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Ten-slot high density switch mainframe

7002

Switch/Control Mainframe

400-Channel



- DC, RF, and optical switch capability
- Interactive channel status display
- Optional light pen for front panel programming
- Integrates easily with DMM and SourceMeter® instruments
- Full channel status display
- 10 card slots
- Supports more than 30 switch/control cards

Ordering Information

7002 400-Channel Switch/ Control Mainframe

Extended warranty, service, and calibration contracts are available.

The Model 7002 Switch System is a 10-slot mainframe that supports up to 400 2-pole multiplexer channels or 400 matrix crosspoints. The front panel includes a unique interactive display of channel status for quick programming. Scanning speeds of up to 165 channels per second are possible with the high density switch cards. The wide selection of more than 30 different switch cards makes the 7002 one of the most flexible switching mainframes available.

Reduce the Size and Cost of Your Switching Application.

Up to 400 channels of 2-pole switching. A single Model 7002 mainframe can accommodate up to ten 40-channel cards. That's 400 channels in a single full-rack package that is only 178mm high (7 in). This level of density provides some important advantages. First, it reduces the amount of switching hardware required for a given application. Second, it provides high flexibility. The high density cards can be used with the special signal cards to cover all your signal needs for a large application with one mainframe.

Switch a wide range of signals. The 7002 is fully compatible with all 7001 switch cards. From this broad selection of more than 30 cards, you can assemble a switch configuration that will ensure signal integrity and minimize errors. These cards allow the 7002 to switch DC signals from femtoamps to amps, nanovolts to kilovolts, as well as RF and optical signals.

Analog backplane. The analog backplane used by the high density cards adds configuration flexibility and eliminates intercard wiring. For example, the outputs of a multiplexer card can be connected to the row inputs of a matrix card. Or, the outputs of ten multiplexer cards can be connected to form one large 1×400 multiplexer. Intercard wiring is eliminated by using the analog backplane to form these configurations.

Faster Test Development

Unique channel status display. The interactive front panel display helps shorten the time required to configure the 7002 and develop test software. The display indicates the open/close status of each channel in the mainframe. This information is very useful when programming the 7002 and developing application software. Knowing the channel status also helps to verify proper operation during the debug phase.

Light pen programming. An optional light pen provides point and click programming from the front panel. By selecting the desired channels or range of channels, the scan list can be built, matrix patterns created, channels opened or closed, and patterns stored in memory. The 7002's non-volatile memory stores up to 500 complete switch patterns.

Automatic card configuration. When the high density cards are installed, the 7002 automatically configures each slot independently for the proper card. The front panel channel status display adjusts to show each card's capacity and configuration.

Front panel Info key. At the touch of a button, the operator receives context-sensitive, on-line information to help configure the system. This information is displayed on a 52-character alphanumeric display for clear and readable messages. There is no need to refer constantly to the operator's manual. All information messages, operating instructions, and prompts are available in English, German, and French. Just select the desired language in the configuration menu.

Programmable channel closure restrictions. The 7002 allows specific channels to be locked out from closure. This restriction can be conditional based on the open/close state of other channels or crosspoints. This capability is useful to prevent certain signals from being accidentally connected to high power circuits, for example.

ACCESSORIES AVAILABLE

RACK MOUNT KITS

7002-RMK-1	Fixed Rack Mount Kit
7002-RMK-2	Slide Rack Mount Kit

COMMUNICATION INTERFACES AND CABLES

7007-1	Double Shielded, Premium GPIB Cable, 1m
7007-2	Double Shielded, Premium GPIB Cable, 2m
7078-PEN	Programming Light Pen (includes holder)
KPCI-488	GPIB/IEEE-488 Interface Board for the PCI Bus
KUSB-488	IEEE-488.2 USB-to-GPIB Interface Adapter

TRIGGERING

8501-1	Trigger Link Cable, DIN-to-DIN, 1m
8501-2	Trigger Link Cable, DIN-to-DIN, 2m
8502	Trigger Link to BNC Break-out Box
8503	Trigger Link Cable, DIN-to-dual BNC, 1m
8505	Male to 2 Female Y-DIN Cable for Trigger Link

SOFTWARE

TestPoint Test Development Software

OTHER

7002-EW 1 Year Warranty Extension

SWITCHING AND CONTROL

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7002

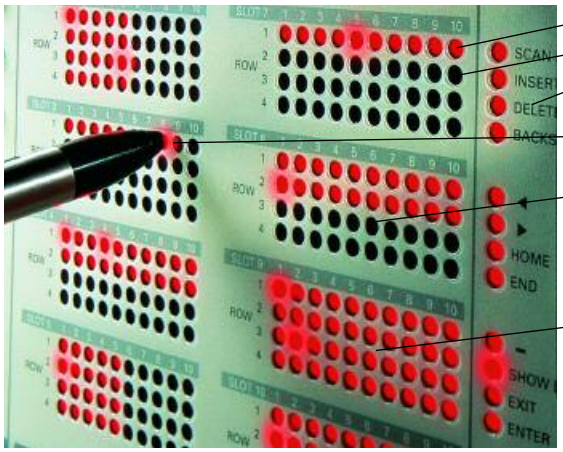
Switch/Control Mainframe

400-Channel

System Throughput

300 channel per second scanning. The 7002 can scan through up to 300 channels per second. This scan process can be controlled by the internal time base of the 7002 or through external triggers. The scan sequence is controlled by what appears in the scan list. The scan list can include channels, ranges of channels, and memory locations. This approach gives maximum flexibility while obtaining maximum throughput.

Built-in Scan Control and Trigger Link. The built-in scan control eliminates the need for the computer to control every step of the test procedure. Simply program the 7002 to control the channel spacing, scan spacing, and number of scans. Trigger Link gives you access to six independent hardware trigger lines on a single cable.



Closed channel

Open channel

"Light Pen Keys" provide functional programming with point and click.

Point and click the light pen on the desired channel or crosspoint.

Matrix cards are displayed in Row-Column format. Only the available rows and columns of the card are displayed. Rows are horizontal and columns are vertical.

Multiplexer card display. The first row across represents channels 1 to 10. The second row is channels 11 to 20. Only the available channels are displayed.

SYSTEM

CAPACITY: 10 plug-in cards per mainframe.

MEMORY: Battery backed-up storage for 500 switch patterns.

SWITCH SETTLING TIME: Automatically selected by the mainframe. For different switchcards, 7002 will be set to the slowest relay settling time. Additional time from 0 to 99999.999 seconds can be added in 1ms increments.

TRIGGER SOURCES:
External Trigger (TTL-compatible, programmable edge, 600ns minimum pulse, rear panel BNC).
IEEE-488 bus (GET, *TRG)
Trigger Link
Manual (front panel)
Internal Timer, programmable from 1.0ms to 99999.999 seconds in 1.0ms increments.

STATUS OUTPUT: Channel Ready (TTL-compatible signal, rear panel BNC). Low going pulse (10μs typical) issued after relay settling time.

SWITCHING SEQUENCE: Break-before-make (programmable).

MAINFRAME DIGITAL I/O: Four open collector outputs (30V maximum, 100mA maximum sink current, 10Ω output impedance), one TTL compatible input, one common, one +5V.

RELAY DRIVE: 3.5A maximum for all 10 card slots.

CARD SIZE: 32mm high × 114mm wide × 272mm long (1¼ in × 4½ in × 10¾ in).

CARD COMPATIBILITY: Fully compatible with all 7001 cards.

ANALOG BACKPLANE

SIGNALS: Four 3-pole rows (Hi, Lo, Guard). These signals provide matrix and multiplexer expansion between cards within one mainframe.

MAXIMUM VOLTAGE: 250V DC, 250V rms, 350V AC peak, signal path to signal path or signal path to chassis.

MAXIMUM CURRENT: 1A peak.

PATH ISOLATION:
$>10^{10}\Omega$, <50pF path to path (any Hi, Lo, Guard to another Hi, Lo, Guard)
$>10^{10}\Omega$, <50pF differential (Hi to Lo or Hi, Lo to Guard).
$>10^{9}\Omega$, <75pF path to chassis.

CHANNEL CROSSTALK: <–65dB @ 1MHz (50Ω load).

BANDWIDTH: <3dB loss at 100MHz (50Ω load).

THROUGHPUT

EXECUTION SPEED OF SCAN LIST (channels or memory locations per second):

	CHANNELS	MEMORIES
Break-Before-Make	OFF 300	243
	ON 270	189

TRIGGER EXECUTION TIME (maximum time from activation of Trigger Source to start of switch open or close[2]):

SOURCE	LATENCY	JITTER
GET[1]	200 μs	<15 μs
*TRG[2, 3]	3.0 ms	
Trigger Link	200 μs	<10 μs
External	200 μs	<10 μs
Timer		<25 μs

[1] Excluding switch settling time.
[2] Assuming no IEEE-488 commands are pending execution.
[3] Display off.

IEEE-488 COMMAND EXECUTION TIME

COMMAND	EXECUTION TIME[1]
CLOS (@1!1)	<8 ms + Relay Settle Time
OPEN (@1!1)	<8 ms + Relay Settle Time
MEM:REC M1	<9 ms + 2× Relay Settle Time (BBM ON)
	<9 ms + Relay Settle Time (BBM OFF)

[1] Measured from the time at which the command terminator is taken from the bus to relay energize. With display OFF.

IEEE-488 BUS IMPLEMENTATION

STANDARDS CONFORMANCE: Conforms to SCPI-1990, IEEE-488.2, and IEEE-488.1.

MULTILINE COMMANDS: DCL, LLO, SDC, GET, GTL, UNT, UNL, SPE, SPD.

UNILINE COMMANDS: IFC, REN, EOI, SRQ, ATN.

INTERFACE FUNCTIONS: SH1, AH1,T5, TE0, L4, LE0, SR1, RL1, PP0, DC1,DT1, C0, E1.

All aspects of 7002 operation are available from the front panel or over the IEEE-bus interface. The 7002 conforms to IEEE-488.2 and the SCPI (Standard Commands for Programmable Instruments) command language protocol.

- Scan List
- Scan Spacing
- Channel Spacing
- Number of Scans
- Number of Channels
- Trigger Source
- Single Channel Mode
- Channel Restrictions
- Save Mainframe Configuration Setups
- Digital I/O
- Card Pair
- Channel Delay
- Number of Poles
- Channel Pattern Memory

GENERAL

DISPLAY: Dual-line vacuum fluorescent. 1st line: 20-character alphanumeric. 2nd line: 32-character alphanumeric. Channel status LED grid.

LIGHT PEN OPTION: Provides interactive programming of channels, cross points, scan lists, and memory.

REAR PANEL CONNECTORS: IEEE-488; 9-pin DB9 Female; 8-pin micro DIN for Trigger Link; 8-pin micro DIN for Trigger Link expansion; BNC for External Trigger; BNC for Channel Ready

POWER: 100V to 240Vrms, 50/60Hz, 110VA maximum.

EMC: Complies with European Union Directive 89/336/EEC, EN61326-1.

SAFETY: Conforms to European Union Directive 73/23/EEC, EN61010-1).

EMI/RFI: Meets VDE 0871B and FCC Class B.

ENVIRONMENT: Operating: 0°C to 50°C, <80% RH (0°C to 35°C). **Storage:** –25°C to +65°C.

DIMENSIONS, WEIGHT: 178mm high × 438mm wide × 448mm deep (7 in × 17¼ in × 17⅝ in). Net weight 9.1kg (20 lb).

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