KENWOOD®

SERVICE MANUAL

SPECIFICATIONS

[GENERAL]

Transmitter Frequency Range:	160 m Band 1.8 ~ 2.0 MHz 80 m Band 3.5 ~ 4.0 MHz 40 m Band 7.0 ~ 7.3 MHz *30 m Band 10.1 ~ 10.15 MHz (10.0 MHz WWV) 20 m Band 14.0 ~ 14.35 MHz *17 m Band 18.068 ~ 18.168 MHz 15 m Band 21.0 ~ 21.45 MHz *12 m Band 24.89 ~ 24.99 MHz 10 m Band 28.0 ~ 29.7 MHz
Receiver Frequency Range:	150 kHz - 30 MHz
Mode:	A3J (USB, LSB), A1 (CW), F1 (FSK), A3 (AM)
Antenna Impedance:	50 ohms
With AT-930 antenna tuner	20 - 150 ohms (80 - 10 meter Amateur bands only)
Power Requirement:	120/220/240 VAC, 50/60 Hz
Power Dissipation:	Max. 510 W during transmission, 80 W during reception
Dimensions:	374(14-3/4")W × 141(5-9/16")H × 350(13-13/16")D mm (inches)
Weight:	With antenna tuner: Approx. 18.5 kg (40.8 lbs) Without antenna tuner: Approx. 16.8 kg (37.0 lbs)

[TRANSMITTER]

Final Power Input:	SSB/CW/FSK 250 W AM 80 W
Carrier Suppression:	Better than 40 dB
Unwanted Sideband Suppression:	Better than 50 dB (with 1 kHz modulation)
Harmonic Content:	Less than −40 dB
Audio Frequency Response:	400 - 2,600 Hz/−6 dB
Modulation:	SSB: Balanced modulation AM: Low level modulation (IF stage)
FSK Shift:	170 Hz
Modulation Distortion:	Less than −31 dB
Microphone Impedance:	500 ohms or 50 kohms (Connector - switchable)
ALC Input:	−10 V DC MAX
Linear Amplifier Switching:	200 V DC MAX 100 mA

[RECEIVER]

Circuitry:	Quadruple conversion
Intermediate Frequencies:	1st IF: 44.93 MHz 2nd IF: 8.83 MHz 3rd IF: 455 kHz 4th IF: 100 kHz
Sensitivity (at 10 dB S+N/N)	
150 - 500 kHz:	Less than 1 μV for SSB, CW and FSK Less than 10 μV for AM
500 kHz - 1.8 MHz:	Less than 4 μV for SSB, CW and FSK Less than 32 μV for AM
1.8 - 30 MHz:	Less than 0.25 μV for SSB, CW and FSK Less than 2 μV for AM
Image Ratio:	More than 80 dB (1.8 MHz ~ 30 MHz)
IF Rejection:	More than 70 dB (1.8 MHz ~ 30 MHz)
Selectivity (W-wide, N-narrow filter selection)	
SSB, CW(W), FSK(W), AM(N):	2.7 kHz/−6 dB, 4.0 kHz/−60 dB
CW(N), FSK(N):	Without optional filter: same as CW(W), FSK(W) With optional YG-455C-1: 500 Hz/−6 dB, 820 Hz/−60 dB With optional YG-455CN-1: 250 Hz/−6 dB, 480 Hz/−60 dB With optional YK-88C-1: 500 Hz/−6 dB, 1.5 kHz/−60 dB
AM(W):	Without optional filter: 6 kHz/−6 dB, 18 kHz/−60 dB With optional YK-88A-1: 6 kHz/−6 dB, 11 kHz/−60 dB
SSB Slope Tune:	High-cut: More than 1500 Hz shift/−6 dB Low-cut: More than 700 Hz shift/−6 dB
CW VBT	
CW(W), FSK(W) AM(N):	600 Hz ~ 2.7 kHz/−6 dB
CW(N), FSK(N):	Without optional filter: same as CW(W), FSK(W) With optional YK-88C-1 and YG-455C-1 installed: 150 Hz ~ 500 Hz −6 dB
AM(W):	With optional YK-88A-1: 4 kHz ~ 6 kHz/−6 dB
Frequency Stability:	Within ±200 Hz after turn-on Within ±30 Hz any 30 minute period there after at constant temperature
Frequency Accuracy:	$\pm 1 \times 10^{-5}$ or better (at normal temperatures)
RIT Variable Range:	±9.99 kHz
Notch Filter Attenuation:	More than 40 dB
Phone Patch Output Z:	600 Ω
Audio Output Power:	More than 1.5 W across 8 Ω (at 10% distortion)

AT-930 (Automatic Antenna Tuner)

Frequency Range:	Amateur bands from 80 ~ 10 m
Input Impedance:	50 Ω, unbalanced
Output Impedance:	20 ~ 150 Ω unbalanced
Insertion Loss:	Less than 1 dB at 3.5 MHz (at optimum match)
Through Power:	150 W max.
Motor Stop SWR Value:	Less than 1.2

*Will transmit on the new 30, 17, and 12 meter bands. Lock-out circuitry installed to prevent accidental transmission before government amateur authorization.

NOTE: The circuit and ratings may change without notice due to developments in technology.

CIRCUIT DESCRIPTION

RX SECTION

The signal from the antenna is applied to the Signal unit

TX SECTION

The microphone signal is applied to the microphone input

CIRCUIT DESCRIPTION

Motorola transistors, having an excellent IMD (inter-modulation distortion) characteristic, a maximum collector

The phase of this 10kHz signal is compared with that of the 10kHz reference signal to lock VCO-3. The locked

CIRCUIT DESCRIPTION

The 20 to 21.99 kHz signal from IC11 pin 12 is mixed with

BAND			

CIRCUIT DESCRIPTION

DIGITAL CIRCUIT

Fig. 3 shows a block diagram of the Digital unit, which consists of 31 ICs including a custom CPU, μPD8049C-211 (IC6). The CPU uses a mapped I/O system on a common bus to control many signals. I/O signals are latched by IC25–29 to prevent noise from affecting other circuits. There are two encoder input ports ; one for the main tuning control signal and the other for the RIT control signal. Each encoded input is applied to a logic circuit that determines both direction of rotation also sends information to the CPU to indicate the desired frequency change. The output of IC16 pin 3 or 4 determines the direction of rotation of the Main encoder. For example, when the encoder is rotated, the output at pin 4 goes to +5V. This output level is maintained until rotation is stopped. The output then returns to 0V. If the dial is turned in the opposite direction, the output drops to −5V and is main-

IC13 (μPD5101LC) is a C-MOS RAM which stores frequency data for the 8 memory channels, and VFOs A and B. IC13 back-up power is supplied by three 1.5V AA batteries, through diode D10, when the power switch is OFF. Since the required back-up current is only 10μA, memories will be maintained for approximately 24hr, even if no batteries are installed, by the discharge current of C21. Power is supplied to IC13 through Q23 and Q24 when the power switch is ON.

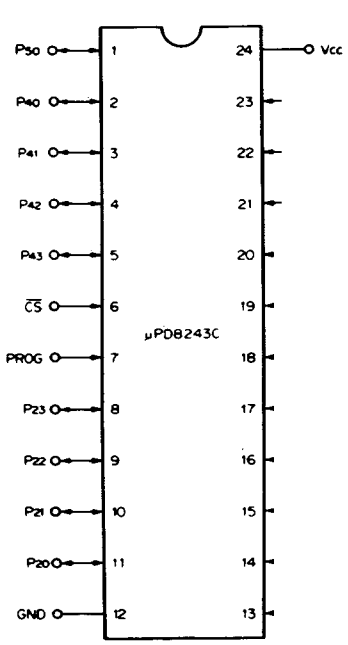
IC1 through IC4 are display drivers. Display date is multiplexed from the microprocessor. Connectors 13 through 16 output to the display tube. Terminals a through g and DP are 7 segment and decimal point data for the display. Terminals P1 through P10 are signals for the analog-type display, which approximates a conventional dial pointer. Terminals G1 through G10 are display tube grid signals. Heater voltage at approximately 7 Vpp is generated by DC-DC converter Q14 and Q15 and is supplied to the dis-

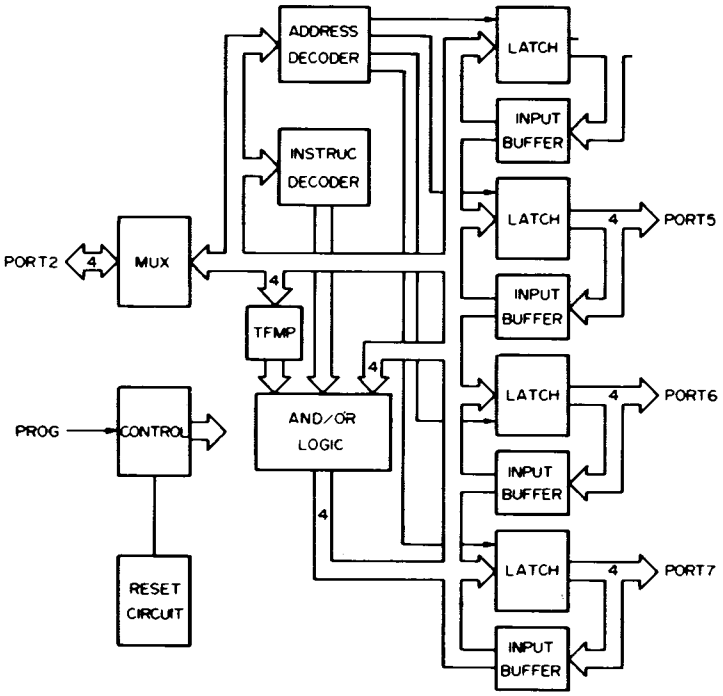
CIRCUIT DESCRIPTION

Terminals No.	Terminals Name	Functions
① 1	24I	DC-DC converter input approx. 24V.
① 2	12I	AVR input.
① 3	5I	AVR input.
② 1	BZ	Signal unit tone oscillator on when "L".
② 2	BRK	When the Main knob is turned, a L pulse is output for the NB gate at every 2kHz step.
② 3	UL	PLL unlock input, L : unlock, display blanks.
② 4	TS	"L" pluse is output when changing BAND, TX stops when "L".
② 5	−C	Approx. −43V.
② 6	TR	TX and RX switching signal input, "L" in RX, "H" in TX.
③ 1	G	GND
③ 2	BAT	Back up DC input 1.5V x 3.
④ 1	5V	5V DC.
④ 2	ME2	Main encoder input, 90° phase difference, 50% duty cycle.
④ 3	ME1	
④ 4	G	GND
⑤ 1	5V	5V DC.
⑤ 2	RE2	RIT encoder input, 90° phase difference, 50% duty cycle.
⑤ 3	RE1	
⑤ 4	G	GND
⑥ 1	DM	Dimmer at open, normally GND.
⑥ 2	−	Not used.
⑥ 3	M0	Memory channel M0.
⑥ 4	CLR	Normally "H", RIT f is cleared when "L".
⑥ 5	B0	BAND DATA input B0.
⑥ 6	FR	VFO select on RX, VFO B at "H", VFO A at "L".
⑥ 7	RIT	Normally "H", RIT-ON, OFF state changes at "L".
⑥ 8	BD	1MHz step BAND DATA, f descends 1MHz steps in at "L".
⑥ 9	−	Not used.
⑥ 10	B1	BAND DATA input B1.
⑥ 11	AB	VFO A=B switch, VFO A=B when "L".
⑥ 12	M1	Memory CH M1.
1	LOCK	Main dial f is locked when "L".

Terminals No.	Terminals Name	Functions
⑩ 1	PL6	PLL DATA for 500kHz comparison.
⑩ 2	PL7	
⑩ 3	PL5	
⑪ 1	AT1	BAND DATA to ANT tuner.
⑪ 2	AT2	
⑪ 3	AT3	
⑪ 4	AT4	
⑪ 5	AT0	
⑪ 6	LP2	BAND DATA in transmit to the Filter unit.
⑪ 7	LP0	
⑪ 8	LP1	
⑪ 9	RB3	BAND DATA in receive to the Signal unit.
⑪ 10	RB2	
⑪ 11	RB0	
⑪ 12	RB1	
⑫ 1	G	GND
⑫ 2	PLL1	Serial division data for PLL1 10Hz steps.
⑫ 3	G	GND
⑫ 4	CK	Clock signal.
⑫ 5	G	GND
⑫ 6	PLL2	Serial division data for PLL2 2kHz steps.
⑫ 7	G	GND
⑫ 8	EN	Division data store signal for PLL IC, data is shifted at "H".
⑬ 1	−	Not used.
⑬ 2	VFO A	Indicator.
⑬ 3	ON	
⑬ 4	LOCK	
⑬ 5	P2	DATA for analog digit.
⑬ 6	P3	
⑬ 7	P4	
⑬ 8	P1	
⑬ 9	P9	
⑬ 10	P10	
1	g	
2	DP	Dot "•"

CIRCUIT DESCRIPTION





Terminals

$P_{20} \sim P_{23}$	:	Input Output (Port 2)
$P_{40} \sim P_{43}$	:	Input Output port (Port 4)
$P_{50} \sim P_{53}$	:	Input Output port (Port 5)
$P_{60} \sim P_{63}$	:	Input Output port (Port 6)
$P_{70} \sim P_{73}$	:	Input Output port (Port 7)
$\overline{CS}$	:	Chip Select
PROG	:	Program pulse
		Input Output port (Port 2)

Maximum Rating (Ta = 25°C)

Item	Symbol	Rating
Operating voltage	Vcc	−0.5 ~ +7V
Input voltage	Vi	−0.5 ~ +7V
Output voltage	Vo	−0.5 ~ +7V
Operating temperature	Topt	0 ~ +70°C
Storage temperature	Tstg	−60 ~ +150°C

Fig. 5 μPD8243C (Digital unit IC5)

Pin No.	Name	Functions		
13	P70	G2 } Digit output		
14	P71	G1 } Digit output		
15	P72	H	H } Scale DATA output	L
16	P73	H	L } Scale DATA output	H
2	P40	e	P9	VFO B
3	P41	f	P10	MEMO
4	P42	g		
5	P43	Dp } Segment	Scale DATA	
1	P50	a } DATA	P1	(–)
23	P51	b	P2	LOCK
22	P52	c	P3	RIT
21	P53	d	P4	VFO A
20	P60		P5	
19	P61		P6	
18	P62		P7	
17	P63		P8	

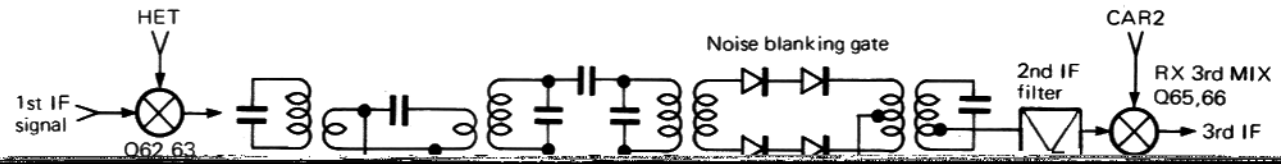
"White" 0 100 200 "Red"

Table 4

CIRCUIT DESCRIPTION

Terminals No.	Terminals Name	Functions	Terminals No.	Terminals Name	Functions
1	T0	RIT encoder clock signal, count at "L".	21	P20	I/O Expander control output.
2	X1	Xtal input	22	P21	
3	X3		23	P22	
4	–		24	P23	
5	$\overline{SS}$	Single step.	25	PROG	
6	$\overline{INT}$	Interrupt.	26	VDD	5V
7	EA	External access. Nomally GND.	27	P10	Digit output.
8	$\overline{RD}$	Read	28	P11	
9	–		29	P12	
10	$\overline{RW}$	Read/Write	30	P13	
11	ALE	Address latch enable.	31	P14	
12	DB0	External Data bus.	32	P15	
13	DB1		33	P16	
14	DB2		34	P17	
15	DB3		35	P24	Enable data for PLL.
16	DB4		36	P25	Tone output.

CIRCUIT DESCRIPTION



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CIRCUIT DESCRIPTION

CIRCUIT DESCRIPTION

● **Notch filter in the Signal unit**

The notch filter is a bridged-T filter consisting of L, C and

● **Temperature protection circuit in the Filter unit**

This circuit also uses the signal from thermistor TH1 on

CIRCUIT DESCRIPTION

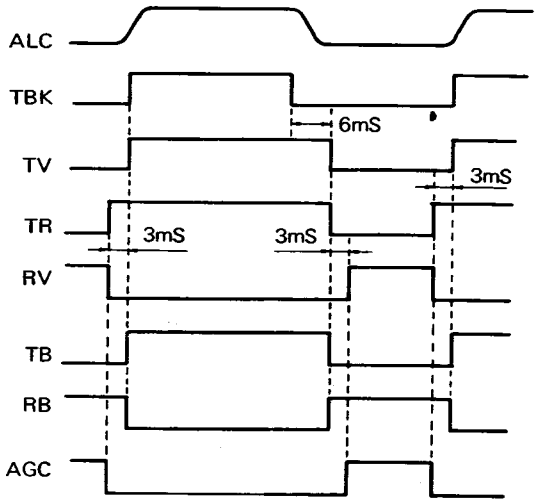


Fig. 16 T-R timing chart
(CW full break-in, SSB, FSK and TUNE modes)

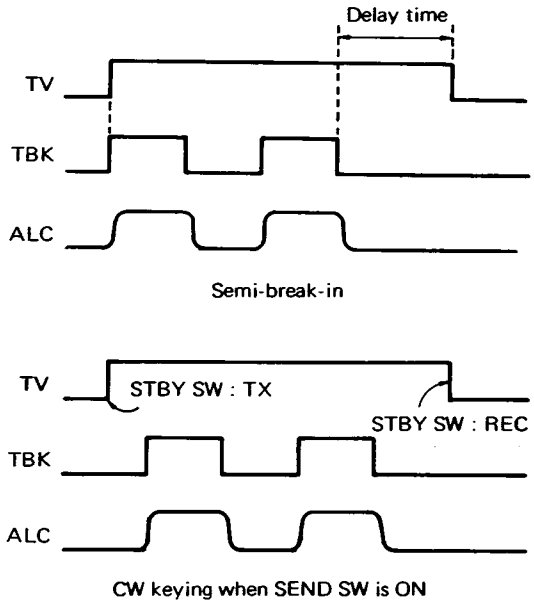
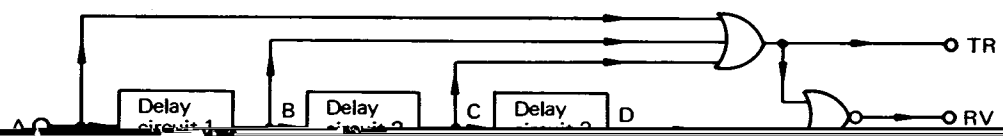


Fig. 17 CW operation timing chart



TC 9999

CIRCUIT DESCRIPTION

● ALC circuit in the Signal unit

For all modes, except CW full break-in, forward wave voltage VSF detected in the Filter unit is applied to the base of Q45 in the Signal unit. Q45 and Q44 form a differential amplifier. When VSF is applied, the collector voltage of Q44 rises and that of Q47 drops. The gate voltage of Q52 then drops, as do the base and emitter voltages of Q51. As a result, the ALC line voltage is dropped through D70 and Q51 to control transmitter power. The level at the drain of Q52 is applied to the ALC meter. VR11 is the 0 adjustment, and VR12 is the sensitivity adjustment. For full break-in operation, the TBK signal generated during keying is applied to active low pass filter Q50, where key clicks are removed. This filtered signal is used as the ALC signal and is fed to the ALC line. As previously shown, the ALC voltage not only controls transmission power, but is also used for waveform shaping during CW operation.

● VSWR protection circuit in the Signal unit

Reflected wave voltage VSR is applied to the base of Q48 in the Signal unit. When the reflected power exceeds 25W (an SWR of about 3 : 1), Q48 is turned on and the voltage input to the ALC circuit is dropped to reduce transmission power.

● Final overcurrent protection circuit in the Signal unit

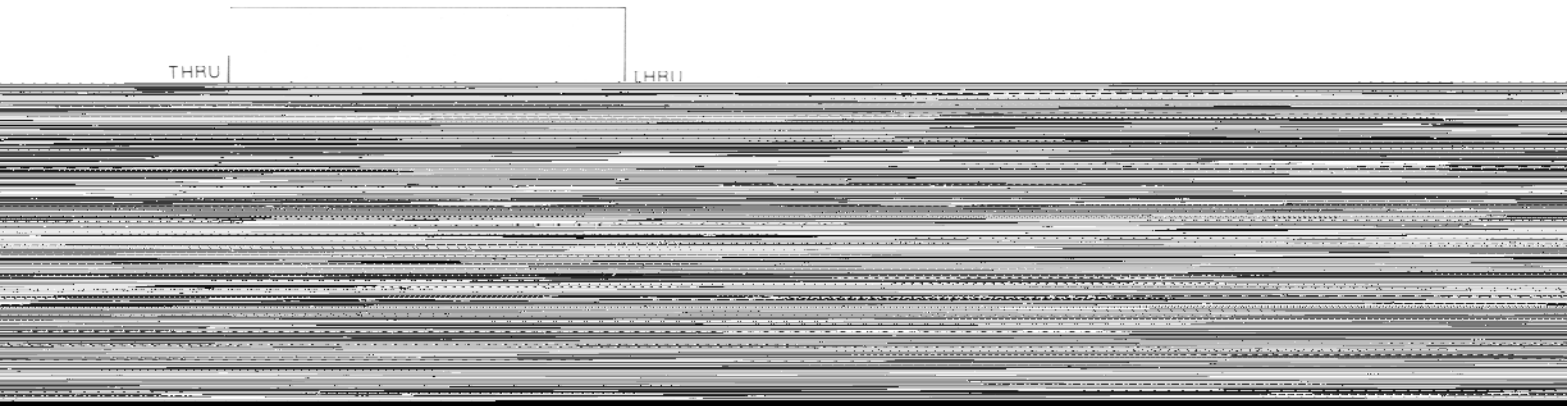
[redacted]

shaped by Q30 and applied to phase comparator Q29. The output level of Q29 changes according to the relationship between the phase of the antenna line current and voltage. This signal is applied to buffer Q28 pins 10 and 15. The levels at pins 12 and 13 change according to the input level, and these signals are applied to Q31 and Q32 (which control the motor drive circuit consisting of Q14 through Q19) so that motor M1 turns in either one direction or the other, according to the phase relationship, until the phase difference is minimized.

Voltages picked up by the directional coupler are also applied to Q39 pins 4 and 6 for comparison. When the voltage at pin 6 is higher than that at pin 4, the level at pin 1 is "H" and that at pin 2 is "L" (and vice versa). Motor M2 turns in either one direction or the other, according to these levels. The circuit is designed so that VC1 and VC2 (that is, M1 and M2) operate independently. However, since phase and voltage are not independent, both VC1 and VC2 operate as either phase or voltage varies.

When the input voltages to Q39 become equal, the level at pin 5 (or pin 7) is determined by the divider consisting of R100 and R104 (or R105 and R101) so it is lower than the corresponding input level ; then output levels at both pins 1 and 2 go "L", the motor drive circuit turns off and the motor stops.

CIRCUIT DESCRIPTION

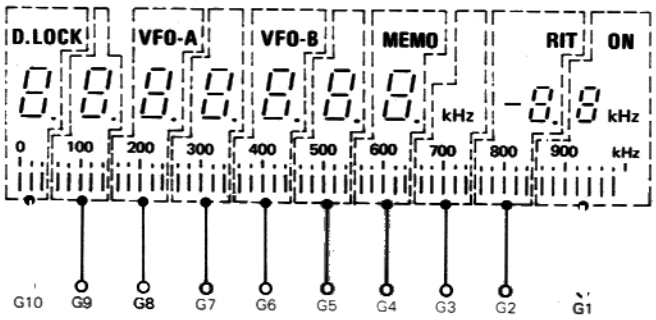


FILTER DATA

Item	Rating
Nominal center frequency	44.930MHz
Pass bandwidth	±6kHz or more at 6dB
Attenuation bandwidth	±25kHz or less at 30dB
Ripple	1.5dB or less
Loss	4dB or less

Item	Rating
Nominal center frequency	8830.0kHz
Center frequency deviation	Within ±70Hz at 6dB (25°C)
Pass bandwidth	±250Hz or more at 6dB
Attenuation bandwidth	±900Hz or less at 60dB
Guaranteed attenuation	80dB or more within

SEMICONDUCTOR DATA



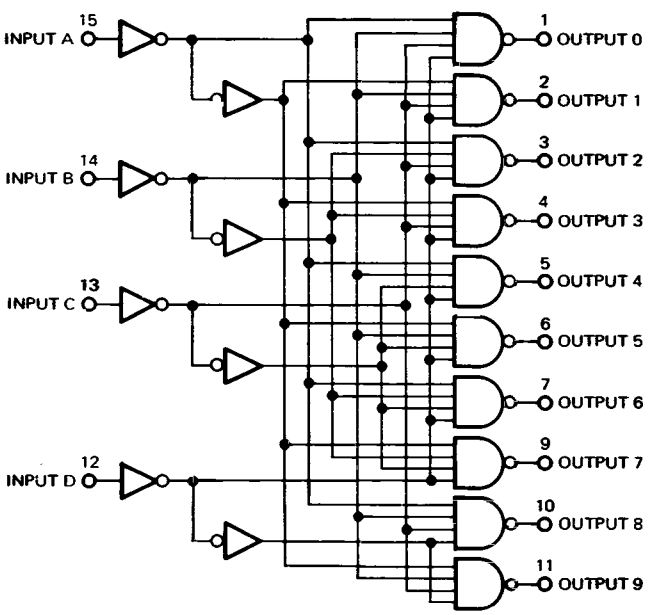
11-BT-03Z (Switch unit V1)

Item	Symbol	Rating
Gate-Drain voltage	V_{CDO}	−25V
Gate-Source voltage	V_{GSO}	−25V
Continuous Drain current	I_D	100mA
Continuous Gate current	I_G	10mA
Power dissipation	Pch	500mW
Channel temperature	Tch	120°C
Storage temperature	Tstg	−50~+120°C

Ta=25°C

2SK125P MAX. Rating (RF unit Q1,2)

SEMICONDUCTOR DATA

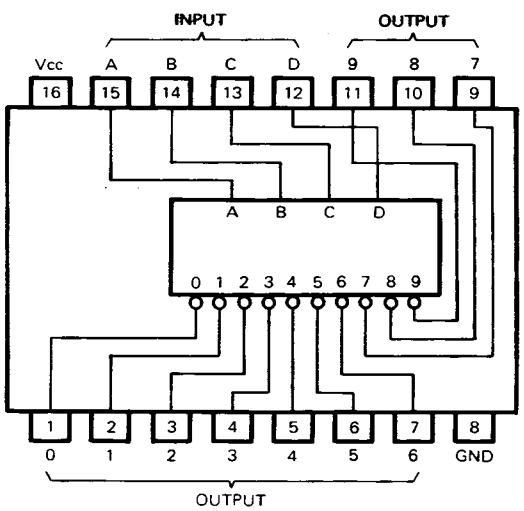


MB74LS42 Block diagram (LPF unit IC1)

No.	BCD input				Decimal output data									
	D	C	B	A	0	1	2	3	4	5	6	7	8	9
0	L	L	L	L	L	H	H	H	H	H	H	H	H	H
1	L	L	L	H	H	L	H	H	H	H	H	H	H	H
2	L	L	H	L	H	H	L	H	H	H	H	H	H	H
3	L	L	H	H	H	H	H	L	H	H	H	H	H	H
4	L	H	L	L	H	H	H	H	L	H	H	H	H	H
5	L	H	L	H	H	H	H	H	H	L	H	H	H	H
6	L	H	H	L	H	H	H	H	H	H	L	H	H	H
7	L	H	H	H	H	H	H	H	H	H	H	L	H	H
8	H	L	L	L	H	H	H	H	H	H	H	H	L	H
9	H	L	L	H	H	H	H	H	H	H	H	H	H	L
	H	L	H	L	H	H	H	H	H	H	H	H	H	H
	H	L	H	H	H	H	H	H	H	H	H	H	H	H
	H	H	L	L	H	H	H	H	H	H	H	H	H	H
	H	H	L	H	H	H	H	H	H	H	H	H	H	H
	H	H	H	L	H	H	H	H	H	H	H	H	H	H
	H	H	H	H	H	H	H	H	H	H	H	H	H	H

H : High level, L : Low level

MB74LS42 Functions table



MB74LS42

Item	V_{CBO}	V_{CEO}	V_{EBO}	I_C	icp	Pc	Tj	Tstg
Condition						Tc= 25°C		
Rating	−100V	−80V	−5V	−500mA	−800mA	600mW	150°C	−55~ +150°C

Ta=25°C

2SK984K MAX. Rating
(Digital unit Q1,16, Signal unit Q23)

Item	V_{CBO}	V_{CEO}	V_{EBO}	I_C	icp	Pc	Tj	Tstg
Condition						Tc= 25°C		
Rating	100V	80V	5V	500mA	800mA	600mW	150°C	−55~ +150°C

Ta = 25°C

2SC2274K MAX. Rating (Digital unit Q14,15)

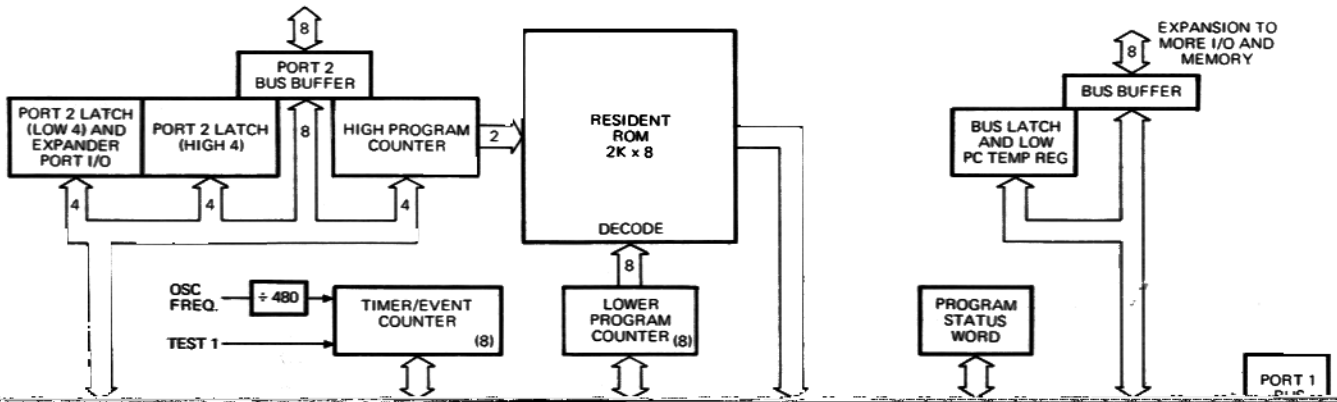
Item	Symbol	Rating
Collector-Emitter voltage	V_{CEO}	35V
Collector-Base voltage	V_{CBO}	65V
Emitter-Base voltage	V_{EBO}	4.0V
Continuous Collector current	I_C	1.0A
Total device dissipation Tc=50°C Derate above 50°C	P_D	30W 0.3W/°C
Storage temperature	Tstg	−65~+150°C

MRF485 MAX. Rating (100W Final unit Q2,3)

Item	Symbol	Rating
Collector-Emitter voltage	V_{CEO}	40V
Collector-Base voltage	V_{CBO}	85V
Emitter-Base voltage	V_{EBO}	3.0V
Continuous Collector current	I_C	20A
Withstanding current −10s	−	30A
Total device dissipation Tc=25°C Derate above 25°C	P_D	290W 1.66W/°C
Storage temperature	Tstg	−65~+200°C

MRF422 MAX. Rating (100W Final unit Q4,5)

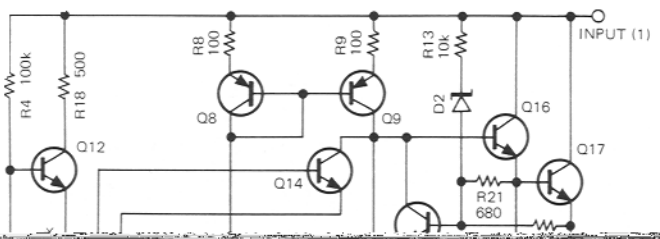
SEMICONDUCTOR DATA

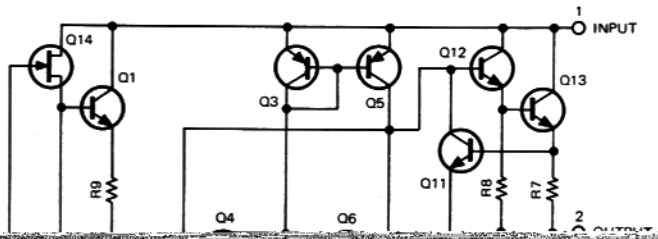


TS-930S

SEMICONDUCTOR DATA

SEMICONDUCTOR DATA





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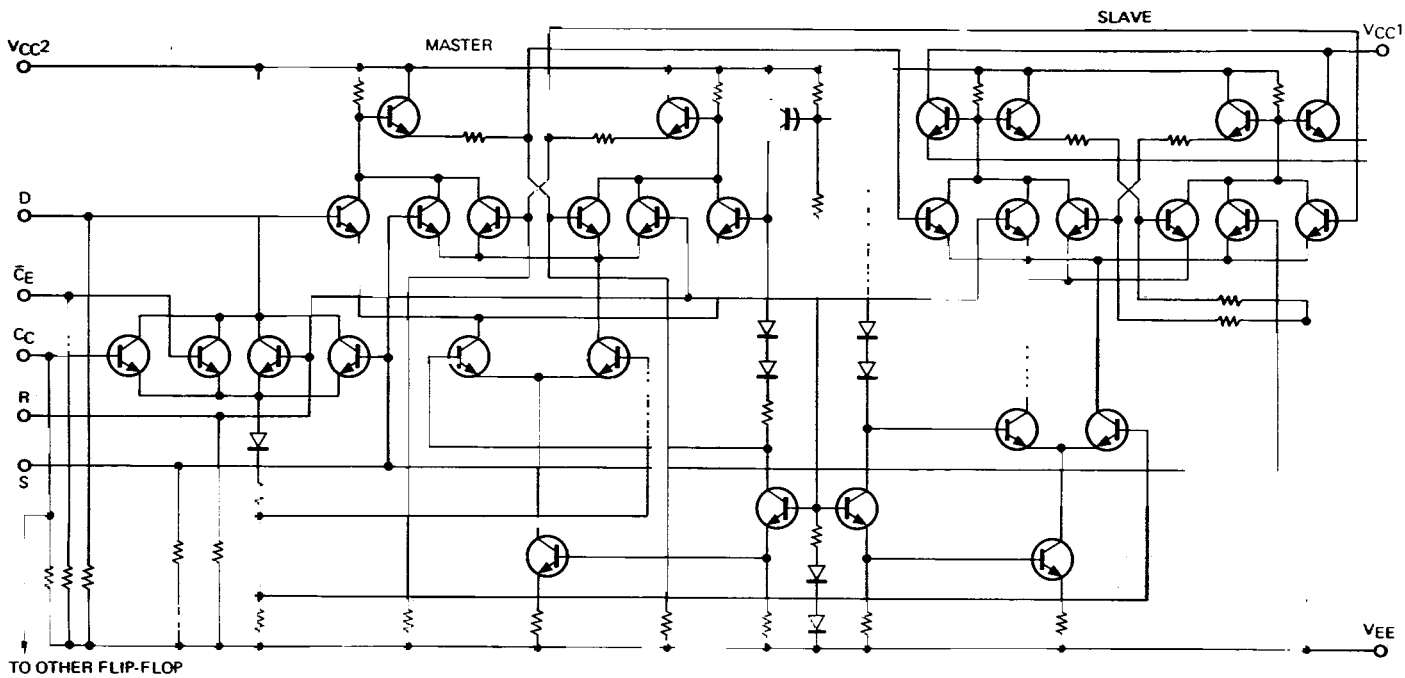
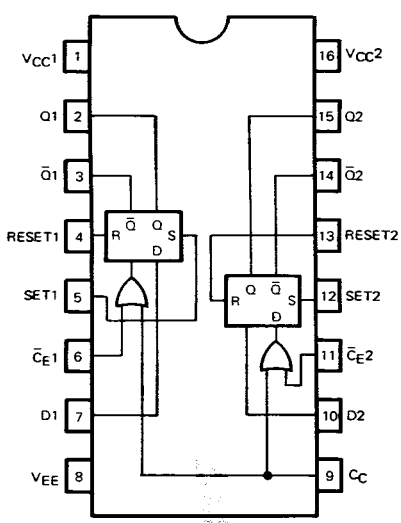
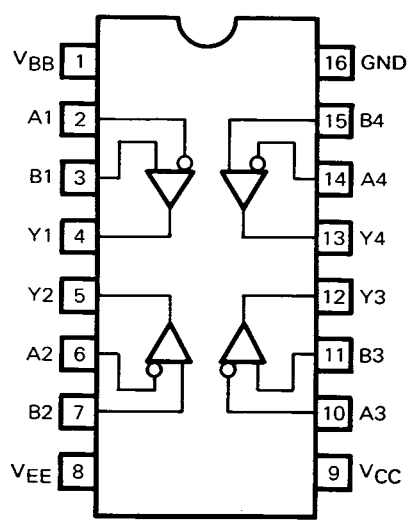


HD10131 Equivalent circuit 1/2 (AT unit Q29)

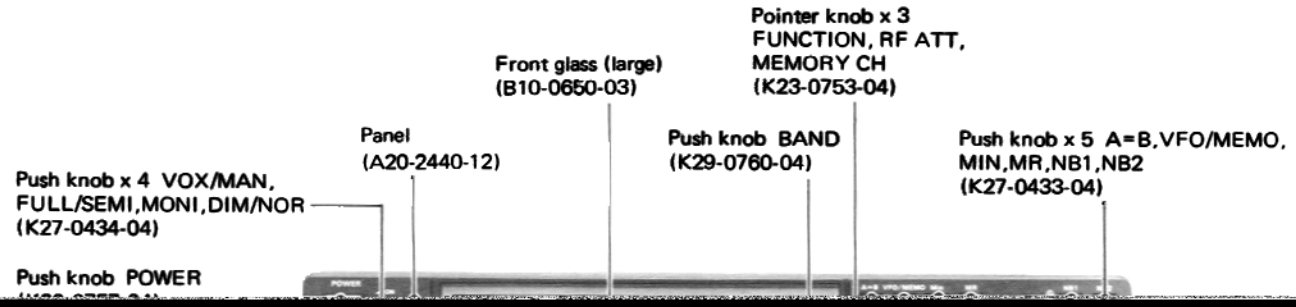


HD10131 (TOP VIEW)



HD10125 (AT unit Q28)
(TOP VIEW)

OUTSIDE VIEWS



LPF UNIT (X51-1:

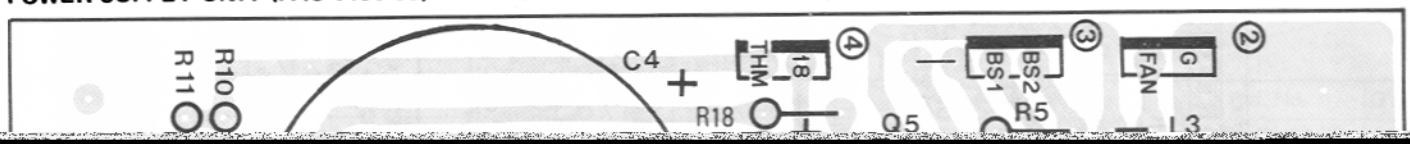
Component side view

TS-930S PC BOARD VIEW

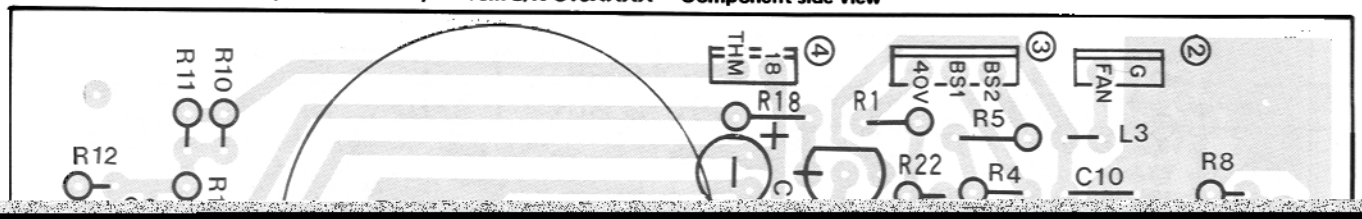
SWITCH UNIT (X41-1410-00) From S/N 208XXXX–309XXXX Component side view

TS-930S PC BOARD VIEWS

POWER SUPPLY UNIT (X43-1430-00) **From S/N 208XXXX–309XXXX Component side view**



POWER SUPPLY UNIT (X43-1430-00) From S/N 310XXXX– Component side view

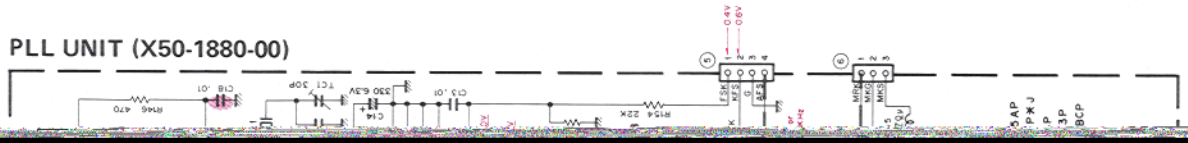


TS-930S PC BOARD VIEW

PLL UNIT (X50-1880-00) **Component side view**

2SA1015
2SC1775

PLL UNIT (X50-1880-00)

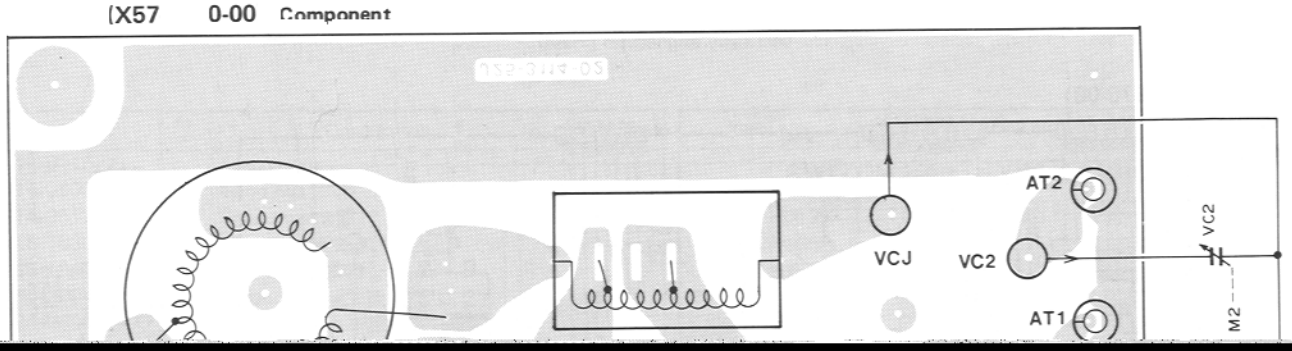


TS-930S PC BOARD VIEW

DIGITAL UNIT (X54-1670-00) Component side view

TS-930S PC BOARD V W

(X57 0-00 Component



AT UNIT (X57-1010-00)

SIGNAL UNIT (X57-1000-11) A/2 From S/N208XXXX–309XXXX Component side view

TR, FET, IC and Terminals address from S/N 310XXXX–

TR,FET	Address	TR,FET	Address	TR,FET	Address	Terminal	Address
Q1	Not used	Q71	G–6	Q141	F–3	①	A,B–1

SIGNAL UNIT (X57-1000-11) A/2 From S/N310XXXX Component side view


Q161

TS-930S PC BOARD VIEWS

SIGNAL UNIT (X57-1000-11) A/2 From S/N310XXXX– Foil side view

TR, FET, IC and Terminals address from S/N 310XXXX–

TR,FET	Address	TR,FET	Address	TR,FET	Address	Terminal	Address
Q1	Not used	Q71	G–6	Q141	F–3	①	A,B–1

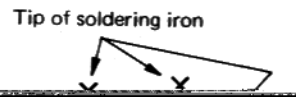
PARTS LIST

Note :

Soldering procedure for the chip capacitor

- Tools and materials
  Soldering iron
  1/8''–3/32'' wide wedge tip
  Solder (Silver solder or low temperature solder)
  Soft jaw tweezers
  Hot plate or drier
- Soldering procedure

2) Length of soldering time :
   In case of silver solder : Within 6 – 8 sec.
   In case of low temperature solder : Within 3 – 4 sec.
3) Keep the temperature of tip of soldering iron below 280°C.



PARTS LIST

Name		Re-marks	Parts No.
	WZ-182		V11-4100-10
	WZ-192		V11-0308-05
	XZ-033		V11-4176-96
	XZ-051		V11-4103-60
	XZ-055		V11-4105-51
	XZ-066		V11-4106-70
	XZ-076		V11-4126-36
	XZ-090		V11-4167-06
	XZ-122		
	XZ-200		V11-4101-70
LED	BG5532K (Green)	N	V11-7261-16
	LT8001P	N	V11-4360-76
	PR5532K (Blue)		V11-7272-36
Surge absorber	ERZC07DK201	N	V11-1163-26
	ERZD03DK331		V11-1163-16
Thermistor	25D29		V11-3360-16
	SDT500		
	SDT1000		
	5T-35		V11-2262-06
	5T-41		V11-2263-06
Photo interruptor	ON1110	N	V11-1173-86
	ON1105		V11-1173-76
Display tube	11-BT-03Z	N	V40-7760-66
TR	2SA473(Y)		V01-0473-06
	2SA496(Y)		V01-0113-05
	2SA733(P)		V01-0733-16
	2SA950(Y)	N	V01-0950-16
	2SA984K(E)	N	V01-0984-10
	2SA1015(Y)		V01-1015-06
	2SA1021(O)	N	V01-1021-16
	2SA1049(GR)	N	V01-1049-16
	2SB861(C)		
	2SC460(B)		V03-0079-05
	2SC496(Y)		V03-0336-05

Name		Re-marks	Parts No.
	2SK125		V09-1004-26
	2SK125P	N	V09-1004-36
	2SK192A*J(GR)		
	3SK73(GR)		V09-1002-46
IC	HA1368	N	V30-1129-16
	HD10116	N	V30-1243-06
	HD10125	N	V30-1243-16
	HD10131	N	V30-1243-26
	HD74LS00P		V30-1046-06
	HD74LS01P		V30-1009-36
	HD74LS02P		V30-1007-36
	HD74LS73P		V30-1076-16
	HD74LS75P		V30-1008-96
	HD74LS90P		V30-1083-06
	HD74LS151P		V30-1008-26
	LM358P		V30-1024-56
	MB74LS42		V30-1241-46
	MB3614	N	V30-1242-16
	MC1723CL		V30-0199-05
	MC14077B	N	V30-1211-36
	MC145155P*J	N	
	MC145156P	N	V30-1203-36
	MC14569BCP		V30-1100-06
	MD74LS90P		
	NE555P	N	V30-0686-10
	NJM2901	N	V30-1020-56
	NJM2903D	N	V30-1020-96
	NJM2904D	N	V30-1021-06
	SN74LS00N		V30-1005-66
	SN74LS01N		V30-1041-16
	SN74LS02N		V30-1041-06
	SN74LS73N		V30-1117-06
	SN74LS75N		V30-1005-16
	SN74LS90N		V30-1005-26
	SN74LS145N	N	V30-1152-26
	SN74LS151N		V30-1240-16

PARTS LIST

○ : From S/N208XXXX–309XXXX
● : From S/N310XXXX–

Parts No.	Remarks	Description	Ref. No.
TS-930S GENERAL			
A01-0922-21	N	Case (upper)	
A01-0927-21	N	Case (lower) ○	
A01-0927-31	N	Case (lower) ●	
A20-2440-12	N	Panel	
A23-1466-22	N	Rear panel	
B03-0525-04	N	Switch mask x 2 RIT	
B03-0526-04	N	Switch mask POWER	
B05-0722-04	N	SP grill cloth	
B06-0504-04	N	Front glass grill cloth	
B07-0638-04	N	Band escutcheon	
B09-0011-04		Rubber cap	
B10-0650-13	N	Front glass (large)	
B10-0651-04	N	Front glass (small)	
B30-0826-05	N	Pilot lamp x 2 28V	PL1,2
B31-0635-05	N	Meter	
B40-2605-04	N	Name plate TS-930S T	
B40-2606-04	N	Name plate TS-930S K,M,W,X	
B41-0629-04	N	Caution plate	
B42-1727-04	N	Adj. seal	
B42-1728-04	N	Adj. seal VOX CONTROL	
B42-1729-04	N	Name plate	
B42-1777-04		Adj. seal ○	
B42-1794-04	N	Adj. seal ●	
B43-0669-04		Name plate TRIO T	
B43-0670-04		Name plate KENWOOD K,M,W,X	
B43-0676-04	N	Name plate	
B46-0407-00		Warranty card K	
B50-3959-20	N	Instruction manual K,M,W,X	
B50-3961-10	N	Instruction manual T	
B58-0644-11	N	Instruction sheet	

Parts No.	Remarks	Description	Ref. No.
F07-0841-14	N	Slide cover	
F07-0842-13	N	Heat sink cover	
F09-0405-24		Fan	
F20-0525-05		Insulating sheet ●	
F20-0527-05	N	Insulating sheet x 2 TR	
F29-0014-05		Shoulder washer ●	
F29-0401-04		Capacitor mounting hardware x 2	
F29-0406-03		Fan motor mounting hardware	
F29-0421-04	N	Protective sheet x 5	
G01-0817-04	N	Coil spring x 4	
G09-0405-05		Knob fixed spring	
G09-0410-05		Knob fixed spring x 3	
G13-0662-04	N	Cushion Speaker	
G53-0510-04		Packing x 2 Case	
G53-0511-04		Packing x 2	
H01-4409-14	N	Packing carton (inside) K,M,W,X	
H01-4410-14	N	Packing carton (inside) T	
H10-1276-04		Cushion M,X	
H10-2558-02	N	Packing fixture (F)	
H10-2559-02	N	Packing fixture (R)	
H12-0491-04	N	Cushion K,T,W,X	
H20-1403-03		Protective cover	
H25-0105-04		Protective bag 150 x 350	
H25-0120-04		Protective bag	
J02-0049-14		Foot (large) x 2 Rear	
J02-0423-04		Foot x 2 Front	
J02-0424-04		Foot x 2	
J02-0426-05	N	Foot (small) x 4	
J13-0033-15		Fuse holder	
J19-1354-05		Battery case	
J61-0019-05		Vinyle tie x 20	

PARTS LIST

Parts No.	Re-marks	Description	Ref. No.
N14-0115-05		Flange nut	
N14-0509-05		Wing nut	
N14-0512-05		Speed nut x 5	
N15-1030-41		Flat washer x 6	
N15-1040-41		Flat washer x 5	
N30-2004-41		Round screw x 6	
N30-2604-41		Round screw x 5	
N30-2605-46		Round screw x 8	
N30-2606-45		Round screw x 4	
N30-2606-46		Round screw x 3	
N30-3004-46		Round screw x 15	
N30-3006-46		Round screw x 11	

Parts No.	Re-marks	Description		Ref. No.	Q'ty
SWITCH UNIT (X41-1410-00)					
CK45B1H012K		C 0.001		C10	1
CK45E2H103P		C 0.01		C1	1
CK45F1H103Z		C 0.01		C2,5,6	3
CK45F1H103Z		C 0.01	o	C8	1
CK45F1H473Z		C 0.047		C3,4	2
CQ92M1H153K		ML 0.015		C9	1
C91-0456-05		C 0.047		C7	1
C91-0456-05		C 0.047	●	C8	1

PARTS LIST

Parts No.	Re-marks	Description	Ref. No.	Q'ty
S01-1432-05	N	Rotary switch FUNCTION, RF ATT	S23,25	2

Parts No.	Re-marks	Description	Ref. No.	Q'ty
RF UNIT (X44-1490-00)				

PARTS LIST

Parts No.	Re-marks	Description	Ref. No.	Q'ty
CC45SL1H070D		C 7pF	C26,40,42,165,168	5
CC45SL1H100D		C 10pF	C23,99,116,117, 122,164	6
CC45SL1H101J		C 100pF	C32,180	2
CC45SL1H150J		C 15pF	C11	1
CC45SL1H151J		C 150pF	C17	1
CC45SL1H220J		C 22pF	C3,41,68,85,98, 166,167	7
CC45SL1H330J		C 33pF	C15,109,169	3
CC45SL1H560J		C 56pF	C194	1
CC45SL1H680J		C 68pF	C110	1
CC45UJ1H070D		C 7pF	C58	1
CC45UJ1H150J		C 15pF	C55	1
CC45UJ1H180J		C 18pF	C57,73	2
CC45UJ1H270J		C 27pF	C74	1
CC45UJ1H330J		C 33pF	C54,75	2
CC45UJ1H470J		C 47pF	C190	1
CC45UJ1H560J		C 56pF	C72	1
CE04W0J331M		E 330 6.3V	C14	1
CE04W1A101M		E 100 10V	C183	1
CE04W1A470M		E 47 10V	C8,70,84,176	4
CE04W1C101M		E 100 16V	C50,79	2
CE04W1C220M		E 22 16V	C53,67,76	3
CE04W1C470M		E 47 16V	C59	1
CE04W1H010M		E 1 50V	C5	1
CK45B1H102K		C 0.001	C21	1
CK45B1H222K		C 0.0022	C47,65,135	3
CK45B1H471K		C 470pF	C82,184,195,196	4
CK45F1H103Z		C 0.01	C13,18,20,22, 33–39,43–45,51, 52,56,60,64,71, 77,78,95,96,100, 102–108,112, 118–121,123–126, 134,136–142,153, 155–163,170–175, 177–179,188,189, 193	71
CQ92M1H123K		ML 0.012	C88,90	2
CQ92M1H222K		ML 0.0022	C6	1
CQ92M1H273K		ML 0.027	C89	1
CQ92M1H333K		ML 0.033	C10,48	2
CQ92M1H472K		ML 0.0047	C81	1
CQ92M1H473K		ML 0.047	C7,185	2
C91-0456-05		C 0.047	C1,4,9,12,24,25, 46,49,66,69,80, 83,86,87,91–94, 97,181,182,186, 187	23
E04-0154-05	N	Coax. connector		2
E23-0047-04		Square terminal		2
E40-0273-05		Mini connector 2P		2
E40-0373-05		Mini connector 3P		3
E40-0473-05		Mini connector 4P		1
E40-0873-05		Mini connector 8P		2
J31-0502-04		PC board collar		7
J42-0428-05		PC board bushing		7

Parts No.	Re-marks	Description	Ref. No.	Q'ty
L32-0196-05		OSC coil 20M	T14	1
L32-0649-05	N	OSC coil 50M	T15	1
L34-0709-05		Tuning coil 10M	T11,12	2
L34-0711-05		Tuning coil 14M	T7	1
L34-0712-05		Tuning coil 14M	T9	1
L34-0713-15		Tuning coil 14M	T8	1
L34-2075-05	N	Tuning coil 50M,60M	T1–6	6
L34-2076-05	N	Tuning coil 40M	T16–18	3
L34-2077-05	N	Tuning coil 8.83M	T13	1
L34-2078-05	N	Tuning coil 5M	T10	1
L40-1011-04		Ferri-inductor 100μH	L2,28	2
L40-1511-03		Ferri-inductor 150μH	L16,27,31	3
L40-2701-03		Ferri-inductor 27μH	L23,24	2
L40-4701-03		Ferri-inductor 47μH	L10–15,17,29,32	9
L40-4711-03		Ferri-inductor 470μH	L1,3–5,9,18–20, 25,26,30,35,36	13
L40-6825-04		Ferri-inductor 6.8mH	L21,22	2
L40-8291-02		Ferri-inductor 8.2μH	L6–8,33,34	5
L71-0233-05	N	MCF 8.8495MHz	MCF1,2	1A
L77-0720-05		Crystal 10.24MHz	X2	1
L77-0963-05	N	Crystal 20MHz	X1	1
R12-1408-05	N	Trim. pot. 4.7kΩ(B)	VR1,2	2
RC05GF2H390J		Solid 39Ω 1/2W	R81	1
R90-0536-05	N	Inline block 6.8kΩx6	IB1	1
R92-0150-05		Short jumper		31

LPF UNIT (X51-1280-00)

CC45SL1H101J		C 100pF	C91	1
CC45SL2H050C		C 5pF 500V	C56	1
CC45SL2H070D		C 7pF 500V	C57	1
CC45SL2H101J		C 100pF 500V	C1,7,18,26,37, 38,55,63	8
CC45SL2H120J		C 12pF 500V	C60	1
CC45SL2H121J		C 120pF 500V	C15,25,27	3
CC45SL2H150J		C 15pF 500V	C43,61	2
CC45SL2H151J		C 150pF 500V	C6,10,21,22,31, 42	6
CC45SL2H181J		C 180pF 500V	C14,30,41	3
CC45SL2H220J		C 22pF 500V	C4	1
CC45SL2H221J		C 220pF 500V	C9,17,50,58	4
CC45SL2H330J		C 33pF 500V	C3,8,99	3
CC45SL2H331J		C 330pF 500V	C13,19,20,28,47, 52	6
CC45SL2H390J		C 39pF 500V	C100	1
CC45SL2H391J		C 390pF 500V	C16,23,33	3
CC45SL2H470J		C 47pF 500V	C2,44,45,49,59	5
CC45SL2H471J		C 470pF 500V	C24	1
CC45SL2H560J		C 56pF 500V	C62	1
CC45SL2H680J		C 68pF 500V	C46	1
CC45SL2H681J		C 680pF 500V	C36	1
CE04W1A221M		E 220 10V	C72	1
CK45F1H103Z		C 0.01	C74–78,80–86, 106	13
CK45F1H473Z		C 0.047	C66	1
CM93D2H102J		MC 0.001 500V	C51	1

PARTS LIST

Parts No.	Re-marks	Description	Ref. No.	Q'ty
CM93D2H152J		MC 0.0015 500V	C29	1
CM93D2H222J		MC 0.0022 500V	C32	1
CM93D2H821J		MC 820pF 500V	C35	1
C91-0456-05		C 0.047	C64,65,67–71,73	8
E04-0154-05		Coax. connector		3
E23-0401-05		Round terminal		8
E40-0273-05		Mini connector 2P		1
E40-0373-05		Mini connector 3P		2
E40-0473-05		Mini connector 4P		1
E40-0573-05		Mini connector 5P		2
L34-3038-05	N	Filter coil A 1.5–2.5	L9	1
L34-3039-05	N	Filter coil B 1.5–2.5	L8	1
L34-3040-05	N	Filter coil C 2.5–4.0	L12	1
L34-3041-05	N	Filter coil D 2.5–4.0	L13	1
L34-3042-05	N	Filter coil E 4.0–6.0	L6,7	2
L34-3043-05	N	Filter coil F 6.0–10.5	L3–5	3
L34-3046-05	N	Filter coil I 10.5–15.5	L10	1
L34-3047-05	N	Filter coil J 10.5–15.5	L11	1
L34-3048-15	N	Filter coil K 15.5–22.0	L14,15	2
L34-3050-05	N	Filter coil M 22.0–30.0	L1	1
L34-3051-15	N	Filter coil N 22.0–30.0	L2	1
L39-0414-05	N	Detector coil	L27,28	2
L40-1011-03		Ferri-inductor 100μH	L31,34–40	8
L40-1011-04		Ferri-inductor 100μH	L22	1
L40-1021-03		Ferri-inductor 1mH	L24,25	2
L40-1511-03		Ferri-inductor 150μH	L16–21,26	7
L40-4791-02		Ferri-inductor 4.7μH	L30	1
N30-3006-41		Round screw		2
N32-3006-41		Flat screw		2
N87-3006-46		Self tapping screw		12
RC05GF2H101J		Solid 100Ω 1/2W	R48–51	4
RC05GF2H121J		Solid 120Ω 1/2W	R53	1
RC05GF2H182J		Solid 1.8kΩ 1/2W	R30	1
RC05GF2H2R2J		Solid 2.2Ω 1/2W	R58–61	4
RC05GF2H681J		Solid 680Ω 1/2W	R17,18	2

Parts No.	Re-marks	Description	Ref. No.	Q'ty
CE04W1C220M		E 22 16V	C12	1
CE04W1C471M		E 470 16V	C9	1
CE04W1E331M		E 330 25V	C6	1
CE04W1H010M		E 1 50V	C23,25	2
CE04W1H100M		E 10 50V	C2,5,40	3
CE04W1H220M		E 22 50V	C3,4	2
CK45B1H102K		C 0.001	C1,16,26–31	8
CK45F1H103Z		C 0.01	C20,50	2
CQ92M1H272K		ML 0.0027	C38	1
C90-0824-05		E 1 50V	C47–49	3
C91-0456-05		C 0.047	C7,10,13,17,18, 22,32–35,41,43	12
E29-0413-05		1P connector (female)		1
E40-0273-05		Mini connector 2P		1
E40-0373-05		Mini connector 3P		2
E40-0473-05		Mini connector 4P		2
E40-0673-05		Mini connector 6P		1
E40-0773-05		Mini connector 7P		2
E40-0873-05		Mini connector 8P		4
E40-1073-05		Mini connector 10P		1
E40-1173-05		Mini connector 11P		1
E40-1273-05		Mini connector 12P		2
J31-0502-04		PC board collar		6
J42-0404-05		PC board bushing		6
L19-0336-05	N	DC-DC transf.	T1	1
L40-1011-04		Ferri-inductor 100μH	L1–4	4
L40-1021-03		Ferri-inductor 1mH	L5–11	7
L77-0964-05	N	Crystal 5.59MHz	X1	1
N35-3006-46		Bind screw		2
N88-3008-46		Flat tapping screw		2

PARTS LIST

Parts No.	Re-marks	Description	Ref. No.	Q'ty
MAIN ENCODER UNIT (X54-1680-00)				
CE04W0J221M		E 220 6.3V	C1	1
CE04W0J470M		E 47 6.3V	C2	1
D09-0304-04		Encoder slit		1
D21-0823-05	N	Shaft ass'y		1
E23-0015-04		Earth lug		2
G02-0519-04		Spring plate		1
J19-1342-04		Senser mounting hardware (A)		1
J19-1343-04		Senser mounting hardware (B)		1
N30-3006-46		Round screw		4
N32-3020-46		Flat screw		1
N89-3005-46		Bind tapping screw		3
R12-2409-05		Trim. pot. 5kΩ(B)	VR1,2	2
RIT ENCODER UNIT (X54-1690-00)				
CE04W0J101M		E 100 6.3V	C1	1
D09-0305-04	N	Encoder slit		1
D21-0824-05	N	Shaft ass'y		1
N30-2606-46		Round screw		2
R12-2409-05		Trim. pot. 5kΩ(B)	VR1,2	2
100W FINAL UNIT (X56-1430-00)				
CC45SL1H271J		C 270pF	C35	1
CC45SL1H331J		C 330pF	C2,9	2
CC45SL2H101J		C 100pF 500V	C8,40,42	3
CE04W1A471M		E 470 10V	C18	1
CE04W1H100M		E 10 50V	C12	1
CE04W1H101M		E 100 50V	C24	1
CK45B1H102K		C 0.001	C4,10,19,23,39	5
CK45F1H473Z		C 0.047	C6,7,15,22	4
CM73F2H331J	N	MC 330pF 500V	C33	1
CM73F2H391J	N	MC 390pF 500V	C38	1
CM73F2H681J	N	MC 680pF 500V	C28	1
CQ92M1H473K		ML 0.047	C21	1
C91-0456-05		C 0.047	C1,3,5,11,13,14, 20,25–27,36,37	12
C91-0491-05	N	Cap. 0.0047	C16,17	2
C91-0493-05	N	Cap. 0.47	C29,30	2

Parts No.	Re-marks	Description	Ref. No.	Q'ty
E04-0157-05		Mini pin jack A		2
E23-0433-05	N	Terminal		8
E40-0373-05		Mini connector 3P		1
F01-0771-15	N	Heat sink		1
F07-0839-03	N	Heat sink cover		1
F09-0405-24		Fan		1
F20-0078-05	N	Insulating sheet		6
F29-0014-05		Shoulder washer		10
F29-0406-03		Fan motor ass'y		1
L19-0337-05	N	Input transf.	T3	1
L19-0338-05	N	Input matching transf.	T2	1
L19-0339-05	N	Output transf. B	T4	1
L19-0340-05	N	RF transf. A	T1	1
L33-0025-05		RFC 1μH	L4,5	2
L33-0032-05		RFC 3μH	L2	1
L33-0617-05		RFC	L3,7–9	4
L33-0644-05		Choke coil 2.2μH	L17	1
L33-0651-05	N	Choke coil	L14,15	2
L33-0653-05	N	Choke coil	L16	1
L33-0655-05	N	RFC	L13	1
L40-1011-04		Ferri-inductor 100μH	L10	1
L40-1511-03		Ferri-inductor 150μH	L6,11,12,18	4
N09-0623-04		Sems screw		5
N09-0643-04	N	Sems screw w. cross head		1
N09-0658-04		Round screw Fan motor		2
N15-1030-41		Washer Fan motor		4
N30-2604-41		Round screw Fan motor		5
N30-3006-46		Round screw Thermistor		1
N35-3008-46		Round screw TR		4
N87-3006-46		Self tapping screw PC board		4
N89-3006-45		Bind tapping screw Cover		10
R12-0072-05		Trim. pot. 470Ω(B)	VR1	1
R12-1406-05		Trim. pot. 1kΩ(B)	VR2	1
RC05GF2H151J		Solid 150Ω 1/2W	R7	1
RC05GF2H220J		Solid 22Ω 1/2W	R9,10	2
RC05GF2H221J		Solid 220Ω 1/2W	R11,12	2
RC05GF2H3R9J		Solid 3.9Ω 1/2W	R23–26	4
RC05GF2H4R7J		Solid 4.7Ω 1/2W	R6	1
RC05GF2H5R6J		Solid 5.6Ω 1/2W	R27–30	4
RC05GF2H560J		Solid 56Ω 1/2W	R34	1
RS14AB3D330J		MF 33Ω 2W	R35	1
R92-0041-25		Cement 0.47Ω 1W	R21	1
R92-0150-05		Short jumper		3
T42-0302-05	N	Fan motor		1

PARTS LIST

Parts No.	Re-marks	Description	Ref. No.	Q'ty
SIGNAL UNIT (X57-1000-11) From S/N208XXXX–309XXXX				
C05-0013-15		Ceramic trimmer 20pF	TC3–6	4
C05-0030-15		Ceramic trimmer 20pF	TC1	1
C05-0314-05		Ceramic trimmer 100pF	TC2	1
C05-0320-05		Ceramic trimmer 30pF	TC7	1
CC45CH1H010C		C 1pF	C255	1
CC45CH1H020C		C 2pF	C471	1
CC45CH1H030C		C 3pF	C105,125,142, 280,473	5
CC45CH1H050C		C 5pF	C476	1
CC45CH1H0R5C		C 0.5pF	C199,249,356, 359,477	5
CC45CH1H070D		C 7pF	C106	1
CC45CH1H100D		C 10pF	C6,128,132,144, 310	5
CC45CH1H150J		C 15pF	C320,469	2
CC45CH1H220J		C 22pF	C340,454,456, 458,364	5
CC45RH1H010C		C 1pF	C107,121	2
CC45RH1H020C		C 2pF	C108,197,212	3
CC45RH1H030C		C 3pF	C178	1
CC45SL1H470J		C 47pF	C15,67,138,278, 313,472,530,656, 657	9
CC45SL1H680J		C 68pF	C13,59	2
CC45SL1H820J		C 82pF	C58,60	2
CC45TH1H030C		C 3pF	C349,462	2
CC45TH1H220J		C 22pF	C94	1
CC45TH1H270J		C 27pF	C99	1
CC45TH1H330J		C 33pF	C116	1
CC45TH1H680J		C 68pF	C464	1
CE04AW1H0R1M		E 0.1 50V	C386,510,534, 542,578	5
CE04AW1HR22M		E 0.22 50V	C86,171,486,509, 636	5
CE04W1A101M		E 100 10V	C488	1
CE04W1C100M		E 10 16V	C537,630	2
CE04W1C102M		E 1000 16V	C651	1
CE04W1C220M		E 22 16V	C151,167,221, 225,226,282,344, 392,396,450,505, 567–569,576, 583,587,631,632	19

PARTS LIST

Parts No.	Re-marks	Description	Ref. No.	Q'ty
CK45F1H103Z		C 0.01	C7,11,12,17,90,95, 102,104,111,117,118, 120,123,129,134,141, 143,145,146,166,172, 173,174,183,194,195, 208,209,219,236,237, 241,242,253,262,269, 271,277,281,284,324, 351,355,361,367,378, 413,430,435,437,439, 443,444,452,453,455, 457,459,461,475,493, 497,515,521,527,535, 539,544,547,559,561, 577,584,607–609, 655	77
CQ09S1H122J		S 0.0012	C402–404	3
CQ09S1H182J		S 0.0018	C518,519	2
CQ09S1H392J		S 0.0039	C554,610	2
CQ92M1H102K		ML 0.001	C26,170,213	3
CQ92M1H103K		ML 0.01	C168,447,448,451	4
CQ92M1H104K		ML 0.1	C643	1

Parts No.	Re-marks	Description	Ref. No.	Q'ty
C91-0457-05		C 0.022	C56,61,68,73,75 79,124,126,130, 131,133,136,137, 139,150,155,160, 238–240,243,246 247,250,251,257 260,261,270,272, 273,276,286–294, 299,312,318, 321–323,326,328, 337,350,354,357, 360,363,419,431, 442,445,460,467, 470,474,479,481	65
C91-0458-05		Laminated cap. 0.47	C169	1
C91-0472-05		ML 0.1	C211	1
E04-0154-05		Coax. connector		8
E23-0512-05		Round terminal		1
E40-0273-05		Mini connector 2P		12
E40-0373-05		Mini connector 3P		2
E40-0473-05		Mini connector 4P		5
E40-0511-05		Mini connector 5P	MC1–6	6

PARTS LIST

Parts No.	Re-marks	Description	Ref. No.	Q'ty
L34-2089-05	N	Tuning coil	L26	1
L34-2090-05	N	Tuning coil	L27	1
L34-2091-05	N	Tuning coil	L29	1
L34-2092-05	N	Tuning coil	L30	1
L34-2093-05	N	Tuning coil	L31,32	2
L34-2094-05	N	Tuning coil	L33	1
L34-2095-15	N	Tuning coil	L34	1
L34-2096-05	N	Tuning coil	L35	1
L34-2097-05	N	Tuning coil	L17	1

Parts No.	Re-marks	Description	Ref. No.	Q'ty
L77-0965-15	N	Crystal 36.1MHz	X1	1
L77-0966-05	N	Crystal 8375kHz	X2	1
L77-0967-05	N	Crystal 8828.5kHz	X4	1
L77-0968-05	N	Crystal 8830kHz	X5	1
L77-0969-05	N	Crystal 8831.5kHz	X3	1
N10-2030-41		Nut		6
N30-3008-41		Round screw		4
N30-3010-41		Round screw		8

PARTS LIST

Parts No.	Re-marks	Description	Ref. No.	Q'ty
CC45RH1H010C		C 1pF	C107,121	2
CC45RH1H020C		C 2pF	C108,197,212	3
CC45RH1H030C		C 3pF	C178	1
CC45RH1H050C		C 5pF	C264	1
CC45RH1H070D		C 7pF	C184,267	1
CC45RH1H100D		C 10pF	C113–115	3
CC45RH1H101J		C 100pF	C51,66,398	3
CC45RH1H120J		C 12pF	C93,96,97,263, 256,296	6
CC45RH1H121J		C 120pF	C14,54,185,187, 552	5
CC45RH1H180J		C 18pF	C186	1
CC45RH1H181J		C 180pF	C45,47	2
CC45RH1H220J		C 22pF	C76,78,92,98 266,319,320	7
CC45RH1H221J		C 220pF	C39,41	2
CC45RH1H241J		C 240pF	C301,309,553	3
CC45RH1H270J		C 27pF	C91,358	2
CC45RH1H330J		C 33pF	C348,411	2
CC45RH1H390J		C 39pF	C70,72	2
CC45RH1H470J		C 47pF	C65	1
CC45RH1H560J		C 56pF	C16,53,55,64, 71,77,370	7
CC45RH1H680J		C 68pF	C52	1
CC45RH1H820J		C 82pF	C10	1
CC45SL1H050C		C 5pF	C158,252	2
CC45SL1H100D		C 10pF	C159,336,468, 478	4
CC45SL1H101J		C 100pF	C218,283,298, 308,331,352,369, 380,393,466,483, 485,511,540,574, 606,654	17
CC45SL1H120J		C 12pF	C641,647	2
CC45SL1H121J		C 120pF	C24	1
CC45SL1H150J		C 15pF	C377	1
CC45SL1H151J		C 150pF	C338,365,373, 376,498,520,528	7
CC45SL1H220J		C 22pF	C279	1
CC45SL1H221J		C 220pF	C335	1
CC45SL1H330J		C 33pF	C254	1
CC45SL1H331J		C 330pF	C28,162,164, 653	4
CC45SL1H391J		C 390pF	C46,622	2
CC45SL1H470J		C 47pF	C15,67,138,278, 313,472,530,657	8
CC45SL1H680J		C 68pF	C13,59	2
CC45SL1H820J		C 82pF	C58,60	2
CC45TH1H030C		C 3pF	C349,462	2
CC45TH1H220J		C 22pF	C94	1
CC45TH1H270J		C 27pF	C99	1
CC45TH1H330J		C 33pF	C116	1
CC45UJ1H820J		C 82pF	C464	1
CE04AW1H0R1M		E 0.1 50V	C385,386,510, 534,542,578	6
CE04AW1HR22M		E 0.22 50V	C86,171,509,636	4
CE04W1HR33M		E 0.33 50V	C355,459	2
CE04W1A101M		E 100 10V	C488	1
CE04W1C100M		E 10 16V	C396,537,630	3
CE04W1C101M		E 100 16V	C525	1
CE04W1C102M		E 1000 16V	C651	1

Parts No.	Re-marks	Description	Ref. No.	Q'ty
CE04W1C220M		E 22 16V	C151,167,221, 225,226,282,344, 392,396,450,505, 567–596,576, 583,587,631,632	19
CE04W1C221M		E 220 16V	C640	1
CE04W1C470M		E 47 16V	C222,345,346, 391,395,536,613, 642,648	9
CE04W1E100M		E 10 25V	C112,220,285, 343,384,387,389, 543,564,571,586, 629,633,634,639, 644,652	17
CE04W1E220M		E 22 25V	C20,22,31,38,44, 50,57,63,69,74, 88	11
CE04W1E471M		E 470 25V	C440,441	2
CE04W1H010M		E 1 50V	C154,191,375, 390,420,423,424, 426,427,432,486, 492,494,541,563, 565,588,599,628, 638	20
CE04W1H3R3M		E 3.3 50V	C388,449,566, 575	4
CE04W1HR47M		E 0.47 50V	C153,101,501, 591,592	5
CE04W1H4R7M		E 4.7 50V	C176,179,500	3
CK45B1H102K		C 0.001	C17,122,127,140, 146,148,152,161, 163,177,207,367, 371,400,401,436, 487,490,532,562, 600,645,646	23
CK45B1H181K		C 180pF	C100	1
CK45B1H221K		C 220pF	C531,595,596, 618	4
CK45B1H222K		C 0.0022	C227,228,533, 549,614,623	6
CK45B1H331K		C 330pF	C412,465	2
CK45B1H391K		C 390pF	C32,34	2
CK45B1H471K		C 470pF	C339,353,434	3
CK45B1H681K		C 680pF	C33,330	2
CK45B1H821K		C 820pF	C23,29,40	3
CK45E2H102P		C 0.001 500V	C135	1
CK45F1H103Z		C 0.01	C1,7,11,12,95,102, 104,111,117,118, 120,123,129,134, 141,143,145,166, 172–174,183, 194,195,208,209, 219,236,237,242, 253,262,269,271, 277,281,284,324, 351,361,378,413, 430,435,437,439, 443,444,452,453, 455,457,461,475, 493,497,515,521, 527,535,539,544, 559,561,577,584, 607–609,655	70

PARTS LIST

Parts No.	Re-marks	Description	Ref. No.	Q'ty
CQ09S1H122J		S 0.0012	C402–404	3
CQ09S1H182J		S 0.0018	C518,519	2
CQ09S1H392J		S 0.0039	C544,610	2
CQ92M1H102K		ML 0.001	C26,170,	2
CQ92M1H103K		ML 0.01	C168,447,448,451	4
CQ92M1H104K		ML 0.1	C643	1
CQ92M1H152K		ML 0.0015	C25,27,616	3
CQ92M1H222K		ML 0.0022	C546,627	2

Parts No.	Re-marks	Description	Ref. No.	Q'ty
E40-0373-05		Mini connector 3P		2
E40-0473-05		Mini connector 4P		5
E40-0511-05		Mini connector 5P	MC1–6	6
E40-0517-05		Mini connector 5P	MB1,2	2
E40-0573-05		Mini connector 5P		1
E40-0673-05		Mini connector 6P		4
E40-0773-05		Mini connector 7P		1
E40-0873-05		Mini connector 8P		3

PARTS LIST

Parts No.	Re-marks	Description	Ref. No.	Q'ty
L34-2108-15	N	Tuning coil	L77	1
L34-2109-15	N	Tuning coil	L84	1
L34-2111-05	N	Tuning coil	L88,92	2
L34-2112-05	N	Tuning coil	L89,91	2
L34-2113-05	N	Tuning coil	L90	1

Parts No.	Re-marks	Description	Ref. No.	Q'ty
R12-2409-05		Trim. pot. 5kΩ	VR1	1
R12-3411-05		Trim. pot. 47kΩ	VR8–10,15,16 26,28,32,34	9
R12-3413-05		Trim. pot. 10kΩ	VR11,13,25,30	4
R12-3438-05	N	Trim. pot. 22kΩ	VR7,29	2

PARTS LIST/PACKING

Parts No.	Re-	Description	Ref. No.	Q'ty	Parts No.	Re-	Description	Ref. No.	Q'ty

DISASSEMBLY

shaft MODE
screw x 4
006-46)
-O
SSB SLOPE TUNE
PITCH/AF TUNE
CW VBT
MODE
ANT TUNE
ON AIR,NOTCH
STBY,AT,PRO.,TONE
PROCESSOR,MIC/DAR
METER
AGC
NOTCH
AF/RF
VOX/MAN,DIM/NOR
FULL/SEMI,MONI
MIC
1MHz STEP
BAND
de switch
5532K
5532K
dle switch
tary switch
tary switch
h switch
h switch
metal socket
t switch
t switch

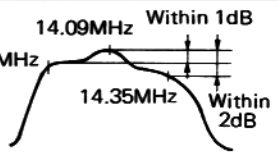
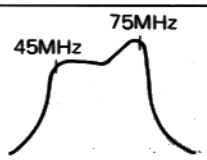
DISASSEMBLY

DISASSEMBLY

ADJUSTMENT

REQUIRED TEST EQUIPMENT

ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specification/Remarks
		Test equipment	Unit	Terminal	Unit	Part	Method	
8. PLL-BPF	1) Disconnect connector 8, CAR 1. Reconnect after adjustment.	Sweep generator Detector Oscilloscope	PLL	IC6-2 Q17-E	PLL	T7–9	Adjust as shown at right.	
9. PLL 8.85MHz IF	1)	RF V.M	PLL	IC6-5 or IC7-2	PLL	T13	MAX	(Ref. 100mV–120mV)
	2)					VR1	100mV	± 5mV
10. PLL 5.2MHz IF	1)	RF V.M	PLL	Q17-E	PLL	T10	MAX	
	2)			IC6-2		VR2	100mV	± 5mV
11. PLL 50.15MHz IF	1)	RF V.M	PLL	Q18-E	PLL	TC3	110mV	± 5mV
	2)			Q16-E		T4–6	MAX	(Ref. 100mV)
12. PLL 60.15MHz IF	1)	RF V.M	PLL	IC3-5	PLL	T1–3	MAX	
	2)					T11,12	MAX	
	3)			Q17-E			Check If above 150mV, lower to below 150 mV with VR1. (Must remove VCO shield).	100–150mV
13. VCO-BPF		Sweep generator Detector Oscilloscope	SIG-NAL	Q16-G Q20-E	SIG-NAL	L66–68	Adjust as shown at right.	
14. 36.1MHz HET	1)	RF V.M	SIG-NAL	R125	SIG-NAL	L77	0.21V (Adjust CW from MAX in direction [core is inserted] .)	0.5dB
	2)							

ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specification/Remarks
		Test						

ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specification/Remarks
		Test						

ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specification/Remarks
		Test equipment	Unit	Terminal	Unit	Part	Method	
	7) BAND : 1.5–3.0MHz	Sweep	Body	ANT	SIG-	L22–	Adjust as shown at	1.5MHz 3MHz

ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specification/Remarks
		Test equipment	Unit	Terminal	Unit	Part	Method	
11. IF trap (If Step 6-1 adjustment is perfomed, this adjustment must also be performed).	1) BAND : 28 MODE : USB SSG output : 44.93MHz 80dB/μ	SSG	Rear panel	ANT	SIG-NAL RF	L11,12 T7	MIN	Almost all received wave-form must disappear.
12. S meter (If TC1 is adjusted in step 9 perform this adjustment).	1) AGC : OFF METER SW : POWER	S meter			SIG-NAL	VR30	Set to S meter starting point.	
	2) FREQ : 14,175.0kHz AGC : FAST SSG output : 14.175MHz 0dB/μ	SSG S meter AF V.M Oscillo-scope AF dummy load	Rear panel	ANT EXT.SP		VR1	Adjust CCW to the point where AF V.M reading decreases by 0.5dB.	
	3) SSG output : 8dB/μ					TC1	S1	8dB ± 4dB
	4) SSG output : 40dB/μ					VR31	S9	40dB ± 6dB
	5) SSG output : 100dB/μ						SSG output : 100dB Repeat step 1) th-rough 4) if necessary.	S9 + 60dB ± 6dB Check
13. NB	1) FREQ : 14,175.0kHz MODE : USB SSG output : 14,175.0kHz	SSG DC V.M	Rear panel SIG-NAL	ANT R144	SIG-NAL	L80,81	1) MIN (SSG out-put : 20dB) Lower SSG output to the point where DC voltage falls slightly, and again reset to MIN.	
	2) MODE : USB NB LEVEL : CCW	Moise GEN. S meter	Rear panel	ANT			Adjust Noise GEN. level to read to S1.	
	3) NB 1 SW : ON Adjust NB LEVEL control to the point where N.B. action begins. (After checking, turn NB 1 SW : OFF)				SIG-NAL	L80,81	MIN (If NB level has insufficient effect, adjust L126 core slightly CCW (out) from peak.	Noise disappears.
	4) NB 2 SW : ON (After checking, shut NB 2 SW OFF)						Check	The same effect as NB 1 is obtained.
	5) Raise Noise GEN. level to S9. NB 1 SW : ON (After checking, turn NB 1 SW OFF).						If any noise remains adjust NB LEVEL to find the point where NB operates.	Noise disappears.
14. Micro-processor Audio-Tone indicator	1) AF GAIN : MIN CLEAR SW : Push	AF V.M Oscillo-scope AF dummy load	Rear panel	EXT.SP	SIG-NAL	VR33	50mV/8Ω	± 3dB

TX ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specification/Remarks
		Test equipment	Unit	Terminal	Unit	Part	Method	
1. TX-BPF	1) FREQ : 14,175.0kHz [illegible]	Sweep	SIG-[illegible]	R196	SIG-[illegible]	L92--	Adjust in order, L92	1.7MHz 30MHz

ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specification/Remarks
		Test equipment	Unit	Terminal	Unit	Part	Method	

ADJUSTMENT

○ : From S/N 208XXXX–309XXXX
● : From S/N 310XXXX–

Item	Condition	Measurement			Adjustment			Specification/Remarks
		Test equipment	Unit	Terminal	Unit	Part	Method	

ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specification/Remarks
		Test equipment	Unit	Terminal	Unit	Part	Method	
16. Carrier suppression (If step 15 is performed, this adjustment must also be performed.)	1) FREQ : 14,175.0kHz MODE : USB ↔ LSB MIC CONTROL : MIN STBY : SEND	Oscilloscope (Spectrum analyzer)	Rear panel	ANT (through Directional coupler)	SIGNAL	TC2 VR21	MIN (Adjust alternately.) Adjust for no difference between USB and LSB.	
	2) MODE : CW CAR CONTROL : MAX STBY : SEND						Calibrate Oscilloscope (Spectrum analyzer.)	

ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specification/Remarks
		Test equipment	Unit	Terminal	Unit	Part	Method	
	3) MIC VR : MIN Remove AG from MIC terminal STBY : SEND						Check hum and noise.	1.5mV/8Ω or less

ADJUSTMENT

MICROPROCESSOR OPERATION CHECK

Item	Condition	Operation check
1. Reset	1) Turn POWER SW off and UF installed remove	FREQ : 14,000.0kHz 20kHz display : 0kHz
3. Dial step	1) FREQ. (Display) : 150kHz	VFO Scale 1 division : 500Hz

ADJUSTMENT

Item	Condition	Operation check	Item	Condition	Operation check

ADJUSTMENT

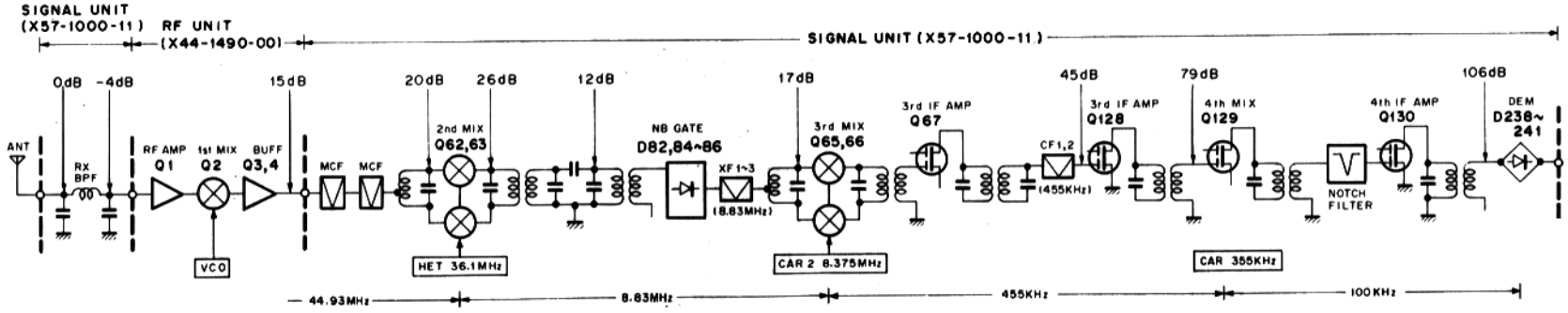
TOP VIEW

ADJUSTMENT

BOTTOM VIEW

*1 : From S/N208XXXX-309XXXX
*2 : From S/N310XXXX-

RECEIVER SECTION



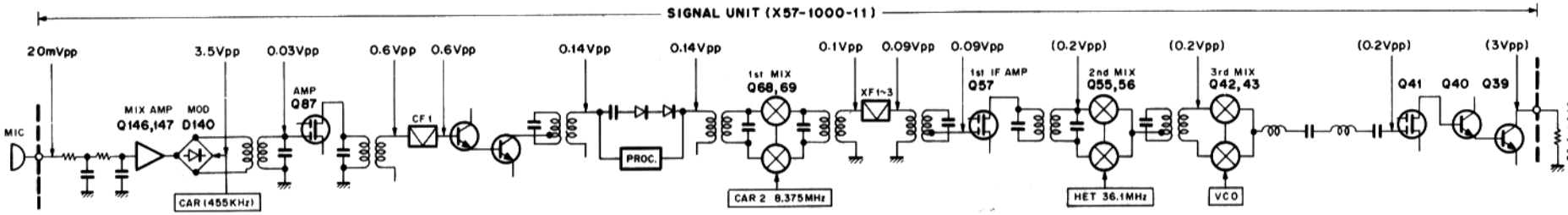
FREQUENCY : 14.200MHz
INPUT : Japanese SSG 0dB
American SSG 0.5μV
AF OUTPUT : 0.63V at 8Ω

NOTES

1) The figures shown are signal generator output required for a constant audio output with a constant AF gain control setting. Set the AF gain control for 0.63V/8Ω (50mW) audio output at 0dB signal generator input at 14.200MHz.

2) To measure signal generator output connect a 0.01μF 500WV capacitor between the signal generator and the check point.

TRANSMITTER SECTION

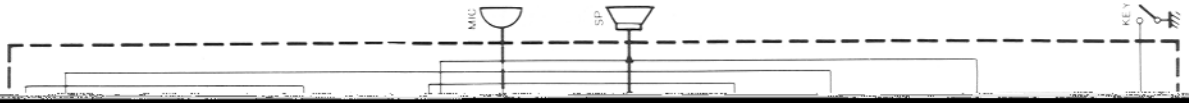


FREQUENCY : 14.200MHz
MIC INPUT : 20mVpp 1.5kHz

Adjust MIC input level so that the voltage at the 50Ω dummy load is 3VPP.

[redacted]

TS-930S BLOCK DIAGRAM



SP-930

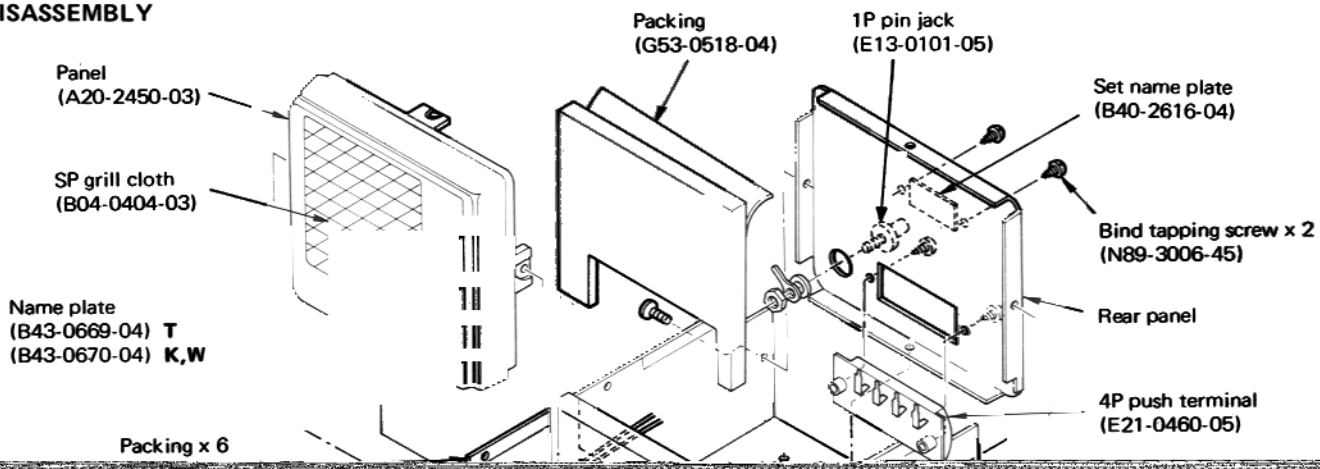
SP-930 SPECIFICATIONS

Speaker used:	10 cm dia.
Rated Input:	1.5 Watts
Impedance:	8Ω
Frequency response:	160 Hz to 8kHz.
Filter cut-off frequency,	
LOW:	430Hz, −3dB.
HIGH 1:	2.3 kHz, −3dB.
HIGH 2:	1.0kHz, −3dB.
HIGH 1 + HIGH 2:	730Hz, −3dB.
Filter attenuation:	−6dB/oct.
Dimensions:	W 180 mm (7-1/16")
	H 140 mm (5-1/2")
	D 288 mm (11-1/3")
Net weight:	1.9 kg. (4.2 lbs.)
Accessories furnished:	Speaker cord, 1 pc. (E14-0101-05)
	1 pin plug, 2 pcs. (E20-1610-05)

Parts No.	Re-marks	Description	Ref. No.
E11-0404-05		Headphone jack	
E13-0101-05		1P pin jack	
E14-0101-05		1P pin plug Accessory	
E21-0460-05	N	4P push terminal	
E30-1711-15	N	SP cord Accessory	
E40-0373-05		Mini connect wafer 3P	
G53-0509-04		Packing x 6	
G53-0514-04		Packing x 2	
G53-0517-04	N	Packing x 8	
G53-0518-04	N	Packing	
G53-0520-04	N	Packing	
H01-4426-04	N	Packing carton (inside) K,W	
H01-4427-04	N	Packing carton (inside) T	
H12-0500-03	N	Cushion x 2	
H20-0276-03		Protective cover	
H25-0049-03		Protective bag	
J02-0049-14		Foot (rear) x 2	
J02-0423-04		Foot (outside) x 2	

SP-930

DISASSEMBLY



AT-930

AT-930 SPECIFICATIONS

PARTS LIST

N : New parts

[redacted]

AT-930/SO-1

AT-930 PACKING

Instruction mamual (B50-3971-00)
Warranty card (B46-0407-00)

SO-1 SPECIFICATIONS

Oscillating frequency 20MHz

SERVICE BULLETIN

MODEL: TS-930 S	NO.: 0045	DATE: D	M	Y
VON/FROM/DE: TRIO-KENWOOD COMMUNICATIONS Division of TRIO KENWOOD ELECTRONICS GMBH		21	10	83

SUBJECT:

Digital Unit through-plated hole defects and their symptoms

CONTENTS:

The unit shows symptoms as listed below, when any of the 56 Digital Unit through-plated holes are open. These examples were compiled by Mr. Negishi of the Kanto service center. Make full use of the Material as a technical reference for repair.

Through-hole No.	Symptom
1	(GND)
2	(GND)
3	Transmit mode not entered.
4	N/C
5	No display. However, pressing the BAND switch operates the BAND changeover relay.
6	Transmit mode not entered.
7	N/C
8	RIT operates in transmit mode.
9	Continuous tone and no display.
10	RIT operates in transmit mode.
11	(GND)
12	(GND)
13	Continuous sound. All indications are displayed.
14	(GND)
15	(GND)

SERVICE BULLETIN

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VON/FROM/DE: TRIO-KENWOOD COMMUNICATIONS Division of TRIO KENWOOD ELECTRONICS GMBH		21	10	83

16 & 17 No display, display disappears when main dial is turned, or display appears when main dial is turned (when nothing is displayed).

18 Turning the main dial generates an abnormal sound. The abnormal sound increases as the receive frequency is approached.

19 No display. However, 80.888.8 .88 is displayed when connector 9 is removed.

20 No display or 54.444.4 is displayed.

21 36.222.2 or 14.444.4 is displayed.

22 RIT-1.1 kHz is displayed when an odd numbered frequency is displayed.

23 Only the 'g' segment of the display lights; "-"

24

25

26 No display or only segments "egf" light. "1-"

27 & 28 The main dial and UP and DOWN switches do not operate.

29

30 Only segments "g, DP" light.

31 Many analog pointers light. The brightness of the pointers varies widely.

32 All 'g' segments light. "----- "

33 The "DP" segment remains continuously it.

34 Analog values from 0 to 700 are displayed, but values from 700 to 1000 are not.

35 Segments "b,g" only are not displayed. Some of the analog pointers do not light.

36

37 No display because UL.

SERVICE BULLETIN

MODEL: TS-930 S	NO.: 0045	DATE: D	M	Y
VON/FROM/DE: TRIO-KENWOOD COMMUNICATIONS Division of TRIO KENWOOD ELECTRONICS GMBH		21	10	83

38 No display, continuous tone.

39 Three digits of values are not displayed

40 ex. 14.XXX.5

41

42

43

44

45

46

47

48 (The main dial does not operate.) 14.000.0 is displayed. Turning on the RIT switch displayes 14.100.00.

49 Continuous tone. Display is locked, RIT is turned ON and 14.001.4 is continuously displayed. Transmission in no possible.

50 Frequency varies.

51 As if scanning were being performed. Transmission is possible.

52

53

54

55

56