MC9S08SH8 Project Board

This printed circuit board is designed to be a hardware platform for evaluating Freescale's MC9S08SH8 microcontroller. Several interesting and useful projects using this board are on my website but many others are possible that I haven't even thought of.

If you are reading this you are likely to be aware of the characteristics of this MPU chip. The highlights are: 8K bytes of flash, 512 bytes of RAM, high speed, many peripherals, 20 pin DIP package and 5 volt compatible. For more information you must read the MC9S08SH8 Data Sheet from Freescale.

Please refer to the schematic diagram. I will describe some of the features of the board.

You should supply power in the range of 6 to 9 Volts DC to the header H1 in the upper right corner of the board. Polarity is unimportant because it is fed thru the full wave bridge rectifier, D1. A filter capacitor may be soldered at C1, or not, depending on your power supply. The voltage is regulated to 5 Volts by the LM7805 or LM340 at IC1. This one amp regulator was chosen, not because the board required that much current but some peripherals may.

IC2 is the MCU, a MC9S08SH8CPJ. Freescale recommends putting a .1 uF and a 10 uF next to the power pins. They are C6 & C5

Communication to the outside world is via a Serial Communication Interface to a RS-232 transceiver. IC4 is the transceiver which may be a MAX232 since this board is 5 volts or a SP3232E. There are many pin compatible versions from several manufactures. The output is to a header H2 and/or a 9 pin female D-Sub socket X2.

The processor has a Serial Peripheral Interface the signals of which are fed to the 6 pin header, H3, located at the lower left side of the board. An I/O signal, which may be used as an Enable is provided on the header as well as +5 V and ground. A SIP resistor network, RN1, may be installed for pull-up. It may not be needed depending upon what may be connected to the SPI. This SPI header is used to connect to several of the projects described on my website.

Located above the header on the board is a LED and a 6-pin mini-DIN socket which is intended for a keyboard interface project but may be used for other purposes with suitable programming.

On the far lower right side of the board is a three pin header intended for a Dallas Semiconductor one-wire interface. On my web pages is a project using the DS18B20 temperature sensor. Other one-wire devices may also be used.

Header SV3 is for the HCS08 background debug controller (BDC). Using the BDC and CodeWarrior you can debug, trace, and load programs. You would need a background debug module to connect between your PC and the Project Board. P&E sells one for about $100. For less than half the cost there is the Open Source BDM (OSBDM08). You can buy an assembled unit from Witztronics. There is a minor problem in using the OSBDM08, however. With a brand new blank 9S08 chip you cannot establish a connection because the BKGD must be held low during power-up. There is provision for doing this on the board with IC3. Unfortunately, that should only be used to establish connection with a blank chip; it will prevent proper operation of the MCU once it is programmed. Therefore, IC3 should only be connected to the BKGD pin of the MPU

when programming a blank chip. There is a jumper, JP1, which should be closed when using a blank chip and open otherwise. If you never intend to program a blank chip you can ignore IC3 and JP1.

There is another way to load your program code into a 9S08 and that is thru the Serial Communication Interface RS-232 port. The chip has to have the Developer's Serial Boot-loader installed first. Any chips that you buy from me will have the bootloader. See Freescale app note AN2295 for more details.

The MC9S08SH8 has four pins of I/O port C which are uncommited by anything on the project board and are available to the user. They are connected to the pads of JP3 & JP4.

The project board also has provision for a serial EEPROM of the AT24CP type which is connected thru the Inter-Integrated Circuit Module (IIC).

The 9S08SH8 project also has a Real Time Clock, the DS1307. This is also connected to the IIC. The battery part # is CR1225FV available from Mouser Electronics. The pads of JP2 are also connected to the IIC module in case the user wanted to put some other IIC device in the prototype area.

The project board is 3.925" x 1.875" and is sized to exactly fit the cute Serpac A-20 enclosure. Four of the six mounting holes in the board align with the mounting bosses in the enclosure. The two other holes align with mounting bosses in the Pactec CM5-125.

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