

CMOS 16-BIT SINGLE CHIP MICROCONTROLLER

**Gang Programmer**  
**(S5U1C17001W2000/2100/2200)**  
**User Manual**

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## 1. Overview

The Gang Programmer (S5U1C17001W2000/2100/2200) is a flash memory programmer dedicated to the Seiko Epson original 16-bit microcontrollers (S1C17 Family).

The Gang Programmer is capable of being used to write user program data to up to eight target systems simultaneously. To do this, insert an SD card in which the program data file and the Gang Programmer control file are stored using a PC into the SD card slot and press the SETUP button. Then connect the target systems to the Gang Programmer and press the START button.

### 1.1 Features

High productivity	Up to eight target systems can be programmed simultaneously. Buzzer sounds to notify that programming has completed.
Easy operation	Programming can be started with the touch of the SETUP and START buttons after setting the SD card. (A large START button excellent in durability is provided.)
High visibility	Adopts LEDs to indicate statuses and results clearly. An LCD panel is also provided to display detailed information.

### 1.2 Operating Environment

Input voltage	AC100–240 V, 50/60 Hz (The AC adaptor included in this package should be used.)
SD card	SD and SDHC cards (FAT16 and FAT32 are supported.)
Maximum target operating frequency	DCLK = Max. 24 MHz

### 1.3 Power Supply Function

Power supply for target operation	3.3 V or 1.8 V (Max. 50 mA) for each target
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Figure 1.1 Gang Programmer Main Unit External View

#### !! NOTE !!

- The Gang Programmer does not support SDXC cards. Be sure to avoid inserting an SDXC card into the SD card slot as data recorded in the inserted card may be destroyed. For S5U1C17001W2000, please prepare an SD card, as it is not included in the package. An SD card manufactured by SanDisk Corporation is recommended.
- Do not use chlorinated solvents for the Gang Programmer. Stop using the Gang Programmer if it comes in contact with a chlorinated solvent.

## 2. Components Included in the Package

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### 2. Components Included in the Package

(1) Gang Programmer main unit	1
(2) SD card (4GB) (Free gift)	1 (Attached only for S5U1C17001W2100 package)
(3) Target system interface cable (type A) (Free gift)	8 (Attached only for S5U1C17001W2000 package)
(4) AC adaptor (DC 12 V/1.5 A)	1
(5) AC cable	1
(6) Precautions for use (English/Japanese)	1



Gang Programmer main unit



AC adaptor



SD card (Free gift)



AC cable



Target system interface cable (Free gift)

Figure 2.1 Components Included in the Package

Refer to “Appendix Target System Interface Cable” for details of the target system interface cable.

### 3. Name and Function of Each Part

The following shows the name and function of each part of the Gang Programmer.

#### 3.1 Top Panel

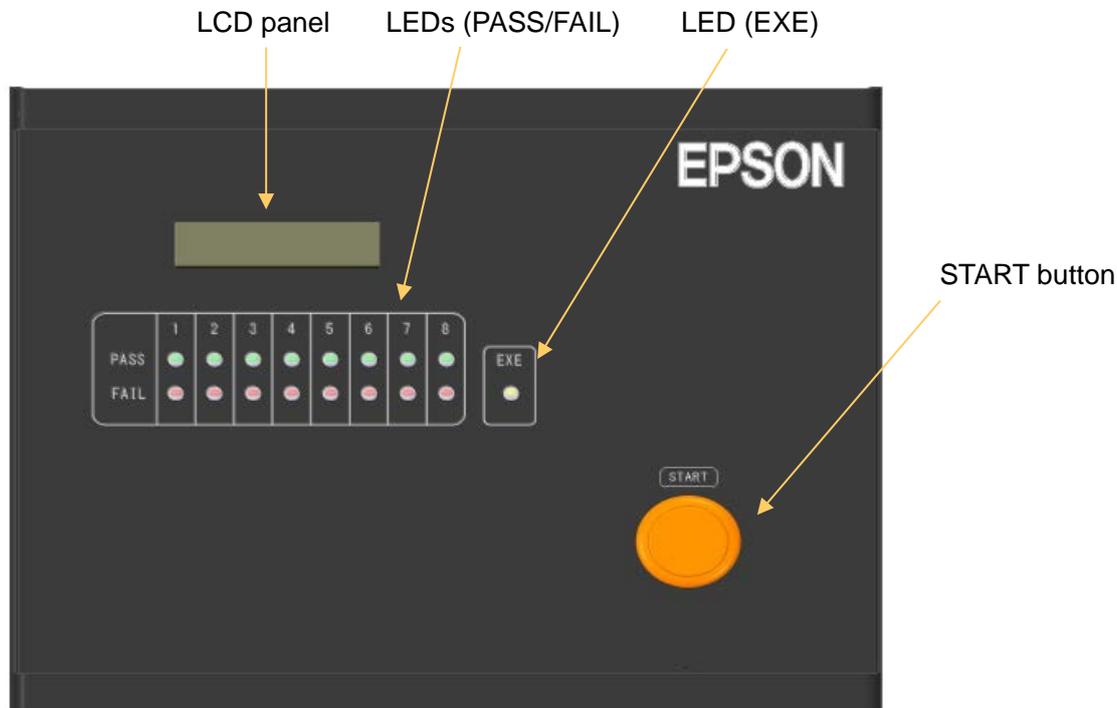


Figure 3.1.1 Top Panel View

##### 3.1.1 LCD Panel

The LCD panel displays various status information.

##### 3.1.2 LEDs (PASS/FAIL, EXE)

The LEDs indicate the flash memory programming status of each channel.

##### 3.1.3 START Button (START)

Pressing this button starts programming the flash memory embedded in the S1C17 MCU.

### 3. Name and Function of Each Part

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#### 3.2 Front Panel

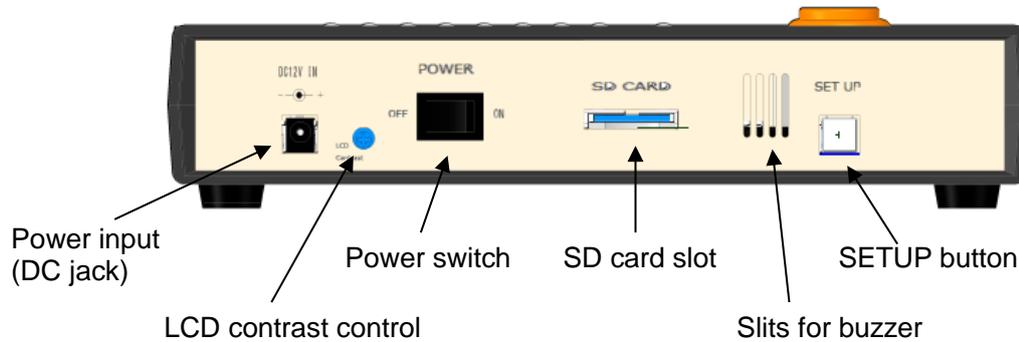


Figure 3.2.1 Front Panel View

##### 3.2.1 Power Input (DC12V IN)

This jack is used to supply DC power voltage.

##### 3.2.2 Power Switch (POWER)

This switch is used to turn the power supply on and off.

##### 3.2.3 LCD Contrast Control (LCD Contrast)

Turning this control using a screwdriver adjusts the LCD contrast. Turning it counterclockwise increases the contrast; turning it clockwise decreases the contrast.

##### 3.2.4 SD Card Slot (SD CARD)

Insert an SD card into this slot. SD (max. 2GB ) and SDHC (max. 32GB) cards only are supported.

##### 3.2.5 SETUP Button (SETUP)

Pressing this button starts transferring of the data recorded in the SD card to the buffer memory of the Gang Programmer. Be aware that the target systems will be programmed with the previous data stored in the buffer memory if pressing the START button to start programming without this operation.

### 3.3 Back Panel

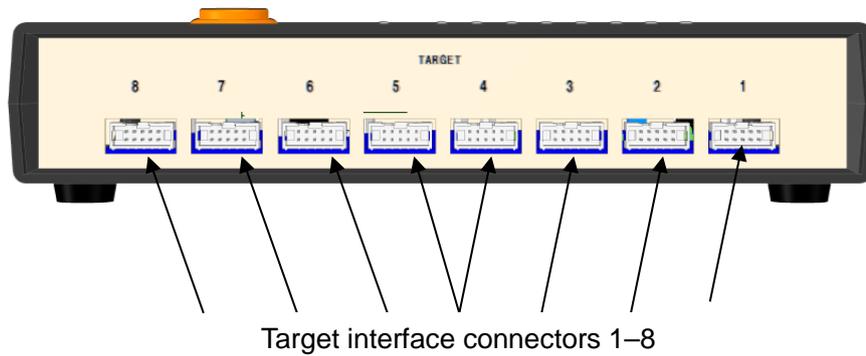


Figure 3.3.1 Back Panel View

#### 3.3.1 Target Interface Connectors (TARGET 1-8)

These connectors are used to connect with target systems. Connectors can be left unconnected if the number of target systems to be connected to the Gang Programmer are less than eight.

## 4. Connection

### 4. Connection

#### 4.1 Connecting with Target Systems

The following shows examples of wiring between the Gang Programmer and a target system. The Gang Programmer provides eight target interface connectors with the same pin configuration.

- When the power voltage for interfacing with the S1C17 MCU is supplied from the target system

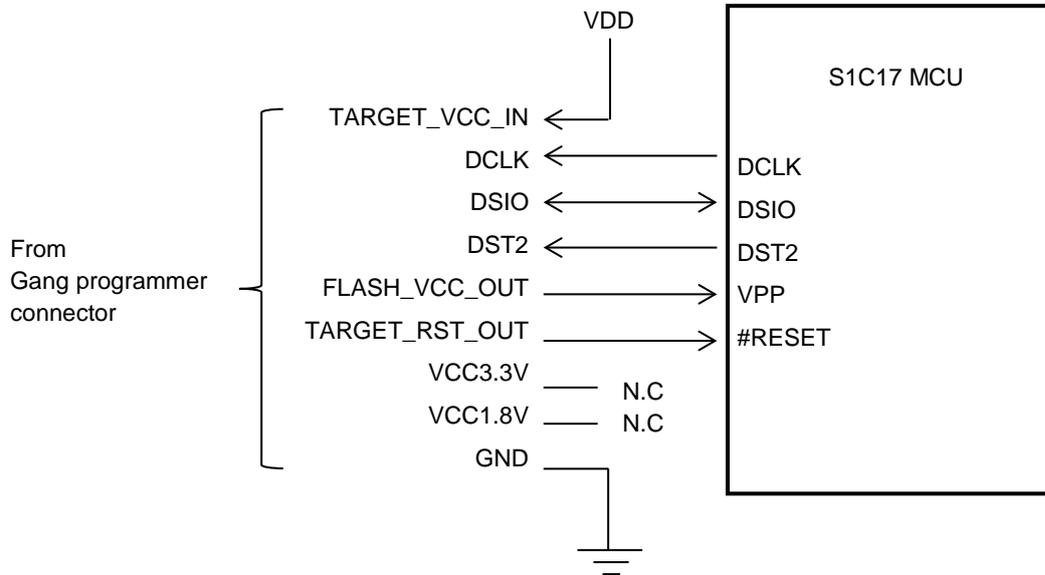


Figure 4.1.1 (a) Target System Connecting Example 1

- When the power voltage (3.3 V) for interfacing with the S1C17 MCU is supplied from the Gang Programmer

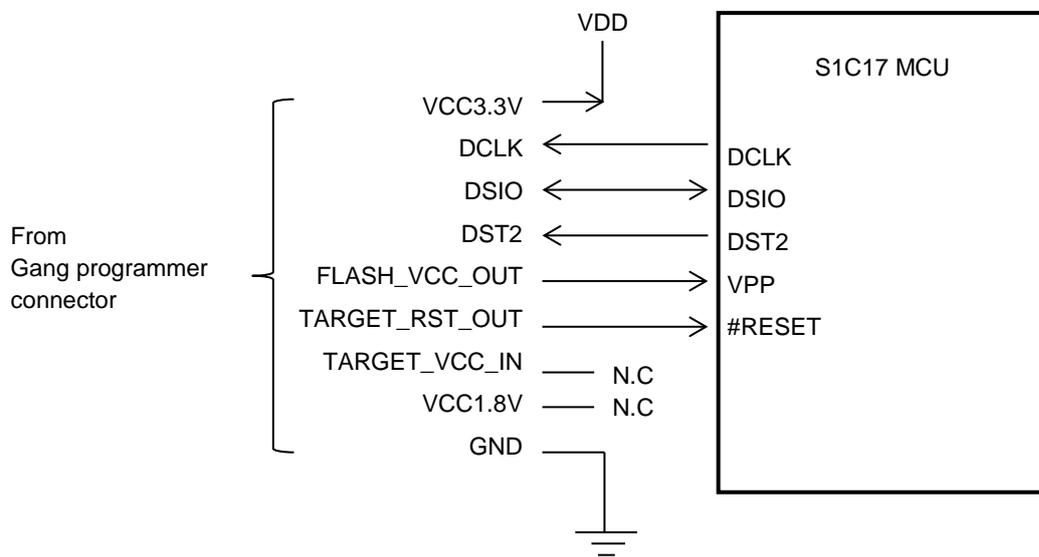


Figure 4.1.1 (b) Target System Connecting Example 2

#### **!! NOTE !!**

Refer to “Basic External Connection Diagram” in the Technical Manual for the S1C17 MCU to be connected to determine the interface circuit.

Please use the cable described in Appendix. When you unavoidably make the interface cable by yourself, the cable length should be as short as possible. Although it depends on the operating environment, a cable length of 30 cm or less is recommended.

### 4.1.1 Gang Programmer Connectors

The following shows the Gang Programmer connector pin assignment.

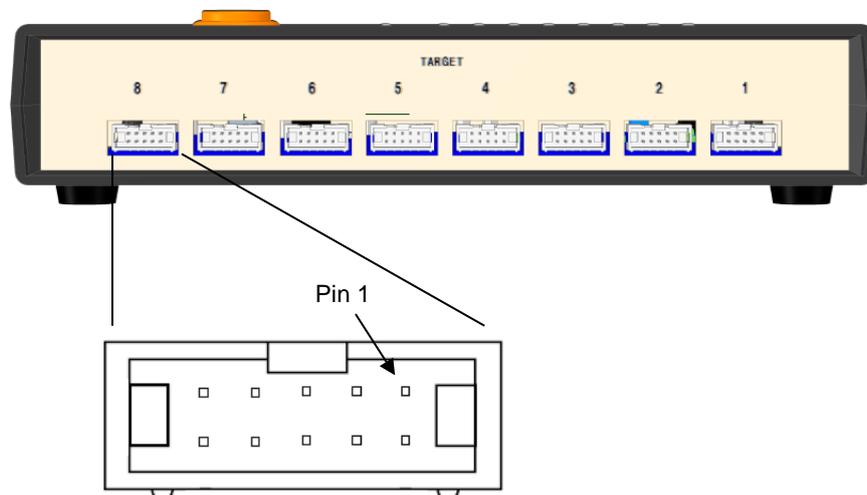


Figure 4.1.1.1 Gang Programmer Connector Pin Layout Diagram

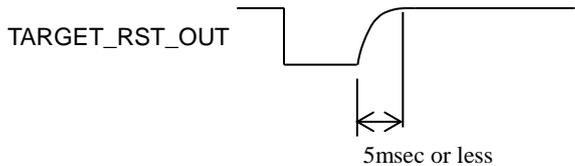
Table 4.1.1.1 Gang Programmer Connector Pin Assignment

Gang Programmer Connector (10 pins)			
No	Pin name	I/O	Pin function
1	DCLK	I	Clock signal input for debugging
2	GND	–	Ground
3	DSIO	I/O	Serial communication signal input/output for debugging
4	DST2	I	Debug status signal input
5	FLASH_VCC_OUT	–	Flash memory programming voltage output
6	GND	–	Ground
7	TARGET_RST_OUT	O	Target reset signal output
8	TARGET_VCC_IN	–	Target power supply voltage input
9	VCC3.3V	–	Power supply (3.3 V)
10	VCC1.8V	–	Power supply (1.8 V)

## 4. Connection

### 4.1.2 Pin Description

Table 4.1.2.1 Gang Programmer Connector Pin Description

Pin name	Description
DCLK	Clock signal input for debugging. Connect this signal to the DCLK pin of the S1C17 MCU.
GND	Ground. Connect this signal to the ground of the S1C17 MCU.
DSIO	Serial communication signal input/output for debugging. Connect this signal to the DSIO pin of the S1C17 MCU.
DST2	Debug status signal input. Connect this signal to the DST2 pin of the S1C17 MCU.
FLASH_VCC_OUT	Flash memory programming voltage output. Connect this output to the VPP pin of the S1C17 MCU when a flash memory programming voltage is externally supplied to the S1C17 MCU that has a flash memory programming power supply pin (VPP).
GND	Ground. Connect this signal to the ground of the S1C17 MCU.
TARGET_RST_OUT	<p>Target reset signal output. Connect this signal to the #RESET pin of the S1C17 MCU. The TARGET_RST_OUT pin is configured as an Nch open drain output with a 10 kΩ pull-up resistor, so this signal can be input to the S1C17 MCU in a wired OR connection even if another reset signal, such as a user reset switch signal, must be input. For this reset signal, please regulate the resistance and the capacity value (including the wiring capacity) between this pin and #RESET pin of S1C17 MCU so that it is released within 5msec. Gang Programmer might be recognized as not connected with target S1C17 MCU when target S1C17 MCU reset is not released within 5msec.</p>  <p>The diagram shows a signal labeled 'TARGET_RST_OUT' that transitions from a high state to a low state, then returns to high. A double-headed arrow below the low pulse indicates its duration is '5msec or less'.</p>
TARGET_VCC_IN	Target power supply voltage input. Use this pin when supplying the interface power voltage from the target system. Power must be supplied to this pin when the S1C17 MCU of the target system operates with a voltage other than 3.3 V or 1.8 V.
VCC3.3V	<p>Power supply (3.3 V) pin. This pin outputs 3.3 V for the target system. The maximum drive capability is 50 mA.</p> <p>The voltage output condition is as follows:</p> <ul style="list-style-type: none"> <li>• In the case of FW Ver. 1.xx <sup>*1</sup> The voltage is always output.</li> <li>• In the case of FW Ver. 2.00 or later <sup>*1</sup> The voltage is output only when the target flash memory is being programmed.</li> </ul>
VCC1.8V	<p>Power supply (1.8 V) pin. This pin outputs 1.8 V for the target system. The maximum drive capability is 50 mA.</p> <p>The voltage output condition is as follows:</p> <ul style="list-style-type: none"> <li>• In the case of FW Ver. 1.xx <sup>*1</sup> The voltage is always output.</li> <li>• In the case of FW Ver. 2.00 or later <sup>*1</sup> The voltage is output only when the target flash memory is being programmed.</li> </ul>

\*1 FW = Firmware

When connecting the above signals to the target system, the connection destinations should be determined using the Gang Programmer internal circuit configuration shown below as a reference.

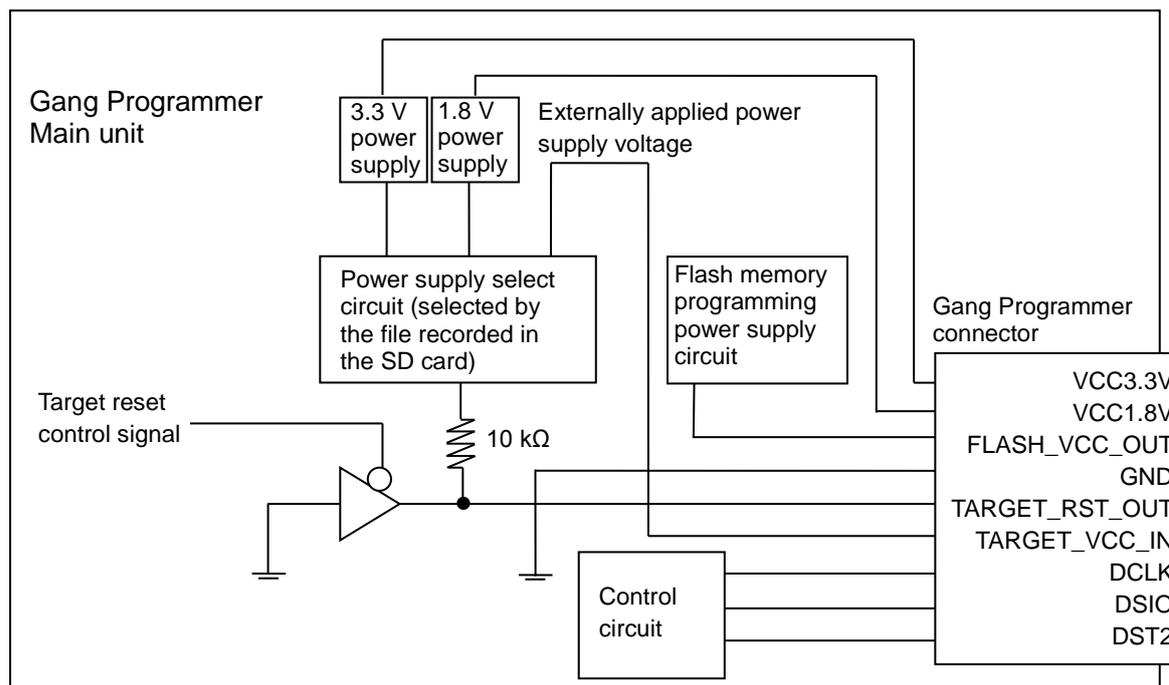


Figure 4.1.2.1 Configuration of Gang Programmer Interface Power Supply and Reset Circuits

## 4.2 Connecting to AC Power Supply

Use the AC adaptor included in the package to supply the power voltage to the “DC12V IN” jack on the front panel.

## 5. Display Specifications

### 5. Display Specifications

#### 5.1 LCD Panel

The figure below shows a basic display layout on the LCD panel.

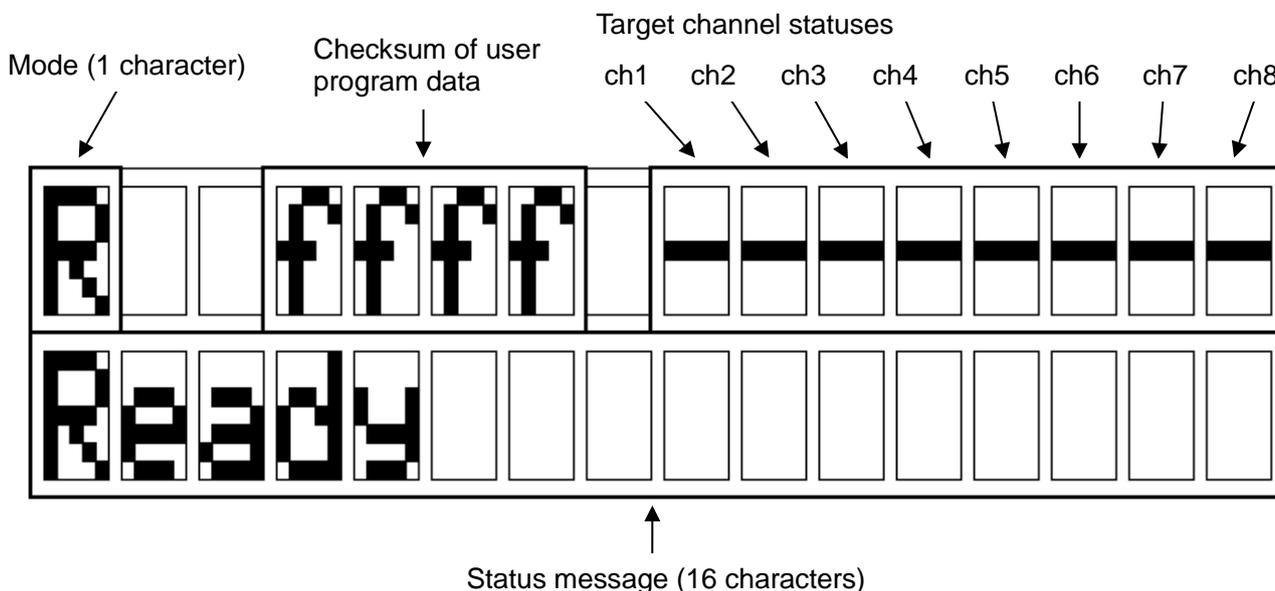


Figure 5.1.1 Basic Display Layout on LCD Panel

#### 5.1.1 Mode

The table below lists the mode symbols and their meanings.

Table 5.1.1.1 Mode Symbols and Meanings

Mode	Meaning	
R	Ready	This indicates that the Gang Programmer is ready to operate and the START and SETUP buttons are enabled to be accepted. This state allows inserting/removing an SD card and connecting/disconnecting the target systems.
S	Setup	This indicates that the Gang Programmer control file (gpc17xxx.bin) and user configuration/program data file (gpdata.bin) are being transferred to the Gang Programmer buffer memory.
P	Program	This indicates that the Gang Programmer is programming the flash memory embedded in the S1C17 MCU or writing data to the SD card.
C	Check	This indicates that the version number of the Gang Programmer firmware and the serial number to be written to the target S1C17 MCU are being displayed.

#### 5.1.2 Checksum of User Program Data

This area displays the checksum of the user program data stored in the Gang Programmer buffer memory as a 16-bit hexadecimal value. The memory data are added in two-byte (16-bit) units to obtain the 16-bit sum with the bits exceeding 16 bits ignored.

### 5.1.3 Target Channel Statuses

This area displays an alphabetic character that indicates an operating status in Setup mode and Program mode.

Table 5.1.3.1 Target Channel Status List

Display	Status
-	Connection to the target system has failed or the target system is unconnected.
v	Connection to the target system has succeeded.
o	Programming of the target system has completed.
d	It failed in reading RAM of S1C17 MCU in the target system.
e	It failed in writing RAM of S1C17 MCU in the target system.
f	It failed in erasing flash memory of S1C17 MCU in the target system.
g	It failed in writing flash memory of S1C17 MCU in the target system.
h	It failed in verifying flash memory of S1C17 MCU in the target system.
i	Down of S1C17 MCU in target system.
a-c	A system error has occurred in the Gang Programmer. (Please contact our sales representative if this error is displayed.)

### 5.1.4 Status Message

The table below lists the status messages and their meanings.

Table 5.1.4.1 (a) Status Message List (Normal Condition)

Status message	Description
Ready	The Gang Programmer is ready to operate.
Setting firmware	The Gang Programmer firmware is being updated with the data included in the Gang Programmer control file (gpc17xxx.bin).
Updating GP	
Setting data	The Gang Programmer buffer memory is being updated with the Gang Programmer control file (gpc17xxx.bin) and the user configuration/program data file (gpdata.bin).
Setup OK	The Gang Programmer buffer memory has been successfully updated with the Gang Programmer control file (gpc17xxx.bin) and the user configuration/program data file (gpdata.bin).
Data Setup OK	
GP, Data Setup OK	
Programming	The flash memory embedded in the S1C17 MCU is being programmed.
Program OK	The programming of the flash memory embedded in the S1C17 MCU has completed.
Logging	The log is being written to the SD card.
Log OK	The writing log to the SD card has completed.
Ver.X.XX	Version number of the Gang Programmer firmware
Connecting	The connection with a target is being established.
Suspend	The update process using the Gang Programmer control file (gpc17xxx.bin) and the user configuration/program data file (gpdata.bin) has been suspended by holding down the START button three or more seconds. In this case, power must be turned off once and then on again to restart the Gang Programmer.

## 5. Display Specifications

Table 5.1.4.1 (b) Status Message List (Abnormal Condition)

Status message	Description
System error	Gang Programmer system error. Power must be turned off once and then on again to restart the Gang Programmer. <sup>*1</sup>
Flash erase err	The erasing of the Gang Programmer control file (gpc17xxx.bin) has failed during updating. This error can be released by recovery operations. <sup>*1</sup>
Flash write err	The writing of the Gang Programmer control file (gpc17xxx.bin) has failed during updating. This error can be released by recovery operations. <sup>*1</sup>
Flash verify err	The verification of the Gang Programmer control file (gpc17xxx.bin) has failed during updating. This error can be released by recovery operations. <sup>*1</sup>
Setup err	The Gang Programmer buffer memory update with the Gang Programmer control file (gpc17xxx.bin) and the user configuration/program data file (gpdata.bin) has failed. This error can be released by recovery operations. <sup>*1</sup>
Program err	The programming of the flash memory embedded in the S1C17 MCU has failed. This error can be released by recovery operations.
Data isn't agree	The user program data stored in the Gang Programmer buffer memory do not match the one that is included in the user configuration/program data file (gpdata.bin) stored in the SD card.
No log	A log has not been saved.
Log err	The writing log to the SD card has failed. This error can be released by recovery operations. <sup>*2</sup>
File control err	The control of the file in the SD card has failed. This error can be released by recovery operations. <sup>*2</sup>
No disk	No SD card is inserted. This error can be released by recovery operations.
File not found	No file exists in the SD card. This error can be released by recovery operations.
File not open	The file in the SD card cannot be opened. This error can be released by recovery operations. <sup>*2</sup>
Duplicate file	The file names in the SD card are duplicated. This error can be released by recovery operations.
Disk full	A free capacity in the SD card is insufficient. This error can be released by recovery operations.
File read only	Data cannot be written to the file in the SD card as the file attribute is read-only. This error can be released by recovery operations.
Disk err	The SD card cannot be accessed as a fatal error has occurred. This error can be released by recovery operations. <sup>*2</sup>
File format err	The SD card cannot be accessed as there is a file format error. This error can be released by recovery operations. <sup>*3</sup>
Disk access err	Accessing to the SD card has failed due to a hardware error. This error can be released by recovery operations. <sup>*2</sup>
Data format err	There is a data format error in the SD card. This error can be released by recovery operations. <sup>*3</sup>
SD Time Out	The process has timed out as the SD card does not make response. Power must be turned off once and then on again to restart the Gang Programmer. <sup>*4</sup>

<sup>\*1</sup> The Gang Programmer may be out of order. Please contact our sales representative if this error is displayed.

<sup>\*2</sup> There may be a failure in the SD card. Please try again with another SD card.

<sup>\*3</sup> There is a data error in the SD card. Please create or acquire the data again.

<sup>\*4</sup> There is a possibility that the SD card control circuit is not operating normally. Please try again after turning the power off once. If it is still not restored, the Gang Programmer may be out of order. Please contact our sales representative if this error is displayed.

## 5.2 LED

The LEDs located on the top panel indicate various statuses of each target as shown below.

Table 5.2.1 LED Status List

Mode	EXE	PASS	FAIL	Description
Setup	★blinks in yellow	● Not lit	● Not lit	The SETUP processing is being executed.
Program	★blinks in yellow	● Not lit	● Not lit	The PROGRAM processing is being executed.
	★blinks in yellow	● Lit in green	● Not lit	The programming of the target channel of which the PASS LED is lit has succeeded. The other channels are being executed.
	★blinks in yellow	● Not lit	● Lit in red	The programming of the target channel of which the FAIL LED is lit has failed. The other channels are being executed.
	● Not lit	● Lit in green	● Not lit	The programming of the target channel of which the PASS LED is lit has succeeded. Execution of all channels has completed.
	● Not lit	● Not lit	● Lit in red	The programming of the target channel of which the FAIL LED is lit has failed. Execution of all channels has completed.

## 6. Preparation of User Program Data

### 6. Preparation of User Program Data

Before programming the flash memory embedded in the S1C17 MCU with the program data developed by the user, the user configuration/program data file (gpdata.bin) must be created as in the flowchart shown below. This file is the user program data with the programming condition desired by the user appended. Write both the user configuration/program data file (gpdata.bin) and the Gang Programmer control file (gpc17xxx.bin) to an SD card to program the target system.

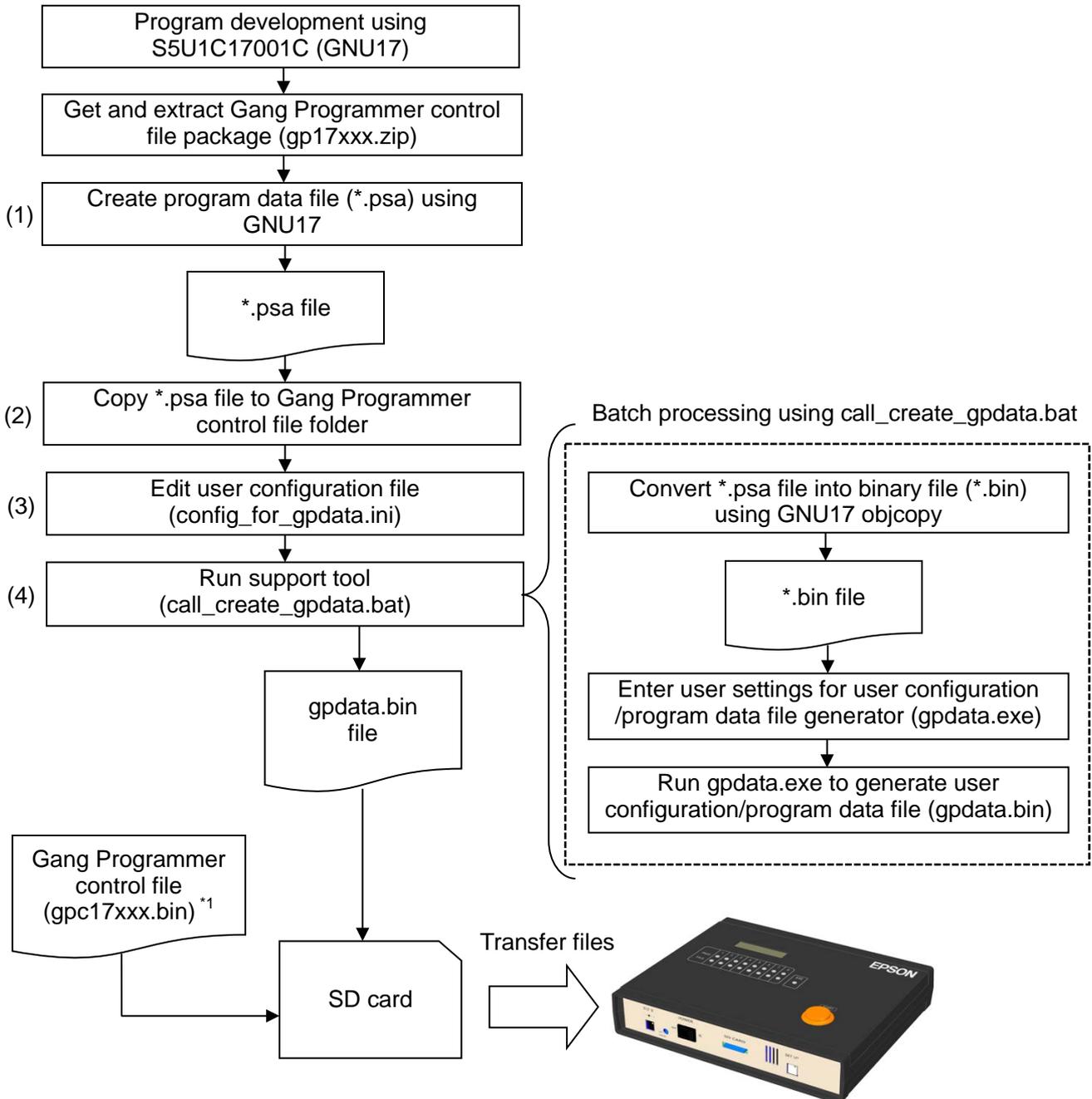


Figure 6.1 User Configuration/Program Data File (gpdata.bin) Creation Flow

\*1 gpc17xxx.bin: This file is provided for each model. “xxx” in the file name represents a model name.

### 6.1 Getting and Extracting Gang Programmer Control File Package (gp17xxx.zip)

A Gang Programmer control file package (gp17xxx.zip) is provided for each model. “xxx” in the file name represents a model name. For example, if the target model is S1C17656, “xxx” is “656.” This file can be downloaded from the EPSON microcontroller user’s site. Or please contact our sales representative. The downloaded Gang Programmer control file package (gp17xxx.zip) should be extracted.

### 6.2 Creating User Configuration/Program Data File (gpdata.bin)

Use the user configuration/program data file generator (gpdata.exe) to create a user configuration/program data file (gpdata.bin). The user configuration/program data file package (gp17xxx.zip) provides config\_for\_gpdata.ini and call\_create\_gpdata.bat for easy user configuration without the user having to directly operate gpdata.exe. Follow the procedure shown below to create the user configuration/program data file (gpdata.bin).

#### (1) Creating a program data file (\*.psa)

Use S5U1C17001C (GNU17) to create the user program data (\*.psa file).  
For how to create program data, refer to the S5U1C17001C manual.

#### (2) Copying the program data file (\*.psa)

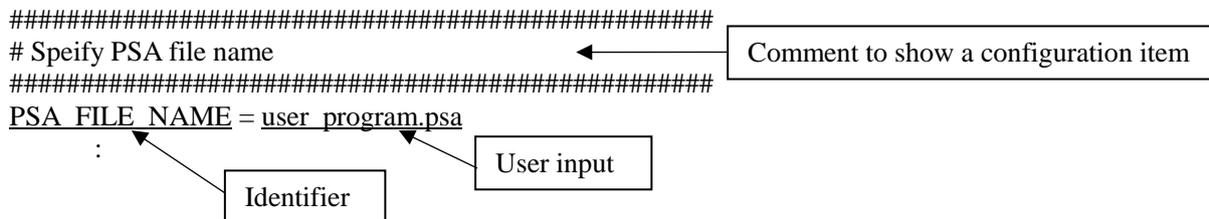
Copy the \*.psa file to the gp folder created when the Gang Programmer control file package (gp17xxx.zip) was extracted.

#### (3) Editing the user configuration file (config\_for\_gpdata.ini)

Open config\_for\_gpdata.ini included in the package with a text editor and enter the user-specific configuration information by following the comments described in the file.

Example of user configuration:

Enter the configuration information at the location indicated as “User input” below. “user\_program.psa” is entered as the PSA file name in this example.



For details of user configuration, refer to “6.3 User Configuration.”

#### (4) Running the support tool (call\_create\_gpdata.bat)

Double-click on call\_create\_gpdata.bat included in the package to launch it. Check that the all the user configuration information is displayed correctly. The gpdata.bin file is generated in the same folder as call\_create\_gpdata.bat.

## 6. Preparation of User Program Data

### 6.3 User Configuration

The user can set the desired flash programming conditions to the Gang Programmer as the user configuration information. The table below lists the user configuration items, their meanings, and the allowable ranges. The configuration items without (mandatory) description are not necessary to configure.

Table 6.3.1 User Configuration Item List

Identifier	Description	Allowable range
PSA_FILE_NAME	Specifies the *.psa user program data file name.	None in particular
VERIFICATION_METHOD (-v) <sup>*1</sup>	<p>Verification method selection Selects a method to verify the S1C17 MCU flash memory data after being programmed with the Gang Programmer buffer memory data from the alternatives shown below.</p> <p>Checksum verification: This method compares the checksum values between the buffer memory and the target flash memory.</p> <p>All data verification: This method compares all data between the buffer memory and the target flash memory.</p>	<p>0: Checksum verification (default) 1: All data verification</p>
INTERFACE_VOLTAGE (-d) <sup>*1</sup>	<p>Target interface voltage level selection (mandatory) Selects the interface voltage level between the Gang Programmer and the S1C17 MCU. Select one from an external power voltage to be applied to the TARGET_VCC_IN pin in the target interface connector and 1.8 V or 3.3 V generated by the Gang Programmer itself. Note that different voltages cannot be selected for each channel.</p>	<p>0: External voltage (default) 1: 1.8 V 2: 3.3 V</p>
BUZZER (-b) <sup>*1</sup>	<p>Selection of buzzer sound on/off at the end of program mode Selects whether the buzzer sound is generated once or not when the execution in program mode has completed.</p>	<p>0: Off (default) 1: On</p>
MODEL (-t) <sup>*1</sup>	<p>Model name setting (mandatory) The Gang Programmer recognizes the model name specified with this identifier as a part of the Gang Programmer control file name (gpc17xxx.bin). For example, if "17656" is specified with this option, the Gang Programmer control file name will be recognized as below by replacing "xxxxx" with "17656." gpcxxxxx.bin → gpc17656.bin (Refer to "6.4 File Copy (PC to SD Card).")</p>	Maximum 10 alphanumeric characters
USER_PROGRAM_ADDRESS (-a) <sup>*1</sup>	<p>User program arrangement address (mandatory) Specifies the user program arrangement address. The Gang Programmer handles the user program data as binary data, therefore, address information set in the Motorola S (psa) format file is all removed. Be sure to specify the user program start address of each model.</p>	<p>4-byte hexadecimal number 0x0000 0000 to 0xffff ffff Default: 0x0</p>

## 6. Preparation of User Program Data

Identifier	Description	Allowable range
INITIAL_SERIAL_NUMBER (-i) <sup>*1</sup>	<p>Initial serial number setting</p> <p>To assign a serial number to the S1C17 MCU on each target system, the initial value should be specified using this identifier. Do not specify this configuration information if serial numbering is not necessary. The serial number is assigned from channel 1 and sequentially incremented by the channel. It is programmed to each S1C17 MCU flash memory. If a programming error has occurred, the serial number that would be assigned shall be retired.</p> <p>Be sure to specify "SERIAL_NUMBER_START_ADDRESS" when "INITIAL_SERIAL_NUMBER" is specified. If "INITIAL_SERIAL_NUMBER" is specified without specifying "SERIAL_NUMBER_START_ADDRESS," "SERIAL_NUMBER_START_ADDRESS" is set to the default value. To restore the serial number to the initial value, execute a SETUP operation again.</p>	<p>4-byte hexadecimal number</p> <p>0x0000 0000 to 0xffff ffff</p> <p>Default: 0x0</p> <p>NO: No serial number</p>
SERIAL_NUMBER_START_ADDRESS (-s) <sup>*1</sup>	<p>Serial number programming area start address setting</p> <p>The serial number occupies a user program area of four bytes. The serial number programming area start address must be specified in an unused user program area. Be sure to specify "INITIAL_SERIAL_NUMBER" when "SERIAL_NUMBER_START_ADDRESS" is specified. If "SERIAL_NUMBER_START_ADDRESS" is specified without specifying the "INITIAL_SERIAL_NUMBER," "INITIAL_SERIAL_NUMBER" is set to the default value.</p>	<p>4-byte hexadecimal number</p> <p>0x0000 0000 to 0xffff ffff</p> <p>Default: 0x0</p> <p>NO: No serial number</p>
SECURITY_PASSWORD (-p) <sup>*1</sup>	<p>Flash memory security password</p> <p>Specifies the password for the S1C17 MCU flash memory security function. The Gang Programmer temporarily disables the flash memory protection during programming and enables the password protection again after the programming has completed.</p>	<p>Maximum 12 alphanumeric characters</p> <p>NO: No password</p>
CHECK_USER_PROGRAM_CHECKSUM (-c) <sup>*1</sup>	<p>User program data checksum display</p> <p>Specifying this identifier displays the checksum of the user program data included in the gpdata.bin file that has already been generated. When displaying the checksum, do not specify any other identifiers. Otherwise, an unintended checksum will be displayed.</p>	<p>YES: Displayed</p> <p>NO: Not displayed</p>

\*1 The symbols given in parenthesis should be used to directly specify the configuration information in the command line of the user configuration/program data file generator (gpdata.exe). For more information, refer to "Appendix B Method for Operating gpdata.exe."

## 6. Preparation of User Program Data

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### 6.4 File Copy (PC to SD Card)

Copy the two files shown below for controlling the Gang Programmer from the PC to an SD card. Do not rename these files.

(User file)

- User configuration program data file: gpdata.bin

(Regular file)

- Gang Programmer control file: gpc17xxx.bin <sup>\*1</sup>

\*1 This file is provided for each model and “xxx” in the file name is a model name.

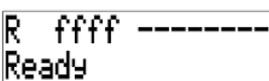
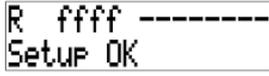
For example, “xxx” is “656” if the target MCU is S1C17656.

## 7. Operations

### 7.1 Data Setup

Turn the power switch of the Gang Programmer to the ON side. Insert the SD card prepared as described in Chapter 6 into the slot on the front panel after making sure that “Ready” is displayed on the LCD panel. Pressing the SETUP button on the front panel starts data transfer from the SD card to the Gang Programmer buffer memory. When the START button is held down three or more seconds while data is being transferred, the Gang Programmer terminates the setup processing and displays “Suspended.” Once the data is set up, it will not disappear even if the Gang Programmer is turned off.

Table 7.1.1 Setup State Transition Table

Operation/status	LED	LCD	Photograph	Note
An SD card is inserted.	1 2 3 4 5 6 7 8 PASS ● ● ● ● ● ● ● ● FAIL ● ● ● ● ● ● ● ● EXE ●	 (Display example immediately after power-on)		Must be Ready mode.
The SETUP button is pressed.	1 2 3 4 5 6 7 8 PASS ● ● ● ● ● ● ● ● FAIL ● ● ● ● ● ● ● ● EXE ★ (blinking)			When the START button is held down three or more seconds after pressing the SETUP button, the setup processing is suspended.
The setup has completed.	1 2 3 4 5 6 7 8 PASS ● ● ● ● ● ● ● ● FAIL ● ● ● ● ● ● ● ● EXE ●	In the case of FW Ver. 1.xx <sup>*1</sup>  In the case of FW Ver. 2.00 or later <sup>*1</sup> 		

\*1 FW = Firmware

If an error has occurred, refer to “Table 5.1.4.1 (b) Status Message List (Abnormal Condition)” for the description of the error.

#### !! NOTE !!

- Always make sure that the Gang Programmer is off or in Ready mode (“R” is displayed on the upper left of the LCD panel) before inserting/removing an SD card. Be sure to do this, otherwise, data, or the SD card itself in the worst case, may be destroyed.
- The Gang Programmer control file (gpc17xxx.bin) contains the Gang Programmer firmware as well as the control data depending on the target model. If the version of the firmware held in the Gang Programmer is older than one that is included in the Gang Programmer control file (gpc17xxx.bin) recorded in the SD card, the Gang Programmer firmware is updated during the data setup performed immediately after the Gang Programmer is powered on. For the status display while the firmware is being updated, see the table below.

## 7. Operations

Table 7.1.2 Gang Programmer Firmware Update State Transition Table

Operation/status	LED	LCD	Photograph	Note
An SD card is inserted.	1 2 3 4 5 6 7 8 PASS ● ● ● ● ● ● ● ● FAIL ● ● ● ● ● ● ● ● EXE ●	 (Display example immediately after power-on)		This operation must be performed immediately after turning power on.
The SETUP button is pressed.	1 2 3 4 5 6 7 8 PASS ● ● ● ● ● ● ● ● FAIL ● ● ● ● ● ● ● ● EXE ★ (blinking)	In the case of FW Ver. 1.xx <sup>*1</sup> 		
		In the case of FW Ver. 2.00 or later <sup>*1</sup> 		
The setup has completed.	1 2 3 4 5 6 7 8 PASS ● ● ● ● ● ● ● ● FAIL ● ● ● ● ● ● ● ● EXE ●	In the case of FW Ver. 1.xx <sup>*1</sup> 		
		In the case of FW Ver. 2.00 or later <sup>*1</sup> 		

\*1 FW = Firmware

If an error has occurred, refer to “Table 5.1.4.1 (b) Status Message List (Abnormal Condition)” for the description of the error.

- Gang Programmer buffer memory

The Gang Programmer includes a buffer memory and the SD card contents are transferred to it by pressing the SETUP button. The target system is programmed with the data in the buffer memory, not directly with the SD card data.

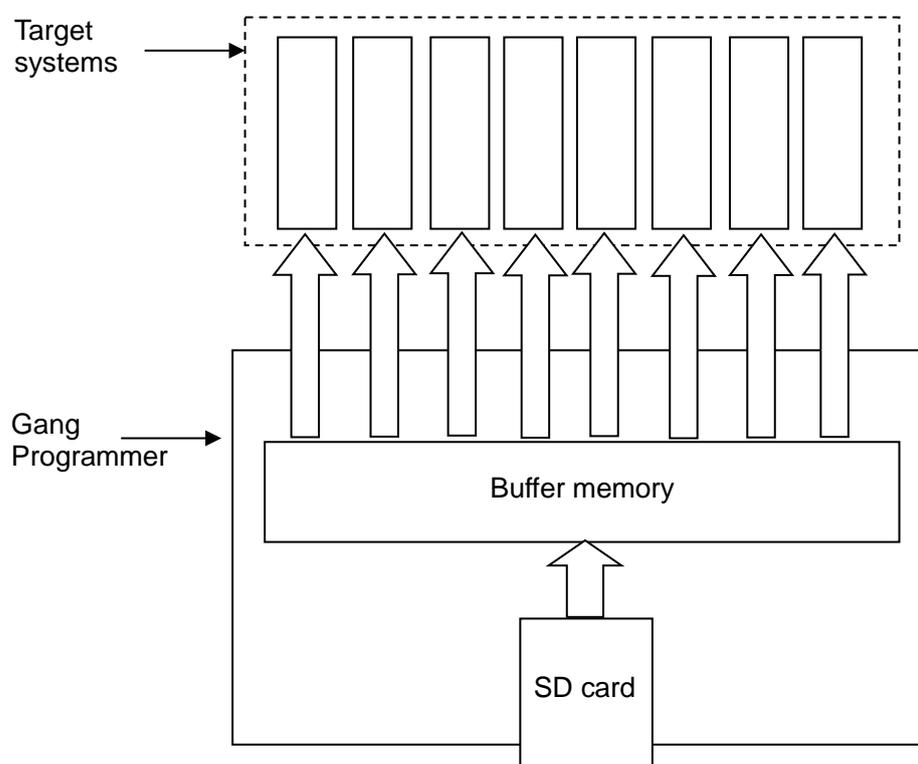


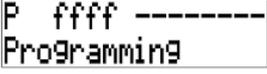
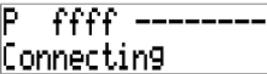
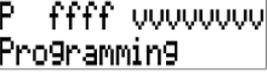
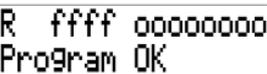
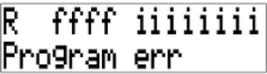
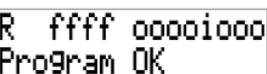
Figure 7.1.1 Data Transfer Schematic Diagram

## 7. Operations

### 7.2 Target Flash Memory Data Programming

Pressing the START button on the top panel starts programming of the flash memory embedded in the S1C17 MCU with the data written to the Gang Programmer buffer memory. It is not necessary to insert an SD card. Make sure that the target systems are connected correctly before pressing the START button. When the programming has all completed, the buzzer sounds to provide notification it has completed. However, the buzzer does not sound if the buzzer condition in the user configuration program file is set to buzzer off.

Table 7.2.1 Programming State Transition Table

Operation/status	LED	LCD	Photograph	Note
The setup or the last programming has completed.	1 2 3 4 5 6 7 8 PASS ● ● ● ● ● ● ● ● FAIL ● ● ● ● ● ● ● ● EXE ●	 (Display example when the setup has completed)		The setup operation must be finished.
The target systems are connected.	1 2 3 4 5 6 7 8 PASS ● ● ● ● ● ● ● ● FAIL ● ● ● ● ● ● ● ● EXE ●			
The START button is pressed.	In the case of FW Ver. 1.xx *1 1 2 3 4 5 6 7 8 PASS ● ● ● ● ● ● ● ● FAIL ● ● ● ● ● ● ● ● EXE ★ (blinking)			
	In the case of FW Ver. 2.00 or later *1 1 2 3 4 5 6 7 8 PASS ● ● ● ● ● ● ● ● FAIL ● ● ● ● ● ● ● ● EXE ●			When TARGET_RST_OUT is not connected to the target system, hold down the START button and reset the target system.
Connection to the S1C17 MCU is established and the programming is being executed. (When programming all channels)	1 2 3 4 5 6 7 8 PASS ● ● ● ● ● ● ● ● FAIL ● ● ● ● ● ● ● ● EXE ★ (blinking)			The programming time depends on the flash memory capacity of the target system.
The programming has completed. (When all channels have successfully completed)	1 2 3 4 5 6 7 8 PASS ● ● ● ● ● ● ● ● FAIL ● ● ● ● ● ● ● ● EXE ●			
The programming has completed. (When all channels have failed)	1 2 3 4 5 6 7 8 PASS ● ● ● ● ● ● ● ● FAIL ● ● ● ● ● ● ● ● EXE ●			Each target channel status display indicates the error that has occurred.
The programming has completed. (When the channels, except channel 5 that has failed, have successfully completed)	1 2 3 4 5 6 7 8 PASS ● ● ● ● ● ● ● ● FAIL ● ● ● ● ● ● ● ● EXE ●			The LCD panel displays "Program OK" when at least one channel has succeeded.

Operation/status	LED	LCD	Photograph	Note
The programming has completed. (When the channels, except channel 5 in connection failure (disconnected), have successfully completed)	1 2 3 4 5 6 7 8 PASS ● ● ● ● ● ● ● ● FAIL ● ● ● ● ● ● ● ● EXE ●			

\*1 FW = Firmware

If an error has occurred, refer to “Table 5.1.4.1 (b) Status Message List (Abnormal Condition)” for the description of the error.

### **!! NOTE !!**

- Always make sure that the Gang Programmer is off or in Ready mode (“R” is displayed on the upper left of the LCD panel) before connecting/disconnecting target systems. Be sure to do this, otherwise, the target system may be destroyed.
- The Gang Programmer programs the target S1C17 MCU flash memory with the data stored in its buffer memory. Be aware that the Gang Programmer does not use the data stored in the SD card even if it has been inserted. The Gang Programmer firmware Ver. 2.00 or later can display an error message if the Gang Programmer buffer memory data and SD card data do not match.

## 7. Operations

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- Serial numbering function

When an initial serial number and a serial number area start address are specified by the user configuration, the Gang Programmer allocates 4 bytes from the specified address for the serial number area and assigns a serial number in ascending order of the target channel number.

If an error occurs while the S1C17 MCU flash memory of a target channel is being programmed, the serial number assigned to the S1C17 MCU is handled as a missing number that will not be reassigned. This missing serial number can be read out from the log file (refer to “7.3 Log Output”).

For example, when the serial numbers are assigned from number 1 and an error occurs in the target corresponding to number 5, the serial number 5 is handled as a missing number.

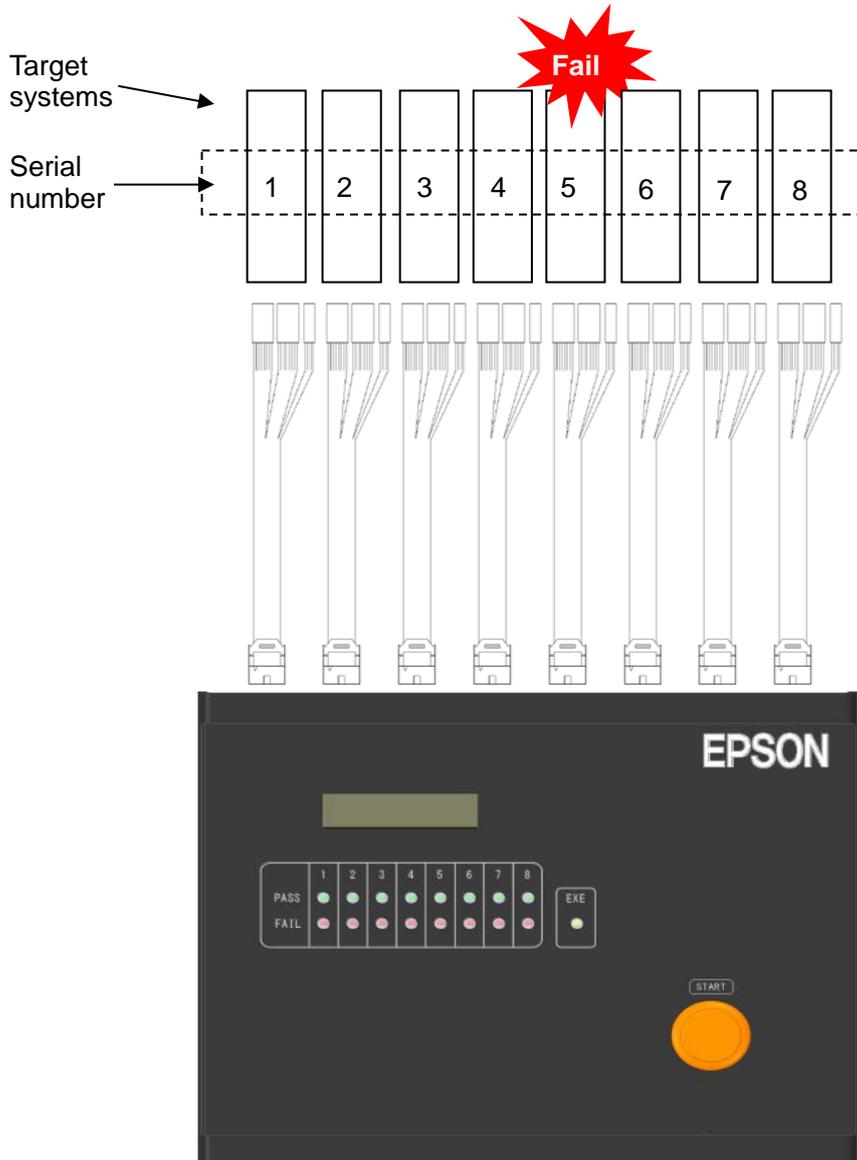
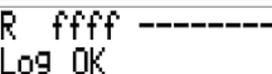


Figure 7.2.1 Handling Serial Number when Programming Error Occurred

### 7.3 Log Output

Log information can be recorded in an SD card. Disconnect all target systems, insert an SD card, and then press the START button.

Table 7.3.1 Log Output State Transition Table

Operation/status	LED	LCD	Photograph	Note
All target systems are disconnected and an SD card is inserted.	1 2 3 4 5 6 7 8 PASS ● ● ● ● ● ● ● ● FAIL ● ● ● ● ● ● ● ● EXE ●	 (Display example when the programming has completed)		
The START button is pressed to start log output.	1 2 3 4 5 6 7 8 PASS ● ● ● ● ● ● ● ● FAIL ● ● ● ● ● ● ● ● EXE ★ (blinking)			
The log output has completed.	1 2 3 4 5 6 7 8 PASS ● ● ● ● ● ● ● ● FAIL ● ● ● ● ● ● ● ● EXE ●			

If an error has occurred, refer to “Table 5.1.4.1 (b) Status Message List (Abnormal Condition)” for the description of the error.

#### **!! NOTE !!**

The log file name is always set to “gplog.txt.” Be aware that the file with the same name is overwritten if it exists in the SD card. The log data in the Gang Programmer is cleared by pressing the SETUP button. Up to 10,752 programming log data can be stored in the Gang Programmer. If log data exceeds 10,752, the existing data will be overwritten from the oldest data first.

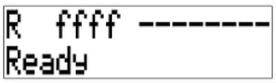


- \*1 This field represents the Gang Programmer buffer memory address and it helps you to check whether the old log data has been overwritten due to full memory or not. The start address is “1000000” and the address is increased by 0x20 every time the log of a channel is acquired. The most significant digit circulates from “1” to “7” and the six low-order digits circulate from “000000” to “05FFE0.”
- \*2 The following information is output only when the Gang Programmer firmware version is 2.00 or later.  
 Gang Programmer FW Ver:  
 Target MCU:  
 FLS Ver:

## 7.4 Gang Programmer Firmware Version Check

The Gang Programmer displays the version number of the Gang Programmer firmware by pressing the SETUP button without an SD card inserted.

Table 7.4.1 Version Check State Transition Table

Operation/status	LED	LCD	Photograph	Note
The SD card is removed from the Gang Programmer and the SETUP button is pressed.	1 2 3 4 5 6 7 8 PASS ● ● ● ● ● ● ● ● FAIL ● ● ● ● ● ● ● ● EXE ●	 (Display example immediately after power-on)		
Version display	1 2 3 4 5 6 7 8 PASS ● ● ● ● ● ● ● ● FAIL ● ● ● ● ● ● ● ● EXE ●			The user serial number that will be programmed next is displayed on the right of the version number. “fffffffff” is displayed if serial numbering is not specified.
Return to Ready mode	1 2 3 4 5 6 7 8 PASS ● ● ● ● ● ● ● ● FAIL ● ● ● ● ● ● ● ● EXE ●			The character “C” (Check) displayed at the upper left on the LCD panel immediately changes to “R” (Ready).

If an error has occurred, refer to “Table 5.1.4.1 (b) Status Message List (Abnormal Condition)” for the description of the error.

## 7. Operations

- Operation Example

Power-on → Setup → Target programming → Log output → Reading Log

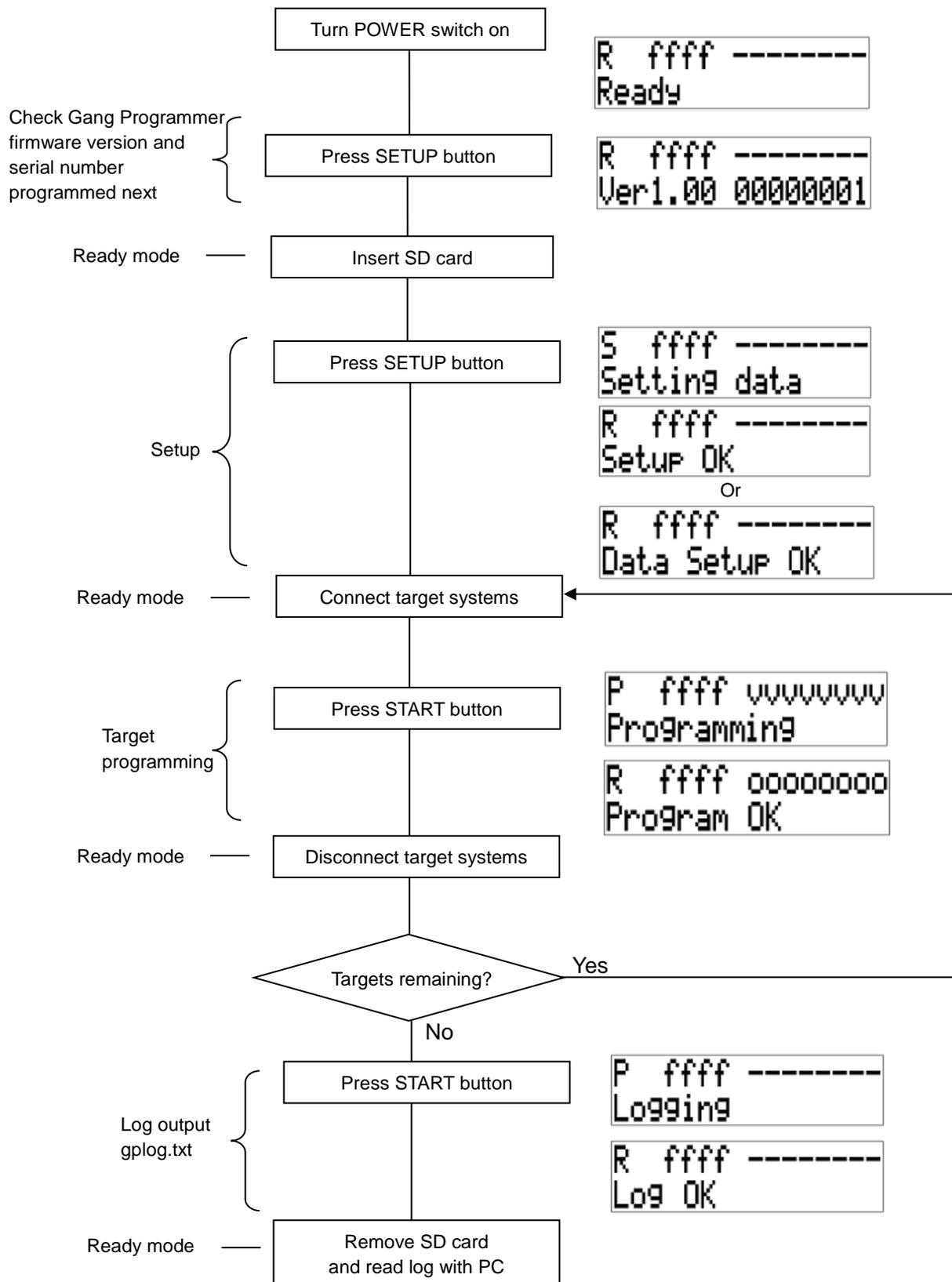


Figure 7.4.1 Example of Operation Flow

## 8. Specifications

### 8.1 Gang Programmer Main Unit

Table 8.1.1 Gang Programmer Main Unit Specifications

Item	Specification	Remarks
Dimensions	270 mm (W) × 220 mm (D) × 50 mm (H)	Rubber legs not included
Input voltage	DC 12 V	
Power consumption	1.5 A or less	
Target interface connector	7610-5002PL (3M)	

### 8.2 AC Adaptor

Table 8.2.1 AC Adaptor Specifications

Item	Specification	Remarks
Dimensions	49.8 mm (W) × 68.2 mm (D) × 26.3 mm (H)	
Input voltage	AC 90 to 264 V, 47 to 63 Hz	
Output voltage	DC 12 V	
Supply power	18 W	
Plug	Inside diameter 2.1 mm, outside diameter 5.5 mm, center +	

- UI318-12-JASK-0073PZ manufactured by UNIFIVE Co., Ltd.

## 9. Electrical Characteristics

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## 9. Electrical Characteristics

### 9.1 Operating Conditions

Table 9.1.1 Operating Conditions

Condition	Range
Operating voltage	DC 12 V $\pm$ 5%
Operating temperature	5 to 40°C
Storage temperature	-10 to 60°C
Operating humidity	35 to 80%, Non-condensing
Storage humidity	20 to 85%, Non-condensing

## Appendix A Target System Interface Cable

### A.1 Cable A ( S5U1C17001W7100 ) Specification

The following shows the specifications of the target system interface cables (selling separately). In S5U1C17001W2000, it is attached to the main body.

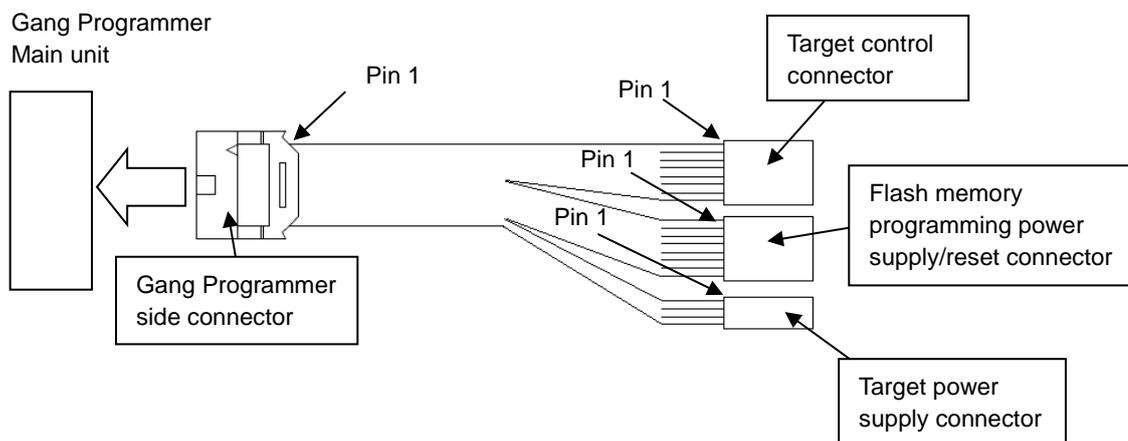


Figure A.1.1 Target System Interface Cable

#### A.1.1 Pin Assignment Table

- Target control connector

The table below lists the pin assignment of the target control connector.

Table A.1.1.1 Target Control Connector Pin Assignment

Target control connector (4 pins)		
No	Pin name	Pin function
1	DCLK	Clock signal output for debugging
2	GND	Ground
3	DSIO	Serial communication signal input/output
4	DST2	Debug status signal output

- Flash memory programming power supply/reset connector

The table below lists the pin assignment of the flash memory programming power supply/reset connector.

Table A.1.1.2 Flash Memory Programming Power Supply/Reset Connector Pin Assignment

Flash memory programming power supply/reset connector (4 pins)		
No	Pin name	Pin function
1	FLASH_VCC_OUT	Flash memory programming voltage output
2	GND	Ground
3	TARGET_RST_OUT	Target reset signal input
4	TARGET_VCC_IN	Target voltage input

## Appendix A Target System Interface Cable

- Target power supply connector

The table below lists the pin assignment of the target power supply connector.

Table A.1.1.3 Target Power Supply Connector Pin Assignment

Target power supply connector (2 pins)		
No	Pin name	Pin function
1	VCC3.3V	Power supply (3.3 V)
2	VCC1.8V	Power supply (1.8 V)

### A.1.2 Each Part Specification

Table A.1.2.1 Target Connector Specifications

Component	Item	Specification	Remarks
Target interface connector (Gang Programmer side)	Product number	Connector: 7910-6500SC (3M) Strain relief: 3448-7910 (3M)	
Target interface cable (10 pins—4 + 4 + 2 pins)	Length	About 30 cm	
Target interface connector (target side)	Product number	Connector (4 pins): RE-04 (JST) Connector (2 pins): RE-02 (JST) Contact: RF-SC2210 (LF) (SN) (JST)	

## A.2 Cable B ( S5U1C17001W7200 ) Specification

The specification of the target system interface cable (selling separately) compatible with ICDminiVer.1 and 2 of the connector on the target system side is as follows.

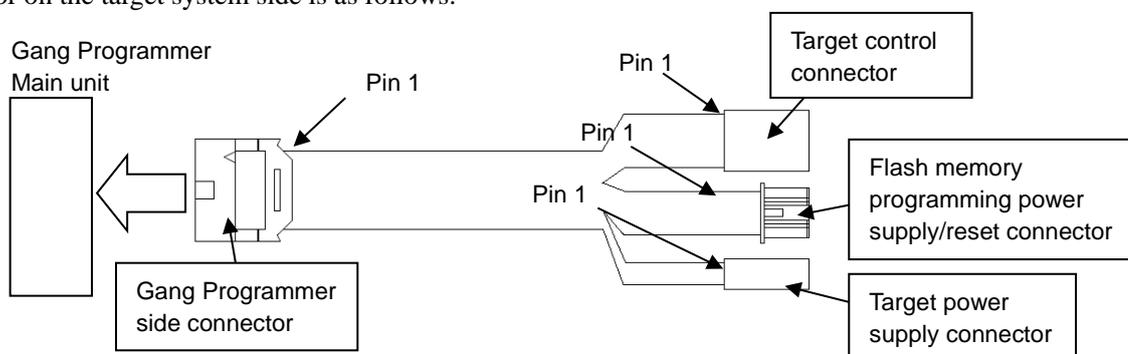


Figure A.2.1 Target Interface Cable Compatible with ICDmini Ver.1 and 2

### A.2.1 Pin Assignment Table

- Target control connector

The table below lists the pin assignment of the target control connector.

Table A.2.1.1 Target Control Connector Pin Assignment

Target control connector (4 pins)		
No	Pin name	Pin function
1	DCLK	Clock signal output for debugging
2	GND	Ground
3	DSIO	Serial communication signal input/output
4	DST2	Debug status signal output

- Flash memory programming power supply/reset connector

The table below lists the pin assignment of the flash memory programming power supply/reset connector.

Table A.2.1.2 Flash Memory Programming Power Supply/Reset Connector Pin Assignment

Flash memory programming power supply/reset connector (4 pins)		
No	Pin name	Pin function
1	FLASH_VCC_OUT	Flash memory programming voltage output
2	GND	Ground
3	TARGET_RST_OUT	Target reset signal input
4	TARGET_VCC_IN	Target voltage input

- Target power supply connector

The table below lists the pin assignment of the target power supply connector.

Table A.2.1.3 Target Power Supply Connector Pin Assignment

Target power supply connector (2 pins)		
No	Pin name	Pin function
1	VCC3.3V	Power supply (3.3 V)
2	VCC1.8V	Power supply (1.8 V)

### A.2.2 Each Part Specification

Table A.2.2.1 Target Connector Specifications

Component	Item	Specification	Remarks
Target interface connector (Gang Programmer side)	Product number	Connector: 7910-6500SC (3M) Strain relief: 3448-7910 (3M)	
Target interface cable (10 pins—4 + 4 + 2 pins)	Length	About 30 cm	
Target interface connector (target side)	Product number	Connector (4 pins): RE-04 (JST) Connector (2 pins): RE-02 (JST) Contact: RF-SC2210 (LF) (SN) (JST)	Black connector
		Connector (4pins): PAP-04V-S(JST) Cantact: SPHD-002T-P0.5(JST)	White connector

### Appendix B Method for operating gpdata.exe

A user configuration/program data file (gpdata.bin) can also be created using the user configuration/program data file generator (gpdata.exe) other than the method that uses the support tool call\_create\_gpdata.bat and the config\_for\_gpdata.ini file. This section describes its procedure. The user configuration/program data file generator (gpdata.exe) and Gang Programmer control file (gpc17xxx.bin) are included in the Gang Programmer control file package (gp17xxx.zip). “xxx” in the file name represents a model name. For the procedure to create a user configuration/program data file (gpdata.bin), refer to “6. Preparation of User Program Data.”

#### B.1 Binary File Conversion

Convert the user program data (.psa file) created by the user into binary data.

To convert .psa file into binary data, launch “objcopy.exe” included in the S5U1C17001C (GNU17) package from the command prompt window on the PC.

Format:

```
>objcopy -I srec -O binary <Input filename> <Output filename>
```

Execution example:

```
>C:\EPSON\GNU17\objcopy -I srec -O binary test17656.psa test17656.bin
```

(In the case that GNU17 is installed in the “C:\EPSON\GNU17” folder)

#### B.2 Adding User Configuration Information

Add the programming conditions desired by the user to the binary data generated as in the previous section using the user configuration/program data file generator (gpdata.exe). The nine conditions shown below can be added. For more information on the items to be configured, refer to “6.3 User Configuration.”

- (1) Verification method (checksum verification or all data verification) (-v)
- (2) Target interface voltage level (3.3 V, 1.8 V, or external input) (-d)
- (3) Buzzer (on or off) (-b)
- (4) Model name (-t)
- (5) User program arrangement address (-a)
- (6) Serial number (-i)
- (7) Address to write serial number (-s)
- (8) Flash security password (-p)
- (9) User program data checksum display (-c)

### B.3 Executing gpdata.exe

Launch “gpdata.exe” from the command prompt window on the PC to generate the user configuration/program data file (gpdata.bin) that includes the ultimate programming data.

Format:

```
>gpdata <filename> { -opt }
```

Execution example:

```
>gpdata test17656.bin -d2 -t17656 -a0x8000  
program checksum 0xaaaa
```

## Revision History

## Revision History

Attachment-1

Rev. No.	Date	Page	Category	Contents
Rev. 1.0	2014/10/03	All	new	New establishment
Rev. 1.1	2015/03/30	cover, P1	revision	Added model name S5U1C17001W2000 -> S5U1C17001W2000/2100
Rev. 1.1	2015/03/30	P1	revision	It was described that S5U1C17001W2000 did not attached the SD card.
Rev. 1.1	2015/03/30	P2	revision	It was described that the target system interface cable A is attached only to S5U1C17001W2000, and the SD card is attached only to S5U1C17001W2100.
Rev. 1.1	2015/03/30	P4	revision	Added maximum size of the SD card and the SDHC card.
Rev. 1.1	2015/03/30	P6	revision	It was described that the target system interface cable is recommended that written in the Appendix.
Rev. 1.1	2015/03/30	P8	revision	Added definition of release time of the target system reset signal.
Rev. 1.1	2015/03/30	P11	revision	Added explanation of status sign when PROGRAM operates.
Rev. 1.1	2015/03/30	P30	revision	Added explanation of the target system interface cable B.
Rev. 1.2	2016/05/27	P11	revision	Modified the description.
Rev. 1.2	2016/05/27	P11 to 12	addition	Added status messages.
Rev. 1.2	2016/05/27	P19	addition	Added a suspending method and display contents in the case of FW Ver. 2.00 to the setup state transition table.
Rev. 1.2	2016/05/27	P19 to 20	addition	Added description for Gang Programmer firmware update.
Rev. 1.2	2016/05/27	P22	addition	Added LED status in the case of FW Ver. 2.00 to the programming state transition table.
Rev. 1.2	2016/05/27	P23	addition	Added a note on programming of the target flash memory.
Rev. 1.2	2016/05/27	P26 to 27	addition	Added output format.
Rev. 1.2	2016/05/27	P27	revision	Modified the section title to the target flash memory.gramming stat. 2
Rev. 1.2	2016/05/27	P28	addition	Added display contents in the case of FW Ver. 2.00 to the example of operation flow.
Rev. 1.2	2016/05/27	P10, P19 to 28	revision	Replaced the LCD panel display contents.
Rev. 1.2	2016/05/27	P14 to 17	revision	Modified the description to the user configuration/program data file (gpdata.bin) creation method using the Gang Programmer control file package (gp17xxx.zip).
Rev. 1.2	2016/05/27	P34 to 35	addition	Added detailed gpdata.exe operation procedure to Appendix.
Rev. 1.3	2017/06/27	cover, P1	addition	Added "S5U1C17001W2200".
Rev. 1.3	2017/06/27	P2	addition	Added "Free gift" comments.
Rev. 1.3	2017/06/27	back cover	addition	Updated the address of Internal Sales Operations. EPSON(CHINA).CO.,LTD / SHANGHAI BRANCH / SHENZHEN BRANCH

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