



DT-H1Q

PROGRAMMER

USER GUIDE

Trademarks & Copyright

Windows and Windows NT are registered trademarks of Microsoft Corporation.

MCS-51 and Pentium are registered trademarks of Intel Corporation.

AVR is registered trademark of Atmel Corporation.

Contents

1.	Introduction	3
1.1	DT-HiQ Programmer Specification.....	3
1.2	Device Support	3
1.3	Unpacking DT-HiQ Programmer	3
1.4	System Requirements	4
2.	Hardware Setup.....	4
2.1	DT-HiQ Programmer Layout	4
2.2	Power Supply.....	4
2.3	Connecting the Hardware	5
2.4	Converter Socket	5
2.5	Jumper Settings.....	6
3.	Using the Software.....	6
3.1	Starting DT-HiQ Programmer Software.....	6
3.2	User Interface.....	7
3.3	Menus, Shortcuts, and Toolbar.....	7
3.3.1	File Menu.....	7
3.3.2	Instructions Menu.....	7
3.3.3	Options Menu	9
3.3.4	Windows Menu	9
3.3.5	Help Menu	10
3.3.6	Toolbar	10
3.4	Programming the Target Device.....	11
4.	Troubleshooting Guide	11
5.	Technical Support	12

1. Introduction

Congratulation on your purchase of DT-HiQ Programmer!

DT-HiQ Programmer is a simple and powerful parallel programmer of MCS-51[®] and AVR[®] 8-bit RISC family of microcontrollers. It is equipped with Windows[®] based software to provide an easy and friendly user interface.

1.1 DT-HiQ Programmer Specifications

DT-HiQ Programmer has following specifications:

- Dimensions : 10.5 cm x 12.5 cm x 3 cm
- Power Supply : 9 - 12 VDC, 250 mA (minimum)
- Interface : UART RS-232, 9-pin “D” connector
- Data Speed : 57600 bps
- Data Format : 8 data bits, no parity, 1 stop bit, no flow control
- Socket : 40 pin DIP - 0.6” and 20 pin DIP - 0.3” (using converter socket)
- File Format : Intel HEX file or BIN file

1.2 Device Support

DT-HiQ Programmer currently supports the following devices with all its programming features:

MCS-51[®] 8-Bit Microcontroller family:

- AT89C51 5V
- AT89C51 12V
- AT89C52 5V
- AT89C52 12V
- AT89C55 5V
- AT89C55 12V
- AT89LV51
- AT89LV52
- AT89LV55
- AT89C1051(U)
- AT89C2051
- AT89C4051
- AT89S51
- AT89S52
- AT89S53
- AT89S8252
- AT89LS51
- AT89LS52
- AT89LS53
- AT89LS8252
- AT89C51RC
- AT89C55WD

AVR[®] 8-Bit RISC Microcontroller family:

- AT90S1200
- AT90S2313
- AT90S8515
- AT90S8535
- ATmega8515(L)
- ATmega8535(L)

1.3 Unpacking DT-HiQ Programmer

The package of DT-HiQ Programmer includes:

- DT-HiQ Programmer.
- 9 pin straight-through RS-232 cable.

- Voltage Adapter (Optional).
- Quick Start.
- DT-HiQ Programmer CD-ROM with user guide and software.

1.4 System Requirements

The minimum hardware and software requirements are:

- 486 processor (Pentium[®] processor recommended).
- 8 MB RAM.
- 2 MB free hard disk space.
- CD-ROM drive.
- 57600 baud RS-232 port (COM port).
- Windows[®] 95/98/2000/ME/XP or Windows NT[®] 4.0 or higher.

2. Hardware Setup

This section provides you with the information about hardware setup procedures.

2.1 DT-HiQ Programmer



Figure 1. DT-HiQ Programmer

2.2 Power Supply

An external power supply (9 – 12 VDC, 250 mA minimum) power supply is required. Connect the power supply to DT-HiQ Programmer's DC jack connector. Pay attention on the polarity!



Figure 2. Connector's Polarity

The power LED indicator is lit when power supply is connected and power switch is turned on.

2.3 Connecting the Hardware

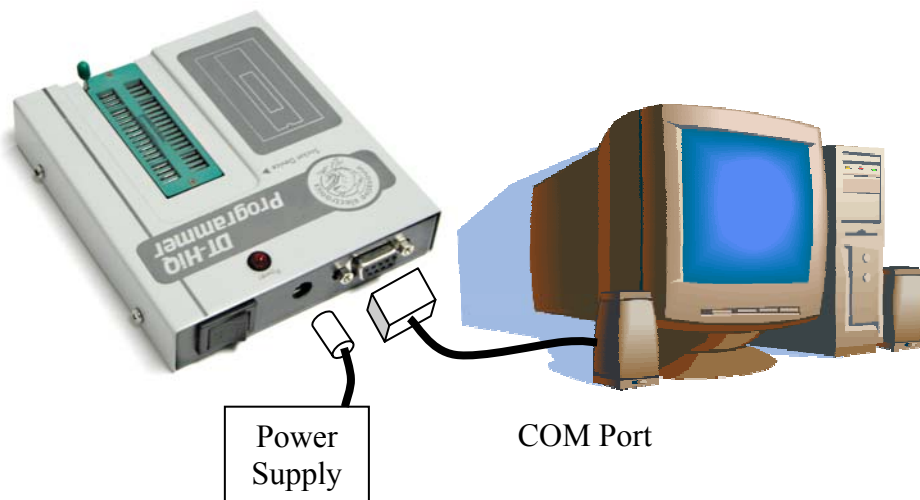


Figure 3. Connection between DT-HiQ Programmer, PC, and Power Supply

Connect a straight-through serial cable to DT-HiQ Programmer's DB-9 connector to a COM port on the PC as shown in Figure 3. Connect the Power Supply and turn DT-HiQ Programmer on. Start the DT-HiQ Programmer software included. When the software started, the program will automatically detect which COM port DT-HiQ Programmer is connected to.

2.4. Converter Socket

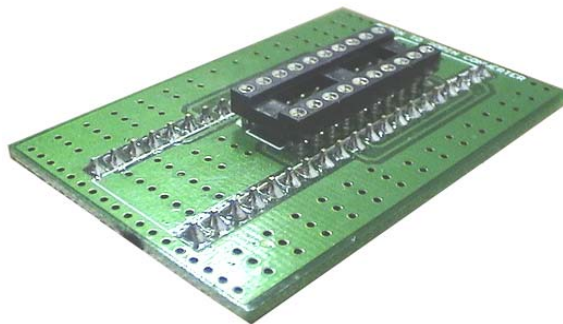


Figure 4. Converter Socket for 20-pin MCS-51[®] and AVR[®]

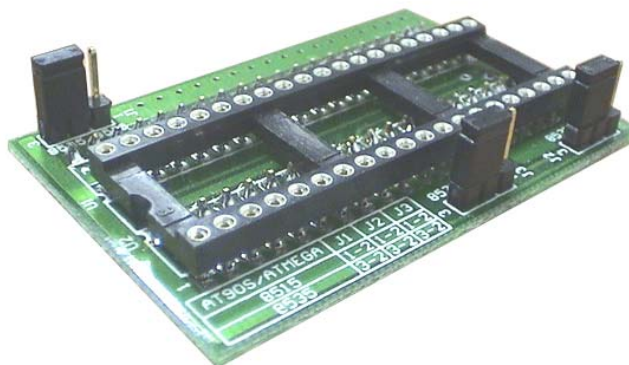


Figure 5. Converter Socket for 40-pin AVR[®]

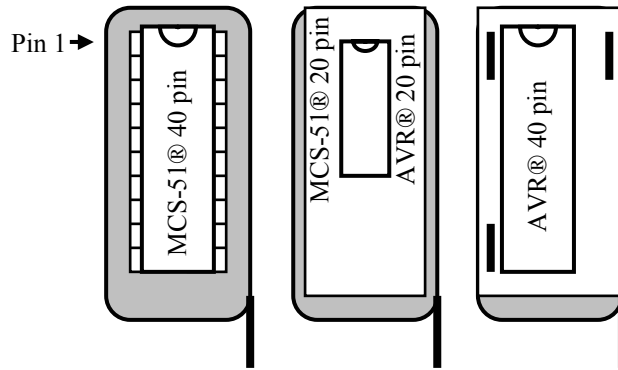


Figure 6. IC's and Converter Socket's position on ZIF Socket

2.5. Jumper Setting

To program a 40-pin AVR® device supported you must use the converter socket included with the programmer. Follow the instruction shown in table to select the AVR® device:

Jumper		40-pin AVR® Device Selected
J1	3 <input type="checkbox"/> 1	AT90S8515 ATmega8515(L)
J2	3 <input type="checkbox"/> 1	
J3	3 <input type="checkbox"/> 1	
J1	3 <input checked="" type="checkbox"/> 1	AT90S8535 ATmega8535(L)
J2	3 <input checked="" type="checkbox"/> 1	
J3	3 <input checked="" type="checkbox"/> 1	
Note : <input checked="" type="checkbox"/> => jumper mounted <input type="checkbox"/> => jumper dismounted		

3. Using the Software

This section provides you with the information about DT-HiQ Programmer software.

3.1 Starting DT-HiQ Programmer Software

To start the software, do one of the following:

- Double-click DT-HiQ Programmer icon from Windows Explorer.
- Right-click on the file and select “Open” function.

3.2 User Interface

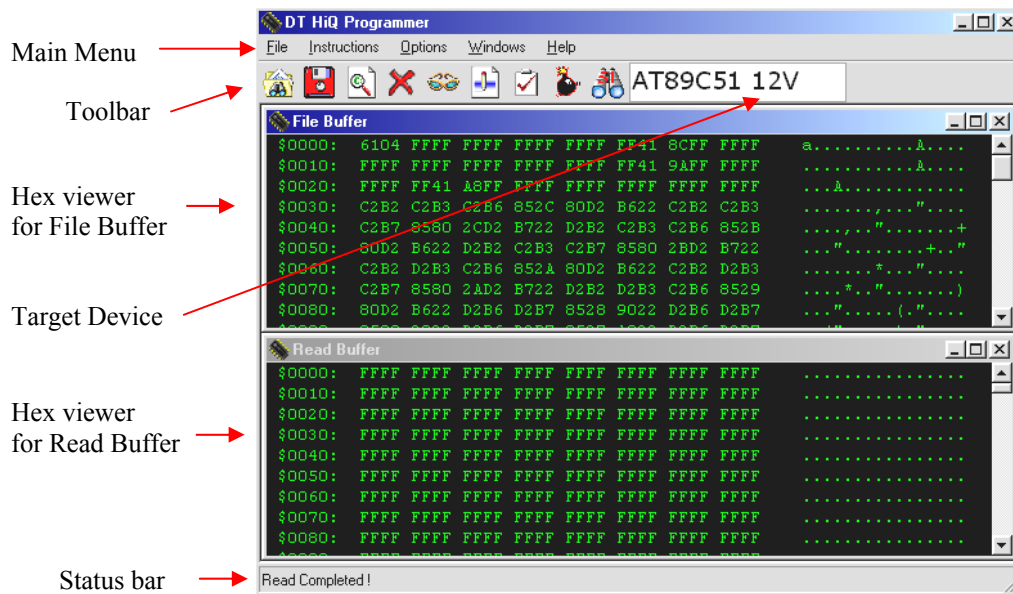


Figure 7. Programmer.EXE User Interface

3.3 Menus, Shortcuts, and Toolbar

DT-HiQ Programmer user interface includes all programming features for supported target devices. The available options and selections depend on the selected target device.

3.3.1 File Menu

1. Load File

Function : Load an Intel HEX or a binary file into File Buffer
 Shortcut Keys : Ctrl + L

2. Save File

Function : Save the contents of Read Buffer into an Intel HEX or a binary file
 Shortcut Keys : Ctrl + S

3. Recent Files

Function : List 10 recently loaded files

4. Exit

Function : Exit the programmer software
 Shortcut Keys : Ctrl + X

3.3.2 Instructions Menu

1. Blank Check

Function : Blank check the target device
 Shortcut Keys : Ctrl + B

2. Erase

Function : Erase the target device
 Shortcut Keys : Ctrl + E

3. **Read Code**
 Function : Read target device's program memory, store, and display it in the Read Buffer window
 Shortcut Keys : Ctrl + R
4. **Write Code**
 Function : Write the code stored in the File Buffer window to the target device's program memory
 Shortcut Keys : Ctrl + W
5. **Verify Code**
 Function : Compare the content of File Buffer and target device's program memory
 Shortcut Keys : Ctrl + V
6. **Lock Bit 1**
 Function : Program lock bit 1
 Shortcut Keys : Ctrl + F1
7. **Lock Bit 2**
 Function : Program lock bit 2
 Shortcut Keys : Ctrl + F2
8. **Lock Bit 3**
 Function : Program lock bit 3
 Shortcut Keys : Ctrl + F3
9. **Read Lock Bit**
 Function : Read the status of target device's lock bits (Programmed or Unprogrammed)
 Shortcut Keys : Ctrl + F5
10. **Read EEPROM**
 Function : Read target device's EEPROM data memory, store, and display it in the Read Buffer window
11. **Write EEPROM**
 Function : Write the code stored in File Buffer window to target device's EEPROM data memory
12. **Verify EEPROM**
 Function : Compare the content of File Buffer and target device's EEPROM data memory
13. **Enable SPI**
 Function : Enable Serial Programming feature
14. **Disable SPI**
 Function : Disable Serial Programming feature
15. **Read SPI Fuse**
 Function : Read the status of target device's Serial Programming feature (Enabled or Disabled)
16. **Enable RC**
 Function : Enable On-chip RC Oscillator

- 17. **Disable RC**
Function : Disable On-chip RC Oscillator
- 18. **Read RC Fuse**
Function : Read the status of target device's On-chip RC Oscillator fuse (Enabled or Disabled)
- 19. **Enable FSTRT**
Function : Enable the Short Startup Time
- 20. **Disable ESTRT**
Function : Disable the Short Startup Time
- 21. **Read FSTRT Fuse**
Function : Read the status of target device's Short Startup Time fuse (Enabled or Disabled)
- 22. **Features Bytes Control**
Function : Read and program features bytes (Lock bytes and Fuses bytes)
- 23. **Auto**
Function : Perform a sequence of commands. The target device's program memory is erased, blank checked, written, and verified
Shortcut Keys : Ctrl + A

3.3.3 **Options Menu**

- 1. **COM Port Detect**
Function : Automatically detect which COM port the DT-HiQ Programmer is connected to (DT-HiQ Programmer must be turned on)
- 2. **MCS-51 Device Detect**
Function : Automatically identify MCS-51[®] target device
Shortcut Keys : Ctrl + D
- 3. **AVR Device Detect**
Function : Automatically identify AVR[®] target device
Shortcut Keys : Ctrl + C
- 4. **Device Select**
Function : Select the target device manually

3.3.4 **Windows Menu**










- 1. **Cascade**
Function : Cascade File Buffer and Read Buffer windows
- 2. **Tile**
Function : Tile File Buffer and Read Buffer windows
- 3. **Arrange Icon**
Function : Arrange File Buffer and Read Buffer windows in minimized mode

- 4. **Minimize All**
Function : Minimize File Buffer and Read Buffer windows
- 5. **File Buffer**
Function : Maximize File Buffer window
- 6. **Read Buffer**
Function : Maximize Read Buffer window

3.3.5 Help Menu

- **About**
Function : Check the version number of programmer software and technical support contact

3.3.6 **T**oolbar

-  **Load File** : Load an Intel HEX or a binary file into File Buffer
-  **Save File** : Save the contents of Read Buffer into an Intel HEX or a binary file
-  **Blank Check** : Blank check the target device
-  **Erase** : Erase the target device
-  **Read Code** : Read target device's program memory, store, and display it in the Read Buffer window
-  **Write Code** : Write the code stored in the File Buffer window to the target device's program memory
-  **Verify Code** : Compare the content of File Buffer and target device's program memory
-  **Auto Programming** : Perform a sequence of commands. The target device's program memory is erased, blank checked, written, and verified
-  **MCS-51 Device Detect** : Automatically identify MCS-51[®] target device




AVR Device Detect : Automatically identify AVR[®] target device

3.4 Programming the Target Device

To program a code (in Intel-hex format or binary format) into the target device, do the following steps:

1. Insert the target device into the target device ZIF socket on the DT-HiQ Programmer (use the appropriate converter socket to program 40-pin AVR[®] or 20-pin device).



2. Load the code into file buffer by “**Load File**” command.
To perform “**Load File**” command, do one of the following:

- Click the **Load File**  button
- Click **File | Load File**
- Press **Ctrl + L**

and locate the Intel-hex file or binary file to load.


3. Detect the target device by “**MCS-51 Device Detect**” or “**AVR Device Detect**” command.

To perform “**MCS-51 Device Detect**” or “**AVR Device Detect**” command, do one of the following:

- Click the **MCS-51 Device Detect**  button or **AVR Device Detect**  button
- Click **Options | MCS-51 Device Detect** or **AVR Device Detect**
- Press **Ctrl + D** (for MCS-51[®]) or **Ctrl + C** (for AVR[®])

or select the target device manually from the pull-down menu on **Options | Device Select**.

4. Program the target device by “**Auto**” command.
To perform “**Auto**” command, do one of the following:

- Click the **Auto Programming**  button
- Click **Instructions | Auto**
- Press **Ctrl + A**

5. Programming progress will be shown in the status bar. When programming is succeeded, the text “**Verify Complete**” will be shown in the status bar. If programming fails, read the troubleshooting guide in section 4.

4. Troubleshooting Guide

Problem	Reason	Solution
Power LED is off.	Power supply is not connected properly	Check power supply's connection to the power jack and its polarity (sec. 2.2)

	Improper power supply	Check that the power supply output is at least 9 VDC and 250 mA (sec. 2.2)
	Power switch is off	Turn on the power switch
Programmer Software does not detect the DT-HiQ Programmer board.	Serial cable is not connected or power is off	Connect the serial cable to PC COM port and DB9 connector on DT-HiQ Programmer board and check power connections (sec. 2.3)
	PC COM port is in use	Disable other programs that are using the same PC COM port Change PC COM port connection
DT-HiQ Programmer cannot identify the target device automatically	The target device is not supported	Read the list of supported target device
	The ID of target device is incorrect	Try to identify the target device manually from Options – Device Select (sec. 3.3.3)
The target device cannot be programmed	The wrong target device is selected	Use “Device Detect” command or choose the correct device from the pull-down menu (sec. 3.3.3 or sec. 3.3.6)
	The device is inserted with wrong orientation	Make sure that the notch on the socket matches the notch on the device target (sec. 2.4)
	The jumpers setting are incorrect	Check the jumpers setting (sec. 2.5)
	The memory lock bits are programmed	Erase the memory before programming
All byte codes in AT89Cx051 are read 00H	AVR [®] device detecting has been performed	Rewrite the target device and don't forget to select the correct target group when detecting
AT89S8252 EEPROM can be written and verified but all bytes are FFH	Address of loaded file doesn't match EEPROM's address because AT89S8252 EEPROM address starts at 2000H	Load a file which addresses are between 2000H and 27FFH
		Change the starting address of file to 2000H
DT-HiQ Programmer Hardware doesn't responding after an error in writing, reading, or verifying	The writing, reading, or verifying failure can cause DT-HiQ Programmer Hardware to respond incorrectly	Turn DT-HiQ Programmer Hardware off for a while and then turn it back on

5. Technical Support

For technical support or if you find other problems, please contact: support@innovativeelectronics.com.

Please include the following information when you request technical support for the programmer:

- Version number of the programmer software. This can be found in DT-HiQ Programmer software menu Help – About

- PC processor type and speed
- PC operating system and version
- What target device is used (Complete part number)
- Programming voltage
- Socket and jumper settings
- A detailed description of the problem