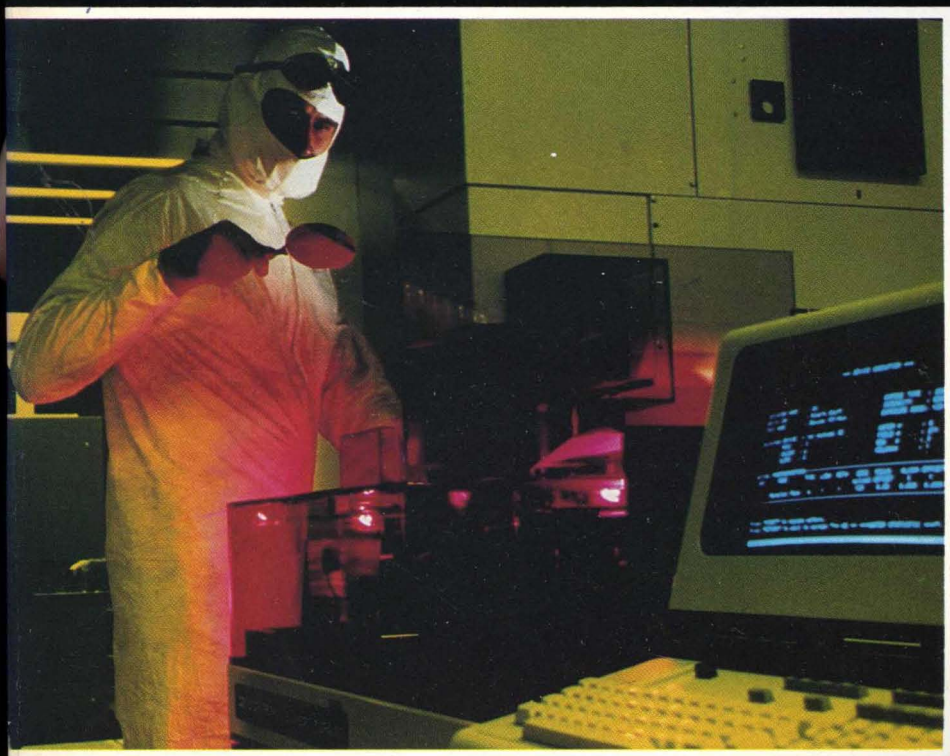


PRODUCTS GUIDE



A Short-Form Reference to
Harris Semiconductor Products



HARRIS

INTRODUCTION

Harris Semiconductor Sector is a leading manufacturer of analog, digital, microwave, semicustom and custom integrated circuits. All represent the state-of-the-art in complexity and performance.

Because of this expertise in design and production, Harris can offer you the most reliable product available in a wide variety of formats, options and packages.

Continuing research and development maintains our position among the top 10 largest U.S. merchant producers of semiconductors. Harris is recognized worldwide as an industry innovator and technology leader.

This booklet contains brief descriptions of all Harris silicon and gallium arsenide products currently available. Plus helpful information on packaging and a product cross reference. For more detailed information, contact your local Harris sales representative or call our literature dept. (305) 724-7418.

Analog Products

Harris is a major force in analog integrated circuitry, with a broad line of products — including bipolar and CMOS switches, multiplexers, data acquisition and conversion circuits and telecommunications products — recognized industrywide for their high performance and reliability.

Two material processes, Dielectric Isolation (DI) and Complementary Metal Oxide Semiconductor (CMOS), are prime examples of Harris leadership in high-performance analog products development.

The DI process developed by Harris surrounds a single crystal chip on all sides with a layer of silicon dioxide to produce a device that can meet the high-performance, high-voltage and high-temperature requirements of telecommunication, military and radiation-resistant space circuits.

The Harris SAJI (Self-Aligned Junction Isolation) CMOS process is key to attaining the low-power, high performance and density potential of LSI (Large Scale Integration) and VLSI (Very Large Scale Integration).

This commitment to innovation, coupled with strong engineering and processing capabilities, enables Harris to continually give customers the competitive edge.

Custom Integrated Circuits Division (CICD)

Harris designs, develops and manufactures custom analog, digital bipolar and CMOS circuits for specialized military and commercial applications.

In the government marketplace, Harris is a leading supplier of radiation-hardened ICs for a number of U.S. military projects such as the Peacekeeper and advanced Trident missile programs, B-1B bomber and major satellite programs. Harris recently introduced the 80C6RH radiation-hardened 16-bit CMOS microprocessor family.

Harris is also using its systems expertise and semiconductor technologies to meet the challenge of VHSIC-like, next-generation micron and submicron IC systems for DOD.

CICD also produces an array of non-military custom and semicustom products. These include commercial aircraft ICs as well as rad-hard telecommunications, electronic data processing and industrial environment suited parts. These hardened parts are in many cases, "plug-in" replacements for regular commercially available ICs and are especially suited for satellite usage.



Harris Semiconductor's Melbourne, Florida, complex contains complete facilities for design, masking, wafer fab and final testing.

Digital Products

Harris is a pioneer in the development and production of digital integrated circuits, achieving many breakthroughs in CMOS and bipolar technology: the first 16-bit CMOS microprocessor family (80C86); the industry's first bipolar PROM; first 64K bipolar PROM; first CMOS PROM; first 4K static CMOS RAM; first 256K static CMOS RAM module; and, most recently, the first CMOS programmable logic circuit.

Harris is also a major producer of digital semicustom standard-cell and gate array circuits for military, data processing, communication, medical and instrumentation applications.

More than a decade of technological creativity and performance — marked by continual research and development, increasing quality control and a relentless commitment to excellence — has made Harris today's leader in digital products.

Microwave (GaAs) Products

Harris Microwave Semiconductor was established in 1980 in Milpitas, California, with a clear goal: research and develop gallium arsenide technology for use in electronic systems requiring great speed, high frequencies and extreme miniaturization.

Today, this Harris company is setting new standards in manufacturing consistency in the production of GaAs FETs and microwave amplifiers. In 1984, Harris Microwave introduced the world's first commercial GaAs digital integrated circuits. These ultra-high speed ICs provide the ultimate in speed for super computers and other signal processing and communication applications.

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Harris Semiconductor products are sold by description only. Harris reserves the right to make changes in circuit design, specifications, and other information at any time without prior notice.

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CMOS 8/16-BIT MICROPROCESSORS

16-Bit Microprocessor 80C86	Pinout
Features	
<ul style="list-style-type: none"> • Compatible with NMOS 8086 • Completely static design <ul style="list-style-type: none"> — DC to 5 MHz (80C86) — DC to 8 MHz (80C86-2) • Low power operation: <ul style="list-style-type: none"> — 10 mA/MHz operating current — 500 μA standby current • 1 MByte of direct memory addressing capability 	
8-Bit Microprocessor 80C88	Pinout
Features	
<ul style="list-style-type: none"> • Compatible with NMOS 8088 • Completely static design <ul style="list-style-type: none"> — DC to 5 MHz (80C88) — DC to 8 MHz (80C88-2) • Low power operation: <ul style="list-style-type: none"> — 10 mA/MHz operating current — 500 μA standby current • Software compatible with 80C86/8086/8088 • 1 MByte of direct memory addressing capability 	

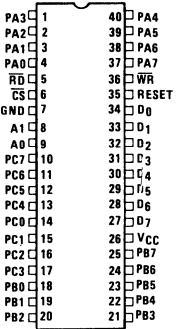
MICROPROCESSOR/PERIPHERAL SELECTION GUIDE

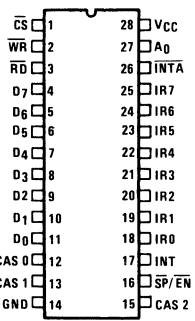
MICROPROCESSOR ARCHITECTURE	8080A	8085A 80C85 NSC800 Z80	80C86 8086	80C88 8088	80286
KEY PERIPHERAL SUPPORT CHIPS					
Serial Datacomm Serial Datacomm Timer/Counter Parallel I/O Interrupt Controller DMA Controller Data Bus Latch Data Bus Transceiver Clock Generator Static Clock Controller Bus Controller Bus Arbiter	82C54 82C55A 82C59A 82C82/83H	82C52 82C50A 82C54 82C55A 82C59A 82C37A 82C82/83H 82C86H/87H	82C52 82C50A 82C54 82C55A 82C59A 82C37A 82C82/83H 82C86H/87H 82C84A 82C85 82C88 82C89	82C52 82C50A 82C54 82C55A 82C59A 82C37A 82C82/83H 82C86H/87H 82C84A 82C85 82C88 82C89	82C54 82C55A 82C59A 82C82/83H 82C86H/87H

CMOS PERIPHERAL CIRCUITS

DMA Controller 82C37A	Pinout
<p style="text-align: center;">Features</p> <ul style="list-style-type: none"> • Compatible with NMOS 8237A • Provides control for direct memory access operation • Up to 4 Mb/s transfer rate with 8 MHz clock • Four independently programmable DMA channels • Low power operation 	
Asynchronous Communication Element 82C50A	Pinout
<p style="text-align: center;">Features</p> <ul style="list-style-type: none"> • Complete serial communication interface <ul style="list-style-type: none"> — UART — Bit rate generator • 80C86/88 compatible • DC to 10 MHz operation (DC to 625 Kbaud) • Modem interface • Low CMOS power dissipation 	
Serial Controller Interface 82C52	Pinout
<p style="text-align: center;">Features</p> <ul style="list-style-type: none"> • UART/Bit rate generator in a single 28-pin package • Operates from DC to 1 Mbaud with an asynchronous 16X clock • 72 programmable bit rates • Low power operation: <ul style="list-style-type: none"> — 1 mA/MHz operating current, typical • 40-pin version available (HD-6406) 	
Programmable Interval Timer 82C54	Pinout
<p style="text-align: center;">Features</p> <ul style="list-style-type: none"> • Compatible with NMOS 8254 • Enhanced version NMOS 8253 • Three independent 16-bit counters • Six programmable counter modes • Completely TTL compatible • 8 MHz count frequency • Low power operation: <ul style="list-style-type: none"> ► ICCOP: 10 mA @ 8 MHz count frequency ► ICCSB: 10 μA maximum 	

CMOS PERIPHERAL CIRCUITS

Programmable Peripheral Interface 82C55A	Pinout																																																																																
Features	 <table border="0"> <tr><td>PA3</td><td>1</td><td>40</td><td>PA4</td></tr> <tr><td>PA2</td><td>2</td><td>39</td><td>PA5</td></tr> <tr><td>PA1</td><td>3</td><td>38</td><td>PA6</td></tr> <tr><td>PA0</td><td>4</td><td>37</td><td>PA7</td></tr> <tr><td>RD</td><td>5</td><td>36</td><td>WR</td></tr> <tr><td>CS</td><td>6</td><td>35</td><td>RESET</td></tr> <tr><td>GND</td><td>7</td><td>34</td><td>D0</td></tr> <tr><td>A1</td><td>8</td><td>33</td><td>D1</td></tr> <tr><td>A0</td><td>9</td><td>32</td><td>D2</td></tr> <tr><td>PC7</td><td>10</td><td>31</td><td>C3</td></tr> <tr><td>PC6</td><td>11</td><td>30</td><td>C4</td></tr> <tr><td>PC5</td><td>12</td><td>29</td><td>C5</td></tr> <tr><td>PC4</td><td>13</td><td>28</td><td>D6</td></tr> <tr><td>PC0</td><td>14</td><td>27</td><td>D7</td></tr> <tr><td>PC1</td><td>15</td><td>26</td><td>VCC</td></tr> <tr><td>PC2</td><td>16</td><td>25</td><td>PB7</td></tr> <tr><td>PC3</td><td>17</td><td>24</td><td>PB6</td></tr> <tr><td>PB0</td><td>18</td><td>23</td><td>PB5</td></tr> <tr><td>PB1</td><td>19</td><td>22</td><td>PB4</td></tr> <tr><td>PB2</td><td>20</td><td>21</td><td>PB3</td></tr> </table>	PA3	1	40	PA4	PA2	2	39	PA5	PA1	3	38	PA6	PA0	4	37	PA7	RD	5	36	WR	CS	6	35	RESET	GND	7	34	D0	A1	8	33	D1	A0	9	32	D2	PC7	10	31	C3	PC6	11	30	C4	PC5	12	29	C5	PC4	13	28	D6	PC0	14	27	D7	PC1	15	26	VCC	PC2	16	25	PB7	PC3	17	24	PB6	PB0	18	23	PB5	PB1	19	22	PB4	PB2	20	21	PB3
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PB1	19	22	PB4																																																																														
PB2	20	21	PB3																																																																														
<ul style="list-style-type: none"> • Compatible with NMOS 8255A • 24 programmable I/O pins • Handshake mode supported • Bit set/reset capability • Bus-hold circuits on all ports eliminate need for pull up/pull down resistors • ICC standby: 10 μA, maximum • Fully TTL compatible 																																																																																	

Priority Interrupt Controller 82C59A	Pinout																																																								
Features	 <table border="0"> <tr><td>CS</td><td>1</td><td>28</td><td>VCC</td></tr> <tr><td>WR</td><td>2</td><td>27</td><td>A0</td></tr> <tr><td>RD</td><td>3</td><td>26</td><td>INTA</td></tr> <tr><td>D7</td><td>4</td><td>25</td><td>IR7</td></tr> <tr><td>D6</td><td>5</td><td>24</td><td>IR6</td></tr> <tr><td>D5</td><td>6</td><td>23</td><td>IR5</td></tr> <tr><td>D4</td><td>7</td><td>22</td><td>IR4</td></tr> <tr><td>D3</td><td>8</td><td>21</td><td>IR3</td></tr> <tr><td>D2</td><td>9</td><td>20</td><td>IR2</td></tr> <tr><td>D1</td><td>10</td><td>19</td><td>IR1</td></tr> <tr><td>D0</td><td>11</td><td>18</td><td>IR0</td></tr> <tr><td>CAS 0</td><td>12</td><td>17</td><td>INT</td></tr> <tr><td>CAS 1</td><td>13</td><td>16</td><td>SP/EN</td></tr> <tr><td>GND</td><td>14</td><td>15</td><td>CAS 2</td></tr> </table>	CS	1	28	VCC	WR	2	27	A0	RD	3	26	INTA	D7	4	25	IR7	D6	5	24	IR6	D5	6	23	IR5	D4	7	22	IR4	D3	8	21	IR3	D2	9	20	IR2	D1	10	19	IR1	D0	11	18	IR0	CAS 0	12	17	INT	CAS 1	13	16	SP/EN	GND	14	15	CAS 2
CS		1	28	VCC																																																					
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CAS 0	12	17	INT																																																						
CAS 1	13	16	SP/EN																																																						
GND	14	15	CAS 2																																																						
<ul style="list-style-type: none"> • Compatible with NMOS 8259A • Eight maskable interrupt inputs • Cascade operation allows up to 64 interrupt inputs with no additional circuitry • Supports both 8080/85 and 80C86/88 formats • Standby current: 10 μA, maximum • Fully, TTL compatible 																																																									

CMOS BUS SUPPORT CIRCUITS

Octal Latching Bus Driver 82C82	Pinout
<p style="text-align: center;">Features</p> <ul style="list-style-type: none"> • Bipolar 8282 function compatible • Propagation delay guaranteed: 35 ns maximum <ul style="list-style-type: none"> — Full temperature range — 10% power supply tolerances — Load capacitance: 300 pf • Gated inputs reduce operating power • ICCSB: 10 μA maximum 	

Octal Latching Inverting Bus Driver 82C83H	Pinout
<p style="text-align: center;">Features</p> <ul style="list-style-type: none"> • Bipolar 8283 function compatible • Full eight-bit latching buffer with inverted data output • Guaranteed propagation delay @ $C_L = 300$ pf • Gated inputs reduce operating power • ICCSB: 10 μA maximum • High output sink current: 20 mA 	

Octal Transceiver 82C86H	Pinout
<p style="text-align: center;">Features</p> <ul style="list-style-type: none"> • Bipolar 8286 function compatible • Eight-bit bidirectional bus transceiver • Guaranteed propagation delay @ $C_L = 300$ pf • Gated inputs reduce power dissipation • ICCSB: 10 μA maximum • High output sink current: 20 mA 	

Octal Inverting Transceiver 82C87H	Pinout
<p style="text-align: center;">Features</p> <ul style="list-style-type: none"> • Bipolar 8287 function compatible • Eight-bit bidirectional bus transceiver with inverting data outputs • Guaranteed propagation delay @ $C_L = 300$ pf • Gated inputs reduce operating power dissipation • ICCSB: 10 μA maximum • High output sink current: 20 mA 	

CMOS BUS SUPPORT CIRCUITS

Clock Generator/Driver 82C84A	Pinout
Features	
<ul style="list-style-type: none"> • Compatible with bipolar 8284A • Output frequencies up to 8 MHz • Provides ready synchronization • Parallel resonant crystal • ICCOP: 40 mA @ 8 MHz system frequency • TTL compatible inputs/outputs 	

Static Clock Controller/Generator 82C85	Pinout
Features	
<ul style="list-style-type: none"> • Provides complete static clock control for 80C86 and 80C88 systems • Supports stop-clock, stop-oscillator and low-frequency operation • 80C86/88 status line interface allows software control • DC to 8 MHz system clock • Low CMOS power dissipation 	

Bus Controller 82C88	Pinout
Features	
<ul style="list-style-type: none"> • Pin compatible with bipolar 8288 • Generates system control signals for maximum mode 80C86/88, 8086/88 • Bipolar drive capability • Low power operation: <ul style="list-style-type: none"> — ICC standby: 10 μA maximum — ICC operating: 1 mA/MHz maximum 	

Bus Arbiter 82C89	Pinout
Features	
<p>COMING SOON</p> <ul style="list-style-type: none"> • Pin compatible with bipolar 8289 • Provides bus control arbitration in multi-master processor systems • Low power operation <ul style="list-style-type: none"> — ICCSB: 10 μA maximum — ICCOP: 1 mA/MHz maximum • Bipolar drive capability 	

CMOS DATA COMMUNICATION

Bit Rate Generator (BRG) HD-4702	Pinout
Features	
<ul style="list-style-type: none"> • Low power dissipation • Programmable bit rate selection • 13 commonly used bit rates • Uses standard 2.4575 MHz crystal • TTL compatible • Conforms to EIA RS-404 	

Universal Asynchronous Receiver/Transmitter (UART) HD-6402R, HD-6402B	Pinout
Features	
<ul style="list-style-type: none"> • Operates from DC to 8 MHz (DC to 500 Kbaud) • Programmable word length, stop bits and parity • Industry standard pinout • Single +5 V power supply • Fully TTL compatible • Automatic data formatting and status generation 	

Programmable Asynchronous Communications Interface HD-6406	Pinout
Features	
<ul style="list-style-type: none"> • UART/Bit rate generator in a single 40-pin package • Data rates from DC to 1 Mbaud with an asynchronous 16X clock • 72 programmable bit rates • Complete modem interface signals • DMA handshaking operation • Low power operation: — 1 mA/MHz, typical • 28-pin version available (82C52) 	

Asynchronous Serial Manchester Adapter (ASMA) HD-6408	Pinout
Features	
<ul style="list-style-type: none"> • 1 Mb/s data rate • Sync identification and lock-in • Clock recovery • Manchester II encode and decode • Low bit error rate 	

CMOS DATA COMMUNICATION

Manchester Encoder/Decoder (MED) HD-6409	Pinout
<p style="text-align: center;">Features</p> <ul style="list-style-type: none"> • 1 Mb/s data rate • Digital PLL clock recovery • On chip oscillator • Manchester II encode and decode • Wide temperature ranges available <ul style="list-style-type: none"> 0°C to +70°C -40°C to +85°C -55°C to +125°C 	

Manchester Encoder/Decoder (MED) HD-15530	Pinout
<p style="text-align: center;">Features</p> <ul style="list-style-type: none"> • Support of MIL-STD-1553 • 1.25 Mb/s data rate • Sync identification and lock-in • Clock recovery • Manchester II encode, decode • Separate encode and decode • Low operating power: 50 mW @ 5 Volts • Full temperature range: -55°C to +125°C 	

Manchester Encoder/Decoder (MED) HD-15531	Pinout
<p style="text-align: center;">Features</p> <ul style="list-style-type: none"> • Support of MIL-STD-1553 • 1.25 Mb/s data rate • 2.5 Mb/s option (HD-15531B) • Sync identification and lock-in • Clock recovery • Variable frame length to 32 bits • Manchester II encode, decode • Separate encode and decode • Low operating power: 50 mW @ 5 Volts • Full temperature range: -55°C to +125°C 	

STANDARD CELL CAPABILITY

PRELIMINARY

DLM HSC CMOS Cell Library

Features

- Low Power - CMOS Technology
- Single 5 Volt Supply
- Commercial-Industrial-Military Temperature Ranges
- Proven Reliable and Manufacturable Process
- CMOS and TTL Compatible Inputs and Outputs
- Large Library of SSI Primitive Cells
- 74XX Macro Function Library
- LSI Peripheral and Communication Cells
- Fully Supported by Teledesign* Software
- Auto-Place and Auto-Route Capability
- 1.5 Micron Effective Channel Lengths
- Circuit Densities up to 15000 2-Input NAND gate equivalents
- I/O Cells Offer 10ns into 100 pF load
- Multiple Package Options
- Two Layer Metal

Description

The HSC STANDARD CELL LIBRARY is a proven, high performance library. The minimum feature size is 1.5 microns with effective channel lengths of 1.5 microns. The library offers predesigned and pre-characterized cells and macros for which the user prescribes the interconnections in order to develop an application specific IC.

The library has a wide assortment of SSI primitive cells, 74XX macros, and a unique Harris offering of LSI cells. The LSI macros are a family of highly integrated micro-processor peripheral and communication functions. The

designer has the choice of intermixing cells or macros from any of the three groups to optimize his design implementation. The designer chooses the most familiar design method and group of functions.

The library is supported by the Teledesign* design automation system. The software includes schematic capture, logic simulation, auto-place, auto-route, electrical and design rule verification. The system allows the users to perform the logic entry and simulation phases of the design process on several major workstations.

Package Options

Plastic DIP.....	16 - 48 pins	Plastic chip carrier.....	20 - 84 pins (leadless)
Ceramic DIP.....	16 - 40 pins	Pin grid array.....	68 - 144 pins (contact factory for current availability)
Ceramic chip carrier.....	68 - 84 pins (leadless)		

LSI Standard Cell Functions

<u>CELL</u>	<u>DESCRIPTION</u>		
82C37A	DMA CONTROLLER	HD4702	BAUD RATE GENERATOR
82C50A	ASYNCHRONOUS COMMUNICATION ELEMENT	HD6402	UART
82C50B	ASYNCHRONOUS COMMUNICATION ELEMENT	HD6406	UART/BRG/MODEM CONTROL
82C52	UART/BRG	HD6408	ASMA
82C54	PROGRAMMABLE INTERVAL TIMER	HD6409	MANCHESTER ENCODER/DECODER
82C55A	PARALLEL I/O	HD15530	MANCHESTER ENCODER/DECODER
82C59A	PRIORITY INTERRUPT CONTROLLER	HD15531	PROGRAMMABLE MANCHESTER ENCODER/DECODER
82C84A	CLOCK GENERATOR		
82C85	STATIC CLOCK CONTROLLER	1K RAM	RECONFIGURABLE STATIC RAM
82C88	BUS CONTROLLER	1K ROM	RECONFIGURABLE ROM
82C89	BUS ARBITER		

STANDARD CELL CAPABILITY

Absolute Maximum Ratings

Supply Voltage.....	-0.5V to 7.0V
Input/Output Voltage	VSS- 0.5V
VCC+ 0.5V	
Input Diode Current.....	10mA
	VI < 0 or VI > VCC
Output Diode Current.....	10mA
	VO < 0 or VO > VCC
Power Dissipation.....	1000mW
Continuous Supply Pin Current	
VCC or GND	100mA
Storage Temperature	
Plastic	-40 to 125°C
Ceramic	-65 to 150°C
Continuous Current per Output	10mA

CAUTION: Stresses beyond those listed under ABSOLUTE MAXIMUM RATINGS may cause permanent damage to the device. These are stress ratings only and functional operation of the device at these or any other conditions beyond those indicated under RECOMMENDED OPERATING CONDITIONS is not implied. Exposure to absolute maximum rated conditions for extended periods may affect device reliability.

Note: All applied voltages are with reference to ground (VSS).

Recommended Operating Conditions

D.C. Electrical Characteristics

VCC = 5 ±10% T_A = Operating Temperature Range

SYMBOL	PARAMETER	MIN	MAX	UNIT	CONDITIONS	
VCC	Operating Supply Voltage	4.5	5.5	V		
T _A	Operating Temperature	Commercial	0	70	C	
		Industrial	-40	85	C	
		Military	-55	125	C	
VIH	Input High Voltage TTL	2.2		V	VCC = 5.5V	
		70% VCC				
VIL	Input Low Voltage TTL		0.8	V	VCC = 4.5V	
			30% VCC			
II	Input Current	Standard	-1.0	+1.0	μA	VSS = VIL = 0.0V VCC = VIH = 5.5V
		Pull Up	-500	+1.0		
		Pull Down	-1.0	+500		
		Pull Up*	-50		μA	VI = 2.2
		Pull Down*		+50	μA	VI = 0.8
VOH	Output Voltage	2.4		V	IOH = -6.0mA; VCC = 4.5V	
VOL	Output Voltage		0.4	V	IOL = 6.0mA; VCC = 4.5V	
IOZ	Output Leakage	-10.0	+10.0	μA	VSS = VOL = 0.0V	
				μA	VCC = VOH = 4.5V	
ICCSB	Stand-By Supply (Inputs closed, Outputs open)		10	μA	VI = VCC = 5.5V	
CI**	Input Capacitance	10.0 Typical		pF	II = 0; IO = 0 VI = VCC or VSS F = 1 MHz	
CO**	Output Capacitance	10.0 Typical		pF	VO = VCC or VSS F = 1 MHz	
CIO**	Input/Output Capacitance	15.0 Typical		pF	VO = VCC or VSS F = 1 MHz	

* Maximum input current for which specified VI will be maintained.

** Characterized at initial design and any major design or process changes.
Maximum values may vary by package type.

STANDARD CELL CAPABILITY

Primitive Standard Cell Functions

CELL	DESCRIPTION	CELL	DESCRIPTION
SC1010	N - CHANNEL	SC1730	TRI-STATE INVERTER (NOT(C), (5X))
SC1020	P - CHANNEL	SC1800	SN7474 EQUIVALENT D FLIP-FLOP
SC1100	INVERTER	SC1810	D-FLIP FLOP (Q,NOT(Q),R,C)
SC1110	INVERTER (2X-DRIVE)	SC1820	D-FLIP FLOP (Q,NOT(Q),S,R,C)
SC1220	2 - NAND	SC1830	MUX DFF (Q,NOT(Q),S,R,C)
SC1230	3 - NAND	SC1840	D-FLIP FLOP (Q,NOT(Q),S,C)
SC1240	4 - NAND	SC1850	T FLIP FLOP W/S
SC1250	5 - AND	SC1860	LOADABLE T FLIP-FLOP
SC1320	2 - NOR	SC1870	JK-FLIP FLOP (S)
SC1330	3 - NOR	SC1880	JK-FLIP FLOP (R)
SC1340	4 - NOR	SC1890	JK-FLIP FLOP (S,R)
SC1420	EXCLUSIVE OR	SC1900	TRI-STATE INVERTER (2X)
SC1430	EXCLUSIVE NOR	SC1910	TRI-STATE 2-NOR
SC1440	2 TO 1 MUX	SC1920	NOT((A*B)'C'D'E)
SC1450	NOR LATCH	SC1930	DELAY INVERTER (12ns)
SC1460	A'NOT(B)	SC1940	TRI-STATE 2-NOR NOT(C)
SC1470	TRI-STATE INVERTER (.5X-DRIVE)	SC1950	ONE-SHOT (20ns PULSE)
SC1480	BUFFER (3X-DRIVE)	SC1960	NOT((A'B)'C'D)
SC1490	TRI-STATE INVERTER (1X-DRIVE)	SC1970	NOT((A'B)*(C'D))
SC1510	NOT((A'B)*C)	SC1980	NOT(((A*B)'C)*D)
SC1520	NOT((A*B)'C)	SC2000	TRI-STATE INV. NOT(C) (1X-DRIVE)
SC1530	D LATCH	SC2030	3-AND
SC1540	D LATCH (Q,NOT(Q))	SC2060	NOT((A*B)'C'D)
SC1580	D LATCH TRI-STATE INV. (.5X-DRIVE)	SC2080	NOT((A'B)'C'D)
SC1590	D LATCH (C,Q,R)	SC2090	DELAY INVERTER (6ns)
SC1610	NAND LATCH	SC2100	NOT((A*B)'(C*D))
SC1620	NOR LATCH WITH (2-RESETS)	SC2110	NOT((A'B'C)*D+E)
SC1630	A*NOT(B)	SC2120	3-OR
SC1640	NOT((A*B*C)*D)	SC2130	TRI-STATE INVERTER (2X-DRIVE)
SC1650	NOT((A'B)*C'D)	SC2160	1-BIT FULL ADDER
SC1660	2-AND 2-NOR LATCH	SC2300	SCHMITT TRIGGER (INVERTER)
SC1710	2-OR	SC2310	BUS HOLD DEVICE
SC1720	2-AND	SC2320	PROGRAMMABLE DELAY ONE-SHOT

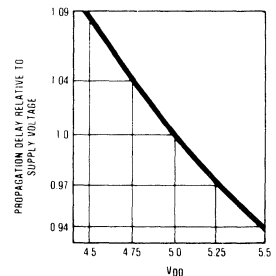
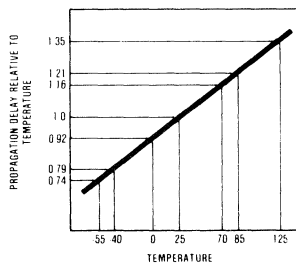
74XX Macro Functions

SN7400	SN7436	SN74109	SN74152	SN74173	SN74237	SN74259
SN7402	SN7442	SN74112	SN74153	SN74174	SN74238	SN74273
SN7404	SN7451	SN74113	SN74154	SN74175	SN74240	SN74280
SN7407	SN7473	SN74114	SN74157	SN74180	SN74241	SN74283
SN7408	SN7474	SN74126	SN74158	SN74181	SN74242	SN74292
SN7410	SN7475	SN74133	SN74160	SN74182	SN74243	SN74298
SN7411	SN7476	SN74137	SN74161	SN74190	SN74244	SN74352
SN7420	SN7477	SN74138	SN74162	SN74191	SN74245	SN74373
SN7421	SN7483	SN74139	SN74163	SN74192	SN74251	SN74374
SN7427	SN7485	SN74147	SN74164	SN74193	SN74253	SN74377
SN7430	SN7486	SN74148	SN74165	SN74194	SN74257	SN74393
SN7432	SN74107	SN74151	SN74166	SN74195	SN74258	SN74645

Derating Curves

Process Parameters Derating

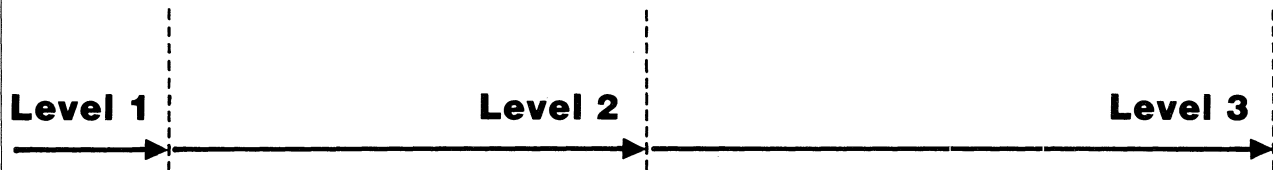
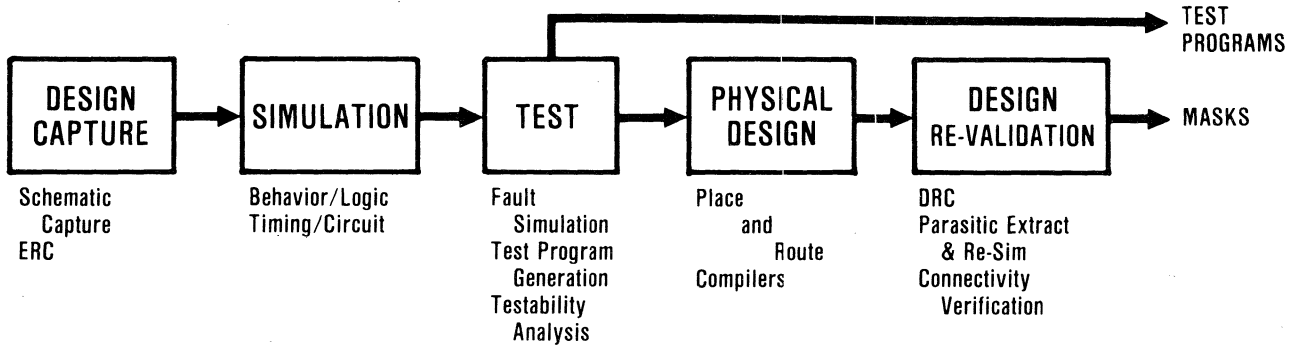
P-channel	N-channel	Multiplier
Best	Best	0.78
Nominal	Nominal	1.0
Worst	Worst	1.37



Design Process

FRONT END

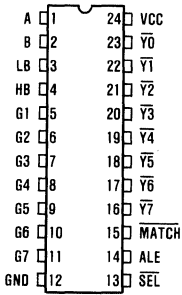
BACK END

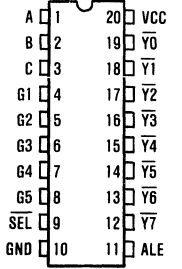


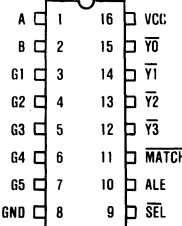
CMOS PROGRAMMABLE LOGIC

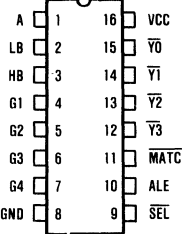
Part Number	Description	Maximum Pwr. Supply Current	Maximum I/O Propagation Delay	
HPL-16LC8	CMOS 16L8 10 inputs 6 bidirectionals 2 outputs Programmable output polarity	ICCSB: 150 μ A ICCOP: 6 mA/MHz	125 ns	
HPL-16RC8	CMOS 16R8 8 inputs 8 registered outputs Programmable output polarity	ICCSB: 150 μ A ICCOP: 7 mA/MHz	125 ns	
HPL-16RC6	CMOS 16R6 8 inputs 6 registered outputs 2 bidirectionals Programmable output polarity	ICCSB: 150 μ A ICCOP: 7 mA/MHz	125 ns	
HPL-16RC4	CMOS 16R4 8 inputs 4 registered outputs 4 bidirectionals Programmable output polarity	ICCSB: 150 μ A ICCOP: 7 mA/MHz	125 ns	

CMOS PROGRAMMABLE LOGIC

Part Number	Description	Maximum Pwr. Supply Current	Maximum Propagation Delay	
HPL-82C339	<ul style="list-style-type: none"> • 24-pin Programmable Chip Select Decoder (PCSD™) • Nine programmable inputs • Superset of 74138/74139 	ICCSB: 50 μ A ICCOP: 2 mA/MHz	50 ns	

Part Number	Description	Maximum Pwr. Supply Current	Maximum Propagation Delay	
HPL-82C338	<ul style="list-style-type: none"> • 20-pin Programmable Chip Select Decoder (PCSD™) • Five programmable inputs • Superset of 74138 	ICCSB: 50 μ A ICCOP: 2 mA/MHz	50 ns	

Part Number	Description	Maximum Pwr. Supply Current	Maximum Propagation Delay	
HPL-82C138	<ul style="list-style-type: none"> • 16-pin Programmable Chip Select Decoder (PCSD™) • Five programmable inputs • Similar to 74138 	ICCSB: 50 μ A ICCOP: 2 mA/MHz	50 ns	

Part Number	Description	Maximum Pwr. Supply Current	Maximum Propagation Delay	
HPL-82C139	<ul style="list-style-type: none"> • 16-pin Programmable Chip Select Decoder (PCSD™) • Six programmable inputs • Similar to 74139 	ICCSB: 50 μ A ICCOP: 2 mA/MHz	50 ns	

CMOS STATIC RAMs 64K

8192 x 8 — 64K Asynchronous					Pinout
Part Number	Access Time	Power Supply Current		Replaces Pin for Pin	
		Operating	Standby		
HM-65642	150 ns	20 mA	250 μ A	AM99C88 NMC6164 MB8464 CDM6264	
HM-65642B	150 ns	20 mA	100 μ A		

CMOS STATIC RAMs — 16K

2048 x 8 — 16K Synchronous				Pinout	
Part Number	Access Time	Power Supply Current		Similar To	
		Operating	Standby		
HM-6516B	120 ns	10 mA/MHz	50 μ A	Hitachi 6116 Toshiba 5517 National 6516	
HM-6516	200 ns	10 mA/MHz	100 μ A		

2048 x 8 — 16K Asynchronous					Pinout
Part Number	Access Time	Power Supply Current		Replaces Pin for Pin	
		Operating	Standby		
HM-65162S	55 ns	70 mA	100 μ A	Fujitsu 8416 Hitachi 6116 NEC 446 Toshiba 5517 National 6116 IDT 6116	
HM-65162B	70 ns	70 mA	50 μ A		
HM-65162	90 ns	70 mA	100 μ A		
HM-65162C	90 ns	70 mA	900 μ A		

16384 x 1 — 16K Asynchronous					Pinout
Part Number	Access Time	Power Supply Current		Replaces Pin for Pin	
		Operating	Standby		
HM-65262S	55 ns	50 mA	50 μ A	Hitachi 6167 IDT 6167	
HM-65262B	70 ns	50 mA	50 μ A		
HM-65262	85 ns	50 mA	50 μ A		

CMOS STATIC RAMs — 4K & 1K

4096 x 1 — 4K Synchronous					Pinout
Part Number	Access Time	Power Supply Current		Replaces Pin for Pin	
		Operating	Standby		
HM-6504S	120 ns	7 mA/MHz	25 μ A	Fujitsu 8404 Oki 5104 National 6504	
HM-6504B	200 ns	7 mA/MHz	25 μ A		
HM-6504	300 ns	7 mA/MHz	25 μ A		

1024 x 4 — 4K Synchronous					Pinout
Part Number	Access Time	Power Supply Current		Replaces Pin for Pin	
		Operating	Standby		
HM-6514S	120 ns	7 mA/MHz	25 μ A	Fujitsu 6514 Hitachi 4334 Nec 444 RCA 5114 Toshiba 5514 National 6514	
HM-6514B	200 ns	7 mA/MHz	25 μ A		
HM-6514	300 ns	7 mA/MHz	25 μ A		

1024 x 1 — 1K Synchronous					Pinout
Part Number	Access Time	Power Supply Current		Replaces Pin for Pin	
		Operating	Standby		
HM-6508B	180 ns	4 mA/MHz	10 μ A	National 74C929 Intersil 6508	
HM-6508	250 ns	4 mA/MHz	10 μ A		

1024 x 1 — 1K Synchronous					Pinout
Part Number	Access Time	Power Supply Current		Replaces Pin for Pin	
		Operating	Standby		
HM-6518B	180 ns	4 mA/MHz	10 μ A	National 74C930 Intersil 6518	
HM-6518	250 ns	4 mA/MHz	10 μ A		

CMOS STATIC RAMs — 1K

256 x 4 — 1K Synchronous					Pinout
Part Number	Access Time	Power Supply Current		Replaces Pin for Pin	
		Operating	Standby		
HM-6551B	220 ns	4 mA/MHz	10 μ A	Intersil 6551	
HM-6551	300 ns	4 mA/MHz	10 μ A		

256 x 4 — 1K Synchronous					Pinout
Part Number	Access Time	Power Supply Current		Replaces Pin for Pin	
		Operating	Standby		
HM-6561B	220 ns	4 mA/MHz	10 μ A	Intersil 6561	
HM-6561	300 ns	4 mA/MHz	10 μ A		

CMOS STATIC RAM MODULES

LCC RAM Module — 8K x 8 — 64K Asynchronous					Pinout			
Part Number	Access Time	Power Supply Current		Replaces Pin for Pin	NC	1	28	V _{CC}
		Operating	Standby					
HM-8808AS	100 ns	70 mA	250 μ A	EDH8808A IDT7M864 HM6264	A12	2	26	E 2
HM-8808AB	120 ns	70 mA	250 μ A		A7	3	25	A8
HM-8808A	150 ns	70 mA	900 μ A		A6	4	24	A9
					A5	5	23	A11
					A4	6	22	G
					A3	7	21	A10
					A2	8	20	E 1
					A1	9	19	DO7
					A0	10	18	DO6
					DO0	11	17	DO5
					DO1	12	16	DO4
					DO2	13	15	DO3
					GND	14		

LCC RAM Module — 8K x 8 — 64K Asynchronous					Pinout			
Part Number	Access Time	Power Supply Current		Replaces Pin for Pin	NC	1	28	V _{CC}
		Operating	Standby					
HM-8808S	100 ns	70 mA	250 μ A	EDH8808 IDT8M864	A12	2	26	NC
HM-8808B	120 ns	70 mA	250 μ A		A7	3	25	A8
HM-8808	150 ns	70 mA	900 μ A		A6	4	24	A9
					A5	5	23	A11
					A4	6	22	G
					A3	7	21	A10
					A2	8	20	E
					A1	9	19	DO7
					A0	10	18	DO6
					DO0	11	17	DO5
					DO1	12	16	DO4
					DO2	13	15	DO3
					GND	14		

LCC RAM Module — 16K x 8 — 128K Asynchronous					Pinout			
Part Number	Access Time	Power Supply Current		Replaces Pin for Pin	NC	1	28	V _{CC}
		Operating	Standby					
HM-8816H	85 ns	400 mA	800 μ A	—	A12	2	26	A13
HM-8816HB	70 ns	400 mA	800 μ A		A7	3	25	A8
					A6	4	24	A9
					A5	5	23	A11
					A4	6	22	NC
					A3	7	21	A10
					A2	8	20	E
					A1	9	19	DO7
					A0	10	18	DO6
					DO0	11	17	DO5
					DO1	12	16	DO4
					DO2	13	15	DO3
					GND	14		

LCC RAM Module — 32768 x 8 — 256K Asynchronous					Pinout			
Part Number	Access Time	Power Supply Current		Replaces Pin for Pin	NC	1	28	V _{CC}
		Operating	Standby					
HM-8832	180 ns	20 mA	900 μ A	EDH8832 IDT7M856 HM62256 MSM5256 μ PD43256 TC55256	A12	2	26	NC
					A7	3	25	A8
					A6	4	24	A9
					A5	5	23	A11
					A4	6	22	G
					A3	7	21	A10
					A2	8	20	E
					A1	9	19	DO7
					A0	10	18	DO6
					DO0	11	17	DO5
					DO1	12	16	DO4
					DO2	13	15	DO3
					GND	14		

CMOS STATIC RAM MODULES

LCC RAM Module — 16384 x 16 / 32768 x 8 — 256K Synchronous				Pinout
Part Number	Access Time	Power Supply Current		Replaces Pin for Pin
		Operating	Standby	
HM-92560	150 ns	30/15 mA	500 μ A	—
HM-92560-5	250 ns	35/20 mA	3.5 mA	—

LCC Buffered Ram Module—16384 x 16 / 32768 x 8—256K Synchronous				Pinout
Part Number	Access Time	Power Supply Current		Replaces Pin for Pin
		Operating	Standby	
HM-92570	250 ns	30/15 mA	600 μ A	EDH 892570
	300 ns	35/20 mA	3.5 mA	

LCC Buffered Ram Module—65536 x 16 / 131072 x 8—1M Asynchronous				Pinout
Part Number	Access Time	Power Supply Current		Replaces Pin for Pin
		Operating	Standby	
HM-91M2	180 ns	30 mA	2 mA	EDH891M2

LCC RAM Module — 16384 x 4 / 8192 x 8 — 64K Synchronous				Pinout
Part Number	Access Time	Power Supply Current		Replaces Pin for Pin
		Operating	Standby	
HM5-6564	350 ns	56/28 mA	800 μ A	—
HM5-6564-5	450 ns	60/30 mA	5.6 mA	—

CMOS PROMs — 4K & 16K

512 x 8 — 4K Synchronous					Pinout
Part Number	Fuse Element	Access Time	Power Supply Current		Replaces Pin for Pin
			Operating	Standby	
HM-6641	PolySi	250 ns	10 mA/MHz	100 μ A	Harris 7641 Signetics 82S141

512 x 8 — 4K Synchronous					Pinout
Part Number	Fuse Element	Access Time	Power Supply Current		Replaces Pin for Pin
			Operating	Standby	
HM-6642 HM-6642B	NiCr NiCr	250 ns 100 ns	15 mA/MHz 15 mA/MHz	100 μ A 100 μ A	Harris 7641 Signetics 82S141 Harris 6641

2048 x 8 — 16K Synchronous					Pinout
Part Number	Fuse Element	Access Time	Power Supply Current		Replaces Pin for Pin
			Operating	Standby	
HM-6616B HM-6616	PolySi PolySi	90 ns 120 ns	15 mA/MHz 15 mA/MHz	50 μ A 100 μ A	NMOS 2716 National 27C16 National 6716 Intersil 6716

2048 x 8 — 16K Synchronous					Pinout
Part Number	Fuse Element	Access Time	Power Supply Current		Replaces Pin for Pin
			Operating	Standby	
HM-6617B HM-6617	NiCr NiCr	90 ns 120 ns	20 mA/MHz 20 mA/MHz	50 μ A 100 μ A	NMOS 2716 National 27C16 National 6716 Intersil 6716 Harris 6616

MILITARY PRODUCT REFERENCE GUIDE

Harris Semiconductor has long been a major supporter of the military market. The knowledge and expertise gained from this association is manifested in our latest military efforts; Military Drawing and 883-compliant products. This Military Product Guide gives you a complete overview of our commitment to military support. For more information on these products, please contact Harris Semiconductor or your nearest Harris sales office or representative.

Microprocessor Products			
Part Number	JAN Part Number	Military Drawing Number	883 Part Number
MD80C86	—	8405201QB	—
MR80C86	—	84052012C	—
MD80C86-2	—	—	MD80C86-2/883
MR80C86-2	—	—	MR80C86-2/883
MD80C88	—	—	MD80C88/883
MR80C88	—	—	MR80C88/883
MD82C37A-5	—	—	MD82C37A-5/883
MR82C37A-5	—	—	MR82C37A-5/883
MD82C37A	—	—	MD82C37A/883
MR82C37A	—	—	MR82C37A/883
MD82C50A-5	—	—	MD82C50A-5/883
MR82C50A-5	—	—	MR82C50A-5/883
MD82C52	—	8501501XB	—
MR82C52	—	85015013C	—
MD82C54	—	8406501JB	—
MR82C54	—	84065012C	—
MD82C55A-5	—	8406601QB	—
MR82C55A-5	—	8406601XC	—
MD82C55A	—	—	MD82C55A/883
MR82C55A	—	—	MR82C55A/883
MD82C59A-5	—	8501601YB	—
MR82C59A-5	—	85016013C	—
MD82C59A	—	8501602YB	—
MR82C59A	—	85016023C	—
MD82C82	—	8406701RB	—
MR82C82	—	84067012C	—
MD82C83H	—	—	MD82C83H/883
MR82C83H	—	—	MR82C83H/883
MD82C84A	—	8406801VB	—
MR82C84A	—	84068012C	—
MD82C85	—	—	MD82C85/883
MR82C85	—	—	MR82C85/883
MD82C86H-5	—	—	MD82C86H-5/883
MR82C86H-5	—	—	MR82C86H-5/883
MD82C87H-5	—	—	MD82C87H-5/883
MR82C87H-5	—	—	MR82C87H-5/883
MD82C88	—	8406901RB	—
MR82C88	—	84069012C	—
MD82C89	—	8552801RB	—
MR82C89	—	85528012C	—

MILITARY PRODUCT REFERENCE GUIDE

Microprocessor Products (continued)			
Part Number	JAN Part Number	Military Drawing Number	883 Part Number
HD1-4702	—	—	HD1-4702/883
HD1-6402	—	—	HD1-6402/883
HD1-6402B	—	—	HD1-6402B/883
HD1-6409	—	—	HD1-6409/883
HD4-6409	—	—	HD4-6409/883
HD1-6440	—	—	HD1-6440/883
HD4-6440	—	—	HD4-6440/883
HD1-6495	—	—	HD1-6495/883
HD4-6495	—	—	HD4-6495/883
HD1-15530	—	7802991JB	—
HD4-15530	—	78029913C	—
HD1-15531	—	—	HD1-15531/883

Data Acquisition Products			
Part Number	JAN Part Number	Military Drawing Number	883 Part Number
HI-506	38510/190-01BXC	—	HI-0506/883
HI-506A	38510/190-02BXC	85131-01	—
HI-507	38510/190-03BXC	—	HI-0507/883
HI-507A	38510/190-04BXC	85131-02	—
HI-508	38510/190-07BEC	77052-01	HI-0508/883
HI-508A	38510/190-05BEC	77052-02	—
HI-509	38510/190-08BEC	—	HI-0509/883
HI-509A	38510/190-06BEC	85131-03	—
HI-516	—	—	HI-0516/883
HI-518	—	—	HI-0518/883
HI-524	—	—	HI-0524/883
HI-546	—	—	HI-0546/883
HI-547	—	—	HI-0547/883
HI-548	—	—	HI-0548/883
HI-549	—	—	HI-0549/883
HI-1818A	—	—	HI-1818/883
HI-1828A	—	—	HI-1828A/883
HI-2420	—	—	HI-2420/883
HI-5320	—	—	HI-5320/883
HI-5330	—	—	HI-5330/883
HI-562A	—	—	HI-562A/883
HI-5687	—	83003-02	HI-5687/883
HI-5697	—	—	HI-5697/883
HI-574ATD	—	85127-04	HI-574A/883
HI-574AUD	—	85127-03	—
HI-674ATD	—	85127-06	HI-674A/883
HI-674AUD	—	85127-05	—

MILITARY PRODUCT REFERENCE GUIDE

CMOS Memory Products			
Part Number	JAN Part Number	DESC Drawing Number	883 Part Number
1K CMOS Static RAMs HM1-6508 HM1-6508B HM1-6518 HM1-6518B HM1-6551 HM1-6551B HM1-6561 HM1-6561B	— — — — — — — —	— — — — — — — —	HM1-6508/883 HM1-6508B/883 HM1-6518/883 HM1-6518B/883 HM1-6551/883 HM1-6551B/883 HM1-6561/883 HM1-6561B/883
4K CMOS Static RAMs HM1-6504 HM1-6504B HM1-6504S HM1-6514 HM1-6514B HM1-6514S HM4-6514 HM4-6514B HM1-6514S	— — 24501BVB — — 24502BVB — — — —	8102405VB* 8102403VB* —* 8102406VB* 8102404VB* —* — — — —	HM1-6504/883 HM1-6504B/883 HM1-6504S/883 HM1-6514/883 HM1-6514B/883 HM1-6514S/883 HM4-6514/883 HM4-6514B/883 HM4-6514S/883
16K CMOS Synchronous Static RAMs HM1-6516 HM1-6516B HM4-6516	29102BJB — —	8403601JB 8403607JB 8403601XC	— HM1-6516B/883 —
16K CMOS Asynchronous Static RAMs HM1-65162 HM1-65162B HM1-65162C HM1-65162S HM4-65162 HM4-65162B HM4-65162C HM1-65262 HM1-65262B HM4-65262 HM4-65262B	29104BJB — — — — — — 29103BJB — — — —	8403602JB 8403606JB 8403603JB — 8403602XC 8403606XC 8403603XC 8413201RB 8413203RB 8413201YC 8413203YC	— HM1-65162B/883 — — — HM4-65162B/883 — — HM1-65262B/883 — — HM4-65262B/883
64K CMOS Static RAMs HM1-65642 HM4-65642	— —	8552503YB 8552503XC	HM1-65642/883 HM4-65642/883

*Obsolete - may still be purchased for contracts prior to 10/22/85.

MILITARY PRODUCT REFERENCE GUIDE

CMOS Memory Products (continued)			
Part Number	JAN Part Number	DESC Drawing Number	883 Part Number
CMOS Static RAM Modules HM5-6564 HM5-8808 HM5-8808B HM5-8808S HM5-8808A HM5-8808AB HM5-8808AS HM5-8816H HM5-8832B HM5-91M2 HM5-92560 HM5-92570	Harris CMOS static RAM modules are available for military and high-reliability applications processed to our high-rel DASH 8 program flow. This includes burn-in and value-added processing (temperature cycling, SEM inspection, etc.). Please contact your local Harris sales office or representative for details.		
CMOS Fuse Link PROMs HM1-6642 HM4-6642 HM6-6642 HM1-6617 HM4-6617 HM6-6617	— — — — — —	— — — — — —	HM1-6642/883 HM4-6642/883 HM6-6642/883 HM1-6617/883 HM4-6617/883 HM6-6617/883

Linear Products			
Part Number	JAN Part Number	DESC Drawing Number	883 Part Number
HA240X	—	—	HA1-2400/883
	—	—	HA4-2400/883
HA2500	12204BGC	—	HA2-2500/883
	—	—	HA7-2500/883
HA2502	—	—	HA2-2502/883
	—	—	HA7-2502/883
HA2510	12205BGC	—	HA2-2510/883
	—	—	HA7-2510/883
HA2512	—	—	HA2-2512/883
	—	—	HA7-2512/883
	—	—	HA4-2512/883
HA2520	12206BGC	—	HA2-2520/883
	—	—	HA7-2520/883
HA2522	—	—	HA2-2522/883
	—	—	HA7-2522/883
	—	—	HA4-2522/883
HA2539	—	—	HA1-2539/883
	—	—	HA4-2539/883
HA2540	—	—	HA1-2540/883
	—	—	HA4-2540/883
HA2541	—	—	HA2-2541/883
	—	—	HA1-2541/883

MILITARY PRODUCT REFERENCE GUIDE

Linear Products (continued)			
Part Number	JAN Part Number	DESC Drawing Number	883 Part Number
HA2600	12202BGC	—	HA2-2600/883
	—	—	HA7-2600/883
HA2602	—	—	HA2-2602/883
	—	—	HA7-2602/883
HA2620	12203BGC	—	HA2-2620/883
	—	—	HA7-2620/883
HA2622	—	—	HA2-2622/883
	—	—	HA7-2622/883
	—	—	HA4-2622/883
HA2640	—	—	HA2-2640/883
	—	—	HA7-2640/883
HA4741	—	—	HA1-4741/883
HA4900	—	—	HA1-4900/883
HA4902	—	—	HA1-4902/883
	—	—	HA4-4902/883
HA5033	—	—	HA2-5033/883
HA5002	—	—	HA2-5002/883
	—	—	HA7-5002/883
HA5102	—	—	HA2-5102/883
	—	—	HA7-5102/883
	—	—	HA4-5102/883
HA5104	—	—	HA1-5104/883
	—	—	HA4-5104/883
HA5112	—	—	HA2-5112/883
	—	—	HA7-5112/883
	—	—	HA4-5112/883
HA5114	—	—	HA1-5114/883
	—	—	HA4-5114/883
HA5135	—	—	HA2-5135/883
	—	—	HA7-5135/883
HA5141	—	—	HA2-5141/883
	—	—	HA7-5141/883
HA5142	—	—	HA2-5142/883
	—	—	HA7-5142/883
	—	—	HA4-5142/883
HA5144	—	—	HA1-5144/883
	—	—	HA4-5144/883
HA5151	—	—	HA2-5151/883
	—	—	HA7-5151/883
HA5152	—	—	HA2-5152/883
	—	—	HA7-5152/883
	—	—	HA4-5152/883
HA5154	—	—	HA1-5154/883
	—	—	HA4-5154/883
HA5160	—	—	HA2-5160/883
HA5170	—	—	HA2-5170/883
	—	—	HA7-5170/883
	—	—	HA4-5170/883
HA5180	—	—	HA2-5180/883

MILITARY PRODUCT REFERENCE GUIDE

Linear Products (continued)			
Part Number	JAN Part Number	DESC Drawing Number	883 Part Number
HA5180	—	—	HA7-5180/883
HA5190	—	—	HA1-5190/883
	—	—	HA2-5190/883
HI200	—	—	HI1-200/883
	—	—	HI2-200/883
HI201	12302BEB	—	HI1-201/883
	—	—	HI4-201/883
HI201HS	—	—	HI1-201HS/883
	—	—	HI4-201HS/883
HI300	—	—	HI2-300/883
	—	—	HI1-300/883
HI301	—	—	HI2-301/883
	—	—	HI1-301/883
HI302	—	—	HI1-302/883
HI303	—	—	HI1-303/883
HI304	—	—	HI1-304/883
	—	—	HI2-304/883
HI305	—	—	HI1-305/883
	—	—	HI2-305/883
HI306	—	—	HI1-306/883
HI307	—	—	HI1-307/883
HI381	—	—	HI1-381/883
	—	—	HI2-381/883
HI384	—	—	HI1-384/883
HI387	—	—	HI1-387/883
	—	—	HI2-387/883
HI390	—	—	HI1-390/883
HI5040	—	8100609EX	HI1-5040/883
HI5041	—	8100610EX	HI1-5041/883
HI5042	—	8100611EX	HI1-5042/883
HI5043	—	8100612EX	HI1-5043/883
	—	—	HI4-5043/883
HI5044	—	8100613EX	HI1-5044/883
HI5045	—	8100614EX	HI1-5045/883
	—	—	HI4-5045/883
HI5046	—	—	HI1-5046/883
HI5046A	—	—	HI1-5046A/883
	—	—	HI4-5046A/883
HI5047	—	—	HI1-5047/883
HI5047A	—	—	HI1-5047A/883
	—	—	HI4-5047A/883
HI5048	—	—	HI1-5048/883
HI5049	—	—	HI1-5049/883
	—	—	HI4-5049/883
HI5050	—	—	HI1-5050/883
HI5051	—	—	HI1-5051/883
	—	—	HI4-5051/883

OPERATIONAL AMPLIFIERS: HIGH SLEW-RATE

	Part Number	Temperature Range	Pinout (See pages 26, 27)	Slew Rate (V/ μ s)	Gain Band-Width Product (MHz)	Full Power Bandwidth (MHz)	Bias Current (nA)	Open Loop Gain (V/mV)	Minimum Gain Stable	Comments
SINGLES	HA-2500	-55°C to +125°C	1,2	30	12	0.5	100	30	Unity	
	HA-2502	-55°C to +125°C	1,2	30	12	0.5	125	25	Unity	
	HA-2505	0°C to +75°C	1,2	30	12	0.5	125	25	Unity	
	HA-5111	-55°C to +125°C 0°C to +75°C	1,2,20	30	60	0.5	60	6000	10	New, low noise
	HA-2620	-55°C to +125°C	2,8,20,27	35	100	0.6	1	150	5	
	HA-2622	-55°C to +125°C	2,8,27	35	100	0.6	5	150	5	
	HA-2625	0°C to +75°C	2,8	35	100	0.6	5	150	5	
	HA-5147	-55°C to +125°C 0°C to +75°C	25,26,27	35	120	0.5	± 15	1500	10	New, precision
	HA-5147A	-55°C to +125°C 0°C to +75°C	25,26,27	35	120	0.5	± 10	1800	10	New, precision
	HA-2512	-55°C to +125°C	1,2	60	12	1.0	125	15	Unity	
	HA-2515	0°C to +75°C	1,2	60	12	1.0	125	15	Unity	
	HA-2510	-55°C to +125°C	1,2,20	65	12	1.0	100	15	Unity	
	HA-5162	-55°C to +125°C 0°C to +75°C	19	70	100	1.0	0.02	100	10	J-FET
	HA-5160	-55°C to +125°C 0°C to +75°C	19	120	100	1.0	0.02	150	10	J-FET
	HA-2520	-55°C to +125°C	1,2,20	120	20	2.0	100	15	3	
	HA-2522	-55°C to +125°C	1,2	120	20	1.6	125	15	3	
	HA-2525	0°C to +75°C	1,2	120	20	1.6	125	15	3	
	HA-2544	-55°C to +125°C 0°C to +75°C	1,2,20	150	30	2.3	8000	6	Unity	New, video
	HA-5190	-55°C to +125°C	4,13,18	200	150	6.5	5000	30	5	
	HA-5195	0°C to +75°C	4,18	200	150	6.5	5000	30	5	
HA-2541	-55°C to +125°C 0°C to +75°C	5,6	280	40	4.5	6000	10	Unity	New	
HA-2542	-55°C to +125°C 0°C to +75°C	7,32	375	120	5.5	6000	10	2	New	
HA-2540	-55°C to +125°C -25°C to +85°C 0°C to +75°C	4,13	400	400	6.0	5000	30	10		
HA-2539	-55°C to +125°C -25°C to +85°C 0°C to +75°C	3,21	600	600	9.5	5000	30	10		
DUALS	HA-5112	-55°C to +125°C 0°C to +75°C	11,12,30	20	60	0.3	130	230	10	Low noise
QUADS	HA-2400	-55°C to +125°C	29,31	30	40	0.5	50	150	10	Addressable
	HA-2404	-40°C to +85°C	29	30	40	0.5	50	150	10	Addressable
	HA-2405	0°C to +75°C	29	30	40	0.5	50	150	10	Addressable
	HA-2406	0°C to +75°C	29	20	30	0.3	50	150	10	Addressable
	HA-5114	-55°C to +125°C 0°C to +75°C	23,24	20	60	0.3	130	230	10	Low noise

OPERATIONAL AMPLIFIERS: WIDE BANDWIDTH

	Part Number	Temperature Range	Pinout (See pages 26, 27)	Gain Band-Width Product (MHz)	Full Power Bandwidth (MHz)	Slew Rate (V/ μ s)	Bias Current (nA)	Open Loop Gain (V/mV)	Minimum Gain Stable	Comments
SINGLES	HA-2500	-55°C to +125°C	1,2	12	0.5	30	100	30	Unity	
	HA-2502	-55°C to +125°C	1,2	12	0.5	30	125	25	Unity	
	HA-2505	0°C to +75°C	1,2	12	0.5	30	125	25	Unity	
	HA-2510	-55°C to +125°C	1,2,20	12	1.0	65	100	15	Unity	
	HA-2512	-55°C to +125°C	1,2	12	1.0	60	125	15	Unity	
	HA-2515	0°C to +75°C	1,2	12	1.0	60	125	15	Unity	
	HA-2600	-55°C to +125°C	2,27	12	0.075	7	1	150	Unity	
	HA-2602	-55°C to +125°C	2,27	12	0.075	7	15	150	Unity	
	HA-2605	0°C to +75°C	2,27	12	0.075	7	5	150	Unity	
	HA-2520	-55°C to +125°C	1,2,20	20	2.0	120	100	15	3	
	HA-2522	-55°C to +125°C	1,2	20	1.6	120	125	15	3	
	HA-2525	0°C to +75°C	1,2	20	1.6	120	125	15	3	
	HA-2544	-55°C to +125°C 0°C to +75°C	1,2,20	33	2.3	150	8000	6	Unity	New, video
	HA-2541	-55°C to +125°C 0°C to +75°C	5,6	40	4.5	280	6000	10	Unity	New
	HA-5111	-55°C to +125°C 0°C to +75°C	1,2,20	60	0.5	30	60	6000	10	New, low noise
	HA-5137	-55°C to +125°C 0°C to +75°C	25,26,27	63	0.3	17	8	1800	5	New, precision
	HA-2620	-55°C to +125°C	2,8,20,27	100	0.6	35	1	150	5	
	HA-2622	-55°C to +125°C	2,8,27	100	0.6	35	5	150	5	
	HA-2625	0°C to +75°C	2,8,27	100	0.6	35	5	150	5	
	HA-5160	-55°C to +125°C 0°C to +75°C	19	100	1.0	120	0.02	150	10	J-FET
HA-5162	-55°C to +125°C 0°C to +75°C	19	100	1.0	70	0.02	100	10	J-FET	
HA-5147	-55°C to +125°C 0°C to +75°C	25,26,27	120	0.5	35	± 15	1500	10	New, precision	
HA-5147A	-55°C to +125°C 0°C to +75°C	25,26,27	120	0.5	35	± 10	1800	10	New, precision	
HA-2542	-55°C to +125°C 0°C to +75°C	7,32	120	5.5	375	6000	10	2	New	
HA-5190	-55°C to +125°C	4,13,18	150	6.5	200	5000	30	5		
HA-5195	0°C to +75°C	4,18	150	6.5	200	5000	30	5		
HA-2540	-55°C to +125°C -25°C to +85°C 0°C to +75°C	4,13	400	6.0	400	5000	30	10		
HA-2539	-55°C to +125°C -25°C to +85°C 0°C to +75°C	3,21	600	9.5	600	5000	30	10		
DUALS	HA-5102	-55°C to +125°C 0°C to +75°C	11,12,30	8	0.05	3	130	230	Unity	Low noise
	HA-5112	-55°C to +125°C 0°C to +75°C	11,12,30	60	0.25	20	130	230	10	Low Noise
QUADS	HA-2400	-55°C to +125°C	29,31	40	0.5	30	50	150	10	Addressable
	HA-2404	-25°C to +85°C	29	40	0.5	30	50	150	10	Addressable
	HA-2405	0°C to +75°C	29	40	0.5	30	50	150	10	Addressable
	HA-2406	0°C to +75°C	29	30	0.3	20	50	150	10	Addressable
	HA-5104	-55°C to +125°C 0°C to +75°C	23,24	8	0.05	3	130	230	Unity	Low noise
	HA-5114	-55°C to +125°C 0°C to +75°C	23,24	60	0.25	20	130	230	10	Low Noise

OPERATIONAL AMPLIFIERS: LOW POWER

	Part Number	Temperature Range	Pinout (See pages 26,27)	Supply Current (μ A/ Amplifier)	Supply Range (V)	Slew Rate (V/ μ s) At Indicated Supply Current	Gain Band-width Product (kHz) At Indicated Supply Current	Output Swing (V) \pm 15V Power Supplies	Offset Voltage (mV)	Single Supply Operation	Comments
SINGLES	HA-5135	-55°C to +125°C 0°C to +75°C	17,22,28	1000	\pm 5/ \pm 20	0.8	2500	\pm 12	0.01		Precision
	HA-5180	-55°C to +125°C -25°C to +85°C 0°C to +75°C	15,16	700	\pm 5/ \pm 20	7	2000	\pm 12	1.0		J-FET
	HA-5180A	-55°C to +125°C -25°C to +85°C 0°C to +75°C	15,16	700	\pm 5/ \pm 20	7	2000	\pm 12	0.1		J-FET
	HA-5151	-55°C to +125°C 0°C to +75°C	9,10	200	\pm 1/ \pm 20	4.5	1300	$>$ \pm 10	0.5	Yes	New
	HA-5141	-55°C to +125°C 0°C to +75°C	9,10	50	+2/+40	1	400	0/+4(+5Vs)	2	Yes	Ultra-low power
	HA-5141A	-55°C to +125°C 0°C to +75°C	9,10	45	+2/+40	1.5	400	0/+4(+5Vs)	0.5	Yes	Ultra-low power
	HA-2720	-55°C to +125°C	14,15	1.5/15	\pm 3/ \pm 20	0.1/0.8	120/1200	\pm 13.5	2.0		Programmable
DUAL	HA-5152	-55°C to +125°C 0°C to +75°C	11,12,30	200	\pm 1/ \pm 20	4.5	1300	$>$ \pm 10	0.5	Yes	New
	HA-5142	-55°C to +125°C 0°C to +75°C	11,12,30	50	+2/+40	1	400	0/+4(+5Vs)	2	Yes	Ultra-low power
	HA-5142A	-55°C to +125°C 0°C to +75°C	11,12,30	45	+2/+40	1.5	400	0/+4(+5Vs)	0.5	Yes	Ultra-low power
QUADS	HA-5134	-55°C to +125°C 0°C to +75°C	23,24	1000	\pm 5/ \pm 20	1.2	4000		0.025		New, precision
	HA-5154	-55°C to +125°C 0°C to +75°C	23,24	200	\pm 1/ \pm 20	4.5	1300	$>$ \pm 10	0.5	Yes	New
	HA-5144	-55°C to +125°C 0°C to +75°C	23,24	50	+2/+40	1	400	0/+4(+5Vs)	2	Yes	Ultra-low power
	HA-5144A	-55°C to +125°C 0°C to +75°C	23,24	45	+2/+40	1.5	400	0/+4(+5Vs)	0.5	Yes	Ultra-low power

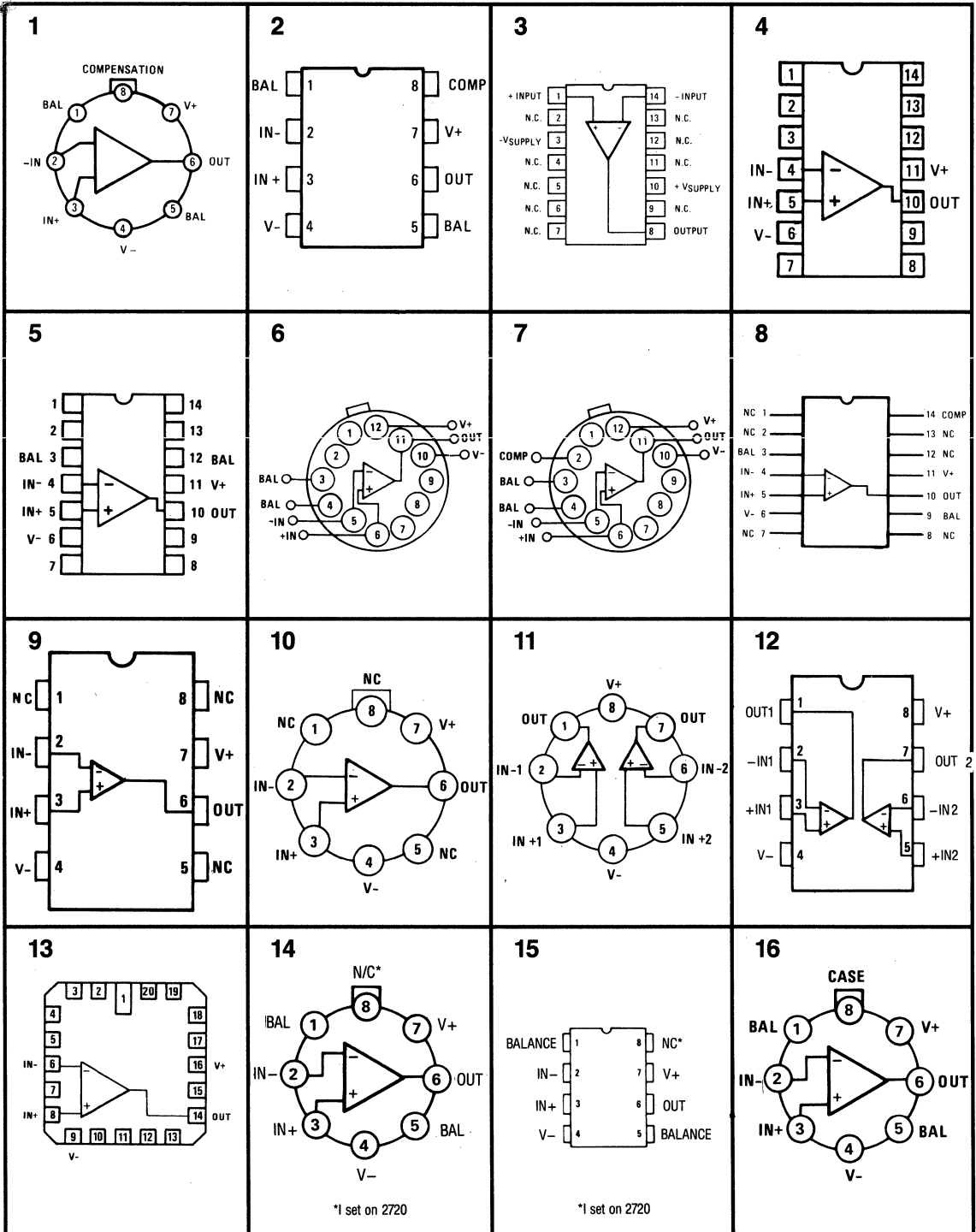
OPERATIONAL AMPLIFIERS: PRECISION

Part Number	Temperature Range	Pinout (See pages 26, 27)	Offset Voltage (μV)	Offset Voltage Drift ($\mu\text{V}/^\circ\text{C}$)	Bias Current (nA)	Open Loop Gain (V/mV)	1 kHz Noise Current ($\text{pA}/\sqrt{\text{Hz}}$)	1 kHz Noise Voltage ($\text{nV}/\sqrt{\text{Hz}}$)	CMRR (dB)	PSRR (dB)	Supply Current (mA/amp)	Comments
HA-5170	-55°C to +125°C -25°C to +85°C 0°C to +75°C	14,15,20	100	2	0.02	600	0.01	10	100	105	1.9	J-FET
HA-5180A	-55°C to +125°C -25°C to +85°C 0°C to +75°C	15,16	100	5	0.0003	1000	0.01	70	110	105	0.7	J-FET
HA-5180	-55°C to +125°C -25°C to +85°C 0°C to +75°C	15,16	1000	5	0.0003	1000	0.01	70	110	105	0.7	J-FET
HA-5134	-55°C to +125°C 0°C to +75°C	23,24	25	5	2.5	1000	2	7	120	116	1	New, quad
HA-5135	-55°C to +125°C 0°C to +75°C	17,22,28	10	0.4	1	10,000	0.14	9.0	120	130	1	
HA-5127 A/E	-55°C to +125°C -25°C to +85°C 0°C to +75°C	25,26,27	10	0.2	± 10	1800	0.4	3.0	126	120	3	New
HA-5127 B/F	-55°C to +125°C -25°C to +85°C 0°C to +75°C	25,26,27	20	0.3	± 12	1800	0.4	3.0	123	120	3	New
HA-5127 C/E	-55°C to +125°C -25°C to +85°C 0°C to +75°C	25,26,27	30	0.4	± 15	1500	0.4	3.2	120	114	3.3	New
HA-5137 A/E	-55°C to +125°C -25°C to +85°C 0°C to +75°C	25,26,27	10	0.2	± 10	1800	0.4	3.0	126	120	3	New
HA-5137 B/F	-55°C to +125°C -25°C to +85°C 0°C to +75°C	25,26,27	20	0.3	± 12	1800	0.4	3.0	123	120	3	New
HA-5137 C/G	-55°C to +125°C -25°C to +85°C 0°C to +75°C	25,26,27	30	0.4	± 15	1500	0.4	3.2	120	114	3.3	New
HA-5147A	-55°C to +125°C -25°C to +85°C 0°C to +75°C	25,26,27	10	0.2	± 10	1800	0.4	3.0	126	114	3.5	New
HA-5147	-55°C to +125°C -25°C to +85°C 0°C to +75°C	25,26,27	30	0.4	± 15	1500	0.4	3.2	120	96	3.5	New

OPERATIONAL AMPLIFIERS: GENERAL PURPOSE

	Part Number	Temperature Range	Pinout (See pages 26,27)	Gain Bandwidth Product (MHz)	Slew Rate (V/ μ s)	Offset Voltage (mV)	Bias Current (nA)	1 kHz Noise Voltage (nV/ $\sqrt{\text{Hz}}$)	Open Loop Gain (V/mV)	Minimum Gain Stable	Supply Current (mA/package)	Comments
SINGLES	HA-2500	-55°C to +125°C	1,2	12	30	2	100	21	30	Unity	4	High slew
	HA-2502	-55°C to +125°C	1,2	12	30	4	125	21	25	Unity	4	High slew
	HA-2505	0°C to +75°C	1,2	12	30	4	125	21	25	Unity	4	High slew
	HA-2600	-55°C to +125°C	1,2	12	7	0.5	1	16	150	Unity	3	Wide band
	HA-2602	-55°C to +125°C	1,2	12	7	3	15	16	150	Unity	3	Wide band
	HA-2605	0°C to +75°C	1,2	12	7	3	5	16	150	Unity	3	Wide band
	HA-5101	-55°C to +125°C 0°C to +75°C	14,15	10	10	0.5	60	3.5	6000	Unity	4	New, low noise
	HA-5111	-55°C to +125°C 0°C to +75°C	1,2	60	30	0.5	60	3.5	6000	10	4	New, low noise
DUALS	HA-5102	-55°C to +125°C 0°C to +75°C	11,12,30	8	3	0.5	130	4.3	230	Unity	3	Low noise
	HA-5112	-55°C to +125°C 0°C to +75°C	11,12,30	60	20	0.5	130	4.3	230	10	3	Low noise
QUADS	HA-4741	-55°C to +125°C	23,24	3.5	1.6	0.5	60	9	100K	Unity	<5	Quad 741
	HA-4741	0°C to +75°C	24	3.5	1.6	1	60	9	50K	Unity	<7	Quad 741
	HA-5104	-55°C to +125°C 0°C to +75°C	23,24	8	3	0.5	130	4.3	230	Unity	5	Low noise
	HA-5114	-55°C to +125°C 0°C to +75°C	23,24	60	20	0.5	130	4.3	230	10	5	Low noise
	HA-5134	-55°C to +125°C 0°C to +75°C	23,24	4	1.2	.025	15	7	1000	Unity	4	New, precision

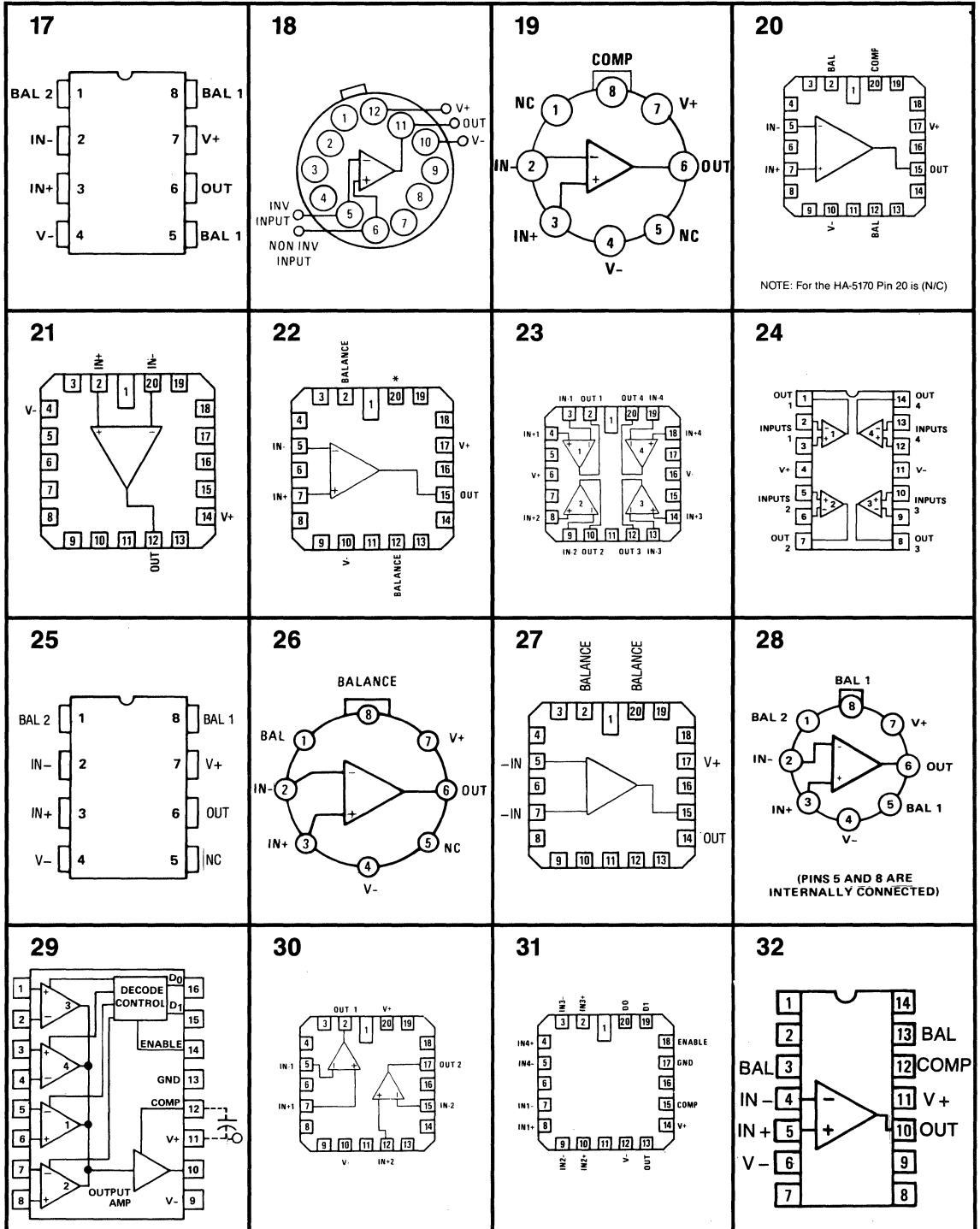
OPERATIONAL AMPLIFIERS: PINOUTS



*I set on 2720

*I set on 2720

OPERATIONAL AMPLIFIERS: PINOUTS



OPERATIONAL AMPLIFIERS: HIGH VOLTAGE

HA-2640, HA-2645		
Features	Applications	Pinout
<ul style="list-style-type: none"> • Slew rate: $1 V/\mu s$ • Bandwidth: 4 MHz • Input offset voltage: 4 mV • Offset current: 5 nA • Output voltage swing: $\pm 35 V$ • Input voltage swing: $\pm 35 V$ • Supply range: $\pm 10 V$ to $\pm 40 V$ • Output overload protection 	<ul style="list-style-type: none"> • Industrial control systems • Power supplies • High-voltage regulators • Resolver excitation • Signal conditioning 	

BUFFER AMPLIFIERS: VIDEO

HA-5033		
Features	Applications	Pinout
<ul style="list-style-type: none"> • Differential phase error: 0.1° • Differential gain error: 0.1% • High slew rate: $1300 V/\mu s$ • $-3dB$ bandwidth: 250 MHz • High output current 	<ul style="list-style-type: none"> • Video buffers • High frequency buffers • High speed line drivers • Current boosters 	

HA-5002		
Features	Applications	Pinout
<ul style="list-style-type: none"> • Voltage gain: .995 • High slew rate: $1300 V/\mu s$ • $-3dB$ bandwidth: 110 MHz • High output current: 200 mA • Pulsed output current: 400 mA • Low supply current: 8.3 mA 	<ul style="list-style-type: none"> • High frequency buffers • High speed line drivers • High power current boosters • High power current sources 	

OPERATIONAL AMPLIFIERS: ADDRESSABLE

HA-2400, HA-2404, HA-2405, HA-2406		
Features	Applications	Pinout
<ul style="list-style-type: none"> • Four channels addressable • High slew rate: 30 V/μs • Wide gain bandwidth product: 40 MHz • High gain: 150K • TTL compatible 	<ul style="list-style-type: none"> • Signal selection/multiplexing • Variable gain stages • Oscillators • Filters • Comparators • Integrators 	

COMPARATORS

HA-4900, HA-4902, HA-4905		
Features	Applications	Pinout
<ul style="list-style-type: none"> • Fast response time: 130 ns • Low offset voltage: 2 mV • Low offset current: 10 nA • Single or dual supply • Analog and logic supplies separated for easier interface and noise immunity 	<ul style="list-style-type: none"> • Threshold detectors • Zero crossing detectors • Window detectors • Interface • Oscillators 	

NEW LINEAR PRODUCTS: COMING SOON

Video Op Amp HA-2544

Features

- .1 dB diff. gain/.1° diff. phase • .2 dB at 5 MHz gain tolerance • 33 MHz unity gain bandwidth • 10 mA supply current

Precision Quad Op Amps HA-5134

Features

- 25 μ V offset voltage • 5 μ V/°C offset drift • 120 dB channel separation • 4 MHz unity gain bandwidth

Monolithic Power Supply HV-1205

Features

- Direct 120/240 VAC to 5 VDC • 50 mA at < 50 mV p-p ripple • Switching pre-regulator
 - Uses Harris' high voltage process

ANALOG MULTIPLEXERS: OVERVOLTAGE-PROTECTED

Part Number	Multiplexer Type	Temperature Range	Package*	R_{ON} Max, Full Temp (Ω)	Off Output Leakage (nA) Max, Full Temp	Access Time (nS) Typ, 25°C	Settling Time (.1%) Typ, 25°C
HI1-0506A-2 HI1-0506A-5 HI3-0506A-5 HI1-0506A-8 HI4-0506A-8	Single-ended 16-channel	-55°C to +125°C 0°C to +75°C 0°C to +75°C -55°C to +125°C -55°C to +125°C	28-pin cerdip 28-pin cerdip 28-pin epoxy dip 28-pin cerdip 28-pin LCC ceramic	1.8K	300	500	1.2 μ s
HI1-0507A-2 HI1-0507A-5 HI3-0507A-5 HI1-0507A-8 HI4-0507A-8	Differential 8-channel	-55°C to +125°C 0°C to +75°C 0°C to +75°C -55°C to +125°C -55°C to +125°C	28-pin cerdip 28-pin cerdip 28-pin epoxy dip 28-pin cerdip 28-pin LCC ceramic	1.8K	200	500	1.2 μ s
HI1-0508A-2 HI1-0508A-5 HI3-0508A-5 HI1-0508A-8 HI4-0508A-8	Single-ended 8-channel	-55°C to +125°C 0°C to +75°C 0°C to +75°C -55°C to +125°C -55°C to +125°C	16-pin cerdip 16-pin cerdip 16-pin epoxy dip 16-pin cerdip 20-pin LCC ceramic	1.8K	200	500	1.2 μ s
HI1-0509A-2 HI1-0509A-5 HI3-0509A-5 HI1-0509A-8 HI4-0509A-8	Differential 4-channel	-55°C to +125°C 0°C to +75°C 0°C to +75°C -55°C to +125°C -55°C to +125°C	16-pin cerdip 16-pin cerdip 16-pin epoxy dip 16-pin cerdip 20-pin LCC ceramic	1.8K	200	500	1.2 μ s
HI1-546-2 HI1-546-4 HI1-546-5 HI3-546-5 HI1-546/883 HI4-546/883 HI4P546-5	Single-ended 16-channel With R_{ON} Matching	-55°C to +125°C -25°C to +85°C 0°C to +75°C 0°C to +75°C -55°C to +125°C -55°C to +125°C -55°C to +125°C	28-pin cerdip 28-pin cerdip 28-pin cerdip 28-pin epoxy dip 28-pin cerdip 28-pin LCC ceramic 28-pin PLCC epoxy	1.8K	300	500	1.2 μ s
HI1-547-2 HI1-547-4 HI1-547-5 HI3-547-5 HI1-547/883 HI4-547/883 HI4P547-5	Differential 8-channel With R_{ON} Matching	-55°C to +125°C -25°C to +85°C 0°C to +75°C 0°C to +75°C -55°C to +125°C -55°C to +125°C -55°C to +125°C	28-pin cerdip 28-pin cerdip 28-pin cerdip 28-pin epoxy dip 28-pin cerdip 28-pin LCC ceramic 28-pin PLCC epoxy	1.8K	200	500	1.2 μ s
HI1-548-2 HI1-548-4 HI1-548-5 HI3-548-5 HI1-548/883 HI4-548/883 HI4P548-5	Single-ended 8-channel With R_{ON} Matching	-55°C to +125°C -25°C to +85°C 0°C to +75°C 0°C to +75°C -55°C to +125°C -55°C to +125°C -55°C to +125°C	16-pin cerdip 16-pin cerdip 16-pin cerdip 16-pin epoxy dip 16-pin cerdip 20-pin LCC ceramic 20-pin PLCC epoxy	1.8K	200	500	1.2 μ s
HI1-549-2 HI1-549-4 HI1-549-5 HI3-549-5 HI1-549/883 HI4-549/883 HI4P549-5	Differential 4-channel With R_{ON} Matching	-55°C to +125°C -25°C to +85°C 0°C to +75°C 0°C to +75°C -55°C to +125°C -55°C to +125°C -55°C to +125°C	16-pin cerdip 16-pin cerdip 16-pin cerdip 16-pin epoxy dip 16-pin cerdip 20-pin LCC ceramic 20-pin PLCC epoxy	1.8K	200	500	1.2 μ s

*Leadless chip carriers available.

ANALOG MULTIPLEXERS: GENERAL PURPOSE

Part Number	Multiplexer Type	Temperature Range	Package*	R _{on} Max, Full Temp (Ω)	Off Output Leakage (nA) Max, Full Temp	Access Time (nS) Typ, 25°C	Settling Time (.1%) Typ, 25°C
HI1-0506-2 HI1-0506-4 HI1-0506-5 HI3-0506-5 HI1-0506/883 HI4-0506/883 HI4P0506-5	Single-ended 16-channel	-55°C to +125°C -25°C to +85°C 0°C to +75°C 0°C to +75°C -55°C to +125°C -55°C to +125°C 0°C to +75°C	28-pin cerdip 28-pin cerdip 28-pin cerdip 28-pin epoxy dip 28-pin cerdip 28-pin LCC ceramic 28-pin PLCC epoxy	400	300	250	1.2μs
HI1-0507-2 HI1-0507-4 HI1-0507-5 HI3-0507-5 HI1-0507/883 HI4-0507/883 HI4P0507-5	Differential 8-channel	-55°C to +125°C -25°C to +85°C 0°C to +75°C 0°C to +75°C -55°C to +125°C -55°C to +125°C 0°C to +75°C	28-pin cerdip 28-pin cerdip 28-pin cerdip 28-pin epoxy dip 28-pin cerdip 28-pin LCC ceramic 28-pin PLCC epoxy	400	200	250	1.2μs
HI1-0508-2 HI1-0508-4 HI1-0508-5 HI3-0508-5 HI1-0508/883 HI4-0508/883 HI4P0508-5	Single-ended 8-channel	-55°C to +125°C -25°C to +85°C 0°C to +75°C 0°C to +75°C -55°C to +125°C -55°C to +125°C 0°C to +75°C	16-pin cerdip 16-pin cerdip 16-pin cerdip 16-pin epoxy dip 16-pin cerdip 20-pin LCC ceramic 20-pin PLCC epoxy	400	200	250	360μs
HI1-0509-2 HI1-0509-4 HI1-0509-5 HI3-0509-5 HI1-0509/883 HI4-0509/883 HI4P0509-5	Differential 4-channel	-55°C to +125°C -25°C to +85°C 0°C to +75°C 0°C to +75°C -55°C to +125°C -55°C to +125°C 0°C to +75°C	16-pin cerdip 16-pin cerdip 16-pin cerdip 16-pin epoxy dip 16-pin cerdip 20-pin LCC ceramic 20-pin PLCC epoxy	400	100	250	360μs
HI1-1818A-2 HI1-1818A-5 HI3-1818A-5 HI1-1818A/883 HI4P1818-5	Single-ended 8-channel Low-power	-55°C to +125°C 0°C to +75°C 0°C to +75°C -55°C to +125°C 0°C to +75°C	16-pin cerdip 16-pin cerdip 16-pin epoxy dip 16-pin cerdip 20-pin PLCC epoxy	500	250	350	1.0μs
HI1-1828A-2 HI1-1828A-5 HI3-1828A-5 HI1-1828A/883 HI4P1828-5	Differential 4-channel Low-power	-55°C to +125°C 0°C to +75°C 0°C to +75°C -55°C to +125°C 0°C to +75°C	16-pin cerdip 16-pin cerdip 16-pin epoxy dip 16-pin cerdip 20-pin PLCC epoxy	500	125	350	1.0μs

ANALOG MULTIPLEXERS: HIGH SPEED/MODE PROGRAMMABLE

Part Number	Multiplexer Type	Temperature Range	Package*	R _{on} Max, Full Temp (Ω)	Off Output Leakage (nA) Max, Full Temp	Access Time (nS) Typ, 25°C	Settling Time (.1%) Typ, 25°C
HI1-0516-2 HI1-0516-5 HI1-0516/883 HI4-516/883	16-channel/Dual 8	-55°C to +125°C 0°C to +75°C -55°C to +125°C -55°C to +125°C	28-pin cerdip 28-pin LCC ceramic	1.0K	100	100	250 ns
HI1-0518-2 HI1-0518-5 HI1-0518/883 HI4-518/883	8-channel/Dual 4	-55°C to +125°C 0°C to +75°C -55°C to +125°C -55°C to +125°C	18-pin cerdip 20-pin LCC ceramic	1.0K	50	80	250 ns

ANALOG MULTIPLEXERS: SPECIAL PURPOSE

Part Number	Multiplexer Type	Temperature Range	Package*	R _{on} Max, Full Temp (Ω)	Off Output Leakage (nA) Max, Full Temp	Access Time (nS) Typ, 25°C	Settling Time (.1%) Typ, 25°C
HI1-0524-2 HI1-0524-5 HI3-0524-5 HI1-0524/883 HI4-0524/883 HI4P0524-5	4-channel video with low 10 MHz crosstalk	-55°C to +125°C 0°C to +75°C 0°C to +75°C -55°C to +125°C -55°C to +125°C 0°C to +75°C	18-pin cerdip 20-pin LCC ceramic 20-pin PLCC epoxy	1.5K	50	150	200 ns
HI1-539-2 HI1-539-5 HI3-539-5 HI1-539-8 HI4P539	Differential 4-channel, Low-level Matched	-55°C to +125°C 0°C to +75°C 0°C to +75°C -55°C to +125°C 0°C to +75°C	16-pin cerdip 16-pin cerdip 16-pin epoxy dip 16-pin cerdip 20-pin PLCC epoxy	1.1K	25 2.5 2.5 25 2.5	250	900 ns

SAMPLE-AND-HOLD AMPLIFIERS

Part Number	Sample/Hold Type	Temperature Range	Package*	Acquisition Time, (to .01%) Typ, 25°C	Charge Transfer Typ, 25°C	Aperture Time Typ, 25°C	Gain Bandwidth Product Typ, 25°C
HA1-2420-1 HA1-2420-2 HA1-2425-5 HA1-2420/883 HA3-2425-5 HA4-2420/883 HA4P2425-5	Fast Low droop rate	200°C -55°C to +125°C 0°C to +75°C -55°C to +125°C 0°C to +75°C -55°C to +125°C 0°C to +75°C	14-pin cerdip 14-pin cerdip 14-pin cerdip 14-pin cerdip 14-pin epoxy 20-pin LCC ceramic 20-pin PLCC epoxy	3.2 μs (C _H = 1,000 pF)	5 pC	30 ns	2.5 MHz
HA1-5320-2 HA1-5320-5 HA1-5320/883 HA4-5320-8	High speed Low charge transfer Precision Complete—includes hold capacitor	-55°C to +125°C 0°C to +75°C -55°C to +125°C -55°C to +125°C	14-pin cerdip 14-pin cerdip 14-pin cerdip 20-pin LCC ceramic	1 μs (C _H = Internal)	0.1 pC	25 ns	2.0 MHz
HA1-5330-5 HA1-5330-4 HA1-5330-2 HA1-5330/883 HA4-5330/883	Very high speed Precision monolithic	0°C to +75°C -25°C to +85°C -55°C to +125°C -55°C to +125°C -55°C to +125°C	14-pin cerdip 14-pin cerdip 14-pin cerdip 14-pin cerdip 20-pin LCC ceramic	500 ns	.05 pC	20 ns	4.5 MHz

A/D CONVERTERS: MICROPROCESSOR COMPATIBLE

12-Bit A/D Converter with μP Interface HI-574A		Pinout
Features		
<ul style="list-style-type: none"> • Complete with reference and clock • 150 ns bus access time • 20 μs typical conversion time (full temperature) • ± 12 V to ± 15 V operation • No missing codes over temperature • Minimal set-up time for control signals • Byte enable/short cycle (A_0 input) • Improved alternate source for the AD574A and HS574 • Available in 28-pin cerdip, coming soon in leadless chip carriers 		

Part Number	Resolution Bits	Temperature Range	Linearity Error max, 25°C (LSB)	Differential Nonlinearity, max 25°C*	Gain Drift ppm/°C, max Full Temp.	Conversion Speed. (μ s) Max Over Temperature	
						12 Bits	8 Bits
HI-574AJD-5	12	0°C to +75°C	± 1	11 bits	± 45	25	17.0
HI-574AKD-5		0°C to +75°C	$\pm 1/2$	12 bits	± 25		
HI-574ALD-5		0°C to +75°C	$\pm 1/2$	12 bits	± 10		
HI-574ASD-2		-55°C to +125°C	± 1	11 bits	± 50		
HI-574ASD/883		-55°C to +125°C	± 1	11 bits	± 50		
HI-574ATD-2		-55°C to +125°C	$\pm 1/2$	12 bits	± 25		
HI-574ATD/883		-55°C to +125°C	$\pm 1/2$	12 bits	± 25		
HI-574AUD-2		-55°C to +125°C	$\pm 1/2$	12 bits	± 12.5		
HI-574AUD/883		-55°C to +125°C	$\pm 1/2$	12 bits	± 12.5		

12-Bit A/D Converter with μP Interface HI-674A		Pinout
Features		
<ul style="list-style-type: none"> • Complete 12 bit A/D converter with reference and clock • Fast conversion – 12 μs typical 15 μs maximum for 12 bits • Selectable 8 or 12 line bus interface to microprocessor • 150 ns bus access time • Same pinout and functions as the HI-574A and AD574A • No missing codes over temperature • Available in 28-pin cerdip 		

Part Number	Resolution Bits	Temperature Range	Linearity Error max, 25°C (LSB)	Differential Nonlinearity, max 25°C*	Gain Drift ppm/°C, max Full Temp.	Conversion Speed. (μ s) Max Over Temperature	
						12 Bits	8 Bits
HI-674AJD-5	12	0°C to +75°C	± 1	11 bits	± 45	15	10
HI-674AKD-5		0°C to +75°C	$\pm 1/2$	12 bits	± 25		
HI-674ALD-5		0°C to +75°C	$\pm 1/2$	12 bits	± 10		
HI-674ASD-2		-55°C to +125°C	± 1	11 bits	± 50		
HI-674ASD/883		-55°C to +125°C	± 1	11 bits	± 50		
HI-674ATD-2		-55°C to +125°C	$\pm 1/2$	12 bits	± 25		
HI-674ATD/883		-55°C to +125°C	$\pm 1/2$	12 bits	± 25		
HI-674AUD-2		-55°C to +125°C	$\pm 1/2$	12 bits	± 12.5		
HI-674AUD/883		-55°C to +125°C	$\pm 1/2$	12 bits	± 12.5		
HI1-774AJD-5		12	0°C to +75°C	± 1	11 bits		
HI1-774AKD-5	0°C to +75°C		$\pm 1/2$	12 bits	± 5		
HI1-774ALD-5	0°C to +75°C		$\pm 1/2$	12 bits	± 2		
HI1-774ASD-2	-55°C to +125°C		± 1	11 bits	± 20		
HI1-774ATD-2	-55°C to +125°C		$\pm 1/2$	12 bits	± 10		
HI1-774AUD-2	-55°C to +125°C		$\pm 1/2$	12 bits	± 5		

*Maximum resolution with no missing codes guaranteed.

A/D CONVERTERS: MICROPROCESSOR COMPATIBLE

12-Bit A/D Converter with μ P Interface HI-774A	Pinout
Features	
<ul style="list-style-type: none"> • Complete with reference and clock • 8 μs conversion time • 150 ns bus access time • Superior alternate source to the AD574A, HS574 and HI574A • No missing codes over temperature • Full 8 or 16-bit μP interface • Error correction 	

D/A CONVERTERS: MONOLITHIC/HIGH PERFORMANCE

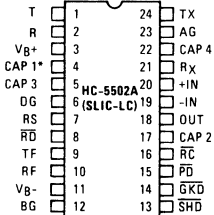
Part No.	Features	Resolution Bits	Temp. Range	Package	Output		Non-linearity Max, 25°C (LSB)	Settling Time to ½ LSB Typ, 25°C
					Current	Voltage		
HI1-5618A-2 HI1-5618A-5 HI3-5618A-5 HI1-5618A-8 HI1-5618B-2 HI1-5618B-5 HI3-5618B-5 HI1-5618B-8	Very fast settling time Low power CMOS, TTL or DTL compatible Guaranteed monotonic over temperature On-chip resistors for gain and bipolar offset	8	-55°C to +125°C 0°C to +75°C 0°C to +75°C -55°C to +125°C -55°C to +125°C 0°C to +75°C 0°C to +75°C -55°C to +125°C	18-pin cerdip 18-pin cerdip 18-pin epoxy dip 18-pin cerdip 18-pin cerdip 18-pin cerdip 18-pin epoxy dip 18-pin cerdip	✓		± ¼ ± ¼ ± ¼ ± ¾ ± ½ ± ½ ± ½ ± ½	65 ns
HI1-565AJD HI1-565AKD HI1-565ASD HI1-565ATD	+10 V internal reference New industry standard Low power Pin compatible with AD565A Operates with ±12 V supplies	12	0°C to +75°C 0°C to +75°C -55°C to +125°C -55°C to +125°C	24-pin cerdip	✓		± ¾ ± ½ ± ¾ ± ½	150 ns
HI1-5660-2 HI1-5660-5 HI1-5660-8 HI1-5660A-2 HI1-5660A-5 HI1-5660A-8	Low cost Similar to AD 566A Excellent power supply rejection Internal cancellation of ground currents	12	-55°C to +125°C 0°C to +75°C -55°C to +125°C -55°C to +125°C 0°C to +75°C -55°C to +125°C	24-pin cerdip	✓		± ½ ± ½ ± ½ ± ¼ ± ¼ ± ¼	250 ns
HI1-0562A-2 HI1-0562A-4 HI1-0562A-5 HI1-0562A/883 HI4-0562A/883	Low gain drift Similar to AD 562 Monotonic over temperature	12	-55°C to +125°C -25°C to +85°C 0°C to +75°C -55°C to +125°C -55°C to +125°C	24-pin cerdip 28-pin LCC ceramic	✓		± ¼	300 ns
HI1-5680I-5 HI1-5680V-5 HI1-5685I-4 HI1-5685V-4 HI1-5684AI-4 HI1-5685AV-4 HI1-5687I-2 HI1-5687V-2 HI1-5687I/883 HI1-5687V-2 HI1-5687V/883	New industry standard direct replacement for the DAC80/85/87 Complete DAC with reference on-board ±12 V power supply operation Available in either current or voltage output	12	0°C to +75°C 0°C to +75°C -25°C to +85°C -25°C to +85°C -25°C to +85°C -25°C to +85°C -55°C to +125°C -55°C to +125°C -55°C to +125°C -55°C to +125°C	24-pin cerdip	✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓	✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓	± ½	300 ns 1.5 μs 300 ns 1.5 μs 300 ns 1.5 μs 300 ns 300 ns 1.5 μs 1.5 μs
HI1-5690V-5 HI1-5695V-4 HI1-5697V-2 HI1-5697V/883	Improved replacement for the DAC 80/85/87 Two or three supply operation On-board low-noise reference	12	0°C to +75°C -25°C to +85°C -55°C to +125°C -55°C to +125°C	24-pin cerdip		✓ ✓ ✓ ✓	± ½	0.75 μs
HI3-5811J HI3-5811K HI1-5811A HI1-5811B HI1-5811R HI1-5811S	Monolithic, double buffered latches, on-chip reference Buffered latches, On-chip reference	2	0°C to +75°C 0°C to +75°C -25°C to +85°C -25°C to +85°C -55°C to +125°C -55°C to +125°C	28-pin epoxy dip 28-pin epoxy dip 28-pin cerdip 28-pin cerdip 28-pin cerdip 28-pin cerdip		✓ ✓ ✓ ✓ ✓ ✓	± ½ ± ¼ ± ½ ± ¼ ± ½ ± ¼	3
HI1-DAC16B-5 HI1-DAC16C-5	Low unipolar offset and offset T.C. Low drift Excellent stability TTL/5 V-CMOS compatible	16	0°C to +75°C	40-pin cerdip	✓		± 2 ± 4	1.0 μs†

*Leadless chip carriers available.

†To ± 2 LSB

TELECOMMUNICATIONS PRODUCTS

Subscriber Line Interface Circuit (SLIC) HC-5502A, HC-5504

Features	Applications	Pinout
<ul style="list-style-type: none"> • Monolithic integrated device • Bipolar Dielectric Isolation (DI) high-voltage process • Ring generator referenced to ground (5502A) • Ring generator referenced to negative battery supply (5504) • Low standby power • Typical short loop current: 30mA (5502A) 40mA (5504) • Controlled supply of battery feed current for short loops • Overvoltage protection ± 500 V in ceramic ± 1000 V in plastic • Internal ring relay driver. 5502A: Tip injected ringing. 5504: Tip/Ring/Balanced • Switch hook, ground key and ring trip detection functions 	<ul style="list-style-type: none"> • Solid-state line interface circuit for analog or digital PBX systems, replacing transformer and hybrid systems • Combine most BORSHT functions on single chip • BORSHT: Battery feed, over-voltage protection, Ring relay driver, Supervision (off-hook, ring trip and ground key detection), Hybrid (2-4 wire/4-2 wire conversions, and Test Access. • Selected denial of power to short loops • Application Note #549 • Available in PLCC packaging 	 <p style="text-align: right;">*Optional</p>

TELECOMMUNICATIONS PRODUCTS

Continuously Variable Slope Delta Modulator (CVSD) HC-55536, HC-55564

Features	Applications	Pinout
<ul style="list-style-type: none"> • Real time A to D • All digital • Requires few external parts • CMOS low power drain: 1.5 mW from single 3.0 V to 7 V supply • Time constants determined by clock frequency • No calibration or drift problems • Automatic offset adjustment • Half-duplex operation by digital control • Automatic overload recovery • Automatic "Quiet" pattern generation • AGC control signal available (HC-55564) • Commercial and military packaging 	<ul style="list-style-type: none"> • Use with HC-5512C CVSD filter • Voice I/O for digital systems and speech synthesis • Voice encryption/scrambling/ security • Audio manipulations: delay lines, time compression, echo generation/echo suppression, and special effects • Voice mail • Voice store and forward • Pagers • Programmable signal generators • Voice/data multiplexers • Satellites • Application Note #607 • Demo boards available 	<p style="text-align: center;">HC-55536</p> <p style="text-align: center;">HC-55564</p>

TELECOMMUNICATIONS PRODUCTS

Universal Active Filter HF-10		
Features	Applications	Pinout
<ul style="list-style-type: none"> • Programmable passband gain, center frequency and Q. Low noise. • Low-power 3 micron analog CMOS • Clock to center frequency ratio accuracy $\pm 2\%$ • Filter cutoff frequency stability directly dependent on external clock quality • Separate highpass (or notch or allpass), bandpass, lowpass outputs. Any three operate simultaneously. • f_{0x} Q range up to 50 kHz minimum • Operates to 10 kHz • -55°C to $+125^{\circ}\text{C}$ temperature range operation to industry standard specification. 	<ul style="list-style-type: none"> • Telecom • Transmission • Modems and multiplexers • Speech processing • General purpose filtering 	

PCM/PAM/CVSD Voiceband Filters HC-5512, HC-5512A, HC-5512C, HC-5512D		
Features	Applications	Pinout
<ul style="list-style-type: none"> • Industry standard pinout • CMOS low power consumption: 45 mW (600Ω/0 dBm Load) 30 mW (power amps disabled) • Power down mode: 0.5 mW • ± 5 V power supplies • Gain adjust range: 20 dB • No external anti-aliasing components • SIN x/x correction in receive filter • 50/60 Hz rejection in transmit filter • TTL/CMOS compatible • All input-protected against static discharge due to handling • Exceeds all D3/D4 and CCITT specifications* *Except C and D version 	<ul style="list-style-type: none"> • Transmit and receive filtering for PCM CODECs and PAM applications • Voice filtering in speech synthesis and digital radio • Filtering in modems and multiplexers • HC-5512C can act as a CVSD I/O filter • HC-5512D is military specification qualified and available in LCC packaging 	

ANALOG SWITCHES

Part Number	Switch Type	Temperature Range °C	Package	R _{on} Max, Full Temp	Off Output Leakage Max, Full Temp	Switch ON Time Max, 25°C	Power Dissipation Typ, 25°C		
HI1-0301-2 HI1-0301-5 HI1-0301-8 HI2-0301-2 HI2-0301-5 HI2-0301-8 HI3-0301-5	<p>SPDT</p>	-55°C to +125°C 0°C to +75°C	14-pin cerdip 14-pin cerdip	75 Ω 75 Ω	100 nA 100 nA	300 ns 300 ns	1.5 mW 1.5 mW		
HI1-0305-2 HI1-0305-5 HI1-0305-8 HI2-0305-2 HI2-0305-5 HI2-0305-8 HI3-0305-5		-55°C to +125°C 0°C to +75°C -55°C to +125°C -55°C to +125°C 0°C to +75°C -55°C to +125°C 0°C to +75°C	14-pin cerdip 14-pin cerdip 14-pin cerdip TO-100 can TO-100 can TO-100 can 14-pin epoxy dip	75 Ω 75 Ω 75 Ω 75 Ω 75 Ω 75 Ω 75 Ω	100 nA 100 nA 100 nA 100 nA 100 nA 100 nA 100 nA	250 ns 250 ns 250 ns 250 ns 250 ns 250 ns 250 ns	1.5 mW 1.5 mW 1.5 mW 1.5 mW 1.5 mW 1.5 mW 1.5 mW		
HI1-0387-2 HI1-0387-5 HI1-0387-8 HI2-0387-2 HI2-0387-5 HI2-0387-8 HI3-0387-5		-55°C to +125°C 0°C to +75°C -55°C to +125°C -55°C to +125°C 0°C to +75°C -55°C to +125°C 0°C to +75°C	14-pin cerdip 14-pin cerdip 14-pin cerdip TO-100 can TO-100 can TO-100 can 14-pin epoxy dip	75 Ω 75 Ω 75 Ω 75 Ω 75 Ω 75 Ω 75 Ω	100 nA 100 nA 100 nA 100 nA 100 nA 100 nA 100 nA	300 ns 300 ns 300 ns 300 ns 300 ns 300 ns 300 ns	1.5 mW 1.5 mW 1.5 mW 1.5 mW 1.5 mW 1.5 mW 1.5 mW		
HI1-5042-2 HI1-5042-5 HI1-5042-8 HI3-5042-5		-55°C to +125°C 0°C to +75°C -55°C to +125°C 0°C to +75°C	16-pin cerdip 16-pin cerdip 16-pin cerdip 16-pin epoxy dip	75 Ω 75 Ω 75 Ω 75 Ω	500 nA 500 nA 500 nA 500 nA	370 ns* 370 ns* 370 ns* 370 ns*	1.5 mW 1.5 mW 1.5 mW 1.5 mW		
HI1-5050-2 HI1-5050-5 HI1-5050-8 HI3-5050-5		-55°C to +125°C 0°C to +75°C -55°C to +125°C 0°C to +75°C	16-pin cerdip 16-pin cerdip 16-pin cerdip 16-pin epoxy dip	75 Ω 75 Ω 75 Ω 75 Ω	500 nA 500 nA 500 nA 500 nA	370 ns* 370 ns* 370 ns* 370 ns*	1.5 mW 1.5 mW 1.5 mW 1.5 mW		
HI1-0303-2 HI1-0303-5 HI1-0303-8 HI3-0303-5		<p>DUAL SPDT</p>	-55°C to +125°C 0°C to +75°C -55°C to +125°C 0°C to +75°C	14-pin cerdip 14-pin cerdip 14-pin cerdip 14-pin epoxy dip	75 Ω 75 Ω 75 Ω 75 Ω	100 nA 100 nA 100 nA 100 nA	300 ns 300 ns 300 ns 300 ns	1.5 mW 1.5 mW 1.5 mW 1.5 mW	
HI1-0307-2 HI1-0307-5 HI1-0307-8 HI3-0307-5			-55°C to +125°C 0°C to +75°C -55°C to +125°C 0°C to +75°C	14-pin cerdip 14-pin cerdip 14-pin cerdip 14-pin epoxy dip	75 Ω 75 Ω 75 Ω 75 Ω	100 nA 100 nA 100 nA 100 nA	250 ns 250 ns 250 ns 250 ns	1.5 mW 1.5 mW 1.5 mW 1.5 mW	
HI1-0390-2 HI1-0390-5 HI1-0390-8 HI3-0390-5			-55°C to +125°C 0°C to +75°C -55°C to +125°C 0°C to +75°C	14-pin cerdip 14-pin cerdip 14-pin cerdip 14-pin epoxy dip	75 Ω 75 Ω 75 Ω 75 Ω	100 nA 100 nA 100 nA 100 nA	300 ns 300 ns 300 ns 300 ns	1.5 mW 1.5 mW 1.5 mW 1.5 mW	
HI1-5043-2 HI1-5043-5 HI1-5043-8 HI3-5043-5 HI4-5043-8			-55°C to +125°C 0°C to +75°C -55°C to +125°C 0°C to +75°C -55°C to +125°C	16-pin cerdip 16-pin cerdip 16-pin cerdip 16-pin epoxy dip 0.35" Sq LCC pack	75 Ω 75 Ω 75 Ω 75 Ω 75 Ω	500 nA 500 nA 500 nA 500 nA 500 nA	370 ns* 370 ns* 370 ns* 370 ns* 370 ns*	1.5 mW 1.5 mW 1.5 mW 1.5 mW 1.5 mW	
HI1-5051-2 HI1-5051-5 HI1-5051-8 HI3-5051-5			-55°C to +125°C 0°C to +75°C -55°C to +125°C 0°C to +75°C	16-pin cerdip 16-pin cerdip 16-pin cerdip 16-pin epoxy dip	50 Ω 50 Ω 50 Ω 50 Ω	500 nA 500 nA 500 nA 500 nA	370 ns* 370 ns* 370 ns* 370 ns*	1.5 mW 1.5 mW 1.5 mW 1.5 mW	
HI1-5044-2 HI1-5044-5 HI1-5044-8 HI3-5044-5			<p>DPST</p>	-55°C to +125°C 0°C to +75°C -55°C to +125°C 0°C to +75°C	16-pin cerdip 16-pin cerdip 16-pin cerdip 16-pin epoxy dip	75 Ω 75 Ω 75 Ω 75 Ω	500 nA 500 nA 500 nA 500 nA	370 ns* 370 ns* 370 ns* 370 ns*	1.5 mW 1.5 mW 1.5 mW 1.5 mW

*TYPICAL VALUE

ANALOG SWITCHES

Part Number	Switch Type	Temperature Range °C	Package	R _{on} Max, Full Temp	Off Output Leakage Max, Full Temp	Switch ON Time Max, 25°C	Power Dissipation Typ, 25°C
HI1-0381-2 HI1-0381-5 HI1-0381-8 HI2-0381-2 HI2-0381-5 HI2-0381-8 HI3-0381-5	<p>DUAL SPST</p>	-55°C to +125°C 0°C to +75°C -55°C to +125°C -55°C to +125°C 0°C to +75°C -55°C to +125°C 0°C to +75°C	14-pin cerdip 14-pin cerdip 14-pin cerdip TO-100 can TO-100 can TO-100 can 14-pin epoxy dip	75 Ω 75 Ω 75 Ω 75 Ω 75 Ω 75 Ω 75 Ω	100 nA 100 nA 100 nA 100 nA 100 nA 100 nA 100 nA	300 ns 300 ns 300 ns 300 ns 300 ns 300 ns 300 ns	1.5 mW 1.5 mW 1.5 mW 1.5 mW 1.5 mW 1.5 mW 1.5 mW
HI1-0200-2 HI1-0200-4 HI1-0200-5 HI1-0200-7 HI1-0200-8 e ² 0200-2 HI2-0200-4 HI2-0200-5 HI2-0200-7 HI2-0200-8 HI3-0200-5	<p>DUAL DPST</p>	-55°C to +125°C -25°C to +85°C 0°C to +75°C 0°C to +75°C -55°C to +125°C -55°C to +125°C -25°C to +85°C 0°C to +75°C 0°C to +75°C -55°C to +125°C 0°C to +75°C	14-pin cerdip 14-pin cerdip 14-pin cerdip 14-pin cerdip 14-pin cerdip TO-100 can TO-100 can TO-100 can TO-100 can TO-100 can TO-100 can 14-pin epoxy dip	100 Ω 100 Ω 100 Ω 100 Ω 100 Ω 100 Ω 100 Ω 100 Ω 100 Ω 100 Ω 100 Ω	500 nA 500 nA 500 nA 500 nA 500 nA 500 nA 500 nA 500 nA 500 nA 500 nA 500 nA 500 nA	240 ns* 240 ns* 240 ns* 240 ns* 240 ns* 240 ns* 240 ns* 240 ns* 240 ns* 240 ns* 240 ns* 240 ns*	15 mW 15 mW 15 mW 15 mW 15 mW 15 mW 15 mW 15 mW 15 mW 15 mW 15 mW 15 mW
HI1-0302-2 HI1-0302-5 HI1-0302-8 HI3-0302-5	<p>DUAL DPST</p>	-55°C to +125°C 0°C to +75°C -55°C to +125°C 0°C to +75°C	14-pin cerdip 14-pin cerdip 14-pin cerdip 14-pin epoxy dip	75 Ω 75 Ω 75 Ω 75 Ω	100 nA 100 nA 100 nA 100 nA	300 ns 300 ns 300 ns 300 ns	1.5 mW 1.5 mW 1.5 mW 1.5 mW
HI1-0306-2 HI1-0306-5 HI1-0306-8 HI3-0306-5	<p>DUAL DPST</p>	-55°C to +125°C 0°C to +75°C -55°C to +125°C 0°C to +75°C	14-pin cerdip 14-pin cerdip 14-pin cerdip 14-pin epoxy dip	75 Ω 75 Ω 75 Ω 75 Ω	100 nA 100 nA 100 nA 100 nA	250 ns 250 ns 250 ns 250 ns	1.5 mW 1.5 mW 1.5 mW 1.5 mW
HI1-0384-2 HI1-0384-5 HI1-0384-8 HI3-0384-5	<p>DUAL DPST</p>	-55°C to +125°C 0°C to +75°C -55°C to +125°C 0°C to +75°C	14-pin cerdip 14-pin cerdip 14-pin cerdip 14-pin epoxy dip	75 Ω 75 Ω 75 Ω 75 Ω	100 nA 100 nA 100 nA 100 nA	300 ns 300 ns 300 ns 300 ns	1.5 mW 1.5 mW 1.5 mW 1.5 mW
HI1-5045-2 HI1-5045-5 HI1-5045-8 HI3-5045-5 HI4-5045-8	<p>DUAL DPST</p>	-55°C to +125°C 0°C to +75°C -55°C to +125°C 0°C to +75°C -55°C to +125°C	16-pin cerdip 16-pin cerdip 16-pin cerdip 16-pin epoxy dip 0.35" Sq LCC pack	75 Ω 75 Ω 75 Ω 75 Ω 75 Ω	500 nA 500 nA 500 nA 500 nA 500 nA	370 ns* 370 ns* 370 ns* 370 ns* 370 ns*	1.5 mW 1.5 mW 1.5 mW 1.5 mW 1.5 mW
HI1-5049-2 HI1-5049-5 HI1-5049-8 HI3-5049-5	<p>DUAL DPST</p>	-55°C to +125°C 0°C to +75°C -55°C to +125°C 0°C to +75°C	16-pin cerdip 16-pin cerdip 16-pin cerdip 16-pin epoxy dip	50 Ω 50 Ω 50 Ω 50 Ω	500 nA 500 nA 500 nA 500 nA	370 ns* 370 ns* 370 ns* 370 ns*	1.5 mW 1.5 mW 1.5 mW 1.5 mW
HI1-5046-2 HI1-5046-5 HI1-5046-8 HI3-5046-5	<p>DPDT</p>	-55°C to +125°C 0°C to +75°C -55°C to +125°C 0°C to +75°C	16-pin cerdip 16-pin cerdip 16-pin cerdip 16-pin epoxy dip	75 Ω 75 Ω 75 Ω 75 Ω	500 nA 500 nA 500 nA 500 nA	370 ns* 370 ns* 370 ns* 370 ns*	1.5 mW 1.5 mW 1.5 mW 1.5 mW
HI1-5046A-2 HI1-5046A-5 HI1-5046A-8 HI3-5046A-5	<p>DPDT</p>	-55°C to +125°C 0°C to +75°C -55°C to +125°C 0°C to +75°C	16-pin cerdip 16-pin cerdip 16-pin cerdip 16-pin epoxy dip	50 Ω 50 Ω 50 Ω 50 Ω	500 nA 500 nA 500 nA 500 nA	370 ns* 370 ns* 370 ns* 370 ns*	1.5 mW 1.5 mW 1.5 mW 1.5 mW
HI1-5047-2 HI1-5047-5 HI1-5047-8 HI3-5047-5	<p>4 PST</p>	-55°C to +125°C 0°C to +75°C -55°C to +125°C 0°C to +75°C	16-pin cerdip 16-pin cerdip 16-pin cerdip 16-pin epoxy dip	75 Ω 75 Ω 75 Ω 75 Ω	500 nA 500 nA 500 nA 500 nA	370 ns* 370 ns* 370 ns* 370 ns*	1.5 mW 1.5 mW 1.5 mW 1.5 mW
HI1-5047A-2 HI1-5047A-5 HI1-5047A-8 HI3-5047A-5	<p>4 PST</p>	-55°C to +125°C 0°C to +75°C -55°C to +125°C 0°C to +75°C	16-pin cerdip 16-pin cerdip 16-pin cerdip 16-pin epoxy dip	50 Ω 50 Ω 50 Ω 50 Ω	500 nA 500 nA 500 nA 500 nA	370 ns* 370 ns* 370 ns* 370 ns*	1.5 mW 1.5 mW 1.5 mW 1.5 mW

*TYPICAL VALUE

ANALOG SWITCHES

Part Number	Switch Type	Temperature Range °C	Package	R _{on} Max, Full Temp	Off Output Leakage Max, Full Temp	Switch ON Time Max, 25°C	Power Dissipation Typ, 25°C
HI1-0201-2 HI1-0201-4 HI1-0201-5 HI1-0201-7 HI1-0201-8 HI3-0201-5 HI4-0201-8	<p>QUAD SPST</p>	-55°C to +125°C	16-pin cerdip	100 Ω	500 nA	185 ns*	15 mW
HI1-0201HS-2 HI1-0201HS-4 HI1-0201HS-5 HI1-0201HS-8 HI3-0201HS-4 HI4-0201HS-5		-25°C to +85°C	16-pin cerdip	100 Ω	250 nA	185 ns*	15 mW
		0°C to +75°C	16-pin cerdip	100 Ω	250 nA	185 ns*	15 mW
		0°C to +75°C	16-pin cerdip	100 Ω	250 nA	185 ns*	15 mW
		-55°C to +125°C	16-pin cerdip	100 Ω	500 nA	185 ns*	15 mW
		0°C to +75°C	16-pin epoxy dip	100 Ω	250 nA	185 ns*	15 mW
		-55°C to +125°C	0.35" Sq LCC pack	100 Ω	500 nA	185 ns*	15 mW
		-55°C to +125°C	16-pin cerdip	75 Ω	100 nA	50 ns	120 mW
		-25°C to +85°C	16-pin cerdip	75 Ω	50 nA	50 ns	120 mW
		0°C to +75°C	16-pin cerdip	75 Ω	50 nA	50 ns	120 mW
		-55°C to +125°C	16-pin cerdip	75 Ω	100 nA	50 ns	120 mW
		-25°C to +85°C	16-pin epoxy dip	75 Ω	50 nA	50 ns	120 mW
		0°C to +75°C	16-pin epoxy dip	75 Ω	50 nA	50 ns	120 mW
HI1-5040-2 HI1-5040-5 HI1-5040-8 HI3-5040-5	<p>SPST</p>	-55°C to +125°C	16-pin cerdip	75 Ω	500 nA	370 ns*	1.5 mW
		0°C to +75°C	16-pin cerdip	75 Ω	500 nA	370 ns*	1.5 mW
		-55°C to +125°C	16-pin cerdip	75 Ω	500 nA	370 ns*	1.5 mW
		0°C to +75°C	16-pin epoxy dip	75 Ω	500 nA	370 ns*	1.5 mW
HI1-0300-2 HI1-0300-5 HI1-0300-8 HI2-0300-2 HI2-0300-5 HI2-0300-8 HI3-0300-5	<p>DUAL SPST</p>	-55°C to +125°C	14-pin cerdip	75 Ω	100 nA	300 ns	1.5 mW
		0°C to +75°C	14-pin cerdip	75 Ω	100 nA	300 ns	1.5 mW
		-55°C to +125°C	14-pin cerdip	75 Ω	100 nA	300 ns	1.5 mW
		-55°C to +125°C	TO-100 can	75 Ω	100 nA	300 ns	1.5 mW
		0°C to +75°C	TO-100 can	75 Ω	100 nA	300 ns	1.5 mW
		-55°C to +125°C	TO-100 can	75 Ω	100 nA	300 ns	1.5 mW
		0°C to +75°C	14-pin epoxy dip	75 Ω	100 nA	300 ns	1.5 mW
HI1-0304-2 HI1-0304-5 HI1-0304-8 HI2-0304-2 HI2-0304-5 HI2-0304-8 HI3-0304-5		-55°C to +125°C	14-pin cerdip	75 Ω	100 nA	250 ns	1.5 mW
	0°C to +75°C	14-pin cerdip	75 Ω	100 nA	250 ns	1.5 mW	
	-55°C to +125°C	14-pin cerdip	75 Ω	100 nA	250 ns	1.5 mW	
	-55°C to +125°C	TO-100 can	75 Ω	100 nA	250 ns	1.5 mW	
	0°C to +75°C	TO-100 can	75 Ω	100 nA	250 ns	1.5 mW	
	-55°C to +125°C	TO-100 can	75 Ω	100 nA	250 ns	1.5 mW	
	0°C to +75°C	14-pin epoxy dip	75 Ω	100 nA	250 ns	1.5 mW	
HI1-5041-2 HI1-5041-5 HI1-5041-8 HI3-5041-5		-55°C to +125°C	16-pin cerdip	75 Ω	500 nA	370 ns*	1.5 mW
	0°C to +75°C	16-pin cerdip	75 Ω	500 nA	370 ns*	1.5 mW	
	-55°C to +125°C	16-pin cerdip	75 Ω	500 nA	370 ns*	1.5 mW	
	0°C to +75°C	16-pin epoxy dip	75 Ω	500 nA	370 ns*	1.5 mW	
HI1-5048-2 HI1-5048-5 HI1-5048-8 HI3-5048-5		-55°C to +125°C	16-pin cerdip	50 Ω	500 nA	370 ns*	1.5 mW
	0°C to +75°C	16-pin cerdip	50 Ω	500 nA	370 ns*	1.5 mW	
	-55°C to +125°C	16-pin cerdip	50 Ω	500 nA	370 ns*	1.5 mW	
	0°C to +75°C	16-pin epoxy dip	50 Ω	500 nA	370 ns*	1.5 mW	

*TYPICAL VALUE

RAD-HARD CMOS STATIC RAMs 1K, 4K

1024 x 1 — 1K HS-6508RH		
Features	Radiation Effects	Pinout
<ul style="list-style-type: none"> • Specifically designed for radiation hardness • Low standby power (max): — 550 μW • Low operating power (max): — 25 mW/MHz • TTL compatible output • High noise immunity • On-chip address register • Three-state output • Full military temperature range 	<ul style="list-style-type: none"> • Each lot screened for total dose hardness • Total dose guaranteed to 2×10^4 rads (Si) • Post rad leakage (typical): — 5 mA • Post rad access time (typical): 160 ns (max): 300 ns • Latch-up free • Upset: $> 10^8$ rads (Si)/sec • Increased immunity to cosmic radiation 	

256 x 4 — 1K HS-6551RH		
Features	Radiation Effects	Pinout
<ul style="list-style-type: none"> • Specifically designed for radiation hardness • Low standby power (max): — 550 μW • Low operating power (max): — 25 mW/MHz • TTL compatible output • High noise immunity • On-chip address register • Three-state output • Full military temperature range 	<ul style="list-style-type: none"> • Each lot screened for total dose hardness • Total dose guaranteed to 2×10^4 rads (Si) • Post rad leakage (typical): — 5 mA • Post rad access time (typical): 160 ns (max): 300 ns • Latch-up free • Upset: $> 10^8$ rads (Si)/sec • Increased immunity to cosmic radiation 	

4096 x 1 — 4K HS-6504RH		
Features	Radiation Effects	Pinout
<ul style="list-style-type: none"> • Specifically designed for radiation hardness • Low standby power (max): — 1050 μW • Low operating power (max): — 36 mW/MHz • TTL compatible output • Three-state output • On-chip address register • Standard JEDEC pinout • Full military temperature range 	<ul style="list-style-type: none"> • Each lot screened for total dose hardness • Total dose guaranteed to 1×10^5 rads (Si) • Post rad leakage (max): — 200 μA • Post rad access time (typical): 150 ns (max): 200 ns • Latch-up free • Upset: $> 10^8$ rads (Si)/sec • SEU immune option available 	

RAD-HARD CMOS STATIC RAMs/RAM MODULES 4K & 64K

1024 x 4 — 4K HS-6514RH		
Features	Radiation Effects	Pinout
<ul style="list-style-type: none"> Specifically designed for radiation hardness Low standby power (max): — 1050 μW Low operating power (max): — 36 mW/MHz TTL compatible output Three-state output Common data in/out Standard JEDEC pinout Full military temperature range 	<ul style="list-style-type: none"> Each lot screened for total dose hardness Total dose guaranteed to 1×10^5 rads (Si) Post rad leakage (typical): — 6 μA Post rad access time (typical): 150 ns (max): 225 ns Latch-up free Upset: $> 10^8$ rads (Si)/sec SEU immune option available 	

(1024 x 4) Fast 4K HS-65142RH		
Features	Radiation Effects	Pinout
<p>COMING SOON</p> <ul style="list-style-type: none"> Specifically designed for radiation environment Asynchronous operation Fast access time: 75 ns max. Fast write cycle: 60 ns max. Low standby current: 200 μA max. Low operating current: 10 mA/MHz max. Data retention current @ 3V: 50 μA max. Full military temperature range 	<ul style="list-style-type: none"> Parametrics guaranteed to 500K rads (Si) Functional > 1000K rads (Si) Transient upset: Short pulse $> 5 \times 10^9$ rads (Si)/sec Long pulse $> 1 \times 10^9$ rads (Si)/sec Latch-up free $> 1 \times 10^{12}$ rads (Si)/sec Neutron fluence $> 10^{14}$ n/cm² 	

HS-65C162RH HS-65T162RH		
Features	Radiation Effects	Pinout
<p>COMING SOON</p> <ul style="list-style-type: none"> Specifically designed for radiation hardness Asynchronous operation CMOS or TTL compatible input/output Low standby power CMOS: 550 μW Low operating power max: 33 mW/MHz Three-state outputs Full military temperature range 	<ul style="list-style-type: none"> Each lot screened for radiation hardness Total dose guaranteed to 2×10^5 rads (Si) Access time (max., CMOS): 150 ns Access time (typ., CMOS): 80 ns Access time (typ., TTL): 100 ns Data upset $\geq 5 \times 10^8$ rads (Si)/s Latch-up free $> 1 \times 10^{12}$ rads (Si)/s SEU immune option available 	

RAD-HARD MEMORIES

(16384 x 1) 16K
HS-65C262RH, HS-65T262RH

Features	Radiation Effects	Pinout
<ul style="list-style-type: none"> Specifically designed for radiation hardness Asynchronous TTL/CMOS compatible input/output Low standby power (CMOS): 1 mW max. Low operating power: 38.5 mW/MHz max. Three-state output Standard JEDEC pinout Full military temperature range 	<ul style="list-style-type: none"> Each lot screened for radiation hardness Total dose guaranteed to 2×10^5 rads (Si) Access time 150 ns max, Access time (CMOS inputs) 80 ns typ. Access time (TTL inputs) 100 ns typ. Data upset $\geq 5 \times 10^8$ rads (Si)/sec Latch-up free $> 1 \times 10^{12}$ rads (Si)/sec SEU immunity option available 	

LCC RAM Module — 16384 x 4 or 8192 x 8 — 64K
HS-6564RH

Features	Radiation Effects	Pinout
<ul style="list-style-type: none"> Specifically designed for radiation tolerance Low standby power (typical): — 800 μW Low operating power (typical): — 90 mW/MHz TTL compatible input/output Three-state output On-chip address register Full military temperature range 	<ul style="list-style-type: none"> Each lot screened for total dose hardness Total dose guaranteed to 1×10^5 rads (Si) Post rad leakage (typical): — 96 μA Post rad access time (max): 250 ns Latch-up free Upset: $> 10^8$ rads (Si)/sec 	

HS-7649RH

Features	Pinout
<ul style="list-style-type: none"> Radiation-hardened to strategic levels Fast address access time: 90 ns max. Three-state outputs and single chip enable input TTL compatible Short circuit protected Pin-compatible with Harris HM-7649 and 74S473 Low input loading 	

HS-76161RH

Features	Pinout
<ul style="list-style-type: none"> Radiation-hardened to strategic levels Fast address access time: 80 ns max. Three-state outputs and three chip enable inputs TTL compatible Short circuit protected Low input loading Pin-compatible with HM-76161 	

RAD-HARD CMOS MICROPROCESSOR PRODUCTS

8-Bit Microprocessor HS-80C85RH		Pinout
Features	Radiation Effects	<p> X₁ 1 40 V_{CC} X₂ 2 39 HOLD RESET OUT 3 38 HLDA SOD 4 37 CLK(I/OUT) SID 5 36 RESETIN TRAP 6 35 READY RST 7.5 7 34 IGM RST 6.5 8 33 S₁ RST 5.5 9 32 RD INTR 10 31 WR INTR 11 30 ALE AD₇ 12 29 S₀ AD₆ 13 28 A₁₅ AD₅ 14 27 A₁₄ AD₄ 15 26 A₁₃ AD₃ 16 25 A₁₂ AD₂ 17 24 A₁₁ AD₁ 18 23 A₁₀ AD₀ 19 22 A₉ V_{SS} 20 21 A₈ </p>
<ul style="list-style-type: none"> Specifically designed for radiation hardness Low standby power: 1.25 mW max. Low operating power: 26 mW/MHz typical Multiplexed address/data bus 5 Volt operation Software and pin compatibility with Intel 8085 Equivalent to Sandia SA3000 Full military temperature range 	<ul style="list-style-type: none"> Each lot screened for total dose hardness Parametrics guaranteed to 1×10^5 rads (Si) Latch-up free $> 10^{12}$ rads (Si)/sec Upset: $> 10^8$ rads (Si)/sec 	

16-Bit Microprocessor HS-80C86RH		Pinout
Features	Radiation Effects	<p> GND 1 40 V_{CC} AD14 2 39 AD15 AD13 3 38 A16/S3 AD12 4 37 A17/S4 AD11 5 36 A18/S5 AD10 6 35 A19/S6 AD9 7 34 BHE/S7 AD8 8 33 MN/MX AD7 9 32 RD AD6 10 31 RD/GT0 (HOLD) AD5 11 30 RD/GT1 (HLDA) AD4 12 29 LOCK (WR) AD3 13 28 S2 (M/R) AD2 14 27 S1 (DT/R) AD1 15 26 S0 (DEN) A00 16 25 OS0 (ALE) NMI 17 24 OS1 (INTR) INTR 18 23 TEST CLK 19 22 READY GND 20 21 RESET </p>
<ul style="list-style-type: none"> Specifically designed for radiation hardness Pin compatible with Harris 80C86 Completely static design <ul style="list-style-type: none"> DC to 5 MHz Low-power operation <ul style="list-style-type: none"> ICCSB = 500 μA maximum ICCOP = 10 mA/MHz typical 1 Mbyte of direct memory addressing capability 24 operand addressing modes Bit, byte, word, and block move operations 8 and 16-bit signed/unsigned arithmetic <ul style="list-style-type: none"> Binary or decimal Multiply and divide Single 5V power supply Military temperature range 	<ul style="list-style-type: none"> Each lot screened for total dose hardness Parametrics guaranteed to 1×10^5 rads (Si) Latch-up free $> 10^{12}$ rads (Si)/sec Upset: $> 10^8$ rads (Si)/sec Functional after 1×10^6 rads (Si) total dose 	

RAD-HARD CMOS MICROPROCESSOR PRODUCTS

8-Bit Bidirectional CMOS/TTL Level Converter HS-3374RH		
Features	Radiation Effects	Pinout
<ul style="list-style-type: none"> Specifically designed for radiation hardness Static operation for low power consumption Non-inverting outputs Low propagation delay Full military temperature range Equivalent to Sandia SA2996 	<ul style="list-style-type: none"> Each lot screened for total dose hardness Parametrics guaranteed to 1×10^5 rads (Si) Latch-up free $> 10^{12}$ rads (Si)/sec Upset: $> 10^8$ rads (Si)/sec 	

3-Line to 8-Line Decoder/Demultiplexer HS-54C138RH		
Features	Radiation Effects	Pinout
<ul style="list-style-type: none"> Specifically designed for radiation hardness Static operation for low power consumption High noise immunity Active low outputs 5 Volt operation Full military temperature range Equivalent to Sandia SA2995 	<ul style="list-style-type: none"> Each lot screened for total dose hardness Parametrics guaranteed to 1×10^5 rads (Si) Latch-up free $> 10^{12}$ rads (Si)/sec Upset: $> 10^8$ rads (Si)/sec 	

2K (256x8) RAM with I/O and Timer HS-81C55RH, HS-81C56RH		Pinout
Features	Radiation Effects	
<ul style="list-style-type: none"> Specifically designed for radiation hardness Static operation for low power consumption Pin compatible with Intel 8155/56 Equivalent to Sandia SA3001 5 Volt operation 3 programmable I/O ports 14-Bit programmable timer Multiplexed address and data bus Full military temperature range 	<ul style="list-style-type: none"> Each lot screened for total dose hardness Parametrics guaranteed to 1×10^5 rads (Si) Latch-up free $> 10^{12}$ rads (Si)/sec Upset: $> 10^8$ rads (Si)/sec 	

RAD-HARD CMOS MICROPROCESSOR PRODUCTS

8-Bit Bus Transceiver HS-82C08RH		
Features	Radiation Effects	Pinout
<ul style="list-style-type: none"> Specifically designed for radiation hardness Static operation for low power consumption Bidirectional three-state input/outputs Low propagation delay 5 Volt operation Full military temperature range Equivalent to Sandia SA2997 	<ul style="list-style-type: none"> Each lot screened for total dose hardness Parametrics guaranteed to 1×10^5 rads (Si) Latch-up free $> 10^{12}$ rads (Si)/sec Upset: $> 10^8$ rads (Si)/sec Increased tolerance to cosmic radiation 	<p>Pinout diagram for HS-82C08RH showing 20 pins:</p> <ul style="list-style-type: none"> 1: A₀ 2: A₁ 3: A₂ 4: A₃ 5: A₄ 6: A₅ 7: A₆ 8: A₇ 9: \overline{DE} 10: GND 11: T R 12: B₇ 13: B₆ 14: B₅ 15: B₄ 16: B₃ 17: B₂ 18: B₁ 19: B₀ 20: V_{CC}

8-Bit Input/Output Port HS-82C12RH		
Features	Radiation Effects	Pinout
<ul style="list-style-type: none"> Specifically designed for radiation hardness Static operation for low power consumption Asynchronous register clear 8-bit data register and buffer Service request flip-flop Three-state outputs Full military temperature range Equivalent to Sandia SA3026 	<ul style="list-style-type: none"> Each lot screened for total dose hardness Parametrics guaranteed to 1×10^5 rads (Si) Latch-up free $> 10^{12}$ rads (Si)/sec Upset: $> 10^8$ rads (Si)/sec 	<p>Pinout diagram for HS-82C12RH showing 24 pins:</p> <ul style="list-style-type: none"> 1: \overline{DS} 2: MD 3: DI₁ 4: DO₁ 5: DI₂ 6: DO₂ 7: DI₃ 8: DO₃ 9: DI₄ 10: DO₄ 11: STB 12: GND 13: DS₂ 14: \overline{CLR} 15: DO₅ 16: DI₅ 17: DO₆ 18: DI₆ 19: DO₇ 20: DI₇ 21: DO₈ 22: DI₈ 23: \overline{INT} 24: V_{CC}

RAD-HARD CMOS MICROPROCESSOR PRODUCTS

Programmable DMA Controller HS-82C37ARH

Features	Radiation Effects	Pinout
<ul style="list-style-type: none"> • Specifically designed for radiation hardness • Pin compatible with Harris 82C37A • High-speed data transfers up to 2.5 MBPS with 5 MHz clock • Four independent maskable channels with autoinitialization capability • Expandable to any number of channels • Memory-to-memory transfer capability • Software-accessible internal registers • Single 5V power supply • Low power consumption <ul style="list-style-type: none"> ▶ IDDP = 2 mA/MHz maximum ▶ IDDSB = 20 μA maximum • Full military temperature range 	<ul style="list-style-type: none"> • Each lot screened for total dose hardness • Parametrics guaranteed to 1×10^5 rads (Si) • Latch-up free $> 10^{12}$ rads (Si)/sec • Upset: $> 10^8$ rads (Si)/sec • Functional after 1×10^6 rads (Si) total dose 	<p>Pinout diagram for HS-82C37ARH:</p> <ul style="list-style-type: none"> 1: IOR 2: IOW 3: MEMR 4: MEMW 5: NC 6: READY 7: HLDA 8: ADSTB 9: AEN 10: HRQ 11: CS 12: CLK 13: RESET 14: DACK2 15: DACK3 16: DREQ3 17: DREQ2 18: DREQ1 19: DREQ0 20: (GND) VSS 21: VCC 22: DB0 23: DB1 24: DB2 25: DB3 26: DB4 27: DACK0 28: DACK1 29: DB5 30: DB6 31: DB7 32: A0 33: A1 34: A2 35: A3 36: EOP 37: A4 38: A5 39: A6 40: A7

COMING
SOON

Serial Controller Interface HS-82C52RH

Features	Radiation Effects	Pinout
<ul style="list-style-type: none"> • Each lot screened for total dose hardness • Parametrics guaranteed to 1×10^5 rads (Si) • Latch-up free $> 10^{12}$ rads (Si)/sec • Upset: $> 10^8$ rads (Si)/sec • Functional after 1×10^6 rads (Si) total dose 	<ul style="list-style-type: none"> • Specifically designed for radiation hardness • Pin compatible with Harris 82C52 • Uses either parallel mode crystal circuit or external frequency source • DC to 16 MHz operation (DC to 1M Baud rate) • Microprocessor bus oriented interface • Modem interface • Line break generation and detection • Loopback and echo modes • Interrupt mode with mask capability • TTL/CMOS compatible inputs/outputs • Single 5V supply • Low power consumption: 1 mA/MHz typical • Full military temperature range 	<p>Pinout diagram for HS-82C52RH:</p> <ul style="list-style-type: none"> 1: RD 2: WR 3: D0 4: D1 5: D2 6: D3 7: D4 8: D5 9: D6 10: D7 11: A0 12: A1 13: IX 14: OX 15: SDO 16: GND 17: CTS 18: DSR 19: DTR 20: RTS 21: CO 22: TBRE 23: RST 24: INTR 25: SDI 26: DR 27: VCC 28: CS0

RAD-HARD CMOS MICROPROCESSOR PRODUCTS

Programmable Interval Timer HS-82C54RH		
Features	Radiation Effects	Pinout
<ul style="list-style-type: none"> • Specifically designed for radiation hardness • Pin compatible with Harris 82C54A • High speed, no "wait state" operation with 5MHz HS-80C86RH • Three independent 16 bit counters • Six programmable counter modes • Binary or BCD counting • Status read back command • Fully TTL compatible • Single 5V power supply • Low power consumption <ul style="list-style-type: none"> ▶ IDDSB = 20 μA ▶ IDDOP = 10 mA • Full military temperature range 	<ul style="list-style-type: none"> • Each lot screened for total dose hardness • Parametrics guaranteed to 1×10^5 rads (Si) • Latch-up free $> 10^{12}$ rads (Si)/sec • Upset: $> 10^8$ rads (Si)/sec • Functional after 1×10^6 rads (Si) total dose 	

Programmable Peripheral Interface HS-82C55ARH		
Features	Radiation Effects	Pinout
<ul style="list-style-type: none"> • Specifically designed for radiation hardness • Pin compatible with Harris 82C55A • High speed, no "wait state" operation with 5 MHz HS-80C86 RH • Fully TTL compatible • 24 programmable I/O pins • Direct bit set/reset capability • Enhanced control word read capability • Single 5V power supply • 2.5 mA drive capability on all I/O port outputs • Low standby power <ul style="list-style-type: none"> ▶ ICCSB = 20 μA • Full military temperature range 	<ul style="list-style-type: none"> • Each lot screened for total dose hardness • Parametrics guaranteed to 1×10^5 rads (Si) • Latch-up free $> 10^{12}$ rads (Si)/sec • Upset: $> 10^8$ rads (Si)/sec • Functional after 1×10^6 rads (Si) total dose 	

RAD-HARD CMOS MICROPROCESSOR PRODUCTS

COMING
SOON

Programmable Interrupt Controller HS-82C59ARH		
Features	Radiation Effects	Pinout
<ul style="list-style-type: none"> Specifically designed for radiation hardness Pin compatible with Harris 82C59A High speed, no "wait state" operation with 5 MHz HS-80C86RH Eight level priority controller Expandable to 64 priority levels Fully TTL compatible Programmable interrupt modes HS-80C85RH and HS-80C86RH compatible operation Individual request mask capability Fully static design Single 5V power supply Low standby power 20 μA Full military temperature range 	<ul style="list-style-type: none"> Each lot screened for total dose hardness Parametrics guaranteed to 1×10^5 rads (Si) Latch-up free $> 10^{12}$ rads (Si)/sec Upset: $> 10^8$ rads (Si)/sec Functional after 1×10^6 rads (Si) total dose 	

Static Clock Controller/Generator HS-82C85RH		
Features	Radiation Effects	Pinout
<ul style="list-style-type: none"> Specifically designed for radiation hardness Pin compatible with Harris 82C85 Generates system clocks for microprocessors and peripherals Complete control over system clock operation for very low system power <ul style="list-style-type: none"> ▶ Stop-oscillator ▶ Stop-clock ▶ Low-frequency (slo) mode ▶ Full-speed operation DC to 15 MHz operation (DC to 5 MHz system clock) Uses either parallel mode crystal circuit or external frequency source TTL/CMOS compatible inputs/outputs Single 5V power supply Very low power consumption Full military temperature range 	<ul style="list-style-type: none"> Each lot screened for total dose hardness Parametrics guaranteed to 1×10^5 rads (Si) Latch-up free $> 10^{12}$ rads (Si)/sec Upset: $> 10^8$ rads (Si)/sec Functional after 1×10^6 rads (Si) total dose 	

RAD-HARD CMOS MICROPROCESSOR PRODUCTS

16K (2Kx8) ROM with I/O Ports HS-83C55RH		Pinout
Features	Radiation Effects	
<ul style="list-style-type: none"> Specifically designed for radiation hardness Static operation for low power consumption Pin compatible with Intel 8355 Equivalent to Sandia SA3002 5 Volt operation 2 programmable I/O ports Multiplexed address and data bus Full military temperature range 	<ul style="list-style-type: none"> Each lot screened for total dose hardness Parametrics guaranteed to 1×10^5 rads (Si) Latch-up free $> 10^{12}$ rads (Si)/sec Upset: $> 10^8$ rads (Si)/sec 	

RAD-HARD ANALOG OPERATIONAL AMPLIFIERS AND COMPARATOR

High Slew Rate/Wide band Operational Amplifier HS-3516RH		
Features	Radiation Effects	Pinout
<ul style="list-style-type: none"> Specifically designed for radiation hardness High slew rate: — $\geq \pm 22$ V/μs Fast settling time: — ≤ 450 ns Unity gain bandwidth: — 12 MHz Low offset voltage @ 25°C: — $\leq \pm 5$ mV Short circuit protection Full military temperature range 	<ul style="list-style-type: none"> Dielectric Isolation technology Each lot screened for total dose hardness Parametrics guaranteed to 1×10^6 rads (Si) Latch-up free Tolerant to neutron fluence $> 5 \times 10^{12}$ n/cm² (E ≥ 10 KeV) Tolerant to gamma rate $> 1 \times 10^9$ rads (Si)/sec 	

RAD-HARD OPERATIONAL AMPLIFIERS AND COMPARATOR

Low-Power/Programmable Operational Amplifier HS-3530RH		
Features	Radiation Effects	Pinout
<ul style="list-style-type: none"> Specifically designed for radiation hardness Wide range AC programming: <ul style="list-style-type: none"> Slew rate: 0.06 to 3 V/μs Gain x bandwidth: 100 kHz to 5 MHz Wide range DC programming: <ul style="list-style-type: none"> Power supply: ± 1.5 to ± 18 V Supply current: 10 μA to 1.2 mA Short circuit protection Full military temperature range 	<ul style="list-style-type: none"> Dielectric Isolation technology Each lot screened for total dose hardness Parametrics guaranteed to 1×10^6 rads (Si) Latch-up free Tolerant to neutron fluence $> 5 \times 10^{12}$ n/cm² (E ≥ 10 KeV) Tolerant to gamma rate $> 1 \times 10^9$ rads (Si)/sec 	<p>NOTE: Case tied to V-</p>

High Speed Latching Comparator HS-3560RH		
Features	Radiation Effects	Pinout
<ul style="list-style-type: none"> Specifically designed for radiation hardness Fast response time: 75 ns Low offset voltage: 375 μV Low offset current: 200 nA Latching output Built-in clamp circuit Laser trimmed input offset voltage 	<ul style="list-style-type: none"> Dielectric Isolation technology Hardened to strategic levels 	

Dual Programmable Operational Amplifier HS-3569RH		
Features	Radiation Effects	Pinout
<ul style="list-style-type: none"> Specifically designed for radiation hardness Programmable AC and DC parameters: <ul style="list-style-type: none"> Unity gain bandwidth 3 to 7 MHz Full power bandwidth 30 to 80 kHz Slew rate: 2 to 5 V/μs Power consumption (typ): 45 to 110 mW Short circuit protection Input overload protection Full military temperature range Laser trimmed input offset voltage 	<ul style="list-style-type: none"> Dielectric Isolation technology Hardened to strategic levels 	

RAD-HARD ANALOG OPERATIONAL AMPLIFIERS AND COMPARATOR

High Performance Quad Operational Amplifier HS-5104RH		
Features	Radiation Effects	Pinout
<ul style="list-style-type: none"> Specifically designed for radiation hardness Low offset voltage: ≤ 3.0 mV High slew rate: ≥ 1.0 V/μs Unity gain bandwidth ≥ 2 MHz Single 5V supply capability Short circuit protection Full military temperature range 	<ul style="list-style-type: none"> Dielectric Isolation technology Each lot screened for total dose hardness Parametrics guaranteed to 1×10^6 rads (Si) Latch-up free Tolerant to neutron fluence $> 5 \times 10^{12}$ n/cm² (E ≥ 10 KeV) Tolerant to gamma rate $> 1 \times 10^9$ rads (Si)/sec 	

RAD-HARD CMOS ANALOG MULTIPLEXERS

8-Channel Multiplexer — Overvoltage Protection HS-508ARH		
Features	Radiation Effects	Pinout
<ul style="list-style-type: none"> Specifically designed for radiation hardness Analog/digital overvoltage protection Fail-safe with power loss (no latch-up) Break-before-make switching DTL/TTL/CMOS compatible Analog signal range: ± 15 V Access time (typical): ~ 500 ns Supply current @ 1 MHz address toggle (typical): ~ 4 mA Standby power (typical): ~ 7.5 mW Full military temperature range 	<ul style="list-style-type: none"> Dielectric Isolation technology Each lot screened for total dose hardness Parametrics guaranteed to 1×10^5 rads (Si) Latch-up free Tolerant to neutron fluence $\geq 1 \times 10^{13}$ n/cm² (E ≥ 10 KeV) Tolerant to gamma rate $> 1 \times 10^9$ rads (Si)/sec 	

RAD-HARD CMOS ANALOG MULTIPLEXERS

16-Channel Multiplexer-High-Z Analog Input Protection HS-1840RH		
Features	Radiation Effects	Pinout
<ul style="list-style-type: none"> Analog signal range: -5 V to +15 V Specifically designed for radiation hardness High analog input impedance during power loss (open): - 500 MΩ Low standby power consumption (typical): - 600 μW Access time (typical): - 500 ns Excellent in hi-rel redundant systems Full military temperature range Break-before-make switching 	<ul style="list-style-type: none"> Dielectric Isolation technology Each lot screened for total dose hardness Parameters guaranteed to 2 x 10⁵ rads (Si) Latch-up free Tolerant to neutron fluence > 1 x 10¹³ n/cm² (E \geq 10 KeV) Tolerant to gamma rate > 1 x 10⁹ rads (Si)/sec 	

Radiation Hardened CMOS Analog Switches

Radiation Hardened CMOS Analog Switches HS-302RH, HS-303RH, HS-306RH, HS-307RH, HS-384RH, HS-390RH	
Features	Radiation Effects
<ul style="list-style-type: none"> Pin for pin compatible with Harris HI-3XX series analog switches Analog signal range: \pm 15 V Low leakage (pre RAD typical at 25°C): 90 pA Low RON (pre RAD typical at 25°C): 30Ω Break-before-make delay (typical): 65 ns Full military temperature range Low operating power 	<ul style="list-style-type: none"> Dielectric Isolation technology Each lot screened for total dose hardness Parameters guaranteed to 1 x 10⁵ rads (Si) Latch-up free Tolerant to neutron fluence > 5 x 10¹³ n/cm² (E \geq 10 KeV) Tolerant to gamma rate > 1 x 10⁹ rads (Si)/sec
PINOUTS	

RAD-HARD CMOS COMMUNICATION PRODUCTS

Manchester Encoder/Decoder (MED) HS-15530RH		
Features	Radiation Effects	Pinout
<ul style="list-style-type: none"> Specifically designed for radiation hardness Support of MIL-STD-1553 1.0 Mbit/sec data rate Sync identification and lock-in Clock recovery Manchester II encode, decode Separate encode and decode Low operating power: 50 mW @ 5 V Full military temperature range 	<ul style="list-style-type: none"> Each lot screened for total dose hardness Parametrics guaranteed to 1×10^5 rads (Si) Latch-up free Upset: $> 10^8$ rads (Si)/sec 	

HS-245 Triple Line Transmitter, HS-246/249 Triple Line Receivers, HS-248 Triple Party-Line Receiver	
Features	
<ul style="list-style-type: none"> High speed: 15 MHz with 50-ft. cable, 2 MHz with 1,000-ft. cable Tolerates -2.0 V to $+20.0$ V ground differential (transmitter with respect to receiver) Current mode operation High common mode rejection Transmitter and receiver party-line capability Transmitter input/receiver output TTL/DTL compatible Low power dissipation Low EMI generation High noise immunity Replaces HD-245/246/248/249 	
Pinouts	
<p>HS-245 Transmitter</p>	<p>HS-246/248/249 Receivers</p>

SECURE DATA COMMUNICATIONS

CYPHER-I™ CMOS DATA ENCRYPTION DEVICE HS-3447	Pinout
Features	
<ul style="list-style-type: none"> • Endorsed by National Security Agency for protecting unclassified national security related information (UNSR) • Per DoD drawing ON304455 • Alternative to WD 2001/2002 and MC6859 NMOS devices • Uses single 5V power supply • Operating range -55°C to $+125^{\circ}\text{C}$ • Lower power operation 250 mW at 10 MHz • Maximum transfer rate: 20 MHz at 7 Volts 10 MHz at 5 Volts 20 MHz at 5 Volts (-55°C to $+85^{\circ}\text{C}$) • Encrypts/decrypts via serial data stream • Available to Class B and Class S equiv. screening • Inputs TTL compatible • Key variable stored on chip is not externally accessible • Available in special configurations 	

SPECIALIZED PRODUCTS

ARINC 429 Bus Interface Line Driver Circuit HS-3182	Pinout
Features	
<ul style="list-style-type: none"> • Inputs TTL and CMOS compatible • Adjustable rise and fall times via two external capacitors • Programmable output differential range via voltage reference input (V_{REF}) • Outputs are inhibited (0 V) if data (A) and data (B) inputs are both in the "logic one" state • Can operate up to a 100-Kbit data rate • Output short circuit proof and contains overvoltage protection • Data "A" and Data "B" signals are "AND'D" with clock and sync signals • Full military temperature range 	

ARINC 429 Bus Interface Circuit HS-3282	Pinout
Features	
<ul style="list-style-type: none"> • ARINC specification 429 compatible • Data rates of 100 Kbits or 12.5 Kbits • Separate receiver and transmitter section • Dual and independent receivers, connecting directly to ARINC bus • Serial to parallel receiver data conversion • Parallel to serial transmitter data conversion • Word lengths of 25 or 32 bits • Parity status of received data • Generate parity of transmitter data • Automatic word gap timer • Single 5 V supply • Low power dissipation • Full military temperature range 	

MIL-STD-1553B Bus Interface Circuit HS-3273	Pinout
Features	
<ul style="list-style-type: none"> • MIL-STD-1553B compatible • Up to 5 MHz data rate for non-MIL-STD-1553B applications • Parallel to serial transmitter data conversion • 8/16 bits host I/O interface • Error interception and recognition • DMA capability • Single 5 V power supply • Full military temperature range 	

RAD-HARD SEMICUSTOM CIRCUIT TECHNOLOGY

HS-CXXXRH Cell Library

Features

- Recommended as the most efficient library for customer circuits implemented in terms of 74 LS or 4000 Series functions
- Over 80 logic functions in cell library
- Soft-coded macros
- Individual data sheets
- 2.5-micron CMOS technology
- 40 MHz clock frequency
- TTL/CMOS compatible
- Full military temperature ranges
- Multiple package options
- Processed to either Class B or Class S equivalent flow
- Guaranteed rad-hard to $> 2 \times 10^5$ rads (Si)
- Upset: $\geq 1 \times 10^9$ rads (Si)/sec
- Functional after 1×10^6 rads (Si) total dose

HS-DXXXRH High-Density CMOS Standard Cell Library

Features

- Recommended as the most efficient library for customer circuits implemented in terms of logic primitives, i.e., gates and flip flops
- Over 100 logic functions in the HD cell library
- 2.5-micron silicon gate CMOS technology
- 3 ns typical gate delay
- Full military temperature ranges
- Utilizes analog or memory drop in functions
- Multiple package options
- 5000 gate, 120 I/O chip complexity
- Total dose 1×10^5 rads (Si)
- Latch-up free

CMOS Gate Array Family HS-G0600RH, HS-G1200RH, HS-G2500RH

Description

Features

600 gates,
54 I/O pins

1200 gates,
78 I/O pins

2500 gates,
100 I/O pins

- 3-micron CMOS technology
- 3 ns typical gate delay
- 10 MHz clock frequency
- 74 LS-SSI/MSI library implemented
- Advanced CAD Teledesign™ software support
- Individually programmable I/O buffers
- Bi-directional and three-state I/O
- TTL/CMOS compatible
- Full military temperature ranges
- Multiple package options
- Total dose 1×10^5 rads (Si)

CUSTOM CIRCUIT TECHNOLOGY

MOS					
Process	Characteristics	f _{max}	Gate t _{pd}	Rad-Hard Option	Application
CMOS Self-Aligned Silicon-Gate SAJI-I SAJI-IV	$V_T \approx 0.6$ to 1.1 V $BV_{DSS} > 7$ V $V_{DD} = 1.8$ to 7 V	20 MHz @ 4.5 V, 125°C 50 MHz @ 4.5 V, 125°C	~5 ns custom ~10 ns ~2 ns custom ~4 ns HD cell library HSC cell library	Yes	<ul style="list-style-type: none"> • Computers • Industrial controls • Interface circuits • Memories • Heart pacemakers • Telecommunications • Data communications • Satellite applications • Military & industry (Custom and semicustom cell library)
CMOS Metal-Gate	$V_T = 1.0$ to 2 V $BV_{DSS} > 15$ V	5 MHz @10 V	50 ns @10 V	Yes	<ul style="list-style-type: none"> • Digital communications • Interface circuits • Logic
PMOS Silicon-Gate	$V_T \approx 1.5$ V $BV_{DSS} > 15$ V $V_{DD} = -7$ V $V_{GG} = -15$ V	1 MHz	125 ns average	No	<ul style="list-style-type: none"> • Digital communications • Dynamic shift registers
PMOS Metal-Gate	$V_T = -3$ to -4 V $BV_{DSS} \geq 30$ V $V_{DD} = -15$ V $V_{GG} = -27$ V	1 MHz	~125 ns average	No	<ul style="list-style-type: none"> • Digital communications • Logic • Dynamic shift registers
Analog CMOS (Analog and digital on one chip)	SAJI-IV with added high-value resistors and voltage-independent capacitors	2 MHz	—	Yes	<ul style="list-style-type: none"> • CVSD • Op amps • Comparators • Oscillators (VCO) • Analog switches • Switched capacitor filter • Voltage/current references • Voltage amplifiers
High-Voltage CMOS	SAJI-I with 40 V	≤ 20 MHz @ 4.5 V, 125°C	~5 ns custom ~10 ns cell library	Yes	<ul style="list-style-type: none"> • Interface circuits • Industrial controls • Automotive

GaAs PRODUCTS

Products And Services	GaAs FET Products
<p>Gallium Arsenide-based standard and custom products are available from Harris Microwave Semiconductor (HMS), located in Milpitas, CA.</p> <p>Standard products include:</p> <ol style="list-style-type: none"> 1. GaAs Field Effect Transistors (GaAs FETs) for RF and microwave applications. 2. GaAs Digital Integrated Circuits for high speed signal processing. 3. GaAs Monolithic Microwave Integrated Circuits (MMICs) for broadband amplification of RF and microwave signals in receive, transmit, and IF stage applications. <p>Custom design and fabrication services are available whereby customers can design or specify specialized digital, MMIC or FET products for manufacture at HMS. Currently in development is a GaAs cell library of standard logic elements and I/O circuits for use with the GaAs DIGI-1 and DIGI-2 processes. Contact a Harris Design Center for current status and details. Analysis, testing, packaging, and screening options are available for all standard and custom products.</p>	<p>Microwave GaAs FETs from Harris Microwave Semiconductor have been designed and built for performance, reliability and consistency. To achieve these objectives, Harris employs extremely low defect gallium arsenide substrates of its own manufacture, ion implantation, a Ti/Pt/Au metallization system, large cross-section "T" gate structure and integral dielectric scratch and short circuit protection.</p> <p>Each wafer undergoes an extensive reliability and performance qualification procedure exceeding the element evaluation requirements of MIL-STD-883C, Method 5008, Class B. Each die is DC tested and visually inspected prior to packaging and shipment. To accommodate specialized requirements, Harris can provide selections tailored to meet these needs. High-reliability screening and qualification testing are available on all Harris GaAs FET Products.</p>

HIGH GAIN PRODUCTS

P/N HMF-	MAG* (dB)		PMAG (dBm)	G _{1dB} (dB)	P _{1dB} * (dBm)		FREQ (GHz)	BIAS V _{DS} , I _{DS}	APPLICATION/ DESCRIPTION
	MIN	TYP			MIN	TYP			
03100-100	6.0	7.5	11	4.5	13	15	18	4 V, 20 mA	2-20 GHz Low Noise
03100-200	6.0	7.5	13.5	4.5	18	19	18	6 V, 50% I _{DSS}	2-20 GHz Gain/Drive
03100-300	6.0	7.5	14.5	4.5	20	21	18	6 V, 50% I _{DSS}	2-20 GHz Drive
0330	—	7.5	13.5	5.0	—	14	18	4 V, 20 mA	2-20 GHz Low Noise, Low Current
0610	6.0	7	19.5	4.0	22.5	23.5	18	6 V, 50% I _{DSS}	2-20 GHz Power
0620	—	10	17	7.0	—	20	12	4 V, 50% I _{DSS}	2-14 GHz High Transconductance
1210	—	6.0	22	4.0	—	25	18	6 V, 50% I _{DSS}	2-20 GHz Power

HIGH POWER PRODUCTS

P/N HMF-	G1dB (dB)	P1dB* (dBm)		η (%)	FREQ (GHz)	MAG* (dB)		PMAG (dBm)	FREQ (GHz)	BIAS VDS,IDS	APPLICATION/ DESCRIPTION
		MIN	TYP			MIN	TYP				
0300	8.5	—	21.5	35	8	—	12	18	8	8 V, 50% IDSS	2-18 GHz, 125 mW
0600	8	—	24.5	35	8	—	10	22	8	8 V, 50% IDSS	2-18 GHz, 250 mW
12000-100	7.5	25.5	27	30	8	9	10	25.0	8	8 V, 50% IDSS	2-16 GHz, 500 mW
12000-200	7.5	27.5	28.5	35	8	8	9	25.5	8	8 V, 50% IDSS	2-16 GHz, 650 mW
24000-100	5.0	28.5	29.5	25	8	6.0	8.0	27.0	8	8 V, 50% IDSS	2-14 GHz, 800 mW
24000-200	5.0	30.0	31.0	30	8	6.0	8.0	28.5	8	8 V, 50% IDSS	2-14 GHz, 1.2 mW

*Compliance with microwave performance limits for MAG and P1dB is confirmed by qualifying wafers on sample evaluation basis.

GaAs MMIC PROGRAMS

Custom and Fabrication Services	
Key Features	MMIC Program Options
<ul style="list-style-type: none"> • Fully documented design rule book includes microwave and physical layout rules • 0.5 Micron plated "T"-gate technology based upon our line of discrete FETs (HMF-0310, -0610, etc.) • Reliable Ti/Pt/Au metallization • Ion implantation processing for uniformity, consistency • Circuit elements <ul style="list-style-type: none"> ▶ "n+" Type (low sheet RHO) resistors ▶ "n" Type (high sheet RHO) resistors ▶ Diodes ▶ FETs ▶ Dual gate FETs ▶ Transmission lines ▶ Inductors ▶ Capacitors ▶ Through substrate via holes 	<ul style="list-style-type: none"> • Gain, power or low current FET models and processing • Circuit design from customer specs • "Layout" from customer-supplied design • Computer simulation of design • Generation of digitized data from customer drawing • RF screening of selected parts (i.e. #/wafer) • Special packaging/assembly • Specialized DC testing • Volume quotations on qualified wafers • High reliability screening • Supplementary consultation/training

GaAs DIGITAL IC STANDARD PRODUCTS

Four-Bit Universal Shift Register HMD-12141-1	Pinout
Features	IC Package 1 (MSI)
<ul style="list-style-type: none"> • 1.3 GHz clock speed • Shift right, shift left, parallel, or hold • Serial or parallel inputs and outputs • ECL compatible & GaAs compatible input and outputs • 32-Pin metal flatpack design • Ti/Pt/Au metallization system 	
Divide by 2/4/8 High Speed Synchronous Counter HMD-11016-1	
Features <ul style="list-style-type: none"> • 2.0 GHz data input rate • Synchronous operation; simultaneous divide by 2, 4 and 8 output • ECL compatible GaAs compatible inputs and outputs • Extended temperature range: -55°C to +85°C • 50 ohm impedance system operation • Asynchronous master clear and enable for down counter operation 	

Digital Signal Processing IC Products — SSI 2 — 3GHz HMD-11131-2, HMD-111301-2, HMD-11104-2, HMD-11101-2, HMD-11113-2, HMD-11685-2	Pinout
Features	IC Package 2 (SSI)
<ul style="list-style-type: none"> • Master/slave D flip-flop • Divide by 2/prescaler • 5-Input NAND/AND gate • 5-Input NOR/OR gate • Dual 2-input exclusive OR gate • Ultra-high speed comparator 	
Signal Processing IC Products — MSI HMD-11011-2	
Features <ul style="list-style-type: none"> • Divide by 10/11 variable modulus divider 	

GaAs DIGITAL IC STANDARD PRODUCTS

GaAs Digital IC Evaluation Kits HMK-11MSI-1, HMK-11SSI-2	Pinout
Features <ul style="list-style-type: none"> • MSI IC evaluation kit for 32-pin packages • SSI IC evaluation kit for 16-pin packages (individual ICs not included in kits) 	IC Package 3 (Custom MSI)
GaAs Standard Cell	
Features	
<ul style="list-style-type: none"> • MSI level semicustom and custom GaAs IC designs • Up to 300 equivalent gate complexity logic designs • Cell library available for semicustom designs (contact nearest Harris representative for details) 	

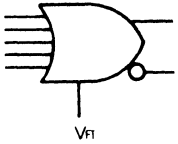

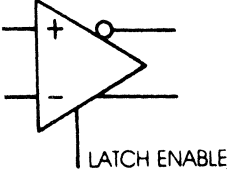
GaAs SSI LOGIC ELEMENTS

Master/Slave D Flip-Flop HMD-11131-2	Logic Symbol
Features <ul style="list-style-type: none"> • 2.5 GHz single clock input speed • ECL & GaAs compatible I/Os • Asynchronous clear & set • Dual phase clock through CK, \overline{CE} permits higher speed operation 	

Divide By 2/Prescaler HMD-11301-2	Logic Symbol
Features <ul style="list-style-type: none"> • 2.7 GHz input clock speed • Complementary ECL outputs • 50 ohm line driving capability • CE can be used to tailor device operation 	

5-Input NAND/AND Gate HMD-11104-2	Logic Symbol
Features <ul style="list-style-type: none"> • 2.5 GHz data input rate • ECL and GaAs compatible I/Os • Propagation delay 500ps typical • VFT input for optimized propagation delay 	

GaAs SSI LOGIC ELEMENTS

5-Input NOR/OR Gate HMD-11101-2	Logic Symbol
Features	
<ul style="list-style-type: none"> • 2.5 GHz data input rate • Extended temperature range: -55°C to $+85^{\circ}\text{C}$ • Propagation delay of 500ps typical • ECL and GaAs compatible I/Os • VFT input for optimized propagation delay 	
Dual 2-Input Exclusive OR Gate HMD-11113-2	Logic Symbol
Features	
<ul style="list-style-type: none"> • 2.5 GHz data input rate • Propagation delay 650ps typical • Extended temperature range: -55°C to $+85^{\circ}\text{C}$ 	
Ultra-High Speed Comparator HMD-11685-2	Logic Symbol
Features	
<ul style="list-style-type: none"> • 2.0 GHz input clock speed • Latch enable for sample and hold mode • 50 ohm line driving capability • Propagation delay 500ps typical • Transition time 150ps typical <p><small>(Contact Harris Microwave Semiconductor for availability)</small></p>	

USER'S GUIDE: LINEAR, DATA ACQUISITION AND TELECOM PRODUCTS

Manufacturer	Part Number	Harris Pin-for-Pin Replacement	Harris Closest Replacement	Harris Advantages
AMD	AM118 AM1408 AM1508 AM318 AM6012 AM6112 AM6420 LF198 LF398 SSS1408 SSS1508	HA-2510 HA-2515	HI5618-5 HI-5618-2 HI-562A HI-5660 HI-774A HA-5320 HA-5330 HA-2420 HA-2425 HI-5618-5 HI-5618-2	Faster, application resistors Faster, application resistors Faster, application resistors, int. linearity Int. linearity, application resistors Improved performance Improved performance Faster, application resistors Faster, application resistors
ANALOG DEV	52 AD1408 AD1508 AD362 AD380,AD382 AD381 AD389 AD507 AD509 AD515 AD518 AD542L AD545 AD547J AD562 AD563 AD565 AD565A AD566 AD566A AD574A AD582 AD583K AD611 AD667 AD7501 AD7502 AD7503 AD7506 AD7507 AD7511 AD7512 AD7521/31 AD7541/41A ADADC80 ADADC84/85 ADDAC 08 DAC 80 DAC 85 DAC 87 ADG200 ADLH0032 H0S050 H0S100	HA-2620 HA-2520 HA-2510 HA-5180 HA-5170 HI-565A HI-565A HI-5660 HI-562 HI-5660 HI-562A HI-574A,HI-674A HA-2425-5 HI-1828A HI-1818A HI-506 HI-507 HI-7541 HI-7541 HI-5680,HI-5690 HI-5685,HI-5695 HI-5687,HI-5697 HA-5033	HA-5180 HI-5618-5 HI-5618-2 HI-5900/01 HA-2542 HA-2541 HA-5320 HA-5180 HA-5170 HI-562A HI-5660 HI-565A HI-5660 HI-562 HI-5660 HI-562A HA-2425 HA-5320 HI-5811 HI-508 HI-201 HI-5043 HI-574A HI-674A HI-674A HI-774A HI-5618 HI-200 HA-5190,HA-2542 HA-2542	Monolithic Faster, application resistors Faster, application resistors Faster Monolithic Monolithic Faster, monolithic Identical Identical Monolithic Better AC Monolithic Better AC Faster Faster Faster Faster Digital timing, 674A is 2.3 times faster Acquisition time Identical Faster, better accuracy DI process DI process DI process DI process DI process Improved linearity Lower output capacitance Power, smaller pkg. Faster, power, smaller pkg. Power, smaller pkg. Faster, power, small pkg. Faster, application resistors 5690 is 2.67 times faster 5695 is 2.67 times faster 5697 is 2.67 times faster Monolithic Monolithic Monolithic
ANALOGIC	MN4708 MP1812A MP250M MP280 MP261 MP270/271		HI-508 HI-1818A HI-5680V HA-2420/25 HA-2420/25 HA-2420 HA-5320	Faster, monolithic, power, smaller pkg. Faster, monolithic, smaller Monolithic, smaller pkg. Monolithic, smaller pkg. Monolithic, smaller pkg.
BECKMAN	7541 7556 7580	HI-7541 HI-5690	HI-574A HI-5680	Faster, monolithic Faster, smaller pkg. Faster, monolithic

USER'S GUIDE: LINEAR, DATA ACQUISITION AND TELECOM PRODUCTS

Manufacturer	Part Number	Harris Pin-for-Pin Replacement	Harris Closest Replacement	Harris Advantages
BURR-BROWN	3500 3503 3506 3507 3508 3521 3523 3527 3528 3550 3553 3554 ADC80 ADC84/85 ADC87 DAC70 DAC700/701 DAC702/703 DAC71/72 DAC80 DAC800 DAC811 DAC85 DAC850 DAC851 DAC87 MPC16S MPC4D MPC800KG MPC801KG MPC801SG MPC8D MPC8S OPA103 OPA104 OPA11 SCH298AM SCH80/85 SHC85ET SHM60 ADC574A ADC674A SHC5320	HA-2505 HA-2605 HA-2525 HA-2625 HA-5180 HI-5680, HI-5690 HI-5680, HI-5690 HI-5811 HI-5685, HI-5695 HI-5685, HI-5695 HI-5687, HI-5697 HI-5687, HI-5697 HI-506A-5 HI-509A-5 HI-516-5 HI-518-5 HI-518-2 HI-507A-5 HI-508A-5 HA-2600 HI-574A HI-674A HA-5320	HA-2600 HA-5170 HA-5180 HA-5180 HA-2541 HA-5033 HA-2542 HI-574A HI-674A HI-674A HI-774A HI-774A HI-DAC16 HI-DAC16 HI-DAC16 HI-DAC16 HA-5180 HA-5180 HA-2425 HA-2425 HA-2420 HA-5320	Better AC Identical Identical Identical Identical Identical Better AC Better AC Better AC Better AC and DC Better AC Monolithic Monolithic Monolithic Monolithic Smaller pkg., power Faster, smaller pkg., power Smaller pkg., power Faster, smaller pkg., power Smaller pkg., power Faster, monolithic Monolithic, "I" output Faster, monolithic, power 5690 is 3.33 times faster, lower power Faster, monolithic, power 5695 is 3.33 times faster, lower power 5697 is 3.33 times faster, lower power Faster, monolithic, power Identical Identical Identical Identical Identical Identical Identical Better AC Improved performance Faster, monolithic, power Faster, monolithic, power Monolithic, smaller pkg. Identical Identical Identical
DATA DEVICE CORP.	ADH051 ADH8585 ADH8586 DDC5200 DDC5210/11 DDC5212/16 DDC5240 DDCADC85 DDCADC87 DDCADC85 DDCADC85LD DDCADC87 DGL13 THC4460	HI-5680, HI-5690 HI-5685, HI-5695 HI-5687, HI-5697	HA-5330 HI-674A HI-774A HI-774A HI-574A HI-674A HI-674A HI-774A HI-674A HI-774A HI-674A HA-5320 HA-5320	Monolithic, smaller pkg., power Smaller pkg., power Faster, smaller pkg. Smaller pkg., power Faster Smaller pkg., power Smaller pkg., power Faster, smaller pkg., power Smaller pkg., power Faster, smaller pkg., power Monolithic, power Monolithic, power, 5697 is 3.33 times faster Monolithic, smaller pkg., power Monolithic, smaller pkg.
DATEL	ADC52XX ADC574A ADC8412 ADC85C12 ADC8712 ADCEH12B1 ADCHX12B ADCL12B2 ADCM12B2	HI-574A, HI-674A	HI-674A HI-774A HI-674A HI-774A HI-674A HI-774A HI-674A HI-774A HI-774A HI-574A HI-674A HI-574A HI-674A HI-674A HI-774A	Lower power Faster, lower power Identical, 674 is 1.67 times faster Smaller pkg. power Faster, smaller pkg., power Smaller pkg., power Faster, smaller pkg., power Smaller pkg., power Faster, smaller pkg., power Faster, smaller pkg., power Smaller pkg., power Faster, smaller pkg., power Smaller pkg. Faster, smaller pkg., power Smaller pkg. Faster, smaller pkg. Smaller pkg. Faster, smaller pkg.

USER'S GUIDE: LINEAR, DATA ACQUISITION AND TELECOM PRODUCTS

Manufacturer	Part Number	Harris Pin-for-Pin Replacement	Harris Closest Replacement	Harris Advantages
DATEL (cont.)	ADCMA12B2A ADCMA12B2B		HI-574A HI574A HI-674A	Faster, smaller pkg. Smaller pkg. Faster, smaller pkg.
	AM450 AM452 AM460 AM462 AM464 DAC08B DAC562 DAC71/72 DAC7541 DAC85 DAC85C DAC87 DACHA12B DACHP16B DACHP16B DACHZ12B DACIC10B DACIC8B MV1606 MV808 MVD409 MVD807 MX1606 MX1616 MX808 MX818 MXD409 MXD807 SHM1C-1 SHM1C-1M SHM20 SHM6M SHM9M SHMLM-2	HA-2505 HA-2525 HA-2605 HA-2625 HA-2645 HI-562A HI-7541 HI-5685, HI-5695 HI-5680, HI-5690 HI-5687, HI-5697 HI-7541 HI-5690/95/97 HI-506 HI-1818A HI-1828A HI-507 HI-506A HI-516 HI-508A HI-518 HI-509A HI-507A HA-2425 HA-2420 HA-5320	HI-5618 HI-DAC16 HI-DAC16 HI-DAC16 HI-5680/85/87 HI-5610 HI-5618 HA-5320 HA-5330 HA-2420 HA-2420	Faster, application resistors Identical Monolithic Equivalent Faster, monolithic, power Monolithic, power, 5690 is 2 times faster Faster, monolithic, power Faster, monolithic Monolithic Monolithic, smaller pkg. Faster, monolithic Faster, application resistors Faster, application resistors Identical Identical Identical Identical Identical Identical Identical Identical Identical Identical Identical Identical Identical Identical Monolithic, smaller pkg. Faster, monolithic, smaller pkg. Faster, monolithic, smaller pkg. Faster
EXAR	XR4212 XR3417 XR3418 XR3517 XR3518		HA-4741 HC-55536 or HC-55564	Lower power Fewer external components Military pkg.
FAIRCHILD	μ A0801/02 μ A1458 μ A1558 μ A198 μ A398 μ A565 μ A702 μ A709 μ A714 μ A715 μ A727 μ A740 μ A741 μ A747 μ A748 μ A776	HA-5102 HA-5102 HI-565A HA-2600 HA-5102 HA-2720	HI-5618 HA-2420 HA-2425 HA-2620 HA-2620 HA-5135 HA-2520 HA-5135 HA-5170 HA-2600	Faster, application resistors Better AC, lower noise Better AC, lower noise Improved performance Improved performance Better DC Better AC Better DC Better AC Better AC Lower noise Better AC Better AC, lower noise
	HITACHI	HA17408		HI-5618
HYBRID SYSTEM	ADC550 ADC581		HI-574A HI-574A HI-674A HI-DAC16	Faster, smaller pkg., power
	DAC3281-16 DAC331-12 DAC335-12 DAC348C-12 DAC347LP-12 DAC372 DAC3721-10 DAC3721-8 DAC395-8 HS346 HS5200 HS574 HS730 DC331-12	HI-7541 HI-574A, HI-674A HI-7541	HI-5687V HI-5680V HI-5687V HI-5680 HI-5610 HI-5618 HI-5618 HA-5320 HI-674A HI-774A HA-5320 HA-5330	Faster Monolithic, smaller pkg. Faster Faster, monolithic Faster, monolithic Faster, monolithic Monolithic Faster, monolithic, smaller pkg. Faster, monolithic Monolithic, smaller pkg. Faster, monolithic Faster Digital timing, 674 is 2 times faster Monolithic, smaller pkg. Faster, monolithic, smaller pkg.

USER'S GUIDE: LINEAR, DATA ACQUISITION AND TELECOM PRODUCTS

Manufacturer	Part Number	Harris Pin-for-Pin Replacement	Harris Closest Replacement	Harris Advantages
HYBRID SYSTEM (cont.)	HS7541 HSDAC80 HSDAC87 MUX201 SH725	HI-7541 HI-5680, HI-5690 HI-5687, HI-5697 HI-1818A	HA-2420	Lower output capacitance Faster, monolithic, power, 5690 is 5.56 times faster Faster, monolithic, power Lower power, smaller pkg. Faster, monolithic, smaller pkg.
INTECH	1048BIN-P 411-10BIN 416 BIN A3103 A3155 A880/880-2 A881 A882/884 ADC111 ADC2812 ASH240/250 ASH271 CY2219 CYAAD12QM		HI-574A HI-674A HI-5610 HI-DAC16 HI-674A HI-774A HI-574A HI-674A HA-5320 HA-5320 HA-2420/25 HI-574A HI-674A HI-547A HI-674A HA-2420/25 HA-5320 HI-7541 HI-574A HI-674A	Smaller pkg., power Faster, smaller pkg., power Faster, smaller pkg. Smaller pkg. Smaller pkg., power Faster, smaller pkg., power Smaller pkg., power Faster, smaller pkg., power Monolithic, power Monolithic, smaller pkg., power Faster, monolithic, power Smaller pkg., power Faster, smaller pkg., power Smaller pkg., power Faster, smaller pkg., power Monolithic, smaller pkg., power Monolithic, smaller pkg., power Faster, smaller pkg., power Smaller pkg., power Faster, smaller pkg., power
INTEL	D2912 D2912A D2910 D2910A D2911 D2911A SBC 86/05 NMOS	HC-5512 HC-5512 HC-5512A/12C/12D HC-5510 HC-5510 HC-5511 HC-5511 HB0-986C05		Lower power, lower noise Lower power, lower noise Lower power, lower noise Lower power, two supplies Lower power, two supplies Lower power, two supplies Lower power, two supplies CMOS micro components. Lower power 16K static RAM w/full mercury back-up
INTERSIL	AD7521/31/41 AD7541 DG200 DG201 HA-2500 HA-2510 HA-2520 HA-2600 HA2620 ICL7541 ICL7611 ICL7615 ICL7621 ICL7642 ICL8017 ICL8021 ICL8075 ICL8211 IH201 IH5040 IH5041 IH5042 IH5043 IH5044 IH5045 IH5046 IH5047 IH5048 IH5049 IH5050 IH5051 IH5108 IH5110/11 IH5112/13 IH5114/15 IH5200 IH5201 IH5208 IH6108 IH6116 IH6208 IH6216 LM4250	HI-7541 HI-7541 HI-200 HI-201 HA-2500 HA-2510 HA-2520 HA-2600 HA-2620 HI-7541 HA-5141 HA-5142 HA-5144 HI-201 HI-5040 HI-5041 HI-5042 HI-5043 HI-5044 HI-5045 HI-5046 HI-5047 HI-5048 HI-5049 HI-5050 HI-5051 HI-508A HI-200 HI-201 HI-509A HI-508 HI-506 HI-509 HI-507 HA-2720	HA-5141 HA-2520 HA-5141 HA-2420/25 HA-2420/25 HA-2420/25	Improved linearity Lower output capacitance Dielectric Isolation Dielectric Isolation Identical Identical Identical Identical Identical Identical Identical Lower noise Better AC, lower noise Better AC, lower noise Better AC, lower noise Dielectric Isolation Dielectric Isolation Dielectric Isolation Dielectric Isolation Dielectric Isolation Dielectric Isolation Dielectric Isolation Dielectric Isolation Dielectric Isolation Dielectric Isolation Dielectric Isolation Dielectric Isolation Dielectric Isolation Dielectric Isolation Dielectric Isolation Signal range, same pinout Dielectric Isolation Dielectric Isolation Vin range, same pinout Ron, Di, same pinout Ron, Di, same pinout Ron, Di, same pinout Ron, Di, same pinout Better AC, lower noise
INTRONICS	A-560 A-561	HA-2525 HA-2625		

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Manufacturer	Part Number	Harris Pin-for-Pin Replacement	Harris Closest Replacement	Harris Advantages
MICRO NETWORKS	ADC80 DAC80 DAC85 DAC87 MN-ADC84/85/87 MN3009 MN3014 MN3348 MN3349 MN3412 MN343/344 MN346/347 MN370/371 MN373 MN375 MN5200 MN5210 MN5240 MN565A MN574A	HI-5680, HI-5690 HI-5685, HI-5695 HI-5687, HI-5697 HA-5320 HI-565A HI-574A, HI-674A	HI-574A HI-674A HI-674A HI-774A HI-5618 HI-5618 HI-5680V/87V HI-5685V/87V HI-7541 HA-2420 HA-5320 HI-5687V HA-5330 HI-574A HI-674A HI-774A HI-774A	Smaller pkg., power Faster, smaller pkg., power Monolithic, power, 5690 is 5.56 times faster Monolithic, power, 5695 is 5.56 times faster Monolithic, power, 5697 is 5.56 times faster Smaller pkg., power Faster, smaller pkg., power Monolithic Monolithic Faster, monolithic, power Faster, monolithic Monolithic Faster, monolithic Faster, monolithic Monolithic Monolithic, lower power Faster Two chip design Faster, two chip design Smaller pkg., power 674A is 2.3 times faster
MICRO POWER SYSTEMS	MP200DI MP201DI MP5527 MP5537 MP562 MP574 MP7501 MP7503 MP7502 MP7506 MP7507 MP7508DI MP7509DI MP7521/23 MP7541/31 MP7621/23	HI-200 HI-201 HA-5127 HA-5137 HI-562A HI-574A, HI-674A HI-508 HI-1818A HI-1828A HI-506 HI-507 HI-508 HI-509 HI-7541 HI-7541 HI-7541		Faster Digital timing, 674A is 2 times faster DI processing DI processing Improved performance
MITEL	MT8912	HC-5512		Lower noise, lower cross talk
MOSTEK	MK5912	HC-5512		Lower noise and power
MOTOROLA	LF155 LF155A LF156 LF156A LF157 LF157A LF355 LF355A LF356 LF356A LF357 LF357A MC1408 MC1430 MC1431 MC1436 MC1458 MC1508 MC1558 MC1748 MC1776 MC34002 MC34004 MC3403 MC3410 AD562A MC3412 MC3417 MC3418 MC3517 MC3518 MC3419	HA-5102 HA-5102 HI-562A HI-565A	HA-5170 HA-5170 HA-5170 HA-5170 HA-5160 HA-5160 HA-5170 HA-5170 HA-5170 HA-5170 HA-5170 HA-5160 HA-5160 HI-5618-5 HA-2600 HA-2600 HA-2640 HI-5618-2 HA-2600 HA-5141 HA-5102 HA-5104 HA-4741 HI-5610-51 HC-5556A or HC-55536 HC-5502A	Better DC Better DC Better DC Better DC Better DC Better DC Better DC Better DC Better DC Better DC Better DC Better DC Better DC Better DC Faster, application resistors Better AC Better AC Better AC and DC Better AC, lower noise Faster, application resistors Better AC, lower noise Better AC and DC Better AC, lower noise Better AC Better AC Better AC Faster, application resistors Lower power, few external components, military pkg. Better longitudinal balance, transhybrid loss. Fewer external components

USER'S GUIDE: LINEAR, DATA ACQUISITION AND TELECOM PRODUCTS

Manufacturer	Part Number	Harris Pin-for-Pin Replacement	Harris Closest Replacement	Harris Advantages
MOTOROLA (cont.)	MC35002 MC35004 MC3510 MC4741	HA-4741	HC-5504 HA-5102 HA-5104 HI-5610-2	Better longitudinal balance, transhybrid loss Fewer external components Better AC Better AC Faster, application resistors Better AC
NATIONAL SEMICONDUCTOR	AD521/31 ADC1080/1280 ADC1210/11 BLC 86/05 DAC0800/0102 DAC0806/07/08 DAC1200/01 DAC1218/19 DAC1220/21/22 DAC1265 DAC1266 DAC1280 DAC1285 LF0023/43 LF0053 LF11201 LF11508 LF11509 LF13201 LF13508 LF13509 LF147 LF151 LF153 LF155 LF155A LF156 LF156A LF157 LF157A LF198 LF247 LF253 LF347 LF353 LF355 LF355A LF356 LF356A LF357 LF357A LF398 LF412 LF412A LF441 LF442 LF444 LH0002 LH0003 LH0004 LH0005 LH0022 LH0032 LH0033 LH0042 LH0052 LH0062 LM108 LM108A LM118 LM124 LM143 LM144 LM146 LM148 LM208 LM208A LM308 LM308A	HI-7541 HBO-986C05 HI-7541 HI-7541 HI-565A HI-5660 HI-5680, HI-5690 HI-5685/87 HI-5695/97 HI-201 HI-508-2 HI-509-2 HI-201 HI-508-5 HI-509-5 HI-5104 HI-5170 HI-5102 HI-5170 HI-5170 HI-5170 HI-5170 HI-5170 HI-5160 HI-5160 HI-2425 HI-5102 HI-5102 HI-5141 HI-5142 HI-5144 HI-5002 HI-2520 HI-2640 HI-2620 HA-5180 HA-5180 HA-5180 HA-5135 HA-5135 HA-2510 HA-2640 HA-2740 HA-5135 HA-5135 HA-5135 HA-5135	HI-574A HI-674A HI-574A HI-5618 HI-5618 HI-5685V/87V HA-2420 HA-2420/25 HA-5320 HA-5104 HA-5170 HA-5102 HA-5170 HA-5170 HA-5170 HA-5170 HA-5170 HA-5160 HA-5160 HA-2425 HA-5102 HA-5102 HA-5141 HA-5142 HA-5144 HA-5002 HA-2520 HA-2640 HA-2620 HA-2542 HA-5033 HA-5160 HA-4741 HA-2640 HA-4741	Improved linearity Smaller pkg., lower power Faster, smaller pkg. power Faster, complete A/D CMOS micro components, lower power 16K static ram w/full mercury back-up Faster, application resistors Faster, application resistors Faster, lower power Improved linearity Monolithic, performance, 5690 is 4.44 times faster Monolithic, performance, 5695/97 is 4.44 times faster Monolithic, performance Monolithic Faster, monolithic CMOS Dielectric Isolation Faster, Ron, power Faster, Ron, power CMOS Dielectric Isolation Faster, Ron, power Faster, Ron, power Better DC Better DC Better DC Better DC Better DC Better DC Better DC Better DC Better DC Better DC Better DC Improved performance Better DC Better DC Better DC Better DC Better DC Better DC Better DC Improved performance Lower noise Monolithic, better AC and DC Monolithic Monolithic Monolithic Monolithic, better AC and DC Monolithic, better AC and DC Monolithic Monolithic, better DC Monolithic, better AC and DC Monolithic, better AC Monolithic, better AC Better DC and AC Better DC and AC Better AC Better AC Better DC and AC Better DC and AC Better DC and AC Better DC and AC Better DC and AC

USER'S GUIDE: LINEAR, DATA ACQUISITION AND TELECOM PRODUCTS

Manufacturer	Part Number	Harris Pin-for-Pin Replacement	Harris Closest Replacement	Harris Advantages
NATIONAL SEMICONDUCTOR (cont.)	LM308A LM318 LM324 LM343 LM344 LM348 LM4250 TP3040 TP3040A TP3020 TP3021	HA-5135 HA-2510 HA-2640 HC-5512 HC-5512A HC-5512C HC-5512D HC-5510 HC-5511	HA-4741 HA-2640 HA-4741 HA-5141	Better DC and AC Better AC Better AC Lower noise Identical Identical Low cost, relaxed spec Military spec Identical Identical
PRECISION MONOLITHICS	DAC-08 DAC-10 DAC-100 DAC-1408 DAC-1508 DAC-312 DMX-88 GAP01 MUX-08 MUX-16 MUX-24 MUX-28 MUX-88 OP01 OP05 OP11 OP20 OP220 OP27 OP37 OP420 PM-562 SMP-10/11 SMP-81 SSS1458 SS1558	HI-508 HA-508 HI-506 HI-509 HI-507 HI-508 HA-5135 HA-5141 HA-5142 HA-5127 HA-5137 HA-5144 HA-2425 HA-5102 HA-5102	HI-5618 HI-5610 HI-5610 HI-5618-5 HI-5618-2 HI-562A HA-2400 HA-2500 HA-4741 HI-562A HA-5320 HA-2420/25 HA-5320	Faster, application resistors Application resistors Faster, monolithic Faster, application resistors Faster, application resistors Int. linearity, application resistors VIN range, lower power 4 channels VIN range, lower power VIN range, lower power VIN range, lower power VIN range, lower power VIN range, lower power Better AC Better AC and DC Better AC Better AC Better AC Faster Lower power Faster, improved accuracy Lower power Faster, improved accuracy Better AC, lower noise Better AC, lower noise
RAYTHEON	LF155 LF155A LF156 LF156A LF157 LF157A LF355 LF355A LF356 LF356A LF357 LF357A LM108 LM108A LM118 LM1124 LM1148 LM208 LM208A LM308 LM308A LM318 LM324 LM348 RC1556 RC4131 RC4136 RC4531 RC4741	HA-5135 HA-5135 HA-2510 HA-5135 HA-5135 HA-5135 HA-5135 HA-2515 HA-2805 HA-2805 HA-2505 HA-4741	HA-5170 HA-5170 HA-5170 HA-5170 HA-5160 HA-5160 HA-5170 HA-5170 HA-5170 HA-5170 HA-5170 HA-5170 HA-5160 HA-5160 HA-5160 HA-5160 HA-5160 HA-5160 HA-4741 HA-4741 HA-4741 HA-4741 HA-4741 HA-4741	Better DC Better DC Better DC Better DC Better DC Better DC Better DC Better DC Better DC Better DC Better DC Better DC Better DC Better DC Better DC Better DC Better DC Better DC Better AC and DC Better AC and DC Better AC Better AC Better AC and DC Better AC and DC Better AC and DC Better AC and DC Better AC Better AC Better AC and DC Better AC Dielectric Isolation Better AC

USER'S GUIDE: LINEAR, DATA ACQUISITION AND TELECOM PRODUCTS

Manufacturer	Part Number	Harris Pin-for-Pin Replacement	Harris Closest Replacement	Harris Advantages
SPRAGUE	ULN2139 ULN2151 ULN2156 ULN2157 ULN2158 ULN2171 ULN2172 ULN2173 ULN2174 ULN2175 ULN2176		HA-2600 HA-2600 HA-2600 HA-2650 HA-2650 HA-2600 HA-2620 HA-2600 HA-2620 HA-2600 HA-2620 HA-2600	
TELEDYNE PHILBRICK	1321 1322 1332 1339 1341 1342 1343 1344 1345 1346 1347 1437 1438 1460 1466 4058 4058-83 4068A 4084 4088 4189 4551 4552 4553 4554 4853 4854 4856 4857 4866 7521 DAC801/V TP5210 TP565A TP574A TPADC85/87	HA-2620 HA-2620 HA-2645 HA-2540 HA-2539 HA-5190 HA-5160 HA-5162 HA-5180 HA-5180A HI-562A HI-5618 HI-DAC16 HI-507A HI-506A HI-509A HI-508A HA-2420/25 HA-5320 HI-7541 HI-5680I/V HI-565A HI-574A, HI-674A	HA-2625 HA-2541 HA-2541 HA-2542 HA-2542 HI-5680 HI-5687 HI-774A HA-5320 HA-2420 HA-5320 HI-674A HI-774A HI-774A	Identical Identical Identical Identical Identical Identical Identical Identical Identical Identical Monolithic Monolithic Monolithic Monolithic Monolithic Identical Identical Identical Identical Identical Identical Identical Monolithic, smaller pkg. Faster, monolithic, smaller pkg. Identical Monolithic, smaller pkg., power Identical Identical Identical Faster Identical Identical, 674A is 1.67 times faster
TEXAS INSTRUMENTS	MC1458 MC1558 TCM2910A TCM2911A TCM2912A TCM4110 TCM4212+ TCM4201+ TCM4208= 3 chip set TCM4910 TL022 TL044 TL061 TL062 TL064 TL072 TL074 TL082 TL084	HA-5102 HA-5102 HC-5510 HC-5511 HC-5512 HC-5510 HC-5510 HA-5142	HC-5502A or HC-5504 HA-5144 HA-5141 HA-5142 HA-5144 HA-5102 HA-5104 HA-5102 HA-5104	Lower noise Lower noise Lower power, two supplies Lower power, two supplies Lower noise, lower cross talk, lower power Lower power, two supplies Fewer external components Lower power, two supplies Better DC Better DC Better DC, lower noise MIL range available MIL range available MIL range available MIL range available MIL range available MIL range available
TRANSITRON	TOA7709 TOA8709	HA-2600 HA-2605		

USER'S GUIDE: 80C86 FAMILY COMMUNICATION CIRCUITS

UART Cross-Reference List

HARRIS	Intersil	RCA	Speed	Temp. Range	Voltage
HD1-6402R-8	IM6402-1MDL/88313	—	2.0MHz	-55°C TO +125°C	5.0V ± 10%
HD1-6402R-2	IM6402-1MDL	CDP6402CD	2.0MHz	-55°C TO +125°C	5.0V ± 10%
HD1-6402R-9	IM6402-1IDL	CDP6402CD	2.0MHz	-40°C TO +85°C	5.0V ± 10%
HD3-6402R-9	IM6402-1IPL	CDP6402CE	2.0MHz	-40°C TO +85°C	5.0V ± 10%
HD1-6402B-8	—	—	8.0MHz	-55°C TO +125°C	5.0V ± 10%
HD1-6402B-2	—	—	8.0MHz	-55°C TO +125°C	5.0V ± 10%
HD1-6402B-9	—	—	8.0MHz	-40°C TO +85°C	5.0V ± 10%
HD3-6402B-9	—	—	8.0MHz	-40°C TO +85°C	5.0V ± 10%

Bit Rate Generator Cross-Reference List

HARRIS	Fairchild	Intersil	Temp. Range	Voltage
HD1-4702-8	4702BDMQB	—	-55°C TO +125°C	5.0V ± 10%
HD1-4702-2	4702BDM	—	-55°C TO +125°C	5.0V ± 10%
HD1-4702-9	4702BDC	IM4702IJE	-40°C TO +85°C	5.0V ± 10%
HD3-4702-8	4702BPC	IM4702IPE	-40°C TO +85°C	5.0V ± 10%

HARRIS/INTEL Cross-Reference Guide

Product	Intel Part No.	HARRIS Part No.
8086 (8MHz)	XX8086-2	XX80C86-2
8086 (5MHz)	XX8086	XX80C86
8088 (8MHz)	XX8088-2	XX80C88-2
8088 (5MHz)	XX8088	XX80C88
8237A (3MHz)	XX8237A	82C37A-5
8237A (4MHz)	XX8237A-4	XX82C37A-5
8237A (5MHz)	XX8237A-5	XX82C37A-5
8237A (8MHz)	NA	XX82C37A
8253 (2MHz)	XX8253	XX82C54-5
8253 (3MHz)	XX8253-5	XX82C54-5
8254 (5MHz)	NA	XX82C54-5
8254 (8MHz)	XX8254	XX82C54
8255A (2MHz)	XX8255A	XX82C55A-5
8255A (3MHz)	XX8255A-5	XX82C55A-5
8255A (5MHz)	NA	XX82C55A-5
8255A (8MHz)	NA	XX82C55A
8259A (2MHz)	XX8259A-8	XX82C59A-5
8259A (5MHz)	XX8259A	XX82C59A-5
8259A (8MHz)	XX8259A-2	XX82C59A
8282	XX8282	XX82C82
8283	XX8283	XX82C83H
8284A	XX8284A	XX82C84A
82C85	NA	XX82C85
8286	XX8286	XX82C86H
8287	XX8287	XX82C87H
8288	XX8288	XX82C88
8289	XX8289	XX82C89

USER'S GUIDE: DIGITAL PRODUCTS

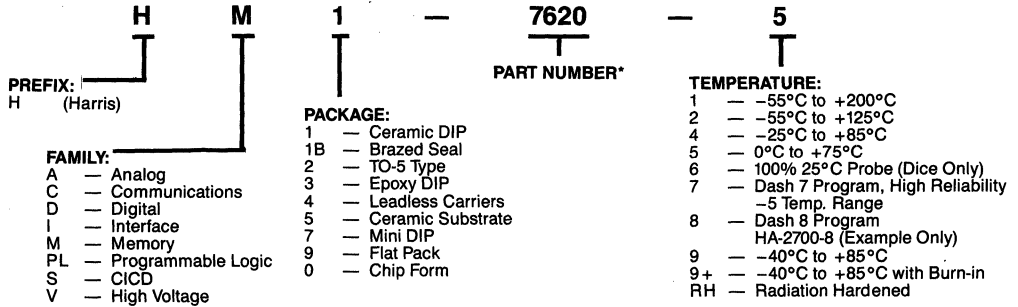
UART Cross-Reference List

Description	Harris	AMD	AMI	Fujitsu	Hitachi	IDT	Intersil	MPS	Mitsubishi
1Kx1, 16 pin Synchronous	HM-6508		6508	8401			6508	6508	
1Kx1, 18 pin Synchronous	HM-6518		6518				6518		
256x4, 22 pin Synchronous	HM-6551						6551		
256x4, 18 pin Synchronous	HM-6561						6561		
4Kx1, 18 pin Synchronous	HM-6504	92L44	6504	8404	4315 6147		6504	6504	
1Kx4, 18 pin Synchronous	HM-6514	91L14 91L24	6514	8414	4334 6148		6514	6514	58981
2Kx8, 24 pin Synchronous	HM-6516								
2Kx8, 24 pin Asynchronous	HM-65162			8416	6116	6116			5117
16Kx1, 20 pin Asynchronous	HM-65262			8167	6167	6167			
8Kx8, 28 pin Asynchronous	HM-65642 HM-8808A	99C88		8464	6264	7M864			5164
32Kx8, 28 pin Asynchronous	HM-8832				62256	7M856			5256

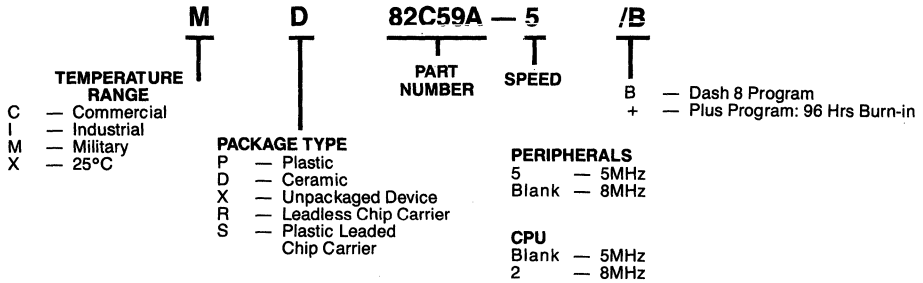
Description	Harris	Motorola	National	NEC	OKI	RCA	SMOS	Toshiba	NMOS, OTHER
1Kx1, 16 pin Synchronous	HM-6508	6508	6508 74C929	443		6508 1821		5508	2125, 4015
1Kx1, 18 pin Synchronous	HM-6518	6518	6518 74C930						
256x4, 22 pin Synchronous	HM-6551		6551 74C920			1822 5101		5101	2101
256x4, 18 pin Synchronous	HM-6561								2111
4Kx1, 18 pin Synchronous	HM-6504	6504	6504		5104		6504	5504	2141, 2147 315D, 4104 4404
1Kx4, 18 pin Synchronous	HM-6514	6514	6514	444	5114 5115	5114	6514	5514	2114, 2148 2149, 4045 314A
2Kx8, 24 pin Synchronous	HM-6516		6516						
2Kx8, 24 pin Asynchronous	HM-65162	65116	6116	446	5128	6116	2016	5517	4802, 2116 2016, 4016
16Kx1, 20 pin Asynchronous	HM-65262								2167, 8167 1400
8Kx8, 28 pin Asynchronous	HM-65642 HM-8808A	6164	6164	4464		6264	2064	5564 5565	
32Kx8, 28 pin Asynchronous	HM-8832			43256				55256	

Component Ordering Information

Harris Part Number



80C86 Family Product Number



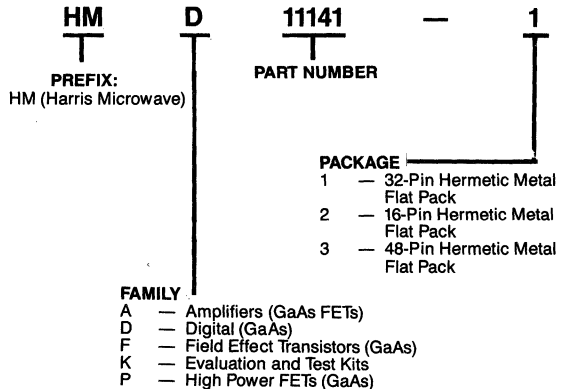
* Alpha suffix parts are defined in individual data sheets.

Ordering Information

Harris products are designated by "Product Code". When ordering, please refer to products by the full code. Harris products will always begin with H, except in the case of Chip products or products which are branded with industry standard part numbers, such as 80C86. Specific device numbers will always be isolated by hyphens. Industry standard part numbers should be ordered as stated in this schedule.

Component Ordering Information

Harris Microwave Products
(Gallium Arsenide)



Harris Sales Locations

For a complete listing of all Harris sales locations throughout the world, or to receive more detailed technical literature on any Harris product described herein, please call (305) 724-7418.

U.S. HEADQUARTERS

Harris Semiconductor
2401 Palm Bay Road
Palm Bay, Florida 32905
TEL: (305) 724-7418

EUROPEAN HEADQUARTERS

Harris/MHS Semiconductor Sales Ltd.
Eskdale Road
Winnersh Triangle
Wokingham RG11 5TR
Berkshire
United Kingdom
TEL: 0734-698787

FAR EAST HEADQUARTERS

Harris K.K.
Shinjuku NS Bldg. Box 6153
2-4-1 Nishi-Shinjuku
Shinjuku-Ku, Tokyo 163 Japan
TEL: (03) 345-8911

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NOTES

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Gallium Arsenide

Semicustom

Custom

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