

SH-4

R20AN0072EJ0101

Rev.1.01

TCP/IP for Embedded system M3S-T4-Tiny: Introduction Guide

Aug 30, 2011

Introduction

This document explains M3S-T4-Tiny for the SH-4 V.1.04 Release00E (hereafter referred to as "T4") that depends on MCUs.

T4 is the TCP/IP protocol stack for embedded system. T4 is provided as library format and user can develop own system with this library to use TCP/IP function.

Target Device

SH-4

Contents

1. Structure of product.....	2
2. Library specification.....	2
3. Corresponding MCU.....	3
4. Development environment	3
5. T4 Ethernet sample application ROM / RAM / stack size	4
6. Version information	5
7. Notes	5
8. Library version information.....	6

1. Structure of product

1. M3S-T4-Tiny for the SH-4 V.1.04 Release00E
 2. M3S-T4-Tiny for the SH-4 V.1.04 Release00E Introduction Guide (r20an0072ej0101_sh4_t4.pdf)
- Part number of this product : R0M0400PT0020RRC

This product includes files below.

table.1 T4 product files

name	discription
installer (setup.exe)	For Windows installer. Installer will show the T4 product agreement. If user admits this agreement, installer will copy the T4 file to the path below. [Free version] C:\Renesas\an_r20an0072ej_sh4_t4_v104r00 [Version for a fee] C:\Renesas\an_r20an0072ej_sh4_t4_v104r00p * There is no difference of the data included in these.
T4 Library(lib)	
T4_Library_sh4_little.lib	SH-4(little endian) Library file ver 1.04(For the Ethernet)
r_t4_itcpip.h	T4 header file
sample driver(drv)	
lan91c111.c lan91c111.h	LAN91C111 Ethernet driver
sample program(sample)	
Ether.hws	HEW Project file
document(doc)	
r20uw0031ej0103_t4tiny.pdf r20uw0032ej0102_t4tiny.pdf r20an0072ej0101_sh4_t4.pdf	User's manual Ethernet driver interface specification Introduction Guide (this document)

2. Library specification

Library specification can be seen in user's manual included in T4-Tiny installer. T4-Tiny installer can be downloaded in Renesas Electronics Web site.

3. Corresponding MCU

This product corresponds to SH4.

Library file is built with default compile option.

* This library supports little endian mode.

4. Development environment

-Host OS

Windows XP, Windows NT 4.0, Windows 2000, Windows Me, Windows 98, Windows 95

Requirement items

When user develops, choose newer version than below.

[Software]

-Integrated Development Environment

High Performance Embedded Workshop Version 4.09.00.007

-C compiler

SuperH RISC engine Standard Toolchain (V.9.4.0.0)

[Debug tools]

-Emulator debugger

E10A-USB emulator

-Emulator software

E10A-USB emulator software V.3.03 Release 00

[Board]

Alpha project MS104-SH4

5. T4 Ethernet sample application ROM / RAM / stack size

Sample application is made with settings below.

- * Some Reception buffer for application
-> Required RAM 1460 byte by 1 reception buffer
- * Some Communication endpoints with 1460 bytes reception window.
-> Required RAM 1460 byte by 1 communication endpoint.
- * 4 Reception buffer for Ethernet driver.
-> Required RAM 1520 byte by 1 reception descriptor.

[Required memory1 : ROM/RAM size for Application (main.c, echo_srv.c (tcp non blocking call))]

ROM : about 320 byte
RAM : about 7068 byte

[Required memory2 : ROM/RAM size for T4 (T4_Library_sh4_little.lib)]

ROM : about 19542 byte
RAM : about 120 byte

[Required memory3 : ROM/RAM size for Ethernet driver (t4_driver.c, lan91c111.c)]

ROM : about 3336 byte
RAM : about 180 byte

[stack size]

API	stack size (includes sample driver)	Function called from T4 Library
tcp_acp_cep	68	api_slp
tcp_con_cep	68	api_slp
tcp_rcv_dat	108	api_slp
tcp_snd_dat	76	api_slp
tcp_sht_cep	48	api_slp
tcp_cls_cep	64	api_slp
tcp_can_cep	32	api_slp
udp_rcv_dat	80	api_slp
udp_snd_dat	48	api_slp
udp_can_cep	28	dis_int ena_int
tcpudp_get_ramsize	28	
tcpudp_open	80	tcpudp_act_cyc
_process_tcpip	376	api_wup api_slp rcv_buff_release lan_write lan_read lan_reset

This ROM/RAM size for Application and stack size table is for TCP nonblockingcall sample program of T4.

Use the "CallWalker" to check your system stack size. Because the stack size is changed in case "Changed compile option" and "Changed sample driver code", etc.

6. Version information

User can access T4 Library information with valuable below.

```
extern const char _T4_Version[];
```

Little Endian: "M3S-T4-Tiny version 1.04 for SH4 little endian.(Aug 30 2011, 16:42:01)"

7. Notes

- (1) Specify the size of 15bit or less for the third argument "INT len" of tcp_rcv_dat() and tcp_snd_dat().
- (2) Specify the size of 15bit or less for the fourth argument "TMO tmout" of tcp_rcv_dat() and tcp_snd_dat().
- (3) The MAC address of the sample program is stored in _myethaddr variable of config_tcpudp.c.
Change an initial value of the myethaddr variable if necessary according to the system.
- (4) Sample program is loaded expansion RAM on MS104-SH4.
- (5) Please push the RESET-SWITCH on MS104-SH4 before loading sample program everytime.

8. Library version information

Ver	change	release date
1.04	function addition Add Ethernet driver function "report_error". Add variable "_udp_zerochecksum" for behavior of UDP sum check.	Aug.30.11
1.03	bug fix -case When user use RI600/4(Renesas uITRON) with T4, User definition function "api_wup()" has no way to know which communication endpoint is ended. -measures Change "api_wup()" argument. To know which communication endpoint is ended.	Feb.02.11
1.02	bug fix -case When user use RI600/4(Renesas uITRON) with T4, conflict r_t4_itcpip and itron.h. -measures fixed r_t4_itcpip.h	internal use
1.01	bug fix -case When T4 uses API "tcp_snd_dat" with condition that other endpoint becomes zerowindow, and other endpoint returns ACK with enough window size. T4 (sender) continues zerowindow probe, and other endpoint returns ACK with enough window size. This condition makes T4 not to be able to update remote window size and hung-up. -measures When T4 judges "other endpoint is zerowindow", and other endpoint returns ACK with enough window size, T4 retransfers previous data. (not zerowindow probe)	Nov.10.10
1.00	first release	Oct.09.10

Website and Support

Renesas Electronics Website

<http://www.renesas.com/>

Inquiries

<http://www.renesas.com/inquiry>

All trademarks and registered trademarks are the property of their respective owners.

Update information

Rev.	Date	Description	
		Page	Summary
1.01	Aug.30.11	—	Release with T4 library ver 1.04
1.00	Feb.15.11	—	First edition issued

General Precautions in the Handling of MPU/MCU Products

The following usage notes are applicable to all MPU/MCU products from Renesas. For detailed usage notes on the products covered by this manual, refer to the relevant sections of the manual. If the descriptions under General Precautions in the Handling of MPU/MCU Products and in the body of the manual differ from each other, the description in the body of the manual takes precedence.

1. Handling of Unused Pins

Handle unused pins in accord with the directions given under Handling of Unused Pins in the manual.

- The input pins of CMOS products are generally in the high-impedance state. In operation with an unused pin in the open-circuit state, extra electromagnetic noise is induced in the vicinity of LSI, an associated shoot-through current flows internally, and malfunctions occur due to the false recognition of the pin state as an input signal become possible. Unused pins should be handled as described under Handling of Unused Pins in the manual.

2. Processing at Power-on

The state of the product is undefined at the moment when power is supplied.

- The states of internal circuits in the LSI are indeterminate and the states of register settings and pins are undefined at the moment when power is supplied.

In a finished product where the reset signal is applied to the external reset pin, the states of pins are not guaranteed from the moment when power is supplied until the reset process is completed.

In a similar way, the states of pins in a product that is reset by an on-chip power-on reset function are not guaranteed from the moment when power is supplied until the power reaches the level at which resetting has been specified.

3. Prohibition of Access to Reserved Addresses

Access to reserved addresses is prohibited.

- The reserved addresses are provided for the possible future expansion of functions. Do not access these addresses; the correct operation of LSI is not guaranteed if they are accessed.

4. Clock Signals

After applying a reset, only release the reset line after the operating clock signal has become stable.

When switching the clock signal during program execution, wait until the target clock signal has stabilized.

- When the clock signal is generated with an external resonator (or from an external oscillator) during a reset, ensure that the reset line is only released after full stabilization of the clock signal. Moreover, when switching to a clock signal produced with an external resonator (or by an external oscillator) while program execution is in progress, wait until the target clock signal is stable.

5. Differences between Products

Before changing from one product to another, i.e. to one with a different type number, confirm that the change will not lead to problems.

- The characteristics of MPU/MCU in the same group but having different type numbers may differ because of the differences in internal memory capacity and layout pattern. When changing to products of different type numbers, implement a system-evaluation test for each of the products.

Notice

- All information included in this document is current as of the date this document is issued. Such information, however, is subject to change without any prior notice. Before purchasing or using any Renesas Electronics products listed herein, please confirm the latest product information with a Renesas Electronics sales office. Also, please pay regular and careful attention to additional and different information to be disclosed by Renesas Electronics such as that disclosed through our website.
- Renesas Electronics does not assume any liability for infringement of patents, copyrights, or other intellectual property rights of third parties by or arising from the use of Renesas Electronics products or technical information described in this document. No license, express, implied or otherwise, is granted hereby under any patents, copyrights or other intellectual property rights of Renesas Electronics or others.
- You should not alter, modify, copy, or otherwise misappropriate any Renesas Electronics product, whether in whole or in part.
- Descriptions of circuits, software and other related information in this document are provided only to illustrate the operation of semiconductor products and application examples. You are fully responsible for the incorporation of these circuits, software, and information in the design of your equipment. Renesas Electronics assumes no responsibility for any losses incurred by you or third parties arising from the use of these circuits, software, or information.
- When exporting the products or technology described in this document, you should comply with the applicable export control laws and regulations and follow the procedures required by such laws and regulations. You should not use Renesas Electronics products or the technology described in this document for any purpose relating to military applications or use by the military, including but not limited to the development of weapons of mass destruction. Renesas Electronics products and technology may not be used for or incorporated into any products or systems whose manufacture, use, or sale is prohibited under any applicable domestic or foreign laws or regulations.
- Renesas Electronics has used reasonable care in preparing the information included in this document, but Renesas Electronics does not warrant that such information is error free. Renesas Electronics assumes no liability whatsoever for any damages incurred by you resulting from errors in or omissions from the information included herein.
- Renesas Electronics products are classified according to the following three quality grades: "Standard", "High Quality", and "Specific". The recommended applications for each Renesas Electronics product depends on the product's quality grade, as indicated below. You must check the quality grade of each Renesas Electronics product before using it in a particular application. You may not use any Renesas Electronics product for any application categorized as "Specific" without the prior written consent of Renesas Electronics. Further, you may not use any Renesas Electronics product for any application for which it is not intended without the prior written consent of Renesas Electronics. Renesas Electronics shall not be in any way liable for any damages or losses incurred by you or third parties arising from the use of any Renesas Electronics product for an application categorized as "Specific" or for which the product is not intended where you have failed to obtain the prior written consent of Renesas Electronics. The quality grade of each Renesas Electronics product is "Standard" unless otherwise expressly specified in a Renesas Electronics data sheets or data books, etc.
"Standard": Computers; office equipment; communications equipment; test and measurement equipment; audio and visual equipment; home electronic appliances; machine tools; personal electronic equipment; and industrial robots.
"High Quality": Transportation equipment (automobiles, trains, ships, etc.); traffic control systems; anti-disaster systems; anti-crime systems; safety equipment; and medical equipment not specifically designed for life support.
"Specific": Aircraft; aerospace equipment; submersible repeaters; nuclear reactor control systems; medical equipment or systems for life support (e.g. artificial life support devices or systems), surgical implantations, or healthcare intervention (e.g. excision, etc.), and any other applications or purposes that pose a direct threat to human life.
- You should use the Renesas Electronics products described in this document within the range specified by Renesas Electronics, especially with respect to the maximum rating, operating supply voltage range, movement power voltage range, heat radiation characteristics, installation and other product characteristics. Renesas Electronics shall have no liability for malfunctions or damages arising out of the use of Renesas Electronics products beyond such specified ranges.
- Although Renesas Electronics endeavors to improve the quality and reliability of its products, semiconductor products have specific characteristics such as the occurrence of failure at a certain rate and malfunctions under certain use conditions. Further, Renesas Electronics products are not subject to radiation resistance design. Please be sure to implement safety measures to guard them against the possibility of physical injury, and injury or damage caused by fire in the event of the failure of a Renesas Electronics product, such as safety design for hardware and software including but not limited to redundancy, fire control and malfunction prevention, appropriate treatment for aging degradation or any other appropriate measures. Because the evaluation of microcomputer software alone is very difficult, please evaluate the safety of the final products or system manufactured by you.
- Please contact a Renesas Electronics sales office for details as to environmental matters such as the environmental compatibility of each Renesas Electronics product. Please use Renesas Electronics products in compliance with all applicable laws and regulations that regulate the inclusion or use of controlled substances, including without limitation, the EU RoHS Directive. Renesas Electronics assumes no liability for damages or losses occurring as a result of your noncompliance with applicable laws and regulations.
- This document may not be reproduced or duplicated, in any form, in whole or in part, without prior written consent of Renesas Electronics.
- Please contact a Renesas Electronics sales office if you have any questions regarding the information contained in this document or Renesas Electronics products, or if you have any other inquiries.
(Note 1) "Renesas Electronics" as used in this document means Renesas Electronics Corporation and also includes its majority-owned subsidiaries.
(Note 2) "Renesas Electronics product(s)" means any product developed or manufactured by or for Renesas Electronics.



SALES OFFICES

Renesas Electronics Corporation

<http://www.renesas.com>

Refer to "<http://www.renesas.com/>" for the latest and detailed information.

Renesas Electronics America Inc.

2880 Scott Boulevard Santa Clara, CA 95050-2554, U.S.A.
Tel: +1-408-588-6000, Fax: +1-408-588-6130

Renesas Electronics Canada Limited

1101 Nicholson Road, Newmarket, Ontario L3Y 9C3, Canada
Tel: +1-905-898-5441, Fax: +1-905-898-3220

Renesas Electronics Europe Limited

Dukes Meadow, Millboard Road, Bourne End, Buckinghamshire, SL8 5FH, U.K.
Tel: +44-1628-585-100, Fax: +44-1628-585-900

Renesas Electronics Europe GmbH

Arcadiastrasse 10, 40472 Düsseldorf, Germany
Tel: +49-211-6503-0, Fax: +49-211-6503-1327

Renesas Electronics (China) Co., Ltd.

7th Floor, Quantum Plaza, No.27 ZhiChunLu Haidian District, Beijing 100083, P.R.China
Tel: +86-10-8235-1155, Fax: +86-10-8235-7679

Renesas Electronics (Shanghai) Co., Ltd.

Unit 204, 205, AZIA Center, No.1233 Lujiazui Ring Rd., Pudong District, Shanghai 200120, China
Tel: +86-21-5877-1818, Fax: +86-21-6887-7858 / -7898

Renesas Electronics Hong Kong Limited

Unit 1601-1613, 16/F., Tower 2, Grand Century Place, 193 Prince Edward Road West, Mongkok, Kowloon, Hong Kong
Tel: +852-2886-9318, Fax: +852-2886-9022/9044

Renesas Electronics Taiwan Co., Ltd.

7F, No. 363 Fu Shing North Road Taipei, Taiwan, R.O.C.
Tel: +886-2-8175-9600, Fax: +886-2-8175-9670

Renesas Electronics Singapore Pte. Ltd.

1 HarbourFront Avenue, #06-10, Keppel Bay Tower, Singapore 098632
Tel: +65-6213-0200, Fax: +65-6278-8001

Renesas Electronics Malaysia Sdn.Bhd.

Unit 906, Block B, Menara Amcorp, Amcorp Trade Centre, No. 18, Jln Persiaran Barat, 46050 Petaling Jaya, Selangor Darul Ehsan, Malaysia
Tel: +60-3-7955-9390, Fax: +60-3-7955-9510

Renesas Electronics Korea Co., Ltd.

11F., Samik Lavied' or Bldg., 720-2 Yeoksam-Dong, Kangnam-Ku, Seoul 135-080, Korea
Tel: +82-2-558-3737, Fax: +82-2-558-5141