RX Family

R20AN0051EJ0102
Rev.1.02
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TCP/IP for Embedded system M3S-T4-Tiny: Introduction Guide

Introduction

This document explains M3S-T4-Tiny for the RX Family 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

RX Family

Contents

Information on additional function has been added to "9. Library version information" on page 6.

1. Structure of product

1. M3S-T4-Tiny for the RX Family V.1.04 Release00E
2. M3S-T4-Tiny for the RX Family V.1.04 Release00E Introduction Guide（r20an0051ej0102_rx_t4.pdf）

part number of this product ： ROMRX60PT0020RRC

This product includes files below.

table.1 T4 product files

name		description
installer (setup.exe)		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_r20an0051ej_rx_t4_v104r00 [Version for a fee] C:\Renesas\an_r20an0051ej_rx_t4_v104r00p * There is no difference of the data included in these.
T4 Library(lib)		
	T4_Library_rx600_ether_big.lib	RX(big endian) Library file ver 1.04(For the Ethernet)
	T4_Library_rx600_ether_little.lib	RX(little endian) Library file ver 1.04(For the Ethernet)
	r_t4_itcpip.h	T4 header file
sample driver (drv)		
	driver bsp	Sample driver for RX62N. This program is shown in Renesas web site as application note. http://www.renesas.com/products/mpumcu/rx/Application_Notes.jsp Document Number R01AN0629EJ0101
sample program(sample)		
	Ether.hws	HEW Project file
document(doc)		
	r20uw0031ej0103_t4tiny.pdf r20uw0032ej0102_t4tiny.pdf r20an0051ej0102_rx_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 installer. T4 installer can be downloaded in Renesas Electronics Web site.

3. Corresponding MCU

This product corresponds to RX family.
Library file is built with default compile option.

- compile option (little endian)
  -cpu=rx600 -output=obj="$(CONFIGDIR)\$(FILELEAF).obj" -nologo

- compile option (big endian)
  -cpu=rx600 -output=obj="$(CONFIGDIR)\$(FILELEAF).obj" –nologo -endian=big

4. Development environment

-Host OS
Windows XP Windows NT 4.0 Windows 2000 Windows Me Windows 98 Windows 95

-Requirement items
When user develops, please choose newer version than below.

[Software]
-Integrated Development Environment
High Performance Embedded Workshop Version 4.09.00.007

-C compiler
C/C++ compiler package for RX family V.1.01 Release 00

[Debug tools]
Emulator debugger E1/E20
RX E1/E20 Emulator Debugger V.1.02.00

[board]
Renesas Starter Kit+ for RX62N (type : R0K5562N0S000BE)

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

Sample application is made with settings below.

* 3 Reception buffer for application
  -> Required RAM1500 byte.by 1 reception buffer.
* 3 Communication endpoints with 1460bytes reception window.
  -> Required RAM 1460byte by 1 communication endpoint.
*8 Reception descriptors Entry for Ethernet driver.
  -> Required RAM 3000byte by 1 reception descriptor.

[Required memory1 : ROM/RAM size for Application]

ROM	:	about	480	byte
RAM	:	about	10040	byte

[Required memory2 : ROM/RAM size for T4]

ROM	:	about	13553	byte
RAM	:	about	134	byte

[Required memory3 : ROM/RAM size for Ethernet driver]

ROM	:	about	2106	byte
RAM	:	about	26559	byte

[stack size]

API	stack size (includes sample driver)	Function called from T4 Library
tcp_acp_cep	60	api_slp
tcp_con_cep	60	api_slp
tcp_rcv_dat	60	api_slp
tcp_snd_dat	60	api_slp
tcp_sht_cep	44	api_slp
tcp_cls_cep	52	api_slp
tcp_can_cep	36	api_slp
udp_rcv_dat	44	api_slp
udp_snd_dat	40	api_slp
udp_can_cep	32	dis_int ena_int
tcpudp_get_ramsize	28	
tcpudp_open	40	tcpudp_act_cyc
_process_tcpip	304	api_wup api_slp rcv_buff_release lan_write lan_read lan_reset

This stack size table is for 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[];

BIG Endian: "M3S-T4-Tiny version 1.04 for RX BIG endian.(Aug 30 2011, 16:41:21)"
Little Endian: "M3S-T4-Tiny version 1.04 for RX LITTLE endian.(Aug 30 2011, 16:41:28)"

7. How to update Ethernet sample driver

In case update sample Ethernet driver shown in Renesas web site, user overwrite directories “bsp” and “driver” from sample Ethernet driver to T4 sample program’s HEW.

And correct 2 files after this.

・Enable Ethernet interrupt

r_ether.c Line 264:

```
/* Enable interrupt */
/* Sets up interrupt when you use interrupt */
EDMAC.EESIPR.LONG = 0x00040000;
ICU.IER[4].BIT.IEN0 = 1;
ICU.IPR[8].BYTE = 4;   // Set priority level
```

・Resist timer interrupt vector

intprg.c Line 60:

```
/************************************************************************
*
Exported global variables and functions (to be accessed by other files)
************************************************************************
/
extern void timer_interrupt(void);
```

Line95:

```
// CMTU0_CMT0
void Excep_CMTU0_CMT0(void){ TimerInterrupt(); }
```

・Adjust stack size

stacksct.h line 30: Adjust stack size to 0x300.

#pragma stacksize si=0x300

8. 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.

9. Library version information

ver	change	release date
1.04	function addition Add Etherent driver function "report_error". Add variable "_udp_enable_zerochecksum" for behavior of UDP sum check. Correct "t4_driver.c" to fix FR flag clear timing. This fixes wrong operation that EDMAC stops incorrectly.	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

ver	change	release date
1.04	The argument of "_process_tcpip()" which is called at a timer interrupt has been changed from "0" to "1" in order to fix the wrong operation in which EDMAC stops incorrectly. This modification is provisional. Since this modification may result in a slower communication speed, we will provide a measure which will not affect the communication speed for the later version. The user's manual describes that the argument mentioned above should be set to "0". Please read "0" as "1".	Aug.30.11

Website and Support

Renesas Electronics Website
http://www.renesas.com/

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http://www.renesas.com/inquiry

Update information

Rev.	Date	Description	
		Page	Summary
1.02	Aug.30.11	—	Release with T4 library ver 1.04
1.01	Feb.02.11	—	Release with T4 library ver 1.03
1.00	Nov.10.10	—	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.

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