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| Importing OpenBTS Software on BeagleBoard |
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Importing OpenBTS Software on BeagleBoard

Prof Dr. Magdy Fikri

**Abstract:**

A software-defined radio system, or SDR, is a radio communication system where components that have been typically implemented in hardware (e.g. mixers, filters, amplifiers, modulators/demodulators, detectors, etc.) are instead implemented by means of software on a personal computer or embedded computing devices.

The main SDR project(composed of 5 other groups , see the NOTES for this) is to develop an open-source Unix application that uses the Universal Software Radio Peripheral (USRP) to present a GSM air interface ("Um") to standard GSM handset and uses the Asterisk® software PBX to connect calls. The combination of the ubiquitous GSM air interface with VoIP backhaul could form the basis of a new type of cellular network that could be deployed and operated at substantially lower cost than existing technologies in Greenfields in the developing world.

From our side(BeagleBoard - SDR group) , we are responsible to install the necessary software that is needed by the system on the Beagle-Board, ex. the open-embedded cross compilation environment we use Angstrom open-embedded for that, GNU Radio ,etc... Moreover, in order to use the Beagle-Board capabilities efficiently we are required to process the complex codes of the Gnu-Radio that require a lot of processing on the DSP, so we need to send these codes from the GPP(ARM cortex 8) side to the DSP(Texas C64x+ ) and again back to the GPP.

**CONCLUSION:**

From the previous analysis we can conclude that in order to run GnuRadio on a heterogeneous processor like the one on BeagleBoard platform we have to use the shared library method. In doing so, the developer would have to build three things: a shared GPP side library using OE which manages the DSP interface for running applications, a DSP executable which can handle functionality requests from the GPP and perform the needed signal processing on data streams, and GNU Radio DSP-based blocks to make effective use of the DSP in a SDR application setting. While the developer can use Dr. Almohanad's LoopAl2 sample as a frame work instead of starting from scratch, a good understanding of GNU Radio, OE, DSPLINK and its dependencies, which were discussed in details in this document, is required in order to use the framework and to add other GNU Radio functions that are required by an Open-BTS application.