

### Features

- 65ns MAXIMUM ADDRESS ACCESS TIME
- "THREE STATE" OUTPUTS AND TWO CHIP ENABLE CONTROLS
- SIMPLE HIGH SPEED PROGRAMMING - ONE PULSE/BIT TYPICAL
- FAST ACCESS TIME - GUARANTEED FOR WORST CASE N<sup>2</sup> SEQUENCING OVER COMMERCIAL AND MILITARY TEMPERATURE AND VOLTAGE
- PRODUCED ON MIL-M-38510 QUALIFIED WAFER FAB LINE
- INDUSTRY STANDARD 24 PIN PACKAGE

### Description

The HM-76321 is a fully decoded Schottky TTL 32,768 bit field programmable ROM in a 4K word by 8 bit/word format with "Three State" outputs. This PROM is available in a 24 pin DIP.

All bits are manufactured storing a logical "1" (Positive Logic) and can be selectively programmed for a logical "0" in any bit position.

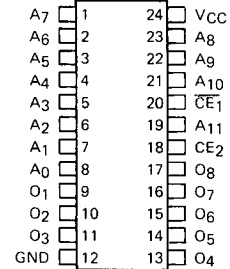
MIL-M-38510 qualified NiCr technology is used on the HM-76321 and all other HARRIS Bipolar PROMs.

The HM-76321 contains test rows and columns which are in addition to the storage array to assure high programmability and guarantee parameters and A.C. performance. The fuses in these test rows and columns are blown prior to shipment.

The HM-76321 utilizes two chip enable controls, where  $\overline{CE}_1$  low and  $CE_2$  high enables the device.

### Pinout

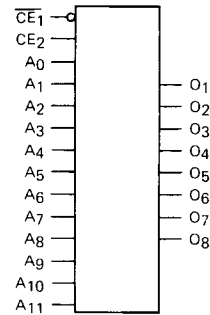
TOP VIEW - DIP



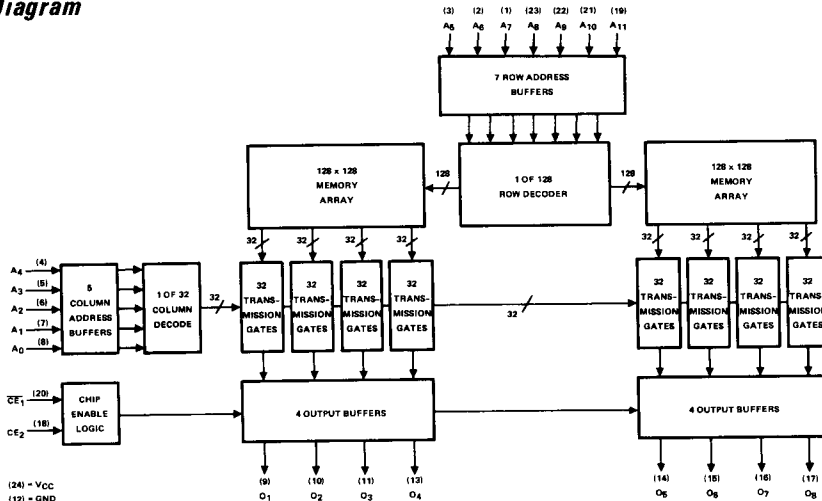
PIN NAMES

A<sub>0</sub> - A<sub>11</sub> Address Inputs  
 O<sub>1</sub> - O<sub>8</sub> Data Outputs  
 $\overline{CE}_1$ , CE<sub>2</sub> Chip Enable Inputs

### Logic Symbol



### Functional Diagram



## Specifications HM-76321

### ABSOLUTE MAXIMUM RATINGS

Output or Supply Voltage (Operating)	-0.3 to +7.0V	Storage Temperature	-65°C to +150°C
Address/Enable Input Voltage	5.5V	Operating Temperature (Ambient)	-55°C to +125°C
Address/Enable Input Current	-20mA	Maximum Junction Temperature	+175°C
Output Sink Current	100mA		

*CAUTION: Stresses above those listed under the "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress only ratings and functional operation of the device at these or at any other conditions above those indicated in the operational sections of this specification is not implied. (While programming, follow the programming specifications.)*

**D.C. ELECTRICAL CHARACTERISTICS (Operating)** HM-76321-5 ( $V_{CC} = 5.0V \pm 5\%$ ,  $T_A = 0^\circ C$  to  $+75^\circ C$ )  
 HM-76321-2/-8 ( $V_{CC} = 5.0V \pm 10\%$ ,  $T_A = -55^\circ C$  to  $+125^\circ C$ )  
 Typical measurements are at  $T_A = 25^\circ C$ ,  $V_{CC} = +5V$ .  
 NOTE: Positive current defined as into device terminals.

SYMBOL	PARAMETER	MIN	TYP	MAX	UNITS	TEST CONDITIONS
I <sub>IH</sub>	Address/Enable "1"	—	—	+40	μA	V <sub>IH</sub> = V <sub>CC</sub> Max.
I <sub>IL</sub>	Input Current "0"	—	-50.0	-100	μA	V <sub>IL</sub> = 0.45V
V <sub>IH</sub>	Input Threshold "1"	2.0*	1.5	—	V	V <sub>CC</sub> = V <sub>CC</sub> Min.
V <sub>IL</sub>	Voltage "0"	—	1.5	0.8*	V	V <sub>CC</sub> = V <sub>CC</sub> Max.
V <sub>OH</sub>	Output "1"	2.4	3.2	—	V	I <sub>OH</sub> = -2.0mA, V <sub>CC</sub> = V <sub>CC</sub> Min.
V <sub>OL</sub>	Voltage "0"	—	0.35	0.50	V	I <sub>OL</sub> = +16mA, V <sub>CC</sub> = V <sub>CC</sub> Min.
I <sub>OHE</sub>	Output Disable "1"	—	—	+40**	μA	V <sub>OH</sub> , V <sub>CC</sub> = V <sub>CC</sub> Max.
I <sub>OLE</sub>	Current "0"	—	—	-40	μA	V <sub>OL</sub> = 0.3V, V <sub>CC</sub> = V <sub>CC</sub> Max.
V <sub>CL</sub>	Input Clamp Voltage	—	—	-1.2	V	I <sub>IIN</sub> = -18mA
I <sub>OS</sub>	Output Short Circuit Current	-15	—	-100	mA	V <sub>OUT</sub> = 0.0V, One Output at a Time for a Max. of 1 Second
I <sub>CC</sub>	Power Supply Current	—	—	190	mA	V <sub>CC</sub> = V <sub>CC</sub> Max., All Inputs Grounded.

\* These are absolute voltages with respect to ground pin and include all overshoots due to system and/or tester noise. Do not attempt to test these values without suitable equipment.  
 \*\* I<sub>OHE</sub> = +100 μA for -2 and -8.

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BIPOlar MEMORY

### A.C. ELECTRICAL CHARACTERISTICS (Operating)

Typical measurements are at  $T_A = +25^\circ C$ ,  $V_{CC} = +5V$

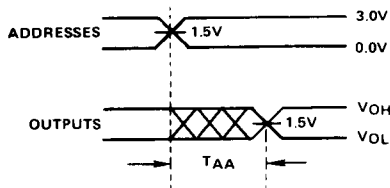
SYMBOL	PARAMETER	HM-76321-5 5V ±5% 0°C to +75°C		HM-76321-2/-8 5V ±10% -55°C to +125°C		UNITS
		TYPICAL	MAXIMUM	TYPICAL	MAXIMUM	
T <sub>AA</sub>	Address Access Time	45	65	—	85	ns
T <sub>EA</sub>	Chip Enable Access Time	25	35	—	40	ns
T <sub>DA</sub>	Chip Disable Access Time	25	35	—	40	ns

A.C. limits guaranteed for worst case N<sup>2</sup> sequencing with maximum test frequency of 5MHz.

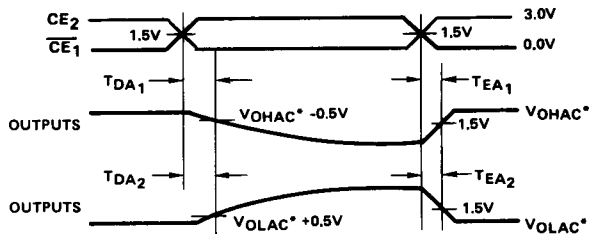
**CAPACITANCE:**  $T_A = 25^\circ C$

SYMBOL	PARAMETER	TYPICAL	UNITS	TEST CONDITIONS
C <sub>INA</sub> , C <sub>INCE</sub>	Input Capacitance	8	pF	V <sub>CC</sub> = 5V, V <sub>IN</sub> = 2.0V, f = 1MHz
C <sub>OUT</sub>	Output Capacitance	10	pF	V <sub>CC</sub> = 5V, V <sub>OUT</sub> = 2.0V, f = 1MHz

## HM-76321 SWITCHING TIME DEFINITIONS



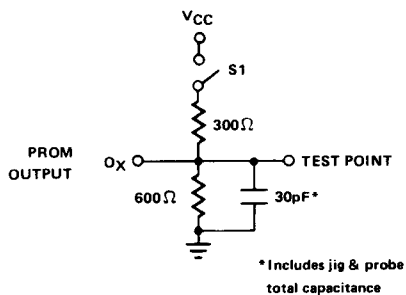
NOTE: As is common to all memory devices, output levels can be undefined during the address access period ( $T_{AA}$ ); however, the outputs are guaranteed to reach stable levels by  $T_{AA}$ . It is not recommended that outputs from this class of devices be used to drive edge triggered inputs on subsequent devices (counters, flip-flops, etc.) without proper intermediate synchronization.



$t_r, t_f < 5ns$

\*  $V_{OLAC}$  AND  $V_{OHAC}$  ARE THE MEASURED OUTPUT VOLTAGE LEVELS WHILE ENABLED.

### A.C. TEST LOAD



\* Includes jig & probe total capacitance

SYMBOL	PARAMETER	S1
$T_{AA}$	Address Access Time	Closed
$T_{EA1}$	Chip Enable Access Time from "Three State" to $V_{OH}$	Open
$T_{EA2}$	Chip Enable Access Time from "Three State" to $V_{OL}$	Closed
$T_{DA1}$	Chip Disable Access Time from $V_{OH}$ to "Three State"	Open
$T_{DA2}$	Chip Disable Access Time from $V_{OL}$ to "Three State"	Closed