TK-880
Tuning procedure

Before attempting to tune the transceiver, connect the unit to a suitable power supply. Whenever the transmitter tuned, unit must be connected to a suitable dummy load, unless the instruction specify otherwise. The speaker output connector must be terminated with a 4 Ohm dummy load at any time during the tuning and connected to an AC voltmeter and an audio distortion meter or a SINAD measurement at all the time during the tuning.

Power sw on during "A" push to test mode [1-1] then push "S" to tuning mode.
This *** mean using 3 numbers from CHANNEL NOB.

1 Transmitter section

1.1 Frequency adjustment
Set test mode CH1,Push "S" to enter tuning mode, Select [FREQ***], then PTT on.
470.100MHz±50Hz.

1.2 TX High power adjustment
Set test mode CH1,Push "S" to enter tuning mode, Select [Hpow***], Push "A" to 5 points.
a) Select [L Hpow***] then PTT on 3.8W±0.1W.
b) Push "C" to select [L2 Hpow***] then PTT on, push "B" after tuned.
c) Push "C" to select [C Hpow ***] then PTT on, push "B" after tuned.
d) Push "C" to select [H2Hpow***] then PTT on, push "B" after tuned.
e) Push "C" to select [H Hpow***] then PTT on, push "S" to return test mode.
The TX current is 2.2A or less.

1.3 TX Low power adjustment
Set test mode CH1,Push "S" to enter tuning mode, Select L pow, Push "A" to 5 points.
a) Select [L Lpow***] then PTT on 0.8W±0.1W.
b) Push "C" to select [L2 Lpow***] then PTT on, push "B" after tuned.
c) Push "C" to select [C Lpow***] then PTT on, push "B" after tuned.
d) Push "C" to select [H2 Lpow***] then PTT on, push "B" after tuned.
e) Push "C" to select [H Lpow***] then PTT on, push "S" to return test mode.
The TX current is 1.0A or less.

1.4 DQT BAL adjustment
Set test mode CH1,Push "S" to enter tuning mode, Select [BAL***], Push "A" to enter 3 Points,
a) Select [LBAL***] adjustments mode then PTT on Push "B" after tuned .
b) Push "C" to select [C BAL***] then PTT on push "B" after tuned.
c) Push "C" to select [H BAL***] then PTT on push "B" after tuned.
Push "A" to return to tuning mode.
d) Push "Lamp" to narrow adjustment mode [n BAL***],then PTT on push "B" after tuned.
Push "Lamp" to return tuning mode.
Make the de-modulation waves into square waves.

1.5 Max deviation adjustment
Set test mode CH1, push "S" to enter tuning mode, Push "A" to 3 points adjustment mode.
a) Select [L MAX***] then PTT on push "B" after tuned.
b) push "C" to select [C MAX***] then PTT on push "B" after tuned.
c) push "C" to select [H MAX***] then PTT on push "B" after tuned
Push "A" to return tuning mode.
Deviation ±3.80KHz(Wide),±1.75KHz(Narrow)
Push " Lamp" to narrow adjustment mode [n MAX***] then PTT on push "Lamp" to return

tuning mode.

1.6 QT Deviation adjustment
a) Push "S" to enter tuning mode select [FQT***] push "A" to adjustment mode.
Select [L FQT***] then PTT on push "B" after tuned.
Deviation ±0.75KHz.(±0.05KHz)
b) same [C FQT***]
c) same [H FQT***]
d) same [n FQT***]

1.7 DQT Deviation adjuastment
a) Same as QT. Select [FDQT***]
b) same as [L FDQT***]
c) same as [C FDQT***]
d) same as [H FDQT***]
e) same as [n FDQT***]
Deviation ±0.75KHz(±0.05KHz)

1.8 LTR Deviation adjustment
a) Select [FLTR***]
b) Select [L FLTR***]
c) Select [C FLTR***]
d) Select [H FLTR***]
e) Select [n FLTR***]
Deviation ±1.0KHz(±0.05KHz)(Wide) ±0.75KHz(±0.05KHz)(Narrow)

1.9 DTMF Deviation adjustment
a) Select [DTMF***] Deviation ±2.5KHz(±0.05KHz)(Wide)
b) Select [n DTMF***] Deviation ±1.25KHz(±0.05KHz)(Narrow)

1.10 MSK Deviation adjustment
a) Select [FMSK***] Deviation±2.5KHz(±0.05KHz)(Wide)
b) Select [n MSK***] Deviation±1.25KHz(±0.05KHz)(Narrow)

2 Receiver section

2.1 Sensitivity
a) Select [SENS***] 12dB SINAD or more.

2.2 Tight squelch adjustment
a) Select [SQL***] Adjust to point of opening squelch.(Wide)
b) Select [n SQL***] Adjust to point of opening squelch.(Narrow)

The basic operation of the synthesizer remains the same.

1.2 Receiver Circuit

The receiver is a double conversion super-heterodyne, designed to operate in the frequency range of 450MHz to 490MHz (ALH24593110) and 485MHz to 512MHz (ALH24593120) and 400MHz to 430MHz (ALH24593130).

The receiver RF and IF sections consist of an RF amplifier (Q201), a first mixer (IC200), a first IF amplifier (Q203) and an FM IF IC (IC11).

An incoming RF signal from the antenna is fed into a band-pass filter which consists of L203 and variable capacitors (D203 and D204) after going through an antenna switch in the transmitter power amplifier section. The D203 and D204 will be electrically tuned by TV voltage for the best BPF response. This RF signal is then amplified by an RF amplifier (Q201) and filtered again by band-pass filters (L207, D205 and D206). After amplification and filtering, the signal is applied to the first mixer (IC200) for mixing with the first local oscillator signal generated by the frequency synthesizer.

The heterodyning action of the first mixer produces a 44.850MHz intermediate frequency (first IF), which is applied into two monolithic crystal filters. The signal out of the crystal filters is amplified by a 2nd IF amplifier (Q15) and is sent to the FM IF IC (IC11).

The FM IF IC (IC11) contains a second mixer, a second local oscillator, second IF amplifiers, a second IF filter, an FM detector and RSSI output. The signal applied to IC11 is mixed with 44.395MHz, which produces a 455kHz second IF signal. The signal obtained at the second mixer is filtered by a 455kHz ceramic filter (CF1 for wide or CF2 for narrow) and it is amplified by limiting amplifiers. The recovered audio signal from the incoming signal is obtained from quadrature type FM demodulator. This recovered audio signal is then sent to the audio amplifier circuit and to the noise actuated squelch circuit.

The recovered audio signal obtained at IC11 is de-emphasized and further amplified for driving a loud speaker.

1.3 Transmitter Circuit

The transmitter circuit consists of a microphone amplifier, an RF power amplifier driver (Q202, Q204 and Q205), an RF power amplifier module (IC400), an antenna switching network, a spurious and harmonics low-pass filter, and an automatic power control (APC).

The audio signal, originating at the microphone, is applied to the microphone amplifier (IC711, IC504). The audio signal is amplified, pre-emphasized (IC504), voltage limited and low-pass filtered. The signal is then switched by transistors to the TX

2. LCD (Liquid Crystal Display) Assembly

The display receives the data from the CPU (IC511) in a control circuit and the data is displayed as a visual indication to the operator.

TK-880
Circuit Descriptions

The Kenwood model TK-880 a an all solid-state frequency synthesized UHF/FM transceiver designed for operation in the frequency range of 450MHz to 490MHz (ALH24593110), 485MHz to 512MHz (ALH24593120), and 400MHz to 430MHz (ALH24593130).
The unit consists of a TX-RX unit and LCD assembly and its transmitter is rated for 25W output power.

1. TX-RX Unit

The TX-RX unit consists of a Voltage Control Oscillator (VCO) sub-unit, a receiver section, a transmitter section, a control section and a power supply section.

1.1 PLL Frequency Synthesizer

The transmit signal and the receiver first L. O. signal are generated by the PLL digital frequency synthesizer. The frequency synthesizer consists of a transmitter voltage controlled oscillator (TX VCO, Q103), a receiver voltage controlled oscillator (RX VCO, Q101), a buffer amplifier (Q106), an RF amplifier (Q300), a low-pass filter, a PLL IC (IC300) and TX VCO/RX VCO switches (Q104 and Q105).

The signal from Q300 passes through the low-pass filter and is applied to IC300 which is PLL frequency synthesizer with VCXO ; X1. The VCXO of which the frequency stability is within 2.5ppm (temperature range of –30 to +60℃)generates 16.8MHz. The PLL–IC consists of three modulus prescaler, fractional divider, reference digital phase comparator with charge pump output.
This PLL–IC is Fractional-N type synthesizer and performs is 40 or 50kHz reference signal which is eighth of the channel step (5 or 6.25kHz). The input signal from the pins 5 and 8 of the PLL–IC is divided down to the 40 or 50kHz and compared at digital phase comparator.
The pulsed output signal of the digital phase comparator is applied to the charge pump and transformed into DC signal. The DC signal from the pin 14 of the PLL–IC passes through the active low–pass filter (loop filter), is applied to the VCO and controls to keep the frequency of the VCO. The serial data (DT,CP,EP) from the CPU IC511 is input to the PLL-IC. And PLL lock condition is always monitored by the pin 31 (LD) of IC511.

The transmitter modulation signals (processed Mic. audio and sub-audible signaling) are applied to the TX VCO for frequency modulation.

In the receive mode, the VCO is substituted with Q104 (RX VCO) and it generates the receiver first local oscillator signal according to the data sent from the control unit.