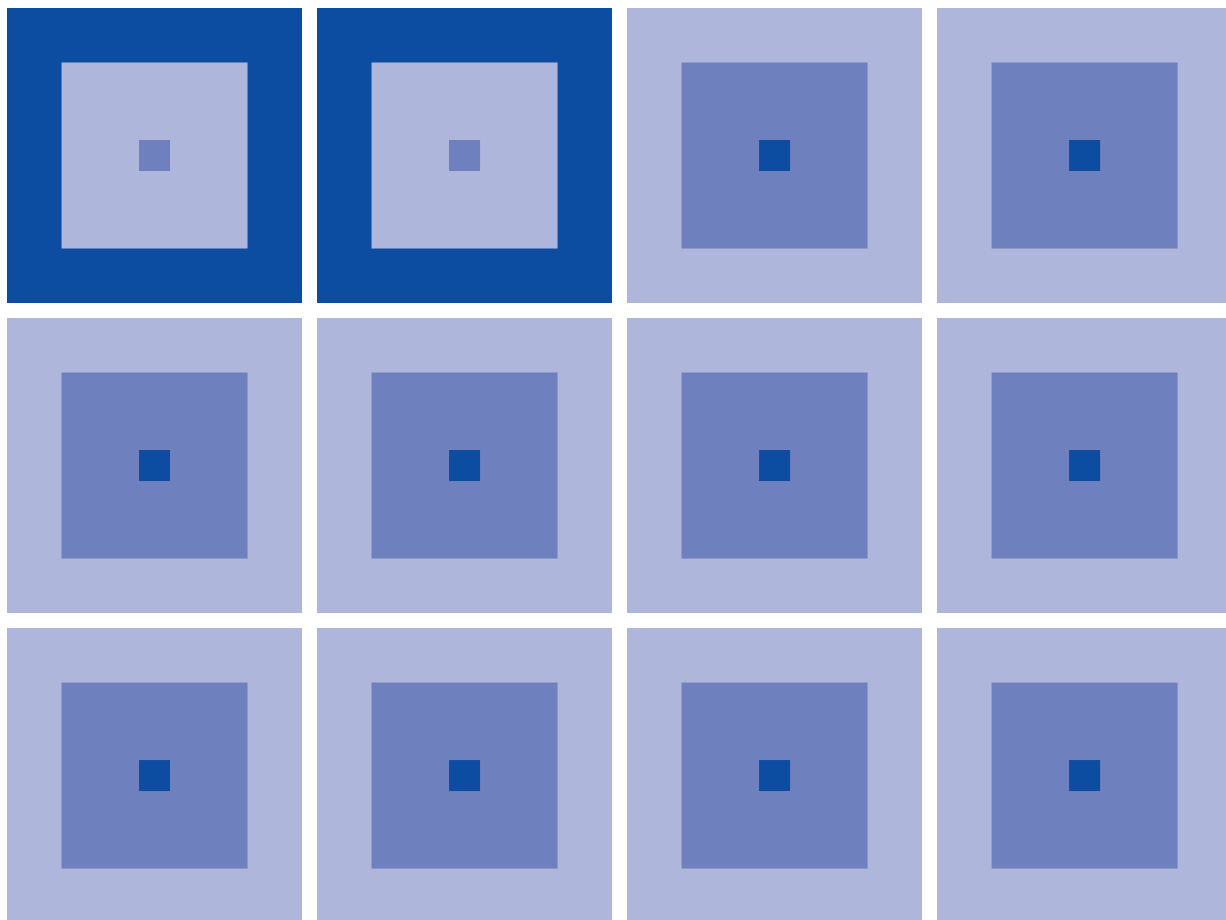


CMOS 8-BIT SINGLE CHIP MICROCOMPUTER
S5U1C88862D Manual
(Development Software Tool for S1C88862)



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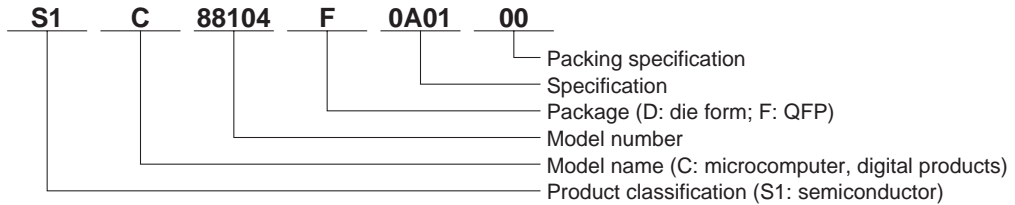
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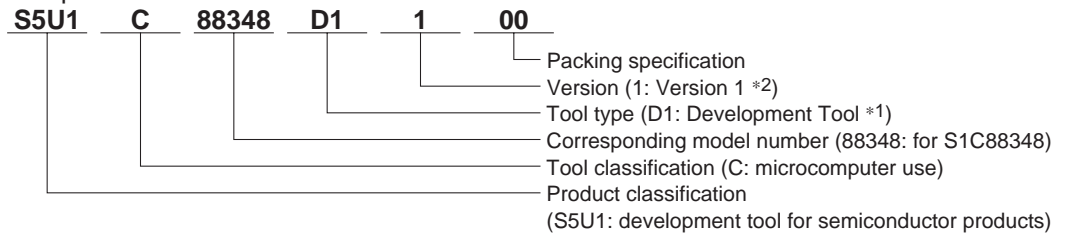
Starting April 1, 2001, the product number has been changed as listed below. Please use the new product number when you place an order. For further information, please contact Epson sales representative.

Configuration of product number

Devices



Development tools



*1: For details about tool types, see the tables below. (In some manuals, tool types are represented by one digit.)

*2: Actual versions are not written in the manuals.

Comparison table between new and previous number

S1C88 Family processors

Previous No.	New No.	Previous No.	New No.
E0C88104	S1C88104	E0C88365	S1C88365
E0C88112	S1C88112	E0C88F360	S1C88F360
E0C88308	S1C88308	E0C88408	S1C88408
E0C88316	S1C88316	E0C88409	S1C88409
E0C88317	S1C88317	E0C88816	S1C88816
E0C88348	S1C88348	E0C88832	S1C88832
E0C88P348	S1C88P348	E0C88862	S1C88862
E0C88349	S1C88349	E0C88F816	S1C88F816

Comparison table between new and previous number of development tools

Development tools for the S1C88 Family

Previous No.	New No.	Previous No.	New No.
88ISAIF	S5U1C88000H4	DEV88816	S5U1C88816D
ADP88348	S5U1C88348X	DEV88832	S5U1C88832D
ADP88360	S5U1C88360X	DEV88862	S5U1C88862D
DEV88104	S5U1C88104D	DMT88348-DB	S5U1C88348T
DEV88112	S5U1C88112D	ICE88UR	S5U1C88000H5
DEV88308	S5U1C88308D	PRC88316	S5U1C88316P
DEV88316	S5U1C88316D	PRC88348	S5U1C88348P
DEV88317	S5U1C88317D	PRC88365	S5U1C88365P
DEV88348	S5U1C88348D	PRC88409	S5U1C88409P
DEV88365	S5U1C88365D	PRC88816	S5U1C88816P
DEV88408	S5U1C88408D	SAP88	S5U1C88000S
DEV88409	S5U1C88409D	URS88348	S5U1C88348Y

Development tools for the S1C63/88 Family

Previous No.	New No.
ADS00002	S5U1C88000X1
GWH00002	S5U1C88000W2
URM00002	S5U1C88000W1

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1 OUTLINE OF PACKAGE

1.1 Preface

The "S1C88862 Development Tool" package is a software development tool package for the CMOS 8-bit single chip microcomputer S1C88 Family, and consists of software tools necessary for debugging by the ICE (S5U1C88000H5) and mask option setting of the S1C88862. The "S1C88 Family Assembler Package" is also necessary for the software development.

Program unused area filling utility **fil88862**
 Function option generator **fog88862**
 Mask data checker **mdc88862**
 Self-diagnostic program **t88862**

1.2 Provided Floppy Disks

This package includes the following floppy disks which are necessary for debugging by the ICE and mask option setting of the IC for the S1C88862 development.

- 1) 3.5" floppy disk (2HD) for IBM-PC/AT 1
- 2) S5U1C88862D Manual (Development Software Tool for S1C88862) (this manual) 1

The type of the personal computer that can be used with the development system and the restrictions are described in "2.1 System Configuration", be sure to read before to use.

Keep the original disk in a safe place as a backup after copying the contents to hard disk or other floppy disk.

Note: Use the DISKCOPY for backup of the original disk.

The contents of the floppy disk and installation procedure of the software development tools are explained in "2.2 Installation".

1.3 Outline of Software Tool

Figure 1.3.1 shows the software development flow.

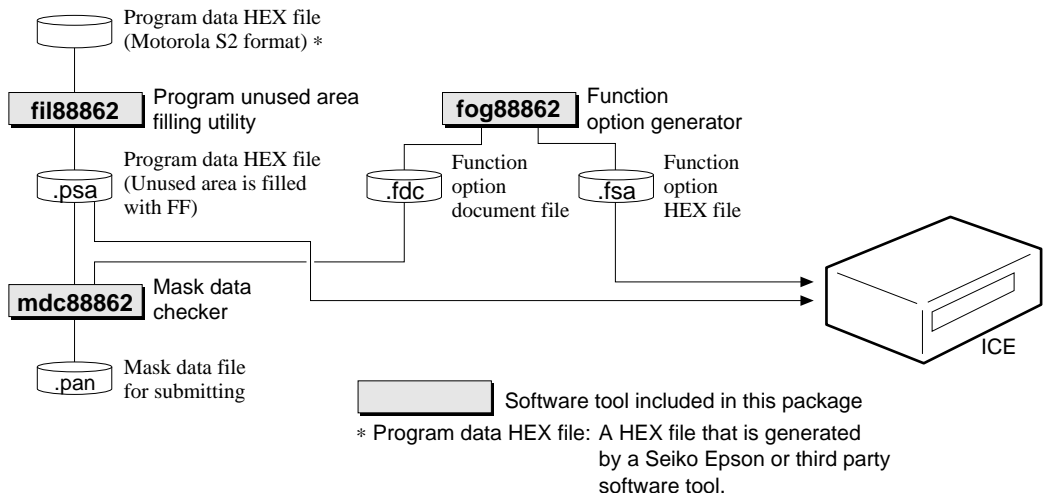


Fig. 1.3.1 Software development flow

1 OUTLINE OF PACKAGE

Outline of the basic function of each program is as follows.

1.3.1 Program unused area filling utility <fil88862>

The program unused area filling utility fil88862 is a tool for filling the unused area of the S1C88862 built-in ROM with the FF and setting the system code for the system reserved area of the S1C88862 when debugging using the ICE and for submitting mask data to Seiko Epson, for S1C88862 software development.

1.3.2 Function option generator <fog88862>

In the S1C88862, 10 items such as an I/O port function can be selected as mask option. The function option generator fog88862 is a tool that can interactively select the S1C88862 mask option settings and generates the mask option setting file for the ICE and the function option document file for generating the mask pattern.

1.3.3 Mask data checker <mdc88862>

The mask data checker mdc88862 is a tool to check the format of the program data that the unused area of the built-in ROM is filled with FFH and the S1C88862 system code is set and the function option document file for generating mask pattern, and to convert data developed by the customer to the mask data for submitting to Seiko Epson. So the customer's data becomes mask IC exactly.

1.3.4 Self-diagnostic program <t88862>

This package includes the self-diagnostic program to check the ICE and the Peripheral Circuit Board (S5U1C88348P) hardware and the function option data. Perform a self-diagnostic of the ICE and Peripheral Circuit Board periodically using this program when using the ICE and the Peripheral Circuit Board for debugging.

2 DEVELOPMENTAL ENVIRONMENT AND INSTALL

Here we will explain the configuration of the program development system and installation procedure for the software tools.

2.1 System Configuration

The system configuration that is necessary for the program development using this package is shown below.

2.1.1 Development using IBM-PC/AT

Model:	IBM-PC/AT and the full compatible (*1)
DOS:	PC-DOS ver. 3.3 or higher MS-DOS ver. 3.3 or higher
RAM capacity:	640K bytes (*2)
Hard disk drive:	Free space more than 200K bytes is necessary (*3)
Floppy disk drive:	3.5 inches, 2HD (1.44M bytes), 1 drive or more
CRT & graphic board:	EGA, VGA (text display only, fixed at 80 character × 25 lines)
Printer:	For listing (only character printing)
Other software:	Editor For source file creation/modification

Restrictions:

- *1 Compatible with models that use Intel 80 × 86 system for CPU.
- *2 This system operates in the real mode and does not use EMS and protected memory.
- *3 Assumes to use HD basically.

2.2 Installation

Here we will explain the installing of the programs included in this package. The contents of the floppy disk supplied with this package are shown in Figure 2.2.1.

Keep the original disk in a safe place as a backup after installing.

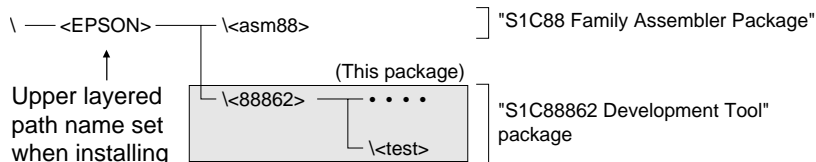
Note: Use the DISKCOPY for backup of the original disk.

2.2.1 Installer

This package includes the exclusive installer "setup862.exe" to install the software tools on the customer's disk drive. Install the software tools in this package by starting this installer.

Path name to install is fixed at \88862 in the default, but the setting that appending the upper layered path name to \88862 is possible. When installing other software tools of the S1C88 Family, by setting the same upper layered path name like this, file management on the disk will be easy.

Example: When setting to append "EPSON" in the upper layered path name.



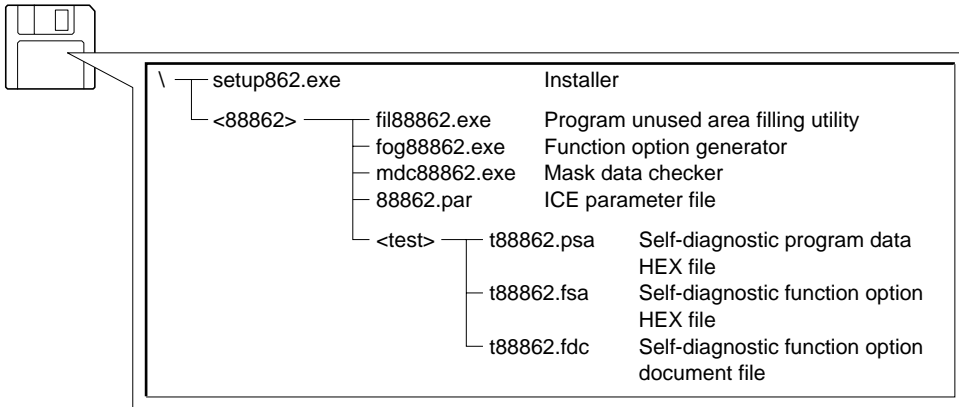


Fig. 2.2.1 Contents of floppy disk

Note: The batch file is installed in the directory ...<88862>. Use it after copying to your work directory if necessary.

2.2.2 Installation procedure

The S1C88 Family software tools need capacity approximate 200K bytes including a work area in case of all the program is installed. Therefore, we recommend to use HD (hard disk) basically. The twin-drive FD model can be used. The exclusive installer in this package checks the free space on the disk to be installed. If there is not enough free space on the install destination disk, reserve free space on the disk to perform file deletion and backup.

■ Operation procedure

- (1) Insert the floppy disk in this package into a drive.
- (2) Start the installer.
When starting the installer, be sure to set English mode.

```
A:setup862
```

Hereafter, install according to the messages displayed as below.

1. Initial screen

```

----- E0C88 Family Development Tool Install Utility Ver. X.XX -----
                Copyright (C) SEIKO EPSON CORP. 199x
                ***** E0C88862 Development Tool *****

Enter install drive from  [ A ]      ← Transfer source drive (original disk)
Enter copy drive & path to [ C:\88862\ ]
                                ↑ Transfer destination drive
                                and path (default setting)

                                (Quit : Ctrl + C )

***** Message Window *****
*  OK : Enter
*  Caution : Install and copy drive must be set different name
*
*****
    
```

2. Changing transfer destination drive and path

```

E0C88 Family Development Tool Install Utility Ver. X.XX

Copyright (C) SEIKO EPSON CORP. 199x

***** E0C88862 Development Tool *****

Enter install drive from [ A ] ← The transfer source drive can also be changed by
                                return the cursor to this position.

Enter copy drive & path to [ C:\88862\ ]
                                ↑
                                |
                                | The appending path of the transfer destination disk can
                                | be set by setting the cursor to this position.
                                |
                                | The transfer destination drive can also be changed by
                                | setting the cursor to this position.

                                (Quit : Ctrl + C )

***** Message Window *****
* Enter appends a path from default setting (max 40 char) *
* * * * *
* * * * *
*****

```

3. Registration of appending path of transfer destination

```

E0C88 Family Development Tool Install Utility Ver. X.XX

Copyright (C) SEIKO EPSON CORP. 199x

***** E0C88862 Development Tool *****

Enter install drive from [ A ]

Enter copy drive & path to [ C:\EPSON\88862\ ]
                                ↑
                                |
                                | Set appending path to transfer destination disk.

                                (Quit : Ctrl + C )

***** Message Window *****
* Enter appends a path from default setting (max 40 char) *
* * * * *
* * * * *
*****

```

2 DEVELOPMENTAL ENVIRONMENT AND INSTALL

4. Confirmation of transfer source disk (original) insertion

```
----- E0C88 Family Development Tool Install Utility Ver. X.XX -----  
  
                Copyright (C) SEIKO EPSON CORP. 199x  
  
                ***** E0C88862 Development Tool *****  
  
Install drive from : A:\                ← Confirm setting by Enter key  
Copy drive to      : C:\EPSON\88862\    ← Confirm setting by Enter key  
  
                Volume name of original disk  
                (Quit : Ctrl + C )  
***** Message Window *****  
* Insert install disk [ 88862_DISK1 ] to specified drive *  
*                                                         *  
*               Press any key to continue_                *  
*****
```

After setting the transfer source drive and transfer destination drive by Enter key respectively, the installer waits for confirmation of the transfer source disk (original) insertion.



Installation starts by inputting any key in this status.

The file name to be transferred is displayed in the "Message Window" during installing. When the installation is completed normally, an end message is displayed in the "Message Window".

5. Error

```
----- E0C88 Family Development Tool Install Utility Ver. X.XX -----  
  
                Copyright (C) SEIKO EPSON CORP. 199x  
  
                ***** E0C88862 Development Tool *****  
  
Install drive from : A:\  
Copy drive to      : C:\EPSON\88862\  
  
                (Quit : Ctrl + C )  
***** Message Window *****  
* Insufficient disk space ← If an error has occurred during installing, an error *  
*               message is displayed in the "Message Window". *  
*               Press any key to continue_                *  
*****
```

Note: When an error which is not fatal is generated in the installing stage, the installer returns to the initial screen and the operation can be continued. However, when "Quit" or a fatal error is generated, the installer is forcibly terminated. (In this case, delete all the file which are installed incompletely.)

<Messages of installer>**1. Start-up message**

E0C88 Family Development Tool Install Utility Ver. X.XX Copyright (C) SEIKO EPSON CORP. 199x

2. Setting, confirmation and operating messages

Message	Explanation
Enter install drive from	Transfer source drive name
Enter copy drive & path to	Transfer destination drive name
Caution : Install and copy drive must be set different name	Transfer source drive name and transfer destination drive name must be set to different names.
Insert install disk [volume name] to specified drive	Insert the transfer source disk [volume name] into the specified drive.
Copy drive and path is [drive and path name]	Transfer destination drive and path is [drive name and path name].
Enter appends a path from default setting (max 40 char)	Input path name appending to the default setting.
Install drive from : [Install drive and path name]	Transfer source drive is [drive name and path name].
Copy drive to : [Copy drive and path name]	Transfer destination drive is [drive name and path name].
Copying [reading file]	Reading transfer source file [file name].
to [writing file]	Writing transfer destination file [file name].
Press any key to continue	Press any key to continue the installer.
Press any key to exit	Press any key to terminate the installer.
E0C88 Family Dev. Tools install utility has been successfully	Installation of the S1C88 Family software tools has been succeeded.
Good-bye from E0C88 Family Dev. Tools install utility	Terminates installation of the S1C88 Family software tools.

3. Error messages

Error message	Explanation
Incorrect DOS Version use DOS 3.X or later	DOS version is incorrect.
Write protect error	Transfer destination disk has been protected from writing.
Unit No. is not exist	There is no unit number.
Drive not ready	The drive is not ready.
Install disk is different	Disk to be installed is different.
Seek error	Seek error has been generated.
Media type is different	Disk is different.
Sector not found	Sector cannot be detected.
Write error	Write error has been generated.
Read error	Read error has been generated.
Other error	Other error has been generated.
Disk error on [drive]	Disk error has been generated on [drive].
Cannot create the path	Path cannot be created.
Setting path already exists enter another drive and path	Since the set path already exists, set another drive and path.
Insufficient disk space	Disk space is insufficient.
Insufficient disk space, insert other disk	Since the disk space is insufficient, insert another disk.
Bad select the install drive	Drive specification for transfer source disk is wrong.
Bad select the copy drive	Drive specification for transfer destination disk is wrong.
Error : [Reading file] Cannot open source file	Transfer source file cannot be read.
Error : [Writing file] Cannot open out file	Transfer destination file cannot be written.
E0C88 Family Dev. Tools install utility has been terminated	Installation of the S1C88 Family software tools has been terminated.
Caution : Delete temporary installed and files	Since the installation of the S1C88 Family software tools has been terminated, delete all the file which are installed incompletely.

3 DETAILED EXPLANATION OF TOOLS

3.1 Program Unused Area Filling Utility (fil88862)

3.1.1 Outline of fil88862

The fil88862 is a tool for filling the unused area of the S1C88862 built-in ROM (000000H–00EFFFH) with the FF and setting the system code for the system reserved area of the S1C88862 when debugging using the ICE and for submitting mask data to Seiko Epson, for S1C88862 software development.

It serves to enhance the compatibility between the data debugged by the customer using the ICE and the mask data for submission to Seiko Epson. After downloading an fil88862 output file to the ICE and debugging using the ICE, use the mask data checker (mdc88862) to convert it into mask data for submission to Seiko Epson.

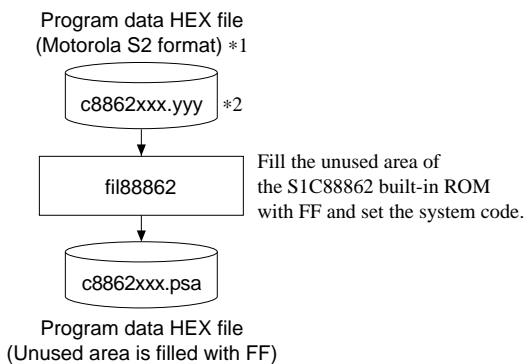


Fig. 3.1.2.1 fil88862 execution flow

- *1 A HEX file that is generated by a Seiko Epson or third party software tool.
- *2 Since the customer code is entered in the xxx part of the file name, it should be as designated by Seiko Epson.

Replace the yyy with an extension of the HEX file generated by a Seiko Epson or third party software tool.

3.1.2 Execution flow and input/output files

Figure 3.1.2.1 shows the fil88862 execution flow.

(1) Preparation of program data HEX file

Prepare a Hex file (Motorola S2 format) generated by a Seiko Epson or third party software tool.

(2) fil88862 execution

A file (c8862xxx.psa) in the format where the unused area of the S1C88862 built-in ROM has been filled by the FFH, for debugging the above mentioned program data HEX file on the ICE, and of the type (mdc88862) for submission of mask data to Seiko Epson is generated by execution of the program unused area filling utility (fil88862). At this time, the system codes F1H and FFH are also set to the system reserved areas (addresses 000024H and 000025H) of the S1C88862.

Note: Since the customer code is entered in the xxx part of the file name, it should be as designated by Seiko Epson.

3.1.3 Operation procedure

To start fil88862, insert the work disk into the current drive at the DOS command level (state in which a prompt such as A> is displayed) and then enter the command as following format.

```
fil88862 <file> ↵
```

↵ indicates the Return key.

■ Input file name (c8862xxx.yyy)

Specify the program data HEX file name to fill the unused area of the built-in ROM.

The fil88862 accepts only Hex files (Motorola S2 format) generated by a Seiko Epson or third party software tool.

When a file for other than the current drive is specified, the path name (drive/directory) must be specified in front of the file name.

Example: A>fil88862 b:\test\c88620a0.sa

■ Start-up message

When fil88862 is started, the following message is displayed.

Example: File name: c88620a0.sa

```
A>fil88862 c88620a0.sa↵
FIL88862 Unused Area Filling Utility Version X.XX
Copyright (C) SEIKO EPSON CORP. 199x
```

■ End message

When a series of operation are complete, the fil88862 displays the following message and returns to DOS command level.

(1) When terminated normally

```
A>fil88862 c88620a0.sa↵
FIL88862 Unused Area Filling Utility Version X.XX
Copyright (C) SEIKO EPSON CORP. 199x
.....
Unused Area Filling Completed
System Area Data Set Completed
A>
```

In this case, since the PATH name of the drive/directory will not be set upon start-up, the post conversion program HEX file (c88620a0.psa) with the built-in ROM unused area filled and the S1C88862 system code set is generated in the directory.

The proceeding status is indicated by a period (.) during fil88862 execution.

(2) When an error has been occurred

```
A>fil88862 c88620a0.sa↵
FIL88862 Unused Area Filling Utility Version X.XX
Copyright (C) SEIKO EPSON CORP. 199x

      C88620A0.SA 5:           File Format Error           ...Example of error message
A>
```

If an error is generated during fil88862 execution, it displays the file name producing the error, the line number and an error message, then terminates the fil88862.

Also, when an error has been generated, a post-conversion program data HEX file (c8862xxx.psa) is not generated. (In the event of a warning message, a post-conversion program data HEX file is generated.)

(3) In the event of forced termination

To forcibly terminate the execution of the fil88862, enter "CTRL" + "C". (This can also be done by pressing the "STOP" key on the host machine you are using.)

3.1.4 Error messages and warning message

fil88862 error messages and warning message are listed below.

Table 3.1.4.1 Error message

Error message	Explanation
Can't Find File	The specified input file does not exist.
Syntax Error: Input File	An input file name has not been specified.
File Format Error	The input file format is wrong. (*1)
Can't Open File	The input file cannot be opened.
Not S Record	The input file is not S record format.
Data Length	The data length of 1 line is too short.
Too Many Data In One Line	The data length of 1 line is too long.
Not 3Byte Address	The address length is not 3 bytes (including S1, S3, S7 and S9 record).
Check Sum Error	The check sum does not match.
Duplicate Error	There is a duplicate definition of data in the same address.
Can't Use Vector 24H System Reserve	The physical addresses 000024H and 000025H cannot be used as a vector because they are reserved as a system area for the S1C88862.
Can't Use Vector 25H System Reserve	
Insufficient disk space	There is no disk space.
Write Error	An error has occurred while writing data.

*1 A file format error will occur under the following conditions:

- Another record has followed the S8 record.
- Something other than a hexadecimal number is included in the file.
- There is a line that consists of less than 12 characters.
- There is an S8 record that has more or less than 12 characters or of which the byte count is not 04.
- There is an S4, S5 or S6 record included in the file.
- There is no S8 record.

Table 3.1.4.2 Warning message

Warning message	Explanation
Warning: No 00H Address	There is no data in the physical address 000000H.

Note: When there is no data in the physical address 000000H, it will output a warning message and filled the data FFH.

3.1.5 fil88862 execution example

■ Input file example (c88620a.sa)

```
S224000000001235000502350235023502350235023502350235023502350235040
S2080000202350015013
S224000100CF6E00F6B4FFDD0030DD0100D94004C700F0C40000CFDCC30200D700F8E7F7F262
S2240001209300D94004B0FFB104C543F8C700F8CFEB7093CF3BE7FBC10001C20001CFEED725
:           :           :           :           :           :           :           :           :           :
S224007F001818000055AA000101000001000100010002000000401011121314151617181919
S20E007F201A1B1C1D1E1F2F3F0F3FEB
S804000000FB
```

■ Output file example (c88620a.psa)

F1H and FFH are set in the system reserved area (addresses 000024H and 000025H) for S1C88862.

```
S224000000001235000502350235023502350235023502350235023502350235040
S224000020235001501FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF21
S224000040FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFBB
S224000060FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF9B
S224000080FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF7B
S2240000A0FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF5B
S2240000C0FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF3B
S2240000E0FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF1B
S224000100CF6E00F6B4FFDD0030DD0100D94004C700F0C40000CFDCC30200D700F8E7F7F262
S2240001209300D94004B0FFB104C543F8C700F8CFEB7093CF3BE7FBC10001C20001CFEED725
S22400014000FEE7EEC500F8C600F8CFEE1255F5DAB000F23A04DD2003D94009DD22019C3F7C
S224000160B001CED400F0D94004F27A00F29000F2A600F2BC00F2DD00F21703F23F03F2BD28
S22400018003F2F203CED084F1803204E703B000CED484F1CED003F1803214E703B000CED462
S2240001A003F1CEACECED006F332FFE7F7B000CED406F3F1B3D97560CED0007F7810CED00143
S2240001C07F7811D97801CED0027F7844CED0037F7845DD62FFDD6000DD63F5DD613FD9768C
S2240001E010DD4008F8A2A0C60E7FB100CED084F1CF40464C02CEB0FC297802A8AAF8CED0CC
S22400020084F13203E608F2E503B000F106F2D403B0FFCED407F4F8A2A0C6127FB100CED0CB
:           :           :           :           :           :           :           :           :           :
S22400EFA0FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF6C
S22400EFC0FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF4C
S22400EFE0FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF2C
S804000000FB
```

3.2 Function Option Generator (fog88862)

3.2.1 Outline of fog88862

With the 8-bit single chip S1C88862 microcomputer, the customer may select 10 mask options. By modifying the mask patterns of the S1C88862 according to the options selected by the customer, the system can be customized to meet the specifications of the target system.

The fog88862 function option generator is a software tool for generating the document file used to generate mask patterns. It lets the customer interactively select the mask option for the S1C88862. From the data file created with fog88862, the S1C88862 mask pattern is automatically generated by a CAD machine at Seiko Epson. In addition, HEX data in the Motorola S2 format necessary for debugging using the ICE can be created. By downloading this data file from the host machine when debugging with the ICE, the same option functions as the actual IC can be executed on the ICE.

3.2.2 Execution flow and input/output files

Figure 3.2.2.1 shows the fog88862 execution flow.

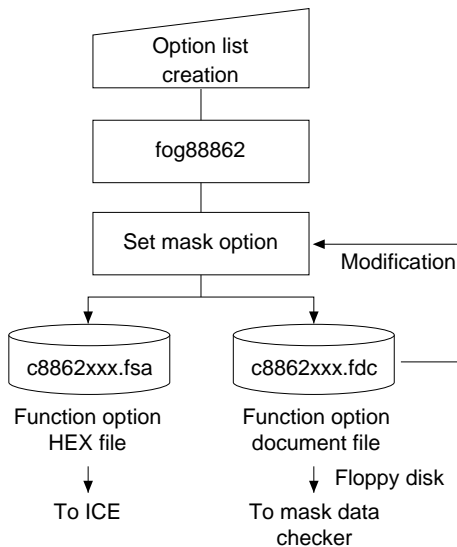


Fig. 3.2.2.1 fog88862 execution flow

(1) Option list creation

Select the S1C88862 mask options that meet the specifications of the customer's target system and record them in the option list (paper for recording items in preparation for input operation; explained later). At this time, decide the option for the ICE use.

(2) fog88862 execution

Start fog88862 and select the mask options for the S1C88862 according to the display on screen. Since options can be selected using the interactive format, a device such as a source file is not necessary when creating data.

In addition, when correcting the contents, once it has been set, the necessary points alone can be corrected by inputting the document file that was output by fog88862.

As a result, fog88862 generates the following two files by option settings.

- **Function option document file (c8862xxx.fdc)**
This is a document file in which the selected mask option items for the S1C88862 have been recorded, used to generate mask patterns at Seiko Epson. You can correct part of this file by inputting it using the fog88862. This file must be run through the mdc88862 mask data checker with the completed program file, and be submitted to Seiko Epson.
- **Function option HEX file (c8862xxx.fsa)**
This is a data file for setting the S1C88862 mask options when debugging by the ICE. This file is generated by a Motorola S2 type format. When debugging is done using the ICE, download this file into the ICE by the command.

Remarks

- * Since the customer code is entered in the xxx part of the file name, it should be as designated by Seiko Epson.
- * Copy the document file and the program file (c8862xxx.psa) in a batch to another floppy disk and submit it to Seiko Epson.
- * Refer to the ICE help file for the method of downloading the mask options into the ICE.

3.2.3 Option list

The following options can be set for the S1C88862 and ICE.

Multiple specifications are available in each option item as indicated in the Option List. Using "3.2.7 Option selection and option specification" as reference, select the specifications that meet the target system and check the appropriate box. Be sure to record the specifications for unused functions too, according to the instructions provided.

The option selection is done interactively on the screen during fog88862 execution, using this option list as reference.

Peripheral Circuit Board (S5U1C88348P) option list

A OSC1 SYSTEM CLOCK

- 1. Internal Clock (32.768 kHz)
- 2. User Clock

B OSC3 SYSTEM CLOCK

- 1. Internal Clock (4.9152 MHz)
- 2. User Clock

S1C88862 mask option list (1/2)

1 OSC1 SYSTEM CLOCK

- 1. Crystal
- 2. External Clock
- 3. CR
- 4. Crystal (with Gate Capacity)

2 OSC3 SYSTEM CLOCK

- 1. Crystal
- 2. Ceramic
- 3. CR
- 4. External Clock

3 MULTIPLE KEY ENTRY RESET

- Combination ... 1. Not Use
- 2. Use K00, K01
- 3. Use K00, K01, K02
- 4. Use K00, K01, K02, K03

4 SVD RESET

- 1. Not Use
- 2. Use

5 INPUT PORT PULL UP RESISTOR

- | | | |
|---------------|---|---|
| • K00 | <input type="checkbox"/> 1. With Resistor | <input type="checkbox"/> 2. Gate Direct |
| • K01 | <input type="checkbox"/> 1. With Resistor | <input type="checkbox"/> 2. Gate Direct |
| • K02 | <input type="checkbox"/> 1. With Resistor | <input type="checkbox"/> 2. Gate Direct |
| • K03 | <input type="checkbox"/> 1. With Resistor | <input type="checkbox"/> 2. Gate Direct |
| • K04 | <input type="checkbox"/> 1. With Resistor | <input type="checkbox"/> 2. Gate Direct |
| • K05 | <input type="checkbox"/> 1. With Resistor | <input type="checkbox"/> 2. Gate Direct |
| • K06 | <input type="checkbox"/> 1. With Resistor | <input type="checkbox"/> 2. Gate Direct |
| • K07 | <input type="checkbox"/> 1. With Resistor | <input type="checkbox"/> 2. Gate Direct |
| • K10 | <input type="checkbox"/> 1. With Resistor | <input type="checkbox"/> 2. Gate Direct |
| • RESET | <input type="checkbox"/> 1. With Resistor | <input type="checkbox"/> 2. Gate Direct |

S1C88862 mask option list (2/2)

6 I/O PORT PULL UP RESISTOR

- | | | |
|-------------|---|---|
| • P10 | <input type="checkbox"/> 1. With Resistor | <input type="checkbox"/> 2. Gate Direct |
| • P11 | <input type="checkbox"/> 1. With Resistor | <input type="checkbox"/> 2. Gate Direct |
| • P12 | <input type="checkbox"/> 1. With Resistor | <input type="checkbox"/> 2. Gate Direct |
| • P13 | <input type="checkbox"/> 1. With Resistor | <input type="checkbox"/> 2. Gate Direct |
| • P14 | <input type="checkbox"/> 1. With Resistor | <input type="checkbox"/> 2. Gate Direct |
| • P15 | <input type="checkbox"/> 1. With Resistor | <input type="checkbox"/> 2. Gate Direct |
| • P16 | <input type="checkbox"/> 1. With Resistor | <input type="checkbox"/> 2. Gate Direct |
| • P17 | <input type="checkbox"/> 1. With Resistor | <input type="checkbox"/> 2. Gate Direct |

7 LCD DRIVE DUTY

- 1. 1/32 & 1/16 Duty
- 2. 1/8 Duty

8 LCD POWER SUPPLY

- 1. Internal TYPE A (V_{C2} Standard, 1/5 Bias, 4.5 V)
- 2. External
- 3. Internal TYPE B (V_{C2} Standard, 1/5 Bias, 5.5 V)
- 4. Internal TYPE C (V_{C2} Standard, 1/4 Bias, 4.5 V)
- 5. Internal TYPE D (V_{C1} Standard, 1/4 Bias, 4.5 V)

9 XBZ OUTPUT

- 1. Use
- 2. Not Use

10XTOUT OUTPUT

- 1. Use
- 2. Not Use

3.2.4 Starting procedure

■ Starting command

```
fog88862 ↵
```

↵ indicates the Return key.

To start fog88862, insert the work disk into the current drive at the DOS command level (state in which a prompt such as A> is displayed), then enter the program name.

■ Start-up message

```
A>fog88862
E0C88862 Function Option Generator Version X.XX
Copyright (C) SEIKO EPSON CORP. 199x

This software makes the following files.

c8862xxx.fsa . . . function option XEX file.
c8862xxx.fdc . . . function option document file.
```

When fog88862 is started, the start-up message is displayed.

Here we will explain the actual operation method of fog88862 according to the screen displayed.

To suspend execution, press the "CTRL" and "C" keys together; the sequence returns to the DOS command level. (It is possible by pressing "STOP" key depending on the PC used.)

■ Operation selection menu

```
*** Operation select menu ***

    1. Input new file
    2. Edit file
    3. Return to dos

Please select No. ?
```

The operation selection menu is displayed on the screen.

Enter a number from 1 to 3 to select a subsequent operation.

The items indicate the following.

1. **Input new file:**
Used to set new function option file.
2. **Edit file:**
Used to read the already-generated function option document file and set or modify the option contents. In this case, the current drive must contain the function option document file (c8862xxx.fdc) generated by "1. Input new file".
3. **Return to dos:**
Used to terminate fog88862 and return to the DOS command level.

3.2.5 Setting new function options (Input new file)

This section explains how to set new function option file.

* In the examples, indicates the Return key.

```

*** Operation select menu ***

    1. Input new file
    2. Edit file
    3. Return to dos

Please select No. ? 1                 .. (1)

Please input file name ? c8862xxx                 .. (2)
Please input user's name ? SEIKO EPSON CORP.                 .. (3)
Please input any comment
(one line is 50 chr) ? ED MARKETING DEPARTMENT                 .. (4)
                    ? 421-8 HINO HINO-SHI TOKYO 191-8501 JAPAN 
                    ? 

```

(1) Please select No. ?

Select "1. Input new file" on the operation selection menu.

(2) Please input file name ?

Enter the function option document (and HEX) file name to be generated. Do not enter the extension of the file name. A small letter is converted to a capital letter and outputs to the document file. Alphabetic characters and "0" to "9" can be used.

In case a function option document file with the same name as the file name specified in the current drive exists, the user is asked whether overwritten is desired. Enter "Y" or "N" accordingly.

```

Please input file name ? c8862xxx 
File exists. Overwrite (y/n) ?

```

(3) Please input user's name ?

Enter the customer's company name. Up to 40 characters may be entered. If 41 or more characters are entered, they are ignored. "[" and "]" is displayed by conversion to "(" and ")".

(4) Please input any comment

Enter any comment. Up to 50 characters may be entered in one line. If 51 or more characters are entered in one line, they are ignored. Up to 10 comment lines may be entered. To end entry of comments, press the Return key.

A small letter is displayed by conversion to a capital letter.

Include the following in comment lines:

- Company, department, division, and section names
- Company address, phone number, and FAX number
- Other information, including technical information

The below symbols for the inputting of (3) and (4) cannot be used. When those symbols are input, it displays an "Illegal character" error message, then again returns to the input status for that line. "\$", "\"("¥)", "|", back-quote ... input disable

Next, start mask option setting for S1C88862. For new settings, select options OPTION No. 1 to No. 10 sequentially and interactively. See "3.2.7 Option selection and option specification" for the selection procedure of each function option.

3.2.6 Modifying function option settings (Edit file)

This section explains how to modify the settings in the function option file.

* In the examples, indicates the Return key.

```

*** Operation select menu ***

    1. Input new file
    2. Edit file
    3. Return to dos

Please select No. ? 2                .. (1)

*** Source file(s) ***

C88620A0          C88620B0          C88620C0          .. (2)

Please input file name ? c88620a0        .. (3)
Please input user's name ?                 .. (4)
Please input any comment
(one line is 50 chr) ?                 .. (5)
Please input edit No. (End=e) ? 4        .. (6)

```

(1) Please select No. ?

Select "2. Edit file" on the operation selection menu.

(2) *** Source file(s) ***

Will display the funPeripheral Circuit Boardtion document files on the current drive. If no modifiable source exists, the following message is displayed and the program is terminated.

```
Function option document file is
not found.
```

(3) Please input file name ?

Enter a file name. Do not enter the extension of the file name. If the function option document file (c8862xxx.fdc) is not in the current drive, an error message like the one below is output, prompting entry of other file name.

```
Please input file name ? c88620a0
Function option document file is
not found.
```

(4) Please input user's name ?

When modifying the customer's company name, enter a new name. The previously entered name may be used by pressing the Return key.

(5) Please input any comment

When modifying a comment, enter all the comment lines anew, beginning with the first line; comment data cannot be partially modified. Previously entered comment data can be used by pressing the Return key. The input conditions are the same as for new settings.

(6) Please input edit No. ?

Enter the number (1-10) of the option to be modified, then start setting the option contents (See "3.2.7 Option selection and option specification").

When selection of one option is complete, the system prompts entry of another function option number. Repeat selection until all options to be modified are selected. If the Return key is pressed without entering a number, the option of the subsequent number can be selected.

Enter "E" to end option setting. Then, move to the confirmation procedure for the function option HEX file generation (See "3.2.8 HEX file generation").

Example:

- When modifying the settings of the option of No. 1
Please input edit No. ? 1
- When ending setting
Please input edit No. ? e

3.2.7 Option selection and option specification

Selection procedure for function options are described below.

- * Option selection is done interactively. For new settings (Input new file), set all options OPTION No. 1 to No. 10 sequentially; to modify settings (Edit file), the specified option number may be set directly.
- * The selections for each option correspond one to one to the option list. While referring to the contents recorded in the option list, enter the selection number.
- * In the message that prompts entry, the value in parentheses () indicates the default value in case of new settings, or the previously set value in case of setting modification. This value is set when only the Return key is pressed.
- * In the selection examples, "↵" indicates the Return key input.

- **Example of option selection**

```

*** OPTION NO.3 ***
--- MULTIPLE KEY ENTRY RESET ---
<COMBINATION>

      1. NOT USE
      2. USE K00,K01
      3. USE K00,K01,K02
      4. USE K00,K01,K02,K03

PLEASE SELECT NO.(1) ? 2↵

      2. USE K00,K01                SELECTED
    
```

- **Modifying procedure when wrong number is selected in new setting (Input new file)**
 When you wish to modify previously set option in the new setting process (Input new file), enter "B↵" to return 1 step back to the previous function option setting operation.

```

*** OPTION NO.3 ***
--- MULTIPLE KEY ENTRY RESET ---
<COMBINATION>

      1. NOT USE
      2. USE K00,K01
      3. USE K00,K01,K02
      4. USE K00,K01,K02,K03

PLEASE SELECT NO.(1) ? B↵

*** OPTION NO.2 ***
--- OSC3 SYSTEM CLOCK ---

      1. CRYSTAL
      2. CERAMIC
      3. CR
      4. EXTERNAL CLOCK

PLEASE SELECT NO.(1) ?
    
```

When all of option settings are completed in new settings, move to the confirmation procedure for the function option HEX file generation (See "3.2.8 HEX file generation").

When modify settings are completed, move to the confirmation procedure for the function option HEX file generation (See "3.2.8 HEX file generation") by entering "E↵".

Screen that can be selected as function options set on the Peripheral Circuit Board is shown below. Please refer to the "S1C88832/88862 Technical Manual" for detailed specification of the S1C88862.

Peripheral Circuit Board (S5U1C88348P) options

Selects the OSC1 and OSC3 system clocks for the Peripheral Circuit Board.

These option selections are valid when performing software development on the ICE. For the system clocks to be used on the actual IC (S1C88862), select them with S1C88862 mask options OPTION No. 1 and No. 2.

A OSC1 system clock

```
#PRC88348 OPTION
*** OPTION A ***
--- OSC1 SYSTEM CLOCK ---

    1. INTERNAL CLOCK(32.768KHz)
    2. USER CLOCK

PLEASE SELECT NO.(1) ? 1 [↓]

    1. INTERNAL CLOCK(32.768KHz)   SELECTED
```

When "1. INTERNAL CLOCK(32.768KHz)" is selected, 32.768 kHz system clock generated from the built-in crystal oscillation circuit is supplied to the Peripheral Circuit Board. When "2. USER CLOCK" is selected, a rectangular wave clock can be input to the Peripheral Circuit Board from outside through OSC1.

B OSC3 system clock

```
*** OPTION B ***
--- OSC3 SYSTEM CLOCK ---

    1. INTERNAL CLOCK(4.9152MHz)
    2. USER CLOCK

PLEASE SELECT NO.(1) ? 1 [↓]

    1. INTERNAL CLOCK(4.9152MHz)   SELECTED
```

When "1. INTERNAL CLOCK(4.9152MHz)" is selected, 4.9152 MHz system clock generated from the built-in crystal oscillation circuit is supplied to the Peripheral Circuit Board. When "2. USER CLOCK" is selected, a rectangular wave clock can be input to the Peripheral Circuit Board from outside through OSC3.

S1C88862 mask options

1 OSC1 system clock

```

*** OPTION NO.1 ***
--- OSC1 SYSTEM CLOCK ---

    1. CRYSTAL
    2. EXTERNAL CLOCK
    3. CR
    4. CRYSTAL (WITH GATE CAPACITY)

PLEASE SELECT NO.(1) ? 1 [v]

    1. CRYSTAL                               SELECTED
    
```

2 OSC3 system clock

```

*** OPTION NO.2 ***
--- OSC3 SYSTEM CLOCK ---

    1. CRYSTAL
    2. CERAMIC
    3. CR
    4. EXTERNAL CLOCK

PLEASE SELECT NO.(1) ? 1 [v]

    1. CRYSTAL                               SELECTED
    
```

3 Multiple key entry reset

```

*** OPTION NO.3 ***
--- MULTIPLE KEY ENTRY RESET ---
<COMBINATION>

    1. NOT USE
    2. USE K00,K01
    3. USE K00,K01,K02
    4. USE K00,K01,K02,K03

PLEASE SELECT NO.(1) ? 1 [v]

    1. NOT USE                               SELECTED
    
```

4 SVD reset

```

*** OPTION NO.4 ***
--- SVD RESET ---

    1. NOT USE
    2. USE

PLEASE SELECT NO.(1) ? 1 [v]

    1. NOT USE                               SELECTED
    
```

5 Input port pull up resistor

```

*** OPTION NO.5 ***
--- INPUT PORT PULL UP RESISTOR ---

    K00:  1. WITH RESISTOR
           2. GATE DIRECT

PLEASE SELECT NO.(1) ? 1 [v]

    K01:  1. WITH RESISTOR
           2. GATE DIRECT

PLEASE SELECT NO.(1) ? 1 [v]

    K02:  1. WITH RESISTOR
           2. GATE DIRECT

PLEASE SELECT NO.(1) ? 1 [v]

    K03:  1. WITH RESISTOR
           2. GATE DIRECT

PLEASE SELECT NO.(1) ? 1 [v]

    K04:  1. WITH RESISTOR
           2. GATE DIRECT

PLEASE SELECT NO.(1) ? 1 [v]

    K05:  1. WITH RESISTOR
           2. GATE DIRECT

PLEASE SELECT NO.(1) ? 1 [v]

    K06:  1. WITH RESISTOR
           2. GATE DIRECT

PLEASE SELECT NO.(1) ? 1 [v]

    K07:  1. WITH RESISTOR
           2. GATE DIRECT

PLEASE SELECT NO.(1) ? 1 [v]

    K10:  1. WITH RESISTOR
           2. GATE DIRECT

PLEASE SELECT NO.(1) ? 1 [v]

    ~RESET: 1. WITH RESISTOR
             2. GATE DIRECT

PLEASE SELECT NO.(1) ? 1 [v]

    K00:  1. WITH RESISTOR      SELECTED
    K01:  1. WITH RESISTOR      SELECTED
    K02:  1. WITH RESISTOR      SELECTED
    K03:  1. WITH RESISTOR      SELECTED
    K04:  1. WITH RESISTOR      SELECTED
    K05:  1. WITH RESISTOR      SELECTED
    K06:  1. WITH RESISTOR      SELECTED
    K07:  1. WITH RESISTOR      SELECTED
    K10:  1. WITH RESISTOR      SELECTED
    ~RESET: 1. WITH RESISTOR      SELECTED
    
```

6 I/O port pull up resistor

```

*** OPTION NO.6 ***
--- I/O PORT PULL UP RESISTOR ---

      P10:  1. WITH RESISTOR
            2. GATE DIRECT

PLEASE SELECT NO.(1) ? 1 [v]

      P11:  1. WITH RESISTOR
            2. GATE DIRECT

PLEASE SELECT NO.(1) ? 1 [v]

      P12:  1. WITH RESISTOR
            2. GATE DIRECT

PLEASE SELECT NO.(1) ? 1 [v]

      P13:  1. WITH RESISTOR
            2. GATE DIRECT

PLEASE SELECT NO.(1) ? 1 [v]

      P14:  1. WITH RESISTOR
            2. GATE DIRECT

PLEASE SELECT NO.(1) ? 1 [v]

      P15:  1. WITH RESISTOR
            2. GATE DIRECT

PLEASE SELECT NO.(1) ? 1 [v]

      P16:  1. WITH RESISTOR
            2. GATE DIRECT

PLEASE SELECT NO.(1) ? 1 [v]

      P17:  1. WITH RESISTOR
            2. GATE DIRECT

PLEASE SELECT NO.(1) ? 1 [v]

      P10:  1. WITH RESISTOR      SELECTED
      P11:  1. WITH RESISTOR      SELECTED
      P12:  1. WITH RESISTOR      SELECTED
      P13:  1. WITH RESISTOR      SELECTED
      P14:  1. WITH RESISTOR      SELECTED
      P15:  1. WITH RESISTOR      SELECTED
      P16:  1. WITH RESISTOR      SELECTED
      P17:  1. WITH RESISTOR      SELECTED
    
```

7 LCD drive duty

```

*** OPTION NO.7 ***
--- LCD DRIVE DUTY ---

      1. 1/32 & 1/16 DUTY
      2. 1/8          DUTY

PLEASE SELECT NO.(1) ? 1 [v]

      1. 1/32 & 1/16 DUTY      SELECTED
    
```

8 LCD power supply

```

*** OPTION NO.8 ***
--- LCD POWER SUPPLY ---

1. INTERNAL TYPE A(VC2 STANDARD,1/5BIAS,4.5V)
2. EXTERNAL
3. INTERNAL TYPE B(VC2 STANDARD,1/5BIAS,5.5V)
4. INTERNAL TYPE C(VC2 STANDARD,1/4BIAS,4.5V)
5. INTERNAL TYPE D(VC1 STANDARD,1/4BIAS,4.5V)

PLEASE SELECT NO.(1) ? 1 [v]

1. INTERNAL TYPE A(VC2 STANDARD,1/5BIAS,4.5V)  SELECTED
    
```

9 XBZ output

```

*** OPTION NO.9 ***
--- XBZ OUTPUT ---

      1. USE
      2. NOT USE

PLEASE SELECT NO.(1) ? 1 [v]

      1. 1. USE      SELECTED
    
```

10 XTOUT output

```

*** OPTION NO.10 ***
--- XTOUT OUTPUT ---

      1. USE
      2. NOT USE

PLEASE SELECT NO.(1) ? 1 [v]

      1. 1. USE      SELECTED
    
```

3.2.8 HEX file generation

When function options setting is completed, the following message is output to ask the operator whether to generate the function option HEX file.

```
End of option setting.
Do you make HEX file (y/n) ? y
```

Do you make HEX file (y/n) ?

Enter "Y" to generate the HEX file (c8862xxx.fsa). If "N" is entered, no HEX file is generated and only document file (c8862xxx.fdc) is generated. Since the function option HEX file (c8862xxx.fsa) is needed when debugging the program with the ICE, normally set "Y".

When debugging with the ICE, download the generated HEX file into the ICE.

When the above operation is completed, fog88862 generates the function option HEX file and function option document file. And then the following message is output and the sequence returns to the operation selection menu. However, when "N" is input in the above selection for the function option HEX file, the end message shown below is not displayed.

```
Making file(s) is completed.
```

3.2.9 End procedure

```
*** Operation select menu ***

      1. Input new file
      2. Edit file
      3. Return to dos

Please select No. ? 3
```

When a series of operations are complete, the sequence returns to the operation selection menu. Execution of fog88862 can be ended by selecting "3. Return to dos" on this menu. If "1. Input new file" or "2. Edit file" is selected, setting function options can be performed again.

fog88862 can be forcibly terminated by pressing the "CTRL" and "C" keys together during program execution. (It is possible by pressing "STOP" key depending on the PC used.) However, in this case, the correct function option HEX file and function option document file are not generated.

3.2.10 Error message

Here following is a list of the fog88862 error messages.

Table 3.2.10.1 fog88862 error message list

Message	Explanation
Illegal character!!	There is an input character error. An input disable character has been input.
Function option document file is not found.	There is no document file at the time of the setting modification (Edit file). There is no document file with the input file name at the time of the setting modification (Edit file).
File name error.	9 characters or more have been input for the file name input.
Bad function option document file.-filename-	A function option document file other than for the S1C88862 is specified during modification (Edit file).
Error: File write error.	The function option document file or function option HEX file cannot be created. This error may occur if there is no disk space.
Can't open file : filename	The file cannot be opened. This error may occur when too many files exist in the current directory.

3.2.11 Sample files

■ Example of function option document file

```

* E0C88862 FUNCTION OPTION DOCUMENT  V X.XX
*
* FILE NAME      C88620A0.FDC
* USER'S NAME   SEIKO EPSON CORP.
* INPUT DATE    XXXX/XX/XX
*
* #PRC88348 OPTION
* *** OPTION A ***
* --- OSC1 SYSTEM CLOCK ---
*   INTERNAL CLOCK(32.768KHZ)  ----- SELECTED
*OPT0A01 01
*
* *** OPTION B ***
* --- OSC3 SYSTEM CLOCK ---
*   INTERNAL CLOCK(4.9152MHZ) ----- SELECTED
*OPT0B01 01
*
* #E0C88862 OPTION
* *** OPTION NO.1 ***
* --- OSC1 SYSTEM CLOCK ---
*   EXTERNAL CLOCK  ----- SELECTED
*OPT0101 02
*
* *** OPTION NO.2 ***
* --- OSC3 SYSTEM CLOCK ---
*   CRYSTAL  ----- SELECTED
*OPT0201 01
*
* *** OPTION NO.3 ***
* --- MULTIPLE KEY ENTRY RESET ---
*   COMBINATION          NOT USE ----- SELECTED
*OPT0301 01
*
* *** OPTION NO.4 ***
* --- SVD RESET ---
*   NOT USE ----- SELECTED
*OPT0401 01
*
* *** OPTION NO.5 ***
* --- INPUT PORT PULL UP RESISTOR ---
*   K00          WITH RESISTOR ----- SELECTED
*   K01          WITH RESISTOR ----- SELECTED
*   K02          WITH RESISTOR ----- SELECTED
*   K03          WITH RESISTOR ----- SELECTED
*   K04          WITH RESISTOR ----- SELECTED
*   K05          WITH RESISTOR ----- SELECTED
*   K06          WITH RESISTOR ----- SELECTED
*   K07          WITH RESISTOR ----- SELECTED
*   K10          WITH RESISTOR ----- SELECTED
*   ~RESET      WITH RESISTOR ----- SELECTED
*OPT0501 01
*OPT0502 01
*OPT0503 01
*OPT0504 01
*OPT0505 01
*OPT0506 01
*OPT0507 01
*OPT0508 01
*OPT0509 01
*OPT0510 01

```

3 DETAILED EXPLANATION OF TOOLS (Function Option Generator fog88862)

```

*
* *** OPTION NO.6 ***
* --- I/O PORT PULL UP RESISTOR ---
*   P10                WITH RESISTOR ----- SELECTED
*   P11                WITH RESISTOR ----- SELECTED
*   P12                WITH RESISTOR ----- SELECTED
*   P13                WITH RESISTOR ----- SELECTED
*   P14                WITH RESISTOR ----- SELECTED
*   P15                WITH RESISTOR ----- SELECTED
*   P16                WITH RESISTOR ----- SELECTED
*   P17                WITH RESISTOR ----- SELECTED
OPT0601 01
OPT0602 01
OPT0603 01
OPT0604 01
OPT0605 01
OPT0606 01
OPT0607 01
OPT0608 01
*
* *** OPTION NO.7 ***
* --- LCD DRIVING DUTY ---
*   1/32 & 1/16 DUTY ----- SELECTED
OPT0701 01
*
* *** OPTION NO.8 ***
* --- LCD POWER SUPPLY ---
*   INTERNAL TYPE A(VC2 STANDARD,1/5BIAS,4.5V) ----- SELECTED
OPT0801 01
*
* *** OPTION NO.9 ***
* --- XBZ OUTPUT ---
*   USE ----- SELECTED
OPT0901 01
*
* *** OPTION NO.10 ***
* --- XTOUT OUTPUT ---
*   USE ----- SELECTED
OPT1001 01
*
*
* SEIKO EPSON'S AREA
*
*
OPT1101 01
\\END

```

Note: End mark "\\END" may be used instead of "~~¥~~END" depending on the PC used. (The code of \ and ¥ is 5CH.)

■ Example of function option HEX file (Motorola S2 format)

```

S2110020000000000000000000000100044000000007A
S804000000FB

```

3.3 Mask Data Checker (mdc88862)

3.3.1 Outline of mdc88862

The mdc88862 mask data checker is a software tool that checks the format of the program data (c8862xxx.psa) that the unused area of the built-in ROM is filled with FFH by fil88862 and option data (c8862xxx.fdc) created by the user and creates the data file (c8862xxx.pan) for generating mask patterns. The user must send the file generated through this software tool to Seiko Epson. Moreover, mdc88862 has the capability to restore the generated data file (c8862xxx.pan) to the original file format (c8862xxx.usa and c8862xxx.ufd).

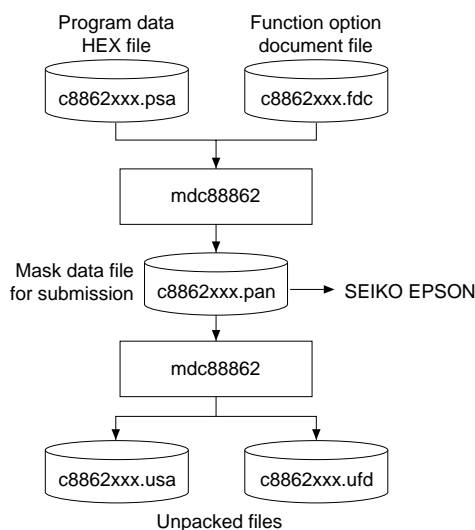


Fig. 3.3.2.1 mdc88862 execution flow

3.3.2 Execution flow and input/output files

Figure 3.3.2.1 shows the mdc88862 execution flow.

(1) Preparation of program data file (c8862xxx.psa)

Prepare the program data HEX file generated from the program unused area filling utility (fil88862).

(2) Preparation of function option data file (c8862xxx.fdc)

Prepare the function option data file generated from the function option generator (fog88862).

(3) Packing of data

Using the mask data checker (mdc88862), compile the program data HEX file and function option document file in one data file for masking (c8862xxx.pan). This file must be sent to Seiko Epson.

(4) Unpacking of data

The data file for masking (c8862xxx.pan) generated by packing processing can be restored to the original program data HEX file and function option document file using the mask data checker (mdc88862).

Note: Since the customer code is entered in the xxx part of the file name, it should be as designated by Seiko Epson.

NOTE: Program data HEX file to be packed/unpacked

mdc88862 executes the following processing for the program data file generated by the user.

Since the built-in ROM capacity of the S1C88862 is 60K bytes (000000H-00EFFFH), the packing/unpacking processing by the mdc88862 is done for only the 60K bytes area from the top of program data that can be masked into ROM.

When packing, the mdc88862 extracts the part (60K bytes) to be masked into the S1C88862 built-in ROM and generates the pack data for generating the mask. When restoring the program data by unpacking, only 60K bytes of program data generated as the pack data is restored. Be careful: the program data exceeding 60K bytes becomes invalid in the mdc88862 if the program data created by the user exceeds 60K bytes.

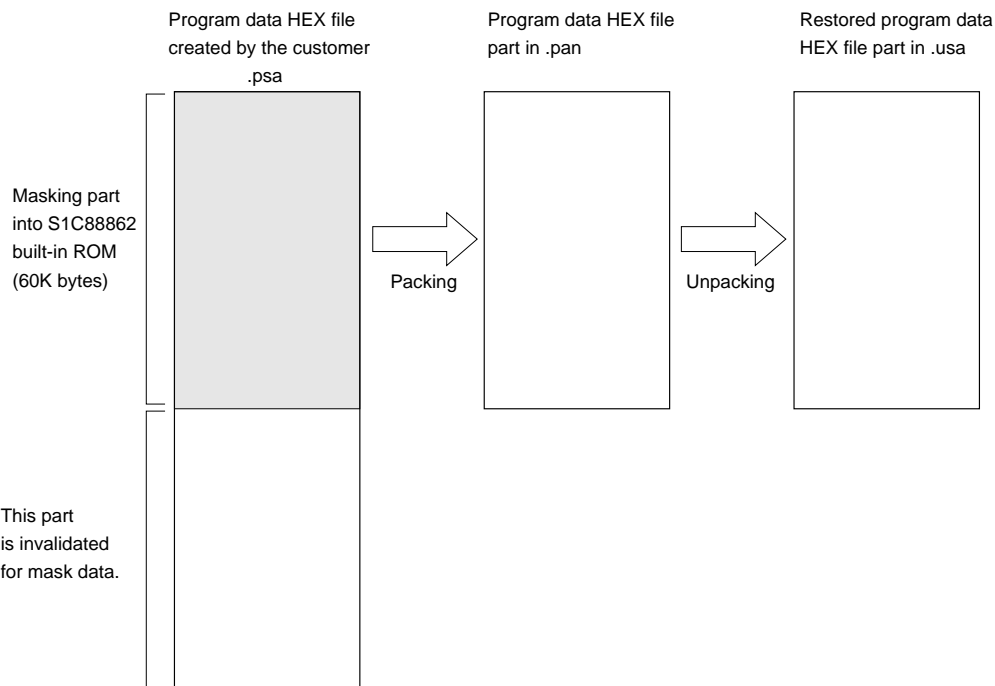


Fig. 3.3.2.2 Program data HEX file to be packed/unpacked

3.3.3 Creating work disk

In order to prevent accidents due to misoperations such as program erasures, place a write protection tab on the mask data checker system disk and keep it as master disk; actual operation should be conducted on other disks.
Create a work disk and copy "mdc88862.exe" on it.

3.3.4 Copying data files

When submitting data to Seiko Epson, copy on the work disk the data generated from the program unused area filling utility (fil88862) and the function option generator (fog88862).

Be sure to assign the following file names. (Since the customer code is entered in the xxx part of the file name, it should be as designated by Seiko Epson.)

- Program data c8862xxx.psa
- Function option data c8862xxx.fdc

3.3.5 Starting procedure

To start mdc88862, insert the work disk into the current drive at the DOS command level (state in which a prompt such as A> is displayed) and then enter the command as following format.

■ Start-up command

```
mdc88862 -[p u] <file> ↵
```

↵ indicates the Return key.

■ Option

The below options have been set for the start-up command of the mdc88862.

1) -p

Specification of packing. When this option has been specified, the output file name must also be specified. In this case, the program data HEX file (.psa) and function option document file (.fdc) must have the same name (excluding the extension) as the specified output file name. Furthermore, generation of the output file and reading of the input files are done only for the current drive.

Example: A>mdc88862 -p c88620a0.pa0 ↵

2) -u

Specification of unpacking. When this option has been specified, an input file name must also be specified.

Furthermore, reading of the input file and generation of the output files are done only for the current drive.

Example: A>mdc88862 -u c88620a0.pa0 ↵

3) Default (When option has not been specified)

When an option has not been specified, it is designed such that pack/unpack processing can be selected from the operation menu displayed, following start-up. It is set-up such that the packing file name to be output or input can also be specified according to the message displayed.

■ Start-up message

When mdc88862 is started, the following message is displayed.

```

Display 1
Example: When option has not been specified.

A>mdc88862
E0C88862 Mask Data Checker Version X.XX
Copyright (C) SEIKO EPSON CORP. 199X

    --- Operation menu ---

        1. Pack
        2. Unpack

Please select No. ?

```

When an option has not been specified at the time the start-up command is input, the operation menu is displayed and the user is prompted to select operation. When creating masking data for submission to Seiko Epson, select "1"; when the masking data is to be split and restored to the original format (c8862xxx.psa and c8862xxx.fdc), select "2". When an option has been specified at the time of start-up of the mdc88862, it executes directly the selected packing or unpacking processing without displaying this operation menu.

Note: In OS environment setup file "CONFIG.SYS", the number of files that can be opened at the same time must be set at least 10.

Example: FILES = 20

3.3.6 Packing of data

When generating data for submission to Seiko Epson, specify `-p` option at the time of start-up of the `mdc88862` (see "1" in "3.3.5 Starting procedure") or select "1. Pack" in the operation menu (see "3" in "3.3.5 Starting procedure").

When "1. Pack" is selected in the operation menu, the user is prompted for the name of the file to be generated. (See Display 2.)

Since the customer code is entered in the `xxx` part of the file name, it should be as designated by Seiko Epson.

Moreover, after submitting the masking data to Seiko Epson and there is need to re-submit the masking data for reasons such as faulty programs, etc., increase the numeric value of "n" by one when the input is made. (Example: When re-submitting data after "c8862xxx.pa0" has been submitted, the pack file name should be entered as "c8862xxx.pa1".)

In addition, access to the input files when packing data is done only for program data HEX file (`.psa`) and function option document file (`.fdc`) that have the same name (excluding the extension) as the specified output file name on the current drive.

When the `-p` option has been specified at `mdc88862` start-up, it executes directly the packing processing without displaying the operation menu and confirmation message of the file name to be generated.

If there is no problem in inputting of the file name and the content of the input file, it generates the packed data for masking and displays the generated file name. (See Display 3.)

With this, the data file for masking (`c8862xxx.pan`) is generated. Submit this file to Seiko Epson.

Display 2

```
Input files are : C8862xxx.PSA
                  C8862xxx.FDC
Output file is  : C8862xxx.PAn

Please input pack file name (C8862xxx.PAn) ? c88620a0.pa0 
```

Display 3

Example: In case of the output file name is "c88620a0.pa0".

```
Input files are : C88620A0.PSA
                  C88620A0.FDC
Output file is  : C88620A0.PA0
```

3.3.7 Unpacking data

When restoring the packed data to original file format, specify -u option at the time of start-up of the mdc88862 (see "2)" in "3.3.5 Starting procedure") or select "2. Unpack" in the operation menu (see "3)" in "3.3.5 Starting procedure").

When "2. Unpack" is selected in the operation menu, the user is prompted for the input file name. (See Display 4.)

When the -u option has been specified at mdc88862 start-up, it executes directly the unpacking processing without displaying the operation menu and confirmation message of the input file name (packed data) to be input.

If there is no problem in the file name and the content of the input file, it executes the unpacking processing and displays the generated file name. (See Display 5.)

With this, the data file for masking (c8862xxx.pan) is restored to the original file format, making it possible to make comparison with the original data. The restored data file names will be as follows:

- *Program data* c8862xxx.usa
- *Function option data* c8862xxx.ufd

— Display 4 —

```
Please input packed file name (C8862xxx.PAn) ? c88620a0.pa0
```

— Display 5 —

Example: In case of the input file name is "c88620a0.pa0"

```
Input file is      : C88620A0.PA0
Output files are  : C88620A0.USA
                  C88620A0.UFD
```

3.3.8 End procedure

When a series of operations are complete, the mdc88862 displays the following message and returns to the DOS command level.

When terminated normally

— Display 6 —

```
Pack/Unpack Completed
A>
```

The output file is generated in the same directory as the input file.

When an error has been occurred

— Display 7 —

```
Hex data error : Not S record ...Example of error message
A>
```

When an error has occurred, an output file is not generated.

3.3.9 Error message

In the packing operation, program data HEX file and function option data file are checked; in the unpacking operation, the packed file is checked. If there is any abnormal format, the message below is displayed. The mdc88862 error message lists are indicated below.

Table 3.3.9.1 Program data error message list

Message	Explanation
Hex data error : Not S record.	The data does not begin with "S".
Hex data error : Data is not sequential.	The data is not described in the ascending order.
Hex data error : Illegal data.	There is an illegal character.
Hex data error : Too many data in one line.	There are too many data in 1 line.
Hex data error : Check sum error.	The checksum is not correct.
Hex data error : ROM capacity over.	The data capacity is too large.
Hex data error : Not enough the ROM data.	The data capacity is too small.
Hex data error : Illegal start mark.	The start mark is incorrect. (during unpacking)
Hex data error : Illegal end mark.	The end mark is incorrect. (during unpacking)
Hex data error : Illegal comment.	The model name at the beginning of the data is incorrect. (during unpacking)

Table 3.3.9.2 Function option data error message list

Message	Explanation
Option data error : Illegal option number.	The option number is incorrect.
Option data error : Illegal select number.	The option select number is incorrect.
Option data error : Data is not enough.	There is not enough option data.
Option data error : Illegal start mark.	The start mark is incorrect. (during unpacking)
Option data error : Illegal end mark.	The end mark of the option data is incorrect. (during unpacking)
Option data error : Illegal comment.	The model name at the beginning of the option data is incorrect. (during unpacking)

Table 3.3.9.3 File error message list

Message	Explanation
Usage: mdcxxxx [-p,-u] [filename]	The start-up parameter is incorrect.
"xxxxxxx.xxx" file is not found.	The specified file is not found.
Pack file name (xxxxxxx.xxx) error.	A wrong pack file name is specified for packing.
Packed file name (xxxxxxx.xxx) error.	A wrong pack file name is specified for unpacking.

Table 3.3.9.4 System error message list

Message	Explanation
Directory Full.	The directory is full.
Disk Write Error.	Writing on the file is failed. This error may occur if there is no disk space.

3.3.10 Packed file

■ Configuration of packed file

The packed file is configured according to the following format:

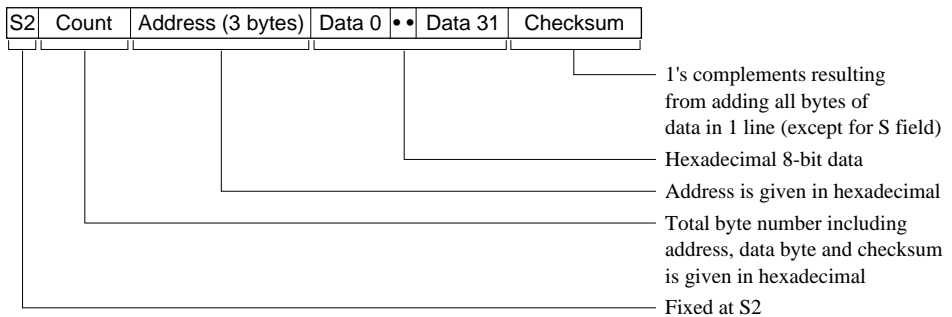
```

*
* E0C88862 MASK DATA VER X.XX
*
Program data header  -\ROM
Model name          -E0C88862XXX PROGRAM ROM
Program data        S224000000.....
(Motorola S2 format) : : : : : : : :
                    S80400000FB
End mark            -\END
Function option header -\OPTION
* E0C88862 FUNCTION OPTION DOCUMENT V X.XX
*
* FILE NAME      C8862XXX.FDC
* USER'S NAME    SEIKO EPSON CORP.
* INPUT DATE     'xx/xx/xx'
*
* #PRC88348 OPTION
* *** OPTION A ***
* --- OSC1 SYSTEM CLOCK ---
*   INTERNAL CLOCK(32.768KHZ) ----- SELECTED
OPT0A01 01
:      :      :      :      :      :
* #E0C88862 OPTION
* *** OPTION NO.1 ***
* --- OSC1 SYSTEM CLOCK ---
*   EXTERNAL CLOCK ----- SELECTED
OPT0101 02
:      :      :      :      :      :
OPT1101 01
End mark            -\END
*\ sometimes appears as ¥, depending on the personal computer being used.
    
```

■ Program data

(1) Data line

The program data is configured as follows, using Motorola S2 format:



(2) End mark

S80400000FB

3.4 Self-diagnostic Program (t88862)

3.4.1 Outline of t88862

t88862 is a self-diagnostic program to check the operation of the hardware tool ICE that is used for program debugging of the S1C88 Family. Perform a self-diagnostic of the ICE and Peripheral Circuit Board periodically using this program when using the ICE and the Peripheral Circuit Board for debugging.

3.4.2 File configuration

(1) Program data HEX file (t88862.psa)

This is the main unit of the self-diagnostic program generated by the fil88862 and in which FFH is filled in the unused area of the internal ROM and the system code is set to the system reserved area of the S1C88862.

(2) Function option HEX file (t88862.fsa)

This is the file generated by the fog88862 to set the mask option into the ICE and the Peripheral Circuit Board, and is used at self-diagnosis.

(3) Function option document file (t88862.fdc)

This is the document file generated by the fog88862 and the setting contents of the function option HEX file mentioned above are described.

3.4.3 Operation procedure

After installing the Peripheral Circuit Board into the ICE, self-diagnosis of the ICE and the Peripheral Circuit Board can be done by the following operating test.

For the following operating test, the self-diagnostic program (t88862.psa) and the function option HEX data (t88862.fsa) in this package are used. Perform the below operations with the ICE.

■ Operation Check on ICE88R

Execute by reading the self-diagnostic program (t88862.psa) and the function option HEX data (t88862.fsa) into the ICE.

Please refer the ICE help file for loading, execution.

Diagnostic procedure

Check using the VDC0–2, OSCC, LCDC, CMP00N, CMP1ON, SVDON and HVLD LEDs on the Peripheral Circuit Board. If the below light statuses are verified following system reset, it is normal. The cycle count indicates a 1 second interval and the light status of the below LED changes every second. When it returns to 1 after 20, it then repeats the cycle again.

Cycle count	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	1	2
VDC0	○	●	○	○	○	●	○	○	○	●	○	○	○	●	○	○	○	●	○	○	○	●
VDC1	●	○	●	○	●	○	●	○	●	○	●	○	●	○	●	○	●	○	●	○	●	○
VDC2	○	○	○	●	○	○	○	●	○	○	○	●	○	○	○	●	○	○	○	●	○	○
OSCC	○	○	○	●	○	○	○	●	○	○	○	●	○	○	○	●	○	○	○	●	○	○
LCDC	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	○	●	●	●
CMP00N	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
CMP1ON	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
SVDON	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
HVLD	○	*	○	●	○	*	○	●	○	*	○	●	○	*	○	●	○	*	○	●	○	*

●: ON (lit)
○: OFF (not lit)
*: Blinking

4 88862.par FILE

The 88862.par file is a macro file that contains the information for the S1C88862. The ICE sets its operating environment by loading this parameter file. Therefore, the ICE cannot start up if this parameter file does not exist.

4.1 Contents of 88862.par File

The supplied 88862.par file contains the following information.

```
[Options]
Prcclocksel=0          ... (1)
Vdddown=0             ... (2)
CC=0                  ... (3)
DIAG=0                ... (4)

[MAP Config]
;EOC88862 MAP Configuration Setting
; 000000-00FFFF:Define 1 byte unit
; 010000-FFFFFF:Define 256 bytes unit
;
;syntax:<Start address> <End address> [E][I][U][S][W]
;      E:Emulation memory
;      I:I/O (PRC Board) memory
;      U:User memory
;      S:Stack area
;      W:Write protect (Default does not protect)

;Internal ROM
Map0=000000 00EFFF E W ... (5)

;Internal RAM
Map1=00F000 00F3FF E

;Stack area
Map2=00F400 00F5FF E S

;Display memory
Map3=00F800 00F828 I
Map4=00F833 00F842 I
Map5=00F900 00F928 I
Map6=00F933 00F942 I
Map7=00FA00 00FA28 I
Map8=00FA33 00FA42 I
Map9=00FB00 00FB28 I
Map10=00FB33 00FB42 I
Map11=00FC00 00FC28 I
Map12=00FC33 00FC42 I
Map13=00FD00 00FD28 I
Map14=00FD33 00FD42 I

;I/O memory
Map15=00FF00 00FF02 I
Map16=00FF10 00FF12 I
Map17=00FF20 00FF25 I
Map18=00FF30 00FF34 I
Map19=00FF35 00FF36 I W
Map20=00FF40 00FF40 I
Map21=00FF41 00FF41 I W
Map22=00FF42 00FF42 I
Map23=00FF43 00FF43 I W
Map24=00FF44 00FF45 I
Map25=00FF48 00FF4A I
Map26=00FF50 00FF53 I
Map27=00FF54 00FF55 I W
Map28=00FF61 00FF61 I
Map29=00FF63 00FF63 I
Map30=00FF70 00FF71 I
Map31=00FF75 00FF75 I
Map32=00FF78 00FF78 I
```

4.2 Description of the Parameters

The parameters (1) to (4) are fixed items, so do not modify their settings. Parameter (5) and the following parameters are used to set the memory allocations and memory conditions.

General format:

```
Map<Serial number>
    = <Start address> <End address> <Switch>
```

■ Serial number

The Map parameter must have a serial number within the range from 0 to 1023.

The serial numbers must not be specified in a special order.

If a number is duplicated, the parameter set first is enabled and the others are disabled.

■ Address settings

Addresses can be set in byte units for the range from 000000 to 00FFFF. Areas exceeding 010000 should be done using 265 byte units. (****00-****FF).

■ Switch

The following five letters are available for specifying <Switch>: E, I, U, S and W.

- *Switches for allocating memories (E, I, U switches)*
The I switch allocates the specified address area to the memory on the Peripheral Circuit Board. The E switch allocates the specified area to the emulation memory on the ICE. The U switch allocates the specified area to the user's memory on the target board.
- *Switch for setting a stack area (S switch)*
The S switch sets the specified area as a stack area.
- *Switch for disabling writing in certain areas*
The W switch sets the specified area as a ROM area that cannot be written on. When an area is specified without the W switch, the ICE will regard it as a RAM area.

■ Comments

The ICE identifies a line that begins with a semicolon (;) as a comment line. Comments cannot be placed following parameters (e.g.,

```
Map0=000000 00EFFF EW ;internal ROM).
```

4.3 Emulation Memory

The ICE (S5U1C88000H5) has built-in a 64KB emulation memory for the memory space from 000000 to 00FFFF and a 512KB emulation memory that can be used as an expanded memory area exceeding address 010000. The emulation memory allows the user to use it as a memory that will be connected externally in the actual product. Thus it is not necessary to mount the external memory on the target board to develop the program. However, prepare the external memory on the target board when developing a product that needs a larger memory than 512KB at a location exceeding address 010000.

■ Notes

- ICE88UR for Windows gets the path information for loading the parameter file from the ICE88UR.INI file. Installation of ICE for Windows makes the DEFAULT.PAR file in the same directory as the ICE88UR.EXE file installed and sets the path information in the ICE88UR.INI file so that the debugger will refer to the DEFAULT.PAR file. It is therefore necessary to edit the path description in the \WINDOWS\ICE88UR.INI file. When the 88862.par file exists in the directory the same as the ICE88UR.EXE file, only the file name part should be modified.
- The parameters (1) to (4) must be described in the part that begins with an [Options] line and the parameters following (5) must be described after the [MAP Config] line. Do not delete [Options] and [MAP Config].

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