

CMOS 16-BIT SINGLE CHIP MICROCONTROLLER

**S5U1C17000Y22**

**GangWriter Ver 2.0**

**Software Manual**

## Evaluation board/kit and Development tool important notice

---

1. This evaluation board/kit or development tool is designed for use for engineering evaluation, demonstration, or development purposes only. Do not use it for other purpose. It is not intended to meet the requirement of design for finished product.
2. This evaluation board/kit or development tool is intended for use by an electronics engineer, and it is not the product for consumer. The user should use this goods properly and safely. Seiko Epson dose not assume any responsibility and liability of any kind of damage and/or fire coursed by usage of it. User should cease to use it when any abnormal issue occurs even during proper and safe use.
3. The part used for this evaluation board/kit or development tool is changed without any notice.

## NOTICE

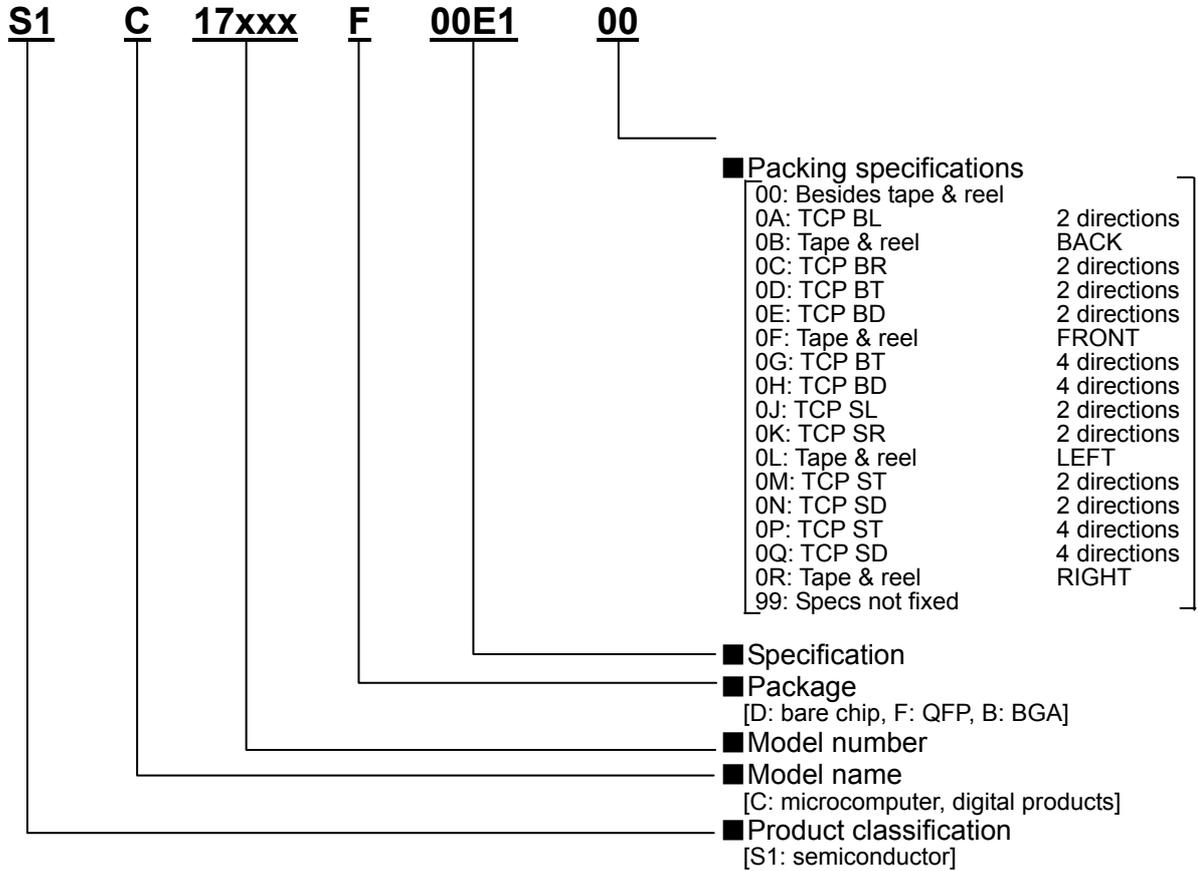
---

No part of this material may be reproduced or duplicated in any form or by any means without the written permission of Seiko Epson. Seiko Epson reserves the right to make changes to this material without notice. Seiko Epson does not assume any liability of any kind arising out of any inaccuracies contained in this material or due to its application or use in any product or circuit and, further, there is no representation that this material is applicable to products requiring high level reliability, such as, medical products. Moreover, no license to any intellectual property rights is granted by implication or otherwise, and there is no representation or warranty that anything made in accordance with this material will be free from any patent or copyright infringement of a third party. This material or portions thereof may contain technology or the subject relating to strategic products under the control of the Foreign Exchange and Foreign Trade Law of Japan and may require an export license from the Ministry of Economy, Trade and Industry or other approval from another government agency.

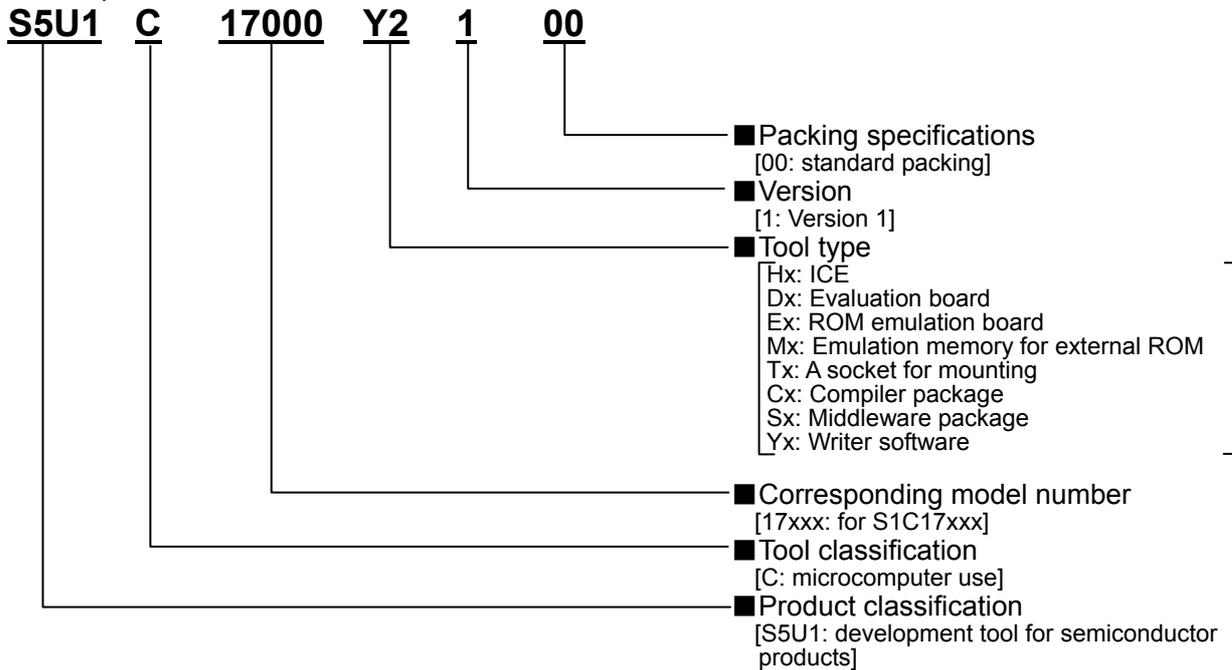
All brands or product names mentioned herein are trademarks and/or registered trademarks of their respective companies.

## Configuration of product number

### ● Devices



### ● Development tools



# Table of Contents

<b>1. Overview</b> .....	<b>1</b>
<b>2. Differences between Versions</b> .....	<b>2</b>
<b>3. Hardware Required</b> .....	<b>3</b>
<b>4. Preparations for GangWriter</b> .....	<b>4</b>
4.1 Prepared Files .....	4
4.2 Created File .....	4
4.3 Confirmation of ICDmini Hardware Version .....	4
<b>5. How to Use GangWriter Software</b> .....	<b>6</b>
5.1 ICDmini DIP Switch Settings .....	6
5.2 Connecting ICDmini with PC .....	7
5.3 GangWriter Software Installation .....	7
5.4 GangWriter Startup .....	7
5.5 GangWriter Load Parameter Settings .....	8
5.6 Loading to ICDmini in Advance .....	13
<b>6. GangWriting</b> .....	<b>18</b>
6.1 GangWriter Main Screen Descriptions .....	18
6.2 Enter ID Number .....	20
6.3 Connect Target System .....	20
6.4 Establish Connection with ICDmini .....	21
6.5 Loading .....	22
6.6 Remove the target systems .....	23
6.7 Clear the LED display .....	23
6.8 Repeat the procedure .....	23
6.9 Finish the task .....	23
<b>7 Other Functions</b> .....	<b>24</b>
7.1 Individual Execution .....	24
7.2 Select an Operation .....	24
7.3 Counter Function .....	24
7.4 Help Function .....	24
7.5 Configuration Function .....	25
<b>Appendix GangWriter Dynamic Link Library Manual</b> .....	<b>27</b>
<b>A.1 Overview</b> .....	<b>27</b>
A.1.1 Function Calling Example .....	27
<b>A.2. Function Details</b> .....	<b>28</b>
A.2.1 OpenIcdConnection .....	28
A.2.2 CloseIcdConnection .....	28
A.2.3 ResetTarget .....	29
A.2.4 CheckTargetConnection .....	29
A.2.5 StartOperation .....	30

A.2.6	GetStatus .....	31
A.2.7	GetString .....	32
A.2.8	GetConnectedICD.....	33
A.2.9	LoadLcdFisProgram.....	35
A.2.10	LoadLcdUserProgram .....	36
A.2.11	GetLcdStatus .....	37
<b>A.3</b>	<b>Restrictions .....</b>	<b>39</b>
<b>A.4</b>	<b>Measurement Results.....</b>	<b>39</b>
<b>Revision History .....</b>		<b>40</b>

## 1. Overview

S5U1C170001Y22 is GangWriter software for Windows to implement the GangWriter functions for the S1C17 Family using S5U1C17001H (ICDmini) and a PC. Controlling up to 10 ICDmini units together, it is possible simultaneously to erase the Flash memory and to load data (a user program) to the Target System connected with each ICDmini. And for each ICDmini, it is also possible to connect a different target system and to load a different user program.

This software is compatible with Windows XP, Windows Vista and Windows7 (Japanese version and English version) (it is not compatible with 64-bit OS).

S5U1C17001H2100 (ICDmini Ver2.0) can be used as-is.

When using S5U1C17001H1100 (ICDmini Ver1.0) and S5U1C17001H1200 (ICDmini Ver1.1), the firmware version-up and the serial number registration in the main body are required.

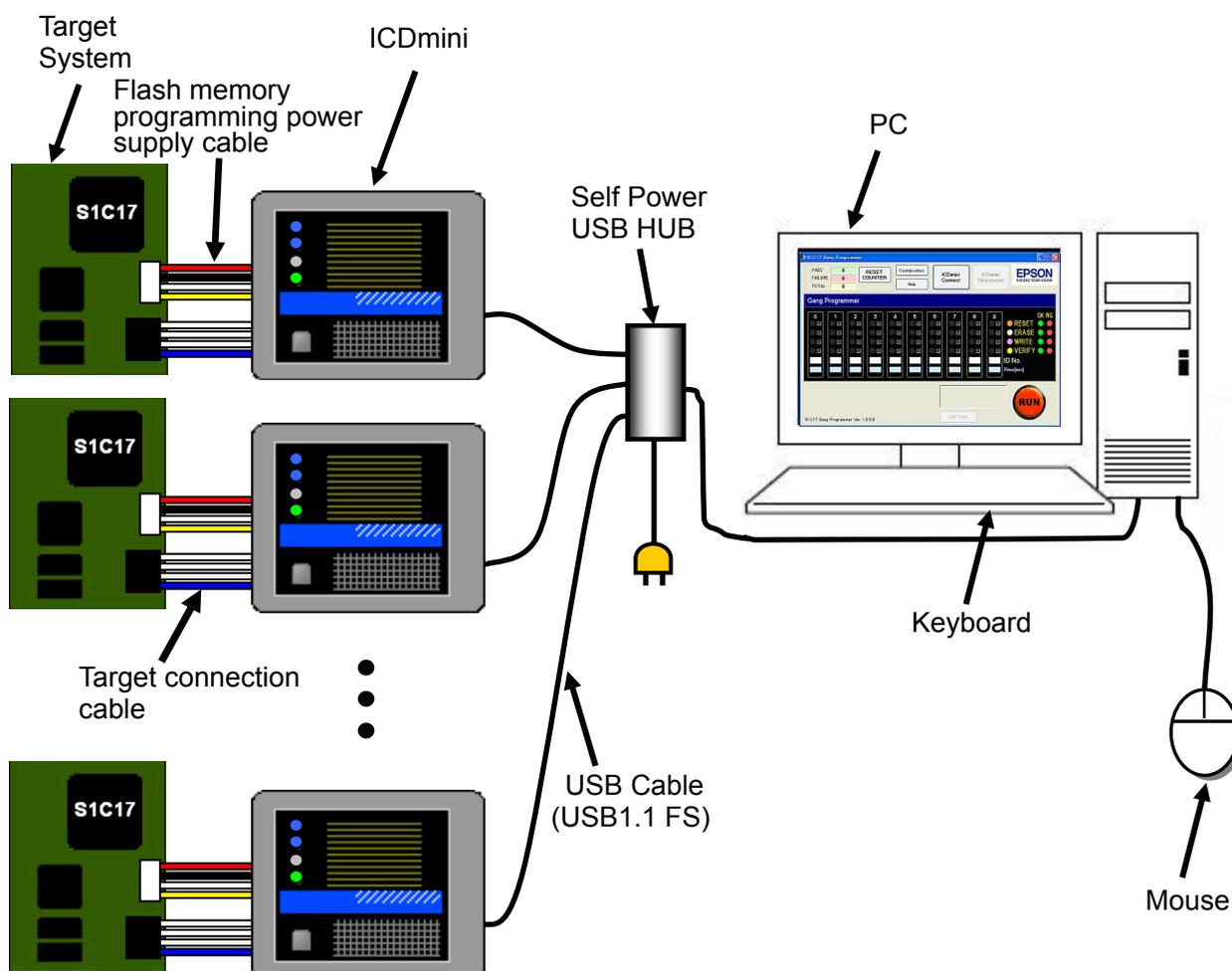


Figure 1.1 GangWriter hardware configurations

## 2. Differences between Versions

---

### 2. Differences between Versions

For GangWriter Ver1.0, loading the Flash memory erase / write program (FLS) and the user program data with GDB (debugger) to each ICDmini is required in advance. However, for GangWriter Ver2.0, all works including the above pre-loading to ICDmini can be done.

Table 2.1 GangWriter function comparison table for each version

GangWriter Software	Ver1.0	Ver2.0
Maximum number of writing units to the Target System at one time (Maximum number of ICDmini units to be connected)	10	
Maximum size of writing user program data	4MB	
Writing to Flash memory built-in MCU	Possible	
Writing to external Flash memory connected with MCU	Possible	
Pre-loading Flash memory erase / write program (FLS) to ICDmini	Not supporting	Supporting
Pre-loading user program data to ICDmini	Not supporting	Supporting
Confirmation of comments (version, etc.) for erasing Flash memory and loading program stored in ICDmini	Not supporting	Supporting
Confirmation of comments (version, etc.) for user program data stored in ICDmini	Not supporting	Supporting
Identification with serial number	Unnecessary	Necessary
Allocation of individual ID number to ICDmini	Possible	

### 3. Hardware Required

The hardware required can be obtained from the following sources.

Table 3.1 Required hardware list

Item	Source
S5U1C17000Y22 GangWriter Software Ver2.0	Epson Web site <a href="http://www.epson.jp/device/semicon_e/product/mcu/">http://www.epson.jp/device/semicon_e/product/mcu/</a>
S5U1C17001C (S1C17 Family C compiler package)	
S5U1C17001H (ICDmini) User Manual	
S5U1C17001H (ICDmini) updated firmware	
S5U1C17001H (ICDmini) firmware Ver1.1 * Necessary only when the current firmware version is Ver1.0.	
S5U1C17001H (ICDmini) firmware, updated software and manual	
The required quantity of S5U1C17001H (ICDmini) units	Please contact the Seiko Epson Sales Representative.
USB HUB (A self-powered hub that can supply a maximum of 500 mA for each ICDmini 1 unit is required.)	Supplied by the user.
PC Required specification: CPU-Pentium 4 1.5 GHz or more, RAM-512 MB or more	Supplied by the user.

## 4. Preparations for GangWriter

---

### 4. Preparations for GangWriter

For implementing the GangWriter functions, it is necessary in advance to prepare and confirm the files.

#### 4.1 Prepared Files

The followings files are necessary to be prepared.

- FLS corresponding to the MCU in the Target System .saf file
- FLS readme corresponding to the MCU in the Target System .txt file
- USB driver for ICDmini

All files are included in S5U1C17001C (S1C17 Family C compiler package). It is not necessarily required to install the C compiler package to the PC used only as a GangWriter.

For installing the C compiler package, refer to “Installing S5U1C17001 (S1C17 Family C Compiler Package)” in the S5U1C17001C Manual.

#### 4.2 Created File

The following file is necessary to be created.

- User program data .saf file

The file is created using S5U1C17001C (S1C17 Family C compiler package). For details, refer to “Stand-alone Flash Writer” in the S5U1C17001C Manual.

#### 4.3 Confirmation of ICDmini Hardware Version

For implementing the GangWriter functions, it is necessary to use S5U1C17001H2100 (ICDmini Ver2.0). For the previous versions: S5U1C17001H1100 (ICDmini Ver1.0), S5U1C17001H1200 (ICDmini Ver1.1), the firmware version-up and the serial number registration in the main body are required. As the hardware version is described in a seal on the backside of the main body, confirm it. Even if using S5U1C17001H2100 (ICDmini Ver2.0), update to the latest firmware as much as possible.

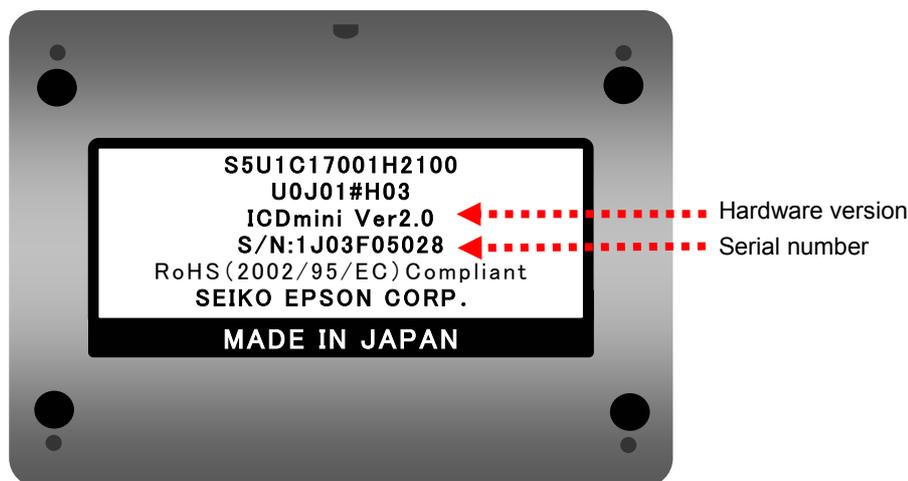


Figure 4.3.1 ICDmini main body backside

### • Firmware Version-up

Download firmware update software, its manuals and the latest firmware of S5U1C17001H (ICDmini) from Epson Web site, and update according to the manuals.

Table 4.3.1 Firmware updates

Firmware Version	Required works
Ver2.2 or later	Firmware update is not necessarily required. Use the latest version as much as possible.
Ver2.1 to 1.1	Firmware update is required. Update to the latest version.
Ver1.0	Firmware update is required. When updating, update to the Ver1.1 first. Then, update to the latest version  Note: If updating directly to the latest version, the ICDmini cannot operate.

### • Serial Number Registration

Download firmware update software and its manuals of S5U1C17001H (ICDmini) from Epson Web site, and register the same serial number as the number shown in a seal on the backside of the ICDmini main body in the main body.

## 5. How to Use GangWriter Software

---

### 5. How to Use GangWriter Software

#### 5.1 ICDmini DIP Switch Settings

The settings of ICDmini DIP switches are as follows.

SW1=OPEN

SW2=OPEN

SW3=OPEN

SW4= Different according to the S1C17 processor in the Target System.\*1

SW5= Different according to the S1C17 processor in the Target System.\*1

SW6=OPEN

SW7=OPEN

SW8= Different according to the S1C17 processor in the Target System.\*1

\*1 SW4, SW5

When DSIO signal level is 3.3V, SW4=OPEN, SW5=OPEN.

When DSIO signal level is 1.8V, SW4=OPEN, SW5=ON.

When DSIO signal level is the voltage input from the Target System, SW4=OPEN, SW5=OPEN or ON.

SW8

Normally, set to SW=OPEN. Only when the setting is described in the S1C17 processor technical manual, set to SW8=ON.

For details, refer to the S5U1C17001H (ICDmini) User Manual.

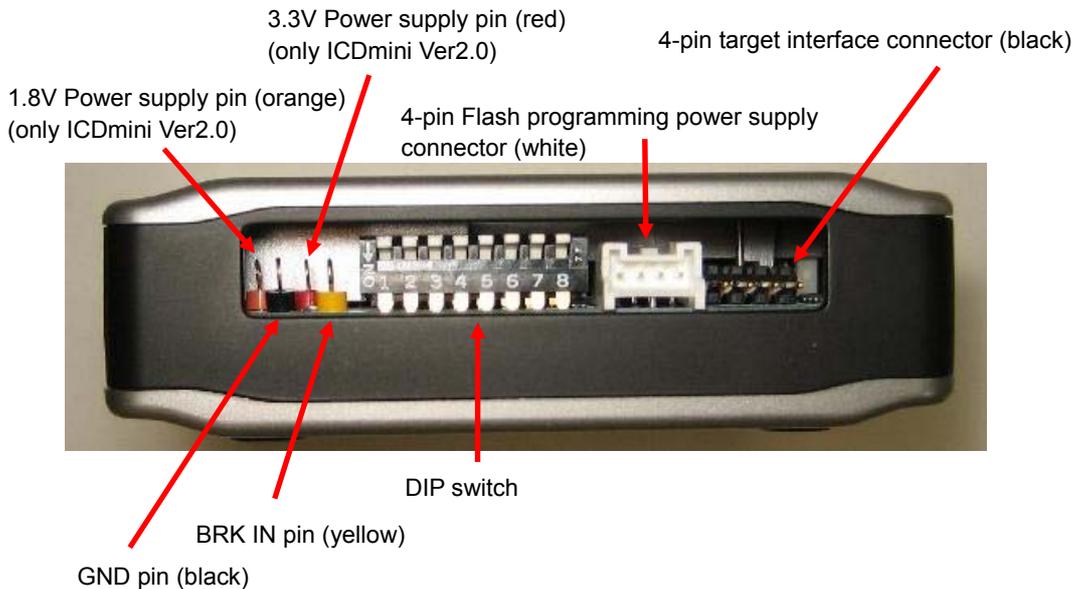


Figure 5.1.1 Name of each part on ICDmini left side

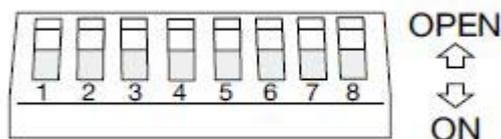


Figure 5.1.2 DIP switch

### 5.2 Connecting ICDmini with PC

Connect each ICDmini with the PC through a self-powered USB hub, using a USB cable. At this time, if the USB driver installation is requested, install the USB driver according to the chapter of “Connecting to the Host Computer” in the S5U1C17001H User Manual. For the USB driver, use the driver included in S5U1C17001C (S1C17 Family C compiler package).

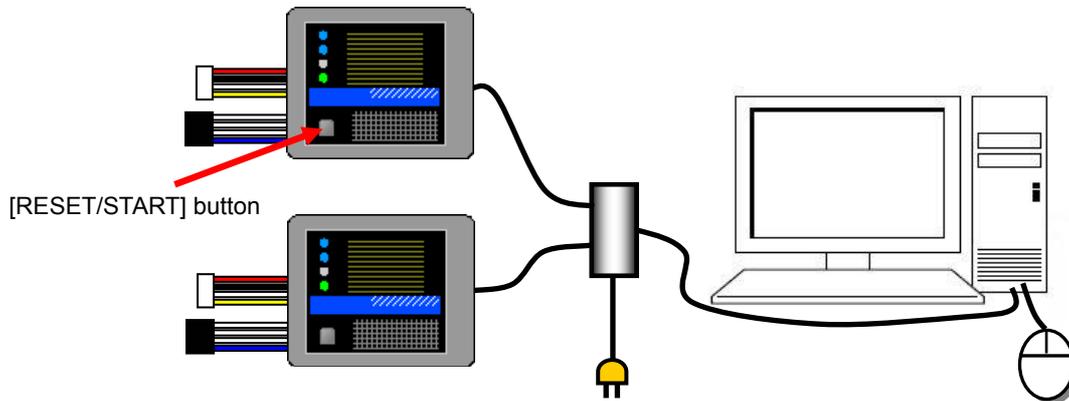


Figure 5.2.1 Connection diagram of ICDmini with PC

### 5.3 GangWriter Software Installation

Install S5U1C17000Y22 downloaded from Epson Web site to the PC, which uses the GangWriter functions.

### 5.4 GangWriter Startup

Select [Start]→[Program]→[EPSON MCU]→[GangWriter] in the Windows start menu. After startup, the following screen is displayed.

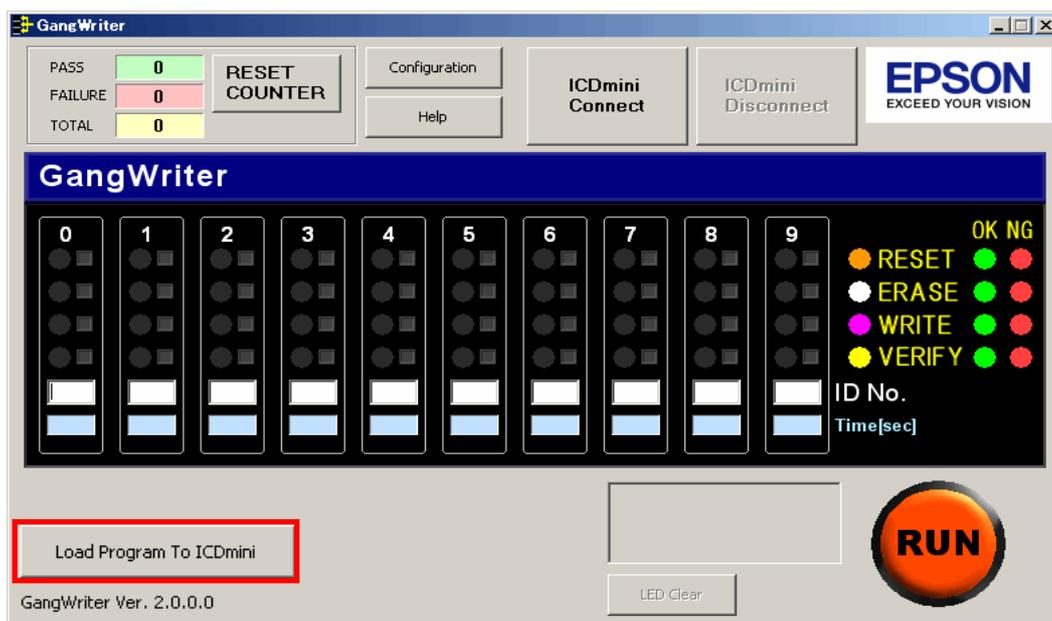


Figure 5.4.1 GangWriter main window

## 5. How to Use GangWriter Software

### 5.5 GangWriter Load Parameter Settings

With GangWriter software, it is necessary to load FLS and the user program data to ICDmini in advance for the parallel operations with multiple ICDmini units. The followings describe the settings of load parameters that are settings for loading FLS and the user program.

Press [Load Program To ICDmini] button in the main window to display [Load Program To ICDmini] window.

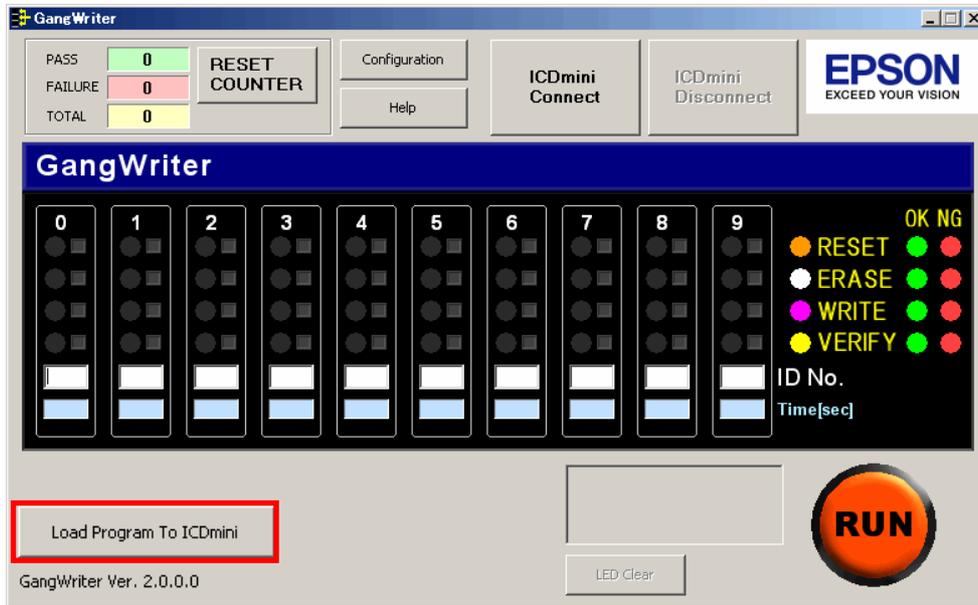


Figure 5.5.1 GangWriter main window

And, press [Advanced] button in [Load Program To ICDmini] window to display [Set Load Parameter] window.

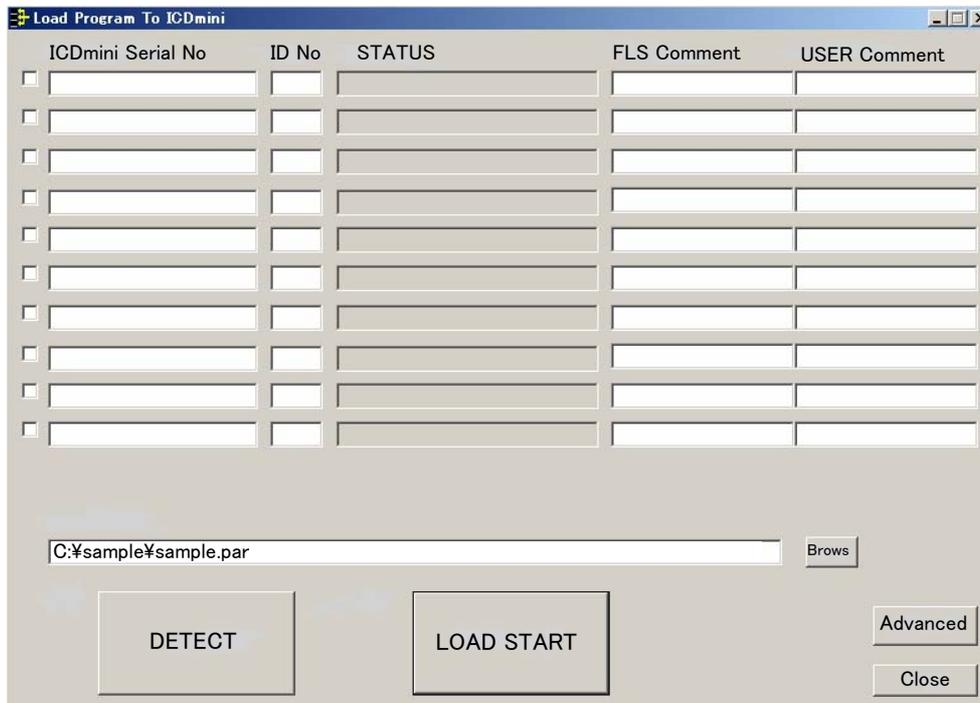


Figure 5.5.2 [Load Program To ICDmini] window

### Input Item Descriptions

According to the S1C17 processor in the Target System, input information. Table 5.5.1 shows details of each input item.

The image shows a Windows-style dialog box titled "Set Load Parameter". It is divided into two main sections: "Erase/Write Program" and "User Program".

**Erase/Write Program section:**

- File: (1) [Brows]
- Erase Routine Address: 0x (2) (0-fffffe)
- Write Routine Address: 0x (3) (0-fffffe)
- Time out: (4) [0-60 sec]
- Comment: (5)

**User Program section:**

- File: (6) [Brows]
- Start Block No. of Erase: (7) (0-16777215)
- End Block No. of Erase: (8) (0-16777215)
- Flash Memory Top Address: 0x (9) (0-fffffe)
- Comment: (10)

At the bottom right, there are "OK" and "Cancel" buttons.

Figure 5.5.3 [Set Load Parameter] window

## 5. How to Use GangWriter Software

Table 5.5.1 Input item details in [Set Load Parameter] window

<b>FLASH memory erase / write program (FLS)</b>	
(1) File	Input the FLS file name.
(2) Erase Routine Address	Input the start address of Flash memory erase routine in hexadecimal. (Effective area: 0x0 to 0xfffffe) "0x" at the head of the value is unnecessary. *1
(3) Write Routine Address	Input the start address of Flash memory write routine in hexadecimal. (Effective area: 0x0 to 0xfffffe) "0x" at the head of the value is unnecessary. *1
(4) Time out	Input the time out value to watch communications between ICDmini and the Target System during the Flash memory erase and write. (0 to 60, unit: sec) When input "0", the time out is not monitored. Set the time out value with necessary times for the Flash memory erase and write including an enough margin. It is recommended to set the time out value to avoid the system freeze. If the necessary times for the Flash memory erase and write are unknown, set the time out value to the maximum first, and adjust the value confirming the actually necessary times.
(5) Comment	Input comment texts (omissible). Available maximum number of characters: 100 Usually, input the FLS file name as a comment. Note that if input the word including "-v" in a comment, the comment is recognized as the following option. When the voltage supply for the Flash memory programming is necessary, set the voltage with the "-v" option in a comment. This option is effective only for the products, for which the technical manuals describe the above voltage supply. -vEraseVoltage-WriteVoltage -v: option identifier EraseVoltage: erase voltage value available voltage range: 6.0V ≤ EraseVoltage ≤ 8.0V -: connector WriteVoltage: write voltage value Available voltage range: 6.0V ≤ WriteVoltage ≤ 8.0V Input continued comments following a space.  Example: When the voltage supply for the Flash memory programming is necessary, the erase voltage is set to 7.5V and the write voltage is set to 7.0V. Input "-v7.5-7.0".
<b>User program data</b>	
(6) File	Input the file name of the user program data. Input the name of .saf file built with the development environment.
(7) Start Block No. of Erase	Input the start block number of the Flash memory erase in decimal. (Effective area: 0 to16777215) Input 0 to erase all areas.
(8) End Block No. of Erase	Input the end block number of the Flash memory erase in decimal. (Effective area: 0 to16777215) Input 0 to erase all areas.
(9) Flash memory top Address	Input the beginning address of the Flash memory in hexadecimal. (Effective area: 0x0 to 0xfffffe) "0x" at the head of the value is unnecessary. Specify the address with an even number.  Example: Input 20000 for S1C17801. Input 80000 for S1C17602.
(10) Comment	Input comment texts (omissible). Usually, input the user program file name as a comment. Available maximum number of characters: 100

\*1 For details of the start address of the Flash memory erase and write routine, the Flash memory address and descriptions in the comment, refer to readme\_e.txt/readme\_j.txt attached to FLS. FLS are prepared for each S1C17 processor, under the "C:\EPSON\GNU17\mcu\_model" folder, which is created when S5U1C17001C (S1C17 Family C compiler package) is installed.

Input Example Using S5U1C17801T (SVT17801) as the Target System

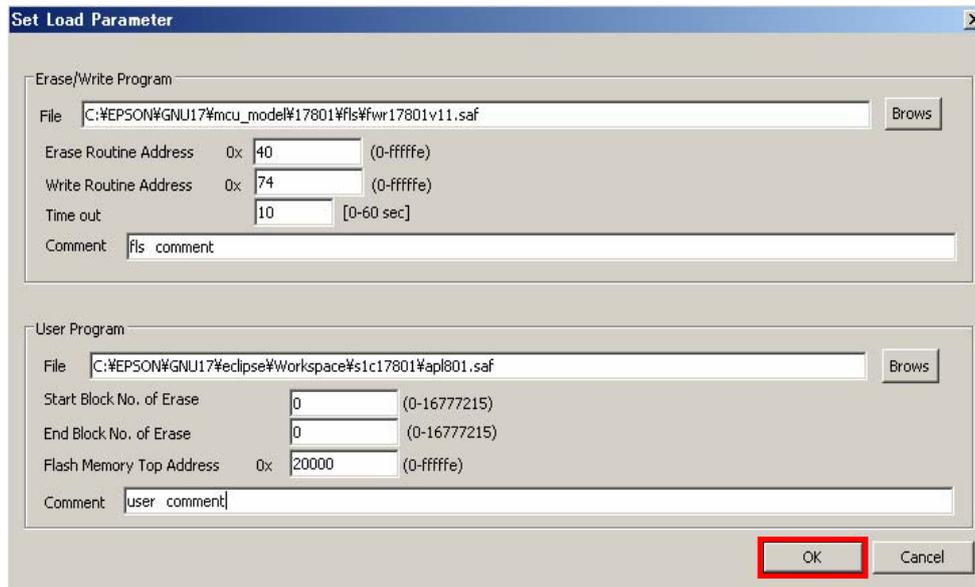


Figure 5.5.4 Input example for [Set Load Parameter] screen

Confirm the entry and press [OK] button. Select [Yes] in the dialog box of “Do you make a parameter file?”

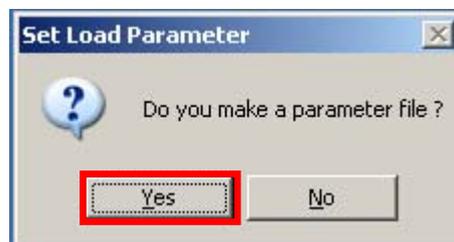


Figure 5.5.5 Confirmation of parameter file saving

## 5. How to Use GangWriter Software

---

When the following window is displayed, input the file name and save the file.

In the following example, the file named with “sample.par” is saved in the “C:\sample” folder.

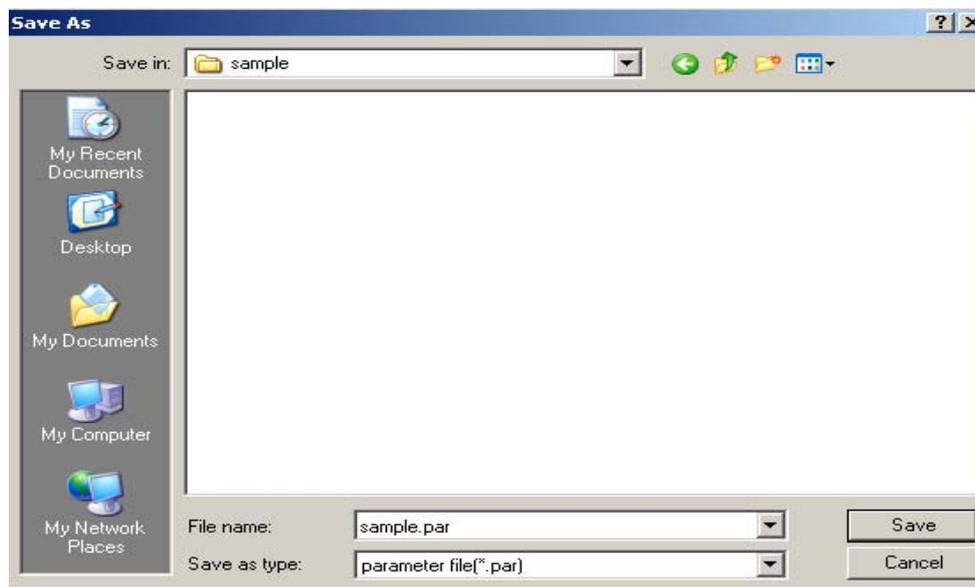


Figure 5.5.6 Parameter file saving

Note: A .par file is used in GDB (debugger) included in the S1C17 Family C compiler package. Note that this is a quite different file.

The load parameter settings are completed here.

### 5.6 Loading to ICDmini in Advance

According to the contents set with the load parameter, load FLS and the user program data to ICDmini. And set an ID number managed easily to each ICDmini (displayed with the serial number), concurrently.

- Name and Descriptions of Each Part in [Load Program To ICDmini] Window

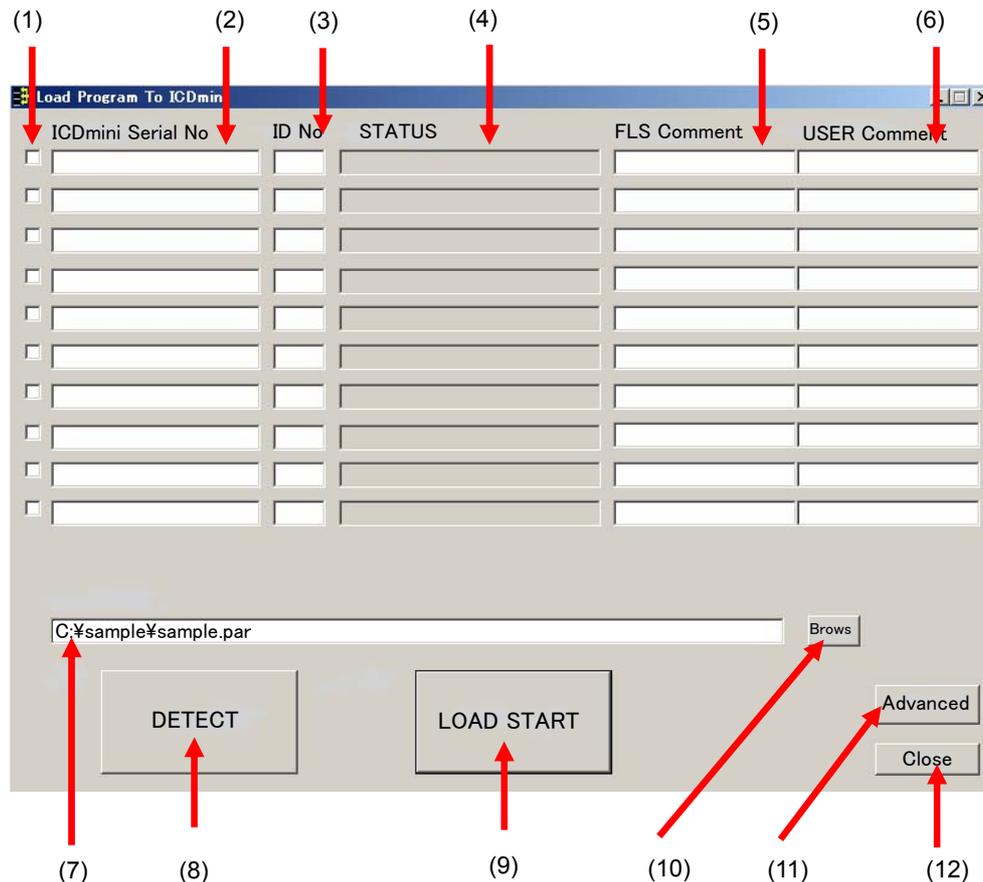


Figure 5.6.1 [Load Program To ICDmini] window

- |                           |  |
|---------------------------|--|
| (1)···Check box           | ICDmini with a check mark is selected.   |
| (2)···ICDmini Serial No.  | Displays the ICDmini serial number.  |
| (3)···ID No.              | Sets and displays the ID number to identify ICDmini.   |
| (4)···STATUS              | Displays the load data progress and result to ICDmini.   |
| (5)···FLS Comment         | Displays comments for FLS up to 20 characters.   |
| (6)···USER Comment        | The ID number and the time out value are displayed in this column by default. The time out value is displayed with “-T (sec)”. Note that this column is not updated as long as [DETECT] button is not pressed. |
| (7)···Parameter File      | Displays comments for the user program data area up to 20 characters.  |
| (8)···[DETECT] button     | Displays none when there is no comment.  |
| (9)···[LOAD START] button | Specifies the parameter file name.   |
| (10)···[Brows] button     | Detects the connected ICDmini.   |
| (11)···[Advanced] button  | Loads FLS and the user program to ICDmini.   |
| (12)···[Close] button     | Browse the parameter file.   |
|                           | Displays [Set Load Parameter] window.  |
|                           | Closes the window and returns to the GangWriter main window.   |

## 5. How to Use GangWriter Software

---

- Detection of the Connected ICDmini

Press [DETECT] button in the bottom of [Load Program To ICDmini] window.

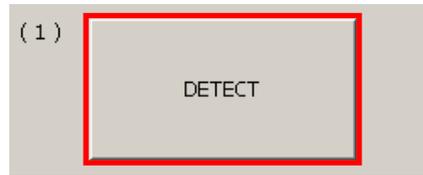


Figure 5.6.2 DETECT button

[Load Program To ICDmini] window is displayed, and the connected ICDmini units are displayed with the serial number (ICDmini Serial No.). The below is an example, when two ICDmini units are detected.

- The ID number and comments are displayed if already registered to ICDmini.
- The serial number is displayed up to 20 characters (the portion exceeding 20 characters is not displayed).

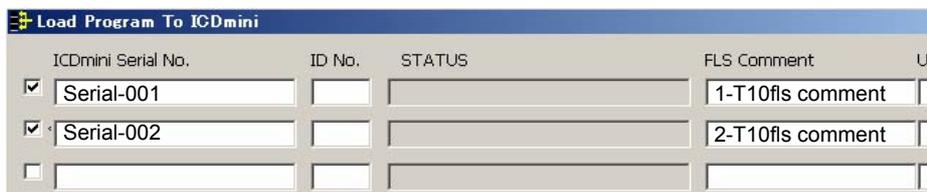


Figure 5.6.3 Display after ICDmini detection

- Setting ID Number

Set an ID number managed easily to each detected ICDmini. In the example, “1” and “2” are set as the ID number to two ICDmini units, respectively. If the ID number is displayed already, the number can be rewritten. The ID number should use any number that differs respectively. The effective range of the ID number is from “0” to “999”.

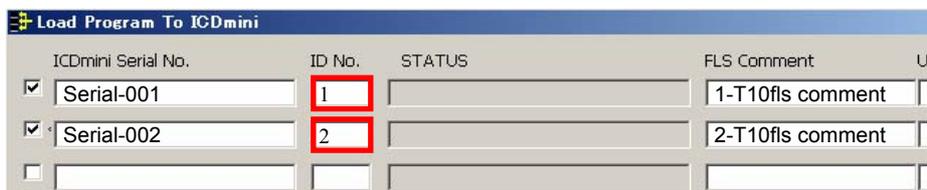


Figure 5.6.4 Setting ID number

- Setting Parameter File

Set the parameter file name in [Parameter File] field.



Figure 5.6.5 Setting parameter file

As this software saves the entry, the settings are unnecessary from the next time.

If not setting the parameter file name, the content of [Set Load Parameter] window set most recently becomes effective. However to avoid mistakes, it is recommended to set the file name.

- Loading FLS and User Program Data to ICDmini

Select ICDmini to load with the check box.



Figure 5.6.6 ICDmini selection

Press [LOAD START] button.



Figure 5.6.7 Loading to ICDmini

Loading is not done to ICDmini without a check mark.

When an error is caused before loading, the following error messages are displayed in the [STATUS] field.

Table 5.6.1 Error message list before loading

Error Message	Meanings
Please check all items.	No Target System to load is detected.
Over useful range. Check ID No.	One or more values input to [ID No.] field exceed the effective range.
There are the same as "ICDmini Serial No." item two or more.	Two or more ICDmini units have the same serial number.
There are the same as "ID No." item two or more.	Two or more values input to [ID No.] are the same.
Please set load parameter information.	[Parameter File] field is empty and no value is input in [Set Load Parameter] window.
Can not found Parameter file.	The parameter file specified with [Parameter File] field is not found.
Parameter file error.	One or more errors are included in the parameter file.
Following characters of parameter file are not allowed to used. /;,*?<> "	The following characters, which are prohibited to use in the parameter file name, are included. /;,*?<> "

## 5. How to Use GangWriter Software

During loading to ICDmini, the progress is displayed in [STATUS] field (refer to Table 5.6.2 STATUS list). When “(G00) COMPLETE” is displayed in [STATUS] field, the loading is completed successfully.

ICDmini Serial No.	ID No.	STATUS	FLS Comment	US
Serial-001	1	(G12) FLS VERIFY	0-T10fls comment	
Serial-002	2	(G12) FLS VERIFY	1-T10fls comment	

Figure 5.6.8 Display during loading

ICDmini Serial No.	ID No.	STATUS	FLS Comment	US
Serial-001	1	(G00) COMPLETE	0-T10fls comment	
Serial-002	2	(G00) COMPLETE	1-T10fls comment	

Figure 5.6.9 Display when the loading is completed successfully

ICDmini Serial No.	ID No.	STATUS	FLS Comment	US
Serial-001	1	(G21) FLS TIMEOUT ERROR	0-T10fls comment	
Serial-002	2	(G21) FLS TIMEOUT ERROR	1-T10fls comment	

Figure 5.6.10 Display when the loading is failed

Table 5.6.2 STATUS list

Display message / background color	Meanings
(G00) COMPLETE	Loading FLS and the user program data to ICDmini is completed successfully.
(G10) FLS ERASE	Erasing FLS storage area.
(G11) FLS LOAD xxx%	Loading FLS (0 % to 100%).
(G12) FLS VERIFY	Verifying FLS storage area.
(G13) USER ERASE	Erasing user program data storage area.
(G14) USER LOAD xxx%	Loading user program data (0% to 100%)
(G15) USER VERIFY	Verifying user program data storage area.
(G21) FLS TIMEOUT ERROR	Communication time out is caused during loading FLS.
(G22) FLS FILE OPEN ERROR	FLS file cannot be open.
(G23) FLS FILE FORMAT ERROR	Format error is caused in FLS file (not Motorola format)
(G24) FLS FILE SIZE OVER	FLS file size exceeds 8KB.
(G25) FLS FILE ADDRESS OVER	FLS file address exceeds 24-bit.
(G26) FLS LOAD VERIFY ERROR	Verify check error of the loaded content is caused, after loading FLS.
(G27) FLS UNEXPECTED ERROR	Unexpected error is caused, during loading FLS.
(G31) USER TIMEOUT ERROR	Communication time out is caused during loading user program data.
(G32) USER FILE OPEN ERROR	User program data file cannot be open.
(G33) USER FILE FORMAT ERROR	Format error is caused in user program data file (not Motorola format).
(G34) USER FILE SIZE OVER	User program data file size exceeds 4MB.
(G35) USER FILE ADDRESS OVER	User program data file address exceeds 24-bit.
(G36) USER LOAD VERIFY ERROR	Verify check error of the loaded content is caused, after loading user program data.
(G37) USER UNEXPECTED ERROR	Unexpected error is caused, during loading user program data.
(G99) ICD COMMUNICATION ERROR	Communication with ICDmini cannot be established.

### Display Message Number Classification

(G00) : Loading completed successfully  
 (G1x) : Processing loading  
 (G2x) : Error caused during loading FLS  
 (G3x) : Error caused during loading user program data  
 (G99) : Communication not established with ICDmini

- Completion

Press [Close] button and close [Load Start To ICDmini] window.

## 6. GangWriting

### 6. GangWriting

This function is to erase and to load the user program data to the Flash memory in each Target System. The example using two ICDmini units with the ID number 1 and 2 respectively is described below.

#### 6.1 GangWriter Main Window Descriptions

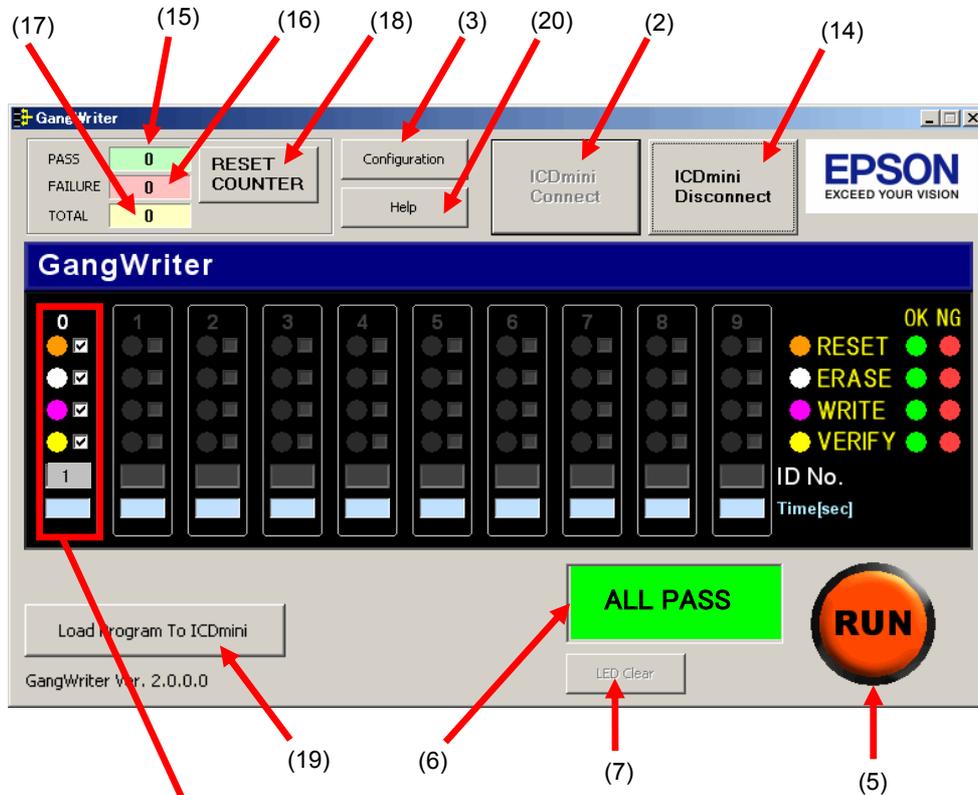


Figure 6.1.1 GangWriter main window

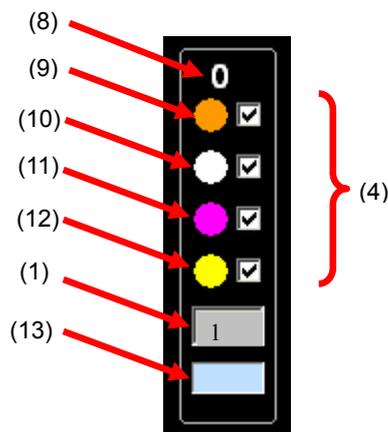


Figure 6.1.2 Display for one ICDmini unit in GangWriter main window

- |   |   |
|---|---|
| (1)···ID number input field             | Set the ID number of the connected ICDmini.   |
| (2)···[ICDmini Connect] button          | Establishes a connection between the ICDmini and PC.  |
| (3)···[Configuration] button            | Displays the [Configuration] window.  |
| (4)···Check box                         | Checked functions are selected.   |
| (5)···RUN button                        | Runs all connected ICDmini units.   |
| (6)···Results                           | If all connected ICDmini units are modified successfully, ALL PASS is displayed in green.<br>If a single ICDmini unit fails, FAILURE is displayed in red. |
| (7)···[LED CLEAR] button                | Resets LEDs 1 to 4 to their defaults.   |
| (8)···Index number                      | Shows the position number of ICDmini. Operations are individually executable by pressing the same number key on the keyboard.                             |
| (9)···LED1                              | Lights up orange when RESET is enabled. After upload, it turns to green for a PASS or red for a FAIL.   |
| (10)···LED2                             | Lights up white when the ERASE function is enabled. After upload, it turns to green for a PASS or red for a FAIL.   |
| (11)···LED3                             | Lights up purple when the WRITE function is enabled. After upload, it turns to green for a PASS or red for a FAIL.  |
| (12)···LED4                             | Lights up yellow when the VERIFY function is enabled. After upload, it turns to green for a PASS or red for a FAIL.                                       |
| (13)···Runtime                          | Displays the runtime in seconds.  |
| (14)···[ICDmini Disconnect] button      | Closes the connection between the ICDmini and PC.   |
| (15)···PASS counter                     | Counts the number of operations that succeed.   |
| (16)···FAILURE counter                  | Counts the number of operations that fail.  |
| (17)···TOTAL counter                    | Counts the total number of operations processed.  |
| (18)···[RESET COUNTER] button           | Sets the PASS, FAILURE and TOTAL counters to zero.  |
| (19)···[Load Program To ICDmini] button | Opens the setting screen to load FLS and the user program data to ICDmini, as a preparation work for GangWriter.  |
| (20)···[Help] button                    | Displays the Help screen.   |

## 6. GangWriting

### 6.2 Enter ID Number

Enter the same number as the ID number set in [Load Program To ICDmini] window to the ID number field in the index No., and associate the index No. with ICDmini.

In the example, ICDmini with the ID number 1 is set to the index No. 0, and ICDmini with the ID number 2 is set to the index No. 1.

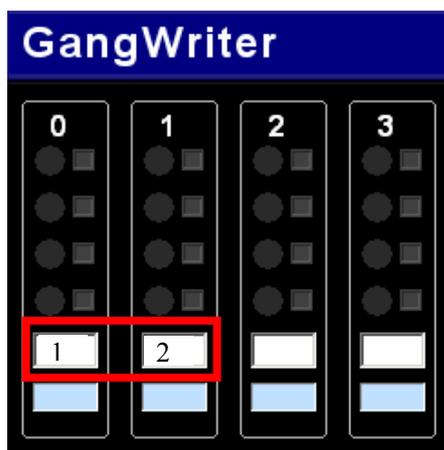


Figure 6.2.1 Entry ID number

### 6.3 Connect Target System

Connect the Target System. Indispensable signals to connect are DCLK, GND, DSIO, DST2 of the 4-pin Target connector (black), and TARGET RST OUT of the Flash programming power supply connector (white). After the connection with the Target System, turn-ON the power supply in the Target System.

Table 6.3.1 Pin configuration of Target connector (black)

4 3 2 1	No.	Pin name	Connection	Pin function
	1	DCLK	Indispensable	Clock signal for debug
	2	GND	Indispensable	Power supply (GND)
	3	DSIO	Indispensable	Serial communication I/O pin for debug
	4	DST2	Indispensable	Debug status signal

Table 6.3.2 Pin configuration of the Flash programming power supply connector (white)

1 2 3 4	No.	Pin name	Connection	Pin function
	1	FLASH VCC OUT	When needed	Voltage output for Flash programming power supply *1
	2	GND	When needed	Power supply (GND) *1 *2
	3	TARGET RST OUT	Indispensable	Reset signal output for Target System
	4	TARGET VCC IN	When needed	Target voltage input *2

Note that the pin configuration is reverse to the Target connector.

\*1 Connect only when the S1C17 processor Technical Manual describes this function.

\*2 Connect when the input voltage from the Target is used for the DSIO signal level.

For details, refer to the S5U1C17001H (ICDmini) User Manual.

Note:

- When using cables other than those provided with ICDmini, make the distance between ICDmini and S1C17 processor as short as possible (within 15cm), including the wiring in the Target System. Longer distance

increases the possibilities of communication errors.

- When the Target System is connected and the power supply is turned-ON, LED3 may turn red or LED4 may turn green in ICDmini. However, ICDmini can be used independently with the turning status of LED3 and LED4, with the reset setting (check the LED1 check box) before erasing the Flash memory.

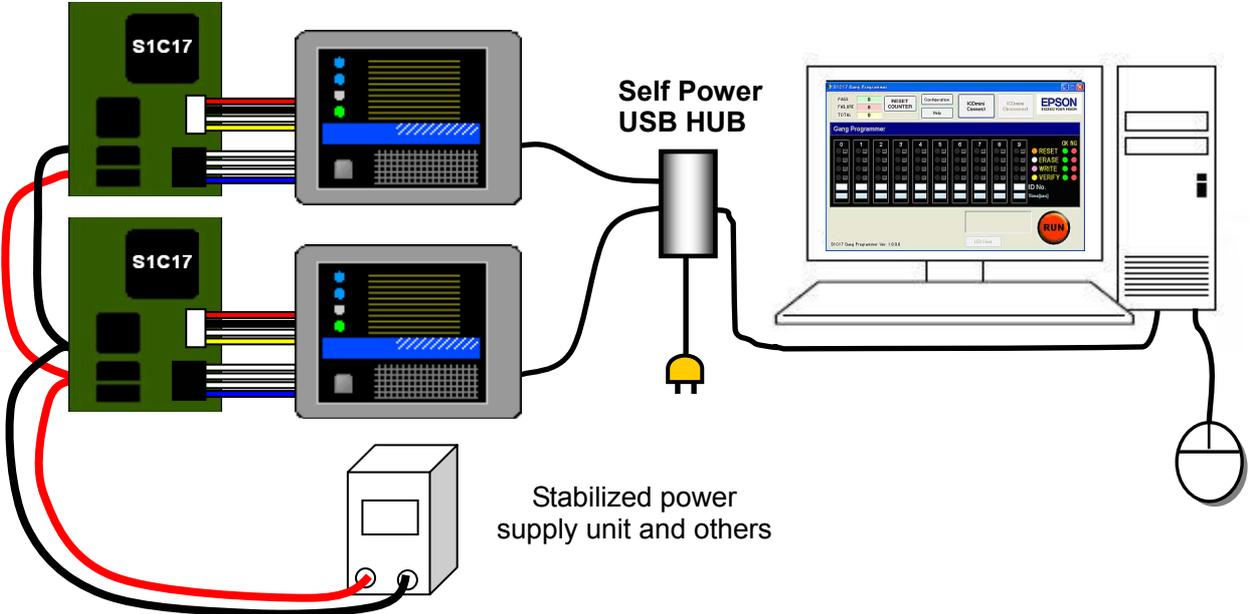


Figure 6.3.1 Configuration when Target Systems are connected

### 6.4 Establish Connection with ICDmini

Press [ICDmini Connect] button.

All LEDs of LED 1 to LED 4 in ICDmini, with which the connection is established, light up.

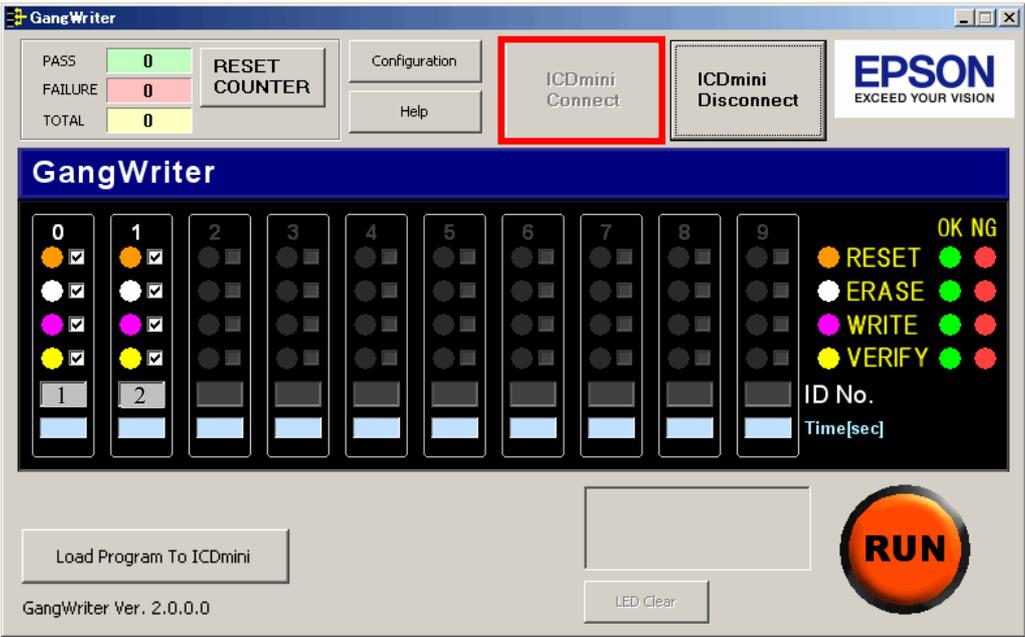


Figure 6.4.1 ICDmini established connection (two ICDmini units)

## 6. GangWriting

### 6.5 Loading

Press [RUN] button (or press [Enter] key on the keyboard).

The operation proceeds in the order of RESET, ERASE, WRITE, VERIFY. The corresponding LED flashes when the operation is in progress.

The LED turns green (●) when the operation is completed normally.

When all operations are completed normally, “All PASS” is displayed at the bottom right of the screen.

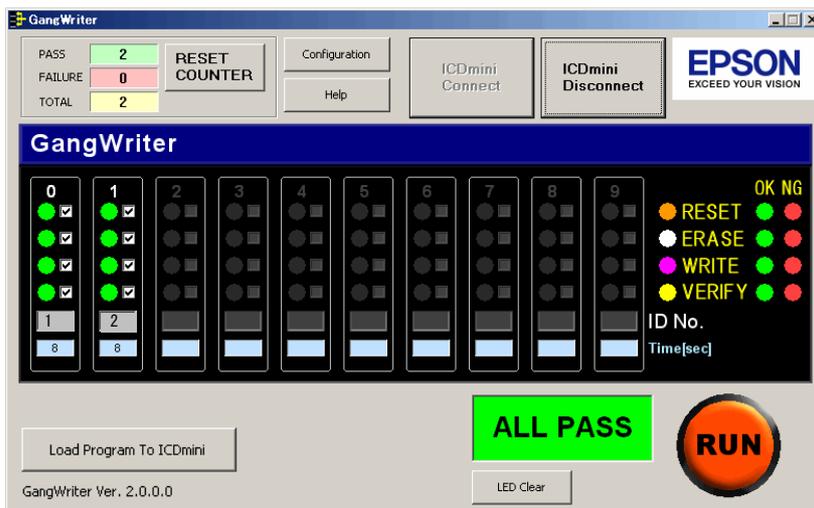


Figure 6.5.1 ALL PASS display

If an error is caused, the LED corresponding to the operation that fails turns red (●), and the processing of ICDmini stops at the time. If errors are caused with one or more ICDmini units, “FAILURE” is displayed at the bottom right of the screen.

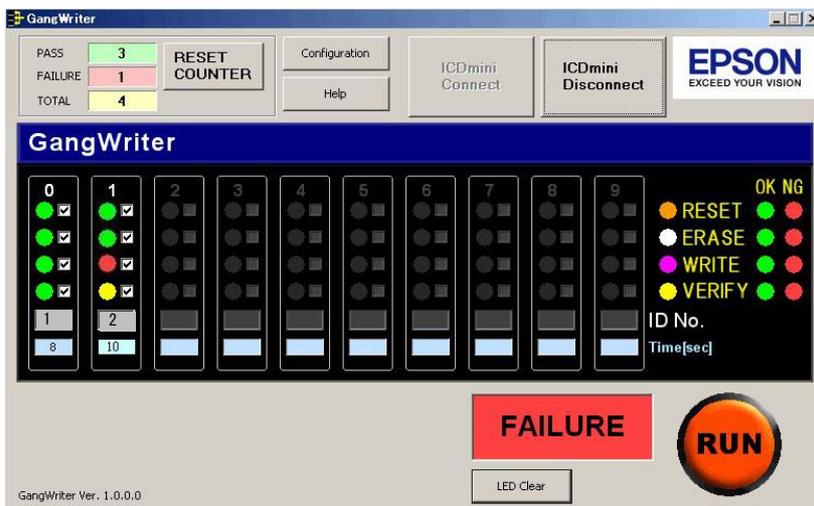


Figure 6.5.2 FAILURE display

If pressing the same number key on the keyboard as the index No. of ICDmini that fails, only operation of the ICDmini can be executed again. For example press “1” on the keyboard to execute the operation of index No.1.

## 6.6 Remove the target systems

Remove the Target System, after turn-OFF the power supply in the Target System.

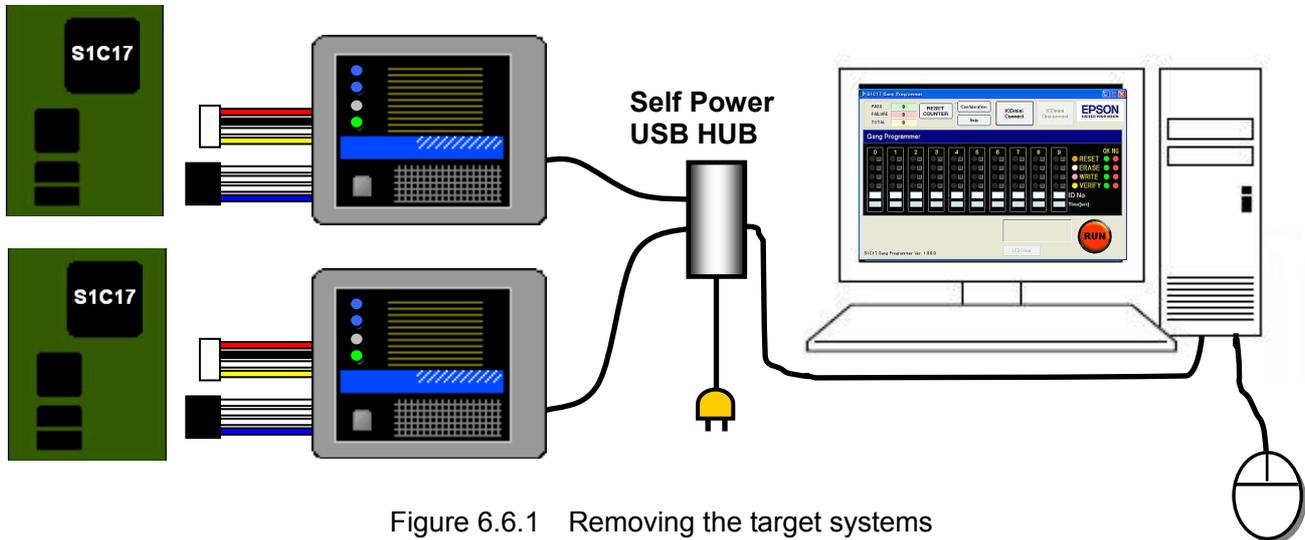


Figure 6.6.1 Removing the target systems

## 6.7 Clear the LED display

Click the [LED Clear] button to return the LEDs to their defaults.

\* If you click the [RUN] button without clicking the [LED Clear] button, when the LEDs return to their defaults, the relevant operation is performed at the same time. Therefore it is not always necessary to click the [LED Clear] button.

## 6.8 Repeat the procedure

Connect the next batch of target systems and to download data again, repeat steps 6.3 to 6.6.

## 6.9 Finish the task

To finish the task, click the [ICDmini Disconnect] button and quit the software.

## 7 Other Functions

---

### 7 Other Functions

#### 7.1 Individual Execution

When press the number key on the keyboard after pressing [ICDmini Connect] button, loading to ICDmini with the same index No. is executed. Ten keys are usable.

#### 7.2 Select an Operation

You can select which operations to run by selecting and clearing the check boxes. The check boxes correspond to RESET, ERASE, WRITE, and VERIFY from the top.

Example: The setting for resetting and verifying only the target system at index number 0.

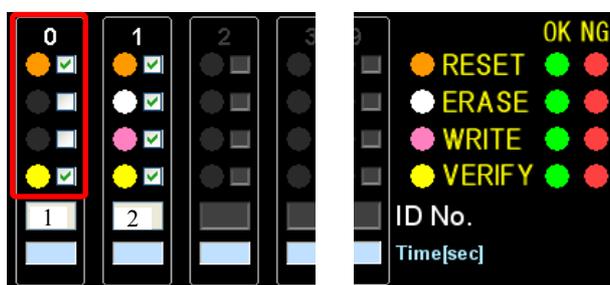


Figure 7.2.1 Individual Selection of Execution function

The check box settings are saved and enabled the next time the software is started.

#### 7.3 Counter Function

The number of times (TOTAL) that operations succeed (PASS) and fail (FAILURE) after the software is started up is displayed at the top of the [GangWriter] window. Click the [RESET COUNTER] button to return each number to 0.



Figure 7.3.1 Counter

#### 7.4 Help Function

Click the [Help] button to display simple explanations of the screens.



Figure 7.4.1 Help button

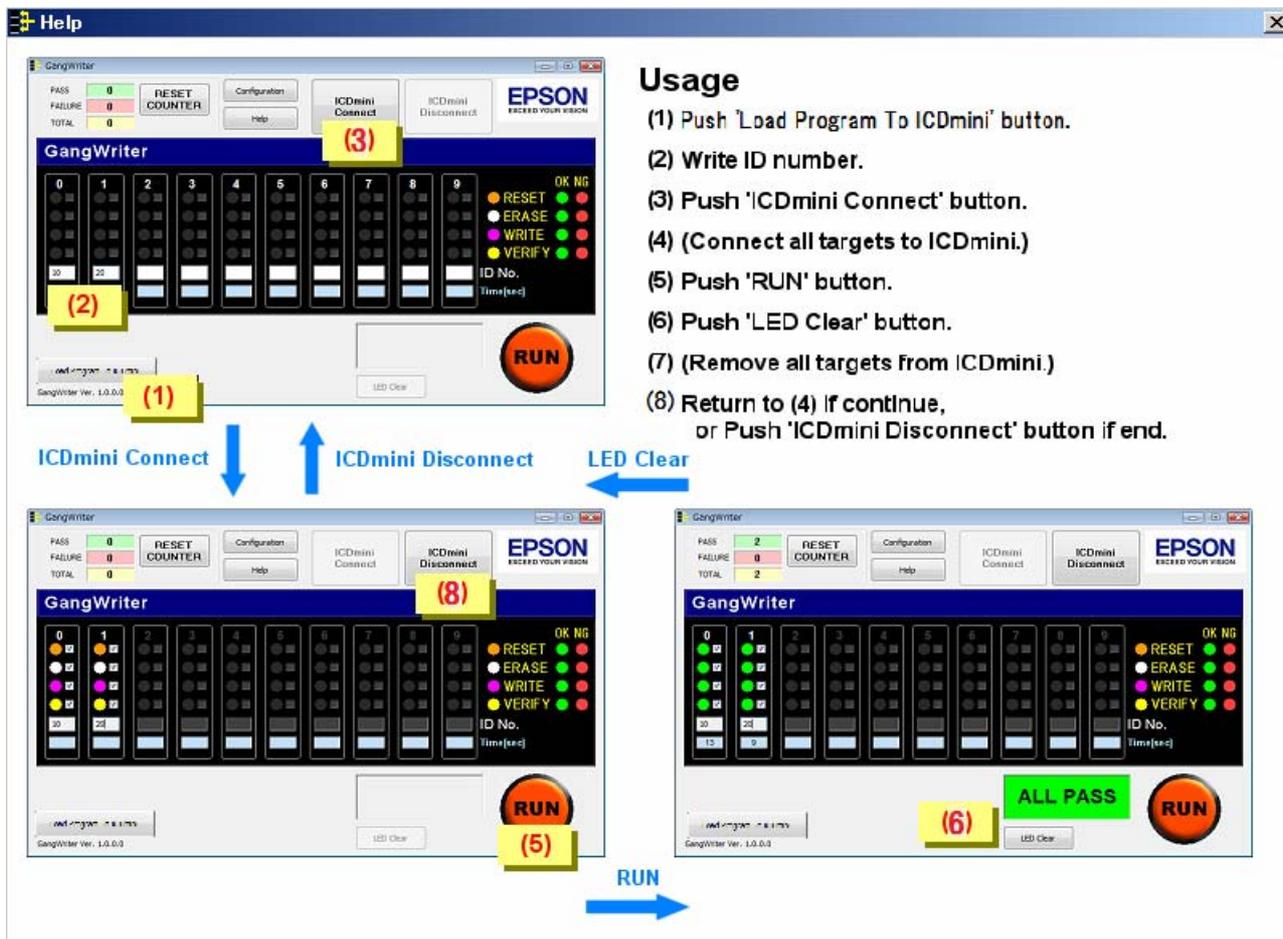


Figure 7.4.2 Help window

## 7.5 Configuration Function

Clicking the [Configuration] button displays the following [Configuration] window.

Here you can set the location for saving log files, the names of files, and the length of time out.



Figure 7.5.1 Configuration button selection

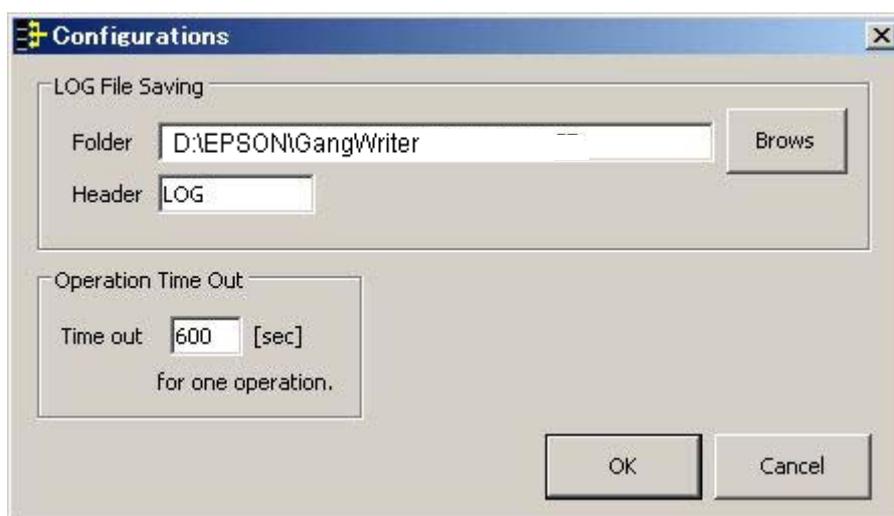


Figure 7.5.2 Configuration window

- Folder

In [Folder], enter the name of a folder for saving log files. Enter a path from the drive name. Click the [Brows] button to select a folder directly.

- Header

In [Header], enter text to add to the front of the names of log files. This field can be left blank. With the header added, the log file appears as follows.

[Header]YYYYMMDD.txt

If the header is "LOG" and the date is June 30, 2009, the file name is as follows.

LOG20090630.txt

The Folder and Header settings are enabled from the next time you start up.

- Time Out

In [Time Out], enter a time out for all operations from erase through write to verification. (The default value is 600 seconds.) If the data for upload is large, a long time out must be set. Enter a value that allows a sufficient margin. (Setting a value of 3 seconds or less will always cause an error.)

## Appendix    GangWriter Dynamic Link Library Manual

### A.1 Overview

This Appendix explains how to use the ICD\_GANG.DLL function used for communicating with the ICDmini. Refer to this Appendix when using the Dynamic Link Library directly.

ICD\_GANG.DLL GangWriter Ver2.0 or later, the following features have been added to ICDmini.

- Setting the ID number
- FLASH memory erase writing program (FLS) in the body of writing ICDmini
- Write to user program data inside the body ICDmini

As a result, GangWriter Ver1.0 in GDB (debugger) were needed for work in advance, ICD\_GANG.DLL now only do all the work.

#### A.1.1 Function Calling Example

---

Example:

```

OpenIcdConnection          // Establishes a connection with the ICDmini
                           // (Execute separately for each unit)

```

\* Repeated Part

```

(Replace the target systems)

ResetTarget                // Issues target reset
GetStatus                  // Monitors the end of target reset
CheckTargetConnection     // Issues confirmation of connection with the target IC
GetStatus                  // Monitors the end of confirmation of connection with
                           // the target IC
StartOperation             // Executes the specified operation
GetStatus                  // Monitors the end of all specified operations

```

```

CloseIcdConnection        // Closes the connection with the ICDmini
                           // (Execute separately for each unit)

```

### A.2. Function Details

#### A.2.1 OpenIcdConnection

---

- Function

Opens the USB communication port and establishes communication with the ICDmini.

Control is not returned until this function either succeeds or fails.

- Format

long OpenIcdConnection (long IcdDeviceNumber);

- Parameter

IcdDeviceNumber : ICDmini ID number (0 to 999)

- Return value

OK

ERROR\_PARAMETER

ERROR\_ICD\_OPEN\_CONNECTION

#### A.2.2 CloseIcdConnection

---

- Function

Corresponds to OpenIcdConnection, and closes communication with the ICDmini.

Control is not returned until this function either succeeds or fails.

- Format

long CloseIcdConnection (long IcdDeviceNumber);

- Parameter

IcdDeviceNumber : ICDmini ID number (0 to 999)

- Return value

OK

ERROR\_PARAMETER

ERROR\_ICD\_CLOSE\_CONNECTION

### A.2.3 ResetTarget

---

- Function

Issues target reset to the target system.

Time out is 1 second.

Control is returned immediately after this function is called.

Monitor the end of the operation with the GetStatus function.

- Format

long ResetTarget (long IcdDeviceNumber);

- Parameter

IcdDeviceNumber : ICDmini ID number (0 to 999)

- Return value

OK

NG

ERROR\_PARAMETER

ERROR\_ICD\_CONNECTION

### A.2.4 CheckTargetConnection

---

- Function

Confirms connection with the target system.

Time out is 1 second.

Control is returned immediately after this function is called.

Monitor the end of the operation with the GetStatus function.

- Format

long CheckTargetConnection (long IcdDeviceNumber);

- Parameter

IcdDeviceNumber : ICDmini ID number (0 to 999)

- Return value

OK

NG

ERROR\_PARAMETER

ERROR\_ICD\_CONNECTION

### A.2.5 StartOperation

---

- Function

Executes the specified operation (target reset, erasure, writing or verification).

Confirms connection with the target system within this function.

Control is returned immediately after this function is called.

Monitor the end of the operation with the GetStatus function.

When performing multiple operations, the GetStatus function returns OK when all operations are finished.

- Format

long StartOperation (long IcdDeviceNumber, long IcdOperation, long TimeOut);

- Parameter

IcdDeviceNumber           : ICDmini ID number (0 to 999)

IcdOperation             : Sets the operation to execute.

                          bit0: Target Reset                           (1: Yes 0: No)

                          bit1: Erasing Flash memory               (1: Yes 0: No)

                          bit2: Writing to Flash memory           (1: Yes 0: No)

                          bit3: Verifying Flash memory           (1: Yes 0: No)

TimeOut                   : Time out (1 = 0.1 seconds)

                          The range is 0 to 72000 (maximum 120 minutes).

                          If 0 is specified, there is no time out.

                          This is used for all Flash memory operations (erase, write, verify).

- Return value

OK

NG

ERROR\_PARAMETER

ERROR\_ICD\_CONNECTION

### A.2.6    GetStatus

---

- Function

Returns the status of the current operation.

- Format

long GetStatus (long IcdDeviceNumber, long\* ErrorAddress);

- Parameter

IcdDeviceNumber : ICDmini ID number (0 to 999)

ErrorAddress     : Returns the address of the error.

ResetTarget	:	Fixed at 0
CheckTargetConnection	:	Fixed at 0
StartErase	:	Erase start address
StartWrite	:	Address of the error
StartVerify	:	Address of the error

- Return value

OK

OPERATION\_TARGET\_CONNECTION

OPERATION\_TARGET\_RESET

OPERATION\_ERASE

OPERATION\_WRITE

OPERATION\_VERIFY

ERROR\_PARAMETER

ERROR\_TIMEOUT\_TARGET\_CONNECTION

ERROR\_TIMEOUT\_TARGET\_RESET

ERROR\_TIMEOUT\_ERASE

ERROR\_TIMEOUT\_WRITE

ERROR\_TIMEOUT\_VERIFY

ERROR\_ICD\_CONNECTION

ERROR\_TARGET\_CONNECTION

ERROR\_TARGET\_RESET

ERROR\_ERASE

ERROR\_WRITE

ERROR\_VERIFY

### A.2.7    GetString

---

- Function

Converts the return code to a character string.

- Format

long GetString (long ReturnedCode, char\* ReturnedString);

- Parameter

ReturnedCode

Return code.

ReturnedString

Returns a character string for the return code.

Allow 256 bytes for the invoker.

With an invalid return code,  
“Invalid returned code” is returned.

- Return value

OK

NG

### A.2.8    **GetConnectedICD**

---

- Function

Returns the serial number of ICDmini connected to PC, and the corresponding ID number list.

When NULL is specified to the IcdSerialNumberList, returns the number of necessary buffers.

The control is not returned until this function succeeds or fails.

- Format

```
long GetConnectedICD ( short* IcdSerialNumberList, long* IcdSerialNumberBufferCount,
                    long* IDNumber, long* IDNumberBufferCount,
                    char* FlsComment, long* FlsCommentBufferCount,
                    char* UserComment, long* UserCommentBufferCount,
                    long* TakenCount, long* ConnectedCount );
```

- Parameter

- When the function is called with IcdSerialNumberList: NULL,

short* IcdSerialNumberList	: NULL
long* IcdSerialNumberBufferCount	: Returns the number of buffers for the serial number list prepared by the caller.
long* IDNumber	: Ignores.
long* IDNumberBufferCount	: Returns the number of buffers for the ID number list prepared by the caller.
char* FlsComment	: Ignores.
long* FlsCommentBufferCount	: Returns the number of buffers for FLS program comments prepared by the caller.
char* UserComment	: Ignores.
long* UserCommentBufferCount	: Returns the number of buffers for the user program comments prepared by the caller.
long* TakenCount	: Returns the number of units of the serial number that can be acquired.
long* ConnectedCount	: Returns the number of units connected with USB.

- When the function is called with IcdSerialNumberList: not NULL,

short* IcdSerialNumberList	: Buffer address for the serial number list. The serial number is stored with a separation of 0x0000 (Unicode).
long* IcdSerialNumberBufCount	: Number of buffers for the serial number list.
long* IDNumber	: Buffer address for the ID number list. The ID number corresponding to the serial number is stored in IDNumber. However, -1 is stored for ICDmini that cannot acquire the ID number.
long* IDNumberBufCount	: Number of buffers for the ID number list.
char* FlsComment	: Buffer address for FLS program comments.
long* FlsCommentBufferCount	: Number of buffers for FLS program comments.
char* UserComment	: Buffer address for the user program comments. Comments are stored in UserComment with a separation of 0x00. However, if the end address of retrieved data is 0x00, 0x00 is not added with DLL side.
long* UserCommentBufferCount	: Number of buffers for the user program comments.
long* TakenCount	: Returns the number of serial numbers stored in the buffer.
long* ConnectedCount	: Returns the number of units connected with USB.

- Return value

OK

ERROR\_EXECUTING

ERROR\_PARAMETER

ERROR\_INSUFFICIENT\_ICDSERIALNUMBUF

ERROR\_INSUFFICIENT\_IDNUMBUF

ERROR\_INSUFFICIENT\_FLSCOMMENTBUF

ERROR\_INSUFFICIENT\_USERCOMMENTBUF

- Explanations

This function executes the following processes, internally.

- Opens the USB port.
- Reads the firmware version.
  - C17, confirmation of firmware and V2.2 or later
- Acquires the serial number.
- Acquires the ID number.
- Closes the USB port.

### \* Comments for FLS

FLS comments (command transferred to ICDmini) are stored in FlsComment with a separation of 0x00. However, if the end address of the retrieved data is 0x00, 0x00 is not added with DLL side.

- ID Number

Alphabetical characters up to 3 bytes from the head of comments (0 x 30 to 0 x 39) are defined as the ID. If there is a data of other characters within 3 bytes from the head, the former portion is defined as the ID.

The ID of "12ABC" is "12".

The ID of "5 43" is "5". The former portion of a space is effective.

The ID of " 123" is not set, because there is no character before a space.

- Time Out

Time out values for erasing the Flash memory and loading are set. Note that the ID number should be placed at the beginning.

For "123-T60", The ID number is "123" and the time out value is 60sec.

- Others

As others are different for each S1C processor, refer to readme\_e.txt/readme\_j.txt attached to each product.

- Precautions

When using this function, the caller should prepare the necessary buffers. Acquire the number of buffers in the following ways.

- Calling this function with setting NULL in IcdSerialNumberList, necessary number of buffers can be acquired.
- Note that the number of buffers means the number of buffer types, does not mean the numbers of bytes of the buffer.
- Note that the necessary number of buffers is not one per unit. That is, the necessary number of buffers for FLS program comments and the necessary number of buffers for the serial number list are the same number of characters described in one unit, respectively.
- If no ICDmini is connected, nothing is written in each buffer. Then, the necessary number of buffers is 0.

### A.2.9 LoadIcdFlsProgram

---

- Function

Loads FLS to ICDmini with the specified serial number.

The control is returned immediately, after this function is called.

The progress status is watched with the GetIcdStatus function.

- Format

```
long LoadIcdFlsProgram( short* IcdSerialNumber, short* FileName, long EraseAddress,
                        long WriteAddress, long IcdDeviceNumber, long TimeOut,
                        char* Comment );
```

- Parameter

short* IcdSerialNumber	: Serial number (Unicode) Terminated with NULL , within 20 characters
short* FileName	: FLS file name (Unicode: full path) Terminated with NULL
long EraseAddress	: Erase routine address
long WriteAddress	: Write routine address
long IcdDeviceNumber	: ID number (0 to 999)
long TimeOut	: Time out value [sec]
char* Comment	: Comments Terminated with NULL ID number and time out value total: within 127 bytes excluding NULL

- Return value

OK  
 ERROR\_EXECUTING  
 ERROR\_PARAMETER  
 ERROR\_ICD\_OPEN\_CONNECTION

- Explanations

This function executes the following processes, internally.

- Opens the USB port
- Searches ICDmini with the specified serial number
- Erase the Flash memory
- Sets entry information  
 → Sets the ID number, time out value and any comments in the comment field of the packet  
 The format is; “ID number \_ -T Time out value \_ any comments”
- Writes to the Flash memory
- Verifies data written in the Flash memory
- Closes the USB port

### A.2.10 LoadIcdUserProgram

---

- Function

Loads the user program to ICDmini with the specified serial number

The control is returned immediately, after this function is called.

The progress status is watched with the GetIcdStatus function.

- Format

```
long LoadIcdFlsProgram( short* IcdSerialNumber, short* FileName, long EraseAddress,  
                        long WriteAddress, long IcdDeviceNumber, long TimeOut,  
                        char* Comment );
```

- Parameter

short* IcdSerialNumber	: Serial number (Unicode) Terminated with NULL, within 20 characters
short* FileName	: User program file name (Unicode: full path) Terminated with NULL
long EraseBlockStart	: Erase start block number
long EraseBlockEnd	: Erase end block number
long FlashAddress	: FLASH memory beginning address
char* Comment	: Comments Terminated with NULL Within 127 bytes, excluding NULL

- Return value

OK  
ERROR\_EXECUTING  
ERROR\_PARAMETER  
ERROR\_ICD\_OPEN\_CONNECTION

- Explanations

This function executes the following processes, internally.

- Opens the USB port
- Searches ICDmini with specified serial number
- Erase the Flash memory
- Sets address information  
→ Sets any comments in the comment field in the packet
- Writes to the Flash memory
- Verifies data written in the Flash memory
- Closes the USB port



- Return code

OK	0x00	Normally ended.
NG	0x01	Error occurred.
ERROR_EXECUTIN	0x03	Not possible to accept because specified production number is executing.
ERROR_TIMEOUT_TARGET_CONNECTION	0x12	Time out occurred while connecting with the target system.
ERROR_TIMEOUT_TARGET_RESET	0x13	Time out occurred while executing target-reset.
ERROR_TIMEOUT_ERASE	0x14	Time out occurred while erasing the FLASH memory.
ERROR_TIMEOUT_WRITE	0x15	Time out occurred while writing to the FLASH memory.
ERROR_TIMEOUT_VERIFY	0x16	Time out occurred while verifying the FLASH memory.
ERROR_TIMEOUT_FLS_ICD	0x17	Time out occurred while loading Fls program to ICDmini.
ERROR_TIMEOUT_USER_ICD	0x18	Time out occurred while loading User program to ICDmini.
ERROR_ICD_OPEN_CONNECTION	0x21	Can not connect with the ICDmini.
ERROR_ICD_CONNECTION	0x22	Already disconnected with the ICDmini.
ERROR_ICD_CLOSE_CONNECTION	0x29	Can not disconnect with the ICDmini.
ERROR_TARGET_CONNECTION	0x32	Disconnected with the target system.
ERROR_TARGET_RESET	0x33	No response from the target for target-reset.
ERROR_ERASE	0x44	Error occurred while erasing the FLASH memory.
ERROR_WRITE	0x45	Error occurred while writing to the FLASH memory.
ERROR_VERIFY	0x46	Error occurred while verifying the FLASH memory.
ERROR_LOAD_FLS_ICD	0x47	Error occurred while loading Fls program to ICDmini.
ERROR_LOAD_USER_ICD	0x48	Error occurred while loading User program to ICDmini.
ERROR_PARAMETER	0x50	Parameter is invalid.
ERROR_INSUFFICIENT_ICDSERIALNUMBUF	0x51	Size of production number Buffer is insufficient.
ERROR_INSUFFICIENT_IDNUMBUF	0x52	Size of ID number Buffer is insufficient.
ERROR_INSUFFICIENT_FLSCOMMENTBUF	0x53	Size of Fls comment Buffer is insufficient.
ERROR_INSUFFICIENT_USERCOMMENTBUF	0x54	Size of user program comment Buffer is insufficient.
ERROR_MOT_OPEN_FLS	0x60	Opening error of the motorola file occurred in Fls program.
ERROR_MOT_FORMAT_FLS	0x61	Format error of the motorola file occurred in Fls program.
ERROR_MOT_SIZE_OVER_FLS	0x62	Size error of the motorola file occurred in Fls program.
ERROR_MOT_ADDR_FLS	0x63	Address error of the motorola file occurred in Fls program.
ERROR_MOT_OPEN_USER	0x64	Opening error of the motorola file occurred in User program.
ERROR_MOT_FORMAT_USER	0x65	Format error of the motorola file occurred in User program.
ERROR_MOT_SIZE_OVER_USER	0x66	Size error of the motorola file occurred in User program.
ERROR_MOT_ADDR_USER	0x67	Address error of the motorola file occurred in User program.
ERROR_VERIFY_FLS_ICD	0x68	Verify error of the motorola file occurred in Fls program.
ERROR_VERIFY_USER_ICD	0x69	Verify error of the motorola file occurred in User program.
OPERATION_TARGET_CONNECTION	0x82	Connecting with the target system.
OPERATION_TARGET_RESET	0x83	Executing target-reset.
OPERATION_ERASE	0x84	Erasing the FLASH memory.
OPERATION_WRITE	0x85	Writing to the FLASH memory.
OPERATION_VERIFY	0x86	Verifying the FLASH memory.
OPERATION_FLS_ICD_ERASE	0x87	Loading Fls program to ICDmini. ( erasing )
OPERATION_FLS_ICD_WRITE	0x88	Loading Fls program to ICDmini. ( writing )
OPERATION_FLS_ICD_VERIFY	0x89	Loading Fls program to ICDmini. ( verifying )
OPERATION_USER_ICD_ERASE	0x8a	Loading User program to icdmini. ( erasing )
OPERATION_USER_ICD_WRITE	0x8b	Loading User program to ICDmini. ( writing )
OPERATION_USER_ICD_VERIFY	0x8c	Loading User program to ICDmini. ( verifying )

### **A.3    Restrictions**

Do not connect multiple ICDmini units with the same ID number at the same time. If you connect multiple ICDmini units with the same ID number at the same time, only the first ICDmini connected is recognized.

### **A.4    Measurement Results**

When loading data from the host to ICDmini, the GBD (debugger) sends 16 bytes per packet. On the other hand, DLL sends up to 1,024 bytes per packet. Then, the faster transfer is expected than the DBG (debugger).

For references, the measured times are shown below, when loading the user program (\*.sa) of 3M bytes from the host to ICDmini.

Table A.4.1    ICDmini loading time list

	<b>Dynamic link library (ICD_GANG.DLL) using LoadIcdUserProgram() function</b>	<b>Debugger (GDB.EXE) using C17 fwld command</b>
Erase time	34sec	
Write time	1min 36sec	
Verify time	3min 14sec	None
Total time	5min 24sec	4min 31sec

## Revision History

---

### Revision History

Code No.	Page	Contents
411755901	All	Newly established

### AMERICA

---

**EPSON ELECTRONICS AMERICA, INC.**

2580 Orchard Parkway,  
San Jose, CA 95131, USA  
Phone: +1-800-228-3964      FAX: +1-408-922-0238

### EUROPE

---

**EPSON EUROPE ELECTRONICS GmbH**

Riesstrasse 15, 80992 Munich,  
GERMANY  
Phone: +49-89-14005-0      FAX: +49-89-14005-110

### ASIA

---

**EPSON (CHINA) CO., LTD.**

7F, Jinbao Bldg., No.89 Jinbao St.,  
Dongcheng District,  
Beijing 100005, CHINA  
Phone: +86-10-8522-1199      FAX: +86-10-8522-1125

**SHANGHAI BRANCH**

7F, Block B, Hi-Tech Bldg., 900 Yishan Road,  
Shanghai 200233, CHINA  
Phone: +86-21-5423-5577      FAX: +86-21-5423-4677

**SHENZHEN BRANCH**

12F, Dawning Mansion, Keji South 12th Road,  
Hi-Tech Park, Shenzhen 518057, CHINA  
Phone: +86-755-2699-3828      FAX: +86-755-2699-3838

**EPSON HONG KONG LTD.**

20/F, Harbour Centre, 25 Harbour Road,  
Wanchai, Hong Kong  
Phone: +852-2585-4600      FAX: +852-2827-4346  
Telex: 65542 EPSCO HX

**EPSON TAIWAN TECHNOLOGY & TRADING LTD.**

14F, No. 7, Song Ren Road,  
Taipei 110, TAIWAN  
Phone: +886-2-8786-6688      FAX: +886-2-8786-6660

**EPSON SINGAPORE PTE., LTD.**

1 HarbourFront Place,  
#03-02 HarbourFront Tower One, Singapore 098633  
Phone: +65-6586-5500      FAX: +65-6271-3182

**SEIKO EPSON CORP.****KOREA OFFICE**

5F, KLI 63 Bldg., 60 Yoido-dong,  
Youngdeungpo-Ku, Seoul 150-763, KOREA  
Phone: +82-2-784-6027      FAX: +82-2-767-3677

---

**SEIKO EPSON CORP.****MICRODEVICES OPERATIONS DIVISION****Device Sales & Marketing Dept.**

421-8, Hino, Hino-shi, Tokyo 191-8501, JAPAN  
Phone: +81-42-587-5814      FAX: +81-42-587-5117