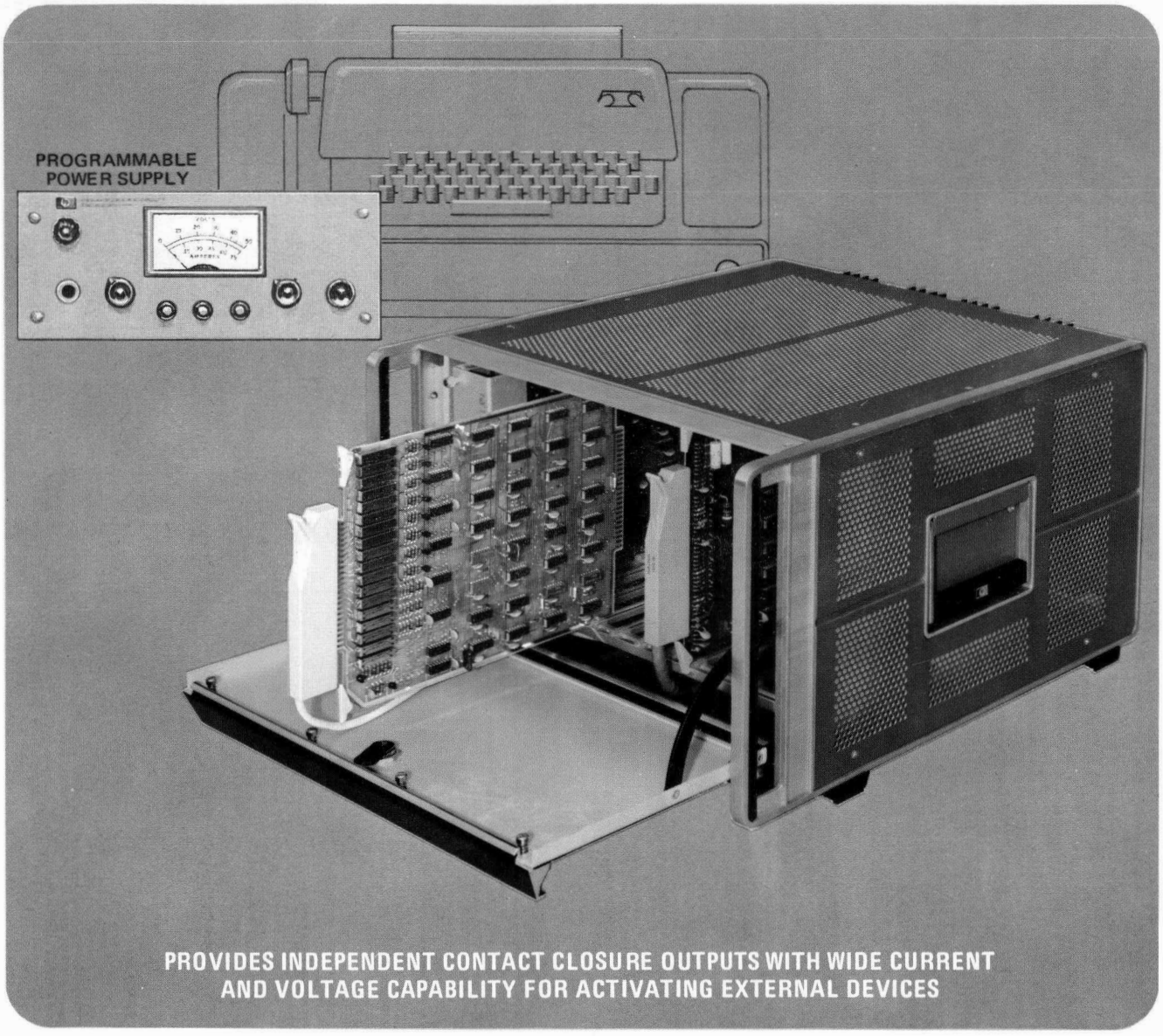
HEWLETT hp PACKARD

16-BIT RELAY REGISTER

Interface Kit
12799A

Plug-in Capability – *FOR USE WITH THE HP 2570A COUPLER/CONTROLLER*



PROVIDES INDEPENDENT CONTACT CLOSURE OUTPUTS WITH WIDE CURRENT AND VOLTAGE CAPABILITY FOR ACTIVATING EXTERNAL DEVICES

- **Independent Controls** – 16 individual closures
- **Power-On Initialization** – Predetermines initial state of all relays individually
- **Floating Contact Closures** – Permit switching of diverse voltages. Avoids ground loops.
- **Programming Flexibility** – Relays may be set from 2570A control board, teleprinter keyboard, or from punched paper tape.

APPLICATION

The 16-BIT RELAY REGISTER, Interface Kit 12799A, provides 16 programmable contact closures for control of external devices such as power supplies, solenoids, electrically activated control valves, or instruments requiring control voltage outside of the normal logic ranges. The contact closures may be subdivided in any combination for controlling one or several devices. The voltages switched through the relay contacts can differ from each other and from the 2570A ground by as much as 100 volts peak. Contacts can be connected in series, parallel, or series-parallel, with or without diode isolation.

DIVERSE OUTPUT CAPABILITY FOR YOUR SYSTEM

Because of the general purpose nature of the Relay Register Card, the commands provide the flexibility to permit controlling external devices (such as controllers) that can return an output to the card, and controlling external devices that need not or cannot return an output to the card (such as a power supply).

Commands

Commands are programmed at the main control card of the 2570A, or given by enabling interfaced devices, such as teleprinter, punched tape reader, etc.

I Reset contacts, expect response signal
N Reset contacts, no response signal expected

Choice Of 'Lock-Out' Delays

A plug-in jumper establishes one of two conditions on the Relay Register Card by determining the proper timing for suspending the main control program, if necessary, to prevent any further commands to the relays until the requirements of the system are met.

The combination of Commands and the complementary Lockout Delays results in four different response modes.

OPERATION

Power-On Preset

The relay settings at power-on condition are determined individually open (position "0") or closed (position "1") by 16 jumpers. This fixed preset condition is also established when the 2570A control system is commanded to normalize, as in *'reset'* or *'start'*. Relays retain their setting until otherwise commanded.

When an I or N command is issued to the Relay Register Card, the relays will set according to the new instructions. All the relays are commanded whether or not a relay setting is to be changed. Settling time for each relay is one millisecond. Three milliseconds after the last relay has been set, an output command is issued by the card.

PROGRAMMING FLEXIBILITY

Jumper Selectable Programming Control

Relays can be set in two groups of eight relays (Two-Word Program), or in four groups of four relays (Four-Word Program)

Two-Word Program

Two cycles of 5-millisecond duration each, are required to set all relays. In this method, ASCII codes for @, [,], Null, cannot be used. If the few restricted codes are not required in the program, the advantage is rapidity of setting relays and a minimum number of program instructions.

Four-Word Program

Four cycles of 5-millisecond duration each, are required to set all relays. In this method there are no restrictions on ASCII code utilization and the register can be programmed from any interfaced device capable of generating ASCII signals, such as a teleprinter or punched tape reader.

Simple Programming

Programming is accomplished by issuing either an "I" or "N" command followed by the bit pattern desired to be set in the relays.

The generalized command from for the relay register is: acmnpq

a – address of the Relay Register Card (channel location 0 through 7 in the 2570A)

c – command ("I" or "N") to the Relay Register Card.

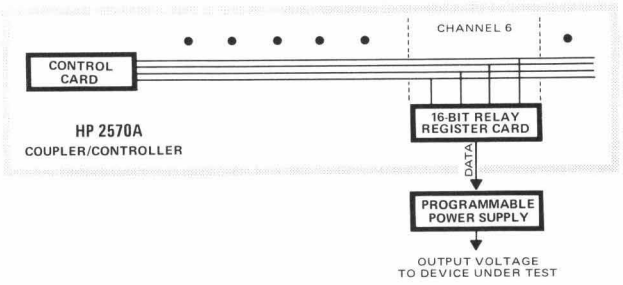
mnpq – bit pattern to be set up at the Relay Register Card, representing four groups of four relays each. Each of four cycles sets the following relays in descending order: 16 through 13, 12 through 9, 8 through 5 and 4 through 1, respectively to m n p and q.

Four-word programming for devices connected to Relay Register Card.

Example:
In channel 6 (I/O slot position in 2570A), no response required (data input command), set the relays in accordance with 'CONDITIONS' shown in Table 2. (Note "0" ≡ Open Relay; "1" ≡ Closed relay).

ASCII SYMBOL	RELAY BIT PATTERN
0	0000
1	0001
2	0010
3	0011
4	0100
5	0101
6	0110
7	0111
8	1000
9	1001
B	1010
C	1011
D	1100
E	1101
F	1110
G	1111

TABLE 1



RELAYS

m				n				p				q			
16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
CLOSED	OPEN	OPEN	CLOSED	CLOSED	CLOSED	CLOSED	OPEN	OPEN	OPEN	CLOSED	CLOSED	CLOSED	OPEN	OPEN	OPEN
1	0	0	1	1	1	1	0	0	0	1	1	1	0	0	0
9				F				3				8			

← RELAY GROUP
← RELAYS (in descending order)
← CONDITIONS
← BIT CODE
← ASCII EQUIVALENT (From Table 1)

TABLE 2

Generalized Command Form: a c m n p q

Four-word program instruction to relay card: **6N9F38**

ADDRESS — 6
COMMAND — N
BIT PATTERN — 9F38

SPECIFICATIONS

RELAY CONTACTS

States: All contacts are normally open when power is off; contacts close individually in response to '1' bit states from the backplane bus of the 2570A Coupler/Controller.

Maximum Power: 10W peak or continuous, per contact.*

Maximum Voltage: 100V peak or continuous across open contacts, between output connector pins, and with respect to controller ground on the register card.*

Maximum Current: 500 mA per contact, peak or continuous.*

Life: 10 million operations under rated load.

Resistance: 0.1Ω at 100 mA (higher at lower current).

Settling Time: 1 millisecond, maximum, for pull-in or dropout.

*Protection Required: Arc suppression must be supplied for reactive loads exceeding any one of these specifications.

DATA OUTPUT

(16 floating relay contacts, with ratings as specified above. See "RELAY CONTACTS")

'1' Level: Contact closed.

'0' Level: Contact open.

Power-on Preset: Individually selectable.

COMMAND OUTPUT, GROUND-REFERENCED

'1' Level: 0V, 12 mA current sink.

'0' Level: +16V through 3.9kΩ.

COMMAND OUTPUT, ISOLATED

(Floating relay contact, with ratings as specified in "RELAY CONTACTS").

'1' Level: Contact closed.

'0' Level: Contact open.

Delay: 3 ms nominal.

RESPONSE (FLAG) INPUT, ISOLATED

Normal: No input to relay coil.

Set Flag: 12V, 12 mA to relay coil.

Response Delay: 15 milliseconds, nominal.

RESPONSE (FLAG) INPUT, GROUND-REFERENCED

Normal: Open Circuit, 16V through 5.9kΩ resistor.

Set Flag: 0V, 5 mA current sink from NPN transistor.

Response Delay: 16 milliseconds, nominal, after response signal is received.

WEIGHT

Net: 3 lb. (1,4 kg) Shipping: 5 lb. (2,3 kg)

EQUIPMENT SUPPLIED

The HP 12799A Interface Kit consists of:
16-Bit Relay Register Interface Card, HP Part No. 12799-60001.
Connector Kit, HP Part No. 02116-6178.
(48-pin connector mates with interface card, for constructing an interconnecting cable to a controlled device.)

Ordering information for the HP 12799A 16-Bit Relay Register Interface Kit, as well as other 2570A interfaces, is available from Hewlett-Packard Sales Offices.

For more information, call your local HP Sales Office or East (201) 265-5000 • Midwest (312) 677-0400 • South (404) 436-6181
West (213) 877-1282. Or, write: Hewlett-Packard, 1501 Page Mill Road, Palo Alto, California 94303. In Europe, 1217 Meyrin-Geneva, Switzerland

12799A TECHNICAL DATA 3/70

Printed in U.S.A. (06)
5952-1555