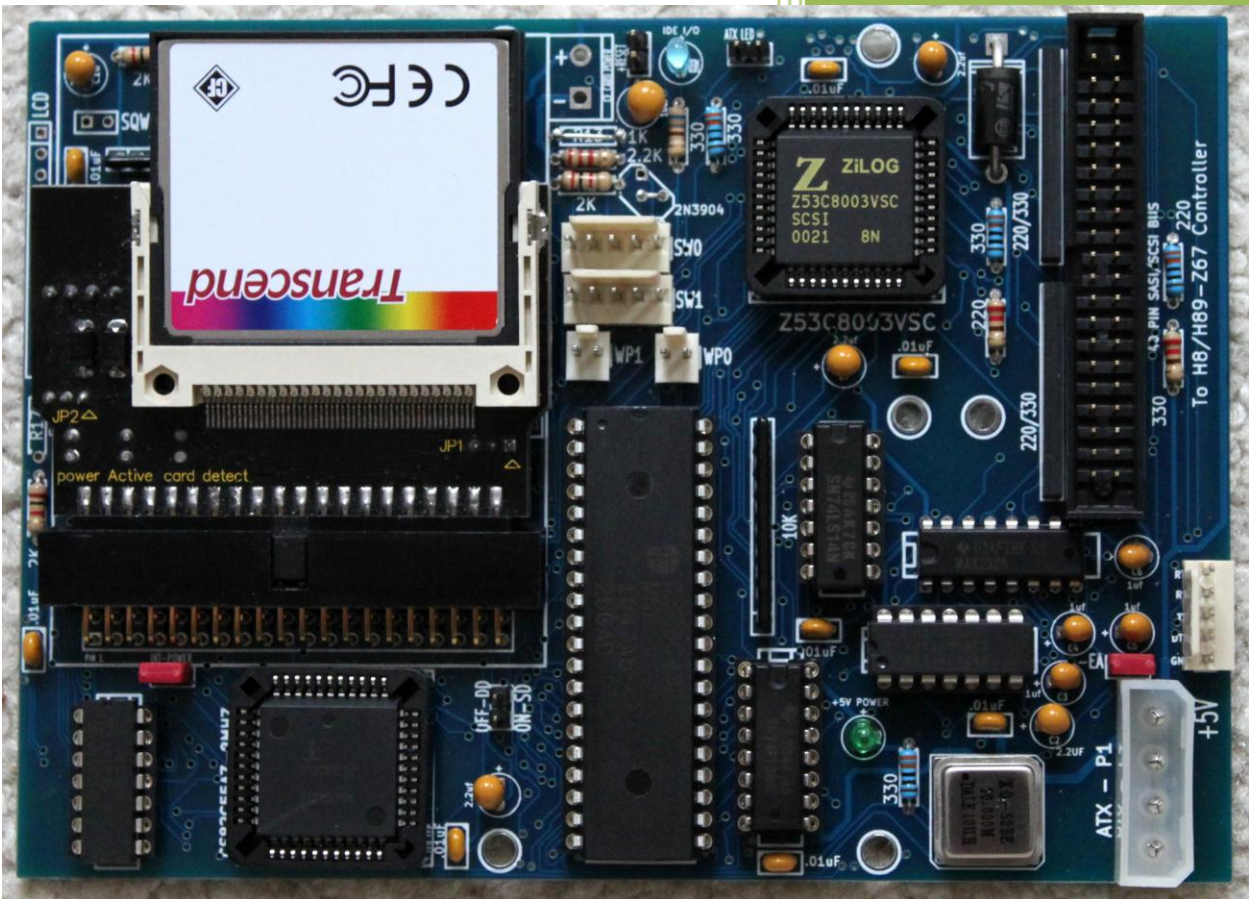


2013

Z67-IDE+ Assembly Guide



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2/3/2013

Revision History and Disclaimer

Revision History		
Revision	Date	Comments
1.0	01/20/2013	Initial draft by Norberto Collado

The purpose of this document is to allow the surviving classic computers to continue to function.

Please don't use any of this material for any purpose other than personal hobby/interest without checking with the owner of the material.

Thank you for your understanding and consideration.

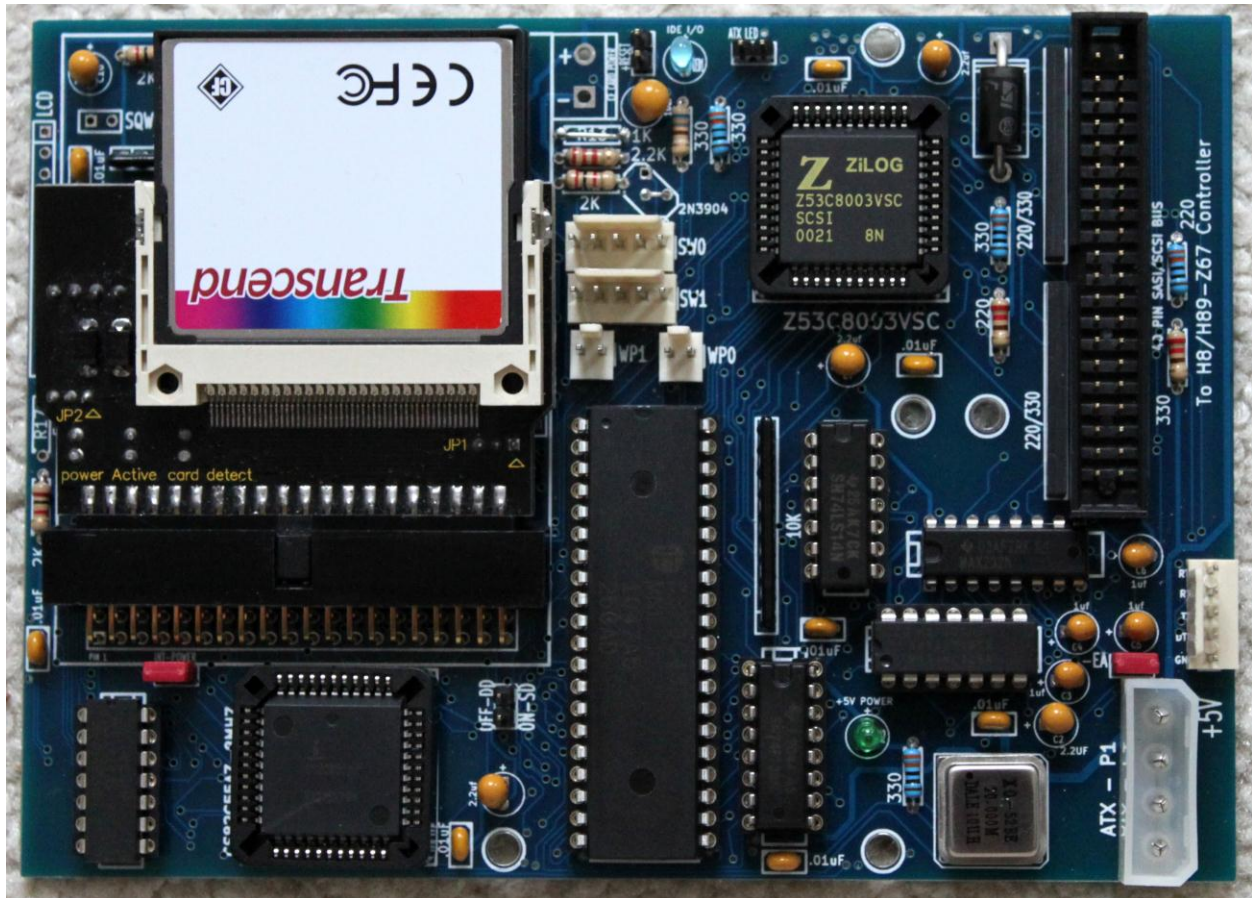


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Introduction

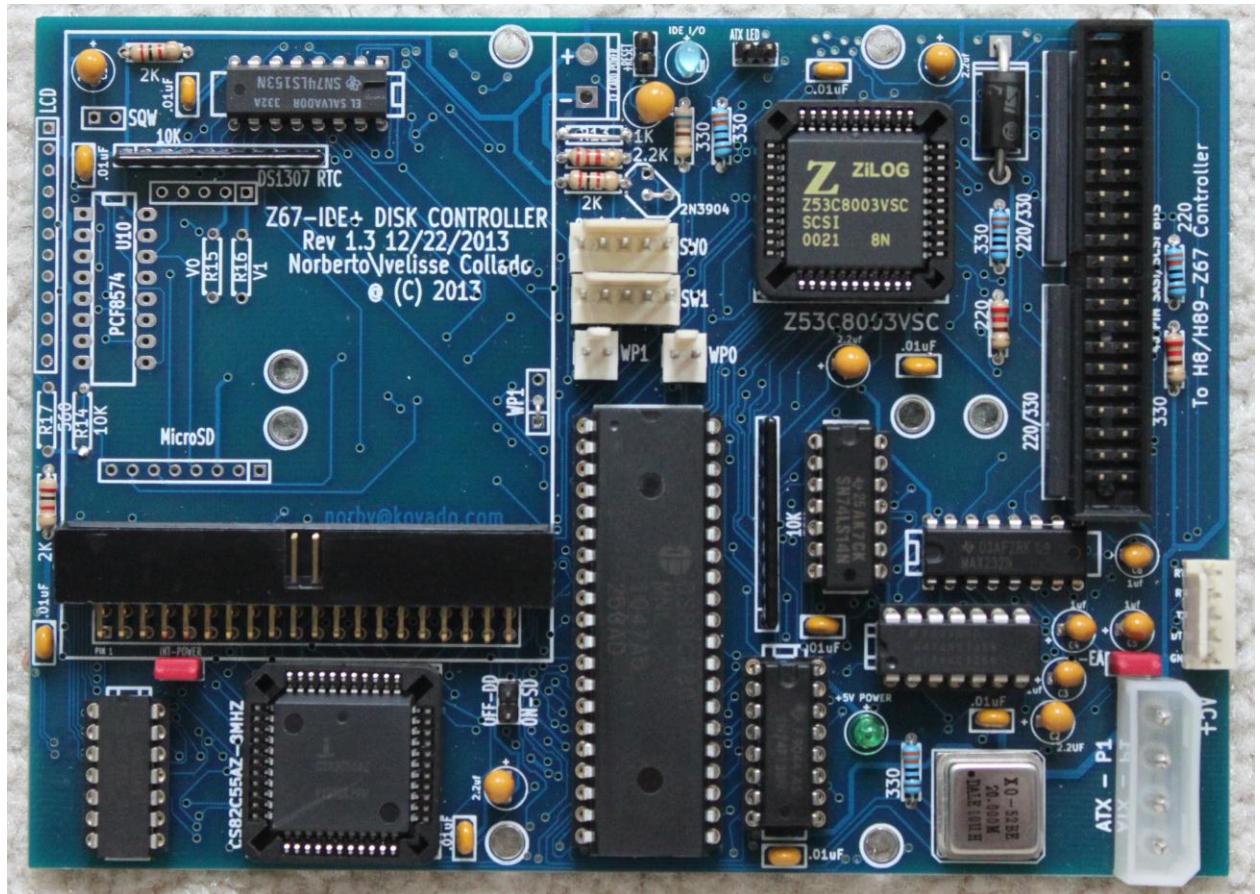
This document provides details on how assemble and test the Z67-IDE+ hard drive controller board design by Norberto Collado for the Heathkit H8 Computer.



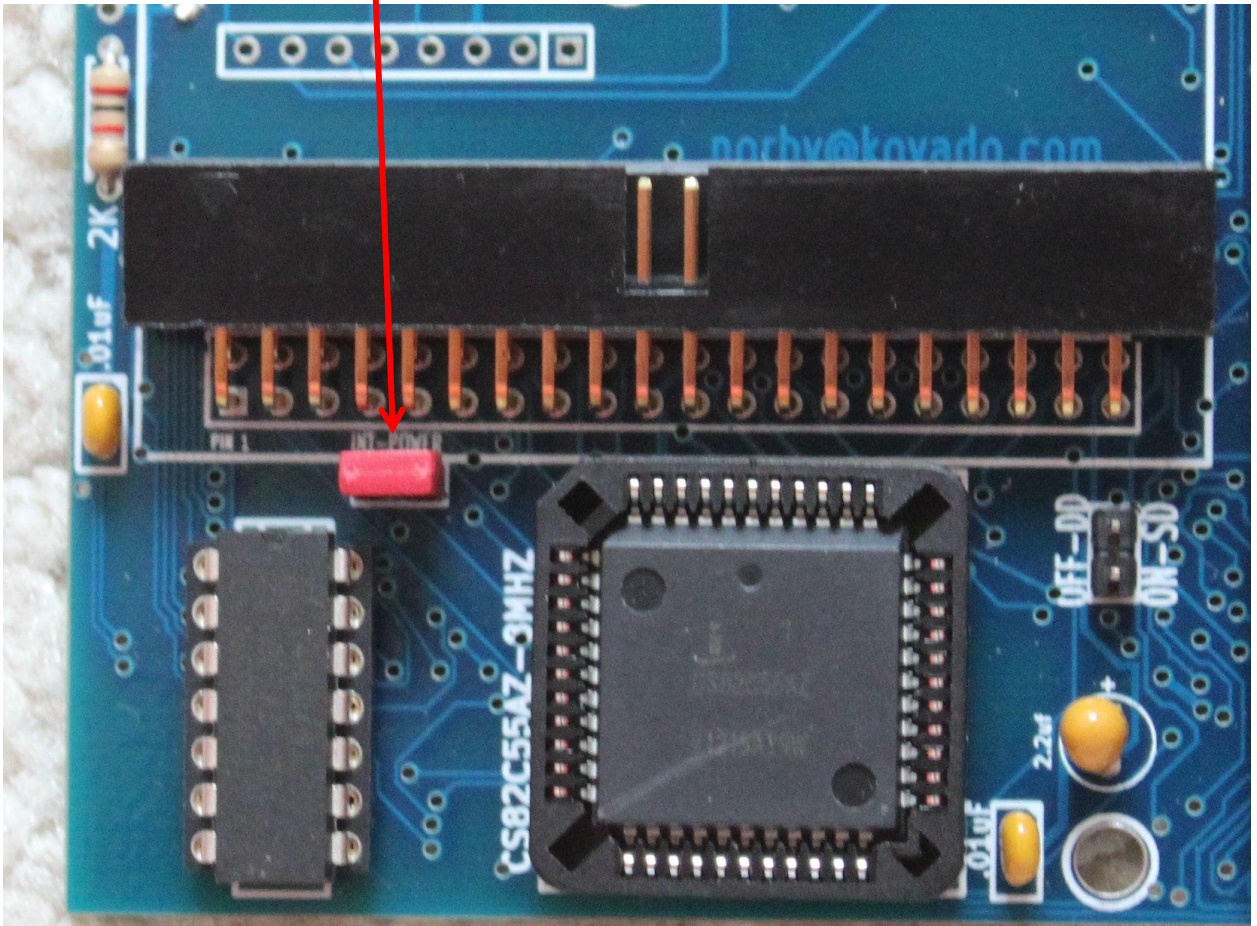
Z67-IDE+ Rev 1.3

Board Assembled

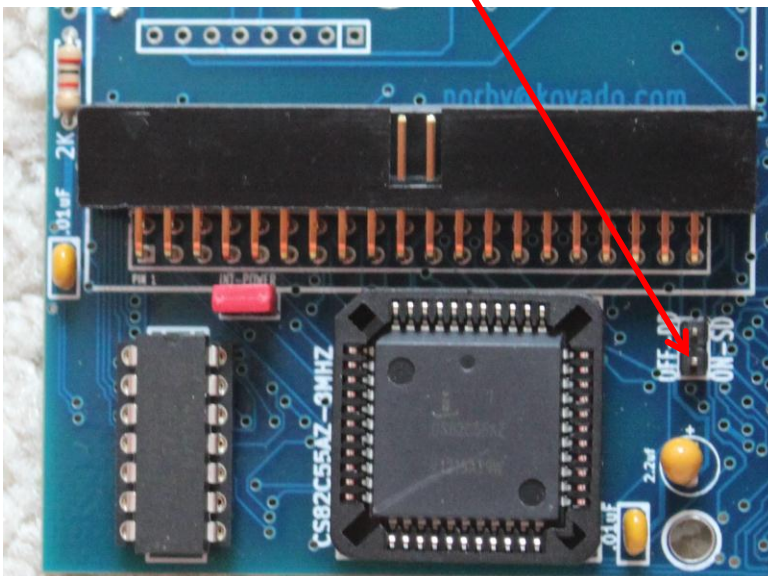
1. Please install parts as shown below. There are some parts that are for future features, but not supported at this time.



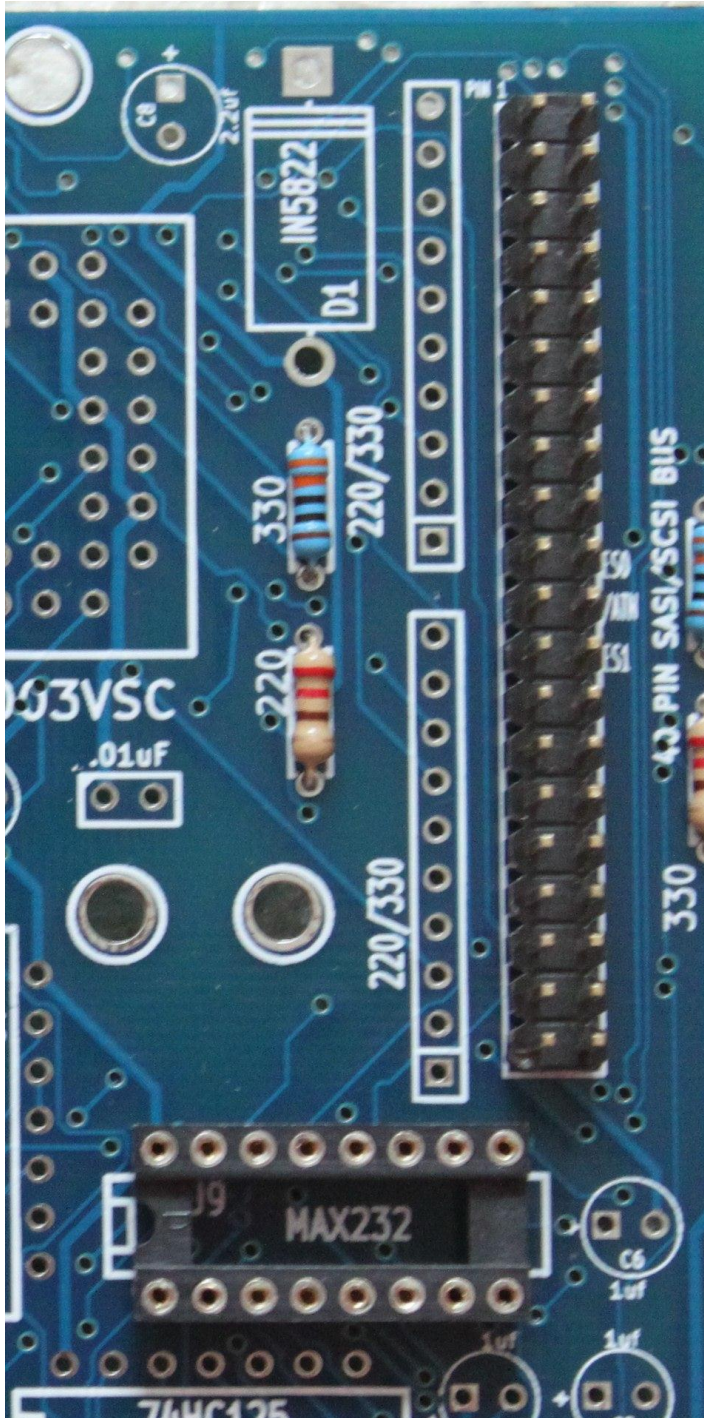
2. The CF card is powered by the jumper shown below. If using IDE drives, please remove the “INT Power” jumper.



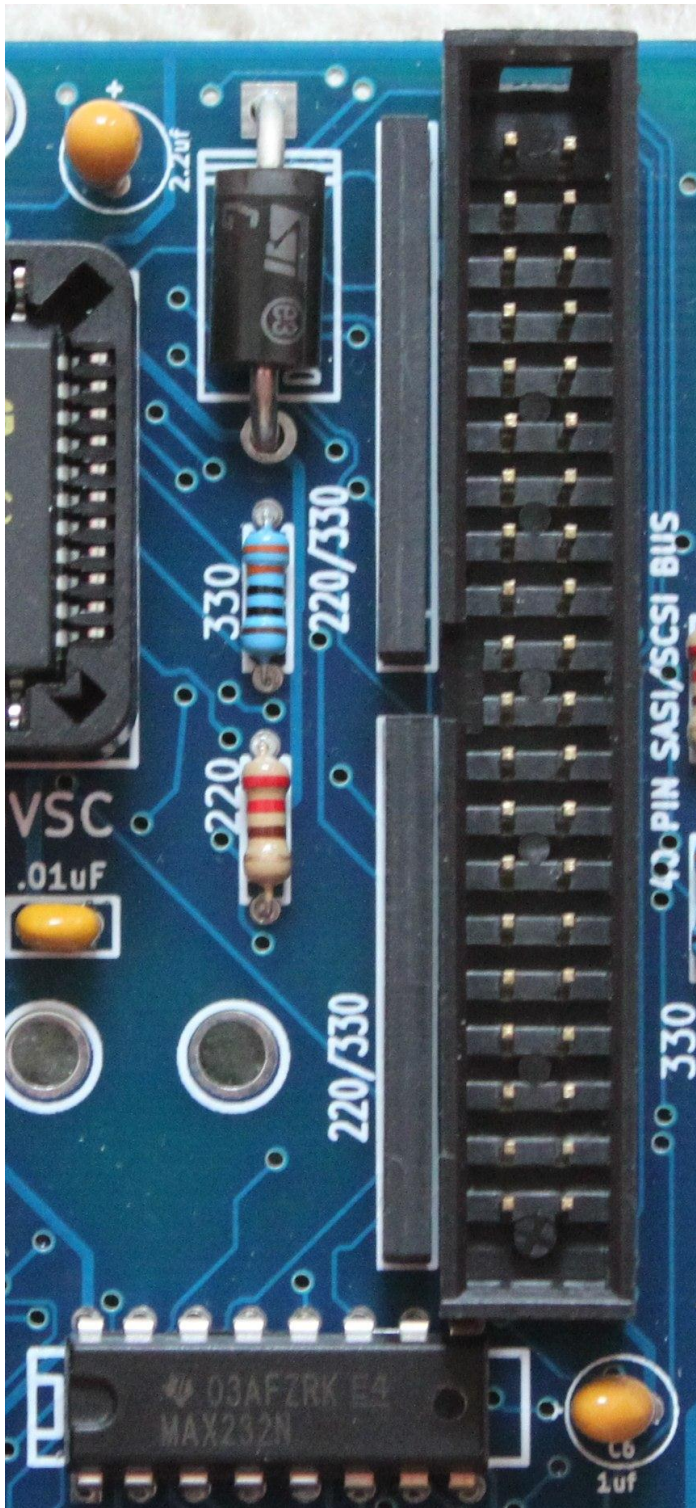
3. Install jumper across “DD/SD” if a single CF card is installed. If using two CF cards, please remove the jumper.



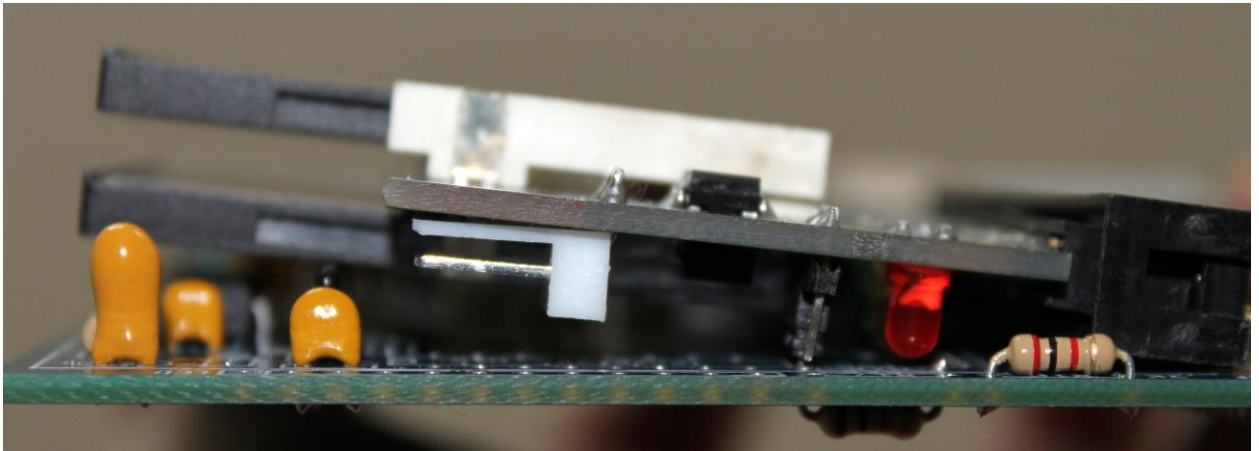
4. On U9 – MAX232 IC, if using un-shrouded 40 pin connector, then proceed to use a socket for U9 as shown below.



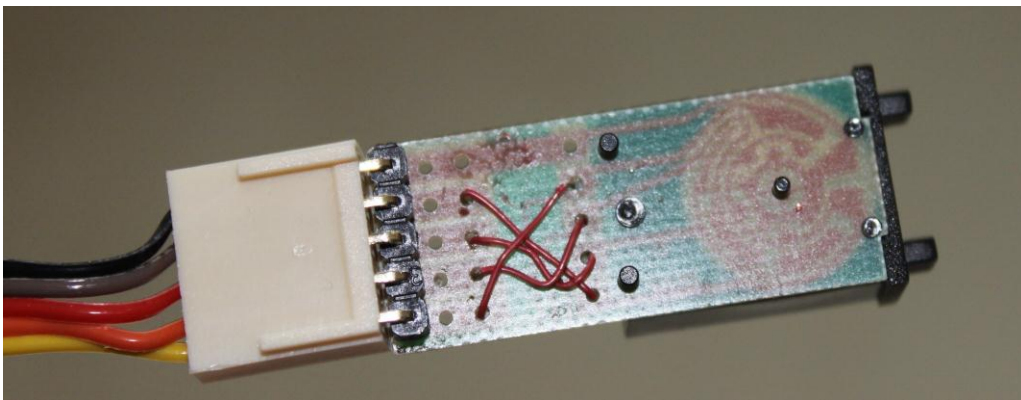
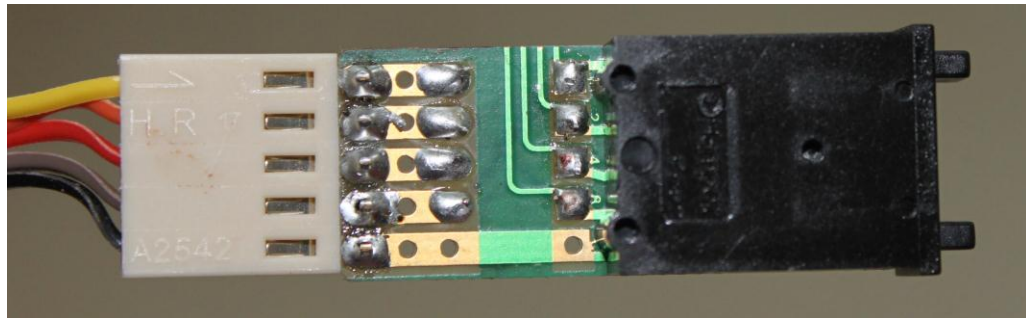
5. On U9 – MAX232 IC, if using shrouded 40 pin connector, then proceed to solder U9 as shown below.



6. Insert CF card into the right angle 40 pin connector and angle the connector so that the bottom CF card is not touching the PCB board. Then proceed to solder the 40 pin connector. This step should be the last step in the assembly process of the board.



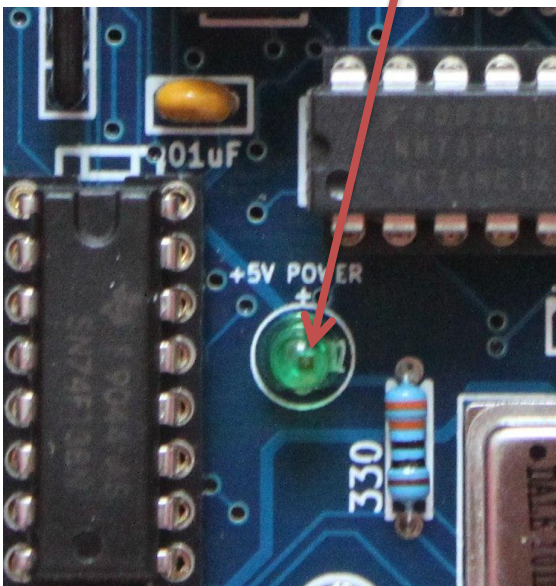
7. There are different BCD switches with the pins defined as follows;
 - a. 1,2,4,8,COMMON
 - b. 8,4,2,1,COMMON
 - c. The Z67-IDE+ supports option “**b**”. Make sure that wires are properly soldered on the BCD switch to allow a 1 to 1 relationship as shown below. Two BCD switches are required to support 60 logical drives.



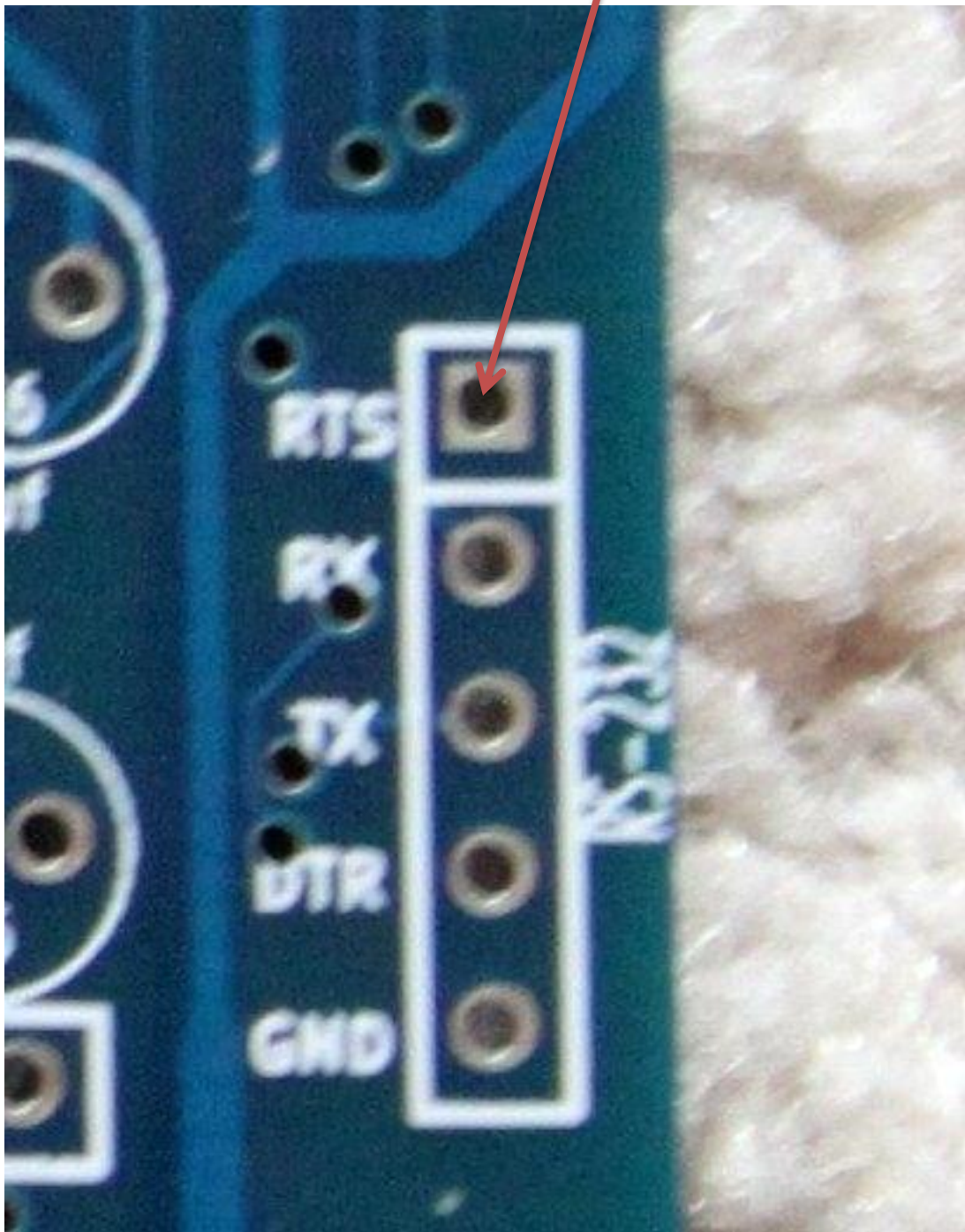
8. For LED1 use a Blue light as shown below



9. For power LED2 use a Green LED.



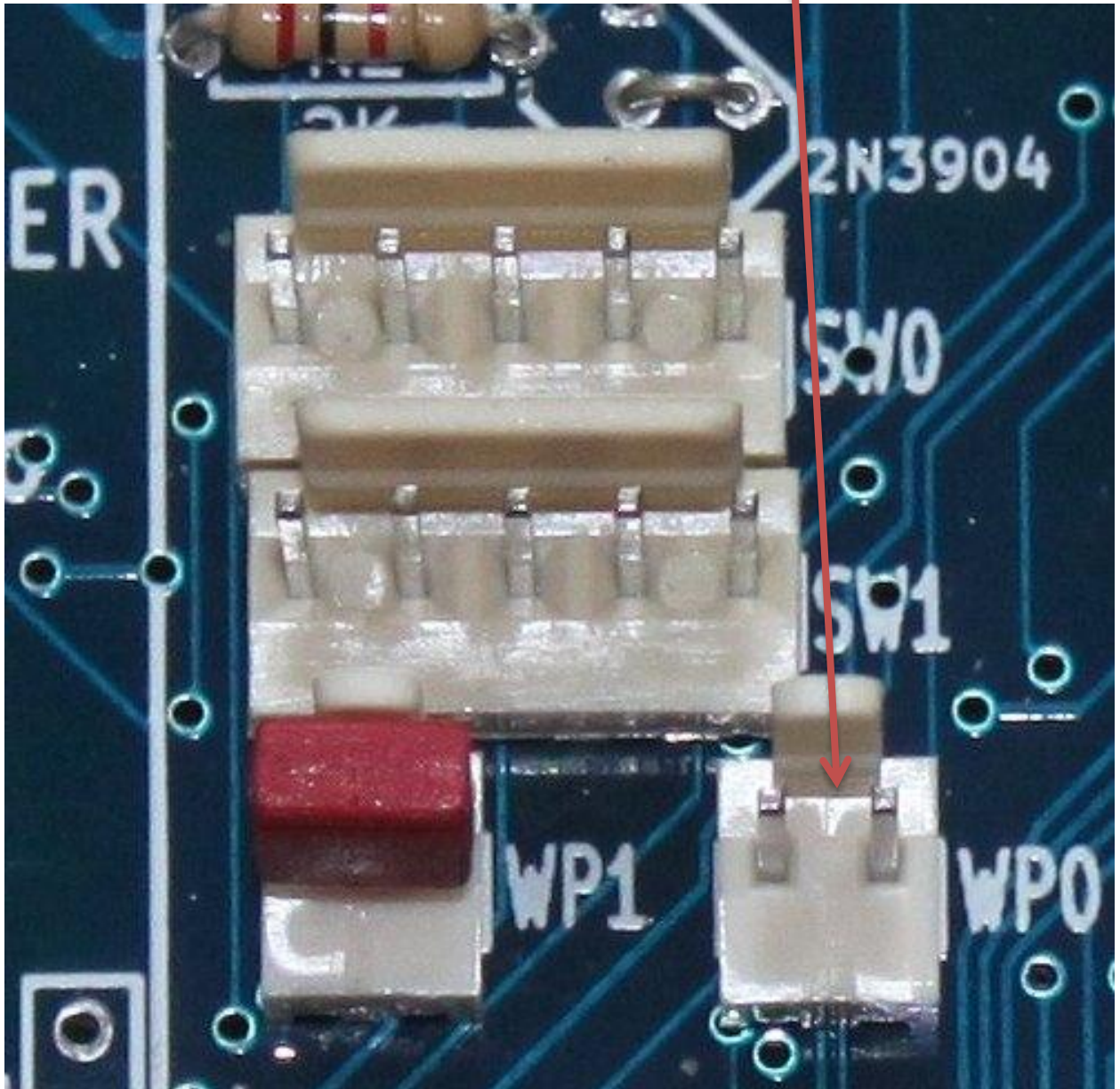
10. Do not connect the RTS signal to the PC port. This is for a future feature when using the board as a printer buffer.



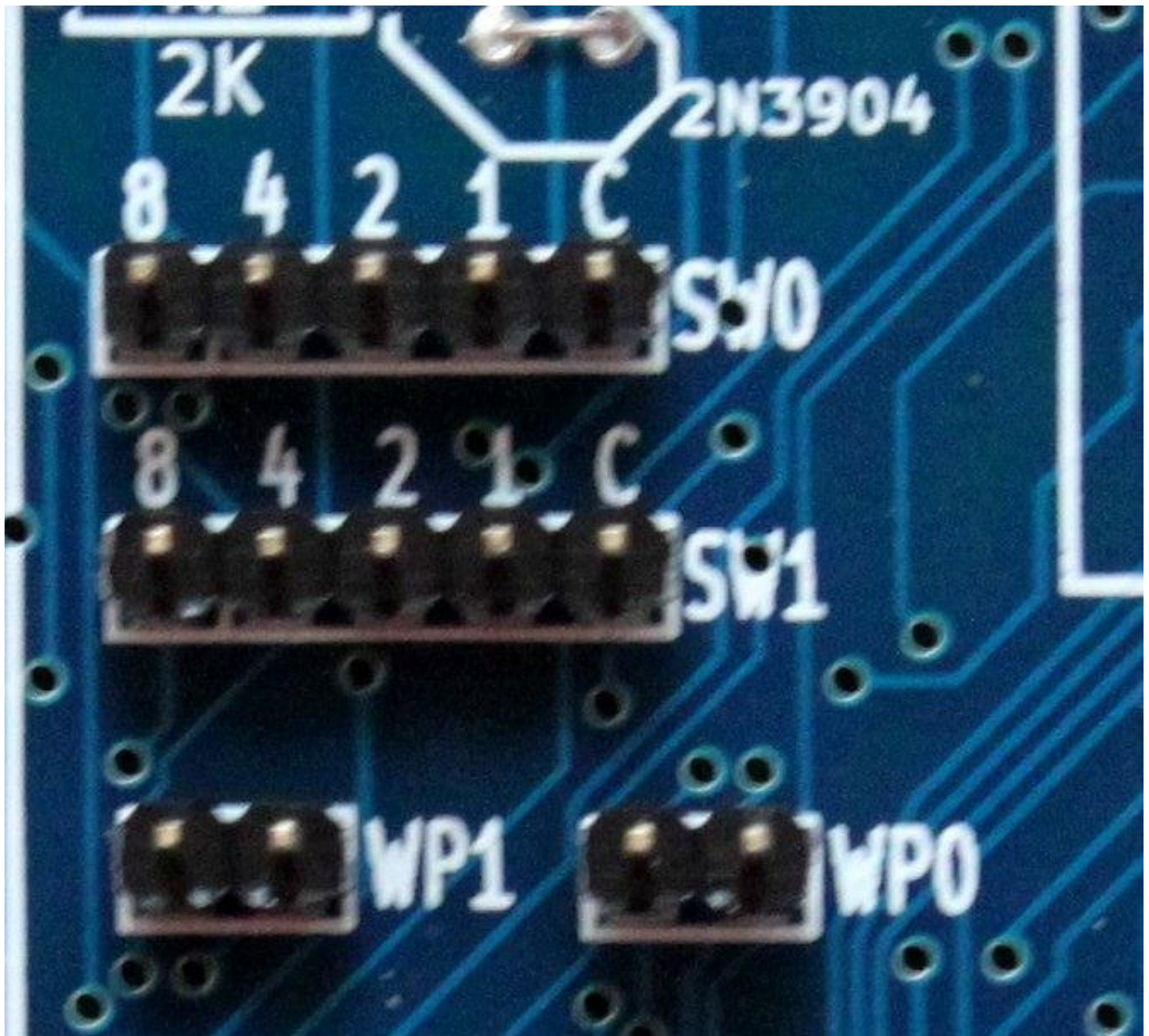
Note: The DTR signal is used to program the Microcontroller and for nothing else. There are no jumpers on the Z67-IDE to manually select the programming bits. More details to follow.

BCD and WP connectors

1. By default the CF cards are "Write Protected". In order to unprotect the CF cards a switch needs to be connected on WP0 and WP1 or a jumper can be used as well.

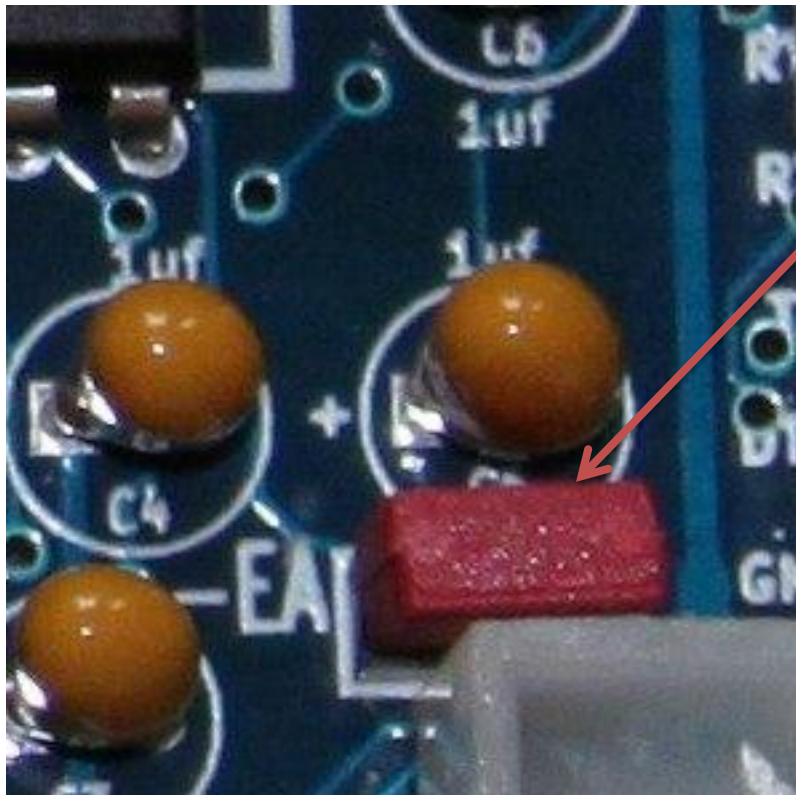


2. Also pin headers can be used for the switch connections.



DS89C430/89V51RD2 programming Jumper

1. If using the DS89C430 microcontroller, then install a jumper across the “-EA” header. Do not remove this jumper after programming. The objective is to program the Microcontroller while is inside the system without the need to open the system to change jumpers.
2. If using the 89V51RD2 microcontroller, then remove jumper across -EA header.



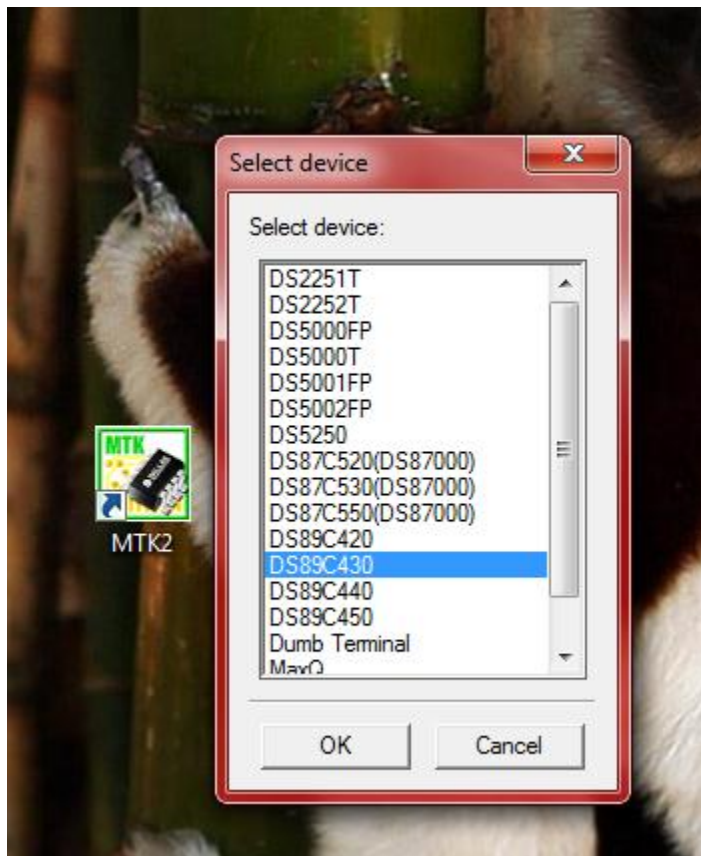
Assembly instructions

1. TBD...

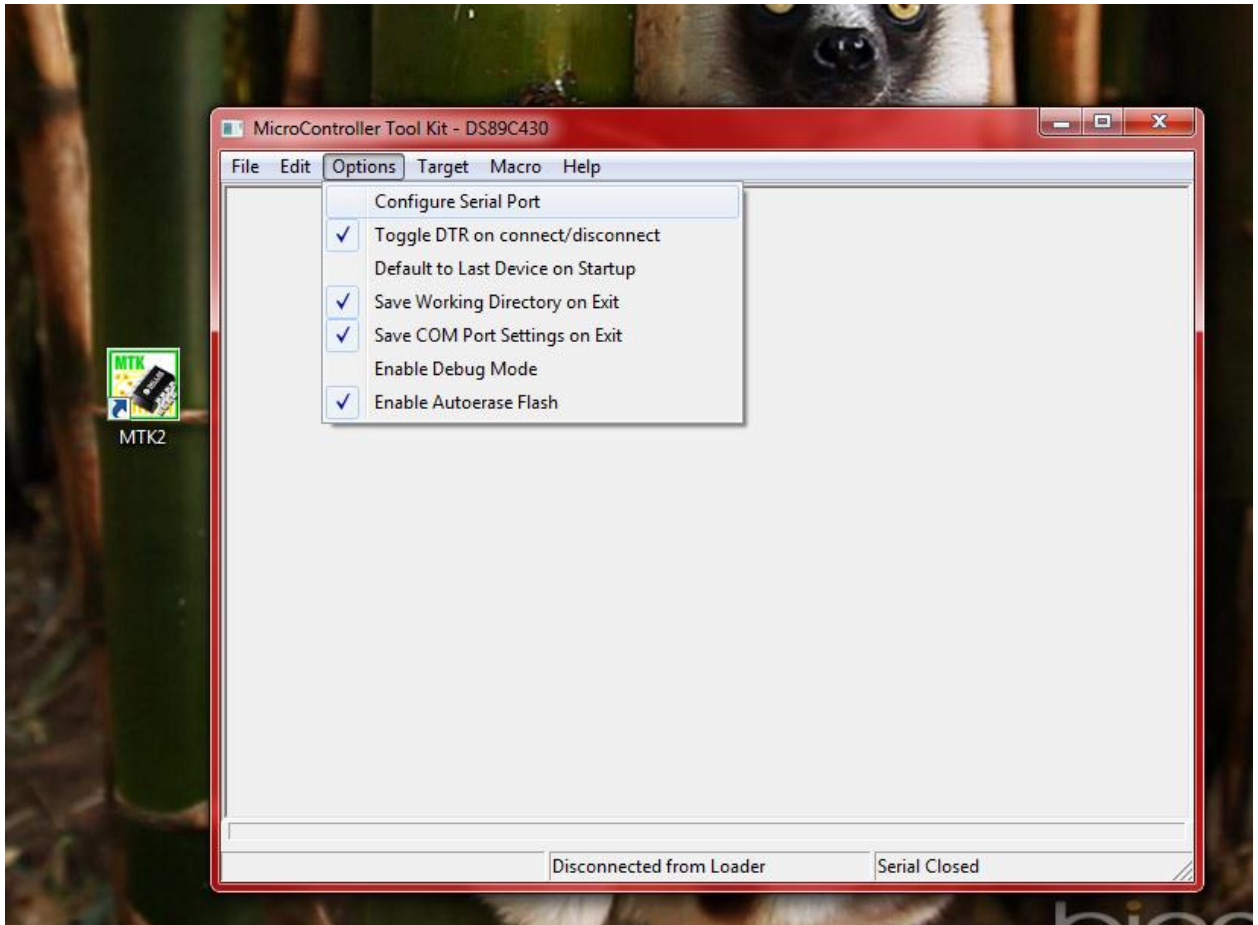
Programming the DS89C430 Microcontroller

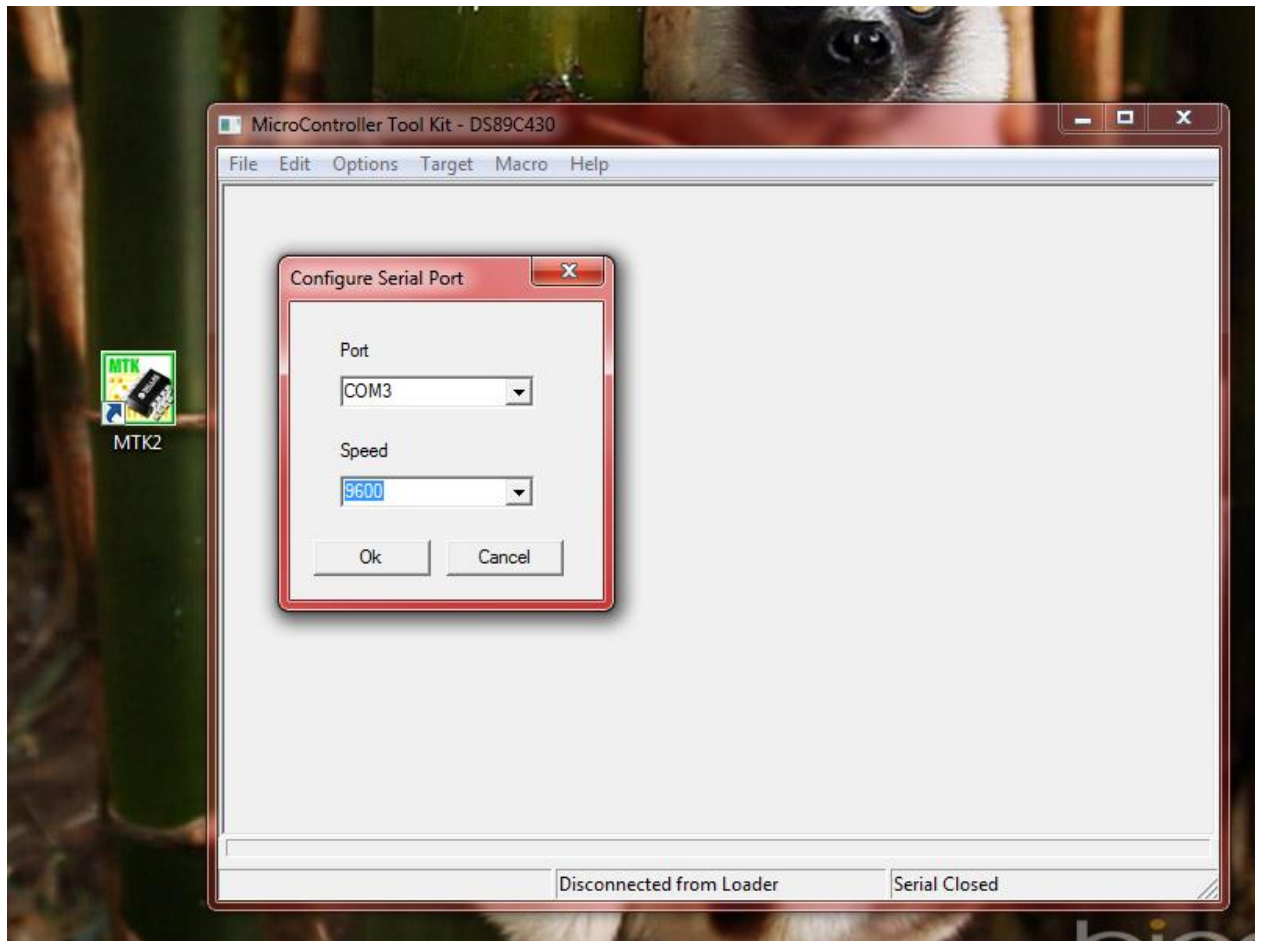
1. Connect the Serial port on the Z67-IDE+ to your Window computer serial port.
2. In Windows launch the MTK2 Application by double-clicking and select the DS89C430 device. The link for the application is as follows;

http://koyado.com/Heathkit/Z67-IDE_files/MTK2_Install-2.4.14.exe.zip

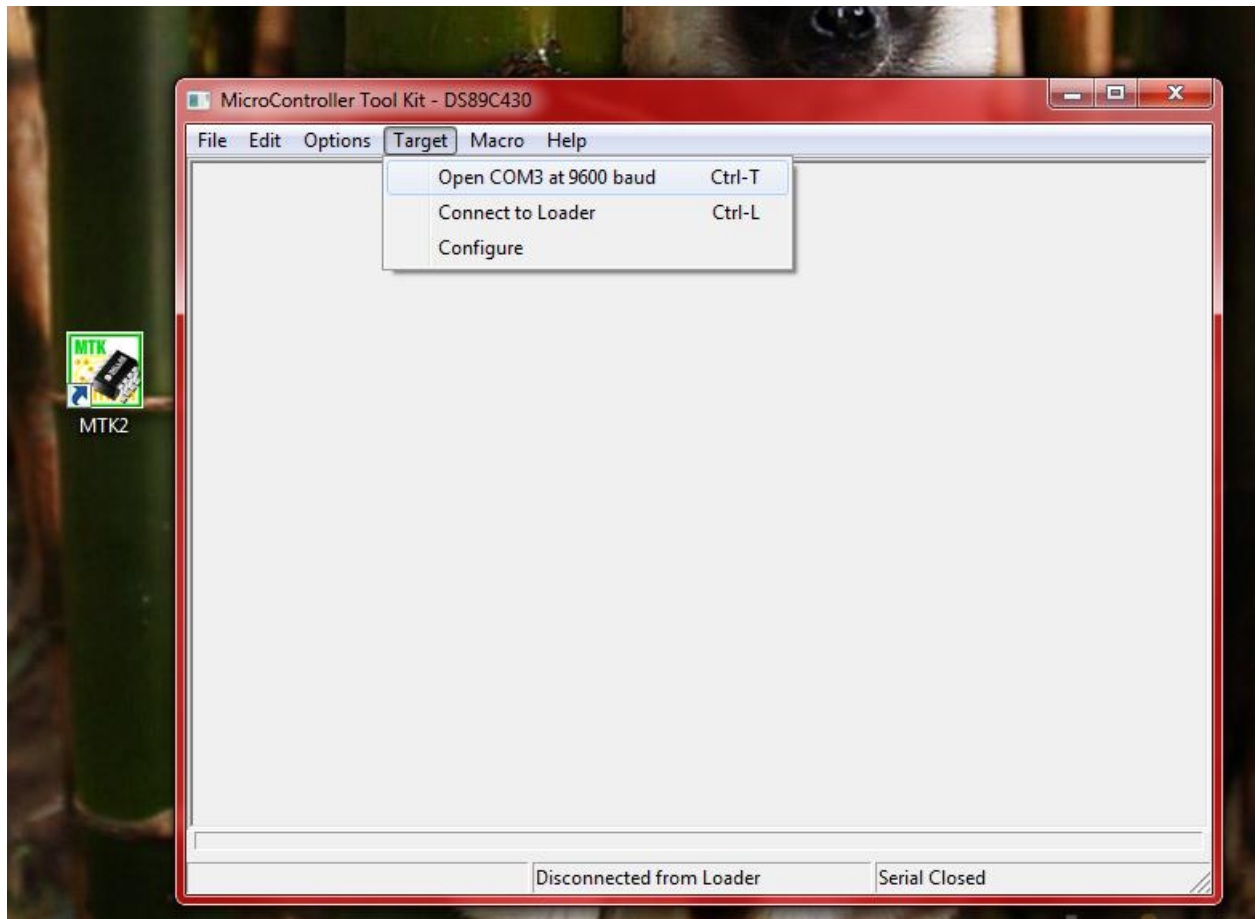


2. Click on options and make sure they are selected as shown below. Click on Configure Serial Port and use the baud rate of 9600bps. Select correct COM port.



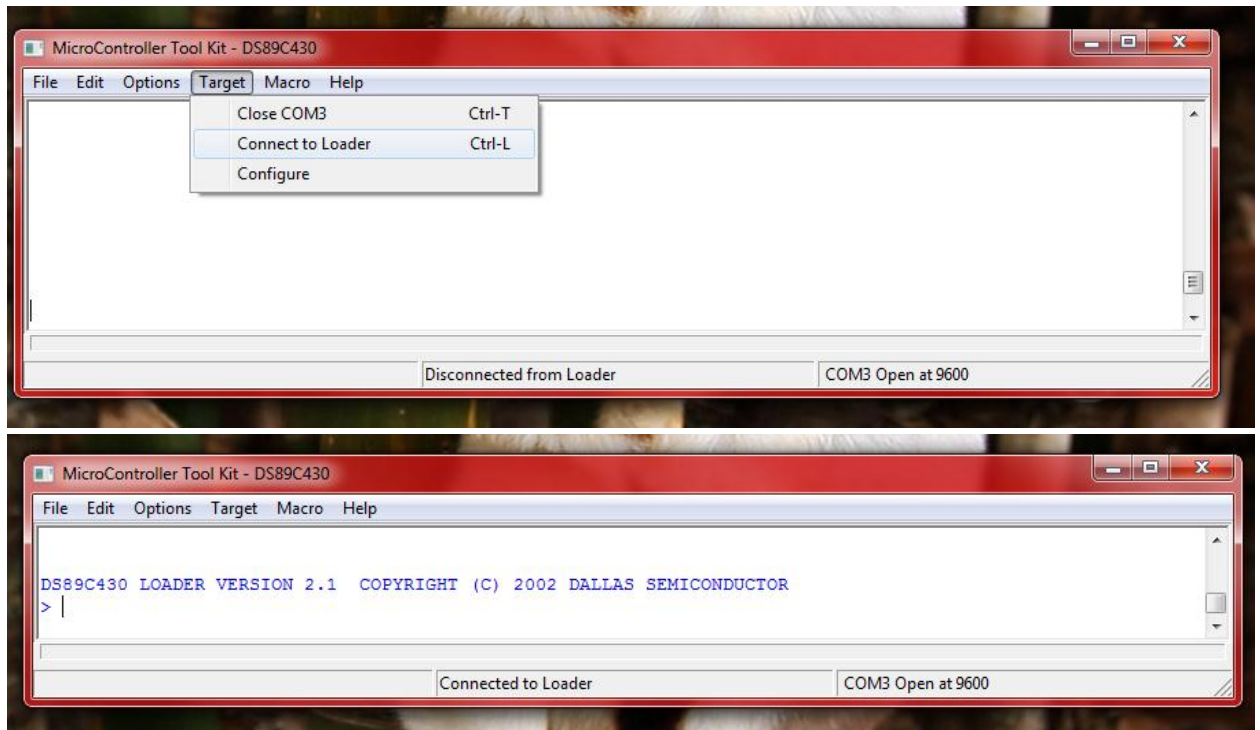


3. Click on target and open the COM port. This will reset the Microcontroller.

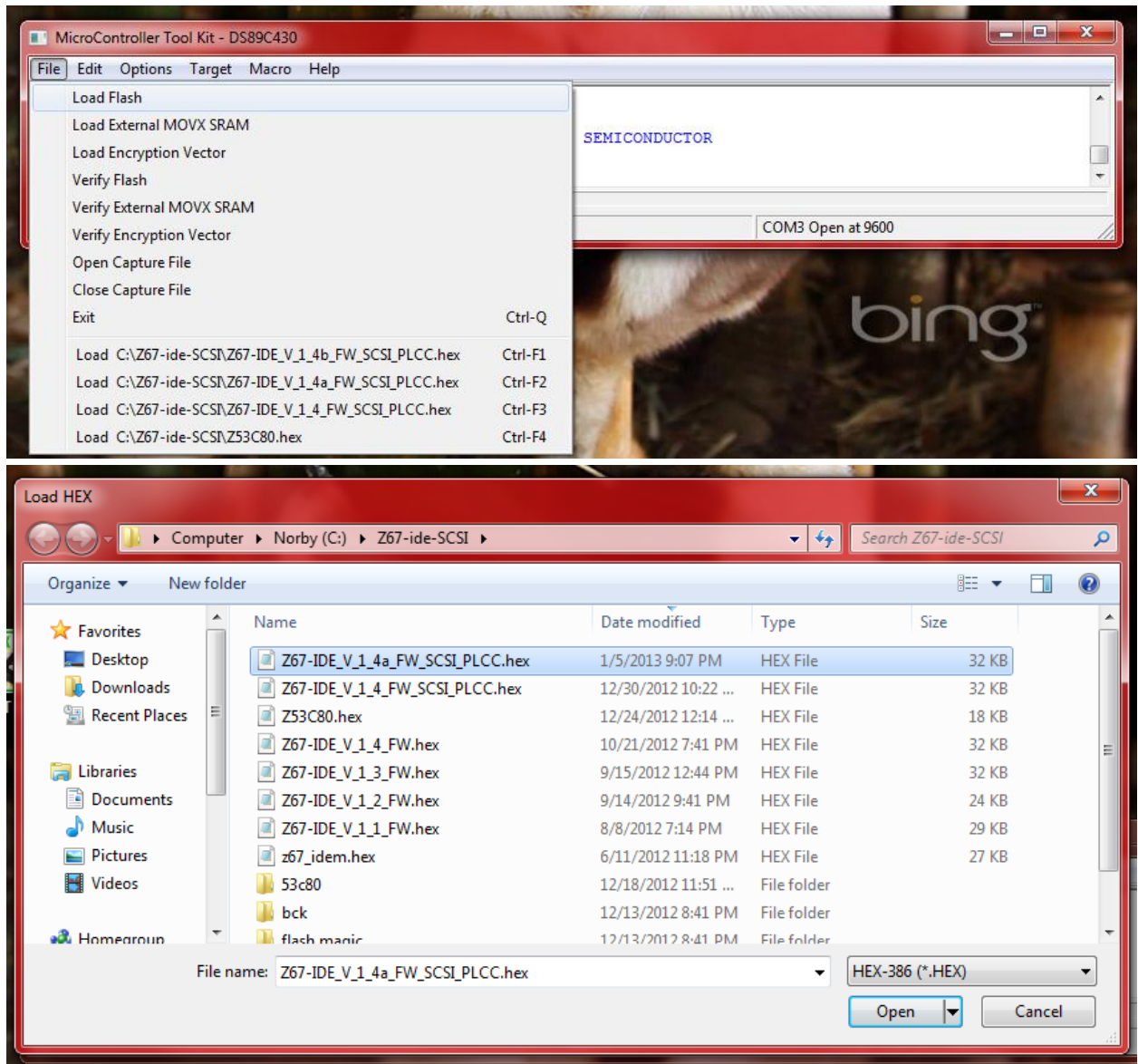


4.

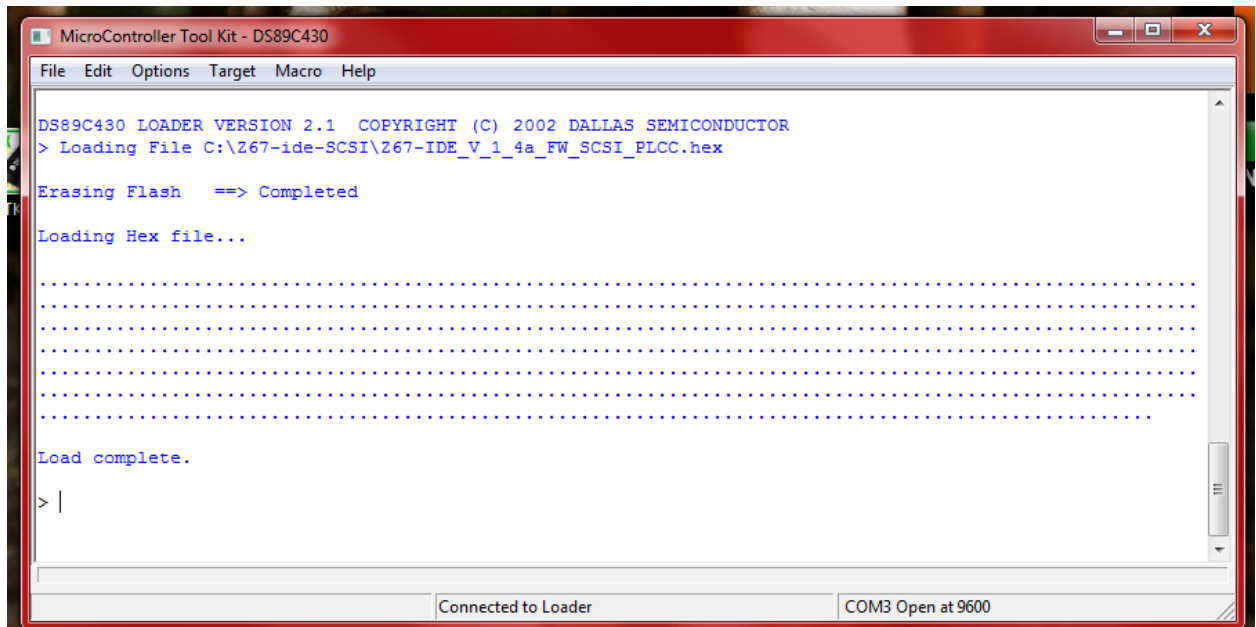
5. Click on Target and select “Connect to Loader”. The Microcontroller will enter “Programming Mode”.



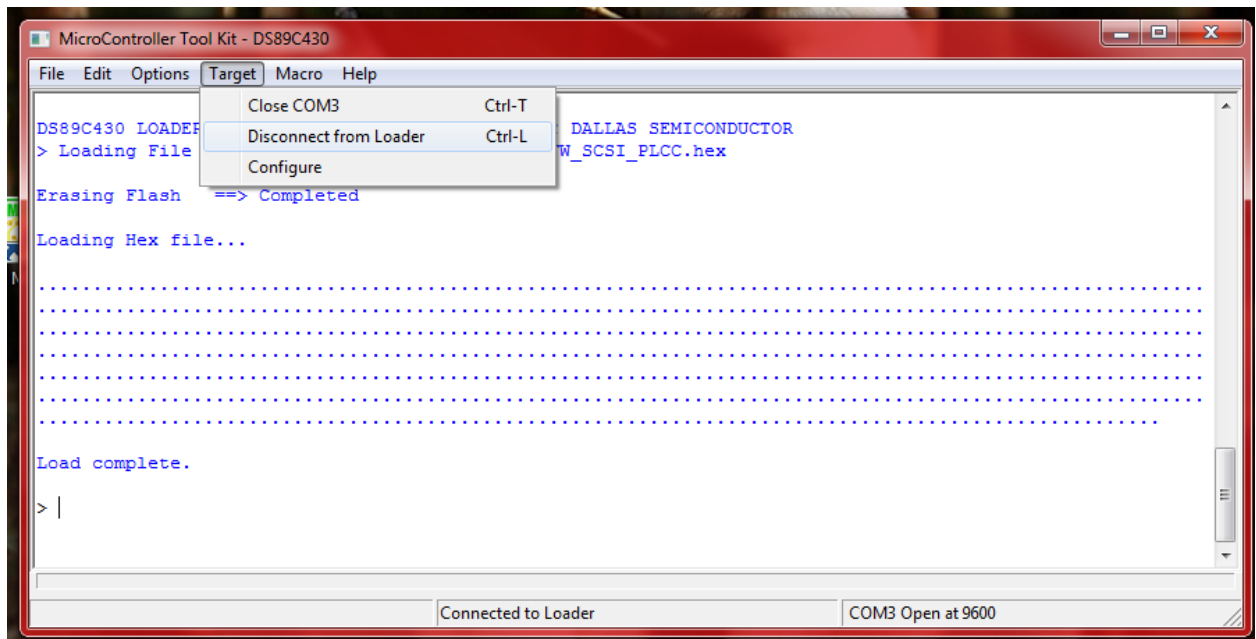
6. Click on File and click on “Load Flash” and select the hex file for such Microcontroller and click on “Open”.




7. The file will be downloaded to the Microcontroller and wait for the operation to complete.



8. Click on Target and select "Disconnect from Loader".



9. The Microcontroller will start to execute the code as shown below.



The screenshot shows the 'MicroController Tool Kit - DS89C430' application window. The menu bar includes File, Edit, Options, Target, Macro, and Help. The main text area displays the following information:

```
Z67-IDE+ SASI/SCSI HARD DRIVE CONTROLLER
Author: Norberto Collado - (C) Copyright, 2010-2014
Email: norberto.collado@koyado.com
Released Version: V1.4a
Date: 01/01/2013 - 12:01 PM
Source file: Z67-IDE_V_1_4a_FW_SCSI_PLCC.ASM - HEX FILE: Z67-IDE_V_1_4a_FW_SCSI_PLCC.HEX
HW/Settings:
  MicroController: DS89C430/450 @20MHz
  Baud Rate: 9600 8-N-1, FLOW CONTROL: NONE
  IDE Controller: CS82C55AZ (8MHz)
  SCSI Controller: Z53C8003VSC
  SCSI Data Transfer: Asynchronous -> PSEUDO-DMA MODE
  SCSI Parity: Enabled -> ODD
  Drive Select: (0-59) Sixty bootable drives with a 8GB CF card supported
  Replication: Boot System 0 is copied to all boot Systems n+1 via the serial port menu
  Imaging: Image Drive X to Drive Y supported via the serial port menu
  Write Protect: Master/Slave IDE Hard Drives Write Protection supported
  Compiler: MCS-51 Family Macro Assembler  A S E M - 5 1  V 1.3
  =====
  Website: http://plit.de/asem-51/
  Total RAM: 1K BYTES

Please wait... Initializing IDE Interface...

Detected SD/DD jumper OFF. Scanning for Master and Slave IDE Drive.

Please wait... Scanning IDE Interface for IDE Hard Drive (0).
Model: TS2GCF133
S/N: 20100813 C613033B
Rev: 20100202
Cylinders: 3884, Heads: 16, Sectors: 63

Please wait... Scanning IDE Interface for IDE Hard Drive (1).
Model: TS2GCF133
S/N: 20101129 C6130593
Rev: 20100804
Cylinders: 3884, Heads: 16, Sectors: 63

Z67-IDE Menu disabled. Use the ESC key to enable Z67-IDE Menu.

Target ID: 1 Z67-IDE+ DISK CONTROLLER
          Product revision level: V 1.0 - 10/31/2013

Switch Selection: #00 position.

Virtual Disk #00 mounted.

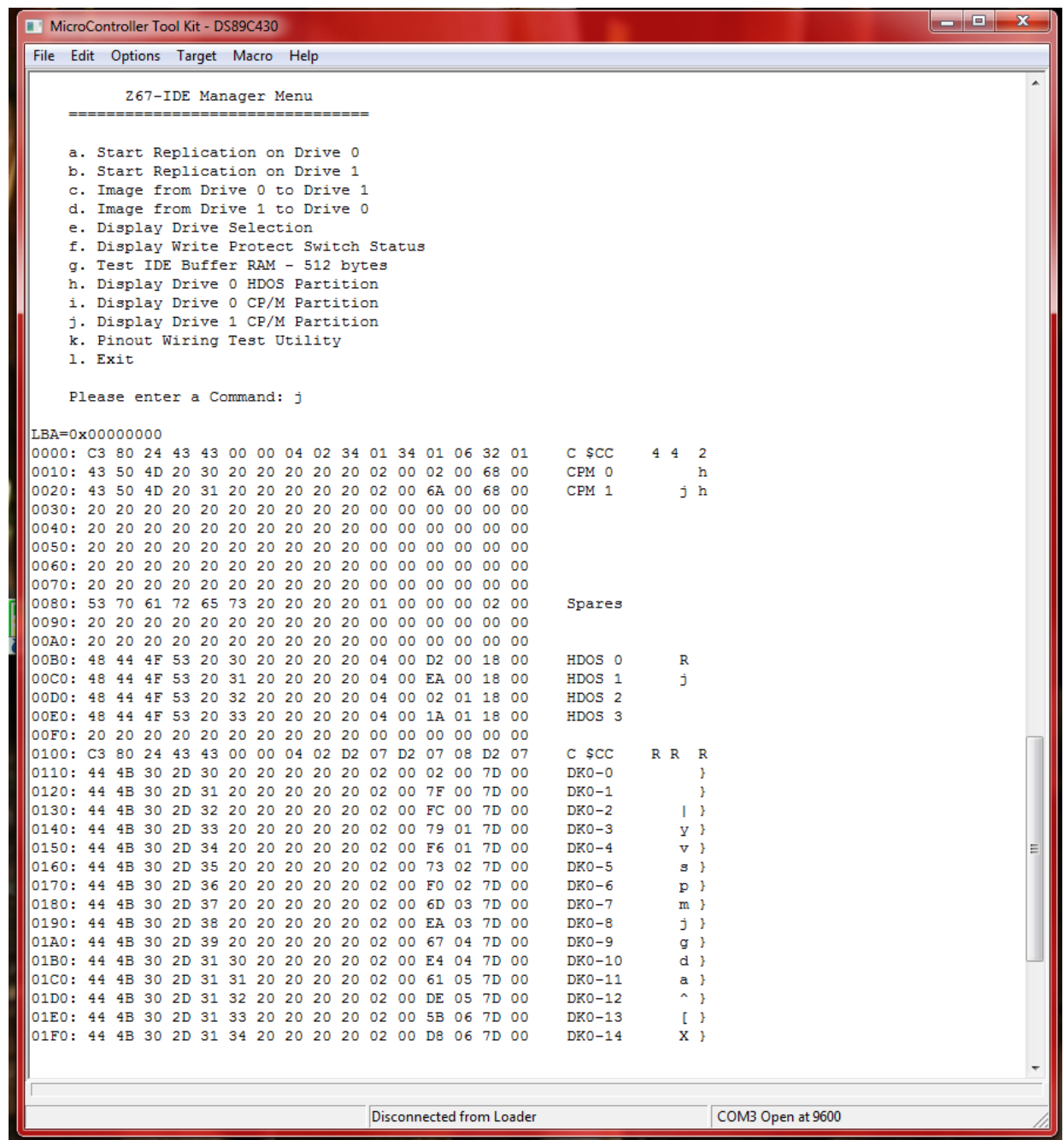
Hard Drive 0 is write protected
Hard Drive 1 is not write protected

Z67-IDE Controller Ready to transfer data to/from IDE Drive 0 or Drive 1.
```

At the bottom of the window, there are two status indicators: 'Disconnected from Loader' and 'COM3 Open at 9600'.

10. Press the "ESC" key to enter the Menu Mode. The following Menu will be displayed. Press the "J" key to display the CP/M partition table if Z67-IDE+ is configured with two CF cards.

Note: The Menu is interrupt driven and it can be use while the system is copying files under HDOS or CP/M. Option a, b, c, & d cannot be selected while in this state.



```
MicroController Tool Kit - DS89C430
File Edit Options Target Macro Help

Z67-IDE Manager Menu
=====

a. Start Replication on Drive 0
b. Start Replication on Drive 1
c. Image from Drive 0 to Drive 1
d. Image from Drive 1 to Drive 0
e. Display Drive Selection
f. Display Write Protect Switch Status
g. Test IDE Buffer RAM - 512 bytes
h. Display Drive 0 HDOS Partition
i. Display Drive 0 CP/M Partition
j. Display Drive 1 CP/M Partition
k. Pinout Wiring Test Utility
l. Exit

Please enter a Command: j

LBA=0x00000000
0000: C3 80 24 43 43 00 00 04 02 34 01 34 01 06 32 01 C SCC 4 4 2
0010: 43 50 4D 20 30 20 20 20 20 20 02 00 02 00 68 00 CPM 0 h
0020: 43 50 4D 20 31 20 20 20 20 20 02 00 6A 00 68 00 CPM 1 j h
0030: 20 20 20 20 20 20 20 20 20 20 00 00 00 00 00 00
0040: 20 20 20 20 20 20 20 20 20 20 00 00 00 00 00 00
0050: 20 20 20 20 20 20 20 20 20 20 00 00 00 00 00 00
0060: 20 20 20 20 20 20 20 20 20 20 00 00 00 00 00 00
0070: 20 20 20 20 20 20 20 20 20 20 00 00 00 00 00 00
0080: 53 70 61 72 65 73 20 20 20 20 01 00 00 00 02 00 Spares
0090: 20 20 20 20 20 20 20 20 20 20 00 00 00 00 00 00
00A0: 20 20 20 20 20 20 20 20 20 20 00 00 00 00 00 00
00B0: 48 44 4F 53 20 30 20 20 20 20 04 00 D2 00 18 00 HDOS 0 R
00C0: 48 44 4F 53 20 31 20 20 20 20 04 00 EA 00 18 00 HDOS 1 j
00D0: 48 44 4F 53 20 32 20 20 20 20 04 00 02 01 18 00 HDOS 2
00E0: 48 44 4F 53 20 33 20 20 20 20 04 00 1A 01 18 00 HDOS 3
00F0: 20 20 20 20 20 20 20 20 20 20 00 00 00 00 00 00
0100: C3 80 24 43 43 00 00 04 02 D2 07 D2 07 08 D2 07 C SCC R R R
0110: 44 4B 30 2D 30 20 20 20 20 20 02 00 02 00 7D 00 DK0-0 }
0120: 44 4B 30 2D 31 20 20 20 20 20 02 00 7F 00 7D 00 DK0-1 }
0130: 44 4B 30 2D 32 20 20 20 20 20 02 00 FC 00 7D 00 DK0-2 | }
0140: 44 4B 30 2D 33 20 20 20 20 20 02 00 79 01 7D 00 DK0-3 y }
0150: 44 4B 30 2D 34 20 20 20 20 20 02 00 F6 01 7D 00 DK0-4 v }
0160: 44 4B 30 2D 35 20 20 20 20 20 02 00 73 02 7D 00 DK0-5 s }
0170: 44 4B 30 2D 36 20 20 20 20 20 02 00 F0 02 7D 00 DK0-6 p }
0180: 44 4B 30 2D 37 20 20 20 20 20 02 00 6D 03 7D 00 DK0-7 m }
0190: 44 4B 30 2D 38 20 20 20 20 20 02 00 EA 03 7D 00 DK0-8 j }
01A0: 44 4B 30 2D 39 20 20 20 20 20 02 00 67 04 7D 00 DK0-9 g }
01B0: 44 4B 30 2D 31 30 20 20 20 20 02 00 E4 04 7D 00 DK0-10 d }
01C0: 44 4B 30 2D 31 31 20 20 20 20 02 00 61 05 7D 00 DK0-11 a }
01D0: 44 4B 30 2D 31 32 20 20 20 20 02 00 DE 05 7D 00 DK0-12 ^ }
01E0: 44 4B 30 2D 31 33 20 20 20 20 02 00 5B 06 7D 00 DK0-13 [ }
01F0: 44 4B 30 2D 31 34 20 20 20 20 02 00 D8 06 7D 00 DK0-14 X }

Disconnected from Loader COM3 Open at 9600
```


11. Disconnect the serial port from the PC for normal operation. **Do not use Putty or HyperTerminal because it causes the Microcontroller to enter the programming mode. Always use the MTK2 application with the Z67-IDE+ controller.**