

## Product Profile

# MCUasm™ Assembly Language Toolset for Microcontrollers

MCUasm is an assembly language development toolset that supports the Motorola M68HC05, M68HC08, M68HC11, M68HC16, and M68300 families of microcontrollers. It replaces the MASM toolset. MCUasm tools provide a path to higher performance while maintaining compatibility with existing software and systems. The toolset can operate under either 32-bit Windows or protected-mode DOS. Various combinations of tools are available in the two operating environments. Refer to **Table 1** for information concerning toolset combinations.

### MCUasm Features

- Fully compatible with MCUinit™, the graphical tool that automates MCU initialization
- Includes MCUdebug™ source-level debugger
- Relocatable or absolute object modules
- Switch selectable processor support
- Full instruction sets
- Instruction browser
- All available addressing modes
- Common syntax and extended instructions to ease upward migration
- Full macro capability with nesting
- Include file support that allows nested include files
- Linking of multiple source files
- Archiver
- Disassembler
- Optimization of long and short branches
- Generation of Motorola S-records
- 128 character symbol names
- Common Object File Format (COFF)
- User-controlled assembly listings
- Cross reference listings
- Symbol table listings
- User-selectable case sensitive labels
- Based on Motorola's assembly language input standard
- Works with existing MMDS systems and will be compatible with planned upgrades
- Works with existing CDS805 hardware and software
- User-selectable option to minimize the size of the symbol table to decrease download time
- Absolute listings available after relocation
- Creates map files for assembly debugging with M68ICD16 and M68ICD32 in-circuit debuggers



# Freescale Semiconductor, Inc.

The Assembly Language Development Toolset comes in a single package that includes:

- User's Manual
- License Agreement
- Toolset software on 3.5-inch floppy disks.

The release guide provides technical support phone and fax numbers, as well as a technical support Internet address.

**Table 1 Toolset Combinations**

Development Tool	Integrated 32-bit Windows					Protected-Mode MSDOS				
	Microcontroller Family					Microcontroller Family				
	M68HC05	M68HC08	M68HC11	M68HC16	M68300	M68HC05	M68HC08	M68HC11	M68HC16	M68300
Relocatable Assembler	✓	✓	✓	✓		✓	✓	✓	✓	✓
Linker	✓	✓	✓	✓		✓	✓	✓	✓	✓
MCUdebug Source Level Debugger <sup>1</sup>	✓	✓								
S-Record Generator	✓	✓	✓	✓		✓	✓	✓	✓	✓
Archive Utility (Librarian)	✓	✓	✓	✓		✓	✓	✓	✓	✓
Instruction Browser	✓	✓	✓	✓						
Disassembler						✓	✓	✓	✓	
Name List Utility						✓	✓	✓	✓	✓
Symbol Strip Utility	✓	✓	✓	✓		✓	✓	✓	✓	✓
Absolute Listing Utility	✓	✓	✓	✓		✓	✓	✓	✓	✓
MASM to MCUasm Assembly Source Translator						✓	✓	✓	✓	
IASM to MASM Assembly Source Translator						✓	✓	✓	✓	
MCUasm to CDS805 Object File Translator	✓					✓				
Absolute Listing to P&E Microcomputer Mapfile Utility	✓	✓	✓	✓		✓	✓	✓	✓	
Terminal Emulator						✓ (real mode)				

**NOTES:**

1. For more information, see the *MCUdebug Product Profile* (M68SMCUDBGPP/D).

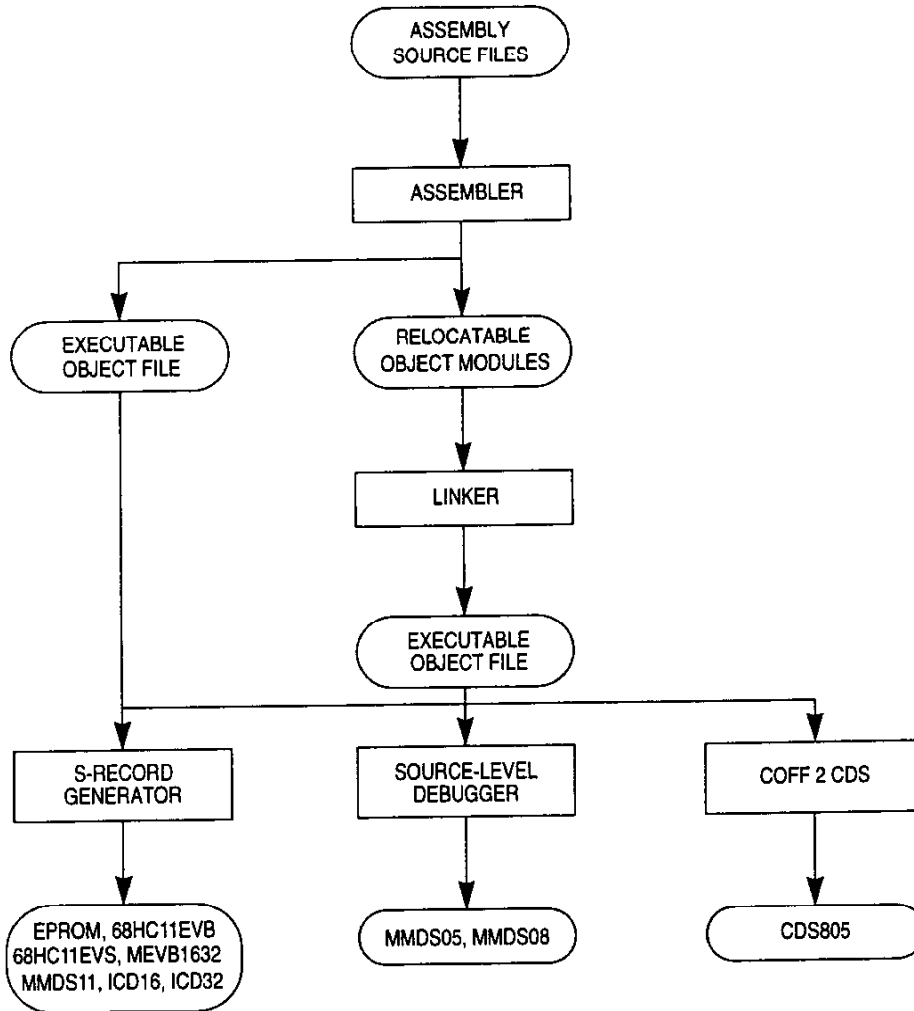
**Host Requirements**

MCUasm is intended for use with IBM PC™ or 100% PC-compatible systems that contain 80386 or later microprocessors, and runs under Microsoft Windows 3.1™, MSDOS 5.0™, or later versions of either. MCUasm requires a minimum of 6 Mbytes of RAM. At least 20 Mbytes of disk storage are needed to install the complete toolset.

**Software**

Many controller applications are limited by the cost of additional memory components or by timing constraints, and thus cannot take advantage of the benefits offered by high-level languages. In other applications, assembly language provides the best access to special hardware features. The MCUasm toolset provides solutions to these problems.

MCUasm provides capabilities not found in typical assembly-level toolsets. Some examples of the freedom allowed are: symbol names up to 128 characters, up to 32,000 symbols per source file, up to 256 sections, nested macros and nested include files up to 256 levels, and evaluation of all expressions using 32-bit arithmetic.



MCUASMDFLW

Figure 1 Development Flow

With the linker, a user arranges program sections to fit into physical memory. Sections can be contained in one or more files to facilitate rapid development and debugging. A user-defined directive file instructs the linker where to place these sections.

Particular Motorola microcontroller families have instruction sets and addressing modes that are optimized for high performance. MCUasm takes full advantage of these optimized instruction sets, and utilizes a common syntax to ease upward migration.

# Freescale Semiconductor, Inc.

**Table 2 Assembler Directives**

<p><b>Assembly Control</b>                  BASE — Sets default number base                  END — End of source program                  FAIL — User generated warning or error                  INCLUDE — Include secondary file                  ORG — Sets location counter</p> <p><b>Data Definition/Storage Allocation</b>                  ALIGN — Aligns data or code in memory                  DC — Allocates initialized storage                  DCB — Allocates initialized memory block                  DS — Reserves uninitialized memory                  EVEN — Align to next word address                  LONGEVEN — Align to next longword address</p> <p><b>Listing Control and Options</b>                  CLIST — Controls conditional assembly listing                  LIST — List the assembly                  LLEN — Sets length of listing line                  MLIST — Controls macro listing                  NOLIST — Stop assembly listing                  NOPAGE — Disables pagination in listing                  PAGE — Advance to next page                  PLEN — Sets page length                  SPC — Insert blank lines in listing                  TABS — Sets the tab length                  TTL — Sets the title</p>	<p><b>Macros and Conditional Assembly</b>                  ELSEC — Assemble when IFcc is false                  ENDC — End conditional assembly                  ENDM — End macro definition                  IFcc — Conditional assembly                  MACRO — Macro definition                  MEXIT — Exit macro</p> <p><b>Symbol Definition</b>                  EQU — Equate symbol to a value                  SECTION — Start section                  SET — Set symbol to a value                  XDEF — External symbol definition                  XREF — External symbol reference                  XREFB — External byte reference</p>
--	---

**Technical Support Information**

- Telephone Support: 512-891-6276
- FAX Number: 512-891-2720
- Internet Address: [masm@lemond.sps.mot.com](mailto:masm@lemond.sps.mot.com)

**Ordering Information**

Motorola's assembly language development toolset can be ordered through Motorola and participating authorized distributors. For information about a sales office or distributor near you, call (800) 765-7795, Extension 910.

Product	Host	Part Numbers
MCUasm	IBM-compatible PC	M68SMCUASMBB

Information in this document is provided solely to enable system and software implementers to use Freescale Semiconductor products. There are no express or implied copyright licenses granted hereunder to design or fabricate any integrated circuits or integrated circuits based on the information in this document. Freescale Semiconductor reserves the right to make changes without further notice to any products herein. Freescale Semiconductor makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does Freescale Semiconductor assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation consequential or incidental damages. "Typical" parameters which may be provided in Freescale Semiconductor data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. Freescale Semiconductor does not convey any license under its patent rights nor the rights of others. Freescale Semiconductor products are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other applications intended to support or sustain life, or for any other application in which the failure of the Freescale Semiconductor product could create a situation where personal injury or death may occur. Should Buyer purchase or use Freescale Semiconductor products for any such unintended or unauthorized application, Buyer shall indemnify and hold Freescale Semiconductor and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that Freescale Semiconductor was negligent regarding the design or manufacture of the part.

RoHS-compliant and/or Pb-free versions of Freescale products have the functionality and electrical characteristics of their non-RoHS-compliant and/or non-Pb-free counterparts. For further information, see <http://www.freescale.com> or contact your Freescale sales representative.

For information on Freescale's Environmental Products program, go to <http://www.freescale.com/epp>.



**For More Information On This Product  
 Go to: [www.freescale.com](http://www.freescale.com)**