DS18B20

The DALLAS Semiconductor DS18B20 is a digital thermometer that gives 12-bit temperature data. The information is sent to the microprocessor over a 1-Wire data interface. Although Dallas calls it 1-wire, Ground and Power are also required. Power can optionally be "stolen" from the I/O in a parasite power mode. Note that the DS18B20 is different than the older DS1820 which only has a 9-bit resolution.

Included in the ZIP file are the source code for three similar programs to use the DS18B20. All three are written for the MC68HC11F1 microprocessor. The assumption is the micro has the BUFFALO monitor resident in ROM and the programs are loaded into RAM at $3000. Use the monitor **load t** command to load the S19 file and the command **CALL 3000** to start the program. The source code can easily be changed to make the programs stand alone and/or run on other versions of the HC11. The DS18B20 provides temperature in a digital format of degrees Celsius; all of the programs convert that to Fahrenheit with a one tenth of degree resolution (almost).

The programs are named DS18B20a.asm, DS18B20b.asm and DS18B20c.asm. Also in the ZIP file are include files called by these programs and the version of the AS11 assembler that can be used to generate listing and S19 files.

DS18B20a.asm

This program reads the DS18B20 and displays the temperature on a 4 digit 7-segment display. When the program is first called it prints on the terminal screen the ROM serial number, the alarm settings and the temperature in Celsius. It then goes into an endless loop of displaying the temperature on the LED display. One note about the display – I have a number of 4 digit display boards I built a few years ago based on the MC14499P display driver chip however it may not be available anymore. I have also have an include file for the similar MC14489A which is available. I wrote that code a few years ago and haven't tested it yet with this program.

The program uses the SKIP ROM command to address the DS18B20 so only one chip is allowed on the 1-wire bus.

DS18B20b.asm

This program reads the DS18B20 and output the data over the serial line in a format intended to be received by the SalmaWare freeware data plotting program "Stamp Plot Lite". Get it at http://www.selmaware.com/

The program uses the SKIP ROM command to address the DS18B20 so only one chip is allowed on the 1-wire bus.

DS18B20c.asm

Each DS18B20 has a unique serial number. Many chips can be placed on the 1-wire bus and each chip addressed by its serial number. Only the addressed chip will respond. This program reads several chips and displays the result on a computer screen running a terminal program such HyperTerminal. Note that ANSI.sys must have been loaded into your computer by CONFIG.sys during boot up for this to work.

You can find the serial number of your chips by first testing them individually with the DS18B20a program.

DS18B20e.asm

NEW in 2003

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I've ported the 1-wire code to the new Motorola MC9S12DP256. The ZIP file with the code should be extracted into a separate folder than the other programs because some of the include files have the same name and function as those for the HC11 but are rewritten.

This program is similar to DS18B20a.asm in that it is written for one sensor on the bus. When the program is first called it prints on the terminal screen the ROM serial number, the alarm settings and the temperature in Celsius. It then goes into an endless loop of displaying the temperature on a 2-line by 16 character LCD display.

The hardware used was the DRAGON12PRO from http://www.evbplus.com/ however it should run on any MC9S12 system. It uses one port for the LCD and bit 7 of another port for the sensor. The program is written to run in RAM in a system with D-Bug12 v4 resident in FLASH. Use the **load** command to download the S19 file and **G 2000** to start the program. The MPU is expected to be running at 24 MHz. The higher speed of this processor required some tweaking of the 1-wire code to get the proper timing.

```
Direct to COM1 - HyperTerminal
File  Edit  View  Call  Transfer  Help

D-Bug12 v4.0.0b14
Copyright 1996 - 2002 Motorola Semiconductor
For Commands type "Help"

>load
**************
>
>g 2000

DS18B20 1-Wire Digital Thermometer Demonstration Pro


Family Code: 28 (hex)
Serial Number: F2 DA 1E 00 00 00 (hex)
ROM CRC: CC (hex)
Alarm high:    75 Celsius
Alarm low:     70 Celsius
Configuration register: 7F (hex)
Current temperature:   19.75 Celsius
```