

MODEL 5110 RELAY LOGIC MODULE

DESCRIPTION

The SST Model 5110 Relay Logic Module is used when dry relay contacts are required to perform logic functions within a NOVA-5000 System, or to interface to external equipment. Typical applications are for operating an external annunciator, or signalling to an external data acquisition system or computer. Each Relay Module is equipped with four two-pole relays. The contacts on three of the relays can be used for external signalling; the fourth relay is programmable for internal logic within the relay module. The various signals on the backplane of the module mounting rack (alarm pulse, fault pulse, etc.) may be used as inputs or outputs for the relays. Additionally, 4 input terminals and 12 output terminals on the module terminal block are provided for the connection of external signals. Each relay may be programmed to operate in latched or non-latched mode. Or the relay may be programmed in "mixed" mode, that is, where some inputs will latch the relay, while other inputs will operate the relay in non-latched mode. Reset conditions may be independently selected for each relay, and the two sets of contacts on each relay can be set to be either normally open or normally closed contacts. The programming connections are made with jumper wires or "suitcase" jumper plugs on individual contacts in a field of header pins. The relay contacts are formed from coin quality gold material, so they are suitable for low level signals, and are protected from tarnishing in corrosive environments. Light emitting diodes (LED's) on the module front panel provide visual confirmation of relay operation.

LOGIC DIAGRAM

Figure 5110-1 shows, in simplified form, the internal logic in the Relay Module when programmed to the default configuration.

- ! The relay module may be configured for many other combinations of logic using jumpers on the module. See complete instructions on following pages.

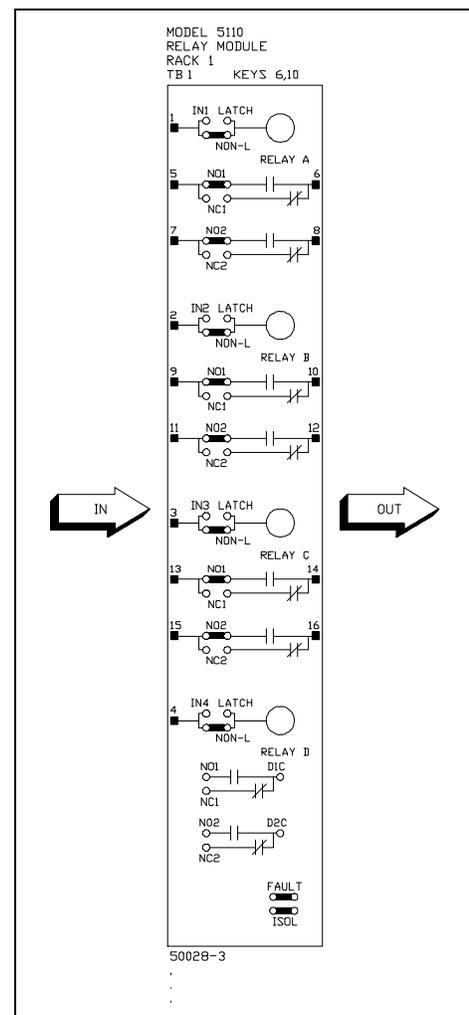


Figure 5110-1 Logic Diagram

THE DEFAULT RELAY MODULE CONFIGURATION

Figure 5110-1 shows the Model 5110 relay module connected in the default configuration, as shipped from the factory. External connections to the Module are made via the 16 position terminal block associated with the module slot where the relay card is installed. The default connections are as follows.

Relay Inputs - terminals 1 through 4

These terminals are connected internally to the non-latching input of each relay, and are used to activate the relays in the module. They are normally "pulled up" to the +24 volt DC supply. When the input is connected to the power supply common (0 VDC), the internal relay will be energized. When wired as non-latching, these inputs connect directly to the coil of the relay; it will draw 16 mA of current through these inputs when energized.

Relay Contact Outputs - terminals 5 through 16

These are NOVA-5000 Standard Relay Outputs which operate when the respective relays are energized. These are "dry" contacts which may be set to be either normally open (NO) or normally closed (NC). To change, move the suitcase jumper plug for the respective relay contacts to the NO or NC position. The jumper plugs install on the two header pins closest to the main module connector.

- ! WARNING: Use care in designing relay circuits associated with any alarm or releasing functions. These should normally be designed such that during non-alarm conditions, any relay coils will be deenergized and contacts open. The relays should be energized under alarm conditions only. This will prevent false alarms or inadvertent release of extinguishant if a Relay Module is unplugged or inserted into a rack when the system is powered on.

MODULE SETUP FOR OTHER CONFIGURATIONS

Custom configurations are made by adding jumper wires between the "header pins" on the module. Figure 5110-2 shows the layout and function of each of these pins. These pins may be interconnected using wire-wrap connections, solder connections, or using quick connect jumper wires.

- ! Programming jumpers are available from Safety Systems Technology. Order in packages of 10, part number 45110-3.

Module Inputs

There are four sets of pins, labeled IN1 through IN4. Each of the four pins in a horizontal row are connected together. These headers connect to terminal numbers 1 through 4 on the module terminal block. They are normally used for input signals into the relay module. However, they may be used for any function that requires access to a terminal on the module terminal block.

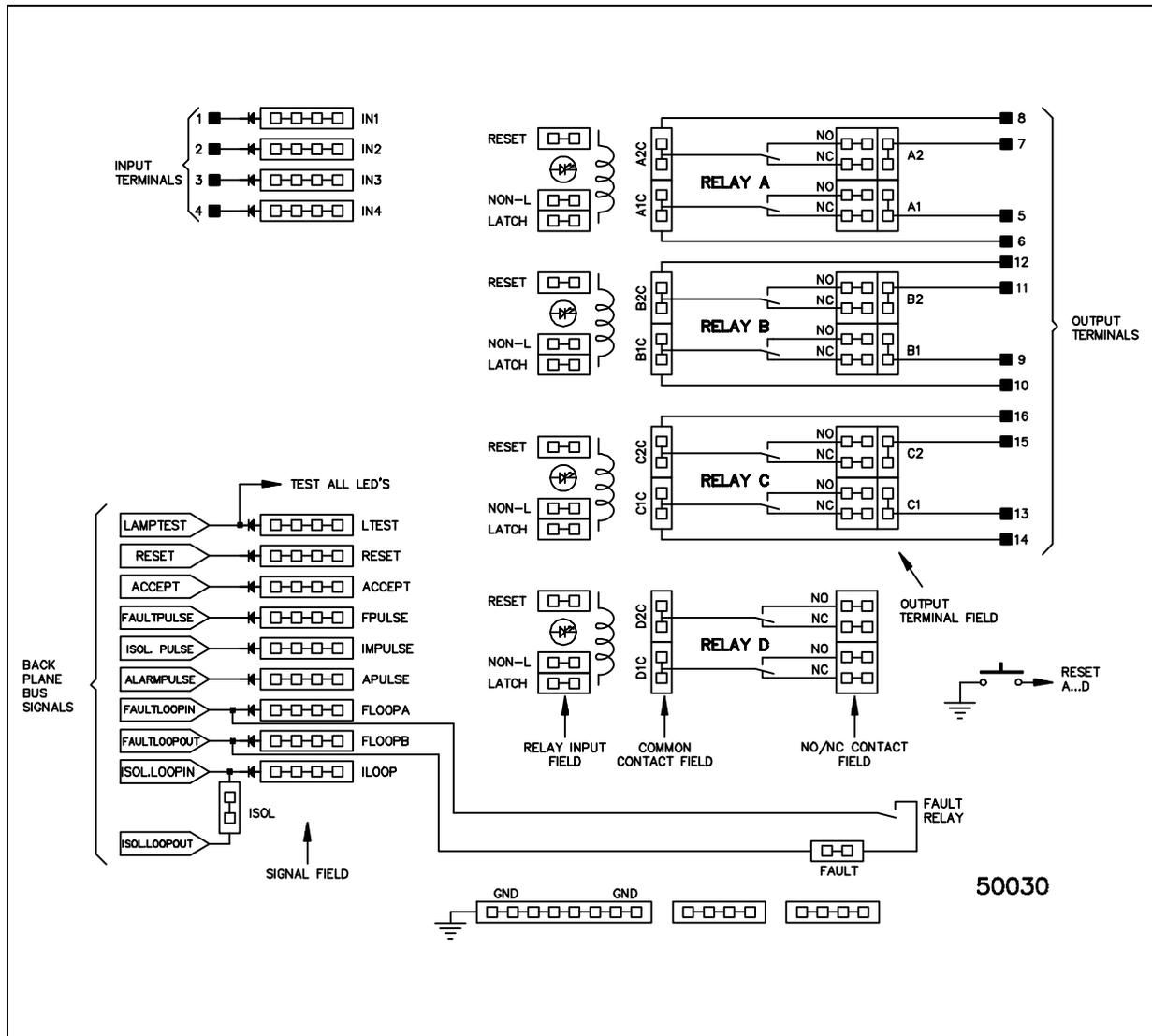


Figure 5110-2 Programming Headers Configuration

Backplane bus signals

A selection of back plane bus signals are connected to header pins located in the module "signal" field. From the headers, the back plane bus signals may be connected to the relay activation inputs, reset inputs or relay contacts. All back plane bus signals used on the Relay Module are isolated with diodes, so that two or more signals may be connected to the same relay without any interaction between the two signals on the back plane bus. The following back plane bus signals are available in the signal field: Lamp test, System Reset, Acknowledge, Fault pulse, Isolate pulse, Alarm pulse, Fault loop, and Isolate loop. Figure 5110-2 shows the marking for the headers connected to each of these busses.

Relay reset

If any of the relays are set for Latching operation (see below), they will be reset when you push the reset button on the front of the module, or when a system reset is made. Each relay may also be individually reset, using either of the RESET header pins. You may use any signal on the signal field to reset. The resetting signal has to be switched low, i.e. a voltage close to zero, to reset the relay.

Non-latched relay activation

The pins marked NON-L connect directly to the relay coil. Any signal in the signal field may be used to activate a relay in the non-latched mode, provided it can sink the required current. The activating signal has to be low, i.e. a voltage close to zero or a solid state output in its active state respectively cause the relay to be activated. The relay coil will draw 16 mA.

Latched relay activation

The pins labeled LATCH activate the relays and latch on until reset. These are NOVA-5000 standard logic inputs. Any signal of the signal field may be used to activate a relay in the latched mode. The activating signal has to be low, i.e. a voltage close to zero, to activate the relay. The ALARM PULSE or FAULT PULSE are typical of the signals which can be used to activate relays in the latched mode.

Mixed latched and non-latched activation

In rare cases it may be desirable to activate a relay with both latched and non-latched signals. This can easily be achieved by wiring both the latched and non-latched inputs to their activating signals.

Example: An external alarm device is to be activated whenever the signal connected to module terminal 1 is activated and is to be activated and stay activated whenever the back plane bus signal FAULT PULSE appears at least once. To achieve this function the alarm device is connected to output terminals 7 and 8, which are controlled by Relay A. The header labeled IN1 is connected to the header labeled NON-L of relay A. The header labeled FPULSE is connected to the header labeled LATCH of relay A. The output of relay A is wired to its NO (normally open) connection with the suitcase jumper at the NO/NC contact field.

Relay outputs

All relay outputs connect to header pins, so they may feed any combination of other relay contacts, bus signals, and the external terminal block. These headers also permit relay D to be interconnected with the other relays on the module for internal logic functions.

Module output terminals

The output terminals are permanently connected to their corresponding headers of the common contact and NO/NC contact fields. Suitcase jumpers on the NO or NC contacts connects the contacts to the terminal block. Or you can use wire jumpers to achieve a variety of logical combinations and functions.

Example: An external alarm device is to be activated only when signals connected to both IN1 and IN2 are activated. To achieve this, the alarm device is connected through two of the output terminals, e.g. terminal 7 (Relay A) and terminal 11 (Relay B). The header labeled IN1 is connected to the header labeled NON-L of relay A. The header labeled IN2 is connected to the header labeled NON-L of relay B. Thus relay A is activated when the signal connected to IN1 is activated and relay B is activated with IN2. Relays A and B have NO (normally open) connections via suitcase jumpers NO2. Finally the header labeled A1C is connected with a jumper wire to the header labeled B1C. This arrangement of jumpers causes terminals 7 and 11 to be connected whenever relay A and relay B are activated at the same time.

Signal combinations

All signals of the signal field may be combined by simply connecting the corresponding headers in the signal field with jumper cables.

Example 1: Relay B is to be reset whenever the signal RESET or ACCEPT occur. To achieve this function the headers for the signals RESET and ACCEPT are connected with a jumper cable and then an additional cable is connected to the header labeled RESET of relay B.

Example 2: Relay C is to be activated and stay activated whenever one of the signals FAULT PULSE, ISOLATE PULSE or ALARM PULSE occurs. To achieve this function the headers of the signals FPULSE, IPULSE and APULSE in the signal field are connected with jumper cables. An additional connection is made to the header labeled LATCH of relay C.

GND Headers

The header labeled GND provides ground or 0 VDC potential (power supply common). This can be used when a backplane bus signal must be activated by a relay contact. In this case, one of the relay contacts is connected to the corresponding header in the signal

field while the other contact is connected to the GND header. Please note that the activation of backplane bus signals requires that the decoupling diode located next to the header in the signal field is replaced by a short-circuit wire.

Multiplying Headers

For the case that one signal has to be connected to many inputs and one runs out of header pins, the two 4x1 headers on the right side of the GND headers can be used as “multipliers”.

Isolate Loop Jumper

In normal operation the Relay Module connects the two backplane bus signals used for the isolate loop. Optionally, this connection can be interrupted by removing the suitcase jumper on the header labeled ISOL. This header is located right next to pin C32 of the backplane connector. With the isolate shunt removed the contacts of relays A through D may be used to either connect or disconnect the isolate loop.

Fault Loop Jumper

During normal operation the Relay Module connects the two backplane bus signals used for the fault loop. A failure of one or two power supply voltages will cause the fault loop to be interrupted. Optionally, the fault loop can be opened by removing the suitcase jumper on the header labeled FAULT. This header is located close to pin C10 of the backplane connector. With the fault shunt removed the contacts of relays A through D may be used to either connect or disconnect the fault loop. It should be noted that any circuitry being used to connect or disconnect the fault loop is electrically in series with the internal fault loop contact of the Relay Module.

Module Keying

Before installing the Model 5110 Relay Logic Module into the wired slot in the mounting rack, be sure that the snap in covers have been installed at keying locations 6 and 10 of the rack keying strip. See “Module Keying Instructions” in section 5300 of this manual for complete details.

- ! Installation of the keying system is very important. A module can be permanently damaged if it is plugged into a slot which is wired for a different type of module.

Modules may be inserted into or unplugged from the rack at any time, even with power on, with out any damage to the module.

OPERATING INSTRUCTIONS

General

During normal operation of the Model 5110 Relay Logic Module, only the green **Power** LED will be lit. When a relay is energized, the associated LED on the module front panel will also light. The following controls and indicators are provided on the module.

Power Lamps (green and yellow)

The two lamps at the top of the panel indicate the status of the power supply to the module. A green lamp indicates that at least one of the dual 24 volt power supply feeds are within specification. If the yellow lamp is flashing or on, a fault in the power circuits is indicated. Probable cause is a blown fuse in the module.

Relay Lamps

When any relay is activated, the associated lamp will be lit, and remains lit until the relay is reset.

Reset Pushbutton

Depressing this button unconditionally resets relays A through D.

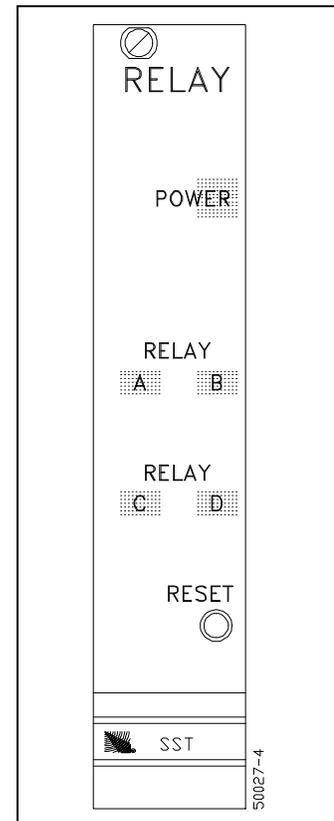


Figure 5110-3 Front Panel

