

RJ SERIES SWITCHING SYSTEMS

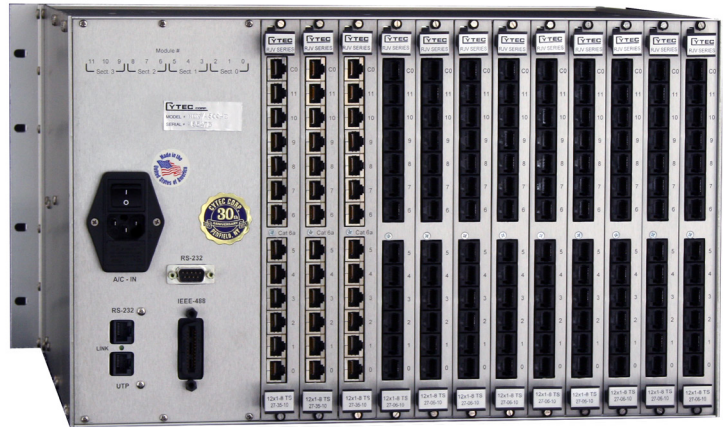
DSL • 10BaseT / 100BaseT • Gig-E (1000BaseT) • VOIP • POE • Telco

FOR COMMUNICATIONS AND AUTOMATED TEST

The RJ Series of Computer Controlled Switching Systems are engineered for physical layer switching of both analog and digital communication applications using RJ45 connectors switching up to 8 wires. Switch point Status Feedback is standard, and LED switch point Status Display is included with some models. Control options include: Ethernet LAN / TCP, IEEE488 Bus (GPIB), RS232, and Universal Serial Bus (USB). Manual Controls are also available.

Applications:

- CAT5E, CAT6 and CAT6A Cable testing
- DSL / Network Equipment Automated Test
- DSL cable testing of Insertion Loss / Isolation
- DSL / LAN Lab Automation
- Automated Ethernet Network Monitoring
- Programmable Patch Panels
- Physical Layer Passive Switches
- Network Redundancy or failsafe switches
- Two to Eight wire communication switches
- Physical layer switching of POE.



RJV/144-MF with LAN, GPIB and RS232 Control



RJM/16x8-MF Matrix Switch

Features:

- Configure for your needs
- Simple ASCII Text string commands
- Full Status Feedback
- Physical Layer switch acts just like a cable
- Control remotely from anywhere
- Program examples in almost any language
- 5 Year warranty
- Lifetime tech support at no charge
- Field Upgradable

This Bulletin Includes:

RJV Series -- Modular system for 1xN, 2xN or 4xN configurations.

RJM Series -- 2 RU Matrix as 16x8, 32x4, dual 16x4 or dual 8x8 configurations.

RJE Series -- Modular system for 1x4 and 2x2 modules.

RJG Series -- High performance DSL and LAN switches, custom configurations.

RJF Series -- Passive fiber optic switches for 1x3 and 2x2 configurations.

WARRANTY

All CYTEC products are warranted against defects in workmanship and materials for a period of five years.

RJV SERIES - Matrices & Multiplexers (up to 144 channels)

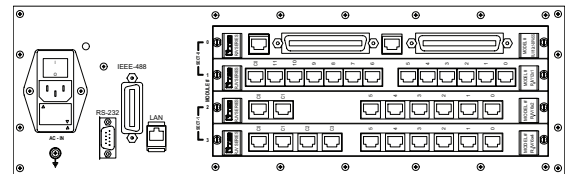
The RJV Series are high performance, bidirectional, passive Multiplexers or Matrices designed for demanding communication applications such as DSL and Ethernet Network Switching. These units are built with high sensitivity Type A Armature Relays to ensure low signal-to-signal cross-talk. Exceptional longitudinal balance and low insertion losses are achieved at high data rates. Connectors are CAT5E or CAT6A RJ45. A modularized design is used, and each Mainframe is built with integrated power supplies, a Control Module and a motherboard that holds the RJV Switch Modules. This results in a great deal of configuration flexibility.

RJV/48 Mainframe

This chassis is 5.25" high and accepts up to four RJV Series Switch Modules. The modules can be used individually, or bussed together in several different configurations (for example, as a 48x1 Mux). **Bandpass** is 100 MHz at -2dB and Near End Crosstalk between wire pairs (**NEXT**) is -42dB at 80 MHz, which exceeds 100Base-TX network specifications.



RJV/48 Mainframe - Front View

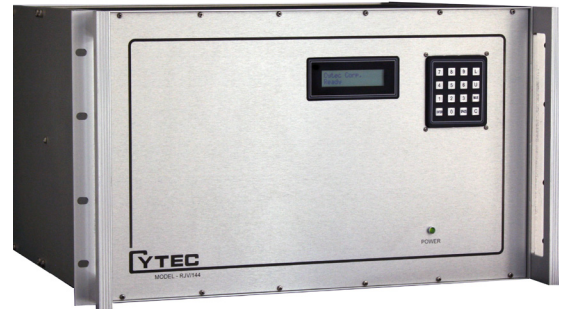


RJV/48 Mainframe - Rear View

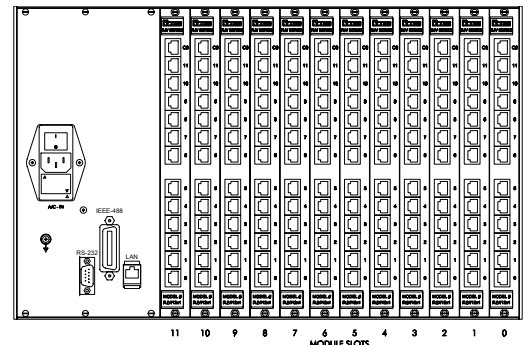
Dimensions:	19" rack mount (483 mm) 16" depth (406 mm) 5.25" (3RU) height (133 mm)
Weight:	15 lbs. (6.8 kg) max.
AC Power:	50 watts max. (110/220 VAC selectable)

RJV/144 Mainframe

This is a 19" rack mounting chassis, 10.5" high and 16" deep, designed to hold up to 12 RJV Series Switch Modules. Modules can be used individually or bussed together in several configurations. In all configurations, 100Base-TX **Bandpass** and **NEXT** specifications are met.



RJV/144 Mainframe - Front View



RJV/144 Mainframe - Rear View

Dimensions:	19" rack mount (483 mm) 16" depth (406 mm) 10.5" (6RU) height (267 mm)
Weight:	25 lbs. (11.4 kg) max.
AC Power:	75 watts max. (110/220 VAC selectable)

RJV/144-E Expansion Chassis

This is the same as the mainframe above but is powered and controlled via a MESA Control Chassis as detailed in the **MESA** Bulletin.

When used individually, RJV/12x1-8 and RJV/4(1x2)-8 Switch Modules will handle gigabit Ethernet.

FOR TECHNICAL ASSISTANCE, PLEASE CONTACT CYTEC AT 800-346-3117 OR VISIT OUR WEBSITE AT cytec-ate.com

RJV Switch Modules

Most RJV Switch Modules use high sensitivity, high isolation Type A Armature Relays and RJ45 connectors. Up to 8 wires are switched as the following pairs:

Pins 1 + 2, Pins 3 + 6, Pins 4 + 5 and Pins 7 + 8. This is based on the EIA / TIA 568 Pin-out for RJ45 connectors. Most connectors are CAT5E compliant but some are available as CAT6A compliant.

RJV/12x1-X-TS Switch Module

Each module supplies a 12x1 Multiplexer as shown in Fig. 1. where X = 2, 4, or 8 wires. Four modules can be placed in the RJV/48 chassis to supply four (12x1), two (24x1), or one (48x1) Mux. In the RJV/144 chassis, one (144x1), two (72x1), four (36x1), or twelve (12x1) Muxes can be configured using 12 switch modules. Bandpass of the system is dependent on the number of modules interconnected. Call or e-mail for configuration specifications.

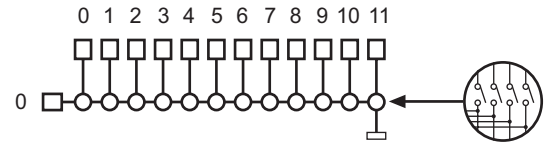
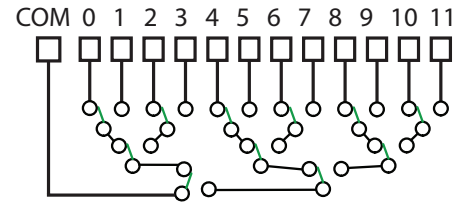


Fig. 1 Backplane Connection
RJV/12x1-TX

RJV/12x1-X-6A Switch Module

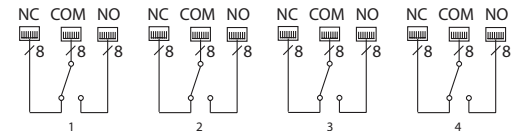
Each module supplies a 12x1 Multiplexer as shown in Fig. 2. where X = 2, 4, or 8 wires. This module does not connect to the backplane and has shielded Cat6A connectors to comply with Gigabit or even 10G Ethernet. The size of the mux is expanded by routing multiple modules in series. Call or e-mail for configuration specifications.



RJV/12x1-X-6A Mux Fig. 2

RJV/4(1x2)-4, -8 Switch Module

Each module furnishes four individual 1x2 or "A/B" switches as shown in Fig. 3. Four and Eight wire versions are available. Form C relays are used, meaning each of the four switches has a Normally Closed position. In an RJV/48, four modules will furnish 16 A/B Switches, and in the RJV/144, 12 modules will give 48 switches. These modules can be used to sub-multiplex other modules, or for redundancy and failsafe switching.



RJV/4(1x2) Fig. 3

RJV/4(1x2)-4, -8 Latching Switch Module

Much like the RJV/4(1x2) Modules shown above but with latching switches. Latching modules maintain their current switched configuration when power is removed.

RJV/6x2-4 Switch Module

These modules switch four poles in a 6x2 Matrix configuration as shown in Fig. 4. They can be assembled in the RJV/48 as one (24x2), two (12x2) or four (6x2) Matrices. In the RJV/144, one (72x2), two (36x2), four (18x2) or twelve (6x2) Matrices can be provided. Modules use pins 1-2 and 3-6 to comply with 10/100BaseT ethernet standard.

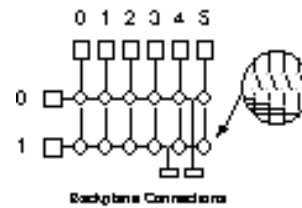


Fig. 4 Backplane Connections
RJV/6x2-4

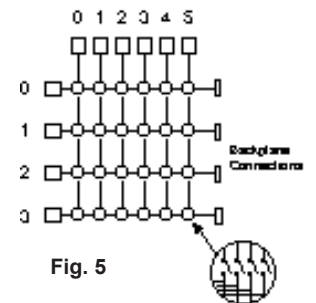


Fig. 5 Backplane Connections
RJV/6x4-4

RJV/6x4-4 Switch Module

These also switch four poles but are configured as a 6x4 Matrix as shown in Fig. 5. They can be assembled in the RJV/48 to create one (24x4), two (12x4) or four (6x4) Matrices, and in the RJV/144 to make one (72x4), two (36x4), four (18x4) or twelve (6x4) Matrices. Modules use pins 1-2 and 3-6 to comply with 10/100BaseT ethernet standard

Switch Specifications

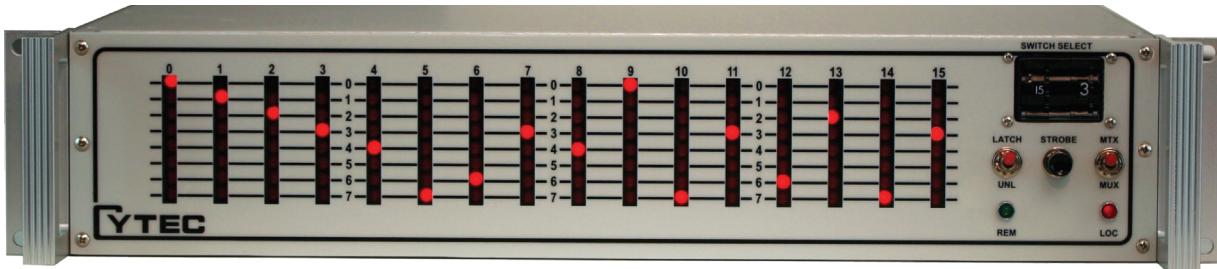
SPECIFICATION	TYPE A
Contact Rating VA	30
Switching Voltage DC	110V
Switching Current DC	1.0 A
Carrying Current DC	2.0A
Breakdown Voltage DC	750V
Operate Time msec	3

The RJV Switch Modules can be assembled in many different ways to provide a number of additional configurations. Contact our Applications Engineers to discuss your specific needs.

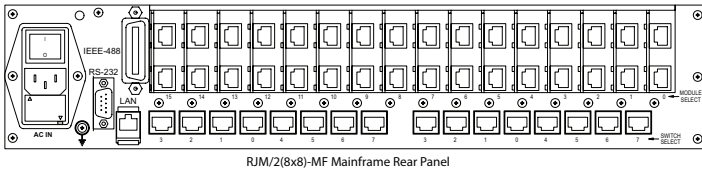
RJM SERIES - MODULAR MATRICES (2, 4 or 8 wire)

The RJM Series are physical layer matrix switches which are completely, bidirectional, passive and non-blocking which means they act exactly like a piece of cable. They have RJ45 connectors and can switch 2, 4 or 8 wires using the standard ethernet LAN pinout pairs. Control via LAN, GPIB, RS232 or USB. Manual Control is optional. LED display of switch points and status feedback.

- Commonly used for Telco, DSL, ADSL, ADSL+, 10/100/1000BaseT Ethernet.
- Can hot switch POE. Does not modify signal so perfect for automated test applications.
- Use as Automated Patch Panels, Cable test applications, switch any 8 wire signal on RJ45's.



RJM Mainframe Front Panel with Manual Control option



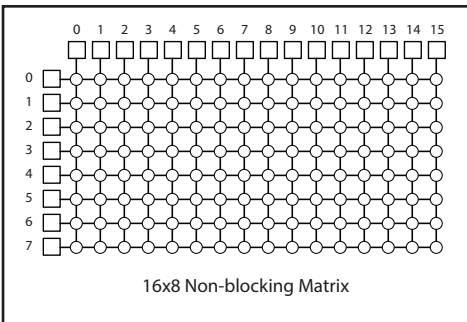
RJM/2(8x8)-MF Mainframe Rear Panel

Dimensions: 19" rack mount (483 mm)
16" depth (406 mm)
3.5" (2RU) height (89 mm)

Weight: 15 lbs. (6.8 kg) max.

AC Power: 50 watts max. (110/220 VAC selectable)

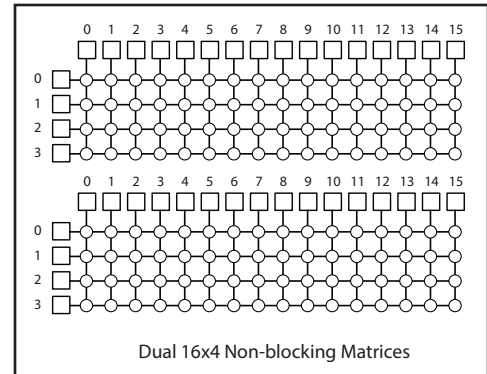
Possible Configurations in a single chassis



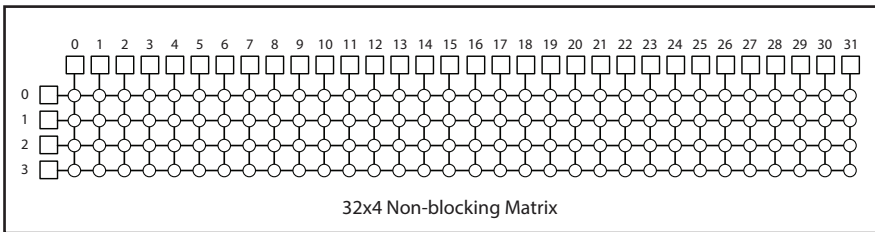
16x8 Non-blocking Matrix

16x8, 32x4 and dual 16x4 configurations work for 10/100BaseT, Versions of DSL up to ADSL2, RS422, RS232, and other 2 to 8 wire signals at data rates up to 25 Mbps.

Systems are modular which means that you can buy the chassis as a 16x8 configuration but only install two modules at the beginning for a 2x8, and then buy additional modules later to expand up to a 16x8 configuration.

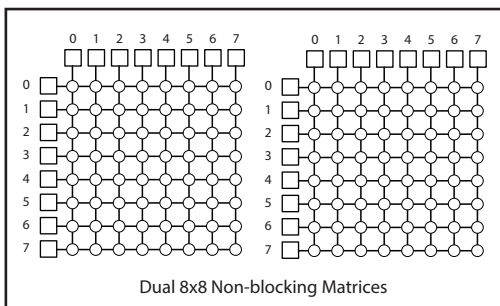


Dual 16x4 Non-blocking Matrices



32x4 Non-blocking Matrix

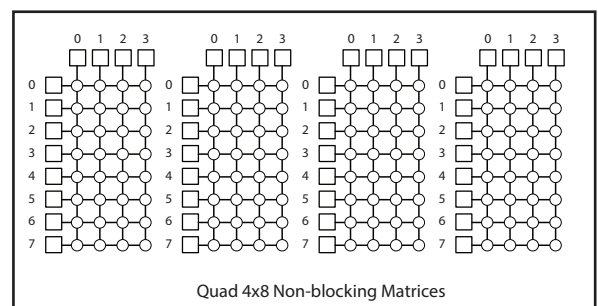
Call 585.381.4740 or
e-mail: sales@cytec-ate.com
for configuration assistance!



Dual 8x8 Non-blocking Matrices

Dual 8x8 and Quad 8x4 configurations work for signals up to 1000BaseT, (Gig-E) ADSL2+, VDSL and other 2 to 8 wire signals at data rates up to 225 Mbps.

Larger configurations can be achieved by connecting smaller matrices together using 2x1 or 4x1 switches (see page X).



Quad 4x8 Non-blocking Matrices

RJM/128 MAINFRAMES

Order the Mainframe according to the needed configuration by using the following part numbers:

- RJM/16x8-MF for a 16x8 matrix configuration.
- RJM/32x4-MF for a 32x4 matrix configuration.
- RJM/2(16x4)-MF for a dual 16x4 matrix configuration.
- RJM/2(8x8)-MF for a dual 8x8 matrix configuration.
- RJM/4(4x8)-MF for a quad 4x8 matrix configuration.

RJM/2(1x4)-4,-8 SWITCH MODULES

These modules are built with high sensitivity two pole Type A Armature Relays which ensures high isolation among signal pairs.

Modules switching from 2 to 8 pins on RJ45 connectors are available and are defined by the corresponding part number suffix.

Each two pole relay switches one pin pair on the RJ45 jacks as defined in the EIA/TIA 568 Specification - that is, Pins 1&2, 3&6, 4&5, 7&8.

Built-in pin jumpers allow the switch module to be configured as a single 1x8 Module or as two separate 1x4 module as shown in Fig. 6.

CP8 DISPLAY MODULES

One Display Module is required for each RJM Switch Module. These provide the relay drive control for the switch module and have LEDs that show switch status.

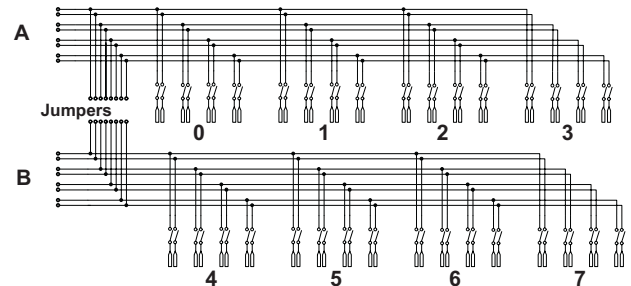
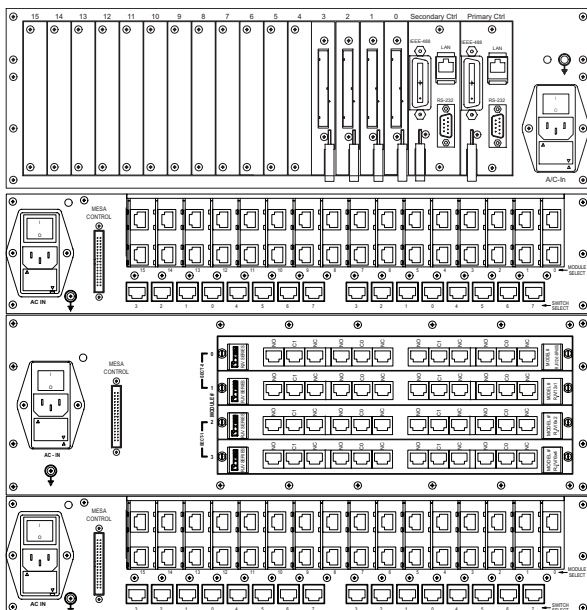


Fig. 6 RJM/2(1x4) Switch Module

Switch Specifications

SPECIFICATION	TYPE A
Contact Rating VA	30
Switching Voltage DC	110V
Switching Current DC	1.0 A
Carrying Current DC	2.0A
Breakdown Voltage DC	750V
Operate Time msec	3

Build Larger Systems with a Mesa Controller and Multiple Expansion Chassis



RJ/16x16 Matrix w/ redundant control

A Mesa Controller and multiple Expansion Chassis can be used to build larger systems with a single point of control.

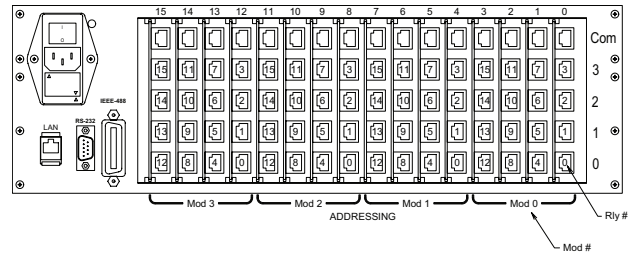
In the example on the left, a Mesa Controller, two RJM/2(8x8) Matrix chassis and an RJV/48 with 2x1 modules is used to form a 16x16 non-blocking matrix which still maintains the bandpass and isolation of a single 8x8 system.

Cytec can configure systems in an infinite variety of sizes and purposes. Call us or e-mail for a system quote or help with any configuration.

Call 585.381.4740 or
e-mail: sales@cytec-ate.com
for configuration assistance!

RJE SERIES - MULTIPLEXERS (up to 16 individual 1x4)

Each RJE chassis holds up to 16 of the RJE/4x1-8 or 16 RJE/2x2-8 Switch Modules as shown in the opposite figure. Each module switches up to eight wires (as four pairs) on RJ45 connectors. These switch modules are designed for demanding high speed networking applications up to Gigabit Ethernet speeds.



RJE Multiplexer - Rear View

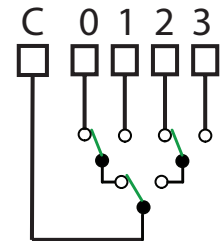
Bandpass is DC to 350 MHz, while both **NEXT** and **FEXT** are 40 dB or better at 100 MHz.

Dimensions:	19" rack mount (483 mm)
	20" depth (508 mm)
	5.25" (3U) height (133 mm)
Weight:	25 lbs. (11.4 kg) max.
AC Power:	50 watts max. (110/220 VAC selectable)

RJE Switch Modules

RJE/1x4-8 Switch Module

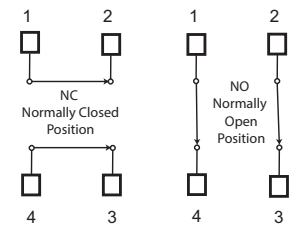
This module is a 1x4 8 wire tree switch configuration that allows you to select any one of 4 ports and connect them to a common. In the off state, the common port is connected to port 0.



RJE/4x1-8 Switch Module

RJE/2x2-8 Switch Module

This module is a 2x2 8 wire switch configuration often referred to as a transfer switch or baseball switch. It allows the rerouting of cables on four ports in either of two positions. It is useful for loop back testing, or using to switch between different configurations on other switch modules. It can also be used as a simple Form A, Form B or Form C switch depending on how it is connected.



RJE/2x2-8 Switch Module

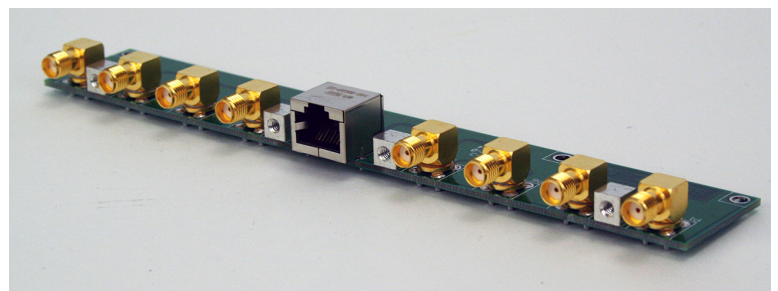
Switch Specifications

SPECIFICATION	Relays = TYPE A (armature)		
Contact Rating VA	30		
Switching Voltage DC	110V	Breakdown Voltage DC	750V
Switching Current DC	1.0 A	Carrying Current DC	2.0A
Operate Time msec	3 msec		

RJ45 to SMA Patch Panel

This adapter module allows you to take an RJ45 connection out to the individual wires for testing. The board uses a CAT6A RJ45 connector and Female SMA coax connectors to ensure maximum performance and can be used up to 10G BaseT Ethernet and CAT6A test applications.

P/N 99-69-10



Performance: Call or e-mail for specific test data.

The module brings out the wires per EIA/TIA 568 Pairs of 1-2, 3-6, 4-5 and 7-8. Allows easy connections to scopes, network analyzers, or test specific switching applications. Buy them as stand alone bench top adapters or we can mount them into rack mount panels with custom labeling.

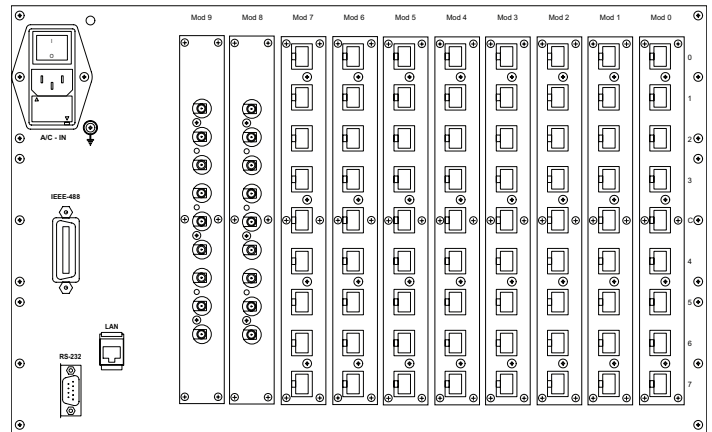
RJG SERIES - High Performance DSL Switches

Each RJG chassis holds up to 10 of the RJG/8x1-2-RJ45 or a variety of other modules such as coax switches. RJG switch Modules allow high performance testing of DSL or other high speed serial communications signals. Can be provided with adaptors and coax modules for measurements using scopes and network analyzers. Has front panel LED indicators for visual status.

Dimensions: 19" rack mount (483 mm)
20" depth (508 mm)
10.5" (6U) height (266 mm)

Weight: 25 lbs. (11.4 kg) max.

AC Power: 50 watts max. (110/220 VAC selectable)

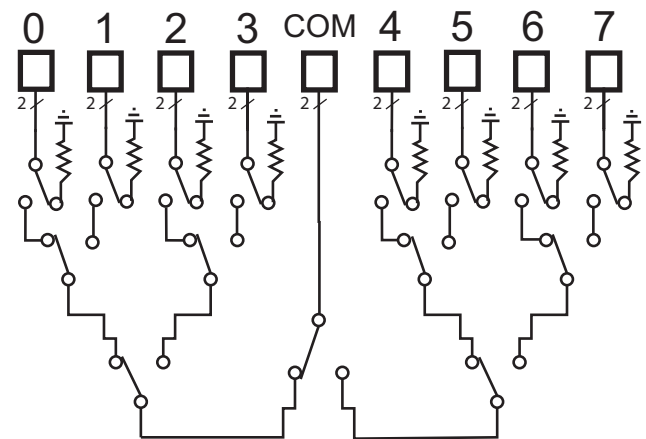


RJG Multiplexer - Rear View

RJG Switch Modules

RJG/1x8-2-RJ45 Switch Module

This module is a 1x8 2 wire tree switch configuration that allows you to select any one of 8 ports and connect them to a common. In the off state, the 8 ports may be open, terminated to ground or terminated across 100 ohms. The module uses CAT6A connectors for excellent isolation and unused pins on the RJ45 connector are grounded. The module allows for high performance testing of advanced DSL technology.



RJG/1x8-2-RJ45 Switch Module

Switch Specifications

SPECIFICATION	TYPE A
Switched Power	1 Watt
Carry Power	10 Watts
Switching Voltage DC	30V
Switching Current DC	0.5 A
Carrying Current DC	1.0 A
Breakdown Voltage DC	500 V
Operate Time msec	10

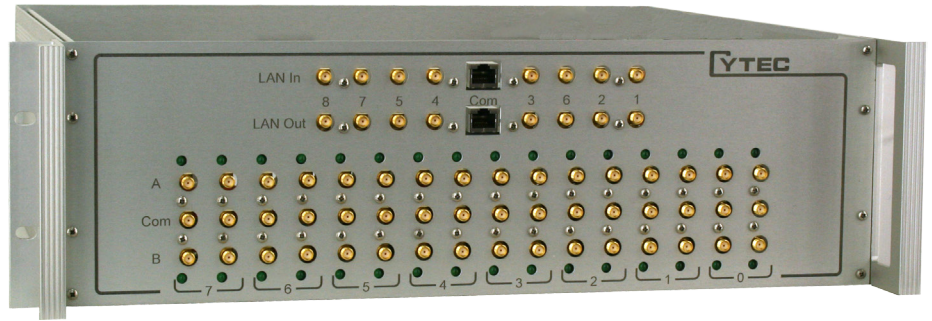
Signal Specifications

Impedance	100 Ohm +/- 2 ohms
Bandpass	DC to 750 MHz (-3dB)
Isolation	> 80 dB to 100 MHz
Isolation	> 65 dB to 250 MHz
Return Loss / VSWR	-25 dB / 1.12:1 to 125 MHz
Return Loss / VSWR	-15 dB / 1.50:1 to 300 MHz
Terminations	Dual 50 ohms to ground or 100 ohms across pair.

FOR TECHNICAL ASSISTANCE, PLEASE CONTACT CYTEC AT 800-346-3117 OR VISIT OUR WEBSITE AT cytec-ate.com

Cytec Model 7446

8 wire μ -second interrupt switch for LAN, DSL or high speed serial flaw testing.

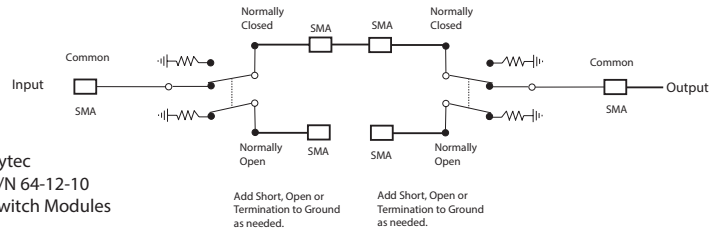


This system has two CAT6A RJ45 to SMA Adaptors and 16 solid state 50 ohm coax switch modules for high performance interrupt testing of serial data lines such as LAN, DSL, or any data being transferred over CAT3 through CAT6 cable.

Special FPGA control allows you to interrupt the data stream in increments of 10 μ S. Commands may be loaded and run to create interrupt patterns of different times on individual lines.

The interrupted wire may be opened, shorted or terminated in either direction by connecting any SMA component as needed. The unused path is always terminated for low noise and crosstalk.

Use as single wire or 100 ohm differential pairs.



Cytec
P/N 64-12-10
Switch Modules

Signal Specifications

Impedance	50 ohm single / 100 Ohm pairs
Bandpass	DC to 1 GHz (-3dB)
Data Rates	100 Kbps to 1.2 Gbps
Isolation	> 65 dB to 250 MHz
Return Loss / VSWR	-20 dB / 1.25:1 to 250 MHz
Delay Increments μ S	10 to 1000
Turn ON / OFF time	1.6 μ S

Call 585.381.4740 or e-mail: sales@cytec-ate.com for price and availability.

Controls

The RJ Series Mainframes are computer controlled via Ethernet LAN, IEEE488 and RS232 (standard). USB and Manual Control are optionally available. FPGA Control only on Model 7446.

Control Modules

IF-11 LAN / GPIB / RS232 Control

Cytec's newest control module has the three most popular control interface protocols built into one module and is backwards compatible with all previous Cytec control modules.

LAN - 10/100BaseT Ethernet with an RJ45 Connector.

The interfaces uses a static IP easily reset by the end user. There are three ports available and all may be used at the same time. Two ports can be set by the end user and one is the default Telnet which may be disabled.

GPIB - IEEE488.2 compliant control module.

Commonly used with automated test applications. Works with all GPIB control cards and software including National Instruments, Matlab and Keysight.

Drivers available upon request.

RS232 - Standard D9 serial port which can be used from computer com ports or USB to COM port cables

MC/2 Manual Control

This Manual Control Option has a Keypad and LCD Display on the front panel so that the operator can select any relay and verify that the relay has been selected via the display. It is only available for the **RJF, RJG & RJV** Series.

MC/128-TW Manual Controls

Thumbwheels and Switches on the front panel select and control up to 128 relays.

CYTEC SWITCH SOFTWARE

Check out the latest versions of free GUI software on our webpage at: <http://cytec-ate.com/support>

The software runs on Windows XP or later. Source code available on request.

SOFTWARE HELP

Free drivers and/or sample programs are available for most commonly available application programming languages including National Instruments LabView and LabWindows, C, VB.net, Java, Python, TCL, Matlab and Keysight Vee. Others on request.

WARRANTY

CYTEC Corp. warrants that all products are free from defects in material or workmanship for a period of five years.