

Moving SHIMMER Bluetooth apps from 115K to 230K

Please strictly follow these steps when moving your Bluetooth apps from 115K to 230K using tinyos-1.x.

Background

The RovingNetworks RN-41 Bluetooth module on SHIMMER is a version 2 bluetooth module that in theory can transfer data at 3Mbits. However due to the fact that the SPP stack and VM application is running in the module itself (the CSR chip only runs at 16mhz and the BT VM is interpreted) means that the RN-41 module can't take advantage of baudrates above 460K. So the bitrate limit on the BT module is 460K. The MSP430 host processor on SHIMMER needs to send sensor data to the BT module. With the current clock configuration on the MSP430, its asynchronous UART bitrate limit is 230K.

In applications where higher throughput is necessary while streaming data from SHIMMER over the Bluetooth radio, the bitrate of the BT module and MSP430 should be carefully changed up to 230K. This is a 2 step process due to the fact that the BT module needs to be sent a command at its old bitrate in order to step it up to 230K.

Procedure

1. Change the bitrate of the BT module. Go to your application file, E.G. in this case tinyos-1.x/contrib./handhelds/apps/BioMOBIUS/EMG/EMGM.nc and search for "setBaudrate". In this file you will find "call Bluetooth.setBaudrate("230");" at the end of StdControl.init. If it is commented out then uncomment it.
2. If your file doesn't have a "call Bluetooth.setBaudrate("230");" at all then add it in here at the end of the "StdControl.init" function, which should be somewhere under call "BTStdControl.init();".
3. BioMOBIUS/EMG/EMGM.nc is defaulted to 500HZ sampling operation, now that the baudrate is being increased to 230K, you can increase the sample frequency to 1000HZ as is necessary with EMG applications, so replace "uint16_t sample_freq = SAMPLING_500HZ;" with "uint16_t sample_freq = SAMPLING_1000HZ;", just do a search and replace 500HZ with 1000HZ.
4. Program the SHIMMER, this will have now changed the BT module bitrate to 230K when SHIMMER boots up.
5. At this point the MSP and BT module will be talking at a different bitrate so change the bitrate of the MSP430 USART1 to match the BT module. Open up tinyos-1.x/contrib./handhelds/tos/lib/RovingNetworks/ RovingNetworksM.nc and search for "UARTControl.setClockRate". Comment out call "UARTControl.setClockRate(8, 0xee);" and uncomment "UARTControl.setClockRate(4, 0x82);"
6. Program the SHIMMER, this will have changed the MSP bitrate to 230K. When SHIMMER boots up all is done. The BT module will now be driven at 230K.

Moving SHIMMER Bluetooth apps back from 230K to 115K

To get the SHIMMER Bluetooth module back to 115K, follow the procedure above but use “call Bluetooth.setBaudrate("115");” in your application and remember to change back “uint16_t sample_freq = SAMPLING_1000HZ;” to “uint16_t sample_freq = SAMPLING_500HZ;”, or whatever the desired new sample frequency is. Lastly for 115K operation change the MSP baudrate to “UARTControl.setClockRate(8, 0xee);” in tinyos-1.x/contrib./handhelds/tos/lib/RovingNetworks/RovingNetworksM.nc.