

MEM-32/A and MEM-32/W 32-Channel Relay Boards for the MetraBus

Description

Each MEM-32/W and MEM-32/A relay board converts 32 digital outputs from the MetraBus system to SPST relay contact closures. The MEM-32/W has mercury-wetted contacts rated at 2A. The MEM-32/A has dry contacts rated at 0.5A. One MetraBus controller can control up to sixteen MEM-32/A or MEM-32/W boards via a single ribbon cable, each connected by a 50-pin connector.

For more information about the MetraBus system in general and the MEM-32/A and MEM-32/W boards specifically, refer to your MetraBus User's Guide. The MetraBus User's Guide also includes programming help for the MEM-32/A and MEM-32/W.

Specifications

Relays

	MEM-32/A	MEM-32/W
Number of relays:	32	32
Relay type:	Form A (SPST)	Form A (SPST)
Contact:	Dry contact	Mercury wetted
Position sensitivity:	May be mounted in any position	Must be mounted within +30° of vertical
Contact rating:	10W at 0.5A or 150VDC/peak VAC (resistive), Installation Category I	50W at 2A or 150VDC/peak VAC (resistive), Installation Category I
Contact resistance:	100mΩ maximum initial	50mΩ maximum initial
Contact life:	10 ⁷ operations at rated load	10 ⁷ operations at rated load
Operate time:	2 s maximum	2ms maximum

Environmental

Operating temperature range: 0 to 70 °C
Storage temperature range: -40 to +100 °C
Humidity: 0 to 90% non-condensing

Power and Signal Requirements

+5V power: 510mA max. (all relays energized)
+15V power: Not used

Physical

Dimensions: 16in L x 4.75in W (40.6cm L x 12.1cm W)

Safety precautions

The following safety precautions should be observed before using this product and any associated instrumentation. This product may be used with hazardous voltages.

This product is intended for use by qualified personnel who recognize shock hazards and are familiar with the safety precautions required to avoid possible injury. Read the operating information carefully before using the product.

General safety definitions

The types of product users are:

Responsible body is the individual or group responsible for the use and maintenance of equipment, and for ensuring that operators are adequately trained.

Operators use the product for its intended function. They must be trained in electrical safety procedures and proper use of the instrument. They must be protected from electric shock and contact with hazardous live circuits.

Maintenance personnel perform routine procedures on the product to keep it operating, for example, setting the line voltage or replacing consumable materials. Maintenance procedures are described in the manual. The procedures explicitly state if the operator may perform them. Otherwise, they should be performed only by service personnel.

Service personnel are trained to work on live circuits, and perform safe installations and repairs of products. Only properly trained service personnel may perform installation and service procedures.

If a grounding screw  is present, connect it to safety earth ground using the wire recommended in the user documentation.

The  symbol on an instrument indicates that the user should refer to the operating instructions located in the manual.

The **WARNING** heading in a manual explains dangers that might result in personal injury or death. Always read the associated information very carefully before performing the indicated procedure.

The **CAUTION** heading in a manual explains hazards that could damage the instrument. Such damage may invalidate the warranty.

Installation safety

As described in the International Electrotechnical Commission (IEC) Standard IEC 664, the signal terminals are Installation Category I and must not be connected to mains, except as noted in the specifications.

When connecting to sources, install protective devices to limit current and voltage to the card.

Operators and maintainers of this product must be protected from electric shock at all times. The responsible body must ensure that users are prevented access and/or insulated from every connection point. In some cases, connections must be exposed to potential human contact. Product users in these circumstances must be trained to protect themselves from the risk of electric shock. If the circuit is capable of operating at or above 1000 volts, **no conductive part of the circuit may be exposed.**

Operation safety

Exercise extreme caution when a shock hazard is present. Lethal voltage may be present on cable connector jacks or test fixtures. The American National Standards Institute (ANSI) states that a shock hazard exists when voltage levels greater than 30V RMS, 42.4V peak, or 60VDC are present. **A good safety practice is to expect that hazardous voltage is present in any unknown circuit before measuring.**

For maximum safety, do not touch the product, test cables, or any other instruments while power is applied to the circuit under test. ALWAYS remove power from the entire test system and discharge any capacitors before: connecting or disconnecting cables or jumpers, installing or removing switching cards, or making internal changes, such as installing or removing jumpers.

Do not touch any object that could provide a current path to the common side of the circuit under test or power line (earth) ground. Always make measurements with dry hands while standing on a dry, insulated surface capable of withstanding the voltage being measured.

Do not exceed the maximum signal levels of the instruments and accessories, as defined in the specifications and operating information, and as shown on the instrument or test fixture panels, or switching card.

If you are using a test fixture, keep the lid closed while power is applied to the device under test. Safe operation requires the use of a lid interlock.

Instrumentation and accessories shall not be connected to humans.

Maintenance and service for safety

Inspect the connecting cables, test leads, and jumpers for possible wear, cracks, or breaks before each use.

Before performing any maintenance, disconnect all power sources and test cables.

Cleaning

Keep the connections free of contaminants (such as dirt, oil, etc.) in order to maintain maximum insulation resistance. If the connections become contaminated, clean them thoroughly with methanol and allow them to dry completely before use.

Installation

WARNING To prevent risk of electric shock, always take the following precautions:

As described in the International Electrotechnical Commission (IEC) Standard IEC 664, the signal terminals are Installation Category I and must not be connected to mains, except as noted in the specifications.

When connecting to sources, install protective devices to limit current and voltage to the card.

Operators and maintainers of this product must be protected from electric shock at all times. The responsible body must ensure that users are prevented access and/or insulated from every connection point. In some cases, connections must be exposed to potential human contact. Product users in these circumstances must be trained to protect themselves from the risk of electric shock. If the circuit is capable of operating at or above 1000 volts, *no conductive part of the circuit may be exposed*.

Setting the board address

Each MEM-32/A or MEM-32/W board requires four unique, consecutive addresses out of 64 addresses available on the MetraBus. The board address is the lowest numbered address of these four—the base or starting address. The board address is set with a four pole DIP switch, which is wired so that the address is incremented in multiples of four. The location of the board address switch is shown in Figure 1.

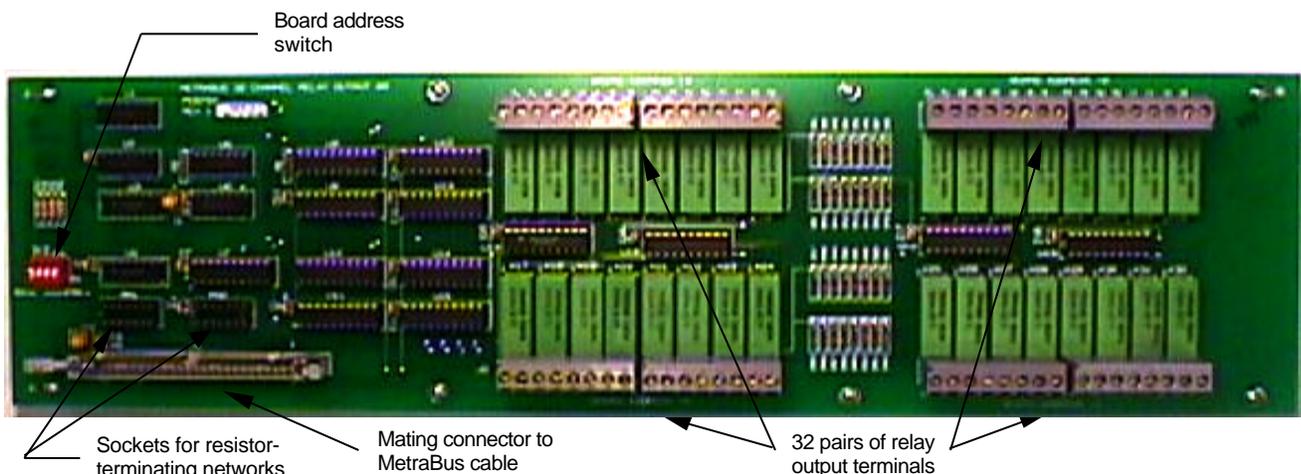


Figure 1. MEM-32/A or MEM-32/W board layout

The board address setting is the sum of the numbers set to ON at the board address switch (i.e., the number 4, 8, 16, or 32 printed above an individual DIP switch pole indicates the number that is added to the address when that pole is turned to ON). For example, to set a board address of 20, turn switch poles numbered 4 and 16 to ON and turn the other poles to OFF. See Figure 2.

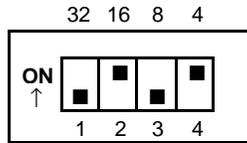


Figure 2. Setting a board address of 20

Installing resistor-terminating networks

If only one MEM-32/A or MEM-32/W is installed on the MetraBus cable or if the MEM-32/A or MEM-32/W is the last board on the cable, then install the resistor-terminating networks provided with your controller card. The resistor-terminating networks minimize signal reflection caused by long cable lengths. With the power off, install the resistor-terminating networks (14-pin integrated circuits) in the sockets marked RN1 and RN2 immediately above the MetraBus connector. See Figure 1.

NOTE For cables of 50 feet or less, resistor-terminating networks are optional and have little effect.

Mounting the board

The MEM-32/W and MEM-32/A boards may be mounted in standard 19" racks or in standard NEMA enclosures. The MEM-32/W board must be mounted within +30° of vertical for the mercury-wetted relays to work properly. The MEM-32/A board may be mounted in any position.

Connecting the board to the MetraBus cable

To connect the board to the MetraBus cable, first remove power from the system, and then plug any unused connector on the MetraBus cable to the mating connector of the board as shown in Figure 1. The MetraBus cable connector is keyed for your protection and should plug in easily. Check the keyways for correct alignment prior to plugging in the MetraBus cable.

Connecting I/O signals to the screw terminals

When connecting I/O signals to the screw terminals, note that each pair of relay contacts is independent and is connected to its own pair of screw terminals, S0, S1, S2...etc. The screw terminals are grouped according to the four port addresses.

You may use wire sizes between 12AWG and 22AWG to make connections to the screw terminals. The screw terminals are detachable from the board. Therefore, you may wire the connections away from the board, and then plug the wired connections into the board.

Connecting power to the board

If you are using an MDB-64 Series controller board (non-isolated) and one or two MEM-32/A or MEM-32/W boards are the only boards connected the MetraBus cable, then no external power is needed. The controller supplies the power.

NOTE To power your MEM-32/A or MEM-32/W from an MDB-64 Series controller board, you must first install fuse F1 (1A) in the MDB-64.

However, in the following cases, you must connect an MBUS-PWR auxiliary power supply to one of the MetraBus cable connectors, and you must remove fuse F1 from an MDB-64 controller:

- If you are connecting more than two MEM-32/A or MEM-32/W boards to the MetraBus cable.
- If you are connecting MetraBus boards needing $\pm 15\text{VDC}$ to the MetraBus cable.
- If you are using an MID-64 controller board (isolated).

See your MetraBus User's Guide for more information about using an MBUS-PWR auxiliary power supply

CAUTION If you are using an MDB-64 Series controller board with an MBUS-PWR auxiliary power supply, remove fuse F1 from the MDB-64. Failure to remove fuse F1 may damage the MDB-64, the MBUS-PWR, or both.