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April 1st, 2010
Renesas Electronics Corporation

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Renesas Technology Corp.
Customer Support Dept.
April 1, 2003

User's Manual

E8000 SH7729/SH7709A Emulator

Diagnostic Program Manual

Renesas Electronics
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Preface

Thank you for purchasing the E8000 emulator for Hitachi's original microcomputer SH7729/SH7709A.

The diagnostic program automatically checks whether the E8000 emulator is operating correctly.
Read this manual and understand it before using the diagnostic program.

IMPORTANT INFORMATION

READ FIRST

- **READ this user's manual before using this evaluation chip board (hereafter referred to as the EV-chip board) for Hitachi microcomputer HD6417729 or HD6417709A.**

- **KEEP the user's manual handy for future reference.**

Do not attempt to use the EV-chip board until you fully understand its mechanism.

EV-Chip Board:

Throughout this document, the term "EV-chip board" shall be defined as the following products produced only by Hitachi, Ltd. excluding all subsidiary products.

- EV-chip board
- Device control board

The user system or a host computer is not included in this definition.

Purpose of the EV-Chip Board:

This EV-chip board is a software and hardware development tool for systems employing the Hitachi microcomputer HD6417729 or HD6417709A (hereafter referred to as SH7729/SH7709A). The E8000 emulator and the user system can be connected through the EV-chip board. This EV-chip board must only be used for the above purpose.

Improvement Policy:

Hitachi, Ltd. (including its subsidiaries, hereafter collectively referred to as Hitachi) pursues a policy of continuing improvement in design, performance, and safety of the EV-chip board. Hitachi reserves the right to change, wholly or partially, the specifications, design, user's manual, and other documentation at any time without notice.

Target User of the EV-Chip Board:

This EV-chip board should only be used by those who have carefully read and thoroughly understood the information and restrictions contained in the user's manual. Do not attempt to use the EV-chip board until you fully understand its mechanism.

It is highly recommended that first-time users be instructed by users that are well versed in the operation of the EV-chip board.

LIMITED WARRANTY

Hitachi warrants its EV-chip boards to be manufactured in accordance with published specifications and free from defects in material and/or workmanship. Hitachi, at its option, will repair or replace any EV-chip boards returned intact to the factory, transportation charges prepaid, which Hitachi, upon inspection, determine to be defective in material and/or workmanship. The foregoing shall constitute the sole remedy for any breach of Hitachi's warranty. See the Hitachi warranty booklet for details on the warranty period. This warranty extends only to you, the original Purchaser. It is not transferable to anyone who subsequently purchases the EV-chip board from you. Hitachi is not liable for any claim made by a third party or made by you for a third party.

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Some states do not allow the exclusion or limitation of implied warranties or liability for incidental or consequential damages, so the above limitation or exclusion may not apply to you. This warranty gives you specific legal rights, and you may have other rights which may vary from state to state.

The Warranty is Void in the Following Cases:

Hitachi shall have no liability or legal responsibility for any problems caused by misuse, abuse, misapplication, neglect, improper handling, installation, repair or modifications of the EV-chip board without Hitachi's prior written consent or any problems caused by the user system.

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Other Important Things to Keep in Mind:

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Figures:

Some figures in this user's manual may show items different from your actual system.

Limited Anticipation of Danger:

Hitachi cannot anticipate every possible circumstance that might involve a potential hazard. The warnings in this user's manual and on the EV-chip board are therefore not all inclusive. Therefore, you must use the EV-chip board safely at your own risk.

SAFETY PAGE

READ FIRST

• READ this user's manual before using this EV-chip board.

• KEEP the user's manual handy for future reference.

Do not attempt to use the EV-chip board until you fully understand its mechanism.

DEFINITION OF SIGNAL WORDS

This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

⚠ DANGER **DANGER** indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

⚠ WARNING **WARNING** indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

⚠ CAUTION **CAUTION** indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

CAUTION **CAUTION** used without the safety alert symbol indicates a potentially hazardous situation which, if not avoided, may result in property damage.

NOTE emphasizes essential information.

⚠ WARNING

Observe the precautions listed below. Failure to do so will result in a FIRE HAZARD and will damage the user system and the EV-chip board or will result in PERSONAL INJURY. The USER PROGRAM will be LOST.

1. **Always switch OFF the EV-chip board and user system before connecting or disconnecting any CABLES or PARTS.**
2. **Always before connecting, make sure that pin 1 on both sides is correctly aligned.**

Warnings on EV-Chip Board Usage

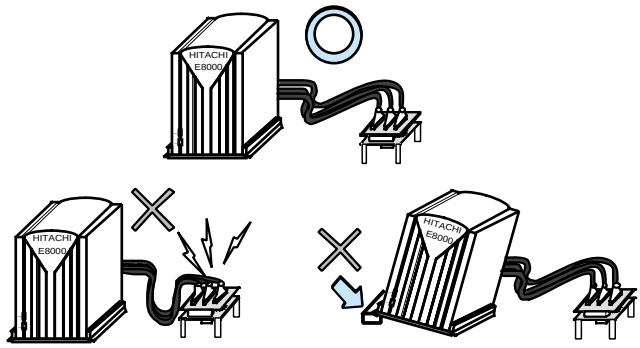
Warnings described below apply as long as you use the EV-chip board. Be sure to read and understand the warnings below before using the EV-chip board. Note that these are the main warnings, not the complete list.

⚠ WARNING

Always switch OFF the EV-chip board and user system before connecting or disconnecting any CABLES or PARTS. Failure to do so will result in a FIRE HAZARD and will damage the user system and the EV-chip board or will result in PERSONAL INJURY. The USER PROGRAM will be LOST.

CAUTION

Place the emulator station and EV-chip board so that the cable is not bent or twisted. A bent or twisted cable will impose stress on the user interface leading to connection or contact failure. Make sure that the emulator station is placed in a secure position so that it does not move during use nor impose stress on the user interface.



Contents

Section 1 Overview

1.1 Purpose

This diagnostic program is used to automatically troubleshoot and maintain an SH7729 E8000 emulator hardware system.

The diagnostic program is on a 3.5-type floppy disk (HS7729EDD81SF). When an error occurs, execute the diagnostic program according to section 4, Diagnostic Program Operation Procedure.

This program supports both the SH7729 EV-chip board and the SH7709A EV-chip board (hereinafter referred to as the SH7729/SH7709A EV-chip board).

CAUTION

1. **This diagnostic program is not capable of finding all failures possible to occur in the E8000 emulator.**
2. **If execution results of the diagnostic program indicate a failure in the E8000 emulator, inform a Hitachi sales agency of the test results in detail.**
3. **Hitachi makes no warranties for an E8000 emulator that has been taken apart, repaired, or remodeled by the user based on the test results of the diagnostic program.**
4. **In addition to this diagnostic program, run the emulator internal system test described in section 5, Troubleshooting, in the SH7729 E8000 Emulator User's Manual (HS7729EDD81HE).**

Section 2 Configuration

2.1 Test System Configuration

Components required for diagnostic program execution are shown in table 2.1, and the test system configuration is shown in figure 2.1.

Table 2.1 Test System Components

Components		Remarks
E8000 emulator (HS8000EST02H)	Control board (HS8000PWB81H)	Always necessary
	Device control board (HS7729EDD81H)	Always necessary
	Trace board (HS8000PWB82H)	Always necessary
	PC I/F board (HS8000PWB85H)	Always necessary
	LAN board (HS7000ELN01H or HS7000ELN02H)	Depends on user system configuration
EV-chip board (HS7729EBH81H or HS7709AEBH81H)		Always necessary
Serial interface cable (RS232C)		Always necessary
Bidirectional parallel interface cable (P1284)		Optional
Personal computer (DOS/V machine)		Always necessary
System floppy disk (HS7729EDD81SF) (Host interface software (IPW) included)		Always necessary
Printer		Optional

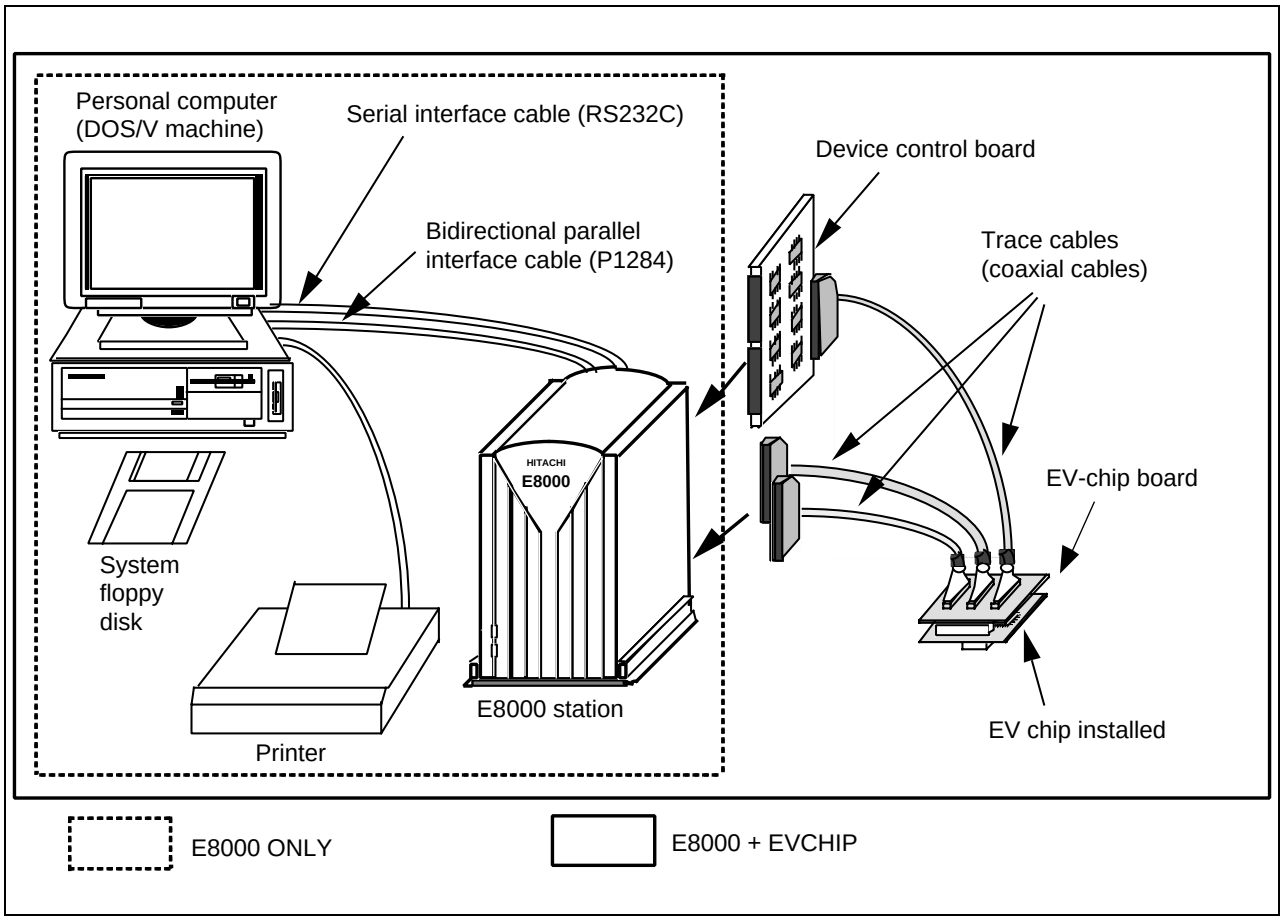


Figure 2.1 Test System Configuration

Section 3 Diagnostic Program Function

3.1 General Description

The diagnostic program has three test-system configurations: E8000 ONLY test and E8000 + EVCHIP test (which are independent E8000 emulator system tests) and E8000 + EVCHIP + FIXED USER test. Note that the E8000 + EVCHIP + FIXED USER test cannot be executed, for it is the E8000 emulator system test at shipment and needs an additional system for testing.

CAUTION
Before executing an independent E8000 emulator system test, remove the EV-CHIP BOARD from the USER SYSTEM. Correct test results cannot be obtained when the E8000 emulator is still connected to the user system.

Independent E8000 Emulator System Test (E8000 ONLY):

The system configuration shown in figure 2.1 is used for testing the independent E8000 emulator system. The test results are displayed on the personal computer display. After start-up, the system enters an endless test loop without operator intervention until an error is detected. When an error occurs and ERROR CONTINUE is not specified, the test is terminated. If ERROR CONTINUE is specified, the test resumes execution after an error content display. When initiating the diagnostic program, select whether to execute the following tests:

- Operation tests
- Serial interface test
- P1284 interface test
- LAN board (optional) test

Test of E8000 Emulator, SH7729 Device Control Board, and SH7729/SH7709A EV-Chip Board (E8000 + EVCHIP):

The system configuration shown in figure 2.1 is used for testing the E8000 emulator, and the SH7729 device control board and SH7729/SH7709A EV-chip board for the E8000 emulator. The test results are displayed on the personal computer display. After start-up, the system enters an endless test loop without operator intervention until an error is detected. When an error occurs and ERROR CONTINUE is not specified, the test is terminated. If ERROR CONTINUE is specified, the test resumes execution after an error content display. When initiating the diagnostic program, select whether to execute the following tests:

- Operation tests
- Serial interface test
- P1284 interface test
- LAN board (optional) test

Notes:
1. **When all test items are executed once, press the (CTRL) + C keys and interrupt the test.**
2. **The P1284 interface and serial interface tests require additional circuits. Prepare the necessary circuits according to the diagrams in section 6, Testing Circuits and Connectors, before selecting the P1284 interface and serial interface tests.**
3. **The LAN board must be installed in the E8000 station and connected to LAN when performing the LAN board (optional) test.**

3.2 Test Items

Test items are listed in table 3.1. The test items to be executed depend on the test system configuration.

Table 3.1 Diagnostic Program Test Items

			Executed or Not	
No.	Test Item	Description	E8000 ONLY	E8000 + EVCHIP
TEST01	FLASH MEMORY READ TEST	Control board flash memory test	O	O
TEST02	CONT WORK RAM TEST	Control board work RAM test	O	O
TEST03	SHARED RAM TEST	Trace board RAM test	O	O
TEST04	FIRM RAM TEST	Firmware RAM test	O	O
TEST05	OPTION I/F TEST	Optional host computer I/F DPRAM test	O	O
TEST06	LAN I/F TEST	LAN board interface test	Δ	Δ
TEST07	P1284 I/F TEST	Bidirectional parallel interface test	Δ	Δ
TEST08	SCI TEST	Serial interface test	Δ	Δ
TEST09	JTAG TEST	JTAG controller function test	O	O
TEST10	CONT REG. TEST	Control board register test	O	O
TEST11	IDR READ TEST	E8000 hardware configuration check	O	O
TEST12	DIP SWITCH TEST	Control board DIP switch test	Δ	Δ
TEST13	TRACE REG. TEST	Trace board register test	O	O
TEST14	TRACE RAM TEST	Trace board RAM test	O	O
TEST15	PARALLEL RAM TEST	Parallel RAM test	O	O
TEST16	EBOX TEST	DCONT firmware and ID check	X	O
TEST17	ERAM WINDOW TEST	ERAM read/write test	X	O
TEST18	ERAM STEP TEST	ERAM step test	X	O
TEST19	ERAM HARD BREAK TEST1	ERAM hardware break test 1	X	O
TEST20	ERAM HARD BREAK TEST2	ERAM hardware break test 2	X	O
TEST21	ERAM SOFT BREAK TEST	ERAM software break test	X	O
TEST22	COMPULSORY BREAK TEST	CBR register break test	X	O
TEST23	ERAM TRACE TEST	ERAM trace mode test	X	O
TEST24	ERAM TIME MEASURE TEST	Time measurement function check	X	O
TEST25	ERAM PARALLEL MONITOR TEST	ERAM parallel monitor function test	X	O
TEST26	AUD TEST	AUD trace function test	X	O
TEST27	JTAG CONTROLER TEST	JTAG control test	X	O

Table 3.1 Diagnostic Program Test Items (cont)

No.	Test Item	Description	Executed or Not: E8000 ONLY	Executed or Not: E8000 + EVCHIP
TEST28	PORT TEST	Test for port pin multiplexed with other signals	X	O
TEST29	RTC TEST	RTC crystal oscillator function test	X	O

Notes: O: Executed without operator intervention
Δ: Executed when specified
X: Not executed

Note: If an error occurs and ERROR CONTINUE is not specified, displays an error message, stops test execution, and displays the following message:

Retry (Y/N) ?

If Y is entered, retests the test item wherein the error occurred.
If N is entered, displays the following message:

Continue (Y/N) ?

If Y is entered, quits testing the test item wherein the error occurred and goes on to the next test item.
If N is entered, displays the following message:

Abort (Y/N) ?

If Y is entered, resets the system software.
If N is entered, returns to the first message (Retry (Y/N) ?) and repeats the above procedure until Y is entered.

3.3 Operation Flowchart

Figure 3.1 shows the diagnostic program operation flowchart.

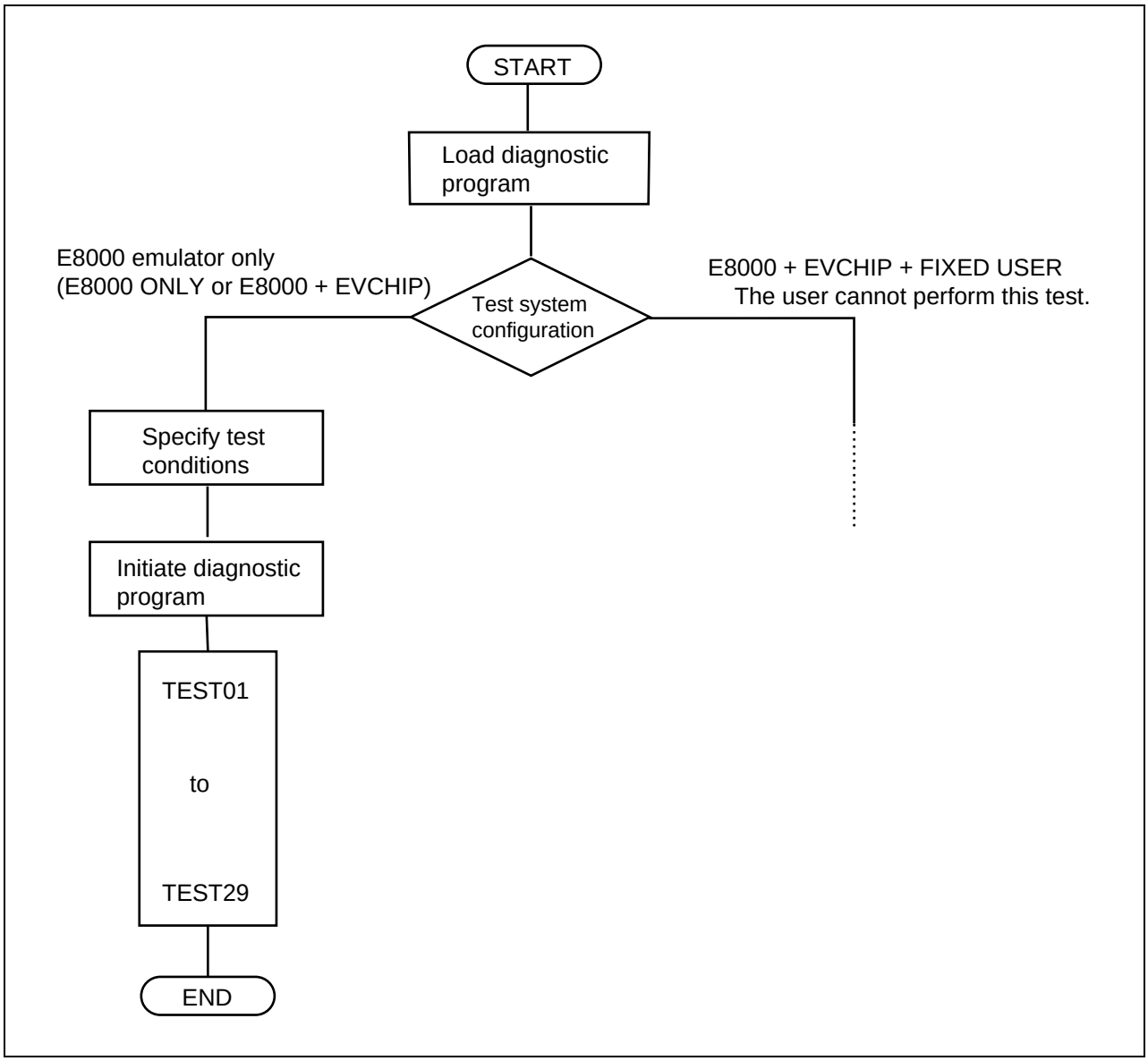


Figure 3.1 Diagnostic Program Operation Flowchart

Note: TEST06 is executed when the optional LAN board test is specified.
TEST07 is executed when the P1284 interface test is specified.
TEST08 is executed when the serial interface test is specified.
TEST12 is executed when the operation tests are specified.
TEST16 to TEST29 are not executed when the E8000 ONLY test is selected.

3.4 Procedure for Outputting to the Printer

The following describes the process for sending diagnostic program execution results to the printer using the E8000 emulator.

Diagnostic Program Output to Printer

```
START E8000
  S: START E8000
  F: FLASH MEMORY TOOL
  L: SET LAN PARAMETER
  T: START DIAGNOSTIC TEST
        (S/F/L/T) ?  >a:TM.LOG (RET)                    (a)
        (S/F/L/T) ?  t (RET)                            (b)
```

(Diagnostic program execution)

```
(CTRL) + C                                              (c)
>q (RET)                                                (d)

E8000 MONITOR Vn.m
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TESTING
 RAM    0123

START E8000
  S: START E8000
  F: FLASH MEMORY TOOL
  L: SET LAN PARAMETER
  T: START DIAGNOSTIC TEST
        (S/F/L/T) ?  >- (RET)                           (e)
```

Notes: 1. Underlined sections should be entered by the user.
2. (RET): RETURN key

Procedure to obtain the TM execution results:

(a) Enter the following command after the emulator monitor command prompt.

>a:TM.LOG (RET)

In the above example, a indicates drive a and TM.LOG indicates the file name.

Note: When selecting drive a, insert the floppy disk in the floppy disk drive before executing this command.

(b) Execute the diagnostic program.

(c) Press the (CTRL) + C keys after executing the diagnostic program.

(d) Enter the following command to return to the monitor command input wait state.

>q (RET)

(e) Enter the following command in the monitor command input wait state to terminate data output to the file.

>- (RET)

Printing out:

Open the file (TM.LOG) to which the diagnostic program execution results were output and output the data to a printer from the personal computer used. The file can be opened from the general editor of the personal computer used.

Section 4 Procedures

This section describes the diagnostic program operation procedure.

⚠ WARNING

Always switch OFF all devices before connecting or disconnecting the E8000 EMULATOR and OTHER DEVICES. Failure to do so will result in a FIRE HAZARD and will damage the E8000 emulator and other devices, or will result in PERSONAL INJURY.

The following describes the operation procedure when using the host interface software (IPW). When the diagnostic program is executed by using the ISA bus interface (PCI interface, PCMCIA interface, or LAN adapter is included), execute the program from the HDI. For HDI installation and diagnostic program operation, refer to sections 2 and 5 in the SH7729/SH7709A E8000 Hitachi Debugging Interface User's Manual.

Notes:
1. **To execute the diagnostic program, DIAG.SYS, E8000.SYS, SHCNF729.SYS, and SHDCT729.SYS must be installed in flash memory, according to the instructions in the SH7729 E8000 Emulator User's Manual (HS7729EDD81HE).**
2. **Before executing the diagnostic program, make sure the DIP switches have the same settings as at shipment (refer to figure 4.1).**

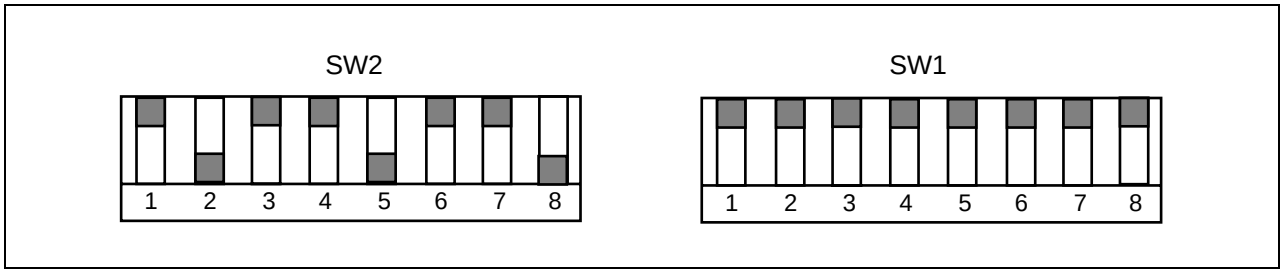

Figure 4.1 DIP Switch Setting at Shipment

4.1 Installation Procedure

To execute the diagnostic program, file DIAG.SYS must be installed in the E8000 emulator flash memory.
If the E8000 emulator is connected to the host computer via the bidirectional parallel interface, the diagnostic program can be loaded with the following procedure. Note that the system disk is assumed to be inserted in drive A of the host computer. It is assumed that E8000.SYS, SHCNF729.SYS, or SHDCT729.SYS has been installed. It takes approximately one minute.

Operations	Display Message
1. Initiate the IPW in the E8000 system floppy disk.	
2. Power on the E8000 emulator.	
3. Emulator monitor command prompt	START E8000 S:START E8000 F:FLASH MEMORY TOOL L:SET LAN PARAMETER T:START DIAGNOSTIC TEST (S/F/L/T) ? _
4. Enter F (RET) to initiate the flash memory management tool. The emulator displays prompt FM> and waits for a flash memory management tool command.	(S/F/L/T) ? F (RET) FM>
5. Enter SL (RET) to load the system program.	FM> SL (RET)
6. Enter 1 (RET) to select PC as the host computer type, and 2 (RET) to select parallel interface as the interface method.	SELECT LOAD No. (1:PC or 2:WS) ? 1 (RET) SELECT INTERFACE (1:RS-232C or 2:PARALLEL) ? 2 (RET)
7. Enter N (RET) to not load system program E8000.SYS.	LOAD E8000 SYSTEM FILE OK (Y/N) ? N (RET)
8. Enter N (RET) to not load configuration file SHCNF729.SYS.	LOAD CONFIGURATION FILE OK (Y/N) ? N (RET)
9. Enter N (RET) to not load firmware file SHDCT729.SYS.	LOAD FIRMWARE FILE OK (Y/N) ? N (RET)
10. Enter N (RET) to not load the ITRON debugger.	LOAD ITRON DEBUGGER FILE OK (Y/N) ? N (RET)

Operations	**Display Message**
11. Enter Y (RET) to allow the diagnostic program file DIAG.SYS to be loaded. Then enter the parallel transfer command to load DIAG.SYS in the current directory on the PC to the emulator flash memory.	LOAD DIAGNOSTIC FILE OK (Y/N) ? Y (RET) INPUT COMMAND : #B:A:/DIAG.SYS (RET) :COMPLETED
12. Enter DIR (RET) to check whether the necessary files have been loaded.	FM> DIR (RET) <FILE ID> <STATUS> SYS OK CONF OK LAN NO FIRM OK TRON NO DIAG OK INI OK MON OK
13. Enter Q (RET) to terminate the flash memory management tool.	FM> Q (RET) START E8000 S:START E8000 F:FLASH MEMORY TOOL L:SET LAN PARAMETER T:START DIAGNOSTIC TEST (S/F/L/T) ? _
14. Installation is completed.	

4.2 Operation Procedure

1. Correctly connect the following components.
   - E8000 emulator and personal computer (RS232C interface)
   - E8000 emulator and EV-chip board (when the E8000 + EVCHIP test is selected)

   For other components, check connection according to the user system configuration.

   Remove the EV-chip board from the user system.

2. Turn on the following power supplies.
   - Personal computer
   - E8000 emulator

   For other components, supply an appropriate voltage according to the user system configuration.

3. Start up the host interface software (IPW) on the personal computer.
   After the host interface software (IPW) is initiated, the E8000 emulator executes a self-diagnostic test which checks the internal RAM and the registers while displaying the starting message shown on the following page. For details, refer to section 5, Troubleshooting, in the SH7729 E8000 Emulator User's Manual (HS7729EDD81HE).

E8000 Emulator Starting Message

```
EMULATOR INTERFACE (HS8000EIW01SF) Vn.m
Copyright (C) Hitachi, Ltd. 1996
Licensed Material of Hitachi, Ltd.

E8000 MONITOR (HS8000EST02SR) Vn.m
Copyright (C) Hitachi, Ltd. 1995
Licensed Material of Hitachi, Ltd.

TESTING
 RAM    0123

START E8000
 S:START E8000
 F:FLASH MEMORY TOOL
 L:SET LAN PARAMETER
 T:START DIAGNOSTIC TEST
    (S/F/L/T) ?
```

Notes: 1. Underlined sections should be entered by the user. Both uppercase and lowercase letters are acceptable.
2. (RET): RETURN key

4. Load the diagnostic program according to the following procedure.

Loading Diagnostic Program

```
START E8000
 S:START E8000
 F:FLASH MEMORY TOOL
 L:SET LAN PARAMETER
 T:START DIAGNOSTIC TEST
    (S/F/L/T) ?  t (RET)

E8000 EMULATOR TEST & MAINTENANCE PROGRAM (DIAG.SYS)
 Version No.=x.xx   mm/dd/yyyy

 Copyright (C) Hitachi, Ltd. 1999
```

5. Specify the test condition.

When the diagnostic program is loaded and the following message is displayed on the personal computer, select the desired test conditions.

Test Condition Specifications

```
Please, key in TEST PARAMETER

OPERATION TEST EXECUTE (Y/N) ? N (RET)                          (a)
ERROR CONTINUE (Y/N) ? N (RET)                                  (b)
TEST MODE SELECT
  1. E8000 ONLY
  2. E8000 + EVCHIP
  3. E8000 + EVCHIP + FIXED USER
TEST MODE (1/2/3) ? 2 (RET)                                     (c)
DEVICE TYPE SH7729, SH7709A
RS232C LOOP CONNECTOR EXIST (Y/N) ? N (RET)                     (d)
P1284 LOOP CONNECTOR EXIST (Y/N) ? N (RET)                      (e)
OPTION LAN BOARD EXIST (Y/N) ? N (RET)                          (f)

 START (Y/N) ? Y (RET)                                          (g)
```

Description:

(a) Only for tests requiring operator intervention. Enter Y to execute the operation tests. Otherwise, enter N.
(b) Y: Test continues when an error occurs.
N: Test stops when an error occurs.
(c) 1: Independent E8000 emulator system test
2: E8000 emulator, device control board, and EV-chip board test
3: E8000 emulator system test at shipment — cannot be used.
(d) Enter Y to execute the serial interface test. Otherwise, enter N.
(e) Enter Y to execute the bidirectional parallel interface test. Otherwise, enter N.
(f) Enter Y to execute the optional LAN board test. Otherwise, enter N.
(g) The test starts by entering Y. If N is entered, the diagnostic program main title will be displayed again.

6. Execute the diagnostic program using the procedure shown in figure 3.1.
Execute each test item following the diagnostic program specifications. OK is displayed if a test is executed with no errors. An example of the E8000 + EVCHIP test is shown on pages 18 to 20.

7. For executing the bidirectional parallel interface test (TEST07)
   To execute the bidirectional parallel interface test, install the P1284 loop connector described in section 6.1, Testing Circuit for P1284 I/F Test (TEST07), onto the bidirectional parallel interface connector on the E8000 emulator before executing the diagnostic program. Perform the following operations while executing the bidirectional parallel interface test.

   Operation Procedures for TEST07 (P1284 I/F TEST):

   (1) Before executing the diagnostic program, install the P1284 loop connector, as shown in figure 4.2.

   (2) Enter Y to the following message at diagnostic program initiation:

```
P1284 LOOP CONNECTOR EXIST (Y/N) ? Y (RET)
```

   (3) When the diagnostic program is executed, the bidirectional parallel interface test will be executed without operator interventions. If no error occurs, the following messages are displayed:

```
TEST07 P1284 I/F TEST          (COUNT = 001)
     FIFO R/W TEST                OK
     PARALLEL INTERRUPT TEST      OK
```

8. For executing the serial interface test (TEST08)
   To execute the serial interface test, install the RS232C loop connector described in section 6.2, Testing Circuit for SERIAL I/F Test (TEST08), onto the serial interface connector on the E8000 emulator before executing the diagnostic program. Perform the following operations while executing the serial interface test.

   Operation Procedures for TEST08 (SERIAL I/F TEST):

   (1) Before executing the diagnostic program, install the RS232C loop connector, as shown in figure 4.2.

   (2) Enter Y to the following message at diagnostic program initiation:

```
RS232C LOOP CONNECTOR EXIST (Y/N) ? Y (RET)
```

   (3) When the diagnostic program is executed, the serial interface test will be executed without operator interventions. If no error occurs, the following message is displayed:

```
TEST08 SERIAL I/F TEST     (COUNT = 001)   OK
```

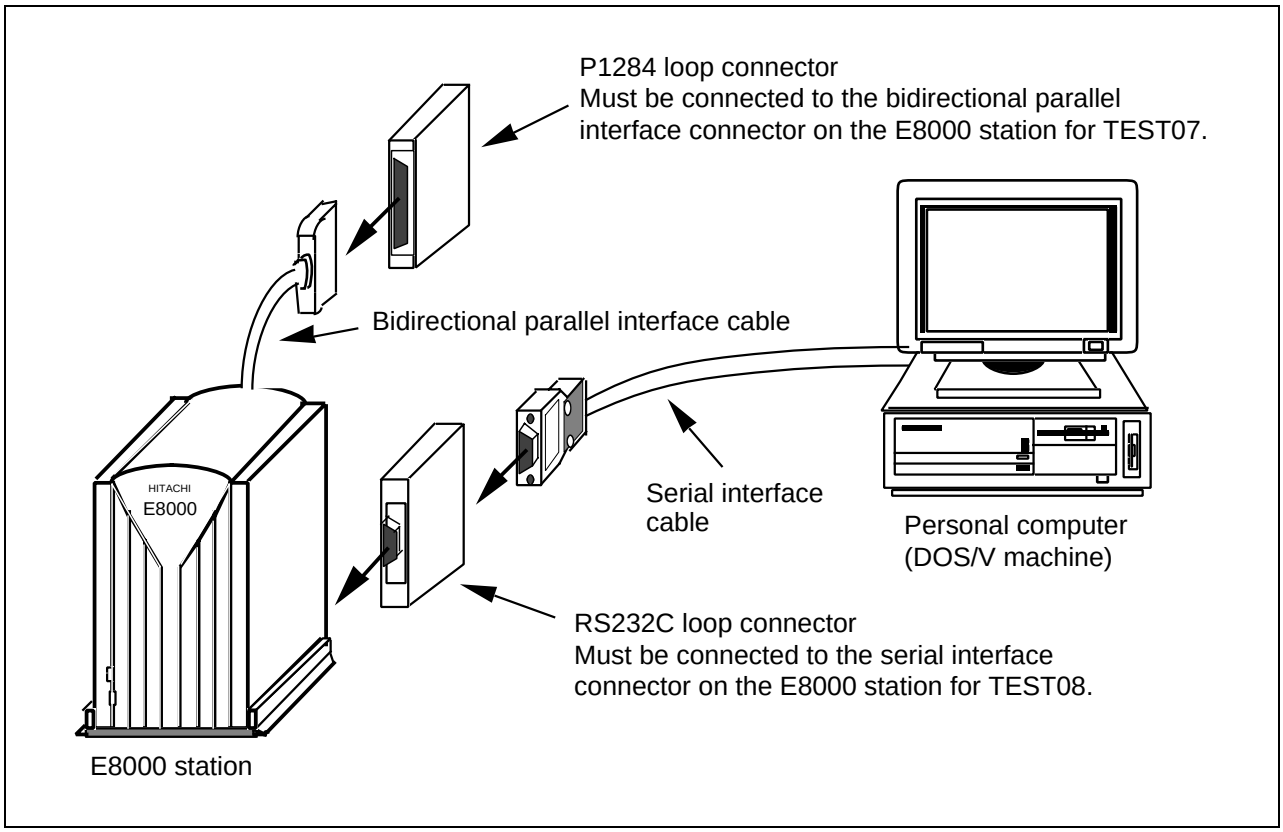

Figure 4.2 Loop Connector Installation

9. For executing the operation tests (TEST12)
   To execute the operation tests, operator interventions are required during diagnostic program execution. Perform the following operations while executing the operation tests.

Operation Procedures for TEST12 (DIP SWITCH TEST):

(1) Enter Y to the following message at diagnostic program initiation:

```
OPERATION TEST EXECUTE (Y/N)? Y (RET)
```

(2) When the diagnostic program is executed, the E8000 emulator will halt at the following message and wait for command input:

```
TEST12 DIP SW TEST              (COUNT = 001)
DIP SW1-2=0092
DIP SWITCH 1-2=5555   SET OK (Y/N)
```

(3) After setting the DIP switches as shown in figure 4.3 (1), enter Y.

(4) If no error occurs, the following message is displayed:

```
TEST OK
```

(5) The E8000 emulator will halt again at the following message:

```
DIP SWITCH 1-2=AAAA   SET OK (Y/N)
```

(6) After setting the DIP switches as shown in figure 4.3 (2), enter Y.

(7) If no error occurs, the following message is displayed:

```
TEST OK
```

(8) The E8000 emulator will halt again at the following message:

```
DIP SWITCH 1-2=0092   SET OK (Y/N)
```

(9) After setting the DIP switches as shown in figure 4.3 (3), enter Y.

(10) If no error occurs, the following message is displayed:

```
TEST OK
```

Note: (RET): RETURN key

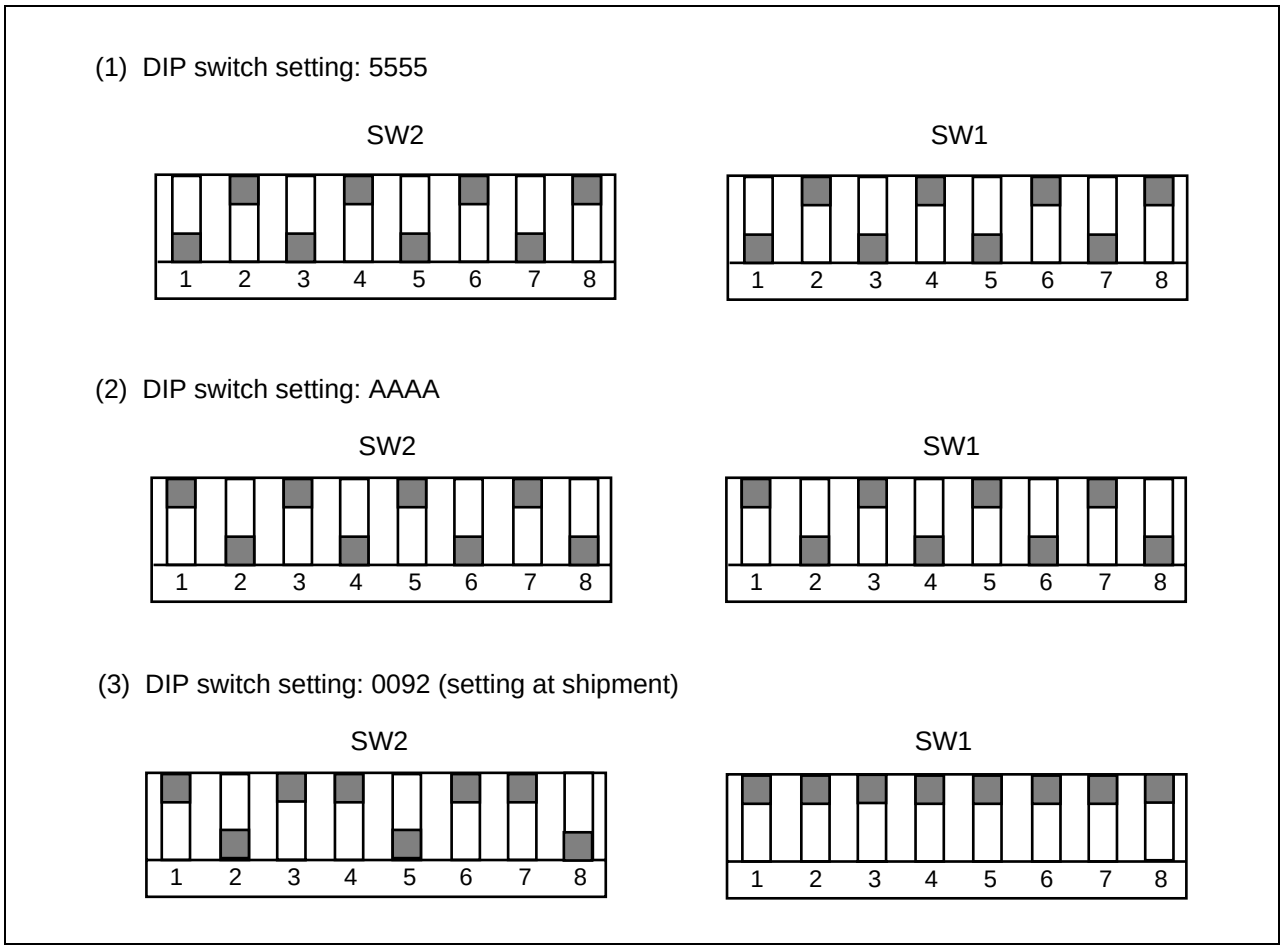

Figure 4.3 DIP Switch Settings

Diagnostic Program Output Example (E8000 + EVCHIP Test)

```
E8000 EMULATOR TEST & MAINTENANCE PROGRAM (DIAG.SYS)
 Version No. = x.xx     mm/dd/yyyy                (x.xx indicates the version number.)

 Copyright (C) Hitachi, Ltd. 1998
 Please, key in TEST PARAMETER

 OPERATION TEST EXECUTE (Y/N) ? N
 ERROR CONTINUE (Y/N) ? N
 TEST MODE SELECT
  1. E8000 ONLY
  2. E8000 + EVCHIP
  3. E8000 + EVCHIP + FIXED USER
 TEST MODE (1/2/3) ? 2
 DEVICE TYPE SH7729,SH7709A
 RS232C LOOP CONNECTOR EXIST (Y/N) ? N
 P1284 LOOP CONNECTOR EXIST (Y/N) ? N
 OPTION LAN BOARD EXIST (Y/N) ? N

 START (Y/N) ? Y

 TEST01 FLASH MEMORY READ TEST       (COUNT = 001)
  (1) MONITOR SUM CHECK       OK
  (2) SYSTEM SUM CHECK        OK
  (3) EVCHIP FIRM SUM CHECK   OK
  (4) CONFIG SUM CHECK        OK
  (5) T/M SUM CHECK           OK
  (6) LAN SUM CHECK
   NO LAN FILE
  (7) ITRON SUM CHECK
   NO TRON FILE
 TEST02 CONT WORK RAM TEST    (COUNT = 001)
  (1) PAUSE TEST        OK
  (2) MARCHING TEST     OK
 TEST03 SHARED RAM TEST       (COUNT = 001)
  (1) PAUSE TEST        OK
  (2) MARCHING TEST     OK
 TEST04 FIRM RAM TEST         (COUNT = 001)
  (1) PAUSE TEST        OK
  (2) MARCHING TEST     OK
 TEST05 OPTION I/F TEST       (COUNT = 001)
  (1) DPRAM PAUSE TEST        OK
```

Diagnostic Program Output Example (E8000 + EVCHIP Test) (cont)

```
  (2) DPRAM MARCHING TEST     OK
 TEST09 JTAG TEST             (COUNT = 001)     OK
 TEST10 CONT REG. TEST        (COUNT = 001)     OK
 TEST11 IDR READ TEST         (COUNT = 001)
  ID CODE = F8EE
  PC I/F BOARD        : DISCONNECT
  TRC BOARD           : CONNECT
  DCONT BOARD         : CONNECT
  EVCH BOARD          : CONNECT
  LAN BOARD           : DISCONNECT
 TEST13 TRACE REG. TEST       (COUNT = 001)     OK
 TEST14 TRACE RAM TEST        (COUNT = 001)
  (1) PAUSE TEST        OK
  (2) MARCHING TEST     OK
 TEST15 PARALLEL RAM TEST     (COUNT = 001)
  (1) PAUSE TEST        OK
  (2) MARCHING TEST     OK
 TEST16 EBOX TEST             (COUNT = 001)
  (1) EBOX ID CODE      OK
  (2) EBOX ID CHECK     OK
  (3) SHARED RAM TEST   OK
  (4) WORK RAM TEST     OK
  (5) ULSR TEST         OK
  (6) MAPR R/W TEST     OK
 TEST17 ERAM WINDOW TEST           (COUNT = 001)
  (1) ERAM WINDOW TEST  OK
  (2) ERAM WP TEST      OK
 TEST18 ERAM STEP TEST             (COUNT = 001)     OK
 TEST19 ERAM HARD BREAK TEST1      (COUNT = 001)
  (1) UBC HARDBREAK TEST1          OK
  (2) UBC HARDBREAK TEST2          OK
  (3) UBC HARDBREAK TEST3          OK
  (4) CHA0-7 HARDBREAK TEST        OK
  (5) CHB0-7 HARDBREAK TEST        OK
  (6) CHC0-7 HARDBREAK TEST        OK
 TEST20 ERAM HARD BREAK TEST2      (COUNT = 001)
  (1) SEQUENTIAL BREAK TEST        OK
  (2) RAR OVERFLOW BREAK TEST      OK
  (3) CHC TIMEOUT BREAK TEST       OK
  (4) CHB0 INTERRUPT TEST          OK
 TEST21 ERAM SOFT BREAK TEST       (COUNT = 001)     OK
```

Diagnostic Program Output Example (E8000 + EVCHIP Test) (cont)

```
TEST22 COMPULSORY BREAK TEST        (COUNT = 001)     OK
TEST23 ERAM TRACE TEST              (COUNT = 001)
  (1) RANGE TRACE TEST              OK
  (2) TRACE STOP TEST               OK
TEST24 ERAM TIME MEASURE TEST (COUNT = 001)
  (1)SUBROUTINE TIME MEASURE TEST1 OK
  (2)SUBROUTINE TIME MEASURE TEST2 OK
  (3)SUBROUTINE TIME MEASURE TEST3 OK
  (4)TIME STUMP TEST                OK
TEST25 ERAM PARALLEL MONITOR TEST   (COUNT = 001)     OK
TEST26 AUD TEST                     (COUNT = 001)
  (1) AUD MEMORY R/W TEST           OK
  (2) AUD TEST                      OK
TEST27 JTAG CONTROLER TEST          (COUNT = 001)     OK
TEST28 PORT TEST                    (COUNT = 001)     OK
TEST29 RTC TEST                     (COUNT = 001)     OK
TEST01 FLASH MEMORY READ TEST       (COUNT = 002)
   (a)            (b)                      (c)
  (1) MONITOR SUM CHECK       OK
                              (d)
```

Description:

(a) Test item number
(b) Test item
(c) Execution count
(d) Test result

Section 5 Error Handling

If an error occurs, provide a Hitachi sales agency with a detailed description of the problem.

Section 6 Testing Circuits and Connectors

6.1 Testing Circuit for P1284 I/F TEST (TEST07)

Connect the testing circuit that forms the loop in figure 6.1 to the bidirectional parallel interface connector on the E8000 emulator.

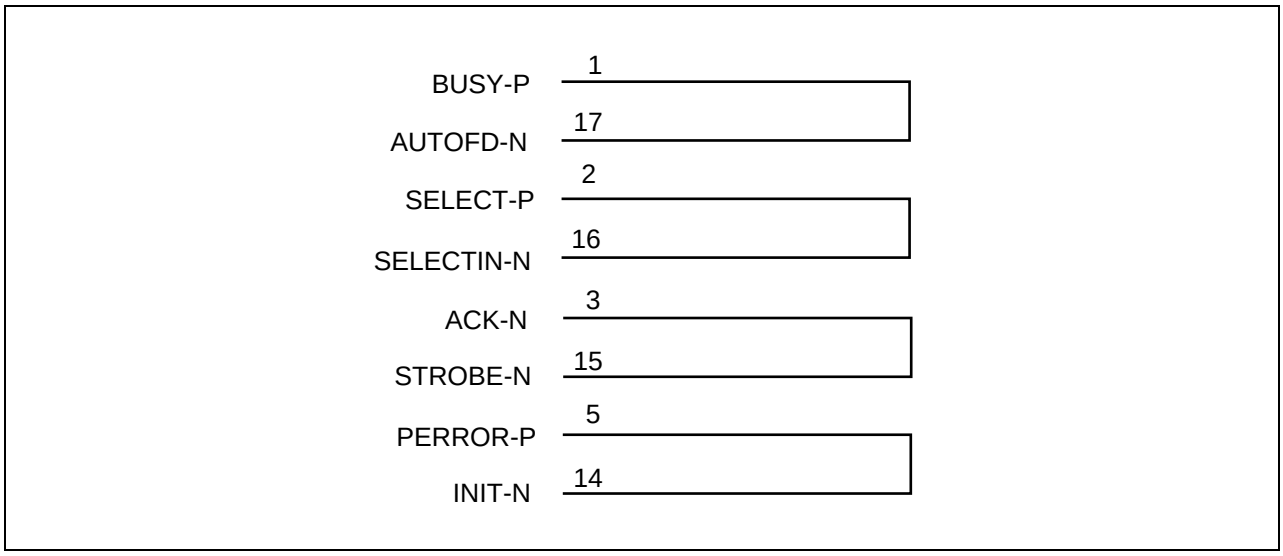

Figure 6.1 Testing Circuit for P1284 Loop Back Test

6.2 Testing Circuit for SERIAL I/F TEST (TEST08)

Connect the testing circuit in figure 6.2 to the serial interface connector on the E8000 emulator.

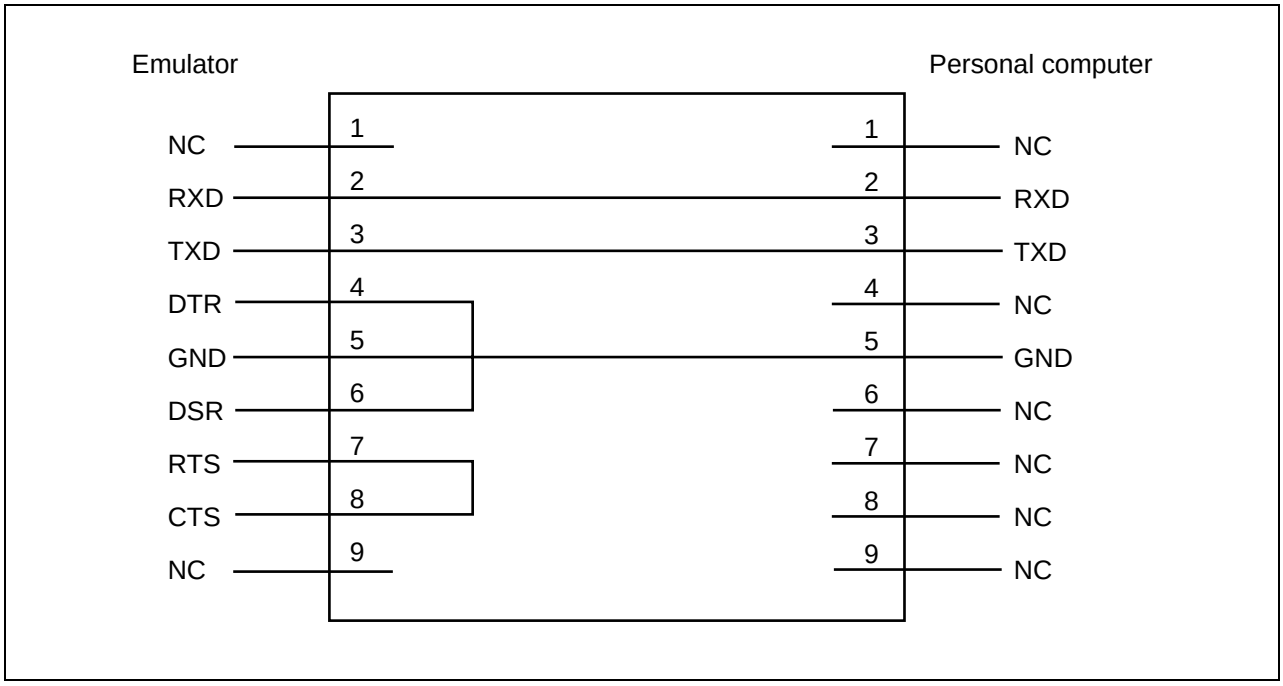

Figure 6.2 Testing Circuit for SERIAL I/F Test

6.3 Serial Interface Connector

Figure 6.3 shows pin locations in the serial interface connector on the E8000 emulator. Table 6.1 lists the signal name of each pin.

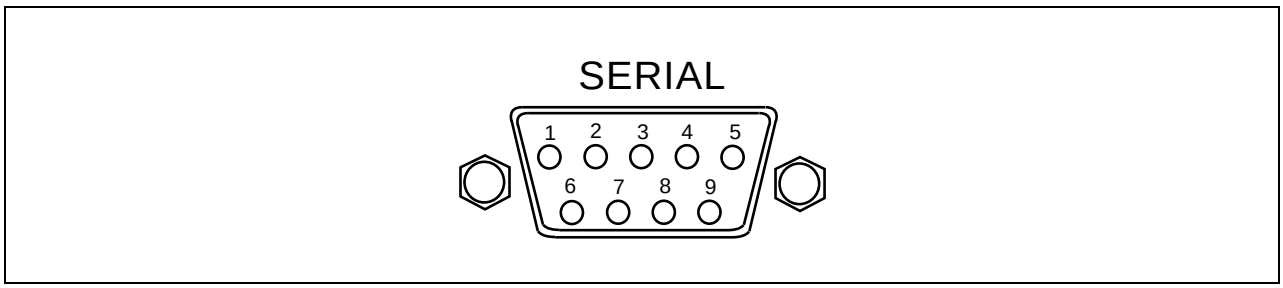

Figure 6.3 Pin Locations in E8000 Emulator Serial Interface Connector

Table 6.1 Pin Signal Names in E8000 Emulator Serial Interface Connector

Pin No.	Signal Name	Pin No.	Signal Name
1 and 9	NC	5	GND
2	RXD	6	DSR
3	TXD	7	RTS
4	DTR	8	CTS

6.4 Bidirectional Parallel Interface Connector

Figure 6.4 shows pin locations in the bidirectional parallel interface connector on the E8000 emulator. Table 6.2 lists the signal name of each pin.

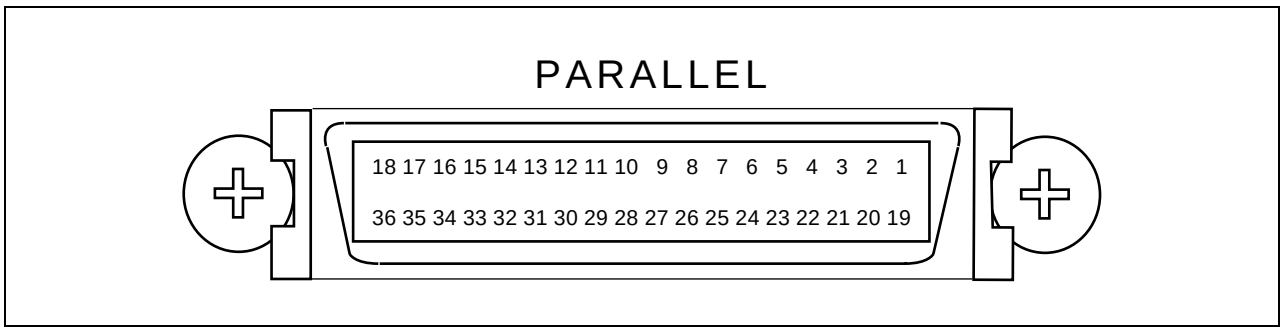

Figure 6.4 Pin Locations in E8000 Emulator Bidirectional Parallel Interface Connector

Table 6.2 Pin Signal Names in E8000 Emulator Bidirectional Parallel Interface Connector

Pin No.	Signal Name	Pin No.	Signal Name
1	BUSY-P	11	SD5-P
2	SELECT-P	12	SD6-P
3	ACK-N	13	SD7-P
4	FAULT-N	14	INIT-N
5	PERROR-P	15	STROBE-N
6	SD0-P	16	SELECTIN-N
7	SD1-P	17	AUTOFD-N
8	SD2-P	18	HOSTLOGICHIGH
9	SD3-P	36	PERIPHERALLOGICHIGH
10	SD4-P	19 to 35	GND