



**I²ICE™ SYSTEM
INSTALLATION
SUPPLEMENT FOR IBM
PERSONAL COMPUTERS
PC/AT AND PC/XT**

I²ICE™ SYSTEM INSTALLATION SUPPLEMENT FOR IBM PERSONAL COMPUTERS PC/AT AND PC/XT*

Order Number: 166305-001

This package contains Appendix C of the *I²ICE™ System User's Guide*. Insert the appendix in the *I²ICE™ System User's Guide* binder, just before the index.

This appendix supplements Appendixes A and B. Start your installation of the I²ICE™ system with Appendix A.

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C

I²ICE™ SYSTEM INSTALLATION ON THE IBM PC/AT AND PC/XT



This appendix describes procedures that apply only to the installation of I²ICE™ hardware and software on the IBM PC/AT and IBM PC/XT. Its main sections are the following:

- Host Requirements
- Hardware Installation
- Final Hardware Installation Steps
- The I²ICE Confidence Tests
- Software Installation

Host Requirements

The PC/AT or PC/XT should have the following configuration:

- A hard disk.
- 2A at 5VDC available for the I²ICE host interface board.
- At least 512K bytes of RAM (of which 384K bytes must be available for the I²ICE software).
- The ability to read 5 1/4-inch, double-density disks (48 tpi).
- PC-DOS version 3.0 or later.
- An open card slot (excluding slot J8 on the PC/XT) for the I²ICE-to-PC interface board.
- I/O address space 120 — 13F (hexadecimal) available for the I²ICE system.

Hardware Installation

The hardware installation procedure assumes that the PC/AT or PC/XT is functioning properly and that its power is off.

I²ICE™-TO-PC Interface Board Installation

Perform the following steps to install and connect the I²ICE-to-PC interface board.

1. Turn off the PC's power.
2. Turn off power to all externally attached devices (e.g., display, printer, etc.).

3. For the PC/AT only: Ensure that the Key Lock is unlocked (turn counter-clockwise) and remove the key.
4. Unplug the PC's power cord and disconnect all cables from the back of the PC.
5. For the PC/AT only: Remove the back panel as shown in Figure C-1. Note that plastic fastener strips are used to attach the panel to the PC/AT.

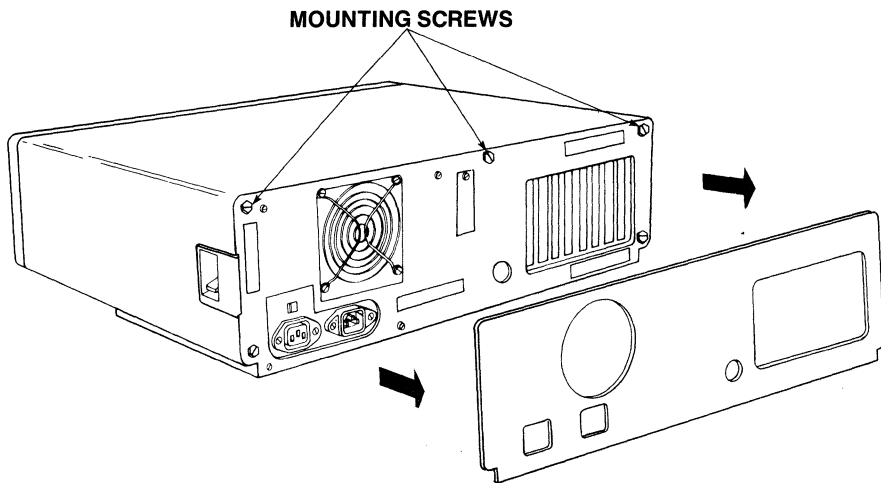


Figure C-1 Removing the PC/AT Back Panel

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6. Remove the cover from the PC, as follows:
 - a. Remove the five screws that secure the cover. The screws are on the back of the PC (see Figure C-2).
 - b. Turn the PC around so that you are facing the front panel; grasp the cover as shown in Figure C-3. Pull the cover slowly toward you until it will go no further. Then tilt the cover up, as shown in Figure C-4, and lift it off the PC.
7. Remove the expansion slot cover from the expansion slot in which you wish to install the I²ICE-to-PC interface board (see Figure C-5). (You can install the I²ICE-to-PC interface board in any unused slot with one exception: Do not use connector J8 on the PC/XT.)
8. Install the I²ICE-to-PC interface board on the mother board so that the 62-pin connector feeds through the open slot (see Figure C-6). Ensure that the interface board is seated properly in its socket. Install the screw (removed in step 7) in the board adapter.

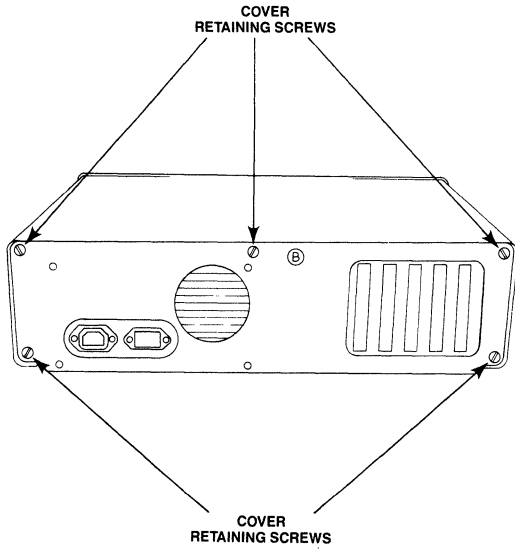


Figure C-2 Removing Cover Screws from the PC

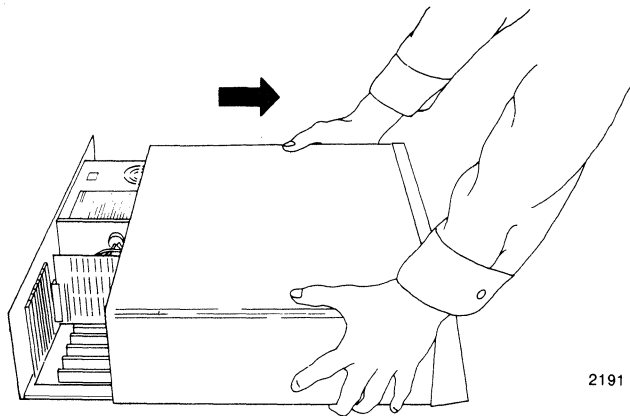


Figure C-3 Pulling the PC Cover Toward You

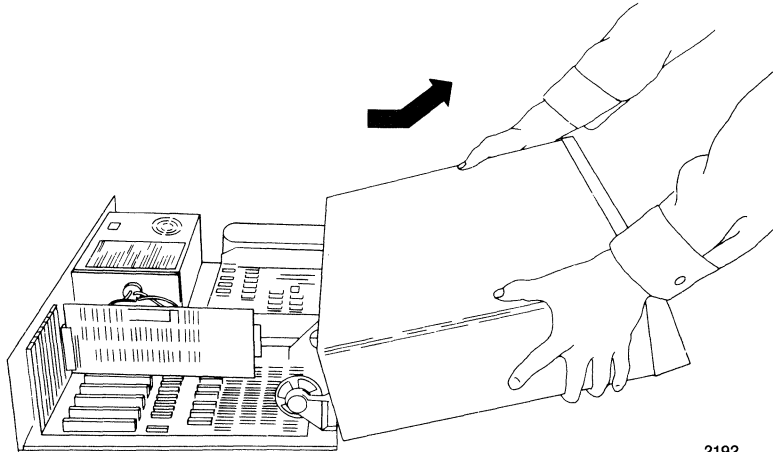


Figure C-4 Tilting Up the PC Cover

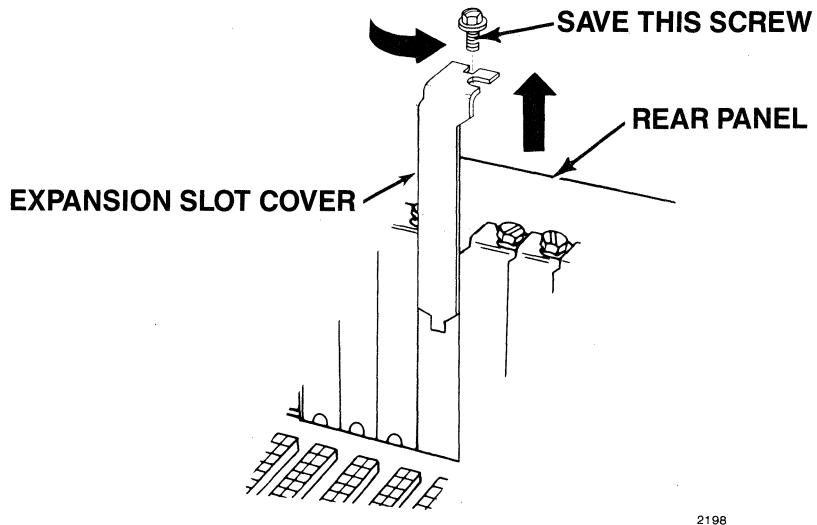
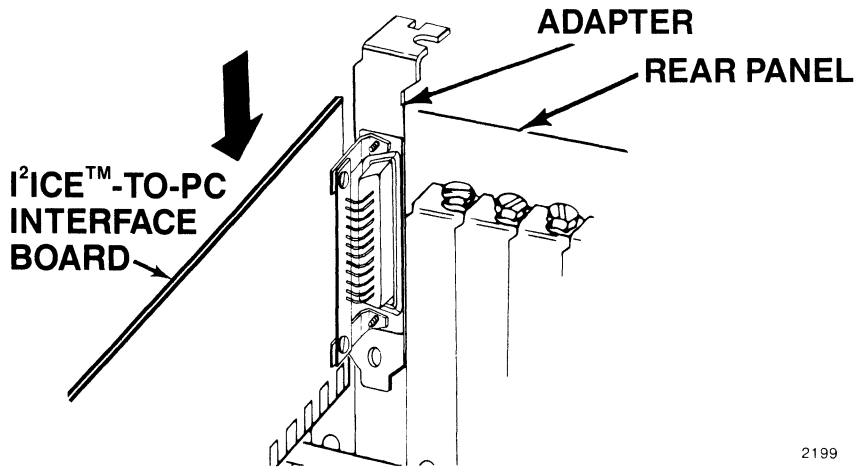


Figure C-5 Removing the Expansion Slot Cover

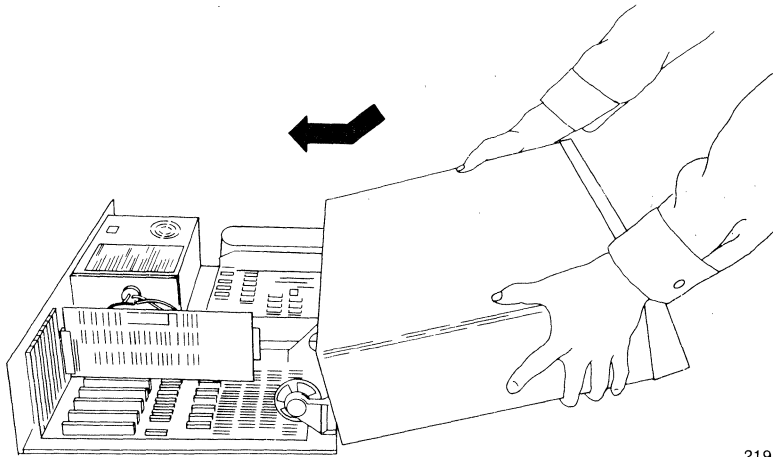


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Figure C-6 Installing the I²ICE™-to-PC Interface Board

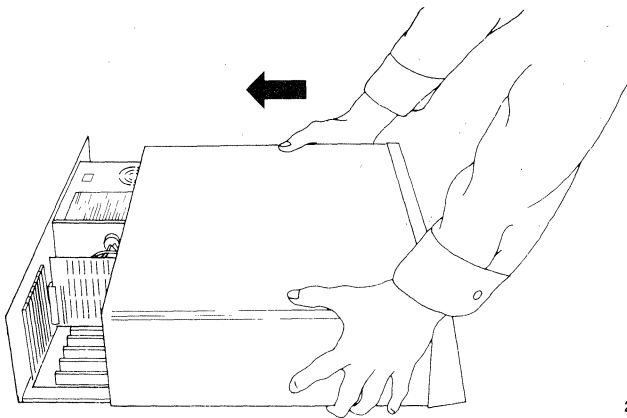
9. Replace the PC's cover (and for the PC/AT, the back panel).
 - a. Position the cover so that the back of the cover is on the front of the PC unit and the front of the cover is tilted up (see Figure C-7).
 - b. Lower the front of the cover as you slide the cover toward the rear of the PC unit (see Figure C-8).
 - c. Replace the back panel on the PC/AT using the plastic fastener strips.
10. Reconnect cables and plug in the power cord.

You are now ready to connect your PC to an I²ICE instrumentation chassis.



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Figure C-7 Positioning the PC Cover



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Figure C-8 Sliding On the PC Cover

Connecting the I²ICE™ System Instrumentation Chassis to the Host

The I²ICE system cables consist of a single host-chassis cable (supplied with the host interface board) and up to three inter-chassis cable sets, depending on the number of instrumentation chassis in your I²ICE system. Refer to Figures C-9 and C-10 when installing the system cables.

CAUTION

The I²ICE system supports a maximum 50 feet (15.2 meters) of system cables. Ensure that the combination of host-chassis and inter-chassis cable lengths does not exceed 50 feet.

For single-chassis I²ICE systems perform the following steps:

1. Plug the D-ribbon end of the host-chassis cable into the slot marked ICE-LINK IN on the I²ICE system back panel (Figure C-9). Tighten the two captive screws.
2. Plug the 62-pin connector end of the host-chassis cable into the 62-pin connector on the I²ICE-to-PC interface board.

For multiple-chassis I²ICE systems perform the following steps:

1. Plug the D-ribbon end of the host-chassis cable into the slot marked ICE-LINK IN on the I²ICE system back panel (Figure C-10). Tighten the two captive screws.
2. Plug the 62-pin connector end of the host-chassis cable into the 62-pin connector on the I²ICE-to-PC interface board.
3. Install an inter-chassis cable set between each successive instrumentation chassis in the I²ICE system. Secure the cable ground wires to the chassis ground lugs, if present. Figure C-10 shows the proper cabling.

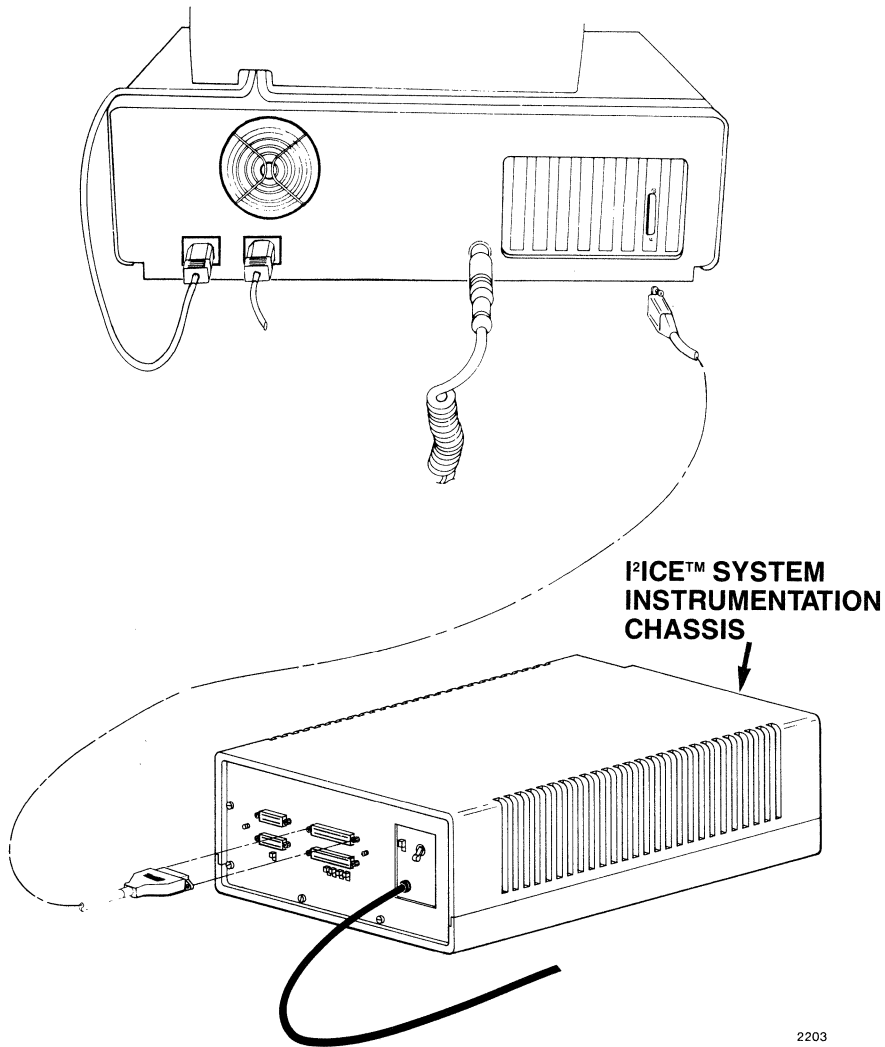


Figure C-9 Cabling Between the I²ICE™-to-PC Interface Board and the I²ICE™ System Instrumentation Chassis

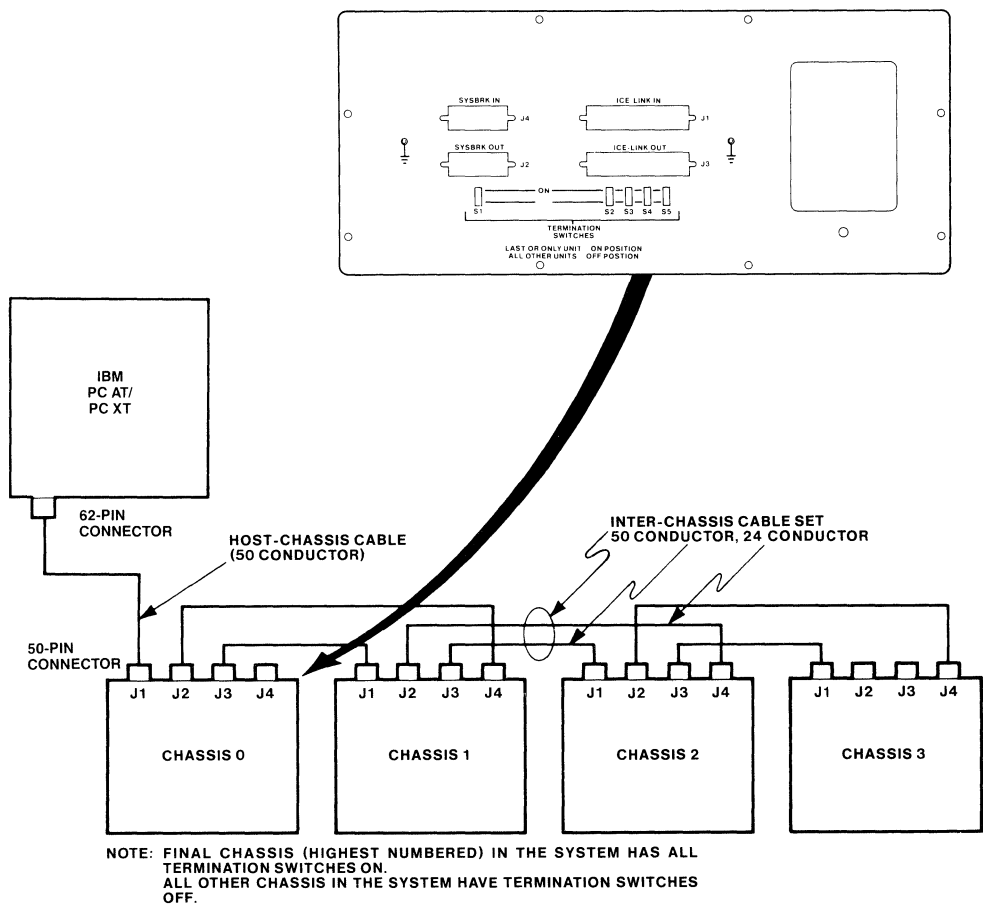


Figure C-10 I²ICE™ System Cable Installation

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Final Hardware Installation Steps

Before running the confidence tests and installing the I²ICE system software, give the hardware a final check, as follows:

1. Verify that the host interface board and the boards installed in the instrumentation chassis are securely seated in the proper board slots.
2. Verify that all host-chassis and inter-chassis cabling is properly routed and the cable connectors are seated and secured to the correct sockets (see Figure C-10).

3. Verify that the user cable is correctly oriented in the loopback mode on the buffer box.
4. Verify that all cable connections between the PC and the instrumentation chassis and between the instrumentation chassis and the buffer box are correct and that any required cable clamps are installed.
5. Verify that the correct preparations have been made to connect the I²ICE system to line power.
6. Install a front panel on each chassis in your I²ICE system and secure the panel using the supplied fasteners.
7. Switch the circuit breaker on the rear panel of each instrumentation chassis in the I²ICE system to ON.
8. Switch on the power to the PC.

The I²ICE system is now ready to run the I²ICE confidence tests.

The I²ICE™ Confidence Tests

The I²ICE confidence tests check the operation of the I²ICE system. Run the confidence tests after installation and whenever you suspect that the I²ICE system is not operating properly.

Separate sections are provided on the following topics:

- Invoking the Confidence Tests
- Running the Confidence Tests
- Controlling Confidence Test Display and Execution
- List of Confidence Tests

Invoking the Confidence Tests

Before running the confidence tests, ensure that the user cable is plugged into the top of the buffer box. If you are testing an emulation clips module, connect the logic clips line as shown in Figure C-11.

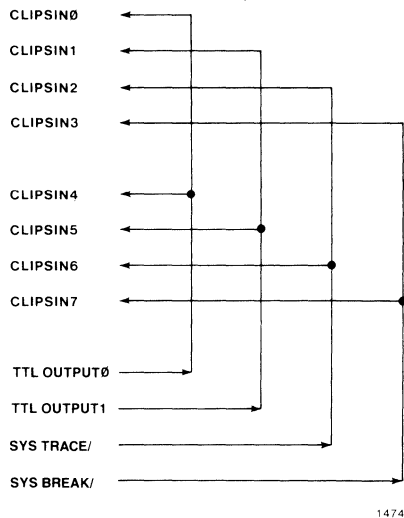


Figure C-11 Emulation Clips Lines Connections for the Confidence Tests

Once the operating system (DOS) has been invoked, insert the diagnostic disk into an available drive (the example assumes drive A). If you have one I²ICE probe, invoke the confidence tests by using the appropriate commands from the following list. (The prompts shown in the example assume that you have set your PC prompt using the command PROMPT = \$P\$G.)

Probe	Commands
8086/8088	C : / > a: <Enter> A : / > ICT086 <Enter>
80186/80188	C : / > a: <Enter> A : / > ICT186 <Enter>
80286	C : / > a: <Enter> A : / > ICT286 <Enter>

If you have more than one probe connected, run confidence tests for each probe. To select a probe for testing, place the number of the probe after the confidence test name. (The probe numbers are 0, 1, 2, and 3. The number 0 is for the probe that has its instrumentation chassis connected directly to the PC.) For example, if you wish to run confidence tests for an 80186/80188 probe that is the second probe (i.e., unit 1), you would place the disk containing the 80186/80188 confidence tests in the PC drive and use the following command:

```
C : / > a: <Enter>
A : / > ICT186 1 <Enter>
```

Running the Confidence Tests

After the confidence test software loads, the following display appears on the host development system screen:

```
system-id I2ICE-xxx Confidence Test Vx.y  
Copyright 1984, Intel Corporation
```

Enter the following command to start the confidence tests:

```
TEST <Enter>
```

The confidence tests take approximately five minutes to complete. If all tests pass, the prompt appears, and you are ready to install the I²ICE software. Enter the following command to return to the PC-DOS operating system:

```
EXIT <Enter>
```

Then enter the following command to change back to your hard disk:

```
A : / > c: <Enter>
```

If an individual confidence test causes a hang (i.e., within two minutes the test does not conclude with PASSED or FAILED), correct the hang by entering a CTRL-BREAK. Type RESET <Enter> after entering CTRL-BREAK to synchronize the processors.

The I²ICE confidence test package has the following three message types.

- Test name—describes the function being tested.
- Status message—describes events or intermediate results within the test currently running.
- Error message—describes a detected fault.

If any of the confidence tests fail, you can obtain a list of the failing tests by entering the following command:

```
SUMMARY EO <Enter>
```

Contact your Intel field service representative or the Intel product service center if your I²ICE system does not pass the confidence tests.

While your system is being tested, examine the next two subsections to learn more about the confidence tests that you receive with I²ICE software. Then, after your system passes the tests, go to the Software Installation section, which explains how to install I²ICE software on your IBM PC.

Controlling Confidence Test Display and Execution

Commands for sequencing tests, looping, and printing information combined with the DEBUG and ERRONLY flags control the test environment. Table C-1 lists commands that control the I²ICE confidence tests.

Table C-1 I²ICE™ System Confidence Test Commands

Command	Description
<u>/* ... */</u>	Allows comments between /* and */.
<u>CLEAR</u>	Clears error counts.
<u>DESCRIBE</u>	Displays the test names.
<u>IGNORE</u> <i>m TO n</i>	Skips execution of a block of tests (numbers <i>m TO n</i>).
<u>LIST</u> ' <i>pathname</i> '	Saves screen display to a file.
<u>RECOGNIZE</u> <i>m TO n</i>	Cancels the effect of IGNORE on a block of tests (numbers <i>m TO n</i>) or on any individual test.
<u>RESET</u>	Returns the hardware and software to a known state.
<u>RESET HARDWARE</u>	Returns the hardware to a known state.
<u>RESET SOFTWARE</u>	Returns the software to a known state.
<u>SUMMARY</u> [EO <i>m TO n</i>]	Summarizes which tests passed and failed. SUMMARY EO lists just the failing tests. SUMMARY <i>m TO n</i> lists just the specified tests.
<u>TEST</u> [<i>m TO n</i>]	Runs all the confidence tests. TEST <i>m TO n</i> runs a block of tests (numbers <i>m TO n</i>).

Note: Commands are underlined to show acceptable abbreviations.

By default, the I²ICE confidence tests provide the test name and a PASS/FAIL message. You can request more information by setting the software flags DEBUG and ERRONLY. Table C-2 shows how the confidence tests interpret the DEBUG and ERRONLY flags. To display the current values for these flags, enter the following command (} is the diagnostic prompt):

```

} QUERY
DEBUG=0000
ERRONLY=0000
    
```

Table C-2 The DEBUG and ERRONLY Flags

DEBUG	ERRONLY	Description
0	0	Prints all test names; prints PASS/FAIL messages. The default is 00.
1	0	Prints all test names; prints all status and error messages.
0	1	Prints only the names of those tests that failed; prints no status or error messages.
1	1	Prints only the names of those tests that failed; prints error messages.

Change the DEBUG and ERRONLY flags by resetting their values. For example, the following command changes the DEBUG flag to TRUE:

```

DEBUG = 1
    
```

(You can also use RESET to clear these flags.)

List of Confidence Tests

Table C-3 lists the individual confidence tests.

Table C-3 The I²ICE™ System Confidence Tests

Test Number	Test Name
0000H	Ignored
0001H	ACK time-out
0002H	System configuration
0003H	ICE-LINK data paths
0004H	Slushware RAM
0005H	Probe initialization
0006H	Probe ID
0007H	Probe start
0008H	Probe address/data
0009H	Host/probe communications
000AH	Slushware loader
000BH	Communications exerciser
000CH	Probe CPU instruction set
000DH	Memory map RAM
000EH	I/O map RAM
000FH	High-speed memory map RAM
0010H	High-speed RAM
0011H	Probe memory time-out
0012H	Probe I/O time-out
0013H	Probe bus time-out
0014H	Ignored
0015H	Ignored
0016H	Software interrupt
0017H	High-speed memory emulation
0018H	Ignored
0019H	Single step
001AH	86/88 and 186/188: Hardware stack pointer 286: Hardware register dump area
001BH	Wait-state generator
001CH	Host disk mapping
001DH	Host I/O mapping
001EH	Guarded access mapping
001FH	Read-only mapping
0020H	Probe self-test
0021H	86/88: 8087 execution 186/188: Internal timer interrupt 286: Execution state machine RAM
0022H	86/88 and 186/188: Execution state machine RAM 286: Execution word recognizer RAM
0023H	86/88 and 186/188: Execution word recognizer RAM 286: Execution word recognizer decoding
0024H	86/88 and 186/188: Execution word recognizer decoding 286: Bus state machine
0025H	86/88 and 186/188: Bus state machine RAM 286: Bus word recognizer RAM

Table C-3 The I²ICE™ System Confidence Tests (continued)

Test Number	Test Name
0026H	86/88 and 186/188: Bus word recognizer RAM 286: Bus word recognizer decoding
0027H	86/88 and 186/188: Bus word recognizer decoding 286: Execution breakpoint
0028H	86/88 and 186/188: Execution breakpoint 286: Bus breakpoint
0029H	86/88 and 186/188: Bus breakpoint 286: Execution bus breakpoint
002AH	86/88 and 186/188: Execution bus breakpoint 286: Trace counter
002BH	86/88 and 186/188: Trace counter 286: Trace on/off
002CH	86/88 and 186/188: Trace on/off 286: Trace buffer RAM part 1
002DH	86/88 and 186/188: Trace buffer RAM part 1 286: Trace buffer RAM part 2
002EH	86/88 and 186/188: Trace buffer RAM part 2 286: Trace buffer RAM part 3
002FH	86/88 and 186/188: Trace buffer RAM part 3 286: Execution delay counter
0030H	86/88 and 186/188: Execution delay counter 286: Bus delay counter
0031H	86/88 and 186/188: Bus delay counter 286: Time-tag counter
0032H	86/88 and 186/188: Time-tag counter 286: System bus
0033H	86/88 and 186/188: System bus 286: Logic clips
0034H	86/88: Coprocessor word recognition 186/188: Status word recognition 286: Local reset
0035H	86/88 and 186/188: Logic clips
0036H	86/88 and 186/188: Optional high-speed memory
0037H	86/88 and 186/188: Verify slushware 286: Optional high-speed memory
0038H	86/88 and 186/188: User interface exerciser*
0039H	86/88 and 186/188: User emulation*
003AH	86/88 and 186/188: Host-probe utilities

*The user interface exerciser test and user emulation test assume that the target system has RAM at addresses 0 to 221H.

Software Installation

By default, the PC-DOS operating system allows only eight files to be opened concurrently. Before invoking the I²ICE software, for I²ICE system efficiency, it is recommended that you change the maximum number of files that can be opened concurrently by adding the following to the CONFIG.SYS file:

```
buffers = 20  
files = 20
```

The I²ICE software is divided into three parts: the host software, the probe software, and the tutorial software. The host software and tutorial software are each sent on two disks; the probe software for a particular probe is sent on one disk. Use the following directions to install the I²ICE software.

1. **Create A New Directory.** Use the PC-DOS operating system, version 3.0 or later, to make a directory on the hard disk. Then change to that directory. For example, for a directory named ICEDIR, enter the following commands (examples assume PROMPT = \$P\$G):

```
C : / > mkdir icedir <Enter>  
C : / > cd icedir <Enter>
```

2. **Copy Host Software.** Once the directory has been created, copy the I²ICE host software to the directory by inserting each host software disk into drive A: and typing

```
C : / ICEDIR > copy a:*. * <Enter>
```

The following files comprise the I²ICE system software:

```
I2ICE.EXE  Host base software [HOST disk]  
I2ICE.OVE  Error files  
I2ICE.OVH  Help files [HELP/ERROR disk]
```

3. **Copy Probe Software.** Copy the appropriate probe software to the directory. Type

```
C : / ICEDIR > copy a:*. * <Enter>
```

The probe software filenames for the I²ICE probes are

```
I2ICE.086  8086/8088 probe  
I2ICE.186  80186/80188 probe  
I2ICE.286  80286 probe
```

To copy the tutorial software, proceed to step 4. (Intel recommends that you use the on-line I²ICE tutorial to become acquainted with I²ICE commands and capabilities; however, if you do not wish to use the I²ICE tutorial software, skip step 4 and go to step 5.)

4. **Copy Tutorial Software.** There are two tutorial disks; together they contain more than 100 tutorial files. Copy all the I²ICE tutorial files to the directory by inserting one tutorial disk into drive A: and typing

```
C : / ICEDIR > copy a:*. * <Enter>
```

Repeat the process until all the files on the second disk have been copied.

NOTE

When the command "I2ICE" is entered, the I²ICE software looks for a macro file called I2ICE.MAC. When I2ICE resides in the same directory as I2ICE.EXE, commands in the macro file are used to set options for running the I²ICE system. The I2ICE.MAC file supplied with the tutorial causes tutorial software to be loaded with I²ICE software.

You may design the I2ICE.MAC file in any way to assist you; however, to use the tutorial, the I2ICE.MAC file that you use must contain the I²ICE commands that are provided in the I2ICE.MAC file on the tutorial disk. Then, when the I2ICE command is entered, both the I²ICE system software and the tutorial software are loaded.

5. **Invoke I²ICE Software.** Execute the I²ICE software and the tutorial software (if you loaded it in step 4) from ICEDIR as follows:

```
C : /ICEDIR> i2ice <Enter>
```

A more general form of the I²ICE invocation command is the following:

```
[pathname]I2ICE
```

Where:

pathname is the qualification needed to reach the I2ICE software. The *pathname* syntax for the IBM PC/AT and PC/XT is described in the Pathname section of the *I²ICE™ System Reference Manual*.

I²ICE invokes the I²ICE software.

The I2ICE entry in the *I²ICE™ System Reference Manual* describes the I2ICE command in detail, including invocation options.

NOTE

Do not use the & delimiter in the invocation path (i.e., do not use & as part of a file name or directory name, and do not use & elsewhere in the invocation line). For example, because it contains the & delimiter as part of a directory name, the following invocation line is invalid:

```
C : /1> ice&dir/i2ice
```

6. The screen will respond with the following messages:

```
DOS I2ICE Vn.m  
Copyright 1983, 1984, 1985 INTEL CORPORATION  
n86 PROBE Vx.y
```

7. If you did not load the tutorial software, you will see the I²ICE prompt (*). The I²ICE software is now loaded and ready to use. If you did load the tutorial software, after approximately 5 seconds, the screen clears and displays the following question:

DO YOU WANT TO USE THE I²ICE TUTORIAL? (Y OR N)

8. Typing a "y" causes the screen to print information about the tutorial.
9. The final direction asks you to type "TUTOR".

When you have typed TUTOR <Enter>, the message "TUTORIAL FILES ARE NOW BEING LOADED" appears on the screen. While you wait for the rest of the tutorial software to load (approximately 30 seconds), turn to Chapter 2 of this manual (the *I²ICE™ System User's Guide*) for information about the tutorial contents.



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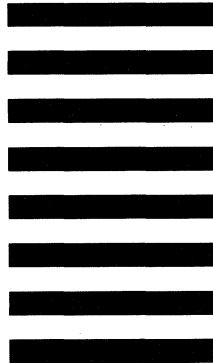
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