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M68ICS05KJOM/D

October 1998

M68ICS05KJ
HC705KJ/J1A IN-CIRCUIT SIMULATOR
OPERATOR'S MANUAL

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CHAPTER 1
INTRODUCTION

1.1 OVERVIEW

This chapter provides an overview of the M68ICS05KJ In-Circuit Simulator Kit components and a Quick Start guide to setting up a development project.

The Motorola M68ICS05KJ In-Circuit Simulator Kit is a development toolkit for designers who develop and debug target systems that incorporate MC68HC705 KJ and J1A Microcontroller Unit (MCU) devices. The toolkit contains all of the hardware and software needed to develop and simulate source code for and program the Motorola MC68HC705KJ microcontrollers.

Together, the M68ICS05KJ printed circuit board (pod) and the ICS05KJW software form a complete simulator and non-real-time I/O emulator for the MC68HC705 KJ and J1A devices. When you connect the pod to your PC and your target hardware, you can use the actual inputs and outputs of the target system during simulation of code.

Use the M68ICS05KJ toolkit with any IBM-Windows 3.x or Windows 95-based computer with a serial port.

1.2 TOOLKIT COMPONENTS

ICS05KJWThe complete M68ICS05KJ toolkit contains:

- Hardware:
  - The M68ICS05KJ in-circuit simulator pod.
  - Sample MC68HC705 KJ and J1A windowed EPROM MCUs.
  - 16- and 20-pin DIP target emulation cables.
- Windows-optimized software components, collectively referred to as ICS05KJW software, and consisting of:
  - WINIDE.EXE, the integrated development environment (IDE) software interface to your target system for editing and performing software or in-circuit simulation.
  - CASM05W.EXE, the CASM05W command-line cross-assembler.
  - ICS05KJW.EXE, the in-circuit/standalone simulator software for the M68ICS05KJ target MCU.

- Documentation:
  - The *M68ICS05KJ In-Circuit Simulator Operator's Manual.*
  - Technical literature, including *Understanding Small Microcontrollers*, an introductory guide to understanding and using Motorola MC68HC05 family microcontrollers.

1.3 HARDWARE AND SOFTWARE REQUIREMENTS

The ICS05KJW software requires this minimum hardware and software configuration:

- An IBM-compatible host computer running Windows 3.x or Windows 95 operating system.
- Approximately 640 Kb of memory (RAM) and 2 Mb free drive space.
- A serial port for communications between the M68ICS05KJ and the host computer.

1.4 TOOLKIT FEATURES

The M68ICS05KJ toolkit is a low-cost development system that supports in-circuit simulation. Its features include:

- Software and in-circuit simulation of MC68HC705 KJ and J1A MCUs
- Ability to program MC68HC705 KJ and J1A EPROM microcontrollers
- Communication with the host PC via a serial port
- ICS05KJW software, including editor, assembler, and assembly source-level simulator
- 64 instruction breakpoints
- SCRIPT command for automatic execution of a sequence of commands
- Emulation cable for connection to the target system
- On-screen, context-sensitive Windows Help
- CHIPINFO command supplies M68ICS05KJ pod memory-map, vector, register, and pin-out information
- Software responds to both mouse and keyboard controls

1.5 SPECIFICATIONS

Table 1-1 summarizes the M68ICS05KJ hardware specifications.

Table 1-1. M68ICS05KJ Specifications

Characteristic	Specification
Temperature: Operating Storage	 0° to 40° C -40° to +85° C
Relative humidity	0 to 95% (non-condensing)
Power requirement	+9 Vdc @ 0.1 A (maximum) (from included wall transformer)
Dimensions	3.5 x 3.2 in. (89 x 81 mm)

1.6 ABOUT THIS USER'S MANUAL

This manual covers the M68ICS05KJ software, hardware, and reference information as follows:

Chapter 2 — Pod Installation

Chapter 3 — Loading and Initializing the ICS05KJW Software

Chapter 4 — WinIDE User Interface

Chapter 5 — ICS05KJW In-Circuit Simulator User Interface

Chapter 6 — CASM05W Assembler Interface

Chapter 7 — ICS05KJW Debugging Command Set

Chapter 8 — Example Project

Appendix A — S-Record Information

Appendix B — Technical Reference and Troubleshooting

Glossary

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NOTE

The procedural instructions in this user's manual assume that you are familiar with the Windows interface and selection procedures.

Figures in this manual show ICS05KJW windows and dialog boxes as they appear in the Windows 95 environment.

1.7 QUICK START INSTRUCTIONS

The following instructions summarize the hardware and software installation instructions of Chapters 2 and 3.

If you are experienced in installing Motorola or other development tools, follow these steps.

- **Install the ICS05KJW software:** follow the instructions on the diskette label to run the ICS05KJW Setup program. During installation, follow the instructions in the installation wizard: choose the *Typical Install* option to install the files to your hard disk, or choose the *Compact Install* option to copy the files onto another diskette.
- **Connect the M68ICS05KJ pod:** connect the M68ICS05KJ pod to the host PC's serial port using the included cable. Plug the cable into the pod connector P2.

CAUTION

See the Electrostatic Discharge Precaution in section 3.1

- **Supply power to the M68ICS05KJ pod:** connect the wall-mounted transformer's circular connector to the connector on the left side of the pod, next to the serial connector.
- **Start the WinIDE editor and open the project files:** Double click the WinIDE icon. From the WinIDE Environment menu, choose the *Open Project* option, and choose a project file from the *Specify project file to open* dialog. If no project file exists, choose the *New* option from the File menu to create a new project file. Paragraph 8.3 gives additional information about setting up a sample project.
- **Configure the environment for the ICS05KJW software components:** from the WinIDE Environment menu, select the *Setup Environment* option to open the *Environment Settings* dialog and make the following changes:
  - Click on the *EXE1 Debugger* tab to bring the tab (Figure 1-1) to the front. Set the executable type, path and filename, command line options (including optional switches, filenames, or port settings), and other options for the ICS05KJW debugger application.

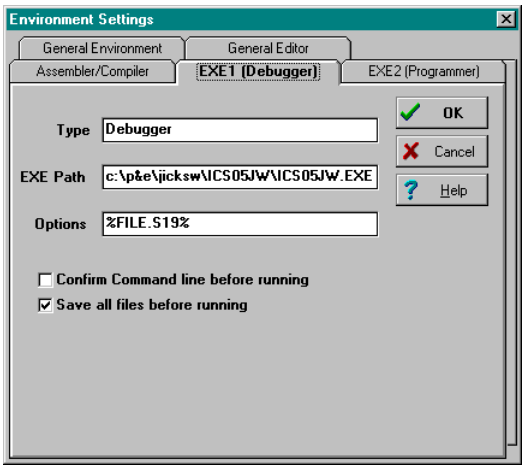

Figure 1-1. *WinIDE Environment Settings* Dialog *EXE1 Tab*

– Click on the *Assembler/Compiler* tab label to bring the tab (Figure 1-2) to the front. Set the executable path and filename, type, and other options for the CASM05W assembler or other application.

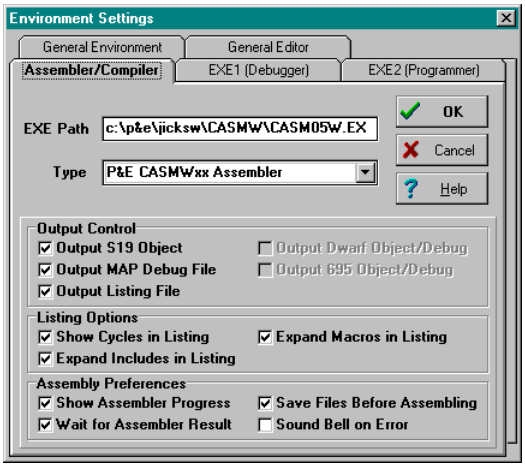

Figure 1-2. WinIDE *Environment Settings* Dialog *Assembler/Compiler* Tab

– If necessary, change the programmer settings in the *EXE2 (Programmer)* tab.

– Click on the *General Environment* and *General Editor* tabs and make changes in each as necessary.

– When you have specified all the environment settings, press the OK button to save the changes in the *WINIDE.INI* file and close the *Environment Settings* dialog.

- **Create a project file:** The desktop and environment settings you make in the *Environment Settings* dialog are stored in the *WINIDE.INI* file and read each time you start the WinIDE editor. You may also choose to save project-specific desktop and

environment settings in a project file (*.*PPF*) which is read when you open the project, allowing you to save and use a general environment as well as custom environments for individual projects. To create the project file:

- Specify the project-specific desktop and environment settings in the WinIDE editor.
- Choose the *Save Project As* option from the WinIDE Environment menu to name and save the project to a directory folder.

- **Run the ICS05KJW simulator:** With a project or source file open in the WinIDE main window, click the Debugger (EXE1) button (Figure 1-3) on the WinIDE toolbar to start the ICS05KJW debugger and debug the contents of the active source window. Additional information about the ICS05KJW debugger can be found in Chapter 6 and Chapter 7.

Figure 1-3. The WinIDE Debugger Toolbar Button

- **Assemble the code:** Press the *Assemble/Compile File* button (Figure 1-4) on the WinIDE toolbar to assemble the source code in the active WinIDE window. Additional information about the CASM05W assembler can be found in Chapter 5.

Figure 1-4. The WinIDE Assemble/Compile File Toolbar Button

If you experience problems with the Quick Start procedures, refer to section B.3 for troubleshooting instructions.

1.8 CUSTOMER SUPPORT

For information about technical assistance and ordering parts, contact the Motorola help desk:

Telephone:	(800) 521-6274
Fax:	(512) 895-6146
Web site:	http://www.mcu.motsps.com
Mailing address:	Motorola, Inc. MCTG Software Support, MD OE45 6501 William Cannon Drive West Austin, TX 78735

CHAPTER 2
POD INSTALLATION

2.1 OVERVIEW

This chapter explains how to install the hardware components of the M68ICS05KJ in-circuit simulator on your host PC in both interactive and standalone modes.

When the M68ICS05KJ pod is connected to the serial port of a host PC, you can use the actual inputs and outputs of your target system during simulation of your source code. When the pod is not connected to the PC, you can use the ICS05KJW software as a standalone simulator.

ELECTROSTATIC DISCHARGE PRECAUTION

Ordinary amounts of static electricity from your clothing or work environment can damage or degrade electronic devices and equipment. For example, the electronic components installed on your printed circuit board are extremely sensitive to electrostatic discharge (ESD). You should wear a grounding wrist strap whenever you handle any printed circuit board. This strap provides a conductive path for safely discharging static electricity to ground.

2.2 INSTALLING THE M68ICS05KJ POD

Before beginning, locate these pod components:

- Hardware reset switch S3
- Power On switch S1
- 9-pin RS-232 serial connector P2
- 9 Volt Input Circular connector P1

To install the M68ICS05KJ Pod:

1. Connect the M68ICS05KJ pod to the serial port of your computer: attach the supplied 9-pin serial cable to the connector on the M68ICS05KJ board and attach the other end to the host PC's serial port.
2. Connect the 9-volt power supply: attach the power supply plug to the circular power connector on the M68ICS05KJ pod and plug the power supply into a surge protection device or wall outlet.

3. To run the ICS05KJW software with actual input and output from the target device, connect the M68ICS05KJ pod to the 16- or 20-pin DIP socket on the target board using the emulation cable included in the M68ICS05KJ kit. When this connection is established and the pod and target system are started up, the target system will provide inputs to and accept output from the ICS05KJW software.

CHAPTER 3
SOFTWARE INSTALLATION AND INITIALIZATION

3.1 OVERVIEW

This chapter how to install and initialize the ICS05KJW software.

3.2 THE ICS05KJW SOFTWARE COMPONENTS

The ICS05KJW software consists of the following components:

- WINIDE.EXE: the Windows Integrated Development Environment editor
- CASM05W.EXE: the 68HC05 Cross Assembler
- ICS05KJW.EXE: the in-circuit Simulator, optimized for the HC05KJx-family Motorola microcontrollers

3.2.1 The WinIDE Editor

The WinIDE editor is a text editing application that lets you use several different programs from within a single development environment. Use the WinIDE editor to edit source code, launch a variety of compatible assemblers, compilers, debuggers, or programmers, and configure the environment to read and display errors from such programs.

If you select error detection options in the *Environment Settings* dialog, the WinIDE editor will highlight errors in the source code, and display the error messages from the compiler or assembler in the editor.

To debug source code in the WinIDE code window, load compatible source-level map files. You can configure the CASM05W to produce such map files as an output.

Because the WinIDE editor is modular, you may, for example, choose to substitute a third party C-compiler or other assembler for the CASM05W cross assembler provided in the toolkit.

3.2.2 CASM05W

The CASM05W is a cross assembler that creates Motorola S19 object files and MAP files from assembly files containing 68HC05 instructions.

The CASM05W assembler has the same functionality as the DOS version of the assembler, optimized to take advantage of the Windows graphical environment. Using the assembler in conjunction with the WinIDE editor, you can edit standard ASCII files (such as the .ASM assembly files), and use menu options and toolbar buttons to call other customized assemblers, compilers, or debuggers. The resulting environment can allow assembled files to be downloaded and tested while the original source code is modified and assembled, all without leaving the WinIDE editing environment.

Paragraph 5-5 gives additional information about assembler options and how to use them.

3.2.3 ICS05KJW

The ICS05KJW is a simulator for HC705KJ series microcontrollers that can get inputs and outputs (I/O) for the device when the external M68ICS05KJ pod is attached to the host computer. If you want to use I/O from your own target board, you can attach the M68ICS05KJ pod to your board through the extension cable that comes with the toolkit. You can also program HC05KJ devices using the ICS05KJ board and ICS05KJW software.

You can start or move to the ICS05KJW in-circuit simulator software from the WinIDE editor. The ICS05KJW software can also be started using standard Windows techniques and run independently of the WinIDE editor.

The ICS05KJW simulator accepts standard Motorola S19 object code files as input for object code simulation and debugging. If you are using a third party assembly- or C-language compiler, the compiler must be capable of producing source-level map files to allow source-level debugging.

3.3 INSTALLING THE ICS05KJW SOFTWARE

The ICS05KJW software is supplied on two 3.5″ diskettes containing a setup program that automatically installs the software on your hard drive.

3.3.1 Installation Steps

To install the software on your host computer's hard drive, follow these steps:

1. Insert the ICS05KJW diskette into the 3.5-inch disk drive.

   For Windows 3.x: in the Program Manager, select Run from the File menu.

   For Windows 95: from the Start Menu, select the Run option.

2. In the Run dialog, enter Setup (or click the Browse button to select a different drive and/or directory) and press OK.

3. In the ICS05KJW Microsoft Setup Wizard, follow the instructions that appear on the screen.

NOTE

Select either the Typical Installation type to install the files to your hard disk, or choose Compact Installation to copy the files to another diskette.

Table 3-1 lists the files and directories required to control the ICS05KJW program modules.

Table 3-1. The ICS05KJW Software Files

Directory	Filename	Description
Casmw	casm05w.exe	Windows Cross Assembler for the 68HC05
ics05kjw	ics05kjw.exe	Windows In-Circuit Simulator
WinIDE	winide.exe Winide.hlp	Windows integrated Development Environment (WinIDE) program file Help for WinIDE

3.3.2 Starting the ICS05KJW Software

Depending on the operating system you are using, choose the appropriate method for starting the WinIDE software:

- From the Windows 3.x Program Manager, double-click the WinIDE and/or ICS05KJW icon(s).
- From the Windows 95 Start Menu, select the WinIDE and/or ICS05KJW icon(s).

You can start the ICS05KJW simulator alone or from within the WinIDE.

3.3.3 ICS Communication

When you double-click the ICS05KJW icon, the software attempts to communicate with the pod using the specified COM port, baud rate, and default parameters. When the software connects to the pod, the Status Bar contains the message, "Contact with pod established."

If the pod is not installed, or the ICS05KJW software cannot establish communications with the pod through the specified COM port, the *Can't Contact Board* dialog appears, with options for changing the COM port or baud rate and retrying the connection, or choosing to run the simulator in standalone mode (with no input or output from the pod).

NOTE

The COM port assignment defaults to COM 1 unless you specify another port in the startup command.

CHAPTER 4
THE WinIDE USER INTERFACE

4.1 OVERVIEW

This chapter is an overview of the WinIDE windows, menus, toolbars, dialogs, options, and procedures for using each.

4.2 THE WINDOWS INTEGRATED DEVELOPMENT ENVIRONMENT

The Windows Integrated Development Environment (the WinIDE editor) is a graphical interface for editing, compiling, assembling, and debugging source code for embedded systems using the M68ICS05KJ In-Circuit Simulator.

The WinIDE interface consists of standard Windows title and menu bars, a WinIDE toolbar, a main window containing any open source or project file windows, and a status bar. The WinIDE components are labeled in Figure 4-1 and described in paragraph 4.3.2.