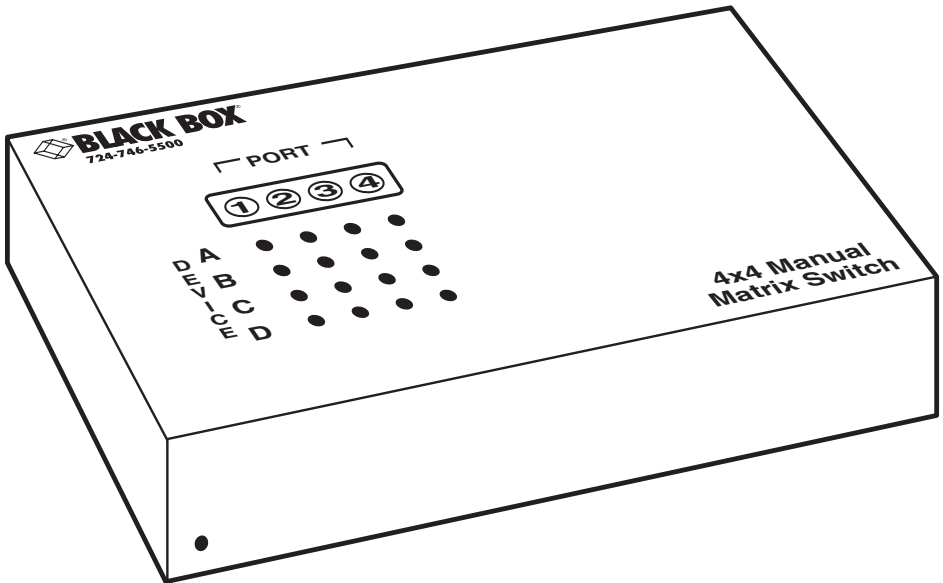




Manual Matrix Switches



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INFORMATION**

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FEDERAL COMMUNICATIONS COMMISSION AND INDUSTRY CANADA RADIO-FREQUENCY INTERFERENCE STATEMENTS

Class B Digital Device. This equipment has been tested and found to comply with the limits for a Class B computing device pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation. This equipment generates, uses, and can radiate radio frequency energy, and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. If this equipment does cause harmful interference to radio or telephone reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult an experienced radio/TV technician for help.

Caution:

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This digital apparatus does not exceed the Class B limits for radio noise emission from digital apparatus set out in the Radio Interference Regulation of Industry Canada.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la classe B prescrites dans le Règlement sur le brouillage radioélectrique publié par Industrie Canada.

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NORMAS OFICIALES MEXICANAS (NOM) ELECTRICAL SAFETY STATEMENT

INSTRUCCIONES DE SEGURIDAD

1. Todas las instrucciones de seguridad y operación deberán ser leídas antes de que el aparato eléctrico sea operado.
2. Las instrucciones de seguridad y operación deberán ser guardadas para referencia futura.
3. Todas las advertencias en el aparato eléctrico y en sus instrucciones de operación deben ser respetadas.
4. Todas las instrucciones de operación y uso deben ser seguidas.
5. El aparato eléctrico no deberá ser usado cerca del agua—por ejemplo, cerca de la tina de baño, lavabo, sótano mojado o cerca de una alberca, etc.
6. El aparato eléctrico debe ser usado únicamente con carritos o pedestales que sean recomendados por el fabricante.
7. El aparato eléctrico debe ser montado a la pared o al techo sólo como sea recomendado por el fabricante.
8. Servicio—El usuario no debe intentar dar servicio al equipo eléctrico más allá a lo descrito en las instrucciones de operación. Todo otro servicio deberá ser referido a personal de servicio calificado.
9. El aparato eléctrico debe ser situado de tal manera que su posición no interfiera su uso. La colocación del aparato eléctrico sobre una cama, sofá, alfombra o superficie similar puede bloquea la ventilación, no se debe colocar en libreros o gabinetes que impidan el flujo de aire por los orificios de ventilación.
10. El equipo eléctrico deber ser situado fuera del alcance de fuentes de calor como radiadores, registros de calor, estufas u otros aparatos (incluyendo amplificadores) que producen calor.
11. El aparato eléctrico deberá ser conectado a una fuente de poder sólo del tipo descrito en el instructivo de operación, o como se indique en el aparato.

12. Precaución debe ser tomada de tal manera que la tierra física y la polarización del equipo no sea eliminada.
13. Los cables de la fuente de poder deben ser guiados de tal manera que no sean pisados ni pellizcados por objetos colocados sobre o contra ellos, poniendo particular atención a los contactos y receptáculos donde salen del aparato.
14. El equipo eléctrico debe ser limpiado únicamente de acuerdo a las recomendaciones del fabricante.
15. En caso de existir, una antena externa deberá ser localizada lejos de las líneas de energía.
16. El cable de corriente deberá ser desconectado del cuando el equipo no sea usado por un largo periodo de tiempo.
17. Cuidado debe ser tomado de tal manera que objetos líquidos no sean derramados sobre la cubierta u orificios de ventilación.
18. Servicio por personal calificado deberá ser provisto cuando:
 - A: El cable de poder o el contacto ha sido dañado; u
 - B: Objetos han caído o líquido ha sido derramado dentro del aparato; o
 - C: El aparato ha sido expuesto a la lluvia; o
 - D: El aparato parece no operar normalmente o muestra un cambio en su desempeño; o
 - E: El aparato ha sido tirado o su cubierta ha sido dañada.

Contents

Chapter	Page
1. Specifications	5
2. Introduction	7
3. Installation	8
3.1 Parallel Installation	8
3.2 Serial Installation	9
4. Operation	11
5. Troubleshooting	13
5.1 Calling Black Box	13
5.2 Shipping and Packaging	13
Appendix: Serial Pinouts	14

1. Specifications

- Compliance** — FCC Part 15 Subpart J Class B, IC Class/classe B
- Interface** — SW490A, SW492A: EIA/TIA RS-232 serial, DCE on numbered ports and DTE on lettered ports;
SW491A, SW493A: Bidirectional IEEE 1284 parallel, including Compatibility (IBM PC parallel compatible), Nibble/Byte, ECP, and EPP modes
- Serial**
- Characteristics** — SW490A, SW492A: Transparent to synchronous or asynchronous protocol, synchronous clocking, data format, flow control, and full- or half-duplex operation
- Data Rate** — Serial: Transparent to data rates up to 230 kbps;
Parallel: Transparent to any data rate sustainable by the attached devices
- Maximum**
- Distance** — SW490A, SW492A: 50 ft. (15.2 m) to any attached device;
SW491A, SW493A: 20 ft. (6.1 m) to any attached device
- User Controls** — All top mounted:
SW490A, SW491A: (1) Four-key membrane touchpad, one key for each numbered (computer) port;
SW492A, SW493A: (2) Four-key membrane touchpads, one key for each numbered (computer) port
- Indicators** — Visible:
(1) Front-mounted green LED for power;
(1) Top-mounted red LED for each combination of lettered and numbered ports:
SW490A, SW491A: (16) arranged in a 4 x 4 matrix;
SW492A, SW493A: (32) arranged in a 4 x 8 matrix;
Audible:
One-second tone to indicate successful power-up;
Short beep to indicate that a port has been switched

MANUAL MATRIX SWITCHES

Connectors —	All rear-mounted: (1) Barrel jack for power; Numbered ports: SW490A: (4) DB25 female; SW491A: (4) DB25 male; SW492A: (8) DB25 female; SW493A: (8) DB25 male; Lettered ports: SW490A, SW492A: (4) DB25 male; SW491A, SW493A: (4) DB25 female
Leads/Signals Supported —	SW490A, SW492A: Pin 7 (SGND) held common; Pins 2 through 6, 8, 15, 17, 19, 20, 22, and 24 (TD, RD, RTS, CTS, DSR, CD, TC, RC, SRTS, DTR, RI, and EXTC) switched; note that on Switch ports Pin 24 (EXTC) is a DCE output and a DTE input—see the Appendix ; SW491A, SW493A: All grounds (Pins 18 through 25) held common, all data and control signals (Pins 1 through 17) switched
Power —	From utility-power (mains) outlet, through wallmount transformer and detachable output cord, to rear-mounted barrel jack: Input: 115 VAC, 60 Hz; Output: 12 VDC at up to 300 mA; Consumption: 3.6 watts maximum
Temperature Tolerance —	32 to 122°F (0 to 50°C)
Humidity Tolerance —	40 to 90% noncondensing
Size —	3.3"H x 12.2"W x 8.3"D (8.3 x 30.8 x 21 cm)
Weight —	SW490A: 3.9 lb. (1.8 kg); SW491A: 3.8 lb. (1.7 kg); SW492A: 4.4 lb. (2 kg); SW493A: 4.2 lb. (1.9 kg)

2. Introduction

With the Manual Matrix Switches, you can share as many as four peripheral devices among as many as eight IBM® PC compatible computers. The Switches are compatible with all standard PCs and all standard serial and parallel peripherals. You can use the touchpad keys and LEDs on a Switch's top-mounted control panel to make and break connections between any pair of attached computers and devices.

Four models are available:

- The 4 x 4 Serial Manual Matrix Switch (our product code SW490A) has four lettered (device) ports and four numbered (computer) ports, all RS-232 serial.
- The 4 x 4 Parallel Manual Matrix Switch (our product code SW491A) has four lettered ports and four numbered ports, all IEEE 1284 parallel.
- The 4 x 8 Serial Manual Matrix Switch (our product code SW492A) has four lettered ports and eight numbered ports, all RS-232 serial.
- The 4 x 8 Parallel Manual Matrix Switch (our product code SW493A) has four lettered ports and eight numbered ports, all IEEE 1284 parallel.

The rows and columns of LEDs on the Manual Matrix Switches show which numbered (computer) ports are connected to which lettered (device) ports. Lettered ports that a numbered port is currently connected to are said to be “occupied.” The Switches won't allow other numbered ports to access an occupied lettered port; you must break the current numbered-port connection first.

NOTE

While it is possible to reverse the normal configuration—plug computers into the lettered (device) ports and peripheral devices into the numbered (computer) ports, so that four computers could share eight devices on the 4 x 8 models—this would require you to use unusual cables with the serial models or DB25 gender changers with the parallel models. If you want to use your Manual Matrix Switch for such an application, but aren't comfortable with or aren't sure about your cabling, please call Black Box for technical support.

3. Installation

Before you begin, make sure that the Manual Matrix Switch is unplugged. If your application involves computers sharing printers, make sure that the computers can communicate with the printers when they are directly attached to each other.

The serial version of the Switch supports RS-232 data transfer—see the **Appendix** for serial-port pinouts. The parallel version of the Switch supports bidirectional IEEE 1284 data transfer in any mode (Compatibility, Byte/Nibble, ECP, or EPP). In Compatibility mode, the Switch is compatible with older IBM PC parallel ports and Centronics® parallel printers.

You'll be attaching peripheral devices to the Switch's lettered (device) ports, which are labeled "A" through "D." You'll be attaching computers to the Switch's numbered (computer) ports; these are labeled "1" through "4" (on 4 x 4 models) or "1" through "8" (on 4 x 8 models). Although it is possible to attach either type of equipment (computer or peripheral device) to either type of Switch port, please refer to the Note on page 7.

3.1 Parallel Installation

Take the steps below to install a Parallel Manual Matrix Switch in a typical computer-to-printer application. (Specify length when you order any of these cables.)

1. Attach the parallel printers to any of the Switch's lettered ports A through D. The cable you'll use to make this attachment will depend on the type of connector the printer has:
 - 36-pin Centronics female: Use our product code EQN202.
 - MDR36 female: Use our product code EQN203.
2. Attach the computers to any of the Switch's numbered ports labeled 1 through 4 or 8. Use straight-through pinned DB25 male to DB25 female cable, such as our product code EQN201. Note that these cables must include all 25 wires; if they are shielded, make sure that Pin 1 is not connected to the shield.
3. Apply power to all equipment connected to the Manual Matrix Switch, then plug in the Switch itself. It should power up and operate normally.

NOTE

To attach printers to the Switch's numbered ports, attach DB25 female/female gender changers (our product code FA412) to the Switch ports, then use the same cables specified in step 1. To attach computers to the Switch's lettered ports, use DB25 male-to-male cable such as our product code EQN200.

3.2 Serial Installation

The table below lists some of the different types of cables involved when you are connecting different types of serial equipment to a Serial Manual Matrix Switch (refer to Figures 3-1 and 3-2 on the next page). If you're not sure what cable you should use to attach a piece of equipment to the Switch, call Black Box for technical support.

Switch Port (Connector)	Equipment and Connector	Cable Product Code ("xx"=length in feet)
<i>Normal configuration</i>		
Numbered 1 through 4 or 8 (DB25 female DCE)	PC or other DB9 male DTE	EVMBMC-00xx
Numbered 1 through 4 or 8 (DB25 female DCE)	PC or other DB25 male DTE	EVMBSM-00xx
Lettered A through D (DB25 male DTE)	Serial Printer or other DB25 female DTE	BC00901 (6 ft./1.8 m*)
Lettered A through D (DB25 male DTE)	Modem or other DB25 female DCE	EVMBSM-00xx

Reversed configuration

Lettered A through D (DB25 male DTE)	PC or other DB9 male DTE	BC01802†
Lettered A through D (DB25 male DTE)	PC or other DB25 male DTE	BC01802† or BC00501 (6 ft./1.8 m*)
Numbered 1 through 4 or 8 (DB25 female DCE)	Serial printer or other DB25 female DTE	ECM25C-00xx-MM
Numbered 1 through 4 or 8 (DB25 female DCE)	Modem or other DB25 female DCE	EYN255C (specify length)

*Longer versions of this cable are available—call or check our Web site for more information.

†The BC01802 is a "universal" null-modem cable with both DB9 and DB25 connectors at each end, available in 6-ft./1.8-m length *only*. Attach the appropriate connector to your PC's serial port and a DB25 female connector to the Switch's lettered port.

MANUAL MATRIX SWITCHES

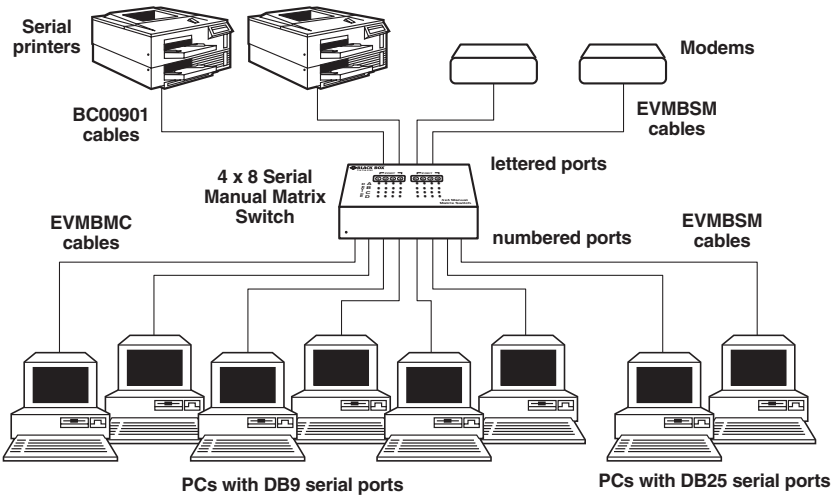


Figure 3-1. Users on numbered ports sharing peripherals on lettered ports.

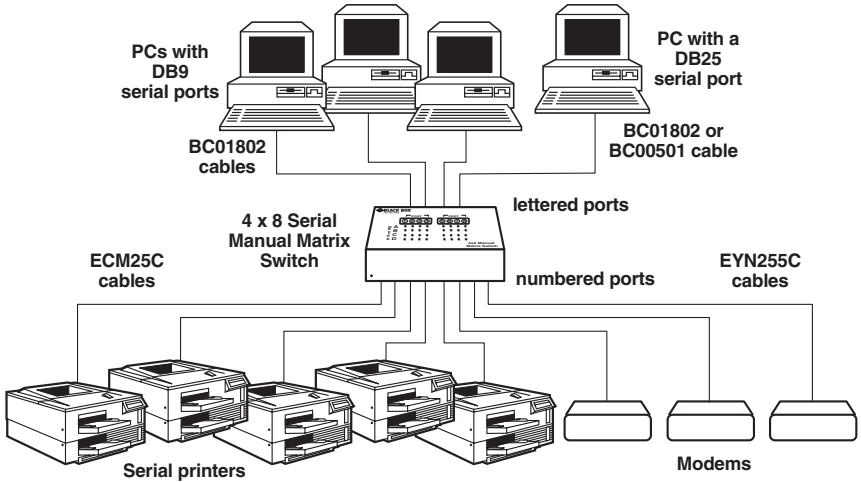


Figure 3-2. Users on lettered ports sharing peripherals on numbered ports.

4. Operation

The Manual Matrix Switch has no power switch; it begins operating (and lights its front-mounted green power LED) as soon as you plug it in. The unit remains powered ON as long as the wallmount transformer is plugged into an active AC source. When you plug in the unit, it will sound a tone for one second to signify that it has successfully reset itself. After this, the Matrix Switch will re-establish any numbered-port-to-lettered-port connections that were present when power was lost. (In the Switch's factory-default state, no such connections are in place.) The Switch will light the indicator LEDs on its top panel as appropriate. For example, if a connection is remade between numbered port 3 and lettered port B, the Switch will light the LED at the intersection of column 3 with row B.

The touch-sensitive switching keypad is located above the matrix of LEDs. Its keys, which correspond to the Switch's numbered (computer) ports, are labeled "1" through "4" on the 4-port units and "1" through "8" on the 8-port units. Each of the four LEDs in the column below a given key indicates a potential connection between that numbered port and the lettered (device) port in the same row—"A," "B," "C," or "D."

When you press a key, the Switch beeps and switches that numbered port:

- From the "disconnected" state to the first unoccupied lettered port (from disconnected to A, for example, or from disconnected to B if port A is in use);
- From its current lettered port to the next unoccupied one (from B to C, for example, or from B to D if port C is in use); or
- From its current lettered port to the disconnected state if all remaining ports are occupied (for example, from B to disconnected if ports C and D are in use).

Here's a full-scale example: Let's say the equipment on numbered port 1 is connected to the device on lettered port A, the equipment on port 3 is connected to the device on port B, and the equipment attached to the other numbered ports isn't connected to any lettered-port devices. If you press the "1" button, the Matrix Switch will skip over port B (which is connected to port 2) and connect port 1 to port C. If you continue to press "1," the Switch will connect port 1 to port D, then disconnect it from everything, then reconnect it to port A.

If all lettered ports are currently connected to a numbered port, you'll need to disconnect a numbered port (that is, switch it to the "disconnected" state) before you can switch any numbered port to a different lettered port.

You shouldn't have to worry about the Manual Matrix Switch limiting your transmission speeds or creating a bottleneck in your system: The serial models support data rates up to 230 kbps on each port-to-port link, while the parallel models—because their propagation delay approaches zero—will support any data rate that can currently be sustained for direct communication between PC parallel ports and parallel printers or other peripherals.

Under normal circumstances, the Manual Matrix Switch should never need to be reset. But if it begins acting oddly—if it lights all of its LEDs during normal operation, for instance—reset the unit by unplugging it for two full seconds, then plugging it back in.

NOTE

As soon as power is restored after you unplug the Manual Matrix Switch or the Switch loses power, the Switch will reestablish any connections that were present when power was lost.

5. Troubleshooting

5.1 Calling Black Box

If you determine that your Manual Matrix Switch is malfunctioning, *do not attempt to alter or repair the unit*. It has no user-serviceable components. Contact Black Box Technical Support at 724-746-5500.

Before you do, make a record of the history of the problem. We will be able to provide more efficient and accurate assistance if you have a complete description, including:

- the nature and duration of the problem;
- when the problem occurs;
- the equipment involved in the problem;
- any particular application that, when used, appears to create the problem or make it worse; and
- the results of any testing you've already done.

5.2 Shipping and Packaging

If you need to transport or ship your Manual Matrix Switch:

- Package it carefully. We recommend that you use the original container.
- If you are returning the unit, include everything you received with it. Before you ship the unit back to Black Box for repair or return, contact us to get a Return Materials Authorization (RMA) number.

Appendix: Serial Pinouts

The ports of the Serial Manual Matrix Switches (SW490A and SW492A) are pinned out this way:

Signal Direction on Numbered Ports (DCE)	DB25 Pin (Signal)	Signal Direction on Lettered Ports (DTE)
In	2 (TD)	Out
Out	3 (RD)	In
In	4 (RTS)	Out
Out	5 (CTS)	In
Out	6 (DSR)	In
N/A	7 (SGND)	N/A
Out	8 (CD)	In
Out	15 (TC)	In
Out	17 (RC)	In
In	19 (SRTS)	Out
In	20 (DTR)	Out
Out	22 (RI)	In
Out*	24 (EXTC)	In*

*This is the opposite of the normal transmission direction for the EXTC (External Clock) signal. If your application requires that External Clock be transmitted from equipment on a numbered port to a device on a lettered port, call Black Box for technical support.



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