

Brief Technical Information of the Body Scale ver.0.4

When user plugged 4 AA cells into the battery compartment, the Body Scale (here after called “the device”) is ready to use.

Part A—Regarding to Schematic Diagram “Scale v13.pdf”

The “Bridge_Sensor” outputs voltage (across *BS-*, *BS+*) correlated to weight imposed on the device. It passes through an RC network (*R7*, *R8*, *C1*, *C21*, *C22*) and ends at pins *AI+*, *AI-* of *UI*.

UI processes the voltage data and display corresponding weight information on the *LCD* with calibration data stored inside EEPROM *U4*. In addition, *UI* stores weight data along with time information (obtained from RTC chip *U3*) to *U4*.

UI will activate *U7* by setting pin 32 (*CE*) to high voltage level. *UI* will then send weight, time and other information via *U7*, data is only sent out but no return information will be received.

If “User 1” or “User 2” is selected, Bluetooth feature will be activated :

UI will activate the Bluetooth Module by enabling the power supply to the module. This is done by setting pin 4 (*CE*) of *U5* to high voltage level. Pin 5 of *U5* will provide a steady 3.3V to the Bluetooth Module.

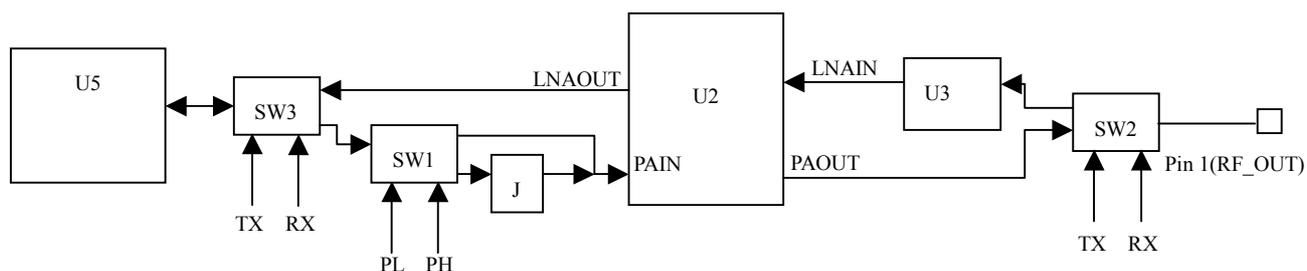
UI will then send weight, time and other information to the Bluetooth Module via the pin 30 (*P5.0*). Bluetooth Module will, in return, send information back to *UI* via pin 35 (*P5.5*) of *UI*.

After sending data out via the Bluetooth module (or after being idle for over 5 minutes), or sending data out via *U7* at “Guest” mode, the device will enter its standby mode (power to Bluetooth Module disabled, with other measures done in order to keep current consumption low). The device leaves it standby mode by activating either the vibration switch *S2*, “User 1” switch *S6*, “User 2” switch *S4* or “Guest” switch *S5*.

Part B—Regarding to Schematic Diagram “ISBTM8-3(Class1 Module) 1120.pdf”

The Bluetooth Module communicates with *UI* (of “Scale_v08.pdf”) via its Baseband IC *U4* (along with data stored inside the EEPROM *U6*). *U5*, *U2*, *U3*, *SW1*, *SW2*, *SW3* are the major components of the module to handle the RF part of the Bluetooth communication. The module outputs the RF signal via its pin 1 (*RF_OUT*). Pseudo-random hopping sequence is used over the total 79 channels between 2.402GHz to 2.480GHz. And with a nominal hop rate of 1600hops/s. The transmit timing is equal to

the bluetooth specification v1.1. Details illustration of the circuits can be found in the following block diagram.



SW1-3 shown above are GaAs MMIC SPDT switches to fork one signal path into two. U5 serves two functions here:

- U5* modulates digital signal from *U4* to RF signal. The RF signal goes through *SW3* to *SW1* under the control of pins *TX*, *RX*. This signal further goes through *SW1* to the Power Amplifier of *U2*. With control pins *PL*, *PH*, two different gains can be provided to the Power Amplifier where *J* is mainly a voltage divider consisting of *R2-4*. Finally the signal path ends at *SW2* which goes to pin 1 (*RF_OUT*)
- U5* decodes RF signal received from Pin 1 (*RF_OUT*). RF signal received firstly goes through *SW2* to *U3* under the control of pins *TX*, *RX*. *U3* is a 2.4GHz SAW filter centered at 2442MHz. The LNA of *U2* amplifies the RF signal to *SW3*. Finally, this signal reaches *U5* under the control pins of *TX*, *RX*.

Part C—Regarding to Schematic Diagram “Antenna.pdf”

The antenna of the Bluetooth Module is printed on the main PCB and is connected to *RF_OUT* pin of the Bluetooth Module. This *RF_OUT* signal feeds into the antenna via a simple LC impedance matching network (L2, L3, C28).

Part D—Regarding to Schematic Diagram “RF Antenna.pdf”

The antenna of the 2.4GHz RF signal (*U7*) is printed on the main PCB and is connected to *ANTI* and *ANT2* pins of the Bluetooth Module. The signal feeds into the antenna via a simple LC impedance matching network (L6, L7, C36 and C37).

Part D— Software Flow of the Body Scale

