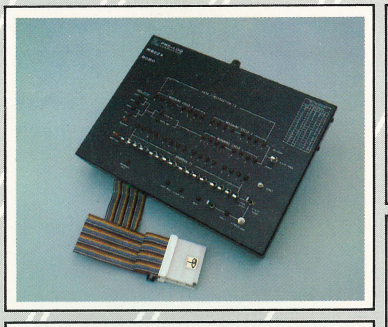
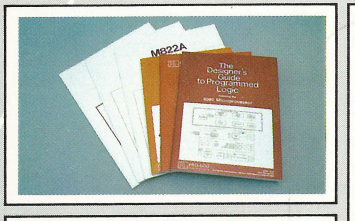
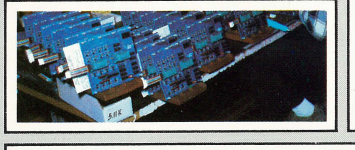
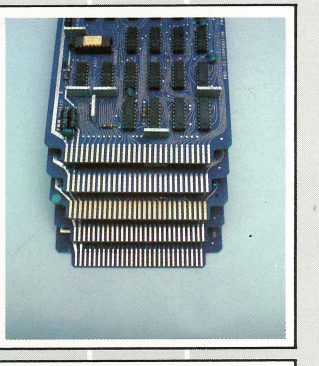
PRO-LOG CORPORATION

1977/78 Price List & Short Form Catalog









U.S. domestic prices effective September 15, 1977.
Prices subject to change without notice.

How PRO-LOG Supports You

PRO-LOG takes pride in being one of the first to recognize and contribute to the tremendous impact microprocessors have on the design of electronic equipment and systems. When we started (in 1972) "microprocessor" was a buzz word that not too many people took seriously. Our first products, the PLS-401 Microprocessor System and M810 PROM Programmer, were unique to the industry because they presented a new concept. Things have changed. Now most engineers know that, to remain competitive, microprocessor based designs are necessary. The questions have changed. No longer is it, "Should we use a microprocessor?" Now it's "Which microprocessor should we use?" and "How should we approach our design?" Now, as then...PRO-LOG can help you.

• PROM Programmers

Our same type of innovative design which pioneered the "Iterative Programming Technique", now an industry standard, is featured in our Series 90, Series 92 PROM Programmers and Personality Modules.

• Microprocessor Systems and Support Hardware

The continually expanding line of single and multi-card systems now include designs utilizing the 4004, 4040, 8008, 8080A, 6800, 8085 and Z-80 Microprocessors. Our wide range of support cards including I/O, memory, interface, and associated accessories ease your design effort. By providing these "unbundled" systems, you only buy what you need.

• Microprocessor Test Instruments

The M400 and M800 Analyzers are easy to use, low cost alternatives to complicated hardware or software debugging aids. Applicable for all phases of engineering, production, and field service.

• Education

PRO-LOG shapes its microprocessor knowledge and experience with you by providing courses and seminars nationwide. A free economics and management seminar tells how to evaluate microprocessors, and a 3 or 4 day, hands-on course teaches microprocessor design and programming techniques (See page 41).

• Quality Control/Warranty

High quality, reliability, and customer satisfaction are the prime requirements of PRO-LOG products. To this end, we use only the best commercial grade products, follow a rigid inspection and testing program, and provide complete documentation and customer service facilities. The results? A TWO-YEAR WARRANTY on the M900 and M920 PROM Programmers, **and now...UL (Underwriters Laboratory) LISTINGS!**

• Flexible Discounts

In order to service all customers equitably, PRO-LOG offers either a discount for single large quantity purchases or dollar volume discount as explained on page 47. We also allow you to be your own second source when you buy cards from PRO-LOG. After delivery of 250 systems, we give you, free of charge, all necessary documentation and non-exclusive manufacturing rights!

"Microprocessors At Your Fingertips"

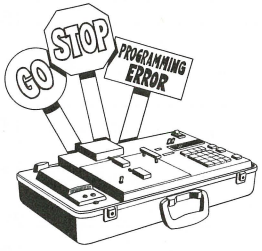
Price List
& Short Form Catalog

Table of Contents

NOTE: (▼) Price Decrease (▲) Price Increase (N) New Product

We taught the PROM programmer to think so you can relax.

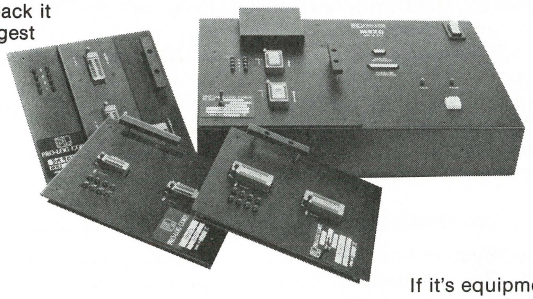
Way back in 1973, PRO-LOG revolutionized PROM programming with a microprocessor-based programmer that simplifies programming and lets you relax.



Because it analyzes PROMs as they're being programmed, it minimizes dropped data and mis-programming.

It leads you step by step through each programming operation to lessen the chance of mistakes.

Our microprocessor-based control unit is so reliable we back it with the industry's longest warranty, 2 full years parts and labor.



Using our field proven plug-in Personality Modules, each with its own full-year parts and labor warranty, the stand-alone Series 90 PROM Programmer programs, lists, duplicates and verifies every major MOS and bipolar PROM.

The single-button Series 92 Peripheral PROM Programmer/Duplicator control unit, includes a TTY interface.

Options include TTY, paper tape reader, parallel I/O, RS232 and CMOS RAM buffer.

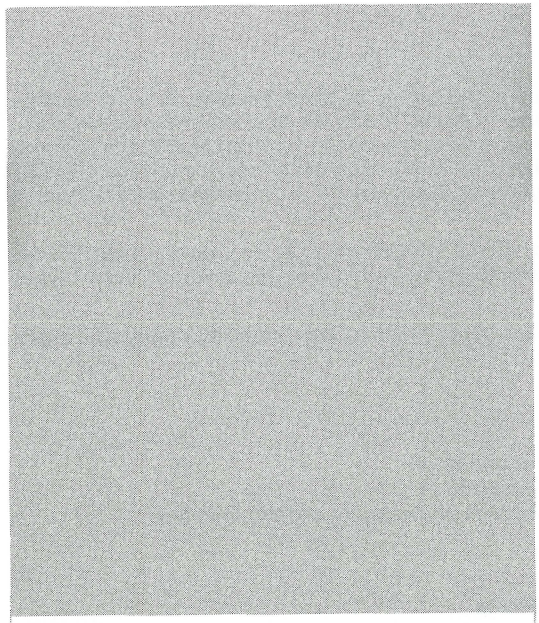
If it's equipment obsolescence you're worried about, consider this. We currently have over 2,000 M900 control units in use worldwide. And every one, oldest and newest alike, will accommodate every one of our field-proven PROM Personality Modules including our new Generic and Gang Modules.

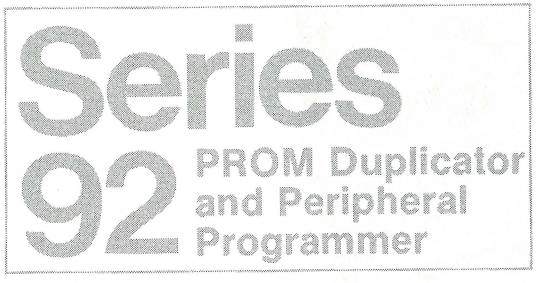
Try programming your next PROM the relaxing way. For a demonstration or for the latest version of our 48-page PROM User's Guide, contact PRO-LOG Corporation.

PRO-LOG CORPORATION

Microprocessors at your fingertips.

PROM Programmers





Both the Series 90 and 92 Programmers are microprocessor based instruments offering maximum flexibility through interfacing with TTY, paper tape reader, minicomputers, development and time share systems. Our Personality Modules are interchangeable between both models, and are available for over 200 existing bipolar and MOS PROMs.

PRO-LOG PROM Programmers are designed with human engineering in mind for "real-world" use. This emphasis has proven successful in producing rugged instruments, which require minimal operator training, offer high reliability and flexibility.

Features

- **A Proven Product**
  Over 2500 PRO-LOG Programmers shipped since 1974.
- **Easy to Operate**
  "Conversational" design minimizes controls and operator instruction.
- **Programming Security**
  Separate master and copy sockets eliminate danger of accidental alterations to master PROM.
- **Precise, Fixed Voltage Regulation**
  No need for calibration. Separate supplies in control unit and Personality Modules assure stable regulation.
- **Rugged Construction**
  All PRO-LOG Programmers are built for engineering, production, and field service use. Carrying case is included at no charge with all programmers.
- **Reliable**
  Our enviable record of dependability is not accidental, but due to our selection of quality components, combined with simple internal construction and rigid test procedures.

Warranty

PRO-LOG now offers a full two-year warranty on the M900 and M920 Master Control Units. This warranty is based on historical data on over 2500 units shipped since November 1974. A recent field failure survey confirmed a MTBF (mean time between failure) of over 50,000 hours!

Vendor Approvals

As a matter of policy, PRO-LOG submits its Personality Modules to PROM manufacturers for evaluation and approval. This is an ongoing proces. Contact PRO-LOG for vendor approval status on any module you are considering.

Series 90, M900
Universal PROM Programmer

The Series 90 PROM Programmer is a low cost, portable and highly versatile solution to programming requirements for MOS and bipolar PROMs. Conversational interaction with the operator makes it simple to use in engineering, manufacturing, quality assurance or in the field. The Master Control Unit (M900) contains a microprocessor system which gives it the capability to handle a wide variety of options to interface with TTY paper tape readers/punches, minicomputers and a host of other equipment. These interfaces are available as standard options to the system.

One of PRO-LOG's Personality Modules may be plugged into the M900 Control Unit to program most PROMs now being manufactured. In many cases a single module enables the user to program several different types of PROMs.

The programmer is packaged in a high impact carrying case but can be bench mounted by simply utilizing its built-in tilt bail.

FEATURES

- **PROGRAM, LIST, DUPLICATE, and VERIFY, modes of operation**
- **Unique Program-Verify sequence adapts to needs of each bit**
- **DUPLICATE mode with advance substitution capability that allows up to sixteen changes**
- **Ability to operate on partial address field**
- **Automatic Zero Check of defined address field**
- **Hexadecimal Keyboard (0-9, A-F)**
- **Six Character Hexadecimal Display of Addresses and Data**
- **Auxiliary Binary Data Display**
- **Quick load, Zero Insertion Force, PROM sockets**
- **Fully portable for field or in-plant use (less than 20 lbs.)**
- **Optional RAM buffer (up to 4K) allows work space for data editing and temporary storage.**

$1800.00 | **M900** | **MASTER CONTROL UNIT**

Includes hexadecimal keyboard, control keys for List, Program, Duplicate and Verify modes, 6 digit hexadecimal display, data invert control switch, connectors for Personality Modules, connectors for serial, and parallel interfaces and is housed in an attache case.

Series 92, M920 Peripheral PROM Programmer/Duplicator

The Series 92 Peripheral PROM Programmer/Duplicator is a low cost, highly versatile solution to PROM programming and PROM duplicating requirements. This field-proven system is designed to interface with TTY, microprocessor development systems, terminals, computers and other external devices; or operates as a stand-alone PROM duplicator.

The Series 92 uses the same plug-in Personality Modules as its companion, Series 90 Universal PROM Programmer, and all modules are interchangeable between these instruments.

The programmer is packaged in a high impact carrying case, but can also be bench mounted by utilizing built-in tilt bail.

FEATURES

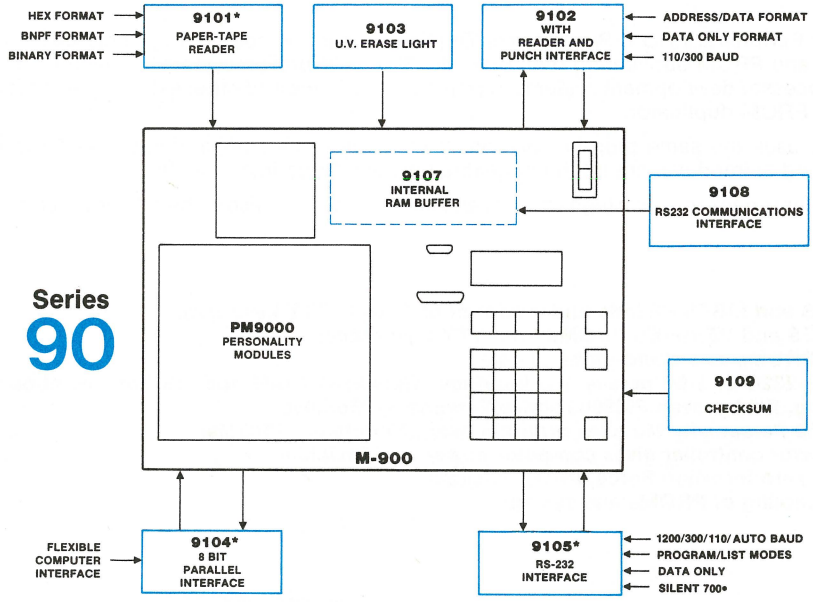
- **PROGRAMS and LISTS PROMs under control of ASR-33 TTY keyboard.**
- **DUPLICATES and VERIFIES PROMs from TTY tape reader.**
- **Duplicates PROMs as a stand-alone system.**
- **Optional RS-232C or 8-bit parallel I/O interface offers PROGRAM and LIST modes of operation.**
- **Uses existing, field-proven PM9000 series Personality Modules.**
- **More than 50 Personality Modules program over 200 different PROMs.**
- **Microprocessor controller gives computer power and flexibility**
- **Quick load, zero Insertion Force, PROM sockets**
- **Forced air cooling of PROMs and system**

$1145.00 (▲) | **M920**

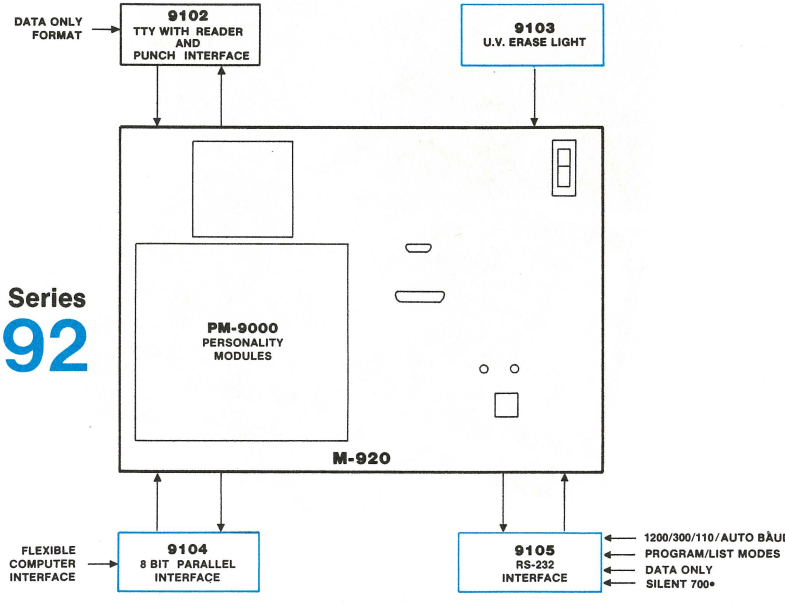
MASTER CONTROL UNIT

Includes Duplicate control key, two LED indicators, 9102-2 TTY control and TTY interface with mating cable, connector for parallel interface, connectors for Personality Modules and is housed in an attache case. Can be used with options listed on pages 6 thru 8.

Programmer Optional Capabilities



The 9102 is a standard feature of the Series 92



• Trademark of Texas Instruments

* The 9101, 9104 and 9105 options also function through the 9107 RAM buffer option.

Series 90 and 92 Options

PRO-LOG's Series 90 and 92 Programmers are not just cost effective, they are versatile. This is clearly demonstrated in the number and variety of options already available for either unit. These options are graphically shown on the facing page and are described in detail in this section.

A remarkable feature of most PRO-LOG options is that they are factory retrofitable in any unit. Old customers can take advantage of new developments and you won't have to spend money today on an option you're not sure you'll need in the future.

$ 900.00 | **9101-1, 9101-2, 9101-3**

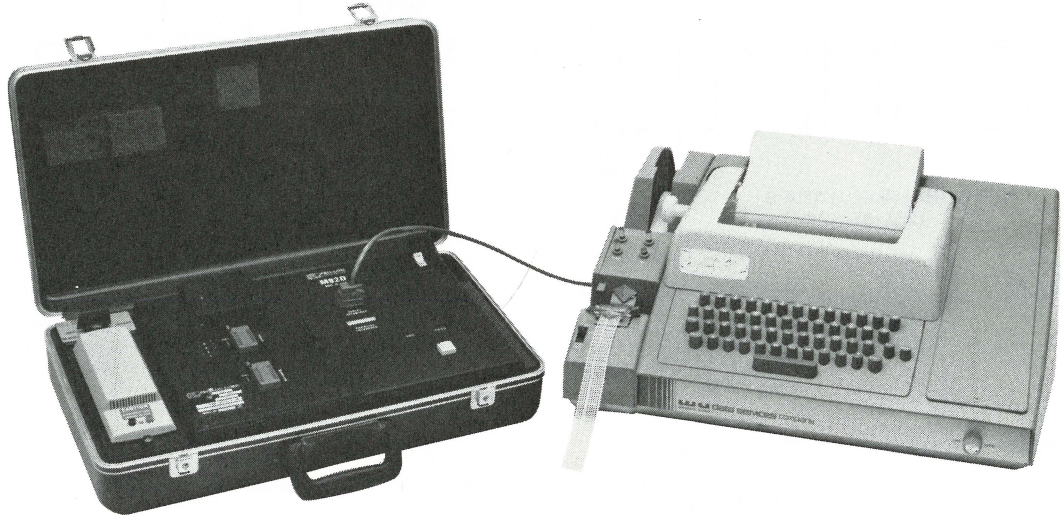
PAPER TAPE READER SYSTEM

Includes 120 cps paper tape reader, control program, and power supply. Plugs into all factory modified Series 90 Programmers. Accommodates ASCII Hex (9101-1), ASCII BNPF (9101-2), Binary (9101-3) (with M900 Master Control Unit only).

200.00 | **9102-1, 9102-2**

TELETYPE CONTROL

Allows full-duplex teletype to be used as keyboard control, paper tape, I/O and hard copy device with all Series 90 programmers. Includes mating cable (standard in M920 Master Control Unit). (9102-1 Address-Data) (9102-2 Data only).



9102
TTY Interface

150.00 | **9103, 9103-1**

ULTRA-VIOLET ERASE LIGHT SYSTEM

Includes UV erase light, 30-minute timer and safety interlock. Mounted in an enclosure that fits in the M900 attache case. Stand alone version (9103-1) comes with 5 ft. power cord for 115 VAC only.

$200.00 | **9104** | **PARALLEL INPUT/OUTPUT INTERFACE**

Provides 8 parallel input DATA lines, 8 parallel output DATA lines and 7 handshake control lines, internal handshake program and mating connector. TTL compatible. Precludes use of 9105 option.

300.00 | **9105-1, 9105-2, 9105-3, 9105-4*, 9105-5*** | **RS232 INTERFACE**

Provides an ASCII coded RS232 Interface allowing compatible interface to computers and semi-intelligent terminals. This option provides an industry standard interface and a control program designed to allow PROM programming and listing operations by a remote controller.

9105-1 (1200 baud) 9105-3 (110 baud) 9105-5* (1200 baud)
9105-2 (300 baud) 9105-4* (300 baud)

*Modified Silent 700

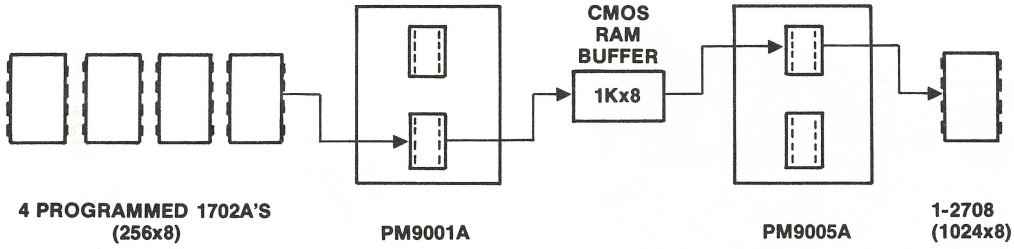
350.00 | **9105-6** | Auto-baud: Automatically adjusts to incoming baud rate within limits of M900 system.

300.00 / 450.00 / 750.00 | **9107-1, 9107-2, 9107-4** | **RAM BUFFER**

Provides RAM workspace for data editing and temporary storage. Complete data moving capability (thru PROM) from any address field of any size to any other address field. Data may be transferred from one type of PROM to another type of PROM by changing Personality Modules while data is stored in RAM. Available with M900 control unit only.

9107-1 (1Kx8) 9107-2 (2Kx8) 9107-4 (4Kx8)

EXAMPLE: Use of CMOS RAM allows data storage for up to 60 seconds with power off. Switching personality modules during this time provides the capability of data transfer between different PROM types.



400.00 | **9108-1, 9108-2, 9108-3** | **RS232 COMMUNICATIONS INTERFACE**

Allows receiving and sending of information from or to the RAM buffer in a communications environment. The option uses the M303 RS232 communications adapter on a Series 90 PROM Programmer with RAM buffer capability. Available only with M900 Control Unit.

9108-1 (1200 baud) 9108-2 (300 baud) 9108-3 (110 baud)

100.00 | **9109** | **CHECKSUM**

Provides an efficient method to check the number of programmed bits in a particular PROM. It is available only with M900 control unit.

75.00 | **9201-1** | **INDIVIDUAL PERSONALITY MODULE CARRYING CASE (up to 5)**

75.00 | **9201-2** | **GENERIC PERSONALITY MODULE CARRYING CASE**

For further specifications on these programmer options please refer to the current issue of PRO-LOG's "PROM Users Guide".

PRO-LOG is continually working on new features to expand the capabilities of our PROM programmers. Be sure you're on PRO-LOG's mail list to receive new product announcements. Use return card on back cover.

Personality Modules

The PM9000 Series of plug-in modules offer you a cost-effective approach to programming an ever expanding range of bipolar and MOS PROMs.

All personality modules include the circuitry for timing, voltages and currents necessary for programming the PROM. Using this approach, PRO-LOG eliminates the need for expensive periodic calibration.

PRO-LOG maintains a close, but independent relationship with the PROM Manufacturers to always provide you with current programming technology. Our on-going program of vendor approval for all Personality Modules assures you of correct programming specifications. Contact PRO-LOG for specific vendor approvals.

PRO-LOG now offers three categories of modules; Individual, Generic and Gang, which provide you with alternatives for specific programming applications. (See details of each on pages 12-14.)

Personality Module Selection Guide

HOW TO USE THE GUIDE:

1) PROM manufacturers are listed in alphabetical order.
2) Select the specific manufacturer and associated part number.
   (Only commercial part numbers are listed, but all modules program military equivalents.)
3) Read PRO-LOG personality module in columns at right, either Individual, Generic, or Gang.
4) Refer to PROM Cross Reference guide in PRO-LOG's PROM Users Guide for further PROM specifications.

PROM MANUFACTURER	PROM PART NUMBER	PROM SIZE	PERSONALITY MODULE	GENERIC MODULE
ADVANCED MICRO DEVICES (AMD)	29760/61,AM27S20/21	256x4	—	PM9058
	29770,29771	512x4	—	PM9058
	1702A	256x8	PM9001A	—
	9702,1702	256x8	PM9011	—
	2708	1024x8	PM9005A (PM9051)	—
AMERICAN MICROSYSTEMS INC (AMI)	5204,6834	512x8	PM9057	(Requires Pin-out Adapter)
ELECTRONIC ARRAYS	2708	1024x8	PM9005A (PM9051)	—
FAIRCHILD SEMICONDUCTOR (FSC)	93416,93426	256x4	PM9024	—
	93417,93427	256x4	PM9025	PM9045
	93436,93446	512x4	PM9025	PM9045
	93452,93453	1024x4	PM9040	PM9045
	93438,93448	512x8	PM9026	PM9045
	2708	1024x8	PM9005A (PM9051)	—
FUJITSU	MB7052	256x4	PM9007	—
	MB7057	256x4	PM9007	—
	MB7053	512x4	PM9007	—
	MB7058	512x4	PM9007	—
	MB7051	32x8	PM9016	—
	MB7056	32x8	PM9016	—
	MB8503,8513	256x8	PM9042**	—
HARRIS SEMICONDUCTOR	HPROM1024A*,1024*	256x4	PM9018	—
	6610,6611	256x4	PM9056	—
	6612	256x4	PM9062**	—
	HM7610,7611	256x4	PM9027	PM9039
	HM7620,7621	512x4	PM9027	PM9039
	7642,7643	1024x4	PM9036	PM9039
	7644	1024x4	—	PM9039

Prices for Personality Modules located on page 15.

PERSONALITY MODULE SELECTION GUIDE CONTINUED

PROM MANUFACTURER	PROM PART NUMBER	PROM SIZE	PERSONALITY MODULE	GENERIC MODULE
HARRIS SEMICONDUCTOR (Continued)	7684,7685	2048x4	—	PM9039
	7602,7603	32x8	PM9029	PM9039
	0512	64x8	PM9055**	—
	7680,7681	1024x8	—	PM9039
INTEL CORPORATION	3601	256x4	PM9003	—
	3621	256x4	PM9009A	PM9048
	3602,3622	512x4	PM9009A	PM9048
	3602A,3622A	512x4	—	PM9048
	3605,3625	1024x4	PM9034**	PM9048
	3605A,3625A	1024x4	—	PM9048
	1702	256x8	PM9011	—
	1702A,4702A,8702A	256x8	PM9001A	—
	3604,3624	512x8	PM9004	PM9048
	3604A,3624A	512x8	—	PM9048
	2704,4704,8704	512x8	PM9005A	—
	3608,3628	1024x8	—	PM9048
	2708,4708,8708	1024x8	PM9005A (PM9051)	—
	2758,2758S1864	1024x8	PM9052	—
	2716	2048x8	PM9052 (PM9061)**	—
	8748	1024x8	PM9054**	—
INTERSIL	5603,5623A	256x4	PM9007	—
	5604,5624	512x4	PM9007	—
	5600,5610	32x8	PM9016	—
	5605,5625	512x8	PM9028	—
	7708	1024x8	PM9005A (PM9051)**	—
MITSUBISHI	58563S	256x8	PM9001A	—
	M58732S(2708)	1024x8	PM9005A (PM9051)	—
MONOLITHIC MEMORIES (MMI)	63001-1,6301-1	256x4	PM9019	PM9037
	6305-1,6306-1	512x4	PM9019	PM9037
	6350-1,6351-1	1024x4	PM9035	PM9037
	6352-1,6353-1	1024x4	PM9044	PM9037
	6330-1,6331-1	32x8	PM9014	PM9037
	6335-1,6336-1	256x8	PM9017A	PM9037
	6308-1,6309-1	256x8	—	PM9037
	63135	256x8	—	PM9037
	6340-1,6341-1	512x8	PM9071A	PM9037
	63137	512x8	—	PM9037
	63139	512x8	—	PM9037
	63141	512x8	—	PM9037
	6380-1,6381-1	1024x8	—	PM9037
	6384-1,6385-1	1024x8	—	PM9037
	6386-1,6387-1	1024x8	—	PM9037
MOTOROLA	5003,5004	64x8	PM9055**	—
	MCM68708	1024x8	PM9005A (PM9051)**	—
NATIONAL SEMICONDUCTOR (NSC)	7573*,8573*7574*,8574*	256x4	—	—
	74S287,S387	256x4	—	PM9047
	74S570,S571	512x4	PM9024	PM9047
	74S572,S573	1024x4	—	PM9047
	74S188,S288	32x8	—	PM9047

Prices for Personality Modules located on page 15.

PERSONALITY MODULE SELECTION GUIDE CONTINUED

PROM MANUFACTURER	PROM PART NUMBER	PROM SIZE	PERSONALITY MODULE	GENERIC MODULE
NATIONAL SEMICONDUCTOR (NSC) (Continued)	74S470,S471	256x8	—	PM9047
	74S472,S473	512x8	—	PM9047
	87S295,S296	512x8	—	PM9047
	87S228,S229	1024x8		PM9047
	1702A	256x8	PM9001A	—
	5203,5203A,5202	256x8	PM9002A	—
	5204	512x8	PM9006A	—
	2708	1024x8	PM9005A	—
			(PM9051)**	—
NIPPON ELECTRIC (NEC)	uPD403D	256x4	PM9007	—
	uPD423D	256x4	PM9007	—
	uPD454D	256x8	PM9038**	—
	uPD405D	512x8	PM9028	—
	uPD425D	512x8	PM9028	—
	uPD458D	1024x8	PM9050**	—
RAYTHEON	29660	256x4	—	PM9037
	29661	256x4	—	PM9037
	29662	256x4	—	PM9037
	29663	256x4	—	PM9037
	29610	512x4	—	PM9037
	29611	512x4	—	PM9037
	29612	512x4	—	PM9037
	29613	512x4	—	PM9037
	29600	256x8	—	PM9037
	29601	256x8	—	PM9037
	29602	256x8	—	PM9037
	29603	256x8	—	PM9037
	29620	512x8	—	PM9037
	29621	512x8	—	PM9037
	29622	512x8	—	PM9037
	29623	512x8	—	PM9037
SIGNETICS CORPORATION (SIG)	82S126,82S129	256x4	PM9008A	PM9059**
	82S130,82S131	512x4	PM9008A	PM9059**
	82S136,82S137	1024x4	PM9041	PM9059**
	82S184,82S185	2048x4	PM9041	PM9059**
	82S23,82S123	32x8	PM9010	—
	8223*	32x8	PM9015	—
	82S114	256x8	PM9021	PM9059**
	82S115	512x8	PM9021	PM9059**
	82S140,82S141	512x8	PM9043	PM9059**
	82S180,82S181,82S2708	1024x8	PM9043	PM9059**
	2708	1024x8	PM9005A (PM9051)	—
	82S190,82S191	2048x8	—	PM9059**
TEXAS INSTRUMENTS (TI)	74S287,74S387	256x4	PM9020	PM9046
	74S188A,74S188,74S288	32x8	PM9023	PM9046
	74186	64x8	PM9022	—
	74S470,74S471	256x8	PM9032	PM9046
	74S472,74S473	512x8	PM9032	PM9046
	74S474,74S475	512x8	PM9033	PM9046
	TMS2708,TMS27L08	1024x8	PM9005A	—
			PM9053 (PM9051)	—
	TMS2716	2048x8	PM9053 (PM9060)**	—

* Obsolete PROM, consult PROM manufacturer before ordering
** Under Development, contact PRO-LOG for latest status
( ) The PM9051, PM9060 and PM9061 program eight PROMs simultaneously

Prices for Personality Modules located on page 15.

Generic Family Personality Modules

The generic family Personality Module offers a cost-effective solution to programming PROMs from those manufacturers who offer a family of PROMs with identical programming parameters, but different pin arrangements, PROM sizes, and bit structures.

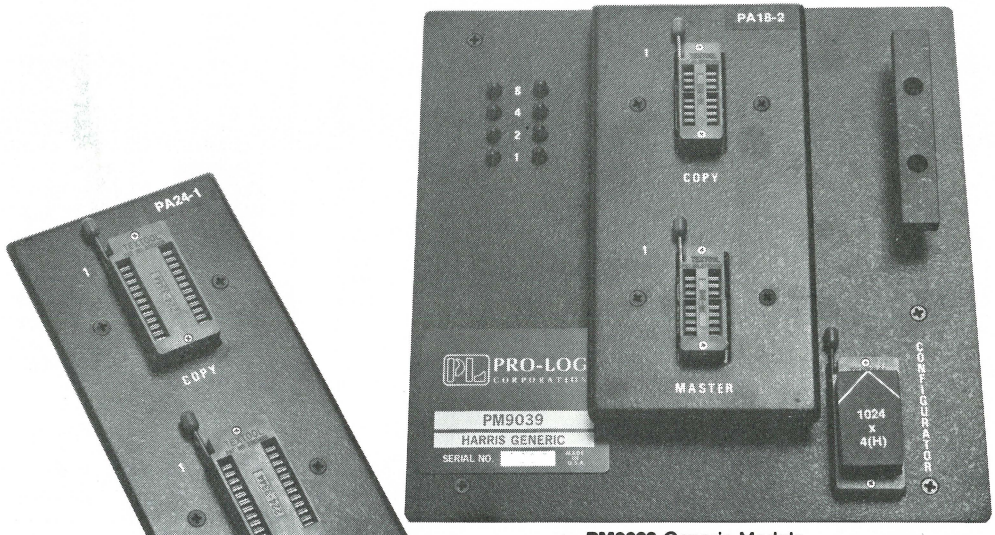
The Personality Module includes the control electronics for the PROM's voltage, current, and timing parameters. To program the entire generic family is simply a matter of accommodating the pin requirements and bit structures of a given PROM in the generic family.

To accommodate the various PROM pinout configurations, the generic module is designed to accept one of a series of pinout adaptors (PA). The PROM bit structures are selected by a plug-in module that adapts the system to the appropriate PROM configuration. This plug-in module is the configurator. A zero insertion force socket is provided on the generic module to accept the configurator (CA).

The cross reference on the next page show the various generic module pinout adaptors and configurators necessary for programming. Note that several PROMs utilize the same pinout adaptor and configurator, another cost saving factor for the generic family PROM user.

FEATURES

- **All pinout adaptors contain both master and copy sockets**
- **Binary data display for copy PROM**
- **Zero insertion force sockets**
- **Can be used with both Series 90 and Series 92 Programmers.**



PM9039 Generic Module

Pinout Adapter

Configurator

Prices for all personality modules on page 15.

Generic Family Selection Guide

Generic personality module prices on page 15.

	PINOUT ADAPTER	CONFIG-URATOR	PM9058 AMD	PM9045 FAIRCHILD	PM9039 HARRIS	PM9048 INTEL	PM9037 MMI	PM9047 NSC	PM9037 RATHEON	PM9059 ** SIG	PM9046 TI
16 PIN	PA16-1	256x4(H) 256x4(L)	— 29760/61,AM27S20/21	93417,93427 —	7610,7611 —	3621 —	6300-1,6301-1 —	— 74S287,S387	29660,29663 —	— 82S126,82S129	74S287,S387 —
		512x4(H) 512x4(L)	— 29770,29771	93436,93446 —	7620,7621 —	3602,3622 ① —	6305-1,6306-1 —	— 74S570,S571	29610,29613 —	— 82S130,82S131	— —
	PA16-2	32x8(H) 32x8(L)	— —	— —	7602,7603 —	— —	6330-1,6331-1 —	— 74S188,S288	— —	— —	— 74S188,S288
	PA16-3	1024x4(H)	—	—	7604	—	—	—	—	—	—
18 PIN	PA18-1	1024x4(H)	—	—	—	—	6350-1,6351-1	—	—	—	—
	PA18-2	1024x4(H) 1024x4(L)	— —	93452,93453 —	7642,7643 —	3605,3625 —	6352-1,6353-1 —	— 74S572,S573	— —	— 82S136,82S137	— —
		2048x4(H) 2048x4(L)	— —	— —	— 7684,7685	— —	— —	— —	— —	— 82S184,82S185	— —
	PA18-3	1024x4(H)	—	—	—	3605A,3625A	—	—	—	—	—
20 PIN	PA20-1	256x8(H) 256x8(L)	— —	— —	— —	— —	— —	— —	— —	— —	— —
		512x8(H) 512x8(L)	— —	— —	— —	— —	6348-1,6349-1 —	— 74S472,S473	29620,29623 —	— —	— 74S472,S473
	PA20-2	256x8(H) 256x8(L)	— —	— —	— —	— —	6308-1,6309-1 —	— 74S470,S471	29600,29603 —	— —	— —
		512x8(H) 512x8(L)	— —	— —	— —	— —	— —	— —	— —	— —	— —
	PA20-3	2048x4(H)	—	—	7686,7687	—	—	—	—	—	—
22 PIN	PA22-1	1024x8(H) 1024x8(L)	— —	— —	— —	— —	6386-1,6387-1 —	— —	— —	— —	— —
24 PIN	PA24-1	256x8(H) 256x8(L)	— —	— —	— —	— —	6335-1,6336-1 —	— —	— —	— 82S114	— —
		512x8(H) 512x8(L)	— —	93438,93448 —	7640,7641 —	— —	6340-1,6341-1 —	— 87S295,S296	— —	— 82S115,82S140,S141	— 74S474,S475
		1024x8(H) 1024x8(L)	— —	— —	7680,7681 —	3608,3628 —	6380-1,6381-1 —	— 87S228,S229	— —	— 82S180,S181,82S2708	— —
		1024x8(H) 1024x8(L)	— —	— —	— —	— —	6384-1,6385-1 —	— —	— —	— —	— —
		2048x8(L)	—	—	—	—	—	—	—	82S190,82S191	—
	PA24-2	512x8(H)	—	—	—	3604,3624 ①	—	—	—	—	—

** Under Development as of September 1977

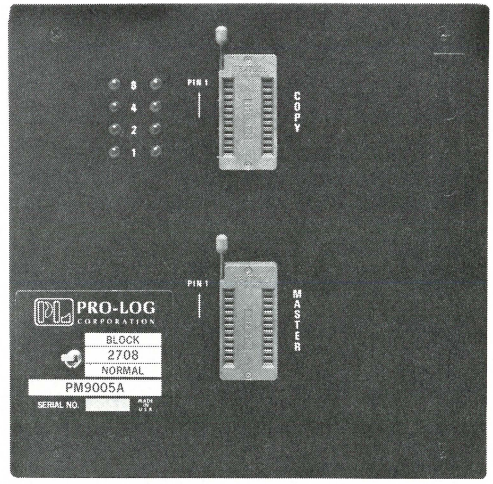
① PM9048 will also program 3602A, 3622A, 3604A, 3624A, 3604AL

Individual Modules

Personality Modules are currently available for over 200 MOS or bipolar PROMs. See selection guide on pages 9 thru 11.

FEATURES:

- **Modules include both master and copy sockets for master data protection**
- **Binary data display for copy PROM**
- **Zero insertion force sockets**
- **Self-guiding connectors for easy insertion/ removal**



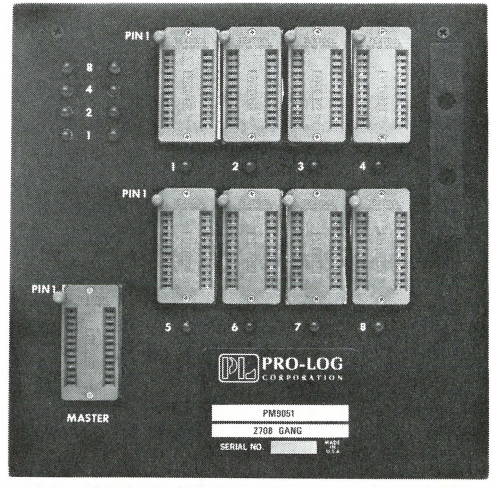
PM9005A
Personality Module

Gang Modules*

Gang Modules provide a cost-effective alternative to expensive and cumbersome automated high production programming. Automatically programs and verifies up to 8 PROMs simultaneously. (It takes over 2 minutes to program a typical 2708 individually, vs 2½ minutes to duplicate 8 on PM9051 Gang Module).

FEATURES:

- **Separate master with 8 copy sockets**
- **Zero force insertion sockets**
- **Automatic self check verify for all 8 copy PROMs**
- **Single copy socket can be listed or verified with Gang Module**
- **binary display for single copy socket**



PM9051 Gang Module

*Due to the increased current drain of multiple device programming, Series 90 and 92 Master Control Units manufactured prior to October 1, 1977 should be returned to PRO-LOG for updating to Gang Module compatability. Contact Customer Service for return authorization. Cost of retrofit: $50 FOB Monterey.

Prices for Personality Modules listed on page 15.

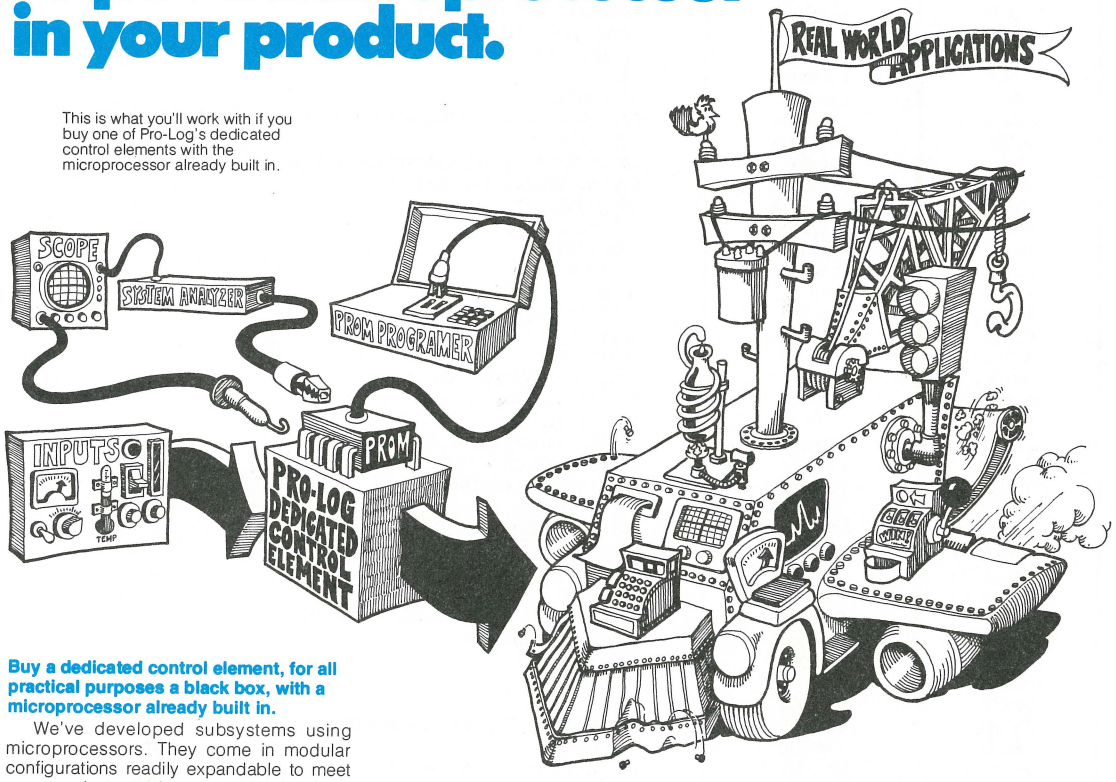
Personality Modules Pricing

PRICE	PERSONALITY MODULE	PROMs PROGRAMMED (For details see Personality Module Selection Guide)
$450.00	PM9001A	1702A,4702A,8702A,58563S,3702
450.00	PM9001QA	1702A, (See 1702A section PROM User's Guide)
450.00	PM9002A	5202,5203,5203A
360.00	PM9003	3601
390.00	PM9004	3604,3624
450.00	PM9005A	2704,4704,8704,2708,4708,8708,TMS2708,68708,7708,M58732S(2708)
450.00	PM9006A	4204,5204
450.00	PM9007	5603A,5623A,5604,5624,MB7052,MB7057,MB7053,MB7058
400.00	PM9008A	82S126,82S129,82S130,82S131
390.00	PM9009A	3621,3602,3622
390.00	PM9010	82S23,82S123
450.00	PM9011	1702,9702
390.00	PM9014	6330-1,6331-1
450.00	PM9015	8223
450.00	PM9016	5600,5610,MB7051,MB7056
400.00	PM9017A	6335-1,6336-1,6340-1,6341-1
360.00	PM9018	1024*,1024A*
390.00	PM9019	6300-1,6301-1,6305-1,6306-1
360.00	PM9020	74S287,74S387(T.I. only)
425.00	PM9021	82S114,82S115
390.00	PM9023	74S188,74188A,74S288(T.I. only)
360.00	PM9024	93416*,93426*,7573*,8573*,7574*,8574*
390.00	PM9025	93417,93427,93436,93446
390.00	PM9026	93438,93448
390.00	PM9027	7610,7611,7620,7621
450.00	PM9028	5605,5625
390.00	PM9029	7640,7641
390.00	PM9031	7602,7603
425.00	PM9032	74S470,74S471,74S472,74S473(T.I. only)
390.00	PM9033	74S474,74S475(T.I. only)
390.00	PM9034**	3605,3625
390.00	PM9035	6350-1,6351-1
390.00	PM9036	7642,7643
350.00	PM9037	MMI Generic, Raytheon Generic (See Generic Cross Reference page 13)
450.00	PM9038**	uPD454D
350.00	PM9039	Harris Generic (See Generic Cross Reference, page 13)
390.00	PM9040	93452,93453
425.00	PM9041	82S136,82S137,82S184,82S185
450.00	PM9042**	MB8503,MB8513
390.00	PM9043	82S140,82S141,82S180,82S181,82S2708
390.00	PM9044	6352-1,6353-1
350.00	PM9045	Fairchild Generic (See Generic Cross Reference, page 13)
350.00	PM9046	TI Generic (See Generic Cross Reference, page 13)
350.00	PM9047	National Generic (See Generic Cross Reference, page 13)
450.00	PM9048	Intel Generic (See Generic Cross Reference, page 13)
450.00	PM9049**	Intersil Generic
450.00	PM9050**	uPD458D
895.00	PM9051	2708 Gang Programmer Module (see note on page 14)
325.00	PM9052	Intel 2716
450.00	PM9053	TI TMS2716/2708
400.00	PM9054**	8748
400.00	PM9055**	Motorola 5003,5004,Harris 0512,TI74186
450.00	PM9056	Harris 6610,6611
450.00	PM9057	AMI 5204,6834 (Requires Pinout Adapters, consult factory)
350.00	PM9058	AMD Generic (See Generic Cross Reference, page 13)
350.00	PM9059**	Signetics Generic (See Generic Cross Reference, page 13)
895.00	PM9060**	TMS 2716 Gang Programmer Module (see note on page 14)
795.00	PM9061**	Intel 2716 Gang Programmer Module (see note on page 14)
450.00	PM9062**	Harris 6612
90.00	PA	Pinout adaptor for Generic Modules
25.00	CA	Configurator for Generic Modules

* Obsolete PROM, Consult PROM manufacturer before ordering
** Under Development, consult factory for latest status

Here's a simple way to put a microprocessor in your product.

This is what you'll work with if you buy one of Pro-Log's dedicated control elements with the microprocessor already built in.



Buy a dedicated control element, for all practical purposes a black box, with a microprocessor already built in.

We've developed subsystems using microprocessors. They come in modular configurations readily expandable to meet your product requirements. You hardwire them directly to relay contacts, switches, push buttons, displays or other real-world devices. They give you all the capabilities of a microprocessor with none of the headaches. And we deliver them in a matter of weeks.

When you use our subsystems, we give you the kind of production and documentation assistance that results in a product your present manufacturing people can build and your present service force can support.

And system design stays with the design engineer.

Plus, we give you something more, a free set of plans and a second source.

Order 250 subsystems and we'll throw in free non-exclusive manufacturing rights and a complete set of manufacturing and assembly plans allowing you to build your own hardware, relying on us as an established and dependable second source.

We make everything you need to design with microprocessors.

Our starter sets include a microprocessor subsystem, a Series 90 PROM programer, a microprocessor system analyzer, plus all associated hardware. 4-bit sets cost around $3,000, 8-bit sets around $3,500, a substantial savings over what you'd pay if you purchased all these items separately.

We have education too.

Our half-day introductory seminar takes a hard look at the function of microprocessors in real-world applications.

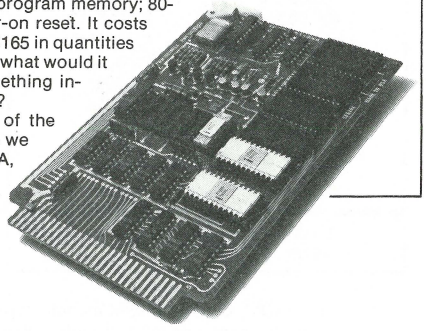
Our three-day hands-on design course teaches engineers how to formulate, program and use microprocessor modules.

Our free booklet, "The Microprocessor User's Guide" answers all your questions.

It explains what a microprocessor is, what it's capable of doing, what criteria you need to evaluate the ones on the market and how Pro-Log can help you put them to best use. Write for your copy.

To show how much Pro-Log can save you both in time and money, consider this. We've got a one-card 4004-based system called the PLS-401. It includes a microprocessor; crystal controlled clock; 16 lines of TTL input; 16 lines of TTL output; sockets for 1024 words of program memory; 80-character RAM and built-in power-on reset. It costs only $99 in quantities above 500 ($165 in quantities of 10.) How long would it take, and what would it cost you to design and build something in-house that could do the same job?

And this is just one example of the many microprocessor subsystems we offer using 4004, 4040, 6800, 8080A, 8085 and Z-80 microprocessors.



Microprocessor System Analyzers

PRO-LOG manufactures a series of low cost Logic Analyzers which clip on to microprocessors and enable the user to observe vital test information.

All instruments have two major characteristics: They allow the user to select a particular instruction cycle and to capture and display all significant information relative to that instruction cycle. They also generate a scope trigger whenever the pre-selected instruction cycle occurs. This permits the user to look at wave forms during the instruction cycle and to relate the system hardware characteristics to the program.

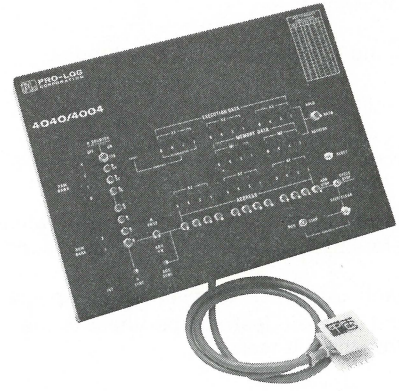
M400 System Analyzers

The M422 and M422A Analyzers are used to design, troubleshoot and test both programs and hardware in systems using the 4040 or 4004 Microprocessor chip. The system Analyzer offers a cost-effective alternative to software techniques used for program development and debugging of microprocessor systems. Satisfies your production and field service requirements too. The Analyzer eliminates the need for:

1) Control panels
2) Software diagnostic routines (simulators)
3) Special considerations for production and field service testing

Common Features Include:

- Displays instruction (M1, M2) and execution (X1, X2, X3) data.
- Provides scope trigger outputs.
- Clip-on (DIP) connector for quick easy interfacing.
- Self-referencing power supply.
- Static and dynamic display modes with counter for loop control.
- Provides for external system reset.
- State displays for Halt, Interrupt, RAM/ROM bank select codes.
- RUN/STOP and single cycle operation (4040 only).



M422 System Analyzer

$600.00	**M422**	**SYSTEM ANALYZER (4040)** Self-powered test instrument that clips to 4040 Microprocessor for check-out of program and hardware.
550.00	**M422A**	**SYSTEM ANALYZER (4004)** Self-powered test instrument that clips to 4004 Microprocessor or 4002 RAM register for check-out of program and hardware. Can be used on limited basis to test 4040 based systems by clipping on to 4002 RAM.

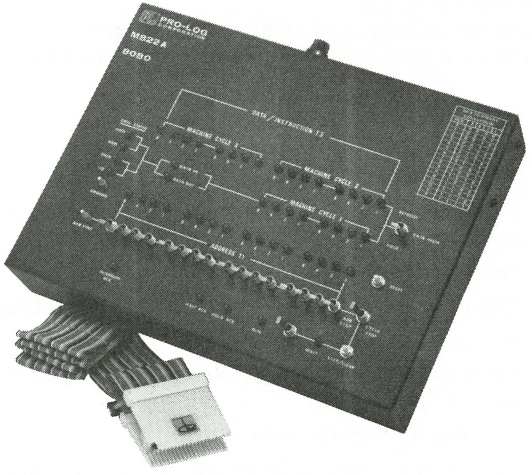
M800 System Analyzers

The M821, M822 and M823 System Analyzers are used for designing, troubleshooting and testing both programs and hardware in systems using the 8008, 8080A or 6800 Microprocessor chips. A System Analyzer offers a cost effective alternative to software techniques used for program development and debugging of microprocessor systems. Use it to design, troubleshoot and debug, in real-time, both software and hardware problems. Satisfy your production and field service requirements too. The Analyzer eliminates the need for:

1) Control panels
2) Software diagnostic routines (simulators)
3) Special considerations for production and field service testing

Common Features Include:

- Displays address, instruction and execution data.
- Provides scope trigger outputs at selected address cycle times.
- Clip-on (DIP) connector for quick easy interfacing.
- Static and dynamic display modes.
- Provides for external system reset.
- RUN/WAIT and single instruction operation.
- Internal power supply which automatically references to the microprocessor supplies.
- Each Analyzer also includes special test and control features pertinent to the Processor it tests.



M822A System Analyzer

$550.00	**M821**	**SYSTEM ANALYZER (8008)** Self-powered test and de-bug instrument that clips to 8008 Microprocessor.
650.00	**M822A**	**SYSTEM ANALYZER (8080A)** Self-powered test and de-bug instrument that clips to 8080A Microprocessor.
650.00	**M823**	**SYSTEM ANALYZER (6800)** Self-powered test and de-bug instrument that clips to 6800 Microprocessor.

Management Questions & Answers on Microprocessor Systems

By Ed Lee . . . . . President of PRO-LOG

What is a Microprocessor System and Why Should Our Company Use It?

A microprocessor system is a standardized set of components usually a microprocessor chip, ROM program memory, data memory, a clock oscillator and logic inputs and outputs. Simply by coding program memory, the system can perform hardware functions such as logic, timing, arithmetic, control, and many more.

Profit is the most likely reason your company should use a microprocessor in your system. Hardware cost-effectiveness, system flexibility and functional capability are so overwhelming when compared to any of the alternatives that you may find yourself vulnerable in the marketplace if you choose another approach. You should consider using a microprocessor system in any design which might otherwise use over 30 TTLIC's or the equivalent.

I Understand There Are Several Design Approaches . . . . . Which One Should I Use?

That depends on your design objectives. Below I have rated design approaches for production equipment.

RELATIVE RATINGS OF DESIGN APPROACHES FOR PRODUCTION EQUIPMENT

FACTORS	HARD-WIRED LOGIC	CUSTOM LSI	IN-HOUSE DESIGN WITH MICROPROCESSOR CHIPS	PRO-LOG MICROPROCESSOR SYSTEMS
LEARNING CURVE	☐	■	▒	☐
LOWEST ENGINEERING AND PROTOTYPE COST	☐	■	▒	☐
SHORTEST DESIGN TIME	☐	■	▒	☐
MOST FLEXIBILITY	☐	■	☐	☐
GREATEST RELIABILITY	■	☐	☐	☐
LOWEST PRODUCTION COSTS:				
UNDER 500 SYSTEMS	▒	■	▒	☐
UNDER 10K SYSTEMS	▒	■	☐	☐
OVER 10 K SYSTEMS	■	☐	☐	☐

LEGEND: ☐ GOOD ▒ FAIR ■ POOR

If your design requires under 30 IC's, the hard-wired logic approach is probably best. If you're planning for a production run of 10,000 or more identical units, custom LSI, might give the greatest reliability at the lowest price. Between these extremes the microprocessor approach fits.

You now have two choices: go with an in-house design by mechanizing a microprocessor chip, with all its associated circuitry on your own P.C. board, or use a ready-to-go, fully checked out module from PRO-LOG, and in quantities have the option to manufacture that module yourself.

Do We Need a 4-bit or an 8-bit Microprocessor System?

The odds are better than 20 to 1 that a 4-bit system will do your job with capacity to spare. If it can handle the job, its cost at system level will probably be less than for 8-bit systems doing the same job. The cost differential at system level is not due to the relative costs of the 4 and 8 bit microprocessor chips, but rather to their relative designs (see MICROPROCESSOR USER'S GUIDE).

Pick an Industry Standard. At this time established industry standards are the 4004, 8080A and the 6800. They all have more than one reliable manufacturer, are widely used throughout the industry and are reasonably priced. Among the three, the 4004 is easiest to use and is sold in the highest volume. However the 8080A has the highest interest and the most sources of supply.

In any event, don't make the choice on the basis of your word size or number of inputs and outputs...any microprocessor can handle any sized problem given adequate time. You trade time for money in many ways when using microprocessors.

QUESTIONS AND ANSWERS ON MICROPROCESSOR SYSTEMS

Who In My Company Should Be Doing The Design of Microprocessor Based Systems?

Your design engineer, unless yours is one of those rare companies which has a true data processing problem. Design engineers and test technicians can learn to use microprocessors the PRO-LOG way in a few weeks. And they can learn to document microprocessor systems so that your present service organization can easily maintain them in the field.

Who Can Service Systems With Microprocessors In Them?

With straight-forward documentation, a few day's training and test equipment, your systems can be serviced by the same personnel who now handle mechanical or hard-wired logic systems.

What Problem Areas Do I Need To Be Aware Of?

A) Documentation: Get appropriate documentation from the design group so that manufacturing and test personnel can build and service from this documentation. Establish your documentation standards at the beginning of the design cycle. Unfortunately, there are no industry standards at present. PRO-LOG'S courses and literature can do a lot to help you to quickly develop a practical standard for your company.

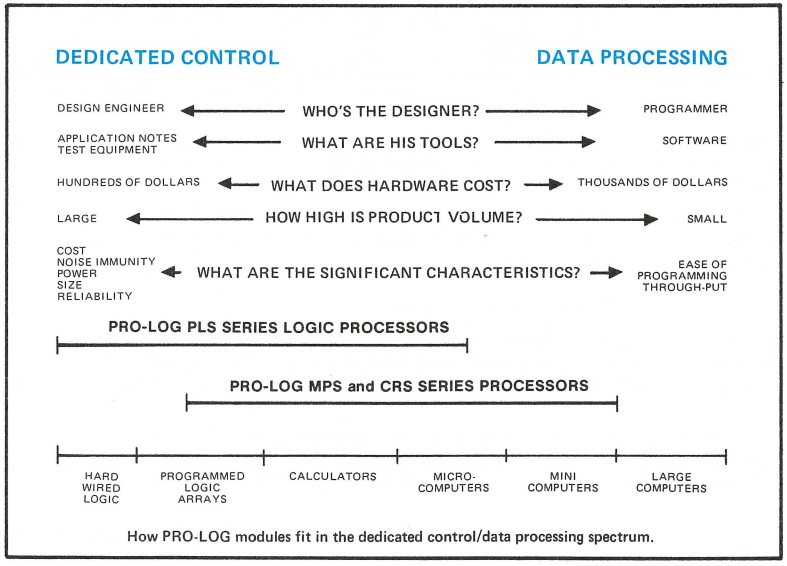
B) Vendor Selection: Stay away from sole-sourced items, either at chip or system level. Sole-sourced microprocessors abound, but they are not likely to become industry standards and could leave you at the vendor's mercy. Now that several good processors are second-sourced there is little justification for purchasing sole-sourced items. PRO-LOG only supports microprocessors and support chips that are or will be second-sourced industry standards (with the single exception of the 4040).

PRO-LOG keeps you from being sole-sourced at system level too. When you buy 250 or more of a specific microprocessor system from us, we supply you (free of charge) the manufacturing documentation and non-exclusive design rights so that you can manufacture the system yourself and use us as your second source. This policy also makes it unnecessary for you to waste development time and money building a microprocessor system from chip level.

C) Design Practices: Avoid overdependence on computer-aided design tools, such as assemblers, compilers and high level languages. These tools can be useful in some designs, but they shouldn't be used without a clear understanding of what they can and can't do. This understanding can only come from knowing how to "do it by hand". Remember...a designer's job is to create documentation suitable for practical manufacturing and field service. Getting a program or simulated system to work in the lab is not the most significant part of the design process.

How Do We Get Started?

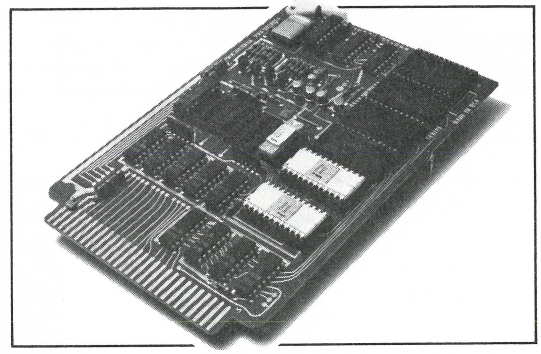
Contact PRO-LOG or the PRO-LOG representative listed for your area (See page 49). We have "how to do it" literature. We have courses to get management and engineering education off on the right foot. We have hardware and documentation to minimize your design time and the cost and complexity of your final system. We have test equipment to enable you to design in the lab, test in the factory, and service in the field.



How PRO-LOG modules fit in the dedicated control/data processing spectrum.

4-bit Microprocessors

four



Cards and Systems

PRO-LOG's 4-bit logic processor modules implement the 4004 and 4040 microprocessor into ready to use systems. For simple dedicated control jobs, systems implemented on one card, such as the PLS-401 or PLS-441, can be the most cost-effective solution. For more complex problems where additional I/O, program memory or data memory are required, the designer can configure his own system by selecting the appropriate set of cards. The Logic Processor Compatibility Table on page 25, shows the designer, at a glance, which cards go together.

PRO-LOG's microprocessor systems fall into two families: TTL compatible I/O and CMOS I/O. The TTL compatible processor cards operate from +5 and -10 volt supplies. The CMOS compatible cards operate from a single +15 volt supply and work only with the 4416 Processor Card.

Starter Sets

PRO-LOG has also combined the most widely used microprocessor configurations with the PROM Programmer, System Analyzer and appropriate support hardware and documentation into Starter Sets. A Starter Set enables the designer to get what he needs for his first design project at a substantial discount. (See page 26).

Comments on 4004 and 4040 Microprocessors

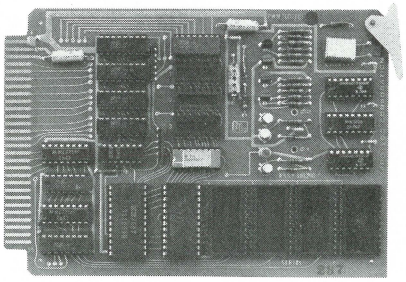
The 4040 Microprocessor is a technically upgraded version of the 4004. The Microprocessor improvements include a 7 level address stack for subroutines (versus 3 levels for the 4004), an enlarged set of index registers, some logical instructions, interrupt, and the ability to single step. These technical improvements can be significant, and may be worth the risk of designing around a sole-sourced chip. An interesting fact is that a program written and debugged on a 4004 system can be directly plugged into an equivalent 4040 system. The reverse may not be true. (Our 4040 Processor cards are the only cards in our product line using sole-sourced components.)

Documentation

All cards come complete with data sheets, schematics and assembly prints. Data sheets are available on request.

Common Features of 4-bit Logic Processor Cards: All cards are 4.5" (11.43 cm) x 6.5" (16.51 cm) printed circuit cards with 56-pin card edge connector on 0.125" (0.318 cm) centers. Operating temperature range is 0 to 55 degrees Centigrade. Clock circuits are all crystal controlled and have an accuracy of better than 0.01% over the operating temperature range. Instruction cycle times are 11.22 microseconds. PROMs are D256 (1702A or equivalent). Ram is 4002 (unless otherwise noted).

One Card Programmed Logic Systems

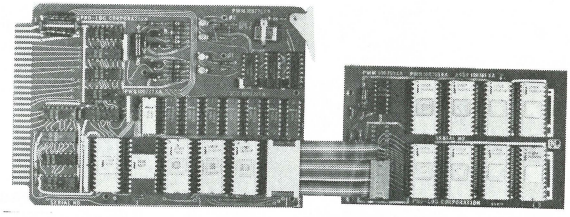


PLS-401 Programmed Logic System

$195.00 (▼) **PLS-401**

ONE CARD PROGRAMMED LOGIC SYSTEM (4004)

Includes 4004 Microprocessor, clock external and power-on reset, sockets for 1024 words of D256 PROM (1702A or equivalent). Contains an 80-character data RAM with capacity to 320 characters. Has 16 TTL input, 16 TTL output and 4 MOS output lines. Requires +5, -10VDC. Does not include PROM.

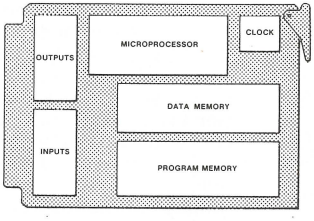


PLS-411 Programmed Logic System **4125** ROM Simulator Card

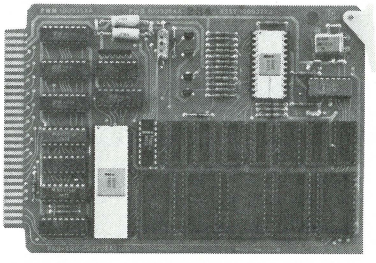
235.00 **PLS-411**

ONE CARD PROGRAMMED LOGIC SYSTEM (4004)

Includes 4004 Microprocessor, clock, external and power-on reset, sockets for 768 words of D256 PROM (1702A or equivalent). Socket for Intel 8316 (2048 word ROM) or for 4125 ROM Simulator Card. Contains 80 character data RAM with capacity to 560 characters. Has 16 TTL input, 16 TTL output and 4 MOS output lines. Requires +5, -10 VDC. Does not include PROM.



General Layout of **PLS-441** System



PLS-441 Programmed Logic System

215.00 (▼) **PLS-441**

ONE CARD PROGRAMMED LOGIC SYSTEM (4040)

Includes 4040 Microprocessor, clock, external and power-on reset, sockets for 1280 words of D256 PROM (1702A or equivalent). Contains an 80-character data RAM with capacity to 640 characters. Has 16 TTL input, 16 TTL output, 4 MOS output lines, interrupt and stop lines. PLS-401 compatible in most applications. Requires +5, -10 VDC. Does not include PROM.

Edge Connected Card Components

(SEE PAGE 25 FOR INTERCONNECT COMPATIBILITY AMONG CARD COMPONENTS.)

PROCESSOR CARDS

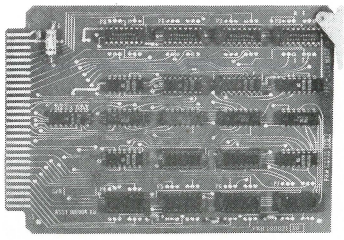
$140.00 (▼)	4111	**PROCESSOR CARD (4004)** Includes 4004 Microprocessor, clock, external and power-on reset, and an 80-character data RAM. Has mixed capacity to 2048 ROM instructions and 32 I/O lines by using a 4001 masked ROM (with I/O lines) or 640 RAM data characters. Has up to 24 MOS output lines. Requires +5, -10VDC.
205.00	4115	**PROCESSOR CARD FOR CUSTOM I/O (4004)** Includes 4004 Microprocessor, clock, external and power-on reset and PROM capacity to 1536 words. Contains an 80-character data RAM with capacity to 320 characters. I/O bus for custom interfaces or remote I/O. Has up to 16 MOS output lines. Uses D256 PROM (1702A or equivalent). Does not include PROM. Requires +5, -10VDC.
240.00	4415	**PROCESSOR CARD FOR CUSTOM I/O (4040)** Includes 4040 Microprocessor, clock, external and power-on reset and PROM capacity to 2048 words. Contains an 80-character data RAM with capacity to 640 characters. I/O bus for custom interfaces or remote I/O. Has up to 16 MOS output lines, interrupt and stop lines. Uses D256 PROM (1702A or equivalent). Does not include PROM. Requires +5, -10VDC.
250.00 (▼)	4416	**PROCESSOR CARD FOR CMOS I/O (4040)** Includes 4040 Microprocessor, clock, external and power-on reset and PROM capacity to 2048 words. Contains an 80-character data RAM with capacity to 640 characters. Has up to 16 MOS output lines, interrupt and stop lines. I/O bus for custom CMOS interfaces, remote I/O or the 4434 and 4433 input and output cards. Uses D256 PROM (1702A or equivalent). Does not include PROM. For high noise, industrial control environments. Requires +15VDC.
205.00	4417	**PROCESSOR CARD (4040)** Includes 4040 Microprocessor, clock, external and power-on reset, and an 80-character data RAM. Has mixed capacity to 4096 ROM instructions by using a 4001 masked ROM (with I/O lines) or 1280 RAM data characters. Has up to 8 MOS output lines, interrupt and stop lines. Requires +5, -10VDC.

MEMORY CARDS

$ 60.00	4111-2	**RAM EXPANDER CARD FOR 4111 PROCESSOR CARD** Capacity to 640 RAM data characters. Uses 4002 RAM. +5, -10VDC. Does not include RAM.
115.00 (▼)	4112	**PROM CARD** Plug in PROM capacity to 2560 words of D256 PROMs (1702A or equivalent). Requires +5, -10VDC. Does not include PROM.
80.00	4112-2	**PROM EXPANDER CARD** Expands PROM capacity to 4096 words when used with 4112 ROM card. Uses D256 PROMs (1702A or equivalent). Requires +5, -10VDC. Does not include PROMs.
110.00 (▲)	4125	**PROM SIMULATOR CARD FOR PLS-411** When used with D256 PROMs (1702A or equivalent) it simulates the Intel 2316A PROM. Includes PROM sockets (for 2048 words of Program memory), interface circuitry and ribbon cable interconnect which plugs into 8316 socket on PLS-411 card. Mounts piggyback to PLS-411 card. Utilizes 2 card slots. Requires +5VDC. Does not include PROM.
95.00 (▼)	4418	**PROM EXPANDER CARD** Plug in PROM capacity to 4096 words. Uses D256 PROMs (1702A or equivalent). Requires +5VDC. Does not include PROMs.
180.00 (N)	4428	**PROM CARD FOR 4416** Plug in PROM capacity to 3840 words for CMOS I/O systems. Interfaces to 4416 Processor card. Uses D256 (1702A or equivalent). Ribbon cable interconnect. Requires +15VDC. Does not include PROM.

Edge Connected Card Components (Continued)

I/O CARDS



4113 TTL I/O Port Card

$ 95.00 | **4113** | **TTL I/O PORT CARD**

Provides 32 lines, field selectable in groups of 4 as input gates or output latches. Interfaces with 4115, 4415, 4417 or with other TTL input or output ports. Requires +5VDC.

65.00 | **4114-2** | **TTL INPUT EXPANDER WITH TRI-STATE OUTPUTS (Digital Multiplexer)**

Multiplexes 32 digital input lines to four lines controlled by TTL or MOS outputs. Allows direct output "OR"ing of two or more cards. Requires +5VDC.

120.00 | **4433** | **BUFFERED CMOS OUTPUT CARD FOR 4416**

Contains 32 CMOS output latches. Each CMOS output can drive two TTL loads at +5 volts. Can drive over 20 CMOS loads. Operating supply voltage may range from +5 VDC to +15 VDC. TTL compatible at +5 VDC.

120.00 | **4434** | **3-STATE CMOS INPUT CARD FOR 4416**

Contains 32 CMOS input gates multiplexed to 4 outputs (3-state). Supply voltage may range from +5 to +15VDC. TTL compatible at +5VDC. Allows direct output "OR"ing of two or more cards.

145.00 | **4434-1** | **3-STATE CMOS INPUT CARD FOR 4416**

Contains 32 CMOS input gates multiplexed to 4 outputs (3-state). Each input has 3mA pullup to supply an LED visible from the card edge. Allows direct output "OR"ing of two or more cards. Requires +15VDC.

Ribbon Cable Connected Card Systems

$ 850.00 | **CM-41** | **CHASSIS MOUNTED PROGRAMMED LOGIC SYSTEM (4004)**

Complete system, prewired, chassis mounted, with power supply. Consists of: 4118, 4122, M272 power supply, chassis, audio speaker, RC16-6 interconnect and 12 hour clock program on D256 PROM (1702A or equivalent).

CM-41 Chassis Mounted Programmed Logic System

Ribbon Cable Connected Card Components And Hardware

$ 395.00 (▼) | **4118** | **KEYBOARD DISPLAY CONTROL CARD**

Contains 24 keys with 16 keys labeled 0 through F and 8 keys with blank tops, eight 2-position switches, eight digits of LED decoded hexadecimal display, a TTY serial bi-directional interface and a 12-line output 11-line input parallel interface. Connects to 4115, 4415 through Ribbon Cable Interconnect RC-16-7. Connects 4122 via RC-16-6. Card measures 7.25 x 8.20 inches.

280.00 | **4122** | **PROGRAMMED LOGIC SYSTEM CARD FOR REMOTE I/O**

Includes 4-bit processor, crystal clock, external and power-on reset and capacity to 2048 words of D256 PROM. Contains an 80-character data RAM with capacity to 640 characters. I/O busing available for custom interfacing or remote I/O. Busing available on each of 4 (16 pin) sockets for ribbon cable connectors. Mounts without card rack. Card measures 7.25" (18.42 cm) x 8.20" (20.83 cm). Up to 32 MOS output lines. Does not include PROM.

10.00 | **RC-16-6** | **RIBBON CABLE INTERCONNECT**

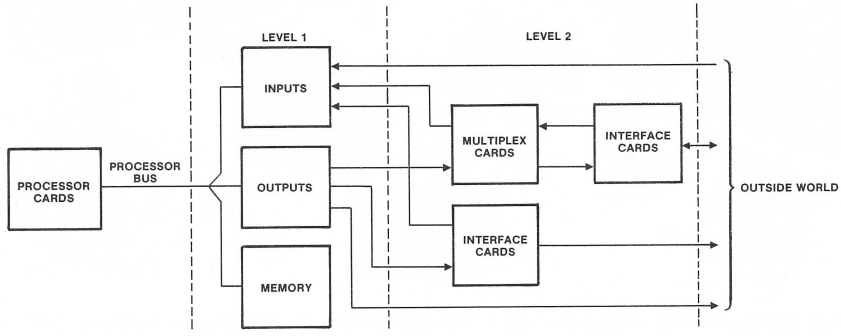
Complete 6 inch ribbon cable and two 16 pin DIP plugs. Connects 4118 to 4122.

50.00 (▲) | **RC-16-7** | **RIBBON CABLE INTERCONNECT**

Complete 2 foot ribbon cable with 16 pin DIP plug on one end and CT-56 transition connector on other end. For wiring 4115 or 4415 to 4118 I/O card.

Microprocessor Card Compatibility Table

The table below shows the possible interconnecting of support cards with specific Processor cards. While there might be other combinations and while some combinations are limited by the capabilities of the Microprocessor instruction sets, this table gives a general idea of the feasible system configurations. (Please see legend and notes below). One card systems (PLS-401, PLS-411 and PLS-441) contain memory and I/O on the card.



MICROPROCESSOR	4004				4040			
PROCESSOR CARD	PLS-401	PLS-411	4111	4115	PLS-441	4415	4416	4417
MEMORY	OC	OC	OC	OC	OC	OC	OC	OC
4111-2			1					
4112			1					
4112-2			1					
4117			1					
4125		1						
4418								1
4428							1	
INPUT/OUTPUT	OC	OC			OC			
4113	2	2	1,2	1,2	2	1,2		1,2
4114-2	2	2	2	2	2	2		2
4433	2	2	1,2	1,2	2	1,2	1,2	
4434	2	2	1,2	1,2	2	1,2	1,2	
4434-1							1,2	
INTERFACE CARDS								
8401-2	2	2	2	2	2	2		2
8402-2	2	2	2	2	2	2		2
8403	2	2	2	2	2	2		2
8404-4	2	2	2	2	2	2		2
8405	2	2	2	2	2	2		2
8406	2	2	2	2	2	2		2
8407	2	2	2	2	2	2		2
8409	2	2	2	2	2	2		2
8419							2	

LEGEND:

OC--Indicates item contained "on-card" (e.g. 441 has I/O on card).
1--Indicates interface level 1, connects to Processor bus
2--Indicates interface level 2, connects to I/O
1,2--Indicates interface level 1 or 2

Starter Sets (4004, 4040)

The SS-1 series of starter sets all use the 4004 Microprocessor and related specialized RAM registers and internal interface chips. This chip set was first developed by Intel and is now second sourced by National Semiconductor with pin compatible parts.
The SS-3 series of starter sets all use the 4040 Microprocessor and related specialized RAM registers, clock chip and internal interface chip. Most of these chips are available only from Intel.

$2950.00 (3594.00) * — **SS-1** — **LOGIC PROCESSOR STARTER SET (4004)**

Complete Programmed Logic System Includes:

PLS-401	One Card Programmed Logic System
CR-10A	½ Rack Card Cage
M272	Dual Power Supply
P561	Utility DIP card
P562	General Utility card
D256	(4 each) PROMs (1024 eight-bit words 1702A type)
CF-1	Program Assembly Forms
DG-1	Designer's Guide to Programmed Logic
PB-1	Programmed Logic Application Notes
SZ-24	Zero Insertion Force Socket
WK-1	Wire Wrap Kit

Engineering Instruments:

Reusable basic equipment for programming and system check-out.

M900, PM9001A, 9103	PROM Programmer for programming D256 and 1702A PROM. Includes UV Erase Light System.
M422A	System Analyzer
P560	Card Extender

3100.00 (3729.00) * — **SS-1A** — **LOGIC PROCESSOR STARTER SET (4004)**

Same as SS-1, but with 4115 and 4113 instead of PLS-401, two additional D256 PROM (1702A type) and CR-10A prewired for 4115 and 4113.

3200.00 (3809.00) * — **SS-1B** — **LOGIC PROCESSOR STARTER SET (4004)**

Same as SS-1, but with 4111, 4112 and 4113 instead of PLS-401, four additional D256 PROMs (1702A type) and CR-10 prewired for 4111, 4112 and 4113.

3000.00 (3664.00) * — **SS-3** — **LOGIC PROCESSOR STARTER SET (4040)**

Same as SS-1, but with PLS-441 instead of PLS-401, and M422 System Analyzer instead of M422A.

3150.00 (3764.00) * — **SS-3A** — **LOGIC PROCESSOR STARTER SET (4040)**

Same as SS-1, but with 4415 and 4113 instead of PLS-401, and M422 System Analyzer instead of M422A, two additional D256 PROMs (1702A type) and CR-10A prewired for 4415 and 4113.

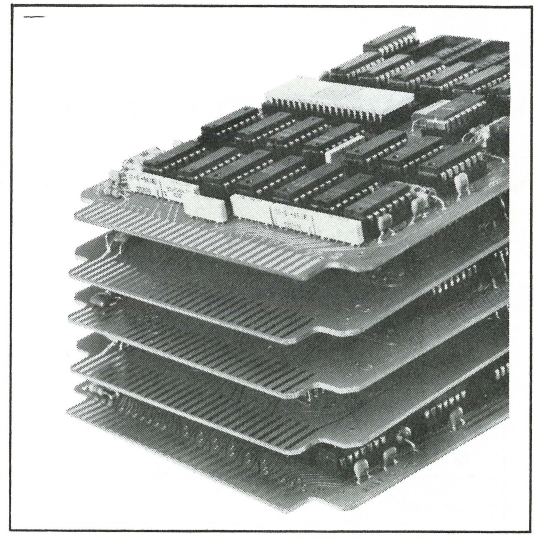
3250.00 (3854.00) * — **SS-3B** — **LOGIC PROCESSOR STARTER SET (4040)**

Same as SS-1, but with 4417, 4418, 4113 instead of PLS-401, M422 System Analyzer instead of M422A, four additional D256 PROM (1702A type) and CR-10A prewired for 4417, 4418 and 4113.

*( ) Total price of items if purchased separately. NOTE: No further discounts apply to starter sets.

8-bit Microprocessors

eight



Cards and Systems

PRO-LOG's family of 8-bit microprocessor cards and systems is constantly expanding to provide you with flexibility of design, combined with proven industry standard devices for cost-effective engineering. PRO-LOG has 8-bit microprocessor cards built around the 8080A, 8008, 6800, 8085 and Z-80 Microprocessors. Common memory expansion and input/output cards are described on page 31 thru 37. The card compatability table on page 33 shows you which cards work together. Our growing line of single-card systems are detailed on pages 28 and 29.

FEATURES:

- All cards are standard 56-pin 4.5" (11.43 cm) by 6.5" (16.51 cm). 0.5" card rack spacing.
- Selection of multi-sourced, industry standard components assures availability and lowest prices.
- All cards are thoroughly tested, including heat run @ 75°C for 72 hours.
- Schematics, assembly prints and application notes included.
- Manufacturing rights offered free after purchase of 250 sets. (See page 28).

Starter Sets

PRO-LOG's 8-bit Starter Sets are shown on page 34, and include everything needed to begin designing with microprocessors; Series 90 PROM Programmer, microprocessor subsystem, associated hardware, and System Analyzer. A substantial savings is offered in these package prices.

Single-Card 8-Bit Microprocessors

The PRO-LOG single-card programmed logic systems have been designed as complete systems with Processor, clock circuit, data memory, program memory, and I/O. Pin compatability has been maintained where possible to offer maximum flexibility and interchange of processors. Use the card compatability guide on page 33 and the following chart for reference.

Single 8-Bit Systems

	PLS 881	PLS 888	PLS 858	PLS-868	PLS 898*
PROCESSOR	8080A	8080A	8085	6800	Z-80
PROM CAPACITY	4K (2708)	8K (TMS2716)	8K (2716)	8K (2716)	8K (2716)
RAM CAPACITY	1K	2K	2K	2K	2K
INPUT PORTS (8 LINES)	2	2	2	2	2
OUTPUT PORTS (8 LINES)	3	3	3	3	3
I/O EXPANSION (TOTAL PORTS)	VIA MULTIPLEXING ADD 12/12	8/8 VIA RIBBON CONNECTOR	20/18 VIA RIBBON CABLE	12/15 VIA RIBBON CONNECTOR	8+/8+ VIA RIBBON CONNECTOR
STATE TIME	488 NSEC	488 NSEC	320 NSEC	1.0 MICROSECOND (CYCLE TIME)	500 NSEC
PIN COMPATIBLE	X	X	X	POWER AND I/O	X
POWER REQUIREMENTS	+12,+5,-5	+12,+5,-5	+5	+5	+5

PROM NOT INCLUDED ON CARD SYSTEMS.

1K OF RAM PROVIDED ON CARD SYSTEMS.

DATA SHEETS ARE AVAILABLE ON REQUEST.

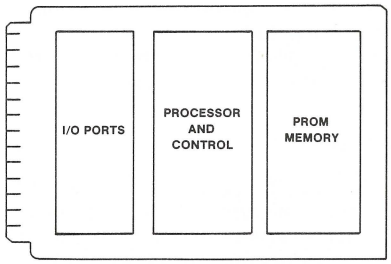
*PRELIMINARY SPECIFICATIONS. CARD NOT AVAILABLE UNTIL 12/77.

• Documentation:

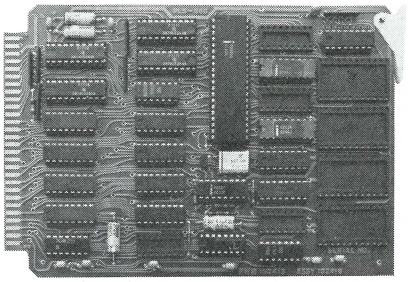
All PRO-LOG card systems are shipped complete with data sheets, schematics, assembly prints and pertinent application notes.

• Manufacturing Rights:

After purchasing 250 units of a particular card system, PRO-LOG will supply free of charge, all necessary documentation and non-exclusive manufacturing rights...you become your own second source!



Typical Single-Card Layout



PLS-888 8080A/TMS2716 System

$260.00 (▼) **PLS-881** **ONE CARD 8080A/2708 SYSTEM**

This industry standard processor is optimized in the PLS-881 for small and medium sized dedicated control systems. I/O is expanded through multiplexing.

Includes 8080A Processor with 0.488 microsecond state time, crystal clock, single level interrupt, power-on and external reset, 1024 bytes of D1002 RAM (2102 or equivalent) and sockets for 4096 bytes of D1024 PROM (2708 or equivalent), 16 TTL input lines and 24 TTL output latches. Requires +12, +5, -5 VDC. Does not include PROM.

295.00 (N) **PLS-888** **ONE CARD 8080A/TMS2716 SYSTEM**

Incorporates the same features of the PLS-881, but with capacity for 8K of program memory and 2K of RAM. I/O expansion to six additional input ports and five additional output ports through simple ribbon connector.

Includes 8080A Processor with 0.488 microsecond state time, crystal clock, interrupt input, power-on and external reset, 1024 bytes of D1004 RAM (2114 or equivalent), with sockets for additional 1024 bytes, and sockets for 8192 bytes of D2001 PROM (TMS 2716 or equivalent), 16 TTL input lines and 24 TTL output latches. Requires +12, +5, -5 VDC. Does not include PROM.

295.00 (N) **PLS-858** **ONE CARD 8085/2716 SYSTEM**

Software compatible with PLS-881/888 with additional instructions for serial data I/O. Expansion through simple ribbon connector for 18 additional input ports and 15 additional output ports. Five interrupts available. Single +5V supply.

Includes 8085 Processor with 0.320 microsecond state time, crystal clock, interrupt input, power-on and external reset, 1024 bytes of D1004 RAM (2114 or equivalent), with sockets for additional 1024 bytes, and sockets for 8192 bytes of D2002 PROM (Intel 2716 or equivalent), 16 TTL input lines and 24 TTL output latches. Requires +5 VDC. Does not include PROM.

295.00 (N) **PLS-868** **ONE CARD 6800/2716 SYSTEM**

The 6800 is well suited to small scale data processing applications and is also capable of high speed bit manipulation for control applications. The PLS-868 allows the designer to select either RAM or I/O in memory base page 00 for use with high speed direct instructions. Expansion to ten additional input ports and twelve additional output ports through simple ribbon connector. Single +5V supply.

Includes 6800 Processor with one microsecond cycle time, crystal clock, two interrupt inputs, power-on and external reset, 1024 bytes of D1004 RAM (2114 or equivalent), with sockets for additional 1024 bytes, and sockets for 8192 bytes of D2002 PROM (Intel 2716 or equivalent), 16 TTL input lines and 24 TTL output latches. Requires +5 VDC. Does not include PROM.

295.00 (N) **PLS-898** **ONE CARD Z-80/2716 SYSTEM**

(Preliminary specifications not available until 12/77.)

The expanded instruction set of the Z-80 (158 instructions) adds versatility particularly useful for bit manipulation. Multiple masked and unmasked interrupts. Ribbon cable port expansion. Single +5V supply.

Includes Z-80 Processor with .500 microsecond state time, crystal clock, interrupt input, power-on and external reset, 1024 bytes of D1004 RAM (2114 or equivalent), with sockets for additional 1024 bytes, and sockets of 8192 bytes of D2002 PROM (Intel 2716 or equivalent), 16 TTL input lines and 24 TTL output latches. Requires +5 VDC. Does not include PROM.

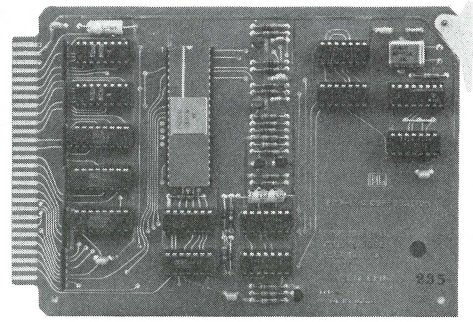
Edge Connected Card Components

PROCESSOR CARDS

$240.00 | **8611** / **8611-1**

PROCESSOR CARD (6800)

Implements the 8-bit 6800 Microprocessor as a fully TTL buffered Microprocessor card with clock, reset, data, address, memory control and I/O control. Includes 6800 Microprocessor, with 1.600 microsecond state time crystal clock. Timing is compatible with D256 PROM (1702A or equivalent). Requires +5VDC. For 1.000 microsecond state time clock specify 8611-1. 8611-1 requires 0.5 microsecond memory.



8611 Processor Card

$240.00 | **8811A**

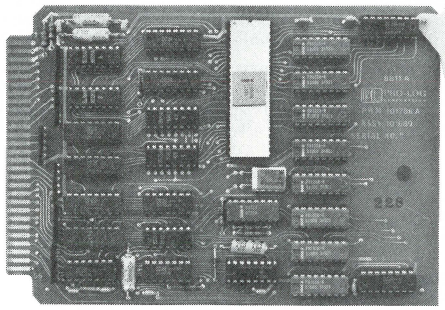
PROCESSOR CARD (8080A)

Includes 8080A with 1.000 microsecond state time, crystal clock, DMA buffers and interrupt input with optional power-on restart, and 1024 bytes of RAM (D1002). Provides fully TTL buffered address and data busses for full memory and I/O expansion. Requires +12,+5, -10VDC.

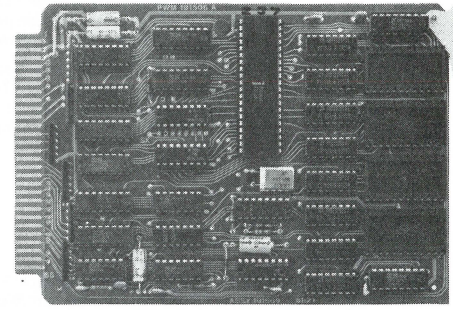
$250.00 | **8821**

PROCESSOR CARD (8080A)

Includes 8080A Microprocessor with 0.488 microsecond state cycle, crystal clock, DMA buffers and interrupt input with optional power-on restart, 1024 bytes of RAM (D1002), and sockets for up to 4096 bytes of 1024 PROM (1702A or equivalent). Provides fully TTL buffered address and data busses for full Memory and I/O expansion. Requires +12, +5, -5VDC. Does not include PROM.



8811A Processor Card



8821 Processor Card

$330.00 | **8111**

PROCESSOR CARD (8008)

Contains 8008-1 Microprocessor with 2.800 microsecond state time, crystal clock, DMA buffers and interrupt input with optional power-on restart. Provides fully TTL buffered address and data busses. Requires +5, -10VDC.

Edge Connected Card Components (Continued)

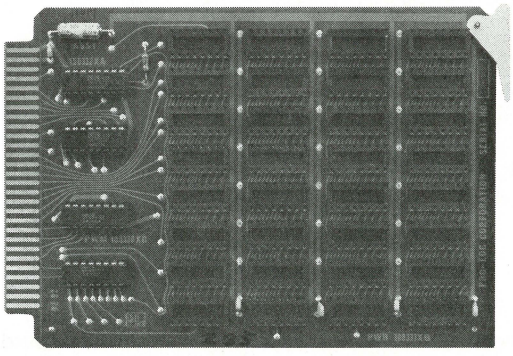
MEMORY CARDS

$ 80.00 | 8112-1 | **ROM/RAM CARD**

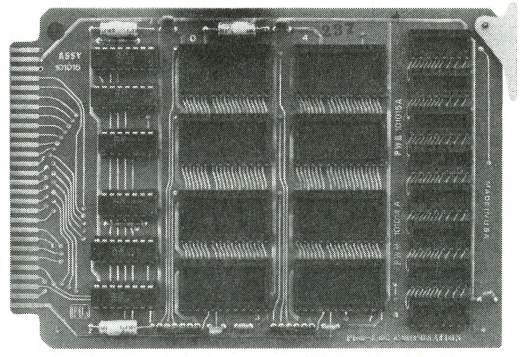
Suggested for 6800 based systems only. Capacity to 1024 words of D256 PROM (1702A or equivalent) and 2048 words of D1002 RAM (2102 or equivalent). Requires +5, -10VDC. Does not include PROM or RAM.

80.00 | 8116 | **ROM CARD**

Capacity to 2048 words of D256 PROM (1702A or equivalent). Requires +5, -10VDC. Does not include PROM.



8117 RAM Card (shown with D1002)



8812 ROM/RAM Card

$ 95.00 | 8117 | **RAM CARD**

Capacity to 4096 words of D1002 RAM (2102 or equivalent). Requires +5VDC. Does not include RAM.

95.00 (N) | 8119 | **RAM CARD**

Capacity to 16,384 words of D1004 RAM (2114 or equivalent). Requires +5VDC. Does not include RAM.

120.00 (N) | 8120 | **ROM/RAM CARD**

Capacity to 16,384 words of D2001 PROM (TMS2716 or equivalent) and 2048 words of D1004 RAM (2114 or equivalent). Interfaces with 8821 processor card. Avoid mixing with 8112 or 8116 cards because of conflicting power supply. Requires +12, +5, -5VDC. Does not include PROM or RAM.

150.00 (N) | 8122 | **RAM CARD, CMOS WITH BATTERY BACKUP**

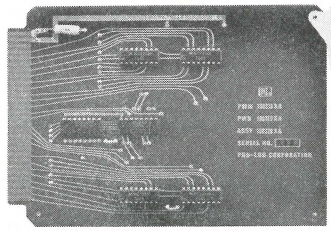
Capacity to 4096 words of D1003 CMOS RAM (6508 or equivalent). Includes nickel-cadmium rechargeable battery which enables RAM data retention for up to 30 days. Requires +5VDC. Does not include RAM.

105.00 | 8812 | **ROM/RAM CARD**

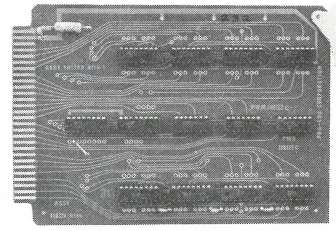
Capacity to 8192 words of D1024 PROM (2708 or equivalent) and 1024 words of D1002 RAM (2102 or equivalent). Interfaces with 8821 processor card. Avoid mixing with 8112 or 8116 because of conflicting power supply requirements. Requires +12, +5, -5VDC. Does not include PROM or RAM.

Edge Connected Card Components (Continued)

I/O AND SUPPORT CARDS



8114 TTL Input Gate Card

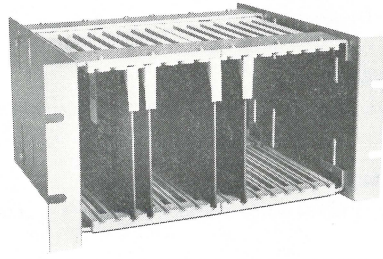


8115 TTL Output Latch Card

$ 95.00	8113 8113-1	**I/O CARD** Contains 28 TTL universal lines, field selectable in groups of 4 as input gate or output latches. Requires +5 VDC. 8113 connects to 8111. 8113-1 connects to 8811A, 8821, or 8611.
60.00	8114	**TTL INPUT GATE CARD** Contains 32 input gates. Requires +5 VDC. Can be used as input multiplexer.
80.00	8115 8115-1	**TTL OUTPUT LATCH CARD** Contains 32 output latches. Requires +5 VDC. 8115 connects to 8111. 8115-1 connects to 8811A, 8821, or 8611.
95.00	8118 8118-1	**8-LEVEL PRIORITY INTERRUPT CARD** Expands interrupt to 8-levels of priority interrupt. Requires +5 VDC. 8118 connects to 8111. 8118-1 connects to 8811A or 8821.

Card Rack Systems

PRO-LOG's expandable 8080A based Card Rack Systems are complete basic systems with cards and card rack. The card rack is pre-wired so that Memory, Inputs and Outputs can be expanded with additional cards.

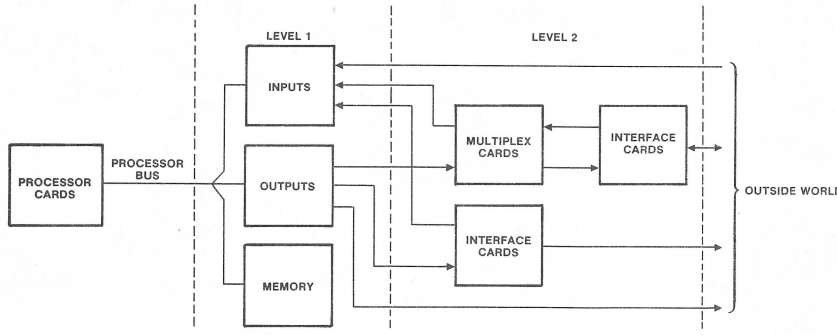


CRS-81

$640.00 (▼)	CRS-81	**EXPANDABLE 8080A/1702A CARD RACK SYSTEM** Includes 8811A Processor Card, 8116 ROM Card, 8114 Input Selector Card, 8115-1 Latched Output Card and a CR-10A Card Rack prewired for system expansion. All 16 of the Card Edge Connectors in the CR-10A are power bussed. Ten of the connectors are pre-wired as follows: one 8811A Processor Card, three 8116 ROM Cards, one 8117 RAM Card, two 8114 Input Selector Cards, two 8115-1 Latched Output Cards and one 8406 20mA-current loop Interface Card. The other six connectors may be wired by the customer to suit his needs. (PRO-LOG now offers the WK-1 Wire Wrapping Kit for this purpose). Requires +12 VDC, +5 VDC and -10 VDC. The clock rate and voltage requirements of the system are compatible with the 1702A PROM. (PROMs not included)
570.00 (▼)	CRS-82	**EXPANDABLE 8080A/2708 CARD RACK SYSTEM** Includes 8821 Processor Card, 8114 Input Selector Card, 8115-1 Output Latch Card and a CR-10A Card Rack pre-wired for system expansion. All 16 of the card edge connectors in the CR-10A are power bussed. Ten of the connectors are prewired as follows: one 8821 Processor Card, one 8812 ROM Card, three 8117 RAM Cards, two 8114 Input Cards, two 8115-1 Latched Output Cards and one 8406 20mA current loop Interface Card. The other six connectors may be wired by the customer to suit his needs. (PRO-LOG now offers the WK-1 Wire Wrapping kit for this purpose). Requires +12 VDC, +5 VDC and -5 VDC. The clock rate and voltage requirements of this system are compatible with the 2708 PROM (PROMs not included).

Microprocessor Card Compatibility Table

The table below shows the possible interconnecting of support cards with specific Processor cards. While there might be other combinations and while some combinations are limited by the capabilities of the Processor instruction sets, this table gives a general idea of the feasible system configurations. (Please see legend and notes below).



MICROPROCESSOR	8080A			8008	6800		8085	Z-80
MICROPROCESSOR CARDS	8811A	8821	PLS-881	8111	8611	PLS-868	PLS-858	PLS-898
MEMORY CARDS	OC	OC	OC			OC	OC	OC
8112-1					1			
8116	1	1		1	1			
8117	1	1	2	1	1	2	2	2
8119	1	1	2	1	1	2	2	2
8120		1(a)			1(a)			
8122	1	1	2	1	1	2	2	2
8812		1(a)			1(a)			
INPUT/OUTPUT CARDS			OC			OC	OC	OC
8113				1,2				
8113-1	1,2	1,2	2		1,2	2	2	2
8114	1,2	1,2	2	1,2	1,2	2	2	2
8115				1,2				
8115-1	1,2	1,2	2		1,2	2	2	2
INTERRUPT CARDS						OC	OC	OC
8118				1				
8118-1	1	1	1					
INTERFACE CARDS								
8401-2	2	2	2	2	2	2	2	2
8402-2	2	2	2	2	2	2	2	2
8403	2	2	2	2	2	2	2	2
8404-4	2	2	2	2	2	2	2	2
8405	2	2	2	2	2	2	2	2
8406	2	2	2	2	2	2	2	2
8407	2	2	2	2	2	2	2	2
8409	2	2	2	2	2	2	2	2
8419	2	2	2	2	2	2	2	2

(a) 8812 or 8120 should not be mixed with 8112 or 8116, because of differing power supply requirements.

LEGEND:

OC--Indicates item contained "on-card" (e.g. PLS-881 has I/O on card).
1--Indicates interface level 1, connects to Processor bus.
2--Indicates interface level 2, connects to I/O.
1,2--Indicates interface level 1 or 2.

Starter Sets (8080A)

SS-11 CRS-81 Starter Set

PRO-LOG's Starter Sets offer the user a complete development system at a substantial discount. A Starter Set includes Engineering Instruments and enough Cards, Components, Support Hardware and Documentation to build and ship the first microprocessor system.

Support Hardware

P561	Utility DIP card
P562	General Utility card
M276	Dual Power Supply
M273	Dual Power Supply
SZ-24	Zero Insertion Force Socket
WK-1	Wire Wrapping Kit

Literature and Documentation

DG-3	Designer Guide to Programmed Logic
CF-1	Program Assembly Forms Schematics and Assembly Prints

Engineering Instruments

M900 PM900X 9103	PROM Programmer with Personality Module and UV Erase Light
M822A	System Analyzer
P560	Card Extender

$3600.00 * (4151.50) — **SS-11** — **MICROPROCESSOR STARTER SET**

Includes CRS-81 Card Rack System, PM9001A Personality Module for the 1702A PROM (D256), 5 each D256 PROMs (1702A or equivalent) and items listed above.

3600.00 * (4076.50) — **SS-12** — **MICROCOMPUTER STARTER SET**

Includes CRS-82 Card Rack System, PM9005 Personality Module for 2708 PROMs (D1024), 2 each D1024 PROMs (2708 or equivalent) and items listed above.

Options

400.00 — **TTY-11** **TTY-12** — **TELETYPE OPTION FOR STARTER SETS**

Includes 8406 Serial TTY Interface Card, the 9102 TTY Option on the PROM Programmer and a Resident Monitor Program on PROM (uses 4 each D256 (1702A or equivalent) for the SS-11 or 1 each D1024 (2708 or equivalent) for the SS-12) in the Microprocessor System. The Teletype Monitor Program performs Load, Dump, Move, Translate and Edit functions.

*( ) *Prices of items if purchased separately.* No further discounts apply to Starter Sets.

Microprocessor Support

PRO-LOG offers a wide range of support for its microprocessor systems. This includes Interface Cards, Card Racks, Power Supplies, Memory Chips Literature and Education. Call PRO-LOG factory or your local representative (page 49) for details and data sheets.

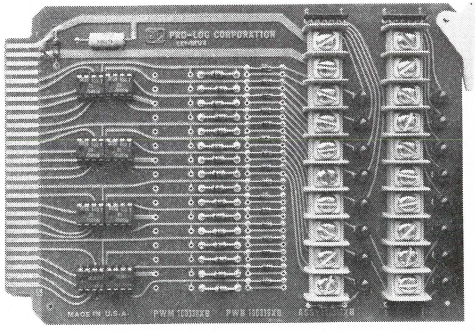
Support From Other Companies

PRO-LOG has also encouraged other vendors with expertise in analog circuits, data acquisition and communications to develop other physically and electrically compatible support cards and associated software. Below is a partial list of sources for compatible support. For technical, pricing or availability information simply call or write the listed contact. This list is given for reference purposes and does not constitute an endorsement of the products.

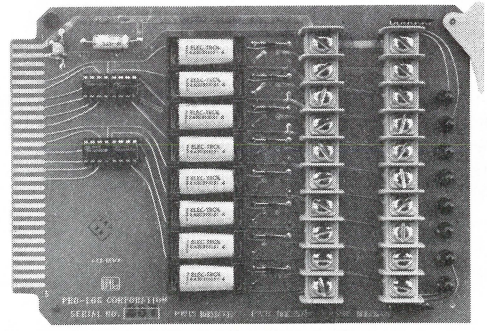
Vendor and Contact	Types of Compatible Cards
Analog Devices Contact: An applications engineer: P.O. Box 280 Norwood, Mass. 02062 (617) 329-4700	Analog to Digital (RTI-1220) Digital to Analog (RTI-1221)
Burr Brown Contact: Sales Dept. P.O. Box 11400 Tucson, Ariz. 85734 (602) 294-1431	Analog to Digital (MP4216) Digital to Analog (MP4102)
Digital Dynamics Contact: Joe Fillo 830 E. Evelyn Sunnyvale, Cal. 94086 (408) 733-4660	Analog to Digital Digital to Analog Thumbwheel Switch Cards Printer Interface Power Supply LED Display Contact Closure Sense Cards
Giuli Microprocessing Contact: An applications engineer: P.O. Box 23100 San Jose, Cal. 95153 (408) 292-8058	Consulting and Special Systems Design Serial Communications Power Supply Cassette Interface
Microcomputer Applications, Inc. Contact: Ernie Frohring 17 Cummings Park Woburn, Mass. 01801 (617) 933-8228	Consulting and Special Systems Design
Micro-Link, Corp. Contact: Dick Thomas 624 So. Range-Line Road Carmel, Indiana 46032 (317) 846-1721	Consulting and Special Systems Design Decimal Display, Timing Battery Backup Analog to Digital DC Digital Voltmeter Digital Clock Printer Interface
Sanlab Contact: Norm Looper 7969 Engineer Road San Diego, Cal. 92111 (714) 292-0646	Low Level Scanners: Millivolt Thermocouple Thermistor

Interface Cards

The cards listed in this section can be used with any of the PRO-LOG 4-bit or 8-bit microprocessor systems having TTL inputs and outputs. The buffer cards may be wired directly to the selected microprocessor ports or port multiplexers. These cards enable the user to efficiently connect his microprocessor system to real world loads such as relays, solenoids and motors.



8401-2 Driver Card



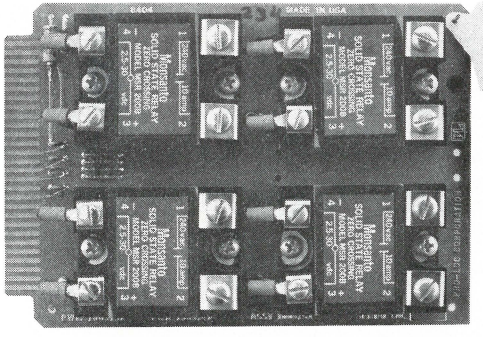
8402-2 Relay Output Card

$ 95.00 | **8401-2** | **DRIVER OUTPUT CARD**

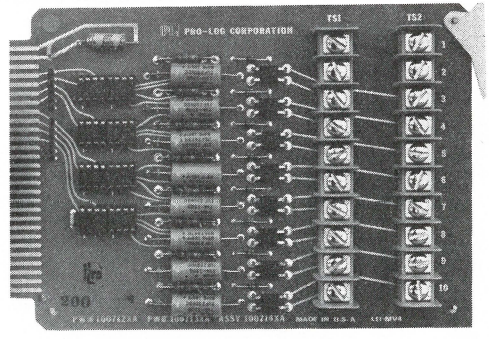
Sixteen driver outputs. Each output sinks 300mA maximum. Each output rated for 28 VDC maximum. Includes 16 LED status indicators on card, and screwdriver log cable attachment. Uses +5 VDC.

130.00 | **8402-2** | **RELAY OUTPUT CARD**

Eight relays, Form A (SPST) isolated contacts, includes 8 LED status indicators on card, and screwdriver lug cable attachment. Uses +5 VDC.



8403 Opto-Isolator AC/DC Input Card



8404-4 Triac Output Card

195.00 (▼) | **8403** | **OPTO-ISOLATOR AC/DC INPUT CARD**

24VAC (8403-1)	24VDC (8403-4)
48VAC (8403-2)	48VDC (8403-5)
115VAC (8403-3)	115VDC (8403-6)

240.00 | **8404-4** | **TRIAC OUTPUT CARD**

Switches up to 240 VAC @ 2A on each of 4 independent loads. Screwdriver lug cable attachment.

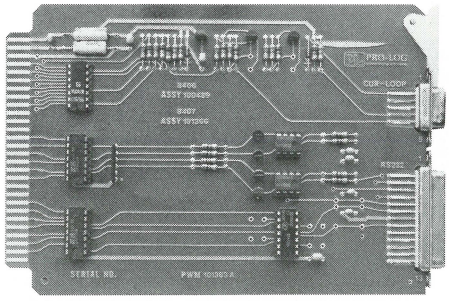
60.00 | **8405** | **TERMINAL STRIP INTERFACE CARD**

Provides connection of 50 screwdriver lugs to card rack.

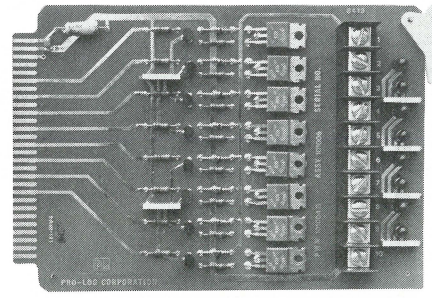
55.00 | **8406** | **SERIAL TTY INTERFACE CARD**

Provides interface to ASR33 20mA current loop. Output on 9 pin connector. Uses +5 VDC and -9 to -12 VDC.

Interface Cards (continued)



8407 Serial TTY and RS232 Interface Card



8419 Driver Output Card

$ 95.00 **8407** **CURRENT LOOP AND RS232 HARDWARE INTERFACE**

Provides interface to ASR33 20mA current loop on 9 pin connector. Provides RS-232 interface on 25 pin connector. Current loop interface identical to that of 8406. Uses +5 VDC and -9 to -12 VDC.

110.00 **8409** **RECEIVER DRIVER CARD**

Contains 8 line driver circuits each capable of driving up to 1000 feet of twisted pair (50-500 ohms impedance) and 8 line receivers for twisted pair cables. Includes terminal strip connectors for cable hookup. Uses +5 VDC.

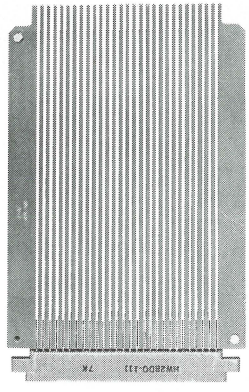
125.00 **8419** **DRIVER OUTPUT CARD**

8 Drivers. Each driver switches 1.0 amps. to 35 VDC. Terminal strip for outputs, GND, and external supply. Each output has a diode clamped to the external supply and an LED display. Each display is visible with card plugged into rack. Uses +15 VDC.

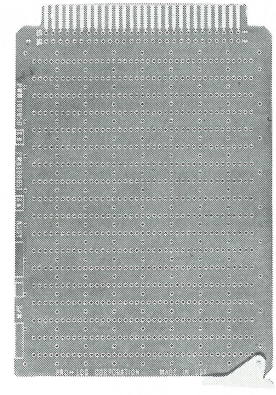
320.00 (N) **8420** **TRIAC OUTPUT CARD, HIGH DENSITY**

Switches up to 240 VAC @ 2A on each of 8 independent loads. Outputs available on card edge connection. Mating connector not included. Includes LED indication of input signals to each Triac.

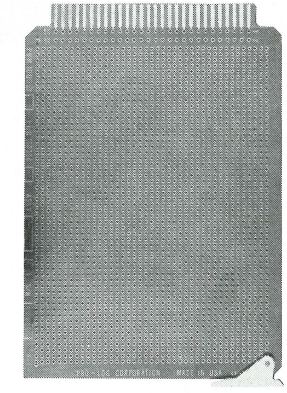
Boards



P560 Card Extender



P561 Utility Dip Card



P562 General Utility Card

$ 35.00 **P560** **CARD EXTENDER**

For all PRO-LOG card edge connected cards.

25.00 **P561** **UTILITY DIP CARD**

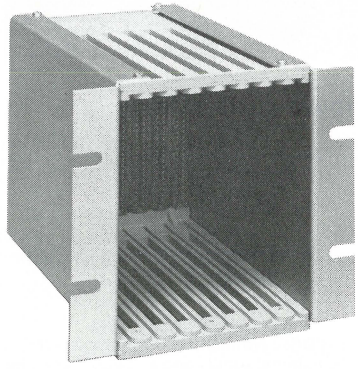
Capacity for 48 dual-in-line IC packages, 56-pin card edge connections on 0.125 inch centers.

25.00 **P562** **GENERAL UTILITY CARD**

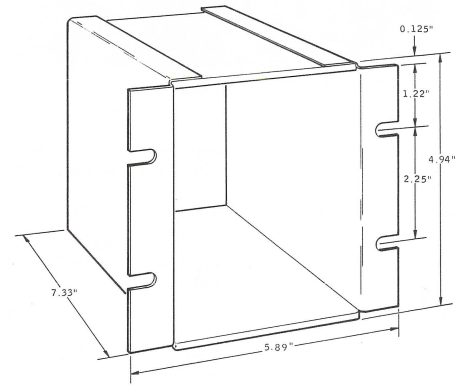
Plated through holes on 0.1 inch centers, 56-pin card edge connections on 0.125 inch centers.

Card Cages and Accessories

PRO-LOG supplies Card Cages with wire wrap connectors installed for customer convenience. The Card Cages and connectors are standard items readily available from several suppliers. The Card Cages listed in this section come with power busing installed, but without interconnect wiring between the connectors. The data sheets for each of PRO-LOG's cards contain the pin-out listings from which the wire lists can be generated. The WK-1 Wire Wrap kit is a convenient tool for making the interconnect. Pre-wired Card Cages for 8080A based systems are supplied with the CRS-81 and CRS-82 systems. (See Page 32).

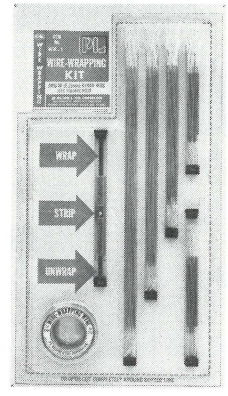


CR-5A Card Cage



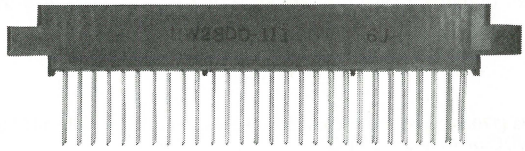
CR-5A Card Cage Dimensional Drawing

$ 80.00	CR-5A	**1/4 WIDTH CARD RACK** Includes seven CW56 connectors and power busing.
80.00 (N)	CR-5B	**1/4 WIDTH CARD RACK** Same as CR-5A but with split power busing for TTY card in slot 7.
140.00	CR-10A	**1/2 WIDTH CARD RACK** Includes sixteen CW56 connectors and power busing.
160.00	CR-19	**FULL WIDTH CARD RACK** Full 19 inch rack with sixteen CW56 connectors and power busing. Field expandable to 32 connectors. For additional connectors order CW-56.
50.00	WK-1	**WIRE WRAPPING KIT** The kit includes: • One 30 AWG wrap, unwrap & stripping tool • Pre-cut & stripped 30 AWG Blue Kynar wire 200 pieces 2 in. insulation length 150 pieces 4 in. insulation length 100 pieces 6 in. insulation length 50 pieces 8 in. insulation length • One 100 foot roll 30 AWG Blue Kynar wire

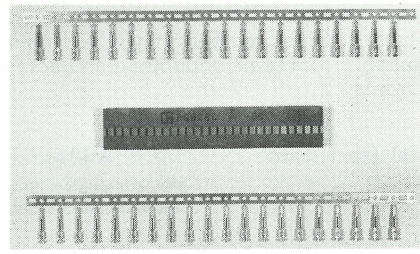


WK-1 Wire Wrapping Kit

Connectors



CW56 Wrap Connector



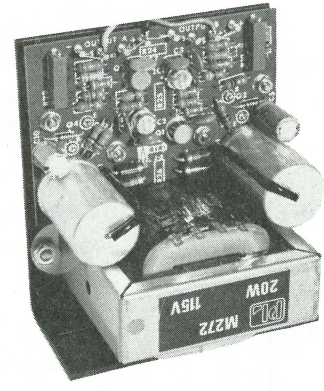
CT56 Transition Connector

$ 12.00	CT56	**TRANSITION CONNECTOR** Mates discrete cable wires to CW56. Includes pack of 40 self crimp connections.
6.00 (▼)	CW56	**WRAP CONNECTOR** Card edge 56-pin, 3-level wire wrap connector. Fits on CR-5, CR-10, CR-19. Pins are 0.025 inches square and spaced on 0.125 inch centers.

Power Supplies

PRO-LOG provides several open-frame power supply modules as convenience items. Customers must add their own AC wiring and fusing. PRO-LOG's cards and systems have no special tolerance or noise requirements for power supplies so that customers may use almost any set of supplies which provide the specified voltages and currents.

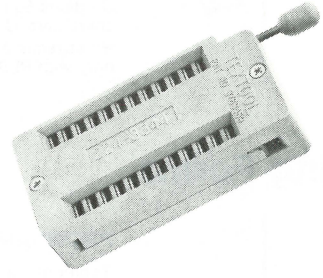
$ 85.00	M272	**DUAL DC SUPPLY** Provides +5 VDC @ 2A and -10 VDC @ 1A. For PLS-400 systems.
130.00	M273	**DUAL DC SUPPLY** Provides +5 VDC @ 6A and -10 VDC @ 2A. For MPS-800 systems and large PLS-400 systems.
60.00	M274	**DC SUPPLY** Provides +12 VDC @ 1A. Used with M273 in 8080A systems.
60.00	M275	**DC SUPPLY** Provides +15 VDC @ 1.5A. Used with 4-bit CMOS systems.
90.00	M276	**DC SUPPLY** Provides +12V @ 1A and -5 VDC @ 2A for 8080A systems.



M272 Power Supply

Sockets

$ 15.00	SZ-24	**ZERO INSERTION FORCE SOCKET** 24 pin socket adapted to mate with PROMs and PROM sockets. Expedites changing of 24 pin PROMs. SZ-24 s do not fit in adjacent sockets on most PRO-LOG memory cards.



SZ-24 Zero Insertion Force Socket

Memory Devices

PRO-LOG provides competitively priced memory devices for the convenience of its customers. These devices are available from semiconductor manufacturers and their distributors. They are sold by PRO-LOG only with card orders.

$ 15.00 (▼) D256 — UV ERASABLE PROM

PROM contains 256 eight-bit words (1702A type). 1.0 microsecond access time. Works with all PLS and most MPS system. Uses +15 VDC or +5 and -10 VDC.

35.00 D1002 — READ/WRITE MEMORY

Static RAM (2102 type) provides 1024 eight-bit words in 8 packages. 0.45 microsecond access time. +5 VDC. Used with 8122 RAM card.

110.00 (N) D1003 — CMOS READ/WRITE MEMORY

Static CMOS RAM (6508 type) 1024 eight-bit words in 8 packages 0.30 microsecond access time. Standby current is 600 microamps at +5V, 300 microamps at +3V, total for 8 packages.

48.00 (N) D1004 — READ/WRITE MEMORY

Static RAM (2114 type or equivalent) provides 1024 eight-bit words in 2 packages. 0.45 microsecond access time. +5 VDC.

40.00 (▼) D1024 — UV ERASABLE PROM

PROM contains 1024 eight-bit words (2708 type). 0.5 microsecond access time suitable for PLS-881 or 8812 cards. Uses +12, +5, -5 VDC.

65.00* (N) D2001 — UV ERASABLE PROM

PROM contains 2048 eight-bit words (TMS2716 type). 0.450 microsecond access time. Uses +12, +5, -5 VDC.

105.00* (N) D2002 — UV ERASABLE PROM

PROM contains 2048 eight-bit word (Intel 2716 type. 0.450 microsecond access time. Uses +5 VDC.

12.00 (▼) 4002-1, 4002-2 — RAM REGISTER

Contains 80 four-bit data characters organized as four registers of 16 data characters and 4 status characters. Order as -1 or -2 depending on system address. First two RAMs, including RAM supplied with system are -1; next two are -2. RAMs alternate in groups of two. Includes 4 MOS outputs. Sold only with PLS hardware. Used only with 4004 or 4040 Processor Chips.

Coding Forms

$ 4.00 CF-1 — PROGRAM ASSEMBLY FORM

Tablet of 100 Hexadecimal coding forms for assembling programs.

*Consult factory for current pricing.

Courses and Seminars

NC | **DC-1** | **HOW TO PROFIT FROM MICROPROCESSORS**

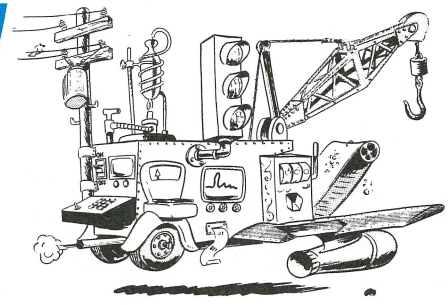
Half-day lecture and demonstration session on the fundamentals of how to select and use a microprocessor. Geared to the corporate decision maker, engineering managers, and anyone looking for a cost-effective approach to designing with microprocessors. The course is conducted throughout the country. Contact your local representative (page 49) for seminar schedule.

$ 350.00 | **DC-3** | **DESIGN COURSE**

Three day, hands-on lab and lecture course on designing with microprocessors. Scheduled throughout the country. Includes lunches, course handouts, application notes, and a DG-3 Manual. Contact PRO-LOG or your local representative (page 49) for course schedule.

designing with MICROPROCESSORS

In three days we teach you how to design and properly document microprocessor-based systems



- **You'll learn to design programs the same way you design circuits, with pencil and paper.**
- **You'll learn to test and modify your designs with simple, detachable equipment.**
- **You'll learn how to evaluate microprocessors and select the best one for your system.**
- **You'll learn to document your systems so that your present manufacturing and test personnel can build them, and your present service organization can maintain them in the field.**

You'll implement a microprocessor system for yourself.

The course gives you hands-on experience with the widely used, easy-to-understand 4-bit 4004 or 8-bit 8080A microprocessors.

We begin with alternate lecture/lab sessions to quickly familiarize the beginner. We then apply this information to solve real-world logic and control problems. You design and build microprocessor-based experimental systems during the course.

Three full days of concentrated study.

Classes last each day from 8:00 a.m. to 5:00 p.m. The lab/classroom remains open until 9:00 p.m. the first two evenings for homework preparation or for individual projects. The course instructor is available until closing.

We take an engineer-oriented approach.

Our design method based on common engineering practices for design and documentation, was devised in 1972 by Matt Biewer, our vice-president of engineering. We find our engineering approach far easier to work with than data processing methods, and use it exclusively in all our own designs. Our engineering method incorporates block diagrams, flow charts, schematics, pencil, paper, scotch tape and scissors rather than complex and expensive computer-aided design tools such as assemblers, compilers and high-level languages.

We've taught our method to more than 2,000 engineers since 1973. If you're familiar with semiconductor gates and latches, you can learn it, too.

400.00 | **DC-4** | **DESIGN COURSE (Regional locations only)**

Four day, hands-on lab and lecture course on designing with 8-bit microprocessors (experiments use 8080A). Includes lunches, course and application notes, and the "Designer's Guide to Programmed Logic Featuring the 8080 Microprocessor". Contact PRO-LOG or your local representative (page 49) for schedule.

400.00 | **DC-5** | **DESIGN COURSE (Monterey location only)**

Four and one half day hands-on lab and lecture course. Includes lunches, course and application notes, and DG-1 and DG-3 manuals. Separated into 4 and 8-bit classes for further applications discussions. Time allowed for PRO-LOG factory tour and interface with applications engineers. Contact PRO-LOG, or your local representative (page 49) for schedule.

Literature

$5.00 **DG-1**

DESIGNER'S GUIDE TO PROGRAMMED LOGIC (4004, 4040)

For PLS-400 systems. Shipped at no charge with initial PLS order.

5.00 **DG-2**

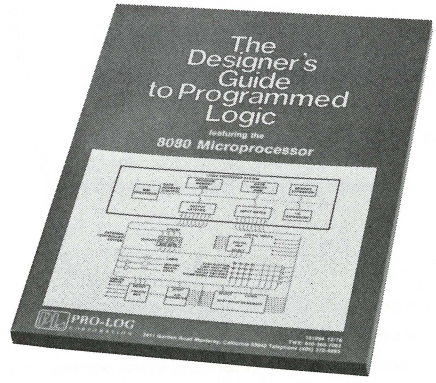
DESIGNER'S GUIDE TO PROGRAMMED LOGIC (8008)

For 8008 based systems. Shipped at no charge with initial MPS order.

7.50 (▲) **DG-3**

DESIGNER'S GUIDE TO PROGRAMMED LOGIC (8080A)

For 8080A based systems. Shipped at no charge with initial order for 8080A cards and systems.



DG-3 Designer's Guide to Programmed Logic

5.00 **PB-1**

PLAN BOOK 1

A book of experiments, program design techniques and application notes centered on the 4004, 4040 microprocesors but useful for all design engineers.

NC **MUG**

MICROPROCESSOR USER'S GUIDE

A 36 page booklet on how to select microprocessor systems and how to design them into equipment. Includes the papers "Microprocessors for Dedicated Control" and "How to Design with Microprocessors."

NC **PUG**

PROM USER'S GUIDE

A 48 page booklet on PROMs and the Series 90 and Series 92 PROM Programmers. Includes the papers "An Introduction to PROM Technology" and "How to use the 1702A MOS PROM Reliably" as well as PROM cross reference tables and complete data sheets on the PRO-LOG PROM Programmers, options and Personality Modules.

NC **MDM**

MICROPROCESSOR DOCUMENTATION FOR EASY MAINTENANCE

An eight page reprint of a scientific paper, presented in 1977, by Ed Lee, which discusses field service problems with microprocessor systems. It describes a design and documentation procedure for creating technician-serviceable systems, characteristics of field test equipment, and examples of documents vs hardware relationships.

NC **MPA**

MICROPROCESSOR ARCHITECTURE

A 14 page reprint of an article by Matt Biewer which explores processor architecture within the range of current limitations. Comparisons are made in areas of cost vs speed and thru-put, single and multi-chip devices, addressing modes, and instruction efficiency.

Index and Quantity Pricing

The following prices for cards, systems and support items, are listed in numeric and alphanumeric order. Quantity pricing is shown for most items and offers substantial discounts over unit prices. No other discounts apply to items purchased at the quantity discount price. Please contact factory for minimum quantity shipment and shipment lead times required. A dot in the quantity price column requires factory quote.

Pricing of PROM Programmers, Personality Modules and options are on pages 4 thru 15.

MODEL	TITLE	PAGE	QUANTITIES			
			1-9	10-24	25-99	100-249
4002-1	RAM REGISTER DEVICE	40	12.00	10.00	●	●
4002-2	RAM REGISTER DEVICE	40	12.00	10.00	●	●
4111	PROCESSOR CARD (4004)	23	140.00	105.00	97.00	80.00
4111-2	RAM EXPANDER CARD FOR 4111	23	60.00	50.00	45.00	40.00
4112	PROM CARD	23	115.00	95.00	80.00	70.00
4112-2	PROM EXPANDER CARD	23	80.00	65.00	57.00	50.00
4113	TTL I/O PORT CARD (4-BIT)	24	95.00	75.00	65.00	55.00
4114-2	3-STATE TTL INPUT EXPANDER (4-BIT)	24	65.00	50.00	42.00	35.00
4115	PROCESSOR CARD FOR CUSTOM I/O	23	205.00	165.00	150.00	135.00
4118	KEYBOARD, DISPLAY, I/O CARD	24	395.00	325.00	●	●
4122	PROCESSOR CARD FOR REMOTE I/O (4004)	24	280.00	220.00	●	●
4125	PROM SIMULATOR CARD	23	110.00	87.00	70.00	58.00
4415	PROCESSOR CARD FOR CUSTOM I/O (4040)	23	240.00	185.00	165.00	145.00
4416	PROCESSOR CARD FOR CMOS I/O (4040)	23	250.00	195.00	175.00	150.00
4417	PROCESSOR CARD (4040)	23	205.00	165.00	150.00	135.00
4418	PROM CARD	23	95.00	72.00	60.00	50.00
4428	PROM CARD	23	180.00	140.00	120.00	105.00
4433	BUFFERED CMOS OUTPUT CARD (4-BIT)	24	120.00	90.00	75.00	65.00
4434	3-STATE CMOS INPUT CARD (4-BIT)	24	120.00	90.00	75.00	65.00
4434-1	3-STATE CMOS INPUT CARD WITH L.E.D.s	24	145.00	110.00	95.00	85.00
8111	PROCESSOR CARD (8008)	30	330.00	270.00	●	●
8112-1	ROM/RAM CARD (6800)	31	80.00	70.00	62.00	55.00
8113	I/O CARD (8008)	32	95.00	85.00	●	●
8113-1	I/O CARD (8080A, 6800)	32	95.00	85.00	75.00	65.00
8114	TTL INPUT GATE CARD, 8-BIT	32	60.00	45.00	40.00	35.00
8115	TTL OUTPUT LATCH CARD (8008)	32	80.00	60.00	52.00	45.00
8115-1	TTL OUTPUT LATCH CARD (8080A, 6800)	32	80.00	60.00	52.00	45.00
8116	ROM CARD (8-BIT)	31	80.00	60.00	52.00	45.00
8117	RAM CARD (8-BIT)	31	95.00	75.00	65.00	55.00

MODEL	TITLE	PAGE	QUANTITIES			
			1-9	10-24	25-99	100-249
8118	8-LEVEL PRIORITY INTERRUPT CARD (8080)	32	95.00	80.00	70.00	60.00
8118-1	8-LEVEL PRIORITY INTERRUPT CARD (6800)	32	95.00	80.00	70.00	60.00
8119	RAM CARD	31	95.00	80.00	70.00	60.00
8120	ROM/RAM CARD	31	120.00	95.00	80.00	70.00
8122	RAM CARD, CMOS WITH BATTERY BACKUP	31	150.00	125.00	●	●
8401-2	DRIVER OUTPUT CARD	36	95.00	80.00	70.00	60.00
8402-2	RELAY OUTPUT CARD	36	130.00	105.00	92.00	80.00
8403	OPTO-ISOLATOR AC/DC INPUT CARD	36	195.00	165.00	150.00	●
8404-4	TRIAC OUTPUT CARD	36	240.00	195.00	●	●
8405	TERMINAL STRIP INTERFACE CARD	36	60.00	50.00	45.00	40.00
8406	SERIAL TTY INTERFACE CARD	36	55.00	45.00	40.00	35.00
8407	SERIAL TTY & RS232 INTERFACE CARD	37	95.00	80.00	70.00	60.00
8409	RECEIVER, DRIVER CARD	37	110.00	90.00	75.00	65.00
8419	DRIVER OUTPUT CARD	37	125.00	110.00	95.00	85.00
8420	TRIAL OUTPUT CARD	37	320.00	260.00	●	●
8611	PROCESSOR CARD (6800)	30	240.00	190.00	170.00	140.00
8811A	PROCESSOR CARD (8080A)	30	240.00	190.00	185.00	155.00
8812	ROM/RAM CARD (8080A)	31	105.00	80.00	65.00	57.00
8821	PROCESSOR CARD (8080A)	30	250.00	200.00	190.00	160.00
CF-1	PROGRAM ASSEMBLY FORM	40	4.00	4.00	3.50	3.00
CM-41	CHASSIS MOUNTED SYSTEM (4004)	24	850.00	750.00	●	●
CR-5A	1/4 RACK CARD CAGE	38	80.00	●	●	●
CR-5B	1/4 RACK CARD CAGE	38	80.00	●	●	●
CR-10A	1/2 RACK CARD CAGE	38	140.00	●	●	●
CR-19	FULL RACK CARD CAGE	38	160.00	●	●	●
CRS-81	8080A/1702A CARD RACK SYSTEM	32	640.00	525.00	495.00	430.00
CRS-82	8080A/2708 CARD RACK SYSTEM	32	570.00	470.00	445.00	395.00
CT-56	TRANSITION CONNECTOR	39	12.00	8.00	●	●
CW-56	WIRE WRAP CONNECTOR	39	6.00	4.50	4.00	●
D256	U.V. ERASABLE PROM (1702A)	40	15.00	13.00	11.50	10.00
D1002	RAM (8 each 2102 type)	40	35.00	30.00	27.00	25.00
D1003	CMOS RAM (8 each 6508 type)	40	110.00	90.00	●	●
D1004	RAM (2 each 2114 type)	40	48.00	●	●	●

MODEL	TITLE	PAGE	QUANTITIES			
			1-9	10-24	25-99	100-249
D1024	U.V. ERASABLE PROM (2708)	40	40.00	35.00	●	●
D2001*	U.V. ERASABLE PROM (TMS 2716)	40	65.00*	●	●	●
D2002*	U.V. ERASABLE PROM (INTEL 2716)	40	105.00*	●	●	●
DC-3	DESIGN COURSE (3 Day)	41	350.00	●	●	●
DC4/5	DESIGN COURSE	41	400.00	●	●	●
DG-1	DESIGNER'S GUIDE FOR 4004	42	5.00	5.00	4.00	3.00
DG-2	DESIGNER'S GUIDE FOR 8008	42	5.00	5.00	4.00	3.00
DG-3	DESIGNER'S GUIDE FOR 8080	42	7.50	5.00	4.00	3.00
M272	DUAL DC SUPPLY +5 AND -10 VDC	39	85.00	●	●	●
M273	DUAL DC SUPPLY+5 AND -10 VDC	39	130.00	●	●	●
M274	DC SUPPLY +12 VDC	39	60.00	●	●	●
M275	DC SUPPLY +15 VDC	39	60.00	●	●	●
M276	DUAL DC SUPPLY +12 AND -5 VDC	39	90.00	●	●	●
M422	SYSTEM ANALYZER (4040)	17	600.00	●	●	●
M422A	SYSTEM ANALYZER (4004)	17	550.00	●	●	●
M821	SYSTEM ANALYZER (8008)	18	550.00	●	●	●
M822A	SYSTEM ANALYZER (8080)	18	650.00	●	●	●
M823	SYSTEM ANALYZER (6800)	18	650.00	●	●	●
P560	CARD EXTENDER	37	35.00	30.00	●	●
P561	UTILITY DIP CARD	37	25.00	20.00	17.00	14.00
P562	GENERAL UTILITY CARD	37	25.00	20.00	17.00	14.00
PB-1	PLANBOOK 1	42	5.00	5.00	4.00	3.00
PLS-401	ONE CARD 4004 SYSTEM	22	195.00	165.00	140.00	115.00
PLS-411	ONE CARD 4004 SYSTEM	22	235.00	200.00	175.00	142.00
PLS-441	ONE CARD 4040 SYSTEM	22	215.00	180.00	160.00	130.00
PLS-858	ONE CARD 8085 SYSTEM	29	295.00	240.00	210.00	185.00
PLS-868	ONE CARD 6800 SYSTEM	29	295.00	240.00	210.00	185.00
PLS-881	ONE CARD 8080A SYSTEM	29	260.00	210.00	185.00	165.00
PLS-888	ONE CARD 8080A SYSTEM	29	295.00	240.00	210.00	185.00
PLS-898	ONE CARD Z-80 SYSTEM	29	295.00	240.00	210.00	185.00
RC-16-6	RIBBON CABLE INTERCONNECT	24	10.00	●	●	●
RC-16-7	RIBBON CABLE INTERCONNECT	24	50.00	●	●	●
SS-1	ONE CARD 4004 STARTER SET	26	2950.00	●	●	●

*Consult factory for current pricing

INDEX and QUANTITY PRICING

MODEL	TITLE	PAGE	QUANTITIES			
			1-9	10-24	25-99	100-249
SS-1A	TWO CARD 4004 STARTER SET	26	3100.00	●	●	●
SS-1B	THREE CARD 4004 STARTER SET	26	3200.00	●	●	●
SS-3	ONE CARD 4040 STARTER SET	26	3000.00	●	●	●
SS-3A	TWO CARD 4040 STARTER SET	26	3150.00	●	●	●
SS-3B	THREE CARD 4040 STARTER SET	26	3250.00	●	●	●
SS-11	8080A BASED STARTER SET (USES 1702A)	34	3600.00	●	●	●
SS-12	8080A BASED STARTER SET (USES 2708)	34	3600.00	●	●	●
SZ-24	ZERO INSERTION FORCE SOCKET	39	15.00	12.00	●	●
TTY-1X	TTY OPTION FOR 8080A STARTER SETS	34	400.00	●	●	●
WK-1	WIRE WRAP KIT	38	50.00	●	●	●

General Information

Placing An Order

Orders may be placed through your local PRO-LOG Representative or directly with the factory. Telephone orders are accepted pending credit verification and confirming paperwork. When telephoning an order to PRO-LOG ask for the Order Desk. We have specially trained personnel to handle your order promptly.

Product Availability

PRO-LOG's normal shipment time is 2-4 weeks ARO on most products. Should you require faster delivery, PRO-LOG will try to accommodate you. However, there will be a $50 expediting charge on any order requiring less than 2 weeks delivery.

If You Should Need Service Or Technical Support

Contact your local Representative or call PRO-LOG direct and ask for the Customer Service Desk. If it is necessary to return some equipment to PRO-LOG for repair, the Service Desk will provide you with a return number and the instructions which will expedite handling of your equipment by PRO-LOG.

Functions and Limitations of PRO-LOG Representatives

PRO-LOG is represented domestically by a network of sales representatives (see inside back cover). These people are ready to answer most of your questions about PRO-LOG and its products and can assist you in getting the support and information you need to solve your problems. Our representatives are not authorized to quote prices other than those listed in our published Price List, nor can they commit PRO-LOG to any contractual arrangements. Such pricing and arrangements can be made only in writing by an officer of PRO-LOG Corporation.

Special Configurations

PRO-LOG is a manufacturer of standard products and as such does not normally consider special purpose designs or hardware configurations. However, PRO-LOG may be willing to quote specialized product configurations, specialized packaging and additional products, services and documentation as part of an OEM agreement.

Pricing

Dollar Volume Discount Policy

PRO-LOG grants its customers significant discounts from unit list price based on the total dollar volume of orders placed for its products and paid for promptly. Late payment penalties include loss of the entire discount on the related order. The Volume Discount Policy has been established by PRO-LOG and is subject to change without notice.

BASE PRICE

Under this policy, prices are based on the published Price List in effect at the time a particular order is placed.

NON-DISCOUNTABLE ITEMS

Some items are shown on PRO-LOG's Price List as non-discountable or as quantity pricing. These items are not subject to the "Dollar Volume Discount", but will be added to your "Accumulated Dollar Volume" for future purchases.

DISCOUNT

The discount is determined from the Volume Discount Schedule shown below. The only requirement to continue your achieved Discount Level is to maintain account activity every 12 months.

Accumulated Dollar Value	Discount
$ 0 - $ 5,999	None
6,000 - 14,999	10%
15,000 - UP	15%

(Continued on Page 48)

DISCOUNT CALCULATION

PRO-LOG calculates the discount for an order by adding the list price of that order to the invoiced or invoiceable amounts of all previous orders placed since the starting date of the agreement. (Except for those invoices subjected to the late payment penalty.) The total figure is "Accumulated Dollar Volume." The applicable discount rate will be determined from the table on the previous page. The discount is applied only to the order in question and is not retroactive to previous orders.

LATE PAYMENT PENALTIES

An invoice not paid within 60 days of the invoice date is "overdue". The following penalties automatically occur on an overdue invoice:

1. All discounts on that invoice are voided. A new invoice for the amount of the discounts will be issued. The original invoice remains due and payable in full.
2. The amount of an overdue invoice shall not be included in any later computation of "Accumulated Dollar Volume".
3. Future orders from the customer will be accepted only on a C.O.D. or cash-with-order basis until credit is re-established to PRO-LOG's satisfaction.

International Ordering Information

We require an irrevocable letter of credit for all sales not handled by one of our international distributors. Our normal delivery time on initial orders if four to six weeks after receipt of order, pending completion of export licensing.

In order for us to obtain an export license, we must have a Letter of Credit, a Purchase Order number, and the necessary documents required for importation (i.e. import certificate). After receiving these documents, we can then apply for the export license, which takes approximately three to four weeks to process. ALL SALES ARE F.O.B. MONTEREY, CALIFORNIA.

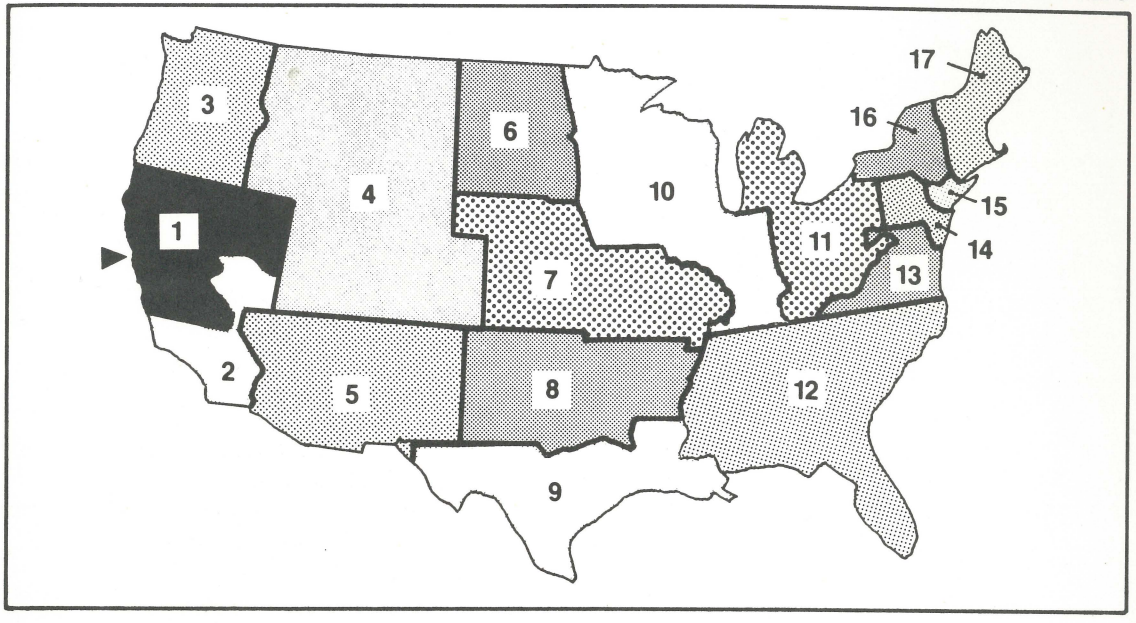
Terms

1. 2%-10 Days, Net 30 Days; F.O.B. Monterey, California.
2. Cancellation charges on orders for standard products will be charged at the rate of 10 percent of the amount of the purchase order covering standard products. This will apply in all instances where orders for standard products are cancelled after PRO-LOG acceptance of purchase order.
3. Minimum Order: $100.00; all orders subject to credit verification.
4. Discounts voided on invoices not paid in 60 days.
5. International orders must be preceded by an irrevocable Letter of Credit.

Warranty

WARRANTY: Seller warrants that the articles furnished hereunder are free from defects in material and workmanship and perform to applicable, published PRO-LOG specifications for one year from date of shipment (two years for M900 and M920 Control Units). This warranty is in lieu of any other warranty expressed or implied. In no event will Seller be liable for special or consequential damages as a result of any alleged breach of this warranty provision. The liability of Seller hereunder shall be limited to replacing or repairing, at its option, any defective units which are returned F.O.B. Seller's plant. Equipment or parts which have been subject to abuse, misuse, accident, alteration, neglect, unauthorized repair or installation are not covered by warranty. Seller shall have the right of final determination as to the existence and cause of defect. As to items repaired or replaced, the warranty shall continue in effect for the remainder of the warranty period, or for ninety (90) days following date of shipment by Seller or the repaired or replaced part whichever period is longer. No liability is assumed for expendable items such as lamps and fuses. No warranty is made with respect to custom equipment or products produced, to Buyer's specifications except as specifically stated in writing by Seller and contained in the contract.

SALES REPRESENTATIVES



PRO-LOG
CORPORATION 2411 Garden Road Monterey, California 93940 Telphone (408) 372-4593 TWX: 910-360-7082

1. **MANCO**
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    (301) 953-7580

14. **MULTI-MEASUREMENTS, INC.**
    Warminster, PA (215) 675-3082

15. **TECNIMAT, INC.**
    Fort Lee, NJ (201) 461-8686

16. **db ASSOCIATES**
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17. **MARTINDALE ASSOCIATES**
    Boston, MA (617) 933-8228
    Glastonbury, CT (203) 633-4034

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MULTITECH INTERNATIONAL CORP.
Taipei
Phone: (02) 7681232 or 7654092

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TECHNITRON, INC.—U.K.
Camberley, Surrey
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☐ Add my name to your mail list ☐ Delete my name from your mail list

☐ **Please send more information.**

I am specifically interested in:

☐ PRO-LOG Microprocessor Card Systems Type _____

☐ PRO-LOG PROM Programmers.
- ☐ Series 90 (Universal)
- ☐ Series 92 (Peripheral Duplicator)
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☐ Microprocessor System Analyzers

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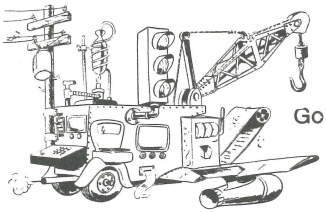

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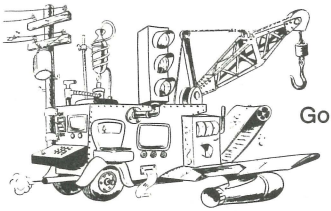

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