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It is my hope that you find the file of use to you personally – I know that I would have liked to have found some of these files years ago – they would have saved me a lot of time !

Colin Hinson

In the village of Blunham, Bedfordshire.

Training Note

BILS

OPERATIONAL TUNING INSTRUCTIONS

LOCALISER AND GLIDEPATH

MARKER BEACONS

DAILY SERVICING

BEAM MEASUREMENT GRAPHS

EXTRACTS FROM AP 116C - 0401 - 5

This training note is issued for the guidance of students during training at RAF Locking. No amendments will be issued in respect of modifications introduced to the equipment referred to in this note.

This note is not intended as a substitute for the relevant Air Publication and must not be regarded as authority for modifications, servicing procedures, etc.

TUNING INSTRUCTIONS - LOCALISER TRANSMITTERS

NB. THESE INSTRUCTIONS ARE INTENDED AS A GUIDE ONLY. TUNING INSTRUCTIONS ARE CONTAINED IN AP 116C-0401-5 AND SHOULD BE STRICTLY ADHERED TO

1. Bring from remote to local in the following manner:
 - a. Local on/off switch on CU721 to on.
 - b. Select transmitter by means of Tx selector switch.
 - c. Transmit/test switch to test.

NB. If no 1 Tx is operational on remote and No 2 Tx is to be tuned then it will be necessary to fault No 1 Tx in order to change to No 2 Tx. The reverse will apply if No 2 Tx is operational and No 1 Tx is to be tuned.

2. Switch off HT, tone, identification and coding meter switches.
3. Tune exciter as follows:
 - a. Set meter switch to grid V9. Alter anode V6, anode V7 and grid V9 controls for maximum reading in the meter.

NB. If no reading is obtained on grid V9 position then it will be necessary to tune exciter unit as follows:

- (1) Set meter switch to grid V7 and alter anode V6 control for maximum reading in meter.
- (2) Set meter switch to grid V8 and alter anode V7 control for maximum reading in meter.
- (3) Set meter to Grid V9 and alter grid V9 control for maximum reading in meter.

(4) Set meter switch to cathode V9 and alter anode V9 control for minimum reading in meter for maximum reading in output unit type 201 with output unit switch set to grid 90 or grid 150 position.

(5) Set meter switch on exciter unit to grid V9 position and alter anode V6, anode V7 and grid V9 controls for maximum reading in meter.

b. Set meter switch to cathode V9 and alter anode V9 control for minimum reading in meter or for maximum reading in output unit type 201, with output unit switch set to grid 90 or grid 150 position.

4. Press Press to remove interlocks' button on fuse 812 and pull out fuse panel 812.
5. Remove rear panel, remove aerial connectors and insert wattmeter connectors.
6. Ensure HT min/max switch on rectifier unit 21 set to max and wattmeter mod/power switch set to 'power'.

LOC/20231

(Retyped)

7. On grid bias unit type 11 adjust set 150V control for reading of 30 mA and set HT switches to on.
 8. On output unit type 201 set meter switch to 90 cathode and adjust 90 anode control for minimum reading in meter or preferably for maximum reading in wattmeter with wattmeter switch set to 90 Hz position.
 9. Repeat for 150 anode with meter switch to cathode 150 position and wattmeter switch to 150 Hz position.
- NB. During operations 7 and 8 ensure that cathode 90 and cathode 150 reading do not exceed 72 mA.
10. On output unit type 201 set meter switch to grid 90 and alter grid 90 control for maximum reading in meter.
 11. Repeat for 150 grid with meter switch to grid 150 position.
 12. Repeat operations 9 and 10 until maximum readings are obtained on both positions.
 13. On output unit type 201 set meter switch to grid 150 and adjust 'set 150 V control in exciter unit for maximum reading in meter.
 14. Readjust anode V9 control for maximum reading in grid 90 or grid 150 meter.
 15. Readjust both grid controls for maximum and ensure that readings are between 20 and 40 mA.
 16. Readjust 90 anode control for maximum reading in wattmeter with switch set to 90 Hz position.
 17. Repeat for 150 anode with switch set to 150 Hz position.
 18. Check both readings greater than 20 watts and within 1 watt of each other.
 19. Switch off HTS, remove wattmeter connectors, replace aerial connectors and rear panel. Put HT min/max switches two notches back and ensure all units are pushed 'full home' with fuse panel 812 last.
 20. Insert phasing link between top of cabinet and 150 Hz aerial connector.
 21. Switch on HTS and put switch on monitor unit type 40 to 90 carrier positions.
 22. Adjust 90 anode control on output unit type 201 for maximum readings in carrier meter in monitor unit type 40.
 23. Repeat for 150 anode control with switch on monitor unit type 40 to 150 carrier position.
 24. Set meter switch on carrier meter on monitor unit type 40 to carrier and switch on receiver to min 1.

25. Increase reading in carrier meter by adjustment of receiver manual gain controls ensuring that overscaling does not occur.
26. When a suitable reading is obtained adjust phasing control on phasing unit type 13 until a minimum reading in the carrier meter is obtained.
27. Adjust manual gain of receiver progressively until maximum gain is reached and readjust phasing control for minimum reading in carrier meter.
28. Adjust HT min/max switches on rectifier unit type 21 to reduce reading in carrier meter to specified minimum (less than 10 micro-amps plus spurious signals).

NB. If necessary a spurious signal check may be carried out as follows:

- a. Ensure that modulator cabinets for both transmitter and RF cabinet on standby transmitters are off. This will provide a check as to whether the spurious signal is coming from the ILS equipment or not.
- b. If this does not reduce the reading below the specified minimum then carry on as follows:
 - (1) Set receiver switch to automatic.
 - (2) Switch off both HT switches on grid bias unit type 11.
 - (3) Remove both aerial connectors from top of cabinet.
 - (4) Return receiver to maximum manual gain.
 - (5) Any reading now obtained in the carrier meter is being received at the monitor aerial from other equipment than ILS and may be added to the specified minimum required when phasing e.g. if 5 microamps spurious is obtained then anything below 15 microamps will be acceptable.

29. Set receiver switch to automatic, switch HT switches to off, remove phasing link and replace aerial connector.

30. Switch HT switches to on and set up preset voltages as follows:

- a. On power unit type 837 adjust set 300V control, with meter switch to 500 FSD, for a reading of 60 mA.
- b. Set meter switch to 750 FSD and check reading is approximately 40 mA.
- c. On monitor unit type 40 set carrier switch to 90 carrier position and adjust 90 level control for a reading of 50 microamps.
- d. Repeat c. using 150 level control with switch on 150 carrier position.

NB. After completion of operations c. and d. the carrier difference and carrier sum alarm lights on monitor unit type 40 should be extinguished.

- e. Repeat c. using set carrier control with switch on carrier position.
- f. On modulator unit type 131 adjust set 250V control for a reading of 50 mA with the meter switch on the set 250V position.
- g. Repeat f. for modulator unit type 130.
- h. On modulator unit type 131 set meter switch to V3 position.
- j. Adjust 150 set bias control on keying unit type 27 for a reading of 40 mA in the modulator meter.
- k. Ensure that reading on V4 position is ± 5 mA of this reading.
- l. Repeat H. J. and K. on modulator unit type 130 using 90 set bias control of keying unit type 27.
- m. On frequency control unit type 4 set meter switch to set 300V position and adjust set 300V control for a reading of 60 mA in the meter.

31. Establish that the tone frequencies are present in the following manner:

- a. Switch on monitor unit type 41.
- b. Switch 90 Hz tone to on and by pressing 'press to read' button on monitor unit type 41 ensure that a reading in excess of 20% is obtained by adjustment of the 90 Hz gain control with the limiter unit type 1 out of circuit.

NB. The limiter unit type 1 may be put out of circuit by inserting a jack plug in the control signal input socket.

- c. Switch off 90 Hz tone and repeat b. for 150 Hz tone using 150 Hz switch and gain control.

32. Set tone frequencies to 90 Hz and 150 Hz exactly in the following manner:

- a. Set both HT switches on grid bias type 11 to off and remove rear panel from modulator cabinet.
- b. Remove plug 41 from modulator unit type 131.
- c. Insert frequency meter plug in modulator unit type 131 and insert plug 41 in frequency meter plus.
- d. Ensure switches on frequency meter set 'localiser' and 'normal'.

- e. Press 'press to remove interlocks' button on fuse panel type 813 and pull out fuse panel type 813.
- f. Set both HT switches to on and 150 Hz switch on frequency control unit type 4 to on.
- g. Ensure reading on frequency is between 250 and 300 microamps adjusting 150 Hz gain control as necessary.
- h. Using 'press to read' switch on frequency meter adjust 'set frequency' control on frequency control unit type 4 for a reading of exactly 150 Hz in frequency meter.
- i. Set HT switches to off and ensure power to modulator cabinet is off by pushing home fuse panel type 813.
- k. Remove frequency meter and re-insert plug 41 in modulator unit type 131.
- l. Replace rear panel and ensure all units are pushed 'fully home' with fuse panel type 813 last.

33. Set modulation depths and adjust limiter type 1, to maintain these modulation depths constant, in the following manner:

- a. Ensure limiter is 'in circuit', set both HT switches to on and 150 Hz tone switch to on.
- b. Note reading on mod meter in monitor unit type 41 and adjust limiter gain control on limiter type 1 to bring this reading to 40 microamps (20).

NB. It may not be possible to obtain 40 microamps, in which case the 150 Hz gain control will have to be increased until 40 microamps is obtainable.

- c. Readjust 150 Hz gain control for a reading, in meter of modulator unit type 131 of between 40 and 45 mA with the meter set to V1 position.
- d. Readjust both these gain controls until a reading of 40 microamps (in % mod meter) consistent with a reading between 40 and 45 mA (in modulator type 131 meter) is obtained.
- e. Repeat a. to d. inclusive for 90 Hz tone using beam centering control and 90 Hz gain control, this time reading in modulator type 130 meter.

NB. During the setting of the modulation depths, the reading on the carrier meter, with the switch set to carrier, must be 50 microamps. Frequent checks and adjustments, using the set carrier control, must be made to ensure this.

34. Carry out a distortion check in the following manner:
- With one tone onk set distortion switch on monitor unit type 41 to appropriate cal position and adjust meter zero for zero reading in distortion meter.
 - Adjust gain control on monitor unit type 41 for FSD in distortion meter.
 - Filter out tone by moving distortion switch to 50% position.
 - If reading is less than 20 (10%) then switch may be moved to 10% position and a more accurate reading obtained - maximum permissible distortion is 10%.
 - Repeat a. to d. inclusive for other tone ensuring that gain control on monitor unit type 41 is set to zero before commencing.
 - On monitor unit type 41 set gain control to zero and distortion switch to off.
35. Set to course and mod depth failure alarms as follows:
- Set 150 Hz tone switch only to on.
 - On monitor unit type 40 adjust course gain control for appropriate transmitter, for a reading of 25 microamps to the right in the monitor meter with the meter switch set to course.
 - Now set 90 Hz tone switch to on - the reading in the monitor meter should be zero \pm 1 microamps, if not, it will be necessary to adjust the filter balance control.
- NB. Do not touch filter balance control since this will necessitate an air calibration - inform NCO.
- Set monitor meter switch to mod gain and adjust mod gain control for a reading of 25 microamps to the right in the monitor meter.
 - Set monitor meter switch to mod balance and adjust mod balance control for a reading of zero in the monitor meter.
 - Readjust mod gain and mod balance controls, with meter switch in appropriate positions, until readings of 25 microamps to the right and zero, respectively are obtained.
36. Set up modulation depth of coding as follows:
- Ensure 90 Hz and 150 Hz tone switches set to off.
 - Set identification switch on keying unit type 27 to tone.
 - Adjust code gain control on keying unit type 27 for a reading of 20 microamps (10) on % mod meter in monitor unit type 41.
 - Set identification switch to code and coding meter switch to on.

- e. Check coding by observing mod meter in monitor unit type 41.
- 37. Set switch on monitor unit type 41 to off.
- 38. Set 90 Hz and 150 Hz tone switches to on.
- 39. When alarms are clear set test/transmit switch on control unit type 721 to transmit and check appropriate transmitter green light illuminates.
- 40. Take Transmitter from local to remote in the following manner:
 - a. Set transmitter selector switch to remote.
 - b. Set local on/off switch on control unit type 721 to off.

NB. If the remote console at air traffic control is functioning and the appropriate transmitter selected then the transmitter will remain operational. However if the remote console is not functioning then all failure alarms will show and the transmitter green light will extinguish. Selection of the transmitter will then be carried out from the remote console.

GLIDEPATH TUNING

Preparation

1.
 - a. Tx off at remote
 - b. Switch from remote to local
 - c. PA - HTs, tones and mains off
 - d. Select Tx required for tuning
 - e. Connect Wattmeter
 - f. Regulated mains on and Interlocks overridden
 - g. Check blowers operate correctly
 - h. Check monitor Rx on Auto.

2. Tuning Exciter T.7518
 - a. Select grid V9 and tune anode V6, V7, V8 and grid V9 for max (if no max can be obtained on grid V9 proceed as shown for localiser tuning para 3 (1 to 5)).
 - b. Select cathode V9 and tune anode V9 for dip.

3. Tuning Output Units T.202 and T.203
 - a. Set both power switches to max.
 - b. Set both drive couplings to max (fully anti clockwise).
 - c. Switch both PA-HTs on.
 - d. Select Tripler Grid on both units
 - e. Tune grid V1 on output unit T.202 for zero
 - f. Tune grid V1 on output unit T.203 for max reduce drive coupling by one half tune and re-adjust grid V1 for max. Repeat this operation until no further increase in reading can be obtained. Tune grid V1 for zero.
 - g. Repeat para f on output unit T.202
 - h. Tune grid V1 on both output units for max. (above 20 mA and within 5 mA of each other). If both grids are not balanced within 5 mA reduce the drive coupling on the higher reading grid. Retune grid V1 on both units for max. It may be necessary to repeat this operation several times until the grids balance within 5 mA.
 - j. Tune anode V9 and exciter bias for max. Tripler grid reading.
 - k. Both PA-HTs off.

NB. The following operation must be performed with minimum delay.

4. On the output unit T.202 remove drive input plug. Select PA anode, switch PA-HT on and adjust RV1 for 60 ma. PA-HT off. Replace the drive input plug and perform the same operation on output unit T.203.

5.
 - a. Select PA grid 1 on output unit T.202 and tune anode V1 and C14 for max with PA-HT on.
 - b. Select PA grid 2 and tune anode V1 and C15 for max.
 - c. Select 90 Hz on wattmeter and tune anode V2 and C23 for max.

d. Select PA grid 1 and PA grid 2 in turn and tune anode V1 for max. Each grid must read above 20 mA and within 2 mA of each other. If not proceed as follows:

- (i) Select the highest PA grid reading
- (ii) Adjust the trimmer associated with that grid in a clockwise direction to reduce the reading by half.
- (iii) Select the other PA grid and adjust its associated trimmer for maximum.
- (iv) Compare both PA grid readings and if the difference between them has decreased continue as above until the grids are within specification. Should the difference be found to have increased then select the highest PA grid reading again.
- (v) Adjust the associated trimmer in an anti clockwise direction to reduce the reading by half.
- (vi) Select the other PA grid and adjust its associated trimmer for maximum.
- (vii) Compare both grid readings and if the difference between them has reduced continue as above until the grids are within specification.
- (viii) Retune anode V1 for max.

e. Re-adjust anode V2 and C23 for max in wattmeter.

6. Repeat the operations detailed in para 5 for output unit T.203 (150 Hz).

7. Compare 90 Hz carriers in wattmeter and ensure both are above 10 watts.

8. a. PA-HTs to off
- b. Regulated Main off
- c. Disconnect wattmeter and reconnect aerials
- d. Regulate mains on and interlocks overridden

9. Tuning into Aerials

- a. 90 Hz PA-HT on
- b. On mon unit 43 select 90 Hz carrier. Tune anode V2 and C23 for max (T.202)
- c. 90 Hz PA-HT off
- d. 150 Hz PA-HT on
- e. On mon unit 43 select 150 Hz carrier. Tune anode V2 and C23 for max (T.203)
- f. 150 Hz PA-HT off

10. Phasing

- a. 90 Hz aerial to phasing position (Back)
- b. Insert phasing link
- c. Phasing control to mid position.
- d. Vernier gain on mon Rx to min
- e. Select carrier on mon unit 43
- f. 90 Hz PA-HT on Mon Rx gain to min 1 and adjust verner gain for 70, 90 Hz PA-HT off.

- g. 150 PA-HT on. Adjust 150 Hz output unit coupling to read 74 (tune anode V2 and C23). Reduce mon Rx gain slightly.
- h. 90 Hz PA-HT on. Adjust phasing control for a dip. If a dip is obtained increase mon Rx to maximum ensuring that carrier meter does not overscale. Reduce 150 Hz power switch to bring phasing dip below 10 micro amps. If reducing power switch causes reading to increase then repeat para's f to h.

(i) It may be found that before a dip is obtained there is no further free movement of the phasing control left. This indicates that the present phasing link requires altering. If the phasing control scale reads zero a shorter link is required or if it reads ten a longer link is required before changing link switch both PA-HT's off and reset phasing control to mid position. Repeat para's f to h until a dip is obtained.

- (ii)
- a. Mon Rx to automatic
 - b. 90 Hz and 150 Hz PA-HT off
 - c. Replace phasing link by normal feeder
 - d. 90 Hz aerial forward

12. Switch 90 Hz and 150 Hz PA-HT on. Set up the preset voltages (1 x 60 ... 5 x 50 ... 2 x 40 ... 1 x 60).

13. Modulation

- a. Switch on Mon unit 44
- b. Switch on 150 Hz and ensure it reads 40% approx. Switch 150 Hz tone off.
- c. Switch on 90 Hz tone and ensure it reads 40% approx. Switch 90 Hz tone off.

14. Frequency

Set up the modulation tone frequencies as shown in localiser tuning notes

15. Mod Depths

NB. When setting mod depths a check must be made that the carrier reading on Mon Unit 43 is always 50.

- a. Set the switch on Mod Units 134 and 135 to V1 position.
- b. Switch on 150 Hz tone and using limiter gain set mod depth to the last air calibration figures (Form 6632).
- c. Adjust the 150 Hz Gain control on FCU for a reading of 48-52 mA in V1 on Mod Unit 134.
- d. Repeat para's b and c until the mod depth reads the last air cal figures and V1 read 43-52 mA. Switch 150 Hz tone off.
- e. Switch on 90 Hz tone and then using beam centering control adjust mod depth to read the last air calibration figure (Form 6632).
- f. Adjust 90 Hz gain control on FCU to obtain a reading of 48-52 mA in V1 on Mod 135.

g. Repeat para's e and f until 90 Hz mod depth reads last air calibration figures and V1 48-52 mA.

16. Distortion

Check that the distortion present on each tone does not exceed 10% (See localiser tuning).

17. Recheck modulation depths as detailed in para 15.

Alarms

Set up the alarms (As detailed in localiser tuning).

NB The cause filter balance on the Mon-unit 43 may be adjusted for a reading of zero on the course position of the meter. However, before adjusting it is essential to check that the phasing of the transmitter and modulation depths are correctly set up.

Remote

Put Test/Transmit switch to transmit and if the green light lights on Control Unit 726 put Tx to remote.

APPENDIX A4

TUNING AND SETTING UP INSTRUCTIONS - MARKER BEACONS

Note ...

These instructions apply equally to all marker beacons. The coding modulations switch on the chassis of the transmitter unit is to be set as follows:-

MIDDLE MARKER - 1.3 kHz

OUTER MARKER - 400 kHz

Preparation

1. Prepare the transmitter unit as follows:
 - a. Switch off the beacon power supply point.
 - b. Unplug the MAINS INPUT, CONTROL LINES and AERIAL connectors.
 - c. Loosen the front panel holding screws and slide out the unit to the full extent of its runners.
 - d. Refit the MAINS INPUT connector.
 - e. Connect the ARTIFICIAL LOAD to the AERIAL plug.
2. Set the main supply switch to ON and the REMOTE/LOCAL ON switch the LOCAL ON. Set the coding modulation switch (SWB) to OFF. Ensure that the green indicator lamp is lit. Allow 30 minutes for the transmitter to warm up.
3. Set the meter switch to HT VOLTS and check that a meter reading equivalent to 270 volts is indicated.

Tuning

4. Ensure that a 12.5 kHz crystal is inserted in the XL 1 holder. Set the meter switch to GRID V10 and adjust the OSC preset control on the chassis for maximum reading in the meter.
5. Set the meter switch to PA GRID and adjust the PA GRID preset control on the chassis for maximum reading in the meter.
6. Set the meter switch to PA CATHODE and adjust the PA TUNING preset control on the front panel for minimum reading in the meter.
7. Set the meter switch to RF POWER and adjust the PA TUNING preset control and the BALANCE preset control on the chassis, alternately, for maximum meter reading.
8. Set the meter switch to PA GRID and adjust the PA GRID preset control for maximum reading.

9. Set the meter switch to RF POWER and adjust the AERIAL COUPLING control for a meter reading of 350 (2.5 watts) or for maximum if 350 cannot be obtained.
10. Set the meter switch to PA CATHODE, adjust the PA TUNING control for minimum meter reading and ensure that the reading is less than 350.
11. Check that the position of the PA TUNING control giving maximum power output coincides with that giving minimum cathode current. When this is not so (or whenever RF output valves V11, V12 have been changed), neutralise as follows:-
 - a. Switch off the main supply. Disconnect the HT supply lead to the PA valves from the tag of the modulation transformer (TR2).
 - b. Connect the junction of R58 and C41, (on the underside of the centre insulating pillar), to chassis, with as short a lead as possible. Switch on the mains supply.
 - c. Set the meter switch to PA CATHODE and note that there is a slight dip in the meter reading when the PA TUNING control is rotated. Slacken the nut securing the neutralising capacitors. Keep the position of the capacitors as symmetrical as possible and adjust the capacitors in step until no dip occurs in the meter reading throughout the PA TUNING control range. Carefully lock the neutralising capacitors securing nuts.
 - d. Switch off the mains supply. Disconnect the load from the junction of R58/C41 and chassis. Reconnect the HT supply lead for the PA valves to the modulation transformer. Switch on the mains supply.
12. Repeat the operation detailed in para 8 to 10 until a power output of 2.5 watts (350 indication on the meter) is obtained consistent with a PA CATHODE meter reading not exceeding 350 (35 mA).

Modulation

13. Set the coding modulation switch (SWB) to the required position. Set the meter switch to MOD LEVEL, depress the SET MOD switch and adjust the MOD GAIN preset control on the chassis for a meter reading of 250.

Aerial Tuning

14. Disconnect the ARTIFICIAL LOAD connector from the AERIAL plug and connect it to the STOWAGE plus. Refit the aerial connector to the AERIAL Plug. Set the meter switch to CATHODE and adjust the PA TUNING control for minimum meter reading. Refit the CONTROL LINES connector.

Monitor

15. Ensure that the AUDIO ON/OFF switch is set to OFF. Set the meter switch to MON OUTPUT, depress the SET MOD switch and adjust the MON GAIN preset control on the chassis for a meter reading of 350. Release the SET MOD switch and check that the meter needle follows the coding.

Coding

16. Set the audio ON/OFF switch to ON and check that the correct coding and tone is monitored by the loudspeaker.

Middle marker - alternate dots and dashes at 1.3 kHz

Outer marker - dashes at 400 kHz

17. Refit the unit as follows:

- a. Set the mains supply switch to OFF.
- b. Unplug the MAINS INPUT connector.
- c. Slide in the unit and refit the front panel holding screws.
- d. Refit the MAINS INPUT connector, ensure that the AERIAL and CONTROL LINES are connected.
- e. Set the REMOTE/LOCAL on switch to REMOTE.
- f. Set the mains supply switch to ON and where the beacon is switched on at the remote control console, ensure that the green indicator lamp is lit.

EXTRACT TAKEN FROM

AP116C - C401 - 5

SCHEDULE
DAILY SERVICING

Note ...

This schedule is written assuming that the equipment is in continuous operation. In the localiser and glide path installations, each transmitter is to be used for alternate 24 hour periods and the changeover effected during the daily servicing.

Estimated time taken: 1 Man-hour (excluding rectification and travelling time)

1. Materials The following may be required for daily servicing:
Fuel, Dieso, 47/20 (F-79) 34/9423220

LOCALIZER INSTALLATION

2. Siting Restrictions Ensure that the siting restrictions contained in Appendix H are not being infringed.
3. Obstruction lights Ensure that the obstruction lights are serviceable.
4. Voltage stabilizer Check the voltage stabilizer as follows:
- a. Ensure that the MAINS ON green indicator lamp is lit.
 - b. Ensure that the MANUAL/AUTO switch is set to AUTO and that the AUTO green indicator lamp is lit.
 - c. Ensure that the output voltage indicated on the meter is 240V.

Note ...

If the equipment is not in continuous operation, start the transmitter in use on the previous occasion and allow 15 minutes for the equipment to warm up.

5. Blower motors Check that all blower motors are running smoothly.
6. Meter readings Check the following meter readings:
- | | |
|--------------------------------|------------------------|
| Modulator units, V1 | 40-45 |
| Monitoring unit Type 40 COURSE | $0 \pm 1 \mu\text{A}$ |
| MOD BAL | $0 \pm 10 \mu\text{A}$ |
| 90 Hz CARRIER | 46-52 |
| 150 Hz CARRIER | 50 ± 1 |
| CARRIER | 46-52 |

Monitoring unit Type 41% MOD 60 approx.
If any reading is outside the quoted limits, set up the transmitter as detailed in Appendix A8.

7. Changeover Arrange for the transmitter required for use to be started at the remote control console. Ensure that after the delay time, the transmitter thus selected operates correctly and that the appropriate green indicator lamp on the control unit Type 721 is lit.
8. Meter readings After a warm up of 15 minutes, perform the operations detailed in para 6 or para 7 as appropriate.

GLIDE PATH INSTALLATION

9. Siting Restrictions Ensure that the siting restrictions contained in Appendix H are not being infringed.
10. Obstruction Lights Ensure that the obstruction lights are serviceable.
11. Voltage stabilizer Check the voltage stabilizer as follows:
- Ensure that the MAINS ON green indicator lamp is lit.
 - Ensure that the MANUAL/AUTO switch is set to AUTO and that the AUTO green indicator lamp
 - Ensure that the output voltage indicated on the meter is 240 V.

Note ...

If the equipment is not in continuous operation, start the transmitter in use on the previous occasion and allow 15 minutes for the equipment to warm up.

12. Blower motor Check that all blower motors are running smoothly.
13. Meter readings Check the following meter readings:
- | | |
|---------------------------------|------------------------|
| Modulator units, V1 | 48-52 |
| Monitoring unit Type 43, COURSE | $0 \pm 1 \mu\text{A}$ |
| MOD BAL | $0 \pm 10 \mu\text{A}$ |
| 90Hz CARRIER | 46-52 |
| CARRIER | 50 |
| 150Hz CARRIER | 46-52 |
| Monitoring unit Type 44% MOD | 64 approx. |
14. Changeover Arrange for the transmitter required for use to be started at the remote control console. Ensure that after the delay time the transmitter thus selected operates correctly and that the appropriate green indicator lamp on the control unit Type 726 is lit.

15. Meter readings

After a warm up period of 15 minutes, perform the operations detailed in para 14 or 15 as appropriate.

MARKER BEACONS

16. Outer marker

If an outer marker mains failure has been reported in the ATCO's log book since the last servicing, a visit must be made to check the stand-by power supply as follows:

- a. Examine the fuel contents gauge. Refuel as necessary with fuel, Dieso 47/20.
- b. On the control panel, ensure that the AVR and CONTROL SELECTOR switches are set to AUTO.
- c. Set the mains supply breaker switch to OFF. Ensure that the stand by set starts and that the beacon reoperates.
- d. Ensure that the voltage indicated on the control panel voltmeter is equivalent to that of the site mains supply.
- e. Set the mains supply breaker switch to ON. After a short delay, ensure that the mains supply is restored to the beacon and that the stand by set stops.

REMOTE CONTROLS

Remote control sonsole

17. Switch positions

Ensure that the switches are in the following positions for normal operation:

- a. MAINS switch to ON.
- b. MARKER BEACON ON/OFF switches for marker beacons in use to ON.
- c. LOCALIZER STANDBY TX switch to AUTOMATIC.
- d. GP STANDBY TX switch to AUTOMATIC.
- e. LOCALIZER SELECTOR switch to No 1 or No 2 (ie Transmitter in use).
- f. GLIDE PATH TX SELECTOR switch to No 1 or No 2 (ie Transmitter in use).

18. Visual indicators

Ensure that the following indicator lamps are lit:

- a. CONSOLE MAINS.
- b. LOC TX 1 ON or LOC TX 2 (as selected).
- c. GP TX 1 ON or GP TX 2 ON (as selected).

19. Visual monitoring Ensure that the following green indicator lamps are flashing the correct coding:
- LOCALIZER IDENT - Station identification.
 - OUTER CODE - 2 dashes per second.
 - MIDDLE CODE - Dots and dashes.
20. Aural monitoring Set the PHONE SELECTOR switch to the following positions and check the correct coded tone is monitored in the handset earpiece.
- LOCALIZER IDENT - Station identification at 1000 Hz.
 - OUTER MARKER - Dashes at 400 Hz (low pitched note).
 - MIDDLE MARKER - Dots and dashes at 1300 Hz.
21. Speech Set the PHONE SELECTOR switch to LOCALIZER IDENT and depress the SPEECH key switch. Check that speech into the handset microphone can be monitored in the handset earpiece.
22. Course indicator Check that the course indicator is showing the correct beams for the localizer and the glide path and that the flags are not showing.

Controller's Desk Panel

23. Visual indicators Ensure that the SYSTEM ON green indicator lamp is lit and that the LOCALIZER IDENTIFICATION lamp is flashing the station identification coding.
24. Speech Depress the SPEECH key switch and check that sidetone can be heard in the handset telephone when speaking into the microphone.

COMPLETE INSTALLATION

25. Unserviceabilities Report on apparent fault or loss of efficiency to the NCO i/c so that remedial action may be taken.
26. Servicing records Make the appropriate entries in the Servicing Log Book for the installation.