Getting started documentation for the DEV-SOM36 PTP Dev Kit

The following links will bring you to our EMAC Wiki site page that overviews the combination of the SoM-A5D36 and SoM-215GS. The page will include links to User Manuals, Datasheets, a quick getting started page, and a page describing the loading of images onto your device.

https://wiki.emacinc.com/wiki/DEV-SOM36
https://wiki.emacinc.com/wiki/Getting_Started_with_the_DEV-SOM36
https://wiki.emacinc.com/wiki/Loading_Images_onto_eMMC_Devices

Overview:

The SoM-215GS is an ultra-compact SoM Carrier/Base/Socket board, designed with the TI DP83640 IEEE 1588 PTP PHYTER onboard, with an optional 4.3-inch WQVGA (480 x 272) TFT color LCD and a resistive touch screen. The dimensions of the SoM-215 are 4.8" by 3.0", about the same dimensions as that of popular touch cell phones. The SoM-215 is small enough to fit in a 2U rack enclosure. This versatile SoM Carrier/Socket board is ideal for evaluation and early development work. This Carrier is designed to work with all EMAC 200-pin SODIMM type SoMs. Note: The SoM-215 is specifically designed for SoMs with Video & USB capability.

The SoM-A536P is a System on Module (SoM) based on the Atmel ARM Cortex A5 ATSAMA5D36 processor. Designed and manufactured in the USA, this wide temperature, fanless ARM 536 MHz SoM has 10/100 BaseT IEEE 1588 Ethernet included along with up to 6 serial ports. The SOM-A536P offers up to 16GB of eMMC Flash, up to 16MB of serial data flash, and up to 512MB of LP DDR2 RAM.

When the SoM-A536P is coupled with the SoM-215GS it provides two IEEE 1588 Ethernet Ports in addition to all the aforementioned I/O.

Setup:

1. You may install the machine specific SDK using this link:
   http://ftp.emacinc.com/openembedded-sw/duncan-5.8.0/latest/soma5d36mp/sdk/soma5d36mp-emac-x86_64-toolchain-5.8.0-cortexa5t2hf-vfp.sh
2. Make the following cable connections using the cables provided:
   a. Board Micro-USB to USB Desktop (Console port connection)
   b. Board Ethernet to Ethernet Network
   c. 5V Wall Power Supply to Board Power (may be left unplugged from wall until Step 3)
3. Open Minicom or preferred terminal emulator & create a terminal session with the DEV-SOM36
   a. After supplying power, boot messages will be displayed followed by a log in prompt.
      i. soma5d36 login: root
      ii. password: emac_inc
   b. Use command "ifconfig" in the terminal session to find the device's IP address that can be used during the development process.

Loading Images onto an eMMC Device:

Some EMAC products use eMMC in place of NAND flash. eMMC is an embedded MMC compliant memory that takes the form of an integrated circuit instead of a media card.

U-Boot does not support writing to file systems in eMMC. To overcome this issue, the embedded target needs to boot into an alternate media such as a network file system or USB flash drive. Once the board has booted into Linux, the eMMC can be partitioned and formatted, and the root file system can be extracted. This article explains the general process of writing the eMMC from Linux as well as some specifics related to programming the SoM-A5D35/6.

Once the Linux command prompt is reached, Linux utilities can be used to create and format partitions on the eMMC. By partitioning the eMMC, the partitions can be accessed individually and formatted differently as required. The fdisk utility can be used to create these partitions on the eMMC.

For more information about fdisk, see:
https://tldp.org/HOWTO/Partition/fdisk_partitioning.html

After creating the partitions, they can be formatted with the various mkfs utilities. The formatting used is dependent on how the partition is to be accessed. For eMMC root filesystems EMAC currently uses EXT4 (http://en.wikipedia.org/wiki/Ext3). Other formatting options are available (EXT2, EXT3, etc) and can be used. It should be noted that the kernel must be configured to support the chosen filesystem and the bootargs need to specify the correct type.

For More Information on this Process go to:
https://wiki.emacinc.com/wiki/Loading_Images_onto_eMMC_Devices

Building the OS:

The build sent with the board should have all the packages you need including ZCM and PTP. The rebuild can be done via the Yocto build system and can be explained with the following link, plus some additional instruction below.

For building emac-oe: dunfell's README.md:

http://git.emacinc.com/OE/emac-oe/-/blob/dunfell/README.md

For information on the linux source, we use bitbake to compile the kernel, patches and additional files included in these links:

http://git.emacinc.com/OE/emac-oe/-/blob/dunfell/meta-emac/recipes-kernel/linux/linux-stable-rt_5.10.bb

http://git.emacinc.com/OE/emac-oe/-/blob/dunfell/meta-emac/recipes-kernel/linux/linux-stable-rt_5.10.bbappend

http://git.emacinc.com/OE/emac-oe/-/tree/dunfell/meta-emac/recipes-kernel/linux/linux-stable-rt-5.10/soma5d36mp/