

### **Circuit Description:**

The Series 7 block diagram is representative of Group 1 detectors. These detectors are scanning superheterodyne receivers that are electronically configurable to operate in either a dual, or triple conversion mode. When configured as a dual conversion receiver the first IF is at 904 MHz., and the second IF is at 10.7 MHz. If the system is configured as a triple conversion receiver, the second and third IF frequencies are 904, and 10.7 MHz., respectively, the first IF frequency is selectable, and may be within two possible ranges, 4.912 to 5.1 GHz., or 3.232 to 3.276 GHz. Range selection is accomplished by an electronic switch, designated as A in the block diagram. The actual IF frequency within the selected range is determined by the second local oscillator frequency, which is controlled by a phase locked loop.

The first local oscillator is voltage controlled, and is swept over predetermined frequency spans within the range of 14.276 to 15.514 GHz. The first local oscillator frequency span, the selected IF frequency, and the mixer bias, which determines the mixer operating mode, determine the range of frequencies over which the receiver will detect signals. These operating parameters are stored in nonvolatile memory within the receiver microcontroller. The first local oscillator frequency is calibrated by marker signals generated from mix products of the first and second local oscillators. The second local oscillator is phase locked to a 4MHz. crystal controlled reference oscillator, this accurate second local oscillator frequency enables precise calibration of the first local oscillator frequency. The same markers are also used to calibrate the third local oscillator. The calibration process determines the required oscillator tuning voltages, which are stored as digital values within the system microcontroller. Digital to analog converters are used to output the required tuning voltage levels to the individual oscillators. The calibration is updated on a periodic basis during receiver operation.

Group 1 detectors operate only in the triple conversion mode, and receives the following RF frequencies:

10.475 to 10.575 GHz.

24.025 to 24.250 GHz.

33.4 to 36 GHz.