

TRISTAR 747

ALIGNMENT PROCEEDURE FOR PCB# PTBM121D4X

MAY BE UTILIZED ALSO ON: COLT 320FM; HAM INTERNATIONAL CONCORDE II; AND  
HYGAIN V (EXPORT).

VCO & Frequency adjustment:

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10.240MHz adjustment - measure at TP2, adjust CT1.

10.535MHz adjustment - measure at TP3, peak point is T1 (AM)

20.105MHz adjustment - measure at TP3, adjust CT2 (USB); +50Hz.

20.1035MHz adjustment - measure at TP3, adjust CT3 (LSB); +50Hz.

(Set in RX condition and check Fo shift for +800Hz in SSB mode using clarifier)....

10.695MHz adjustment - measure at TP5, adjust CT4 (USB); CT5 (LSB);  
for 10.695MHz....+50Hz.

SPECIAL NOTE: UNITS WITH AN S METER WHOSE VALUE OF MEASUREMENT  
IS OVER 1.5. Adjust USB for 10.695MHz, +100Hz.  
Adjust LSB for 10.692MHz, -100Hz.

VCO Voltage adjustment - measure at TP1, adjust coil for 3.6VDC,  
+0.1VDC at Ch. 1.

Transmitter & 38MHz RF adjustment:

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Set the following: 2.4KHz, 10mV to Mike Input.

T6 -  $\frac{1}{2}$  turn up

L8 -  $1\frac{1}{2}$  turns up

L14 - 1 turn up

RV2, RV4 - fully clockwise

38MHz RF adjustment - adjust Mike Input signal to obtain 1W of Output  
power in USB mode.

Tune T1 for max power at mid Fo.

\*Tune T2 for max power at unit's highest Fo.

\*Tune T3 for max power at unit's lowest Fo.

\*(Repeat above till no further power can be obtained)

11MHz & 27MHz adjustment - LEAVE MIKE INPUT AS SET..

Tune T7 for max power at mid Fo.

\*Tune T4 for max power at unit's highest Fo.

\*Tune T5 for max power at unit's lowest Fo.

\*(Repeat until no further power increase)

## TRISTAR 747 ALIGNMENT (Cont.)

### Transmitter & 38MHz adjustments (Cont.)

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T6, L8, L12, L14, adjustment - LEAVE MIKE INPUT AS SET

Turn RV4 for max power

RV12 to fully clockwise

Peak T6, L8, and L12 for maximum power  
across entire Fo band - linear output

\*Turn L14 down to obtain at least 78V P-P  
output.

\*(Recheck this adjustment in AM mode to make  
sure no oscillations occur, may have to adjust  
down about  $\frac{1}{2}$  turn.)

Carrier Leak adjustment - NO MIKE INPUT, adjust in LSB mode.

Turn RV5 and RV6 alternately a few times  
to obtain minimum output power.

(Mike input/No Mike input should be at  
least 40db difference when adjusted correctly).

SSB Output Power adjustment - (See Spec's \*A and \*B) TX in USB.

Adjust RV12 for 'Carrier Output' (\*A) V P-P  
at 2.4KHz, 10mV input.

Adjust RV4 for 'Carrier Output' (\*B) V P-P  
at 2.4KHz, +500Hz; 2 tone.

NOTE: Scope two-tone input, make sure is  
correctly adjusted for closed output waveform.

\*A. RV12 adjust - SSB Output

10W P-P Model - 70V-73V P-P (2.4KHz, 1 Tone)

0.5W P-P Model - 18V-20V P-P (1.25KHz, 1 Tone)

\*B. RV4 adjust - SSB Output

10W P-P Model - 64-67V P-P (2.4KHz, +500Hz;  
two tone.)

0.5W P-P Model - 12.7-14.5V P-P (1.25KHz only)

CAUTION: When adjusting 0.5W (1 tone) model,  
turn RV2 to full CW and fix to protect Xstr  
damage on final stage. Exception-model on  
which linearity (for 2-tone waveform) is fairly  
wrong.

Model using 2SC1969/equiv., possible to turn  
RV2 fully CCW, but adjustment depends on the  
linearity.

AM Output Power adjustment - (See Spec. \*C) TX in AM mode.

Adjust RV13 to get RF Carrier Output (\*C) no  
microphone input.

\*C. RV13 adjust - AM Output, NO mic. input.

4W Model - 3.5-3.95W

0.5W Model - 0.4-0.5W

## TRISTAR 747 ALIGNMENT (Cont.)

### Transmitter & 38MHz adjustment (Cont.)

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"Set Meter" adjust - adjust RV3 until matches 'Power Meter' value.

AM Modulation adjustment - Mic. input at 1.25KHz, 100mV  
Adjust RV14 to 100% modulation.  
Re-set Mic. input 20db down from above,  
check that modulation becomes 80-95%.

FM Deviation adjust - Set TX to FM, Mic. Input at 1.25KHz 10mV;  
use lowest freq. channel in unit.  
Connect Linear Detector to RF Power Meter.  
(See Spec. \*D), adjust RV1 for deviation.

\*D. RV1 adjust (FM Deviation)

40 Channel unit — 1.5KHz at channel 1 or  
lowest frequency.

120 Channel unit - 2.5KHz at channel 120 or  
(80 Channel) highest frequency

### Receiver Alignment:

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AGC voltage adjustment - terminal #14 is test point, adjust RV9  
for 1.8-2.0VDC; USB mode with nothing on  
antenna input - maximum front panel RF GAIN

SSB RX output adjustment - Sig Gen and unit both set to unit's center  
frequency. Clean signal on Sig Gen!  
Max Volume, Min SQ, Max RF gain, DX,  
Clarifier on center, ANL off, NB off;  
settings for radio.  
Adjust Delta Tune/Clarifier for a 1KHz  
audio output.  
Adjust T9, T10, T11, T12, and T8 for  
max output - use scope!  
(Audio Output should be over 500mW at  
0.5<sub>m</sub>V input from Sig Gen.)

AM RX output adjustment - Sig Gen and unit both set to unit's center  
frequency, switch to AM mode, and 1<sub>m</sub>V input.  
Adjust T13, T14, and T15 for max audio output.  
(Audio Output should be over 500mW)  
READJUST: T9 Clockwise to get optimum Signal  
to Noise ratio (about  $\frac{1}{2}$  to 1 turn).

AM & SSB sensitivity - Confirm that S+N/N = 10db less than:  
1<sub>m</sub>V Sig Gen output in AM mode.  
0.5<sub>m</sub>V Sig Gen output in SSB mode.

FM RX adjustment - unit to FM mode, no connection to antenna.  
Adjust T16 and T17 for maximum, then adjust volume  
for noise output of 500mW.  
Apply Sig Gen (1.5KHz Deviation, 1KHz Modulation),  
and re-adjust T17 for peak. NOTE: 3 different peaks!

## TRISTAR 747 ALIGNMENT (Cont.)

### Receiver Alignment (Cont.)

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- S Meter adjustment - Sig Gen output of 100<sub>m</sub>V  
Adjust RV7 in AM mode, and RV8 in SSB mode for a  
meter reading of S-'9'.
- Squelch adjustment - Sig Gen output to 500<sub>m</sub>V, Squelch to maximum on unit.  
Adjust RV10 until audio generates in AM mode.  
Adjust RV11 until audio generates in SSB mode.
- Verify other receive controls operate: RF Gain, Local/DX, ANL, NB, etc.
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### PTOS01LAOX - Alignment (Extra Crystal Oscillator board).

- Frequency adjustment - probe to TP3 on main PCB (PTBM121D4X) and adjust  
T1 of OS011 board for carrier peak, with the  
Clarifier to center, USB mode.  
Match up the crystal frequencies of X1, X2, X3,  
to the Low/Mid/High switch positions..  
RE: Low - X1, 20.105MHz adjust CT1; +50Hz.  
Mid - X2, 20.330MHz adjust CT2; "  
High - X3, 20.555MHz adjust CT3; "  
NOTE: there is one model which uses a 19.880MHz  
crystal, and must be matched per wiring.  
Switch to LSB mode, Mid position, and adjust  
CT4 for 1.5KHz lower frequency than obtained  
when adjusting in USB mode.  
RE: 20.330MHz, -1.5KHz = 20.3285MHz (+50Hz)  
Check that all the crystals shift down by this  
amount (+300Hz).

Confirm that units meet respective Clarifier/Tune specifications.

- VCO Voltage adjustment - probe to TP1 of main PCB.  
Low channels - adjust VCO Block core on Ch. 1 (3.6V)  
Mid channels - adjust RV1 on OS011, Ch. 1 (3.7V)  
High channels - adjust RV2 on OS011, Ch. 1 (3.9V)  
NOTE: This order depends on unit's wiring.  
CAUTION: If PLL locking disorder appears when  
placed on highest frequency channel. The voltage  
on Ch. 1 may have to be increased to no higher than  
4.3V
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### "FACTORY CLARIFIER MODIFICATION"

- Remove D-7 on the main board. Remove R-18 and insert between the center  
terminal on Clarifier potentiometer and terminal #5 of main board.
- Add following parts to OS011 board: D-5, D-6 (ITT310); R-9, R-10 (100K).
- Connect terminals #7 and #10 on OS011 board together.