Description of the Philips Home Scale Transmitter circuit

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The M3813 Home Scale transmitter circuit is based an R. F. Monolithics (RFM) TR1000 hybrid transceiver module. Printed circuit board load options have been selected to constrain the transceiver to three operating modes. The operating mode in effect at any given time is selected by the device microprocessor. The available modes are *Standby*, *Transmit*, and *Test*.

- *Standby* mode is a very low power consumption state in which the transceiver consumes absolute minimum power, and emits no RF energy.

- *Transmit* mode is constrained, again by load options, to ON-OFF keying. *Transmit* mode is the normal mode for transfer of measurement and status messages. *Transmit* mode is used during FCC part 15 testing.

- *Test* mode is identical to *Transmit* mode except that RF output is reduced by approximately 3 dB. *Test* mode – rarely used - is used during device installation, and to verify RF link operation.

A 19.6 kilobit serial data stream modulates the TR1000 output in *Transmit* and *Test* modes.

Quoting from the RFM TR1000 data sheet:

TR1000 916.50 MHz Hybrid Transceiver

The TR1000 hybrid transceiver is ideal for short-range wireless data applications where robust operation, small size, low power consumption and low cost are required. The TR1000 employs RFM's amplifier-sequenced hybrid (ASH) architecture to achieve this unique blend of character-istics. All critical RF functions are contained in the hybrid, simplifying and speeding design-in.
The receiver section of the TR1000 is sensitive and stable. A wide dynamic range log detector, in combination with digital AGC and a compound data slicer, provide robust performance in the presence of on-channel interference or noise. Two stages of SAW filtering provide excellent receiver out-of-band rejection. The transmitter includes provisions for both on-off keyed (OOK) and amplitude-shift keyed (ASK) modulation. The transmitter employs SAW filtering to suppress output harmonics, facilitating compliance with FCC 15.249 and similar regulations.

The TR1000 transmitter output power is determined by current flowing into TXMOD (pin 8 of the TR1000). The transmitter design supports both Transmit mode used to transfer Blood Pressure measurement results and status messages, as well as a reduced power test mode.

R133 and R134 control the current into TR1000 pin 8 in the higher power normal mode. The two resistors are used in series to allow the combined resistance, and the resulting power level, to be set with greater precision than possible using a single standard resistor value. The data signal driving the resistors and the TR1000 TXMOD input is the output of a 74HC00 quad NAND gate. The 74HC00 output is lightly loaded by the transmitter, and when driven, will be stable and close to the power supply voltage. The power supply voltage is controlled by a linear regulator (Micrel MIC5219-3.0BM5) with better than 1% output load regulation and worst case accuracy of 2%. In combination, these factors result in a well-controlled drive signal to the RFM TR1000.

R135 modifies the drive to the TXMOD pin by diverting a portion of the available drive current when RFattenuate- is asserted (LOW). Current into TXMOD, and the resulting TR1000 output level, are reduced when Rfattenuate- is asserted. R135 was selected to produce a 3dB drop in RF output level. D20 is reverse biased during *Transmit* mode assuring that R135 is isolated from the transmitter during non-test operation.