Application Note

RELAY MODULE

Part Number 212-2009

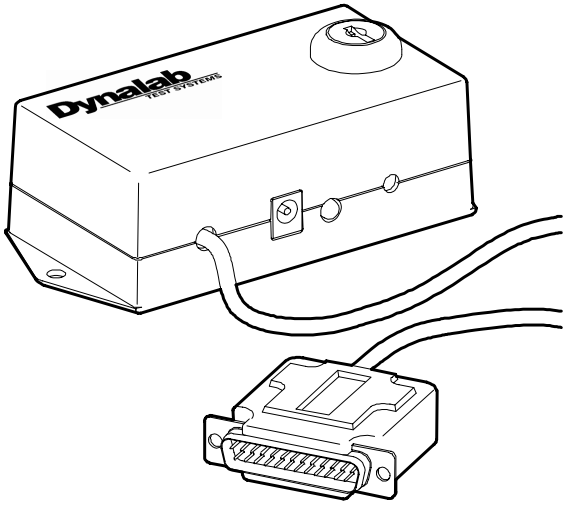
Dynalab
TEST SYSTEMS

Relay Module

Introduction

Dynalab recommends using the Relay Module to provide a robust interface between the Dynalab Analyzer and customer supplied external devices. The Relay Module prevents damage to the Analyzer in the event of faulty wiring, power surges, etc.

The Relay Module (part # 212-2009) simplifies external device control. When connected to a Dynalab Analyzer Control Port, this device provides isolated, high-power switching capabilities. The Relay Module is a complete turnkey solution for activating external devices – such as relays or locking fixtures.



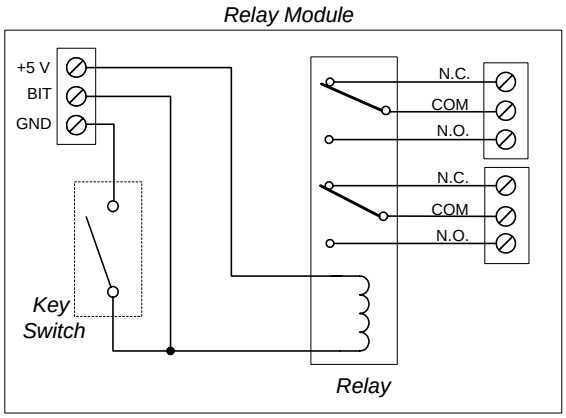
- Screw terminals allow for quick and easy wiring. Control Port cable is pre-wired to the proper terminals
- Key switch is included to manually activate the relay.
- Design isolates the Analyzer Control Port to protect it from accidental over-current damage.
- LED indicator visually confirms operation.
- Heavy-duty DPDT relay and connectors are capable of switching up to 8 Amperes. Surge suppression protects the relay contacts when controlling inductive loads.

Specifications

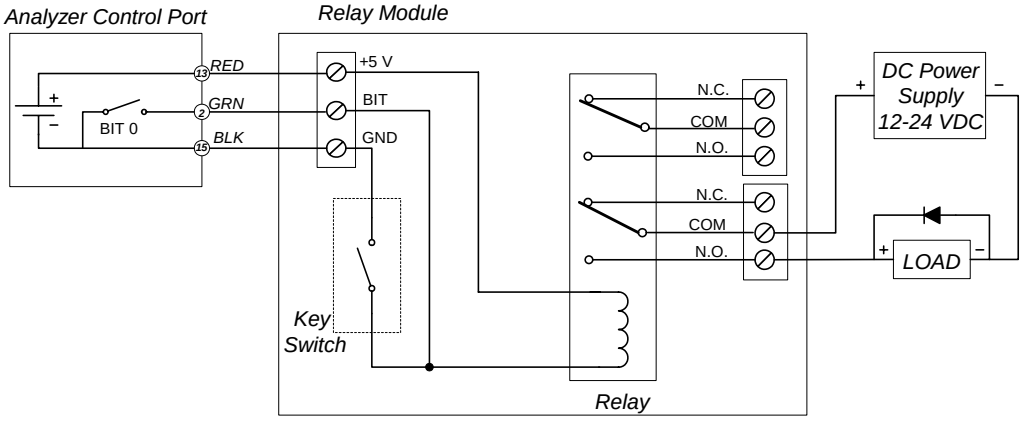
The Relay Module is capable of switching up to 24 VDC at 8 Amps.

Connections

The schematic below shows the circuit diagram of the Relay Module. This diagram is shown with the relay in the de-energized state.



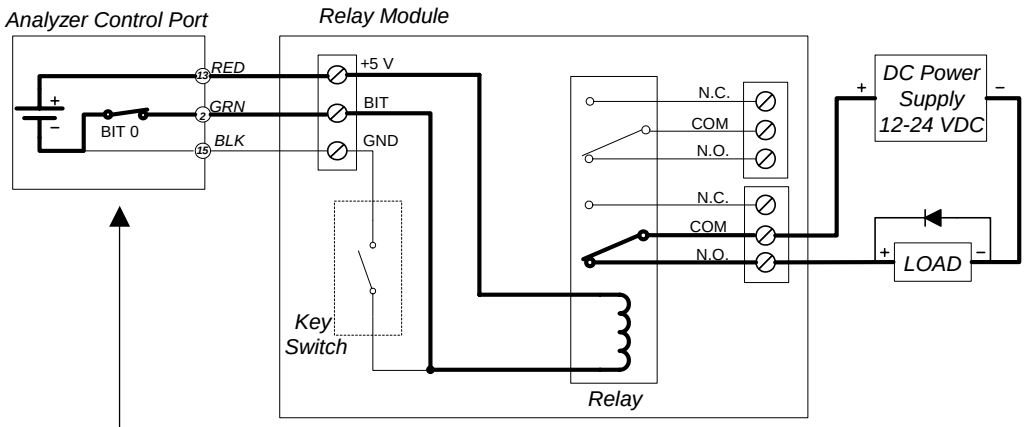
The following schematic shows the Relay Module with connections to an external power supply and load. Also shown are the connections to the Analyzer's control port. The connections to the control port are pre-wired and are established simply by attaching the Relay Module's control port adaptor to the Analyzer's control port. The connections to the load and external power supply are made by the customer. (Note the use of a noise suppression diode. This is necessary when the load is an inductive load such as a coil or motor. It is important that it be located as close to the load as possible.)



Two methods are available to energize the relay. The Relay Module can be energized automatically via Sequence control or manually via the Key Switch. Each method is presented in detail in the following sections of this document.

How to energize the Relay Module via Sequence control

To energize the Relay Module, DC voltage must be applied to the relay coil. Note the switch output connection on the Analyzer Control Port labeled "BIT 0". When this switch closes, 5 VDC is connected to the relay coil, energizing the relay and closing the N.O. contacts. This is illustrated in the schematic shown below:

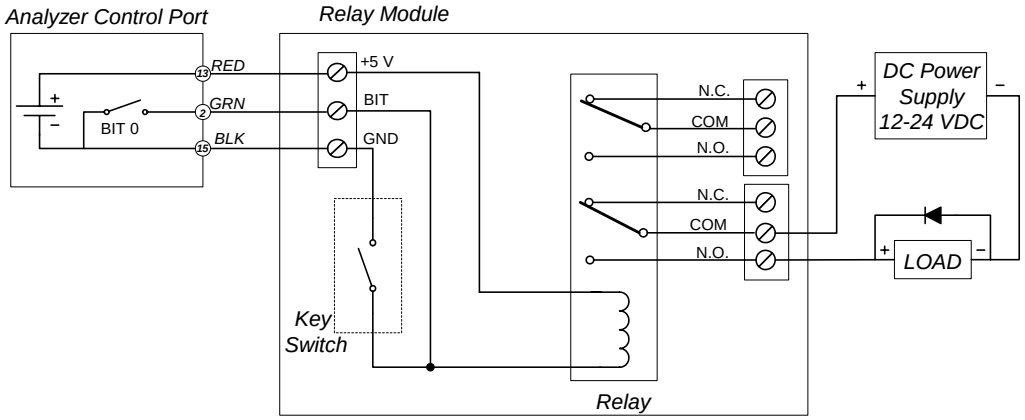


To energize the Relay Module via Sequence control, it is necessary to manipulate the "BIT 0" control port switch. This is done with the following two Sequence items:

- BSET 0 - Sets the Analyzer's control port BIT 0.
- BCLR 0 - Clears the Analyzer's control port BIT 0.

When BSET 0 appears in the Sequence, it has the effect of closing the BIT 0 switch as seen in the schematic shown above. This energizes the relay, causing the relay contacts to switch to the N.O positions.

When BCLR 0 appears in the Sequence, it has the effect of opening the BIT 0 switch, de-energizing the relay, causing the relay contacts to return to their N.C. positions as shown below.



The following is an example Sequence employing BSET and BCLR to momentarily energize a solenoid after testing is completed. The solenoid releases a fixture clamp. For a detailed description of this application, please refer to Dynalab's Application Note entitled *Fixture Clamp Activation.*

Table 1. Basic Fixture Clamp Activation Sequence

Line	Sequence item	Parameter	Application Effect
1	ADVOFF		Forces the operator to repair errors before continuing the test
2	TEST	MAIN	Performs a complete Netlist scan of MAIN
3	SOUND	4	Play sound 0
4	**BSET**	**0**	**Turns on control port BIT 0**
5	DELAY	1	Delays Sequence execution for 1 second
6	**BCLR**	**0**	**Turns off control port BIT 0**
7	REPORT		Show error report
8	KWAIT	0	Waits for START button input
9	REPEAT		Go to line 1 and continue Sequence execution

Line 1 The ADVOFF Sequence item at the beginning of the Sequence instructs the Analyzer not to accept input from the START button when stopped on an error encountered during the TEST scan. This Sequence item prevents the operator from advancing and completing the test until the error has been fixed.

Line 2 TEST instructs the Analyzer to perform a complete test of the Netlist specified by the parameter, in this case, MAIN. (The TEST Sequence item scans for continuity, shorts, and detection switch closures. See PASS Help for more information about the TEST Sequence item.)

Line 3 Plays sound zero – "twirl". Sound zero is generally used to indicate that the harness has passed the test. (See PASS 6.0 Help for a description of available sounds.)

Line 4 BSET instructs the Analyzer to switch the specified Control port bit to the on position.

Line 5 DELAY instructs the Analyzer to wait a specified number of seconds before executing the next Sequence item.

Line 6 BCLR instructs the Analyzer to switch the specified Control port bit to the off position.

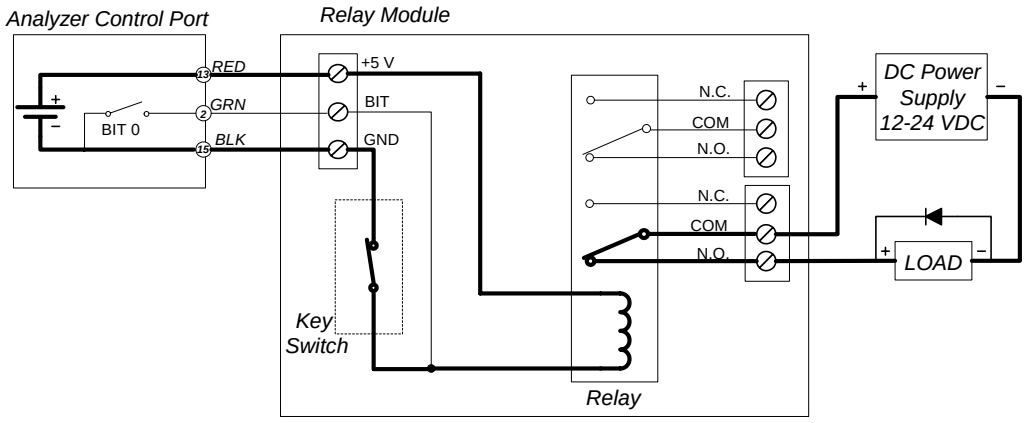
Line 7 REPORT instructs the Analyzer to show the number of errors of each type on the display.

Line 8 KWAIT forces the Analyzer to wait for START button input before continuing to the next Sequence item.

Line 9 REPEAT instructs the Analyzer to go to line 1 and repeat execution of Sequence. Sequence execution will continue to repeat in this manner until the STOP button is pressed.

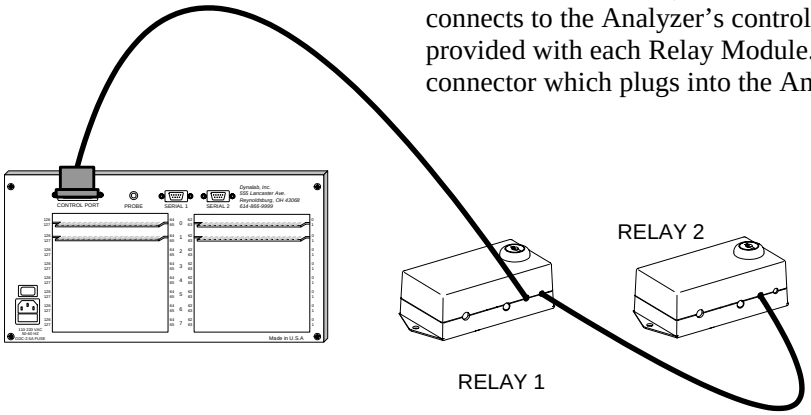
How to energize the Relay Module via the Key Switch

The Relay Module can also be energized by manually closing the key switch located on the faceplate. When the Key Switch is closed, 5 VDC is connected to the relay coil, energizing the relay and closing the N.O. contacts. This is illustrated in the schematic shown below:



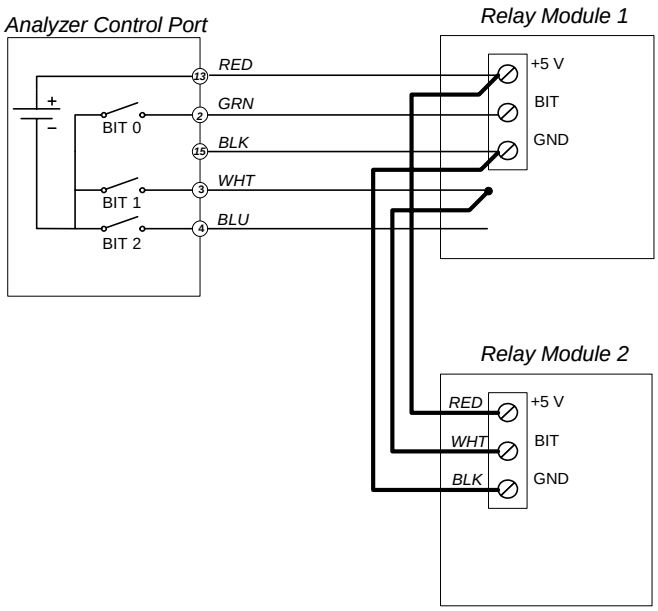
Connecting Two Relay Modules

It is possible to cascade two relay modules, where BIT 0 is used to control the first relay module, and BIT 1 is used to control the second relay module. The wiring to accomplish this is shown here. Relay 1 is connected to the Analyzer in the normal fashion via the cable that connects to the Analyzer's control port. This 5-conductor cable is provided with each Relay Module. The cable is terminated on a DB-25 connector which plugs into the Analyzer's control port.



Relay 2 is connected to Relay 1 using a 5-conductor cable. This connection must be custom-made in the field by modifying the cable that is supplied with Relay 2. Note that each Relay Module is supplied with a 5-conductor cable terminated on a DB-25 connector on one end, and hardwired to the Relay Module on the other end. For the connection between Relay 2 and Relay 1, the following instructions apply:

- Remove the DB-25 connector from one end of the cable – this can be done by simply cutting the cable.
- Strip back the sheathing and expose the 5 wires. Strip the red, white, and black wires.



- Open Relay 2. On the 3-position terminal strip to which the cable is terminated, remove the green from the middle terminal and replace with the white wire.
- Open Relay 1. Connect wires from Relay 2 as shown in the diagram at left: Connect the red wire to the terminal marked +5V, connect the black wire to the terminal marked GND, and splice the white wire to the white wire that is part of the cable between Relay 1 and the Analyzer.