Southern Cross Debug Serial Monitor (SCBUG Version 1.0)

The Southern Cross Debug serial monitor (SCBUG) is a small program that allows you to download executable code, examine and change memory and execute code using the bit banged serial port of the Southern Cross Computer connected to a terminal program on your PC via a serial to USB converter. SCBUG also has a register display that can be used to debug programs using breakpoints or single stepping.

The monitor starts with a VT100 terminal string to erase the display and send the cursor home, a sign on string '**SCBUG**' and the version of the code is displayed followed by the '**>**' prompt. SCBUG is now waiting for a command.

Commands are entered and the **<CR>** (Enter key) is used to execute the command, while you are entering the command you can use the **<ESC>** key to cancel and return to the prompt. **Note that all the commands are UPPER CASE and that all hexadecimal is also UPPER CASE.**

Commands:

1. **D <address> <CR>**

   The **D**isplay command will show the data at the entered address in a row of 16 bytes followed by the ASCII representation of the byte or a full stop if the byte is non-printing.

   Pressing the <space> bar will display the bytes at the next 16 addresses, <ESC> key will return to the prompt.

   e.g. 0070 3F F5 D5 E5 79 E6 7F CB 27 26 01 6F 7E 23 56 2A ?...y...'&.o~#V*

2. **T <CR>**

   The **T**oggle command outputs to the IO7 (87h) IO port address which will either turn on or turn off the single stepper if it is connected. You can find out more information about the single stepping hardware in the SC User's Manual.

3. **M <address> <CR>**

   The **M**odify Memory command lets you change the byte at the entered memory address. Once you enter an address the current byte is displayed, and the cursor waits for a new value.

   After you enter the new value the monitor writes it to the address location and reads it back, if it is not the same the monitor will print a question mark next to the value. This typically happens when you try to write to an EPROM or where there is no memory decoded.

   The modify memory command will advance to the next address or you can press <ESC> to return to the prompt.

   e.g.   M 2000 <CR>

   　　　　2000 C3 32 <CR>

   　　　　2001 00 76 <CR>

   　　　　2002 02 98<CR>

   　　　　2003 FF<ESC>

   　　　　>

4. **G <address> <CR>**

   The **G**o command will jump to the entered address and begin program execution from there.

5. **I <CR>**

   The assembler output in Intel Hex file format can be downloaded using the **I** command.

   The monitor will display: SEND INTEL HEX FILE… Use your terminal program to send the Intel Hex File as a text file.

   The Intel format has a checksum for each line of data so if there is a checksum error the monitor will display CHECKSUM ERROR and return to the SCBUG prompt. If the transfer was successful FILE RECEIVED OK will be displayed.

6. **X<CR>**

   The **X** command returns control to the Southern Cross monitor.

Breakpoint/Single Stepping Register Output

Inserting a **RST 38H** instruction in your code will cause a breakpoint and will display the contents of the registers;

PC	AF	BC	DE	HL	IX	IY	SP	SZ-H-VNC
2021	0450	F2CC	DDEE	DEAD	BEEF	FEED	3F00	01010000

Pressing the **<space>** bar will return program execution to the code after the breakpoint, **<ESC>** will return to the SCBUG prompt. If you have the single stepping hardware connected you can also single step your program as long as it resides in RAM, turning the single stepper on and off as required with either the **T** command above or inserting **OUT (IO7),A** within your program.