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F-ZTAT™ Microcomputer On-Board Programming Adapter Board

HS0008EASF3H User's Manual

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- **READ** this user's manual before using this adapter board.
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Do not attempt to use the adapter board until you fully understand its mechanism.

Adapter Board:

Throughout this document, the term "adapter board" shall be defined as the adapter board main unit and attached cables manufactured by Hitachi, Ltd.

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

Purpose of the Adapter Board:

The adapter board, which is connected between a host computer and the user system, has a function that can write/erase user application programs on the flash memory incorporated in the F-ZTAT microcomputer on the user system (on-board) when it is used with the on-board programming tool.

Therefore, the burden on the peripheral circuit required during on-board programming can be minimized. This board can be used for all single 5-V F-ZTAT microcomputers incorporating a flash memory.

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HITACHI

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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 adapter board are therefore not all inclusive. Therefore, you must use the adapter board safely at your own risk.

SAFETY PAGE

READ FIRST

- **READ** this user's manual before using this adapter board.
- **KEEP** the user's manual handy for future reference.

Do not attempt to use the adapter board until you fully understand its mechanism.

DEFINITION OF SIGNAL WORDS

DANGER indicates an **imminently** hazardous situation which, **if not avoided**, will result in **DEATH** or **SERIOUS INJURY** to you or other people.

WARNING indicates a **potentially** hazardous situation which, **if not avoided**, could result in **DEATH** or **SERIOUS INJURY** to you or other people.

CAUTION indicates a hazardous situation which, **if not avoided**, may result in **minor or moderate injury** to you or other people, or may result in **damage to the machine** or **loss of the user program**. It may also be used to alert against unsafe usage.

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 adapter board or will result in **PERSONAL INJURY**. The **USER PROGRAM** will be **LOST**.

1. Always switch **OFF** the adapter board and user system before connecting or disconnecting any **CABLES** or **PARTS**.
2. Before connecting, always make sure that **pin 1** on both sides are correctly aligned.
3. The adapter board can be used for **F-ZTAT** microcomputers to which **3 V** to **5 V** is supplied from a single power source. The adapter board cannot be used for **F-ZTAT** microcomputers in which **12 V** is applied to both the **Vpp** pin and **MD** pin.

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Section 1 Overview

The adapter board HS0008EASF3H, connected between a host computer and the user system, can write/erase user application programs on the flash memory incorporated in the F-ZTAT[®] microcomputer on the user system (on-board) when it is used with the on-board programming tool. Therefore, the burden on the peripheral circuit required during on-board programming can be reduced.

A system configuration using the adapter board is shown in figure 1.1. This board can only be used for the F-ZTAT microcomputers that incorporate a flash memory to which 3 V to 5 V is supplied from a single power source.

Note: F-ZTAT (Flexible-Zero Turn Around Time) is a registered trademark of Hitachi, Ltd.

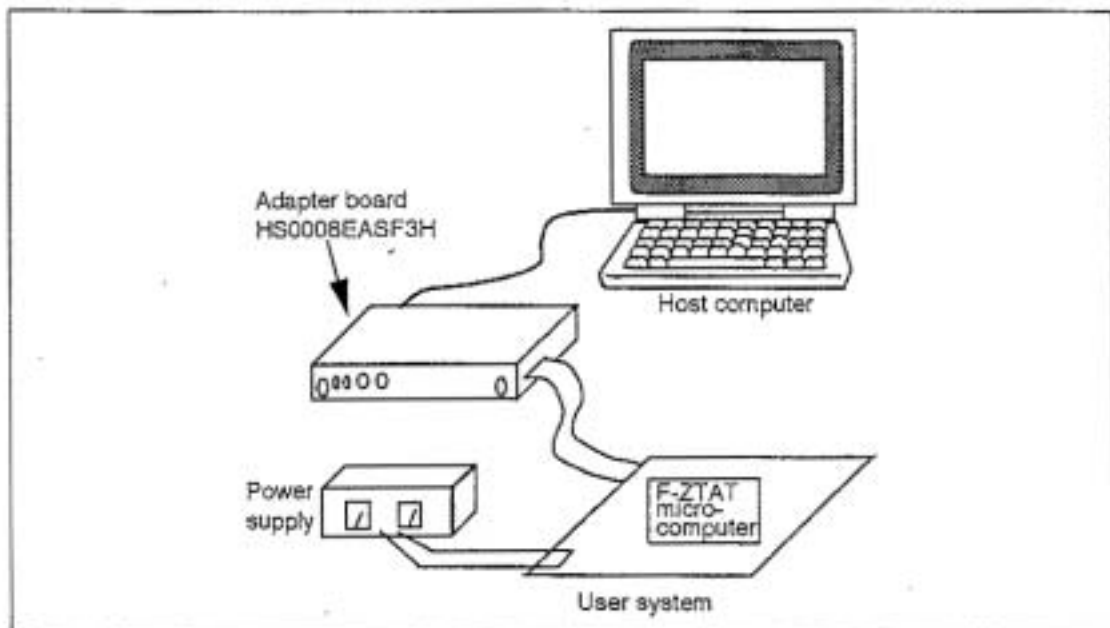


Figure 1.1 System Configuration Using Adapter Board

Section 2 Configuration

The configuration and components of the adapter board are shown in figure 2.1 and table 2.1, respectively.

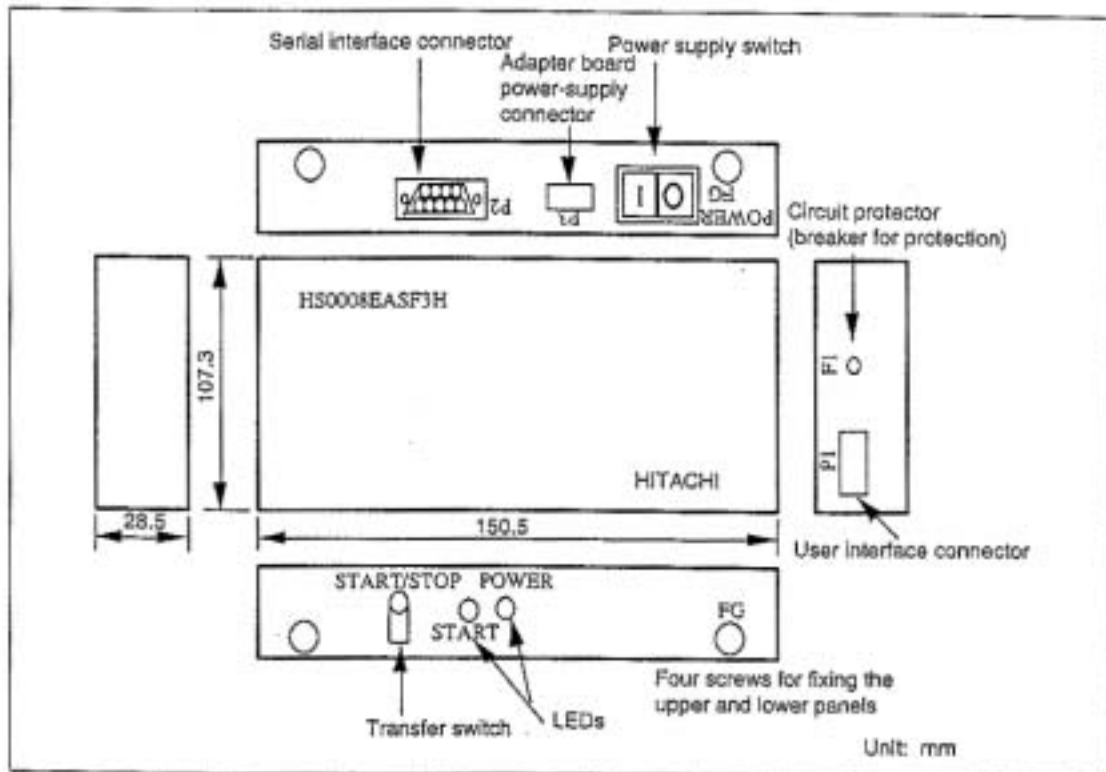


Figure 2.1 Adapter Board

Table 2.1 Components

Item Name	Description	Quantity
Adapter board	Main unit	1
Serial interface cable	Connection between main unit and host computer (1000 mm)	1
User system interface cable	Connection between main unit and user system (300 mm)	1
User system interface cable connector	Connection between main unit and user system	1
Adapter board power cable	Adapter board power supply (1000 mm)	1

Section 3 Connectors, Switches, and LEDs

3.1 Connectors

This adapter board has connectors P1, P2, and P3.

3.1.1 User Interface Connector (P1)



WARNING

Observe the precautions listed below. Failure to do so will result in a **FIRE HAZARD** and will damage the user system and the adapter board or will result in **PERSONAL INJURY**.

1. Always switch **OFF** the adapter board and the user system before connecting or disconnecting **ANY CABLES** or **PARTS**.
2. Before connecting, always make sure that pin 1 on both sides are correctly aligned.
3. When disconnecting cables, take care not to put excessive stress on the cables.

The signals required for writing to flash memory are shown in figures 3.1 and 3.2. Connect the adapter board and the user system using the user system interface cable provided (with an 20-pole connector on both ends) and a user system interface cable connector (used for connecting the cable to the user system). The user system interface cable provided straight-matches the pins in the adapter board to those in the user system, as shown in figure 3.2.

3428-6002LCSC (manufactured by Sumitomo 3M Ltd.) is used as a user system interface cable connector.

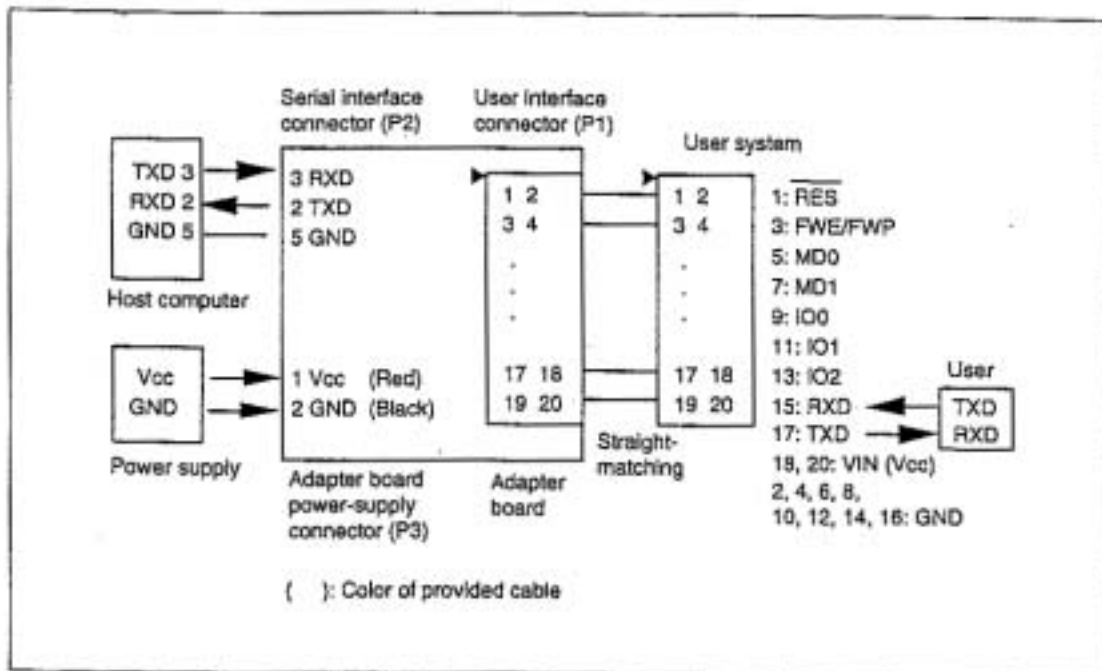


Figure 3.1 Connector Pin Location

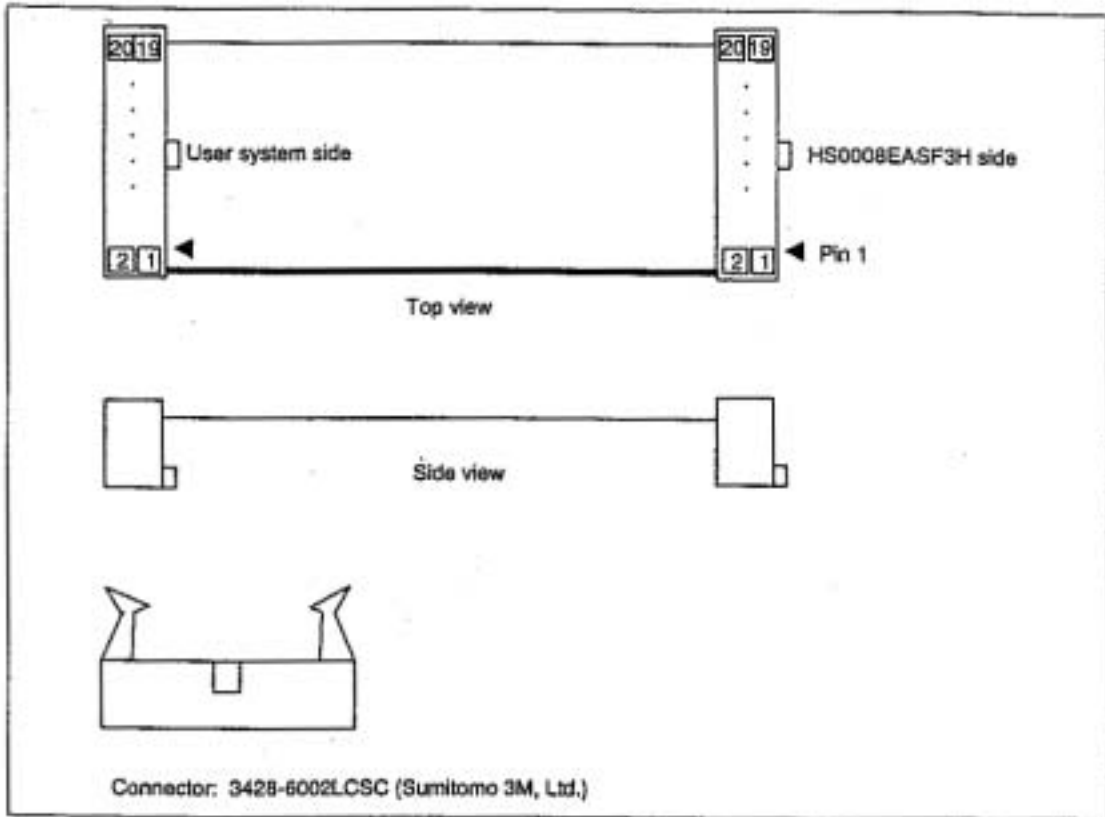


Figure 3.2 User System Interface Cable

Table 3.1 Correspondence between Signals and Numbers Indicated on the User System Interface Cable

Number on Cable	Signal
1	\overline{RES}
2	GND
3	FWE/FWP
4	GND
5	MD0
6	GND
7	MD1
8	GND
9	IO0
10	GND
11	IO1
12	GND
13	IO2
14	GND
15	RXD (TXD for the user system)
16	GND
17	TXD (RXD for the user system)
18	VIN (Vcc)
19	NC
20	VIN (Vcc)

When the target microcomputer requires port control during on-board programming, connect necessary port signals. For details, refer to table 3.4 in section 3.2.7, S3 and S4 Setting Examples.

3.1.2 Serial Interface Connector (P2)

Connect the adapter board and host computer using the serial interface cable provided.

3.1.3 Adapter Board Power-Supply Connector (P3)

Supply power to the adapter board from the user system power supply (V_{CC} 2.7 V to 5.25 V) via the VIN pin of the user system interface cable.

If the current supply capability of the user system power supply is insufficient, power (V_{CC} 5 V \pm 5%) can be supplied using a separate power supply from this connector to the adapter board.

3.2 Switches

3.2.1 Transfer Switch (START/STOP)

When this switch is pressed once, a programming control is initiated. In this case, the START LED (red) is turned on. When this switch is pressed again after program transfer, the programming control is terminated. At this time, the START LED (red) is turned off.

CAUTION

After program transfer, press the transfer switch (START/STOP) and confirm that the START LED (red) is turned off. If the user system power supply VIN (V_{CC} 2.7 V to 5.25 V) is turned off while the START LED is on, the user system will be damaged.

For details on activating the on-board programming tool, refer to the On-Board Programming Tool User's Manual HS6400FWTW2SE.

Activate the on-board programming tool HS6400FWTW2SF, and select the boot mode or user program mode displayed on the host computer. The hardware setting sequence is displayed. **Then press the transfer switch.** The START LED (red) is turned on and a programming control is initiated.

After programming the flash memory in the selected mode, confirm the end message, **press the transfer switch again**, and complete the programming control. At this time, the START LED is turned off.

3.2.2 Power-Supply Switch (POWER)

The following two power-supply methods are available for this adapter board.

- Power is supplied from the user system power supply via the user system interface cable and connector (VIN pin).

- As a countermeasure against insufficient current supply capability by the above method, power is supplied through the power-supply connector (P3). In this case, the user must prepare a separate power supply.

Vcc $5\text{ V} \pm 5\%$ is supplied to the power-supply connector (P3) of the adapter board. This switch is activated as the power-supply switch (on and off) of the adapter board only when power is supplied from the power-supply connector (P3) of the adapter board. (Refer to figure 3.3.) In this case, power also needs to be supplied to the VIN pin of the user system interface cable and the connector.

When power is supplied to the adapter board only from the user system power supply, this power-supply switch does not work. In this case, the power-supply switch on the user system is used as the power-supply switch for the adapter board.

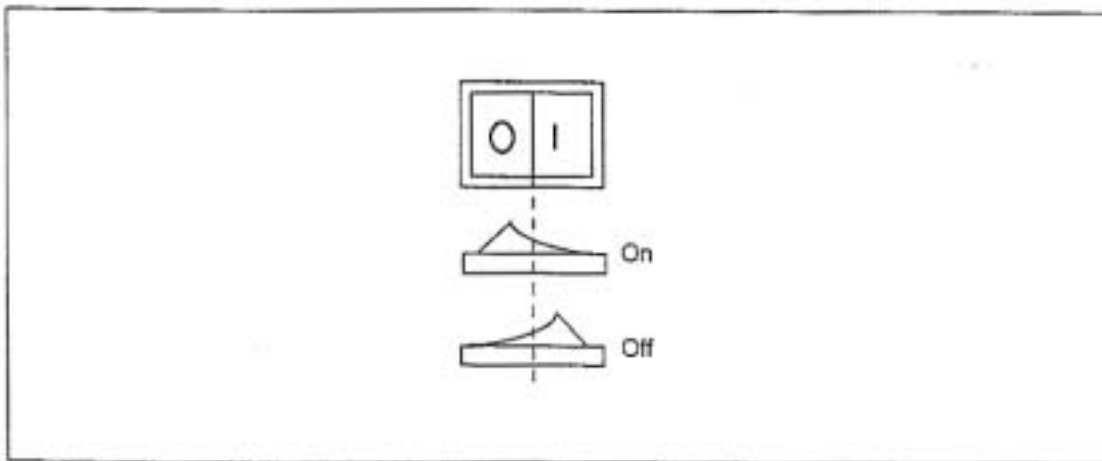


Figure 3.3 Power-Supply Switch (POWER)

3.2.3 Jumper Terminals for Power-Supply Switch (JP1)

CAUTION

Do not insert jumpers concurrently (1 - 2 and 3 - 4) into the jumper terminals. Concurrent dual connection will damage the system.

The jumper terminals are inside the chassis. Open the upper panel by removing the screw in each corner attaching the upper and lower panels. After jumper setting, close the chassis by re-fixing the screws.

The following two methods are available for supplying power to the adapter board; appropriate jumper setting is required for these jumper terminals.

- To supply power from the user system via the user system interface cable and connector (VIN pin), insert a jumper into 3 and 4.
- To supply power from power-supply connector (P3), prepare a power supply for the adapter board. Insert a jumper into 1 and 2 (default setting at shipment).

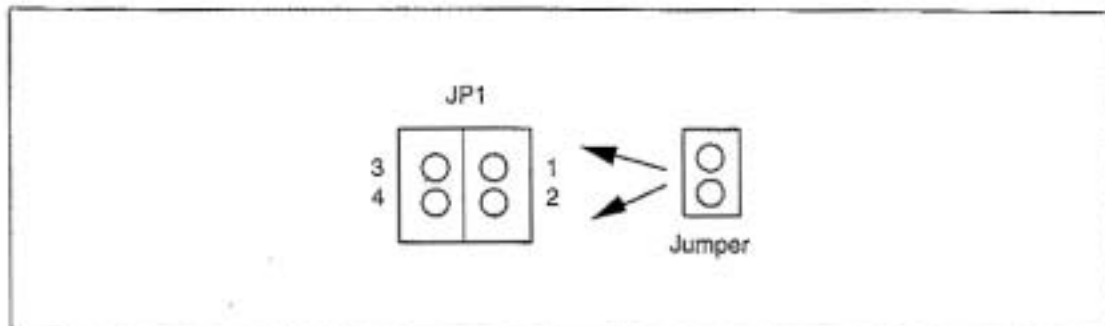


Figure 3.4 Jumper Terminals for Power-Supply Switch (JP1)

3.2.4 Circuit Protector (F1)

This adapter board is provided with a resumable circuit protector on the input section of the user system power supply to prevent damage to the system. If the circuit protector is turned off due to erroneous power-supply connection or excessive current (1 A or more), check the system, then return the circuit protector to the original state by pressing the switch in the hole with a thin pin or wire to activate the circuit protector (figure 3.5).

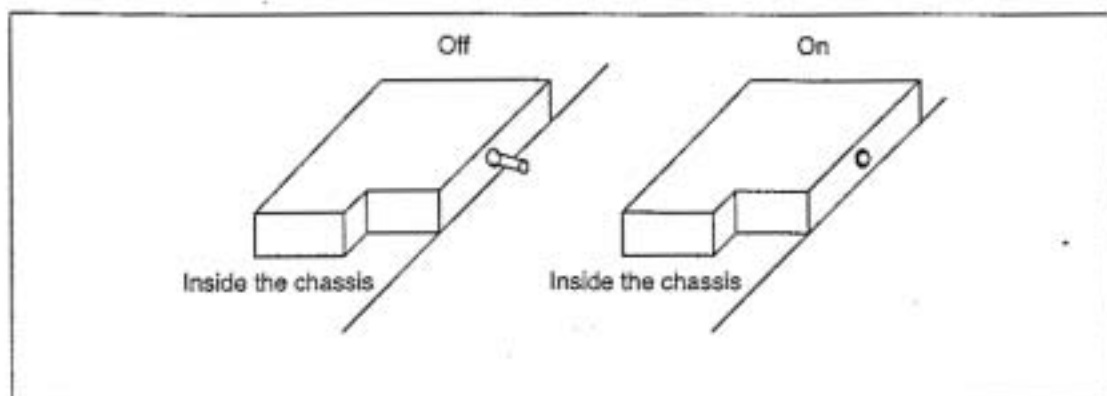


Figure 3.5 Circuit Protector Setting

3.2.5 Control-Signal Enable/Disable Switches (S4)

This adapter board is provided with switches so that each control signal can be enabled or disabled separately, as shown in table 3.2; the control-signal switches that are necessary to program the F-ZTAT microcomputer should be set to E. These switches are inside the chassis. Open the upper panel by removing the screw in each corner attaching the upper and lower panels. After switch setting, close the chassis by re-fixing the screws.

Table 3.2 Control-Signal Enable/Disable Switches (S4)

Signal	E	D
FWE	Enabled	Disabled
MD0	Enabled	Disabled
MD1	Enabled	Disabled
IO0	Enabled	Disabled
IO1	Enabled	Disabled
IO2	Enabled	Disabled

3.2.6 Low (0)/High (1) Switches (S3)

This adapter board is provided with switches so that each control signal can be set either at 0 or 1 separately when the corresponding enable/disable switch (S4) is enabled, as shown in table 3.3; the control-signal switches that are necessary to program the F-ZTAT microcomputer should be set. These switches are inside the chassis. Open the upper panel by removing the screw in each corner attaching the upper and lower panels. After switch setting, close the chassis by re-fixing the screws.

Table 3.3 Low (0)/High (1) Switches (S3)

Signal	0	1
FWE	0	1
MD0	0	1
MD1	0	1
IO0	0	1
IO1	0	1
IO2	0	1

3.2.7 S3 and S4 Setting Examples

Table 3.4 shows examples of S3 and S4 switch settings for on-board programming in boot mode. When using an F-ZTAT microcomputer that is not listed in table 3.4, refer to the corresponding hardware manual.

Table 3.4 S3 and S4 Setting Examples

HS0008EASF3H	H8/3067F			H8S/2144F			SH7044F		
P1 Connector Signal	MCU Signal	S4	S3	MCU Signal	S4	S3	MCU Signal	S4	S3
VIN	Vcc	Must	Must	Vcc	Must	Must	Vcc	Must	Must
GND	Vss	Must	Must	Vss	Must	Must	Vss	Must	Must
RES	RES	Must	Must	RES	Must	Must	RES	Must	Must
TXD	RXD	Must	Must	RXD	Must	Must	RXD	Must	Must
RXD	TXD	Must	Must	TXD	Must	Must	TXD	Must	Must
FWE/FWP	FWE	E	1	FWE	E	1	FWP	E	0
MD0	—	D	*	MD0	E	0	—	D	*
MD1	MD2	E	0	MD1	E	0	MD1	E	0
I/O1	—	D	*	P90	E	1	—	D	*
I/O2	—	D	*	P91	E	1	—	D	*
I/O3	—	D	*	P92	E	1	—	D	*

Note: Must: Must always be connected regardless of the S3 and S4 settings.

—: Need not be connected.

*: Either 0 or 1 can be set.

3.3 LEDs

3.3.1 START LED (START: Red)

This LED is turned on or off when the transfer switch (START/STOP) is pressed.

3.3.2 Power LED (POWER: Green)

This LED is on while the user system power supply VIN (2.7 V to 5.25 V) or the power supply Vcc (5 V ± 5%) dedicated to the adapter board is supplied.

Section 4 Notes On Use

1. The $\overline{\text{RES}}$ pin of the adapter board is an open-collector output. Pull up the $\overline{\text{RES}}$ pin on the user system using a 1-k Ω resistor.
2. Do not directly connect control signals FWP/FWE, MD0, MD1, IO0, IO1, or IO2 to Vcc or GND. Pull up or pull down these signals using a 470-k Ω or greater resistor.
3. After program transfer, press the transfer switch (START/STOP) and confirm that the START LED (red) is turned off. If the user system power supply VIN (Vcc 2.7 V to 5.25 V) is turned off while the START LED is on, the user system will be damaged.
4. For the host computer connected to the adapter board, only the IBM PC* (DOS/V machines) can be used.

Note: IBM PC is a registered trademark of International Business Machines Corporation.

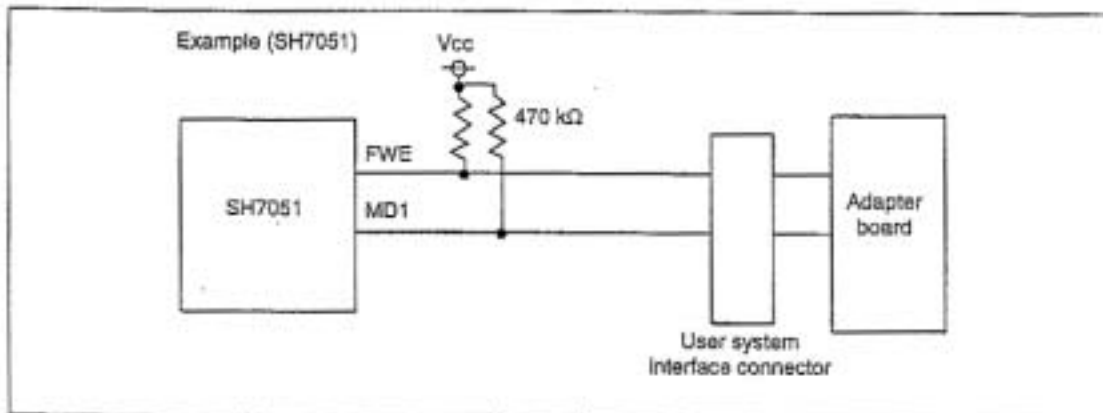


Figure 4.1 Control-Signal Circuit Example

Section 5 Specifications

5.1 Input Voltage and Consumption Current

- Power-supply input (VIN) from the user interface connector: 2.7 to 5.25 V
- Power-supply input (Vcc) from the P3 connector of the adapter board: 5 V ± 5%

5.2 Write Processing

1. When the transfer switch is pressed, the $\overline{\text{RES}}$ signal is held to the low level for 500 ms.
2. After 10 ms of the falling edge of the $\overline{\text{RES}}$ signal, 2.7- to 5.25-V application to the FWE/FWP pin starts or stops (figure 5.1).

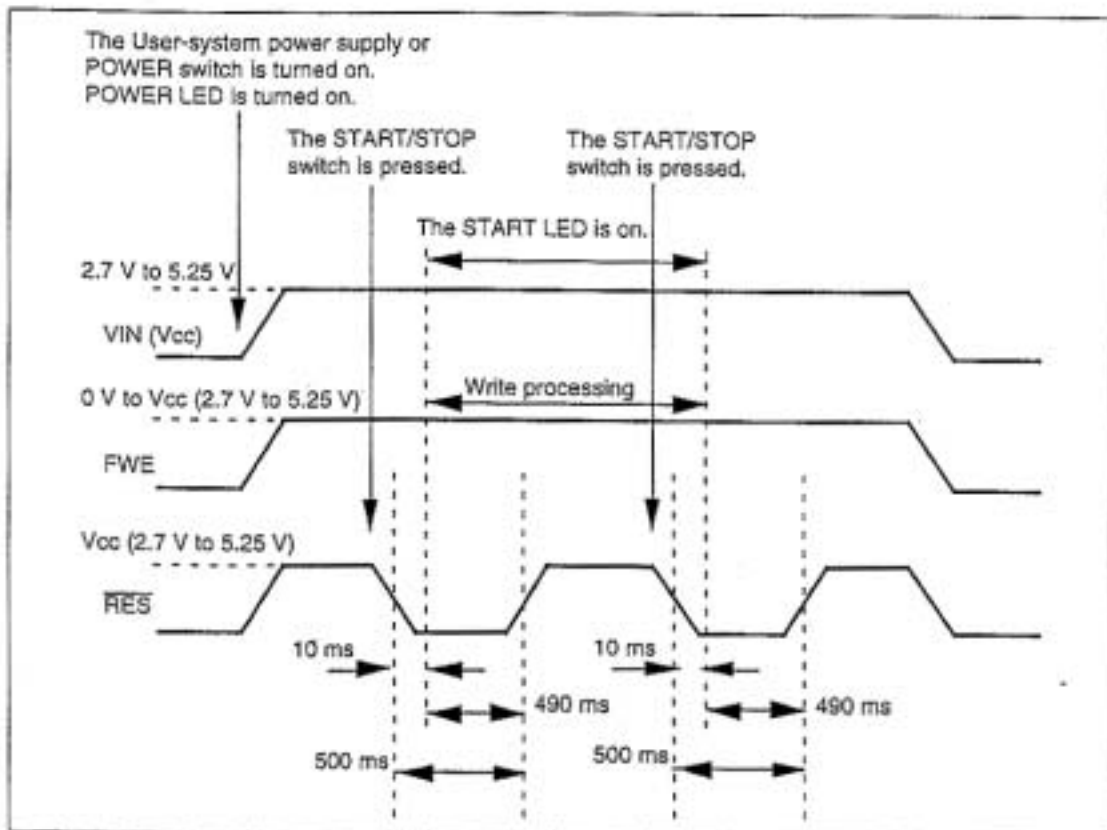


Figure 5.1 Reset Signal, 2.7- to 5.25-V Application, and Stop Timing