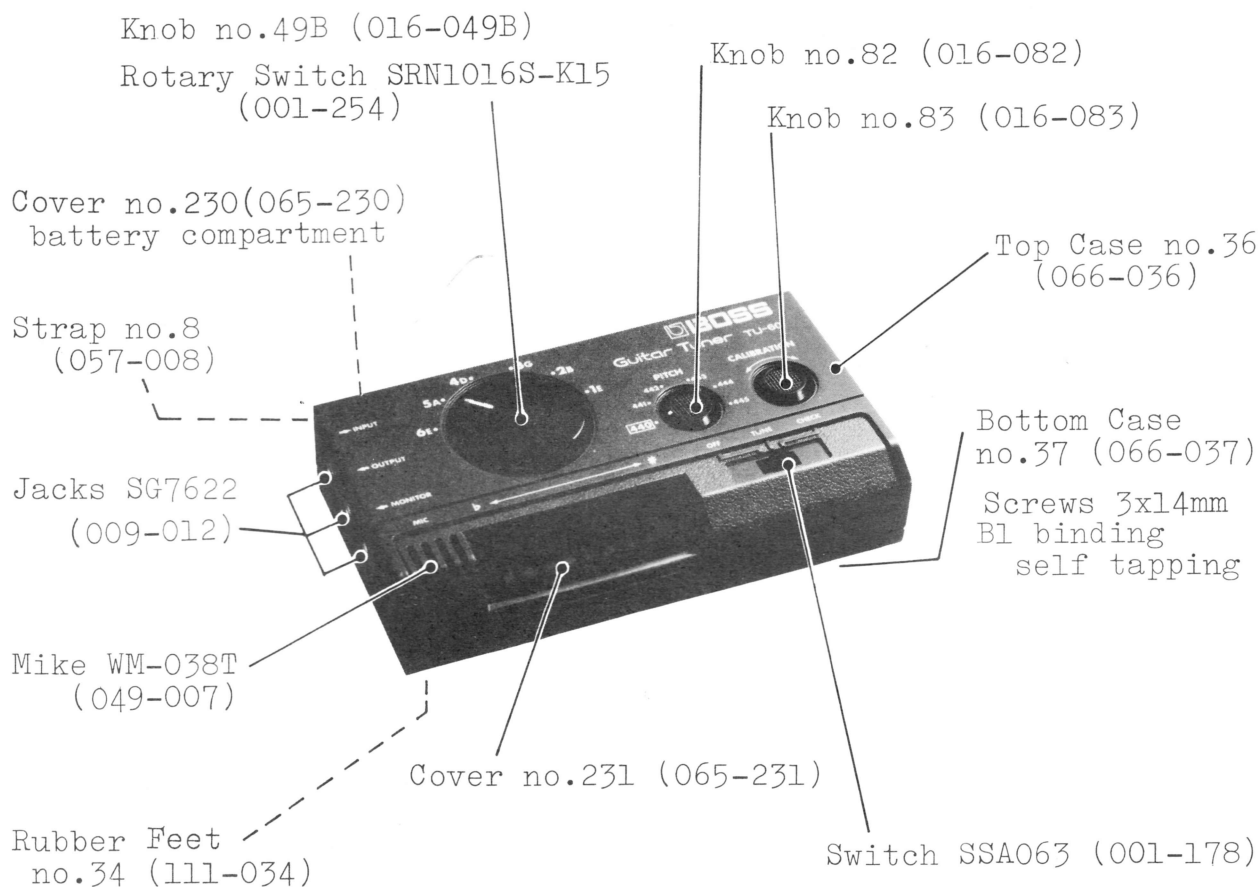


BOSS TU-60 SERVICE NOTES

First Edition

SPECIFICATIONS

Power	Battery 9V (1)	Standard pitch oscillator	440.00Hz \pm 1 cent.
Power requirements	DC 9V, 10mA	Display	8-LED Stroboscope
Strobo tuning range	6-note 3octaves	Built-in microphone	Electret condenser microphone
Generated frequency	1E:329.6 Hz, 2B:246.9 Hz	Jack	Input, Output, Monitor
at A=440.0 Hz	3G:196.0 Hz, 4D:146.8 Hz	Dimensions	92(W) x 38(H) x 154(D) mm
	5A:110.0 Hz, 6E:82.41 Hz	Weight	260 g



PARTS LIST

ICs		POTENTIOMETERS		
020-062	μ PC1458C	028-1040	VR10R502	10KB
020-165	NE555	030-490	SR19R	1.5K trimpot.
020-167	MC14022	030-491	SR19R	2.2K trimpot
020-166	MC14520	030-492	SR19R	3.3K trimpot
		030-493	SR19R	4.7K trimpot
		030-495	SR19R	10K trimpot
TRANSISTORS		CAPACITOR polypropylene		
017-110	2SC1815-Y	035-312	ECQP1	103GZ
017-105	2SA1015-Y			
DIODES		RESISTORS metal oxide \pm 1%		
018-059	1S1588 or 1S2473	* CRB $\frac{1}{4}$ FX		470-ohm
018-075*	RD-5.1EB zener(RD6.8EB)	* CRB $\frac{1}{4}$ FX		46.4K-ohm
019-003	SLP-24B LED A rank	* CRB $\frac{1}{4}$ FX		61.9K-ohm
049-011	*Tuning Fork AFB-880.T or TFC-880.0Hz	* CRB $\frac{1}{4}$ FX		78.7K-ohm
*part changed, refer to next pages		* CRB $\frac{1}{4}$ FX		105K-ohm
		* CRB $\frac{1}{4}$ FX		143K-ohm
		* CRB $\frac{1}{4}$ FX		187K-ohm

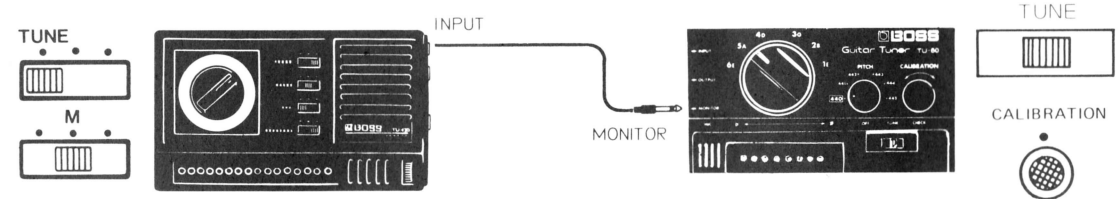
CALIBRATION

Below, one of the TU-60 calibrations using TU-120 as a reference tuner. APPLY SAME order for any methods.

IMPORTANCE

1. Check TU-60 reference gen.(tuning fork) for 440Hz.
2. Calibrate 5A first and foremost in six notes.

Turning trimpot 5A will change basic time-constant of IC-1.



PITCH	NOTE	VR	FREQUENCY	(period)
440Hz	5A	5A	110.00Hz	9.0909ms
440Hz	6E	6E	82.406Hz	12.135ms
440Hz	4D	4D	146.83Hz	6.8106ns
440Hz	3G	3G	196.00Hz	5.1020ns
440Hz	2B	2B	246.94Hz	4.0496ns
440Hz	1E	1E	329.63Hz	3.0337ns
445Hz	5A	VR7	111.25Hz	8.9887ms

440.00Hz
(2.2727ms)

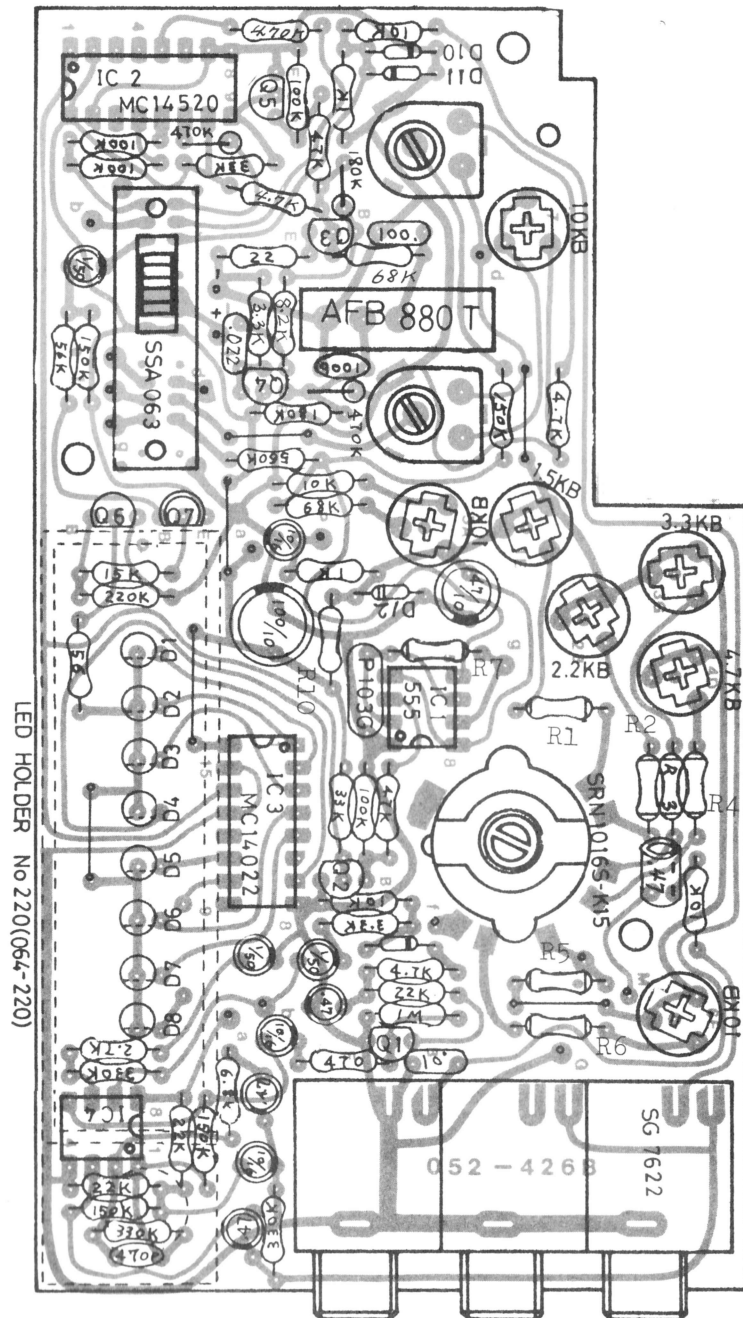
permissible
tolerance
± 0.06% (± 1 cent)

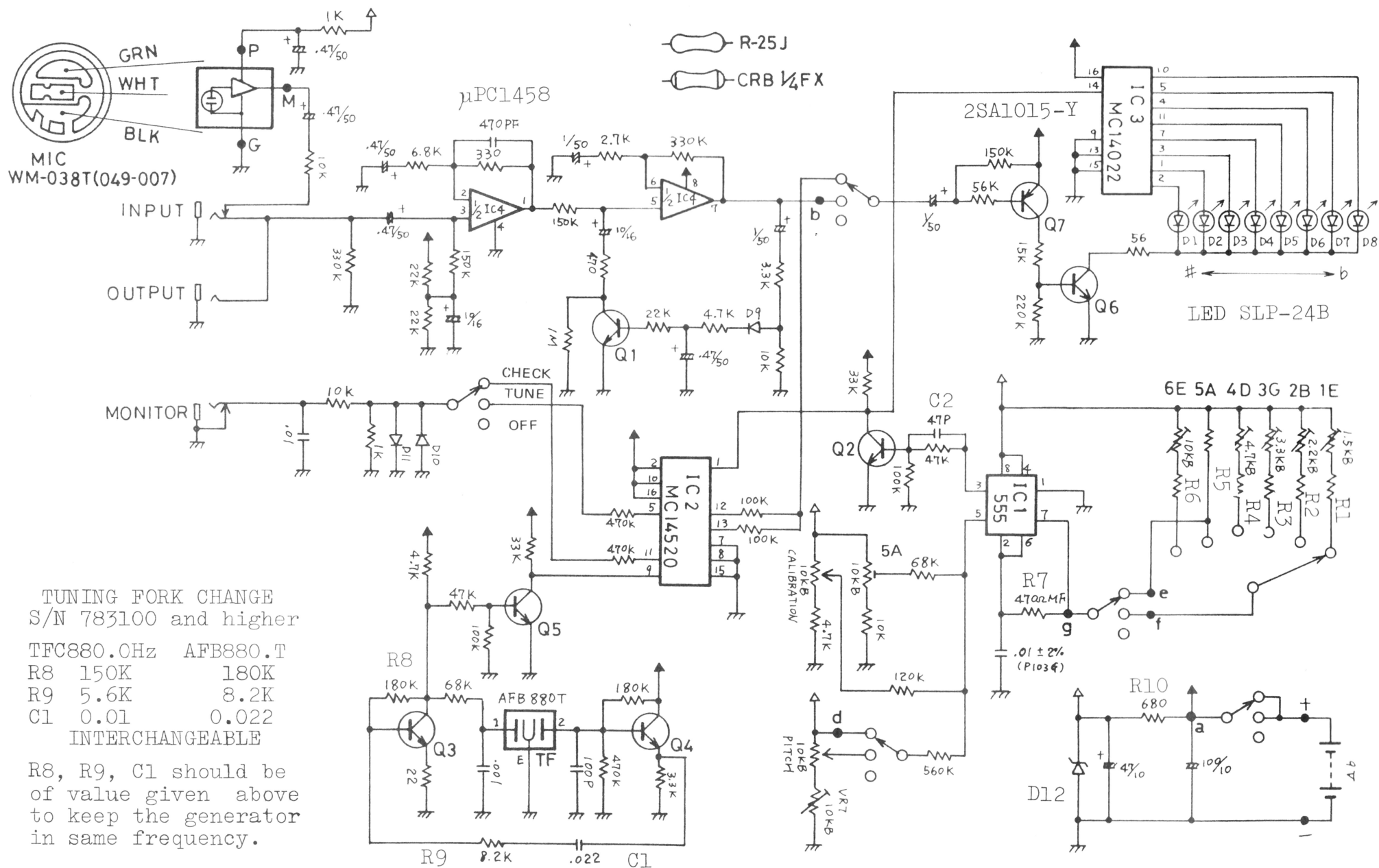
R1	34.0k	--	46.4k
R2	52.3k	--	61.9k
R3	69.8k	--	78.7k
R4	100k	--	105k
R5	143+1k	--	143k
R6	196k	--	187k
R7	10k	--	470-ohm
R10	470-ohm	--	680-ohm
D12	RD6.8EB	--	RD5.1EB
C2	----	--	47pF

CHANGED PARTS for better frequency
stability

Serial no.793600 and higher

When change is made on product
bearing S/N up to 793599, all the
components in the left column
should be replaced with those in
right, otherwise individual note
cannot be tuned accurately.





BOSS TU-60 SERVICE NOTES

CHANGES INFORMATION

Second Edition

REFERENCE GENERATOR

SN 945800 and up

From Tuning Fork AFB880Hz to Time Base Module LQT-880X with associated circuit and PCB re-laid out (see page 2 of this notes).

The LQT-880X is a piezoelectric crystal unit capable of assuring more stable and reliable generation. It can substitute for Tuning Forks on the predecessor PCBs with some modifications (see at right portion of this page).

TIMER IC1 555

From NE555 to NJM555D

SN 101500 and up

NJM555D tends to generate on slightly lower frequency when associated components values equal ones for NE555. R46 100k ohms (or lower) to a ground compensates for this characteristic. Reverse is true in replacing NJM555D with NE555. If higher, remove R46, or in extreme case pull the resistor up via pin 4 (8) of IC1.

(Confirm this with note 5A by turning VR5.)

DIODES D13-D20

Pertaining to Timer change

These diodes prevent LEDs from dimly lit in off state.

PARTS CODING

Roland has changed part number from 6 digits to 8-10 digits.

When ordering replacement part, describe it from the new Parts List.

CORRECTION ON FIRST EDITION

PAGE 2. (period) in table — ns to ms

PARTS PICTORIAL (refer to P.4 of first edition)

CROSSREFERENCE

PART NUMBERS CHANGED (some are renamed)

When ordering, describe part in new number.

OLD	NEW		OLD	NEW		
016-049B	2247011700	Knob	N-117	065-231	2202060400	LED Cover N-604
016-082	2247013000	Knob	N-130	057-008	2231010101	Strap N-101A
016-083	2247013100	Knob	N-131	009-012	13449106	Jack SG7622
066-036	2201060300	Top Case	N-603	049-007	12389301	Mike WM-038T
066-037	2201060400	Bottom Case	N-604	001-254	13119501	Rotary Switch SRN1016S-K15
065-230	2202060300	Cover	N-603	001-178	13159303	Switch SSA063

PARTS LIST

NOTES:

Use new number.

Changed Part — Improved new part is compatible with parenthesized old one expect for TUNING FORK.

Renamed Part — Literal errors on old Parts List are corrected without remark.

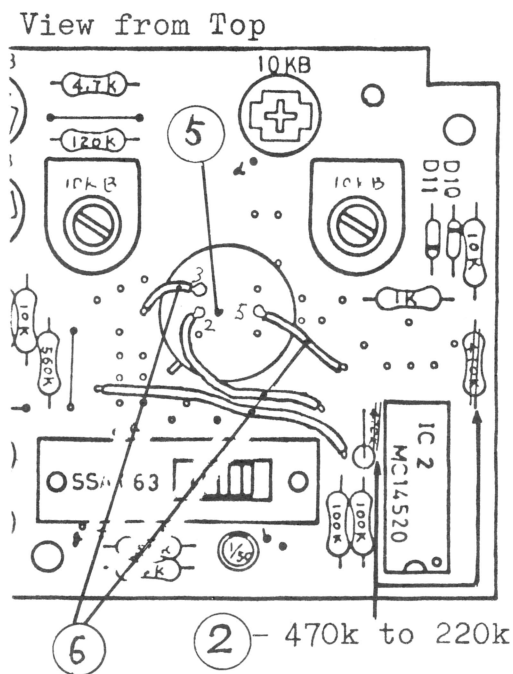
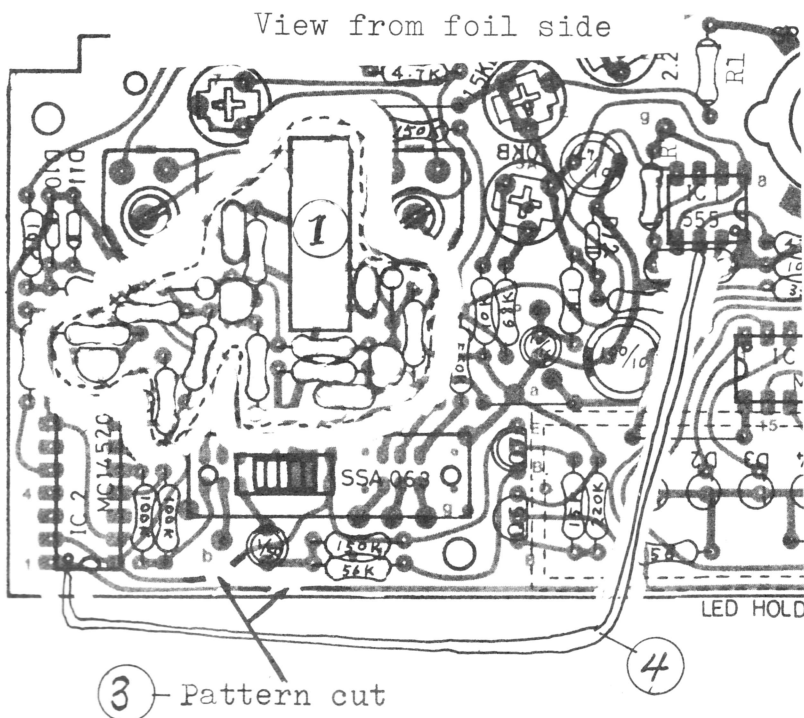
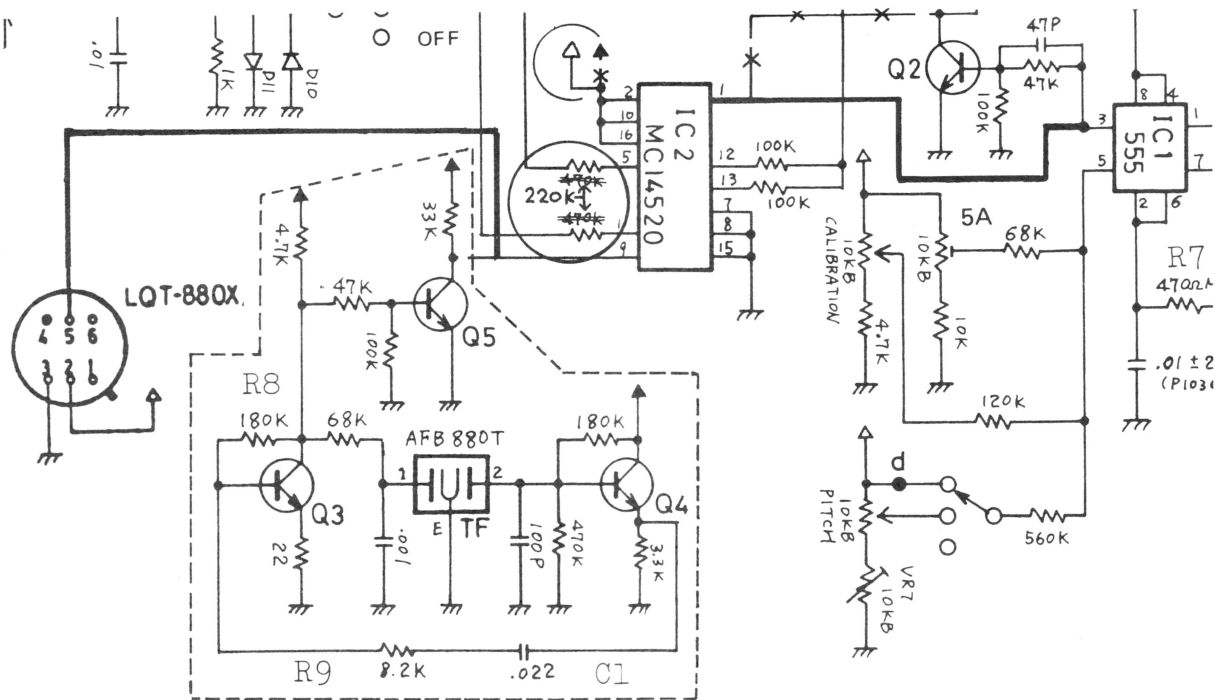
OLD	NEW		OLD	NEW	
		IC			POTENTIOMETER
020-062	15189107	μ PC1458C	028-1040	13279201	VR10R502 10k Ω
020-165	15219109J0	NJM555D (NE555)	030-490	13299110	SR19R 1.5k trimmer
020-167	15159107H0	HD1422BP (MC14022)	030-491	13299111	SR19R 2.2k trimmer
020-166	15159301M0	MN4520B (MC14520)	030-492	13299112	SR19R 3.3k trimmer
		TRANSISTOR	030-493	13299113	SR19R 4.7k trimmer
017-110	15129108	2SC945-P (2SC1815-Y)	030-495	13299114	SR19R 10k trimmer
017-105	15119105	2SA733-Q (2SA1015-Y)			CAPACITOR polypropylene
		DIODE	035-312	13589201M0	ECQP1 103GZ
018-059	15019102	1S1588 or 1S2473			RESISTOR metal oxide $\pm 1\%$
019-003	15029115	SLP-24B LED (rank A)	See p.2 of First Edition for unit SN up 793599.		
	12389704	Time Base Module LQT-880X	13769141D0	CRB $\frac{1}{4}$ FX 470k	
(049-011)		(Tuning Fork AFB-880.T or TFC-880.0Hz)	13769232D0	CRB $\frac{1}{4}$ FX 46.4k	
	15019528	RD6.2EB2 zener	13769240D0	CRB $\frac{1}{4}$ FX 61.9k	
	15019528	1SS-133	13769241D0	CRB $\frac{1}{4}$ FX 78.7k	
			13769242D0	CRB $\frac{1}{4}$ FX 105k	
			13769243D0	CRB $\frac{1}{4}$ FX 143k	
			13769244D0	CRB $\frac{1}{4}$ FX 187k	

REPLACEMENT PROCEDURE

AFB(TFC)-880 with TimeBase Module LQT-880X

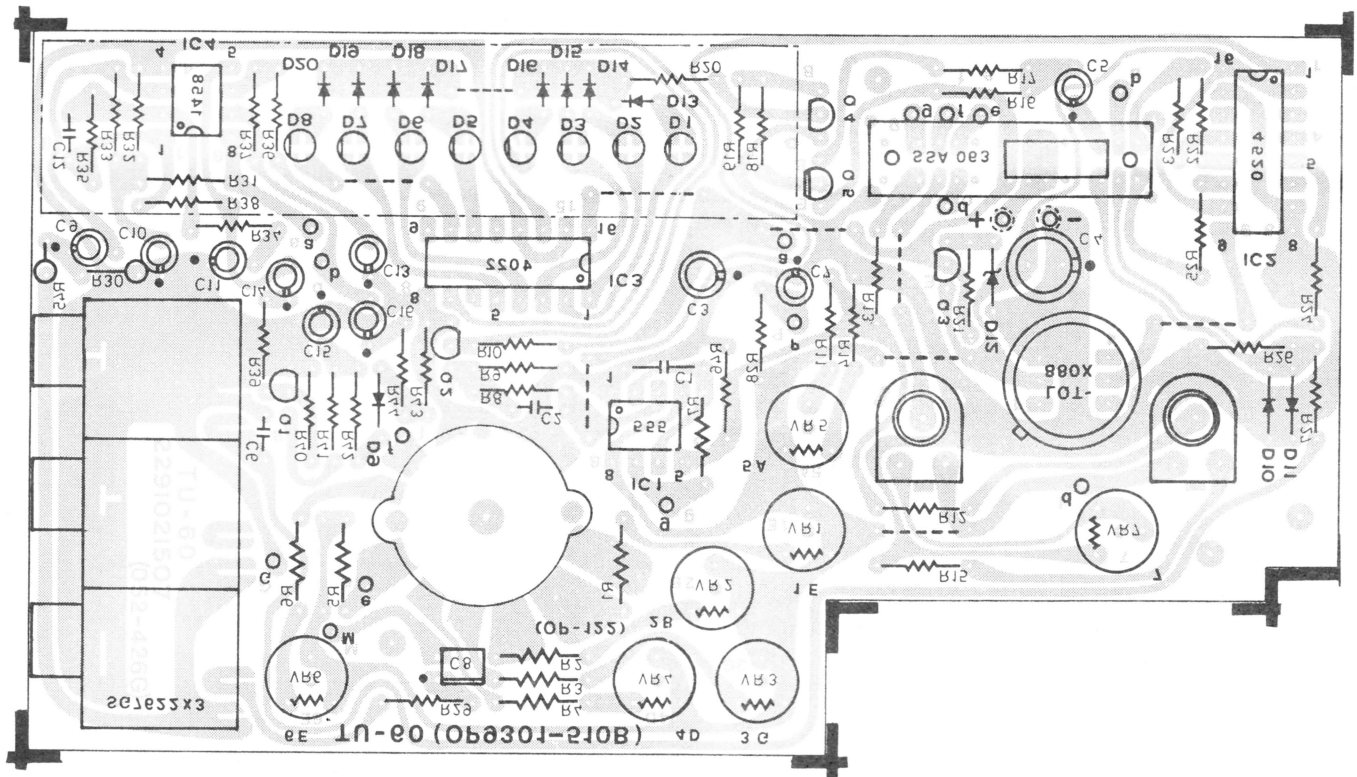
Refer to illustrations below.

1. Remove parts within dotted line.
2. Replace two 470k's with 220k.
3. Scrape off copper at two points.
4. Connect pin 1 of IC2 to pin 3 of IC1 through wire.
5. Locate LQT-880 on the PCB up side down, considering a room for casing. Fix the module top onto PCB top with double-sided adhesive tape.
6. Lay four wires. Put the ends into exact holes. Solder them.





View from foil side



View from component side

