



CHAPTER 2

SETUP AND INSTALLATION

INTRODUCTION

This chapter describes the various steps necessary to start development using the Z8S180 Emulator. The sections covered in this chapter are as follows:

- Installing the Software
- Setting Up the Hardware
- Connecting to Power
- Initial Checkout/Sample Session

INSTALLING THE SOFTWARE

Software for the Z8S180 Emulator is stored on two diskettes:

1. Z8S180 Sample Files and Monitor Source Diskette
2. Zilog ZASM Cross Assembler/Zilog MOBJ Object File Util. diskette

Z8S180 Source Diskette Installation

1. Select the "Run" command from the "File" menu under Microsoft Windows "Program Manager".
2. Insert the diskette labeled "Z8S180 Sample Files and Monitor Source" into drive A (or drive B, if appropriate).
3. Type "a:\setup" and press <ENTER>. (Type "b:\setup" if drive B is used.)
A dialog box will now prompt you for the directory into which the software will be installed (default is C:\180). The setup program will copy the files into the target directory, creating an icon in the Windows environment. After the installation is finished, you can move the icon into any program group of your choice.

Note: The icon will be created in the window that is currently selected.

4. Remove diskette and store in a safe place when installation is completed.

INSTALLING THE SOFTWARE (Continued)

Creating TZ Program (TZ.EXE) Icon Using Windows Program Manager

This kit includes a software monitor program that runs on a PC. If you choose to create a TZ icon from which you can run the TZ program, perform the following steps:

1. Select "New" from the Program Manager's "File" menu and select "OK" or press <ENTER> on the keyboard.
2. Type the designated name (such as "tz 9600 com1") in the Program Manager window.
3. Type the full path and filename of (one of) the .PIF files you copied from the Source Diskette, such as "C:\WINDOWS\TZ96COM1.PIF".
4. Type the full path of the directory you created (such as "C:\180"), then press <ENTER>.

The program item icon should then be created and ready to use. If you want to run copies of TZ on both COM1 and COM2, repeat Steps 1–4.

Notes:

1. Modification of the "win.ini", "autoexec.bat", or "config.sys" files is not required.
2. Consult MS-Windows documentation if you need additional information about alternate install procedures.
3. Refer to the README files on diskettes. (The README files are easily accessed via the Microsoft Windows "Notepad" program.)

ZASM-Cross Assembler/MOBJ-Object Utility Installation (Optional)

If you are using the ZASM Cross Assembler/MOBJ-Object File Utility, install the appropriate diskette **before** installing the GUI diskette. (You may choose to use a different assembler.)

1. Select the "Run" command from the "File" menu under Microsoft Windows "Program Manager".
2. Insert the diskette labeled "Zilog ZASM Cross Assembler/Zilog MOBJ Object File Util." into drive A (or drive B, if appropriate).
3. Type "a:\setup" and press <ENTER>. (Type "b:\setup" if drive B is used.)
A screen now appears listing various installation options.
4. Select the desired installation option ("Full Installation" is the default selection; however, only Z8 installation is required.)
5. Press <ENTER> and follow on-screen instructions.
6. Remove diskette and store in a safe place when installation is completed.

Note: The installation procedure can be run before creating the installation directory.

SETTING UP THE HARDWARE

Serial Connections to the Host

The Z8S180 Emulator includes two serial channels, ASCI0 and ASCI1. Header J4 connects one of these channels to the RS-232 interface chip U7, which, in turn, is connected to the DB-9 Host connector P5.

Using ASCI0 (Instead of Default ASCI1) As User Interface

1. Move shunts to the other side of J4 (as follows):

From:	To:
(ASCI1)	(ASCI0)
J4 2-3, 5-6, 8-9, 11-12, 14-15	J4 1-2, 4-5, 7-8, 10-11, 13-14.

2. Connect a DB-9 to DB-9 “straight-through” (EGA Extender) cable between one of the COM ports of your PC and P5 on the Z8S180 board.

RS-232 Signals

The serial interface of the Z8S180 consists of four RS-232 signals: Tx and Rx data plus one control output and one status input.

Control Output

The control output drives pins 1, 6, and 8 of the DB-9 connector P5, (DCD, DSR, and CTS respectively). When using ASCI0, the control output is controlled by the 180's /RTS0 output; when using ASCI1, the control output is always asserted.

Control Input

The control input is taken from pin 7 of the DB-9 connector P5, which is RTS from the host. When using ASCI0, it is routed to both the /CTS0 and /DCD0 pins. When using ASCI1, it is routed to the RXS/CTS1 pin.

Receiving Data Using CSIO Facility, While Using ASCI1 for Host Communications

To receive data using the Z8S180 Emulator's CSIO facility, while using ASCI1 for host communications, remove the shunt between J4-11 and J4-12.

Using ASCI0 for Host Communications Without “Request to Send”

To use ASCI0 for host communications, but your PC does not assert Request to Send, remove the shunts between J4-10 and J4-11, and between J4-13 and J4-14, and wire J4-10 and J4-13 to Ground, which is available on J4-9, P1-2, P1-9, P2-11, P3-17, P4-8, and P4-9.

RAM Size

16 KB (or larger) RAM at U4

The Z8S180 Emulator is shipped with an 8 KB RAM in the U4 location, and a shunt between J3-1 and J3-2. If you want to put a 16 KB (or larger) RAM at U4, move the shunt to between J3-2 and J3-3.

RAM Presence/Location in User Address Space

The J5 header controls whether the RAM on the emulator appears in the user (target) memory map, and if so, at what 8 KB boundary. It includes three separate shunt positions, between pins 1-2, 3-4, and 5-6. The emulator is shipped with all three shunts installed, which locates the RAM to start at address 00000. Other options include the following:

J5-5 to J5-6	J5-3 to J5-4	J5-1 to J5-2	Emulator RAM Starts At:
In	In	In	00000
In	In	Out	02000
In	Out	In	Not in User Space
In	Out	Out	06000
Out	In	In	08000
Out	In	Out	0A000
Out	Out	In	0C000
Out	Out	Out	0E000

Note: When you locate Z8S180 Emulator RAM in user space, the emulator “hides” the last 256 bytes of the RAM from being accessed by your software and your monitor commands, in order to protect its internal variables, states, and tables. It passes accesses to these 256 bytes on to the target board, if any.

EPROM Size

32 KB (27256) or larger ROM at U3

The Z8S180 Emulator is shipped with an 8 KB ROM in the U3 location, and a shunt between J2-1 and J2-2. If you want to put a 32 KB (27256) or larger ROM at U3, move the shunt to between J2-2 and J2-3.

RESET and NMI Drive to Target

The RESET and NMI push buttons always assert /RESET and /NMI to the Z8S180 processor. The J8 and J9 shunt positions control whether or not the emulator drives these signals to the target board as well.

Insert the J8 shunt to drive /RESET to the target, if the target board drives /RESET only with open-collector (open drain) driver(s). Leave J8 open if the target board drives /RESET with a totem pole (High and Low) driver.

Insert the J9 shunt to drive /NMI to the target, if the target board does not drive /NMI, or drives it only with open-collector (open drain) driver(s). Leave J9 open if the target board drives /NMI with a totem pole (high and low) driver.

No-Emulation Option

The Emulator board is normally configured with an Altera EPLD device at U2, which implements its in-circuit emulation functions. This part can be eliminated if emulation is not desired, which converts the board to a simple "evaluation board."

If the U2 EPLD is present, leave shunt positions J1, J6, and J7 open. In this configuration, the Emulator board operates as described in this document.

If an EPLD is not present at U2, insert shunts at J1, J6, and J7. In this case all addresses with A15 low (including 00000-07FFF) select the ROM, and all addresses with A15 High (08000-0FFFF) select the RAM. If the ROM and RAM are both 8-KB devices as shipped, each is replicated four times within each 32-KB window. (This is the same as the address map in Monitor Mode when U2 is present.)

Connecting the Serial Cable to the PC. Locate the serial cable. Connect the serial cable plug to the socket on the emulator board, and the other end of the cable to either the COM1, COM2, COM3, or COM4 connector of your PC.

Note: If connector availability is limited to a 9-pin COM1 through COM4, a different cable or a 25-pin to 9-pin converter must be used. (Zilog does not provide either of these items.)

CONNECTING TO POWER

Connecting to Power Supply. (Refer to Figure 2-1, which follows.)

1. Turn the 2.0A power supply on and adjust it to +5V (if your power supply allows adjustment).
2. Set the +5V power supply for at least 1.5A, if there's a current-limiting adjustment.
3. Turn the supplies off, or make sure nonadjustable supplies are off.
4. Connect the Ground screw and V_{CC} screw terminals on the emulator to Ground (or COM) and power connections (usually labeled "+" or "+V" or "+5V") on the power supply, respectively.

Note: Some manufacturers will also have black or white jacks. Refer to individual manufacturers' manuals to decide how to connect in this case.

SETTING UP FOR IN-CIRCUIT EMULATION

(Refer to Figure 2-1, Z8S180 Emulator Board and PC, and Emulation Adapter Hook-Up Diagram) If you already have a Z80180 board, or when your new design is built, you can use the Z8S180 Emulator in place of the Z180 processor chip. (See Chapter 1 for the requirements and restrictions involved in such use.) To perform in-circuit emulation, the target board must have a 68-pin PLCC socket for the 68-pin PLCC Emulation Adapter/Z8S180 Emulator.

1. Locate the 68-pin PLCC Emulation Adapter, which is supplied.
2. Looking at the “top” of both boards (the sides with yellow markings), align the Z8S180 Emulator Board and the Emulation Adapter so that the P1-4 connectors match up.
3. Plug the Emulation Adapter into the connectors on the “bottom” of the emulator board. Fully seat the connectors.
4. Align the Emulator Board and Emulation Adapter with your target board, so that the beveled corner on the Emulation Adapter matches up with the beveled corner of the 68-pin PLCC socket on the target board.
5. Plug the Emulation Adapter into the PLCC socket.

Power Distribution for In-Circuit Emulation. The Z8S180's power pin and four Ground pins are connected through the included 68-Pin PLCC Emulation Adapter. When using the Z8S180 Emulator for in-circuit emulation, there are three power-distribution options (refer to Figure 2-1):

1. Leave V_{CC} and GND screw terminals on the emulator board open. Power is drawn from the target board.
2. Connect power to the emulator board. Target board draws its power from the emulator by means of the 68-Pin PLCC Emulation Adapter.
3. Connect power to both the emulator board and the target board. Each board then has lower-impedance power distribution than the other options.

Note: This may cause “Ground loop” in some applications.

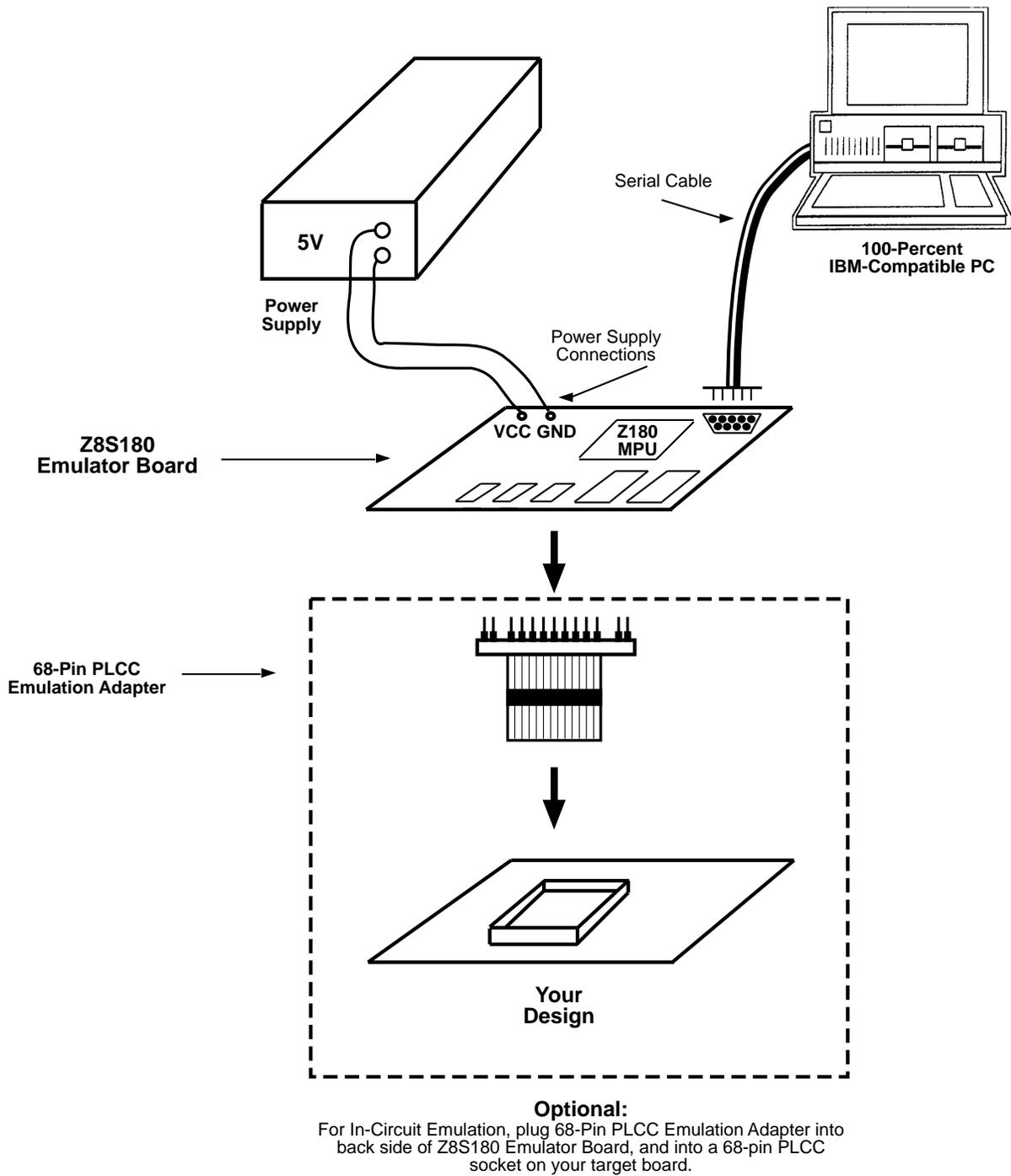


Figure 2-1. Z8S180 Emulator Board, PC, and Emulation Adapter Hook-Up Diagram

INITIAL CHECKOUT/SAMPLE SESSION

The section that follows provides an initial checkout of the hardware/software installation and setup and introduce you to some of the features of the TZ terminal emulation program.

Note: There must be RAM between addresses 00000 and 01FFF for purposes of this exercise; therefore, all three shunts must be inserted in the J5 header, unless you have already joined the emulator board to a target board that includes RAM at these addresses.

1. If necessary, power-up the PC and wait for the boot process to complete.
2. Double-click the TZ icon (if you have installed the TZ Program as an icon within Windows Program Manager).

or

At the DOS prompt (in the directory containing TZ.EXE, DISTEST.HEX, and TSTRST20.HEX), type "TZ COM n " (where n is the number of the COM port to which you connected the Monitor serial cable), then press <ENTER>.

You should now see the Debug Monitor's initial screen message:
Zilog Z80180 Monitor Version $n.m$ (where $n.m$ is the version number of the Debug Monitor).
Z80180>

3. Power-up the system.
If powering up the board from a separate power supply:
Set the voltage to +5V.
4. Type "H" (for Help) at a Monitor command prompt to see a list of commands.
5. Type an "L". The screen should show "Enter File Name:"

Note: Only if using the TZ emulation program only. Not available if you are using a dumb terminal or running a PC communications program other than TZ.

6. Type "DISTEST", then press <ENTER>. You should see an incrementing count. Its final value should be followed with the message "Intel hex lines—Done" and a new Monitor command prompt: "Z80180>"

Note: Refer to Chapter 3: "Using the Debug Monitor" if you do not get the "hex done" message.

7. Type a "U". The screen should display the following message: "Disassemble Starting At (just CR = from PC):"

Press <ENTER> to indicate that you want to disassemble from the current Program Counter value, which was set to the start of the DISTEST program as it was downloaded.

The screen should now show a new prompt "Number of Instructions:"

8. Type "16", then press <ENTER>.

A screen full of assembly-language instructions should appear, followed by another command-line prompt.

```

1000 00      NOP
1001 10FD   DJNZ      1000
1003 1018   DJNZ      101D
1005 20F9   JR        NZ,1000
1007 2014   JR        NZ,101D
1009 30F5   JR        NC,1000
100B 3010   JR        NC,101D
100D 08     EX        AF,AF'
100E 18F0   JR        1000
1010 180B   JR        101D
1012 28EC   JR        Z,1000
1014 2807   JR        Z,101D
1016 38E8   JR        C,1000
1018 3803   JR        C,101D
101A 013412 LD        BC,1234
101D 11DCFE LD        DE,0FEDC
1020 215A5A LD        HL,5A5A
1023 31A5A5 LD        SP,0A5A5
1026 09     ADD       HL,BC
1027 19     ADD       HL,DE
1028 29     ADD       HL,HL
1029 39     ADD       HL,SP
Z80180>

```

9. Press <ENTER> at the command prompt to disassemble more of the instructions in DISTEST.

Note: The file, which preceded, is not intended to be an executable program. Rather, it is the test file for the disassembly command in this Debug Monitor. DISTEST includes all the instructions that can be executed by the Z8018x family processors.

10. Type another "L" at the command prompt, then type "TSTRST20" as the file name, followed pressing <ENTER>.
11. Again you should see the final count followed by the " Intel hex lines—Done" and a Monitor command prompt.

INITIAL CHECKOUT/SAMPLE SESSION (Continued)

- 12.** Type "G" at the monitor command prompt. The screen should show the message "Go Starting at Address:". Press <ENTER> to start the TSTRST20 program.

Note: Chapter describes the I/O services that the Debug Monitor provides to downloaded programs.

The first two lines displayed by TSTRST20 tests the 'message' service, and should appear as:
(message) Test RST 20 services (date)

- A.** Enter a hex value up to 4 digits (in_hl)
- B.** Enter a 1- to 4-digit hex value followed by pressing <ENTER>. This tests the 'in_hl' service. The following display tests three services called 'out_hl', 'out_a', and 'out_char', and should appear as follows:

```
16-bit value we saw (out_hl) : XXXX
the terminating character was (out_a) : 0D
and the 'any digits' CC was (out_char) : NZ
Waiting for you (test_char) :
```

- C.** Check that the value shown above as XXXX is the hex value you entered.
- D.** Type any data character on the keyboard. This tests two services called 'test_char' and 'in_char'.

After you type a character, the concluding messages from TSTRST20 should appear as follows:

```
Your character was (in_char) : XX
A F B C D E H L A' F' B' C' D' E' H' L' I IX IY SP SEI
0D 20 03 B6 8E 0D 03 6A 02 F7 00 04 2E B7 04 62 00 010F 28BF 1F00 0
024C EF RST 28
Z80180>
```

- 13.** Check whether the value shown as XX in the preceding paragraph is the hex value of the character entered. The second through fourth lines above indicate that the TSTRST20 program ended with a Breakpoint instruction.

This completes the Initial Checkout/Sample Session.