LMS-3000 Functional Overview

The LMS-3000 radio module is a single PCB wireless solution based on the Intersil PRISM II Direct Sequence Chip Set.

The two block diagrams, one representing the RF functionality , the other the Digital functionality of the radio module are located in Figure 1 and 2. The digital section contains the following functionality:

1) I/O
2) Microprocessor
3) MAC
4) Memory
5) Reference Oscillator
6) Power Regulation

The radio modules RF section contains the following functionality:

1. Baseband Processor
2. Modulator/Demodulator
3. Dual Synthesizer
4. Up/Down Converter
5. Power Amplifier
6. Low Noise Amplifier (LNA)
7. RF VCO
8. IF VCO
9. Antenna (RF) Interface

During transmission , data obtained by the Microprocessor from the I/O ports, is transferred to the MAC. The MAC reformats the data and places it on the Baseband Processor TX data line. This data is modulated according to the format selected (CCK) and then spread using a defined PN code. Two signals are generated (the In-Phase (I) and Quadrature (Q) components). The I & Q signals are sent to the Modulator/Demodulator where they are first filtered and then modulated with the IF frequency (70 MHz).

The IF oscillator generates a 140 MHz signal which is divided by two inside the Modulator/Demodulator, generating a final IF signal of 70 MHz. Next, the two signals are combined into a single signal and sent to the Up/Down converter. The Up/Down converter will shift this signal to the RF frequency for the channel programmed in the synthesizer, for operation within the 902-28 MHz ISM band.

In the final stage, this signal is amplified to produce +26 dBm RF power output as measured at the output of the antenna port. In the receive mode, the radio signal is amplified by the LNA, and then sent to the Up/Down converter. The Up/Down converter down-converts this signal from the 902-28 MHz range to the IF frequency, 70 MHz.

The Modulator/Demodulator then converts the signal to baseband and splits the signal into its I & Q components, before sending it to the Baseband Processor.

Finally, the Baseband Processor despreads and demodulates the data contained in the CCK format, and places it on the RX data line to the MAC. The MAC modifies the data, then transfers it to the Microprocessor which reformats the information and sends it out the I/O ports. The RF and IF Local Oscillator signals are generated using the synthesizer and voltage controlled oscillators. The synthesizer is programmed with the desired RF channel frequency plus the IF frequency. The baseband processor and the synthesizer are driven from a common 44 MHz oscillator to control the timing of these chips.

Example (for Channel 1 operation)**:**

RF		**IF**		**LO**
905 MHz	+	70 MHz	=	975 MHz

The antenna (RF) connector is connected to a 50-ohm impedance matched transmission line (Times Microwave LMR-400 or LMR-600) to one of the following antenna types: Omni, Disc, Patch, Yagi and Dipole Reflector. The table below includes examples of each of the recommended antenna types, as well as their associated maximum antenna system gain.

Antenna Type	Manufacturer	Model Number	Maximum Antenna System Gain
Omni	Astron	V-9183	5.1 dBi
Disc	Astron	PCNLP09V	3 dBi
Patch	Astron	ASTPCG09HD	8.5 dBi
Yagi	Astron	928-4	9.1 dBi
Dipole Reflector	Til-Tek	TA-811	10.4 dBi

Table 1: Antenna Types for use with the LMS-3000

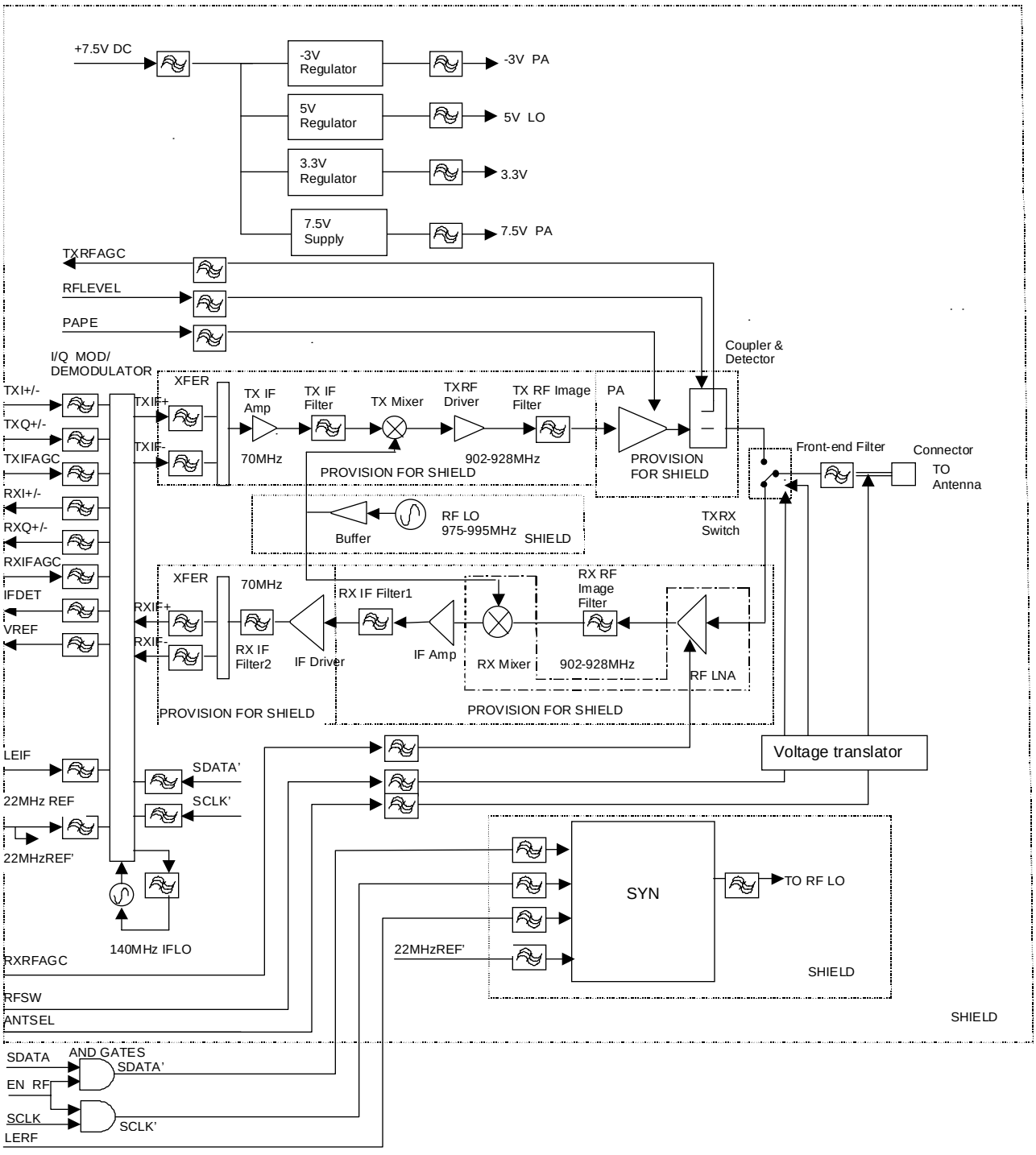

Figure 1 RF Section Block

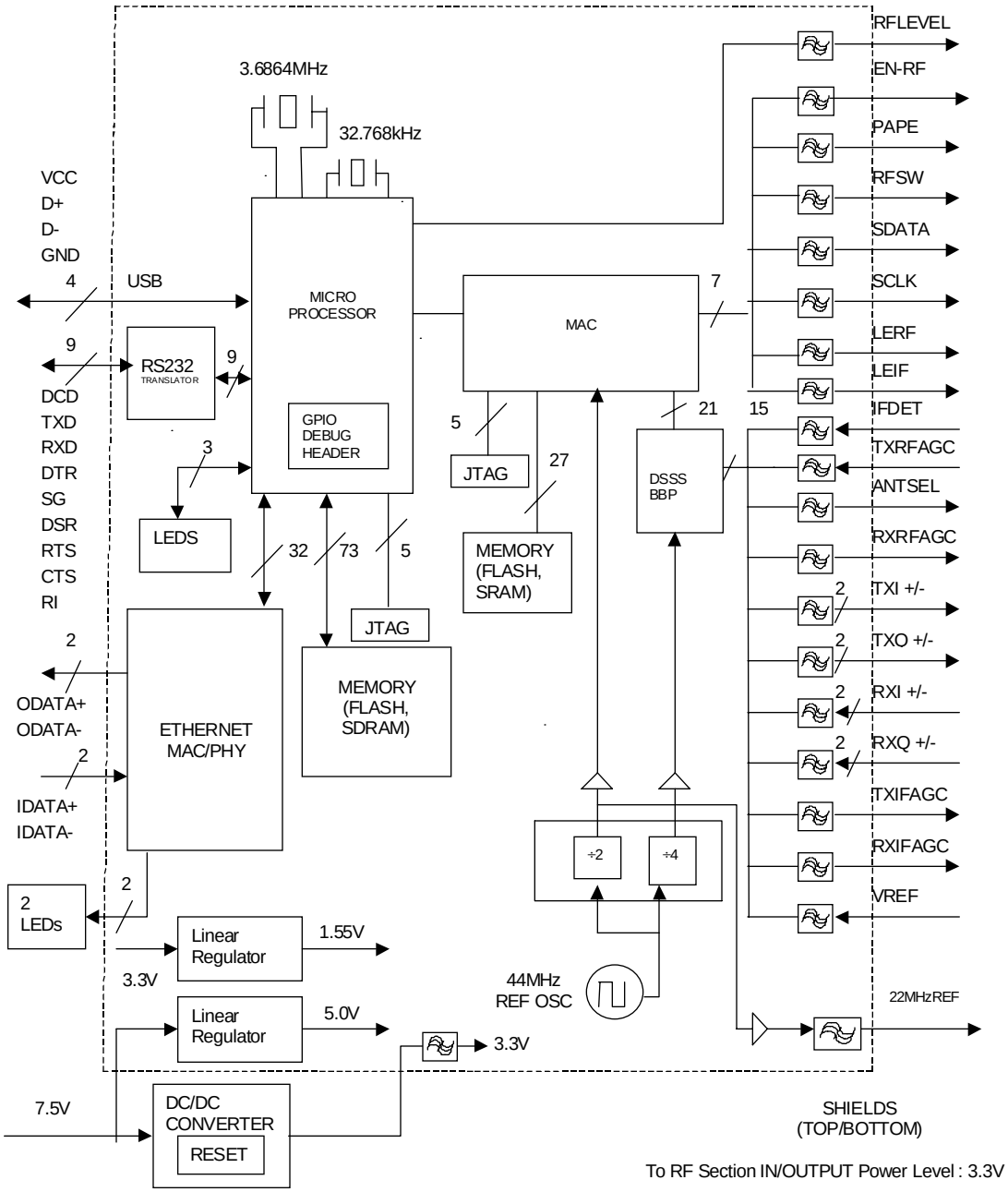

Figure 2 Digital Section Block