emPURS for DIMM-MX6

Instruction Guide to use emPURS for production purposes

Rev02en / 25.01.2016

emtrion GmbH

Revision: **02en / 25.01.2016**

Rev	Date/Signature	Changes
1	12.01.2016/Ft	--
2	25.01.2016/Ft	Chapter 4: Added instruction to set execution permissions for file emPURS_plat

Contents

1 Introduction

This instruction guide describes how emPURS works and how the customer can use it for writing it's own data (e.g. root fs) to the onboard flash.

emPURS (emtrion production, update and recovery system) is a script based solution to setup/restore the content of onboard flash. This includes also formatting the onboard flash with a supported file system.

2 Prerequisites

To use emPURS you need the following equipment:

- DIMM-MX6 board with running U-Boot.
- Serial connection (terminal) to control the U-Boot
- Ethernet connection to download the new data
- Either a NFS or a TFTP server on the network, where the board is connected to.

3 Preparing the data files with your own content

For each partition which should on the onboard flash device you need an archive file. Each archive file will be extracted into the corresponding partition. The emPURS script supports the following formats of archive files:

- tar.gz
- tar.bz2
- tar

If you don't get such archive files directly from you build systems, the easiest way to create such an archive file is to create the wanted content (including the excepted layout) in an empty directory on your development system. After this is done you create an archive from this directory. The stored information in the archive should contain the names of the subdirectory (but without the path of the base directory). Example under Linux:

```
cd <base directory>
fakeroot tar cjf <output directory>/<archive name>.tar.bz2
```

An alternative to this procedure is to open an existing archive with an archive manager and copy or remove files to/from the archive using this archive manager. But in this case you have to consider that the file permissions have to be stored correctly in the archive.

Important remarks:

a) The data archive used for the first partition should contain the file uboot_script stored in a directory /boot. This file contains additional U-Boot environment variables (macros) which are automatically imported during the start sequence of the emtrion U-Boot. If this file is not available you have to adapt the U-Boot environment according to your needs.

b) The directory content which you are put in the archive must not already used for booting a DIMM-MX6 device (not used for booting with nfs boot). This is necessary because during the first start Linux creates some device and system directories and if these already exists it maybe happen that the boot is unsuccessful.

4 Prepare the data on the NFS or TFTP server

> Preliminary note:
> Below the term "base directory" is used. This term means the root data directory used by your TFTP server resp. the directory which you have exported in your NFS server. Which directory on your server computer this is configured in the setup of your server configuration, which is not part of this instruction guide. To find out this directory please look into the documentation of the server which you are using.

In order to provide the data on the NFS or TFTP server, perform the following steps once:

1. Extract the delivered emPURS archive into the base directory.
2. Tell emPURS the used server type
   a. Open the file <base directory>/root/rootfs/boot/uboot_script in a text editor
   b. Search for the line which starts with "boot_mode="
   c. After the equal sign the server type is told. Set this to the server type which you are using. Allowed values are "nfs" or "tftp" (all letters must be lower case).
   d. Save the modified file and close the text editor.
3. Copy the archive files with your data into the subdirectory images of the base directory
4. Set the partition information and archive files in the emPURS script
   a. Open the file <base directory>/root/rootfs/boot/emPURS_plat in a text editor
      Note: in this file lines with # at the beginning are comments
   b. Search for the comment "Specification of the required flash layout and data"
   c. Set the value of the variable FS_PARTTBL_TYPE to the type of the partition table which you want. Allowed values are "gpt" for a GUID partition table or "msdos" for a classic partition table with MBR
   d. Setup the information (file system type, partition name and size) for each partition which you want.

> Notes:
> - The size parameter **must not** specified for the last partition because the last partition get always the flash space which is not used by the other partitions
> - The current emPURS script supports up to three partitions
> - Supported file systems are:
>   ext2, ext3, ext4, vfat, fat32

e. Correct the values of the environment variables which tell the name of the archive files with the data. These variables are:
    i. SYS_RFS for the first partition
    ii. SYS_PART2 for the second partition
    iii. SYS_PART3 for the third partition

> Note:
>
> The value of the environment variable should tell the complete file but without a path specification.

f. Save the modified emPURS_plat script file and close the text editor.
g. If you are using an NFS server: Make sure that everyone has execution permissions on the file emPURS_plat script

Now your NFS or TFTP server is prepared for using emPURS.

5 Execute emPURS

After you have prepared the NFS or the TFTP server with your data you have execute the following commands from the U-Boot command line:

1. Setup the IP of our device
   a. using a DHCP server

   ```
   setenv  ip-method  dhcp
   ```

   b. using a static IP configuration

   ```
   setenv  ip-method  static
   setenv  ip-addr  <IP address>
   setenv  netmask  <network mask>
   setenv gatewayip  <IP of the gateway if the server is in a different network>
   ```

2. Setup the information about the server
   a. using a NFS server

   ```
   setenv  serverip  <IP address of the NFS server>
   setenv  nfsroot  <path to the root of the NFS server>
   setenv  tftproot
   ```

   b. using a TFTP server

   ```
   setenv  serverip  <IP address of the TFTP server>
   setenv  nfsroot
   setenv  tftproot  /root/rootfs
   ```

3. Execute emPURS

   ```
   run   restore_sys
   ```