M68EM05B32/D2

SEPT 1994

HC05B32
EMULATOR MODULE
USER'S MANUAL

SECOND EDITION

© MOTOROLA Inc., 1994; All Rights Reserved

Motorola reserves the right to make changes without further notice to any products herein to improve reliability, function, or design. Motorola does not assume any liability arising out of the application or use of any product or circuit described herein; neither does it convey any license under its patent rights nor the rights of others. Motorola products are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other application in which the failure of the Motorola product could create a situation where personal injury or death may occur. Should Buyer purchase or use Motorola products for any such unintended or unauthorized application, Buyer shall indemnify and hold Motorola 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 Motorola was negligent regarding the design or manufacture of the part.

Motorola and the Motorola logo are registered trademarks of Motorola Inc.

Motorola Inc. is an Equal Opportunity/Affirmative Action Employer.

CONTENTS

CHAPTER 1 INTRODUCTION 1-1

1.1 Development Systems 1-1
1.1.1 Motorola Modular Development System (MMDS05) 1-1
1.1.2 M68HC05EVS Evaluation System (HC05EVS) 1-2
1.2 EM Layout 1-3
1.3 Connector P4 Pin Assignments 1-4

CHAPTER 2 MMDS05 CONFIGURATION AND OPERATION .. 2-1

2.1 Setting B32EM Jumper Headers 2-1
2.1.1 R/W Control Select (J1) 2-2
2.1.2 Address Line A13 Select (J2) 2-3
2.1.3 Address Line A14 Select (J3) 2-4
2.1.4 Reset Source Select (J4) 2-5
2.1.5 Stretch Select (J5) 2-6
2.1.6 RAM/EEPROM Select (J6) 2-7
2.1.7 Clock Select (J7) 2-8
2.1.8 Timer Stop Select (J8) 2-9
2.1.9 Clock Select (J9) 2-10
2.1.10 Device Selection/Options (S1) 2-11
2.2 The Emulated MCU 2-12
2.2.1 MC68HC05B4 Emulation 2-13
2.2.2 MC68HC05B5 Emulation 2-13
2.2.3 MC68HC05B6 Emulation 2-13
2.2.4 MC68HC05B8 Emulation 2-13
2.2.5 MC68HC05B16 Emulation 2-14
2.2.6 MC68HC05B32 Emulation 2-14
2.2.7 MC68HC05B16 Emulation using a MC68HC05B32 2-14
2.2.8 MC68HC05B4,B5,B6,B8 Emulation using a MC68HC05B32 part2-14
2.3 Remaining System Installation 2-15

CHAPTER 3 HC05EVS CONFIGURATION AND OPERATION . 3-1

3.1 Setting B32EM Jumper Headers 3-1
3.1.1 R/W Control Select (J1) 3-2
3.1.2 Address Line A13 Select (J2) 3-3
3.1.3 Address Line A14 Select (J3) 3-4
3.1.4 Reset Source Select (J4) 3-5
3.1.5 Stretch Select (J5) 3-6
3.1.6 RAM/EEPROM Select (J6) 3-7

3.1.7 Clock Select (J 7) 3-8
3.1.8 Timer Stop Select (J 8) 3-9
3.1.9 Clock Select (J 9) 3-10
3.1.10 Device Selection/Options (S 1) 3-11
3.2 The Emulated MCU 3-12
3.2.1 MC68HC05B4 E m u l a t i o n 3-12
3.2.2 MC68HC05B5 E m u l a t i o n 3-12
3.2.3 MC68HC05B6 E m u l a t i o n 3-12
3.2.4 MC68HC05B8 E m u l a t i o n 3-12
3.2.5 MC68HC05B16 E m u l a t i o n 3-13
3.2.6 MC68HC05B32 E m u l a t i o n 3-13
3.2.7 MC68HC05B16 Emulation using a MC68HC05B32 3-13
3.2.8 MC68HC05B4,B5,B6,B8 Emulation using a MC68HC05B32 part3-13
3.3 EVS L i m i t a t i o n s 3-14
3.4 Logic Analyzer Connector P 1 3-15
3.5 Remaining System I n s t a l l a t i o n 3-17

FIGURES

Figure		Page
1-1	HC05B32 Emulator Module	1-3
1-2	Connector P4 and P5 Pin Assignments	1-4
3-1	Connector P1 Pin Assignments	3-15

TABLES

Table		Page
2-1	MCUs and Personality Files	2-12
3-1	Logic Analyzer Connector P1 Signal Descriptions	3-16

CHAPTER 1
INTRODUCTION

This user's manual explains connection, configuration, and operation information specific to the HC05B32EM Emulator Module (B32EM). The B32EM makes possible emulation and debugging of target systems based on these microcontroller units (MCUs):

MC68HC05B4	MC68HC705B5	MC68HC05B6
MC68HC05B8	MC68HC05B16	MC68HC05B32

The B32EM can be part of two development systems. This chapter describes those systems and explains the layout of the B32EM.

The MC68HC705B32 is the resident MCU in the B32EM.

1.1 DEVELOPMENT SYSTEMS

Your B32EM can be part of two Motorola development tools: the HC05 Motorola Modular Development System (MMDS05) or the M68HC05EVS Evaluation System (HC05EVS).

1.1.1 Motorola Modular Development System (MMDS05)

The MMDS05 is an emulator system that provides a bus state analyzer and real-time memory windows. The unit's integrated design environment includes an editor, an assembler, user interface, and source-level debug. A complete MMDS05 consists of:

- **a station module** — the metal MMDS05 enclosure, containing the control board and the internal power supply. Most system cables connect to the MMDS05 station module. (The cable to an optional target system, however, runs through an aperture in the station module enclosure to connect directly to the emulator module.)
- **an emulator module (EM)** — such as the B32EM: a printed circuit board that enables system functionality for a specific set of MCUs. The EM fits into the station module through a sliding panel in the enclosure top. The EM has a connector for the target cable.
- **two logic clip cable assemblies** — twisted-pair cables that connect the station module to your target system, a test fixture, a clock, or any other circuitry useful for evaluation or analysis. One end of each cable assembly has a molded connector, which fits into station-module pod A or pod B. Leads at the other end of each cable terminate in female probe tips. Ball clips come with the cable assemblies.

- **a 9-lead RS-232 serial cable** — the cable that connects the station module to the host computer RS-232 port.
- **a 9- to 25-pin adapter** — a molded assembly that lets you connect the 9-lead cable to a 25-pin serial port.
- **system software** — software, on 3-1/2 inch diskettes.
- **MMDS05 documentation** — an MMDS05 operations manual (MMDS05OM/D) and the appropriate EM user's manual.

As mentioned, your B32EM gives the MMDS05 the ability to emulate all B series MCUs. By substituting a different EM, you can enable your MMDS05 to emulate an MCU of a different series. (Your Motorola representative can explain all the EMs available.)

Chapter 2 explains how to configure and use your B32EM as part of an MMDS05 system. For information about MMDS05 software or the station module, see the MMDS05 operations manual. For layout and configuration information pertaining to a different EM, see the corresponding EM user's manual.

1.1.2 M68HC05EVS Evaluation System (HC05EVS)

An HC05EVS is an economical, two-board tool for designing, debugging, and evaluating target systems based on an MC68HC05 MCU. A complete HC05EVS consists of:

- **a platform board (PFB)** — the bottom board, which supports the emulator module. The platform board has connectors for power and for the terminal or host computer.
- **an emulator module (EM)** — such as the B32EM: a printed circuit board that enables system functionality for a specific set of MCUs. The EM fits onto the PFB. The EM has connectors for a target cable and for a cable to a logic analyzer.
- **an RS-232 serial cable** — the cable that connects the PFB to the host computer RS-232 port.
- **system software** — software, on 3-1/2 inch diskettes.
- **HC05EVS documentation** — an HC05EVS operations manual (HC05EVSOM/D) and the appropriate EM user's manual.

As mentioned, your HC05B32EVS emulates all B series MCUs. By substituting a different EM, you can enable your HC05EVS to emulate an MCU of a different series. (Your Motorola representative can explain all the EMs available.)

Chapter 3 explains how to configure and use your B32EM as part of an HC05EVS system. For information about HC05EVS software or the platform board, see the HC05EVS operations manual. For layout and configuration information pertaining to a different EM, see the corresponding EM user's manual.

1.2 EM LAYOUT

Figure 1-1 shows the layout of the B32EM.

Connectors P4 and P5, provide the interface to the target system.If you install the B32EM in the MMDS05 station module, the target cable passes through the slit in the station module enclosure. Connector P1 connects to a logic analyzer. (Connector P1 has more significance for an EVS system, as an MMDS05 system includes a bus analyzer.) Expansion header connectors P2 and P3 connect together the EM and the control board (for an MMDS05) or the EM and the platform board (for an EVS).

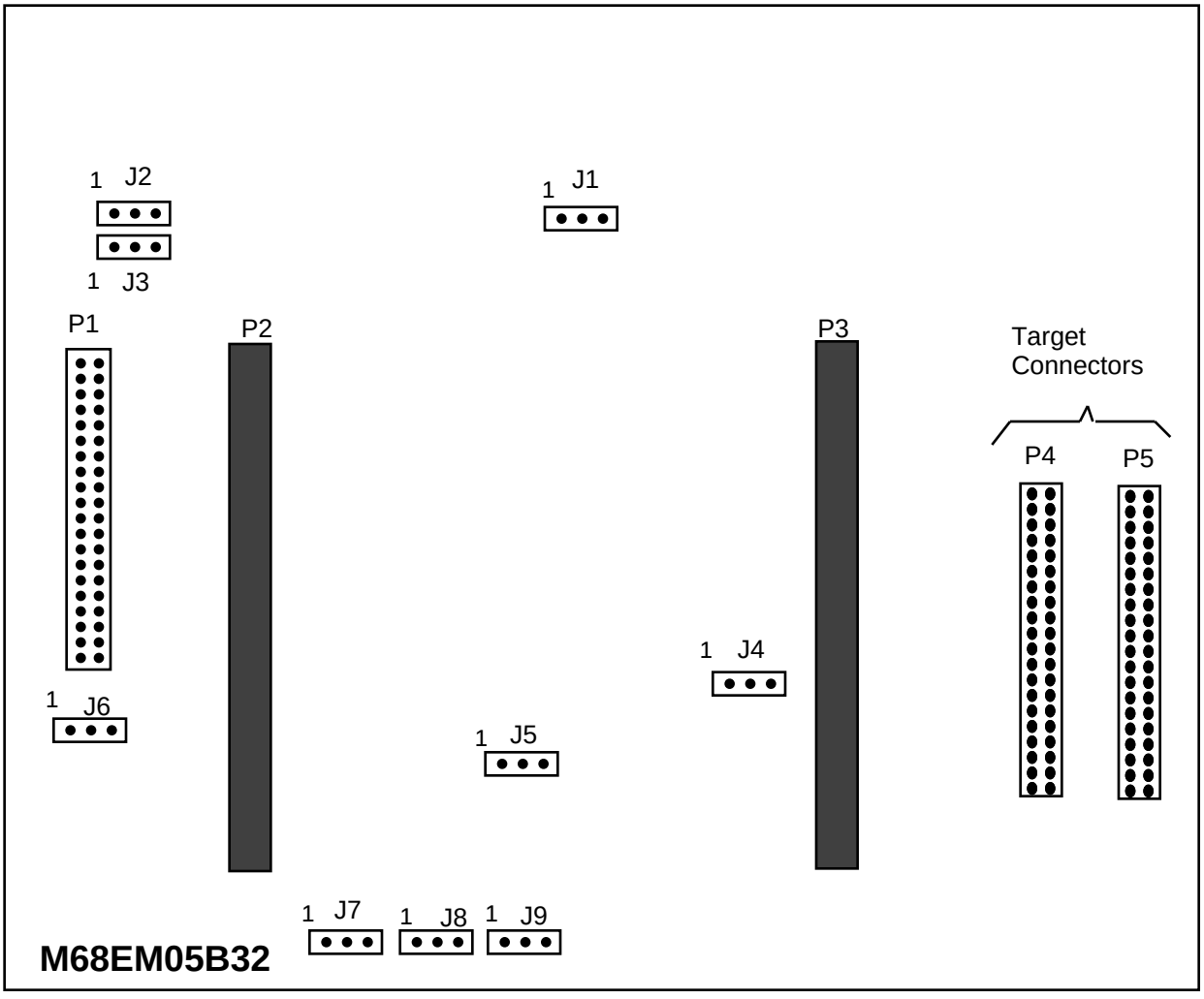


Figure 1-1. HC05B32 Emulator Module

1.3 CONNECTOR P4 PIN ASSIGNMENTS

Figure 1-2 shows the pin assignments for connector P4 and P5. For signal descriptions, consult the technical data book for the specific MCU.

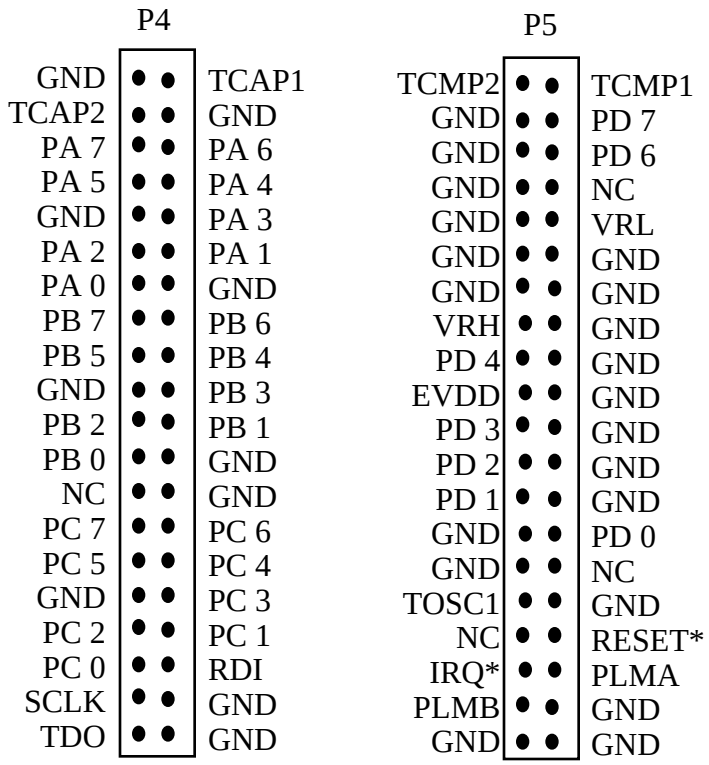


Figure 1-2. Connector P4 and P5 Pin Assignments

As connector P1 has more importance to an HC05EVS than to an MMDS05, pin assignments for connector P1 are in Chapter 3.

To configure your B32EM for use as part of an MMDS05, follow the instructions of Chapter 2. To configure your B32EM for use as part of an HC05EVS, follow the instructions of Chapter 3.

CHAPTER 2
MMDS05 CONFIGURATION AND OPERATION

This chapter explains how to configure and use your B32EM as part of an MMDS05. For other parts of system installation or configuration, see the MMDS05 operations manual (MMDS05OM/D). (If you will use your B32EM as part of an HC05EVS system, go to Chapter 3 for corresponding information.)

Paragraph 2.1 explains how to set B32EM jumper headers. Paragraph 2.2 explains considerations pertaining to the MCU you emulate. Paragraph 2.3 explains remaining system installation.

Note that you can configure a B32EM already installed in the MMDS05 station module enclosure. To do so, switch off station-module power, remove the panel, then follow the guidance of this chapter.

CAUTION

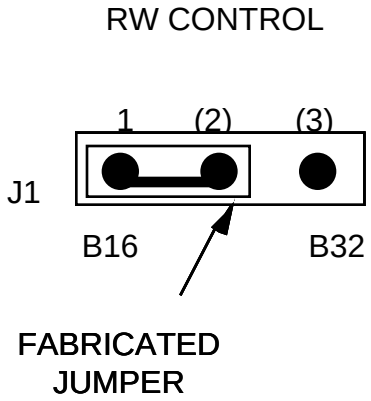
Be sure to switch off power if you reconfigure an installed EM. Reconfiguring EM jumper headers with power left on can damage MMDS05 circuits.

2.1 SETTING B32EM JUMPER HEADERS

Your B32EM has nine jumper headers, J1 to J9 and one switch pack, S1. Paragraphs 2.1.1. and 2.1.10 explain how to configure these headers and the switch pack.

2.1.1 R/W Control Select (J1)

Jumper header J1 selects the correct R/W signal source. The factory set configuration for this jumper is shown below: The B16 (1-2) position selects the correct R/W signal for the all other B-series parts.

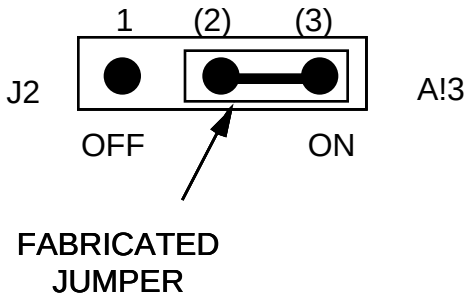


NOTE

The EM board will not function if this jumper is not set correctly.

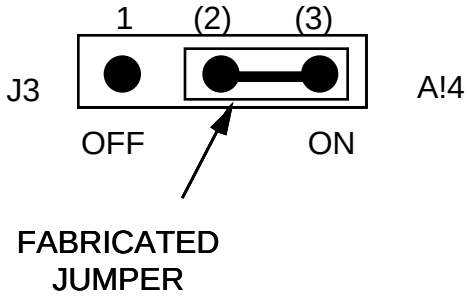
2.1.2 Address Line A13 Select (J2)

Jumper header J2 selects the correct memory map size for the device being emulated. The factory set configuration for this jumper is shown below: A13 ON (2-3) is set when emulating either a B16 or B32 part. A13 OFF (1-2) is set when emulating any other B-series part.



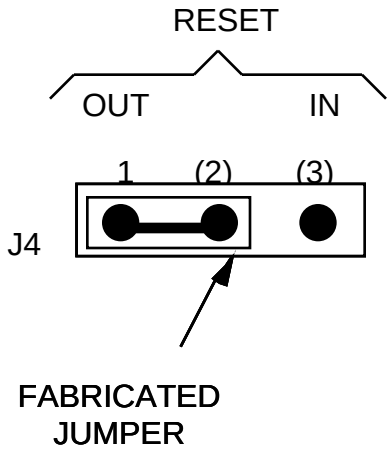
2.1.3 Address Line A14 Select (J3)

Jumper header J3 selects the correct memory map size for the device being emulated. The factory set configuration for this jumper is shown below: A14 ON (2-3) is set when emulating B32 part. A14 OFF (1-2) is set when emulating any other B-series part.



2.1.4 Reset Source Select (J4)

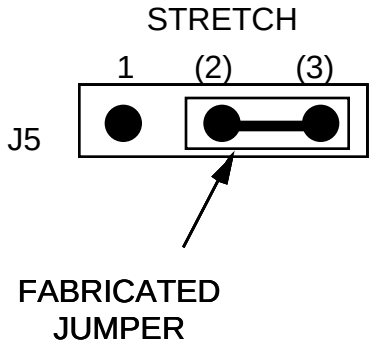
Jumper header J4 selects the source of the target reset. The factory set configuration for this jumper is shown below: RESET OUT (1-2) is the only valid setting for this jumer when using an MMDS05 system.



The J1 pins 2-and-3 configuration is not correct for a B32EM that is part of an MMDS05 system. Such a configuration would interfere with correct operation of the RESETIN and RESETOUT commands.

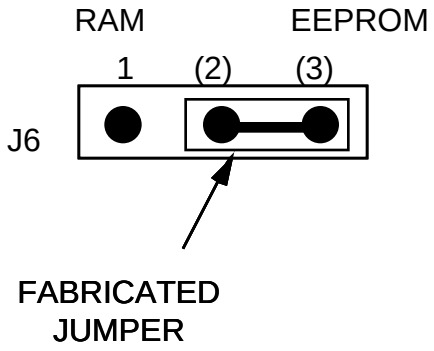
2.1.5 Stretch Select (J5)

Jumper header J5 determines if clock stretching is required. The diagram below shows the factory configuration: the fabricated jumper between pins 2 and 3 disables clock stretching circuitry. This is the only correct position for MMDS05 operation.



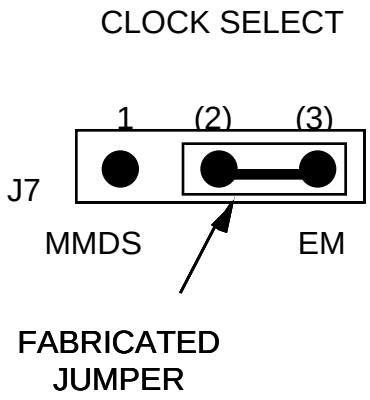
2.1.6 RAM/EEPROM Select (J6)

Jumper header J6 determines if the on chip EEPROM or off chip RAM should occupy the EEPROM address space. The diagram below shows the factory configuration: the fabricated jumper between pins 2 and 3 selects the on chip EEPROM. The fabricated jumper between pins 1 and 2 selects off chip RAM to occupy the EEPROM address space.



2.1.7 Clock Select (J7)

Jumper header J7 selects between the on-board canned oscillator or the MMDS05 is clock sources. The diagram below shows the factory configuration: the fabricated jumper between pins 2 and 3 selects the B32EM canned oscillator clock source.



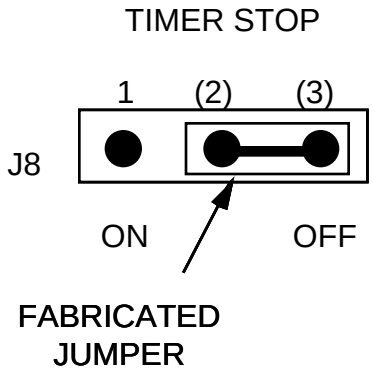
Alternatively, you may use a clock source originating from the control board. To do so, reposition the J2 jumper between pins 1 and 2, then use the MMDS05 OSC command to select a frequency.

NOTE

This header only effects the clock source of the MCU if the fabricated jumper on header J9 is between pins 1 and 2.

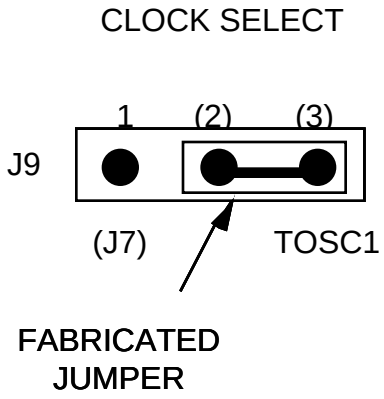
2.1.8 Timer Stop Select (J8)

Jumper header J8 selects if the on chip timers should be stopped when the chip is operating in background mode. The diagram below shows the factory configuration: the fabricated jumper between pins 2 and 3 allows the timers to continue running when in background mode. The J8 jumper between pins 1 and 2 stops the on chip timers when in background.



2.1.9 Clock Select (J9)

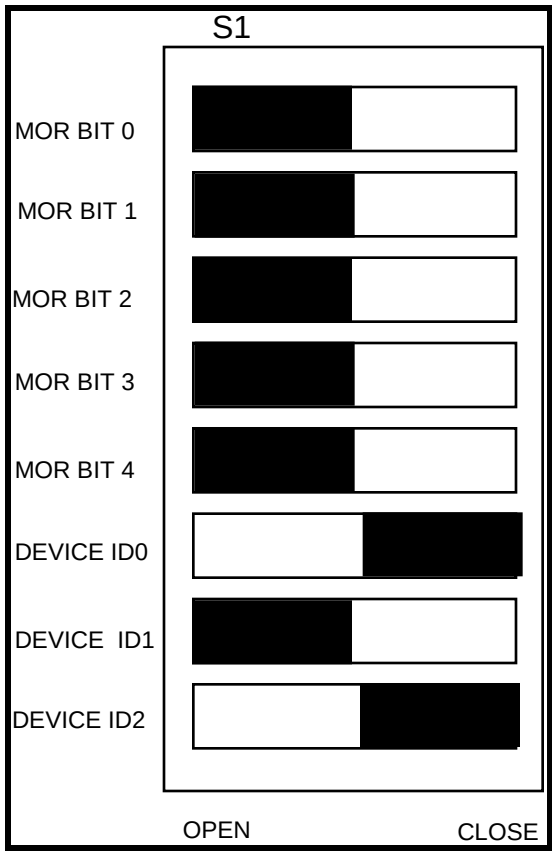
Jumper header J9 selects between the Target clock or the clock selected by jumper J7. The diagram below shows the factory configuration: the fabricated jumper between pins 1 and 2 selects the clock selected by jumper J7. The fabricated jumper between pins 2 and 3 selects the Target clock as the source of the MCU clock.



2.1.10 Device Selection / Options (S1)

The switch pack (S1) allows the selection of the bottom five bit of the MOR register (the top three bits are hard wired low). The remaining bits allow for the selection of the resident MCU. The default state of the switches is as follows: MOR bits 0 to 4 open, DEVICE ID0 closed, DEVICE ID1 open, DEVICE ID2 closed (sets B32 device emulation). The table below details the device emulation selected:

DEVICE ID2	DEVICE ID1	DEVICE ID0	J2 (A13)	J3 (A14)	MCU required in socket U11	MCU emulated
OPEN	OPEN	OPEN	OFF	OFF`	HC05B4	HC05B4
OPEN	OPEN	CLOSED	OFF	OFF	HC705B5	HC705B5
OPEN	CLOSED	OPEN	OFF	OFF	HC805B6	HC05B6
OPEN	CLOSED	CLOSED	OFF	OFF	HC05B8	HC05B8
CLOSED	OPEN	OPEN	ON	OFF	HC705B16	HC05B16
CLOSED	OPEN	CLOSED	ON	ON	HC705B32	HC05B32
CLOSED	CLOSED	OPEN	ON	OFF	HC705B32	HC05B16
CLOSED	CLOSED	CLOSED	OFF	OFF	HC705B32	HC05B8,B6, B5,B4



2.2 THE EMULATED MCU

Your MMDS05 system uses a specific personality file for the MCU type being emulated. For example, to emulate an MC68HC05B32 the system uses personality file 0022DVxx.MEM. Table 2-1 lists all the personality files that pertain to the B32EM. Note that personality file names follow the pattern **00ZZZVxx.MEM**, where **ZZZ** is the EM identifier or MCU name, and **xx** is the version of the file.

Table 2-1. MCUs and Personality Files

EMULATED MCU	PERSONALITY FILE	RESIDENT MCU	COMMENTS
MC68HC05B4	00228Vxx.MEM	MC68HC05B4	See paragraphs 2.2.1
MC68HC705B5	00229Vxx.MEM	MC68HC705B5	See paragraphs 2.2.2
MC68HC05B6	0022AVxx.MEM	MC68HC805B6	See paragraphs 2.2.3
MC68HC05B8	0022BVxx.MEM	MC68HC05B8	See paragraphs 2.2.4
MC68HC05B16	0022CVxx.MEM	MC68HC705B16	See paragraphs 2.2.5
MC68HC05B32	0022DVxx.MEM	MC68HC705B32	See paragraphs 2.2.6
MC68HC05B16	0022EVxx.MEM	MC68HC705B32	See paragraphs 2.2.7
MC68HC05B4,B5, B6,B8	0022FVxx.MEM	MC68HC705B32	See paragraphs 2.2.8

MMDS05 software loads the personality file upon powerup; the default personality file is 0022DVxx.MEM for the B32. To replace the default personality file with a different one, use the LOADMEM command. (For more information about the LOADMEM command, see the explanation in the MMDS05 operations manual.)

Alternatively, you can insert the line LOADMEM 00ZZZVxx.MEM in the STARTUP.05 script file. This way, the system automatically loads the specified personality file as part of system startup. (For more information about the STARTUP.05 script file, see the SCRIPT command explanation in the MMDS05 operations manual.)

2.2.1 MC68HC05B4 Emulation

When emulating a MC68HC05B4 using the B32EM you should not to write to location $001F as this may cause a system malfunction. Also S-records downloads should avoid this location or write 0 into it.

For more information about the MC68HC05B4 features, see the corresponding technical data book.

The MOR bits settings on switch pack S1 should be set to the open position.

2.2.2 MC68HC705B5 Emulation

When emulating a MC68HC705B5 using the B32EM you should not to write to location $001F as this may cause a system malfunction. Also S-records downloads should avoid this location or write 0 into it.

For more information about the MC68HC705B5 features, see the corresponding technical data book.

The required MOR of this part must be programmed into the part using a programmer board. Only the MOR bits 0 and 1 positions of switch pack S1 have any relevance when emulating this part.

2.2.3 MC68HC05B6 Emulation

When emulating a MC68HC05B6 using the B32EM you should not to write to location $001F as this may cause a system malfunction. Also S-records downloads should avoid this location or write 0 into it.

Information about the MC68HC05B6 features, see the corresponding technical data book.

The MOR bits settings on switch pack S1 should be set to the open position.

2.2.4 MC68HC05B8 Emulation

When emulating a MC68HC05B8 using the B32EM you should not to write to location $001F as this may cause a system malfunction. Also S-records downloads should avoid this location or write 0 into it.

For more information about the MC68HC05B8 features, see the corresponding technical data book.

The MOR bits settings on switch pack S1 should be set to the open position.

2.2.5 MC68HC05B16 Emulation

When emulating a MC68HC05B16 using the B32EM you should not to write to location $004F as this may cause a system malfunction. Also S-records downloads should avoid this location or write 0 into it.

For more information about the MC68HC05B16 features, see the corresponding technical data book.

The WOI feature of the MC68HC705B16 is not available.

2.2.6 MC68HC05B32 Emulation

When emulating a MC68HC05B32 using the B32EM you should not to write to location $004F as this may cause a system malfunction. Also S-records downloads should avoid this location or write 0 into it.

For more information about the MC68HC05B32 features, see the corresponding technical data book.

The WOI feature of the MC68HC705B32 is not available.

2.2.7 MC68HC05B16 Emulation using a MC68HC05B32 part

When emulating a MC68HC05B16 using the B32EM you should not to write to location $004F as this may cause a system malfunction. Also S-records downloads should avoid this location or write 0 into it.

For more information about the MC68HC05B4 features, see the corresponding technical data book.

The WOI feature of the MC68HC705B16 is not available.

2.2.8 MC68HC05B4,B5,B6,B8 Emulation using a MC68HC05B32 part

When emulating a MC68HC05B4,B5,B6,B8 using the B32EM you should not to write to location $004F as this may cause a system malfunction. Also S-records downloads should avoid this location or write 0 into it.

For more information about the MC68HC05B4,B5,B6,B8 features, see the corresponding technical data book.

2.3 REMAINING SYSTEM INSTALLATION

When you have configured headers J1 to J9 and switch pack S1, you are through with B32EM configuration:

- To install the B32EM in an MMDS05 station module, remove the panel from the station-module top. Fit together EM connectors P2 and P3 (on the bottom of the board) and control-board connectors P11 and P12. Snap the corners of the EM onto the plastic standoffs. Connect the target cable, if appropriate. Replace the panel.

At this point, you are ready to make remaining cable connections, as necessary, and restore power. For instructions, consult the MMDS05 operations manual (MMDS05OM/D).

CHAPTER 3
HC05EVS CONFIGURATION AND OPERATION

This chapter explains how to configure your B32EM for use as part of an HC05EVS. For other parts of system installation or configuration, see the HC05EVS operations manual (HC05EVSOM/D). (If you will use your B32EM as part of an MMDS05 system, go to Chapter 2 for configuration information.)

Paragraph 3.1 explains how to set B32EM jumper headers and switch pack S1. Paragraph 3.2 explains considerations pertaining to the MCU you emulate. Paragraph 3.3 lists limitations on using the B32EM in an HC05EVS. Paragraph 3.4 explains pin assignments and signal descriptions for the logic analyzer connector (P1). Paragraph 3.5 explains remaining system configuration.

Note that you can configure a B32EM already installed on the HC05EVS platform board. To do so, disconnect platform-board power, then follow the guidance of this chapter.

CAUTION

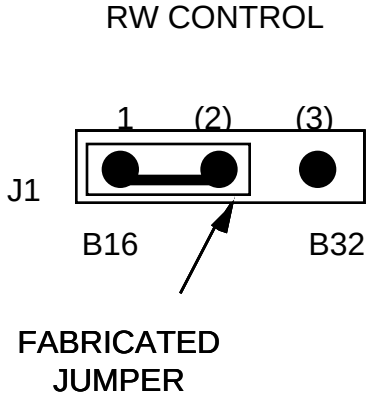
Be sure to disconnect power if you reconfigure an installed EM. Reconfiguring EM jumper headers with power left on can damage HC05EVS circuits.

3.1 SETTING B32EM JUMPER HEADERS

Your B32EM has nine jumper headers, J1 to J9 and one switch pack, S1. Paragraphs 3.1.1. and 3.1.10 explain how to configure these headers and the switch pack.

3.1.1 R/W Control Select (J1)

Jumper header J1 selects the correct R/W signal source. The factory set configuration for this jumper is shown below: The B16 (1-2) position selects the correct R/W signal for all other B-series parts.

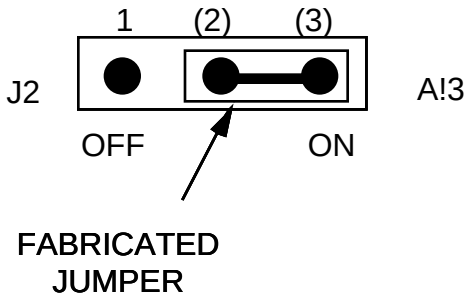


NOTE

The EM board will not function if this jumper is not set correctly.

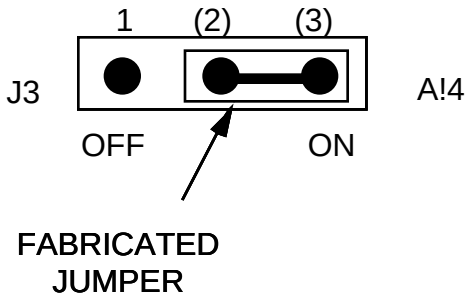
3.1.2 Address Line A13 Select (J2)

Jumper header J2 selects the correct memory map size for the device being emulated. The factory set configuration for this jumper is shown below: A13 ON (2-3) is set when emulating either a B16 or B32 part. A13 OFF (1-2) is set when emulating any other B-series part.



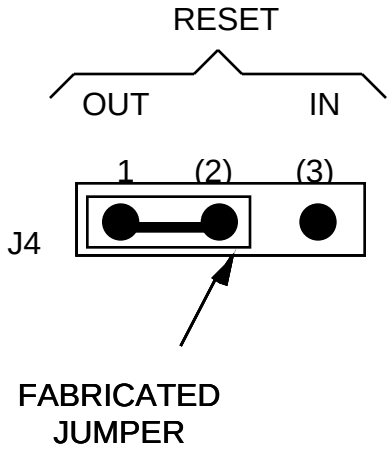
3.1.3 Address Line A14 Select (J3)

Jumper header J3 selects the correct memory map size for the device being emulated. The factory set configuration for this jumper is shown below: A14 ON (2-3) is set when emulating B32 part. A14 OFF (1-2) is set when emulating any other B-series part.



3.1.4 Reset Source Select (J4)

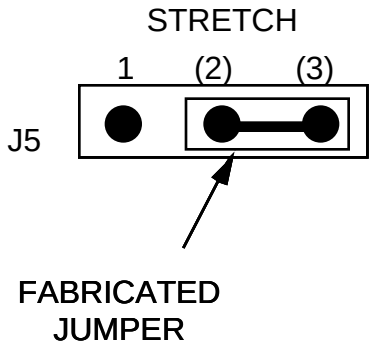
Jumper header J4 selects the source of the target reset. The factory set configuration for this jumper is shown below: RESET OUT (1-2) jumper position selects the EVS to drive the target reset line. The RESET IN (2-3) jumper position selects the target reset line as the source of the RESET signal.



The J1 pins 2-and-3 configuration is not correct for a B32EM that is part of an MMDS05 system. Such a configuration would interfere with correct operation of the RESETIN and RESETOUT commands.

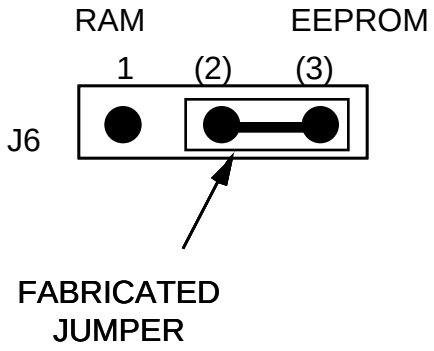
3.1.5 Stretch Header (J5)

Jumper header J5 determines if clock stretching is required. The diagram below shows the factory configuration: the fabricated jumper between pins 2 and 3 disables clock stretching circuitry. This is the normal position for this jumper, however if EVS communication problems occur when operating at high bus frequencies the jumper should be placed between pins 1 and 2 enabling the clock sketching circuitry when in background mode.



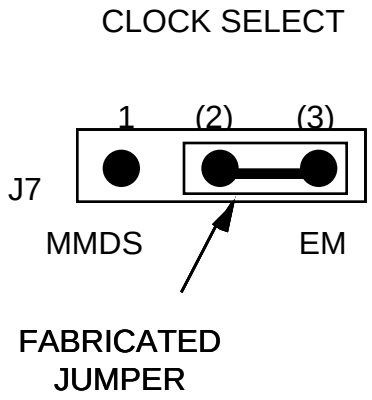
3.1.6 RAM/EEPROM Select (J6)

Jumper header J6 determines if the on chip EEPROM or off chip RAM should occupy the EEPROM address space. The diagram below shows the factory configuration: the fabricated jumper between pins 2 and 3 selects the on chip EEPROM. The fabricated jumper between pins 1 and 2 selects off chip RAM to occupy the EEPROM address space.



3.1.7 Clock Select (J7)

Jumper header J7 selects between the on-board canned oscillator or the MMDS05 is clock sources. The diagram below shows the factory configuration: the fabricated jumper between pins 2 and 3 selects the B32EM canned oscillator clock source. This is the only valid position for this jumper when using an EVS.

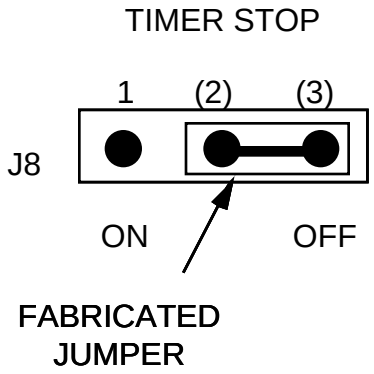


NOTE

This header only effects the clock source of the MCU if the fabricated jumper on header J9 is between pins 1 and 2.

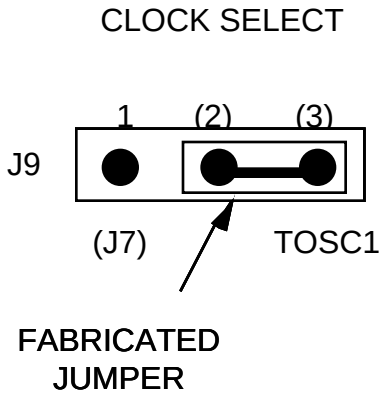
3.1.8 Timer Stop Select (J8)

Jumper header J8 selects if the on chip timers should be stopped when the chip is operating in background mode. The diagram below shows the factory configuration: the fabricated jumper between pins 2 and 3 allows the timers to continue running when in background mode. The J8 jumper between pins 1 and 2 stops the on chip timers when in background.



3.1.9 Clock Select (J9)

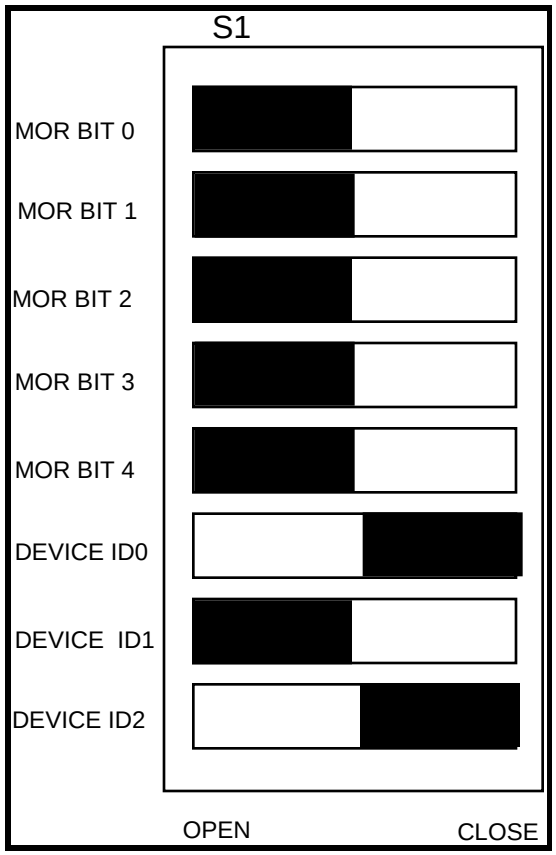
Jumper header J9 selects between the Target clock or the clock selected by jumper J7. The diagram below shows the factory configuration: the fabricated jumper between pins 1 and 2 selects the clock selected by jumper J7. The fabricated jumper between pins 2 and 3 selects the Target clock as the source of the MCU clock.



3.1.10 Device Selection / Options (S1)

The switch pack (S1) allows the selection of the bottom five bit of the MOR register (the top three bits are hard wired low). The remaining bits allow for the selection of the resident MCU. The default state of the switches is as follows: MOR bits 0 to 4 open, DEVICE ID0 closed, DEVICE ID1 open, DEVICE ID2 closed (sets B32 device emulation). The table below details the device emulation selected:

DEVICE ID2	DEVICE ID1	DEVICE ID0	J2 (A13)	J3 (A14)	MCU required in socket U11	MCU emulated
OPEN	OPEN	OPEN	OFF	OFF`	HC05B4	HC05B4
OPEN	OPEN	CLOSED	OFF	OFF	HC705B5	HC705B5
OPEN	CLOSED	OPEN	OFF	OFF	HC805B6	HC05B6
OPEN	CLOSED	CLOSED	OFF	OFF	HC05B8	HC05B8
CLOSED	OPEN	OPEN	ON	OFF	HC705B16	HC05B16
CLOSED	OPEN	CLOSED	ON	ON	HC705B32	HC05B32
CLOSED	CLOSED	OPEN	ON	OFF	HC705B32	HC05B16
CLOSED	CLOSED	CLOSED	OFF	OFF	HC705B32	HC05B8,B6, B5,B4



3.2 THE EMULATED MCU

The factory ships the B32EM with an MC68HC705B32 resident MCU, which is appropriate for emulating MC68HC05B'series MCUs.

3.2.1 MC68HC05B4 Emulation

When emulating a MC68HC05B4 using the B32EM you should not to write to location $001F as this may cause a system malfunction. Also S-records downloads should avoid this location or write 0 into it.

For more information about the MC68HC05B4 features, see the corresponding technical data book.

The MOR bits settings on switch pack S1 should be set to the open position.

3.2.2 MC68HC705B5 Emulation

When emulating a MC68HC705B5 using the B32EM you should not to write to location $001F as this may cause a system malfunction. Also S-records downloads should avoid this location or write 0 into it.

For more information about the MC68HC705B5 features, see the corresponding technical data book.

The required MOR of this part must be programmed into the part using a programmer board. Only the MOR bits 0 and 1 positions of switch pack S1 have any relevance when emulating this part.

3.2.3 MC68HC05B6 Emulation

When emulating a MC68HC05B6 using the B32EM you should not to write to location $001F as this may cause a system malfunction. Also S-records downloads should avoid this location or write 0 into it.

Information about the MC68HC05B6 features, see the corresponding technical data book.

The MOR bits settings on switch pack S1 should be set to the open position.

3.2.4 MC68HC05B8 Emulation

When emulating a MC68HC05B8 using the B32EM you should not to write to location $001F as this may cause a system malfunction. Also S-records downloads should avoid this location or write 0 into it.

For more information about the MC68HC05B8 features, see the corresponding technical data book.

The MOR bits settings on switch pack S1 should be set to the open position.

3.2.5 MC68HC05B16 Emulation

When emulating a MC68HC05B16 using the B32EM you should not to write to location $004F as this may cause a system malfunction. Also S-records downloads should avoid this location or write 0 into it. The WOI feature of the MC68HC705B16 is not available.

For more information about the MC68HC05B16 features, see the corresponding technical data book.

3.2.6 MC68HC05B32 Emulation

When emulating a MC68HC05B32 using the B32EM you should not to write to location $004F as this may cause a system malfunction. Also S-records downloads should avoid this location or write 0 into it. The WOI feature of the MC68HC705B32 is not available.

For more information about the MC68HC05B32 features, see the corresponding technical data book.

3.2.7 MC68HC05B16 Emulation using a MC68HC05B32 part

When emulating a MC68HC05B16 using the B32EM you should not to write to location $004F as this may cause a system malfunction. Also S-records downloads should avoid this location or write 0 into it.

For more information about the MC68HC05B4 features, see the corresponding technical data book.

The WOI feature of the MC68HC705B16 is not available.

3.2.8 MC68HC05B4,B5,B6,B8 Emulation using a MC68HC05B32 part

When emulating a MC68HC05B4,B5,B6,B8 using the B32EM you should not to write to location $004F as this may cause a system malfunction. Also S-records downloads should avoid this location or write 0 into it.

For more information about the MC68HC05B4,B5,B6,B8 features, see the corresponding technical data book.

3.3 EVS LIMITATIONS

This paragraph explains the limitations that apply to using your B32EM in an HC05EVS.

Limitation 1. CLI/RTI. You may not trace a clear interrupt mask (CLI) or return from interrupt (RTI) instruction with an interrupt enabled and pending, due to MCU interrupt handling. Attempting such a trace causes an interrupt in the monitor map; this forces a software reset of the HC05EVS. User breakpoints remain in the user map as SWI instructions; you must remove such SWI instructions.

Limitation 2. Branch. Do not trace a conditional branch instruction (such as BRCLR) that branches to itself. As the monitor places an SWI instruction on the object of the branch, the system never would execute the instruction. However, it would appear to you that the instruction had executed. You may enter a G command while the PC points to this type of instruction as long as the instruction is not a breakpoint address.

Limitation 3. IRQ/SWI. Whenever possible, avoid mixing interrupt requests (IRQs) and user software interrupts (SWIs). This prevents a possible IRQ-SWI timing problem: a concurrent hardware interrupt and SWI could cause an HC05EVS failure that could stop program execution. To recover from such a failure (which occurs very infrequently, statistically), press the master reset switch (SW3).

Limitation 4. Memory Map. You must be aware of the memory map of the MCU being simulated; be sure to use only valid ROM locations. The HC05EVS does not provide protection to limit user programs to the exact amount of MCU ROM available. (For information about memory maps, consult the technical data book for the MCU.)

Limitation 5. COP. The COP is not supported by the current platform board.

Limitation 6. At slow E clock rates the MCU will be unable to load S-records correctly. This is due to communication overruns, due to the inability of the MCU to service the ccommunication chip fast enough. To avoid this problem you can slow the transmission rate (not baud rate) or use a faster clock to load the MCU and then slow the clock down.

3.4 LOGIC ANALYZER CONNECTOR P1

Figure 3-1 shows the pin assignments for logic analyzer connector P1. Table 3-2 lists signal descriptions for this connector.

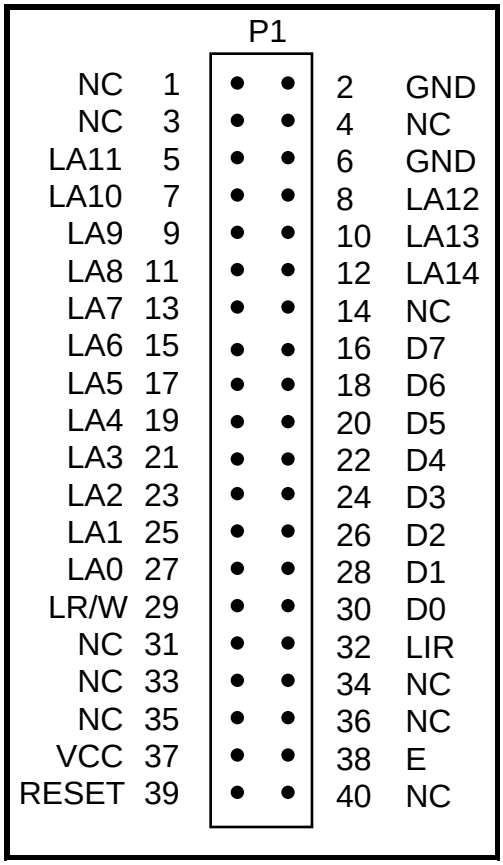


Figure 3-1. Connector P1 Pin Assignments

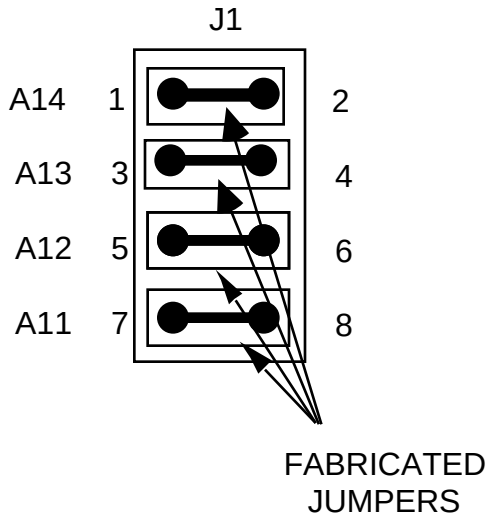
Table 3-1. Logic Analyzer Connector P1 Signal Descriptions

PIN	MNEMONIC	SIGNAL
1, 3, 4, 12, 14, 31, 33 — 36, 40	-----	No connection
2, 6	GND	GROUND
5, 7, 9, 11. 13. 15. 17, 19, 21, 23, 25, 27	LA11 — LA0	LATCHED ADDRESSES (bits 11—0) - MCU latched output address bus.
8, 10,12	LA12, LA13, LA14	LATCHED ADDRESSES (bit 12 and 13) - MCU latched output address bus.
16, 18, 20, 22, 24, 26, 28, 30	AD7 — AD0	DATA BUS (bits 7—0) - MCU multiplexed I/O data bus.
29	LR/W	LATCHED READ/WRITE - Active-high output signal that indicates the direction of data transferred on the bus.
32	LIR	LOAD INSTRUCTION REGISTER - Open-drain, active-low output signal that indicates an instruction is starting.
37	VCC	+5 VDC POWER - Input voltage (+5 Vdc @ 1.0 A) used by EVS logic circuits.
38	E	EXTERNAL CLOCK - Internally generated output clock signal used as a timing reference. The frequency of E clock is 1/2 the input frequency of the signal on the OSC2 pin.
39	RESET	RESET - Active-low bidirectional signal for starting an EVS reset.

3.5 REMAINING SYSTEM INSTALLATION

When you have configured headers J1 to J9 and switch S1, you are through with B32EM configuration.

Find jumper header J1 of the HC05EVS platform board. Make sure that three fabricated jumpers are installed, per the diagram below.



To install the B32EM on an HC05EVS platform board, fit together EM connectors P2 and P3 (on the bottom of the board) and platform-board connectors P3 and P4. Snap the corners of the EM onto the plastic standoffs.

At this point, you are ready to make remaining cable connections, as necessary, and restore power. For instructions, consult the HC05EVS operations manual (HC05EVSOM/D).