, and reentry names.

See also: Category.

Remote Modem

An external modem connected to a system controller.

The remote modem must be an external type capable of being configured to automatically answer incoming calls. Because the system controller does not output any modem configuration information, the remote modem must be completely transparent to the controller. The only modems tested by PESA for use as remote modems are the Practical Peripherals PM288MT II and the U.S. Robotics Sportster 28.8 using the following initialization strings:

PM288MT II: AT S0=2 Q1 X4 &C1 &D0 &K3 &S1 &W0 &Y0

Sportster 28.8: AT &F1 S0=2 &H1 &R2 &I0 L2 Q1 &C1 &D0 Y0 &W0

For more information about these modems and their initialization strings, see the Practical Peripherals web site at http://www.practical.com/ or the U.S. Robotics web site at http://www.usr.com/. Before using any other type of remote modem, please consult with PESA Customer Service.

See also: Local Modem.

Requester Code

A property of panels and ports that allows them to be grouped with other panels or ports for the purpose of establishing lock and protect authority.

Panel requester codes not explicitly defined automatically default to the panel address.

See also Lock, Lock Priority, Protect.

RM5 Device

A device designed to be compatible with the System 5 (RM5) control protocol.

The RM4000, RM5000, and Lynx routing switcher families are RM5 devices.

See also: PRC Device.

Salvo

A group of predefined logical switches taken in the same vertical interval.

Example: Assume the existence of sources CART1 and CART2; and destinations MON1, VTR1, and VTR2, defined on levels AUD and VID.

By pressing a single control panel key, the user desires to take the following switches: audio and video from CART1 to MON1; audio from CART2 and video from CART1 to VTR1; and audio and video from CART2 to VTR2.

Table 12. Salvo

Salvo Entry	Destination	Source	
		Level: AUD	Level: VID
1	MON1	CART1	CART1
2	VTR1	CART2	CART1
3	VTR2	CART2	CART2

Salvo SAL1 is created and will consist of three salvo entries (one salvo entry per destination in the salvo). Each salvo entry is then configured to switch the selected sources on the appropriate levels. Once salvo SAL1 is assigned to a salvo key on the control panel, the user will be able to take all the specified switches with the press of a single key.

All switches in a salvo are taken within the same vertical interval.

Salvo names are one to eight characters in length and are constructed using uppercase letters, numbers, and spaces. The first character must be a letter.

Salvo Entry

One or more logical switches assigned to a specific destination that is part of a salvo.

Salvo entry names are the same as the destination they are associated with.

Salvo Include List

A named list of the salvos a specific control panel is authorized to control.

A salvo include list may be shared by multiple panels.

Salvo include list names are one to eight characters in length and are constructed using uppercase letters, numbers, and spaces. The first character must be a letter.

Salvo Key

A user configurable control panel key, whose assigned function is used when the panel is in salvo select mode.

Many control panels have user configurable keys. Each key can be assigned two functions, one as a data key and one as a salvo key. When the keys are pressed, the data key functions are used except when the panel is in salvo mode.

When a panel is in salvo select mode, a salvo will be executed immediately when the salvo key is pressed.

Salvo Key List

A named list of the functions assigned to each salvo key on a panel.

Multiple panels may share a salvo key list as long as they are the same type of panel. Different panel types may not use the same salvo key list.

Salvo key list names are one to eight characters in length and are constructed using uppercase letters, numbers, and spaces. The first character must be a letter.

SECAM

Sequential Couleur Avec Memoire, the line sequential color system used in France, Russia, Eastern Europe, and some Middle Eastern countries. Like PAL, SECAM is based on a 50 Hz power system, displaying interlaced lines at 50 fields per second. The color information is transmitted sequentially (R-Y followed by B-Y, etc.) for each line and conveyed by a frequency modulated sub carrier that avoids the distortion arising during NTSC transmission.

See also: NTSC, SECAM.

Serial Port

See: Port.

Shared Input

A logical input that is used by more than one source.

Note that shared outputs are not permitted.

See also: Source Block.

SMPTE

Society of Motion Picture and Television Engineers (www.smpte.org). A professional organization that recommends standards for the television and film industries.

Soft Destination Key

See: Soft Key.

Soft Key

A special type of data key whose assigned function may be changed locally by a panel user.

Control system software is used to designate a data key as either a soft source key or a soft destination key. The assignment of a specific source or destination to the soft key may then be made with either the control system software, or locally at the panel by using Store Mode.

Soft Source Key

See: Soft Key.

Source

One or more logical inputs (limited to one per level), on one or more levels, that are switched together as a group.

Destination names may be created by using categories, and:

1. Shall be created using only the following characters:
    - Upper case letters A through Z
    - Lower case letters A through Z if enabled in the control system software
    - Numbers 0 through 9
    - The following special characters: space (   ), hyphen-minus (-), exclamation mark (!), ampersand (&), plus sign (+), equals sign (=), commercial at (@), and low line (_)
2. Shall contain a minimum of one, and a maximum of eight characters.
3. Shall not begin with a space. However, they may end with a space, have embedded spaces, and consist of a single space.
4. Shall be unique in the universe of source and reentry names.

See also: Category.

Source Block

A means of ensuring that a particular source will not be switched to a specific.

When configuring a switching system, it may be desirable to use source blocking to restrict the switching of certain logical inputs. This may be done while configuring either sources or destinations.

Since a blocked source may contain a logical input that is shared (used by more than one source), care should be taken to ensure that all sources using the logical input are blocked from the destination to be protected.

Source Group

See: Source.

Source Include List

A named list of the sources a specific control panel is authorized to control.

A source include list may be shared by multiple panels.

Source include list names are one to eight characters in length and are constructed using uppercase letters, numbers, and spaces. The first character must be a letter.

Source Number

A number assigned to each source by the controller and used by CPU Protocol 1.

Source numbers are also assigned to reentries.

Status

A list of all sources on all levels currently switched to a selected destination.

Sometimes also used to refer to the operational state of the control system (lock status, switch status, and panel status).

Status Level

The default level to be used when displaying the status of a destination receiving signals from multiple sources, on a panel in all levels mode (ALL LEVS).

One function of the LCD display on a panel is to show which source is currently switched to a selected destination. This is known as destination status. Although more than one source can be switched to a single destination (limited to one source per level), the status display can only show one source at a time. When the panel is in all levels mode (ALL LEVS), Status Level is used to designate a default level to be used when displaying status. Only the source on this default level will be displayed. On panels that do not have LCD displays, this is indicated by a continuous, bright, pushbutton light.

If one or more other sources are also switched to the destination (on other levels), an octothorp (the "#" symbol) will be appended to the source name. The other source names can be viewed by toggling each level key in turn to show, level-by-level, which source has been switched to the destination. On panels that do not have LCD displays, this is indicated by an alternating bright/dim push button light.

Status Method

One of two possible ways to display status when a panel is in all levels (ALL LEVS) mode and the destination is not defined on the Status Level.

When a panel is in all levels mode (ALL LEVS), the status shown will be the source on the Status Level assigned to that panel. If the destination is not defined on the Status Level, Status Method is used to control the resulting display:

If DEF (Default Method) is selected, NO XXXXX will be displayed where XXXXX is the Status Level assigned to the panel.

If GRP (Group Method) is selected, the controller will examine every level sequentially, starting with the level designated as Level Order 1. The source switched on the first level found where the destination is defined, will be displayed as the destination status.

Stop Bit

In asynchronous communication, a bit that indicates that a byte of data has just been transmitted.

Every byte of data is preceded by a start bit and followed by a stop bit.

Strobe

The third dimension of matrix space.

Every routing switcher in a switching system is assigned a strobe. This is usually accomplished by setting a DIP switch on the back of the routing switcher. Strobes do not have to be unique and, in larger systems, each strobe might be associated with several routing switchers.

In many switching systems, strobes are used to group levels of the same type together. For example, video may be on Strobe 1, audio on Strobe 2, etc.

Sync Reference

A vertical sync signal used to ensure that switching occurs in the vertical interval of a video signal.

Sync Reference names are one to eight characters in length and are constructed using uppercase letters, numbers, and spaces. The first character must be a letter.

See also: Vertical Sync Signal.

System 5 Device

See: RM5 Device.

TIA

Telecommunications Industry Association (www.tiaonline.org).

Tieline

A special type of logical switch that allows a logical input on one level to be switched to a logical output on a different level.

Example 1 - Switch a signal from analog camera ANCAM into an analog-to-digital converter (A/D) and then into digital video tape recorder DIGVTR: (Figure 32) Connect a cable between the appropriate output connector of the analog routing switcher and the input of the A/D, and a cable between the output of the A/D and the appropriate input connector on the digital routing switcher. Configure levels ANAVID and DIGVID and tieline TLINE1 to connect them. Configure destination DIGVTR on level DIGVID. Configure source ANCAM on level ANAVID to use tieline TLINE1. ANCAM may now be switched to DIGVTR with a single logical switch even though they are on different levels.

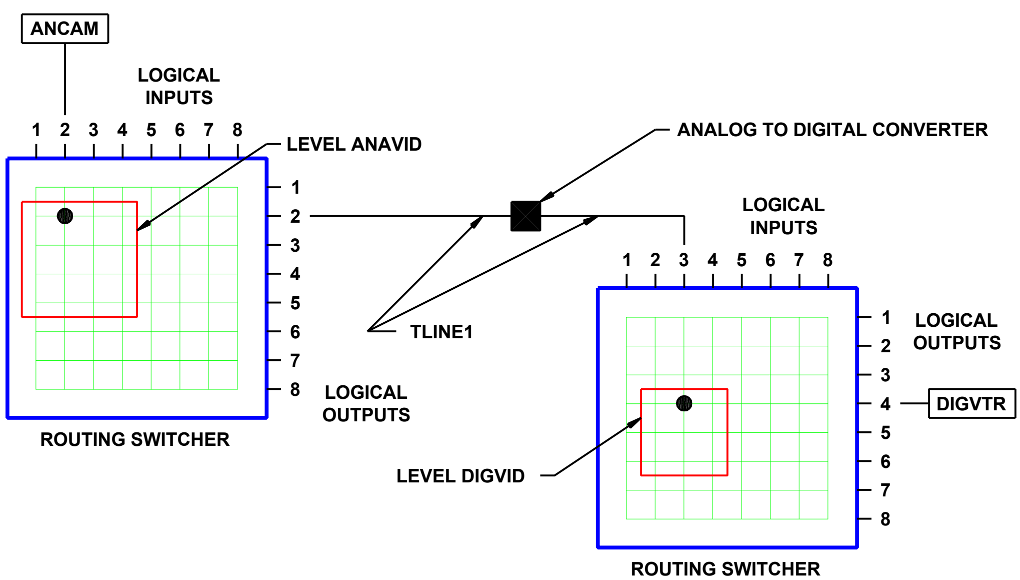

Figure 32. Tieline

Example 2 - Switch a signal from camera CAM1 (connected to a routing switcher in Room A) to video tape recorder VTR1 (connected to a routing switcher in Room B): (Figure 33) Connect a cable between the appropriate output connector of the routing switcher in Room A and the appropriate input connector on the routing switcher in Room B. Create levels VIDA and VIDB and configure a tieline connecting the output of VIDA to the input of VIDB. Define source CAM1 on level VIDA and destination VTR1 on level VIDB. CAM1 may now be switched to VTR1 with a single logical switch even though they (and their respective routing switchers) are located in two separate rooms.

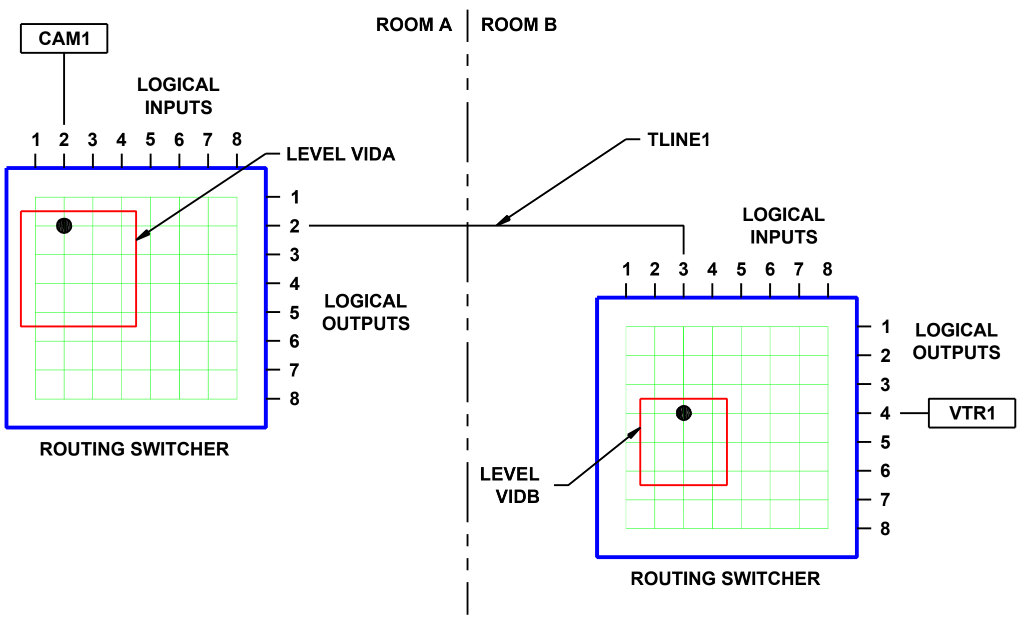

Figure 33. Tieline

Tieline names are one to eight characters in length and are constructed using uppercase letters, numbers, and spaces. The first character must be a letter.

User Account

A set of privileges and an optional user password saved as a user name.

User accounts provide a means of restricting access to certain system functions on a user-by-user basis.

User Name

An eight-character string consisting of upper case letters, numbers, spaces, and some symbols:

Permitted: ! @ # $ % ^ & * _ + - = [ ] \ : " ; ' < > . ? /

Forbidden: { } | , ( )

User Password

An eight-character string consisting of letters, numbers, and spaces. A User Password may begin with either a number or a letter. Leading spaces are discarded.

Vertical Interval

The portion of the video signal in which image information is absent to allow for the video device to prepare for the next frame of information.

Vertical Sync Signal

A short pulse generated at the beginning of each video timing frame that tells the video monitor when to start a new video timing field. For switching purposes, the vertical sync signal may be derived from house sync.

See also: Sync Reference.

Vertical Trigger

See: Vertical Sync Signal.

Video Timing Field

A package of information that contains information required to complete a full scan across a video monitor. There are two types of video fields denoted as odd and even.

Video Timing Frame

A package of information that contains all the information required to draw an image on a video device. Generally considered with respect to NTSC and PAL signals where the information is transmitted over a fixed time frame. A frame consists of two video timing fields denoted odd and even.

Working Directory

The location on the PC hard drive where control system software such as Win3500Plus is installed.

If the default settings of the Win3500Plus installation program were used, this will be c:\win3500p for 16-bit versions of the Microsoft Windows OS, and c:\program files\win3500p for 32-bit versions. Configurations may not be saved in the working directory or any subdirectory of the working directory.

Revision History

Rev.	Date	Description	By
A	05-07-01	Initial release per ECO-CE00183.	J. Doe

PESA

Switching Systems