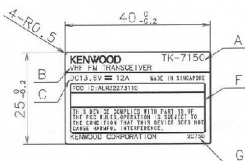


1	2	3	4
TOLERANCE (C)	SYMBOL	REVISION NO.	CODE
6 ± 0.15	$\Delta \times -$	-	-
6 $\sim 30 \pm 0.20$			
30 $\sim 80 \pm 0.30$			
80 $\sim 250 \pm 0.40$			
250 $\sim 500 \pm 0.55$			
			2000-



F部ハ・ターン詳細
DETAIL FOR F

注記

NOTES:

- ・ 印刷色/PRINTING COLOR: BLACK
印刷公差/PRINTING TOLERANCE: $\pm 0.5\text{mm}$
- ・ フィルムを用いて印刷を行なう。
MUST BE PRINTED WITH FILM.
- ・ フィルムはケンウッドが供給する。
FILM TO BE SUPPLIED BY KENWOOD.
- ・ 納入形態は、10枚/シートである。
PER SHEET: 10PCS
- ・ 提出承認サンプル数/NUMBER OF APPROVAL SAMPLES: 3 PCS
- ・ その他詳細は承認サンプルを参照のこと。
SEE APPROVED SAMPLE FOR OTHER DETAILS.

KEYS

1	B72-2075-04	TK-7150	VHF FM TRANSCEIVER	12A	ALH32273110	-	F1	20750	-	Y51-4910-10
NO.	PART NUMBER	A	B	C	D	E	F	G	H	MODEL
-	-	-	-	アルミ蒸着板 10.1 銀ツヤクシ AL EVAPORATION PLATE 10.1 FROSTED SILVER		シル印刷、強粘着剤 SEAL PRINTING, STRONG TACKIFIER		-	-	-
NO.	PART NUMBER	NOTE		MATERIAL		FINISH		MODEL		QTY.
SCALE NT: S		DESIGNED		CHECKED		APPROVED		PART NAME		-
UNIT : mm		Y. TATSUHIRA		KIYOSHI NAITO		T. ARAI		キシメイハン MODEL NAME PLATE		-
		DATE		2002-04-26		DRAWING NUMBER PART NO.		SHEET NO. REL.		-
JIS 78310-84		KENWOOD		KENWOOD CORPORATION		B72-2075-04		1/1 01		S

DRWN. DATE 2001-12-13

#

TK-7150 Specifications

1. General

Frequency Range	136 to 174 MHz (ALH32273110)
Number of Channel	255
Channel Spacing	30kHz, 25 kHz (Wide) / 15kHz, 12.5kHz
Type of Emission	16K0F3E, 20K0F1D (Wide) 11K0F3E, 11K2F1D (Narrow)
Power Supply Voltage	13.6V DC Nominal
Antenna Impedance	50 Ω Nominal
Operating Temperature	-30 °C to +60 °C
Dimension	W.180 mm $\times$ D.160 mm H. 50mm

2. Receiver

Conversion Type	Double Conversion Superheterodyne
Intermediate Frequencies	1st 44.85 MHz 2nd 455 kHz
Sensitivity (12dB SINAD)	0.35 μ V (Wide) / 0.446 μ V (Narrow)
Spurious & Image Rejections	85 dB Minimum
Intermodulation Rejection	78 dB Min. (Wide) / 70 dB Min. (Narrow)
Adjacent Channel Rejection	83 dB Min. (Wide) / 77 dB Min. (Narrow)
Hum and Noise	45 dB Min. (Wide) / 40 dB Min. (Narrow)
Audio Output Power	4.0 W Minimum (5% distortion / 8 Ω)
Frequency Stability	$\pm$ 2.5 ppm
Current Consumption	0.8 A Std-by 2.2 A Operating

3. Transmitter

Output Power	15to50 W(Adjustable)
Maximum Modulation	$\pm$ 5.0 kHz (Wide) / $\pm$ 2.5 kHz (Narrow)
FM Hum and Noise	50dB Min. (Wide) / 45 dB Min. (Narrow)
Audio Distortion	3% Maximum (Wide) / 5% Maximum (Narrow)
Mic Sensitivity	5 mV Nominal
Spurious and Harmonics Attenuation	75 dB Minimum
Frequency Stability	$\pm$ 2.5 ppm
Current Consumption	Less than 13A

T K - 7 1 5 0 (K) F R E Q U E N C Y L I S T

Display	RX Frequency [MHz]	TX Frequency [MHz]	Power	W / N
136.05 / 136WH	1 3 6 . 0 5 0	1 3 6 . 0 0 0	High	Wide
155.05 / 155WH	1 5 5 . 0 5 0	1 5 5 . 0 0 0	High	Wide
173.95 / 174WH	1 7 3 . 9 5 0	1 7 4 . 0 0 0	High	Wide
136.05 / 136NH	1 3 6 . 0 5 0	1 3 6 . 0 0 0	High	Narrow
155.05 / 155NH	1 5 5 . 0 5 0	1 5 5 . 0 0 0	High	Narrow
173.95 / 174NH	1 7 3 . 9 5 0	1 7 4 . 0 0 0	High	Narrow
136.05 / 136WL	1 3 6 . 0 5 0	1 3 6 . 0 0 0	Low	Wide
155.05 / 155WL	1 5 5 . 0 5 0	1 5 5 . 0 0 0	Low	Wide
173.95 / 174WL	1 7 3 . 9 5 0	1 7 4 . 0 0 0	Low	Wide
136.05 / 136LN	1 3 6 . 0 5 0	1 3 6 . 0 0 0	Low	Narrow
155.05 / 155LN	1 5 5 . 0 5 0	1 5 5 . 0 0 0	Low	Narrow
173.95 / 174LN	1 7 3 . 9 5 0	1 7 4 . 0 0 0	Low	Narrow

TK-7150 Circuit Description

The Kenwood model TK-7150 is an all solid-state frequency synthesized VHF/FM transceiver designed for operation in the frequency range of 136 MHz to 174 MHz.

This model has maximum 128 channels.

The unit consists of a TX-RX unit and Display unit and its transmitter is rated for 50 W output power.

1. TX-RX Unit

The TX-RX unit consists of phase-locked loop (PLL) frequency synthesizer, receiver, transmitter, and control circuit.

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: Q507), a receiver voltage controlled oscillator (RX VCO: Q509), a buffer amplifier (Q513 and Q515), an RF amplifier (Q516), a low-pass filter (Q501, Q503 and Q504), a PLL IC (IC501), and TX VCO / RX VCO switches (Q510 and Q512).

In the transmit signal mode, an operating frequency programming data is sent to IC501, from the CPU (IC701), to set the programmable counter within IC501. Q512 is turned on to activate the TX VCO and the output signal of the TX VCO is amplified by Q513 and Q516.

The signal is then divided down in frequency, at the programmable counter in IC501, to 5.0kHz or 6.25kHz, 7.5kHz which is compared in phase with a 5.0kHz or 6.25kHz, 7.5kHz reference signal, derived from 16.8MHz VCXO (X501) and a 1/3360 or a 1/2688, 1/2240 fixed counter in IC501, at the phase comparator in IC501. The VCXO operates at 16.8MHz and its frequency stability is maintained within 2.5ppm (temperature range of -30 to +60 degrees).

The phase comparator output signal is fed into a low-pass filter (Q501, Q503 and Q504) before being applied to the TX VCO as a frequency control voltage. If an unlock condition occurs in the phase locked loop, this condition is detected by Q518 and Q519. This cause the transmitter 8V supply cut off, resulting in the prevention of an unauthorized transmission.

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 Q509 (RX VCO) and it generates the receiver first local oscillator signal according to the data sent from the CPU (IC701).

The basic operation of the synthesizer remains the same.

1.2 Receiver Circuit

The receiver is double conversion super-heterodyne, designed to operate in the frequency range of 136MHz to 174MHz.

The receiver circuit consists of front-end circuit, First Mixer, IF amplifier circuit, audio amplifier circuit, and squelch circuit.

The front-end circuit consists of former BPF(D209), RF amplifier Q213, and latter BPF (D208,207). The BPF covers frequency ranges 136 to 174MHz. The latter BPF(D208,207) attenuates the unwanted signals, and sends only the necessary signal to the first mixer.

The signal from the BPF is heterodyned with the first local oscillator signal from the PLL frequency synthesizer circuit at the first mixer DBM (Q209,210,211,212) to become a 44.85MHz first intermediate frequency (IF) signal. The first IF signal is fed through two monolithic crystal filters (XF201: Wide, XF202: Narrow) to further remove spurious signals.

The first IF signal is amplified by Q207 and Q206, and then enters IC201 (FM system IC). The signal is heterodyned again with a second local oscillator signal(44.395MHz) with in IC201 to become a 455kHz second IF signal. The second IF signal is fed through a 455kHz ceramic filters (CF201,203: Wide, CF202,204: Narrow) to further eliminate unwanted signal, and the quadrature detection circuit FM-detects the signal to produce a base-band signal and output it from pin 9.

The recovered audio signal obtained from IC201 is amplified and anti-aliasing filtered by IC712(A/2), inputted to the AINR terminal of CODEC IC (IC713), and audio processed by DSP (IC710).

The processed audio signal from AOUTR terminal of IC713 is amplified and filtered by IC716 (A/2) to a sufficient level. The audio signal goes to an electronic volume (IC718), to the input of multiplexer IC (IC717), and is amplified to drive a loudspeaker by an audio power amplifier (IC720).

The 12W audio output can be provided to external 4 ohms speaker through the 6-pin ACC connector “ES1,ES2” on the rear panel.

The output signal from IC201 enters FM IC again, then passed through a band-pass filter.

The noise component output from IC201 is amplified by Q204 and rectified by D202 to produce a DC Voltage corresponding to the noise level. The DC voltage is sent to the analog port of the CPU (IC701). And IC201 outputs a DC voltage(RSSI) corresponding to the input of the IF amplifier.

1.3 Transmitter Circuit

The transmitter circuit consists of Microphone circuit, Modulation level adjustment circuit, Driver and Final power amplifier circuit, and Automatic power control circuit.

The signal from the microphone is passed through AGC circuit (Q707, Q708 and D711, D712 and IC714 A/2) so that it dose not saturates. The AGC is operated by controlling the + and - side levels of amplitude using the current obtained by positive and negative detection of the amplified audio signal. The audio signal is amplified by IC712 B/2, inputted to the AINL terminal of CODEC IC (IC713), and audio processed by DSP (IC710). The processed audio signal from the AOUTL terminal of IC713 is filtered by IC716 (B/2), and amplified by the summing amplifier IC719 (B/2). The output of the summing amplifier IC719 (B/2) is passed to an electronic volume (IC718) for maximum deviation adjustment before being applied to a varactor diode in the voltage controlled oscillator (VCO).

The transmit signal is generated by the TX VCO, and amplified by Q515, and sent to Driver and Final power amplifier circuit. This amplified signal is amplified by Driver circuit consists of Q1, Q2, and Q4. And this signal is passed to the FINAL stage. The RF power amplifier consists of MOS FET transistor (Q5).

This signal is routed to the antenna connector after going through the antenna switching network and the low-pass filter. This filter has a minimum attenuation of 75dB at the second harmonic

frequency.

The automatic power control (APC) circuit stabilizes the transmitter output power at a pre-determined level. The forward /reflected power detector circuits detects RF power to DC voltage, and consists of RF detector D5, D6 and DC amplifier IC2 (A/2). The voltage comparator (IC2 B/2) compares the voltage obtained by the above detected voltage with a reference voltage, set using the CPU (IC701) and IC718, IC715 (A/2). An APC voltage proportional to the difference between the sensed voltage and the reference voltage appears at the output of IC2. This output voltage controls the gate voltage for the drive amplifier Q4 and final amplifier Q5, which keeps the transmitter output power constant.

1.4 Control Circuit

The control circuit mainly consists of CPU, memory circuit, DSP circuit, and power supply circuit.

The CPU (IC701) controls the flash ROM, the DSP, the receiver circuit, the transmitter circuit, the control circuit, and the display circuit and transfers data to or from an external device.

IC705 has a flash ROM with a capacity of 4M bits that contains the control program for the CPU, the signal processing program for DSP and data such as channels and operating features. This program can be easily written from an external devices. Data such as the operating status are programmed into the EEPROM (IC704).

The DSP circuit filters transmit/receive audio signal and encode/decodes signaling (QT, DQT, MSK,

DTMF, 2TONE, LTR ID). This circuit consists of IC710, IC706, IC707, IC708, IC709, IC713.

The receive audio signal is converted from analog to digital by IC713 with a sampling frequency of 19.2kHz. The digitized audio signal is sent to DSP IC710 to process the signaling signal and audio signal. The processed digital audio signal is fed to CODEC IC713, converted from digital to analog, and the analog signal is output from pin 16(AOUTR).

The transmit audio signal coming from IC714(A/2) is amplified by IC712(B/2), fed to pin 3 (AINL) of CODEC IC713, and converted from analog to digital at a sampling frequency of 19.2kHz .

The digitized transmit audio signal is AGC-processed , pre-emphasized and filtered at 300Hz to 3kHz by DSP IC710, and the resulting signal is fed back to CODEC IC713, and converted from digital to analog, and the analog signal is output from pin 15 (AOUTL).

IC706,IC707,IC708 and IC709 are interface IC between the CPU operated at 5.0V and the DSP operated at 3.3V.

2. Display Unit

The display unit consists of CPU (IC904), LCD assembly, LED, and other components.

Channels are changed by the rotary encoder (S1). The up/down pulses from the rotary encoder enter the CPU (IC904), and converted to a serial data signal, and are sent to the CPU (IC701) in TX-RX unit. The on/off signals of keys other than the power switch, and the PTT and HOOK signals, are converted to serial data and sent to the CPU (IC701) in TX-RX unit.

Data is displayed on the 12 digits and 3 digits dot matrix alphanumeric display.

TK-7150(K) Tuning Procedure

1 Tuning Procedure

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

Adjusting Mode

Press the Power button while holding the leftmost button.
Next press the 3rd button on the left.

Adjust level by CH SW.
Then press the enter button (the rightmost button)
(Press the 2nd button on the right when change wide/narrow.)

2 Tuning Items

Frequency Tune
Frequency Tune for 2.5kHz Step at Low frequency
Frequency Tune for 2.5kHz Step at High frequency
RF High Power
RF Low Power
Max Deviation (Wide/Narrow)
DQT Balance (Wide/Narrow)
QT Fine Deviation (Wide/Narrow)
DQT Fine Deviation (Wide/Narrow)
LTR Fine Deviation (Wide/Narrow)
DTMF Fine Deviation (Wide/Narrow)
MSK Fine Deviation (Wide/Narrow)
Tone Fine Deviation (Wide/Narrow)
Sensitivity (Wide)
Squelch(Tight) (Wide/Narrow)
Squelch(Open) (Wide/Narrow)

3 Tuning Frequencies

Low	RX : 136.05000 ,	TX : 136.00000
Low'	RX : 145.55000,	TX : 145.50000
Center	RX : 155.05000,	TX : 155.00000
High'	RX : 164.55000,	TX : 164.50000
High	RX : 173.95000,	TX : 174.00000

Adjustment points

1point : Use Center frequency

3points : Use Low, Center and High frequencies

5points : Use Low, Low', Center, High' and High frequencies

4 Transceiver tuning

4-1 VCO Alignment

4-1-1 Connect a voltmeter to CV

4-1-2 Set the frequency High

4-1-3 Adjust the voltage $8.0 \pm 0.2V$ (TX:TC501, RX:TC502)

4-2 Transmitter tuning

4-2-1 Select the tuning item “Frequency Tune”, transmit the radio,
then adjust the frequency to $155.00000MHz \pm 50Hz$

4-2-2 Select the tuning item “Frequency Tune for 2.5kHz step at Low frequency”
, transmit the radio,
then adjust the frequency to $136.00250MHz \pm 50Hz$

4-2-3 Select the tuning item “Frequency Tune for 2.5kHz step at High frequency”
transmit the radio,
then adjust the frequency to $173.99750MHz \pm 50Hz$

4-2-4 Select the tuning item “RF High Power”, and transmit the radio.
Then adjust the RF Power to $45 \pm 1.0W$. Adjustment point is 3.

4-2-5 Select the tuning item “RF Low Power”, and transmit the radio.
Then adjust the RF Power to $15 \pm 1.0 W$. Adjustment point is 3.

4-2-6 Select the tuning item “Max Deviation(Wide)” and transmit the radio.
Then adjust the Deviation $3.8 \pm 0.1kHz$. Adjustment point is 3.

4-2-7 Select the tuning item “Max Deviation(Narrow)” and transmit the radio.
Then adjust the Deviation $1.75 \pm 0.05kHz$. Adjustment point is 3.

4-2-8 Select the tuning item “DQT Balance(Wide)”, and transmit the radio.
Then adjust the DQT waveform flat. Adjustment point is 1.

4-2-9 Select the tuning item “DQT Balance(Narrow)”, and transmit the radio.
Then adjust the DQT waveform flat. Adjustment point is 1.

- 4-2-10** Select the tuning item “QT Fine Deviation(Wide)” and transmit the radio.
Then adjust the Deviation $0.75 \pm 0.05\text{kHz}$. Adjustment point is 1.
- 4-2-11** Select the tuning item “QT Fine Deviation(Narrow)” and transmit the radio.
Then adjust the Deviation $0.35 \pm 0.05\text{kHz}$. Adjustment point is 1.
- 4-2-12** Select the tuning item “DQT Fine Deviation(Wide)” and transmit the radio.
Then adjust the Deviation $0.75 \pm 0.05\text{kHz}$. Adjustment point is 1.
- 4-2-13** Select the tuning item “DQT Fine Deviation(Narrow)” and transmit the radio.
Then adjust the Deviation $0.35 \pm 0.05\text{kHz}$. Adjustment point is 1.
- 4-2-14** Select the tuning item “LTR Fine Deviation(Wide)” and transmit the radio.
Then adjust the Deviation $1.00 \pm 0.05\text{kHz}$. Adjustment point is 1.
- 4-2-15** Select the tuning item “LTR Fine Deviation(Narrow)” and transmit the radio.
Then adjust the Deviation $0.75 \pm 0.05\text{kHz}$. Adjustment point is 1.
- 4-2-16** Select the tuning item “DTMF Fine Deviation(Wide)” and transmit the radio.
Then adjust the Deviation $3.0 \pm 0.2\text{kHz}$. Adjustment point is 1.
- 4-2-17** Select the tuning item “DTMF Fine Deviation(Narrow)” and transmit the radio.
Then adjust the Deviation $1.5 \pm 0.1\text{kHz}$. Adjustment point is 1.
- 4-2-18** Select the tuning item “MSK Fine Deviation(Wide)” and transmit the radio.
Then adjust the Deviation $3.0 \pm 0.2\text{kHz}$. Adjustment point is 1.
- 4-2-19** Select the tuning item “MSK Fine Deviation(Narrow)” and transmit the radio.
Then adjust the Deviation $1.5 \pm 0.1\text{kHz}$. Adjustment point is 1.
- 4-2-20** Select the tuning item “TONE Fine Deviation(Wide)” and transmit the radio.
Then adjust the Deviation $3.0 \pm 0.2\text{kHz}$. Adjustment point is 1.
- 4-2-21** Select the tuning item “TON Fine Deviation(Narrow)” and transmit the radio.
Then adjust the Deviation $1.5 \pm 0.1\text{kHz}$. Adjustment point is 1.

4-3 Receiver tuning

- 4-3-1** Connect the tracking generator to CN202.
Connect the spectrum analyzer to CN201.
Tune L205,L207,L209 (wide) L206,L208,L210 (narrow)
to make gain maximum and make the band flat.
- 4-3-2** Tune L201 for maximum audio level at narrow.
- 4-3-3** Select the tuning item “Sensitivity”.
Then adjust the receiver sensitivity maximum. Adjustment point is 5.

- 4-3-4** Select the tuning item “Squelch(Tight) (Wide)”.
Then adjust the squelch(Tight)
Opening level when 5dB is added from the sensitivity value of 12dB SINAD.
Adjustment point is 1.
- 4-3-5** Select the tuning item “Squelch(Tight) (Narrow)”.
Then adjust the squelch(Tight)
Opening level when 5dB is added from the sensitivity value of 12dB SINAD.
Adjustment point is 1.
- 4-3-6** Select the tuning item “Squelch(Open) (Wide)”.
Then adjust the squelch(Open)
Opening level when 3dB is subtracted from the sensitivity value of 12dB SINAD.
Adjustment point is 1.
- 4-3-7** Select the tuning item “Squelch(Open) (Narrow)”.
Then adjust the squelch(Open)
Opening level when 3dB is subtracted from the sensitivity value of 12dB SINAD.
Adjustment point is 1.

FOR MODEL: TK-7150 (K) FCCID:ALH32273110
 <X57-6570-10> TXRX UNIT

CIRCUIT SYMBOL	PART NUMBER	DESCRIPTION	
D1	ZSA5A27	ZENER DIODE	SURGE PROTECTOR
D2	02DZ6.2(Y)	ZENER DIODE	VOLTAGE PROTECTION
D3	MA4PH633	DIODE	ANT SWITCH
D4	XB15A709	DIODE	ANT SWITCH
D5, 6	MA742	DIODE	RF DETECTOR
D7	1SS226	DIODE	TEMPERATURE COMPENSATION
D11	1SS355	DIODE	TEMPERATURE COMPENSATION
D101	DSA3A1-FK	DIODE	PROTECTION OF REVERSE CONNECTION
D102	02DZ18(X,Y)	ZENER DIODE	VOLTAGE REFERENCE
D103	02DZ15(X,Y)	ZENER DIODE	VOLTAGE REFERENCE
D104-106	1SS355	DIODE	DC SWITCH
D108	DA204U	DIODE	SURGE PROTECTOR
D109	02DZ15(X,Y)	ZENER DIODE	VOLTAGE REFERENCE
D201	1SS355	DIODE	DC SWITCH
D202	MA742	DIODE	NOISE DETECTION
D203-206	DAN235E	DIODE	WIDE/NARROW SWITCH
D207-209	1SV228	VARICAP	BPF TUNING
D501-508	1SV282	VARICAP	FREQUENCY CONTROL
D509	1SS388	DIODE	VOLTAGE DOUBLER
D510	1SS388	DIODE	VOLTAGE DOUBLER
D511	1SV278	VARICAP	MODULATOR
D512	02DZ12(Y)	ZENER DIODE	VOLTAGE REFERENCE
D513, 514	HVC131	DIODE	RF SWITCH
D515	MA2S111	DIODE	DC SWITCH
D700	1SS355	DIODE	SURGE PROTECTOR
D701-703	DA204U	DIODE	SURGE PROTECTOR
D704	MA2S111	DIODE	VOLTAGE REDUCTION
D705-709	DA204U	DIODE	SURGE PROTECTOR
D710	02DZ18(X,Y)	ZENER DIODE	SURGE PROTECTOR
D711, 712	MA742	DIODE	AF DETECTOR
D714	1SS388	DIODE	DC SWITCH
D715, 716	02DZ18(X,Y)	ZENER DIODE	SURGE PROTECTOR
D717	02DZ5.1(Y)	ZENER DIODE	VOLTAGE PROTECTION
D718	MA742	DIODE	RF DETECTOR
D785-790	02DZ5.1(Y)	ZENER DIODE	SURGE PROTECTOR
D791	MINISMDM075/24	VARISTOR	CURRENT PROTECTOR
D792, 793	MINISMDM110/16	VARISTOR	CURRENT PROTECTOR
IC1, 2	TA75W01FU	IC	DC AMP
IC101	PST9140NR	IC	VOLTAGE DETECTOR
IC102	TC4013BF(N)	IC	D Flip-Flop
IC103	PST9140NR	IC	VOLTAGE DETECTOR
IC104	TA7808S	IC	VOLTAGE REGULATOR
IC105	TA7805F	IC	VOLTAGE REGULATOR
IC106	XC62FP3302P	IC	VOLTAGE REGULATOR
IC107	XC62FP1802P	IC	VOLTAGE REGULATOR
IC108	XC62FP3302P	IC	VOLTAGE REGULATOR
IC109	AN8009M	IC	VOLTAGE REGULATOR
IC201	TA31136FN	IC	FM IF SYSTEM
IC202	TC7S66FU	IC	MULTIPLEXER
IC501	ADF4111BRU	IC	PLL
IC700	BU4094BCFV	IC	SHIFT RESISTER
IC701	M30624FGAGP	IC	CPU
IC702	BU4094BCFV	IC	SHIFT RESISTER
IC703	ADM202EARN	IC	RS232C TRANCEIVER
IC704	AT24128N10SI27	IC	EEP ROM
IC705	AT29C040A-12TI	IC	FLASH ROM
IC706	TC74LVX4245FS	IC	BUS TRANSCEIVER
IC707-9	TC7WH32FK	IC	OR GATE
IC710	320VC5402PGE	IC	DSP
IC711	TC7SU04FU	IC	INVERTER
IC712	TA75W01FU	IC	AF AMP
IC713	AK4550VT	IC	CODEC
IC714	TC75W51FU	IC	MIC AMP/AGC
IC715	TA75W01FU	IC	BUFFER AMP
IC716	TA75W01FU	IC	ANTI-ALIASING FILTER
IC717	BU4053BCFV	IC	MULTIPLEXER
IC718	M62364FP	IC	D/A CONVERTER

IC719	TC75W51FU	IC	AF AMP
IC720	TDA8561Q	IC	AUDIO POWER AMP
IC721	LMC7101BIM5	IC	DC AMP
IC722	TA75S01F	IC	AF AMP
IC723	NJM78L05UA	IC	VOLTAGE REGULATOR
IC724	TC7S66FU	IC	MULTIPLEXER
Q1	2SC3356(R24)	TRANSISTOR	RF AMP
Q2	2SC3357	TRANSISTOR	RF AMP
Q4	PD55003S	TRANSISTOR	DRIVE AMP
Q5	RD70HVF1	TRANSISTOR	FINAL AMP
Q101	DTC114EE	TRANSISTOR	DC SWITCH
Q102	DTC114EE	TRANSISTOR	SWITCH
Q103	2SJ506(S)	FET	DC SWITCH
Q104	DTC114EE	TRANSISTOR	DC SWITCH
Q105	DTC114EE	TRANSISTOR	DC SWITCH
Q106	2SB1132(Q,R)	TRANSISTOR	DC SWITCH
Q107	2SB1132(Q,R)	TRANSISTOR	DC SWITCH
Q108	DTA114EE	TRANSISTOR	DC SWITCH
Q109	DTA114YE	TRANSISTOR	DC SWITCH
Q110	DTC114TE	TRANSISTOR	DC SWITCH
Q111	DTA114EE	TRANSISTOR	DC SWITCH
Q112	DTA114YE	TRANSISTOR	DC SWITCH
Q113	DTC114YE	TRANSISTOR	DC SWITCH
Q201	DTA114EE	TRANSISTOR	W/N SWITCH
Q202	DTC114EE	TRANSISTOR	W/N SWITCH
Q203	DTC114EE	TRANSISTOR	W/N SWITCH
Q204	2SC4617(S)	TRANSISTOR	NOISE AMP
Q205	DTA144EE	TRANSISTOR	W/N SWITCH
Q206	2SC4215(Y)	TRANSISTOR	IF AMP
Q207	2SC3357	TRANSISTOR	PRE IF AMP
Q208	2SC3357	TRANSISTOR	RF AMP
Q209	2SK508NV(K52)	FET	MIXER
Q210	2SK508NV(K52)	FET	MIXER
Q211	2SK508NV(K52)	FET	MIXER
Q212	2SK508NV(K52)	FET	MIXER
Q213	2SC3357	TRANSISTOR	RF AMP
Q501	2SC4116(GR)	TRANSISTOR	ACTIVE FILTER
Q502	2SK1215(E)	FET, DC AMP	OSCILLATOR
Q503	2SC4116(GR)	TRANSISTOR	ACTIVE FILTER
Q504	2SC4116(GR)	TRANSISTOR	ACTIVE FILTER
Q505	2SC4738(GR)	TRANSISTOR	DC SWITCH
Q506	2SA1832(GR)	TRANSISTOR	DC SWITCH
Q507	2SK508NV(K52)	FET	RX OSCILLATOR
Q508	2SC4116(GR)	TRANSISTOR	AVR
Q509	2SK508NV(K52)	FET	TX OSCILLATOR
Q510	2SC4116(GR)	TRANSISTOR	TX/RX SW
Q511	2SC4116(GR)	TRANSISTOR	RIPPLE FILTER
Q512	2SC4116(GR)	TRANSISTOR	TX/RX SW
Q513	2SC5108(Y)	TRANSISTOR	BUFFER AMP
Q514	DTC114EE	TRANSISTOR	INVERTER
Q515	2SC5108(Y)	TRANSISTOR	BUFFER AMP
Q516	2SC5108(Y)	TRANSISTOR	AMP
Q517	2SC4116(GR)	TRANSISTOR	RIPPLE FILTER
Q518	2SA1832(GR)	TRANSISTOR	DC SWITCH
Q519	DTC144EE	TRANSISTOR	DC SWITCH
Q520	2SC4116(GR)	TRANSISTOR	DC SWITCH
Q521	DTC114EE	TRANSISTOR	INVERTER
Q700	2SK1824	FET	DC SWITCH
Q701	DTC114EE	TRANSISTOR	DC SWITCH
Q702	DTC144EE	TRANSISTOR	DC SWITCH
Q703	DTD114EK	TRANSISTOR	DC SWITCH
Q704	DTD114EK	TRANSISTOR	DC SWITCH
Q705	DTD114EK	TRANSISTOR	DC SWITCH
Q706	DTD114EK	TRANSISTOR	DC SWITCH
Q707	2SC4116(Y)	TRANSISTOR	MIC GAIN SWITCH
Q708	2SA1586(Y,GR)	TRANSISTOR	MIC GAIN SWITCH
Q709	DTC144EE	TRANSISTOR	INVERTER
Q710	DTC114EE	TRANSISTOR	DC SWITCH
Q711	2SD1757K	TRANSISTOR	DC SWITCH
Q712	2SJ243	FET	DC SWITCH
Q713	2SK1824	FET	DC SWITCH

Q714	DTC144EE	TRANSISTOR	DC SWITCH
Q716	DTC114EE	TRANSISTOR	DC SWITCH
Q719	DTC114YE	TRANSISTOR	DC SWITCH
Q720	DTC114YE	TRANSISTOR	DC SWITCH

FOR MODEL: TK-7150 (K)
<X54-340> DISPLAY UNIT

CIRCUIT SYMBOL	PART NUMBER	DESCRIPTION	
D902	DA204U	DIODE	SURGE PROTECTOR
D903	DA204U	DIODE	SURGE PROTECTOR
D904	DA204U	DIODE	SURGE PROTECTOR
D905	DA204U	DIODE	SURGE PROTECTOR
D906	DA204U	DIODE	SURGE PROTECTOR
D907	02CZ9.1(X,Y)	ZENER DIODE	VOLTAGE REFERENCE
D908	B30-2050-05	LED	KEY backlight
D909	B30-2050-05	LED	KEY backlight
D910	B30-2050-05	LED	KEY backlight
D911	B30-2050-05	LED	KEY backlight
D912	B30-2193-05	LED	TX light
D913	B30-2050-05	LED	KEY backlight
D914	B30-2050-05	LED	KEY backlight
D915	B30-2194-05	LED	RX light
D916	02DZ18(X,Y)	ZENER DIODE	SURGE PROTECTOR
D917	MINISMD C020	VARISTOR	CURRENT PROTECTOR
IC901	TA7805F	IC	VOLTAGE REGULATOR
IC902	RH5VL42C	IC	VOLTAGE DETECTOR
IC904	30622M4A-410GP	IC	CPU
Q901	2SJ243	FET	MIC SWITCH
Q902	2SK1824	FET	DC SWITCH
Q903	2SD1760	TRANSISTOR	CURRENT DRIVER
Q904	DTC114EE	TRANSISTOR	DC SWITCH
Q905	DTC114EE	TRANSISTOR	DC SWITCH
Q906	DTC114EE	TRANSISTOR	DC SWITCH
Q907	DTC114EE	TRANSISTOR	DC SWITCH
Q908	DTC114EE	TRANSISTOR	DC SWITCH
Q909	DTC144EE	TRANSISTOR	INVERTER
Q910	DTC144EE	TRANSISTOR	INVERTER
Q911	DTC144EE	TRANSISTOR	DC SWITCH

TK-7150 FCCID:ALH32273110

K

PARTNO	PROCESS '0-10	UNIT	PART NAME(E)
Z83-3151-03	X	1	INTERCONNECTION DIAGRAM
X54-3400-10		1	DISPLAY UNIT
X57-6570-10		1	TX-RX UNIT
A01-2185-02		1	CABINET
A10-4059-01		1	CHASSIS
A62-1037-03		1	PANEL ASS'Y
A62-1038-01		1	MAIN PANEL
B10-2732-04		1	FRONT GLASS
B11-1296-04		1	ILLUMINATION GUIDE
B43-1138-04		1	BADGE
G10-1289-04		1	FIBROUS SHEET
G13-1932-04		1	CUSHION
B11-1297-04		1	FILTER
B41-1837-04		1	CAUTION LABEL
B42-5650-04		1	S/NO. LABEL
B44-2163-04		1	UPC CODE LABEL
B44-2165-04	0.2	5	UPC CODE LABEL
B59-1653-00		1	PAMPHLET
B59-2297-00		1	PAMPHLET
B62-1619-00		1	INSTRUCTION MANUAL
B72-2075-04		1	MODEL NAME PLATE
E04-0167-05		1	RF COAXIAL PECEPTACLE(M)
E30-3478-05		1	DC CORD ASS'Y
E37-1002-05		1	LEAD WIRE WITH CONNECTOR
E37-1003-05		1	LEAD WIRE WITH CONNECTOR
E37-1004-05		1	LEAD WIRE WITH CONNECTOR
E37-1006-05		1	LEAD WIRE WITH CONNECTOR
E37-1031-05		1	LEAD WIRE WITH CONNECTOR
F05-1537-05		3	FUSE(BLADE)
F09-0445-05		1	CAP
F10-2442-02		1	SHIELDING COVER
F29-0478-05		1	INSULATING COVER
G02-0861-04		1	FLAT SPRING
G02-0894-04		1	EARTH SPRING
G02-0896-04		1	FLAT SPRING
G53-1551-02		1	PACKING
G53-1552-03		1	PACKING
G53-1554-03		1	PACKING
G53-1555-04		2	PACKING
H02-0616-03		1	INNER PACKING CASE
H12-3124-02		1	PACKING FIXTURE
H12-3125-02		1	PACKING FIXTURE
H12-3141-03		2	PACKING FIXTURE
H25-0029-04		2	PROTECTION BAG
H25-0720-04		1	PROTECTION BAG
H25-2343-04		1	PROTECTION BAG
H25-2352-04		1	PROTECTION BAG
H52-1894-02		1	ITEM CARTON CASE
H62-1638-03	0.2	5	OUTER PACKING CASE
J19-1584-05		1	HOLDER
J21-8436-04		1	HARDWARE FIXTURE
J21-8437-04		1	HARDWARE FIXTURE
J21-8445-04		1	HARDWARE FIXTURE
J29-0697-03		1	BRACKET

J61-0307-05	1	1 BAND
K29-9221-03	2	1 KNOB
K29-9222-02	1	1 KEY TOP
N09-2409-05	2	1 HEXAGON HEAD SCREW
N10-2070-46	1	1 HEXAGON NUT
N87-2606-46	14	1 BRAZIER HEAD TAPTITE SCREW
N87-2620-46	9	1 BRAZIER HEAD TAPTITE SCREW
N87-3008-45	6	1 BRAZIER HEAD TAPTITE SCREW
N99-2033-05	1	1 SCREW SET
T07-0738-05	1	1 SPEAKER
T91-0621-05	1	1 MICROPHONE
RD70HVF1-01	1	1 FET
N67-3008-46	2	1 PAN HEAD SEMS SCREW W
PD55003S	1	1 FET

INSTRUCTION MANUAL

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MODELS COVERED BY THIS MANUAL

The models listed below are covered by this

- **TK-7150:** VHF FM Transceiver
- **TK-8150:** UHF FM Transceiver

NOTICES TO THE USER

WARNING:

GOVERNMENT LAW PROHIBITS THE OPERATION OF UNLICENSED RADIO TRANSMITTERS WITHIN THE TERRITORIES UNDER GOVERNMENT CONTROL.

ILLEGAL OPERATION IS PUNISHABLE BY FINE AND /OR IMPRISONMENT.

REFER SERVICE TO QUALIFIED TECHNICIANS ONLY.

SAFETY:

It is important that the operator is aware of, and understands, hazards common to the operation of any transceiver.

WARNING:

EXPLOSIVE ATMOSPHERES (GASES, DUST, FUMES, etc.)

Turn off your transceiver while taking on fuel, or while parked in gasoline service stations. Do not carry spare fuel containers in the trunk of your vehicle if your transceiver is mounted in the trunk area.

INJURY FROM RADIO FREQUENCY TRANSMISSIONS

Do not operate your transceiver when somebody is either touching the antenna or standing within two to three feet of it, to avoid the possibility of radio frequency burns or related physical injury.

DYNAMITE BLASTING CAPS

Operating the transceiver within 500 feet (150m) of dynamite blasting caps may cause them to explode.

Turn OFF your transceiver when in an area where blasting is in progress, or where "TURN OFF TWO-WAY RADIO" signs have been posted. If you are transporting blasting caps in your vehicle, make sure they are carried in a closed metal box with a padded interior. Do not transmit while the caps are being placed into or removed from the container.

PRECAUTIONS

Please observe the following precautions to prevent fire, personal injury, and transceiver damage.

- . Do not attempt to configure the transceiver while driving, it is too dangerous.
- . Do not modify the transceiver for any reason.
- . Do not expose the transceiver to long periods of direct sunlight, nor place it near heating appliances.
- . Do not place the transceiver in excessively dusty, humid, or wet areas, nor on unstable surfaces.
- . If an abnormal odor or smoke is detected coming from the transceiver, turn OFF the power immediately.

Contact your **KENWOOD** dealer.

FCC WARNING

This equipment generates or uses radio frequency energy. Changes or modifications to this equipment may cause harmful interference unless the modifications are expressly approved in the instruction manual. The user could lose the authority to operate this equipment if an unauthorized change or modification is made.

INFORMATION TO THE DIGITAL DEVICE USER REQUIRED BY THE FCC

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules.

These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses and can generate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

However, there is no guarantee that the interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment to an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer for technical assistance.

UNPACKING AND CHECKING EQUIPMENT

Note: The following unpacking instructions are for use by your **KENWOOD** dealer, an authorized **KENWOOD** service facility, or the factory.

Carefully unpack the transceiver. We recommend that you identify the items listed in the following table before discarding the packing material. If any items are missing or have been damaged during shipment, file a claim with the carrier immediately.

Supplied Accessories

Item	Part Number	Quantity
		K
Instruction Manual	B62- x x x x - x x	1
DC power cable	E30- x x x x - x x	1
Fuse	F15- x x x x - x x	1
Mounting bracket	J29- x x x x - x x	1
Screw Set	N99- x x x x - x x	1

PREPARATION

WARNING

Various electronic equipment in your vehicle may malfunction if they are not properly protected from the radio frequency energy which is present while transmitting. Electronic fuel injection, anti-skid braking, and cruise control systems are typical examples of equipment that may malfunction. If your vehicle contains such equipment, consult the dealer for the make of vehicle and enlist his/her aid in determining if they will perform while transmitting.

Note: The following preparation instructions are for use by your **KENWOOD** dealer, an authorized **KENWOOD** service facility, or the factory.

TOOLS REQUIRED

Note: Before installing the transceiver, always check how far the mounting screws will extend below the mounting surface. When drilling mounting holes, be careful not to damage vehicle wiring or parts.

The following tools are required for installing the transceiver:

- 6mm(1/4 inch) or larger electric drill
- 4.2mm(5/32 inch) drill bit for the self-tapping screws
- Circle cutters

POWER CABLE CONNECTION

CAUTION

The transceiver operates in 12V negative ground systems only! Check the battery polarity and voltage of the vehicle

Before installing the transceiver.

- 1 Check for an existing hole, conveniently located in the firewall, where the power cable can be passed through.
 - If no hole exists, use a circle cutter to drill the firewall, then install a rubber grommet.
- 2 Run the two- power cable leads through the firewall and into the engine compartment, from the passenger compartment.
- 3 Connect the red lead to the positive (+) battery terminal and the black lead to the negative (-) battery terminal.
 - Locate the fuse as close to the battery as possible.
- 4 Coil and secure the surplus cable with a retaining band.
 - Be sure to leave enough slack in the cables so the transceiver can be removed for servicing while keeping the power applied.

INSTALLING THE TRANSCEIVER

WARNING

For passenger safety, install the transceiver securely, using the supplied mounting bracket, so the transceiver will not break loose in the event of a collision.

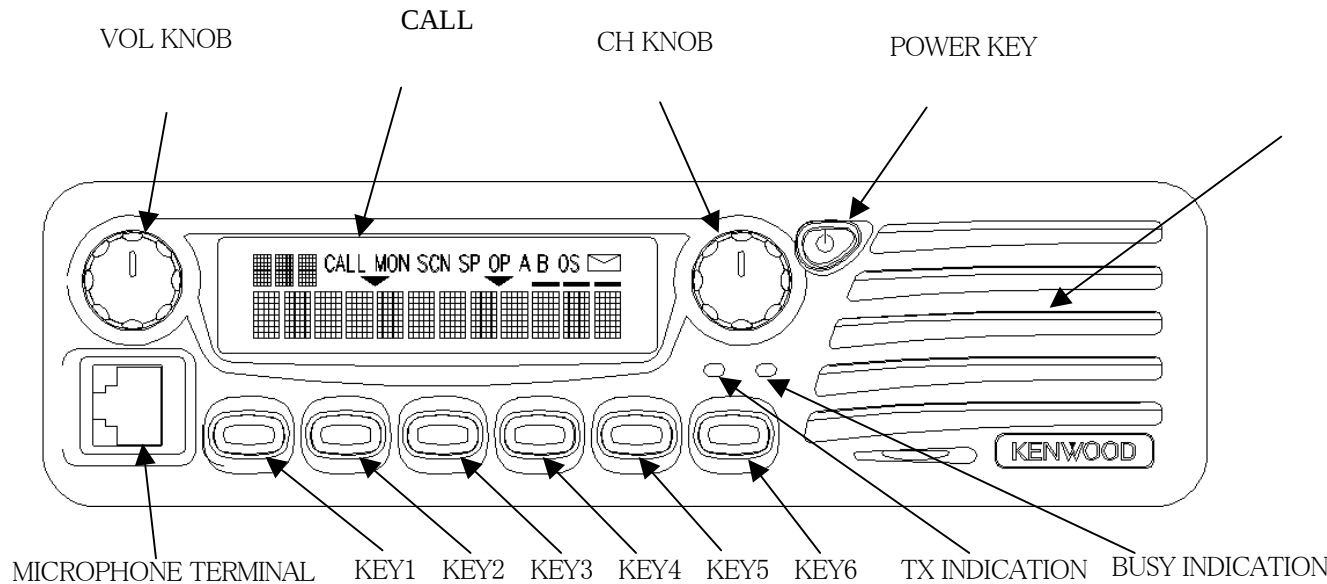
- 1 Mark the position of the holes in the dash by using the mounting bracket as a template. Drill the holes, then attach the mounting bracket using the supplied self-tapping screws.
 - Be sure to mount the transceiver in a location where the controls are within easy reach of the user and where there is sufficient space at the rear of the transceiver for cable connections.
- 2 Connect the antenna and the supplied power cable to the transceiver.
- 3 Slide the transceiver into the mounting bracket and secure it using the supplied hex-headed screws.
- 4 Mount the microphone hanger in a location where it will be within easy reach of the user.
 - The microphone and microphone cable should be mounted in a place where they will not interfere with the safe operation of the vehicle.

CAUTION

When replacing the fuse in the DC power cable, be sure to replace it with a fuse of the same value.
Never replace a fuse with a fuse that has a higher value.

GETTING ACQUAINTED

ORIENTATION



Functional and Operational specifications

1) Front Panel

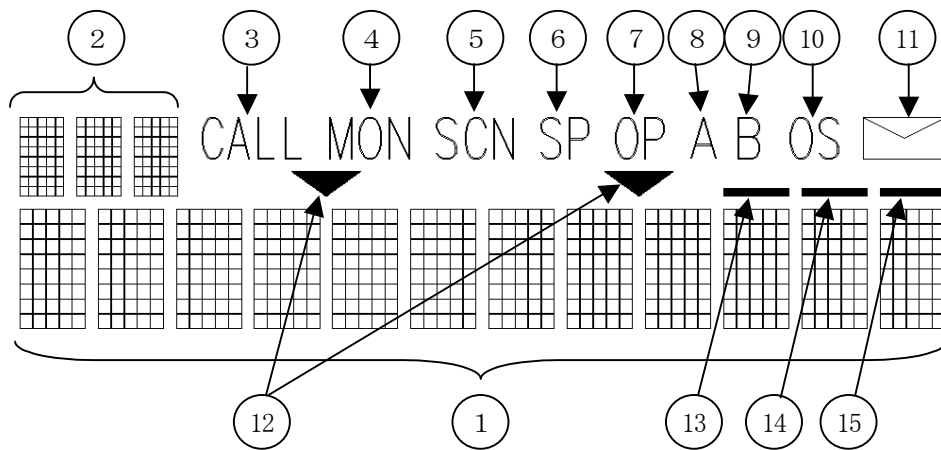
1) Knob (Rotary type)

NO.	Name	Description
1	VOL	Adjust RX Volume, Alert tones and Public Address Level
2	CH	Programmable Up/Down Default:Channel /GID Up/Down
3	PO	Power key (Push type)
4	MIC	Microphone Terminal
5	KEY	Key 1 to Key 6 (Push type)
6	TX IND	TX Indication
7	BUSY	BUSY Indication
8	CALL	Call display
9	SP	Speaker display

2) Switch (Push type)

No.	Name	Description
1	POWER	Power ON/OFF
2	KEY1	Programmable Default: : Zone Up
3	KEY2	Programmable Default : Zone Down
4	KEY3	Programmable Default : None

3)DISPLAY LCD



NO.	Name	Description
1		Alphanumeric display Channel/GID display Zone display
2		Channel/GID display Zone display
3	CALL	Call display
4	MON	Monitor ON display
5	SCN	Monitor ON display
6	SP	Speaker B display
7	OP	Option ON display
8	A	AUX A display
9	B	AUX B display
1 0	OS	Operator selectable tone display
1 1		Message display
1 2	▼	ADD display
1 3	-	Not used
1 4	-	Not used
1 5	-	Not used

OPERATING BASICS

Switching Power ON/OFF

Press the switch to switch the transceiver ON.

Press and hold the switch for approximately 1 second to switch the transceiver OFF.

Adjusting the Volume

Rotate the **Volume** control to adjust the volume. You can adjust the volume to clockwise increases the volume and counterclockwise decreases it.

Selecting a Channel

Rotate the **Channel selector** to select a channel.

Clockwise increases the channel number and counterclockwise decreases it.

Transmitting

Note: Before transmitting, first monitor the channel to make sure it is not already in use.

- 1 Select your desired channel.
 - If the channel is busy, wait until it becomes free.
- 2 Press the microphone **PTT** switch and speak into the microphone. Release the **PTT** switch when you have finished speaking.
 - For best sound quality at the receiving station, hold the microphone approximately 1.5 inches (3~4cm) from your mouth.

Receiving

- 1 Select your desired channel.
- 2 When you hear a signal, readjust the volume level if necessary.
- 3 Respond to the call as described in step 2 of “TRANSMITTING”, above.

AUXILIARY FEATURES

Time-out Timer (TOT)

The purpose of the Time-out Timer is to prevent any caller from using a channel for an extended period of time. If you continuously transmit for a period of time that exceeds the programmed time, the transceiver will stop transmitting and an alert tone will sound. To stop the tone, release the **PTT** switch.

Your dealer can program a warning function to alert you before the TOT expires. Continuously transmitting for the specified by your dealer will cause the warning tone to sound.

INSTRUCTION MANUAL

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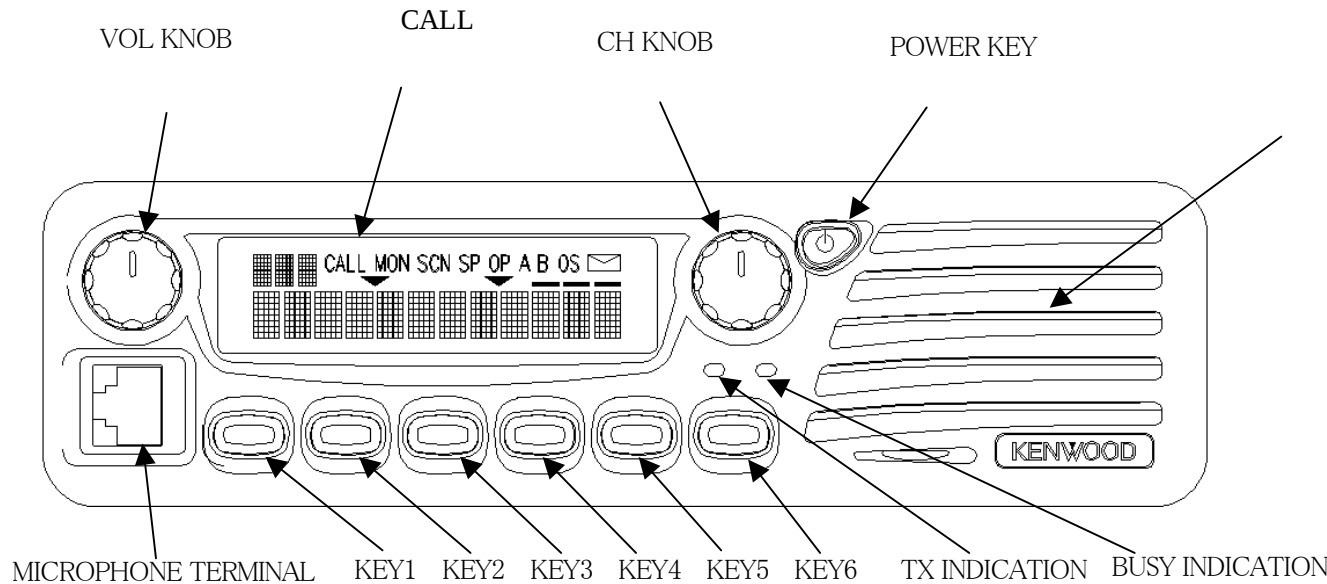
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ORIENTATION



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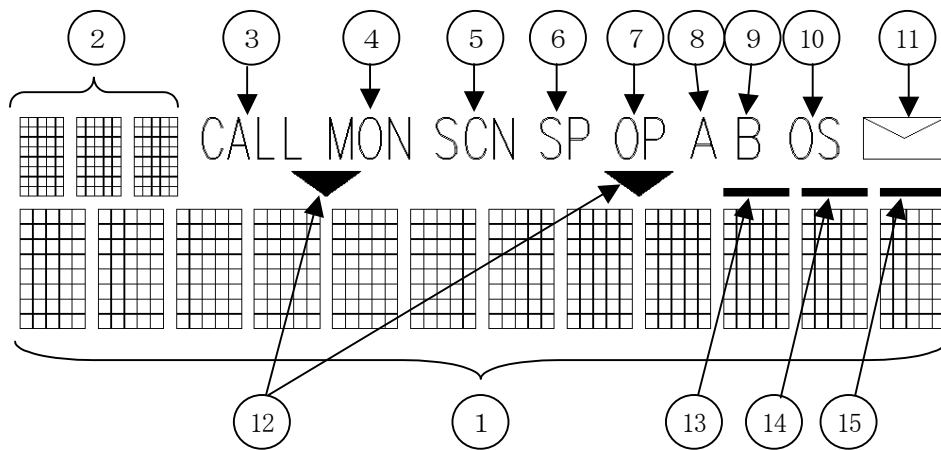
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Time-out Timer (TOT)

The purpose of the Time-out Timer is to prevent any caller from using a channel for an extended period of time. If you continuously transmit for a period of time that exceeds the programmed time, the transceiver will stop transmitting and an alert tone will sound. To stop the tone, release the **PTT** switch.

Your dealer can program a warning function to alert you before the TOT expires. Continuously transmitting for the specified by your dealer will cause the warning tone to sound.

