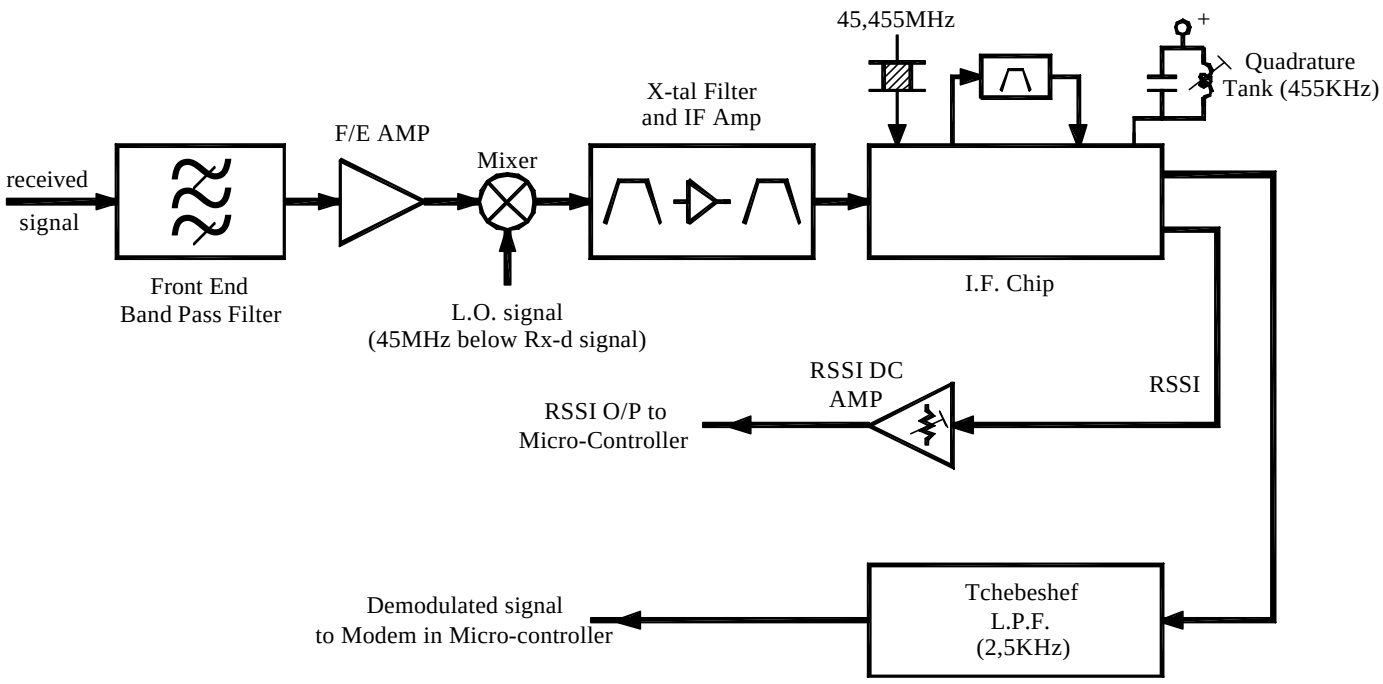
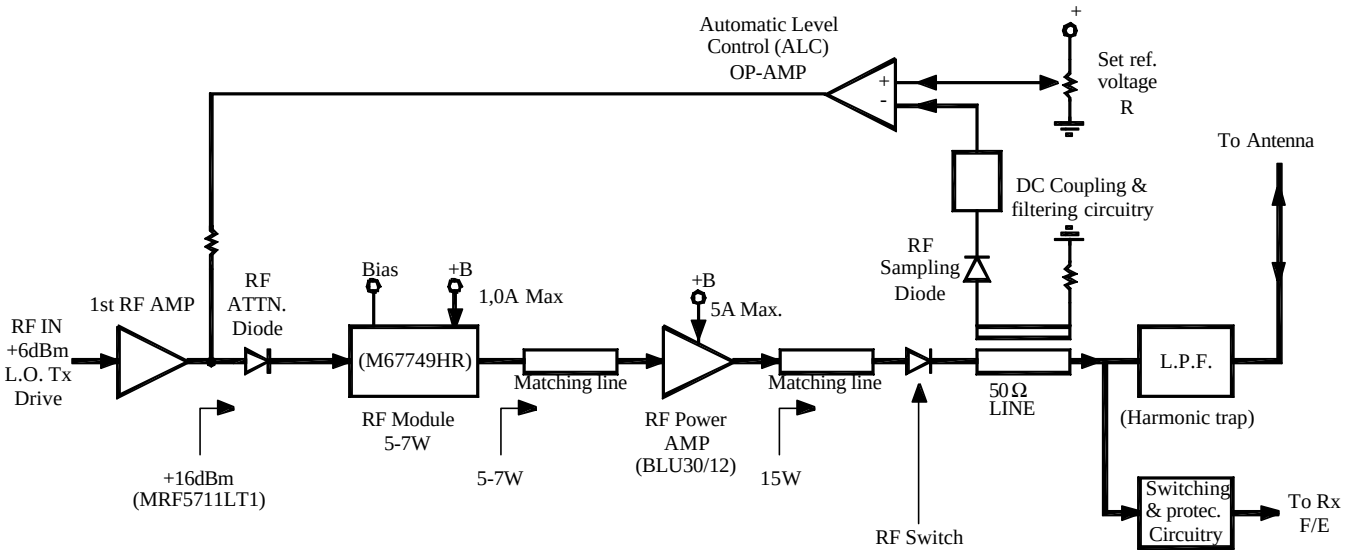
Receiver Block Diagram



Receiver Block Diagram Description

The received signal which comes via the L.P.F. in the Transmitter (Tx) goes via the Front End (F/E) Band pass filter to the RF F/E Amplifier. The total gain of the F/E filter and the F/E Amplifier is in the order of 12dB. The Amplifier's signal is fed to the Mixer which is also fed the L.O. signal, the Mixer provides some 15dB gain as well as the difference between the incoming signal and the L.O. signal which is 45MHz. The x-tal Filter and IF amplifier filter the 45MHz signal and feed it to the IF chip which together with the quadrature tank circuit demodulate (recover) the audio tone signal. The difference of 455KHz is achieved by mixing inside the IF chip between the 45MHz incoming signal and the 45,455MHz x-tal oscillator which is also part of the IF chip.
The demodulated tone signals pass through a Tchebeshef L.P.F circuit and is fed into a Modem circuit which is part of the Micro-controller.
The I.F. chip produces also an RSSI (DC) signal which is also fed to the Micro-controller.

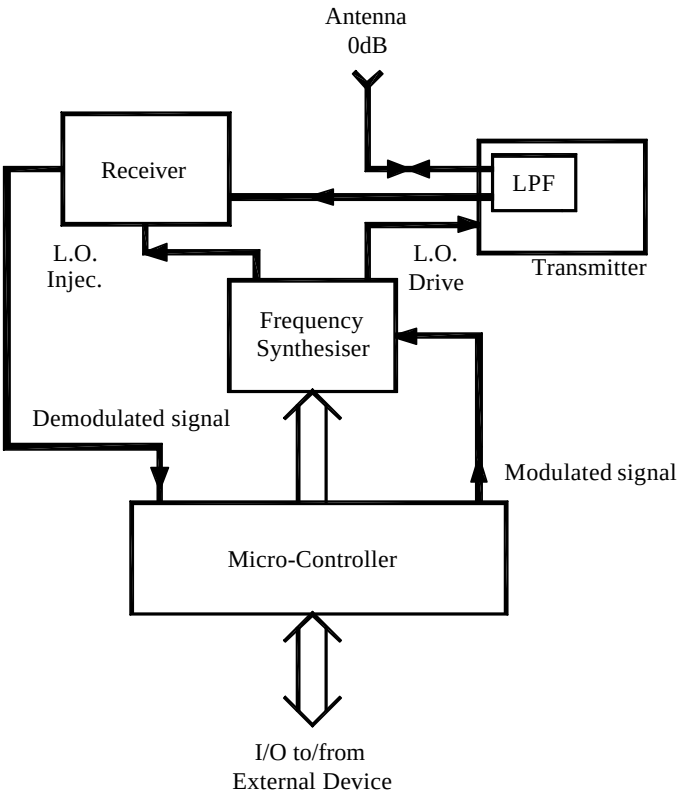
Transmitter Block Diagram



Transmitter Block Diagram Description

The transmitter consists of 3 RF amplifiers. The 1st RF Amplifier amplifies the +6dBm incoming drive signal to a level of approx. +16dBm. The amplified signal passes through the RF Attenuator diode and feeds the RF Module (type M67749HR). This in turn produces a level of 5 to 7W of RF output. This signal is fed to the RF Power Amplifier via a matching line (Micro-strip). The RF power amplifier, which is capable of transmitting up to 20W, amplifies the signal to the desired level. As the radio is specified as a 15watts device, it is set so at the factory by the set ref. voltage/level potentiometer (top right-hand side of diagram). The current at the 50Ω line is sampled (sensed) by the RF sampling diode which produces a DC voltage relative to the O/P power this DC is compared to the Set Ref. Voltage by the ALC Opamp which in turn biases the RF attenuator diode, thus setting the O/P to 15W. The received signal flows via the LPF (Harmonic Trap) to the switching and protection circuitry and the fed to the Rx F/E

General Block Diagram



General Description of Block Diagram

The KLT Alarm radio is controlled by its Micro-Controller.
The radio could work in one of the following modes:

a) On a fixed channel.

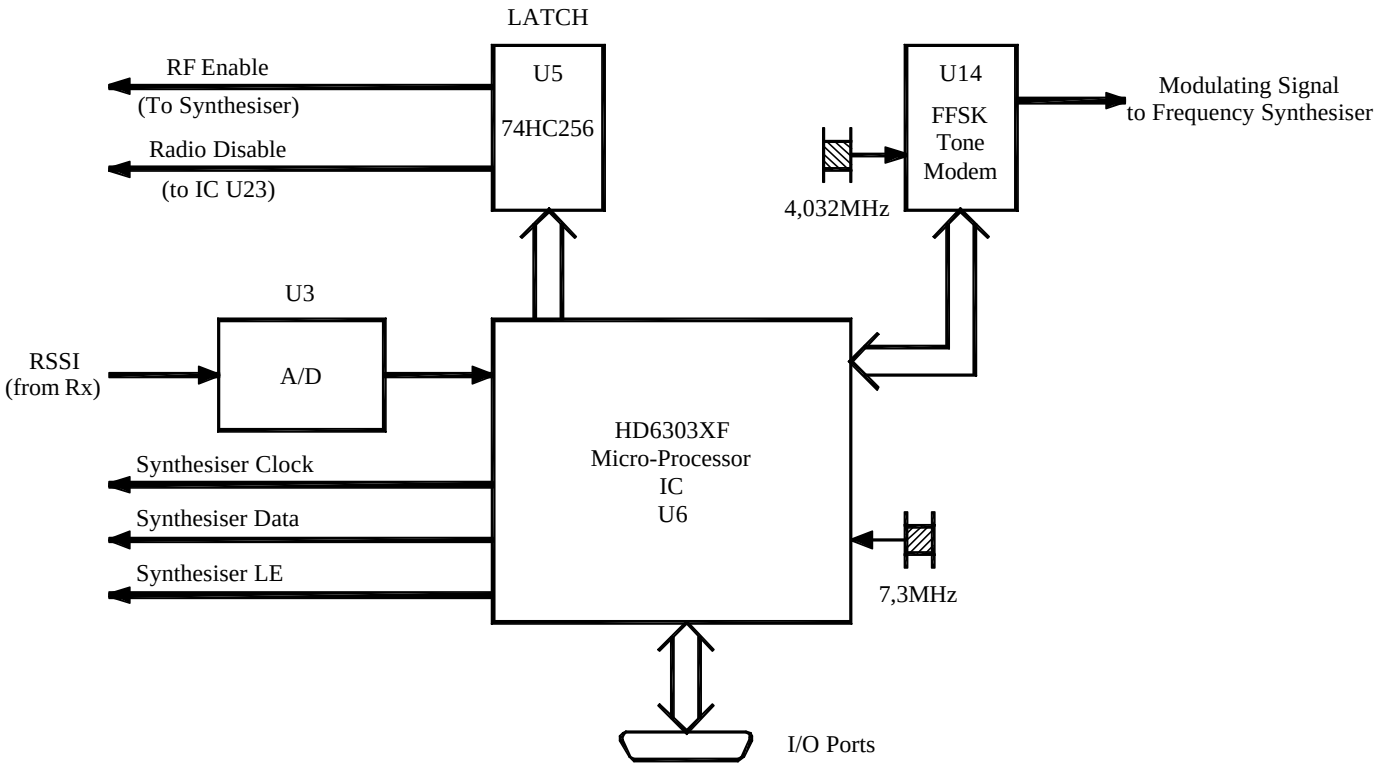
b) On a group of channels, choosing the strongest one (by using its RSSI facility) and locking on it.

Depending on the way it is programmed the radio can operate on either mode a or b but not both.
The Micro-controller may be connected to an external device to receive a command or to deliver a command to that external device. The commands are DC signals of either high (5V) or low (0V) voltages. The same I/O port serves also for programming the KLT. The Freq. Synthesizer receives a command from the Micro-Controller as to what frequencies (for L.O. Injection and Tx Drive) it should produce.
The Micro-Controller circuitry also produces the Modulating (tone) signal which is responsible for the modulation of the Tx VCO. This modulation is of Analogue Frequency type. The modulating signal can be either 1200Hz tone or 1800Hz. No other tone frequency is used. The frequency deviation is always fixed at 1,5KHz ± 1dB. In addition the Micro-controller receives a demodulated tone of the above freq. (i.e. 1200Hz or 1800Hz) and outputs a command at the I/O port.

The transmitter is driven by the L.O. Tx drive signal which is of the order of 6-8dBm. The Tx produces a signal of 15W maximum, this signal passes through the low pass filter (LPF) which acts as a harmonic suppressor (trap). Thus delivering a "clean" signal with harmonic content of less than –70dBC.

The receiver signal passes through the Tx LPF and arrives at the its Front End. The receiver outputs the demodulated signal which goes to the Micro-Controller.

Micro-Controller Block Diagram

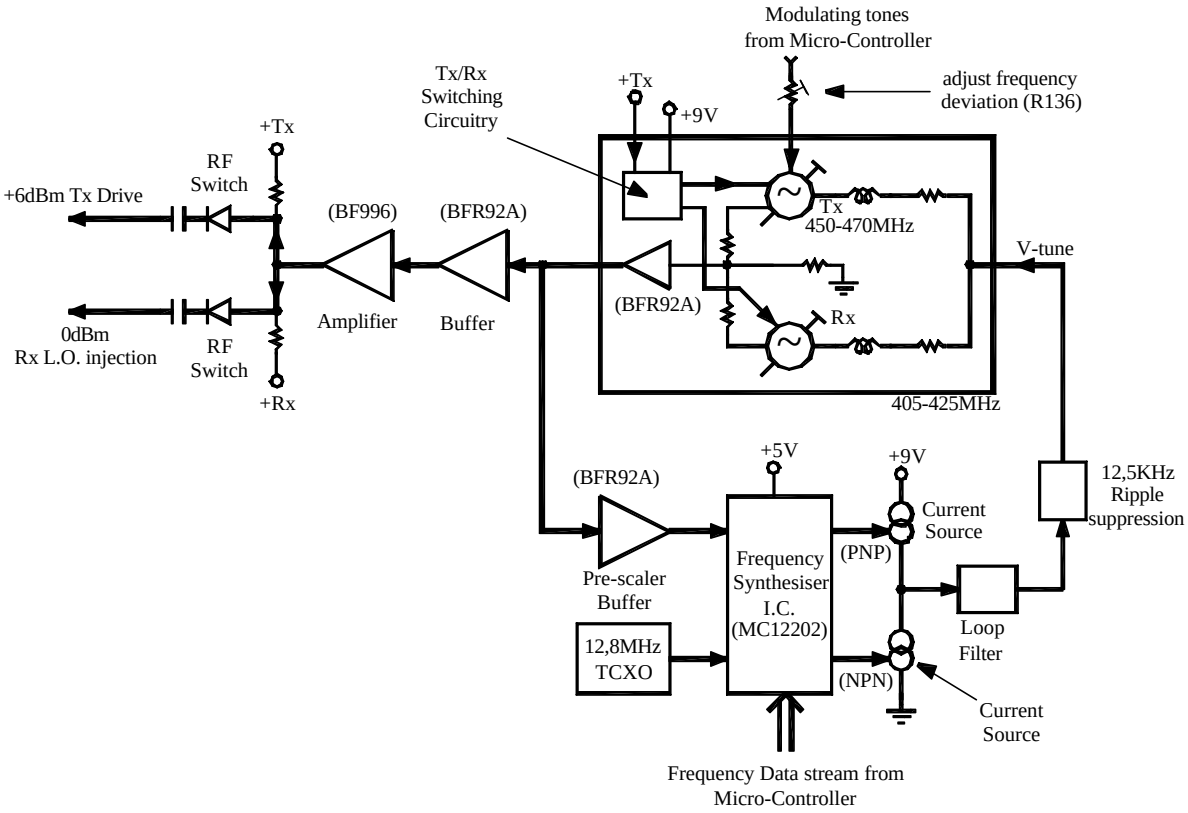


Micro-Controller Block Diagram Description

The Micro-controller part of the KLT includes the above shown three main blocks the Micro-processor IC HD6303XF (U6) the FFSK Tone Modem (U4) and the LATCH IC (U5).

The Micro-Processor IC receives the commands as to when to transmit an alarm signal and to what frequency the synthesiser must be locked on. The Processor can also raise an alarm DC level at the I/O port depending on the mode that the programming was done for.
The Micro-Processor also receives the RSSI (DC) signal via an A/D device (U3) this allows it to choose a better off-the-air signal if available. The FFSK Tone Modem outputs the tones-modulating signal-to directly (analog) modulate the Tx VCO in Synthesiser.
In order to save energy the radio can be “put to sleep” by using the Radio Disable (DC) command which is sent to IC U23 via the LATCH U5 in the Micro-Controller part of the KLT.

Synthesiser Block Diagram



Synthesiser Block Diagram Description

The function of the frequency Synthesiser is to generate the Local Oscillator (L.O.) injection for the Rx (approx. 0dBm) and the Tx Drive (approx. +6dBm) signals.

The frequency Synthesiser employs two VCO's one for the Tx and one for the Rx. The Tx VCO range of frequencies is 450-470MHz whereas the Rx VCO range is 405-425MHz. The frequency Synthesiser IC (MC12202 type) receives two signals the VCO's through the Pre-scaler Buffer and the Temperature Compensated x-tal oscillator (TCXO at 12,8MHz). The TCXO which operates over temperature range of -30°C to +60°C with 2,5ppm freq. variation keeps therefore the Rx and Tx drive signals within ±2,5ppm of the desired frequencies.

The Frequency Synthesiser IC drives the charge-pump circuitry which is made up of two current sources and the loop is closed via the loop Filter and ripple suppression circuitry.

Frequency Modulation is achieved by directly modulating the Tx VCO varactor diode. The amount of frequency deviation is adjusted by a specially provided potentiometer R136. This level is always set to 1,5KHz ±1dB.