

IDB-HC08AP Evaluation Board For Freescale MC68HC908AP

User's Manual (Rev. 2.0)

1. Introduction

Overview

The IDB-HC08AP Evaluation Board demonstrates the capabilities of the 48-pin MC68HC908AP devices. The IDB-HC08AP Evaluation Board can be used as a standalone application or with an emulator system, such as inDART-HC08, through a MON08-compatible connection.

Board Features

The IDB-HC08AP Evaluation Board has the following hardware features:

1. An MC68HC908AP64 microcontroller (in QFP48 package, already programmed with a demo application—in addition, you can also use any of the pin-to-pin-compatible MC68HC908AP family devices);
2. ZIF socket for the microcontroller;
3. A standard MON08 connector;
4. Eight jumpers to connect/disconnect each of the eight DIP-switches to/from their respective Port B pins;
5. Eight general-purpose DIP-switched connected to Port B;



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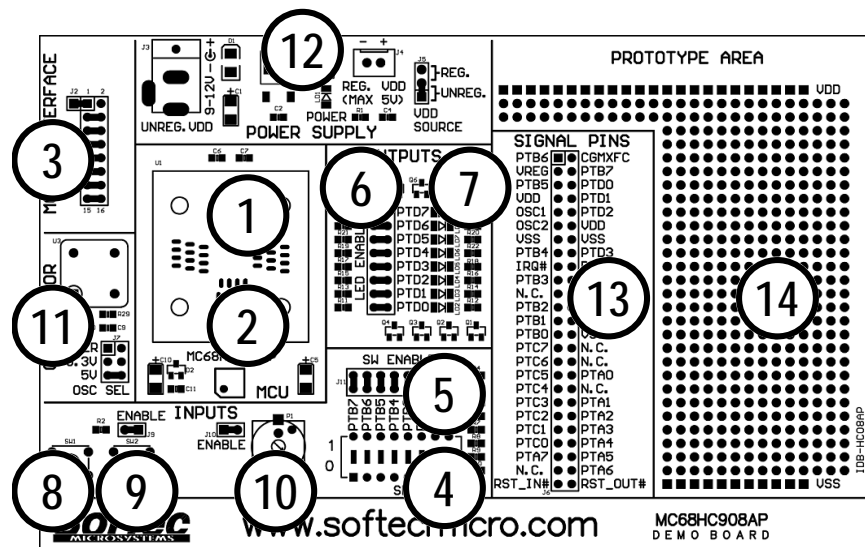
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6. Eight jumpers to connect/disconnect each of the eight LEDs to/from their respective Port D pins;
7. Eight high-efficiency (low-current) LEDs connected to Port D;
8. A push-button switch connected to RESET;
9. A push-button switch, together with a jumper to connect/disconnect it to/from PTA6;
10. A potentiometer, together with a jumper to connect/disconnect it to/from PTA7;
11. A 16-MHz oscillator, together with a jumper to connect/disconnect it from the microcontroller's OSC1 pin;
12. A connector for a 9-12 V, 200 mA (unregulated) power supply and an auxiliary connector for a 5 V (max., regulated) power supply, together with a jumper to select the power supply source;
13. A connector area to access the I/O pins of the microcontroller for expansion prototyping;
14. A prototyping area.



The IDB-HC08AP Demo Board

Supported Devices

The IDB-HC08AP Evaluation Board supports the following devices:

- MC68HC908AP16;
- MC68HC908AP32;
- MC68HC908AP64;
- And any future MC68HC908AP family pin-to-pin compatible device.

Recommended Reading

Freescale MCU CD-ROM or individual datasheet;

Freescale CPU08 Central Processor Unit Reference Manual;

inDART-HC08 User's Manual.

2. Getting Started

Overview

The IDB-HC08AP Evaluation Board may be used as a standalone application or with a MON08-based emulator/programmer (host mode).

Standalone Mode

The IDB-HC08AP Evaluation Board comes with the microcontroller pre-programmed with a sample application. When working in standalone mode, the sample application configures the A/D peripheral to convert on the A/D channel connected to the potentiometer and displays the results on the LEDs. By pressing the PTA6 push button, the DIP-switches status is displayed on the LEDs instead.

In order for the IDB-HC08AP Evaluation Board to work in standalone mode, the MON08 connector's pins must be jumpered as shown below (factory setting).



MON08 Connector Jumpered for Standalone Mode Operation

Additionally, you must verify that the board's other jumpers are set correctly.

- Make sure that the "OSC SEL" (J7) jumper selects either the "5V" position or the "3.3V" position. This is needed to enable the on-board 16-MHz oscillator with the correct signal voltage. If the microcontroller works at 3.3 V, the "OSC SEL" jumper must select the "3.3V" position; if the microcontroller works at 5.0 V, the "OSC SEL" jumper must select the "5V" position.
- Make sure that all of the "LED ENABLE" jumpers (J8) and the "POTENTIOMETER ENABLE" jumper (J10) are inserted.
- Make sure that the pre-programmed sample device is in the appropriate socket on the board. Finally, power up the board. The IDB-HC08AP Evaluation Board can be powered either via the "UNREG. VDD" connector (J3) or the "REG. VDD" connector (J4).

The "UNREG. VDD" connector accepts 9-12 V DC, 200-mA wall plug-in power supply with a 2.1 mm pin and sleeve plug with positive in the center and sleeve as ground. When powering the board through this connector, make sure the "VDD SOURCE" jumper (J5) selects the "UNREG." Position. The "UNREG. VDD" voltage is internally regulated to 5 V DC.

The "REG. VDD" connector accepts 5 V DC (max.). When powering the board through this connector, make sure the "VDD SOURCE" jumper (J5) selects the "REG." position. The "REG. VDD" voltage directly powers the microcontroller and the rest of the board.

Upon powering up the board, the green "POWER" LED turns on. By rotating the potentiometer, you affect the results of the A/D conversion, and the value of each conversion is displayed (in a linear bar fashion) on the LEDs.

Host Mode

The IDB-HC08AP Evaluation Board can be used in conjunction with a MON08-based emulator/programmer, such as SofTec Microsystems' inDART-HC08 In-Circuit Debugger/Programmer or a Freescale development tool.

If you use the evaluation board with SofTec Microsystems' inDART-HC08, a sample application similar to that described in the previous section can be executed in "Host" mode, where the program execution is controlled by the host PC. You can use the PC, additionally, to debug the application by, for example, execute the program step by step and watching how the microcontroller registers vary, by using the Metrowerks' CodeWarrior HC08 IDE provided with inDART-HC08. The example is available both in Assembly and in C language. Please refer to the inDART-HC08 user's manual for a step-by-step tutorial.

In order to work with an emulator/programmer, the jumpers in the MON08 connector must be removed, and the MON08 cable of the emulator/programmer must be connected to the evaluation board's MON08 connector (J1) connector, taking care of the proper polarity. The J2 connector is not used in this mode.

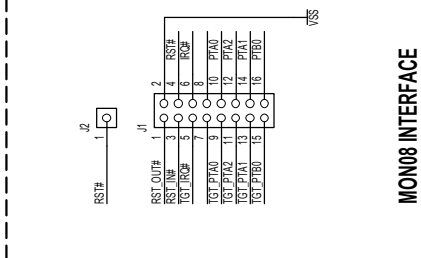
3. MON08 Connections (J1 Connector)

Pin #	Pin Name	Description
1	RST_OUT#	Reset signal to target system: GND or open drain output reflecting the state of the MCU RST# and RST_IN# signals.
2	GND	System ground.
3	RST_IN#	Reset signal from target system: GND to V_{DD} input to control the state of the MCU RST# and RST_OUT# signals.
4	RST#	MCU reset; held at V_{PP} out of reset. No other target-system logic should be tied to this signal.
5	TGT_IRQ#	Interrupt signal from target system: GND to V_{DD} input to control the state of the MCU IRQ# signal.
6	IRQ#	MCU interrupt; held at V_{PP} when the TGT_IRQ# signal is not asserted.
7	N.C.	Not connected.
8	N.C.	Not connected.
9	TGT_PTA0	Port A, bit 0; reserved MCU connection (unavailable to application).
10	PTA0	Port A, bit 0; MON08 single-wire communication.
11	TGT_PTA2	Port A, bit 2.
12	PTA2	Port A, bit 2; grounded during reset.
13	TGT_PTA1	Port A, bit 1.
14	PTA1	Port A, bit 1; held at V_{DD} during reset.
15	TGT_PTBO	Port B, bit 0.
16	PTB0	Port B, bit 0; held at ground or V_{DD} during reset, depending on the "Frequency Divider" parameter (see inDART-HC08 User's Manual).

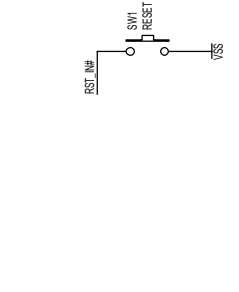
MON08 Signals

(RQ#)	PTB8	1	COM#FC
(NC.)	VREG	2	PTB7
(NC.)	PTB5	3	PTB0
(NC.)	VDD	4	PTD0
(NC.)	OSC1	5	PTD1
(NC.)	OSC2	6	VDD
(NC.)	PTB4	7	VSS
(NC.)	PTB3	8	PTD2
(NC.)	PTB2	9	PTD3
(NC.)	PTB1	10	PTD4
(NC.)	PTB0	11	PTD5
(NC.)	PTC7	12	PTD6
(NC.)	PTC6	13	PTD7
(NC.)	PTC5	14	VSS
(NC.)	PTC4	15	PTD8
(NC.)	PTC3	16	PTD9
(NC.)	PTC2	17	PTD0
(NC.)	PTC1	18	PTD1
(NC.)	PTC0	19	PTD2
(NC.)	PTB7	20	PTD3
(NC.)	PTB6	21	PTD4
(NC.)	PTB5	22	PTD5
(NC.)	PTB4	23	PTD6
(NC.)	PTB3	24	PTD7
(NC.)	PTB2	25	PTD8
(NC.)	PTB1	26	PTD9
(NC.)	PTB0	27	VSS
(NC.)	PTC7	28	VSS
(NC.)	PTC6	29	VSS
(NC.)	PTC5	30	VSS
(NC.)	PTC4	31	TGT_PTA0
(NC.)	PTC3	32	TGT_PTA1
(NC.)	PTC2	33	TGT_PTA2
(NC.)	PTC1	34	TGT_PTA3
(NC.)	PTC0	35	TGT_PTA4
(NC.)	PTB7	36	TGT_PTA5
(NC.)	PTB6	37	TGT_PTA6
(NC.)	PTB5	38	TGT_PTA7
(NC.)	PTB4	39	TGT_PTA8
(NC.)	PTB3	40	TGT_PTA9
(NC.)	PTB2	41	TGT_PTA0
(NC.)	PTB1	42	TGT_PTA1
(NC.)	PTB0	43	TGT_PTA2
(NC.)	PTC7	44	TGT_PTA3
(NC.)	PTC6	45	TGT_PTA4
(NC.)	PTC5	46	TGT_PTA5
(NC.)	PTC4	47	TGT_PTA6
(NC.)	PTC3	48	TGT_PTA7
(NC.)	PTC2	49	TGT_PTA8
(NC.)	PTC1	50	TGT_PTA9
(NC.)	PTC0	51	RST_Out#

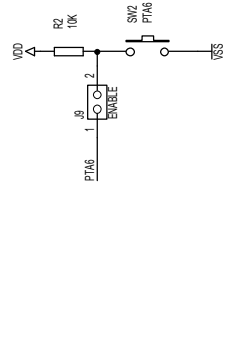
SIGNAL PINS



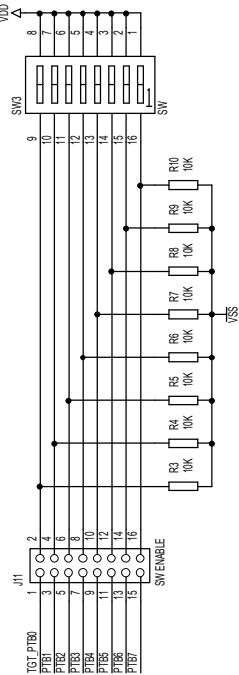
MON08 INTERFACE



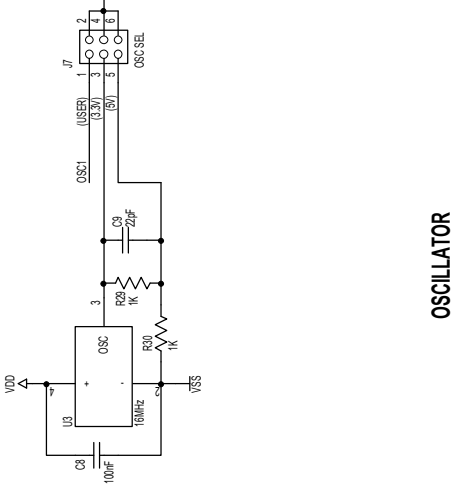
INPUTS



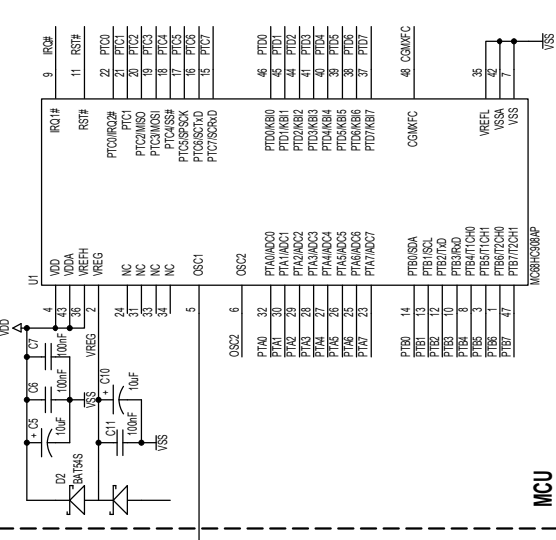
OUTPUTS



OSCILLATOR



MCU



POWER SUPPLY

