How to use uBUG12

uBUG12 is a GUI to interface with Freescale's Serial Monitor that are pre-programmed into the NC12s and Adapt9S12E128 families. It has some similarities with Gordon Doughman's DBUG12.

uBUG12 can be downloaded from Technological Arts website
http://support.technologicalarts.ca/files/uBug12.zip

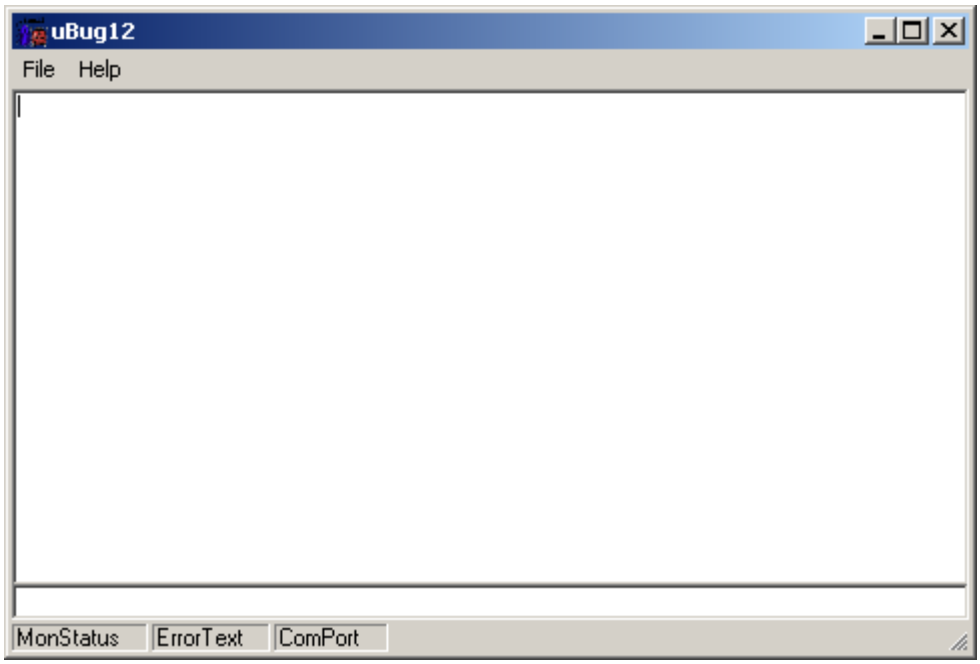
For PCs with Windows98SE the .net framework must be installed in order for uBUG12 to run. WinXP, 2K the .net framework is (usually) already installed. The .net framework can be found at MS website

http://www.microsoft.com/downloads/details.aspx?FamilyID=d7158dee-a83f-4e21-b05a-009d06457787&displaylang=en

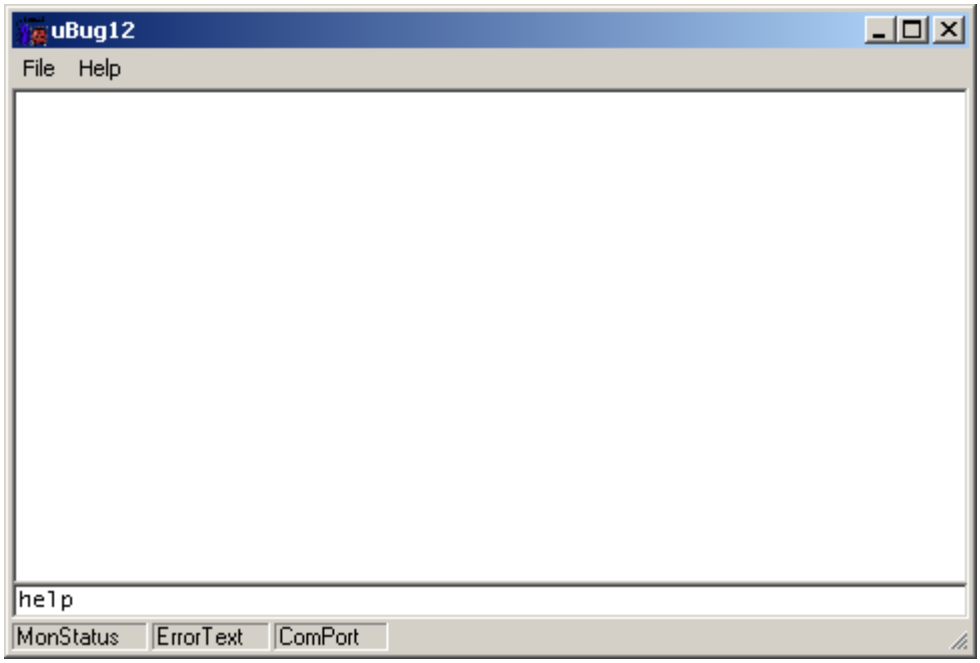
Getting Started:

Double click on the uBUG12 icon to start GUI. Below is what uBUG12 started.

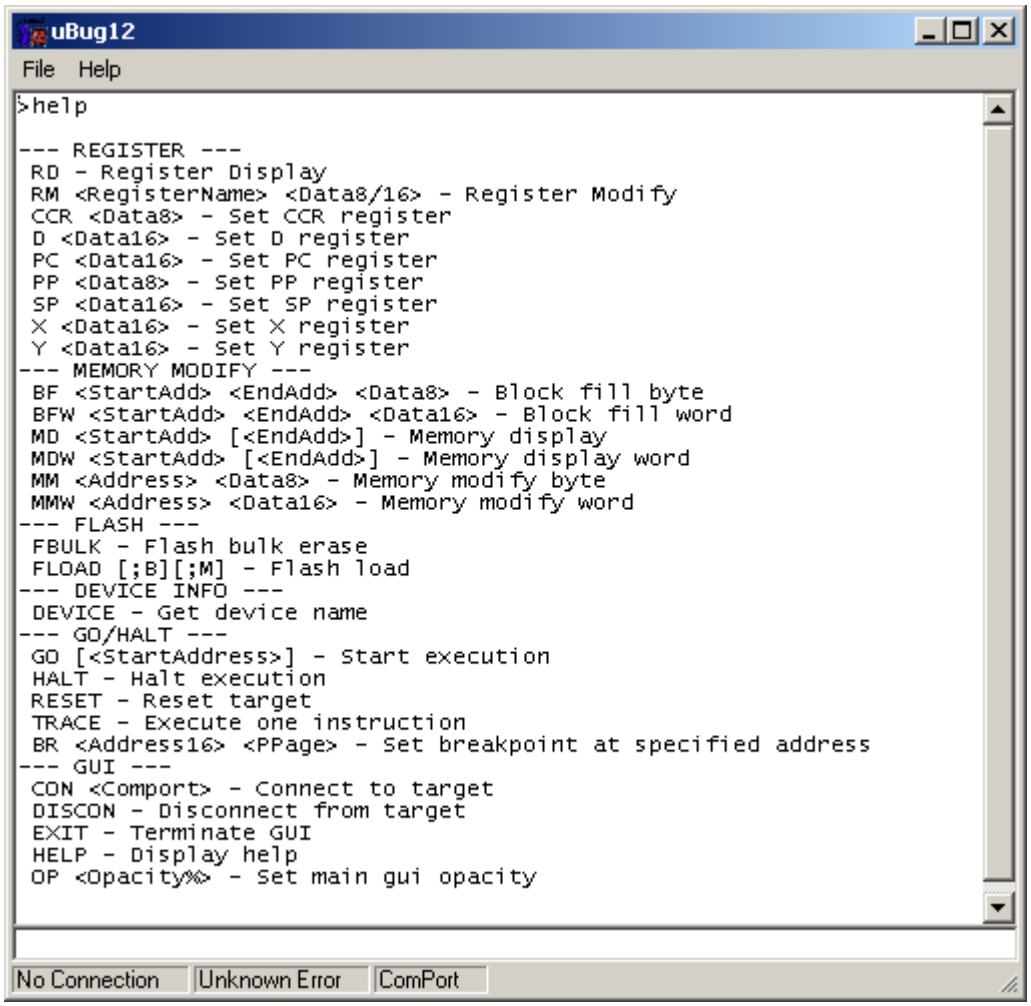
Here uBUG12 is waiting for commands. By typing ***help*** one can see different commands that can be use.



Type the ***help*** command



Once the help command is invoked, uBUG12 will list the different commands as shown.



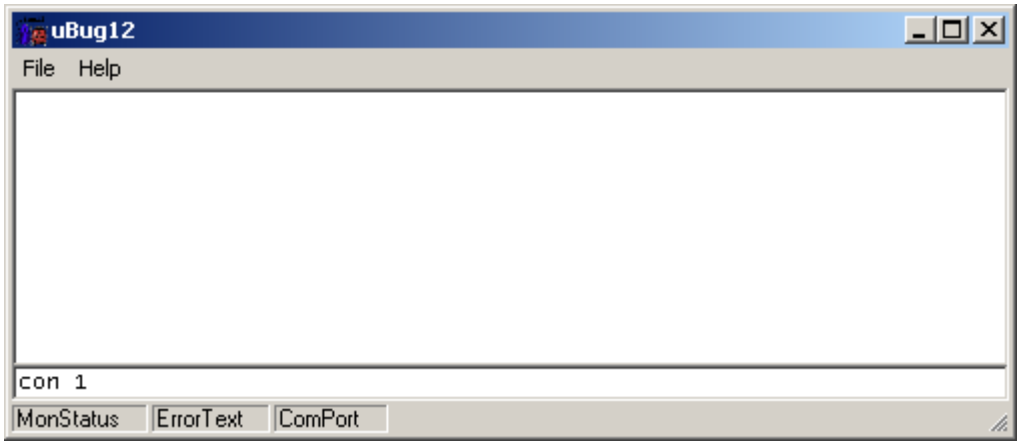
The different commands will be explained throughout this document. This document will use the NC12 module with a Docking module to help explain the command types.

Connecting:

This document will use COM 1 of the PC to connect to the target as an example. For PC without serial port, a USB to COM can be purchase from any computer store.

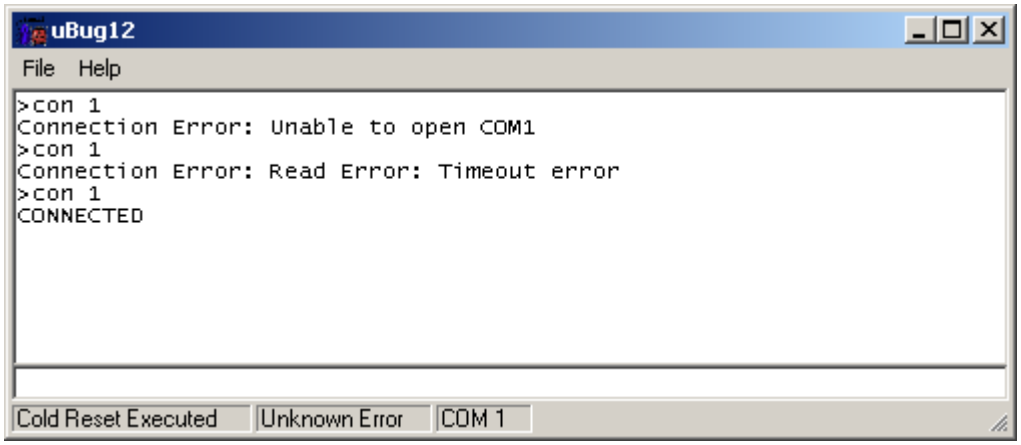
Connect a Serial cable from COM 1 to the Docking Module. Slide the Run/Load switch to Load or Boot then power up the board. Make sure the power LED is on.

The command to connect is ***CON 1*** for COM 1 and ***CON 2*** for COM 2.



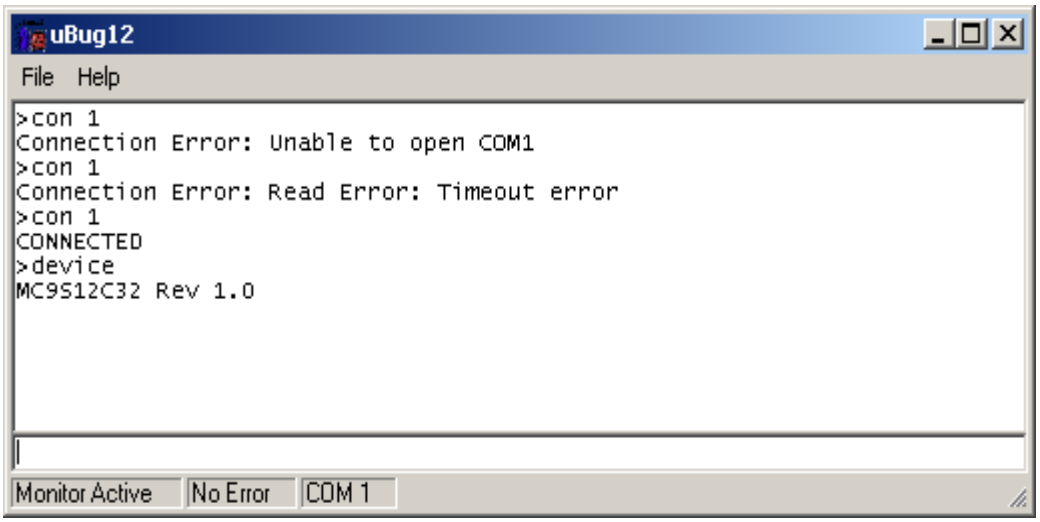
2 possible errors can occur:
Connection Error: Unable to open COM1 <- Another application is using the COM port

Connection Error: Read Error: Timeout error <- The MCU not currently in LOAD mode or the cable is disconnected from either PC or Docking Module, lastly the serial cable is connected on the wrong COM port.



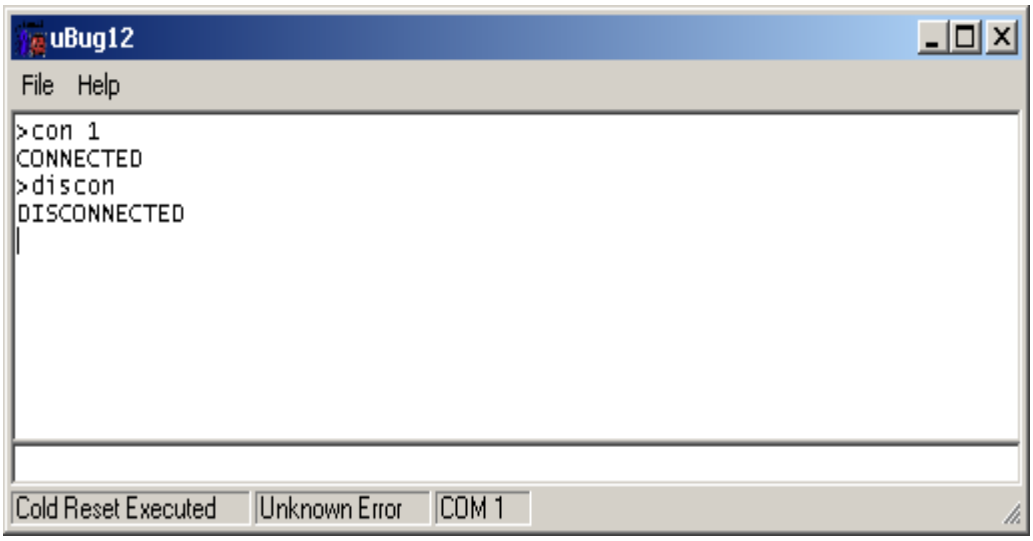
A ***CONNECTED*** message will appear to show good connection between PC and the target.

The ***device*** command will show the target type is as MC9S12C32 Rev 1.0.



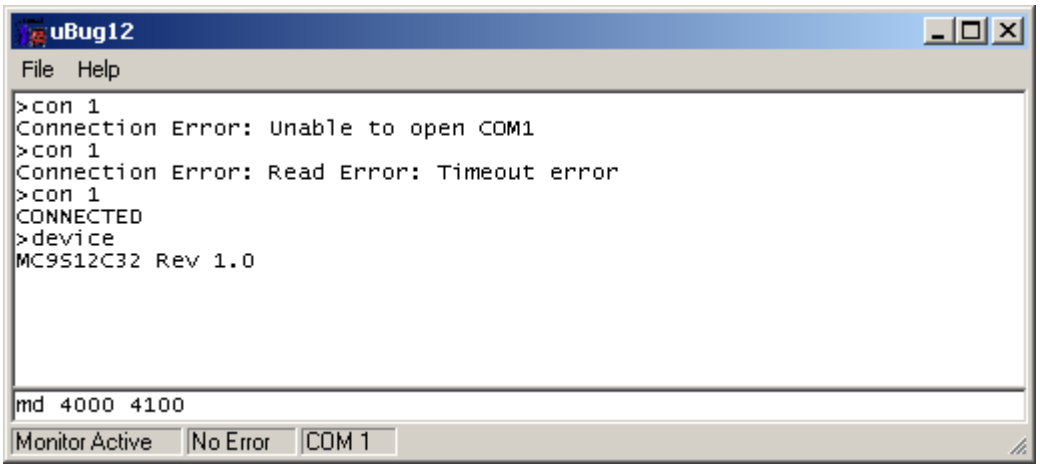
Disconnecting:

To disconnect uBUG12 from the serial port, the command **discon**. This would allow other application to use the COM 1 like HyperTerm or Tera Term.



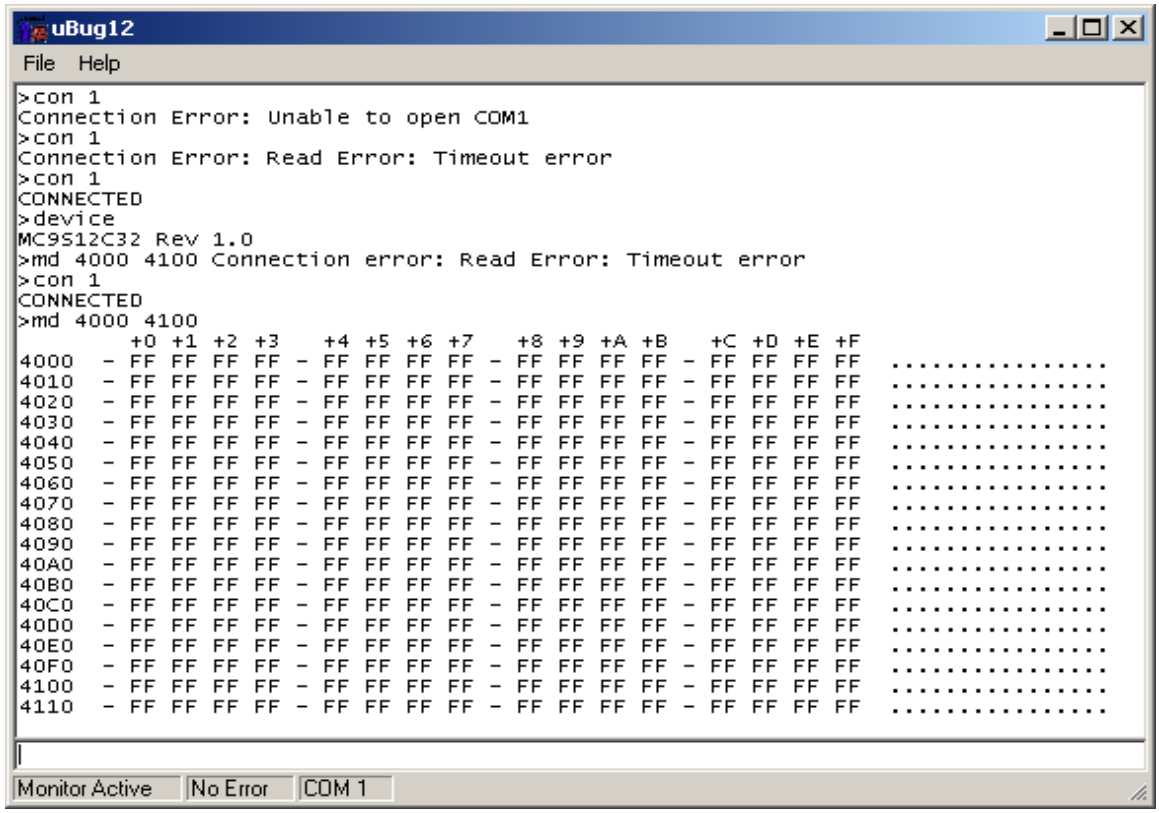
Memory Dump:

The commands are ***MD*** and ***MDW***. For example, type ***md 4000 4100*** to dump an address block.

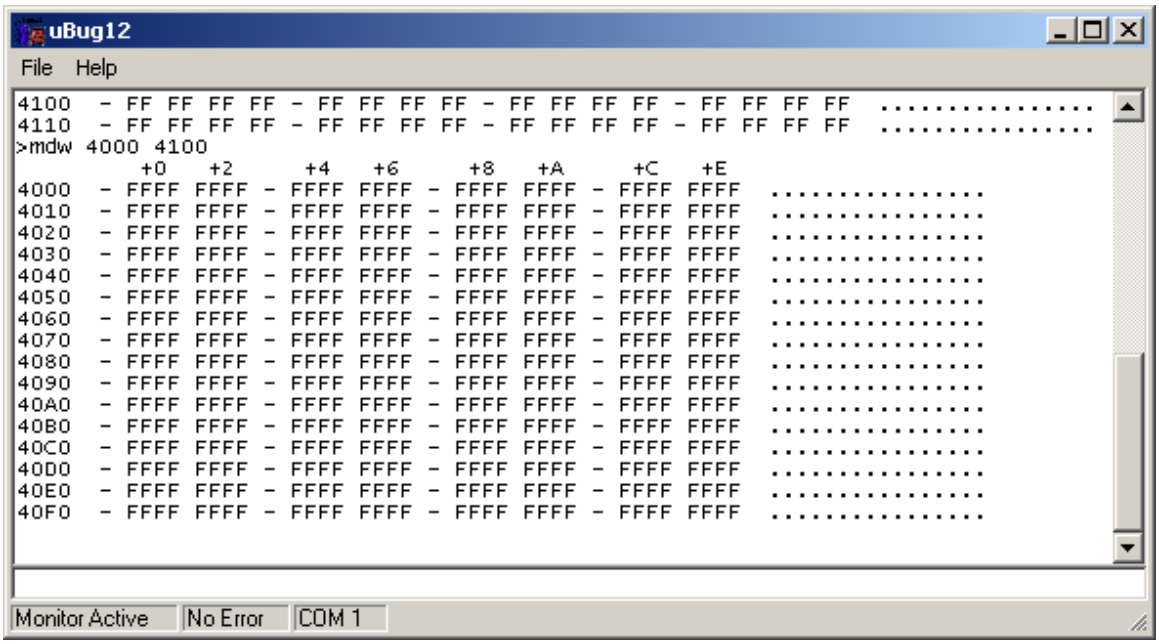


If for whatever reason the cable is disconnected, power disruption, MCU is reset the error may appear "***>md 4000 4100 Connection error: Read Error: Timeout error***". Reconnect again by typing ***CON 1***.

The ***MD*** command is byte dump.

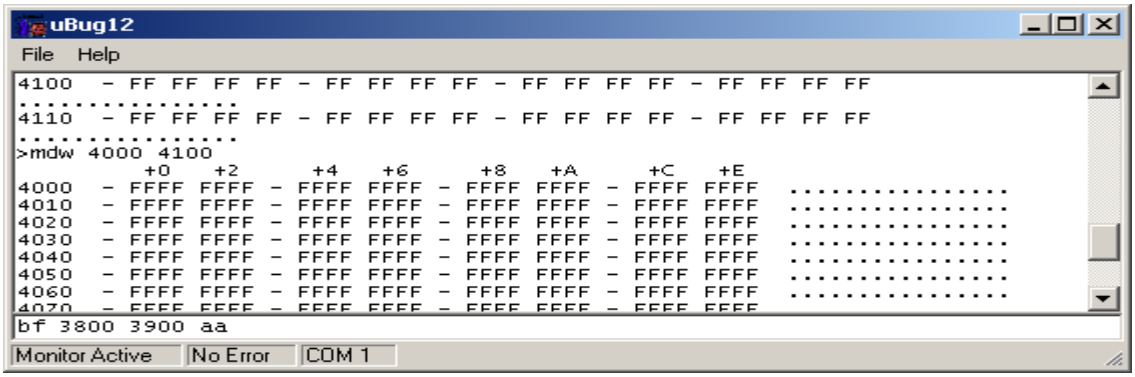


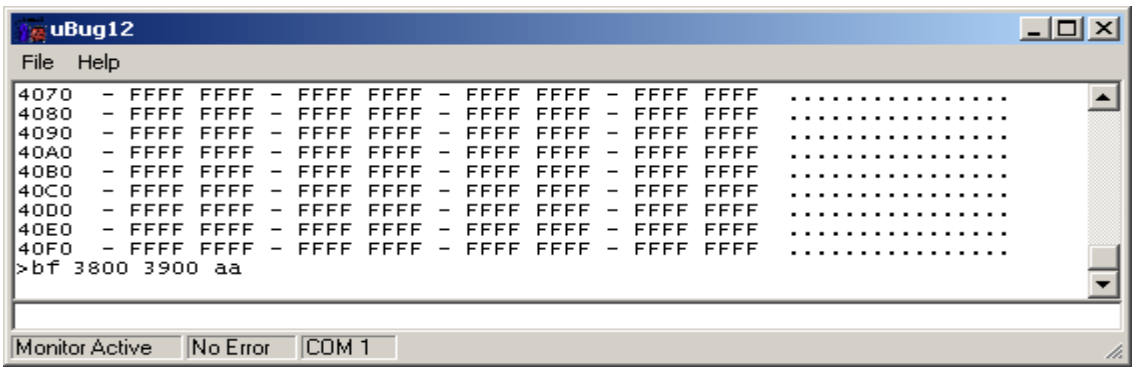
The ***MDW*** command is word dump.



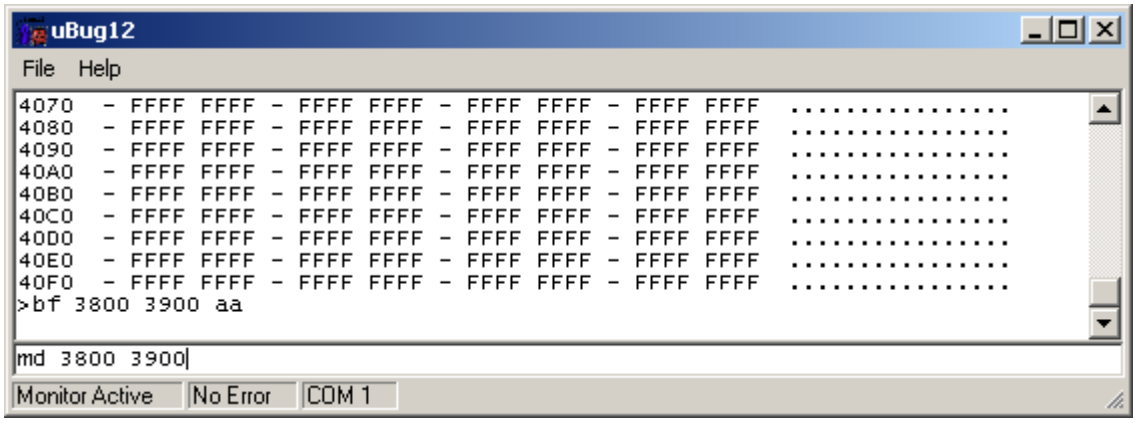
Memory Fill:

The commands are ***BF*** and ***BFW***. Example of byte fill, type ***bf 3800 3900 AA*** to fill an address block with the value $AA

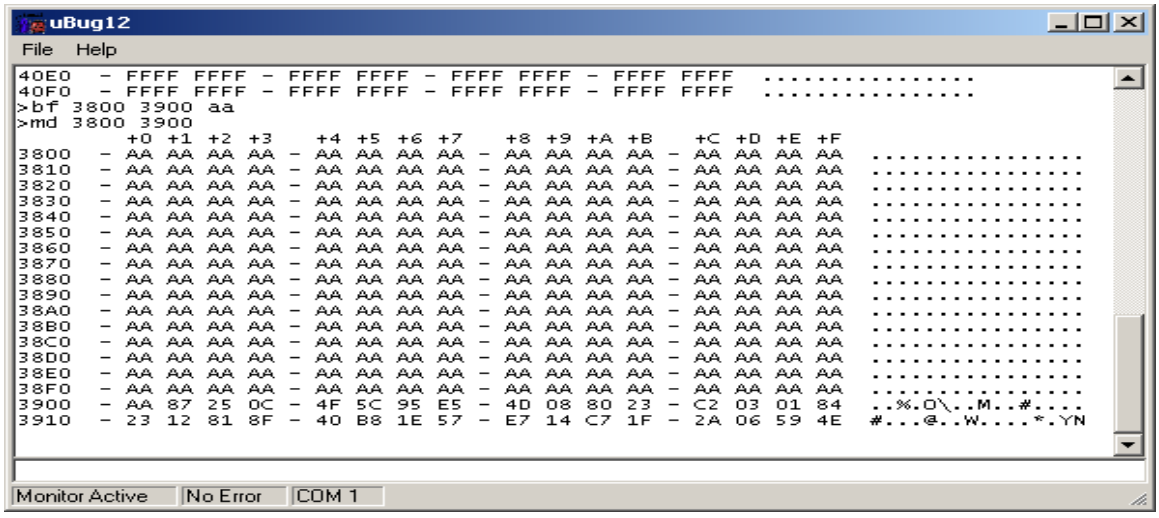




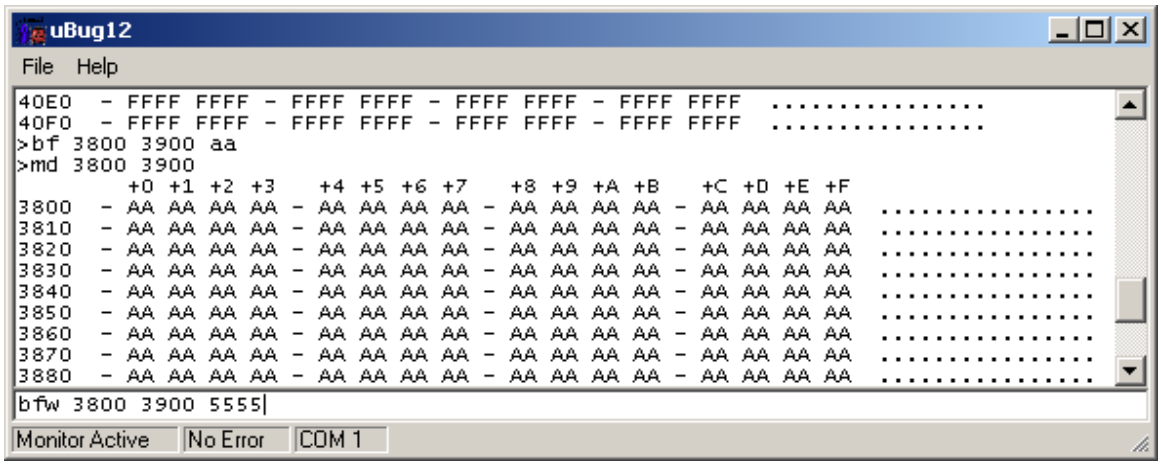
Verifying the block fill

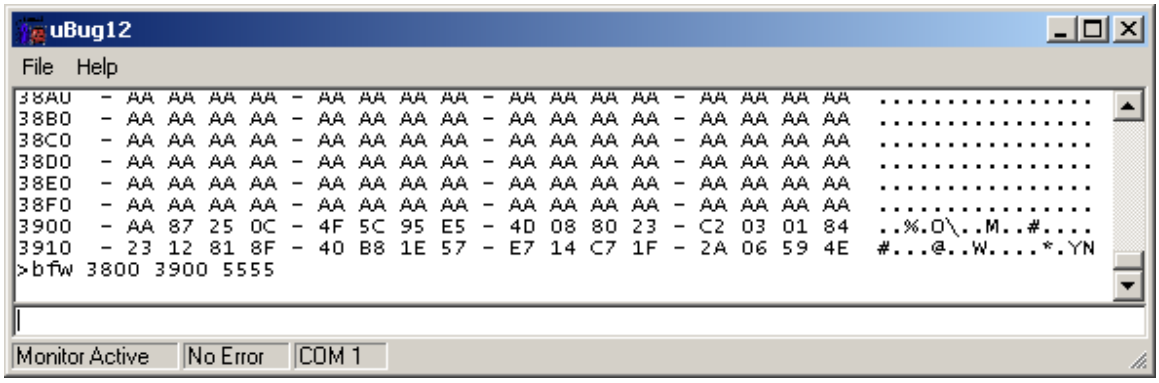


Memory dump of the address block $3800 to $3900

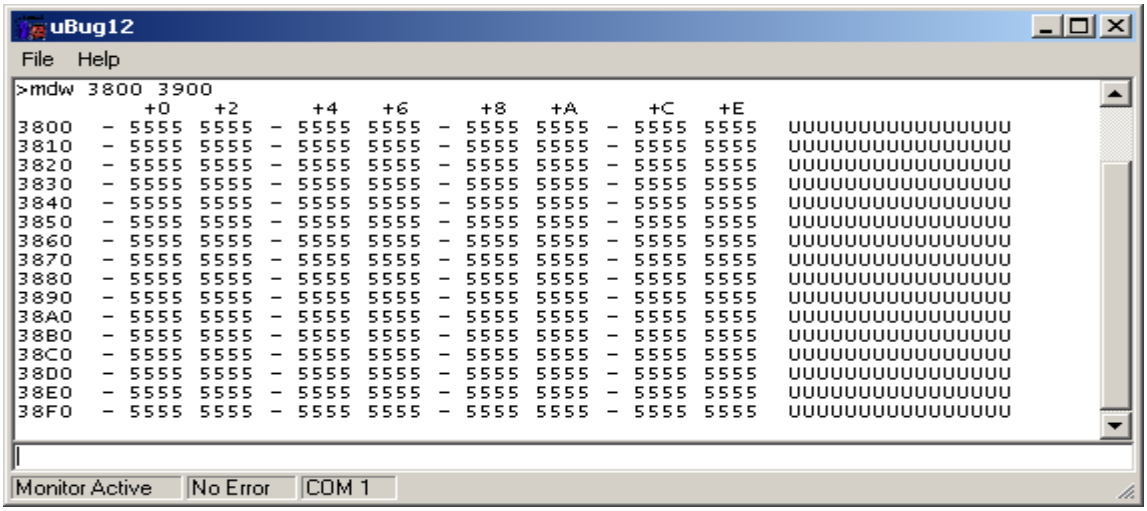


Example of word fill, type ***bfw 3800 3900 5555*** to fill an address block with the value $5555



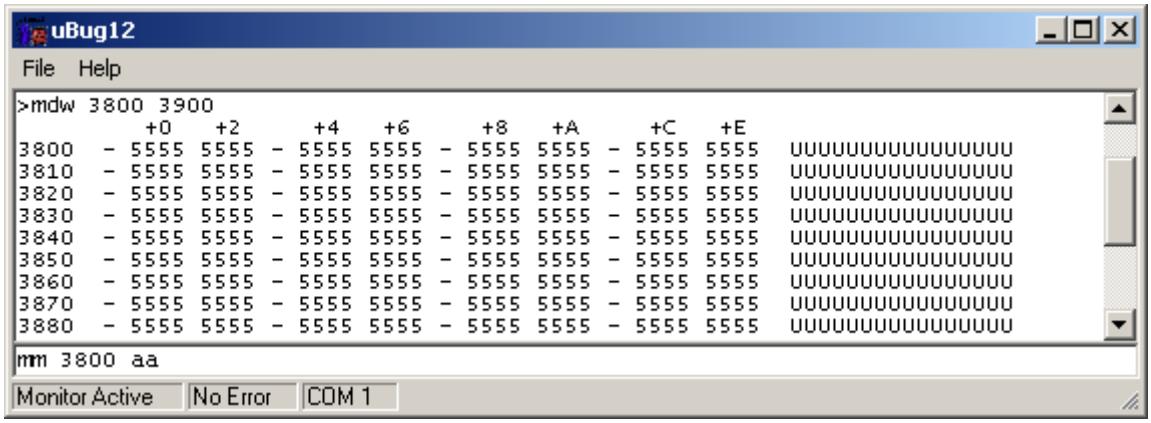


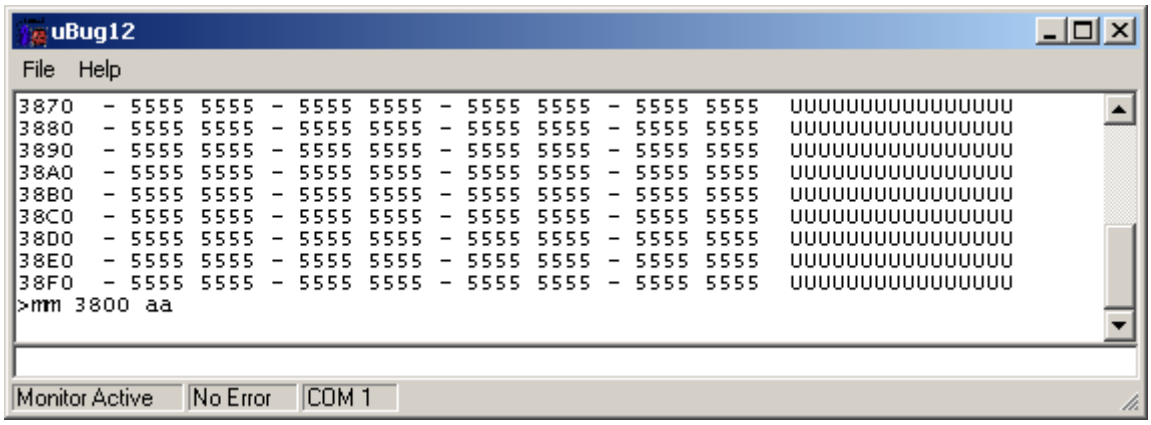
Memory dump of the address block $3800 to $3900



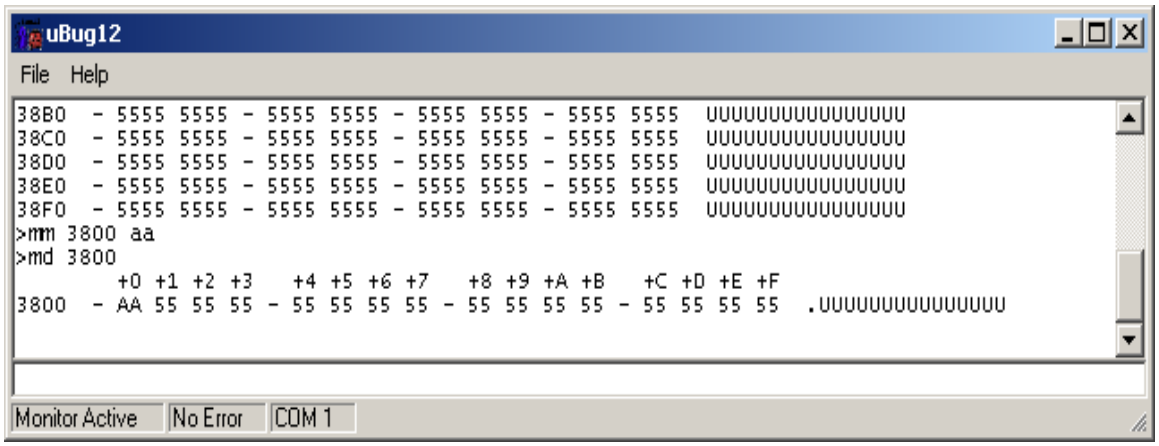
Memory Modify:

The commands are ***MM*** and ***MMW***. Example of byte modify, type ***mm 3800 AA*** to modify the value at address memory $3800 with $AA.

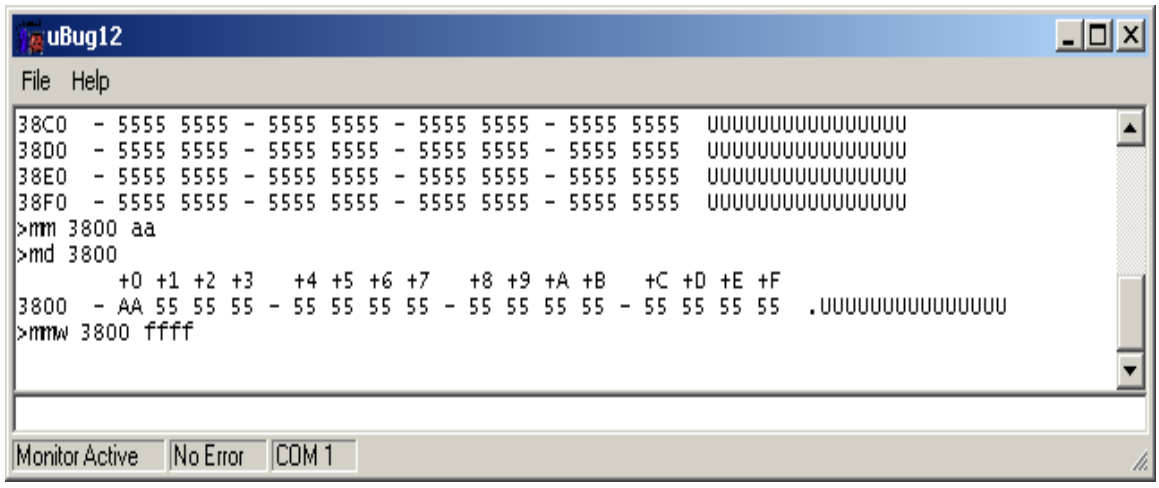




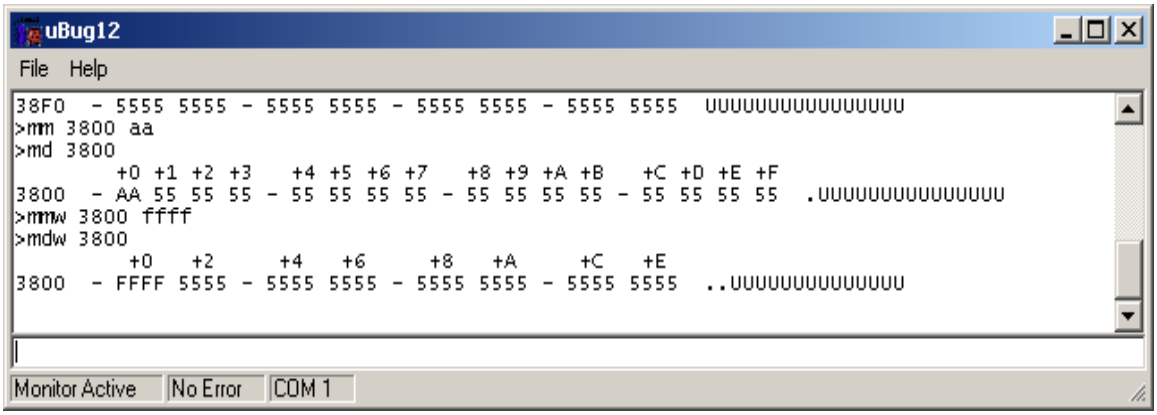
Verifying the memory modify. Note the byte change at $3800.



Example of word modify, type ***mmw 3800 FFFF*** to modify the value at address memory $3800 with $FFFF.



Verifying the memory modify. Note the word change at $3800.



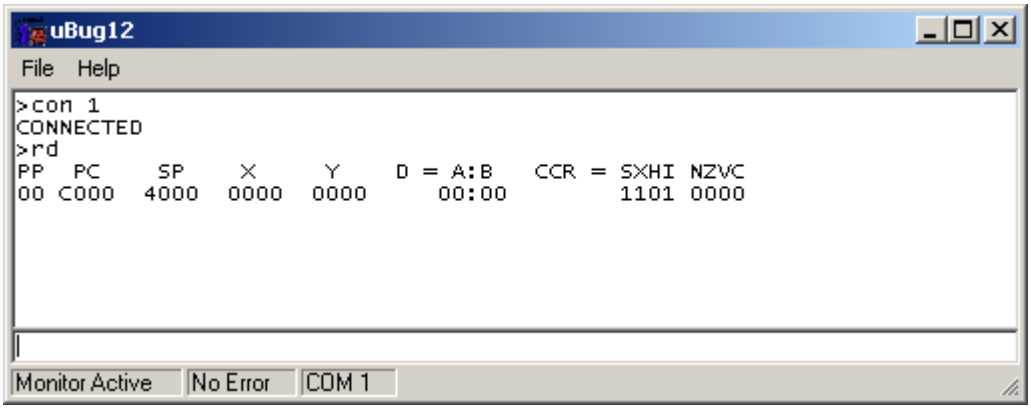
Registers:

There are 9 commands to modify the different registers.

RD - Register Display
RM <**RegisterName**> <**Data8/16**> - Register Modify
CCR <**Data8**> - Set CCR register
D <**Data16**> - Set D register
PC <**Data16**> - Set PC register
PP <**Data8**> - Set PP register
SP <**Data16**> - Set SP register
X <**Data16**> - Set X register
Y <**Data16**> - Set Y register

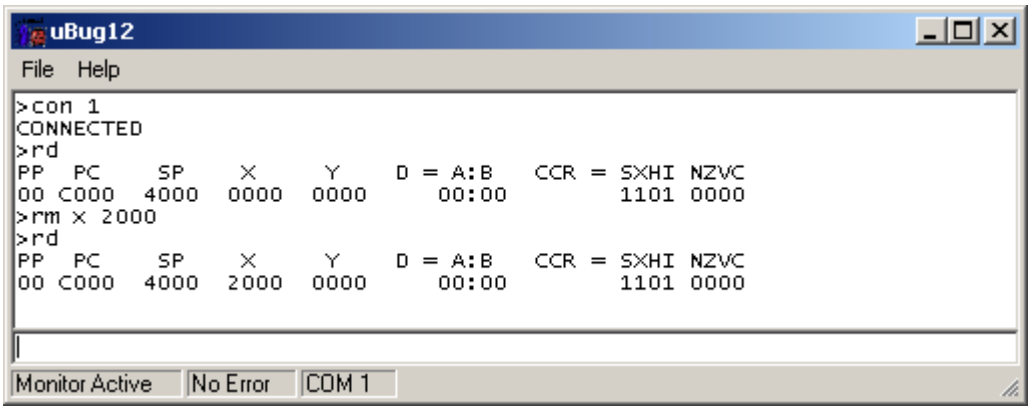
Data8 – 8 bit value
Data16 – 16 bit value

The ***RD*** command shows the content of PPAGE (**PP**), Program Counter **(PC**), Stack Pointer (SP), Conditional Code (**CCR**) **X**, **Y**, and **D** registers.

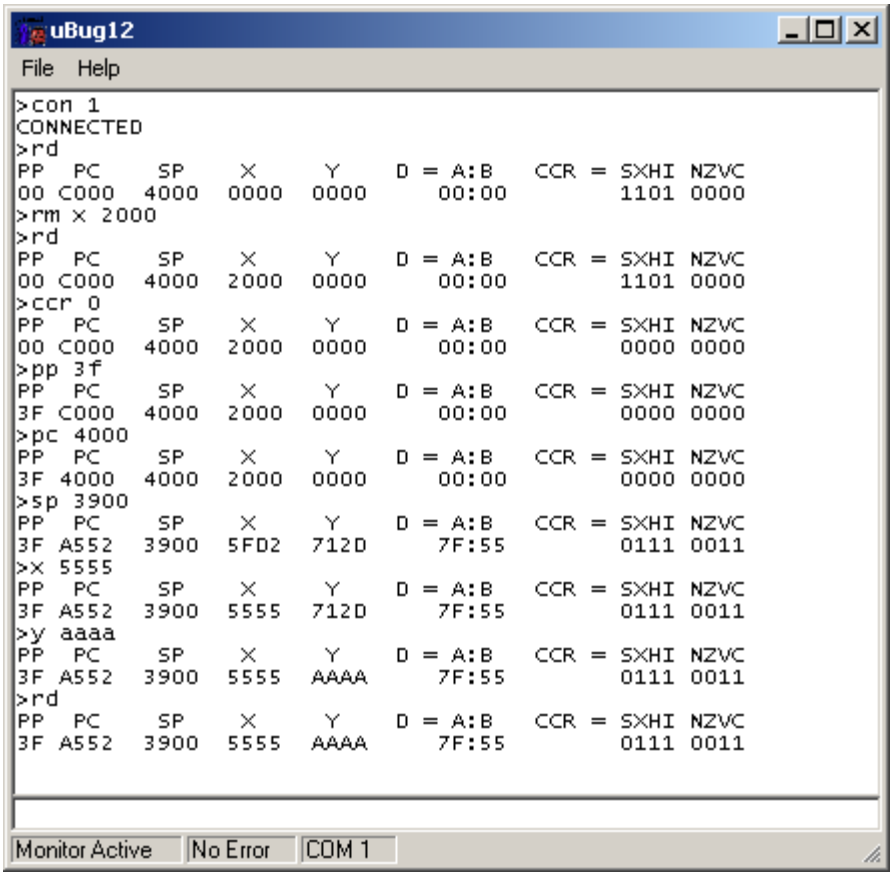


The ***RM*** command will allow the registers to be changed. For example, change Register X content with value 2000. Type the command ***RM X 2000.***

Note that Register X has changed from $0000 to $2000

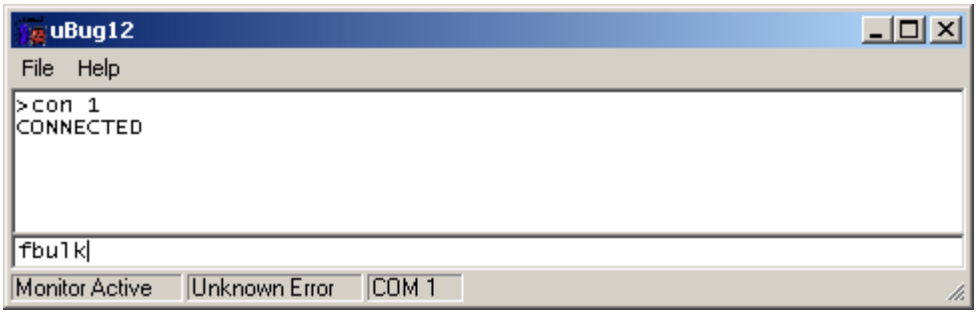


Notice the registers as each one are changed.

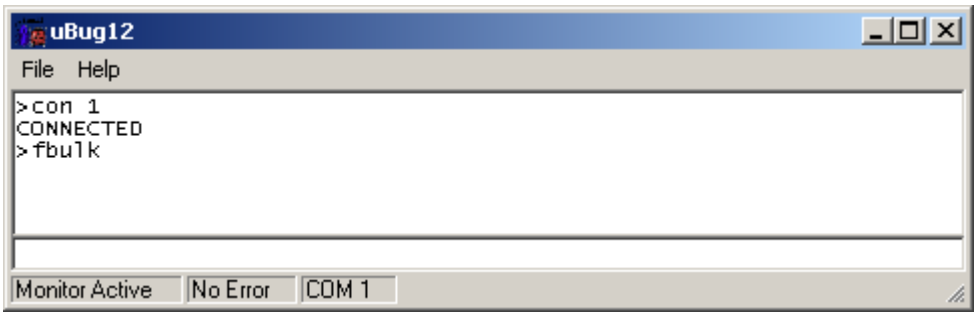


Flash erase and programming:

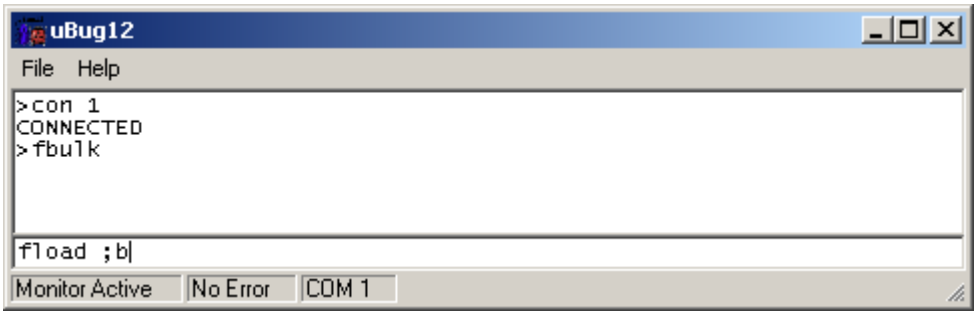
To erase the Flash memory the command is ***FBULK***.



Successful erase

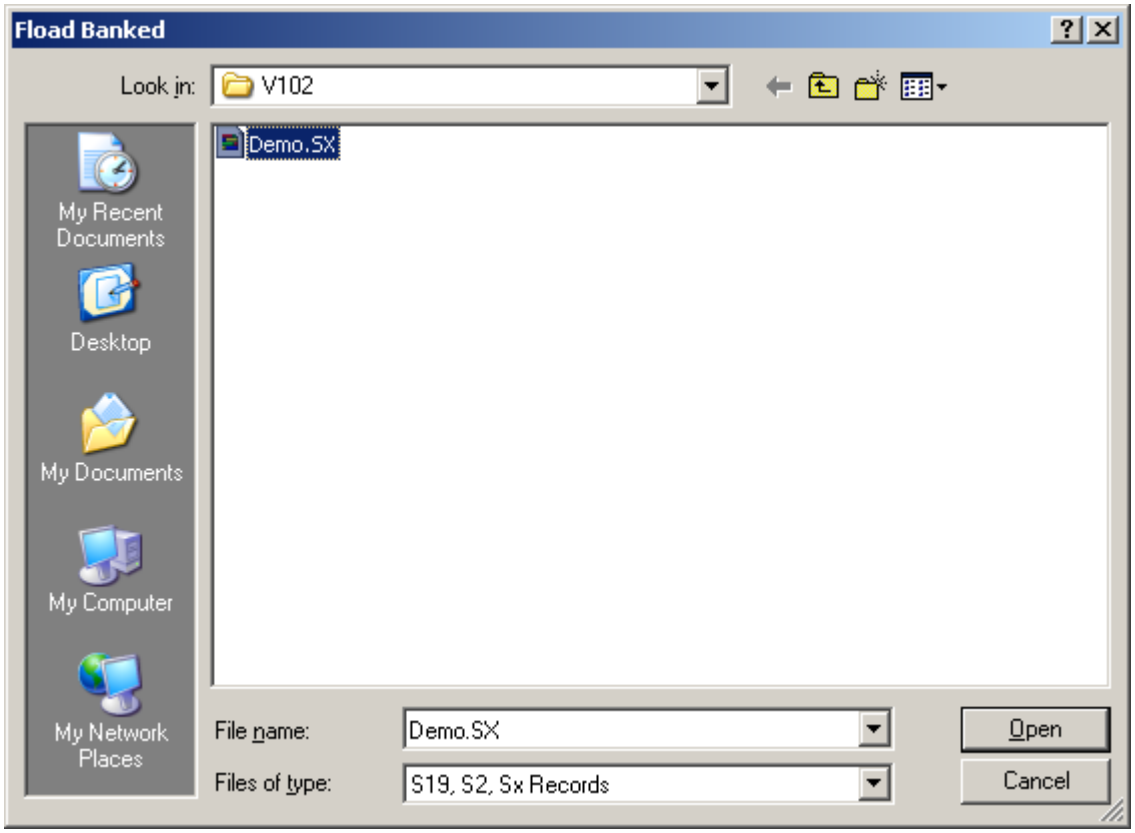


To program FLASH the command is ***Fload ;b*** for banked S19, SX, S2 records. For non banked S2 or formatted S19 (went thru SrecCVT) record the command is ***Fload***.

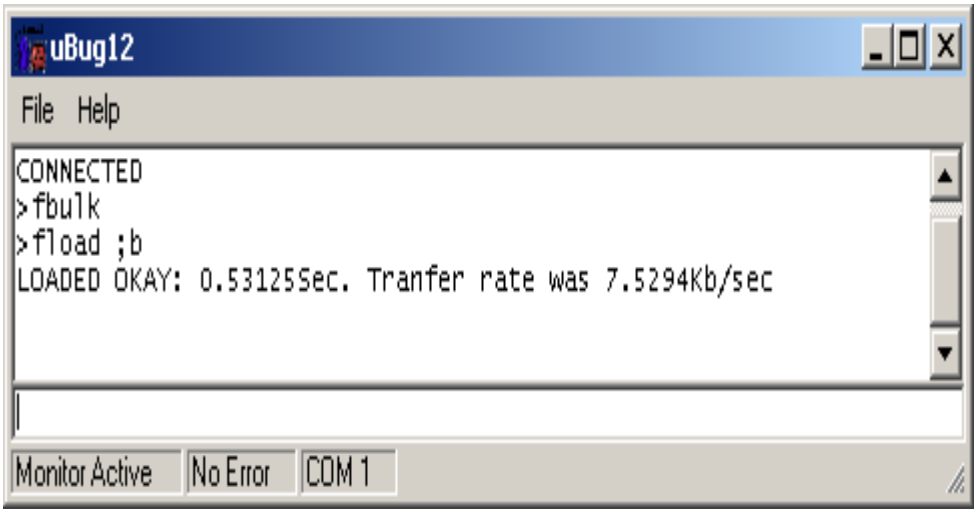


Once the Fload ;b command is invoked, uBUG12 will open an explorer window to help and locate the S-record. In this example, demo.sx will be the target S-record file.

Double click on the file to initiate upload.



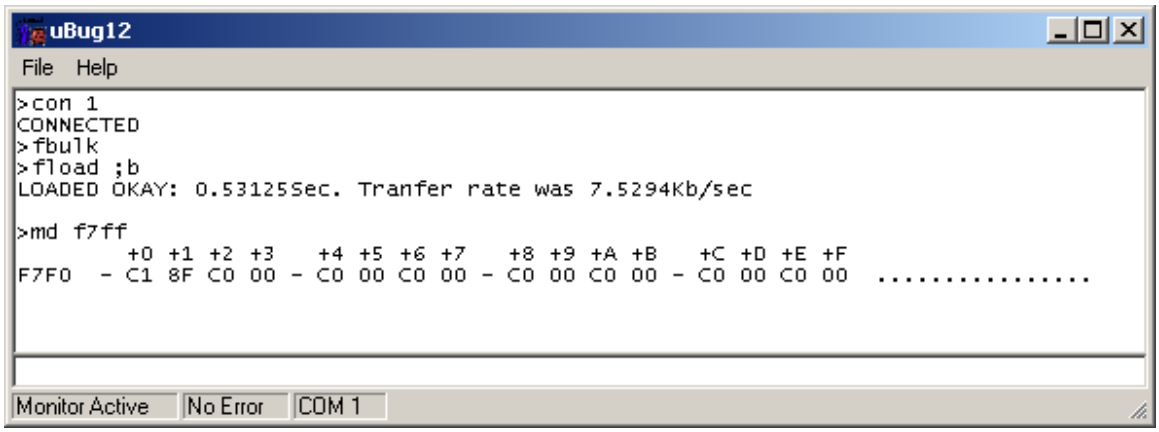
Successful programming of Demo.sx



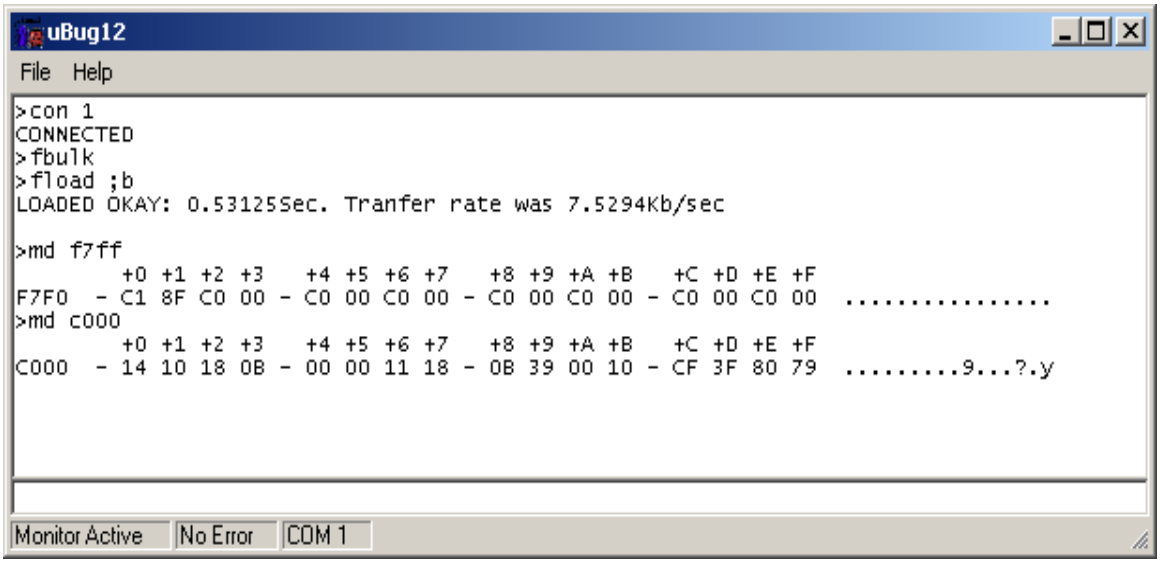
Note that the Serial Monitor resides at $F800 - $FFFF. Therefore uBUG12 will automatically re-locate the vector addresses at below $F800.

Briefly look at the Pseudo Vector address to check where the start of the program. The command is ***md f7ff*** to show a memory dump of the Pseudo Vector address at power up or reset.

The power up reset value at $F7FE is $C000. Therefore the program will start at $C000

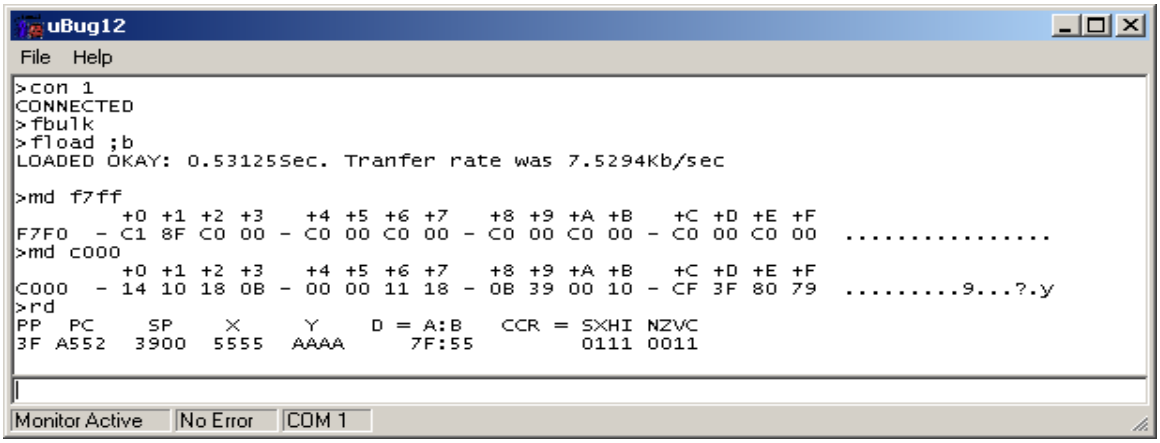


Memory dump at $C000

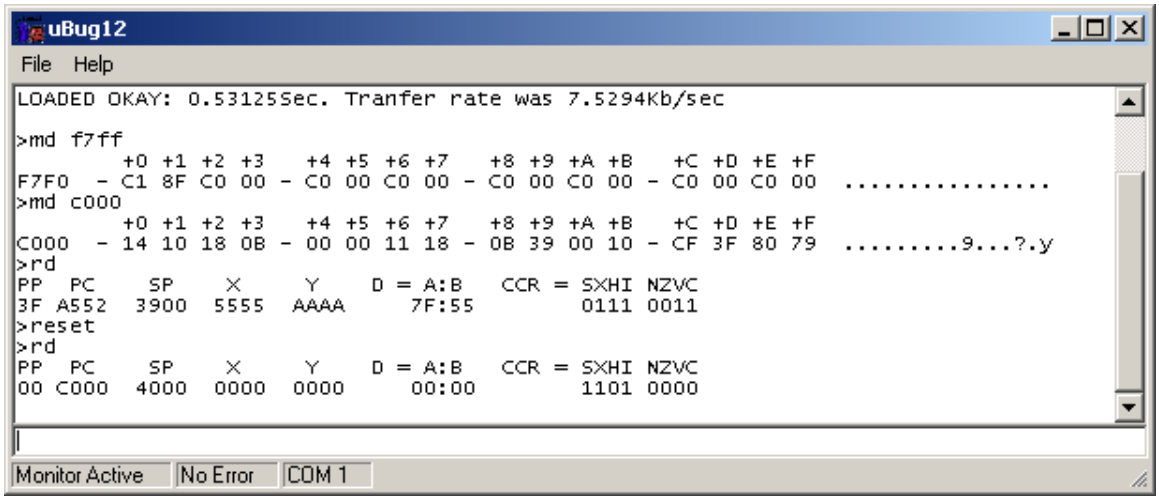


One can see that there are Data at $C000. To execute the program using uBUG12, several registers needs to be initialized. Firstly, look at the registers by the ***RD*** command then invoke the ***RESET*** command to initialize the registers.

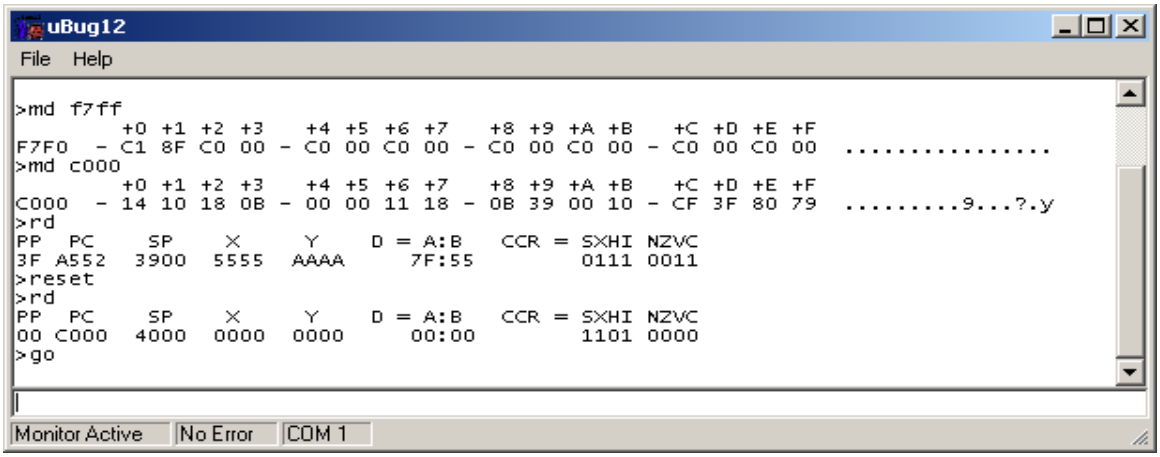
Memory dumps of the registers before ***RESET*** command is invoked.



After ***RESET*** command please note the changes with various registers.



To execute program the command is simply type ***go*** (after RESET is invoked) or ***go C000***.



The BR, TRACE commands are not to be use and will at some point be fully implemented.

This concludes the uBUG12. Stay tune for further development.

Lastly, the ***op*** command will change the look of the GUI. One should try to see what it does as it cannot be shown in this document.