

MRX-24™/24S MATRIXERS

Overview

The *MRX-24™* is a computerized relay patch bay system. It also is available in a secondary version (*MRX-24S*). Operating under IQ control, both versions have 24 DPST (balanced) re-lays, arranged in four groups of six (four 6x1), for switching electrical signals. The *MRX-24/ 24S* is ideal for routing balanced audio from microphone level to 70V speaker level, AC or DC power, digital signal routing and switching, and other electrical signals. Each relay can handle at least 1 ampere at 100V (0.5 A while switching). Pictured to the right are the front panels of an *MRX-24* and an *MRX-24S*. Simple descriptions follow that introduce each feature of the unit, and provide brief overview of operation and basic electrical specifications.

Master and Secondary

In terms of practical operation, the secondary version is almost identical to the master version. A secondary utilizes the microprocessor of its master to operate its own relays. Up to 31 secondary units may be operated from any one master, including *MRX-12™* master units (*MRX-12* is another Matrixer model with a different relay configuration). Without its own processor, secondary unit Aux ports are inoperative and it has no battery backup. Secondary units communicate with their master via special secondary bus, and the addressing

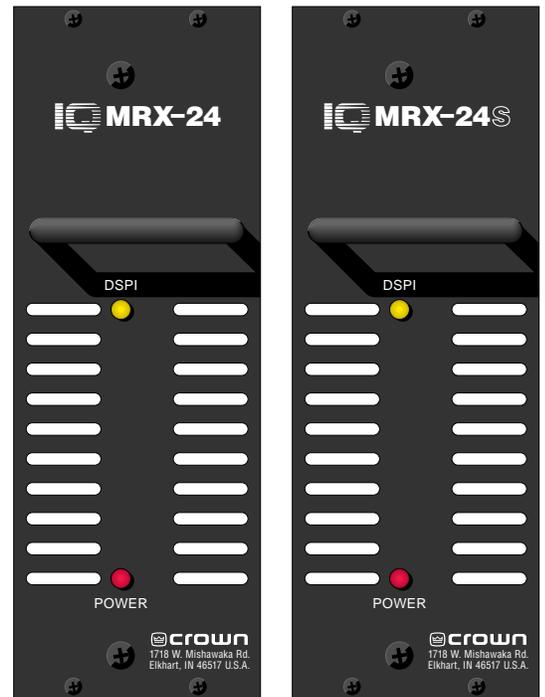
of masters and secondary units is handled differently. By using the processing power of a master unit, using secondary units in larger Matrixer systems is highly cost effective.

IQ-CAG Card Cage Installation

All IQ Matrixer units are designed for easy installation into a Card Cage. The IQ-CAG is a four rack space cage which can hold about 6 MRX modules plus an IQ-LPS +12 VDC Linear Power Supply. Matrixers require +12 VDC. If an IQ-LPS is not used, another supply such as an adaptor or battery is required. Components designed to mount in the IQ-CAG are modular in construction. They slide into the cage on rails, and are held in place by small screws. At the rear of the cage "T-board" is used to provide connection to relays, and for digital communication. The T-board for *MRX-24/24S* units is shown on the following page.

Front Panels

Front panels for both versions are shown to the right. On each is a power indicator showing that the unit is powered by +12 VDC. A DSPI indicator also lights up to indicate that digital information addressed to that unit is being received. When power is

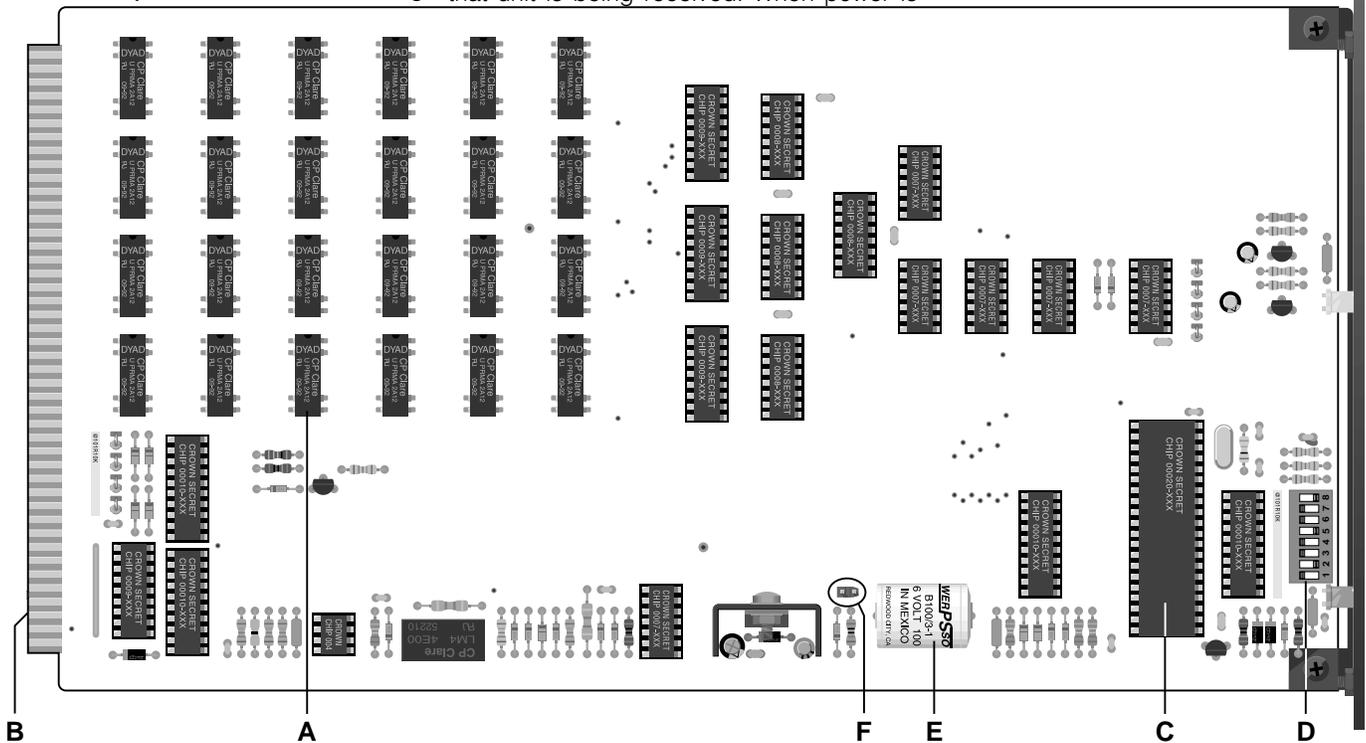


MRX-24 (MASTER) & MRX-24S (SECONDARY)

removed an internal battery will maintain programming memory in a master unit for at least 60 days.

A. Relays

MRX-24/24S relays are DPST devices which



MRX-24/24S MODULE CIRCUIT BOARD

can handle one ampere at 100V continuously, or 0.5 A at 100V while switching. Relays are arranged as four groups of six. One side of each of the six in a group are tied together to an unswitched common external connector. Refer to the block diagram shown on the next page. By tying relays together at the T-board, any form of matrix can be formed with the necessary number of MRX modules.

B. Edge Connector

When installing the MRX module into the cage, the edge connector seats into a female edge connector mounted to the T-board.

C. MRX Microprocessor

Only master MRX units have an installed microprocessor. Secondary units operate by special communication, called a Secondary Bus, with a master unit.

D. IQ Component Address

Both master and secondary units have this DIP switch on their circuit boards, but the address is only used with master units. On secondary units this set of switches is out of circuit and unused. Up to 250 master units can be used on any one Crown Bus serial data loop to the system interface.

E. Battery Backup

Master units have a battery installed to maintain processor memory when the +12 VDC supply is lost. This battery will maintain memory for at least 60 days.

F. Battery Backup Enable Jumper

A jumper is provided to disable battery backup if that feature is not desired.

G. Relay Connectors

Connections to relay contacts are made via mini-barrier strip pins.

H. Power Supply Connection

Plated holes are provided for connection of +12 VDC and ground from an IQ-LPS or other 12 volt supply. Holes are sized to accept #6 screws.

I. Sensing Aux Port

A mini-barrier block connector is provided for auxiliary functions. +10 VDC at 20 mA is output at Aux Out when switched on. Aux In senses voltage: if +3 to +20 VDC is sensed (with respect to Aux Ground), the microprocessor will interpret the voltage as a digital high (on condition). Note that although both the master and secondary versions have this connection, only the master's Aux port is operational.

J. Crown Bus

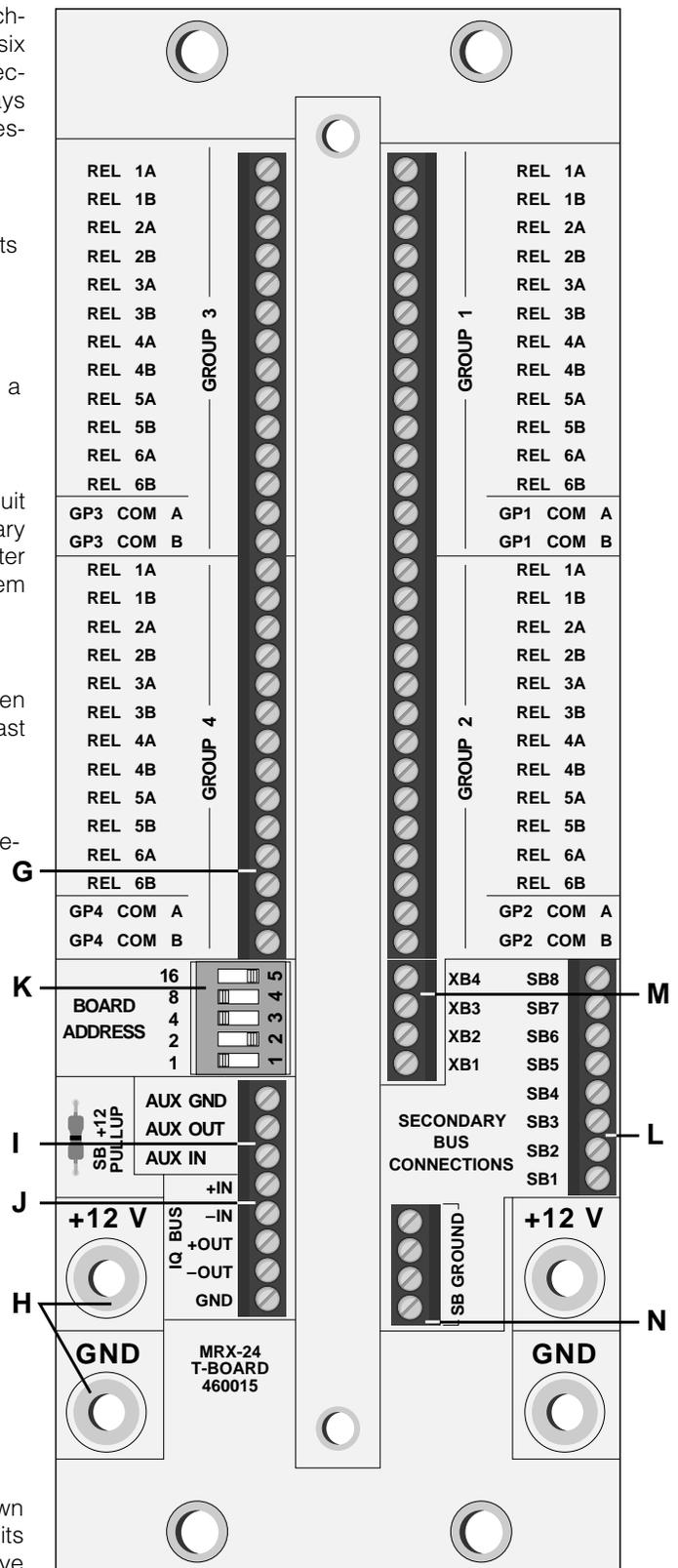
A 5-pin mini-barrier block connector is provided for digital communication via the Crown Bus serial data loop to other IQ components. This connector is only used by master units (present on both).

K. Board (Secondary) Address

Master units communicate with other IQ system components via Crown Bus, and thus use the IQ Address setting (item D). Secondary units use the Board Address to identify themselves to the master unit. The five position switch allows for 31 valid settings (a setting of 0 is not valid), thus up to 31 secondary units can be operated from one master. Board Address settings have no effect on master units.

L. Secondary Bus (SB1-8)

An 8-pin mini-barrier block connector is provided for digital communication via the Secondary Bus between a master unit and secondary units. This is a parallel communications bus and must tie into all secondary units being operated by one master. For complete communication the XB4 and SB Ground connections must also be made, as detailed under items M and N.



MRX-24/24S "T-Board" For External Connections

M. Extended Bus (XB1-4)

A 4-pin mini-barrier block connector is provided for Extended Bus communication. With present firmware, only the XB4 pin is

actually used. The XB4 pin must be connected in the same manner as SB pins (master to each secondary). The XB4 line serves as an acknowledgment line for the parallel data bus.

N. SB Ground

A 4-pin mini-barrier block connector is provided as a digital ground for secondary bus reference. SB Ground must be tied together from a master to each secondary for proper digital ground reference on the Secondary Bus.

Digital Communication

The form of communication available between master MRX units and other IQ System components is the Crown Bus. The Crown Bus is a communication standard for serial transmission of IQ command protocol. It normally operates on a simple two-wire 20 mA current loop (fiber optic optional). See also item J. When operating on a Crown Bus loop, a system interface is required for communication with a computer. A Drone can also

be used to manipulate MRX modules. A special secondary bus is used between a master unit and up to 31 secondary units. This is a ten wire system including SB1-8, XB4, and SB Ground. The secondary bus is a parallel communication medium allowing the processor on a master unit to take direct control of secondary unit functions.

Applications

MRX-24/24S IQ Matrixers can serve a variety of very powerful functions. You customize operation, tailoring it to the system requirements. MRX-24/24S units can function in a variety of matrix formats. Individual relay groups can function as 6x1, 1x6, or can simply be viewed as a group bus which any of seven lines—six switched and one unswitched common—can tie into. Four of these groups are present on a single MRX-24/24S module.

It can switch low power loads such as lighting, fan, and motor controls, low DC and AC power, and all types of audio and digital electrical signals.

Besides easy routing of balanced audio, the MRX-24 makes it easy to perform current monitoring operations, either with individual speakers or in groups. This is done by adding small resistances to the speaker lines, then using the MRX-24/24S to control which speaker line(s) will be monitored. An IQ SMX-6™ sensing mixer/multiplexer monitors whichever speaker line is routed to it by the matrixer.

For applications where higher voltages or currents are being switched, the MRX-12 or MRX-12S is recommended.

Additional Electrical Specifications

Protection: The MRX units use dry contact relays with no other in-line electronics.

For protection, power circuits controlled by

these units must be properly fused.

Controls: An 8 segment DIP switch on the component face of the circuit board is used to set the Master unit's IQ address. A 5 segment DIP switch on the MRX-24T T-board sets the secondary unit board address. A jumper on the face of the module disconnects battery backup on master units.

Display: Power LED shows presence of +12 VDC supply, DSPI LED shows reception of digital information addressed to the unit.

Power Requirements: +12 VDC.

Aux Port: Three pins of an 8 pin mini-barrier strip provide Aux Ground reference, Aux Out supplies +10 VDC at 20 mA, and Aux In is a sensing input where +3 to +20 VDC = Digital High. Aux In floats, and therefore must be tied to ground to force the input off.

Crown Bus: Five pins of an 8 pin mini-barrier strip allow connection to a two-wire 20 mA current loop for Crown Bus communication. The Crown Bus is a serial data communication standard used between a system interface and its loop components.

Secondary Bus: The secondary bus is a parallel communications medium used between a master MRX unit and up to 31 secondary units. Required connections include SB1-8, XB4, and SB Ground. All connectors are on mini-barrier strips located on the T-board. Dimensions: 2.5 inches (6.35 cm) wide for 2-space IQ-CAG mounting; 7 inches (17.78 cm) high, and 12.125 inches (30.8 cm) behind mounting surface.

Finish: Smooth black powder coat.

Relays:

Contacts: 48 (24 pair).

Contact Form: DPST.

Maximum Switching Voltage: 100 VAC Peak.

Maximum Switching Current: 0.5 amperes.

Maximum Carry Current: 1 ampere.

Operation Time: 1 msec.

Release Time: 1 msec. Mechanical Life Expectancy: 10 million operations.

Guaranteed Excellence



Crown International, Inc.

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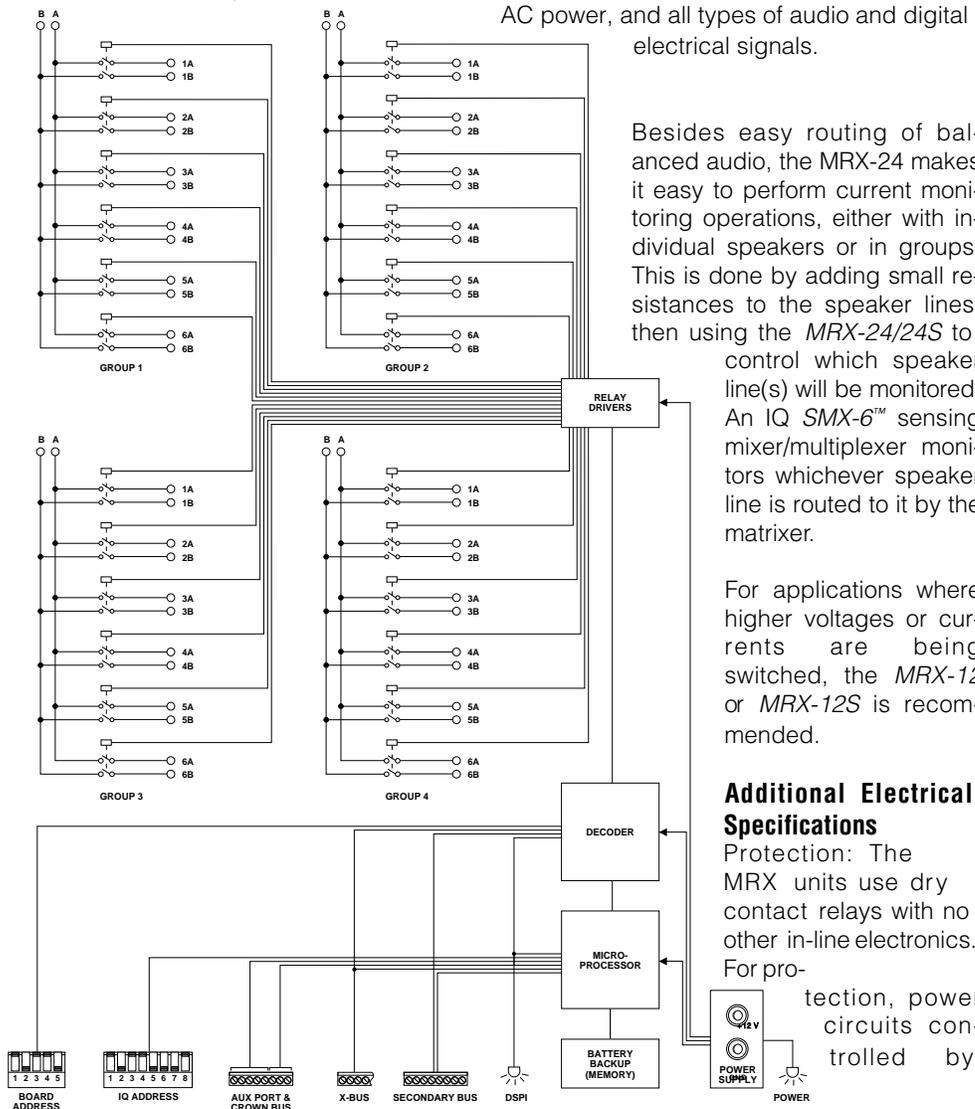
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MRX-24/24S Block Diagram