PCM3
Power Control Board/Cable

The PCM3 is a general purpose remote relay card for the control of power AC and DC devices. Ideal for demanding control applications in scientific and industrial automation systems, the PCM3 permits the direct interface of relays, heaters, motors, actuators, and a wide variety of AC and DC devices-over the full range of voltages from 10 to 280V. The PCM3 is the external relay board which is normally included with the PCM2 module set. It is an option for the System 570, and can be used as a spare relay board for the PCM2. The card is fully optoisolated and protected. All connections are made to high-current screw terminals, and the relays are industry standard, plug-in, solid-state elements, so the system is readily reconfigured as the application requires.

The PCM3 is a remote unit which keeps potentially hazardous and noisy currents outside the system environment. The remote assembly can be mounted in a variety of positions.

The PCM3 provides up to 16 channels of power interface. Each channel can be configured with plug in relays for DC or AC output. Each channel is short-circuit protected with plug-in fuses, and isolated to 1000V AC. Control channels can switch up to 3A. LED indicators are provided to indicate channel status. A ribbon cable is used to connect the remote card to the interface board.

WARNING: The relay card should not be handled unless all power to external circuits has been disconnected. For maximum safety, mount the relay card in an enclosure.

User-Configured Components

The PCM3 has provisions for 16 channels of plug-in relays. Two relay types can be accomodated: the AC output relay and the DC output relay. Either relay type can be installed in any channel position.

Each channel is interfaced with two screw terminals on the remote card.

Table 1. User-Configured Components on the PCM3

Name	Designation	Function
Screw Terminals	J161	Screw Terminals for connection of AC/DC output channels (32 terminals)
Screw Terminals	±	External +5V power source connection (2 terminals)
Cable 1	CB1	Linking cable between the System 570 and the relay card assembly (50 pin)
Fuses	See Figure 1	Per channel current limit plug-in wire fuses, 5A
Relays	See Figure 1	Plug-in modular relays
Jumper	See Figure 1	+5V power jumper

PCM3 Relay No.	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
PCM2 Channel	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
575/576 Port & Channel	Port C								Port D							
	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31

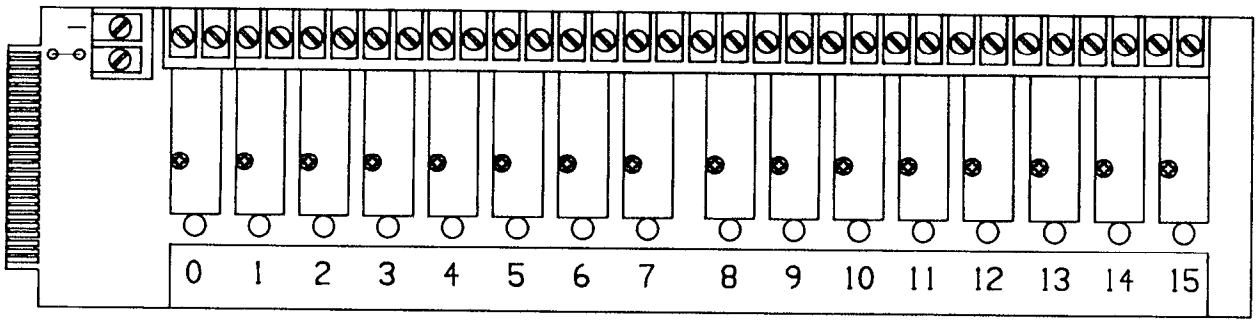

Figure 1. PCM3 Power Control Board/Cable

REPLACEABLE PARTS			
No.	P/N	Description	Qty.
1	R-76-33k	Resistor	16
2	PL-67	LED Red	16
3	FU-61	Fuse, Samp	16

RELAY SELECTION CHART	
Customer to specify quantity and type of relay(s) per Keithley Model No.	
Model No.	Description
500-OAC1	AC Output - Black 3A, 12-140V
500-OAC2	AC Output - Black 3A, 24-280V
500-ODC1	DC Output - Red 3A, 10-60V
500-ODC2	DC Output - Red 1A, 10-200V

Connections

The PCM3 provides screw terminals for 16 channels of interface. The locations of screw terminals are marked on the remote relay card. A typical connecting scheme is illustrated in Figure 2.

Output voltage relays will operate with up to 60V for DC units; and 280V for AC units. The maximum operating voltages of the output relays should not be exceeded or damage to the relays will result. Outputs are fuse-protected, but currents should not exceed the rated maximum. To avoid the possibility of damage or fire, do not thwart the fuse or expose the system to voltages greater than the maximum ratings. Signal polarity at the screw terminals must be observed, or damage to the relay may result.

The power source, whether AC or DC, should be connected in series with the load device and the output relay screw terminals (see Figure 2).

WARNING: When operating the PCM3 with high voltage AC and DC signals, such as 120V line power, user-supplied hazardous voltages are present on both sides of the remote assembly and at all the screw terminals. DISCONNECT ALL HAZARDOUS VOLTAGES BEFORE HANDLING THE REMOTE UNIT. INSTALL THE PCM3 IN A PROTECTED AREA AWAY FROM HUMAN CONTACT. Disconnect all high voltages before removing or installing modular relays. Do not detach the interface ribbon cable from the remote assembly with hazardous signals present.

CAUTION: Fuses provide protection for the relay card from 120V low energy circuits. However, the user must provide additional fusing for 240V line protection.

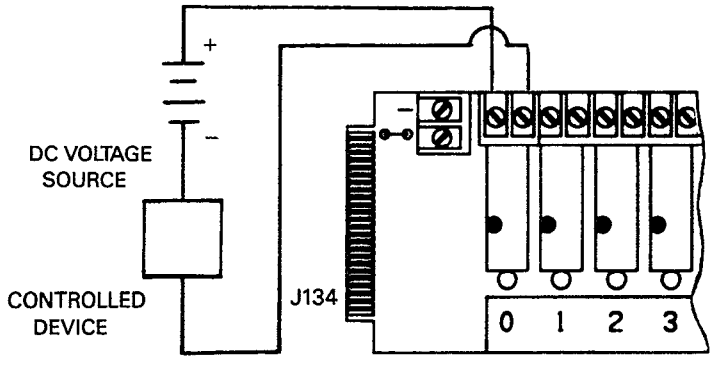

Figure 2. Typical PCM3 Connections (Channel 0 Shown)

Powering the Relays

The relays require 5V for operation. Normally, the System 570 power supply is used to power the relays. This supply is provided to the relay card by installing a jumper on the PCM 3. Connections are made with a 50-contact, flat ribbon cable with industry-standard edge-card connectors at both ends. The connectors are keyed.

It is also possible to power the relays with an external power source. Screw terminals are provided for this purpose (see Figure 2). To operate the remote relay card from an external source, disconnect the jumper and then connect the external power source to the "+" and "–" terminals. The jumper is located directly to the left of the screw terminals.

Remote Board Configuration

By installing appropriate plug in relays, the PCM3 is easily configured to accept output signals. Output relays are designed to switch external loads. Available relays are listed below.

Keithley Model	MFG Type	Type	Ratings
500-OAC1	OAC5	AC Output (Black)	3A, 12-140V
500-OAC2	OAC5A	AC Output (Black)	3A, 24-280V
500-ODC1	ODC5	DC Output (Red)	3A, 10-60V
500-ODC2	ODC5A	DC Output (Red)	1A, 10-200V

Relay Module Installation

The PCM3 will be shipped with the relays specified at the time of order not installed. At any time the user may alter PCM3 capabilities by installing the appropriate relays. Install relays as follows:

WARNING: Remove all power from circuits connected to the PCM3 relay card before removing or installing relays.

CAUTION: Make sure the relay type agrees with expected load conditions.

1. Plug in the relay at the desired position. Make sure the mounting screw lines up correctly with the screw hole and that each relay terminal seats properly. The spacing on the terminals is such that the relay can be installed in one direction only.
2. Secure the relay to the board with the mounting screw
3. Connect the remote relay card to the System 570 using the supplied interface cable.

Commands

The PCM3 is controlled by commands programmed to the System 570 power control channels, or to the PCM2 control board. See the documentation for these devices.

Theory of Operation

The PCM3 is interfaced to the System 570 or PCM2 control card by a 50 pin ribbon cable, with a standard edge-card IDC connector. The remote relay card is an Opto-22 PB-16, an industry-standard 16 channel solid state relay rack, with high current screw terminal connections (two per channel), channel status LED's and plug-in fuses for each channel. The relays are secured by screws provided on each encapsulated relay.

Output relays contain an LED and current limiting resistor interfaced to the driving logic. The output relay is composed of an optically coupled phototransistor, a zero voltage circuit, and a triac output stage with a resistor-capacitor snubber circuit. In the DC output relay, the phototransistor is coupled to an amplifier, a power transistor output (saturated on), and a protective diode.

The fuse is in the path to the screw terminals for both input and output relays, and is rated at 5A, 125V.

PCM3 Specifications

Channels: up to 16 output
Characteristics:
- Configuration: any combination of plug-in modules (AC and DC Output)
- Operating temperature: −30 to +70°C
- Status indication: LED for channel "on"
- Isolation: 350V RMS channel to channel
- Connections: screw terminals for #16-24 AWG wire 4' ribbon cable to mainframe card (TTL signals)
- Dimensions: 3.5" (89mm)W × 14.7" (375mm)L × 2.2" (56mm)H

Modules for PCM3

AC Output Module:
- Operating Voltage:
  - 12-140V AC (OAC-120)
  - 24-280V AC (OAC-240)
- Frequency: 25-65Hz
- Current: max 3A at 25°C, derate to 1A at 70±C
  min 20mA peak 50A for 1 cycle surge
- Voltage drop: 1.6V max (device on)
- Leakage: 5mA max (device off)
- Power factor: up to 0.5
- Switch form: 1 pole, normally open
- Switch technique: optically isolated solid state switch
- Switching time: ½ cycle max (10ms at 50Hz)

DC Output Module:
- DC output: ODC-60, ODC-200
- Operating voltages: 10-60V, 10-200V
- Current at 25°C: 3A, 1A
- Current at 70°C: 1A, 0.3A
- Voltage drop: 1.6V max (device on)
- Leakage: 2mA max (device off)
- Switch form: 1 pole, normally open
- Switch technique: optically isolated solid state switch
- Switching time: 1ms max