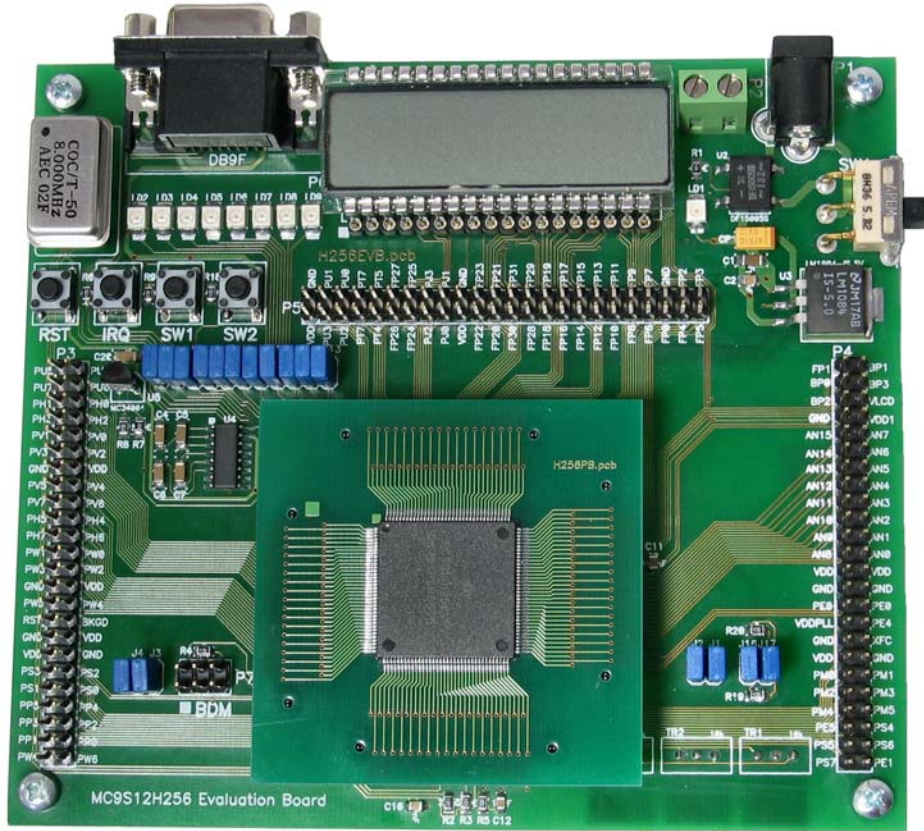


Motorola MC9S12H256 Evaluation Board

Ordering code	ITMC9S12H256
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MC9S12H256 Evaluation Board



MC9S12H256 CPU Piggyback

Features

The ITMC9S12H256 is an evaluation or development board for the Motorola MC9S12H256 microcontroller. iSYSTEM MC9S12H256 ActivePOD (in-circuit emulation) or HC(S)12 BDM debugger (on-chip emulation) can be connected to the board.

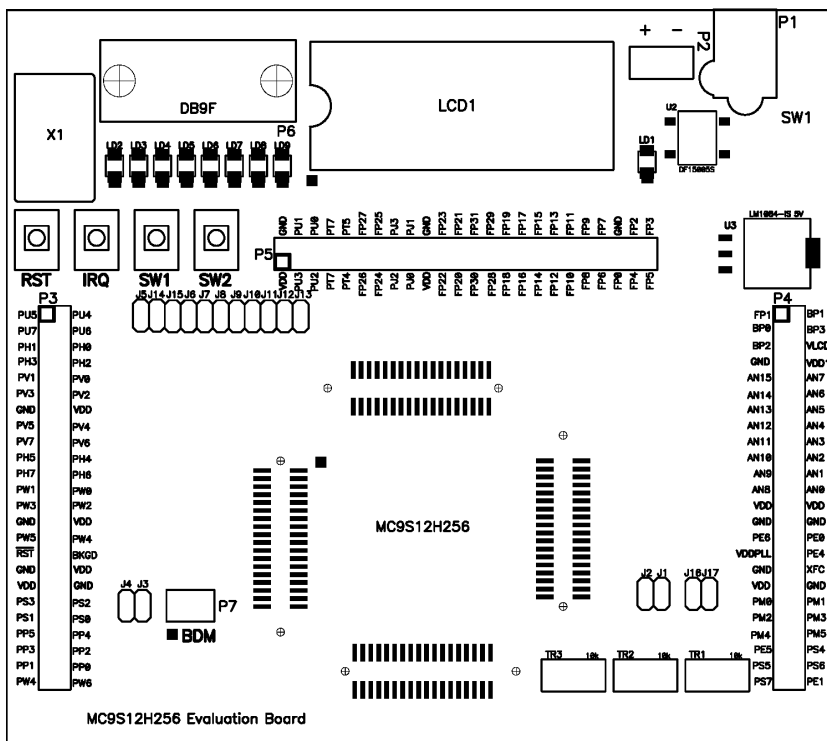
ActivePOD is connected directly to the board replacing the MC9S12H256 CPU piggyback. When BDM debugger is connected, MC9S12H256 CPU piggyback must be connected to the target and a standard BDM port is provided for the development tool.

Features

- MC9S12H256 CPU
- LCD display (16 segments x 8 characters)
- BDM debug connector
- RS232 port with DB9-F connector
- 8 MHz clock oscillator (16 MHz max)
- 3 expansion connectors
- Regulated 5 V power supply
- ON/OFF switch
- 3 + 1 push-buttons
- 8 + 1 LED indicators

Specifications

- Board size: 132.1 x 116.8 mm
- CPU piggyback size: 55.4 x 55.4 mm
- Power input 6 - 12 V DC, 9 V DC typical



Getting started

Setting up the board

The MC9S12H256 Evaluation board has been tested and programmed with the demo application. Please examine the board and check that:

- The LCD module and the crystal oscillator are installed.
- All jumpers (J1-J17) are set.

Standalone operation

- Make sure that the CPU piggyback is installed.
- Plug the DC source (e.g. AC wall adapter) to the P1 connector or apply DC source to the connector P2.
- Turn on the power switch SW1 and check the green power LED LD1.
- The board should execute a sample application.

Use with MC9S12H256 ActivePOD

- Remove the CPU piggyback from the board.
- Connect the MC9S12H256 ActivePOD to the board.
- Turn the emulator on and then power the target.
- Run winIDEA, open a sample project and carry out the debug reset. The system is ready for debugging.

Use with BDM debugger

- Make sure that the CPU piggyback is installed.
- Connect the 68HC(S)12 iCARD to a standard 6-pin BDM debug connector P7
- Turn the emulator on and then power the target.
- Run winIDEA, open a sample project and carry out the debug reset. The system is ready for debugging.

Running winIDEA

It's assumed that winIDEA is installed on a PC, where iSYSTEM development tool is connected.

Contact your local iSYSTEM sales representative for a sample project or download it from:

<ftp://www.asystemelectronic.si/winidea/samples/targets/itmc9s12h256.zip>

Start winIDEA application from the Start menu and open a sample project workspace. If you are using ActivePOD, open sampleICE.jrf workspace and if you are using BDM debugger, open sampleBDM.jrf workspace. Next, check if proper emulator hardware is selected and the communication between the PC and the emulator.

Carry out the debug reset and run the application (debug run) in case of BDM debugger and carry out the debug download and run the application (debug run) in case of MC9S12H256 ActivePOD.

Blinking red LEDs (LD2-LD9) and a "Welcome" title on the LCD display indicate a working system. Additionally, a test string is sent to the host RS232 terminal.

There are four push buttons on the board designated SW1, SW2, RST and IRQ. RST resets the complete system. Make sure that 'Reset from target' option is checked in winIDEA when using RST button and the development system is connected to the board. IRQ turns on all LEDs. SW1 turns on one LED and shift its position to the left for each consecutive push. SW2 does the same except that it shifts in the opposite direction.

Trimmer TR1 controls the LCD brightness. Use a mini-screwdriver to adjust it.

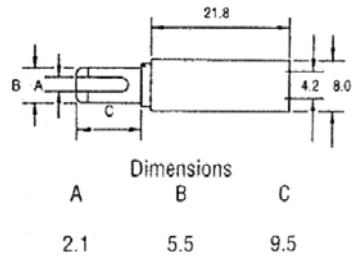
Trimmers TR2 and TR3 are connected to the CPU A/D converter. TR2 is connected to the channel 0 and TR3 to the channel 1. Refer to the board schematic for more details.

ITMC9S12H256 Operation

Power Supply

The external power supply must provide the voltage between 6 and 12 V DC (typical 9 V DC). Maximum current consumption shouldn't exceed 100 mA when 9 V DC is used. The polarity is not important. Low voltage DC plug must conform to the DIN 45323 standards:

- The hole diameter is 1.95 – 2.5 mm (standard: 2.1 mm)
- The external diameter is 6.2 - 5.5 mm (standard: 5.5 mm)



Note: The emulator must be powered on first, then the target board and vice versa when switching off the system. First, switch off the target and then the emulator.

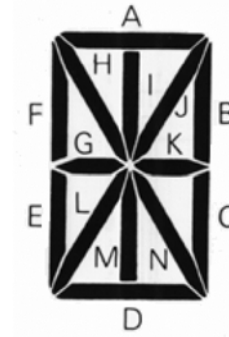
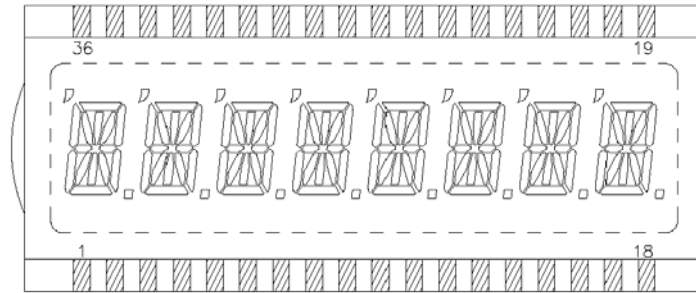
Jumpers

All CPU peripheral signals used on the board can be disconnected from the CPU via jumpers. By removing the jumper, the belonging signal is freed for the user. Note that all CPU signals are available on the expansion connectors and can be used by the user.

Jumper	DESCRIPTION
J1	Enable AN0 (Analog input 0)
J2	Enable AN1 (Analog input 1)
J3	Enable PS1 (Transmit data)
J4	Enable PS0 (Receive data)
J5	Enable PE1 (IRQ push-button)
J6	Enable PH0 (LD2)
J7	Enable PH1 (LD3)
J8	Enable PH2 (LD4)
J9	Enable PH3 (LD5)
J10	Enable PH4 (LD6)
J11	Enable PH5 (LD7)
J12	Enable PH6 (LD8)
J13	Enable PH7 (LD9)
J14	Enable PE0 (SW1 push-button)
J15	Enable PM0 (SW2 push-button)
J16	Enable PE6 (MODB=0)
J17	Enable PE5 (MODA=0)

LCD display

ITMC9S12H256 evaluation board uses 8-character LCD glass display. Each character consists of 14 segments. Following figures shows the segment position and a decoding table.



PIN	COM1	COM2	COM3	COM4	PIN	COM1	COM2	COM3	COM4
1	1D	1E	1F	1S	19	NC	NC	COM3	NC
2	1J	1I	1H	1G	20	NC	NC	NC	COM4
3	2D	2E	2F	2S	21	8DP	8C	8B	8A
4	2J	2I	2H	2G	22	8K	8L	8M	8N
5	3D	3E	3F	3S	23	7DP	7C	7B	7A
6	3J	3I	3H	3G	24	7K	7L	7M	7N
7	4D	4E	4F	4S	25	6DP	6C	6B	6A
8	4J	4I	4H	4G	26	6K	6L	6M	6N
9	5D	5E	5F	5S	27	5DP	5C	5B	5A
10	5J	5I	5H	5G	28	5K	5L	5M	5N
11	6D	6E	6F	6S	29	4DP	4C	4B	4A
12	6J	6I	6H	6G	30	4K	4L	4M	4N
13	7D	7E	7F	7S	31	3DP	3C	3B	3A
14	7J	7I	7H	7G	32	3K	3L	3M	3N
15	8D	8E	8F	8S	33	2DP	2C	2B	2A
16	8J	8I	8H	8G	34	2K	2L	2M	2N
17	COM1	NC	NC	NC	35	1DP	1C	1B	1A
18	NC	COM2	NC	NC	36	1K	1L	1M	1N

Decoding Table

Connectors

RS232 connector

Pin	DESCRIPTION
P1	N.C.
P2	TxD (Transmit data)
P3	RxD (Receive data)
P4	N.C.
P5	GND
P6	N.C.
P7	N.C.
P8	N.C.
P9	N.C.

BDM debug connector

BKGD	1	2	GND
N.C.	3	4	~RST
N.C.	5	6	VDD

Expansion connectors

All CPU signals are present on the expansion connectors (P3, P4 and P5).

PU5	1	2	PU4	FP1	1	2	BP1	VDD	1	2	GND
PU7	3	4	PU6	BP0	3	4	BP3	PU3	3	4	PU1
PH1	5	6	PH0	BP2	5	6	VLCD	PU2	5	6	PU0
PH3	7	8	PH2	GND	7	8	VDD1	PT7	7	8	PT7
PV1	9	10	PV0	AN15	9	10	AN7	PT4	9	10	PT5
PV3	11	12	PV2	AN14	11	12	AN6	FP26	11	12	FP27
GND	13	14	VDD	AN13	13	14	AN5	FP24	13	14	FP25
PV5	15	16	PV4	AN12	15	16	AN4	PJ2	15	16	PJ3
PV7	17	18	PV6	AN11	17	18	AN3	PJ0	17	18	PJ1
PH5	19	20	PH4	AN10	19	20	AN2	VDD	19	20	GND
PH7	21	22	PH6	AN9	21	22	AN1	FP22	21	22	FP23
PW1	23	24	PW0	AN8	23	24	AN0	FP20	23	24	FP21
PW3	25	26	PW2	VDD	25	26	VDD	FP30	25	26	FP31
GND	27	28	VDD	GND	27	28	GND	FP28	27	28	FP29
PW5	29	30	PW4	PE6	29	30	PE0	FP18	29	30	FP19
~RST	31	32	BKGD	VDDPLL	31	32	PE4	FP16	31	32	FP17
GND	33	34	VDD	GND	33	34	XFC	FP14	33	34	FP15
VDD	35	36	GND	VDD	35	36	GND	FP12	35	36	FP13
PS3	37	38	PS2	PM0	37	38	PM1	FP10	37	38	FP11
PS1	39	40	PS0	PM2	39	40	PM3	FP8	39	40	FP9
PP5	41	42	PP4	PM4	41	42	PM5	FP6	41	42	FP7
PP3	43	44	PP2	PE5	43	44	PS4	FP0	43	44	GND
PP1	45	46	PP0	PS5	45	46	PS6	FP4	45	46	FP2
PW4	47	48	PW6	PS7	47	48	PE1	FP5	47	48	FP3
	P3				P4				P5		

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