Be sure to read this note

For M16C/60,30,Tiny,20,10,R8C/Tiny series

M3T-NC30WA V.5.30 Release 1
Release Note

Second Edition

Renesas Solutions Corporation

Apr 1 2004

Abstract

Welcome to M3T-NC30WA(abbreviated as NC30WA) V.5.30 Release 1. This document contains supplementary descriptions to User's Manual. When you read certain items in the User's Manual, please read this document as well.

Also, this document contains a License Agreement in the last. Please read it before using. By using the software, you are accepting and agreeing to such terms.

1. The latest info and FAQs

Please refer to the useful following sites:

Tool News:

http://www.renesas.com/jpn/products/mpumcu/tools/index.html

FAQs:

http://www.renesas.com/jpn/products/mpumcu/toolhp/faq/m16c80/nc30wa/nc30wa_j.htm

2. Precautions

Please observe the following precautions before using NC30WA.

2.1. Note of using this compiler

Please be sure to take note of the problem in using this compiler. The note is described the end of this document.

2.2. Precaution M16C Family-Dependent Code.

You may need to use specific instructions when writing to or reading registers in the SFR area. Because the specific instruction is different for each model, see the User's Manual for the specific Machine. These instructions should be used in your program using the asm function.

[Problem]

When -O5 optimizing options is used, the compiler generates in some cases BTSTC or BTSTS bit manipulation instructions. In M16C, the BTSTC and BTSTS bit manipulation instructions are prohibited from rewriting the contents of the interrupt control registers. However, the compiler does not recognize the type of any register, so, should BTSTC or BTSTS instructions be generated for interrupt control registers, the assembled program will be different from the one you intend to develop. For detailed information about this, see Section 5, "Precautions for Interrupts" Described in Related Documents (Excerpts).

When using any of the products concerned, ensure that no incorrect code is generated.
Note:

In the products other than those concerned, this problem does not occur because BTSTC and BTSTS instructions are not generated if any of the above-mentioned optimizing options is used.

[Workaround]

This problem will be circumvented in either of the following ways:

1. Suppress the generation of the BTSTC and BTSTS instructions resulting from using an optimizing option by selecting the -ONA (or -Ono_asmopt) option together with any of the above-mentioned optimizing options.

2. Add an asm function to disable optimization locally, as shown in the example below.

Example:

```
-------------------------------------------------------------------

while(TA0IC.IR==0)

{

        asm();    /* An asm function added to disable

                optimization for TAOIC.IR */

}

-------------------------------------------------------------------
```

Make sure that no BTSTC and BTSTS instructions are generated after these side-steppings.

[Example]

When -O5 optimizing options is used in the program shown below, a BTSTC instruction is generated at compilation, which prevents an interrupt request bit from being processed correctly, resulting in the assembled program performing improper operations.

```
--------------------------------------------------------------------------
#pragma ADDRESS TA0IC    0055h    /* M16C/62 MCU's Timer A0 interrupt control register */
struct {
char     ILVL : 3;
char     IR   : 1;              /* An interrupt request bit */
char     dmy  : 4;
} TA0IC;
void wait_until_IR_is_ON(void)
{
while (TA0IC.IR == 0)    /* Waits for TA0IC.IR to become 1 */
{
       ;
}
TA0IC.IR = 0;            /* Returns 0 to TA0IC.IR when it becomes 1 */
}

--------------------------------------------------------------------------
```

== "Precautions for Interrupts" Described in Related Documents (Excerpts) ==

The excerpts of the descriptions on "Precautions for Interrupts" in data sheets and User's Manuals of M16C MCUs are shown below.

[Precautions for Interrupts]

When a instruction to rewrite the interrupt control register is executed but the interrupt is disabled, the interrupt request bit is not set sometimes even if the interrupt request for that register has been generated. This will depend on the instruction. If this creates problems, use the below instructions to change the register.

Instructions: AND, OR, BCLR, BSET

When accessing registers in the SFR area in C language, make sure that the same correct instructions are generated as done by using asm functions, regardless of the compiler's version and of whether optimizing options are used or not.

2.3. Precaution for startup .

For C-language programs to be written into ROM,NC30 comes with a sample startup program written in the assembly language to initial set the hardware (M16C),locate sections, and set up interrupt vector address tables,etc. This startup program needs to be modified to suit the system in which it will be installed. See the manual or data book for your machine for the address of the processor mode register and the bit settings and for your machine for the address of the interrupt vector.

Note, however, that effective from this version, the startup program is separated between the M16C use and the R8C/Tiny use by conditional assemble instructions (.if –, .else – .endif) with a conditional expression "__R8C__!=1." When you alter the startup program, be careful not to alter irrelevant parts of the program.

If you are using the M16C, alter the program on the *.if* side.

If you are using the R8C/Tiny, alter the program on the *.else* side.

2.4. Precaution for MS-Windows version

2.4.1. Precautions about environment of operation

- If in Windows NT environment the command prompt size is set to other than "80 x 25," the command prompt size will change frequently as you start the compiler. Make sure the command prompt size is set to "80 x 25."

2.4.2. Suggestions Concerning File Names

The file names that can be specified are subject to the following restrictions:

- Directory and file names that contain kanji cannot be used.
- Only one period (.) can be used in a file name.
- Network path names cannot be used. Assign the path to a drive name.
- Keyboard shortcuts cannot be used.
- Directory and file names that contain a space character cannot be used.
- The "..." symbol cannot be used as a means of specifying two or more directories.
- A file name in length of 128 characters or more including path specification cannot be used.

2.4.3. Precautions about virus check programs

If the virus check program is memory-resident in your computer, NC30WA may not start up normally. In such a case, remove the virus check program from memory before you start M3T-NC30WA.

2.4.4. Precautions when upgrading

To upgrade M3T-NC30WA, uninstall the currently installed NC30WA first before you install the new version.

- Procedure for uninstalling M3T-NC30WA

  To uninstall M3T-NC30WA, launch Add/Remove Programs in Control Panel and then execute Uninstall.

2.4.5. Precautions about access of SFR area

You may need to use specific instructions when writing to or reading registers in the SFR area. Because the specific instruction is different for each model, see the User's Manual for the specific Machine. These instructions should be used in your program using the asm function.

2.5. The directory in which NC30WA will be installed

You can not specify a name that contains a blank for the directory in which AS30 will be installed. For other points to note, see "Suggestions Concerning File Names" in this note.

2.6. When installing the Windows 95 version

When changing the item "Installation directory" from the "Select Components" screen by using "Brouse..." during installation, a trouble sometimes occurs that you cannot select some of the drives displayed by "Drives:" on the "Chose Directory" screen. In such a case, return to the "Select Components" screen and use "Disk Space..." on that screen to specify a drive. If you still have difficulty, reexecute the installer after restarting Windows 95.

2.7. Precautions regarding the preprocessing directive #define

To define a macro which will be made the same value as the macro ULONG_MAX, always be sure to add the prefix UL.

2.8. About specifying the interrupt control register

NC30WA supports the function that set or change the value of an interrupt priority level to conform to MESC TECHNICAL NEWS(No. M16C-14-9805).

case of specifying the value

Please use SetLevel function. In this time, please be sure to include "intlevel.h" file.

SetLevel(char *adr, char val)

adr   : Address of the interrupt control register

val   : Specifying the value

case of changing the value

Please use ChgLevel function. In this time, please be sure to include "intlevel.h" file.

ChgLevel(char *adr, char val)

adr   : Address of the interrupt control register

val   : Specifying the value

[Example]

```
#include <intlevel.h>
#pragma ADDRESS timerA 55H
char *timerA;
void func(void)
{
        SetLevel(timerA,2); // Specifying the value "2" to the interrupt priority level
                :
        ChgLevel(timer A,4); // Changing the value "4" to the interrupt priority level
}
```

2.9. Precautions to be taken when using #pragma ASM/ENDASM

Regarding debug information when using #pragma ASM outside functions, if you write #pragma ASM anywhere outside functions, no C source line information will be output. for this reason, information regarding descriptions in #pragma ASM to #pragma ENDASM, such as error message lines when assembling or linking and line information when debugging, may not be output normally.

Do not write branches (including conditional branches) in the register or variable areas, that would allow the asm functions to affect program flow during program flow analysis and processing by the compiler.

C compilers generate code of arguments to be passed via registers and of register variables by analyzing their scopes. However, if manipulations of register values are described using inline assemble functions (such as #pragma ASM/#pragma ENDASM directives and asm function), C compilers cannot hold information on the scopes of the above-mentioned arguments and register variables. So, be sure to save and recover register contents on and from the stack when registers are loaded using inline assemble functions

2.10.   Regarding M16C/62 4M extended mode

Make sure the program is located in the internal ROM.

2.11.   Searching for files to include

If you give a file to include together with a drive name in the #include line, and attempt to compile the file from a directory different from the one in which the file to compile is present, instances may occur in which the file to include cannot be searched.

 [Example]

   #include "c:\user\test\sample.h"
   main(){}

   C:\user>nc30   \user\test2\sample.c -silent
   \user2\tm_test\aa.c
   [Error(cpp30.21):\user2\test2\sample.c, line 1] include file not found 'c:\user\test\sample.h'

2.12.   Note of Debugging the program using _Bool type

When you debug the program which uses the _Bool type, please confirm whether the debugger is supporting the _Bool type.
In using the debugger which is not supporting the _Bool type, please use a debugging option

   ● "**-gbool_to_char (-gBTC)**" at the time of compile.

2.13.   About the standard I/O function

The standard I/O functions consume many RAM. If you use the standard I/O functions in your program for R8C/Tiny Series, please check that there is no problem on your system.

2.14.   About asmmacro.h file

Please add a charachter '#' to 85-line of "asmmacro.h" file in "NC30WA installed directly\inc30" directly.

asmmacro.h file: 85-line

pragma __ASMMACRO dsub_b(R0H,R0L)

==>

#pragma __ASMMACRO dsub_b(R0H,R0L)   // Please add a character '#' to the head of this line

3. Enhancement of function for passing arguments by the specified register

In this version, extensions of "#pragma PARAMETER" and "#pragma INTCALL" can specify registers for arguments also about the C language function.
And "**-fuse_SB_for_variable(-fUSFV)**" option was added. It changes these "#pragma" to be able to use also SB register.

SB register can be used as a near pointer.But SB is weak in calicuration. So we recommend to use SB as pointer to a structure.

The option "-fuse_SB_for_variable(-fUSFV)" can not be used with follows:

   ● #pragma SBDATA

   ● -fauto_over_255 (-fAO2) option

4. Contents of Release Up

NC30

1. Compile option "-fno_switch_table [-fNST]" added

    It always compares to a switch sentence and a branched code is generated.

    [Note]
    Generation of the table jump code to a switch sentence is deterred.

2. Command option "-fmake_vector_table [-fMVT]" added

    Interrupt vector table is generated automatically.

3. Command option "-fmake_special_table [-fMST]" added

    Special page table is generated automatically.

4. Command option "-Oforward_function_to_inline [-OFFTI]" added

    Inline expanding is performed to all inline functions.

5. Command option "-Oglb_jmp [-OGJ]" added

    The branch command optimal at linking is chosen.

6. Command option "-Wno_used_function [-WNUF]" added

    Detection of the function which is not used by the application program outputs warning.

7. Command option "-Wstop_at_link [-WSAL]" added

    When warning occurs at the time of a link, an absolute module file is not generated.

8. Command option "-Wundefined_macro [-WUM]" added

    Warning is outputted when MACRO which is not defined by the inside of #if sentence is used.

9. The Option "/E" to enable the multiple interrupts is added to the extended function "#pragma INTHANDLER(#pragma HANDLER)"

10. The known problems fixed**.**

AS30

1. A option "-fMVT" added

    Interrupt vector table is generated automatically.

2. Command option "-fMST" added

    Special page table is generated automatically.

3. Command option "-JOPT"added

    Global branch is optimized.

4. Directive command ".RVECTOR" to generate the information of variable vector table is added.

5. Directive command ".SVECTOR" to generate the information of special page table is added.

6. The known problems fixed**.**

LN30

1. A option "-fmake_vector_table [-fMVT]" added

    Variable vector table is generated automatically.

2. A option "-fmake_special_table [-fMST]" added.

    Special page table is generated automatically.

3. The known problems fixed**.**

5. Improvements Over the Previous Version

Improvements have been made to all of the following precaution that had been Informed to you by tool news:

5.1. NC30

[RSO-M3T-NC30WA-031001D]

● On using the standard library function "strcpy"

[RSO-M3T-NC308WA_2-031016D]

● On the division and remainder operations between constants

[RSO-M3T-NC30WA-031016D]

● On using the enhancing patch tool of the Scan All Dependencies function.

● On using the Options dialog box

[RSO-M3T-NC308WA_2-031116D]

● On declaring parameters in function definitions

[RSO-M3T-NC308WA_3-031116D]

● On function calls using the indirection operator

[RSO-M3T-NC308WA_1-040116D]

● On defining array-type variables

[RSO-M3T-NC308WA_2-040301D]

● On Referencing Members in a Union

[RSO-M3T-NC30WA_1-040301D]

● On an OR Operation Between a Variable and a Constant

[RSO-M3T-NC30WA_2-040301D]

● On Using Standard Library Function "strcpy"

5.2. LN30

[RSO-M3T-NC308WA-030916D]

● On using the link option "-U"

[RSO-M3T-NC308WA_1-031116D]

● On linking relocatable module files with no sections

5.3. HEW

[RSO-HEW-031016D]

● On using the Import Makefile function

[RSO-HEW_1-031101D]

● On the navigation function

[RSO-HEW_2-031101D]

● On scanning the dependencies of header files on an assembler source file

[RSO-HEW_2-031216D]

● On the name of the workspace

- On the selection of PD debuggers
- On using the E7 debugger

  [RSO-HEW_2-040116D]
- On displaying files edited by an external editor on the Editor window

  [RSO-HEW_4-040116D]
- On the Scan All Dependencies function

  [RSO-HEW_2-040316D]
- On the option setting

6. Precautions to be taken when Using HEW

## 6.1. Installing the compiler(NC8C) for R8C/Tiny Free only version

If you create the project of R8C/Tiny Series, please create it by the following method.

- Using NC30WA compiler

(1). New Project Workspace

- CPU family

  Please select "M16C".

(2). New Project 1/6-Select Target CPU Toolchain version

- CPU Series

  Please select "R8C/Tiny".

- Using NC8C compiler

(1). New Project Workspace

- CPU family

  Please select "R8C"

6.2. Using the PDxx Debugger

When you use the following debuggers, please choose the debugger used at the time of work space new creation.

PD30	V.8.10 or later
PD30F	V.2.10 or later
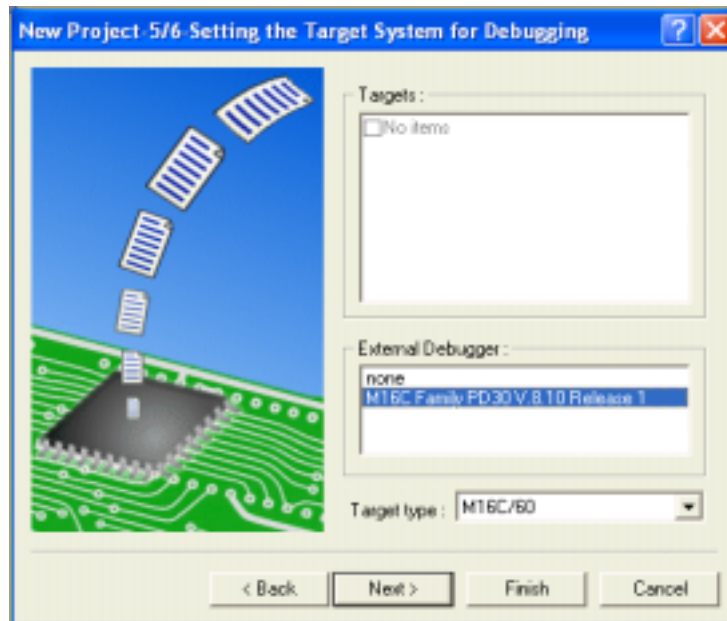
How to register a debugger of which version is former than the above debuggers is following.

    (1)   Select menu [Tool->Customize…].
    (2)   Select "Debugger" tab on the Customize dialog box.
    (3)   Select "other external debugger" for the [External debugger selected].
    (4)   Specify the location of the executable file PDxx.exe for the [External debugger location].
    (5)   Input "-LOAD=$(CONFIGDIR)\$(WORKSPNAME).x30" to the [Command line options].

The following is an example for the setting.
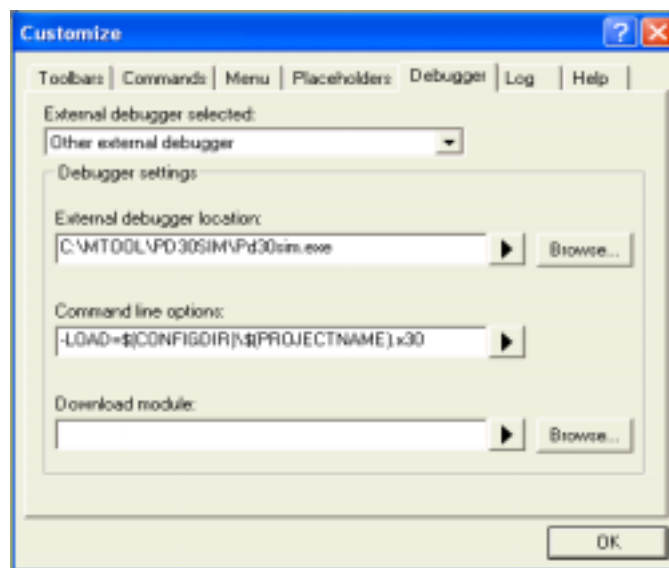
6.3. Start-up program is linked to a head.

If a default start-up program (ncrt0.a30) is specified when work space creates, this file is automatically linked to a head.

6.4. User defined start-up program is linked to a head

When user defined start-up program (without "ncrt0.a30") is linked to a head, please set up HEW in the following procedure.

   (1)   From the menu, click [Options] -> [Renesas M16C Standard Toolchain...].
         (This opens [Renesas M16C Standard Toolchain] dialog..)

(2) Click [Link] tab.
(3) Select [Input] form the [Category:].
(4) Select [Relocatable files] from [Show entries for:].
(5) Click [Add] button.
      (This opens [Add Relocatable files] dialog..)
(6) Select [Configuration directory] from [Relative to:].
(7) Input [ncrt0.r30] to [File path:].
(8) Click OK button in [Add Relocatable files] dialog..
(9) Click OK button in [Renesas M16C Standard Toolchain] dialog.
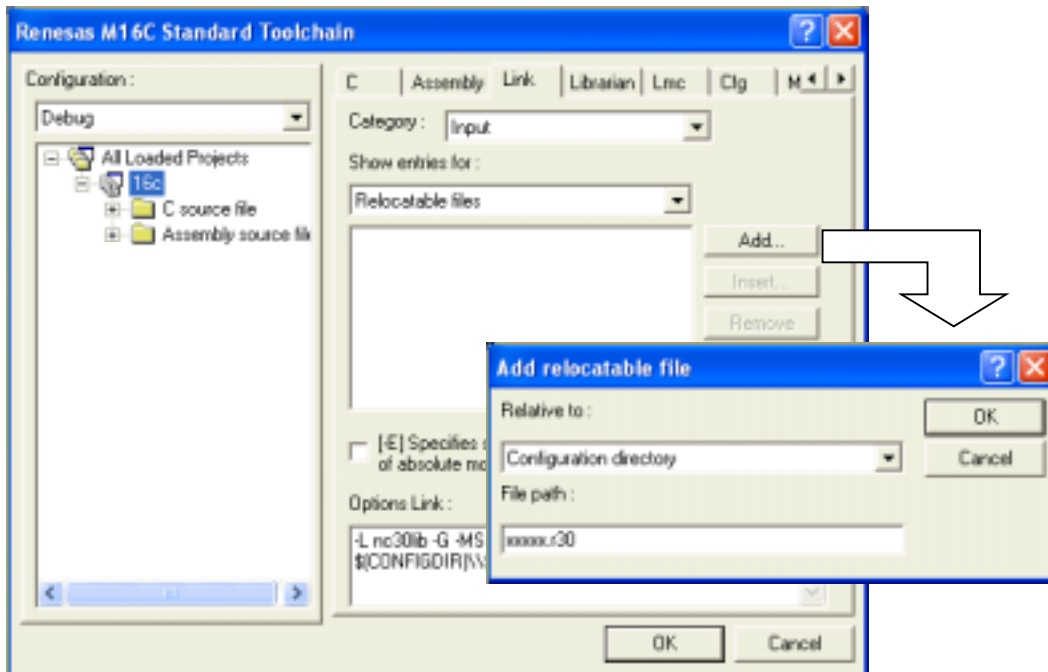
7. Installing M3T-NC30WA

7.1. Before installing M3T-NC30WA

Please confirm as follows before installing M3T-NC30WA in your computer.

- Please carefully read the "License Agreement" and "Release Note" included with your product before using M3T-NC30WA. If you've installed this product in your computer, it is assumed that you've agreed to the provisions stipulated in the License Agreement.
- In order that M3T-NC30WA operates comfortably, it requires at least 32Mbytes of memory and a hard disk having 20Mbytes or more of space.
- Use the dedicated installer to install M3T-NC30WA.
- You need to input a license ID in the middle of installation. Before you start installing M3T-NC30WA, check your license ID.

7.2. Precaution about installing this product

- When you install this product, this installer is sure to install HEW (High-performance Embedded Workshop), too.
- If the dialog described the following message is output during installing, please select "Yes to All".

  Dialog Message:
        The following file is already on your computer.
        C:\WIN98\TEMP\NC30WA\....
        Do you wish to overwrite this file?
                          :

11

7.3. M3T-NC30WA Installer

The installer is provided for each of the environments (supported host, supported OS and language) listed below. Check the product you've purchased to find the appropriate installer.

Supported host	Supported OS	Installer name	Directory on CD-ROM
IBM PC/AT compatible	Microsoft Windows 98 Microsoft Windows Me Microsoft Windows NT Microsoft Windows 2000 Microsoft Windows XP	SETUP.EXE	\NC30WA\W95E

7.4. Installing MS-Windows version

Please install the MS-Windows version in the following procedure.

Go to the directory corresponding to your system, which can be found the name of the software you purchased, on the CD-ROM.

Start up the installer and follow the messages displayed on the screen as you install M3T-NC30WA

7.5. Setting environment after installation

After you finished installing M3T-NC30WA, set environment variables next.

7.5.1. Environment settings for the MS-Windows version

The environment variables marked by "Auto" in the tables below do not need to be set because the Windows installer automatically rewrites AUTOEXEC.BAT.

Environment variable	Example of setting
BIN30	Auto (SET BIN30=C:\MTOOL\BIN)
INC30	Auto (SET INC30=C:\MTOOL\INC30)
LIB30	Auto (SET LIB30=C:\MTOOL\LIB30)
TMP30	Auto (SET TMP30=C:\MTOOL\TMP)
NCKIN	SET NCKIN=SJIS
NCKOUT	SET NCKOUT=SJIS
Command path	Auto (C:\MTOOL\BIN is added)

8. Entering user registration

To be eligible for upgrade information, technical support, and other services, you must be registered as a user with Renesas Technology Corporation. Unless you are a registered user, the said services cannot be received.

Please register your name with Renesas Technology Corporation within 30 days after purchase.

8.1. User registration of the MS-Windows version

When you've installed the PC version of M3T-NC30WA, the following file is created.

\ mtool \ support \ nc30wa \ regist.txt

When you've installed the PC version of M3T-NC30WA, the following file is created.

Cut all contents of the regist.txt file and paste them into a file, then send it to the electronic mail address given below.

regist_tool@renesas.com

9. Operating environments that have been confirmed

The table below lists the host computers and OS versions with which NC30WA has been confirmed to be operating normally.

Host computer	OS version	CD-ROM directory
IBM[4] PC/AT[1]	Microsoft[2] Windows[5] 98 Microsoft Windows Me Microsoft Windows NT[5] 4.0 Microsoft Windows 2000 Microsoft Windows XP	W95E

Whether NC30WA operates normally with other host computers and OSs depends on the manufactures of those host computers and OSs. Therefore, please contact the manufactures of your host computer and OS to see if the software will work properly with your computer system.

10. Software version list of NC30WA V.5.30 Release 1

The following lists the software items their versions included with NC30WA V.5.30 Release 1

nc30	V.6.00.03	Compile driver
cpp30	V.4.05.00	Preprocessor
ccom30	V.5.30.05	Compiler
aopt30	V.1.02.00	Assembler's optimizer
utl30	V.1.00.08	SBDATA & Special page Utility
stk	V.1.00.04	stack utility
stkviewer	V.1.00.01(W95E)	STK Viewer
mapviewer	V.3.00.00(W95E)	MAP Viewer
as30	V.5.10.00	Assemble driver
mac30	V.3.40.01	Macro processor
pre30	V.1.10.12	Structure Assembler Preprocessor
asp30	V.5.10.00	Assemble Processor
ln30	V.5.10.01	Linkage Editor
lb30	V.1.01.00	Librarian
lmc30	V.4.00.01	Loadmodule Converter
xrf30	V.2.01.00	Cross Referencer
abs30	V.2.11.00	Absolute listor

---

[1] IBM and AT are registered trademarks of International Business Machines Corporation.

[2] Microsoft,Windows and Windows NT are registered trademarks of Microsoft Corporation in the U.S.and other

countries.

11. License Agreement

IMPORTANT

Licensed Copy Number :   1 Copies

DO NOT OPEN THIS PACKAGE NOR INSTALL THE SOFTWARE UNTIL YOU HAVE READ AND AGREED TO THE TERMS AND CONDITIONS SPECIFIED IN THE SOFTWARE USER LICENSE AGREEMENT BELOW

Permission to use this software is subject to your agreeing to the terms and conditions specified in the agreement entitled "Software User License Agreement" below. Please read carefully the Software User License Agreement before you open the package. If you do not agree to the terms and conditions specified in this agreement, do not open the package and return the product to your distributor, with the program disk packaging seal unbroken for a full refund.

Software User License Agreement

The customer (hereafter referred to as "Licensee") and Renesas Technology Corp. (hereafter referred to as "Licensor") do hereby agree to the terms and conditions as specified in this Software User License Agreement (hereafter referred to as "Agreement") concerning the enclosed this software and its explanatory manuals.

ARTICLE 1.   Definition
(2).   "Licensed Software" shall mean the main unit of the C compiler, Assembler, Simulator and related executable programs, the "Library" as defined in Section 1.3 below and documentation such as explanatory manuals for the Licensed Software and all other materials provided to Licensee in connection with use of the Licensed Software.

(3).   "Designated System" shall mean the computer system to be installed Licensed Software. In case of Network environment system, "Designated System" shall mean the computer system to be executed Licensed Software.

(4).   "Licensed Copy Number" shall mean the number which is printed at right upper part in this sheet. And it shall mean the number of "Designated System" which you can install Licensed Software and can make the copy of the Master Disk of Licensed Software.

(5).   "Library" shall mean a group of function programs that enable operations including, but not limited to input/output and character recognition and that are offered in the forms of a re-locatable program.

(6).   "Developed Software" shall mean software created by Licensee incorporating all or part of a Library in accordance with the licenses granted to Licensee under the terms and conditions of this Agreement.

ARTICLE 2.   LICENSES

Licensor grants Licensee a non-exclusive, non-assignable, non-transferable license:
(1).   to use the Licensed Software solely on the Designated System for Licensee's business purpose of creating and copying Developed Software to be incorporated in the Licensee's products installed with Licensor's Renesas microcomputer (hereafter referred to as "Licensee's Products");

(2).   to make copies of Licensed Copy Number by installer program of Licensed Software on Designated System for the purposes of using the Licensed Software in accordance with subparagraph (1) above of this Section 2 to develop Developed Software in accordance with subparagraphs (3) below of this Section 2;

14

(3). to merge the Library with one or more other programs to develop Developed Software, provided any portion of the Library so merged continues to be subject to the terms and conditions of this Agreement; and

(4). to copy the Developed Software in connection with the manufacture and sale of the Licensee's Products incorporating Developed Software, subject to provisions of Article 6 hereunder.

ARTICLE 3.   Restrictions

(1). Licensee shall not transfer the rights granted herein or allow any third party to use the Licensed Software.
(2). Licensee shall not remove the copyright notice contained in the Licensed Software.
(3). Licensee shall not sublicense, rent, lease, or assign the Licensed Software.
(4). Licensee shall not reverse assemble, reverse compile or otherwise reverse engineer the Licensed Software.

ARTICLE 4.   Title to Licensed Software

(1). All right, title and interest in and to the Licensed Software are shall remain with Licensor. The copyrights in the Licensed Software owned by Licensor are protected by Japanese copyright laws, other applicable intellectual property laws and international treaty provisions.
(2). Licensor retains all rights not expressly granted.
(3). The copyrights in the Developed Software as a derivative work of Library shall be owned by Licensee, provided, however, that copyrights in any part of Library contained in such Developed Software shall remain the property of Licensor.

ARTICLE 5.   Confidentiality

Licensee acknowledges that the Licensed Software contains valuable proprietary information and trade secrets of Licensor. Licensee shall preserve the Licensed Software in confidence, and shall not provide or disclose the contents of all or any part of the Licensed Software to any third party without written authorization from Licensor.
Licensee will take appropriate action, by instruction, agreement or otherwise, with any persons permitted access to the Licensed Software so as to enable them to hold the Licensed Software in confidence and otherwise to satisfy their obligations under this Agreement.
This Agreement shall not restrict disclosure or use of any information which:

- can be demonstrated by Licensee to be in the public domain when received, or thereafter enters the public domain through no fault of Licensee;

- is known to Licensee at the time of the disclosure by Licensor:

- is received from a third party without any restrictions on disclosure and use; or

- is independently developed by Licensee through persons who have not had access to the Licensed Software.

ARTICLE 6.   Term and Termination

(1). This Agreement shall become effective upon Licensee's breaking the packaging seal of the Licensed Software and shall remain in force until terminated by any of the provisions in (2) and (3) below.
(2). Licensee may terminate this Agreement at any time on thirty (30) day prior written notice to Licensor.
(3). In the event that Licensee shall be in default under this Agreement, Licensor may terminate this Agreement and all licenses granted hereunder by giving written notice of termination to Licensee, effective upon its sending.

ARTICLE 7.   POST-TERMINATION PROCEDURES

(1). In the event of any termination of this Agreement, Licensee shall cease all use of the Licensed Software and shall remove any and all copies of the Licensed Software from the Designated

System, shall remove any Libraries contained in the Developed Software from such Developed Software (except for Libraries incorporated in the Licensee's Products already sold), and shall destroy all such copies of Licensed Software.

(2). Licensee shall complete all the obligations described in Section 7.1 above and shall submit written proof to that effect to Licensor within thirty (30) days from the termination of this Agreement.

ARTICLE 8. PROPRIETARY RIGHTS INDEMNIFICATION

(1). Licensor shall defend or, at its option, settle any claim or proceedings brought against Licensee to the extent that it is based on an assertion that the Licensed Software, used within the scope of this Agreement, constitute direct infringement of any copyright, patent or trademark of a third party and shall indemnify Licensee against all costs, damages and expenses finally awarded against Licensee which result from any such claim, provided that Licensee notifies Licensor promptly in writing of such claim or proceedings and gives Licensor full and complete authority, information and assistance to defend such claim or proceedings, and further provided that Licensee gives Licensor sole control of the defense of any such claim or proceedings and all negotiations for its compromise or settlement.

(2). Should the Licensed Software become, or, in Licensor's opinion, be likely to become the subject of a claim of infringement, Licensor may procure for the Licensee the right to continue using the Licensed Software or replace or modify it to make it non infringing. If neither of the foregoing alternatives is reasonably available to Licensor, then Licensor's sole and exclusive remedy shall be to terminate this Agreement, and to return to Licensee refund of License fees and other expenses paid to Licensor.

(3). Licensor's obligations under this Article 8 shall not apply to any claims of infringement based upon (i) use of other than the latest upgrades of the Licensed Software made available to Licensee by Licensor according to Section 9.2 hereunder if such infringement would have been avoided by the use of such upgrades of the Licensed Software, (ii) combination, operation or use of the Licensed Software with any programs, data or products not furnished by Licensor if such infringement would not have occurred without such combination, operation or use, (iii) use of the Licensed Software after receiving written notice from Licensor that the Licensed Software infringes any patent, copyright or trademark of a third party, or (iv) claimant expresses its intent to license or otherwise resolve its claim only with the Licensee of any apparatus incorporating the Licensee's Products. LICENSOR'S OBLIGATION UNDER THIS ARTICLE 8 CONSTITUTE LICENSEE'S SOLE AND EXCLUSIVE REMEDY FOR A CLAIM OR PROCEEDINGS FOR AND INTELLECTUAL PROPERTY INFRINGEMENT OF A THIRD PARTY.

ARTICLE 9. Limited Warranty, Indemnification and Limitation of Liability

(1). Licensor warrants that it has the right to grant to Licensee a license to use the Licensed Software and that Licensor has the right to enter into this Agreement. EXCEPT AS SPECIFICALLY PROVIDED HEREIN, LICENSOR DISCLAIM ALL WARRANTIES, REPRESENTATION, PROMISE OR GUARANTEE, EITHER EXPRESS OR IMPLIED, STATUTORY OR OTHERWISE, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. IN NO EVENT SHALL LICENSOR BE LIABLE FOR ANY INDIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES OF ANY KIND INCLUDING WITHOUT LIMITATION, DAMAGES RESULTING FROM LOSS OF USE, LOSS OF DATA, LOSS OF PROFITS OR LOSS OF BUSINESS. THE LICENSED SOFTWARE IS PROVIDED "AS IS", WITH ALL FAULTS. LICENSEE AGREES THAT LICENSOR'S LIABILITY HEREUNDER FOR DAMAGES, REGARDLESS OF THE FORM OF ACTION, SHALL NOT EXCEED THE CHARGES PAID BY LICENSEE FOR THE LICENSED SOFTWARE. Notwithstanding the foregoing, in the event Licensee find what it believes to be an error or failure of the Licensed Software, Licensor shall make reasonable efforts to correct any such error or failure by taking measures which Licensor deems appropriate provided that Licensee has returned the Customer

Registration Card to Licensor. However, Licensor does not guarantee that any measures described above will correct all of the errors or failures.

(2). The warranty coverage under this Agreement does not apply to any error or failure of the Developed Software or any error or failure caused by a modification of the Licensed Software by Licensee or by any negligent act or omission of Licensee.

(3). In the event Licensor provides Licensee with any upgrades or error corrections of the Licensed Software, Licensee may upgrade the Licensed Software under the terms and conditions determined by Licensor. Licensor may request Licensee to submit the Master Disk for the Licensed Software at the time an upgrade is conducted.

ARTICLE 10.   Export Control

Licensee hereto represents and warrants that it shall not use any products, software and/or technology provided by Licensor, or any other products, software and/or technology manufactured or developed by using them (collectively hereinafter called, "Products"), for the purposes of disturbing international peace and security, including (i) the design, development, production, stockpiling or use of weapons of mass destruction such as nuclear, chemical or biological weapons or missiles, (ii) the other military activities, or (iii) any use supporting these activities.

Licensee also represents and warrants that it shall not sell, export, dispose of, license, rent, transfer, disclose or otherwise provide the Products to any third party, whether directly or indirectly, with knowledge or reason to know that the third party or any other party will engage in the activities described above.

Furthermore, Licensee represents and warrants that it shall not directly or indirectly, export, re-export, transship or otherwise transfer the Products in violation of any applicable export control laws or regulations promulgated and administered by the governments of the countries asserting jurisdiction over the parties or their transactions

ARTICLE 11.   GENERAL

This Agreement constitutes the entire agreement between the parties concerning Licensee's use of the Licensed Software and no waiver, alteration, modification or cancellation shall be binding unless made in writing and signed by the parties.

If any provision of this Agreement shall be held by a court of competent jurisdiction to be illegal, invalid or unenforceable, the remaining provisions shall remain in full force and effect.

This Agreement is made under and shall be construed in accordance with the Laws of Japan. Licensee agrees that any disputes related to this Agreement shall be settled by the jurisdiction of the court determined by Licensor. LICENSEE ACKNOWLEDGES THAT LICENSEE HAS READ THIS AGREEMENT AND AGREES TO ALL TERMS AND CONDITIONS STATED HEREIN.

Renesas Technorogy Corp