



MOTOROLA
Semiconductors

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Advance Information

1024 X 8-BIT READ ONLY MEMORY

The MCM6830 is a mask-programmable byte-organized memory designed for use in bus-organized systems. It is fabricated with N-channel silicon-gate technology. For ease of use, the device operates from a single power supply, has compatibility with TTL and DTL, and needs no clocks or refreshing because of static operation.

The memory is compatible with the M6800 Microcomputer Family, providing read only storage in byte increments. Memory expansion is provided through multiple Chip Select inputs. The active level of the Chip Select inputs and the memory content are defined by the customer.

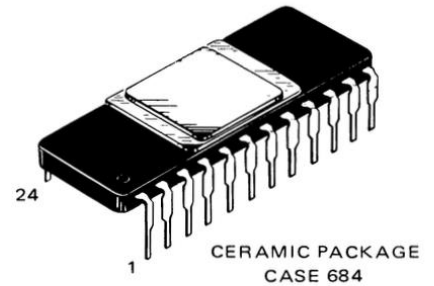
- Organized as 1024 Bytes of 8 Bits
- Static Operation
- Three-State Data Output
- Four Chip Select Inputs (Programmable)
- Single 5-Volt Power Supply
- TTL Compatible
- Maximum Access Time = 575 ns

MCM6830L

MOS

(N-CHANNEL, SILICON-GATE)

1024 X 8-BIT READ ONLY MEMORY



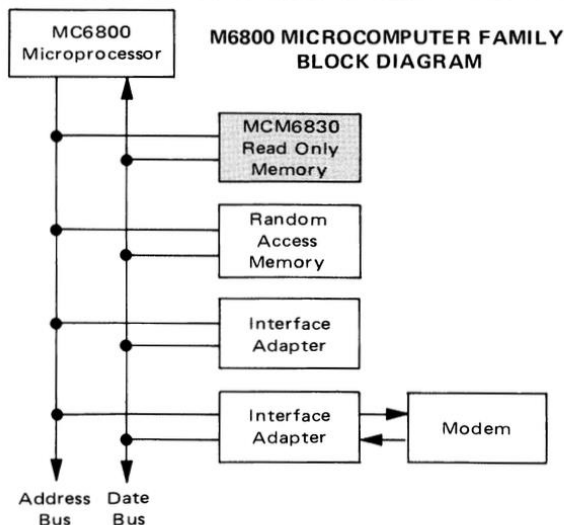
PIN ASSIGNMENT

1	Gnd	A0	24
2	D0	A1	23
3	D1	A2	22
4	D2	A3	21
5	D3	A4	20
6	D4	A5	19
7	D5	A6	18
8	D6	A7	17
9	D7	A8	16
10	CS0	A9	15
11	CS1	CS3	14
12	V _{CC}	CS2	13

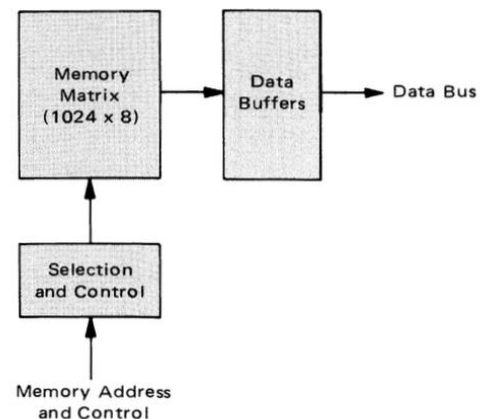
ABSOLUTE MAXIMUM RATINGS (See Note 1)

Rating	Symbol	Value	Unit
Supply Voltage	V _{CC}	-0.3 to +7.0	Vdc
Input Voltage	V _{in}	-0.3 to +7.0	Vdc
Operating Temperature Range	T _A	0 to +70	°C
Storage Temperature Range	T _{stg}	-55 to +150	°C

NOTE 1: Permanent device damage may occur if ABSOLUTE MAXIMUM RATINGS are exceeded. Functional operation should be restricted to RECOMMENDED OPERATING CONDITIONS. Exposure to higher than recommended voltages for extended periods of time could affect device reliability.



MCM6830 READ ONLY MEMORY BLOCK DIAGRAM



DC OPERATING CONDITIONS AND CHARACTERISTICS
(Full operating voltage and temperature range unless otherwise noted.)

RECOMMENDED DC OPERATING CONDITIONS

Parameter	Symbol	Min	Typ	Max	Unit
Supply Voltage	V_{CC}	4.75	5.0	5.25	Vdc
Input High Voltage	V_{IH}	2.4	—	5.25	Vdc
Input Low Voltage	V_{IL}	-0.3	—	0.4	Vdc

DC CHARACTERISTICS

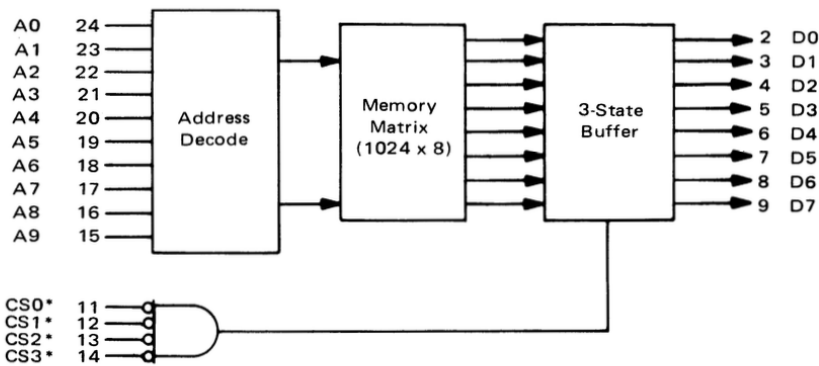
Characteristic	Symbol	Min	Typ	Max	Unit
Input Current ($V_{in} = 0$ to 5.25 V)	I_{in}	—	—	2.5	μ A _{dc}
Input High Threshold Voltage	V_{IHT}	2.0	—	—	Vdc
Input Low Threshold Voltage	V_{ILT}	—	—	0.65	Vdc
Output High Voltage ($I_{OH} = -100 \mu$ A)	V_{OH}	2.4	—	—	Vdc
Output Low Voltage ($I_{OL} = 1.6$ mA)	V_{OL}	—	—	0.45	Vdc
Output Leakage Current ($V_O = 2.4$ V, $CS = 0.4$ V, $\overline{CS} = 2.4$ V)	I_{LOH}	—	—	10	μ A _{dc}
Output Leakage Current ($V_O = 0.4$ V, $CS = 0.4$ V, $\overline{CS} = 2.4$ V)	I_{LOL}	—	—	10	μ A _{dc}
Supply Current ($V_{CC} = 5.25$ V, $T_A = 0^\circ$ C)	I_{CC}	—	—	150	mA _{dc}

CAPACITANCE ($f = 1.0$ MHz, $T_A = 25^\circ$ C, periodically sampled rather than 100% tested.)

Characteristic	Symbol	Max	Unit
Input Capacitance	C_{in}	7.5	pF
Output Capacitance	C_{out}	15	pF

This device contains circuitry to protect the inputs against damage due to high static voltages or electric fields; however, it is advised that normal precautions be taken to avoid application of any voltage higher than maximum rated voltages to this high-impedance circuit.

BLOCK DIAGRAM



*Active level defined by the customer.

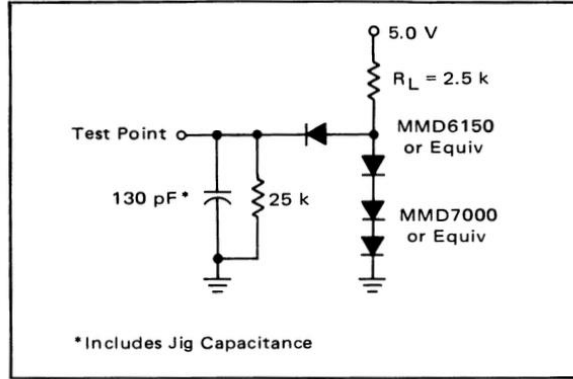
$V_{CC} =$ Pin 12
Gnd = Pin 1



AC OPERATING CONDITIONS AND CHARACTERISTICS

(Full operating voltage and temperature unless otherwise noted.)

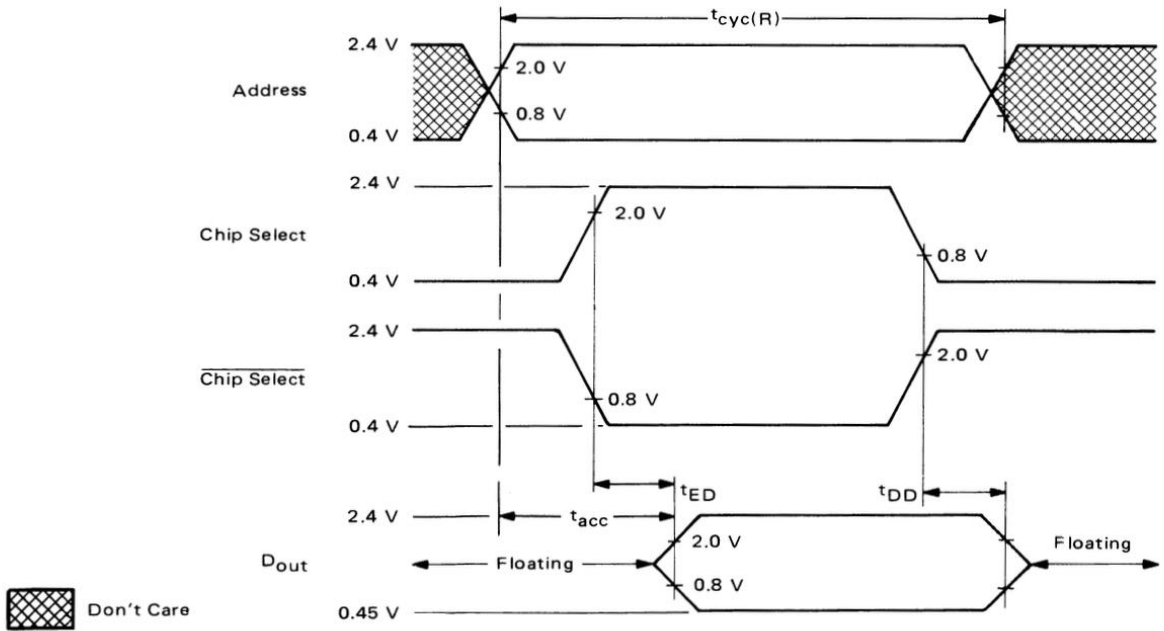
FIGURE 1 – AC TEST LOAD



READ CYCLE (All timing with $t_r = t_f = 20$ ns, Load of Figure 1)

Characteristic	Symbol	Min	Max	Unit
Read Cycle Time	$t_{cyc}(R)$	575	—	ns
Output Enable Delay Time	t_{ED}	—	300	ns
Output Disable Delay Time	t_{DD}	10	150	ns
Read Access Time	t_{acc}	—	575	ns

READ CYCLE TIMING



CUSTOM PROGRAMMING

By the programming of a single photomask for the MCM6830, the customer may specify the content of the memory and the method of enabling the outputs.

Information on the general options of the MCM6830 should be submitted on an Organizational Data form such as that shown in Figure 3.

Information for custom memory content may be sent to Motorola in one of two forms (shown in order of preference):

1. Paper tape output of the Motorola M6800 Software.
2. Hexadecimal coding using IBM Punch Cards.

FIGURE 2 – BINARY TO HEXADECIMAL CONVERSION

Binary Data				Hexadecimal Character
0	0	0	0	0
0	0	0	1	1
0	0	1	0	2
0	0	1	1	3
0	1	0	0	4
0	1	0	1	5
0	1	1	0	6
0	1	1	1	7
1	0	0	0	8
1	0	0	1	9
1	0	1	0	A
1	0	1	1	B
1	1	0	0	C
1	1	0	1	D
1	1	1	0	E
1	1	1	1	F

PAPER TAPE

Included in the software packages developed for the M6800 Microcomputer Family is the ability to produce a paper tape output for computerized mask generation. The procedure for generating and verifying a system is shown in Figure 4. The assembler directives are used to control allocation of memory, to assign values for stored data, and for controlling the assembly process. The paper tape must specify the full 1024 bytes.

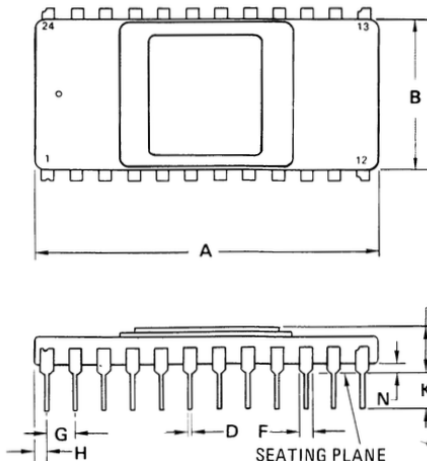
Note: Motorola can accept magnetic tape and truth table formats. For further information, contact your local Motorola sales representative.

IBM PUNCH CARDS

The hexadecimal equivalent (from Figure 2) may be placed on 80 column IBM punch cards as follows:

Step	Column	Description
1	12	Byte "0" Hexadecimal equivalent for outputs D7 thru D4 (D7 = M.S.B.)
2	13	Byte "0" Hexadecimal equivalent for outputs D3 thru D0 (D3 = M.S.B.)
3	14-73	Alternate steps 1 and 2 for consecutive bytes.
4	77-78	Card number (starting 01)
5	79-80	Total number of cards (32)

PACKAGE DIMENSIONS



- NOTES:
1. LEADS WITHIN 0.13 mm (0.005) RADIUS OF TRUE POSITION AT SEATING PLANE WITH MAXIMUM MATERIAL CONDITION.
 2. LEAD NO. 1 CUT FOR IDENTIFICATION, OR BUMP ON TOP.
 3. DIM "L" TO INSIDE OF LEADS. (MEASURED 0.51 mm (0.020) BELOW PKG BASE)

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	29.34	30.86	1.155	1.215
B	12.70	14.22	0.500	0.560
C	3.05	3.94	0.120	0.155
D	0.38	0.51	0.015	0.020
F	0.89	1.40	0.035	0.055
G	2.54 BSC		0.100 BSC	
H	0.89	1.40	0.035	0.055
J	0.20	0.30	0.008	0.012
K	2.92	3.68	0.115	0.145
L	14.86	15.87	0.585	0.625
M	—	15 ⁰	—	15 ⁰
N	0.51	1.14	0.020	0.045

CASE 684-04



FIGURE 3 – FORMAT FOR PROGRAMMING GENERAL OPTIONS

ORGANIZATIONAL DATA
MCM6830 MOS READ ONLY MEMORY

Customer:

Company _____
Part No. _____
Originator _____
Phone No. _____

Motorola Use Only:

Quote: _____
Part No.: _____
Specif. No.: _____

Enable Options:

	1	0
CS0	<input type="checkbox"/>	<input type="checkbox"/>
CS1	<input type="checkbox"/>	<input type="checkbox"/>
CS2	<input type="checkbox"/>	<input type="checkbox"/>
CS3	<input type="checkbox"/>	<input type="checkbox"/>

Input Logic Levels:

1 is most positive
0 is most negative
X is don't care



FIGURE 4 – SYSTEM DESIGN AND VERIFICATION PROCEDURE

