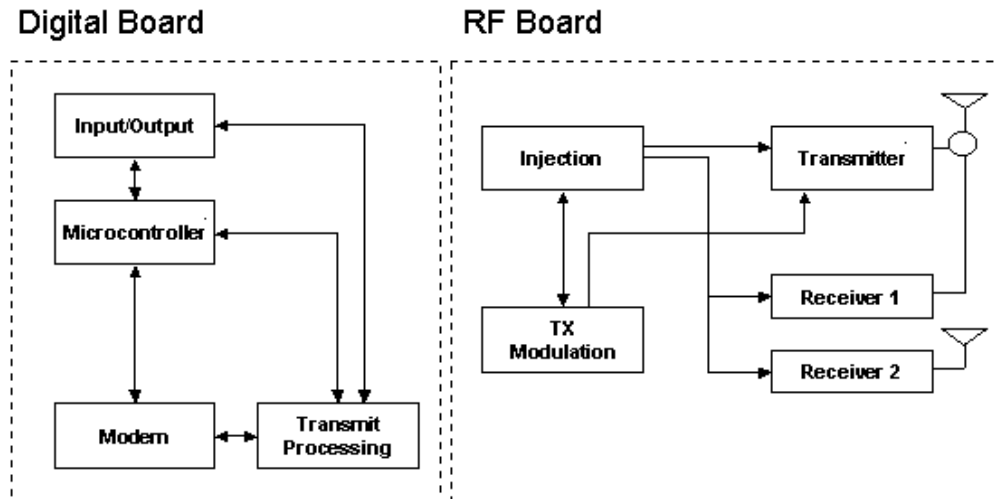




IP4 HPV Mobile Radio Operational Description

General Block Diagram



General Block Diagram Definitions



For increased data security, the modem supports the Federal Government developed Digital Encryption Standard (DES) data encryption and decryption protocols. This capability requires installation of third party, Internet Protocol (IP) compliant DES encryption and decryption software on the system.

The IP4HPV mobile radio is comprised of two (2) circuit boards, the digital board and the RF board. The digital circuit board contains the following sections:

Input/Output	Circuitry associated with the radio's DB9 data connector providing all the RS232 data and handshake functions, including the necessary level changes.
Microcontroller	Manages the operation of the radio, the modem, and determines which receiver provides a better signal from a given transmission. Also provides transmit time-out protection in the event a fault causes the radio to halt in the transmit mode.
Modem	Converts serial data into an analog audio waveform for transmission and analog audio from the receiver to serial data. Within a single chip it provides forward error detection and correction, bit interleaving for more robust data communications, and third generation collision detection and correction capabilities.
Power Supply	The power supply creates the various voltages required by the digital portion of the mobile radio.

The RF circuit board contains the following sections:

Transmit Processing	Circuitry that amplifies the analog audio signal from the modem and uses it to modulate the voltage controlled oscillator (VCO) and 10 MHz reference oscillator in the injection synthesizer section. Modulating the VCO and reference oscillator simultaneously results in a higher quality FM signal.
Injection Synthesizer	Provides programmable, ultra stable signals for the radio. Synthesizer incorporates phase lock loop technology used for both receiving and transmitting.
Injection	In the receive mode, the synthesizer provides a local oscillator signal of 45 MHz above or below the selected receive channel frequency.
Transmitter	Consists of an exciter and power amplifier module. The transmitter covers the various frequency bands in segments. A different power amplifier module is required for each segment. The transmitter circuitry includes a T/R switch switching the antenna between transmitter and receiver 1 (TX/RX1).
Receiver 1/Receiver 2	Required to support the mobile DRS; two (2) discrete receivers are tuned to the same channel and use two (2) antennas. The receivers are double-conversion superheterodyne with a first Intermediate Frequency (IF) of 45 MHz and a second IF frequency of 455 KHz. Each receiver consists of bandpass filters, an RF amplifier, a MMIC mixer, crystal filters, and a one-chip IF system. The injection synthesizer provides the first local oscillator signal. Outputs from each receiver include RSSI and analog audio for the baseband routing circuitry and modem.
Power Supply	Consists of circuitry that derives the various operating voltages for the RF portion of the mobile radio.