LIBEEPROM – EEPROM Library for LPC1100 and LPC1300
Version 3

Why LIBEEPROM?

Selected devices in the LPC1100 and LPC1300 families come with a dedicated EEPROM block of up to four kilobytes size. Reading and writing the EEPROM is supported by boot ROM based IAP routines.

For the time being, interrupts must be globally disabled when making IAP calls. The technical reason for this is that for a short moment during the IAP call the flash becomes inaccessible. Interrupts could be allowed only if both the exception vector table and exception handlers are located in SRAM.

LIBEEPROM allows full access to EEPROM whit no restrictions on interrupts.

Implementation

LIBEEPROM is a simple replacement of the built-in EEPROM IAP calls. It presents the same API, and can be used the same way as IAP calls. Request for flash functions are redirected to the ROM handler, and EEPROM related calls (read and write) are provided by LIBEEPROM. There are two differences between the IAP calls and LIBEEPROM:

1. LIBEEPROM has no restrictions with respect to interrupts. When making EEPROM read and write calls, all interrupts can be allowed, even if exception table and handlers are all located in flash memory.

2. LIBEEPROM has a limited capability to do parameter checks. In particular, it cannot verify the actual size of the flash block in the device. If, for instance, you try to write to EEPROM address 0x500 in a device that only has 1 KiB of EEPROM, the data would end up in EEPROM at address 0x100. This is because the 1 KiB block is mirrored four times at addresses 0x000, 0x400, 0x800, and 0xC00.
   The built-in ROM IAP drivers would reject that request, and return an error code.

Usage

Using LIBEEPROM is easy: An existing application using IAP jumps to address 0x1FFF1FF1 (LPC1100 and LPC1300), the entry point of the ROM IAP routines. Typically this is done in C code like this:

```
uint32_t command[5];
uint32_t result[5];
typedef void (*IAP)(uint32_t command[5], uint32_t result[5]) ;
IAP *iap_entry = (IAP *)0x1FFF1FF1;
…
((IAP)IAP_ENTRY)(command, result);
```

In order to use LIBEEEPROM, include the libeeprom.h header in your application, and change the IAP entry address to the library entry point:

```
IAP *iap_entry = (IAP *)EELIB_entry;
```

Then just link your application to libeeprom-lpc11e14.a (GCC compiler) or libeeprom-lpc11e14.lib (ARM compiler).

There are a different variants of the library to support the different CPU cores used by the LPC device families. While LPC1100 and LPC1300 share the same EEPROM controller, variants for LPC11E14 series, LPC11U68 series, and LPC1347 series have been created to support the Cortex-M0, Cortex-M0+ and Cortex-M3 cores, and avoid linker warnings for incompatible CPU architectures.

Idle Hook

Calls to LIBEEPROM are blocking calls, i.e. they return only after the read/write operation completes. While a library call is waiting for the EEPROM controller to complete an operation, it calls a function named `EELIB_idleHandler()`.

A default empty implementation of this function exists in the library. Since this default implementation has the “`weak`” attribute, an application can simply redefine this function and use it to implement actions to be executed while the library call is blocking.

```
void EELIB_idleHandler (void)
{
    /* Application specific activity while waiting for EEPROM */
}
```

Supported Devices

The library variants support the devices listed in the following table. Use the library variant specified for your device.

LPC11A02	libeeprom-lpc11e14
LPC11A04	libeeprom-lpc11e14
LPC11A11	libeeprom-lpc11e14
LPC11A12	libeeprom-lpc11e14
LPC11A14	libeeprom-lpc11e14
LPC11E11	libeeprom-lpc11e14
LPC11E12	libeeprom-lpc11e14
LPC11E13	libeeprom-lpc11e14
LPC11E14	libeeprom-lpc11e14
LPC11E66	libeeprom-lpc11u68
LPC11E67	libeeprom-lpc11u68
LPC11E68	libeeprom-lpc11u68

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LPC11U22/301	libeeprom-lpc11e14
LPC11U23/301	libeeprom-lpc11e14
LPC11U24/301	libeeprom-lpc11e14
LPC11U24/401	libeeprom-lpc11e14
LPC11U34/311	libeeprom-lpc11e14
LPC11U34/421	libeeprom-lpc11e14
LPC11U35/401	libeeprom-lpc11e14
LPC11U35/501	libeeprom-lpc11e14
LPC11U36/401	libeeprom-lpc11e14
LPC11U37/401	libeeprom-lpc11e14
LPC11U37/501	libeeprom-lpc11e14
LPC11U66	libeeprom-lpc11u68
LPC11U67	libeeprom-lpc11u68
LPC11U68	libeeprom-lpc11u68
LPC1315	libeeprom-lpc1347
LPC1316	libeeprom-lpc1347
LPC1317	libeeprom-lpc1347
LPC1345	libeeprom-lpc1347
LPC1346	libeeprom-lpc1347
LPC1347	libeeprom-lpc1347

Do not attempt to use this library with any device not listed above.