HP 82166C HP-IL Interface Kit

HEWLETT PACKARD

The HP 82166C HP-IL Interface Kit contains four complete sets of parts for developing and evaluating prototype devices incorporating Hewlett-Packard Interface Loop (HP-IL) components. A complete set of HP-IL documentation is also included in the kit.

Operation

What is HP-IL?

HP-IL is a bit-serial interface designed for small, low-cost, battery-operated systems. It is intended for use in simple, portable or bench-top systems that use controllers such as the Series 40 and Series 70 computers. The portability of these systems make them ideal for field uses.

In HP-IL systems, devices are connected by two-wire cables leading from the output port of one device to the input port of the next, until all are connected in a closed loop configuration.

Warranty

The parts included in the HP 82166C HP-IL Interfacing Kit are covered by a 90-day warranty. Components purchased in bulk quantities, however, will not be covered under warranty once the customer inspects and accepts the order.

Precautions

Electrostatic Discharge (ESD)

Your HP-IL integrated circuit is susceptible to ESD damage. Since ESD damage is considered abuse, the warranty on the HP 82166C HP-IL Interfacing Kit will not cover ESD damage. The unit into which the HP-IL components will be incorporated, must provide adequate protection for the integrated circuits from ESD, such as grounding any work surfaces and removing static-producing materials during the assembly process.

In The Box

Quantity	Description
4	Capacitor, .1 microfarad (0160-0576)
4	Capacitor, 10 microfarad (0180-3135)
4	Capacitor, 120 picofarad, 5% (0160-4800)
4	Inductor, 56 microhenry, 5% (9100-1631)
2	Crystal, 4 megahertz (0410-1305)
8	Resistor, 15 kilohms, 5%, .25 watt * (0683-1535)
8	Resistor, 383 ohms, 1%, .125 watt * (0698-3446)
8	Capacitor, 330 picofarad, 5%, * (0160-4292)
8	Zener diode, 6.2 volt, IN 753A * (1902-0953)
8	Zener diode, 33 volt, IN 973B * (1902-0970)
8	Screw, 2-28 self-tapping (1810-0651)
8	Washer, flat (3050-0626)
4	HP-IL panel receptacle ** (1810-0651)
4	HP-IL pulse transformer (9100-4226)
4	HP-IL integrated circuit (1LB3-0003)
2	Microprocessor integrated circuit (1820-2810)
1	The HP-IL System: An Introductory Guide to the Hewlett-Packard Interface Loop (92233A)
1	The HP-IL Interface Specifications Manual (82166-90017)
1	The HP-IL Integrated Circuit User's Manual (82166-90016)
1	HP-IL Interface Kit Technical Manual (82165-90020)
1	HP 82166A Manual Supplement (82165-90012)
2	HP-41 HP-IL Development Module } (00041-15043)
1	HP-41 HP-IL Development Module Owner's Manual } (00041-15043)
1	HP-75 I/O Utilities Solution Book } (00075-13013)
1	HP-75 I/O Utilities Magnetic Card } (00075-13013)
1	HP-75 RIOWIO Utility Instructions } (00075-13014)
1	HP-75 RIOWIO Utility Magnetic Card } (00075-13014)

*These parts may be purchased as an HP-IL hybrid network. (1810-0651)
**The panel receptacle is made of polycarbonate plastic.

Key Components to the HP-IL Interface

HP-IL Integrated Circuit

The general-purpose HP-IL integrated circuit provides a convenient interface from most standard microprocessors to HP-IL. The chip appears to the microprocessor as eight memory or I/O locations. Reading or writing data in these registers causes corresponding action on the loop, such as transmitting a message, setting the service request bit, as well as enacting the appropriate data transfer. The integrated circuit handles bit coding, serial/parallel conversion and the time-critical aspects of HP-IL protocol. However, most of the protocol is implemented in the user's microprocessor firmware.

HP-IL Transformer Set

The HP-IL transformer set provides electrical isolation between devices on the loop as well as voltage level conversion and impedance matching. The transformer set and its associated circuitry help protect the sensitive CMOS integrated circuit from both electrical noise and electrostatic discharge. The circuitry also minimizes the electrical noise that could potentially be radiated from the HP-IL integrated circuit.

HP-IL Panel Receptacle

The HP-IL panel receptacle provides a foolproof mechanical method of connecting HP-IL devices. The following features help to ensure correct HP-IL system connection:

- The cable is polarized to prevent inverted linkup;
- The receptacle is keyed so that two transmit ports cannot be incorrectly connected together;
- The plugs are mated so that a device can be removed from the loop and the cable ends plugged together.

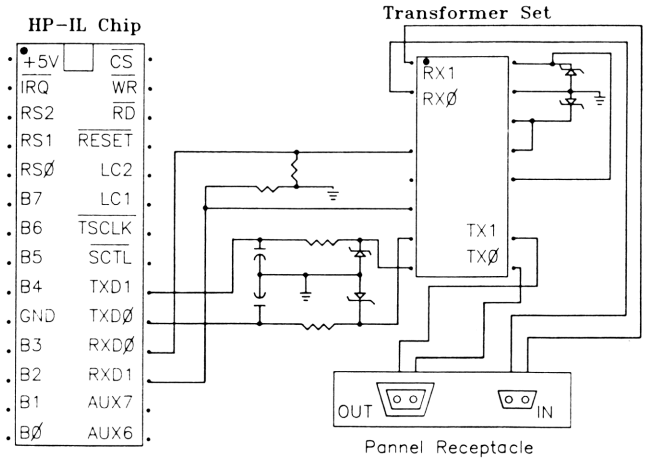
General-Purpose HP-IL Integrated Circuit

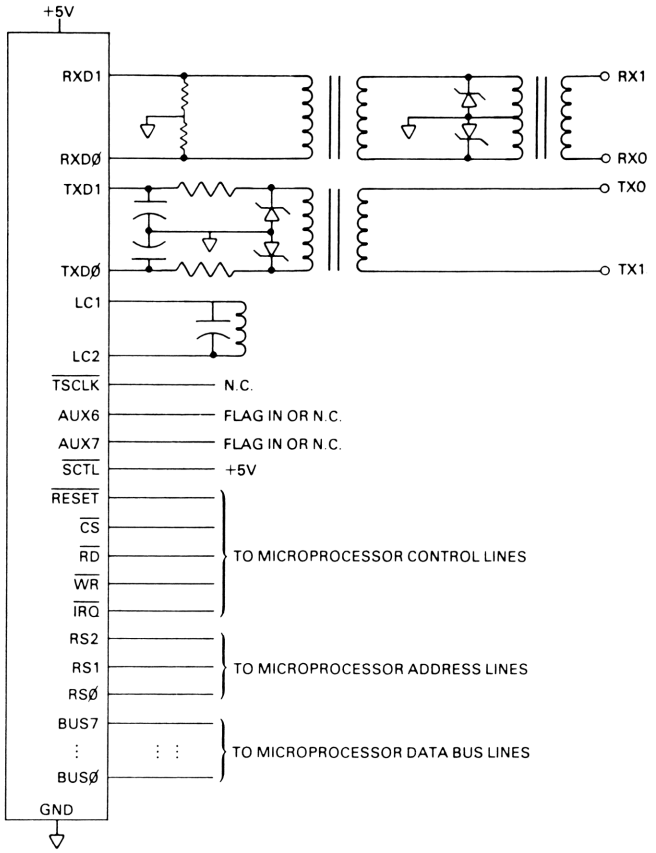
1LB3-0003
CMOS—28-Pin Plastic Dip Package

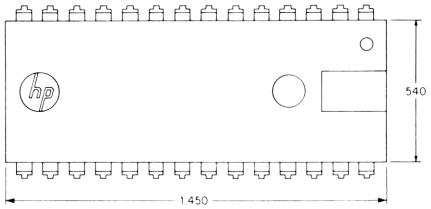
VDD	1	28	$\overline{CS}$
IRQ	2	27	$\overline{WR}$
RS2	3	26	$\overline{RD}$
RS1	4	25	$\overline{RESET}$
RSØ	5	24	LC2
BUS7	6	23	LC1
BUS6	7	22	$\overline{TSCLK}$
BUS5	8	21	$\overline{SCTL}$
BUS4	9	20	TXD1
GND	10	19	TXDØ
BUS3	11	18	RXDØ
BUS2	12	17	RXD1
BUS1	13	16	AUX7
BUSØ	14	15	AUX6

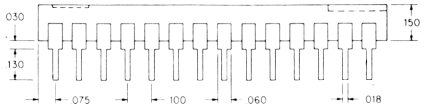
VDD	Supply Voltage (+5V)
$\overline{IRQ}$	Interrupt Request (Open-Drain Output, active Low, TTL Compatible)
RS2, RS1, RSØ	Register Select (Inputs, TTL Compabible)
BUS7 : BUSØ	8-Bit Data Bus (Bidirectional, TTL Compatible)
GND	Ground (ØV)
AUX6, AUX7	Auxiliary Flags (Inputs, On-Chip Pull-Ups)
RXDØ, RXD1	HP-IL Receiver Data (Inputs)
TXDØ, $\overline{TXD1}$	HP-IL Transmitter Data (Outputs)
$\overline{SCTL}$	System Controller Flag (Input, Active Low)
$\overline{TSCLK}$	External Clock (Input, On-Chip Pull-Up)
LC1, LC2	On-Chip Oscillator LC Circuit Connections
$\overline{RESET}$	Reset Line (Input, Active Low)
$\overline{RD}$	Read Enable (Input, Active Low)
$\overline{WR}$	Write Enable (Input, Active Low)
$\overline{CS}$	Chip Select (Input, Active Low)

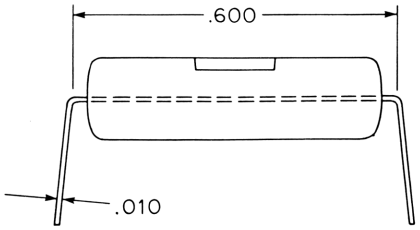
Typical HP-IL Circuitry



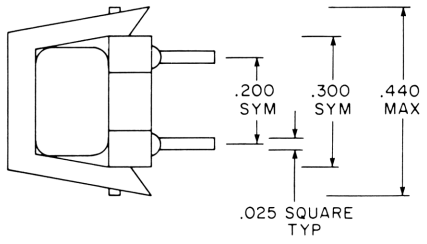


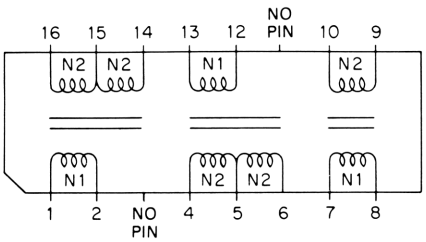


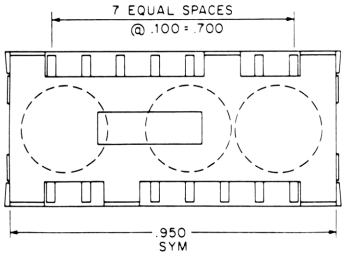


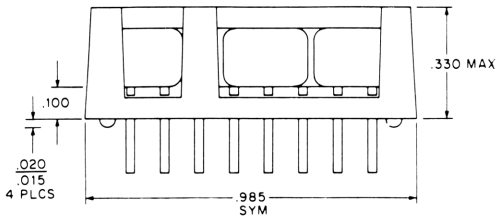


HP-IL Transformer Set
16-Pin Dip Header
9100-4226

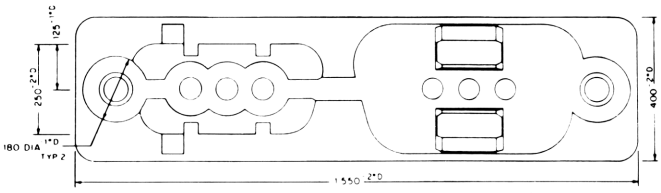


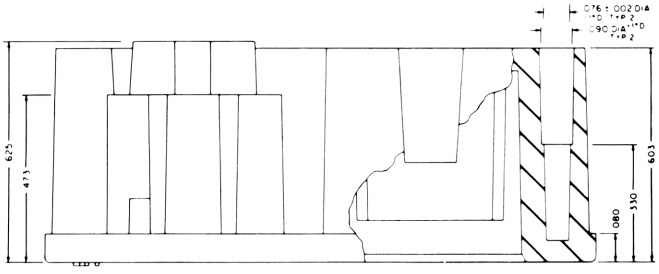


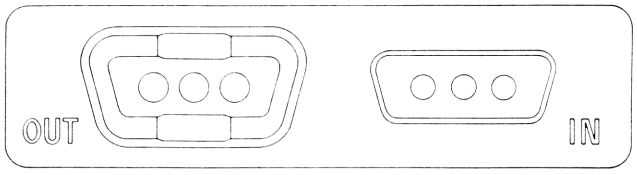




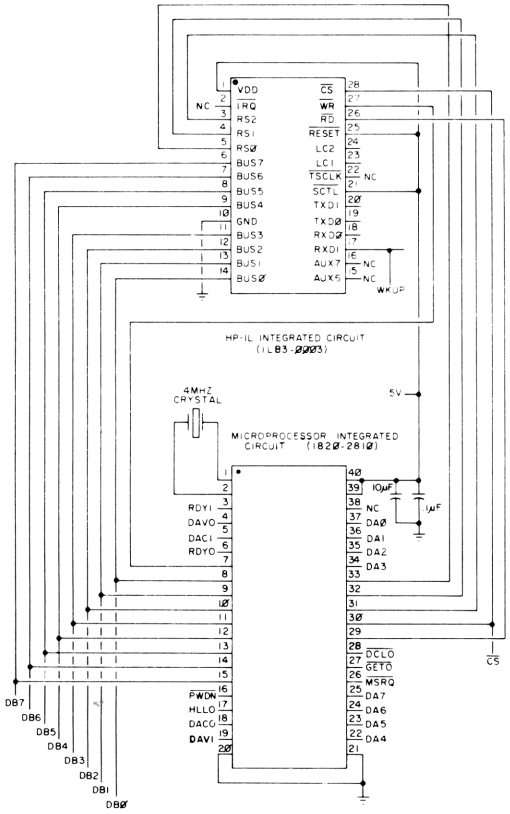
HP-IL Panel Receptacle
0950-0852



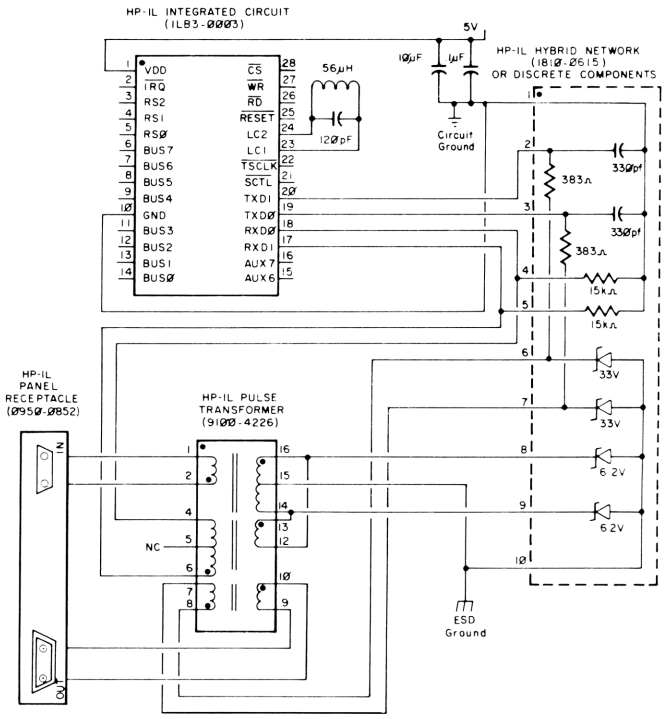




HP-IL Converter Microprocessor Connection Diagram



HP-IL Interface Connection Diagram



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