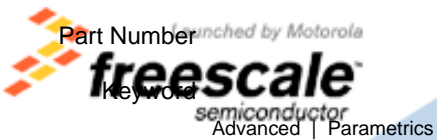


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[Microcontrollers](#) > [16-Bit \(HCS12, M68HC12, M68HC16, 56800/E\)](#) > [HCS12 Family](#) > MC9S12UF32

MC9S12UF32 : Microcontroller

BE ▶

The MC9S12UF32 microcontroller unit (MCU) is a 16-bit device composed of standard on-chip peripherals including a 16-bit central processing unit (HCS12 CPU), 32K bytes of Flash EEPROM, and 3.5K bytes of RAM. In addition to the in-chip full-speed USB 2.0 interface, the MC9S12UF32 has built-in the following interfaces and host controllers: ATA-5 interface, compact Flash, secure digital / multimedia, smartmedia, and memory stick. Together with the flexible I/O ports, 8-channel, 16-bit timer, this MCU is well suited for applications such as multi-card readers, USB thumb drives, and USB to external harddisk drives. Available in 100-pin LQFP package. 64-pin LQFP planned for Q3 2004

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MC9S12UF32 Features

- High-performance 16-bit HCS12 CPU core
 - Upward compatible with M68HC11 instruction set
 - Interrupt stacking and programmer's model identical to M68HC11
 - Instruction pipe
 - Enhanced indexed addressing
 - Multiplexed external bus
- Maximum 30MHz bus operation at 5V
- Memory
 - 32K byte Flash EEPROM
 - 3.5K byte RAM
- Up to 75 input/output (I/O) lines
- Integrated Queue controller (IQUE)
- 8-channel, 16-bit enhanced capture timer
- Full/High speed universal serial bus 2.0 (USB 2.0)
- Serial communications interface (SCI)
- ATA-5 host controller interface
- Flash memory card interfaces
 - Compact Flash host controller
 - Secure digital/multimedia card host controller
 - Smartmedia host controller
 - Memory stick host controller
- Available in 100-pin LQFP package. 64-pin LQFP planned for Q3 2004

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Internal RAM (Byte)	Flash (Byte)	Serial Interface	Timers	Bus Frequency (Max) (MHz)	Supply Voltage (Typ) (V)	I/O Pins	Other Peripherals
		Type	Channels				
3584	32768	SCI, USB 2.0	8	30	5	75	Watchdog Timer





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MC9S12UF32 Parametrics

MC9S12UF32 Documentation








Documentation

Application Note



ID and Description	Vendor ID	Format	Size K	Rev #	Date Last Modified	Order Availability
Loading...					Loading...	
AN2546 HCS12 Load RAM and Execute Bootloader User Guide	FREESCALE	pdf	210	1	12/22/2004	
AN2546SW Software For Application Note AN2546	FREESCALE	zip	74	1	12/22/2004	-
AN2727 Designing Hardware for the HCS12 D-Family	FREESCALE	pdf	479	0	12/15/2004	
AN2597SW Software files for application note AN2597	FREESCALE	zip	324	0	11/04/2004	-
AN2287 HCS12 External Bus Design	FREESCALE	pdf	577	1	8/27/2004	
AN2408 Examples of HCS12 External Bus Design; A Companion Note to AN2287/D	FREESCALE	pdf	565	2	8/13/2004	
AN2548SW1 Software for application note AN2548. Part 1 of a 2-part set.	FREESCALE	zip	162	1.0	7/21/2004	-
AN2548SW2 Software to accompany application note AN2548. Part 2 of a 2-part set.	FREESCALE	zip	22	1.0	7/21/2004	-
AN2720SW Software files for AN2720/D	FREESCALE	zip	2	1.0	7/21/2004	-

<u>AN2720</u> A Utility for Programming Single FLASH Array HCS12 MCUs, with Minimum RAM Overhead	FREESCALE	pdf	339	1	5/27/2004	
<u>AN2617</u> A Software Interrupt Priority Scheme for HCS12 Microcontrollers	FREESCALE	pdf	422	0	2/10/2004	
<u>AN2617SW</u> Software files for AN2617	FREESCALE	zip	60	0	2/10/2004	-
<u>AN2678</u> Using the HCS12 NVM Standard Software Drivers with the Cosmic Compiler	FREESCALE	pdf	350	0	1/30/2004	
<u>AN2250SW2</u> Software files for application note AN2250. Part 2 of a 3 part set.	FREESCALE	zip	139	0	12/05/2003	-
<u>AN2250SW1</u> Software files for application note AN2250. Part 1 of a 3 part set	FREESCALE	zip	51	1	12/03/2003	-
<u>AN2250SW3</u> Software Files For Application Note AN2250. Part 3 of a 3 Part Set.	FREESCALE	zip	487	1	12/03/2003	-
<u>AN2612SW</u> Software for AN2612	FREESCALE	zip	145	0	11/21/2003	-
<u>AN2612</u> PWM Generation Using HCS12 Timer Channels	FREESCALE	pdf	294	0	11/14/2003	
<u>AN2597</u> Using the MC9S12E128 to Implement an IrDA Interface	FREESCALE	pdf	702	0	10/17/2003	
<u>AN2548</u> Serial Monitor Program for HCS12 MCUs	FREESCALE	pdf	672	0	9/11/2003	
<u>AN2485</u> HCS12 Software Stationery	FREESCALE	pdf	1181	0	8/26/2003	
<u>AN2485SW</u> Software files for application note AN2485	FREESCALE	zip	313	0	8/26/2003	-
<u>AN2400</u> HCS12 NVM Guidelines	FREESCALE	pdf	808	3	7/30/2003	
<u>AN2216</u> MC9S12DP256 Software Development Using Metrowerks Codewarrior	FREESCALE	pdf	467	2	4/17/2003	
<u>AN2428</u> An Overview of the HCS12 ATD Module	FREESCALE	pdf	415	0	4/02/2003	
<u>AN2429</u> Interfacing to the HCS12 ATD Module	FREESCALE	pdf	416	0	3/19/2003	
<u>AN2438</u> ADC Definitions and Specifications	FREESCALE	pdf	497	0	2/21/2003	

<u>AN2461</u> Low Power Management using HCS12 and SBC devices	FREESCALE	pdf	701	0	2/07/2003	
<u>AN2318SW</u> Source code for use with AN2318/D	FREESCALE	zip	108	1	1/21/2003	-
<u>AN2304SW</u> Software Files for AN2304	FREESCALE	zip	1660	0	10/23/2002	-
<u>AN2304</u> Implementation of a UDP/IP Stack on HCS12 Microcontrollers	FREESCALE	pdf	3921	0	10/21/2002	
<u>AN2153SW</u> Software files for app note AN2153	FREESCALE	zip	13	0	10/17/2002	-
<u>AN2342</u> Opto Isolation Circuits For In Circuit Debugging of 68HC9 (S)12 and 68HC908 Microcontrollers	FREESCALE	pdf	337	0	9/25/2002	
<u>AN2221</u> MI Bus Software Driver for the MC9S12DP256	FREESCALE	pdf	448	1	8/21/2002	
<u>AN2318</u> Using the I2C Bus with HCS12 Microcontrollers	FREESCALE	pdf	306	0	8/14/2002	
<u>AN2221SW</u> Executable to set up software files for AN2221	FREESCALE	exe	868	0	3/06/2002	-
<u>AN2204</u> Fast NVM Programming for the MC9S12DP256	FREESCALE	pdf	382	1	2/04/2002	
<u>AN2204SW</u> Software Files for AN2204 zipped	FREESCALE	zip	11	1	2/04/2002	-
<u>AN2250_D</u> Audio Reproduction on HCS12 Microcontrollers	FREESCALE	pdf	152	0	1/23/2002	-
<u>AN2213</u> Using Cosmic Software's M68HC12 Compiler for MC9S12DP256	FREESCALE	pdf	391	0	9/01/2001	
<u>AN2153</u> A Serial Bootloader for Reprogramming the MC9S12DP256 FLASH Memory	FREESCALE	pdf	480	0	6/28/2001	
<u>AN2104</u> Using Background Debug Mode for the M68HC12 Family	FREESCALE	pdf	517	0	2/02/2001	
<u>AN1837</u> Non-Volatile Memory Technology Overview	FREESCALE	pdf	322	0	3/27/2000	
<u>AN1050_D</u> Designing for Electromagnetic Compatibility (EMC) with HCMOS Microcontrollers	FREESCALE	pdf	277	0	1/01/2000	-
<u>AN1705</u> Noise Reduction Techniques for Microcontroller-Based Systems	FREESCALE	pdf	248	0	1/01/1999	

<u>AN1783</u> Determining MCU Oscillator Start-Up Parameters	FREESCALE	pdf	226	1	1/01/1999	
<u>AN1775</u> Expanding Digital Input with an A/D Converter	FREESCALE	pdf	257	1	1/01/1998	
<u>AN1280A</u> Using the Callable Routines in D-Bug12	FREESCALE	pdf	243	0	1/01/1997	
<u>AN1716</u> Using M68HC12 Indexed Indirect Addressing	FREESCALE	pdf	256	1	1/01/1997	
<u>AN1280_D</u> Using and Extending D-Bug12 Routines	FREESCALE	pdf	247	0	1/01/1996	-
<u>AN1284</u> Transporting M68HC11 Code to M68HC12 Devices	FREESCALE	pdf	342	0	1/01/1996	
<u>AN1259</u> System Design and Layout Techniques for Noise Reduction in MCU-Based Systems	FREESCALE	pdf	234	0	1/01/1995	
<u>AN1263</u> Designing for Electromagnetic Compatibility with Single-Chip Microcontrollers	FREESCALE	pdf	104	0	1/01/1995	



Brochure

ID and Description	Vendor ID	Format	Size K	Rev #	Date Last Modified	Order Availability
<u>FLYREMBEDFLASH</u> Embedded FLASH: Changing the Technology World for the Better	FREESCALE	pdf	68	2	1/01/2003	
<u>FLYRHCS12FAM</u> The HCS12 Family of Microcontrollers	FREESCALE	pdf	35	1	4/04/2002	

Data Sheets

ID and Description	Vendor ID	Format	Size K	Rev #	Date Last Modified	Order Availability
<u>9S12UF32_ZIP</u> MC9S12UF32 User Guides, zip format, all files	FREESCALE	zip	4748	2	12/07/2004	-
<u>READ-ME_HCS12</u> READ-ME_HCS12 -- HCS12 Document Methodology	FREESCALE	pdf	224	0.2	7/09/2003	-


Engineering Bulletin

ID and Description	Vendor ID	Format	Size K	Rev #	Date Last Modified	Order Availability
<u>EB614</u> SCI Interrupt Errata Workaround for HCS12 Family Devices	FREESCALE	pdf	261	1	2/12/2003	
<u>EB396</u> Use of OSC2/XTAL as a Clock Output on Freescale Semiconductor Microcontrollers	FREESCALE	pdf	220	0	6/19/2002	

Errata - [Click here for important errata information](#)

ID and Description	Vendor ID	Format	Size K	Rev #	Date Last Modified	Order Availability
MSE9S12UF32_0L24N UPDATED MSE9S12UF32_0L24N Mask Set Errata	FREESCALE	pdf	63	2	1/18/2005	-
MSE9S12UF32_1L47S UPDATED MSE9S12UF32_1L47S Mask Set Errata	FREESCALE	pdf	55	2	1/18/2005	-



Fact Sheets

ID and Description	Vendor ID	Format	Size K	Rev #	Date Last Modified	Order Availability
MC9S12UF32FS 16-bit Microcontrollers Fact Sheet	FREESCALE	pdf	62	0	5/24/2004	

Product Change Notices

ID and Description	Vendor ID	Format	Size K	Rev #	Date Last Modified	Order Availability
PCN10302 TSPG 8/16 BIT TRIO TECH B/I CAPACITY	FREESCALE	htm	107	0	10/07/2004	-
PCN10009 MC9S12UF32 ERRATA ON BDM MASS ERASE	FREESCALE	htm	3	0	6/23/2004	-

Selector Guide

ID and Description	Vendor ID	Format	Size K	Rev #	Date Last Modified	Order Availability
SG1006 Microcontrollers Selector Guide	FREESCALE	pdf	566	0	1/01/2005	
SG1011 Software and Development Tools Selector Guide	FREESCALE	pdf	347	0	1/01/2005	

Training Reference Material

ID and Description	Vendor ID	Format	Size K	Rev #	Date Last Modified	Order Availability
HCS12TR HCS12 Hardware and Software Course	FREESCALE	htm	8	1.0	11/09/2001	-

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ID and Description	Vendor ID	Format	Size K	Rev #	Order Availability
RDHCS12UF32TD USB Thumb Drive Reference Design	FREESCALE	-	-	-	-

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Hardware Tools**Adapters**

ID and Description	Vendor ID	Format	Size K	Rev #	Order Availability
<u>SPECIAL ADAPTERS</u> Find special adapters for Freescale microcontrollers	FREESCALE	htm	2	0	-

Emulators/Probes/Wigglers

ID and Description	Vendor ID	Format	Size K	Rev #	Order Availability
<u>EMUL12--PC</u> HC12 & HCS12 Emulator BDM and Full-Featured Emulators for all HCS12 and HC12 derivatives. 5V and 3.3V operation to above 25MHz bus speed. Extensive support for debug through Resets, Power-Downs, Limp-Home and full PLL use. Unlimited number of breakpoints.	<u>NOHAU</u>	-	-	-	-
<u>INDART-HCS12/D</u> In-Circuit, Real-Time Debugger/Programmer for Motorola HCS12 and HCS12X Families (USB) inDART-HCS12/D is a powerful entry-level tool for Motorola HCS12-based systems. inDART-HCS12/D takes advantage of Metrowerks CodeWarrior HC(S)12 IDE and the BDM (Background Debug Module) feature to debug the user program.	<u>SOFTEC</u>	-	-	-	-
<u>M68CYCLONEPRO</u> Cyclone Pro Universal Standalone In-Circuit Debugger/ Programmer	<u>METROWERKS</u>	-	-	-	 
<u>USBMULTILINKBDM</u> USB HCS08/HCS12 BDM Multilink - In-Circuit Debugger/ Programmer	FREESCALE	-	-	-	 

Evaluation/Development Boards and Systems

ID and Description	Vendor ID	Format	Size K	Rev #	Order Availability
<u>M68KIT912UF32</u> MC9S12UF32 Development Kit	FREESCALE	-	-	-	 
<u>SCBDMPGMRS12</u> Enhanced 16-bit BDM Stand Alone Programmer	FREESCALE	-	-	-	 

Software**Device Drivers**

ID and Description	Vendor ID	Format	Size K	Rev #	Order Availability
HCS12SGF25NMSSD HCS12 SGF NVM Standard Software Driver Flash program/erase software driver for embedded applications and BDM programming tools.	FREESCALE	zip	2017	3.1.0	-
HIS-DRIVER HCS12SGF25NVM HIS-compatible Driver for 0.25um SGF Flash in HCS12	FREESCALE	zip	1092	1.0	-
MC9S12UF32DRV UPDATED Application Code for the M68KIT912UF32	FREESCALE	zip	2693	0.2	-


Programmers

ID and Description	Vendor ID	Format	Size K	Rev #	Order Availability
PROG12Z S PROG12Z Programmer for Internal and External Flash/EEPROM using BDM. Both a GUI and a Command Line version for production programming are provided.	PEMICRO	-	-	-	-

Software Tools**Assemblers**

ID and Description	Vendor ID	Format	Size K	Rev #	Order Availability
SRECCVTSW SRecCvtSW The zip file contains the .exe file and documentation for SRecCvt; a command line tool for the conversion and reformatting of Freescale S-Record object files. Also included is a GUI interface to the command line tool for Windows and Mac OSX.	FREESCALE	zip	1603	1.0.21	-



Compilers

ID and Description	Vendor ID	Format	Size K	Rev #	Order Availability
 CWS-H12-DXP-CX CodeWarrior for HC(S)12 Data Expert Edition	METROWERKS	-	-	-	Buy Direct Buy from Distributor
CX6812 Cosmic C Cross Compiler for HC12/HCS12 is an optimizing ANSI C compiler and integrated development environment that provides the convenience and portability of the C language along with the low level control necessary for embedded real-time applications.	COSMIC	-	-	-	-

Debuggers

ID and Description	Vendor ID	Format	Size K	Rev #	Order Availability
ZAP 6812 ICD ZAP 6812 BDM Debugger is a full featured real-time debugger and Flash programmer interface to Motorola's on- chip BDM. ZAP uses P&E's BDM Multilink cable via a PC parallel or USB port to connect to virtually any target system.	COSMIC	-	-	-	-
ZAP 6812 SIM ZAP HC12/HCS12 Simulator Debugger integrates a C and assembly source debugger with an instruction simulator to provide a standalone debugging/execution environment on the host. Features include: interrupt simulation, timers, code coverage & performance analysis.	COSMIC	-	-	-	-



IDE (Integrated Development Environment)

ID and Description	Vendor ID	Format	Size K	Rev #	Order Availability
 CWS-H12-PROED-CX CodeWarrior Development Studio for HC(S)12 Professional Edition	METROWERKS	-	-	-	Buy Direct Buy from Distributor
 CWS-H12-STDED-CX CodeWarrior Development Studio for HC(S)12, Standard Edition	METROWERKS	-	-	-	Buy Direct Buy from Distributor
FREEMASTER Application Development Tool	FREESCALE	-	-	-	-

Initialization/Boot Code Generation

ID and Description	Vendor ID	Format	Size K	Rev #	Order Availability
HCS12PLLALSW HCS12 PLL Component Calculator Utility	FREESCALE	zip	127	0	-

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Part Number	Package Description	Tape and Reel	Pb-Free Terminations	Application/Qualification Tier	Status	Budgetary Price	Info	Order
MC9S12UF32PB	LQFP 64 10*10*1.4P0.5	No	No	COMMERCIAL	Available	_____	more	
MC9S12UF32PU	LQFP 100 14*14*1.4P0.5	No	No	COMMERCIAL	Available	more	_____	Order Sample 
	_____						_____	Order Sample  Buy from Distributor

NOTE:

- Not all orderable parts are offered through our online sampling program. For further assistance in selecting a similar part from within the program, please submit a [Request for a sample order advice.](#)
- Refer to [Samples FAQ](#) for more information.
- Looking for an obsolete part? Check our [distributors' inventory](#)

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