Circuit Analysis of JAGUAR700M 800MHz Receiver Block (RF Block:TG-0038LR, IF Block: TC-0135EK)

1, Receiver Circuit

The FM dual-conversion super heterodyne receiver is designed for operation in the 851-870MHz frequency range.
The Receiver has intermediate frequencies (IF) of 82.2MHz and 450KHz.
Adjacent channel selectivity is obtained by using two band pass filters, a 82.2MHz crystal filter and a 450KHz ceramic filter.
The FM-detector is Quadrature discriminator.

1-1. Receiver Front-end

A RF signal from antenna is coupled though the low pass filters, antenna switch and band pass filter FL201 to the input of low noise amplifier TR201. The output of TR201 is coupled through band pass filter FL202 to input of 1'st Mixer TR203. These band pass filter provides front End selectivity.

1-2. 1'st Mixer

The 1'st Mixer is a Transistor-Mixer (TR203), that converts a RF signal the 851-870MHz range to 82.2MHz 1'st IF frequency.
In the mixer stage, a RF signal from the Front-end RF filter is applied to the input of the Transistor-Mixer.
The 1'st Mixer is output to A/L & IF BOARD from J202.

1-3. 1'st IF

The 1'st IF that was output from J202 of RF/SYN BOARD is input to J1301 of A/L & IF BOARD.
The 82.2MHz 1'st IF output signal is coupled from the output of T201 through IF amplifier TR204 and Crystal filter FL1301 and FL1302 to IF-amplifier TR1309
The 82.2MHz 1'st IF signal is coupled to IF-amplifier TR1309 from the output and FL1302 of crystal filter FL1301 and amplifier TR204 from J1301 to IF.
The highly selective crystal filters FL201-1 and FL 201-2 provide the first portion of the receiver IF selectivity. The output of the filters is coupled through the impedance matching net work T204, C246 and R224 to 1'st IF amplifier TR205.

1-4. 2'nd Mixer, 2'nd IF filter,2'nd IF amplifier and FM detector

IF Receiver IC1303 is an one-chip IC for digital communication system. It includes 2nd Mixer, 2nd IF amplifier and Limiter amplifier. With the internal circuits of IC1303, The lst IF signal is amplified and applied to the input of 2nd Mixer. The 2nd local injection frequency 82.2MHz is applied from 2nd local amplifier TR1309 to another input of the 2nd Mixer. The 2nd Mixer converts a list IF signal 82.65MHz to 2nd IF frequency 450KHz. Then the 2nd IF signal is applied to Ceramic Filter FL1303, which provides the 450KHz selectivity. The output of the 2nd IF filter is applied through 2nd IF amplifier and Ceramic Filter FL1305 to Limiter amplifier. This IF signal is amplified and balanced outputs, RXIF+ and RXIF-, are sent to HILLARY. These two lines, one positive and the other negative, are used to cancel out any noise that might get on the line. These balance outputs is applied to the phase digitizer on HILLARY and detected.