How-To Build Meteohub on DreamPlug

The DreamPlug is a low power, small form-factor device that can be seen as a WLAN-enabled successor of the famous SheevaPlug. This document explains how to bring Meteohub onto a DreamPlug. At the moment Meteohub on DreamPlug has these limitations (compared to x86 Meteohb implementations):

- no WebCam support: This is also not planned for the future

- no Labjack support: unclear if this can be added by a home-brew kernel module, low priority

Meteohub on DreamPlug makes use of an external SD card where operating system, Meteohub application and data are stored. Capacity is 4GB. It should be a SLC based card. A SLC-based SD card that is proven to be working is:

- Transcend SDHC Class 6 150x: TS4GSDHC150

Weather stations are connected to the Meteohub by one of the USB connectors of the DreamPlug. These USB ports are able to drive RS232-USB converters based in Prolific or FTDI chipsets, when you have a RS232-based weather station. Meteohub on DreamPlug consumes about 5 watts, which is really effective.

DreamPlug has an internal WLAN chip, that Meteohub can make use of. In this respect Dreamplug is the WLAN version of the SheevaPlug, but it comes with some premium price for it. Conversion of a DreamPlug into a Meteohub is still a complicated procedure and needs some limited Linux knowledge and a Linux PC at your hand. If you just have a Windows machine, go with a Linux Live CD (of one of the major distributions) and you don't have to install Linux on your hard disk.

Files you need:

You find the needed files in the Wiki at: http://wiki.meteohub.de/Images#DreamPlug

1. Meteohub installer for DreamPlug:
   http://www.meteohub.de/files/dreamplug-installer.tgz

2. Meteohub SD card image for DreamPlug:
   http://www.meteohub.de/files/mhdreamplug-v4.7g.rar

Hardware you need:

You need the JTAG Board for the DreamPlug. This is necessary to change settings in uboot environment. At the moment there is no way to get around this.

JTAG Board gets connected via USB to your PC and connects by a 4-wire cable to the DreamPlug. Dip switch on the top has to select "UART" (not RS232)

STEP 1: Bring Installer to your Linux PC

DreamPlug's boot loader needs some changes in it's environment settings. The following steps explain how to patch these. To make it as easy as possible for your, there is a n automated environment settings patch program included, but it does not take the burden from you, to get the JTAG board connected and online.

1. Login as user "`root`" on your Linux PC. If you don't have one, make use of one of the live Linux CDs that allow to use Linux right from a CD without having to install something on your hard disk. Take one of the major distributions that works well with your PC's hardware.

2. Goto to directory "`/home`" by giving the command "`cd /home`"

3. Copy downloaded installer archive "`dreamplug-installer.tgz`" to directory "`/home`" and extract the files with command
   "`tar xzf dreamplug-installer.tgz`".

4. Goto to directory "`dreamplug-installer`" by command
   "`cd dreamplug-installer`"

STEP 2: Update uboot environment on the DreamPlug

5. Connect DreamPlug with 4-wire cable to the JTAG board. Corresponding connectors on DreamPlug and JTAG board are labeled "UART". Make sure JTAG board is in UART-mode (check Dip switch on the JTAG board's top).

6. Connect JTAG board with USB cable to a USB port of your PC.

7. Check system messages of your Linux PC to find out which devices maps to the JTAG Board. Give command "`dmesg | tail`". There you will find information that Linux has discovered a new USB serial device named "`/dev/ttyUSB??`". In the following steps I assume it is mapped to "`/dev/ttyUSB0`".

8. Change environment settings by calling command
   "`./dreampatch /dev/ttyUSB0 meteohub.env`"

9. Program is now waiting for a DreamPlug starting to boot. Therefore, power-up the DreamPlug or press the reset button, if it is already up and running. Shortly after this dreampatch program should printout a successful log like this:
   ```
   Waiting for DreamPlug boot process...
   Boot process identified.
   Boot loader halted.
   [......]
   6 Environment settings changed (0 failed).
   Environment settings permanently stored.
   ```

10. Congratulations. From now on DreamPlug will tra to boot your Meteohub software from the SD card first. If there is no SD card there, DreamPlug will boot preinstalled Ubuntu Linux GlobalScale is shipping it with. You can now disconnect the JTAG board and shut down your Linux PC.

STEP 3: Setup SD Card

Previous steps did a preparation of the DreamPlug to boot from SD card. Last step is to prepare a SD card. This can be most easily done by using "DiskImage" from a Windows 7 machine or by "dd" on a Linux PC environment. Download and un-rar SD card image file. Resulting Meteohub SD card image (`mhdreamplug-vx.x.img`) includes 4 disk partitions and it is essential that you copy this data in raw mode to your SD card. You do that on a Linux machine by "`dd if=mhdreamplug-vx.x.img of=/dev/sde bs=1M`" assuming that Meteohub image file is named "`mhplug-vx.x.img`" and SD card is recognized as "`/dev/sde`" on your Linux PC. When using DiskImage on Windows, please make sure that you select the target drive as "physical drive" (you have to scroll down the list of target drives until the very end to find these).

SD card must have a capacity of 4GB. If it is bigger, just 4GB are used. When it is smaller, Meteohub will not work.

STEP 4: Start Meteohub

1. Insert prepared SD card into DreamPlug (contact side down) and press reset "button".

2. When boot has finished, Meteohub can be reached by it's IP exactly like any other Meteohub.