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RJ SERIES
SWITCHING SYSTEMS
FOR COMMUNICATIONS AND AUTOMATED TEST

The RJ Series of Computer Controlled Switching Systems are engineered for both analog and digital communication applications. A modular design is used, and different Control Modules, Switch Modules and Display Modules plug into prewired chassis, allowing systems to be tailored to fit specific applications. Connectors are RJ45, and up to 8 wires can be switched. Switchpoint Status Feedback is standard, and LED switch point Status Display is included with some models. Control options include: IEEE488 Bus (GPIB) / RS232, Ethernet LAN and Universal Serial Bus (USB). Manual Controls are also available.

The units are available as either Mainframes with built-in Control Modules and power supplies or as Expansion Chassis that are controlled and powered via a MESA Control Chassis. Please see the MESA Bulletin for more information.

10BaseT • 100BaseT • Gig-E (1000BaseT) • VOIP • POE • T1 • DSL • FireWire



This Bulletin Includes:

- **RJE Series** - **Multiplexers (up to 16 individual 1x4 or 1x5)**
- **RJF Series** - **Passive Fiber Optic Switches**
- **RJG Series** - **Gig-E Matrices or Multiplexers (8 wire)**
- **RJM Series** - **Modular Matrices (4 or 8 wire / 16x8 or 32x4 configurations)**
- **RJV Series** - **Matrices and Multiplexers (up to 144 channels per chassis)**

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

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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 100Base-T Network Switching. These units are built with high sensitivity Type A Armature Relays to insure low signal-to-signal crosstalk. Exceptional longitudinal balance and low insertion losses are achieved at high data rates. Connectors are CAT5 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.

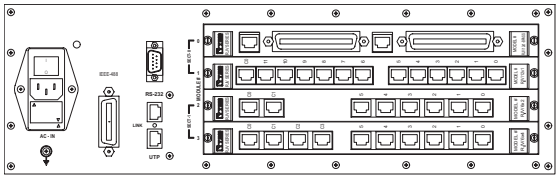
RJV/48 Mainframe

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.

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/48 Mainframe - Front View



RJV/48 Mainframe - Rear View

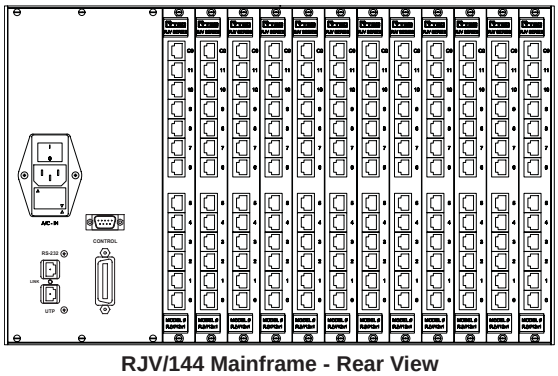
RJV/144 Mainframe

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.

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 Mainframe - Front View



RJV/144 Mainframe - Rear View

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.

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RJV Switch Modules

Most RJV Switch Modules use high sensitivity, high isolation Type A Armature Relays and RJ45 connectors. Up to 8 poles are switched (but not on all models). Signals can be routed to the Common connectors on the individual modules or alternately to the motherboard bus. The bus interconnects the modules and creates larger multiplexers and matrices. The RJV/FOSM Fiber Optic Switch Modules are passive, bidirectional optical switches.

RJV/12x1-4, -8 Switch Module

Each module supplies a 12x1 Multiplexer as shown in **Fig. 1**. Four or 8 pole versions are available. 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.

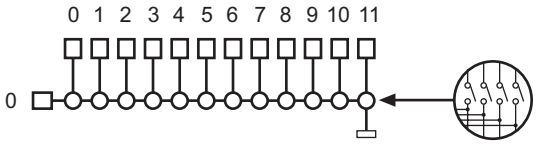


Fig. 1 Backplane Connection

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

Each module furnishes four individual 1x2 or "A/B" switches. Four and 8 pole 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.

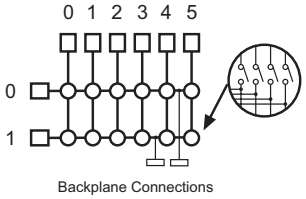


Fig. 2

RJV/6x2-4 Switch Module

These modules switch four poles in a 6x2 Matrix configuration as shown in **Fig. 2**. 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.

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.

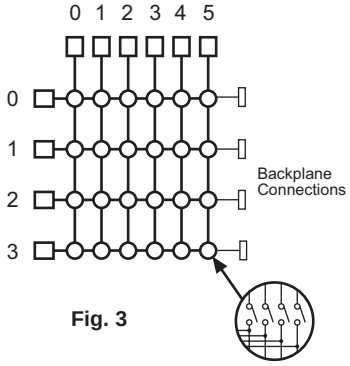


Fig. 3

Four Pole Versions of Switch Modules

RJV/6x4-4 Switch Module

These also switch four poles but are configured as a 6x4 Matrix as shown in **Fig. 3**. 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.

RJV/FOSM Duplex (1x3) Latching Switch Module

Each module provides a passive fiberoptic switch in a dual 1x3 configuration as shown in **Fig. 4**. A 'moving fiber' design concept is used to achieve highly accurate and repeatable direct fiber to fiber connections. Both single and multimode versions are available. ST, SC or FC connectors are offered. As a latching design, this module will remain in its current switched state even if the power is turned off.

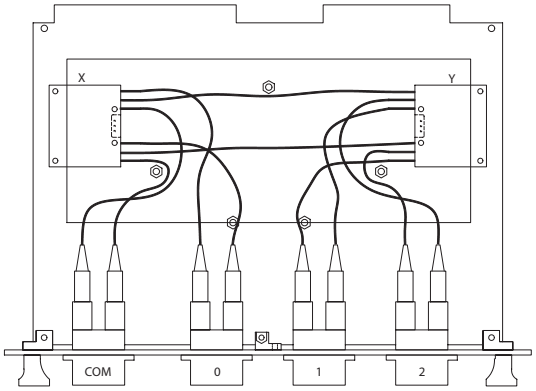


Fig. 4 - Duplex 1x3 Latching

RJV/FOSM Duplex (2x2) Latching Switch Module

This passive fiberoptic switch is built as a dual 2x2 matrix. The same moving fiber design is used to assure highly accurate and repeatable fiber connections. Single and multimode versions are offered, along with ST, SC or FC connectors. This is also a latching module and it will retain its switched state when power is removed.

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.

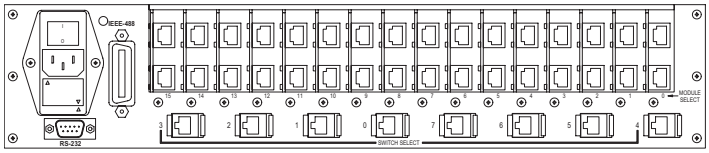
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RJM SERIES - MODULAR MATRICES (4 or 8 wire / 16x8 or 32x4)

The RJM Series are high Performance, bidirectional, passive Matrices and are designed to switch high speed communication signals, including T1, E1, DSL and 100Base-T Ethernet. High sensitivity Type A Armature Relays and RJ45 connectors are used to ensure high pair-to-pair isolation, and low attenuation. A modularized design is used, and each Mainframe is built with integrated power supplies, a Control Module and prewired motherboards. CL8 Display Modules show switch point status. The RJM Switch Modules are available in versions switching 2, 4, 6 or 8 wires per the EIA/TIA 568 specification pairs.





RJM/16x8 Matrix - Rear View

RJM/128 MAINFRAMES

These are 19" rack mounting chassis, 3.5" high and 16" deep. Each Mainframe is assembled with power supplies and motherboards that hold one Control Module and up to 16 RJM Series Switch Modules. Signal connectors are RJ45 jacks. One CL8 Module is required for each Switch Module. Three different standard matrix configurations are offered:

RJM/2(16x4) MAINFRAME

This chassis holds up to 16 RJM/2(1x4) Switch Modules and forms two separate 16x4 matrices as shown in **Fig. 5**. Each matrix has a **Bandpass** of DC to 30 MHz (-3dB). **Crosstalk** between signal pairs is less than -60dB at 20 MHz.

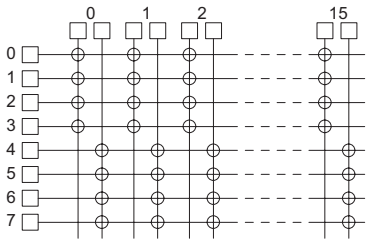


Fig. 5

RJM/16x8 Mainframe

This mainframe holds a maximum of 16 RJ/2(1x4) Switch Modules (each jumpered in a 1x8 configuration) to furnish a 16x8 Matrix. **Bandpass** is DC to 25 MHz and **Crosstalk** is less than -50dB at 20 MHz.

RJM/32x4 Mainframe

Bussing together the four output pairs (0 & 4, 1 & 5, etc) of the first 16x4 matrices shown in **Fig. 5** creates a single 32x4 matrix with a **Bandpass** from DC to 15 MHz and **Crosstalk** less than -45dB at 20MHz.

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)

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

These modules are built with high sensitivity two pole Type A Armature Relays which insures 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 Matrix as shown in Fig. 6.

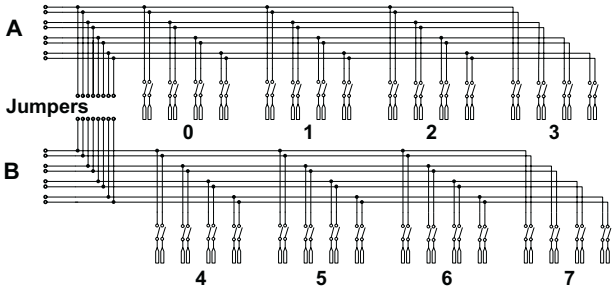


Fig. 6 RJM/2(1x4) Switch Module

CL8 DISPLAY MODULES

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

RJM/128 EXPANSION CHASSIS

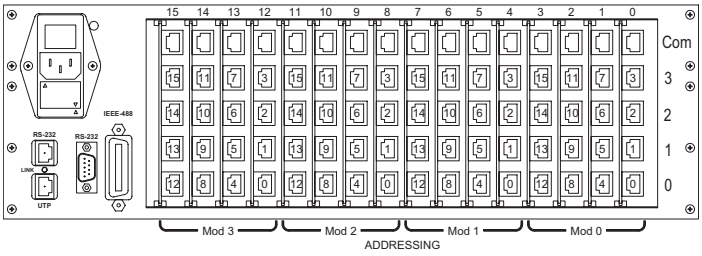
These chassis are available in the same configurations as the mainframes but are built without power supplies or a control module. They are controlled and powered by a MESA Control Chassis as detailed in the MESA Bulletin.

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

Each RJE chassis holds up to 16 of the RJE/4x1-8 Switch Modules as shown in the opposite figure. Each RJE/4x1-8 switches up to eight wires (as four pairs) on RJ45 connectors. These switch modules are designed for demanding high speed networking applications such as Gigabit Ethernet, ATM-155 and 100VG-AnyLan. The chassis is offered only in configurations of one to 16 individual 1x4s.

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)



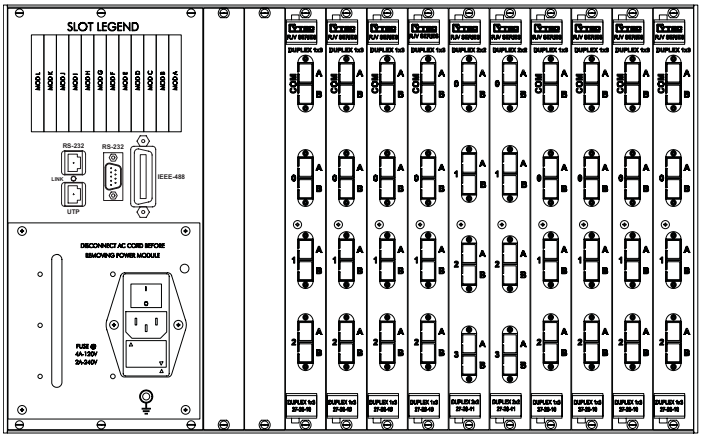
RJE Multiplexer - Rear View

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

RJF SERIES - Passive Fiber Optic Switches

The RJF/144 Mainframe holds up to 12 of the RJV/FOSM Duplex (1x3) or (2x2) Switch Modules. These passive modules provide Tx/Rx switching of either single mode or multimode fiber optic cables as selected by the end user. A moving fiber design concept is utilized to achieve highly accurate and repeatable direct fiber to fiber connections. ST, SC or FC connectors are offered.

Dimensions:	19" rack mount (483 mm) 16" depth (406 mm) 10.5" (6RU) height (257 mm)
Weight:	25 lbs. (11.4 kg) max.
AC Power:	75 watts max. (110/220 VAC selectable)

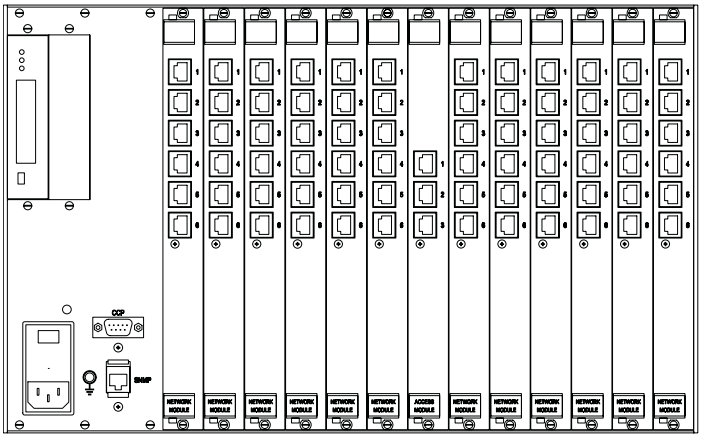


RJF Passive Fiber Optic Switch - Rear View

RJG SERIES - Gig-E Matrices or Multiplexers (8 wire)

The RJG Series of Gigabit Ethernet Switches holds 12 of the RJE Series Switch Modules along with a single *Switched* Signal/IO Module. The motherboard bus is divided into four separate segments, which minimizes stub length and capacitive loading effects. The Signal I/O Module switches to route the required motherboard segment to the chassis outputs.

Dimensions:	19" rack mount (483 mm) 16" depth (406 mm) 10.5" (6RU) height (257 mm)
Weight:	25 lbs. (11.4 kg) max.
AC Power:	75 watts max. (110/220 VAC selectable)



RJG Gigabit Ethernet Switch - Rear View

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Controls

The RJ Series Mainframes are computer controlled via IEEE488 and RS232 (standard). LAN, USB and Manual Control are optionally available. The Control Module selects any Mainframe switch point and is able to Latch, Unlatch and request Status of the switch in both Matrix and Multiplex Modes.
In the Matrix Mode, any number of switches can be closed at the same time. In the Multiplex Mode, only one switch can be closed at a time.

RJE/RJM Control Modules

IF-5 IEEE488/RS232

This module combines both the IEEE488 BUS and RS232 features detailed in Applications Bulletin AP-5.

IF-6 LAN INTERFACE

This module allows control via LAN using TCP/IP protocols detailed in the AP-5 Bulletin.

IF-7 Combined USB/RS232

This control module is plug-and-play compatible with Universal Serial Bus and furnishes dual controls via both RS232 and USB, allowing users to switch to USB control as COM ports become obsolete on new computers.

MC/128-TW Manual Controls

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

Additional Manual Control Options

The following Manual Control Options are available for ALL chassis mentioned in this Bulletin. Contact our Technical Sales Representatives for more details and information.

CYTEC SWITCH MANAGER SOFTWARE



The Cytec Switch Manager provides a GUI interface for controlling matrices and multiplexers via remote computer. The software includes an intuitive graphical interface, security implementation, built in test functionality, multiple device control, switchpoint memory, as well as many other useful features. You can download the Switch Manager free of charge from our website.

Available for Windows, Linux, Mac OS, or any other Java enabled platform

SOFTWARE

Free drivers and/or sample programs are available for the most common application programming languages.

WARRANTY

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

RJF/RJG/RJV SERIES Controls

IF-5C IEEE488/RS232

This module combines both the IEEE488 BUS and RS232 features detailed in Applications Bulletin AP-5.

IF-6 LAN INTERFACE

This module allows control via LAN using TCP/IP protocols detailed in the AP-5 Bulletin.

IF-7 Combined USB/RS232

This control module is plug-and-play compatible with Universal Serial Bus and furnishes dual controls via both RS232 and USB, allowing users to switch to USB control as COM ports become obsolete on new computers.

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.

Switch Specifications

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

The RJM Matrices and RJV Multiplexers are built with high sensitivity Type A Armature relays.

All Chassis

Material:	Gray Anodized extruded or sheet aluminum with a polycarbonate front panel overlay.
Mounting Hardware:	Rack mount handles are standard. Flush mount flanges available at no cost.
Protection:	Selectable AC input fused at: 2 amps 110 VAC, 1 amp 220 VAC.

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