PowerScan RF General Operation

(In reference to Brutus RF Flow Chart)

System Operation

Handheld scanner reads a barcode label. Transmits barcode in a packet form to base station. Base station sends digital barcode data to host system via a wire. Base Station then sends a signal back to handheld that barcode communication to host system is complete and waits for another barcode code packet from handheld.

Circuit description

Handheld scanner and base Station have the same transmitter/receive circuit except handheld uses a battery for DC operation voltage.

Handheld: When handheld trigger is depressed, DC-DC converter is turned on.

Handheld/Base Station: 3.3 V activates Radio Power Control to enable RX_EN and TX_EN (receive and transmit)

Receive:

Saw filter signal from antenna → LNA (low noise amp 16 db gain for 915 Mhz – low impedance when receiving data, high when transmitting data) → Mixer → 10.7 Mhz bandpass filter (-6 db total roll off or –3 db on each side) → 34 db amp → 10.7 Mhz filter (same roll off) → 60 db amp → Mixer (to digitized signal, 90° phase shift using capacitors/resistors as threshold for comparator → CPU HC08 R_RX (SCI) receives digital data, which is a Manchester decoded/undecoded → data goes to HC16 processor (via SPI – 3 lines).

Transmit:

Digital data on R_TX (SCI) from CPU HC08 → wiggles Voltage Control Oscillator (VCO) with aid of synthesizer to transmit a modulated frequency across carrier of +/- 30 Khz (60 Khz deviation) with FSK (frequency shift key) centered around frequency of +/- 30 Khz → PA (ac coupled amp +3 db – low impedance while LNA is now high impedance) → antenna.

RF 2945 chip by RF Micro comprises of LNA, PA, all mixers, all amplifiers, radio power controller, and VCO. Saw filter (signal), all bandpass filters, synthesizer, 14.7456 Mhz crystal, CPU, and selected resistors/capacitors are separate devices or circuits.