Bipolar PROM Cross-Reference Guide

MEMORY DESCRIPTION				MMI	AMD	FAIR-CHILD	HARRIS	INTEL	INTERSIL	MOTOROLA	NATIONAL	RAYTHEON	SIGNETICS	TI
SIZE	ORGANIZATION	PINS	OUTPUT											
256	32x8	16	OC	**6330-1**	27S08/29750		7602		5600				N82S23	TBP18SA030 SN74S188
			TS	**6331-1**	27S09/29751		7603		5610				N82S123	TBP18S030 SN74S288
1024	256x4	16	OC	**6300-1**	29S10/29760		7610	3601	5603			29660	N82S27/82S126	TBP14SA10 SN74S387
			TS	**6301-1**	27S11/29761		7611	3621	5623			29661	N82S129	TBP14510 SN74S287
2048	256x8	20	OC	**6308-1**							DM74S470	29600		TBP18SA22 SN74S470
			TS	**6309-1**							DM74S471	29601		TBP18S22 SN74S471
		24	OC	**6335-1**										
			TS	**6336-1**										
2048	512x4	16	OC	**6305-1**	27S12/29770		7620	3602A	5604	MCM 7620	DM74S570	29610	N82S130	
			TS	**6306-1**	27S13/29771		7621	3602A	5624	MCM 7621	DM74S571	29611	N82S131	
4096	512x8	20	OC	**6348-1**			7648				DM74S473	29620		TBP18SA42 SN74S473
			TS	**6349-1**			7649				DM74S472	29621		TBP18S42 SN74S472
4096	512x8	24	OC	**6340-1**			7640	3604A	5605	MCM 7640	DM87S295	29624	N82S140	TBP18SA46 SN74S475
			TS	**6341-1**			7641	3624A	5625	MCM 7641	DM87S296	29625	N82S141	TBP18S46 SN74S474
4096	1024x4	18	OC	**6352-1**		93452	7642	3605	5606	MCM 7642	DM74S572		N82S136	
			TS	**6353-1**		93453	7643	3625	5626	MCM 7643	DM74S573		N82S137	
8192	1024x8	24	OC	**6380-1**		93450	7680	3608	5608	MCM 7680	DM87S229	29630	N82S180	TBP28SA86 SN74S479
			TS	**6381-1**		93451	7681	3628	5618	MCM 7681	DM87S228	29631	N82S181	TBP2S586 SN74S478

Note: Only commercial specification part numbers are listed.

AMD	MMI
27S08/29750	6330-1
27S09/29751	6331-1
27S10/29760	6300-1
27S11/29761	6301-1
27S12/29770	6305-1
27S13/29771	6306-1

FAIRCHILD	MMI
93450	6389-1
93451	6381-1
93452	6352-1
93453	6353-1

HARRIS	MMI
7602	6331-1
7603	6331-1
7610	6300-1
7611	6301-1
7620	6305-1
7621	6306-1
7648	6348-1
7649	6349-1
7640	6340-1
7641	6341-1
7642	6352-1
7643	6353-1
7680	6380-1
7681	6381-1

INTEL	MMI
3601	6300-1
3602A	6305-1
3602A	6306-1
3604A	6340-1
3605	6352-1
3608	6380-1
3621	6301-1
3624A	6341-1
3625	6353-1
3628	6381-1

INTERSIL	MMI
5600	6330-1
5603	6300-1
5604	6305-1
5605	6340-1
5606	6352-1
5608	6380-1
5610	6331-1
5618	6381-1
5623	6301-1
5624	6306-1
5625	6341-1
5626	6353-1

MOTOROLA	MMI
MCM 7620	6305-1
MCM 7621	6306-1
MCM 7640	6340-1
MCM 7641	6341-1
MCM 7642	6352-1
MCM 7643	6353-1
MCM 7680	6380-1
MCM 7681	6381-1

NATIONAL	MMI
DM74S470	6308-1
DM74S471	6309-1
DM74S472	6349-1
DM74S473	6348-1
DM74S580	6305-1
DM74S571	6306-1
DM74S572	6352-1
DM74S573	6353-1
DM87S228	6381-1
DM87S229	6380-1
DM87S295	6340-1
DM87S296	6341-1

RAYTHEON	MMI
29600	6308-1
29601	6309-1
29610	6305-1
29611	6306-1
29620	6348-1
29621	6349-1
29624	6340-1
29625	6341-1
29630	6380-1
29631	6381-1
29660	6301-1
29661	6301-1

SIGNETICS	MMI
N82S23	6330-1
N82S27/82S127	6300-1
N82S123	6331-1
N82S129	6301-1
N82S130	6305-1
N82S131	6306-1
N82S136	6352-1
N82S137	6353-1
N82S140	6340-1
N82S141	6341-1
N82S180	6380-1
N28S181	6381-1

TI	MMI
OLD NUMBERS	
SN74S188	6330-1
SN74S287	6301-1
SN74S288	6331-1
SN74S387	6300-1
SN74S470	6308-1
SN74S471	6309-1
SN74S472	6349-1
SN74S473	6348-1
SN74S474	6341-1
SN74S475	6340-1
SN74S478	6381-1
SN74S479	6380-1

TI	MMI
NEW NUMBERS	
TBP18SA030	6330-1
TBP14S10	6301-1
TBP18S030	6331-1
TBP14SA10	6300-1
TBP18SA22	6308-1
TBP18S22	6309-1
TBP18S42	6349-1
TBP18SA42	6348-1
TBP18S46	6341-1
TBP18SA42	6340-1
TBP28S86	6381-1
TBP28SA86	6380-1

Generic PROM Family
53/63XX-1

Features/Benefits

- **Standard Schottky processing**
- **Reliability proven nichrome fusible links (qualified for MIL-M-38510)**
- **PNP inputs for low input current**
- **Compatible pin configurations for upward expansion**
- **4-bit-wide and 8-bit-wide for byte oriented applications**

Application

- **Microprogram store**
- **Microprocessor program store**
- **Look up table**
- **Character generator**
- **Random logic**
- **Code converter**

Description

The 53/63XX-1-series generic PROM family offers the widest selection of sizes and organizations available in the industry. The 4-bit wide PROMs range from 256x4 to 1024x4 and feature upward/downward pin out compatibility in the space saving 16 and 18 pin packages. The 8-bit-wide PROMs range from 32x8 to 1024x8 in a wide selection of package sizes. All PROMs have the same programming specifications allowing a single generic programmer.

The family features low input current PNP inputs, full Schottky clamping, three-state and open collector outputs. The nichrome fuses store a logical high and are programmed to the low state. Special on chip circuitry and extra fuses provide preprogramming tests which assure high programming yields and high reliability.

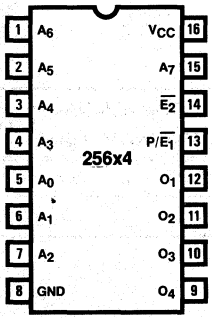
The 63 series is specified for operation over the commercial temperature and voltage range. The 53 series is specified for the military ranges.

Generic PROM Selection Guide

MEMORY			PACKAGE	DEVICE TYPE		
SIZE	ORGANIZATION			COMMERCIAL	MILITARY	
1K	256x4	OC	J16	6300-1	5300-1	4-bit-wide
		TS		6301-1	5301-1	
2K	512x4	OC	J16	6305-1	5305-1	
		TS		6306-1	5306-1	
4K	1024x4	OC	J18	6350-1	5350-1	
		TS		6351-1	5351-1	
		OC		6352-1	5352-1	
		TS		6353-1	5353-1	
1/4K	32x8	OC	J16	6330-1	5330-1	8-bit-wide
		TS		6331-1	5331-1	
2K	256x8	OC	J20	6308-1	5308-1	
		TS		6309-1	5309-1	
		OC	J24	6335-1		
		TS		6336-1		
4K	512x8	OC	J24	6340-1	5340-1	
		TS		6341-1	5341-1	
		OC	J20	6348-1	5348-1	
		TS		6349-1	5349-1	
8K	1024x8	OC	J24	6380-1	5380-1	
		TS		6381-1	5381-1	

Pin Configurations

53/6300-1
53/6301-1



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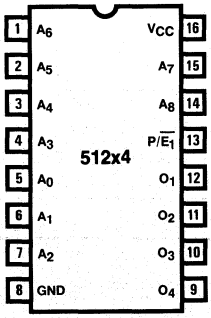

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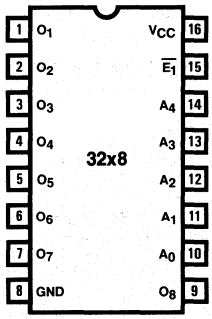

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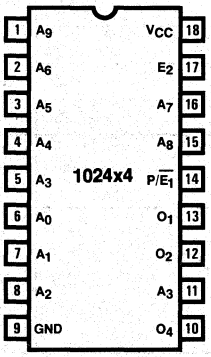

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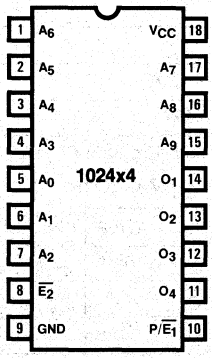

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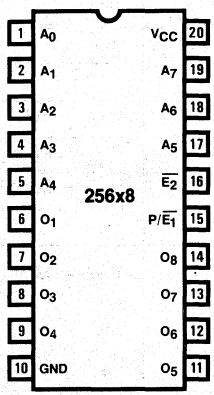

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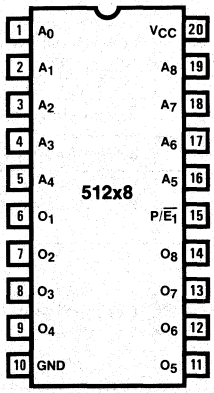

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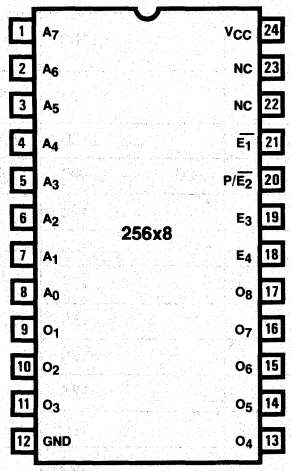

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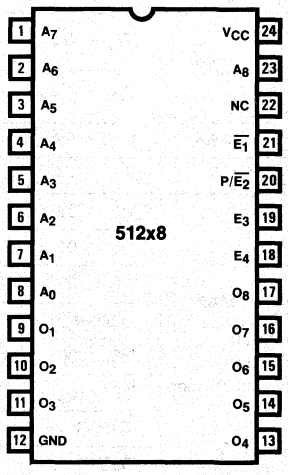

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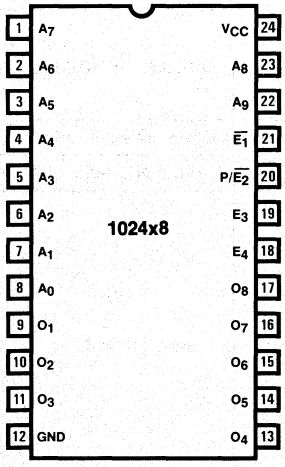


3

Absolute Maximum Ratings

Supply Voltage, V_{CC} 7V
Input Voltage 7V
Off-state output voltage 5.5V
Storage temperature ..... –65° to +150°C

Operating Conditions

SYMBOL	PARAMETER	MILITARY MIN	MILITARY NOM	MILITARY MAX	COMMERCIAL MIN	COMMERCIAL NOM	COMMERCIAL MAX	UNIT
V_{CC}	Supply voltage	4.5	5	5.5	4.75	5	5.25	V
T_A	Operating free-air temperature	–55		125	0		75	°C

Electrical Characteristics Over Operating Conditions

SYMBOL	PARAMETER	TEST CONDITIONS			MIN	TYP	MAX	UNIT
V_{IL}	Low-level input voltage						0.8	V
V_{IH}	High-level input voltage				2			V
V_{IC}	Input clamp voltage	V_{CC} = MIN	I_I = –18mA				–1.5	V
I_{IL}	Low-level input current	V_{CC} = MAX	V_I = 0.45V				–0.25	mA
I_{IH}	High-level input current	V_{CC} = MAX	V_I = 4.5V (Program Pin) V_I = V_{CC} MAX (Other inputs)				40	μA
V_{OL}	Low-level output voltage	V_{CC} = MIN V_{IL} = 0.8V V_{IH} = 2V	MIL I_{OL} = 12mA	All PROMs except '30, '31, '80, '81			0.5	V
			COM I_{OL} = 16mA					
			MIL I_{OL} = 8mA	'30, '31, '80, '81				
			COM I_{OL} = 12mA					
V_{OH}	High-level output voltage	V_{CC} = MIN V_{IL} = 0.8V V_{IH} = 2V	MIL I_{OH} = –2mA		2.4			V
			COM I_{OH} = –3.2mA					
I_{OZL}	Off-state output current	V_{CC} = MAX	V_O = 0.5V				–100	μA
I_{OZH}			V_O = 2.4V				100	μA
I_{CEX}	Open collector output current	V_{CC} = MAX	V_O = 2.4V				100	μA
I_{OS}	Output short-circuit current *	V_{CC} = 5V	V_O = 0V		–20		–90	mA
I_{CC}	Supply current	V_{CC} = MAX All inputs grounded All outputs open	'30, '31				125	mA
			'00, '01, '05, '06				130	
			'08, '09, 6348/9				170	
			5348/9				155	
			'35, '36, '40, '41				170	
			'50, '51, '52, '53				175	
			6380/1				190	
			5380/1				180	

* Not more than one output should be shorted at a time and duration of the short-circuit should not exceed one second.

Switching Characteristics

Over Commercial Operating Conditions

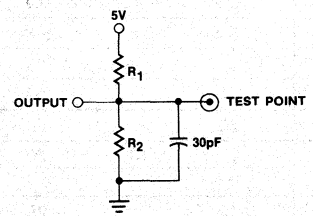
DEVICE TYPE	t_{AA} (ns) ADDRESS ACCESS TIME	t_{EA} & t_{ER} (ns) ENABLE ACCESS & RECOVERY TIME	CONDITIONS (See standard test load)	
	MAX	MAX	R1(Ω)	R2(Ω)
6300-1, 6301-1	55	30	300	600
6305-1, 6306-1	60	30		
6308-1, 6309-1	70	30		
6335-1, 6336-1	70	30		
6340-1, 6341-1	70	30		
6348-1, 6349-1	70	30		
6350-1, 6351-1	60	30		
6352-1, 6353-1	60	30		
6330-1, 6331-1	50	30	375	750
6380-1, 6381-1	90	40		

Over Military Operating Conditions

DEVICE TYPE	t_{AA} (ns) ADDRESS ACCESS TIME	t_{EA} & t_{ER} (ns) ENABLE ACCESS & RECOVERY TIME	CONDITIONS (See standard test load)	
	MAX	MAX	R1(Ω)	R2(Ω)
5300-1, 5301-1	75	40	300	600
5305-1, 5306-1	75	40		
5308-1, 5309-1	80	40		
5335-1, 5336-1	80	40		
5340-1, 5341-1	80	40		
5348-1, 5349-1	80	40		
5350-1, 5351-1	75	40		
5352-1, 5353-1	75	40		
5330-1, 5331-1	60	40	375	750
5380-1, 5381-1	125	40		

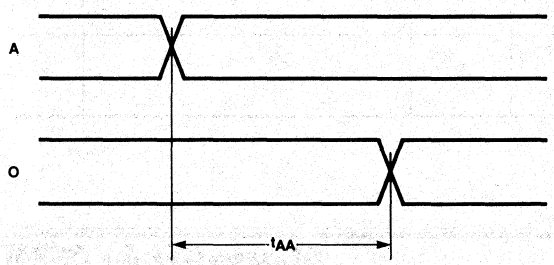
3

Standard Test Load

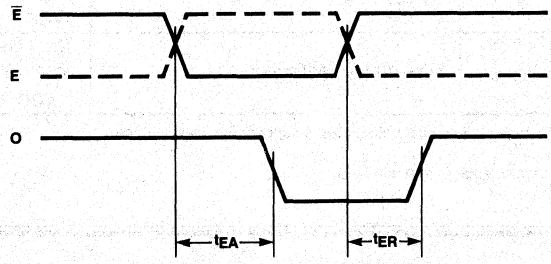


Input Pulse: 0V to 3V
Input Rise and Fall Times: 5ns from 1V to 2V
Measurements Made at 1.5V

Definition of Waveforms



Address Access Time



Enable Access Time and Recovery Time

PROM Programming Instructions

53/63XX-1

Description

The 53/63XX-1 Generic PROM Family is manufactured with outputs high in all storage locations. To make an output low at a particular word, a nichrome fusible link must be opened. This procedure is called programming.

Programming Procedure (See Figure 1)

1. Apply the desired address to the inputs.
2. Enable Inputs may be left at any state.*
3. Apply 5.5V to V_{CC}.
4. Apply V_{PP} to the program pin. (This step is not used on the 32x8 PROM)*.
5. Apply V_{OUT} to the output to be programmed. (Program only one output at a time).
6. Remove V_{OUT}.
7. Remove V_{PP}.
8. Verification may be performed after each bit or word or after completing the programming of all memory locations.

*The 5330/1 and 6330/1 do not have a program pin. For these devices the output only is used in programming a particular selected bit and the device must be in the disabled state.

Verification Procedure (See Figure 2)

1. Enable the device.
2. To verify low-state:
   - 2A. Apply an address where the output should be low.
   - 2B. Apply 4.2V to V_{CC}.
   - 2C. Load the output with I_{OL} = 12 mA.
   - 2D. Check that the output is less than 0.8V.
3. To verify High-state:
   - 3A. Apply an address where the output should be high.
   - 3B. Apply 6V to V_{CC}.
   - 3C. Load the output with I_{OH} = 0.3 mA.
   - 3D. Check that the output is higher than 4.5V.

Programming Parameters Do not test these parameters or you will program the device.

SYMBOL	PARAMETER	CONDITIONS TA = +25° C	FIGURE	LIMITS MIN	LIMITS TYP	LIMITS MAX	UNIT
t_R	Slew rate of Programming Pulses†			0.3		0.5	V/μs
V_{CCP}	VCC During Programming			5.4	5.5	5.6	V
	Maximum Duty Cycle					25	%
V_{PP}	Programming Voltage on Program Pin*		1	27		33	V
V_{OUT}	Programming Voltage on Output Pin*		1	20		26	V
t_{D1}	Delay between VPP and VOUT		1	0	10	20	μs
t_{D2}				0	0.5	1	
t_p	Pulse width of V_{OUT}		1	10		25	μs
V_{OLV}	VOL during verification	Chip enabled I_{OL} = 12 mA VCC = 4.2V	2			0.8	V
V_{OHV}	VOH during verification	Chip enabled I_{OH} = 0.3 mA VCC = 6V	2	4.5			V

*Voltage supply must be capable of supplying at least 240 mA.

†Leading edge of VPP and VOUT

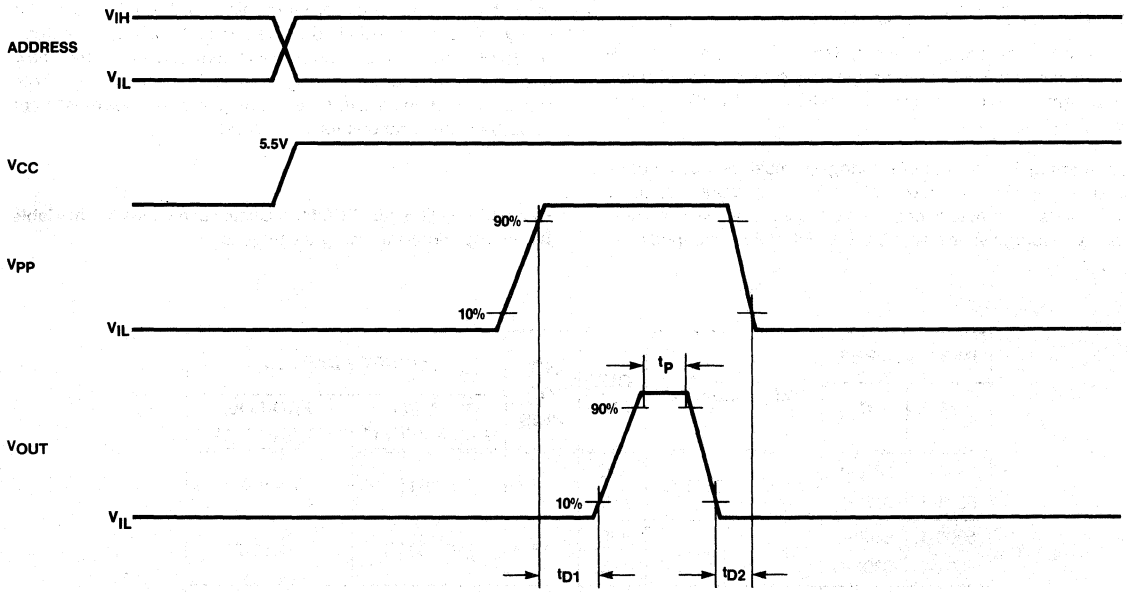


Figure 1. Programming Timing Diagram

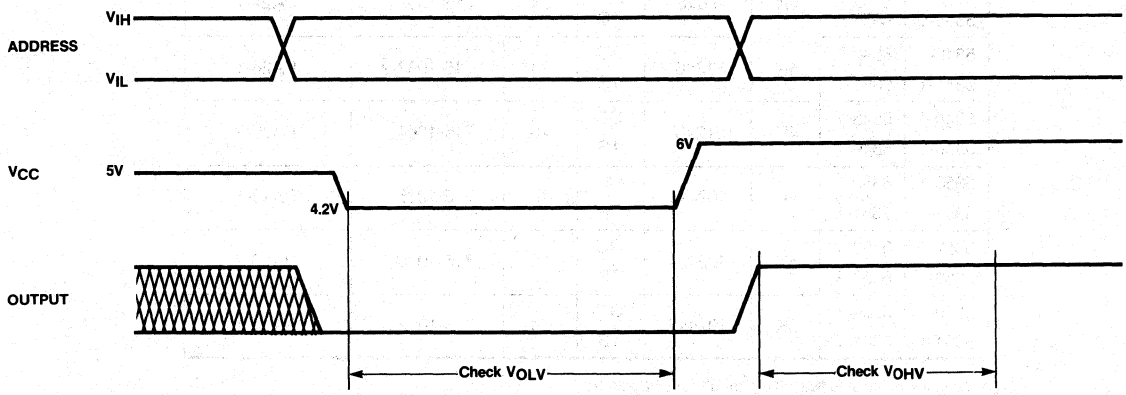


Figure 2. Verification Timing Diagram

Optimized Programming Algorithm

1. Pulse all fuses to be programmed with single, minimum voltage programming pulses (line 1 in the table).
2. Verify all fuses at low VCC (4.2V). During this step, unprogrammed fuses are pulsed up to eight more times (see table).
3. Re-verify at low VCC (4.2V) and high VCC (6V).

PULSE NUMBER	PROGRAM PIN VOLTAGE	OUTPUT VOLTAGE
1 to 3	27V	20V
4 to 6	30V	23V
7 to 9	33V	26V

Commercial Programmers

MMI PROMs are designed and tested to give a programming yield greater than 95%. If your programming yield is lower, check your programmer. It may not be properly calibrated. (See figures 1 and 2).

Programming is final manufacturing—it must be quality-controlled. Equipment must be calibrated as a regular routine, ideally under the actual conditions of use. The best method involves a storage scope, with DC current probes clamped over the external wires to the program pin and the output pin. The current should not be limited at a value less than 240mA. This can be checked by using a 50-ohm resistor as a load. Each time a new board or a new programming module is inserted, the whole system should be checked. Both timing and voltages must meet published specifications for the device.

Remember—The best PROMs available can be made unreliable by improper programming techniques.

PART NUMBER		SIZE	CONFIG.	OUT PUT	NO. OF PINS	SOCKET ADAPTER	
M	C					DATA I/O (ALL SERIES)*	PRO-LOG (SERIES 90, 92)†
5330-1 5331-1	6330-1 6331-1	1/4K	32x8	OC TS	16	715-1046	PA16-2
5300-1 5301-1	6300-1 6301-1	1K	256x4	OC TS	16	715-1035-1	PA16-1
5305-1 5306-1	6305-1 6306-1	2K	512x4	OC TS	16	715-1035-2	PA16-1
5308-1 5309-1	6308-1 6309-1	2K	256x8	OC TS	20	715-1028-1	PA20-2
5335-1 5336-1	6335-1 6336-1	2K	256x8	OC TS	24	715-1033-1	PA24-1
5340-1 5341-1	6340-1 6341-1	4K	512x8	OC TS	24	715-1033-2	PA24-1
5348-1 5349-1	6348-1 6349-1	4K	512x8	OC TS	20	715-1064	PA20-2
5350-1 5351-1	6350-1 6351-1	4K	1024x4	OC TS	18	715-1036	PA18-1
5352-1 5353-1	6352-1 6353-1	4K	1024x4	OC TS	18	715-1039-3	PA18-2
5380-1 5381-1	6380-1 6381-1	8K	1024x8	OC TS	24	715-1033-3	PA24-1

* Program card set is 909-1226-1 for all series DATA I/O

† Personality module is PM 9037 for all PRO-LOG (series 90, 92)