

8-bit Microcontrollers

H8/300L Series

Series	Product Name	Part No.			Memory Size		Speed MHz		Low Power Mode	Timers			Serial			A/D 8-Bit # channels	I/O Pins		Interrupts		Other Features	Notes	Package		
		OTP	ROM	Flash	ROM	RAM	@5V	@3V		8-bit	16-bit	PWM 14-bit	Sync I/O 8/16 bit	Sync I/O 32-byte	Sync/Async		I/O	Input only	Ext.	Int.			DIP	QFP	TQFP
H8/3614	H8/3612	HD6473614	HD6433612		16K	512	4.2	2.1	4	5			1	1	8	44	10	6	9	32KHz Sub Clock Generator.	6	64	64		
	H8/3613	HD6473614	HD6433613		24K	1K	4.2	2.1	4	5	1		1	1	8	44	10	6	9		6	64	64		
	H8/3614	HD6473614	HD6433614		32K	1K	4.2	2.1	4	5	1		1	1	8	44	10	6	9		6	64	64		
H8/3644	H8/3640	HD6473644	HD6433640		8K	512	5	5	7	3	1	1	1	1	8	45	8	12	21	Watchdog timer, 32KHz Sub Clock Generator.	6	64	64	80	
	H8/3641	HD6473644	HD6433641		12K	512	5	5	7	3	1	1	1	1	8	45	8	12	21		6	64	64	80	
	H8/3642	HD6473644	HD6433642		16K	512	5	5	7	3	1	1	1	1	8	45	8	12	21		6	64	64	80	
	H8/3643	HD6473644	HD6433643		24K	1K	5	5	7	3	1	1	1	1	8	45	8	12	21		6	64	64	80	
	H8/3644	HD6473644	HD6433644	HD64F3644	32K	1K	5	5	7	3	1	1	1	1	8	45	8	12	21		2,6,7	64	64	80	
H8/3657	H8/3652	HD6473657	HD6433652		16K	1K	5	2.5	7	3	1	1	1	1	8	59	8	12	21	Watchdog timer, 32KHz Sub Clock Generator.	8,9	80	80		
	H8/3653	HD6473657	HD6433653		24K	1K	5	2.5	7	3	1	1	1	1	8	59	8	12	21		8,9	80	80		
	H8/3654	HD6473657	HD6433654		32K	1K	5	2.5	7	3	1	1	1	1	8	59	8	12	21		8,9	80	80		
	H8/3655	HD6473657	HD6433655		40K	2K	5	2.5	7	3	1	1	1	1	8	59	8	12	21		8,9	80	80		
	H8/3656	HD6473657	HD6433656		48K	2K	5	2.5	7	3	1	1	1	1	8	59	8	12	21		8,9	80	80		
	H8/3657	HD6473657	HD6433657		60K	2K	5	2.5	7	3	1	1	1	1	8	59	8	12	21		8,9	80	80		
H8/3714	H8/3712	HD6473714	HD6433712		16K	384	4.2	2.1	4	5		1	1	1	8	44	10	4	10	VFD driver, 16 Segments, 8 Digits and 8 combined segments/digits, -40V output drive, VFD can be multiplexed with keyboard scanning. 32KHz Sub Clock Generator.	1,5,6	64	64		
	H8/3713	HD6473714	HD6433713		24K	384	4.2	2.1	4	5		1	1	1	8	44	10	4	10		1,5,6	64	64		
	H8/3714	HD6473714	HD6433714		32K	512	4.2	2.1	4	5		1	1	1	8	44	10	4	10		1,5,6	64	64		
H8/3724	H8/3723	HD6473724	HD6433723		24K	384	4.2	2.1	4	5		1	1	1	8	60	10	6	10	VFD driver, 20 Segments, 8 Digits and 8 combined segments/digits, -40V output drive, VFD can be multiplexed with keyboard scanning. 32KHz Sub Clock Generator.	1,5,6		80		
	H8/3724	HD6473724	HD6433724		32K	512	4.2	2.1	4	5		1	1	1	8	60	10	6	10		1,5,6		80		
	H8/3725	HD6473726	HD6433725		40K	640	4.2	2.1	4	5		1	1	1	8	60	10	6	10		1,5,6		80		
	H8/3726	HD6473726	HD6433726		48K	1K	4.2	2.1	4	5		1	1	1	8	60	10	6	10		1,5,6		80		
H8/3814S	H8/3812S	HD6473834	HD6433812S		16K	512	5	2.5	6	2	1		1	1	12	71	13	13	16	LCD controller, 20 byte character RAM. 40 Segments, 4 common, externally expandable with HD66100 up to 160 segments., low voltage A/D, 32KHz Sub Clock Generator.	3,4,5,6		100	100	
	H8/3813S	HD6473834	HD6433813S		24K	512	5	2.5	6	2	1		1	1	12	71	13	13	16		3,4,5,6		100	100	
	H8/3814S	HD6473834	HD6433814S		32K	512	5	2.5	6	2	1		1	1	12	71	13	13	16		3,4,5,6		100	100	

Notes

1. High voltage I/O ports are from Vcc to -40 volts. Normal I/O are from Vcc to Gnd
2. Devices in TQFP 80 pin package are under development
3. The 16 bit timer can be used as two independent 8-bit timers
4. For H8/3812/13/14 expanding segment drivers work only for 1/1 and 1/2 duty ratios
5. VFD = Vacuum Fluorescent Display, LCD = Liquid Crystal Display
6. Standard temp is -20 C to +75 C. 1 temp is -40 C to +85 C @ 1000 hr test
7. For H8/3644 Flash device Vcc = 3.0 - 5.5V
8. Low voltage operation device: For this device "5V" = 2.7V to 5.5V and "3V" = 2.2V to 5.5V
9. This device is offered in two types of TQFP and QFP packages: TQFP-80C, TQFP-80F, QFP-80A, and QFP-80B

Package Type Descriptions

- DIP: Dual In-line Package
 QFP: Quad Flat Package
 TQFP: Thin Quad Flat Package

8-bit Microcontrollers (Continued)

H8/300 Series

Series	Product Name	Part No.				Memory Size		Speed MHz		Low Power Mode	Timers			SCI ¹ Sync / Async	A/D # chan, res	D/A # chan, 8-bit	I/O Pins		Interrupts		Other Features	Notes	Package					
		OTP	ROM	ROMless	Flash	ROM	RAM	@ 5v	@ 3v		8-bit	16-bit	PWM 8-bit				I/O	Input only	Ext	Int			DIP	QFP	TQFP	PLCC	win DIP	win LCC
SmartCard ICs	H8/3101	HCD6483101				10K	256	10		1							2				ROM security function, 8K EEPROM		Die, COB or 10 pin SOP					
	H8/3102	HCD6483102				16K	512	10	5	1							2						Die, COB, or COT					
	H8/3103	HCD6483103				20K	512	5	5	1							2				16K EEPROM		Die, COB, or COT					
H8/325	H8/322	HD6473228	HD6433228			8K	256	10		3	2	1				53		4	17	Parallel handshake port 16 high current (10 mA) outputs	4	64	64	68	64			
	H8/323	HD6473238	HD6433238	HD6413238		16K	512	10		3	2	1				53		4	17		4	64	64	68	64			
	H8/324	HD6473258	HD6433248			24K	1K	10		3	2	1				53		4	17		4	64	64	68	64			
	H8/325	HD6473258	HD6433258	HD6413258		32K	1K	10		3	2	1				53		4	17		4	64	64	68	64			
	H8/3256	HD6473256	HD6433256			48K	2K	10	5	3	2	1				53		4	17		4	64	64	68	64			
	H8/3257	HD6473257	HD6433257			60K	2K	10	5	3	2	1				53		4	17		4	64	64	68	64			
H8/3217	H8/3202	HD6473214	HD6433202			16K	512	16	10	3	2	1				53		4,8	26	I ² C, ISA bus Host I/F (not H8/3212), KBD controller (not H8/3212), Watchdog timer, 16 high current (10 mA) outputs	4,5	64	64	80				
	H8/3212	HD6473214	HD6433212			16K	512	16	10	3	3	1	16			53		4	26		4,5	64	64	80				
	H8/3214	HD6473214	HD6433214			32K	1K	16	10	3	3	1	16			53		4,8	26		4,5	64	64	80				
	H8/3216	HD6473217	HD6433216			48K	2K	16	10	3	3	1	16			53		4,8	26		4,5	64	64	80				
	H8/3217	HD6473217	HD6433217			60K	2K	16	10	3	3	1	16			53		4,8	26		4,5	64	64	80				
H8/329	H8/326	HD6473278	HD6433268	HD6413278		8K	256	10	5	3	2	1		1	8, 8bit		43	8	4	18	16 high current (10 mA) outputs	4	64	64	68			
	H8/327	HD6473278	HD6433278	HD6413278		16K	512	10	5	3	2	1		1	8, 8bit		43	8	4	18		4	64	64	80	68	64	
	H8/328	HD6473298	HD6433288	HD6413298		24K	1K	10	5	3	2	1		1	8, 8bit		43	8	4	18		4	64	64	68	64		
	H8/329	HD6473298	HD6433298	HD6413298		32K	1K	10	5	3	2	1		1	8, 8bit		43	8	4	18		4	64	64	80	68	64	
H8/3297	H8/3292	HD6473294	HD6433292			16K	512	16	10	3	2	1		1	8, 10bit		43	8	4	19	Watchdog timer, wait state controller	4	64	64	80			
	H8/3294	HD6473294	HD6433294			32K	1K	16	10	3	2	1		1	8, 10bit		43	8	4	19		4	64	64	80			
	H8/3296	HD6473297	HD6433296			48K	2K	16	10	3	2	1		1	8, 10bit		43	8	4	19		4	64	64	80			
	H8/3297	HD6473297	HD6433297			60K	2K	16	10	3	2	1		1	8, 10bit		43	8	4	19		4	64	64	80	64		

(table continued next page)

Notes

1. SCI = Serial Communication Interface.
2. IKAP = Integrated Keyboard And Power management.
3. fC is an option for H8/3334Y, 3336Y, 3337Y, H8/3434, H8/3436, and H8/3437. Inform Hitachi if option is to be used. In mask ROM versions, chips featuring the PC bus include a W in the part number.
4. Standard temp is -20 C to +75 C. I temp is -40 C to +85 C @ 1000 hr. test. J temp (limited devices) = I temp @ 2000 hr. test. Please contact Marketing for extended temperature requirements.
5. KBD Controller is Keyboard Controller.

www.hitachi.com/semiconductor

Package Type Descriptions

- DIP: Dual In-line Package
 QFP: Quad Flat Package
 TQFP: Thin Quad Flat Package
 PLCC: Plastic Leaded Chip Carrier
 win DIP: Windowed DIP
 win LCC: Windowed Leaded Chip Carrier
 Die: Bare die
 COB: Chip On Board
 COT: Chip On Tape
 SOP: Small Outline Package

8-bit Microcontrollers (Continued)

H8/300 Series (Continued)

Series	Product Name	Part No.				Memory Size		Speed MHz		Low Power Mode	Timers			SCI ¹ Sync / Async	A/D # chan, res	D/A # chan, 8-bit	I/O Pins		Interrupts		Other Features	Notes	Package							
		OTP	ROM	ROMless	Flash	ROM	RAM	@ 5v	@ 3v		8-bit	16-bit	PWM 8-bit				I/O	Input only	Ext	Int			DIP	QFP	TQFP	PLCC	win DIP	win LCC		
H8/3522	H8/3522	HD6473294	HD6433522			16K	512	10		3	2	1		1	8, 10bit		43	8	4	19	Watchdog timer, wait state controller	4	64	64						
H8/330	H8/330	HD6473308	HD6433308	HD6413308		16K	512	10		3	2	1	2	1	8, 8bit		58	8	9	19	15 byte dual port RAM, KBD controller 16 high current (10 mA) outputs	2,4,5		80		84			84	
H8/3337Y	H8/3334Y	HD6473334Y	HD6433334Y		HD64F3334Y	32K	1K	16	10	3	2	1	2	2	8, 10bit	2	58	8	9	26	I ² C, ISA bus Host I/F, KBD controller, watchdog timer, wait state controller, 16 high current (10mA) outputs	2,3,4,5		80	80	84				
	H8/3336Y	HD6473337Y	HD6433336Y		HD64F3337Y	48K	2K	16	10	3	2	1	2	2	8, 10bit	2	58	8	9	26		2,3,4,5		80	80	84				
	H8/3337Y	HD6473337Y	HD6433337Y		HD64F3337Y	60K	2K	16	10	3	2	1	2	2	8, 10bit	2	58	8	9	26		2,3,4,5		80	80	84			84	
H8/3397	H8/3394	HD6473334Y	HD6433394			32K	1K	16	10	3	2	1	2	2	8, 10bit		58	8	9	26	KBD controller, watchdog timer, wait state controller, 16 high current (10 mA) outputs	2,4,5		80	80	84				
	H8/3396	HD6473337Y	HD6433396			48K	2K	16	10	3	2	1	2	2	8, 10bit		58	8	9	26		2,4,5		80	80	84				
	H8/3397	HD6473337Y	HD6433397			60K	2K	16	10	3	2	1	2	2	8, 10bit		58	8	9	26		2,4,5		80	80	84				
H8/3534	H8/3534		HD6433534			32K	1K	10		3	2	1	2	2	8, 10bit		58	8	9	26	KBD controller, watchdog timer, wait state controller, 16 high current outputs	2,4,5		80						
H8/3437	H8/3434	HD6473434	HD6433434		HD64F3434	32K	1K	16	10	3	2	1	2	2	8, 10bit	2	74	8	9	26	I ² C, ISA bus Host I/F, KBD controller, watchdog timer, wait state controller, 16 high current (10mA) outputs	2,3,4,5		100	100					
	H8/3436	HD6473437	HD6433436		HD64F3437	48K	2K	16	10	3	2	1	2	2	8, 10bit	2	74	8	9	26		2,3,4,5		100	100					
	H8/3437	HD6473437	HD6433437		HD64F3437	60K	2K	16	10	3	2	1	2	2	8, 10bit	2	74	8	9	26		2,3,4,5		100	100					
H8/338	H8/336	HD6473378	HD6433368	HD6413378		24K	1K	10	5	3	2	1	2	2	8, 8bit	2	58	8	9	22	16 high current (10 mA) outputs	4		80		84				
	H8/337	HD6473378	HD6433378	HD6413378		32K	1K	10	5	3	2	1	2	2	8, 8bit	2	58	8	9	22		4		80		84			84	
	H8/338	HD6473388	HD6433388	HD6413388		48K	2K	10	5	3	2	1	2	2	8, 8bit	2	58	8	9	22		4		80		84			84	
H8/3318	H8/3315	HD6473318	HD6433315			32K	2K	16	10	3	2	2		2	8, 10bit		58	8	9	33	Data transfer unit (DTU), programmable timing pattern controller (TPC), watchdog timer	4		80	80	84				
	H8/3318	HD6473318	HD6433318			60K	4K	16	10	3	2	2		2	8, 10bit		58	8	9	33		4		80	80	84			84	

Notes

1. SCI = Serial Communication Interface.
2. IKAP = Integrated Keyboard And Power management.
3. PC is an option for H8/3334Y, 3336Y, 3337Y, H8/3434, H8/3436, H8/3437, and H8S/2100. Inform Hitachi if option is to be used. In mask ROM versions, chips featuring the PC bus include a W in the part number.
4. Enables programmable interconnections of timer inputs and outputs.
5. Standard temp is -20 C to +75 C. I temp is -40 C to +85 C @ 1000 hr. test. J temp (limited devices) = I temp @ 2000 hr. test. Please contact Marketing for extended temperature requirements.
6. KBD Controller is Keyboard Controller.

Package Type Descriptions

- DIP: Dual In-line Package
 QFP: Quad Flat Package
 TQFP: Thin Quad Flat Package
 PLCC: Plastic Leaded Chip Carrier
 win DIP: Windowed DIP
 win LCC: Windowed Leaded Chip Carrier

H8S/2100 Series

Series	Part No.	Memory Size		Add Space	External Data Bus	Speed MHz		Low Power Mode	Timers				SCI ² Sync / Async	IrDA 1.0	Comparator # channels 6 bit	A/D # channels 10-bit	D/A # channels 8-bit	I/O Pins		Interrupts		Package	
		Flash	RAM			@ 5v	@ 3v		8-bit	16-bit	WD Timer	PWM 14-bit						I/O	Input only	Ext	Int	QFP	TQFP
H8S/2144	HD64F2144	128K	4K	16M	8, 16	20	10	8	3	1	2	2	3	1	16	8	2	74	8	9	46	100	100
H8S/2134	HD64F2134	128K	4K	16M	8	20	10	8	3	1	2	2	3	1	8	8	2	58	8	9	31	80	80

16-bit Microcontrollers

H8/300H Series

Series	Product Name	Part No.				Memory Size		Speed ¹		Low Power Modes	Timers			TPC ⁵ Bits	SCI ² Sync/ Async	A/D 10-bit # chan	D/A 8-bit # chan	I/O Pins		Interrupts		DMA # chan	External Bus Interface (BSC) ⁹	Other Features	Notes	Package			
		OTP	ROM	ROMless	Flash	ROM	RAM	MHz @5V	MHz @3V		8-bit (PWM)	16-bit (PWM)	Watch-dog					I/O	Input only	Ext	Int					QFP	TQFP		
H8/3001	H8/3001			HD6413001		512		18	13	3		5		12	1	4		28	4	4	20			3,4,6	80	80			
H8/3002	H8/3002			HD6413002		512		17	10	3		5	1	16	2	8		38	8	7	30	max 4	DRAM,SRAM,EPR OM		3,4,6	100	100		
H8/3003	H8/3003			HD6413003		512		16	10	3		5	1	16	2	8		50	8	9	34	max 8	DRAM,SRAM,EPR OM		3,4,6	112	120		
H8/3005	H8/3004			HD6413004		2K		18	13	3		5	1		1	8		21	11	6	21		SRAM,EPROM		3,4,6,8	80	80		
	H8/3005			HD6413005		4K																							
H8/3032	H8/3030			HD6433030S		16K	512	18	10	3		5	1	16	1	8		55	8	6	21		SRAM,EPROM		3,4,6,8	80	80		
	H8/3031			HD6433031S		32K	1K																						
	H8/3032	HD6473032		HD6433032S		64K	2K																						
H8/3035	H8/3033			HD6433033		128K	4K	18	10	3		5	1	16	1	8		55	8	6	21		SRAM,EPROM		8	80	80		
	H8/3034			HD6433034		192K		18	10																				
	H8/3035	HD6473035		HD6433035		256K		18	10																				
H8/3042	H8/3040			HD6433040S		32K	2K	17	10	3		5	1	16	2	8	2	70	8	7	30	max 4	DRAM,SRAM,EPR OM			100	100		
	H8/3041			HD6433041S		48K																			3,4,6				
	H8/3042	HD6473042		HD6433042S		64K																							
H8/3048	H8/3044			HD6433044S		32K	2K	18	13	5		5	1	16	2	8	2	70	8	7	30	max 4	DRAM,SRAM,EPR OM	Smart Card Interface, Clock Pulse Generator ¹⁰	3,4,6,7	100	100		
	H8/3045			HD6433045S		64K	2K																						
	H8/3047			HD6433047S		96K	4K																						
	H8/3048	HD6473048S		HD6433048S	HD64F3048	128K	4K																						

Notes

- 2.7-5.5 device operation designated by a V version; eg. HD64330xx(S)VF8. At 2.7V, max frequency is 8MHz.
- SCI = Serial Communication Interface.
- Address space is max 16MB except for H8/3032 where it is max 1MB.
- Bus width is 8 or 16 bits wide except for H8/3004, H8/3005, H8/303x where it is only 8 bits.*
- TPC = Timing Pattern Controller. Provides additional PWM pulse outputs.
- Standard temp is -20 C to +75 C. Extended (I) temp. is -40 C to +85 C @ 1000 hr test. J temp (limited devices)= I temp @ 2000 hr test; limited availability.
- Flash version operates at a maximum frequency of 16MHz at 5V.
- No Chip Select (CS) lines implies decoding logic needed.
- BSC = Bus State Controller. Allows for wait state insertion during external access cycles.
- Allows dynamic system frequency modification.

Package Type Descriptions

- QFP: Quad Flat Package
TQFP: Thin Quad Flat Package

16-bit Microcontrollers (continued)

H8S/2000

Series	Product Name	Part No.			Memory Size		Speed		Low Power Modes	Timers			PPG ¹ Bits	SCI ² Sync/ Async	A/D ³ 10-bit # chan	D/A 8-bit # chan	I/O Pins		Interrupts		DMA # chan	External Bus Interface (BSC) ⁴	Other Features	Notes	Package Type	
		OTP	ROM	ROMless	ROM	RAM	MHz @ 5v	MHz @ 3v		8-bit (PWM)	16-bit (PWM)	Watch-dog					I/O	Input only	Ext	Int					QFP	TQFP
H8S/2245	H8S/2240			HD6412240		4K																				
	H8S/2241		HD6432241		32K	4K																SRAM, EPROM, Burst ROM	Smartcard Interface, Interrupt Priority Controller ⁵ , DTC ⁶ , CPG ⁷			
	H8S/2242		HD6432242		32K	8K																				
	H8S/2245		HD6432245		128K	4K																				
	H8S/2246	HD6472246	HD6432246		128K	8K	20	13	5	2	3	1		3	4		75	4	9	34				8	100	100
H8S/2345	H8S/2343		HD6432343		64K	2K	20	10	5	2	6	1		2	8	2	71	8	9	43		SRAM, EPROM, Burst ROM	Smartcard Interface, Interrupt Priority Ctrl ⁵ , DTC ⁶ , CPG ⁷	8	100	100
	H8S/2345	HD6472345	HD6432345		128K	4K																				
H8S/2350	H8S/2350			HD6412350		2K	20	13	5		6	1	16	2	8	2	87	8	9	42	max 4	DRAM ¹⁰ , SRAM, EPROM, Burst ROM	Smartcard Interface, Interrupt Priority Ctrl ⁵ , DTC ⁶ , CPG ⁷	8	128	120
	H8S/2351		HD6432351		64K	2K	20	10	5		6	1	16	2	8	2	87	8	9	42	max 4			8	128	120
H8S/2355	H8S/2353		HD6432353		64K	2K	20	10	5	2	6	1		3	8	2	87	8	9	47		SRAM, EPROM, Burst ROM	Smart Card I/F, H8S/2655 pin- Smartcard Interface, Interrupt Priority Ctrl ⁵ , DTC ⁶ , CPG ⁷	8	128	120
	H8S/2355		HD6432355		128K	4K																				
	H8S/2355	HD6472355			128K	4K	20	10	5	2	6	1		3	8	2	87	8	9	47				8	128	120
H8S/2655	H8S/2653		HD6432653		64K	4K	20	10	5	2	6	1	16	3	8	2	87	8	9	52	max 4	DRAM ¹⁰ , SRAM, EPROM, Burst ROM	Smartcard Interface, Interrupt Priority Ctrl ⁵ , DTC ⁶ , CPG ⁷	8,9	128	120
	H8S/2655	HD6472655	HD6432655		128K	4K																				

Under Development, available 2Q98

Notes

1. PPG = Programmable Pattern Controller. Provides additional PWM pulse outputs.
2. SCI = Serial Interface Controller.
3. A/D conversion times at 20MHz: 2.2us (H8S/2655), 6.7us (H8S/23xx), 10us (H8S/22xx)
4. BSC = Bus State Controller. Allows for wait state insertion during external access cycles.
5. H8S devices allow for 8 interrupt priority levels except the H8S/22xx which only allow 3.
6. DTC = Data Transfer Controller. Provides another means of transferring data (besides the DMA) within the allowable memory space.
7. CPG = Clock Pulse Generator. Has built-in duty correction circuitry, and allows dynamic system frequency modification down to 32KHz.
8. Std temp -20 C to +75 C. 1 (wide) temp -40 C to +85 C @ 1000 hr test (Planned).
9. A Multiply-Accumulate function (MAC) is provided on the H8S/2655 performing 16x16+42-bit operations.
10. Supports DRAM fast page mode.

Package Type Descriptions

- QFP: Quad Flat Package
TQFP: Thin Quad Flat Package