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## **Loading Code into the TERIDIAN 71M6511 or 71M6513 without Using an ICE (In-Circuit Emulator)**

The TERIDIAN 71M6511 and 71M6513 power meter ICs can be programmed without having to use an in-circuit emulator (ICE). The tools and procedures required to do this are described in this application note.

## Introduction

The program code for the MPU of the 71M6511 and 71M6513 is stored in flash memory, while the program code for the CE is stored in XRAM. A device with totally erased flash memory requires either an in-circuit emulator (ICE) or specialized programmer (download board) to be programmed. However, once the device has been programmed with demo code, data can be downloaded into various memory spaces of the device using the serial interface.

Downloading in the context of this application note means storing code from an external device (host PC) in the 71M6511 or 71M6513. Uploading means copying code from the 71M6511 or 71M6513 to a file on the host PC.

## Code Download

Code download requires the so called Download Board which can be obtained from TERIDIAN. This board is considerably more affordable than an in-circuit emulator and is useful for cases where a chip has lost its code due to inadvertent code erasure or where existing code in a chip must be upgraded or replaced. The download utility (DOS or Windows program) that is shipped with the Download Board must be installed in the host PC.

## Procedure

The Download Board is connected to J14 on the Demo board. The DB-9 cable of the Download Board is plugged into a COM port of a PC. The target code for the 71M6511 or 71M6513, i.e. the file in Intel Hex Record format (\*.hex file name extension) is loaded using the file menu of the download utility. A typical program transfer to the Demo Board takes only a few seconds. After the program is transferred, the connection to J14 is removed, and the Demo Board is reset by pressing SW2.

## Data Download

The target 71M6511 or 71M6513 must have Demo Code or an equivalent program running, and access must be possible to the serial interface. This is accomplished most easily by using the Demo Board with its companion Debug Board. A serial cable is plugged into the 9-pin D-sub connector of the Debug Board on one side and into a COM port of a PC on the other side. Some sort of terminal program, such as HyperTerminal must be used on the PC in conjunction with a simple ASCII (text) editor, such as Wordpad.

Code to be downloaded into the 71M6511 or 71M6513 must be in Intel Hex Record format. Typically, the file extension for this file format is \*.hex.

## Preparation

The terminal program on the PC must be set to the following parameters:

- 9600 baud
- 8 bits, no parity, 1 stop bit
- XON/XOFF flow control

The Debug Board should be plugged into the connector J2 of the Demo Board with its header J3. After the connection from the PC to the Debug Board is made using the DB-9 cable, typing <ENTER> a few times should result in the command prompt of the demo program ( > ) to show up on the screen. Typing **i1** at the prompt should cause the Demo Board to respond with the revision and date of its current demo code.

## Available CE Data Commands

Table 1 shows the available CE data commands:

Command	Description
] ]	General command for CE data access
] <addr>?	Display decimal value at location <addr>
] <addr>????	Display four decimal values starting at location <addr>
] <addr>\$	Display hex value at location <addr>
] <addr>\$\$\$\$	Display four hex values starting at location <addr>
] <addr>=<n>	Write <n> into location <addr>
] <addr>=<n>=<m>=...	Write values <n>, <m>, etc. into consecutive locations starting at <addr>
] U	Update flash memory with CE data (make permanent)
;	Exit CE memory mode

Command examples:

] 1F0????	Reads decimal values from four consecutive locations starting at 1F0
] 1F0=+1234=+5678	Writes decimal 1234 into 1F0 and 5678 into 1F1
] U	Makes permanent (stores to flash memory) all previously changes to CE register locations.

## Available MPU Data Commands

Table 2 shows the available MPU data commands:

Command	Description
) ]	General command for MPU data access
) <addr>?	Display decimal value at location <addr>
) <addr>????	Display four decimal values starting at location <addr>
) <addr>\$	Display hex value at location <addr>
) <addr>\$\$\$\$	Display four hex values starting at location <addr>
) <addr>=<n>	Write <n> into location <addr>
) <addr>=<n>=<m>=...	Write values <n>, <m>, etc. into consecutive locations starting at <addr>
) U	Update flash memory with MPU data
;	Exit MPU memory mode



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