

MTP Writer User's Guide

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MTP Writer User's Guide

Introduction

The Holtek HT-MTPWriter was specifically developed to program the range of Holtek MTP (Multi-Time Programmable) microcontroller devices allowing users to easily and efficiently burn their program code into MTP devices. The HT-MTPWriter offers the advantages of a small and easy to manage size, in addition to easy to use special features. Other additional advantages include the ability to operate both connected to a PC in an on-line programming mode as well as being able to operate in a stand-alone programming mode. After downloading the program code from the PC to the HT-MTPWriter, the stand-alone mode allows the user to program MTP devices without connection to a PC.

In the on-line programming mode, the HT-MTPWriter is connected to the PC via the supplied RS232 cable. In the stand-alone programming mode, no connection is required to the PC. As the Holtek range of MTP devices are supplied in many different package types, a range of adapters is supplied by Holtek to match the appropriate package type and pin count being used. The correct adapter must therefore also be selected and plugged into the HT-MTPWriter.

The HT-MTPWriter writes both program code and data into the MTP MCU device. The data can be initialized using the HT-IDE3000 or the HT-MWriter software utility.

The requirements for using the HT-MTPWriter are:

- 16V power adapter with minimum current rating of 500mA. It is recommended that only the supplied power adapter is used.
- The correct adapter to match the MTP device package type and pin count
- IBM 386 compatible or higher specification PC
- Win95/98/NT/2000/XP Windows operating system
- HT-MWriter software utility

Installation

For connection to the PC, use the supplied cable to connect the HT-MTPWriter 9-pin D-type connector to the RS232 port of the PC as shown in Figure 1.

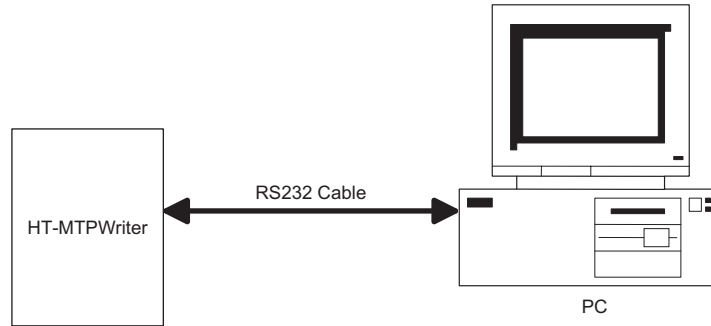


Figure 1

To install the HT-MTPWriter software utility, run the "HT-MwriterSetup.exe" file as supplied with the HT-MWriter, after which the following instructions should be followed.

Note If the HT-Mwriter software utility has been installed already, then ignore this software installation.

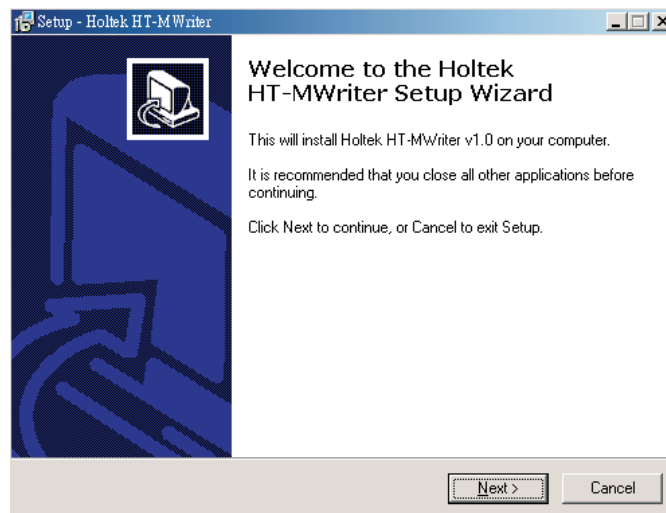


Figure 2

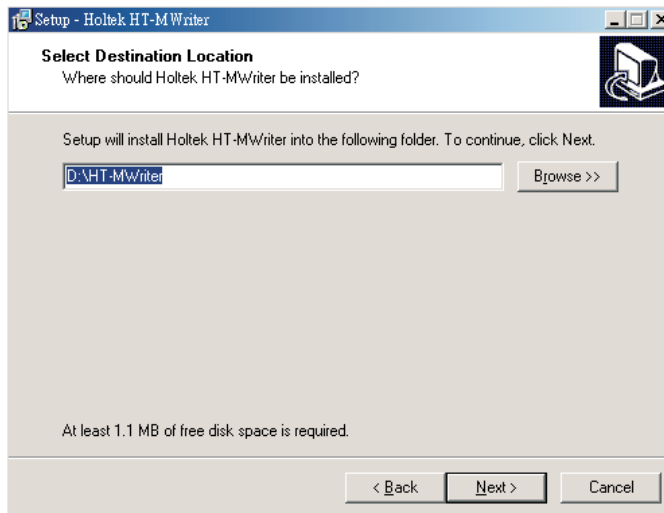


Figure 3

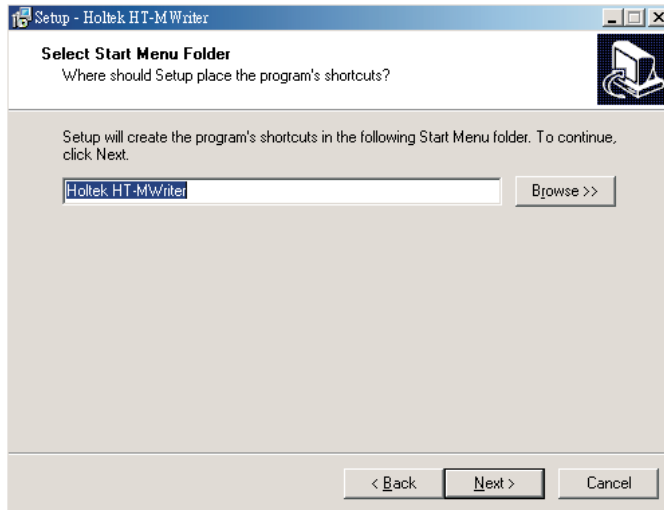


Figure 4

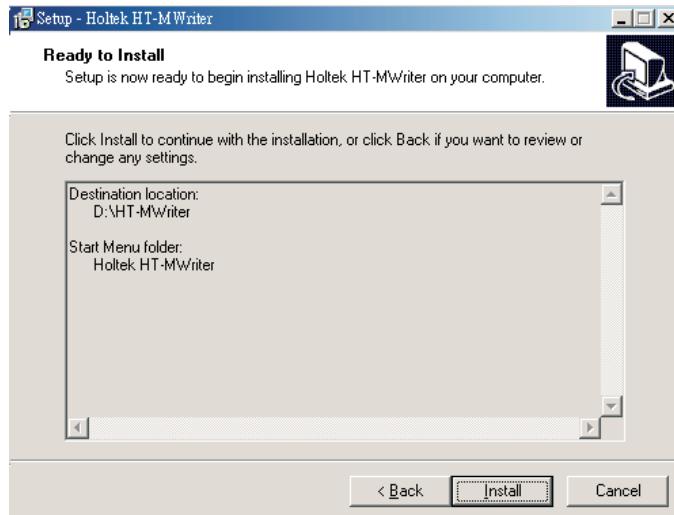


Figure 5

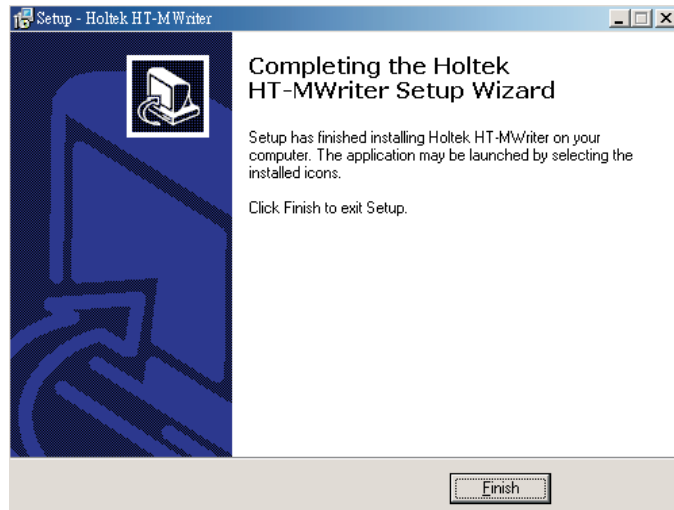


Figure 6

Accompanying Hardware

The outline of the HT-MTPWriter is shown in Figure 7:

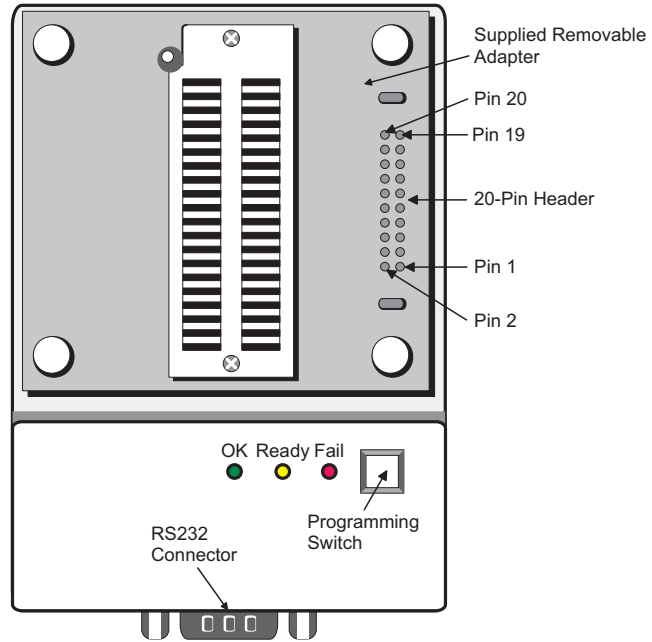


Figure 7

Component	Description
DC16V	DC JACK, DC 16V socket
20-Pin Header	Programming signal connector
OK	Green LED to indicate normal conditions
Ready	Yellow LED to indicate ready conditions
Fail	Red LED to indicate error conditions
Programming Switch	Programming key for stand-alone mode
RS232 Connector	9-pin D-type connector for PC RS-232 port connector
4P DIP Switch	DIP switch on rear side of HT-MTPWriter

MTP Device Pin Name	Programming Signal	20-pin Header Position
PA0	AD0	8
PA1	AD1	6
PA2	AD2	4
PA3	AD3	2
PA4	CLK	10
PA5	$\overline{\text{CS}}$	12
PA6	$\overline{\text{RW}}$	14
OSC1	Ground (direct connection)	—
OSC3	Ground (direct connection)	—
VDD	VDD	18
$\overline{\text{RES}}$	VPP	20
VSS	Ground (direct connection)	11, 13, 15, 16, 17, 19

Programming Signal/MTP Device Pin-Out Cross-Reference Table

Programming an MTP Device with the HT-MWriter

Prepare the MTP File Before Programming the MTP Device

Before the MTP device can be programmed, an MTP data file, with the file extension .MTP, must first be generated using the Build command in the Project menu within the HT-IDE3000 development environment. After finishing the build procedure, the HT-MTPWriter hardware and the HT-MWriter software can then be used to program the MTP device.

Running the HT-MWriter Software Utility

After running the HT-MWriter software utility from under the Holtek HT-Mwriter item in the main Windows program group, the window as shown in Figure 8 will be displayed.

MCU Type and Driver Type for Programming

The MCU box indicates the present MCU type that is to be programmed. Either of the following commands determines the MCU type:

- Open an MTP file by selecting the Open button, the MTP file contains information about the MCU type of MTP device that is to be programmed
- Set the MCU type by selecting the MCU command in the Settings menu

Initialize the Data EEPROM

If an initial value is required for some of Data EEPROM memory, then set the value by using Data EEPROM Editor command in the Tools menu within the HT-IDE3000 development environment before building the MTP data file. Also, the initial value can be set before downloading to the writer within the HT-Mwriter software. Please refer to On-Line Programming Mode, Basic Function in the following text.

Note If an MTP device blank check is required, then it is not necessary to open an MTP file. After the HT-MTPWriter is connected to the PC, the HT-MWriter software utility reads the driver type from the HT-MTPWriter and displays it in the Driver box as shown in Figure 8. If no driver type is read out, the HT-MWriter software utility will download the corresponding driver data to the writer according to the last MCU type or the default MCU type. Therefore, the MCU type and the Driver type should be the same unless the connection between the PC and the HT-MTPWriter is broken or the HT-MTPWriter is powered off. The functions that can be executed by the HT-MTPWriter depend upon the driver type in its flash memory. An incorrect driver type will induce programming errors. The user has to ensure that the MCU type and Driver type are the same.

On-Line Programming Mode

Basic Functions

There are 9 function keys or control buttons as shown at the right hand side of the window shown in Figure 8, with each button representing an instruction, the functions of which are explained below.

In Figure 8, the Program window contains/displays the program code read either from the MTP file or from an MTP device. The Data window contains/displays the data read either from the MTP file or from the Data EEPROM of the MTP device. The Status Bar displays the result of executing each basic function.

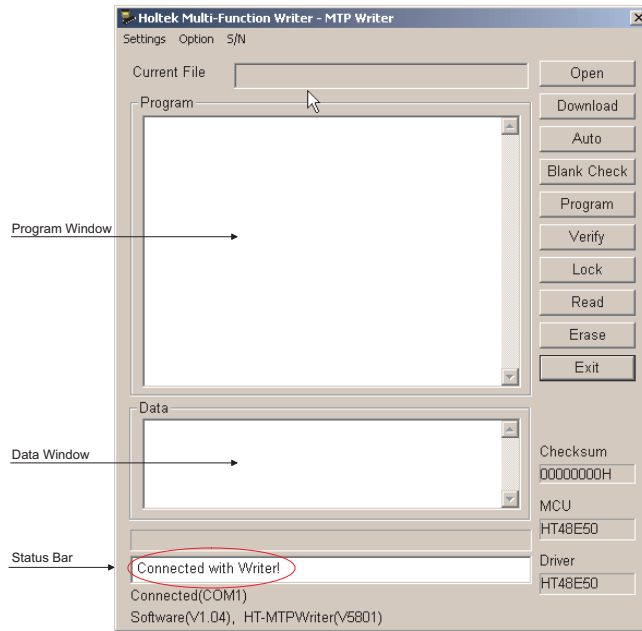


Figure 8

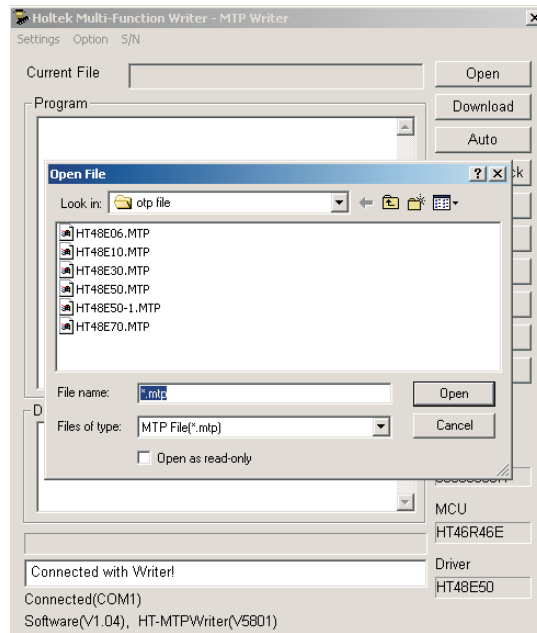


Figure 9

→ **Open**

This opens a file which has an .MTP suffix. It is the contents of this memory which will be accessed when programming the relevant MTP device. After selecting "Open" the file dialogue box will be displayed from which the correct folder and file name can be chosen, as shown in Figure 9. The file contents will be displayed in the Program window and Data window after being opened, and the checksum of the opened file will be shown in the Checksum box, as shown in Figure 10.

After opening an MTP file, the value in the Data window can be modified directly. Any modification is not written to the writer before executing the Download command.

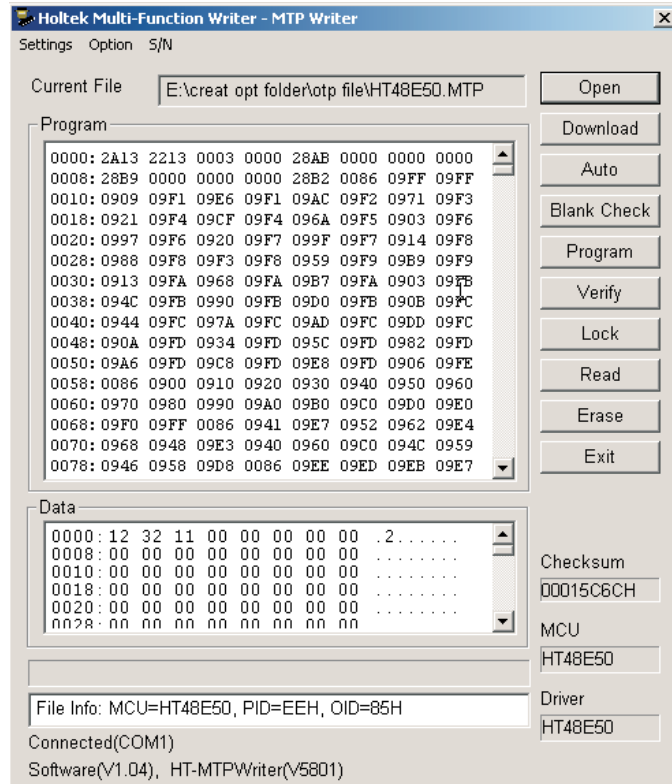


Figure 10

→ **Download**

This instruction downloads the contents of the presently opened MTP file and driver information to the writer's flash memory, as shown in Figure 11. An MTP file must already have been opened before using this instruction.

If the value in the Data window has been modified, then the new value will be downloaded into the writer's flash memory.

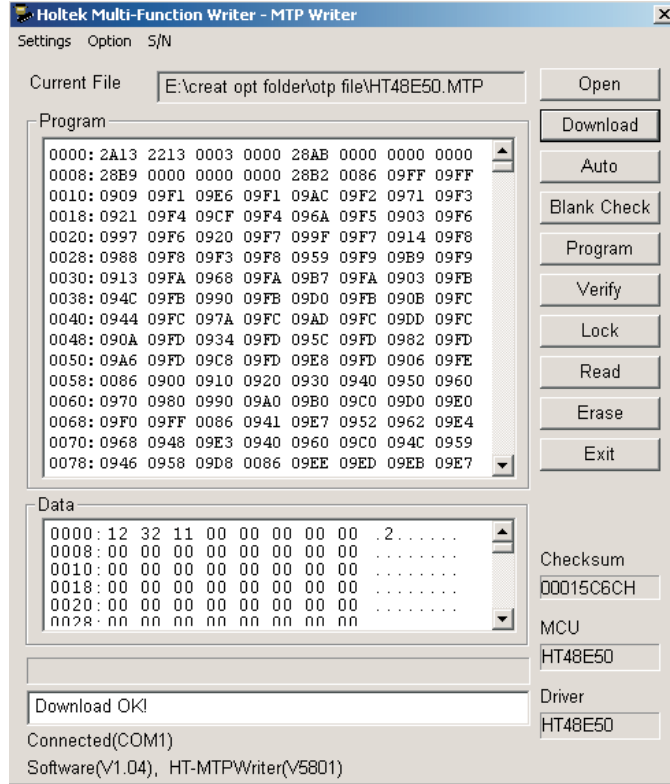


Figure 11

→ **Blank Check**

This instruction checks that the presently loaded MTP device has not previously been written to. The results of this check will be displayed in the Program window.

→ **Erase**

This instruction will erase the contents of the MTP device including both the program and data memory. Figure 14 will be displayed when this instruction has completed.

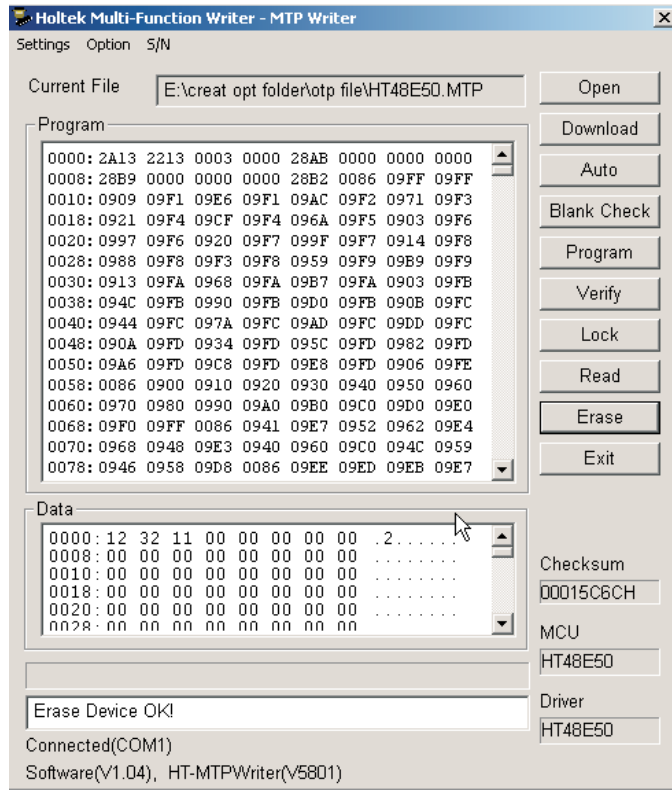
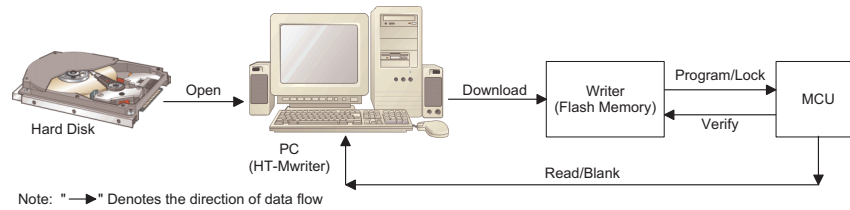


Figure 14

The relationship between function commands and programming resource.



Additional Functions

→ Setting

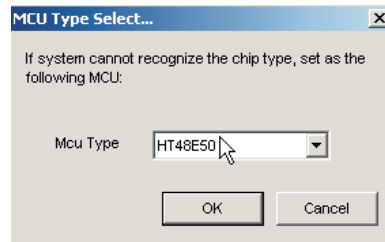
This menu contains three setup commands for the basic configuration of the HT-MTPWriter which determines the way in which the HT-MTPWriter is configured and operated. A detailed explanation of each command is shown below:

- Detect Connect

This command looks for a connection between the HT-MTPWriter hardware and the PC and will display the result in the Program window.

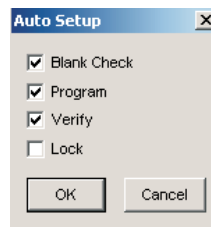
- MCU

This command specifies a specific MCU type for the following operations. The driver data for the specified MCU will be downloaded to the HT-MTPWriter hardware if the writer has been connected to the PC and is powered on.



- Auto

This command will setup which programming instructions are to be automatically and sequentially executed by the Auto button.



→ **Option**

Two commands exist in this menu. The first of these is the option command which will display the configuration options for the presently opened MTP file as shown in Figure 15. The other is the Print command, which will printout the configuration options for the presently opened MTP file.

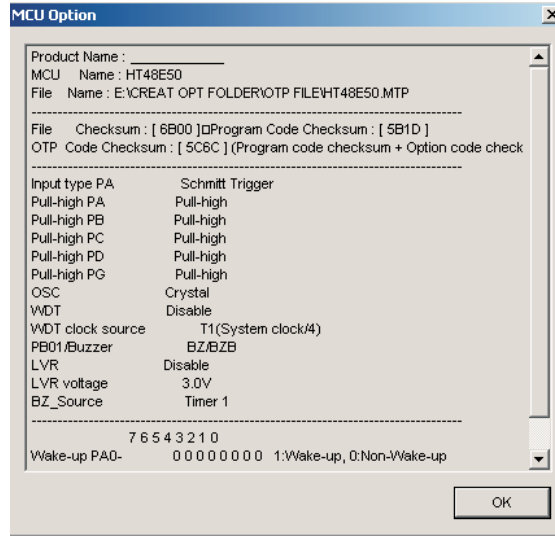


Figure 15

→ **S/N – Serial Number Writing**

The serial number function allows a user specified serial number to be written into each MTP device. This serial number, the address of which is specified by the user, is written into the Lower Byte address of Program ROM for each MTP device. After a serial number is written into an MTP device, an auto-incrementing function ensures that subsequently programmed devices will contain serial number incremented by one each time. It is first required to setup the initial data and fixed address of the first serial number. Selecting "Setup" from the "S/N" menu will display the window as shown in Figure 16, which can be used to input the initial serial number's data and its corresponding address.

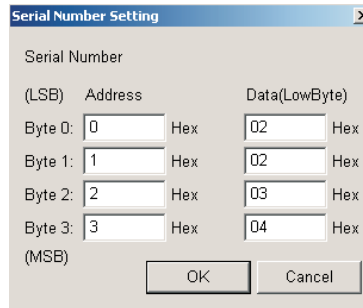


Figure 16

After the initial data and address information has been setup, selecting "Enable" from the "S/N" menu will activate the serial number function. When the serial number function is activated, the present serial number's corresponding address and data will be displayed at the lower right hand side of the main window as shown in Figure 17. During the programming stage the first device to be programmed will contain the previously setup serial number data in its Program ROM at the indicated address. Subsequent devices will contain serial numbers incremented by one for each additional device. To reset the order of serial numbers, again select "Setup" from the "S/N" menu.

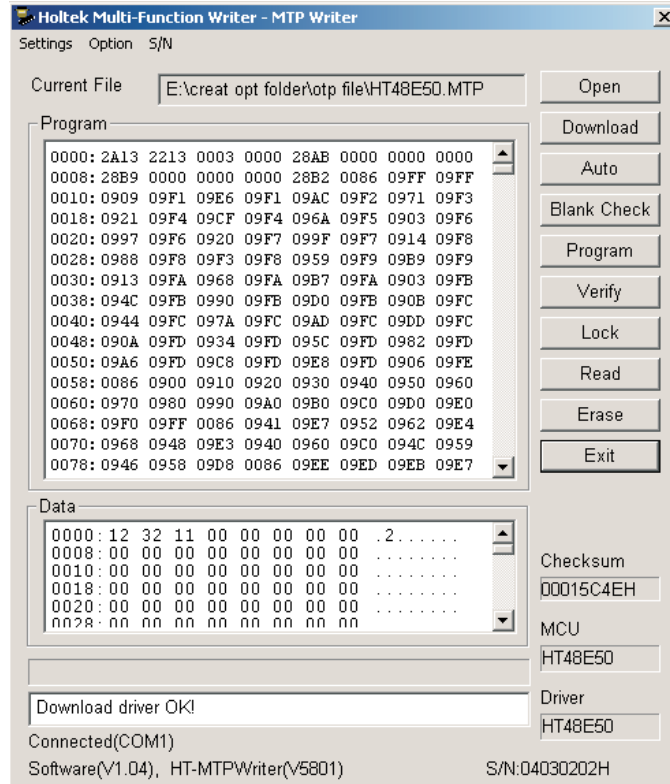


Figure 17

Stand-Alone Programming Mode

Before the stand-alone programming mode is used it is essential that the following steps have been first implemented:

- The program code must have been already been downloaded into the HT-MTPWriter. When this happens the yellow LED will illuminate to indicate that the system is ready, if there is an error then the red LED will illuminate.
- Select the programming commands using the DIP Switch. The following table lists the DIP switch functions. Note that the DIP switches are only used for stand-alone operation.

DIP Position	Function	Description
DIP1	Erase	If DIP switch #1 is on, the writer will erase the program memory and data memory of the MTP device before programming
DIP2	Blank Check	If DIP switch #2 is on, the writer will run a blank check on the MTP to check if its contents are empty before programming. If DIP switch #2 is off, the writer will start programming without a blank check.
DIP3	Lock	If DIP switch #3 is on, after programming the data into the MTP, the data will be locked and prevented from being read out in the future.
DIP4	Buzzer	If DIP switch #4 is on, then after programming, whether successful or not, an audible reminder signal will be generated.

Programming Steps

- **Step 1**
Connect the supplied 16V power adapter, the HT-MTPWriter will check whether the programming data in the Flash memory is correct or not. The system will then remain in a standby state if the programming data is valid. Otherwise, the HT-MTPWriter must be connected to the PC using the supplied RS232 cable to download the program code to the HT-MTPWriter.
- **Step 2**
Place an MTP device that is compatible with the data in the HT-MTPWriter, into the Textool socket.
- **Step 3**
Press the programming switch to begin the programming cycle.
- **Step 4**
Check the indicator LEDs to verify that the programming operation was successful.
- **Step 5**
If successful, remove the programmed MTP device to allow the HT-MTPWriter to return to its standby state. If the programming operation has failed, press the programming key again to allow the HT-MTPWriter to go back to its standby state.
- **Step 6**
Repeat step 2~step 5.

LED Indicator Description

The HT-MTPWriter contains 3 LED indicators to display the status of the programming operation. The following table lists the function of each of the LED indicators:

LED Type	Status	Description
Red LED – Failure Status	Flash once then stop	MTP device is locked
	Flash twice then stop	Data in the HT-MTPWriter is incompatible with the present MTP device
	Flash 3-times then stop	MTP device already contains data, device not blank
	Flash 4-times then stop	Programming failed
	Flash 5-times then stop	Programming complete but error detected during the verification process
	Flash 6-times then stop	Failed to lock the present MTP device
	Rapid flashing*	Data in the HT-MTPWriter is invalid
Green LED – OK Status	LED illuminated	Programming successful
Yellow LED – Ready Status	Slow flashing	System is ready and awaiting programming instruction
	Rapid flashing	Programming operation in progress

*** If the Red LED flashed rapidly, which indicates the content of the writer's flash memory is invalid. To repair this, just to connect the HT-MTPwriter to the PC and execute the HT-Mwriter software utility, then open an MTP file and download to the writer.

Using the Adapter Card

The HT-MTPWriter is supplied with an adapter card which contains a 40-pin Textool socket. If it is necessary to program MTP devices whose package types are unable to use the supplied Textool socket there are two alternative possibilities:

- Remove the supplied adapter card and replace it with another type of adapter card that can accommodate the different MTP. These other adapter cards for the HT-MTPWriter will have a C prefix next to their adapter card product name.
- Use the existing supplied adapter card in conjunction with one of the MTP writer alternative adapter cards. These alternative MTP writer adapter cards can be plugged directly into the 40-pin Textool socket of the supplied HT-MTPWriter adapter card. These other adapter cards for the MTP writer will have a T prefix next to their adapter card product name.

System Messages

- Download driver OK!
The PC has downloaded the MCU programming information to the writer's flash memory.

- **Disconnected from the Writer**
The PC has failed to connect to the HT-MTPWriter, to rectify check the power supply and the RS232 cable.
- **Connected with Writer!**
The PC has connected to the writer.
- **Failed to Open File!**
The present MTP file cannot be opened, either this file has errors or the file format is invalid.
- **Load file failed!**
Can't load the present MTP file. Check the specified file.
- **Not support the type of MCU!**
The software utility does not support the MCU type in the present MTP file or the driver in the writer.
- **Not support the type of File!**
The software utility does not support the file format, it may not be an MTP file.
- **Failed to Read MTP File Record!**
The file format of the present MTP file has errors or the file format is invalid.
- **Failed to Allocate Memory!**
Failed to allocate memory for the present MTP file.
- **Invalid Checksum for the MTP File!**
The checksum of the MTP file is incorrect.
- **Writer is Busy.**
The writer cannot execute the requested command as it is still executing other operations.
- **Failed to write to flash ROM!**
The writer is unable to download the contents of the MTP file or Driver data into the writer.
- **Device is Locked!**
The MTP device has been locked.
- **ID Error!**
The Driver is not consistent with the ID in the MTP device
- **Not Blank!**
The MTP device is not empty.
- **Programming Failed!**
Failed to program the MTP device.
- **Verify Failed!**
The contents of the present MTP device is not consistent with the data in the writer's flash memory.

- Lock Failed!
Cannot lock the present MTP device.
- ROM Format Error!
The record format in writer's flash memory is incorrect. This error may be caused by incomplete downloading or because the contents of the flash memory is not valid for the present Driver in the writer.
- Writer Time-out!
The writer does not respond after a command has been issued.
- Checksum of received data error!
The checksum returned from the writer is incorrect. Restart the writer and the software utility.
- Unknown Error!
The software utility cannot recognize the message returned from the writer. Restart the writer and software utility.
- Not Blank!
The result message for the Blank Check instruction indicating that the MTP device is not empty.
- Erase failed!
The result message for the Erase instruction indicating that the writer is unable to erase the MTP device.
- Failed to Write to Program ROM!
The writer has failed to write to the program ROM.
- Write OK!
The writer has successfully programmed the program ROM.
- Verify data failed!
The writer has failed to verify the contents of the data EEPROM.
- Verify OK!
The writer has successfully verified the program ROM.
- S/N Address Exceeds the Program ROM Size, Set to Default Address: 1, 2, 3, 7
The address specified for the serial number exceeds the program memory's range. The system will set the addresses to the default addresses 1,2, 3,7.
- S/N Addresses are not Blank in the MTP File!
In the present MTP file, there is data already written to the address specified for the serial number.
- No status return from writer
The PC is unable to receive the return status from the writer. To rectify check the power supply and the RS232 cable.
- Unknown status
This is an internal error.

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