

# KENWOOD SERVICE MANUAL



## CIRCUIT DESCRIPTION

### OVERVIEW

The TS-430 is a transceiver and general-coverage receiver featuring double conversion at 48.055 and 8.830MHz intermediate-frequencies. Triple-conversion to 455kHz is used during FM receive operation. A microprocessor based 10Hz or 100Hz step switchable digital VFO system is employed for frequency control. The PLL system reference

is a 36MHz master oscillator.

The following features are provided with the TS-430 : dual digital VFOs, 8 memory channels, memory scan, programmable band scan, IF shift, RIT, VOX, CW side tone, speech processor, NB, AF notch, squelch, F step, F lock, Mic UP/DWN.

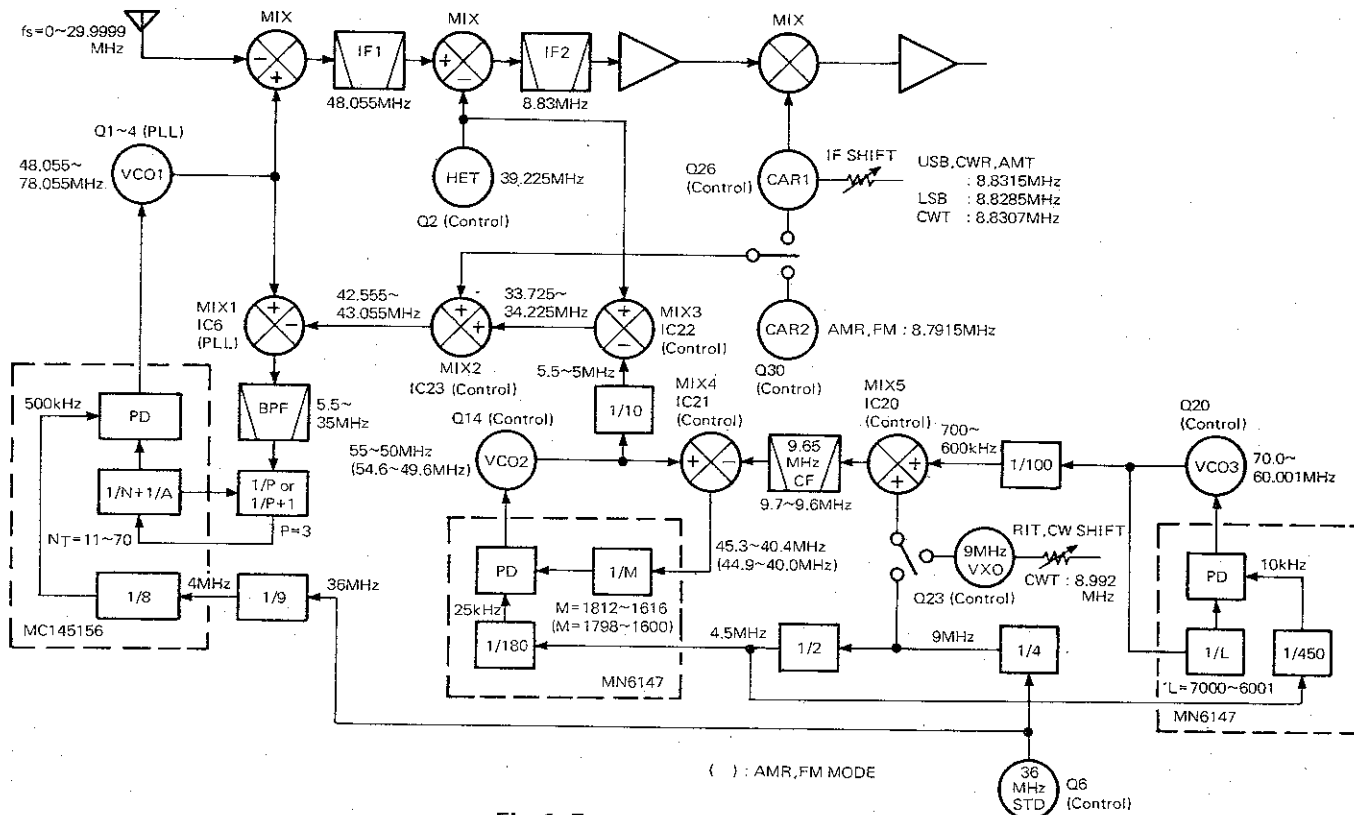


Fig. 1 Frequency configuration

### RECEIVER CONFIGURATION

The TS-430 uses a double conversion receiver with a 48.055 MHz 1st intermediate frequency and 8.830MHz 2nd IF for SSB, CW, and AM modes. Triple conversion is used for the FM mode, in which the 3rd IF is 455kHz.

A signal from the antenna passes through one of seven LPF (Low Pass Filters) on the LPF unit, the antenna relay RL1, and enters the RF unit RA terminal. It then passes through the 20dB ATT (ATTENUATOR), controlled by Q14, a 30MHz LPF, the LPF for each band (a combination HPF

and amplified by the NB (Noise Blanking) chain (Q8-Q13). The main portion of this 2nd IF signal passes through the NB gate (D28-D31). The NB is also triggered by Q33, Q34 from a pulse signal supplies off the Control unit at PLL reset. This suppresses the "click" normally heard when one of the PLL loops resets. The signal is then fed to two outputs : one for the SSB, AM and CW modes, which is supplied to the IF unit, and the other, which is amplified by Darlington Pair Q7, Q43 and supplied to the (optional) FM unit. The signal supplied to the IF unit first passes through the MCF for the selected mode and is then ampli-

## CIRCUIT DESCRIPTION

fied by Q5. The AGC buffer, and AM detected by D20 (1N60). Its output is fed to the notch filter via buffer amplifier Q6 (2SC2240). D38 and D39 are the AGC rectifiers, Q16 is the AGC amplifier, and Q17 is the AGC-slow time constant switch. Q13 and Q24 are the S meter amplifiers, while in the FM mode Q15 "kills" the IF unit S meter signal : The FM unit supplies the S meter signal during FM operation. In the FM mode, the RF unit FMI output is delivered to the FM unit, where the signal is input to Q5 : MC3357P, a monolithic IC containing the second conversion oscillator, mixer, limiting amplifier, quadrature discriminator, active filter, squelch, scan control, and mute. Q4 : 2SC2240 buffers the detected output and returns this audio signal (via the FAF line) to the IF unit, D26 switch.

FM signal meter drive (FSM) is derived through amplifiers Q6, Q7 : 2SC1815 (Y), transformer T3, and rectifiers D5, D6 : 1N60. The low level audio signal from the AF GAIN control is power amplified by IC5 ( $\mu$ PC2002V), and is then output to the speaker.

Item	Rating
Nominal center frequency	8830 kHz
Center frequency deviation	Within $\pm 150$ Hz at 6 dB
Pass bandwidth	$\pm 1.2$ kHz or more at 6 dB
Attenuation bandwidth	$\pm 1.5$ kHz or less at 20 dB $\pm 2.2$ kHz or less at 60 dB $\pm 3.0$ kHz or less at 80 dB
Ripple	20 dB or less
Insertion loss	6 dB or less
Guaranteed attenuation	80 dB or more within

Item	Rating
Center frequency $f_0$	8830.7 kHz
Center frequency deviation	$f_0 \pm 150$ Hz at 6 dB
6 dB bandwidth	$\pm 250$ Hz or more
60 dB bandwidth	$\pm 900$ Hz or less
Ripple	2 dB or less
Loss	6 dB $\pm 2$ dB
Guaranteed attenuation	80 dB or more within $f_0 \pm 2$ kHz to $\pm 1$ MHz
Input and output impedance	600 $\Omega$ / 15 pF

**Table 3 CW crystal filter YK-88C  
(L71-0211-05) Option**

Item	Rating
Center frequency $f_0$	8830.7 kHz
Center frequency deviation	$f_0 \pm 50$ Hz at 6 dB
6 dB bandwidth	$\pm 125$ Hz or more
60 dB bandwidth	$\pm 600$ Hz or less
Ripple	2 dB or less
Loss	8 dB $\pm 2$ dB
Guaranteed attenuation	80 dB or more within $f_0 \pm 2$ kHz to $\pm 1$ MHz
Input and output impedance	600 $\Omega$ / 15 pF

**Table 4 CW crystal filter YK-88CN  
(L71-0221-05) Option**

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### TRANSMITTER CONFIGURATION

This transceiver uses a dual conversion transmitter for all operating modes. The audio signal from the microphone is delivered to the IF unit X48-1370-00 for preamplification by Q34, 2SC2240GR. The output from this stage is routed to three circuits. The amplified audio signal continues either to the microphone gain control through emitter follower Q48, 2SC1815Y, or at processor ON, through IC6,  $\mu$ PC1158H2, the processor audio amplifier. Q35 2SC1815Y is the processor AGC amplifier, and establishes the degree of compression, while Q37, 2SC945R is a switch, operated at processor ON, which interrupts the normal, non-processed signal flow. The secondary destinations of Q34's output are the VOX circuit input, and the (optional) FM unit microphone input.

Returning from the microphone gain control, the audio signal is amplified by Q38, 2SC2240GR, and input to the balanced modulator IC7, AN612, along with the 8.8MHz carrier signal developed on the Control unit. In the AM mode, the modulator is unbalanced to output a modulated carrier, while in the CW mode, the modulator is unbalanced and amplifier Q38 is disabled to yield only a controlled carrier (D66, Pin Diode) from IC7. This signal is diode switched (D17, D16, D3) through the 8.8kHz MCF (Monolithic Crystal Filter), and thence to the TX IF amplifier Q41, 3SK73GR. Q27 is the CW keying transistor used to control Q41's operating voltage. ALC is also applied to Q41. Q42 and Q43 are the ALC meter amplifiers, while Q44 "kills" the SSB, CW or AM ALC during FM mode operation. Q32 is a phase-shift audio oscillator supplying sidetone in the CW mode.

The signal then exits the IF unit and is sent to the RF unit via the TIF line. On the RF unit X44-1510-11, the signal is up-converted, mixed with the VCO (voltage controlled oscillator) output, then amplified and sent on to the Final Amplifiers. Q15 and Q16, 3SK73GR are the HET (heterodyne) mixers. The 39.225MHz HET injection signal originates on the Control unit, and is amplified by Q4, 2SC1959Y. In the FM mode, the TIF signal is diode switched off (D35), while the FM unit transmit signal output (FMT) line is switched on (D36) into the HET mixers. In the FM mode, the audio signal from the Switch unit "L" goes to the FM unit via the FMC line. In the FM-430 unit, the MIC signal is amplified and limited by Q1 : TA7061AP, an OP AMP, and is applied to varicap diode D1 : 1S2208 to modulate crystal X1.

The 8831.5kHz carrier output generated by oscillator Q2

level transmitter signal output through the XVRTR port. At the same time, Q21, 2SC2703 turns off Q20 to interrupt the normal transmitter signal flow from the RF to the Final unit.

In the Final unit X45-1280-00, the signal is amplified by Q1, 2SC2075, then push-pull amplified by Q2 and Q3, 2SC2509. Q4 and Q5 2SC2290 are the final push-pull amplifiers. D4 and Q6 are the driver bias control elements, and D5 and Q7 are the final transistor bias circuit. The Final unit output is then sent to the Filter unit:

In the Filter unit X51-1290-00, the transmitter output is filtered by one of seven filter circuits, automatically selected from the Control unit. ALC and SWR protection sensing are provided by T1, a toroidal directional coupler, and Q3 and Q5, 2SC1815Y.

### RECEIVER ANCILLARY CIRCUITS

#### NOTCH CIRCUIT

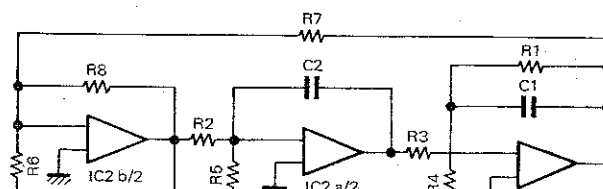
IC11 and IC2 in the IF unit constitute a Bi-Quad filter circuit. The notch frequency is determined by the following two formulas.

$$(1) f_N = \sqrt{R6/2\pi} \sqrt{R3 \cdot R5 \cdot R1 \cdot C1 \cdot C2}$$

$$(2) R1 \cdot R6 = R4 \cdot R7$$

If a variable resistor is used for resistor R3, the notch frequency can be controlled according to formula (1). The notch frequency range is from 350 to 2800Hz, and attenuation is from 25 to 50dB. The correlation between the formula and circuit diagram resistor & capacitor values is :

R1 = R80	R4 = R75	R1 = R79
C2 = C52	R2 = R81	R5 = R76
R8 = R77	R3 = R88 + Notch control	
C1 = C51		



## CIRCUIT DESCRIPTION

### TRANSMITTER ANCILLARY CIRCUITS

#### PROTECTION CIRCUITS

The transmitter output circuit is triple-protected.

- **VSWR Protection**

Reflected power detected by current transformer T1 is rectified by diode D3, amplified by transistor Q3 and added to the ALC circuit. When the VSWR is high, the ALC circuit reduces the drive signal into the power amplifiers.

- **Heat Sink Temperature Protection**

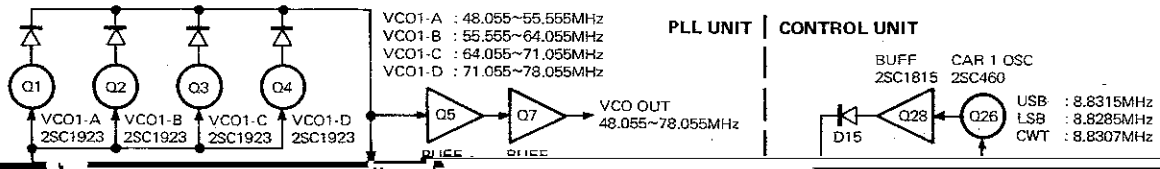
Thermister TH1, mounted on the Final unit heat sink is connected to the inverting inputs of comparators IC1 sections c & d. If the thermistor resistance decreases, due to an excessive increase in heat sink temperature, comparator "d" turns on before comparator "c" since "d's" reference voltage is established higher than that of section "c's". Comparator "d's" output turns on Q6 which starts the fan motor. If the heat sink's temperature continues to rise, due, for example to continuous transmission or an

quency, and controls VCO3 to generate frequencies from 70 to 60MHz in 10kHz steps. The 36MHz signal is divided by 8 to 4.5MHz before it is input to PLL3. In PLL3, the 4.5MHz signal is divided by 450 to generate the 10kHz reference signal. The microcomputer (IC1) applies 4-bit serial program data, plus 1 clock data bit to the programmable divider to vary the division-ratio from 1/7000 to 1/6001.

The 70 to 60MHz signal generated by VCO3 (Q20 : 2SC1923) is divided by 100 by IC18 (M54459L) to obtain output from 700 to 600kHz. The result is then mixed with the 9MHz reference signal by MIX5 (IC20 : SN16913P) to produce a 9.7 to 9.6MHz signal which is applied to MIX4 (IC21) through a ceramic filter.

PLL2 also uses an MN6147 (IC8). This IC uses 25kHz as its reference frequency and controls VCO2 (Q14) to generate frequencies from 55 to 50MHz. The signal output by VCO2 is mixed with the 9.7 to 9.6MHz signal generated by PLL3 in MIX4 (IC21 : SN16913P) to obtain a 45.3 to 40.4MHz signal which is applied to the programmable

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built-in lithium battery can backup the RAM for about 5 years. Various keyboard functions have a telltale audio "Beep" heard through the speaker. The control pulse is

fed to the IF unit to trigger multivibrator Q30 & Q31, whose output is fed directly to the AF Power amplifier IC5.

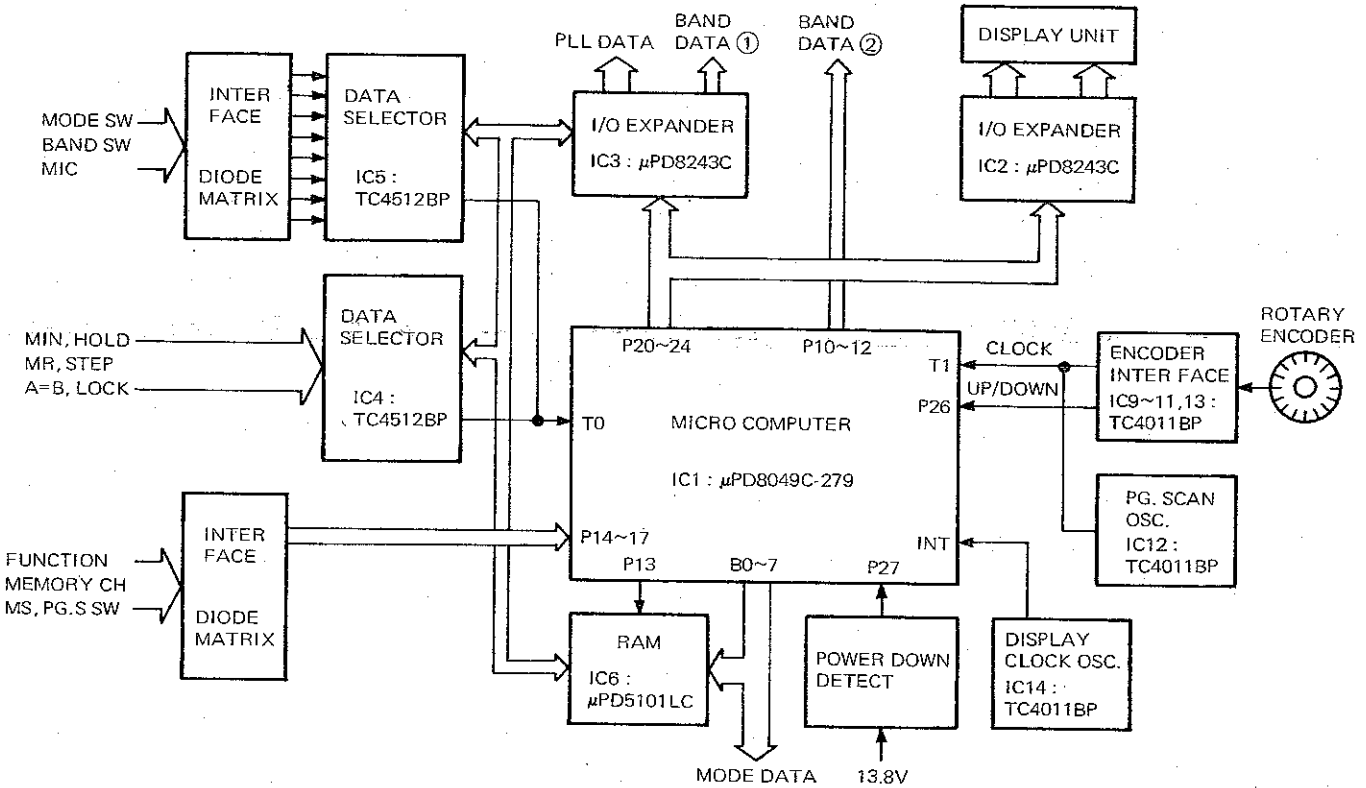


Fig. 4 Digital control system

Terminal No.	Name	Function	Terminal No.	Name	Function	
1	T0	Encoder clock, P. SCAN clock input	21	P20	I/O EXPANDER control output	
2	XTAL 1	Micro computer clock (5.74MHz) input	22	P21		
3	XTAL 2		23	P22		
4	RESET	Microcomputer reset input operate: "H"	24	P23		
5	SS	Normally "H" (5V)	25	PROG		
6	INT	Display tube dynamic drive clock input (1 kHz)	26	VDD	Power supply 5V	
7	EA	Normally "L" (GND)	27	P10	TX inhibit signal (Out of hum band)	
8	RD	Not used, normally open	28	P11	TX inhibit signal (Out of hum and WARC band)	
9	PSEN		29	P12	28MHz Power down output	
10	WR		30	P13	External RAM control output (R/W)	
11	ALE	M.CH selector input	31	P14	P. SCAN input	
12	DB0		VFO A indicator output	32	P15	M. SCAN input
13	DB1		VFO B indicator output	33	P16	FUNCTION input
14	DB2		No memory signal output	34	P17	FUNCTION input M.CH input
15	DB3		MODE output LSB	35	P24	I/O Exp. data selector control output "L": EX (0), DS (1); "H": EX (1), DS (2)
16	DB4		MODE output USB	36	P25	External RAM control output (CE)
17	DB5		MODE output CW	37	P26	Encoder UP/DOWN input "L": DOWN, "H": UP
18	DB6	MODE output AM	38	P27	Voltage down detection signal input "L": Power down; "H": Normal	
19	DB7	MODE output FM	39	T1	Data selector input	
20	GND	GND	40	Vcc	Power supply 5V	

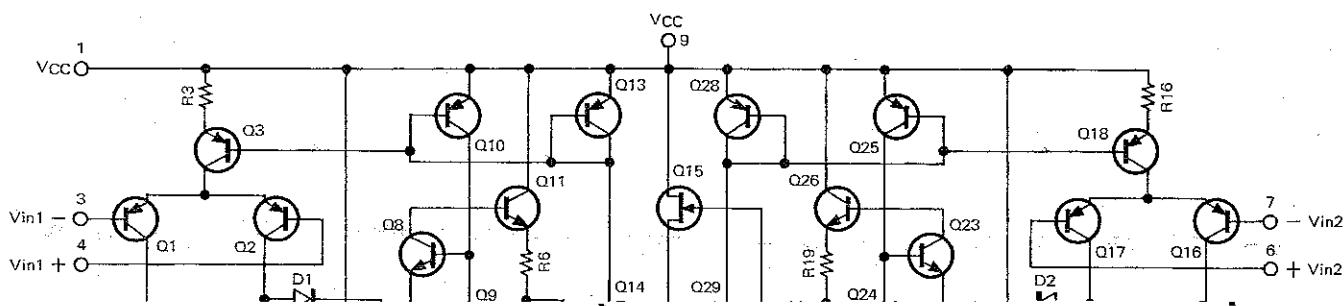
Table 8 Function of μPD8049C-279

## CIRCUIT DESCRIPTION/SEMICONDUCTOR DATA

Terminal No.	Name	Function	Terminal No.	Name	Function																						
24	Vcc	Power supply 5V	24	Vcc	Power supply 5V																						
2	P40	<table border="1"> <thead> <tr> <th>BAND data</th> <th>Frequency</th> </tr> </thead> <tbody> <tr> <td>Band 0</td> <td>0-0.5MHz</td> </tr> <tr> <td>1</td> <td>0.5-1.6MHz</td> </tr> <tr> <td>2</td> <td>1.6-2.5MHz</td> </tr> <tr> <td>3</td> <td>2.5-4MHz</td> </tr> <tr> <td>4</td> <td>4-6.5MHz</td> </tr> <tr> <td>5</td> <td>6.5-7.5MHz</td> </tr> <tr> <td>6</td> <td>7.5-10.5MHz</td> </tr> <tr> <td>7</td> <td>10.5-16MHz</td> </tr> <tr> <td>8</td> <td>16-23MHz</td> </tr> <tr> <td>9</td> <td>23-30MHz</td> </tr> </tbody> </table>	BAND data	Frequency	Band 0	0-0.5MHz	1	0.5-1.6MHz	2	1.6-2.5MHz	3	2.5-4MHz	4	4-6.5MHz	5	6.5-7.5MHz	6	7.5-10.5MHz	7	10.5-16MHz	8	16-23MHz	9	23-30MHz	2	P40	DIGIT output 100Hz
BAND data	Frequency																										
Band 0	0-0.5MHz																										
1	0.5-1.6MHz																										
2	1.6-2.5MHz																										
3	2.5-4MHz																										
4	4-6.5MHz																										
5	6.5-7.5MHz																										
6	7.5-10.5MHz																										
7	10.5-16MHz																										
8	16-23MHz																										
9	23-30MHz																										
3	P41	} BAND data (BCD output)	3	P41	DIGIT output 1kHz																						
4	P42		4	P42	DIGIT output 10kHz																						
5	P43	} Chip selector input	5	P43	DIGIT output 100kHz																						
6	CS		6	CS	Chip selector input																						
7	PROG	} Control input	7	PROG	} Control input																						
8	P23																										
9	P22																										
10	P21																										
11	P20	} Data selector output	11	P20	} External RAM data in-output																						
12	GND		12	GND																							
13	P70	} PLL 2 3 data output	13	P70	SEGMENT output e																						
14	P71		14	P71	SEGMENT output f																						
15	P72		15	P72	SEGMENT output g																						
16	P73	} PLL select signal Normally : "H"	16	P73	Buzzer output ON : "L"																						
17	P63		17	P63	SEGMENT output d																						
18	P62	} PLL 1 ENABLE	18	P62	SEGMENT output c																						
19	P61		19	P61	SEGMENT output b																						
20	P60	} PLL 3 clock output	20	P60	SEGMENT output a																						
21	P53		21	P53	DIGIT output M.CH																						
22	P52	} Data selector output	22	P52	DIGIT output 10Hz																						
23	P51		23	P51	DIGIT output 10MHz																						
1	P50	} Data selector output	1	P50	DIGIT output 1MHz																						

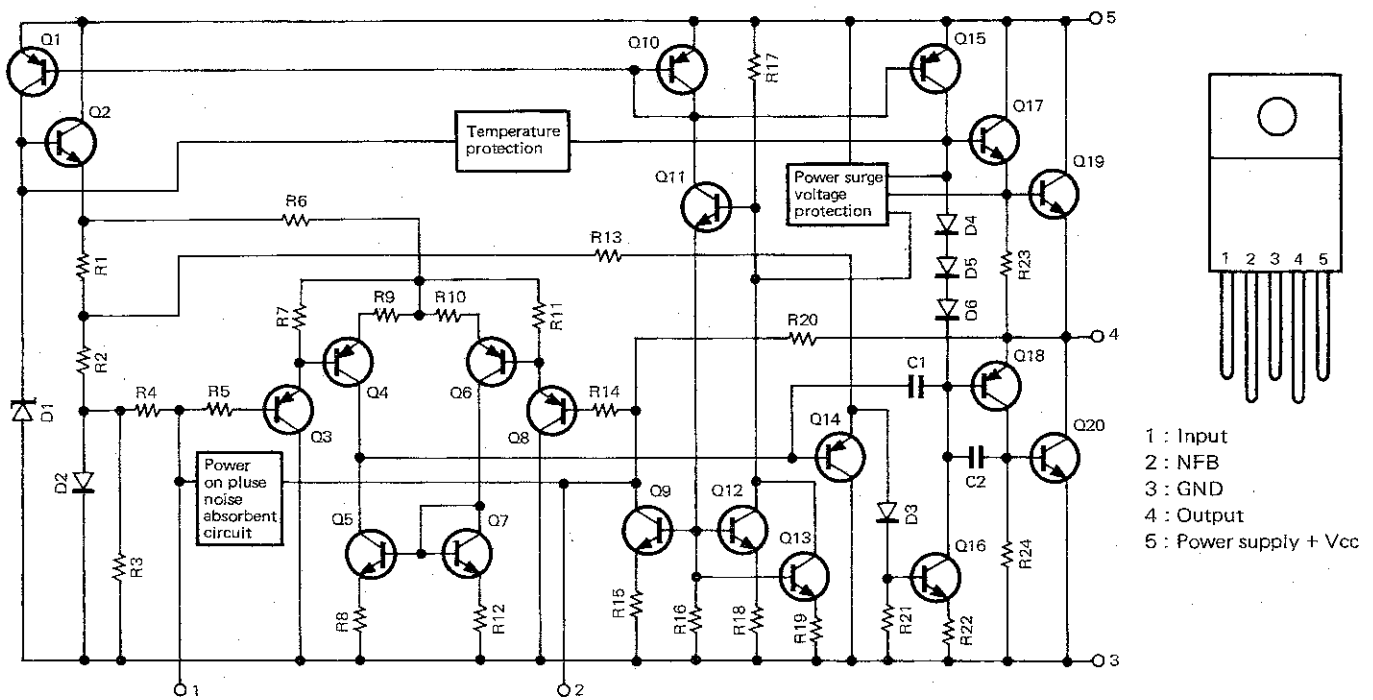
Table 9 I/O EXPANDER (0) IC2:  $\mu$ PD8243C

Table 10 I/O EXPANDER (1) IC3:  $\mu$ PD8243C

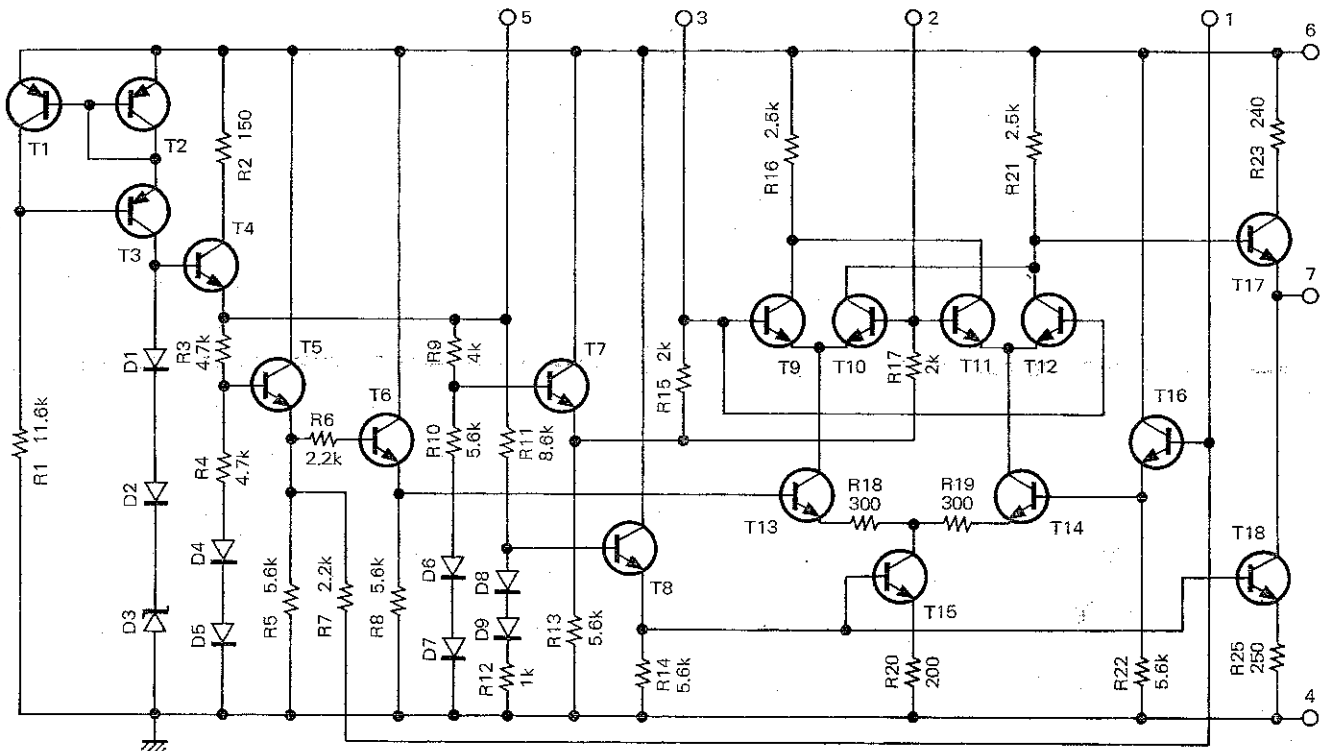




## SEMICONDUCTOR DATA

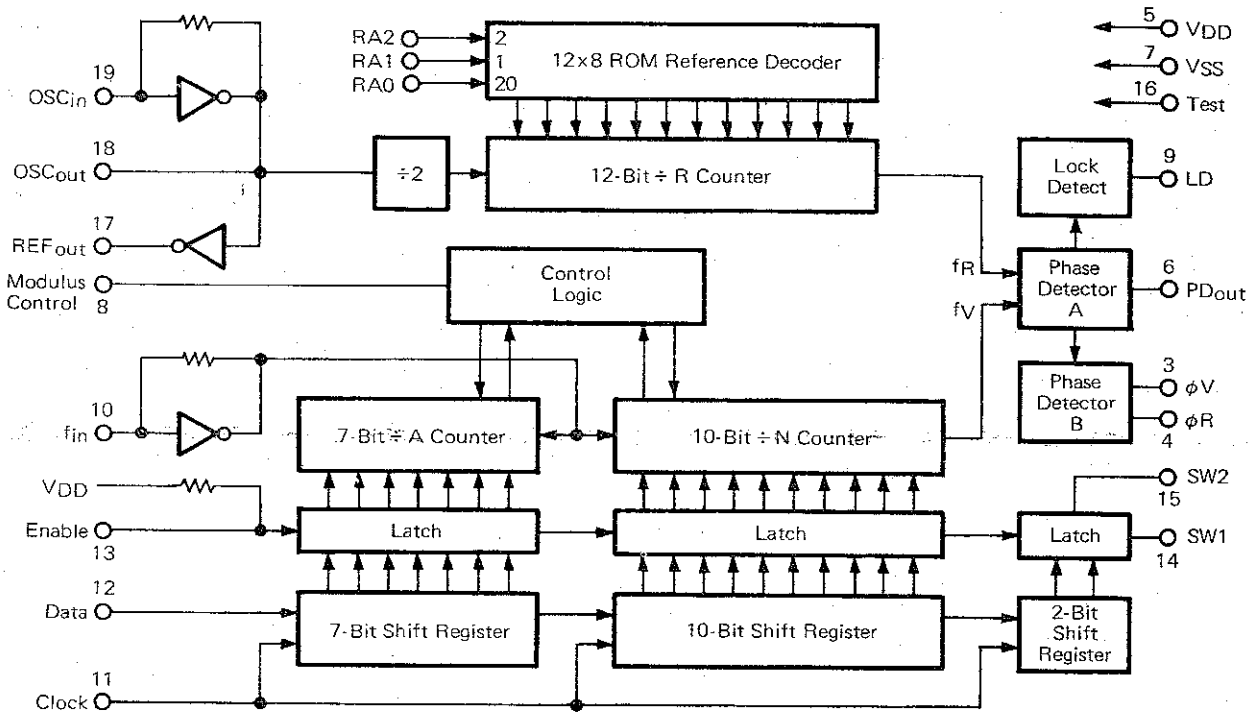


μPC2002V Equivalent circuit (IF unit IC5)

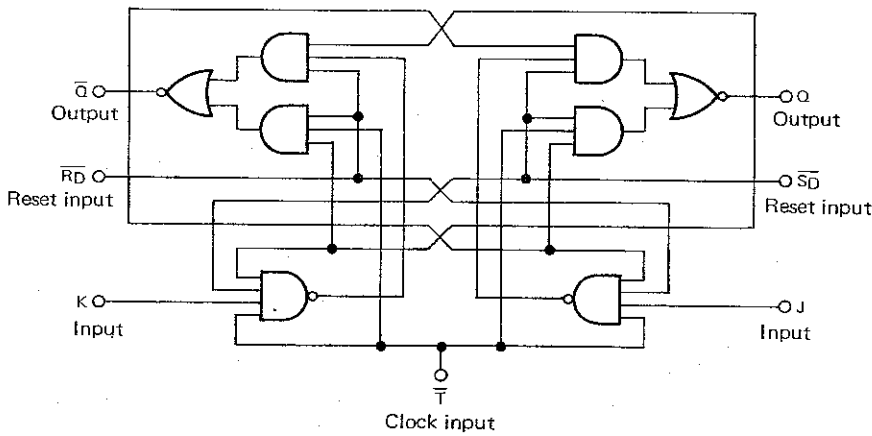


AN612 Equivalent circuit (IF unit IC7)

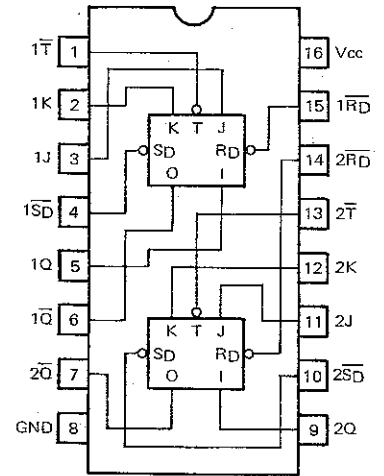
SEMICONDUCTOR DATA



MC14156P Block diagram (PLL unit IC1)



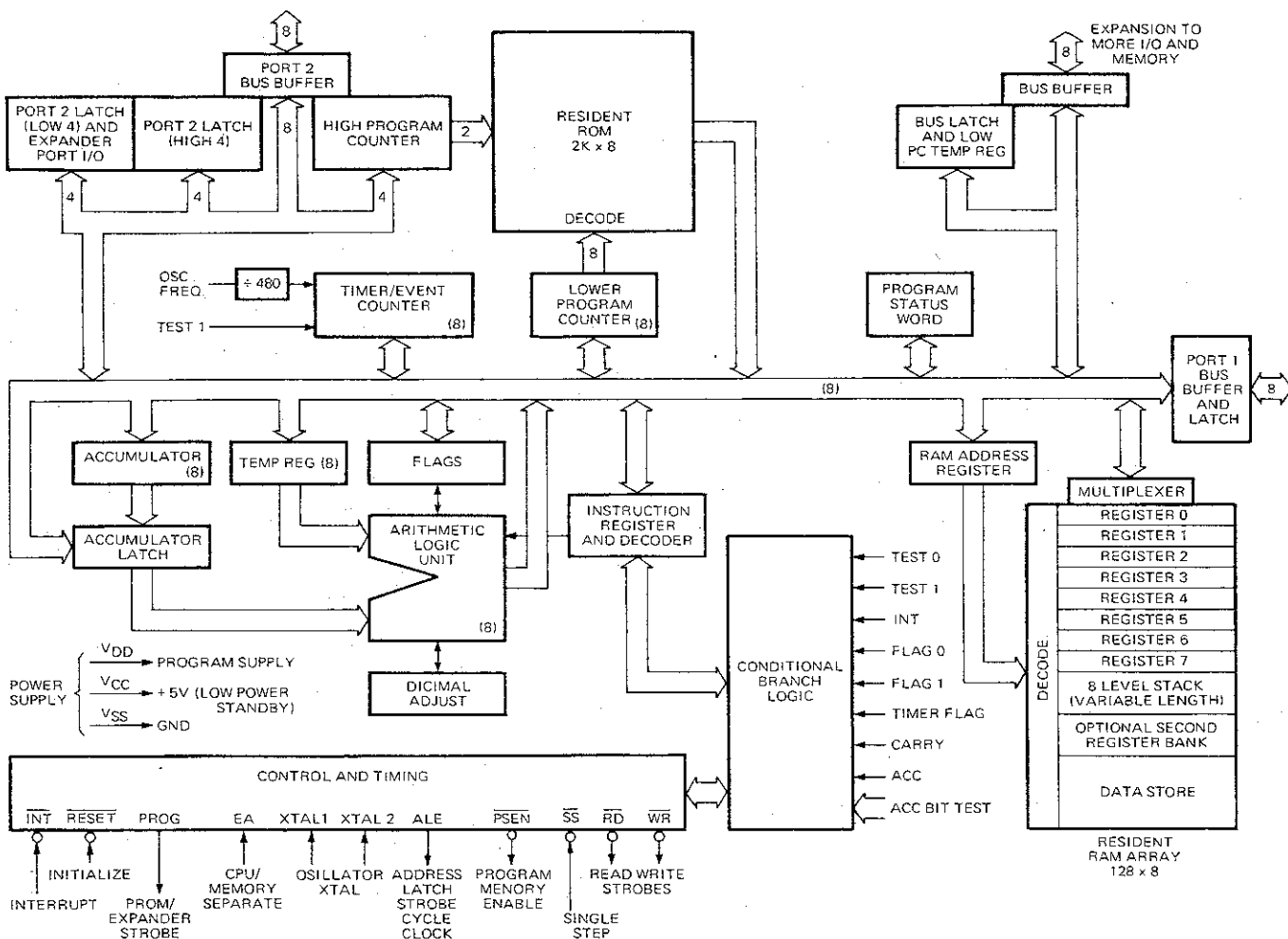
M74LS112AP Logic circuit (PLL unit IC5)



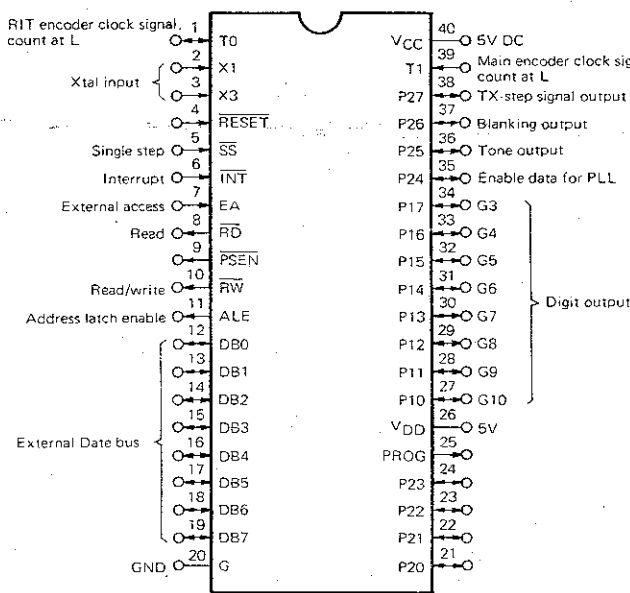
M74LS112AP

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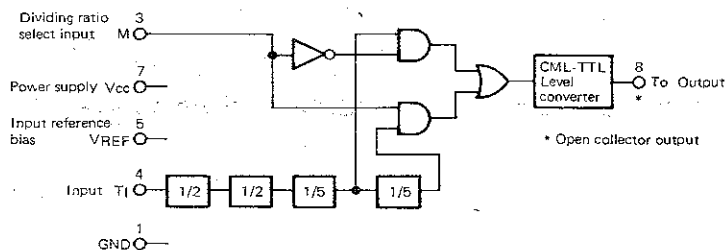
## SEMICONDUCTOR DATA



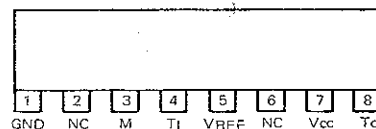
μPD8049C-279 Block diagram (Control unit IC1)



μPD8049C-279



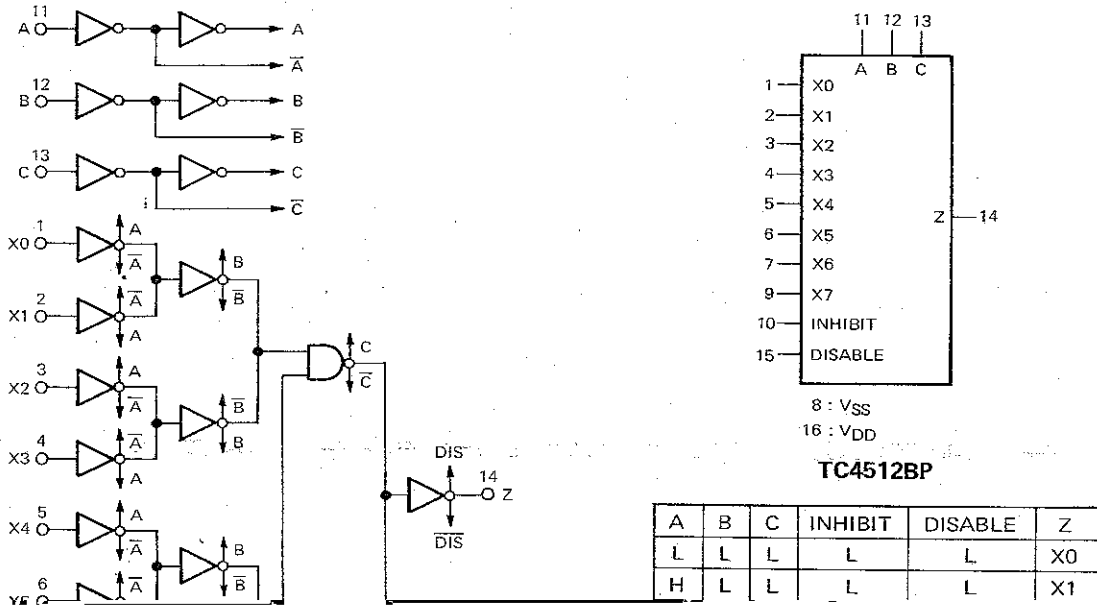
M54459L Block diagram (Control unit IC18)



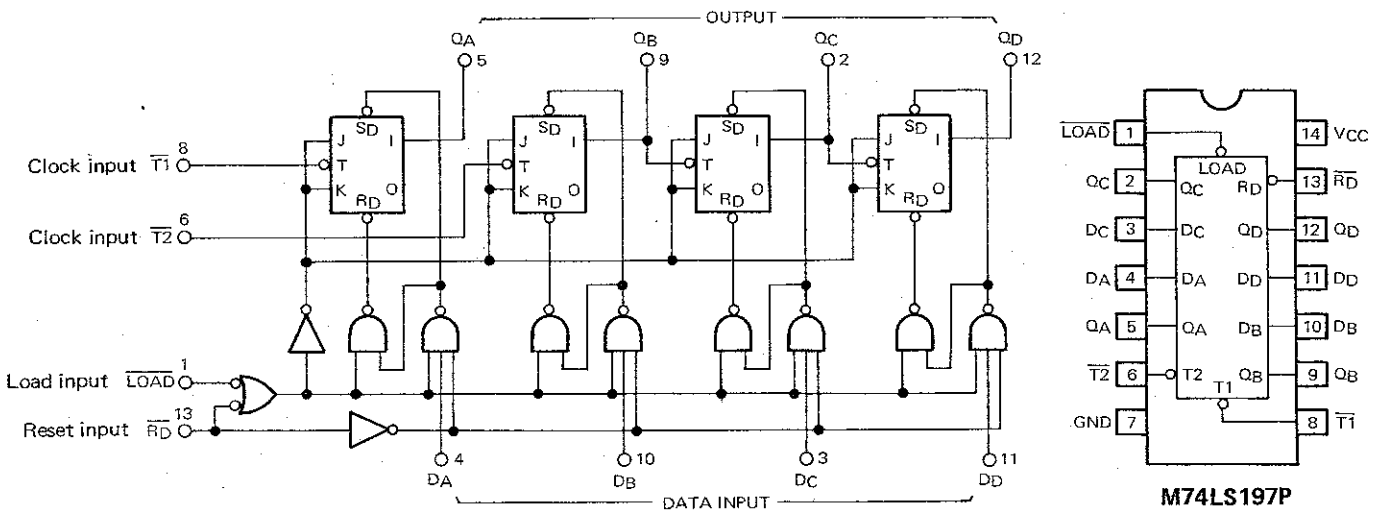
M54459L

# TS-430S

## SEMICONDUCTOR DATA



## SEMICONDUCTOR DATA



M74LS197P Logic circuit (Control unit IC16)

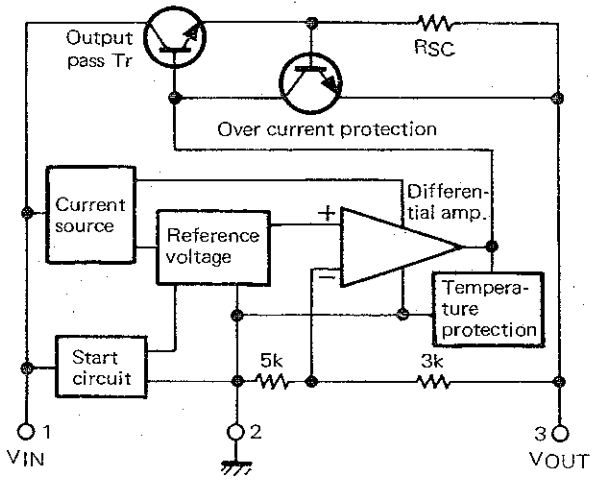
INPUT			OUTPUT			
$\bar{T}$	$\bar{RD}$	LOAD	QA	QB	QC	QD
X	L	X	L	L	L	L
X	H	L	DA	DB	DC	DD
↓	H	H	COUNT			

↓ : Change H to L  
X : Either H or L

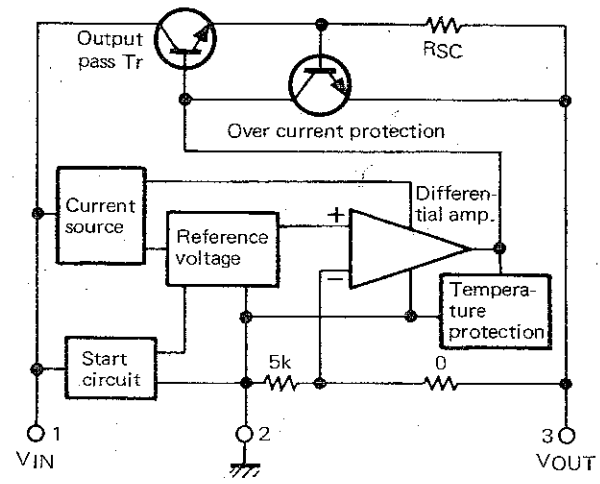
M74LS197P Truth table (1)

COUNT	OUTPUT			
	QA	QB	QC	QD
0	L	L	L	L
1	H	L	L	L
2	L	H	L	L
3	H	H	L	L
4	L	L	H	L
5	H	L	H	L
6	L	H	H	L
7	H	H	H	L
8	L	L	L	H
9	H	L	L	H
10	L	H	L	H
11	H	H	L	H
12	L	L	H	H
13	H	L	H	H
14	L	H	H	H
15	H	H	H	H

M74LS197P Truth table (2)



AN7808 Block diagram (IF unit IC8)



AN7805 Block diagram (IF unit IC9)

## PARTS LIST

### CAPACITORS

CC 45 TH 1H 220 J  
 1 2 3 4 5 6

- 1 = Type .... ceramic, electrolytic, etc.
- 2 = Shape .... round, square, etc.
- 3 = Temp coefficient
- 4 = Voltage rating
- 5 = Value
- 6 = Tolerance

#### ● Temperature coefficient

1st Word	C	L	P	R	S	T	U
Color*	Black	Red	Orange	Yellow	Green	Blue	Violet
ppm/°C	0	-80	-150	-220	-330	-470	-750

2nd Word	G	H	J	K	L
ppm/°C	± 30	± 60	± 120	± 250	± 500

Example CC45TH = -470 ± 60 ppm/°C

#### ● Tolerance

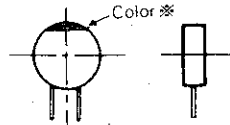
Cord	C	D	G	J	K	M	X	Z	P	No cord
(%)	± 0.25	± 0.5	± 2	± 5	± 10	± 20	+ 40	+ 80	+ 100	More than 10μF - 10 ~ + 50 Less than 4.7μF - 10 ~ + 75

Less than 10 pF

Cord	B	C	D	F	G
(pF)	± 0.1	± 0.25	± 0.5	± 1	± 2

Abbreviation		Abbreviation	
Cap	Capacitor	ML	Mylar
C	Ceramic	S	Styren
E	Electrolytic	T	Tantalum
MC	Mica		

CC45



#### ● Rating voltage

2nd word / 1st word	A	B	C	D	E	F	G	H	J	K	V
0	1.0	1.25	1.6	2.0	2.5	3.15	4.0	5.0	6.3	8.0	-
1	10	12.5	16	20	25	31.5	40	50	63	80	35
2	100	125	160	200	250	315	400	500	630	800	-
3	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	-

#### ● Capacitor value

0 1 0 = 1pF

1 0 0 = 10pF

1 0 1 = 100pF

1 0 2 = 1000pF = 0.001μF

1 0 3 = 0.01μF

2 2 0 = 22pF

1st number    Multiplier  
2nd number

Symbol	Destination
K	U.S.A.
W	Europe
T	Britain
M	General market

Resistors not listed in this parts list are standard, fixed carbon composition, 1/4W or 1/8W. The resistance values, in ohms, are indicated on the schematic diagram.

### SEMICONDUCTOR

N : New parts

Item	Re-remarks	Name	Item	Re-remarks	Name	Item	Re-remarks	Name	Item	Re-remarks	Name		
Diode		1N60	LED	N	LN247RP	FET		2SC2053	IC		M74LS112AP		
		1S1007		N	LN347GP			N		M74LS145P		N	M74LS196P
		1S1555		N	LN447YP					2SC2240(GR)		N	M74LS197P
		1S1587		SG238D				2SC2290*J			N	M54459L	
		1S2588		SY438D				2SC2509			N	M54561P	
		BA379	Surge absorber	ERZC07DK201			N	2SC2538			N	MB3614	
		ITT310		ERZD03DK331				2SC2603(E)			N	MC145156P	
		LN66(R)	Thermistor	25D29				2SC2703(O)			N	MN6147C	
		S31C		32D27				2SC2703(O or Y)					
		V06B		N	SDT1000F					2SD880(Y)			SN74LS90N
Vari-cap		1SV53A	Display tube	N	FIP9D7			2SK30A(O)			SN74S10N		
		1SV54GC			Photo TR	N	PN126S			2SK125		SN74S112N	
Varistor		MV5T	TR		2SA562(Y)			2SK192A(GR)			SN16913P		
		MV13			2SA733(R)			2SK192(Y)			TC4011BP		
		SV03Y			2SA1015(Y)			3SK73(GR)			TC4512BP		
Zener diode		BZ-240		2SC460(B)			3SK74(L)			TC5065BP			
		RD3.0EB2		2SC945(Q)		N	74LS90N			TC5067BP			
		RD4.3EB3		2SC945(R)		N	AN612		N	μPB551C			
		RD5.1EB1		2SC945(R)		N	AN6551		N	μPC1158H2			
		RD6.2EB1		2SC1775(E)		N	AN7805		N	μPC2002V			
		RD6.2EB2		2SC1815(Y)		N	AN7808		N	μPD5101LC			
		RD9.1EB2		2SC1815(Q)			HD74LS90P			μPD8049C-279			
		RD9.1EB3		2SC1923(O)			LM358P			μPD8243C			
		RD10EB1		2SC1959(Y)									

PARTS LIST

Part No.	Re- marks	Description	Ref. No.	Part No.	Re- marks	Description	Ref. No.
<b>TS-430 GENERAL</b>				H25-0079-04		Protective bag MIC M	
A01-0935-02	N	Case (A) upper		H25-0112-04		Protective bag Cord	
A01-0936-02	N	Case (B) lower		H25-0116-04		Protective bag	
A20-2457-13	N	Panel		J02-0323-05		Foot x 4	
B05-0708-04		SP grill cloth		J02-0403-04		Rubber foot x 4	
B30-0817-15		Pilot lamp 14V, 80mA		J02-0407-04		Assistant foot	
B31-0639-05	N	Meter		J13-0404-05		Fuse holder	
B39-0407-04		Spacer x 2 Assistant foot		J21-2573-04		Foot mounting hardware x 2	
B42-1767-04	N	VOX name plate Case (A)		J31-0141-04		Spacer ring MIC	
				J61-0019-05		Vinyle tie x 10	

PARTS LIST

Part No.	Re- marks	Description	Ref. No.
T03-0027-15		Speaker	
T91-0352-05		Microphone Accessory M	
W02-0328-10	N	Encoder ass'y	
W09-0326-05		Lithium battery CR2032	
X41-1470-00	N	Switch unit	
X44-1510-11	N	RF unit	
X45-1280-00	N	Final unit	
X48-1370-00	N	IF unit	
X50-1910-00	N	PLL unit	
X51-1290-00	N	Filter unit	
X53-1290-00	N	Control unit	
X54-1710-00	N	Display unit	

Part No.	Re- marks	Description	Ref. No.	Q'ty
S29-1428-05	N	Rotary switch M.CH	S1	1
S36-2408-05	N	Paddle switch SEND/ REC, VOX/MAN	S14,15	2
S36-2411-05	N	Paddle switch PROC, ALC/IC, MAR/WIDE	S16-18	3
S40-2440-15	N	Push switch LOCK, STEP, M.CH,MS, PG.S, HOLD, 1MHz STEP, RIT NB, ATT, NOTCH	S6-8,11-13, 19-23	11
S40-2441-15	N	Push switch A=B, MR, M.IN	S5,9,10	3
S50-1409-05		Tact switch BAND	S3,4	2
S50-1411-05		Tact switch MODE	S24-28	5

RF UNIT (X44-1510-11)

Part No.	Re- marks	Description	Ref. No.	Q'ty
<b>SWITCH UNIT (X41-1470-00)</b>				
CE04W1C222M		E 2200 16V	C2,3	2
CK45B1H102K	C	0.001	C10,11	2
CK45F1H103Z	C	0.01	C5,6	2
CK45F1H473Z	C	0.047	C1,4	2
C91-0456-05	C	0.047	C7,8,12	3
E06-0853-05		8P metal socket MIC		1
E08-0272-05	N	Mini connector 2P		1
E08-0373-05	N	Mini connector 3P		1
E23-0401-05		Round terminal		1
E40-0273-05		Mini connector 2P		5
E40-0473-05		Mini connector 4P		1
E40-0573-05		Mini connector 5P		1
E40-0673-05		Mini connector 6P		4
L15-0016-05		Choke coil	CH1	1
N10-2030-16				

CC45RH1H010C	C	1P	C141	1
CC45RH1H030C	C	3P	C144,200	2
CC45RH1H050C	C	5P	C93,145	2
CC45RH1H070D	C	7P	C138,140	2
CC45RH1H100D	C	10P	C80,90,134,143	4
CC45RH1H101J	C	100P	C73	1
CC45RH1H270J	C	27P	C101	1
CC45RH1H330J	C	33P	C158	1
CC45RH1H560J	C	56P	C77,78	2
CC45SL1H030C	C	3P	C122	1
CC45SL1H050C	C	5P	C152,159	2
CC45SL1H070D	C	7P	C154	1
CC45SL1H101J	C	100P	C70,71,104,110	4
CC45SL1H121J	C	120P	C58,166,186	3
CC45SL1H151J	C	150P	C59	1
CC45SL1H180J	C	18P	C199	1
CC45SL1H181J	C	180P	C53	1
CC45SL1H221J	C	220P	C46	1
CC45SL1H271J	C	270P	C48,54	2
CC45SL1H330J	C	33P	C72,79	2
CC45SL1H390J	C	39P	C3	1
CC45SL1H470J	C	47P	C2,106,107, 157	4
CC45SL1H560J	C	56P	C63,189	2

PARTS LIST

Part No.	Re- marks	Description	Ref. No.	Q'ty	Part No.	Re- marks	Description	Ref. No.	Q'ty
CK45F1H103Z		C 0.01	C5,61,65,81-83, 87,91,96,97,103, 105,109,111,113, 115,117,120,127, 128,133,135,147, 153,160-162,169, 175,183,184,187, 188,192,202	35	L34-2146-05	N	Tuning coil	T19	1
CK45F1H223Z		C 0.022	C14,22,28,32,38, 43,51,56,88,89, 95,112,118,119, 121,123,126,132, 136,137,139,156, 163,164,168,195 196	27	L40-1001-02		Ferri-inductor 10μH	L6-8	3
CQ92M1H103K		ML 0.01	C176	1	L40-1001-14		Ferri-inductor 10μH	L15,17,41,65,66	5
CQ92M1H223K		ML 0.022	C181	1	L40-1011-03		Ferri-inductor 100μH	L48,53	2
CQ92M1H472K		ML 0.0047	C171	1	L40-1011-14		Ferri-inductor 100μH	L67	1
CQ92M1H473K		ML 0.047	C172	1	L40-1021-03		Ferri-inductor 1mH	L3,44	2
C90-0838-05		E 1 50V	C193	1	L40-1092-14		Ferri-inductor 1μH	L28	1
C91-0105-05		C 0.0047	C7,10,13,74,75	5	L40-1292-14		Ferri-inductor 1.2μH	L31,33	2
C91-0125-05		C 0.0027	C6,19	2	L40-1501-03		Ferri-inductor 15μH	L47	1
C91-0131-05		C 0.01	C146,148-150	4	L40-1511-03		Ferri-inductor 150μH	L68	1
C91-0132-05		C 0.01	C11,12,16,17	4	L40-1511-13		Ferri-inductor 150μH	L63	1
C91-0456-05		C 0.047	C4,9,21,27,33, 39,44,52,57,62, 67-69,86,102, 130,131,151,185, 194,197,201	22	L40-1511-14		Ferri-inductor 150μH	L5,50,51,55,64	5
C91-0498-05		C 0.35P	C142	1	L40-1592-14		Ferri-inductor 1.5μH	L25	1
E04-0157-05		Mini pin jack A		3	L40-1892-01		Ferri-inductor 1.8μH	L54	1
E23-0512-05		Terminal		1	L40-1892-14		Ferri-inductor 1.8μH	L27,29	2
E40-0273-05		Mini connector 2P		8	L40-2201-14		Ferri-inductor 22μH	L11	1
E40-0373-05		Mini connector 3P		2	L40-2211-14		Ferri-inductor 220μH	L4,45	2
E40-0473-05		Mini connector 4P		1	L40-2282-01		Ferri-inductor 0.22μH	L2	1
E40-0573-05		Mini connector 5P		3	L40-2282-14		Ferri-inductor 0.22μH	L42	1
E40-0673-05		Mini connector 6P		2	L40-2292-14		Ferri-inductor 2.2μH	L19,24,26	3
E40-0773-05		Mini connector 7P		1	L40-2701-14		Ferri-inductor 27μH	L10,12	2
J31-0502-04		PC board collar		6	L40-3301-14		Ferri-inductor 33μH	L62	1
J42-0428-05		PC board bushing		6	L40-3382-01		Ferri-inductor 0.33μH	L1,46,56	3
L19-0324-05		Wide bandwidth transf.	T3,23	2	L40-3382-14		Ferri-inductor 0.33μH	L38	1
L19-0328-05		Wide bandwidth transf.	T24	1	L40-3391-14		Ferri-inductor 3.3μH	L18,60	2
L19-0344-05		Wide bandwidth transf.	T2	1	L40-3982-14		Ferri-inductor 0.39μH	L35,36,39,40,43	5
L30-0506-05		Tuning coil	T11	1	L40-3991-14		Ferri-inductor 3.9μH	L21,22	2
L30-0511-05		Tuning coil 8.83MHz	T14	1	L40-4701-03		Ferri-inductor 47μH	L49,52,57	3
L34-0535-05		Tuning coil	T15	1	L40-4701-13		Ferri-inductor 47μH	L59	1
L34-0536-05		Tuning coil	T16	1	L40-4701-14		Ferri-inductor 47μH	L13,14,61	3
L34-0697-05		Tuning coil	T18	1	L40-4791-14		Ferri-inductor 4.7μH	L23	1
L34-0857-05		Tuning coil	T7	1	L40-5682-14		Ferri-inductor 0.56μH	L37	1
L34-0858-05		Tuning coil	T22	1	L40-5691-14		Ferri-inductor 5.6μH	L20	1
L34-0859-05		Tuning coil	T5,21	2	L40-6811-03		Ferri-inductor 680μH	L9	1
L34-0860-15		Tuning coil	T20	1	L40-6822-14		Ferri-inductor 0.68μH	L30,32	2
L34-0862-05		Tuning coil	T17	1	L40-8282-14		Ferri-inductor 0.82μH	L34	1
L34-0942-05		Tuning coil	T13	1	L40-8291-14		Ferri-inductor 8.2μH	L16	1
L34-2159-05		Tuning coil	T12	1	L71-0214-05		MCF 48.055MHz	XF	1
L34-2142-05	N	Tuning coil	T4,10	2	L92-0110-05		Ferrite-bead	L70,71	2
L34-2143-05	N	Tuning coil	T1	1	R12-1412-05		Trim. pot. 1kΩ	VR1-4	4
L34-2144-05	N	Tuning coil	T8	1	R12-3428-05		Trim. pot. 47kΩ	VR5	1
L34-2145-05	N	Tuning coil	T6	1	R90-0517-05		Resistor block 4.7kΩ x 7	RB1	1
					S51-1404-05		Relay G2E	RL1	1
<b>100W FINAL UNIT (X45-1280-00)</b>									
					CC45CH1H220J	C	22P	C5	1
					CC45SL2H220J	C	22P 500V	C29	1
					CC45SL2H101J	C	100P 500V	C10	1
					CC45SL2H271J	C	270P 500V	C34,35	2
					CE04W1C100M	E	10 16V	C17,22	2
					CE04W1E101M	E	100 25V	C19,23	2
					CK45B1H102K	C	0.001	C21	1
					CK45B1H103K	C	0.01	C13,14,26,27	4

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## PARTS LIST

Part No.	Re- marks	Description	Ref. No.	Q'ty	Part No.	Re- marks	Description	Ref. No.	Q'ty
CK45B1H471K		C 470P	C1	1	CC45SL1H150J		C 15P	C165,166	2
CK45F1H103Z		C 0.01	C33	1	CC45SL1H221J		C 220P	C64,153	2
CK45F1H473Z		C 0.047	C6,7,28	3	CC45UJ1H470J		C 47P	C63,65,125,137, 149	5
CM73F2H122J		Laminated cap. 0.0012 500V	C15	1	CC45UJ1H330J		C 33P	C34	1
CM93D2H561J		MC 560P 500V	C30	1	CE04BW1HR22M		E 0.22 50V	C55	1
C91-0456-05		C 0.047	C2-4,8,9,16, 18,20,24,25,31,32	12	CE04BW1HR47M		E 0.47 50V	C99	1
C91-1004-05	N	Chip cap. 0.0068 50V	C11,12	2	CE04W0J470M		E 47 6.3V	C121	1
E23-0401-05		Round terminal		1	CE04W1A101M		E 100 10V	C47,147	2
E40-0273-05		Mini connector 2P		1	CE04W1A221M		E 220 10V	C98	1
E40-0275-05		Pin connector 2P		1	CE04W1A470M		E 47 10V	C39,56,116,150, 151,158	6
					CE04W1C100M		E 10 16V	C81,101	2
					CE04W1C220M		E 22 16V	C112	1

## PARTS LIST

Part No.	Re- marks	Description	Ref. No.	Q'ty	Part No.	Re- marks	Description	Ref. No.	Q'ty
E23-0512-05		Terminal		2	CC45TH1H330J	C	33P	C30	1
E29-0413-05		1P connector (female)		1	CC45TH1H390J	C	39P	C28	1
E40-0273-05		Mini connector 2P		13					
E40-0373-05		Mini connector 3P		2	CE04W1A101M	E	100 10V	C44	1
E40-0473-05		Mini connector 4P		4	CE04W1A470M	E	47 10V	C8,11,15,21,27	7
E40-0573-05		Mini connector 5P		3				49,55	
E40-0673-05		Mini connector 6P		3	CE04W1V100M	E	10μ 16V	C78	1
E40-0773-05		Mini connector 7P		1					
E40-0873-05		Mini connector 8P		1	CK45B1H102K	C	0.001	C77,91-93,101	5
				1	CK45B1H222K	C	0.0022	C5	1
F20-0516-05		Insulating sheet		1	CK45F1H103Z	C	0.01	C1-4,12,16,	24
F29-0014-05		Shoulder washer		1				22,26,33,36,54,	
								57,62,69-74,79,	
J31-0502-04		PC board collar		7	CK45F1H223Z	C	0.022	82,90,97,98	
J42-0428-05		PC board bushing		7				C94-96	3
L34-0535-05		Tuning coil	L3,9	2	CO92M1H102K	ML	0.001	C47	1
L34-0536-06		Tuning coil	L4	1	CO92M1H104K	ML	0.1	C46	1
L34-0708-05		Tuning coil	L1	1					
L34-2077-05		Tuning coil	L2	1	C91-0119-05	C	0.047 (SR)	C37,39,48,52,65	5
L40-1011-14		Ferri-inductor 100μH	L14,15	2	C91-0131-05	C	0.01	C6	1
L40-1021-03		Ferri-inductor 1mH	L5	1	C91-0456-05	C	0.047	C7,31,35,40,45,	17
L40-1511-03		Ferri-inductor 150μH	L10,11	2				50,51,53,58,60,	
L40-3391-03		Ferri-inductor 3.3μH	L6	1				63,64,68,75,81,	
L40-4711-03		Ferri-inductor 470μH	L13	1				99,102	
L40-1511-13		Ferri-inductor 150μH	L16	1	E04-0157-04		Mini pin jack A		1
L71-0208-05		MCF YK-88S	XF1	1	E23-0046-04		Square terminal		2
					E40-0273-05		Mini connector 2P		2
N09-0641-05		Screw		4	E40-0473-05		Mini connector 4P		2
N30-3006-46		Round screw 3 x 6		4	E40-0673-05		Mini connector 6P		1
R12-1408-05		Trim. pot. 4.7kΩ	VR4,5,9	3	J31-0502-04		PC board collar		6
R12-1412-05		Trim. pot. 1kΩ	VR1	1	J42-0428-05		PC board bushing		6
R12-3427-05		Trim. pot. 10kΩ	VR2,8,12	3	L19-0344-05	N	Wide bandwidth transf.	T5	1

## PARTS LIST

Part No.	Re- marks	Description	Ref. No.	Q'ty	Part No.	Re- marks	Description	Ref. No.	Q'ty
<b>FILTER UNIT (X51-1290-00)</b>					<b>CONTROL UNIT (X53-1290-00)</b>				
C05-0043-05		Ceramic trimmer 20P	TC1	1	L34-3062-05	N	LPF coil N 23-30	L13,14	2
CC45SL2H030C	C	3P 500V	C82	1	L34-3081-05	N	LPF coil C 2.5-4	L3	1
CC45SL2H100D	C	10P 500V	C65,72	2	L34-3082-05	N	LPF coil D 2.5-4	L4	1
CC45SL2H101J	C	100P 500V	C35,60	2	L39-0406-05		Detector coil	T1	1
CC45SL2H120J	C	12P 500V	C14	1	L40-1011-13		Ferri-inductor 100μH	L4	1
CC45SL2H121J	C	120P 500V	C38,51,40	3	L40-1011-14		Ferri-inductor 100μH	L37-40	4
CC45SL2H180J	C	18P 500V	C46	1	L40-1021-03		Ferri-inductor 1mH	L15-17	3
CC45SL2H151J	C	150P 500V	C4,7	2	L40-1511-03		Ferri-inductor 150μH	L18,19	2
CC45SL2H181J	C	180P 500V	C3,18,24,34,57,68	6	R12-0427-05		Trim. pot. 500Ω	VR5	1
CC45SL2H221J	C	220P 500V	C15,26,39,47,79	5	R12-2410-05		Trim. pot. 5kΩ	VR4	1
CC45SL2H271J	C	270P 500V	C21	1	R12-3434-05		Trim. pot. 10kΩ	VR3	1
CC45SL2H330J	C	33P 500V	C37,52	2	R12-4411-05		Trim. pot. 50kΩ	VR1,2	2
CC45SL2H391J	C	390P 500V	C12,29,36	3	RC05GF2H181J		Solid 180Ω 1/2W	R40	1
CC45SL2H470J	C	47P 500V	C23,48,55,61	4	R92-0150-05		Short jumper		20
CC45SL2H471J	C	470P 500V	C6,8,17,25	4	S51-1404-05		Relay G2E	RL2-15	14
CC45SL2H560J	C	56P 500V	C13,45,64,71	4	S51-2407-05		Relay FBR321	RL1	1
CC45SL2H680J	C	68P 500V	C28,43,58,81	4	<b>CONTROL UNIT (X53-1290-00)</b>				
CC45SL2H681J	C	680P 500V	C9	1	C05-0035-05		Ceramic trimmer 50P	TC1	1
CC45SL2H820J	C	82P 500V	C98,106	2	C05-0067-05		Ceramic trimmer 25P	TC5,6	2
CE04W1C100M	E	10 16V	C84	1	C05-0309-05		Ceramic trimmer 40P	TC2-4	3
CE04W1H010M	E	1 50V	C88	1	CC45CH1H0R5C	C	0.5P	C47	1
CE04W1HR47M	E	0.47 50V	C86	1	CC45CH1H020C	C	2P	C31,116,135	3
CK45F1H103Z	C	0.01	C1,74,75,77,78,83,87,93,94,99,102-104	13	CC45CH1H150J	C	15P	C3,30,33,36,178,179	6
CK45F1H473Z	C	0.047	C19,31,32,41,42,53,54,62,73,76,80,85,105	13	CC45CH1H220J	C	22P	C136	1
CM93D2H102J	MC	0.001	C16	1	CC45CH1H560J	C	56P	C29,38	2
CM93D2H182J	MC	0.0018	C5	1	CC45RH1H030C	C	3P	C58	1
CM93D2H821J	MC	820P	C95	1	CC45RH1H050C	C	5P	C67	1
C91-0119-05	C	0.047 (SR)	C2,10,11,20,63,89-92,101	10	CC45RH1H070D	C	7P	C57	1
E04-0154-04		Coax. connector		1	CC45RH1H100D	C	10P	C56	1
E04-0157-04		Mini pin jack		1	CC45RH1H120J	C	12P	C6,66,68	3
E23-0512-04		Square terminal		2	CC45RH1H220J	C	22P	C16,18,55,124	4
E29-0413-05		1P connector (female)		1	CC45RH1H270J	C	27P	C127	1
E40-0273-05		Mini connector 2P		4	CC45RH1H560J	C	56P	C115,117	2
E40-0373-05		Mini connector 3P		3	CC45RH1H820J	C	82P	C100	1
E40-0473-05		Mini connector 4P		2	CC45SL1H030C	C	3P	C144	1
E40-0673-05		Mini connector 6P		1	CC45SL1H050C	C	5P	C40,42,85,144	4
J31-0502-04		PC board collar		6	CC45SL1H100D	C	10P	C32,86,110	3
J42-0428-05		PC board bushing		6	CC45SL1H101J	C	100P	C12,41,92,94,114,133,143	7
L33-0672-05		Ferri-inductor 100μH	L21-36	16	CC45SL1H120J	C	12P	C84	1
L34-3038-05		LPF coil A 1.5-2.5	L1	1	CC45SL1H150J	C	15P	C43,112	2
L34-3039-05		LPF coil B 1.5-2.5	L2	1	CC45SL1H151J	C	150P	C140	1
L34-3054-05	N	LPF coil E 4-6.5	L5	1	CC45SL1H221J	C	220P	C93,107	2
L34-3055-05	N	LPF coil F 4-6.5	L6	1	CC45SL1H270J	C	27P	C24,26	2
L34-3056-05	N	LPF coil G 6.5-10.5	L7	1	CC45SL1H470J	C	47P	C211	1
L34-3057-05	N	LPF coil H 6.5-10.5	L8	1	CC45SL1H560J	C	56P	C25	1
L34-3058-05	N	LPF coil J 10.5-16	L9	1	CC45SL1H680J	C	68P	C108	1
L34-3059-05	N	LPF coil K 10.5-16	L10	1	CC45TH1H120J	C	12P	C6	1
L34-3060-05	N	LPF coil L 16-23	L11,12	2	CC45TH1H150J	C	15P	C54	1
					CC45TH1H270J	C	27P	C53,58	2
					CC45UJ1H030C	C	3P	C5,17	2
					CC45UJ1H120J	C	12P	C4	1
					CC45UJ1H180J	C	18P	C39	1
					CC45UJ1H220J	C	22P	C82,106,213	3
					CC45UJ1H221J	C	220P	C105	1
					CC45UJ1H270J	C	27P	C126	1
					CC45UJ1H330J	C	33P	C139	1

## PARTS LIST

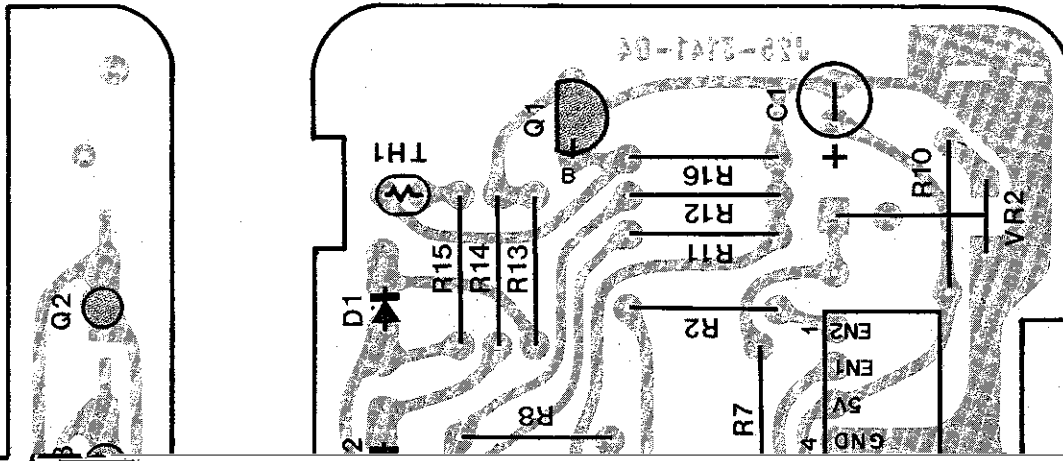
Part No.	Re- marks	Description	Ref. No.	Q'ty	Part No.	Re- marks	Description	Ref. No.	Q'ty
CE04W1A101M		E 100 10V	C48,79,118,119,175	5	L34-3067-05	N	BPF coil 42.5MHz	T7,9	2
CE04W1A470M		E 47 10V	C75,147,151,163	4	L34-3068-05	N	BPF coil 42.5MHz	T8	1
CE04W1H010M		E 1 50V	C148,174	2	L40-1011-03		Ferri-inductor 100μH	L1,4-7,11, 13-15,17,27,35	12
CE04W1H3R3M		E 3.3 50V	C150	1	L33-0672-05		Ferri-inductor 100μH	L36-41	6
CE04W1HR47M		E 0.47 50V	C129,195,196,149	4	L40-1011-04		Ferri-inductor 100μH	L25,26	2
CK45B1H102K		C 0.001	C34,155,158-162,202,205,212	10	L40-1021-03		Ferri-inductor 1mH	L8,9	2
CK45B1H222K		C 0.0022	C52,80	2	L40-1511-03		Ferri-inductor 150μH	L34,43	2
CK45B1H471K		C 470P	C132,142	2	L40-2201-03		Ferri-inductor 22μH	L2,3,42	3
CK45F1H103Z		C 0.01	C1,7-11,13-15,19-23,27,35,37,44,45,59-65,69-72,81,87-89,91,95,102,103,104,109,111,113,123,125,128,130,131,134,137,138,141,145,146,165-173,177,180-194,200,201,206,209,210	83	L40-2211-03		Ferri-inductor 220μH	L16,19,20,24,30 32,33	7
CK45F1H223Z		C 0.022	C197	1	L40-4711-03		Ferri-inductor 470μH	L21,28,29	3
CO92M1H102K		ML 0.001	C50	1	L72-0336-05	N	Ceramic filter 9.65MHz	CF1	1
CO02M1H104K		ML 0.1	C51	1	L77-0485-05		Crystal 8.8315MHz	X2	1
CO92M1H152K		ML 0.0015	C76	1	L77-0486-05		Crystal 8.8285MHz	X1	1
CO92M1H683K		ML 0.068	C77	1	L77-0978-05	N	Crystal 36MHz	X4	1
CO92M1H822K		ML 0.0082	C154	1	L77-0979-05	N	Crystal 39.225MHz	X5	1
C91-0131-05		C 0.01	C203	1	L77-0980-05	N	Crystal 8.7915MHz	X3	1
C91-0456-05		C 0.047	C2,28,46,49,73,74,78,90,96-99,120,121,122,156,164,176,198,199,204,207,208	23	L77-0981-05	N	Crystal 9MHz	X6	1
C91-0457-05		C 0.022	C153,157	2	L78-0005-05		Ceramic OSC 5.75MHz	X7	1
E04-0157-05		Mini pin jack A		1	R12-1038-05		Trim. pot. 1kΩ	VR1,2	2
E23-0046-04		Square terminal		5	R12-1040-05		Trim. pot. 4.7kΩ	VR3	1
E40-0273-05		Mini connector 2P		8	R90-0515-05		Resistor block 10kΩ x 4	RB1	1
E40-0274-05		Mini connector 2P		1	R90-0561-05	N	Resistor block 22kΩ x 6	RB3	1
E40-0373-05		Mini connector 3P		4	R90-0562-05	N	Resistor block 22kΩ x 8	RB2	1
E40-0473-05		Mini connector 4P		8	R92-0150-05		Short jumper		94
E40-0573-05		Mini connector 5P		4	S31-1005-05		Slide switch	S1	1
E40-0673-05		Mini connector 6P		1	<b>DISPLAY UNIT (X54-1710-00)</b>				
E40-0773-05		Mini connector 7P		2	CE04W0J221M		E 220 6.3V	C2	1
E40-0873-05		Mini connector 8P		1	CE04W1A470M		E 47 10V	C1	1
J31-0502-04		PC board collar		7	CE04W1V100M		E 10 35V	C3,5-7	4
J42-0428-05		PC board bushing		7	CO92M1H103K		ML 0.01	C4	1
L32-0198-05		OSC coil	L10	1	C91-0456-05		C 0.047	C8	1
L32-0201-05		OSC coil 8.83MHz	T14	1	E40-0273-05		Mini connector 2P		1
L32-0639-05		OSC coil	L18	1	E40-0473-05		Mini connector 4P		1
L33-0636-05		Choke coil 28μH	L31	1	E40-0773-05		Mini connector 7P		1
L33-0663-05	N	Choke coil 1μH	L12	1	E40-0873-05		Mini connector 8P		1
L33-0664-05	N	Choke coil 2.7μH	L22	1	L19-0305-05		OSC transf.	T1	1
L33-0665-05	N	Choke coil 39μH	L23	1	L40-1011-04		Ferri-inductor 100μH	L1	1
L34-2140-05	N	Tuning coil 9.67MHz	T10	1	L40-1511-03		Ferri-inductor 150μH	L2	1
L34-2141-05	N	Tuning coil 9MHz	T12,13	2	N30-2604-46		Round screw 2.6 x 4		6
L34-3064-05	N	BPF coil 43MHz	T1,3,4,6	4	N87-3006-46		Self tapping screw 3 x 6		2
L34-3065-05	N	BPF coil 43MHz	T2	1	R90-0511-05		Resistor block 47kΩ x 8	RB1	1
L34-3066-05	N	BPF coil 34MHz	T5	1	R90-0521-05		Resistor block 47kΩ x 7	RB2	1

# TS-430S PC BOARD VIEW

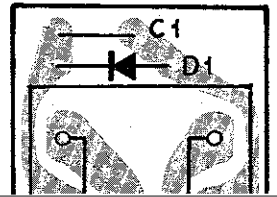
SWITCH UNIT (X41-1470-00) Component side view



ENCODER ASS'Y (J25-3141-04) Component side view

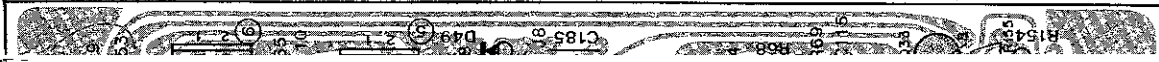


RELAY BOARD Component side view



# TS-430S PC BOARD VIEW

RF UNIT (X44-1510-11) Component side view





# TS-430S PC BOARD VIEW

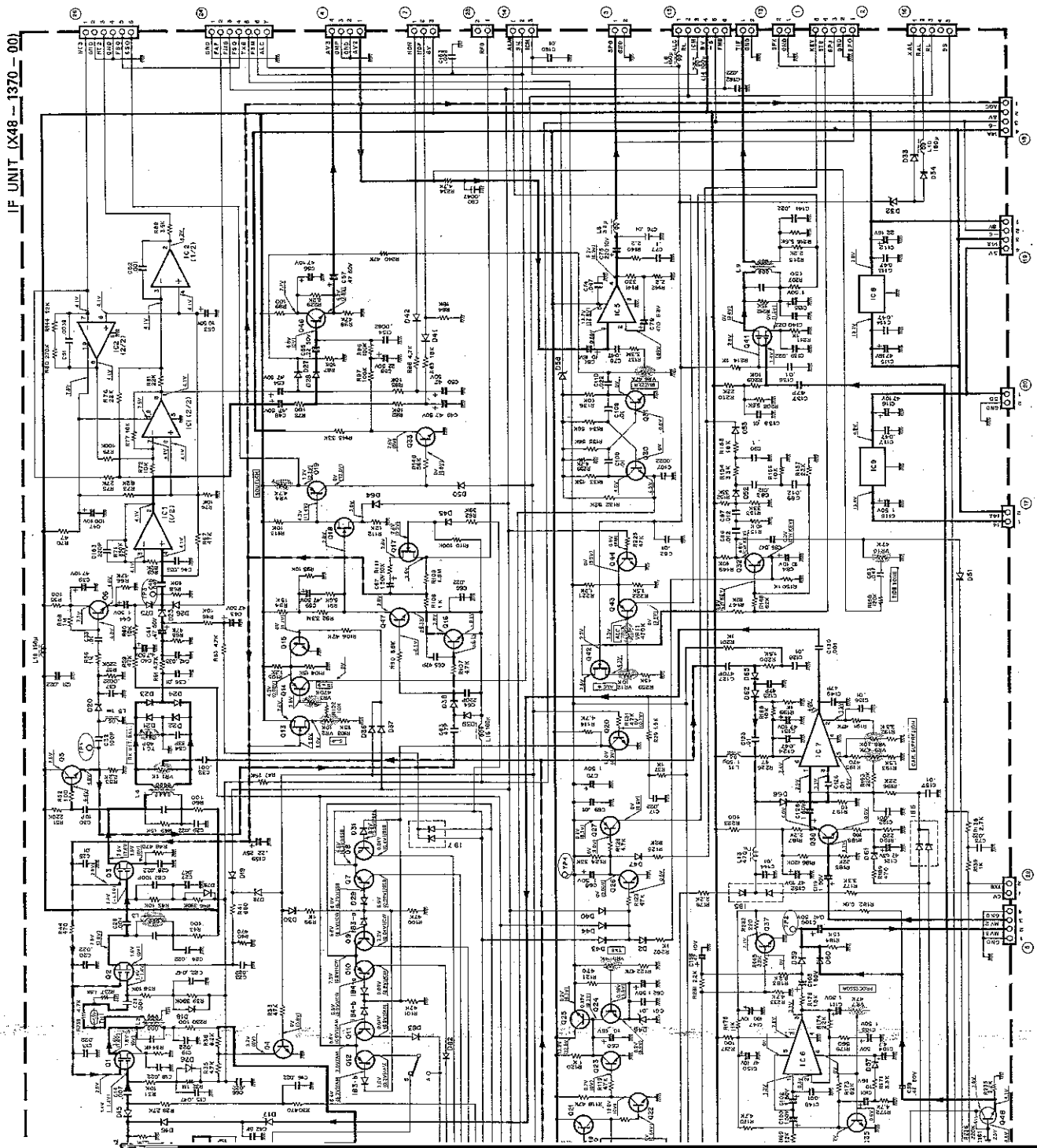
IF UNIT (X48-1370-00) Component side view



2SA1015  
2SC945  
2SC1815  
2SC2240  
2SC2703

# CIRCUIT DIAGRAM TS-430S

IF UNIT (X48-1370-00)



2

4

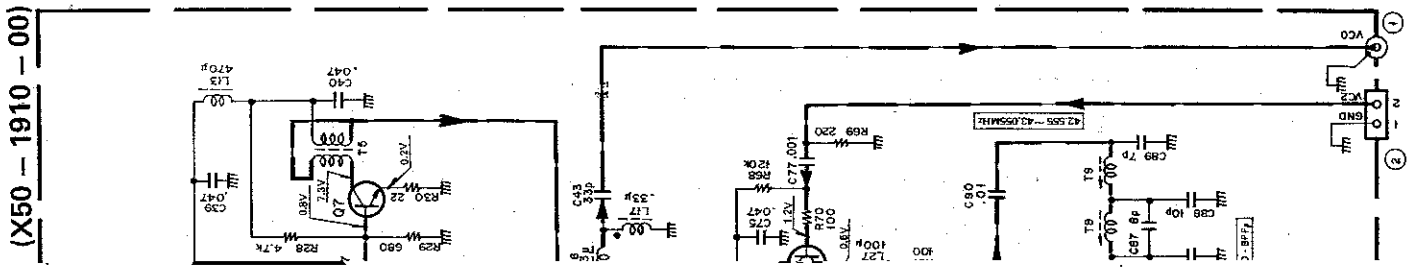
# TS-430S PC BOARD VIEW

PLL UNIT (X50-1910-00) Component side view



# CIRCUIT DIAGRAM TS-430S

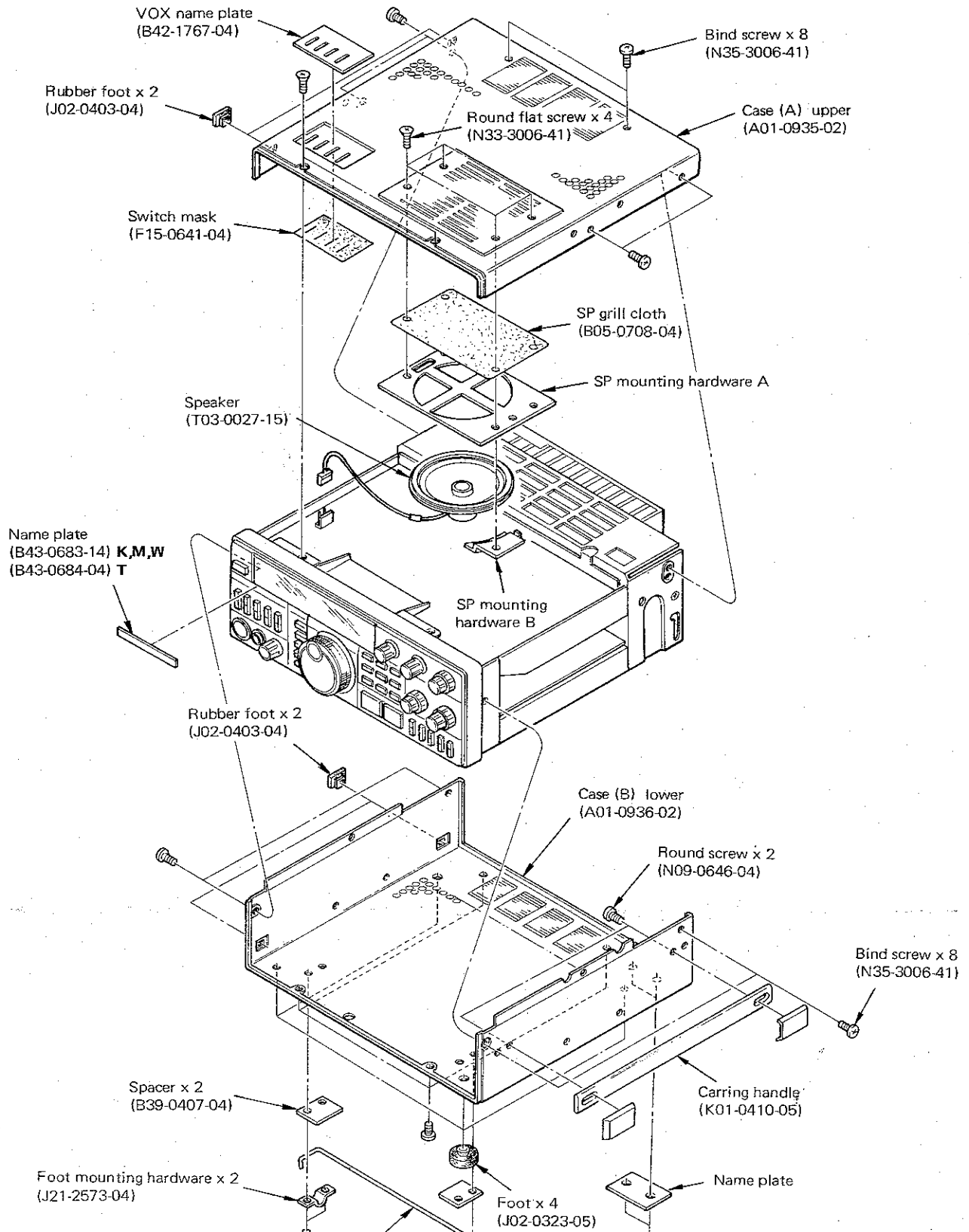
PLL UNIT (X50-1910-00)



Downloaded by  
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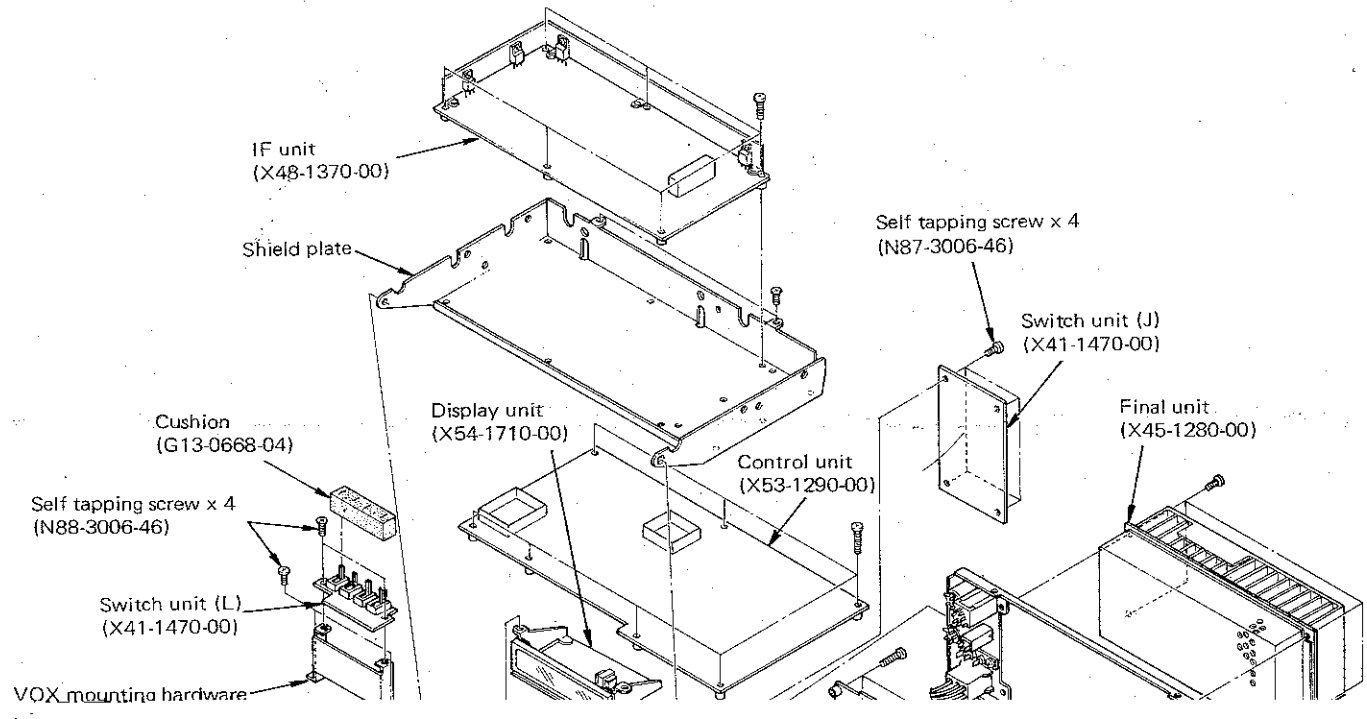


## DISASSEMBLY

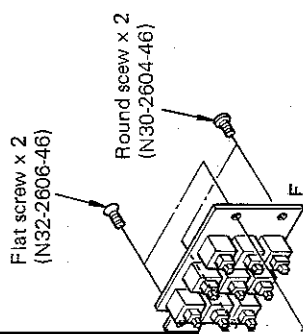


# TS-430S

## DISASSEMBLY



## DISASSEMBLY



Flat screw x 2  
(N32-2606-46)

Round screw x 2  
(N30-2604-46)

E

SS X 2

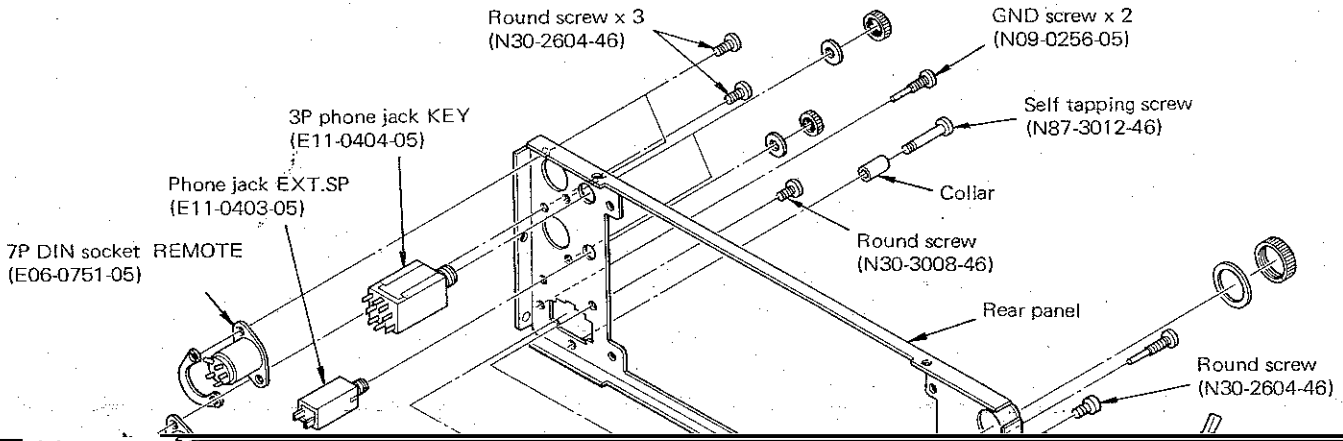
Round screw x 2  
(N30-2604-46)

M.CH  
FUNCTION  
+MIC  
MODE  
+CW

SEND  
SEND/REC, VOX/MAN  
PROC, ALC/IC, NAR/WIDE

# TS-430S

## DISASSEMBLY/PACKING



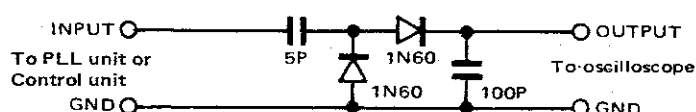
## ADJUSTMENT

### REQUIRED TEST EQUIPMENT

1. DC Voltmeter (DC V.M)
  - 1) Input resistance : More than  $1M\Omega$
  - 2) Voltage range : 1.5 to 1000 V AC/DC

NOTE : A high-precision multimeter may be used. However, accurate readings can not be obtained for high-impedance circuits.
2. DC Ammeter
  - 1) Current range : 1.5A, 3A, 20A, High-precision ammeter may be used.
3. RF VTVM (RF V.M)
  - 1) Input impedance :  $1M\Omega$  and less than  $3nF$  min

14. Spectrum Analyzer
  - 1) Frequency range : 100kHz to 110MHz or greater
  - 2) Bandwidth : 1 kHz to 3MHz
15. Detector
  - 1) For adjustment of PLL/VCO BPF



16. Directional Coupler
17. Power supply
  - PS-430

# TS-430S

## ADJUSTMENT

### VOLTAGE CHECK, ADJUSTMENT

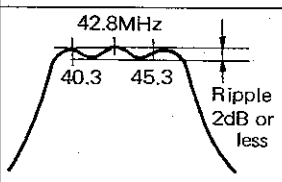
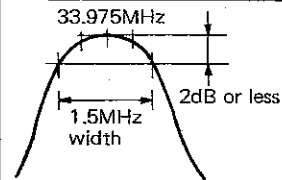
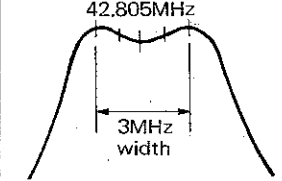
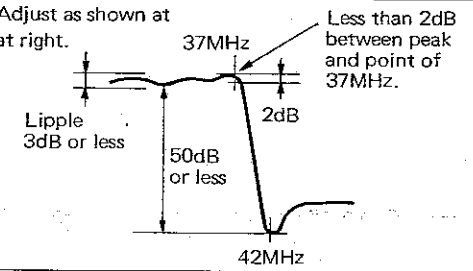
Item	Condition	Measurement			Adjustment			Specification/Remarks
		Test equipment	Unit	Terminal	Unit	Part	Method	
1. Voltage	1) POWER : ON RF GAIN : MAX MODE : USB STBY : REC	DC V.M	IF	⑨-1			Check	7.4-8.4V
				⑨-4				4.75-5.25V
				⑨-2				-5.8 -- -6.3V
				⑨-1				8.3-9.1V
				⊕(BATT)				3.0V or more .
				⑨-1	SW"A"	VR1		2.6V*1 or 2.8V*2
	2) STBY : SEND	TP4	IF	VR5	8.8V	±0.1V		

IF UNIT Q1-3,41 : 3SK73(GR)\*1  
3SK73(BL)\*2

### PLL ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specification/Remarks
		Test equipment	Unit	Terminal	Unit	Part	Method	
1. Reference oscillator frequency	1) 36MHz	f. counter	Cont	①-2	Cont	TC1	36,000,000Hz	±10Hz
	2) HET (39.225MHz)			HET				
2. FXT	1) BIT RATE : CFM	f. counter	Cont	DE	Cont	TC2	3,000,000Hz	±50Hz

## ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specification/Remarks
		Test equipment	Unit	Terminal	Unit	Part	Method	
7. PLL 42.8MHz BPF	1) Connect a 0.01μF capacitor between Q14 Base and GND. (To stop oscillation) Disconnect the capacitor after adjustment.	Sweep Gen. Detector Oscilloscope	Cont TP3	IC21-5	Cont	T7,8,9	Adjust as shown at right.	
8. PLL 33.975MHz BPF	1) Connect a 0.01μF capacitor between Q14 Base and GND. (Stop oscillation) Disconnect the capacitor after adjustment.	Sweep Gen. Detector Oscilloscope	Cont TP5	IC22-5	Cont	T4,5,6	Adjust as shown at right.	
9. PLL 42.805MHz BPF	1) Disconnect connector ② VC2. Reconnect connector ② after adjustment. Connect a 0.01μF capacitor between D15 cathode and GND. Disconnect the capacitor after adjustment.	Sweep Gen. Detector Oscilloscope	Cont ②-2	TP5	Cont	T1,2,3	Adjust as shown at right.	
10. VCO-2	1) FREQ : □□,000.0[0] kHz To obtain this frequency 1st set dial to □.999.9[9]. Then using mic push button depress UP button one step.	DC V.M	Cont	TP4	Cont	L10	6.5V	±0.1V
	2) FREQ : □□,999.9[9] kHz To obtain this frequency 1st set dial to □,000.0[0]. Then using mic push button depress DOWN button one step.						Check	2.1V±0.5V
11. VC2 level		RF VTVM	Cont	Connector ②	Cont	TC6	50mV	±1dB
12. VCO-BPF	1) Disconnect PLL unit connector ②. Reconnect connector ② after adjustment. Connect 560Ω resistor in Tracking Gen. output line. Use high impedance probe to connect to spectrum analyzer. (or connect 150Ω in series)	Tracking Gen. Detector Spectrum analyzer	PLL	IC6-1 TP2	PLL	T6-9	Adjust as shown at right.	
13. VCO-3A	1) FREQ : 7,499.9[9] kHz To obtain this frequency 1st set dial to 7,500.0[0]. Then using mic push button depress DOWN button one step.	DC V.M	PLL	TP1	PLL	T1	2.1V	±0.1V
	2) FREQ : 0,000.0 kHz						Check	6.5V or less
14. VCO-3B	1) FREQ : 15,999.9[9] kHz To obtain this frequency 1st set dial to 16,000.0[0]. Then using mic push button depress DOWN button one step.	DC V.M	PLL	TP1	PLL	T2	2.1V	±0.1V
	2) FREQ : 7,500.0[0] kHz						Check	6.5V or less
15. VCO-3C	1) FREQ : 22,999.9[9] kHz To obtain this frequency 1st set dial to 23,000.0[0]. Then using mic push button depress DOWN button one step.	DC V.M	PLL	TP1	PLL	T3	2.1V	±0.1V
	2) FREQ : 16,000.0[0] kHz						Check	6.5V or less

# TS-430S

## ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specification/Remarks
		Test equipment	Unit	Terminal	Unit	Part	Method	
16. VCO-3D	1) FREQ : 29,999.9[9] kHz Turn VFO to frequency stop.	DC V.M	PLL	TP1	PLL	T4	1.6V	±0.1V
	2) FREQ : 23,000.0[0] kHz						Check	6.5V or less
17. Encoder	1) Remove the VFO knob and motor-drive the encoder at	Oscilloscope	Cont	③-3				Point C may be located anywhere. When a motor is not

ADJUSTMENT

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

**TS-430S**

**ADJUSTMENT**

ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specification/Remarks
		Test equipment	Unit	Terminal	Unit	Part	Method	
13. IC meter	1) FREQ : 14,175.0kHz MODE : CW CAR LEVEL control : current drain 17.5A Connect Ammeter ⊕ : EXT power supply ⊕ terminal ⊖ : Power connector ⊕ terminal STBY : SEND	IC meter (Power meter)		ANT	Filter	VR5	14A	
14. ALC meter	1) MODE : USB MIC LEVEL control : MIN METER SW : ALC STBY : SEND	ALC meter			IF	VR12	Set to ALC meter starting point.	
	2) FREQ : 14,175.0kHz AG output : 1kHz, 5mV MIC LEVEL control : Set to ALC meter starting point.	Power meter (50Ω)		ANT				
	AG output : +6dB				IF	VR11	Adjust for maximum ALC scale reading.	
15. Speech processor	1) MODE : USB MIC LEVEL control : MIN AG output : 1kHz, 10mV PROC SW : ON and OFF STBY : REC.	AM V.M	IF	TP2	IF	VR7	Level should be the same between ON and OFF.	140mV (Reference value)
16. CW side tone	1) MODE : CW AF GAIN control : 12 o'clock VOX SW : MAN STBY : REC Connect KEY to KEY jack and close the key contacts.	AF V.M Oscilloscope AF dummy load	Rear panel	EXT. SP	IF	VR10	0.63V/8Ω	

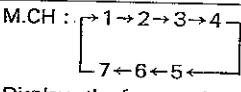
## ADJUSTMENT

### MICROPROCESSOR OPERATION CHECK

Item	Condition	Operation check																		
1. Reset check	1) FUNCTION SW : A POWER SW : OFF Set the POWER SW ON while depressing the <b>A=B</b> key. Then release the <b>A=B</b> key.	FREQ : 14,000.0kHz MODE : USB VFO A : Lights The "Beeper" sounds simultaneously with POWER ON.																		
	2) FUNCTION SW : B	FREQ : 14,000.0kHz MODE : USB VFO B : Lights																		
	3) <b>M.CH</b> SW : ON M.CH SW : change the channels in 1 through 8 order.	The frequency display disappears. M.CH display lights and displays 1-8 in order.																		
2. Band	1) <b>M.CH</b> SW : OFF 1MHz STEP SW : OFF Depress the "BAND : UP" key once. Press repeatedly.	FREQ : <b>18</b> , <b>00</b> .0kHz The "Beeper" sounds simultaneously.  The MHz display <b>□□.□</b> counts up. The "Beeper" sounds simultaneously.																		
	2) Hold the "BAND : UP" on.	FREQ : <table style="margin-left: auto; margin-right: auto; border-collapse: collapse;"> <tr> <td style="text-align: center;">14,000.0</td> <td style="text-align: center;">18,000.0</td> </tr> <tr> <td style="text-align: center;">↑</td> <td style="text-align: center;">↓</td> </tr> <tr> <td style="text-align: center;">10,000.0</td> <td style="text-align: center;">21,000.0</td> </tr> <tr> <td style="text-align: center;">↑</td> <td style="text-align: center;">↓</td> </tr> <tr> <td style="text-align: center;">7,000.0</td> <td style="text-align: center;">24,500.0</td> </tr> <tr> <td style="text-align: center;">↑</td> <td style="text-align: center;">↓</td> </tr> <tr> <td style="text-align: center;">3,500.0</td> <td style="text-align: center;">28,500.0</td> </tr> <tr> <td style="text-align: center;">↑</td> <td style="text-align: center;">↓</td> </tr> <tr> <td style="text-align: center;">1,500.0</td> <td style="text-align: center;">29,500.0</td> </tr> </table> The "Beeper" sounds at each Key-press.	14,000.0	18,000.0	↑	↓	10,000.0	21,000.0	↑	↓	7,000.0	24,500.0	↑	↓	3,500.0	28,500.0	↑	↓	1,500.0	29,500.0
	14,000.0	18,000.0																		
	↑	↓																		
	10,000.0	21,000.0																		
↑	↓																			
7,000.0	24,500.0																			
↑	↓																			
3,500.0	28,500.0																			
↑	↓																			
1,500.0	29,500.0																			
3) Depress the "BAND : DOWN" key once.  Repeat the operation.	FREQ : <b>□□.□</b> 00.0kHz Displays 1MHz lower frequency from that previously displayed in 2). The "Beeper" sounds.  The frequency display steps down 1MHz at each key-press. The "Beeper" sounds.																			
4) Hold the "BAND : DOWN" key on.	The frequency display in 2) steps down. The "Beeper" sounds at each key-press.																			
5) 1MHz STEP SW : ON Hold the "UP" key on.  Hold the "DOWN" key on.	FREQ : <b>□□.000</b> .0kHz The MHz display <b>□□</b> advances 1MHz at each key-press.  The display steps down 1MHz at each key-press.																			

Item	Condition	Operation check																
3. Dial	1) FREQ : 0,000.0kHz ① Check to see if the display does not change by turning the VFO control counterclockwise. And adjust the index by turning it in the same way. ② Turn the VFO control slowly clockwise. <b>STEP</b> SW : OFF	One revolution of VFO is 9.5-10kHz.																
	2) <b>STEP</b> SW : ON	One revolution of VFO is 95-100kHz.																
4. Memory write	1) FREQ : 14,000.0kHz MODE : USB M.CH SW : 1 <b>MIN</b> SW : ON	The "Beeper" sounds when "M.IN" key is depressed.																
	2) M.CH SW : 6 <b>MIN</b> SW : ON																	
	3) FREQ : 14,010.0kHz M.CH SW : 7 <b>MIN</b> SW : ON																	
	4) M.CH SW : 8 <b>MIN</b> SW : ON	The "Beeper" sounds continuously when "M.IN" key is depressed.																
	5) FREQ : 14,020.0kHz M.CH SW : 8 <b>MIN</b> SW : ON	The continuous tone stops when the "M.IN" key is depressed.																
	6) FREQ : 7,000.0kHz MODE : LSB M.CH SW : 2 <b>MIN</b> SW : ON	The "Beeper" sounds when the "M.IN" key is depressed.																
	7) FREQ : 21,000.0kHz MODE : CW M.CH SW : 3 <b>MIN</b> SW : ON																	
	8) FREQ : 24,500.0kHz MODE : AM M.CH SW : 4 <b>MIN</b> SW : ON																	
	9) FREQ : 29,500.0kHz MODE : FM M.CH SW : 5 <b>MIN</b> SW : ON																	
5. Memory recall (1)	1) <b>M.CH</b> SW : ON STBY SW : REC  M.CH SW : 1 2 3 4 5 6 7	"M.CH" display lights. <table style="margin-left: auto; margin-right: auto; border-collapse: collapse;"> <thead> <tr> <th>FREQ.</th> <th>MODE</th> </tr> </thead> <tbody> <tr> <td>14,000.0kHz</td> <td>USB</td> </tr> <tr> <td>7,000.0kHz</td> <td>LSB</td> </tr> <tr> <td>21,000.0kHz</td> <td>CW</td> </tr> <tr> <td>24,500.0kHz</td> <td>AM</td> </tr> <tr> <td>29,500.0kHz</td> <td>FM</td> </tr> <tr> <td>14,000.0kHz</td> <td>USB</td> </tr> <tr> <td>14,010.0kHz</td> <td>USB</td> </tr> </tbody> </table>	FREQ.	MODE	14,000.0kHz	USB	7,000.0kHz	LSB	21,000.0kHz	CW	24,500.0kHz	AM	29,500.0kHz	FM	14,000.0kHz	USB	14,010.0kHz	USB
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14,000.0kHz	USB																	
14,010.0kHz	USB																	
2) M.CH SW : 8 STBY SW : REC	FREQ : 14,010.0kHz USB																	
STBY SW : SEND	FREQ : 14,020.0kHz USB																	

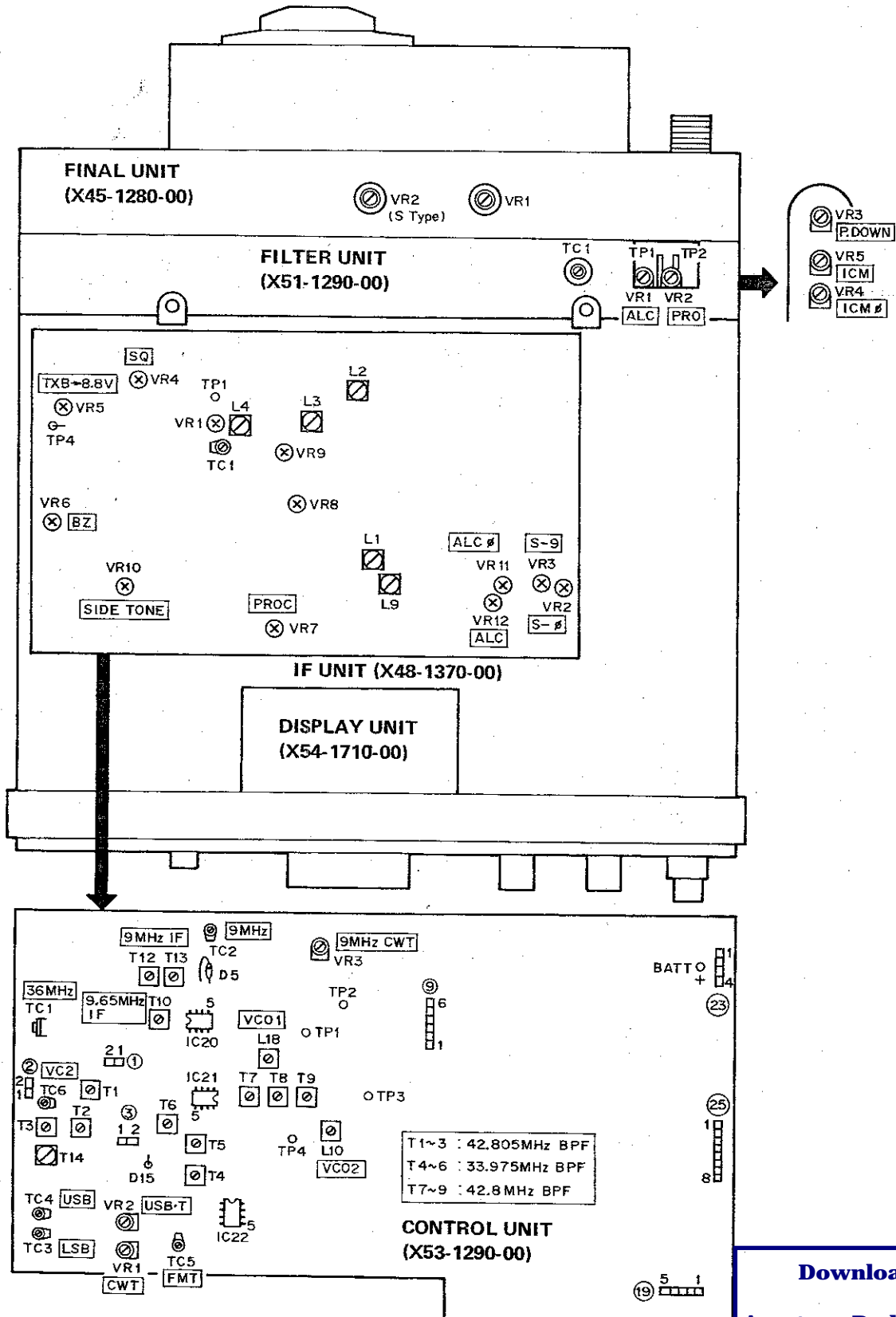
## ADJUSTMENT

Item	Condition	Operation check
6. Memory recall (2)	1) M.CH SW : 1 [MR] SW : ON	FREQ : 14,000.0kHz The "Beeper" sounds.
	2) Turn the VFO both clockwise and counterclockwise.	The display shows normal frequency control.
	3) [MR] SW : ON	FREQ : 14,000.0kHz The tone sounds simultaneously.
7. Memory erase	1) M.CH SW : 8 STBY : REC Place the [MIN] SW : ON While depressing either UP or DOWN BAND SW key.	The frequency display clears after the BAND and [MIN] SW keys are released. The "Beeper" sounds.
8. Memory scan	1) [MS] SW : ON	M.CH :  Displays the frequencies and modes in Item 5. 1).
9. Program scan	1) [MS] SW : OFF [PG.S] SW : ON PG. SCAN SPEED Pot. : MIN.	The scan starts from M.CH : 6 (FREQ : 14,000.0kHz) to M.CH : 7 (FREQ : 14,010.0kHz). When the frequency reaches
10. A=B (Function)	1) [MS] SW : OFF [PG.S] SW : OFF [M.CH] SW : OFF FUNCTION : B FREQ : 7,000.0kHz MODE : LSB	"VFO B" display lights.
	2) FUNCTION : A [A=B] SW : ON FUNCTION : B	"VFO A" display lights. FREQ : 14,000.0kHz MODE : USB FREQ : 14,000.0kHz MODE : USB
11. UP/DOWN (Microphone)	1) Connect a microphone (MC-60A or MC-42S). Momentarily depress the "UP" key several times.	When the 100Hz digit changes, the 100Hz upper frequency is displayed after ten key-presses.
	2) Hold the "UP" key on. SHIFT SPEED/SEC.	The frequency continuously advances forward after a short delay.

# TS-430S

## ADJUSTMENT

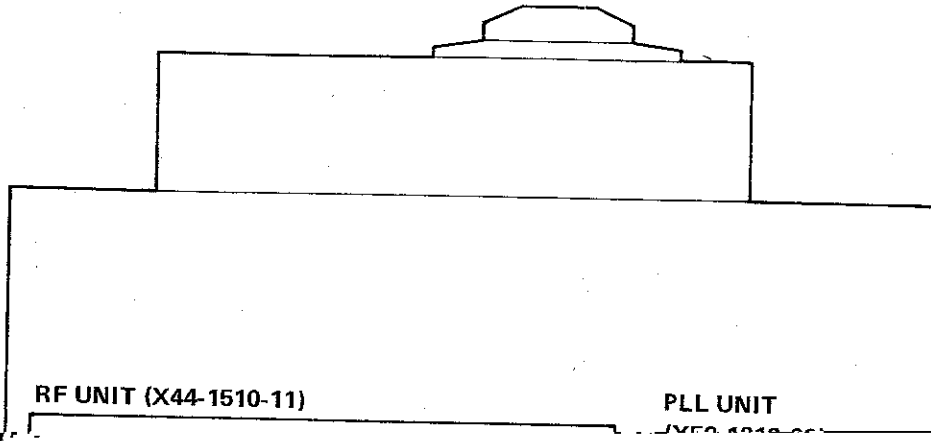
TOP VIEW



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ADJUSTMENT

BOTTOM VIEW



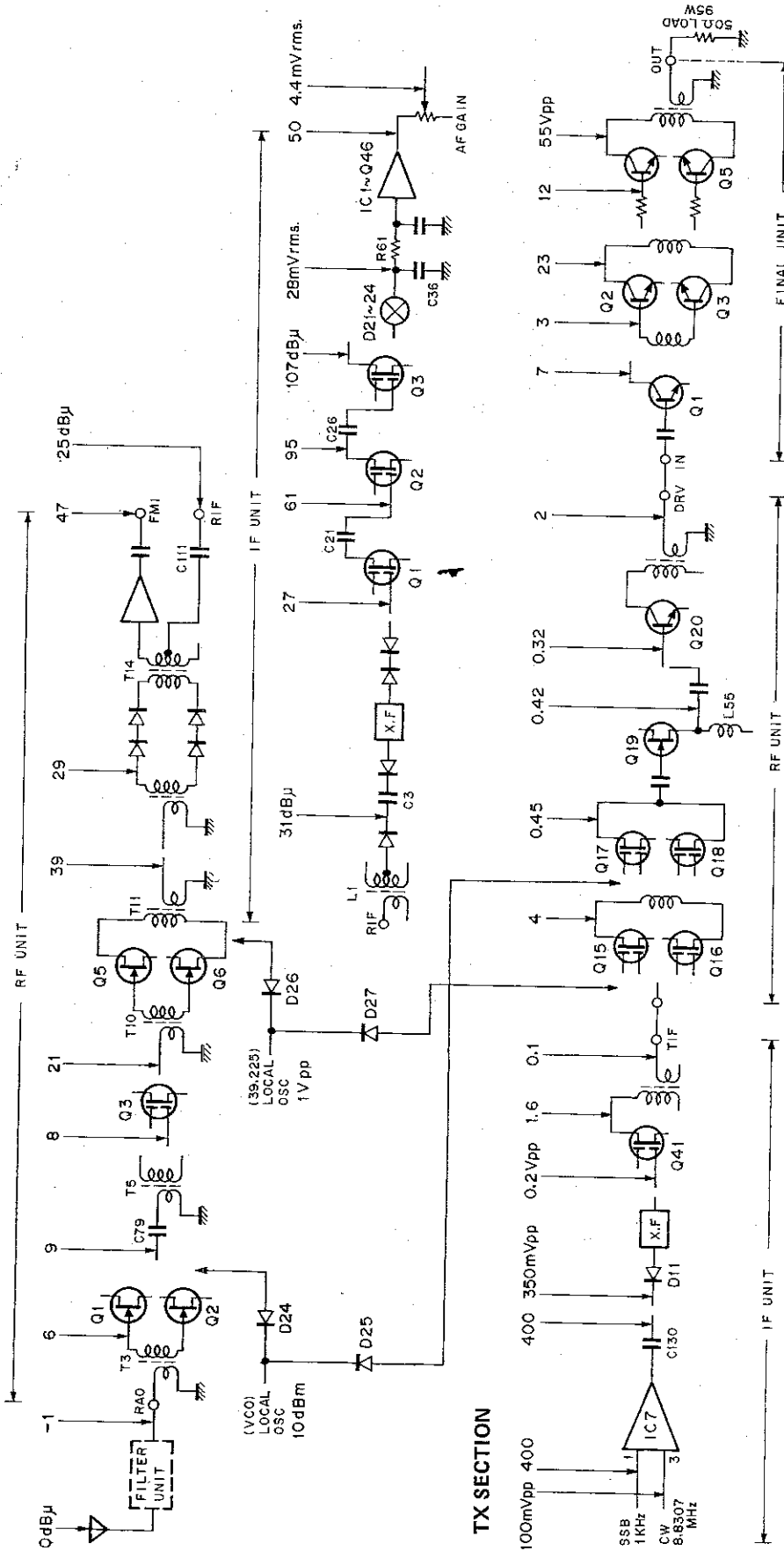
## LEVEL DIAGRAM

### RX SECTION

FREQUENCY : 14.200MHz  
 INPUT : 0dBμ  
 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.



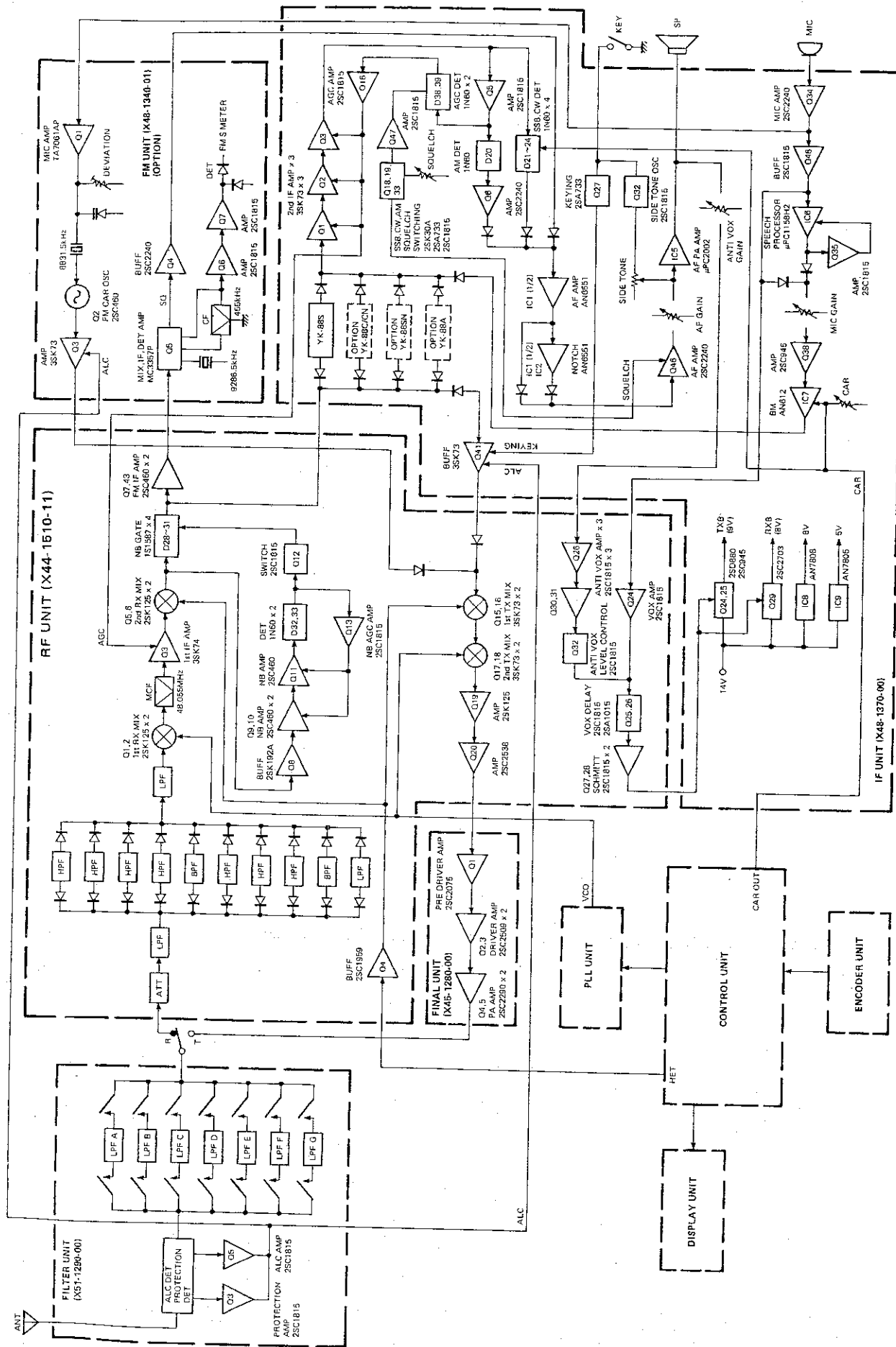
FREQUENCY : 14.200MHz  
 AF INPUT

- SSB : 1kHz, 400mVpp to IC7 1pin.
- CW : 8.8307MHz, 100mVpp to IC7 3pin.

#### NOTES

- 1) Adjust ALC level control for full scale reading.

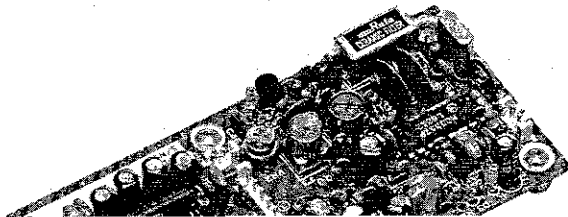
# BLOCK DIAGRAM TS-430S



# TS-430S

## FM-430

OUTSIDE VIEW



Part No.	Re- marks	Description	Ref. No.	Q'ty
<b>FM UNIT (X48-1340-01)</b>				
C05-0031-15		Ceramic trimmer 10P	TC1	1
CC45SL1H050C	C	5P	C15	1
CC45SL1H101J	C	100P	C29	1
CC45SL1H120J	C	12P	C40	1
CC45SL1H121J	C	120P	C22	1



# TS-430S

## PS-430

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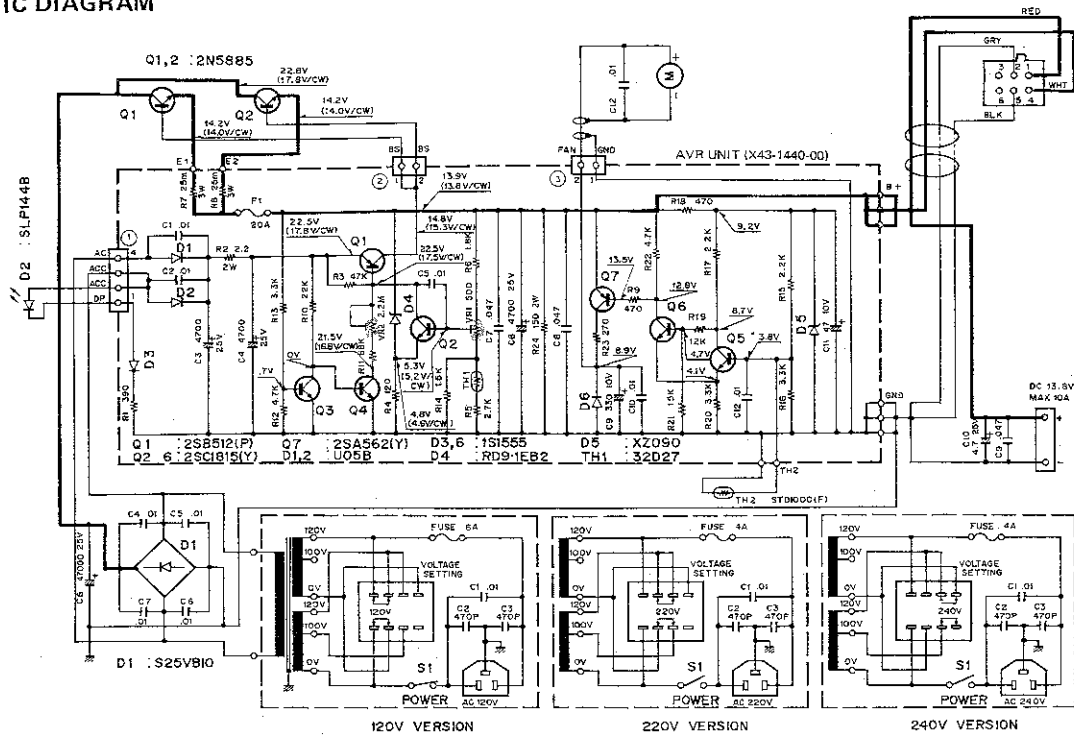
### SPECIFICATIONS

**Input voltage:** 120/220/240V AC±10%, 50/60Hz  
**Output voltage:** 13.8V DC (standard voltage)  
**Output current:** 20 A (25% duty cycle) 15A (50% duty cycle)  
**Continuous load current:** 10 A max. (including external output terminal)  
**Output voltage fluctuation:** Within ±0.7 V at AC 120V, 220V, 240V±10%  
(Load current: 15A)  
Within 0.7 V between 2–15 A load.  
(No-load output voltage: Less than 16V at 120V/220/240V. AC)

Part No.	Re- marks	Description	Ref. No.
E30-1645-05		AC cord	W
E30-1647-05		AC cord	X
E31-0500-05		Cable with plug	
F01-0786-03	N	Heat sink plate	
F01-0787-13	N	Heat sink	
F05-4022-05		Fuse 4A	K
F05-4022-05		Fuse 4A x 2	M,T,W,X
F05-6021-05		Fuse 6A x 2	

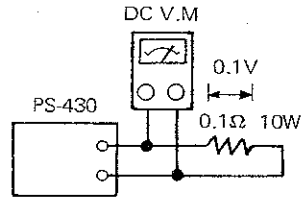
## PS-430

### SCHEMATIC DIAGRAM



### ADJUSTMENT

1. Connect the load and set the current to 15A.
2. Adjust output voltage to 13.8V  $\pm$  0.4V with VR1.
3. Protection circuit



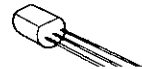
Connect a 0.1Ω 10W resistor and adjust VR2 so that 0.1V DC is obtained.

### PC BOARD VIEW

#### AVR UNIT (X43-1440-00) Component side view



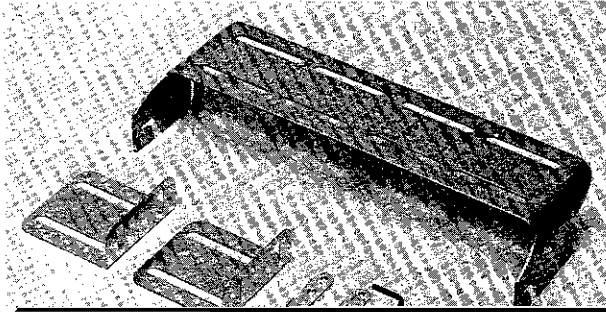
2SC1815



# TS-430S

## MB-430/SP-430

MB-430 OUTSIDE VIEW



MB-430 PARTS LIST

N : New parts

Part No.	Re- marks	Description	Ref. No.
A13-0635-03	N	Angle	
B50-4016-00	N	Instruction manual	
H01-4453-13	N	Packing control (inside) <b>M</b>	
H01-4454-13	N	Packing control (inside) <b>T</b>	
H25-0077-04		Protective bag	
H25-0098-04		Protective bag 150 x 480	
J30-0521-04	N	Spacer x 2	
N00-0007-05		Washer x 5	