emLoad

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ANSI-“C“ Software für Programm updates via RS232 in embedded Anwendungen

emLoad is a software for program updates for embedded applications via serial interface from a PC. The software consists of a window program and a program for the target application (bootloader) in source code form.

An increasing number of embedded applications uses in-circuit reprogrammable memory chips. These chips can be dedicated EEPROM or FLASH-memory chips or microcontroller with on-chip FLASH-memory. The advantage of this technology compared to the old generation of on-time programmable or mask programmed chips is obvious: The application can be reprogrammed at any time, i.e. after assembly of the hardware or even after shipment at customers site in case of a bug or new features. The only things required are an embedded application with a FLASH-type memory for program storage, a communications interface (typ. RS-232) and the software for application and PC: ***emLoad***.

Function of the software

After RESET the bootloader is started instead of the application program. The bootloader waits for a configurable time (default .5 sec.) for a data frame from the PC. If it does not receive a data frame from the PC within this time, the bootloader starts the application by accessing the RESET vector of the application. The application program is not affected by the bootloader and has all resources available.

Availability

The software is written completely in ANSI-“C“ and can therefore be used on most microcontrollers. The only things needed to port the bootloader for a particular application are: a “C“-module for access to the peripherals of the microcontroller and a “C“-module containing the programming algorithm for the FLASH-memory chip(s). At this moment ports are available for MITSUBISHI M16C and M77 controllers and for a variety of FLASH chips. Ports for other microcontrollers can be made in short time.

Configuration

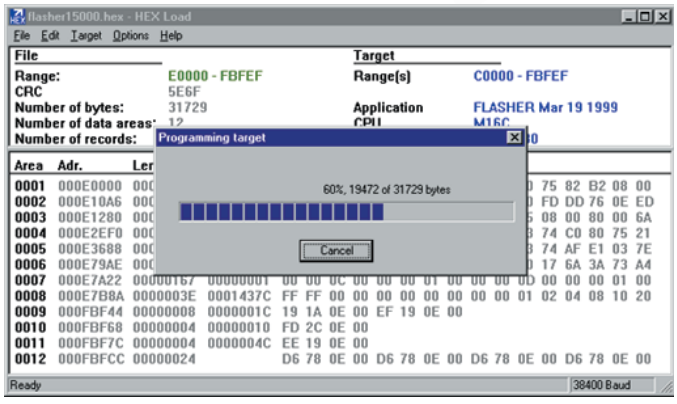
The target program can be configured to meet the requirements of the application by modifying a configuration file CONFIG.H. Adjustable are baudrate, system frequency of the CPU, interface selection, reset delay and the optional password.
Sample for a configuration file CONFIG.H:

```
/*********************************************************
*                                                        *
*            Configuration of BOOT LOADER                *
*                                                        *
*********************************************************
*/

/* CPU settings */
#define UPCLOCK         10000000         //  CPU frequency [Hz]
/*  Password / Name settings */
#define APPNAME  „Unspec. Application“
#define PASSWORD „“                      /* password, optional */
/*  Address settings */
#define FLASH_USER_START      0x10000    /* start of USER area */
#define FLASH_USER_LEN        0x18000    /* length of USER area */

/*   Communication parameters */
#define UARTSEL    0                     /* select UART to use */
#define BAUDRATE   19200                 /* select baudrate */
/*   Preferences */
#define RESETDELAY_MS (500)              /* dwell time after reset
before application is started [ms] */
```

Further customizations - i.e. special initialization of the hardware - can be achieved by modifying the source code. Using a different FLASH chip is no problem, even automatic recognition of the used FLASH chip is possible through reading of device- and manufacturer ID.

PC-Program

The PC-Program is very easy to use. Any hex file can be loaded and transferred to the bootloader for a program update. The program can be run from the command line. The following is a „screenshot“ of the PC-program with loaded hex file:



d-i-r-e-c-t i-n-s-i-g-h-t

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