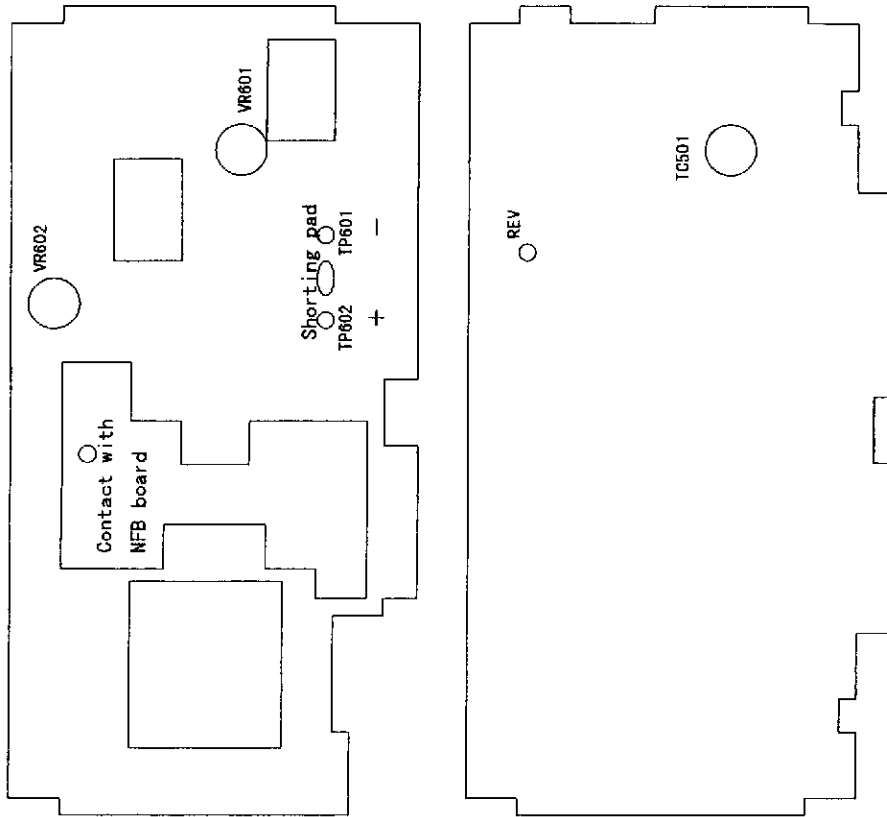


# ALIGNMENT

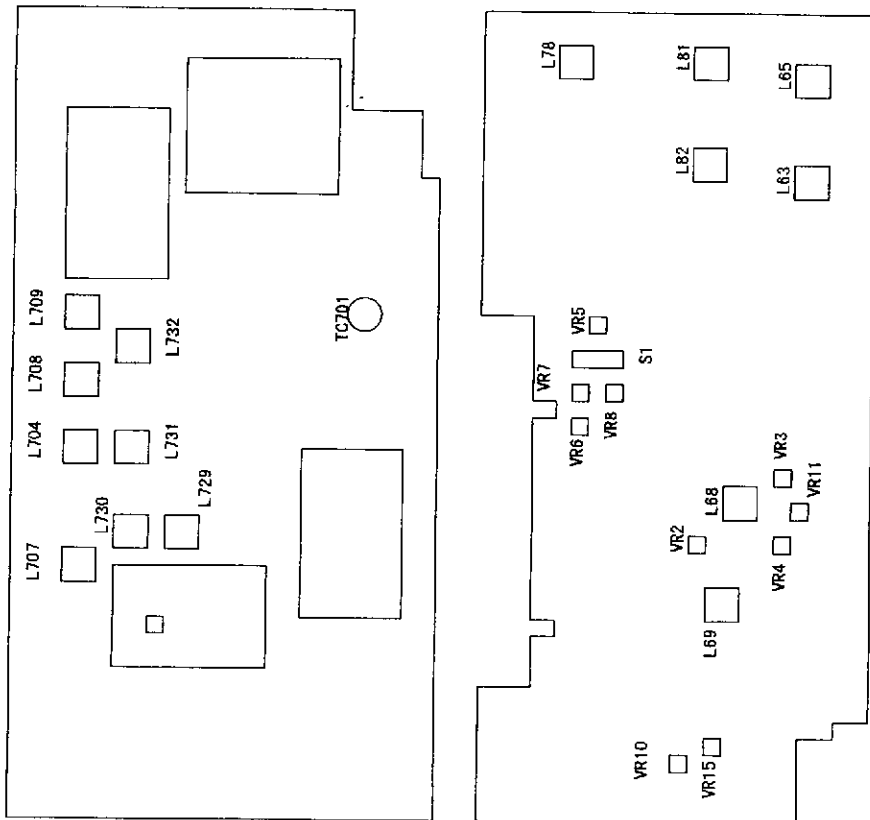
- (1) PA, FILTER Unit Alignment
- PA, FILTER Unit Alignment Points



item	condition	UNIT	adjust	Procedure
2SC3133*2 idling current	No input USB mode VR601 VR602 MIN (fully counter clockwise)	PA	VR601	Measure current between TP601 & TP602 and adjust to 100mA. (Polarity written on PCB). Short specified pads after adjusting.
2SC2904*2 idling current	No input USB mode	PA	VR602	Ground the contact to NFB board and measure current. Then take it off from ground; adjust VR602 to get 300mA more than when grounded.
Reflected power detection	1. 9000MHz Input SG to PA	FIL	TC501	Adjust SG so that power output is about 50W; Adjust TC501 for minimum REV power.

(2) PLL, MAIN Unit Alignment

PLL, MAIN Unit Alignment Points



(3) Transmitter Arignment

Item	condition	UNIT	adjust	Procedure
Tx output	14.1000MHz FM	PLL	L707 L704	Adjust for maximum
CW carrier	14.1000MHz CW	MAIN	VR4	Adjust CW raising edge to be 3mS. (Sidetone to be audible during the procedure)
AM carrier	14.1000MHz AM MOD 1KHz -35dBm	MAIN	VR11	Adjust for 100% modulation
Total current	10.1000MHz FM unmodulated	MAIN	VR6	Adjust to 22A
100W mode output	14.1000MHz FM unmodulated	MAIN	VR7	Adjust to obtain 100W output
50W mode output	14.1000MHz FM unmodulated	MAIN	VR5	Switch the S1 to 50W and adjust VR5 to 50W. output. Switch back S1 to 100W after.
TUNE power	14.1000MHz	MAIN	VR8	Adjust to 10W
Carrier balance	14.1000MHz SSB	MAIN	VR3	Adjust VR3 to get more than 50dB as compared to 100W
FM MOD	28.1000MHz FM 1KHz -35dBm	MAIN	VR13	Adjust to 2.3KHz/DEV

Note: Use High power mode unless mentioned

#### (4) Receiver Alignment

Item	condition	UNIT	adjust	Procedure
Reference frequency		PLL	TC701	Measure CP802 and adjust TC701 to 16.777216MHz±5Hz
Sensitivity	14.1000MHz USB RF:+10dB SG:-6dBu	PLL  MAIN	L729 L730 L731 L732 L708 L709 L78 L81 L82 L68 L69	Adjust repeatedly for maximum receive audio S/N 10dB or better
Total Gain	14.1000MHz USB RF:0dB SG:40dBu	MAIN	VR2	Adjust AF gain for AF output of about 1V. Let this level be 0dB. Turn off the SG output, and adjust VR2 to get -28dB with noise only. L68 and L69 may be adjust optionally
Smeter	14.1000MHz USB RF:0dB SG:20dBu  SG:40dBu	MAIN	VR10  VR15	Adjust to display between 1 and 2. Adjust to display 9. Adjust VR10 and VR15 repeatedly.
Noise Blanker	14.1000MHz USB RF:+10dB SG:15dBu FM MOD 20Hz 100KHz/DEV	MAIN	L65 L63	Adjust for the least noise.

#### (5) Transmitter Check

item	condition	Adjusted value	Pass limit	Remarks
Ref freq FM	14.1000MHz	±5Hz	±50Hz	
Tx power FM unmodulated	1. 8MHz band 3. 5MHz band 7 Mhz band 10MHz band 14MHz band 18MHz band 21MHz band 24MHz band 28MHz band	95~110W	90~110W	Use default freq of each band
Tx power AM unmodulated	1. 9MHz band 3. 5MHz band 7MHz band 10MHz band 14MHz band 18MHz band 21MHz band 24MHz band 28MHz band	35~50W	30~50W	- ibid -
Current dissipation in Tx FM unmodulated	1. 9MHz band 3. 5MHz band 7MHz band 10MHz band 14MHz band 18MHz band 21MHz band 24MHz band 28MHz band	20A max	20A max	- ibid -

Item	Condition	Check
Low power	14. 1000MHz FM Low Pwr, unmodulated	See that the output is between 5~20W
AM power	14. 1000MHz AM unmodulated	See that the output is between 35~50W
Power on each band	Each band FM unmodulated	See that the output is between 90 and 110W for each band
Spurious	Each band FM unmodulated	Better than -52dB (For 10MHz band -47dB)
Modulation	LSB/USB FM AM	Use a separate receiver and check audio
Elec. -keyer	14. 1000MHz CW	Install the keyer unit, activate, and see that it's working
CTCSS	28. 1000MHz FM	88.5Hz tone deviation is within 0.3~0.6KHz/DEV

item	Condition	Adjusted value	Pass limit	Remarks
Low pwr FM unmodulated	14. 1000MHz	5~20W	5~20W	
TUNE power	14. 1000MHz	10W	8~12W	
FM deviation	28. 1000MHz FM	2. 3KHz	2. 1~2. 4KHz	
CW waveform	14. 1000MHz CW	Leading edge 3mS	2~6mS	
Spurious FM	1. 9MHz band	-52dB max	-52dB max	
	3. 5MHz band	-52dB max	-52dB max	
	7MHz band	-52dB max	-52dB max	
	10MHz band	-47dB max	-47dB max	
	14MHz band	-52dB max	-52dB max	
	18MHz band	-52dB max	-52dB max	
	21MHz band	-52dB max	-52dB max	
	24MHz band	-52dB max	-52dB max	
28MHz band	-52dB max	-52dB max	-52dB max	
Carrier balance SSB Unmodulated	14MHz band	-50dB max	-45dB max	Check both USB/LSB
modulationSSB FM AM	FM on 28MHz	Check only	Check only	See that its clear
	Other mode on any band			
	SPEECH Compressor ON		Check only	See modulation goes up / power meter swings more

Item	Condition	Aligned value	Pass limit	Remarks
Rx SSB sensitivity	1. 0000MHz	+6dBu (emf)	+6dBu (emf)	S/N 10dB or better
	1. 9000MHz	-6dBu	-6dBu	
	3. 6000MHz	-6dBu	-6dBu	
	7. 1000MHz	-6dBu	-6dBu	
	10. 1000MHz	-6dBu	-6dBu	Pass limit "-“ means
	14. 1000MHz	-6dBu	-6dBu	the band has already
	18. 1000MHz	-6dBu	-	been checked in the
	21. 1000MHz	-6dBu	-6dBu	same BPF
24. 9000MHz	-6dBu	-6dBu		
28. 1000MHz	-6dBu	-6dBu		
Rx AM Sensitivity	1. 0000MHz	+26dBu	+26dBu	S/N 10dB 以上
	14. 1000MHz	+10dBu	+12dBu	MOD 1KHz 30%
Rx FM sensitivity	28. 1000MHz	0dBu	0dBu	SINAD 12dB 以上
	28. 1000MHz	3% max	3% max	MOD 1KHz 1.75KHz/DEV
S-meter SSB 14. 1000MHz	No signal	No display	No display	
	RF: 0dB 20dBu	S 1~2 S 9	displays S 8~9.5	
Squelch SSB 14. 1000MHz	No signal		Closes at	
	RF: 0dB >+30dBu		9 to 11 o'clock. >Can be closed	

item	Condition	Aligned value	Pass limit	Remarks
Noise Blanker	14. 1000MHz SSB SG : 40dBu MOD 20Hz 100KHz/DEV		Check only	With NB ON the noise is reduced and the S-meter is not displaying
AGC (not for DX-707)	14. 1000MHz SSB SG : +40dBu	Check only	Check only	Toggle AGC-F/-S: With SG ON/OFF see that S-meter response changes
RF GAIN	14. 1000MHz SSB SG : +40dBu	Check only	Check only	With RF GAIN changed, see the S-meter changes
FILTER (Not for DX-707)	14. 1000MHz CW AM	Check only	Check only	See that noise changes with FILTER on and off

### (6) Receiver Check

item	condition	Check
distortion	14. 1000MHz FM RF: +10dB SG: 40dBu 1KHz 1. 75KHz/DEV	To be less than 3% If not, fine-tune the L78.
squelch	14. 1000MHz USB RF: +10dB SG: OFF	Squelch to close at 10 o'clock, and see that S-meter is not displaying.
AGC	14. 1000MHz USB RF: +10dB SG: 40dBu	With AGC-Slow, at the moment the SG is turned OFF, the meter to go down slowly and with AGC-fast, to go down fast.
RF GAIN	14. 1000MHz USB SG: 40dBu	From RF GAIN +10dB, press the RF key to see that S-meter goes down gradually.
FILTER	SG: OFF	Press the MODE key and see that the audio quality changes.
Check each band	1. 9000MHz 3. 6000MHz 7. 1000MHz 10. 1000MHz 21. 1000MHz 28. 1000MHz LSB or USB SG: -6dBu	Toggle the SG ON and OFF, and see that the difference is more than 10dB, on each band.

### (7) Operation Check

item	condition	Adjusted value	Pass limit	Remarks
Dial	Main dial	Check only	Check	Rotate both directions to see freq changes
Switches	Each switch	Check only	Check	See BEEP sounds for all switches except POWER
Volume	AF GAIN	Check only	Check	Loudness changes
	SQUELCH	Check only	Check	Squelch opens/closes
	IF SHIFT (DX77 only)	Check only	Check	Check that audio quality changes
	RIT	Check only	check	Varies in the range of $\pm 1.0$ KHz and is 0.0 at the centre
Jacks	PHONES	Check	Check	Use a headset to check
	REMOTE	check	Check	PC control possible
LCD	LCD	Check	check	All segments show when resetting
DIMMER	DIMMER LP0~LP5		check	See that luminosity changes. Erases at LPO
Preshipment	Reset and DX77 shows default 7.1MHz (DX707 shows memory) AF, SQL volumes at full counterclockwise, RIT, $\Delta$ IF volumes at the centre.			