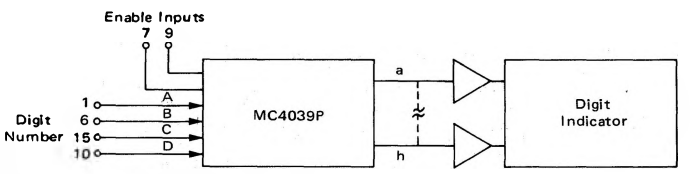
SEVEN-SEGMENT
CHARACTER GENERATOR

MC4039P*



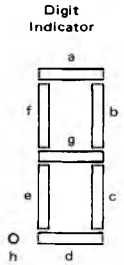
Output	a	b	c	d	e	f	g	h
Pin No.	12	11	5	4	13	14	2	3

V_{CC} = Pin 16
Gnd = Pin 8
Total Power Dissipation = 240 mW typ/pkg

The MC4039P is derived from the XC170 128-Bit Read Only Memory. It can directly operate low-voltage lamp indicators. A four digit binary input is translated into combinations of the eight outputs. These combinations correspond to different illuminated segments of the seven-bar digit indicator. The input and output codes with their related numerical digits are shown in the diagram. The enable inputs can be used for automatic blanking.

Features:
- Address times < 45 ns
- Outputs sink 20 mA
- Output capacitance < 7.0 pF @ 1.5 V
- Wired OR capability to 64 memories

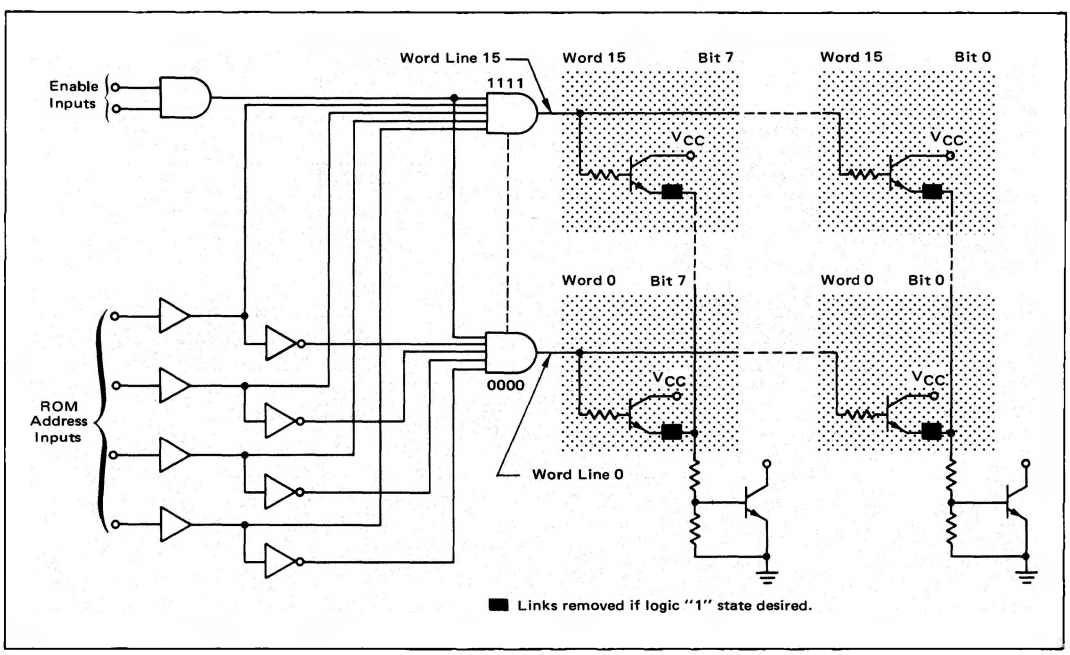
TRUTH TABLE (POSITIVE LOGIC)



DIGIT	SEGMENTS ILLUMINATED	INPUT D	C	B	A	OUTPUT a	b	c	d	e	f	g	h
0	a,b,c,d,e,f	0	0	0	0	0	0	0	0	0	0	1	1
1	b,c	0	0	0	1	1	0	0	1	1	1	1	1
2	a,b,d,e,g	0	0	1	0	0	0	1	0	0	1	0	1
3	a,b,c,d,g	0	0	1	1	0	0	0	0	1	1	0	1
4	b,c,f,g	0	1	0	0	1	0	0	1	1	0	0	1
5	a,c,d,f,g	0	1	0	1	0	1	0	0	1	0	0	1
6	c,d,e,f,g	0	1	1	0	1	1	0	0	0	0	0	1
7	a,b,c	0	1	1	1	0	0	0	1	1	1	1	1
8	a,b,c,d,e,f,g	1	0	0	0	0	0	0	0	0	0	0	1
9	a,b,c,f,g	1	0	0	1	0	0	0	1	1	0	0	1
NONE		1	0	1	0	1	1	1	1	1	1	1	1
•	h (Ext.)	1	0	1	1	1	1	1	1	1	1	1	0
–	g	1	1	0	0	1	1	1	1	1	1	0	1
NONE		1	1	0	1	1	1	1	1	1	1	1	1
NONE		1	1	1	0	1	1	1	1	1	1	1	1
NONE		1	1	1	1	1	1	1	1	1	1	1	1

ENABLE INPUT TRUTH TABLE (POSITIVE LOGIC)

E	E	a	b	c	d	e	f	g	h
0	0	1	1	1	1	1	1	1	1
0	1	1	1	1	1	1	1	1	1
1	0	1	1	1	1	1	1	1	1
1	1	FUNCTION ENABLED							



*P suffix = 16-pin dual in-line plastic package (Case 612).

INPUT and OUTPUT LOADING FACTORS
with respect to MTTL and MDTL families

FAMILY	MC4000 INPUT LOADING FACTOR	MC4000 OUTPUT LOADING FACTOR
MC4000	1.0	
MC400	1.0	
MC2000	0.67	Open Collector I_{OL} = 20 mA
MC3000	0.7	
MC7400	1.0	
MC830	1.15**	

Note: Differences in MC4000 series loading factors result from differences in specifications for each family.

** Applies only when input is being driven by MDTL gate with 2 k ohm pullup resistor. Logic "1" state drive limitations of gates with 6 k ohm pullup resistors reduce drive capability to fan-out of 3.

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Supply Voltage	V_{CC}	−0.5 to +7.0	Vdc
Supply Operating Voltage Range	V_{CC}	4.5 to 5.5	Vdc
Input Voltage	V_{in}	−1.5 to +5.5	Vdc
Operating Temperature Range	T_A	0 to +75	°C
Storage Temperature Range	T_{stg}	−55 to +125	°C

ELECTRICAL CHARACTERISTICS (T_A = 0 to +75°C)

Characteristic	Symbol	Min	Max	Unit
Address Input Forward Current (V_A = 0, V_{CC} = 5.0 Vdc)	I_F	-	1.6	mAdc
Enable Input Forward Current (V_E = 0, V_{CC} = 5.0 Vdc)	I_F	-	1.6	mAdc
Address Input Leakage Current (V_A = 5.5 Vdc, V_{CC} = 5.0 Vdc)	I_R	-	100	μAdc
Enable Input Leakage Current (V_E = 5.5 Vdc, V_{CC} = 5.0 Vdc)	I_R	-	100	μAdc
Logical "0" Output Voltage (I_{OL} = 20 mAdc, V_{IL} = 0.9 Vdc, V_{IH} = 2.0 Vdc, V_{CC} = 4.75 Vdc)	V_{OL}	-	0.45	Vdc
Logical "1" Output Leakage Current (V_{IL} = 0.9 Vdc, V_{IH} = 2.0 Vdc, V_{CEX} = 7.0 Vdc, V_{CC} = 5.25 Vdc)	I_{CEX}	-	100	μAdc
Power Supply Drain Current				mAdc
(Memory Enabled, V_{CC} = 5.25 Vdc)	$I_{PD\ max}$	-	73	
(Memory Disabled, V_{CC} = 5.25 Vdc)	$I_{PD\ min}$	-	55	

SWITCHING TIMES (V_{CC} = 5.0 Vdc)

Positive Input Address to Positive Output	I_{OL} = 10 mA driving 30 pF	t++	-	45	ns
Negative Input Address to Negative Output		t−−	-	45	ns
Positive Input Address or Enable to Negative Output		t+−	-	45	ns
Negative Input Address or Enable to Positive Output		t−+	-	45	ns