Realtime operating system for ARM 7 family

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Foreword

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and topics

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Top Level Intro

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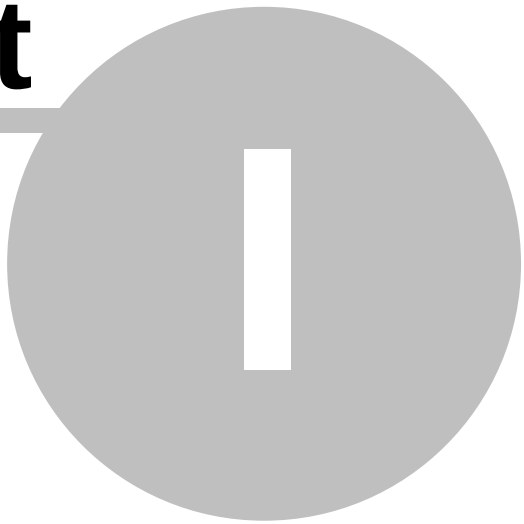

1 Introduction

RT is a embedded realtime free operating system for ARM7 based devices with this feature :

- Hard real time multi threading
- Support for semaphore
- Support for message
- User definable thread priorities
- Cross compiler with GNUARM
- Asynchronous serial driver for 16550 Uart
- Serial console.
- Support for the embedded file system library
- Sample application
- And more .....

The li brary is tested using the KEIL MCB2140 with Philips LPC2148 processor also it is possible to run simple application in the simulator supplied with the KEIL IDE .

1.1 Welcome topic

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1.2 Second topic

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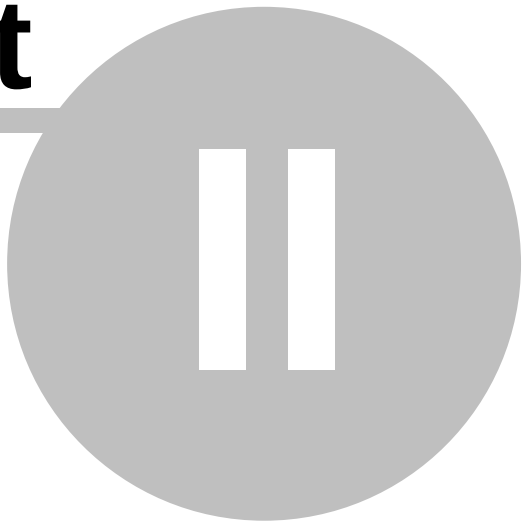

2 Installation

Extract all the file in one new directory (in this manual we assume the file are extracted in c:\arm7) the directory structure appear in this form :

Directories	Description
c:\arm	Main installation directories
c:\arm\rt	RT Library
c:\arm \efslXXXX	EFSL Library
c:\arm \examples	Examples directories
c:\arm\obj	Object directories

The object are separated from source to permit multiple configuration target with the same source.

2.1 Overview

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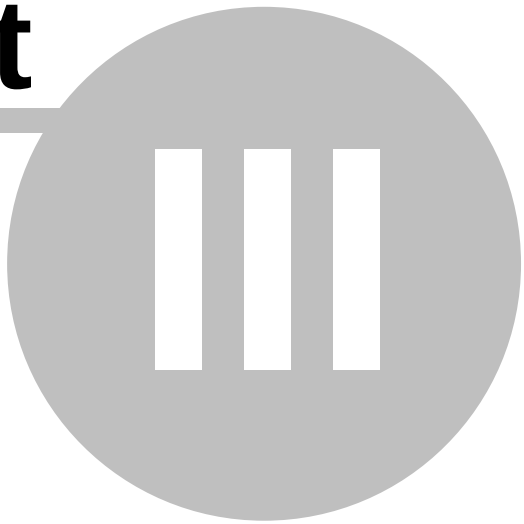

3 Function

3.1 Memory allocation

Like other embedded system memory allocation is not very much important and all the allocation normally are static and defined however one simple method to allocate memory are supplied. No method for free memory are provided.

3.1.1 RTMemoryAddRegion

```
int     RTMemoryAddRegion(unsigned long base,unsigned long top)
base - Base address for the region.
top - Top address for the region.
return the number of region configured.
```

This function is called during the initialization and all the free system memory it is added as one pool of memory.

3.1.2 RTMemoryAlloc

```
void * RTMemoryAlloc(unsigned size)
size - Number of byte to allocate.
```

Allocate one pieces of memory.
.

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3.2 Queue

Queue are the most important and delicate part of any real time operating system, this implementation is a double link queue version.

3.2.1 RTQueueInit

```
void RTQueueInit(RT_QUEUE_T * head,void * object)
head - Pointer to the link queue.
object - Object hold by the queue.
```

.
Initialize a new queue or link to the queue, the supplied object is the object hold by the queue in this way it is possible to have the same object in more than one queue.

3.2.2 RTQueueRemove

Enter topic text here.

3.3 Thread

Enter topic text here.

3.3.1 Thread priorities

Priority of thread can be from 0 (maximum priority) to 254 (minimum priority) the only exception is for the idle thread with priority 255 with this priority the thread can run when no other thread are ready. When a thread is created or a system is initialized a priority must be supplied and for compatibility version it is better to use constants.

Constants	Description
RT_MAX_PRIORITY	Maximum priority thread.
RT_ABOVE_PRIORITY	Priority above normal.
RT_NORMAL_PRIORITY	Normal thread priority.
RT_BELOW_PRIORITY	Priority below normal.
RT_MIN_PRIORITY	Minimum priority thread.

Priority can be increased or decremented of same unit (1 to 16) to permit fine tuning of thread priorities.

3.3.2 RTThreadCreate

```
void RTThreadCreate(RT_TCB_T *tcb,int priority,char *name,void (* main)(void *),void *arg,int ssize);
tcb - Must be allocated from the caller and contain all the thread data.
priority - Thread priority (see Thread priorities ).
name - Thread name
main - Main function will be called when the thread start.
arg - Argument for the main function.
ssize - Stack size in byte.
```

Create a new thread and put it in the ready queue.

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Endnotes 2... (after index)

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