Operational Description

With the Model 539 Argonaut VI, Ten-Tec has created a QRP transceiver combining simplified controls and ease of operation with the excellent performance of a low first IF ham-band architecture in a compact, mobile-friendly structure. The analog portion of the radio is double conversion with IF frequencies of 9.0018 MHz and 22.5 kHz. A third conversion to zero-frequency IF is accomplished in the DSP processor.

Refer to the block diagram for the following discussion. Receive signals are routed to a T/R switch at the input of the BPF/Preselector board. This board also contains the bandpass filter selected for the band in use and a switchable 12dB receive preamplifier. On the TX/RX board, output from the preamplifier is mixed with the first Local Oscillator to 9.0018 MHz and routed to one of the three roofing filters. After selectivity roofing, IF amplification is provided by a variable gain amplifier which also develops the high-level AGC. Finally, the 9.0018 IF signal is mixed with the second LO to develop a 22.5 kHz low IF for the Signal Processing Unit (SPU). Based on a 36.096 MHz temperature-stable reference, the Oscillator board generates first and second LO's with a DDS circuit and fixed frequency division. The SPU samples the low IF at 96K samples per second and applies the resulting data to a digital signal processor. Numerical algorithms running in the digital processor accomplish additional selectivity filtering, low-level AGC, and demodulation. The resulting audio appears at the speaker and line outputs.

The PIC processor in the front panel CPU module executes firmware stored in EEPROM to perform housekeeping functions such as synthesizer programming/tuning, signal switching, and front panel display and control input. Based on the control inputs from the front panel (or remotely via the USB interface), the CPU writes display information, tunes the LOs, adjusts selectivity, and chooses both receiver detection and transmit emission modes. Transmit operation is basically the reverse of receive. Audio or CW signals are generated at zero-frequency (baseband) in the DSP, frequency-shifted to the 22.5 kHz low IF, and output to mixers on the TX/RX board for conversion to the operating frequency. The signal then travels in the reverse direction through the selected Bandpass Filter to the low-level drivers and Power Amplifier, then finally through the Lowpass Filter to the antenna.

The Argonaut VI is designed to cover the following hambands:

160M - 1.795-2.005
80M - 3.495-4.005
40M - 6.995-7.305
30M - 10.095-10.155
20M - 13.995-14.355
17M - 18.063-18.173
15M - 20.995-21.455
10M - 27.995-29.705