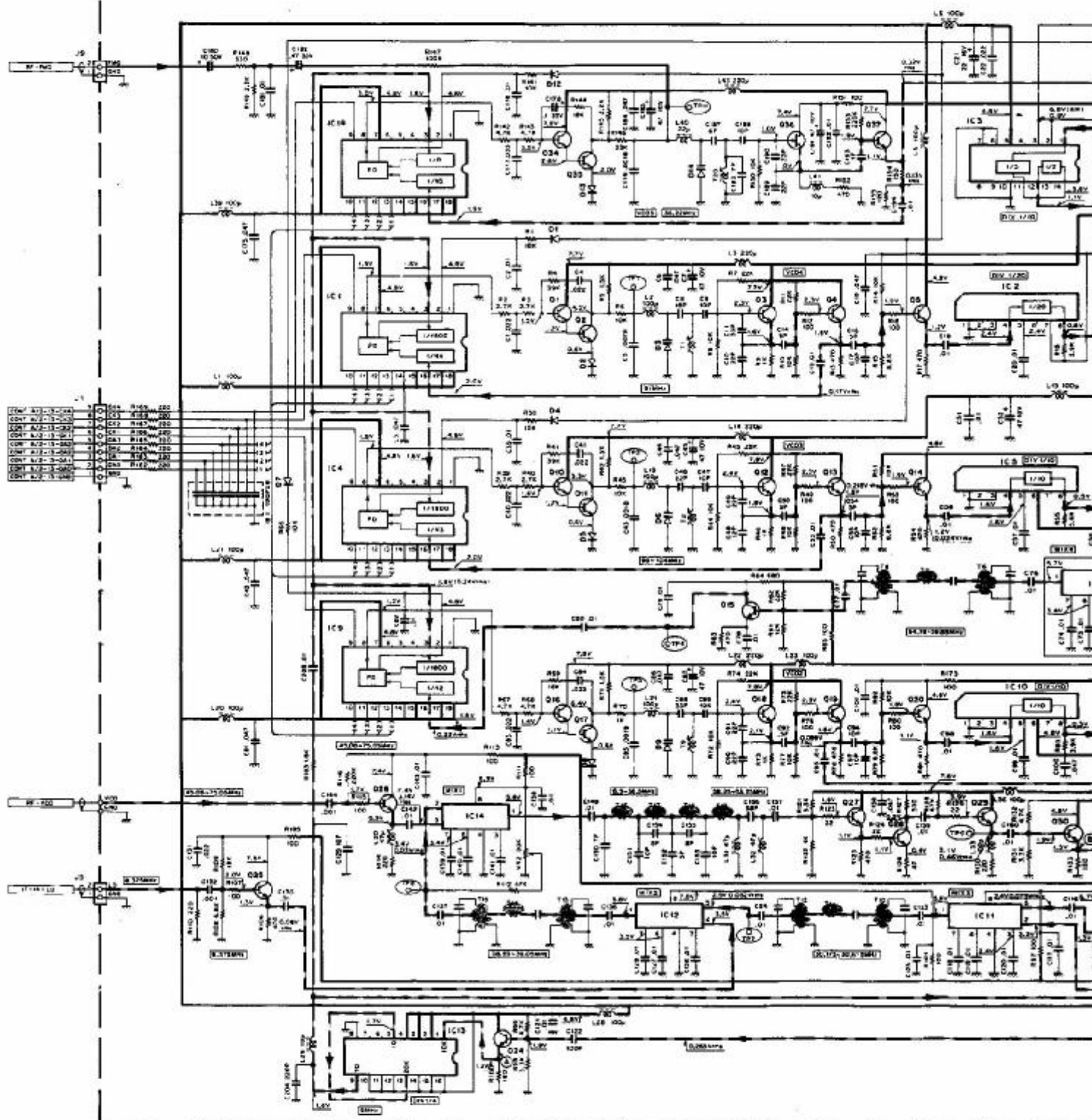


**UNIT (X50-2050-00) Component side view**

PLL UNIT (X50-2050-00)



IC 1,4	MM6147W, MM6147C
IC 2	MS4ASL
IC 3,6	SN74LS90H
IC 7,8,11,12,16	SN74S13P
IC 5,10	MS4MGL
IC 13,16	SN74S12N
IC 15	SN74S10N
IC 17	MSB7C06
IC 9,18	MM6147

Q 1,2,10,11,16,17 : 25C3113 (B)  
Q 3-5,12-15,18-20,22-24,26-30,  
32,34 : 25C2660 (Y)  
Q 6,7,9,23 : 23C2498 (Y)  
Q 8 : 23C1939 (Y)  
Q 21 : 26C3787 (L)  
Q 31-35 : 25C2459 (B)  
Q 36 : 25B1924 (B)

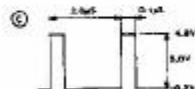
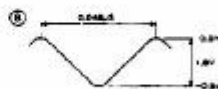
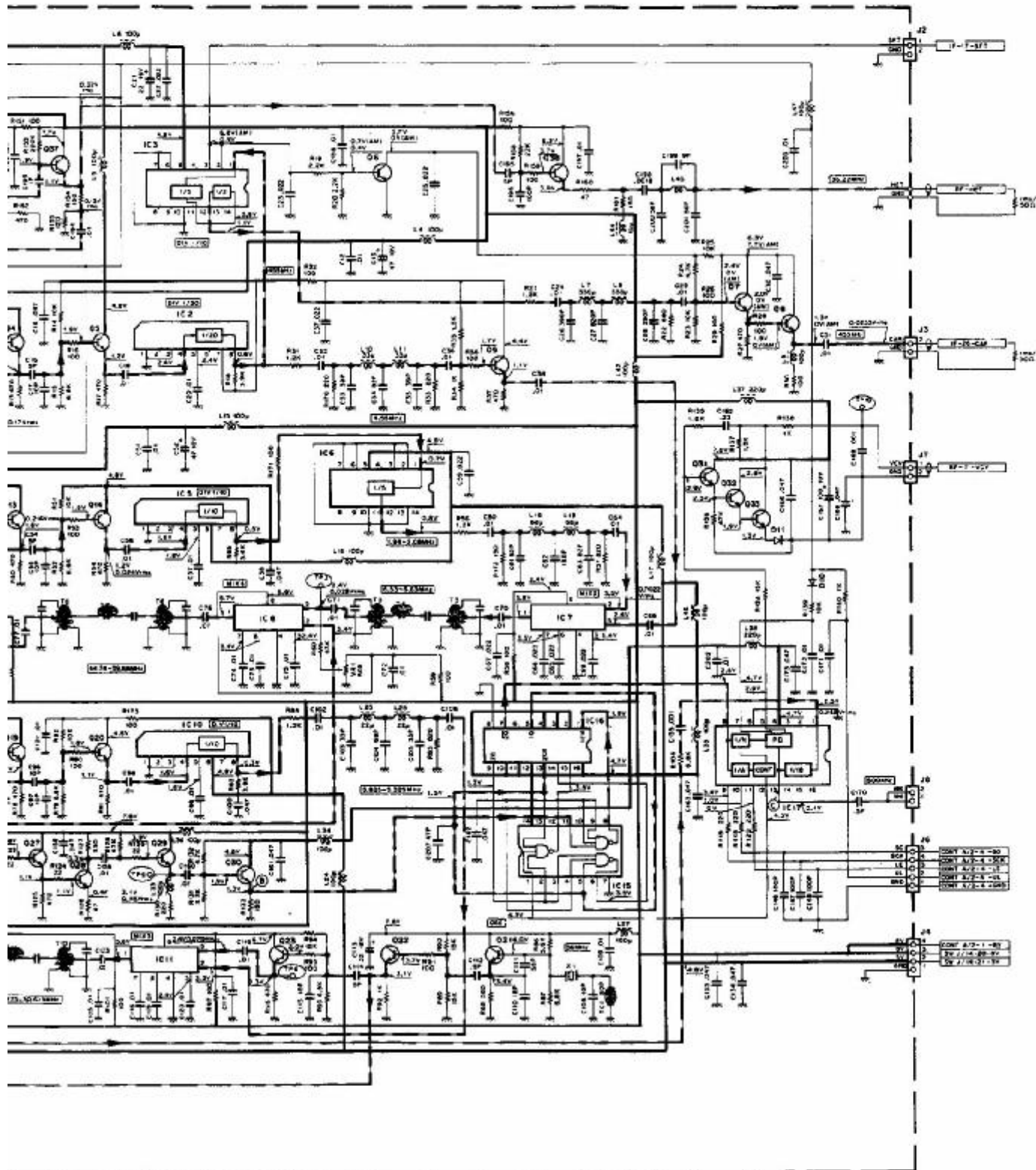
```
D 1,2,4,5,7,8,10,12 : ISS133
S 3 : ISS58A
D 6,9 : ITTSAPTE
Q 11 : MV13
Q 13 : MV205
Q 14 : ISSV133
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- K88133
- K8V88A
- KTT3ADTE
- NV13
- NV200
- NV433



# CIRCUIT DIAGRAM TS-440S

Refer to Schematic diagram on page 113.



## PARTS LIST

\* New Parts

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Ref. No. 参照番号	Address 位置	New Parts 新	Parts No. 部品番号	Description 部品名 / 規格	Desti- nation 仕向	Re- marks 備考
CC	2M		N09-0658-04	SCREW		
VV	20		N09-0372-04	SCREW (PULLEY)		
WW	1M		N09-0682-04	SCREW		
Y	1N, 2N		N30-3008-46	PAN HEAD MACHINE SCREW		
Z	20		N30-4005-46	PAN HEAD MACHINE SCREW		
R3			RC05GF2H3R9J	RC 3.9 J 1/2W		
R9 .10			RC05GF2H1B1J	RC 180 J 1/2W		
R11 .14			RS14AB3A5R6J	FL-PROOF RS 5.6 J 1W		
R15 .16			RC05GF2H150J	RC 15 J 1/2W		
R17 .18			RS14AB3A5R6J	FL-PROOF RS 5.6 J 1W		
R33			RC05GF2H100J	RC 10 J 1/2W		
VR1 .2			R12-1406-05	TRIMMING PNT. (BASE CURRENT)		
WB			R92-0150-05	JUMPER RES 0 OHM		
155	2N		T42-0302-05	DC MOTOR ASSY		
D1			MV-ST	VARISTOR		
D2 .3		*	SVD3YS	VARISTOR		
D4			1SS133	DIODE		
D4			1S1555	DIODE		
Q1			2SC2075	TRANSISTOR		
Q2 .3			2SC2509	TRANSISTOR		
Q4 .5		*	2SC2879	TRANSISTOR		
Q6 .7			2SD1406(Y)	TRANSISTOR		
Q8			2SC1815(Y)	TRANSISTOR		
Q9			AN6551	IC(OP AMP X2)		
TH1			SDT1000	THERMISTOR		
TH1		*	5T41L	THERMISTOR		
PLL UNIT (X50-2050-00)						
C1			C092M1H223K	MYLAR 0.022UF K		
C2			C91-0117-05	CERAMIC 0.01UF K		
C3			C91-0119-05	CERAMIC 0.047UF K		
C4			C092M1H223K	MYLAR 0.022UF K		
C5			CK45B1H182K	CERAMIC 1800PF K		
C6			C91-0119-05	CERAMIC 0.047UF K		
C7			CE04W1A470M	ELECTRO 47UF 10WV		
C8			CC45RH1H180J	CERAMIC 18PF J		
C9			CC45CH1H100D	CERAMIC 10PF D		
C10			CC45CH1H220J	CERAMIC 22PF J		
C11			CC45CH1H330J	CERAMIC 33PF J		
C12			C91-0117-05	CERAMIC 0.01UF K		
C13			CE04W1A470M	ELECTRO 47UF 10WV		
C14			CC45CH1H050C	CERAMIC 5.0PF C		
C15			C91-0769-05	CERAMIC 0.01UF M		
C16			CC45SL1H050C	CERAMIC 5.0PF C		
C17			CC45SL1H100D	CERAMIC 10PF D		
C18			C91-0117-05	CERAMIC 0.01UF K		
C19			C91-0119-05	CERAMIC 0.047UF K		
C20			C91-0769-05	CERAMIC 0.01UF M		
C21			CE04W1C220M	ELECTRO 22UF 16WV		
C22 .23			C91-1008-05	CERAMIC 0.022UF K		
C24			C91-0769-05	CERAMIC 0.01UF M		
C25			C91-1008-05	CERAMIC 0.022UF K		
C26			CK45B1H391K	CERAMIC 390PF K		
C27			CK45B1H821K	CERAMIC 820PF K		

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Ref. No. 参照番号	Address 位置	New Parts 新	Parts No. 部品番号	Description 部品名 / 規格	Desti- nation 仕向	Re- marks 備考
L37 .3B			L40-2211-14	SMALL FIXED INDUCTOR		
L39		*	L40-1011-13	SMALL FIXED INDUCTOR		
L40		*	L40-2201-13	SMALL FIXED INDUCTOR		
L41		*	L40-1001-14	SMALL FIXED INDUCTOR		
L42		*	L40-1011-13	SMALL FIXED INDUCTOR		
L43			L40-2211-14	SMALL FIXED INDUCTOR		
L44		*	L40-1001-14	SMALL FIXED INDUCTOR		
L46		*	L40-1011-13	SMALL FIXED INDUCTOR		
L47		*	L40-1011-14	SMALL FIXED INDUCTOR		
T1 .2		*	L32-0666-15	OSCILLATING COIL (VCO, 95MHZ)		
T3		*	L34-2269-05	COIL (6.6MHZ, BPF)		
T4		*	L34-2270-05	COIL (6.6MHZ, BPF)		
T5		*	L34-2269-05	COIL (6.6MHZ, BPF)		
T6		*	L34-2271-05	COIL (62MHZ, BPF)		
T7		*	L34-2272-15	COIL (62MHZ, BPF)		
T8		*	L34-2292-05	COIL (62MHZ, BPF)		
T9			L32-0639-05	OSCILLATING COIL (VCO, 55MHZ)		
T10		*	L34-2273-05	COIL (30MHZ, BPF)		
T11		*	L34-2274-05	COIL (30MHZ, BPF)		
T12		*	L34-2273-05	COIL (30MHZ, BPF)		
T13		*	L34-2275-05	COIL (39MHZ, BPF)		
T14		*	L34-2276-05	COIL (39MHZ, BPF)		
T15		*	L34-2275-05	COIL (39MHZ, BPF)		
T16			L34-0851-05	COIL (40MHZ, LPF)		
T17 .18			L34-0856-05	COIL (40MHZ, LPF)		
T19			L34-0851-05	COIL (40MHZ, LPF)		
T20			L32-0677-15	OSCILLATING COIL (VCO, 36MHZ)		
T45			L34-1124-05	COIL		
X1		*	L77-1299-05	CRYSTAL RESONATOR		
IB1		*	R90-0596-05	MULTI-COMP (100PF X8)		
VR1 .2			R12-4413-05	TRIMMING PNT. (VCO2, ETC.)		
W8			R92-0150-05	JUMPER REST 0 OHM		
W18			R92-0150-05	JUMPER REST 0 OHM		
W20			R92-0150-05	JUMPER REST 0 OHM		
W21			R92-1061-05	JUMPER REST 0 OHM		
W35			R92-0150-05	JUMPER REST 0 OHM		
W45 .46			R92-0150-05	JUMPER REST 0 OHM		
W49 -51			R92-0150-05	JUMPER REST 0 OHM		
D1 .2			1SS133	DIODE		
D3			1SV53A	DIODE		
D4 .5			1SS133	DIODE		
D6			ITT310TE	VARI CAP		
D7 .8			1SS133	DIODE		
D9			ITT310TE	VARI CAP		
D10			1SS133	DIODE		
D11			MV13	VARISTOR		
D12			1SS133	DIODE		
D13			MV203	VARISTOR		
D14		*	1SV153	DIODE		
IC1			MN6147	IC		
IC1			MN6147C	IC (FREQ SYNTHESIZER PLL)		
IC2			MS4459L	IC (PRE SCALER)		
IC3			SN74LS90N	IC		
IC4			MN6147	IC		

## PARTS LIST

\* New Parts

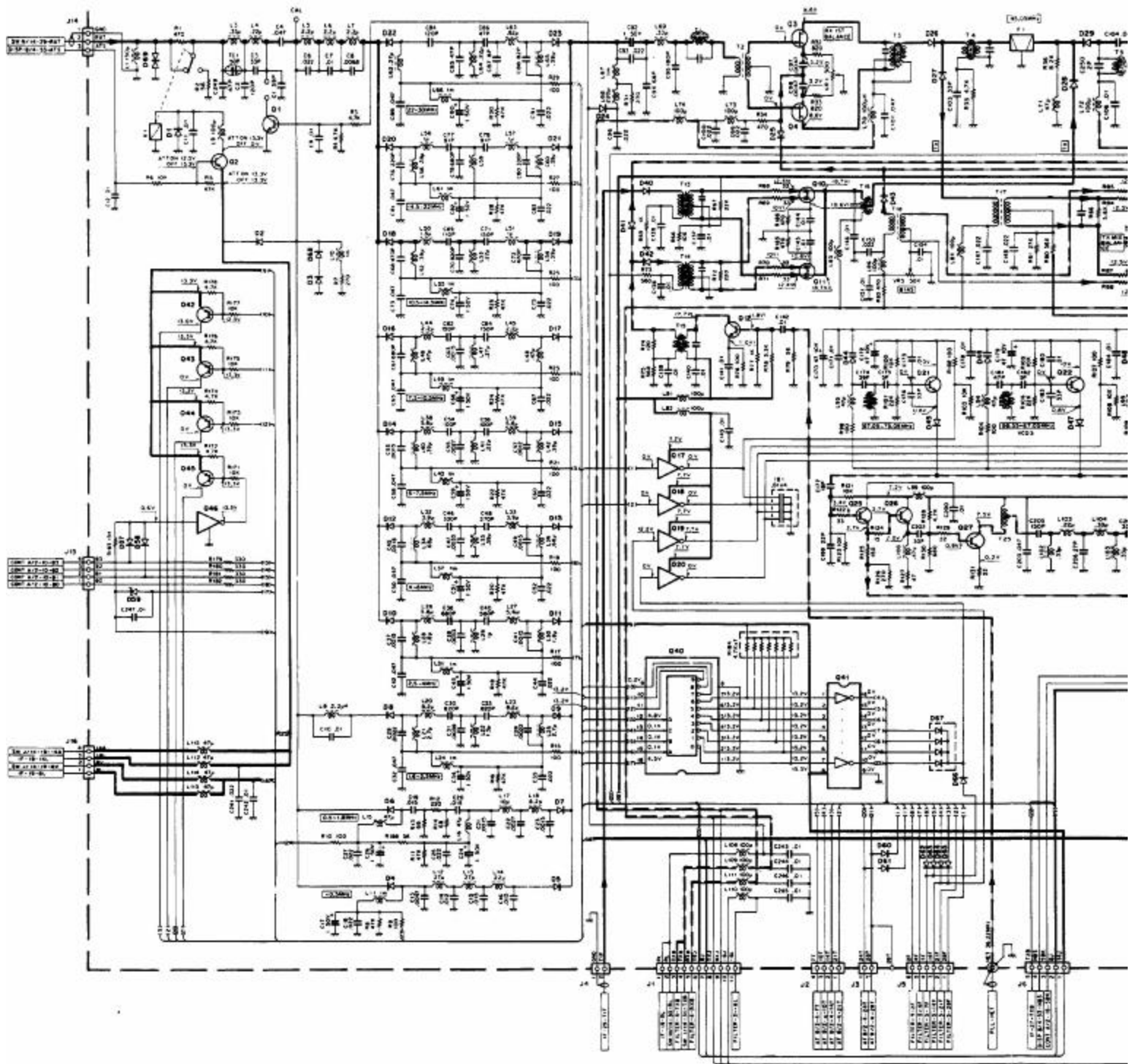
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Ref. No. 参照番号	Address 位置	New Parts 新	Parts No. 部品番号	Description 部品名 / 規格	Desti- nation 仕向	Re- marks 備考
IC4			MN6147C	IC(FREQ SYNTHESIZER PLL)		
IC5		*	M54460L	IC(PRE SCALER)		
IC6			SN74LS90N	IC		
IC7 .8			SN16913P	IC(DUBLE BALANCED MIXERS)		
IC9			MN6147	IC		
IC10		*	M54460L	IC(PRE SCALER)		
IC11.12			SN16913P	IC(DUBLE BALANCED MIXERS)		
IC13			SN74S112N	IC		
IC14			SN16913P	IC(DUBLE BALANCED MIXERS)		
IC15			SN74S10N	IC		
IC16			SN74S112N	IC		
IC17		*	MB87006	IC(FREQ SYNTHESIZER PLL)		
IC18			MN6147	IC		
Q1 .2			2SC3113(B)	TRANSISTOR		
Q3 -5			2SC2668(Y)	TRANSISTOR		
Q6 .7			2SC2458(Y)	TRANSISTOR		
Q8			2SC1959(Y)	TRANSISTOR		
Q9			2SC2458(Y)	TRANSISTOR		
Q10 .11			2SC3113(B)	TRANSISTOR		
Q12 -15			2SC2668(Y)	TRANSISTOR		
Q16 .17			2SC3113(B)	TRANSISTOR		
Q18 -20			2SC2668(Y)	TRANSISTOR		
Q21			2SC2787(L)	TRANSISTOR		
Q22 -24			2SC2668(Y)	TRANSISTOR		
Q25			2SC2458(Y)	VARICAP		
Q26 -30			2SC2668(Y)	TRANSISTOR		
Q31 -35			2SC2459(BL)	TRANSISTOR		
Q36			2SK192A(GR)*J	FET		
Q37			2SC2668(Y)	TRANSISTOR		
FILTER UNIT (X51-1340-00)						
C1 .2			CC45CH1H101J	CERAMIC 100PF J		
C3 -6			CK45B1H222K	CERAMIC 2200PF K		
C7 .8			CK45F1H473Z	CERAMIC 0.047UF Z		
C9 .10			CK45B1H222K	CERAMIC 2200PF K		
C11			CK45F1H473Z	CERAMIC 0.047UF Z		
C12			CK45F1H103Z	CERAMIC 0.010UF Z		
C13			CE04W1H010M	ELECTRO 1.0UF 50WV		
C14			CE04W1HR47M	ELECTRO 0.47UF 50WV		
C15			CE04W1H100M	ELECTRO 10UF 50WV		
C16			CK45F1H103Z	CERAMIC 0.010UF Z		
C18			C91-0117-05	CERAMIC 0.01UF K		
C20			C91-0117-05	CERAMIC 0.047UF K		
C21			C91-0117-05	CERAMIC 0.01UF K		
C23			CK45F1H103Z	CERAMIC 0.010UF Z		
C24			CK45F1H223Z	CERAMIC 0.022UF Z		
C25			CK45F1H103Z	CERAMIC 0.010UF Z		
C26			CK45F1H473Z	CERAMIC 0.047UF Z		
C27			CK45F1H103Z	CERAMIC 0.010UF Z		
C28			CE04W1HR47M	ELECTRO 0.47UF 50WV		
C29			C91-0117-05	CERAMIC 0.01UF K		
C30			CE04W1H3R3M	ELECTRO 3.3UF 50WV		
C31			C91-0117-05	CERAMIC 0.01UF K		
C32 -44			CK45F1H473Z	CERAMIC 0.047UF Z		
C45			CE04W1H100M	ELECTRO 10UF 50WV		
C46			CK45F1H103Z	CERAMIC 0.010UF Z		





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Ref. No. 参照番号	Address 位置	New Parts 新	Parts No. 部品番号	Description 部品名 / 規格	Desti- nation 仕向	Re- marks 備考
Q5 .6			2SC245B(Y)	TRANSISTOR		
RF UNIT (X44-1680-00)						
C1			CC45SL1H390J	CERAMIC 39PF J		
C2			CC45SL1H121J	CERAMIC 120PF J		
C3			CC45RH1H330J	CERAMIC 33PF J		
C4			CK45F1H473Z	CERAMIC 0.047UF Z		
C6			C91-1008-05	CERAMIC 0.022UF K		
C7			C91-0117-05	CERAMIC 0.01UF K		
C8		*	C91-1065-05	CERAMIC 0.0068UF K		
C9 .10			C91-0117-05	CERAMIC 0.01UF K		
C11			CK45F1H103Z	CERAMIC 0.010UF Z		
C12			C91-0117-05	CERAMIC 0.01UF K		
C13			C91-0105-05	CERAMIC 0.0047UF K		
C14			C092M1H123K	MYLAR 0.012UF K		
C15 .16			C092M1H153K	MYLAR 0.015UF K		
C17			CE04W1H010M	ELECTR 1.0UF 50WV		
C18			C91-1008-05	CERAMIC 0.022UF K		
C19 .20			C092M1H153K	MYLAR 0.015UF K		
C21			CK45B1H152K	CERAMIC 1500PF K		
C22			C91-0125-05	CERAMIC 0.0027UF K		
C23			CK45B1H152K	CERAMIC 1500PF K		
C24			CE04WC1H010M	ELECTR 0.01UF C1		
C25			C91-1008-05	CERAMIC 0.022UF K		
C26			CE04WC1H010M	ELECTR 0.01UF C1		
C27			C91-1008-05	CERAMIC 0.022UF K		
C28 .29			CK45B1H222K	CERAMIC 2200PF K		
C30			CK45B1H821K	CERAMIC 820PF K		
C31		*	C91-1064-05	CERAMIC 0.0039UF K		
C32			C91-0119-05	CERAMIC 0.047UF K		
C33			CK45B1H821K	CERAMIC 820PF K		
C34			CE04W1H010M	ELECTR 1.0UF 50WV		
C35			C91-1008-05	CERAMIC 0.022UF K		
C37			CK45B1H152K	CERAMIC 1500PF K		
C38			CK45B1H681K	CERAMIC 680PF K		
C39		*	C91-1063-05	CERAMIC 0.0033UF K		
C40			CK45B1H561K	CERAMIC 560PF K		
C41			CK45B1H152K	CERAMIC 1500PF K		
C42			C91-0119-05	CERAMIC 0.047UF K		
C43			CE04W1H010M	ELECTR 1.0UF 50WV		
C44			C91-1008-05	CERAMIC 0.022UF K		
C45			CK45B1H182K	CERAMIC 1800PF K		
C46			CC45SL1H331J	CERAMIC 330PF J		
C47		*	C91-1063-05	CERAMIC 0.0033UF K		
C48			CC45SL1H271J	CERAMIC 270PF J		
C49			CK45B1H152K	CERAMIC 1500PF K		
C50			C91-0119-05	CERAMIC 0.047UF K		
C51			CE04W1H010M	ELECTR 1.0UF 50WV		
C52			C91-1008-05	CERAMIC 0.022UF K		
C53			CK45B1H152K	CERAMIC 1500PF K		
C54			CC45CH1H101J	CERAMIC 100PF J		
C55			C91-0125-05	CERAMIC 0.0027UF K		
C56			CC45SL1H101J	CERAMIC 100PF J		
C57			CK45B1H122K	CERAMIC 1200PF K		
C58			C91-0119-05	CERAMIC 0.047UF K		

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C121			C91-0117-05	CERAMIC 0.01UF K		
C122			CC45SL1H470J	CERAMIC 47PF J		
C123			C91-0769-05	CERAMIC 0.01UF M		
C124			CC45SL1H100D	CERAMIC 10PF D		
C125			C91-0117-05	CERAMIC 0.01UF K		
C126			CE04W1H100M	ELECTR0 10UF 50WV		
C127			C91-0117-05	CERAMIC 0.01UF K		
C128			CC45SL1H040C	CERAMIC 4.0PF C		
C129-132			C91-0117-05	CERAMIC 0.01UF K		
C133			CC45SL1H101J	CERAMIC 100PF J		
C134			C91-0117-05	CERAMIC 0.01UF K		
C135			CC45SL1H121J	CERAMIC 120PF J		
C136			C91-0117-05	CERAMIC 0.01UF K		
C137			C91-0769-05	CERAMIC 0.01UF M		
C138-142			C91-0117-05	CERAMIC 0.01UF K		
C143-145			C91-0769-05	CERAMIC 0.01UF M		
C146			C91-0117-05	CERAMIC 0.01UF K		
C147,148			C91-1008-05	CERAMIC 0.022UF K		
C149,150			C91-0769-05	CERAMIC 0.01UF M		
C151			C91-0117-05	CERAMIC 0.01UF K		
C153			C91-1008-05	CERAMIC 0.022UF K		
C154,155			C91-0769-05	CERAMIC 0.01UF M		
C156			CC45RH1H020C	CERAMIC 2.0PF C		
C157			C91-1008-05	CERAMIC 0.022UF K		
C158			CC45SL1H100D	CERAMIC 10PF D		
C159			CC45SL1H120J	CERAMIC 12PF J		
C160			C91-1008-05	CERAMIC 0.022UF K		
C161			C91-0119-05	CERAMIC 0.047UF K		
C162			CE04W1H2R2M	ELECTR0 2.2UF 50WV		
C163			C91-0119-05	CERAMIC 0.047UF K		
C164			CK45B1H181K	CERAMIC 180PF K		
C165			CK45B1H331K	CERAMIC 330PF K		
C166			C91-0117-05	CERAMIC 0.01UF K		
C166,167			C91-0117-05	CERAMIC 0.01UF K		
C168			CE04W1H100M	ELECTR0 10UF 50WV		
C169			C91-0119-05	CERAMIC 0.047UF K		
C170			CE04W1A470M	ELECTR0 47UF 10WV		
C171			C91-0117-05	CERAMIC 0.01UF K		
C172			CE04W1A470M	ELECTR0 47UF 10WV		
C173			C91-0769-05	CERAMIC 0.01UF M		
C174			CC45TH1H390J	CERAMIC 39PF J		
C175			CC45CH1H050C	CERAMIC 5.0PF C		
C176			CC45CH1H330J	CERAMIC 33PF J		
C177		*	C91-0727-05	CERAMIC 18PF J		
C178			C91-0117-05	CERAMIC 0.01UF K		
C179			CE04W1A470M	ELECTR0 47UF 10WV		
C180			C91-0769-05	CERAMIC 0.01UF M		
C181		*	CC45SH1H470J	CERAMIC 47PF J		
C182			CC45CH1H050C	CERAMIC 5.0PF C		
C183			CC45CH1H330J	CERAMIC 33PF J		
C184			C91-0117-05	CERAMIC 0.01UF K		
C185			CE04W1A470M	ELECTR0 47UF 10WV		
C186			C91-0769-05	CERAMIC 0.01UF M		
C187			CC45RH1H560J	CERAMIC 56PF J		
C188			CC45CH1H050C	CERAMIC 5.0PF C		



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J1			E40-1173-05	PIN CONNECTOR		
J2			E40-0473-05	PIN CONNECTOR (MINI,4P)		
J3 ,4			E40-0273-05	PIN CONNECTOR (MINI,2P)		
J6			E40-0573-05	PIN CONNECTOR		
J7 -9			E40-0273-05	PIN CONNECTOR (MINI,2P)		
J11			E40-0273-05	PIN CONNECTOR (MINI,2P)		
J12			E40-0473-05	PIN CONNECTOR (MINI,4P)		
J14			E40-0373-05	PIN CONNECTOR (MINI,3P)		
J14			E40-0673-05	PIN CONNECTOR		
J15 ,16			E40-0473-05	PIN CONNECTOR (MINI,4P)		
-			J32-0795-04	HEX BOSS		
-			L92-0110-05	BEAD CORE (FOR L77,L78)		
F1		*	L71-0259-05	CRYSTAL FILTER (45.05MHZ)		
F2		*	L71-0260-05	CRYSTAL FILTER (8.83MHZ)		
L1			L40-1511-13	SMALL FIXED INDUCTOR(150UH)		
L3			L40-3382-14	SMALL FIXED INDUCTOR(0.33UH)		
L4			L40-2282-14	SMALL FIXED INDUCTOR(0.22UH)		
L5 -8			L40-2292-14	SMALL FIXED INDUCTOR(1.2UH)		
L9			L40-1011-13	SMALL FIXED INDUCTOR(100UH)		
L10			L40-1021-03	SMALL FIXED INDUCTOR(1MHZ)		
L11			L40-1021-13	SMALL FIXED INDUCTOR(1MHZ)		
L12 ,13			L40-2701-14	SMALL FIXED INDUCTOR(27UH)		
L14			L40-2201-14	SMALL FIXED INDUCTOR(22UH)		
L15 ,16			L40-4701-14	SMALL FIXED INDUCTOR(47UH)		
L17			L40-1001-14	SMALL FIXED INDUCTOR(10UH)		
L18			L40-8291-14	SMALL FIXED INDUCTOR(8.2UH)		
L20			L40-8291-14	SMALL FIXED INDUCTOR(8.2UH)		
L21			L40-2792-14	SMALL FIXED INDUCTOR(2.7UH)		
L22			L40-1592-14	SMALL FIXED INDUCTOR(1.5UH)		
L23			L40-8291-14	SMALL FIXED INDUCTOR(8.2UH)		
L24			L40-1021-13	SMALL FIXED INDUCTOR(1MHZ)		
L25			L40-2792-14	SMALL FIXED INDUCTOR(2.7UH)		
L26 ,27			L40-5691-14	SMALL FIXED INDUCTOR(5.6UH)		
L28			L40-1892-14	SMALL FIXED INDUCTOR(1.8UH)		
L29			L40-1092-14	SMALL FIXED INDUCTOR(1UH)		
L30			L40-1892-14	SMALL FIXED INDUCTOR(1.8UH)		
L31			L40-1021-13	SMALL FIXED INDUCTOR(1MHZ)		
L32 ,33			L40-3991-14	SMALL FIXED INDUCTOR(3.9UH)		
L34			L40-6882-14	SMALL FIXED INDUCTOR(0.68UH)		
L35			L40-3982-14	SMALL FIXED INDUCTOR(0.39UH)		
L36			L40-6882-14	SMALL FIXED INDUCTOR(0.68UH)		
L37			L40-1021-13	SMALL FIXED INDUCTOR(1MHZ)		
L38 ,39			L40-5691-14	SMALL FIXED INDUCTOR(5.6UH)		
L40			L40-3982-14	SMALL FIXED INDUCTOR(0.39UH)		
L41			L40-2282-14	SMALL FIXED INDUCTOR(0.22UH)		
L42			L40-3982-14	SMALL FIXED INDUCTOR(0.39UH)		
L43			L40-1021-13	SMALL FIXED INDUCTOR(1MHZ)		
L44 ,45			L40-2292-14	SMALL FIXED INDUCTOR(1.2UH)		
L46			L40-4782-14	SMALL FIXED INDUCTOR(0.47UH)		
L47		*	L40-2782-14	SMALL FIXED INDUCTOR(0.27UH)		
L48			L40-4782-14	SMALL FIXED INDUCTOR(0.47UH)		
L49			L40-1021-13	SMALL FIXED INDUCTOR(1MHZ)		
L50			L40-1592-14	SMALL FIXED INDUCTOR(1.5UH)		
L51			L40-1092-14	SMALL FIXED INDUCTOR(1UH)		

## PARTS LIST

\* New Parts

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Ref. No. 参照番号	Address 位置	New Parts 新	Parts No. 部品番号	Description 部品名 / 規格	Desti- nation 仕向	Re- marks 備考
T14		*	L34-2286-05	COIL (36.22MHZ)		
T15		*	L34-2287-05	COIL (36.22MHZ)		
T16		*	L34-2288-05	COIL (45.05MHZ)		
T17		*	L34-2289-05	COIL (45.05MHZ)		
T18	.19		L19-0324-05	BALUN TRANSFORMER(TX MIX, DRIVE)		
T20		*	L19-0362-05	BALUN TRANSFORMER(TX DRIVE)		
T21	.22	*	L34-2290-05	COIL (VCO, HH. H)		
T23		*	L34-2277-05	COIL (VCO L)		
T24		*	L34-2278-05	COIL (VCO LL)		
T25			L19-0344-05	BALUN TRANSFORMER(PLL)		
T26			L34-0535-05	COIL (8.83MHZ)		
T27			L34-0536-05	COIL (8.83MHZ)		
-			N10-2026-46	HEX NUT		
IB1			R90-0188-05	MULTI-COMP 0.01UF X4		
R184		*	R90-0454-05	MULTI-COMP		
VR1		*	R12-0435-05	TRIMMING PBT. (1ST MIX BALANCE)		
VR2			R12-1431-05	TRIMMING PBT. (2ND MIX BALANCE)		
VR3			R12-4413-05	TRIMMING PBT. (FM DEV)		
VR4			R12-1431-05	TRIMMING PBT. (SQUARING)		
VR5			R12-4414-05	TRIMMING PBT. (TX AMP)		
VR6			R12-3447-05	TRIMMING PBT. (FM DEV)		
W5			R92-0150-05	JUMPER REST 0 OHM		
W23			R92-0150-05	JUMPER REST 0 OHM		
W27			R92-0150-05	JUMPER REST 0 OHM		
W32			R92-0150-05	JUMPER REST 0 OHM		
W100			R92-1061-05	JUMPER REST 0 OHM		
RL1			SS1-1404-05	RELAY (G2E, 12V)		
D1			1S1555	DIODE		
D2	.3	*	US1090	DIODE		
D4			1S2588	DIODE		
D5			BA282	DIODE		
D6			1S2588	DIODE		
D7			BA282	DIODE		
D8			1S2588	DIODE		
D9			BA282	DIODE		
D10			1S2588	DIODE		
D11			BA282	DIODE		
D12			1S2588	DIODE		
D13			BA282	DIODE		
D14			1S2588	DIODE		
D15			BA282	DIODE		
D16			1S2588	DIODE		
D17			BA282	DIODE		
D18			1S2588	DIODE		
D19			BA282	DIODE		
D20			1S2588	DIODE		
D21			BA282	DIODE		
D22			1S2588	DIODE		
D23			BA282	DIODE		
D24			1S133	DIODE		
D25		*	MA858	DIODE		
D26	.29		BA282	DIODE		

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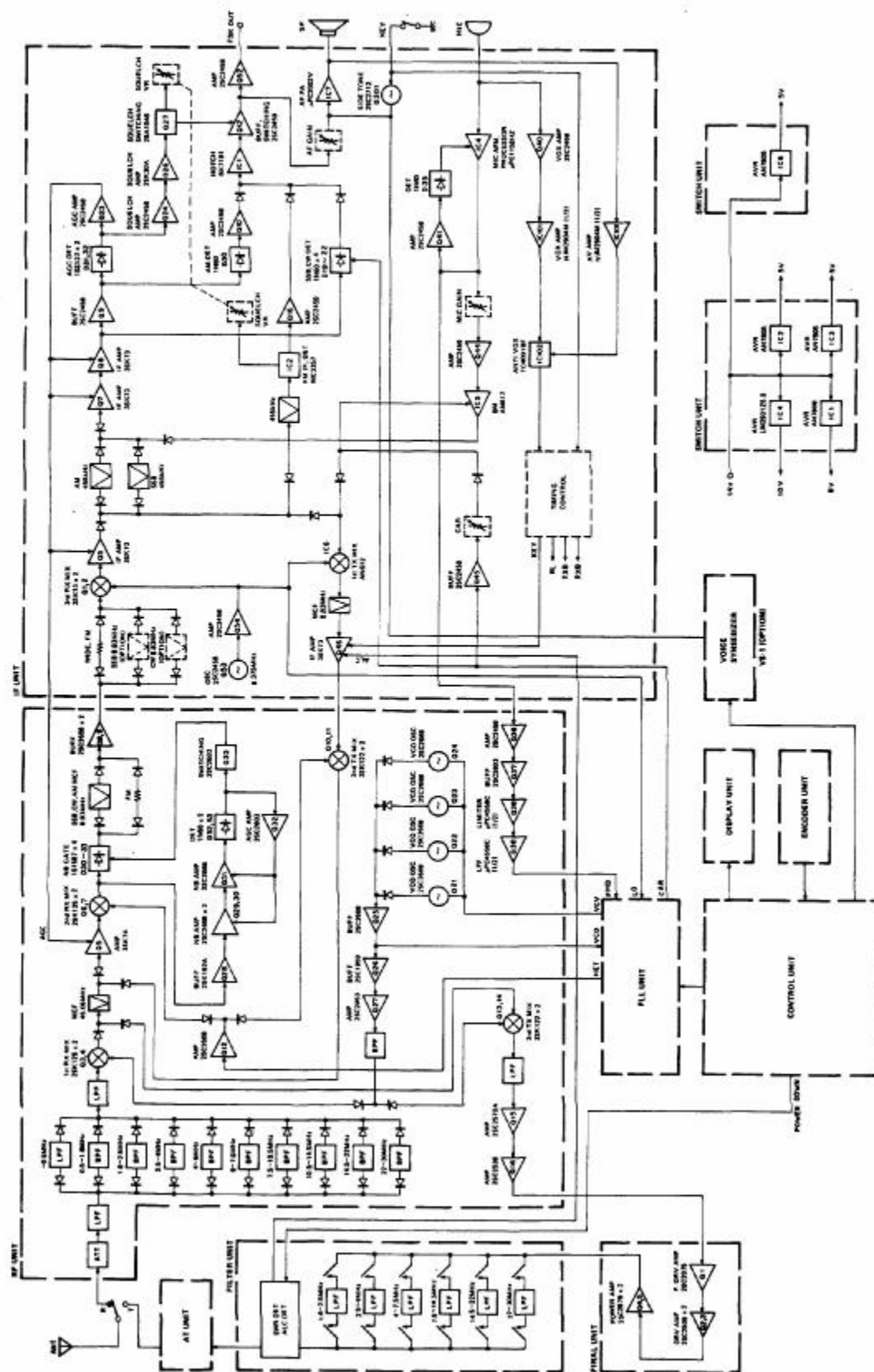
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Ref. No. 参照番号	Address 位置	New Parts 新	Parts No. 部品番号	Description 部品名 / 規格	Desti- nation 仕向	Re- marks 備考
L52			L40-3982-14	SMALL FIXED INDUCTOR(0.39UH)		
L53			L40-2282-14	SMALL FIXED INDUCTOR(0.22UH)		
L54			L40-3982-14	SMALL FIXED INDUCTOR(0.39UH)		
L55			L40-1021-13	SMALL FIXED INDUCTOR(1MHZ)		
L56 ,57			L40-1092-14	SMALL FIXED INDUCTOR(1UH)		
L58			L40-3982-14	SMALL FIXED INDUCTOR(0.39UH)		
L59		*	L34-1163-05	COIL		
L60			L40-3982-14	SMALL FIXED INDUCTOR(0.39UH)		
L61			L40-1021-13	SMALL FIXED INDUCTOR(1MHZ)		
L62		*	L40-2782-14	SMALL FIXED INDUCTOR(0.27UH)		
L63			L40-8282-14	SMALL FIXED INDUCTOR(0.82UH)		
L64			L40-2282-14	SMALL FIXED INDUCTOR(0.22UH)		
L65			L40-3982-14	SMALL FIXED INDUCTOR(0.39UH)		
L66			L40-1021-13	SMALL FIXED INDUCTOR(1MHZ)		
L67			L40-1021-03	SMALL FIXED INDUCTOR(1MHZ)		
L68			L40-2211-03	SMALL FIXED INDUCTOR		
L69			L40-3382-14	SMALL FIXED INDUCTOR(0.33UH)		
L70			L40-1011-14	SMALL FIXED INDUCTOR(100UH)		
L71			L40-4701-03	SMALL FIXED INDUCTOR(47UH)		
L72 -76			L40-1011-14	SMALL FIXED INDUCTOR(100UH)		
L79 -84			L40-1011-14	SMALL FIXED INDUCTOR(100UH)		
L86			L40-1011-14	SMALL FIXED INDUCTOR(100UH)		
L87			L40-2201-14	SMALL FIXED INDUCTOR(22UH)		
L88			L40-6891-14	SMALL FIXED INDUCTOR(6.8UH)		
L89			L40-2292-14	SMALL FIXED INDUCTOR(1.2UH)		
L90		*	L34-1162-05	COIL		
L91			L40-1011-14	SMALL FIXED INDUCTOR(100UH)		
L92		*	L40-6891-14	SMALL FIXED INDUCTOR(6.8UH)		
L93 -96			L40-4701-14	SMALL FIXED INDUCTOR(47UH)		
L97			L40-1011-14	SMALL FIXED INDUCTOR(100UH)		
L98			L40-1511-14	SMALL FIXED INDUCTOR(150UH)		
L99 -84			L40-1011-14	SMALL FIXED INDUCTOR(100UH)		
L100			L40-4782-14	SMALL FIXED INDUCTOR(0.47UH)		
L101			L40-1011-14	SMALL FIXED INDUCTOR(100UH)		
L102			L40-3382-14	SMALL FIXED INDUCTOR(0.33UH)		
L103			L40-2282-14	SMALL FIXED INDUCTOR(0.22UH)		
L104,105			L40-3382-14	SMALL FIXED INDUCTOR(0.33UH)		
L106			L40-1511-14	SMALL FIXED INDUCTOR(150UH)		
L107			L40-1021-13	SMALL FIXED INDUCTOR(1MHZ)		
L108			L40-1011-14	SMALL FIXED INDUCTOR(100UH)		
L109			L40-1011-13	SMALL FIXED INDUCTOR(100UH)		
L110-111			L40-1011-14	SMALL FIXED INDUCTOR(100UH)		
L112-115			L40-4701-13	SMALL FIXED INDUCTOR(47UH)		
T1		*	L34-2266-05	COIL (45.05MHZ)		
T2		*	L19-0361-05	BALUN TRANSFORMER(RX MIX)		
T3			L34-2267-05	COIL (45.05MHZ)		
T4			L34-2268-05	COIL (45.05MHZ)		
T5			L34-2145-05	COIL (45.05MHZ)		
T6		*	L34-2283-05	COIL (45.05MHZ)		
T7			L34-2267-05	COIL (45.05MHZ)		
T8			L30-0506-05	IFT (8.83MHZ)		
T9			L34-2159-05	COIL (8.83MHZ)		
T10 ,11			L34-0942-05	COIL (8.83MHZ)		
T12		*	L34-2284-05	COIL (8.83MHZ)		
T13		*	L34-2285-05	COIL (8.83MHZ)		



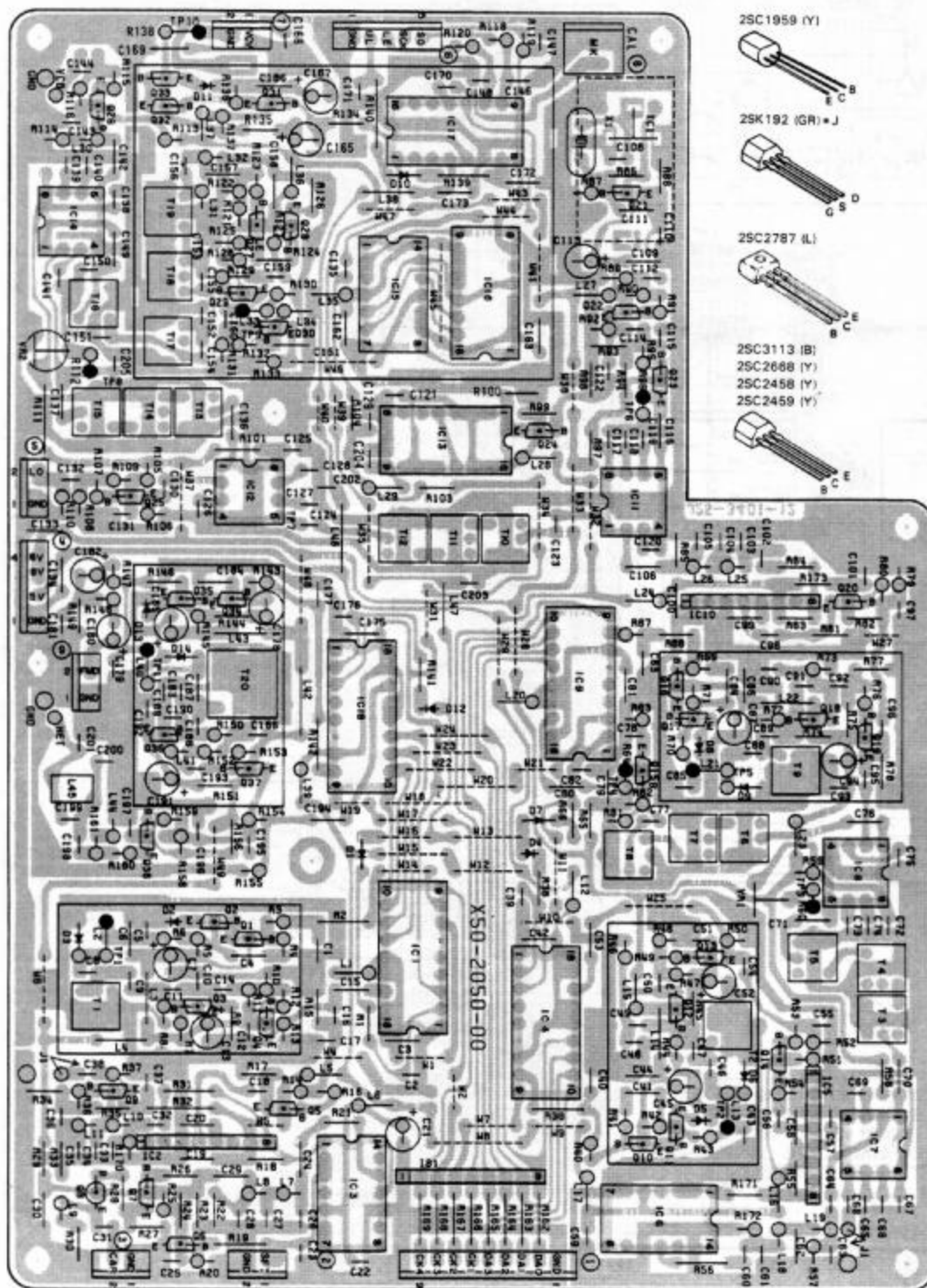
## BLOCK DIAGRAM





# TS-440S PC BOARD VIEW

PLL UNIT (X50-2050-00) Component side view



IC1, 4, 9, 18: NM6147, IC2: M54459L, IC3, 6: SN74LS90N, IC5, 10: M54460L, IC7, 8, 11, 12, 14: SN16913P, IC13, 16: SN74S112N, IC15: SN74S10N, IC17: MB87006, Q1, 2, 10, 11, 16, 17: 2SC3113(B), Q3-5, 12-15, 18-20, 22-24, 26-30, 37: 2SC2668(Y), Q6, 7, 9, 25: 2SC2458(Y), Q8: 2SC1959(Y), Q21: 2SC2787(L), Q31-35: 2SC2459(BL), Q36: 2SK192A (GR)+J

## PARTS LIST

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Ref. No. 参照番号	Address 位置	New Parts 新	Parts No. 部品番号	Description 部品名 / 規格	Desti- nation 仕向	Re- marks 備考
C28			CK45B1H391K	CERAMIC 390PF K		
C29			C91-0769-05	CERAMIC 0.01UF M		
C30			C91-0119-05	CERAMIC 0.047UF K		
C31 ,32			C91-0117-05	CERAMIC 0.01UF K		
C33			CC45SL1H390J	CERAMIC 39PF J		
C34			CC45SL1H820J	CERAMIC 82PF J		
C35			CC45SL1H390J	CERAMIC 39PF J		
C36			C91-0117-05	CERAMIC 0.01UF K		
C37			C91-1008-05	CERAMIC 0.022UF K		
C38 ,39			C91-0117-05	CERAMIC 0.01UF K		
C40 ,41			C092M1H223K	MYLAR 0.022UF K		
C42			C91-0119-05	CERAMIC 0.047UF K		
C43			CK45B1H182K	CERAMIC 1800PF K		
C44			C91-0119-05	CERAMIC 0.047UF K		
C45			CE04W1A470M	ELECTR0 47UF 10WV		
C46			CC45UJ1H220J	CERAMIC 22PF J		
C47			CC45CH1H100D	CERAMIC 10PF D		
C48			CC45CH1H120J	CERAMIC 12PF J		
C49			CC45CH1H220J	CERAMIC 22PF J		
C50			CC45SL1H050C	CERAMIC 5.0PF C		
C51			C91-0117-05	CERAMIC 0.01UF K		
C52			CE04W1A470M	ELECTR0 47UF 10WV		
C53			C91-0769-05	CERAMIC 0.01UF M		
C54			CC45SL1H050C	CERAMIC 5.0PF C		
C55			CC45SL1H100D	CERAMIC 10PF D		
C56			C91-0117-05	CERAMIC 0.01UF K		
C57			C91-0117-05	CERAMIC 0.01UF K		
C58			C91-0119-05	CERAMIC 0.047UF K		
C59			C91-1008-05	CERAMIC 0.022UF K		
C60			C91-0117-05	CERAMIC 0.01UF K		
C61			CC45SL1H820J	CERAMIC 82PF J		
C62			CC45SL1H181J	CERAMIC 180PF J		
C63			CC45SL1H820J	CERAMIC 82PF J		
C64			C91-0117-05	CERAMIC 0.01UF K		
C65 -67			C91-1008-05	CERAMIC 0.022UF K		
C68			C91-0117-05	CERAMIC 0.01UF K		
C69			C91-1008-05	CERAMIC 0.022UF K		
C70 ,71			C91-0769-05	CERAMIC 0.01UF M		
C72 -75			C91-0117-05	CERAMIC 0.01UF K		
C76			C91-0769-05	CERAMIC 0.01UF M		
C77 ,78			C91-0117-05	CERAMIC 0.01UF K		
C79 ,80			C91-0769-05	CERAMIC 0.01UF M		
C81			C91-0119-05	CERAMIC 0.047UF K		
C82			C91-0117-05	CERAMIC 0.01UF K		
C83			C092M1H223K	MYLAR 0.022UF K		
C84			C092M1H333K	MYLAR 0.033UF K		
C85			CK45B1H182K	CERAMIC 1800PF K		
C86			C91-0119-05	CERAMIC 0.047UF K		
C87			CE04W1A470M	ELECTR0 47UF 10WV		
C88			CC45UJ1H330J	CERAMIC 33PF J		
C89			CC45CH1H100D	CERAMIC 10PF D		
C90 ,91			CC45CH1H220J	CERAMIC 22PF J		
C92			CC45CH1H050C	CERAMIC 0.5PF C		
C93			C91-0117-05	CERAMIC 0.01UF K		
C94			CE04W1A470M	ELECTR0 47UF 10WV		

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C95			C91-0117-05	CERAMIC 0.01UF K		
C96, 97			CC45SL1H100D	CERAMIC 10PF D		
C98			C91-0117-05	CERAMIC 0.01UF K		
C99			C91-0769-05	CERAMIC 0.01UF M		
C100			C91-0119-05	CERAMIC 0.047UF K		
C101, 102			C91-0117-05	CERAMIC 0.01UF K		
C104			CC45SL1H680J	CERAMIC 68PF J		
C106			C91-0769-05	CERAMIC 0.01UF M		
C108			CC45CH1H100D	CERAMIC 10PF D		
C109			C91-0769-05	CERAMIC 0.01UF M		
C110			CC45UJ1H180J	CERAMIC 18PF J		
C111			CC45CH1H560J	CERAMIC 56PF J		
C112			CC45CH1H0R5C	CERAMIC 0.5PF C		
C113			CE04W1C220M	ELECTRO 22UF 16WV		
C114			CC45SL1H050C	CERAMIC 5.0PF C		
C115			CC45SL1H100D	CERAMIC 10PF D		
C116			C91-0769-05	CERAMIC 0.01UF M		
C117-121			C91-0117-05	CERAMIC 0.01UF K		
C122			CC45SL1H101J	CERAMIC 100PF J		
C123-128			C91-0117-05	CERAMIC 0.01UF K		
C129			CC45SL1H100D	CERAMIC 10PF D		
C130			C91-0117-05	CERAMIC 0.01UF K		
C131			C91-1008-05	CERAMIC 0.022UF K		
C132			CK45B1H102K	CERAMIC 1000PF K		
C133, 134			C91-0119-05	CERAMIC 0.047UF K		
C135			CK45B1H102K	CERAMIC 1000PF K		
C136, 137			C91-0769-05	CERAMIC 0.01UF M		
C138-141			C91-0117-05	CERAMIC 0.01UF K		
C142			C91-0769-05	CERAMIC 0.01UF M		
C143			C91-0117-05	CERAMIC 0.01UF K		
C144			CK45B1H102K	CERAMIC 1000PF K		
C146-148			CC45SL1H101J	CERAMIC 100PF J		
C149			C91-0769-05	CERAMIC 0.01UF M		
C150			CC45RH1H070D	CERAMIC 7.0PF D		
C151			CC45RH1H100D	CERAMIC 10PF D		
C152			CC45RH1H050C	CERAMIC 5.0PF C		
C153			CC45RH1H100D	CERAMIC 10PF D		
C154, 155			CC45RH1H080D	CERAMIC 8.0PF D		
C156			CC45SL1H680J	CERAMIC 68PF J		
C157			C91-0769-05	CERAMIC 0.01UF M		
C158			C91-0119-05	CERAMIC 0.047UF K		
C159, 160			C91-0117-05	CERAMIC 0.01UF K		
C161-163			C91-0119-05	CERAMIC 0.047UF K		
C165			CS15E1VR33M	TANTAL 0.33UF 35WV		
C166			C91-0119-05	CERAMIC 0.047UF K		
C167			CE04W1A101M	ELECTRO 100UF 10WV		
C168			CK45B1H102K	CERAMIC 1000PF K		
C169			C91-0119-05	CERAMIC 0.047UF K		
C170			CC45CH1H0R5C	CERAMIC 0.5PF C		
C171			C91-0117-05	CERAMIC 0.01UF K		
C172			C91-0769-05	CERAMIC 0.01UF M		
C173			C91-0119-05	CERAMIC 0.047UF K		
C175			C91-0119-05	CERAMIC 0.047UF K		
C176			C91-0117-05	CERAMIC 0.01UF K		
C177			C092M1H333K	MYLAR 0.033UF K		

## PARTS LIST

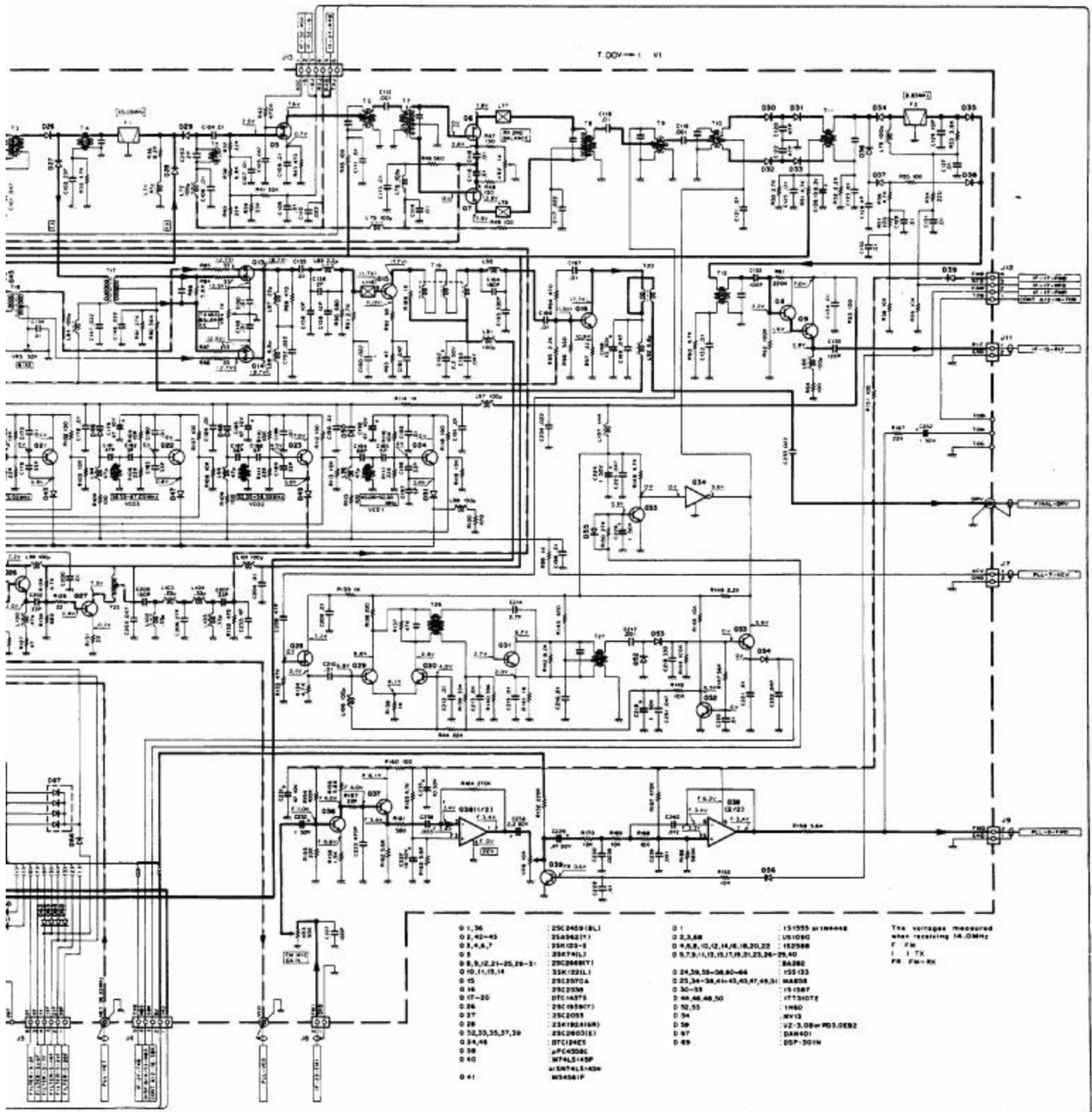
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C178			CS15E1V0R1M	TANTAL 0.1UF 35WV		
C179			CK45B1H182K	CERAMIC 1800PF K		
C180			CE04W1H100M	ELECTR0 10UF 50WV		
C181			C91-0117-05	CERAMIC 0.01UF K		
C182			CS15E1VR47M	TANTAL 0.47UF 35WV		
C183			CC45RH1H070D	CERAMIC 7.0PF D		
C184			C91-0119-05	CERAMIC 0.047UF K		
C185			CE04W1A470M	ELECTR0 47UF 10WV		
C186			C91-0117-05	CERAMIC 0.01UF K		
C187			CC45RH1H060D	CERAMIC 6.0PF D		
C188			CC45CH1H100D	CERAMIC 10PF D		
C189			CC45CH1H220J	CERAMIC 22PF J		
C190			CC45CH1H220J	CERAMIC 22PF J		
C191			CE04W1A470M	ELECTR0 47UF 10WV		
C192			C91-0117-05	CERAMIC 0.01UF K		
C193			CC45CH1H010C	CERAMIC 1.0PF C		
C194			C91-0769-05	CERAMIC 0.01UF M		
C195			CC45SL1H050C	CERAMIC 5.0PF C		
C196			CC45SL1H101J	CERAMIC 100PF J		
C197			C91-0117-05	CERAMIC 0.01UF K		
C198			CK45B1H182K	CERAMIC 1800PF K		
C199		*	CC45CH1H090D	CERAMIC 9.0PF D		
C200, 201			CC45SL1H560J	CERAMIC 56PF J		
C202, 203			C91-0117-05	CERAMIC 0.01UF K		
C204			CC45SL1H221J	CERAMIC 220PF J		
C205			CC45CH1H100D	CERAMIC 10PF D		
C206			C91-0119-05	CERAMIC 0.047UF K		
TC1			C05-0035-05	TRIMMING CAP (50PF)		
-			E40-0273-05	PIN CONNECTOR (MINI, 2P)		
-			E40-0274-05	PIN CONNECTOR (MINI, 2P)		
-			E40-0473-05	PIN CONNECTOR (MINI, 4P)		
-			E40-0573-05	PIN CONNECTOR (MINI, 5P)		
-			E40-0973-05	PIN CONNECTOR (MINI, 9P)		
L1 ,2		*	L40-1011-13	SMALL FIXED INDUCTOR		
L3			L40-2211-14	SMALL FIXED INDUCTOR		
L4 ,6		*	L40-1011-14	SMALL FIXED INDUCTOR		
L7 ,8		*	L40-3311-14	SMALL FIXED INDUCTOR		
L9		*	L40-1011-14	SMALL FIXED INDUCTOR		
L10 ,11			L40-3301-14	SMALL FIXED INDUCTOR		
L12 ,13		*	L40-1011-13	SMALL FIXED INDUCTOR		
L14			L40-2211-14	SMALL FIXED INDUCTOR		
L15 ,16		*	L40-1011-14	SMALL FIXED INDUCTOR		
L17		*	L40-1011-13	SMALL FIXED INDUCTOR		
L18 ,19			L40-6801-14	SMALL FIXED INDUCTOR		
L20 ,21		*	L40-1011-13	SMALL FIXED INDUCTOR		
L22			L40-2211-14	SMALL FIXED INDUCTOR		
L23 ,24		*	L40-1011-14	SMALL FIXED INDUCTOR		
L25 ,26			L40-2201-14	SMALL FIXED INDUCTOR		
L27		*	L40-1011-14	SMALL FIXED INDUCTOR		
L28		*	L40-1011-13	SMALL FIXED INDUCTOR		
L29		*	L40-1001-14	SMALL FIXED INDUCTOR		
L30 ,32			L40-4701-14	SMALL FIXED INDUCTOR		
L33 ,34		*	L40-1011-14	SMALL FIXED INDUCTOR		
L35 ,36		*	L40-1011-13	SMALL FIXED INDUCTOR		





## CIRCUIT DESCRIPTION

## 16. Semi-self test function

Semi-self test is started by turning the POWER switch on with the [4] (AM) and T-F SET switches pressed.

This test provides a method of testing the TS-440 digital system in a shorter time during production or servicing. The test enables the following:

1. Circuits which are difficult to test during program execution to be tested easily. For example, dynamic data can be output as static data.
2. Items on which information is held only by the CPU and is not available to the user to be tested.

- a. Approximately threshold level input
- b. Incorrect input due to input pin fault

## Operation procedure

1. POWER SW OFF
2. The power switch on while pushing switch [4] (AM) and switch T-F SET
3. The test number has starts from "0" to "56" and END when turn the VFO knob clockwise.  
Operation chart shows as follow.
4. To reset SEMI-SELF TEST function, Power switch OFF.

## TEST NO. LIST

TEST NO	Condition	TEST NO	Condition
0	Start All Fip's light's	31	RES = "H"
1	All Fip's light's (Segment)	32	" = "L"
2	All Fip's light's	33	CO = "H" (A/D)
3	All Fip's OFF (digit)	34	" = "L" ( " )
4	Each digit lights G1	35	AX = "H" ( " )
5	" G2	36	" = "L" ( " )
6	" G3	37	8255 Port A all = "H" (IC2)
7	" G4	38	" " all = "L" ( " )
8	" G5	39	8255 Port B all = "H" ( " )
9	" G6	40	" " all = "L" ( " )
10	" G7	41	8255 Port C CO~C3 = "H" ( " )
11	" G8	42	" " CO~C3 = "L" ( " )
12	" G9	43	8255 Port C all = "H" (IC53)
13	" G10	44	" " all = "L" ( " )
14	" G11	45	LOCK,PTT,MIC,U/D,AT,VS-1(BUSY)check
15	" G12	46	[SIMPLEX] VS-1(BUSY)check
16	" G13	47	Key scan input check
17	BZ ON	48	[1] (LSB), [6] ,V/M,VOICE (check)
18	BZ OFF	49	[2] (USB), [7] ,M/V,RIT,A/B (check)
19	Mode LED all ON	50	[3] (CW), [8] ,SCAN,XIT,SPRIT (check)
20	" all OFF	51	[4] (AM), [9] ,MIN,T-FSET,A=B,100L 200L 400L ( " )
21	RL = "H"	52	[5] (FMI), [0] ,(FSK),CLEAR,1MHz,25L 50L 25U 50U ( " )
22	" = "L"	53	ENT,DOWN,UP, 100U 200U 400U ( " )
23	BAND all = "H"	54	-
24	" all = "L"	55	-
25	PD = "H"	56	END
26	" = "L"		
27	ENF = "H"		
28	" = "L" (immediatly)		
29	ENP = "H"		
30	" = "L"		

# PARTS LIST

\* New Parts

Parts without Parts No. are not supplied.

Les articles non mentionnés dans le Parts No. ne sont pas fournis.

Teile ohne Parts No. werden nicht geliefert.

Ref. No. 参照番号	Address 位置	New Parts 新	Parts No. 部品番号	Description 部品名 / 規格	Desti- nation 仕向	Re- marks 備考
C59			CE04W1H010M	ELECTR0 1.0UF 50WV		
C60			C91-1008-05	CERAMIC 0.022UF K		
C61			CK45B1H681K	CERAMIC 680PF K		
C62			CC45SL1H151J	CERAMIC 150PF J		
C63			CK45B1H152K	CERAMIC 1500PF K		
C64			CC45SL1H151J	CERAMIC 150PF J		
C65			C91-0119-05	CERAMIC 0.047UF K		
C66			CE04W1H010M	ELECTR0 1.0UF 50WV		
C67			C91-1008-05	CERAMIC 0.022UF K		
C68			CK45B1H471K	CERAMIC 470PF K		
C69		*	CC45SL1H111J	CERAMIC 110PF J		
C70			CK45B1H821K	CERAMIC 820PF K		
C71			CC45SL1H151J	CERAMIC 150PF J		
C72			CK45B1H471K	CERAMIC 470PF K		
C73			C91-0119-05	CERAMIC 0.047UF K		
C74			CE04W1H010M	ELECTR0 1.0UF 50WV		
C75			C91-1008-05	CERAMIC 0.022UF K		
C76			CC45SL1H221J	CERAMIC 220PF J		
C77			CC45SL1H910J	CERAMIC 91PF J		
C78			CK45B1H681K	CERAMIC 680PF K		
C79			CC45SL1H910J	CERAMIC 91PF J		
C80			CC45SL1H331J	CERAMIC 330PF J		
C81			C91-0119-05	CERAMIC 0.047UF K		
C82			CE04W1H010M	ELECTR0 1.0UF 50WV		
C83			C91-1008-05	CERAMIC 0.022UF K		
C84			CC45SL1H121J	CERAMIC 120PF J		
C85 ,86			CC45SL1H470J	CERAMIC 47PF J		
C87			CC45SL1H080D	CERAMIC 8.0PF D		
C88			CC45SL1H820J	CERAMIC 82PF J		
C89			C91-0119-05	CERAMIC 0.047UF K		
C90			CE04W1H010M	ELECTR0 1.0UF 50WV		
C91			C91-1008-05	CERAMIC 0.022UF K		
C92		*	CE04W1H010M	ELECTR0 1.0UF 50WV		
C93			C91-1008-05	CERAMIC 0.022UF K		
C94			CC45SL1H680J	CERAMIC 68PF J		
C95			CK45B1H181K	CERAMIC 180PF K		
C96			C91-1008-05	CERAMIC 0.022UF K		
C97 ,98			C91-0105-05	CERAMIC 0.0047UF K		
C99 ,100			C91-1008-05	CERAMIC 0.022UF K		
C101			C91-0119-05	CERAMIC 0.047UF K		
C103			CC45SL1H330J	CERAMIC 33PF J		
C104			C91-0117-05	CERAMIC 0.01UF K		
C105			C91-0119-05	CERAMIC 0.047UF K		
C106-108			C91-0117-05	CERAMIC 0.01UF K		
C109			C91-0769-05	CERAMIC 0.01UF M		
C110			C91-1008-05	CERAMIC 0.022UF K		
C111			C91-0117-05	CERAMIC 0.01UF K		
C112			CK45B1H102K	CERAMIC 1000PF K		
C113			C91-0117-05	CERAMIC 0.01UF K		
C114			C91-0769-05	CERAMIC 0.01UF M		
C115,116			C91-0117-05	CERAMIC 0.01UF K		
C117			C91-1008-05	CERAMIC 0.022UF K		
C118			C91-0117-05	CERAMIC 0.01UF K		
C119			C91-0757-05	CERAMIC 0.001UF K		
C120			CC45SL1H470J	CERAMIC 47PF J		

## PARTS LIST

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Ref. No. 参照番号	Address 位置	New Parts 新	Parts No. 部品番号	Description 部品名 / 規格	Desti- nation 仕向	Re- marks 備考
C189			CC45CH1H330J	CERAMIC 33PF J		
C190,191			C91-0117-05	CERAMIC 0.01UF K		
C192			CE04W1A470M	ELECTR0 47UF 10WV		
C193			C91-0769-05	CERAMIC 0.01UF M		
C194			CC45RH1H680J	CERAMIC 68PF J		
C195			CC45CH1H050C	CERAMIC 5.0PF C		
C196			CC45CH1H330J	CERAMIC 33PF J		
C197			CC45CH1H050C	CERAMIC 5.0PF C		
C198			CK45F1H103Z	CERAMIC 0.010UF Z		
C199			CC45SL1H220J	CERAMIC 22PF J		
C200			C91-0117-05	CERAMIC 0.01UF K		
C202			CC45SL1H330J	CERAMIC 33PF J		
C203			C91-0119-05	CERAMIC 0.047UF K		
C204			C91-0117-05	CERAMIC 0.01UF K		
C205			C91-0747-05	CERAMIC 150PF K		
C206			CC45SL1H270J	CERAMIC 27PF J		
C207			CC45SL1H331J	CERAMIC 330PF J		
C208			CC45SL1H470J	CERAMIC 47PF J		
C209-213			C91-0117-05	CERAMIC 0.01UF K		
C214		*	C91-0714-05	CERAMIC 2.7PF K		
C215,216			C91-0117-05	CERAMIC 0.01UF K		
C217			CK45B1H102K	CERAMIC 1000PF K		
C218			CK45B1H331K	CERAMIC 330PF K		
C219			CE04W1H010M	ELECTR0 1.0UF 50WV		
C220			C91-0117-05	CERAMIC 0.01UF K		
C221			C91-0117-05	CERAMIC 0.01UF K		
C222,223			C91-0119-05	CERAMIC 0.047UF K		
C224			CE04W1H010M	ELECTR0 1.0UF 50WV		
C225			C91-0117-05	CERAMIC 0.01UF K		
C226			CE04W1H010M	ELECTR0 1.0UF 50WV		
C227			CC45SL1H101J	CERAMIC 100PF J		
C228			C91-0117-05	CERAMIC 0.01UF K		
C229			CS15E1VR47M	TANTAL 0.47UF 35WV		
C230			C092M1H392K	MYLAR 3900PF K		
C231			CE04W1A470M	ELECTR0 47UF 10WV		
C232			CE04W1H0R1M	ELECTR0 0.1UF 50WV		
C233			CK45B1H471K	CERAMIC 470PF K		
C235			CE04W1H100M	ELECTR0 10UF 50WV		
C236			C092M1H333K	MYLAR 0.033UF K		
C237			CE04W1H100M	ELECTR0 10UF 50WV		
C238			CS15E1A2R2M	TANTAL 2.2UF 10WV		
C239			C092M1H102K	MYLAR 1000PF K		
C240			C092M1H123K	MYLAR 0.012UF K		
C241			CK45F1H223Z	CERAMIC 0.022UF Z		
C242-247			C91-0769-05	CERAMIC 0.01UF M		
C249			CC45SL1H470J	CERAMIC 47PF J		
C250			CC45RH1H020C	CERAMIC 2.0PF C		
C251			C91-0119-05	CERAMIC 0.047UF K		
C252		*	CE04WC1H010M	ELECTR0 H01UF C1		
C253,254			C91-1008-05	CERAMIC 0.022UF K		
TC1			C05-0328-05	TRIMMING CAP (50PF)		
-			E04-0157-05	RF COAXIAL CABLE RECEPTACLE(X3		
-			E23-0512-05	TERMINAL		
-			E31-1448-05	CONNECTING WIRE		

## PARTS LIST

\* New Parts

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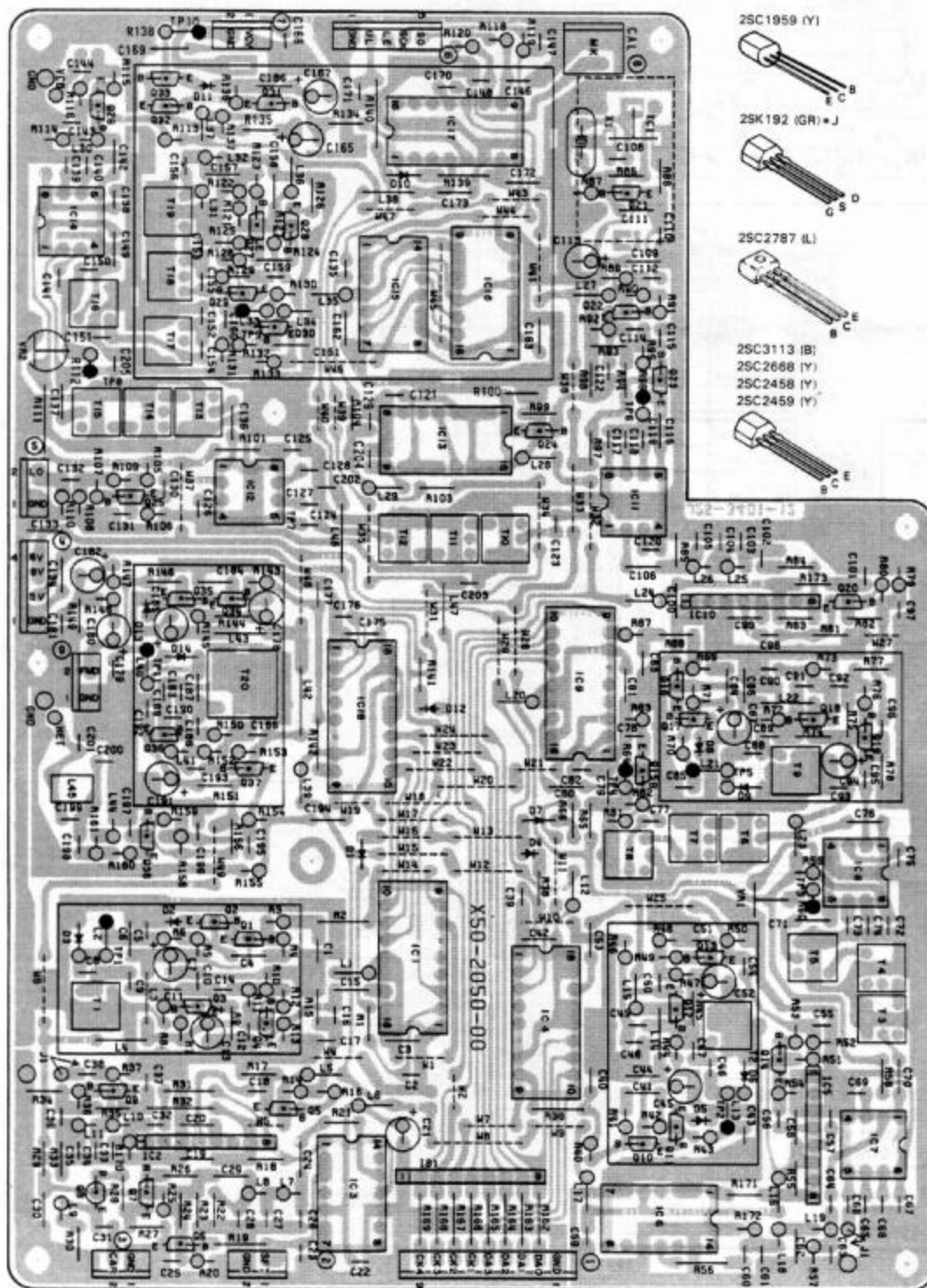
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Ref. No. 参照番号	Address 位置	New Parts 新	Parts No. 部品番号	Description 部品名 / 規格	Desti- nation 仕向	Re- marks 備考
D30 -33			1S1587	DIODE		
D34 -37		*	MA858	DIODE		
D38		*	MA858	DIODE		
D39			1SS133	DIODE		
D40			BA282	DIODE		
D41		*	MA858	DIODE		
D42 ,43		*	MA858	DIODE		
D44			ITT310TE	VOLTAGE VARIABLE CAP.		
D45		*	MA858	DIODE		
D46			ITT310TE	VOLTAGE VARIABLE CAP.		
D47		*	MA858	DIODE		
D48			ITT310TE	VOLTAGE VARIABLE CAP.		
D49		*	MA858	DIODE		
D50			ITT310TE	VOLTAGE VARIABLE CAP.		
D51		*	MA858	DIODE		
D52 ,53			1N60	DIODE		
D54			MV13	VARISTOR		
D56 -58			1SS133	DIODE		
D59		*	UZ3.0B	ZENER DIODE		
D67			DAN401	DIODE		
D68		*	US1090	DIODE		
D69		*	DSP-301N	SERIE ABSORBER		
D60 66			1SS133	DIODE		
Q1			2SC2459(BL)	TRANSISTOR		
Q2			2SA562(Y)	TRANSISTOR		
Q3 ,4			2SK125-5	FET		
Q5			3SK74(L)	FET		
Q6 ,7			2SK125-5	FET		
Q8 ,9			2SC2668(Y)	TRANSISTOR		
Q10 ,11			3SK122(L)	FET		
Q12			2SC2668(Y)	TRANSISTOR		
Q13 ,14			3SK122(L)	FET		
Q15			2SC2570A	TRANSISTOR		
Q16			2SC2538	TRANSISTOR		
Q17 -20			DTC143TS	DIGITAL TRANSISTOR		
Q21 -25			2SC2668(Y)	TRANSISTOR		
Q26			2SC1959(Y)	TRANSISTOR		
Q27			2SC2053	TRANSISTOR		
Q28			2SK192A(GR)	FET		
Q29 -31			2SC2668(Y)	TRANSISTOR		
Q32 ,33			2SC2603(E)	TRANSISTOR		
Q34			DTC124ES	DIGITAL TRANSISTOR		
Q35			2SC2603(E)	TRANSISTOR		
Q36			2SC2459(BL)	TRANSISTOR		
Q37			2SC2603(E)	TRANSISTOR		
Q38			UPC4558C	IC(OP AMP X2)		
Q39			2SC2603(E)	TRANSISTOR		
Q40			M74LS145P	IC(DECIMAL DECODER/DRIVER BCD)		
Q40			SN74LS145N	IC(DUAL MONO MULTI)		
Q41			MS4561P	IC(7CH LED DRIVER)		
Q45			2SA562(Y)	TRANSISTOR		
Q46			DTC124ES	DIGITAL TRANSISTOR		
FINAL UNIT (X45-1470-00)						
C1			CK45B1H561K	CERAMIC 560PF K		

### TS-440S PC BOARD VIEW

PLL UNIT (X50-2050-00) Component side view



IC1, 4, 9, 18: NM6147, IC2: M54459L, IC3, 6: SN74LS90N, IC5, 10: M54460L, IC7, 8, 11, 12, 14: SN16913P, IC13, 16: SN74S112N, IC15: SN74S10N, IC17: M887006, Q1, 2, 10, 11, 16, 17: 2SC3113(B), Q3~5, 12~15, 18~20, 22~24, 26~30, 37: 2SC2668(Y) Q6, 7, 9, 25: 2SC2458(Y), Q8: 2SC1959(Y), Q21: 2SC2787(IL), Q31~35: 2SC2459(BL) Q36: 2SK192A (GR)-J