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**USER HANDBOOK**  
**for**  
**RADIO STATION**  
**UK/VRC-353**

**WARNING**

The voltages used in this equipment are high enough to endanger life

**CARELESSNESS COULD BE FATAL**

See First Aid instructions on page (ii) and (iii)

Published under the authority of  
The Signal Officer-in-Chief (Army), Ministry of Defence, Whitehall, S.W.1.

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**FIRST AID IN CASE OF ELECTRIC SHOCK**  
EXHALED AIR METHOD

1. **SWITCH OFF** If this is not possible, **PROTECT YOURSELF** with dry insulating material and pull the victim clear of the conductor.  
**DON'T TOUCH THE VICTIM WITH YOUR BARE HANDS** until he is clear of the conductor, but **DON'T WASTE TIME**

- 2.(a) Lay the patient on his back. Quickly loosen waist band and clothing round neck. If his mouth is open, sweep a finger through his mouth to clear obstruction and remove loose dentures.

- (b) Lift the head and tilt the head back - wards by putting one hand underneath the neck and the other on the crown of the head.

See fig. 1



- (c) Hold the head tilted as far back as possible and lift up the jaw firmly, closing the lips. This keeps the victim's airway clear by straightening the breathing passage.

See fig. 2

- (d) Take a deep breath. Open your mouth as wide as you can. Seal your lips on the victim's cheeks around his nose. Blow air into his nose until you see the chest rise (inspiration).

See fig. 3



- (e) Remove your mouth to let him breathe out, his chest will fall (expiration).

See fig. 4

- (f) Take another deep breath and blow again as soon as he has exhaled, and continue inflations 10 — 15 times a minute. (This is a little slower than the normal rate of 18).

The movement of the victim's chest provides visual confirmation of the success of your efforts.

3. If you fail with the nasal route, try the mouth as follows :-  
Lift the jaw and hold his mouth open slightly as you blow, keeping the head tilted well back with the other hand.  
Seal your lips around his opened mouth and press your cheek against his nostrils to stop air leakage, and blow until you see the chest rise.

Continue as described in (e) and (f) above until normal breathing returns or medical assistance becomes available.

**NOTE**

DO NOT GIVE LIQUIDS UNTIL VICTIM IS CONSCIOUS

If after 5 or 6 effective inflations of the patient's lungs there is :-

- (i) no improvement in the colour of the face and lips
- (ii) no constriction of the dilated pupils
- (iii) no pulse to be felt in the neck or elsewhere,  
this means that the heart is not beating.

Carry out External Cardiac Massage

## EXTERNAL CARDIAC MASSAGE

1.
  - (a) Lay the victim on his back on the ground or on some other firm surface.
  - (b) Place the heel of one hand, with the other on top of it, on the lower part of the sternum (breast bone) in the mid line of the chest, see note 1. below.
  - (c) Apply firm pressure vertically downwards aided by the weight of the body, about 60 times a minute.
  - (d) At the end of each pressure stroke, the hands are to be lifted slightly to allow full recoil of the victim's chest.
  - (e) Sufficient pressure should be used to depress the sternum an inch or so towards the vertebral column (spine).



2. Artificial respiration must continue simultaneously with external cardiac massage at the rate of about 5 compressions of the heart to one inflation of the lungs.
3. Massage should continue until the victim's pulse is clearly felt and the colour returns to normal, or until medical assistance arrives.

### Notes :

1. Do not attempt cardiac massage if there is obvious damage to the victim's chest wall.
2. There is a real danger of damage to internal organs by the improper use of external cardiac massage.
3. Particular care must be taken with infants and small children, with whom much less pressure is required to depress the sternum than in the case of adults. In these cases the fingers should be used in preference to the palms of the hands.

WARNING

THE COOLING AIR-FLOW THROUGH THE RADIO MUST NOT BE OBSTRUCTED AT THE BACK OR THE FRONT OF THE RADIO.

SYNOPSIS

The UK/VRC 353 is a VHF/FM Transmitter/Receiver designed for use in Military vehicles and ground stations.

It provides simplex voice and digital data communications between vehicles over distances up to 30 kilometres using end fed whip antennas. Greater ranges can be achieved between static stations by the use of a suitable elevated antenna or inverted V antennas.

Telegraph, data and facsimile communications are possible provided the correct input is made at the audio and harness socket.

Operation is from a nominal 28 volt dc supply and the weight of the radio is approximately 22 kg.

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## ASSOCIATED PUBLICATIONS

	Army Code
Radio Station UK/PRC-320	61123
Radio Station UK/VRC-321	61253
Radio Station UK/VRC-322	61255
Radio Station UK/PRC-350	61124
Radio Station UK/PRC-351 and UK/PRC-352	61128
Clansman Radio Control Harness	61172
Clansman Batteries, Battery Charging and Testing	61395
Clansman VHF Antennas	61388
Test Set Audio, Radio Audio Accessories	
Adaptor, Telegraph, radio	





FIG. 1 RT353

## CHAPTER 1

### PURPOSE AND PLANNING INFORMATION

#### INTRODUCTION

1.1 The Radio Station UK/VRC 353 is a simple-to-operate VHF/FM Transmitter operating in the 30 - 76 MHz range with channels at 25 kHz steps. It is designed primarily for use in conjunction with Clansman Harness as the standard Clansman VHF radio for use in both armoured and soft skinned vehicles. It can also be used without Harness.

1.2 The radio incorporates a frequency synthesizer and operates from the vehicle's 28 volt dc supply. A headgear assembly and handset are provided as basic station items. The RT 353 and associated items for antenna tuning are fully sealed and are suitable for use in combat conditions anywhere in the world.

#### PURPOSE

1.3 The radio is the standard vehicle-borne VHF/FM radio providing Simplex Voice at 25 kHz channel spacing and digital data communications at 50 kHz spacing at all levels of command for the ground forces. With appropriate adaptors, telegraph, data and facsimile communications are possible. Use of the radio in the digital mode will be covered in a separate handbook.

#### DESCRIPTION

1.4 The VRC 353 will give reliable communications over rolling countryside of distances up to 30 kilometres using whip antennas. Impedance matching over the frequency range to the vehicular mounted 2 metre end fed whip antenna is carried out using a Tuning Unit Automatic Antenna Matching (TUAAM) in conjunction with an Adaptor RF Antenna Tuning (ARFAT). Early radios bear the marking TURF in place of ARFAT. The TUAAM is tuned by operating the Power Switch on the radio.

1.5 When used in a static role, or as a ground station, greater distance may be obtained by the use of a suitable elevated antenna or an inverted 'V' antenna. Provision of a Ground Mounted Monopole Antenna enables the station and the antenna to be concealed but sited advantageously.

1.6 Power for the radio is obtained from either a 28 volt dc vehicle supply (which may vary between 20 and 33 volts) or a 24 volt dc supply derived from appropriately connected signals batteries. An AC PSU can be used which enables the power to be supplied from a mains source.

1.7 The UK/VRC 353 is compatible with other Clansman VHF equipments and also with in-service equipment such as the C42 No. 2, VRC 12 and the SEM 25 installations.

## PERFORMANCE DETAILS

1.8 General

Frequency range:	30.000 to 75.975 MHz.
Channel spacing:	25 and 50 kHz steps available by front panel switch selection.
Modes of operation:	
Voice:	FM Narrow with 150 Hz tone. FM Wide. FM Wide Tone with 150 Hz tone. FM Wide Data. FM Narrow Data.
Data:     Analogue:	Up to 750 bauds, input through an Adaptor Telegraph Radio (ATR).
Digital:	Up to 20 kbs.
Telegraph:	Up to 150 bauds, using ATR: Wide frequency shift ( $\pm$ 425 Hz at 2 kHz). Narrow frequency shift ( $\pm$ 42.5 Hz at 425 and 2805 Hz).
Facsimile:	With appropriate applique units.
Power supplies:	
Vehicular:	24V provided by 2 x 12V 75 Ah batteries floating on the 28V dc vehicle supply.
Vehicular ground station:	AC PSU fed from mains supply.
Manportable ground station:	24V provided by 2 x 12V 75 or 100 Ah batteries.
Current consumption (24V input):	
Receive:	3A typical.
Transmit:	MIN power 3.3A typical. 1W power 4A typical. 15W power 6A typical. 50W power 10A typical.
Fans:	Extra load 1A typical.
Maximum current including surges:	14A.

1.9 Transmitter

RF Output: MIN power 40 to 250 mW  
(100 mW nominal).  
1W power 0.5 to 2.5W (1W nominal).  
15W power 10 to 27W (15W nominal).  
50W power 40 to 75W (50W nominal).

To ARFAT during tuning: 50W nominal.

Spurious emissions: -100 dB at 1 MHz or more from  
carrier except for harmonics  
which can be -60 dB.

1.10 Receiver

AF Output: 60 to 150 mW terminated with 100  
ohms.

Sensitivity: 0.5  $\mu$ V emf through 50 ohms at the  
antenna input for 6 dB  $\frac{S+N}{N}$  ratio.

Image rejection: Greater than 80 dB.

IF rejection: Greater than 90 dB.

LO radiation: Less than 400  $\mu$ V into 50 ohms at LO  
fundamental.

1.11 Antenna system

Vehicular: TUAAM and 2 metre end fed whip. An  
ARFAT is incorporated between  
the RT 353 and TUAAM.

WEIGHTS AND DIMENSIONS

1.12 <u>Item</u>	<u>Dimensions</u> (overall)	<u>Weight</u>
RT 353	24 x 36 x 21 cm	22.2 kg
TUAAM	14 x 14 x 23.5 cm	( 3.4 kg)
ARFAT	6.4 x 11.6 x 9 cm	0.9 kg
2 metre Whip Antenna	2 m	( 0.28 kg)
Wing Mounting Box fitted with:	34 x 18 x 25.5 cm	8.7 kg
a TUAMM		
b Antenna Base Assembly		

TOTAL WEIGHT OF UK/VRC GROUND STATION (less  
connectors, leads and batteries): 31.8 kg

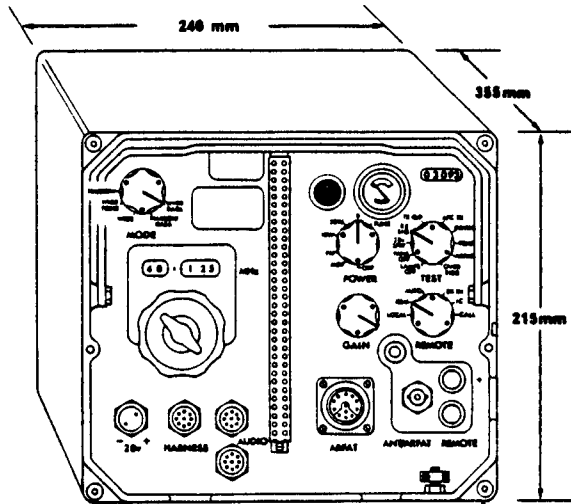


FIG. 2 DIMENSIONS

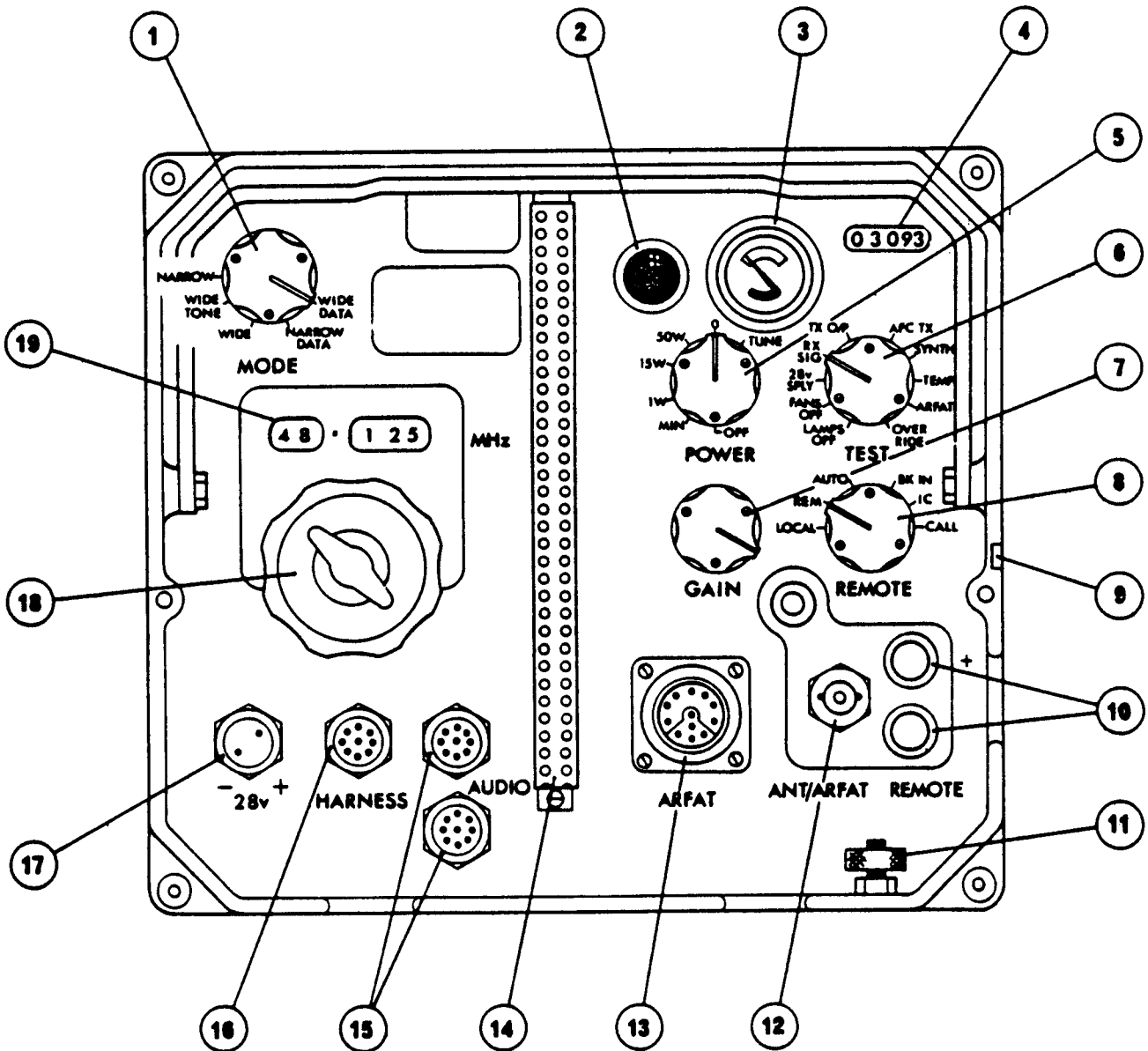


FIG. 3 CONTROLS AND CONNECTIONS

## CHAPTER 2

## OPERATING INFORMATION

## FRONT PANEL CONTROLS AND FACILITIES

2.1 Sub-sub paragraph designations relate to illustration reference in Fig. 3.

## MODE

2.1.1 Five-position rotary switch labelled as follows:

WIDE DATA	This is the normal position when operating in the data mode.
NARROW DATA	This is a special position for low rate data for possible future applications.
WIDE	This position should be used when working to LARKSPUR equipments, eg SR C42 No. 2; SR C45 No. 2; SR B47; or SR B48.
WIDE TONE	This position must be used when working to equipments which have channel spacing of 50 kHz and use a tone squelch system of 150 Hz, eg PRC 25 or VRC 12.
NARROW	This is the normal operational position when working analogue to other Clansman equipments. In this narrow bandwidth position the channels are confined to 25 kHz.

## Notes:

- a When the MODE switch is set to positions other than DATA, the radio can be operated from:
- (1) Clansman Harness, when connected to the HARNESS connector.
  - (2) Clansman audio gear connected to either of the AUDIO connectors.
  - (3) Clansman Remote Harness, Remote Personal or Remote Combining Unit connected to the REMOTE terminals.
- b When the MODE switch is set to DATA, the radio can only be operated from special equipment connected to the HARNESS connector.
- c When operating with data to another UK/VRC 353 the MODE switch must be switched to WIDE DATA.

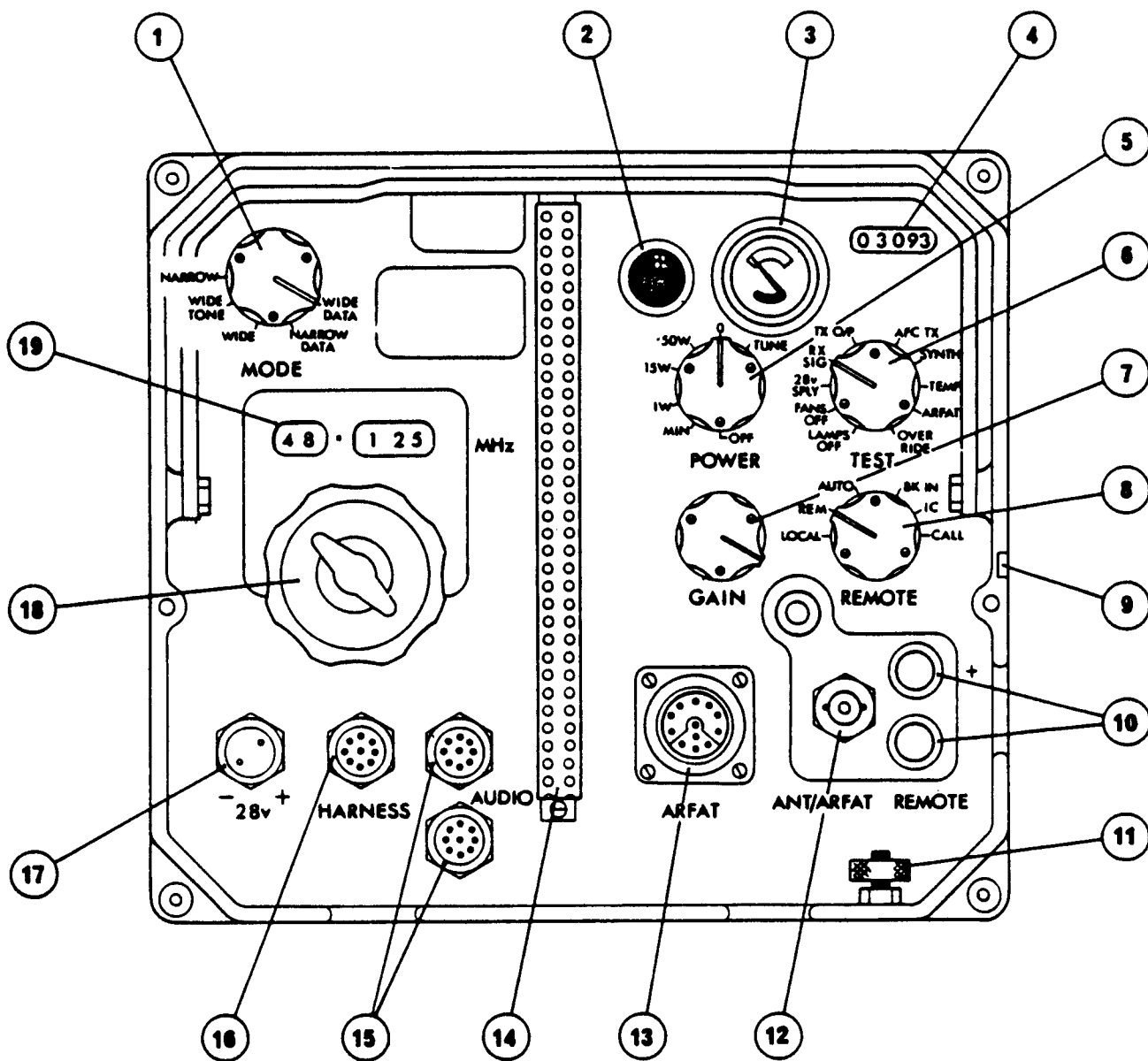


FIG. 3 CONTROLS AND CONNECTIONS

## RESTRICTED

### TX

2. 1. 2 An indicator lamp. The lamp lights when the radio is transmitting.

### METER

2. 1. 3 The meter scale is calibrated from 16 to 32 divisions. It is used in conjunction with the TEST switch, to indicate the supply voltage and various other measurements depending upon the setting of the TEST switch.

### ELAPSED TIME INDICATOR

2. 1. 4 A digital read-out of the total running hours of the radio set.

### POWER

2. 1. 5 A seven-position rotary switch labelled as follows:

OFF	In this position the complete equipment is switched OFF (with the exception of the meter when the TEST switch is set to 28V). In all other positions the equipment is switched ON and the nominal RF Power output level is as follows:
MIN	100 milliwatts.
1W	1 watt.
15W	15 watts.
50W	50 watts.
0	This position is for Radio Silence.

#### Notes:

##### During Radio Silence:

a The radio will receive signals but cannot be caused to transmit into the antenna.

b The TUAAM will tune to a dummy load (SILENT TUNE) if the POWER selection switch is returned to this position after being switched to TUNE, to initiate tuning of the TUAAM.

c At the end of Radio Silence the TUAAM must be returned by switching to TUNE and then to the required output power.

TUNE This is a spring biased position used to initiate tuning of the TUAAM.



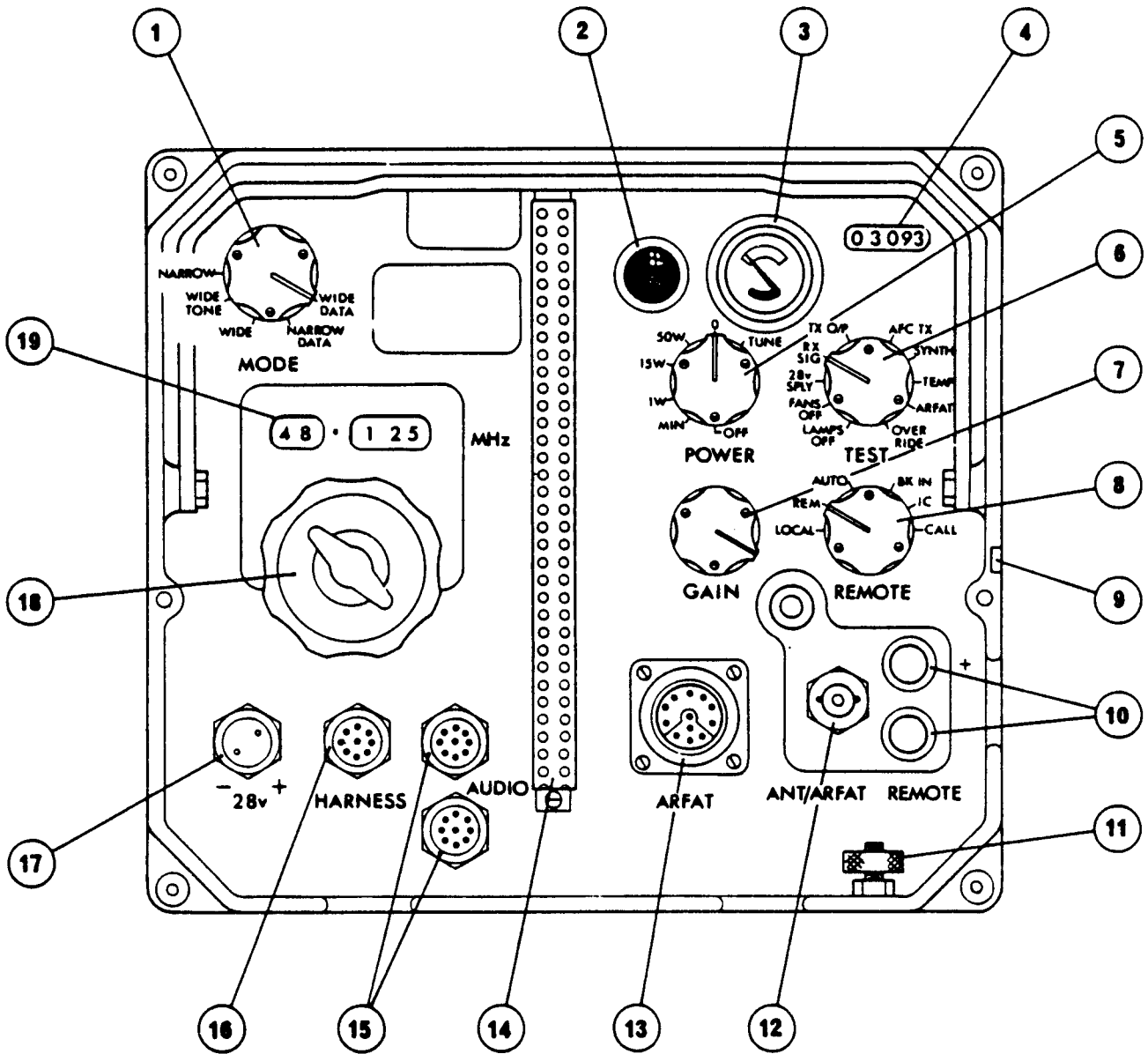


FIG. 3 CONTROLS AND CONNECTIONS

## TEST

2.1.6 A ten-position rotary switch labelled as follows:

**LAMPS OFF** In this position all illumination on the radio is switched off. Received signal strength is indicated on the meter. Note also that the transmission indicator lamp does not light up during transmission when the switch is in this position.

**FANS OFF** In this position the cooling fans will not switch on and transmission is inhibited except for automatic tuning. Other conditions will be as for LAMPS OFF.

This position is for use ONLY when SILENCE (in the vicinity of the radio) is essential.

Note: Excessive use of this position will increase likelihood of failure of the radio and may cause the safety trip to operate which will initially prevent the radio from transmitting and finally switch the radio off until it is cool again.

**28V SUPPLY** In this position the meter indicates the voltage of the DC Supply at the input to the radio. The meter scale is calibrated from 16 to 32 volts. Should the meter indicate less than 22V ie more than one division to the left of the centre scale, the supply batteries are low. In this case the batteries should be changed, or if part of a vehicle installation they should be recharged by starting the vehicle engine and allowing it to run for a period.

**RX SIG** When set to this position the received signal strength is indicated on the meter. The meter will indicate that a signal is present even when there is no apparent signal in the earphones, such as when there is strong electrical interference in the vicinity of the receiver, or when a strong unmodulated carrier is on the same frequency as the receiver.

**TX O/P** In this position the meter indicates the RF output from the radio. The meter indication should be in the green area irrespective of the setting of the POWER switch whilst the radio is transmitting.

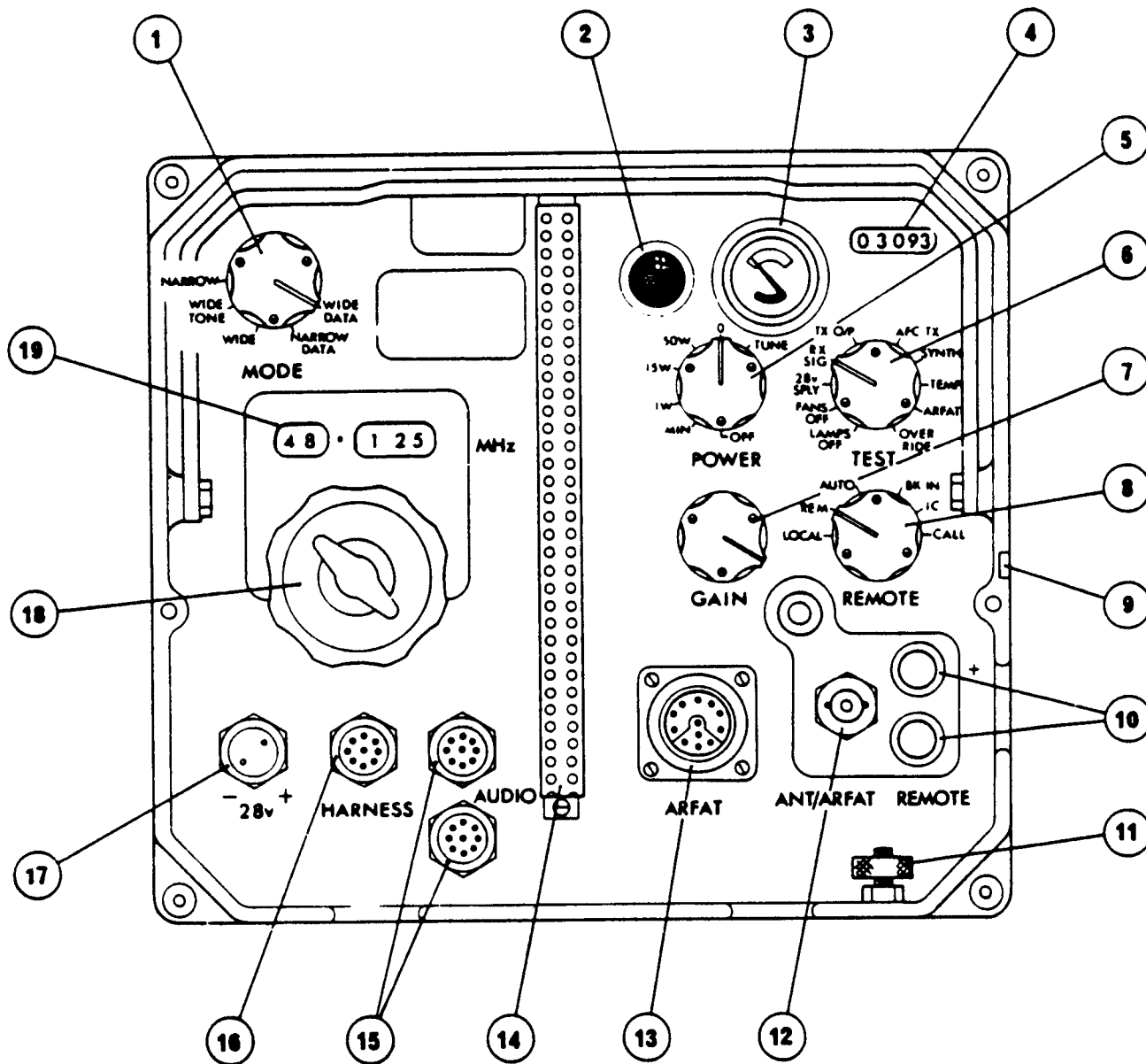


FIG. 3 CONTROLS AND CONNECTIONS

RESTRICTED

TEST 2.1.6 (contd.)

The remaining five positions on the switch are for fault location purposes only.

- AFC TX In this position if the set is transmitting and the meter does not read within +3 divisions of centre scale, the transmitter is out of alignment and the set may not transmit at a later occasion.
- SYNTH If the frequency window illumination flashes and the meter reads in the red or left hand half of scale in this switch position the synthesiser is out of lock possibly due to a frequency outside the range 30 to 75.975 MHz having been selected. Otherwise the set needs to be repaired.
- TEMP If the frequency window illumination flashes and the meter reads in the red or left hand half of scale in this switch position the set is overheating. Check that the air flow through the set is not restricted. Under this condition the set will not go to transmit. In emergency ONLY the set may be made to transmit for a short period by turning the TEST switch to OVERRIDE and operating pressel but the set may be damaged by doing this.
- ARFAT If the frequency window illumination flashes and the meter reads in the red or left hand half of the scale in this switch position there is a fault in the antenna system. This is detected because the ARFAT will have overheated indicating a fault in the antenna system beyond the RT 353.
- OVERRIDE In this position standard functions are overridden:
- a. All illumination is switched off.
  - b. The fans operate.
  - c. Audio muting is removed even in the absence of an incoming signal to give confidence that the receiver is operating by listening to its own noise.
  - d. The transmit inhibit caused by TEMP or ARFAT faults is removed.
  - e. A reading is obtained on the meter. If in the red or left hand half of the scale when the pressel is operated the transmitter is out of lock. It will not transmit and the radio is faulty.

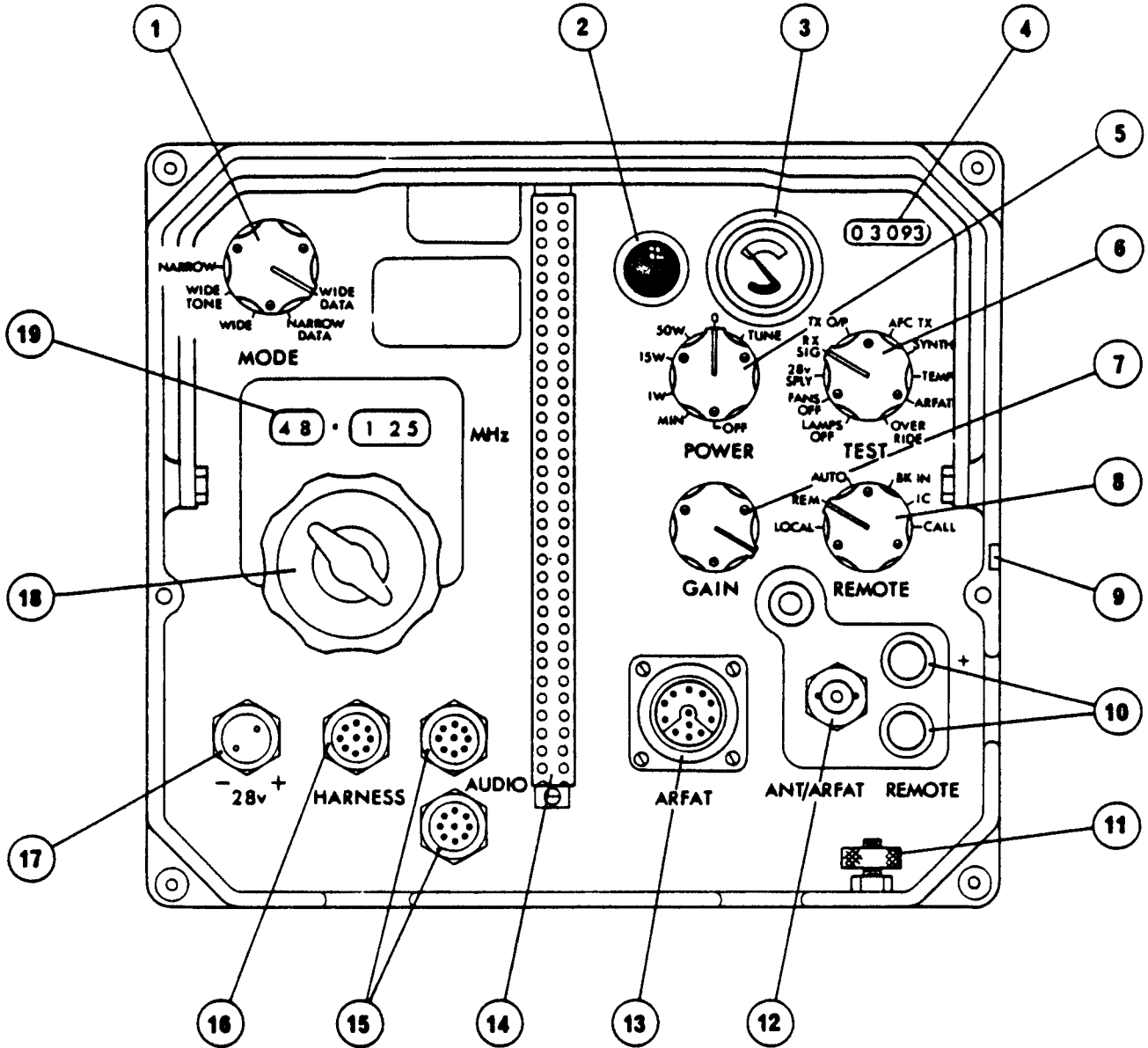


FIG. 3 CONTROLS AND CONNECTIONS

## GAIN

2.1.7 A ten-position rotary switch controls the audio output to the two AUDIO sockets.

## REMOTE

2.1.8 A six-position rotary switch the last position of which is spring loaded. The setting chosen depends upon the choice of operation ie Local Remote or Harness. Details can be found in the operational procedure section.

The switch positions are labelled as follows:

LOCAL	No Harness, no Remote.
REM	Local, Harness or Remote except AUTO re-broadcast.
AUTO	Automatic rebroadcast, Local or Remote.
BK IN	For setting up Automatic Rebroadcast.
IC	For intercommunication over remote line without transmitting over the air.
CALL	Spring loaded switch for calling the remote operator when intercommunication is required without transmitting over the air.

## D10 CABLE STRIPPER

2.1.9 For stripping insulation from ends of remote cable before connecting cable to REMOTE terminals.

## REMOTE

2.1.10 Pair of spring terminals for remote line connection.

## EARTH TERMINAL

2.1.11 Terminal for Earth connection.

## ANT/ARFAT

2.1.12 A coaxial connector for ARFAT or remote antenna.

## ARFAT

2.1.13 A twelve-way connector used to supply power and control information between the set and the ARFAT.

AIR INTAKE GRILL

2. 1. 14 Fans prevent overheating. The air intake grill on the front panel and two fan outlet housings at the rear of the set provide physical protection to the heat exchanger. Air flow must not be obstructed.

AUDIO

2. 1. 15 Pair of sockets for connection of audio gear.

HARNESS

2. 1. 16 A seven-pin plug for connecting radio into Harness.

28V

2. 1. 17 A two-pin plug for 28V supply connection.

FREQUENCY SELECTOR

2. 1. 18 Inner and Outer control knobs for frequency selection.

FREQUENCY DISPLAY WINDOWS

2. 1. 19 Two windows where the frequency to which the radio is tuned is displayed.

Note: If the set detects a fault the frequency window illumination will be made to flash and the audio output will be alternately muted and not muted in time with the light. (See ALARM Paragraph 3. 7).

INSTALLATION

2.2 The RT 353 can be installed in both armoured and soft skinned vehicles. Clansman mounting bars should be used and fitted as shown in Fig. 4.

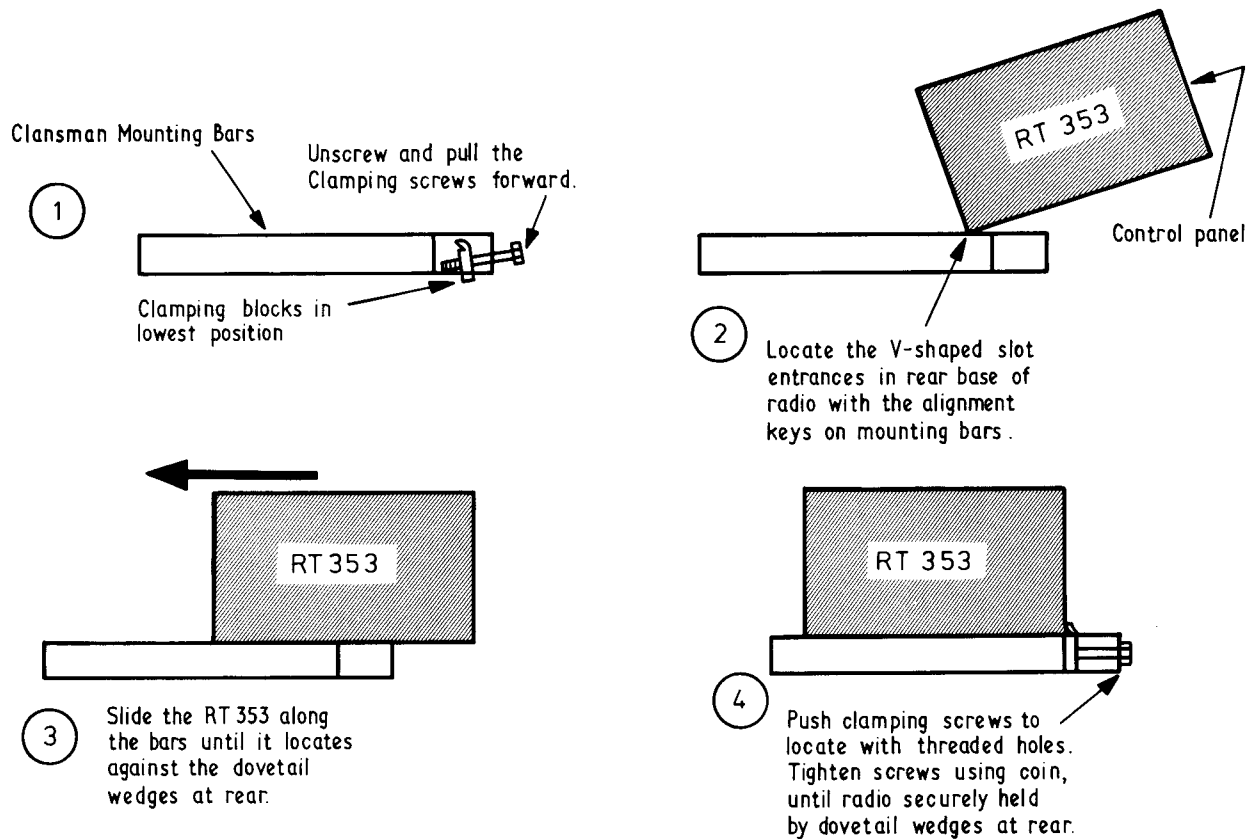


FIG. 4 FITTING THE RT353 TO CLANSMAN MOUNTING BARS

Note: Re-alignment of Mounting Bars:

If difficulty is encountered in sliding the radio onto the bars, remove radio and slightly loosen the four hexagonal socket-headed bolts holding the bars to the base plate, slide the radio along the bars, then remove radio and re-tighten the socket-headed bolts; take care that the bars do not move whilst re-tightening. Refit the radio as shown, it should slide easily when the bars are in correct alignment.



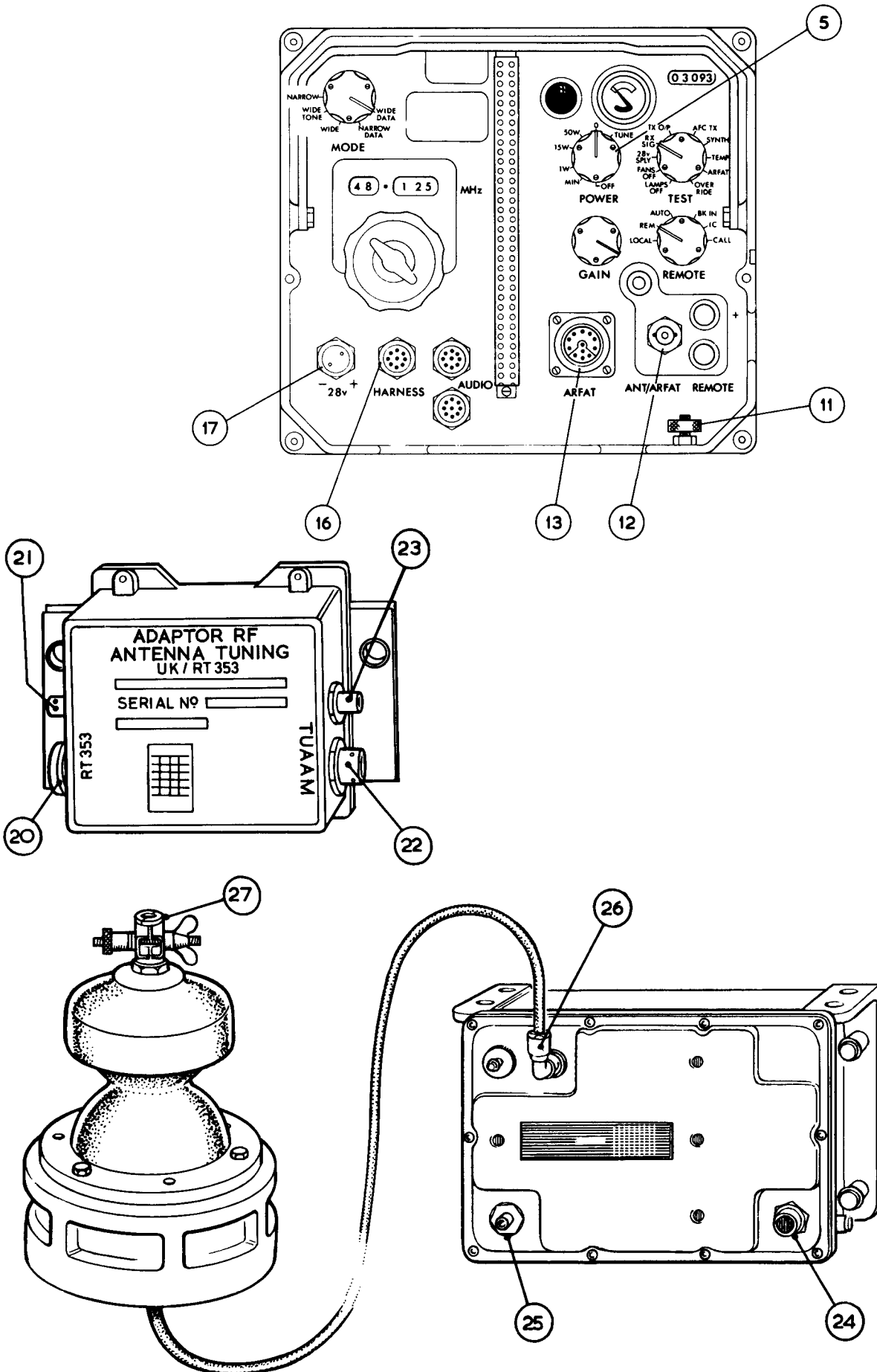


FIG. 5 CONNECTING UP

## CONNECTING UP THE RADIO STATION

2.3.1 In vehicles fitted with Harness follow the instructions in the order shown in the table below:

ORDER	OPERATION	ILLUSTRATION REFERENCE FIG. 5
1	Connect Earth Braid	11
2	Set POWER switch to OFF	5
3	Connect dc supply lead to 28V socket	17
4	Connect Harness cable to the 7-pin Harness socket	16
5	Connect the 12-way interconnecting cable from the ARFAT socket on the RT 353 to the 12-way socket marked RT 353 on the ARFAT	13, 20
6	Connect coaxial cable from ANT/ARFAT socket on the RT 353 to the coaxial cable socket marked RT 353 on the ARFAT	12, 21
7	Connect the 7-way interconnecting cable from the 7-way socket marked TUAAM on the ARFAT to the 7-way socket (ISK1) on the TUAAM	22, 24
8	Connect coaxial cable from the coaxial socket marked TUAAM on the ARFAT to the coaxial socket (ISK2) on the TUAAM	23, 25
9	Connect the coaxial cable from the antenna base No. 31 to the coaxial socket (ISK3) on the TUAAM	26
10	Screw the two whip antenna sections together and mount on the antenna base	27

2.3.2 In vehicles without Harness, connect as in 2.3.1 except that at operation (4), connect Headgear to the socket marked AUDIO.

Note: Alternative antenna systems can be used; information on these will be found in Army Code No. 61388 'VHF Antennas for Clansman'

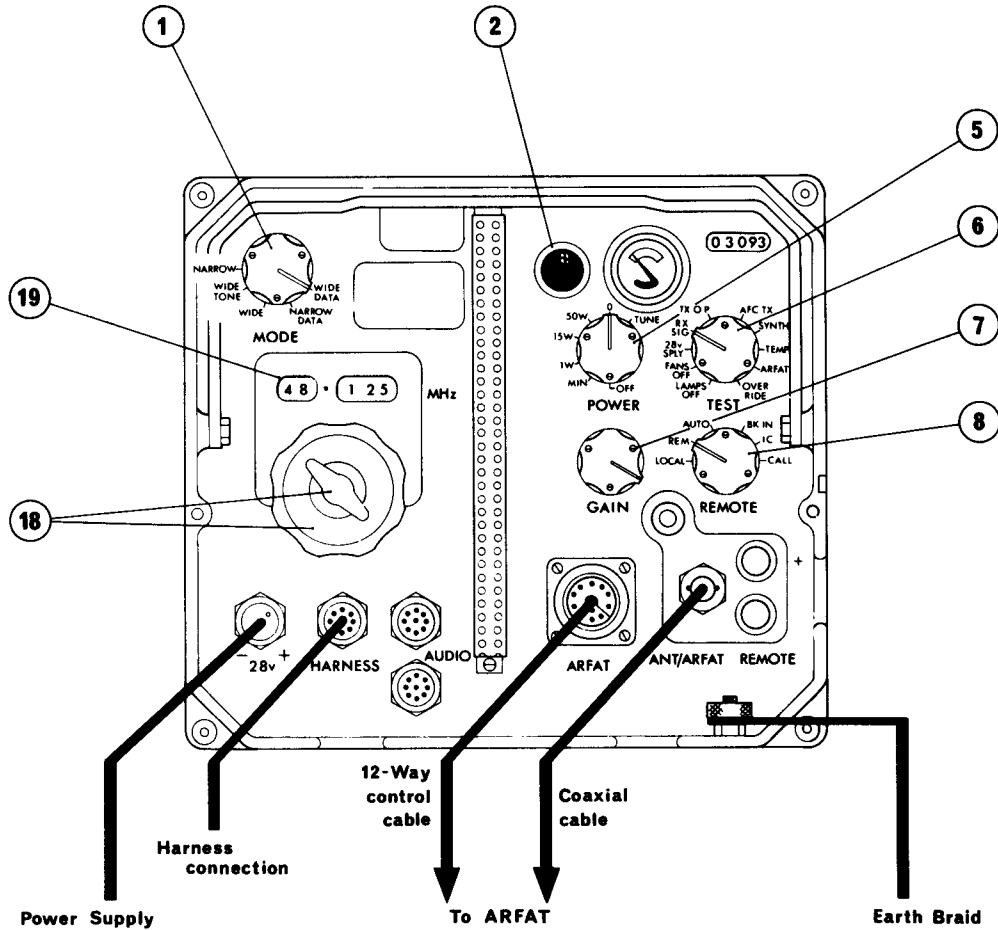


FIG. 6 SETTING-UP SEQUENCE

SETTING UP AND ANTENNA TUNING

GENERAL INSTRUCTION

2.4.1 Follow the instructions in the order shown in the table below:

ORDER	OPERATION	ILLUSTRATION REFERENCE FIG. 6
1	Set the REMOTE switch to REM if Harness is in use. Set the REMOTE switch to LOCAL if local audio gear is in use	8
2	Set the TEST switch to RX SIG (when panel illumination prohibited set to LAMPS OFF)	6
3	Set MODE switch to the appropriate mode of operation, eg NARROW	1
4	Set up Frequency (See 2.4.2)	18, 19
5	Set POWER switch to minimum RF output level needed. The OFF position disconnects power supply	5
6	Wait 40 seconds before using the RT 353	
7	If a TUAAM, ARFAT and 2 m end-fed whip antenna are in use, initiate automatic antenna tuning (see 2.4.3)	5
8	Adjust GAIN control (NOT applicable if AUDIO gear is connected via Harness)	7

SETTING UP FREQUENCY

2.4.2 Use the following sequence:

ORDER	OPERATION
1	Set the inner control knob fully anti-clockwise
2	Rotate the outer control knob until the required 'Tens of MHz' appears in the left hand window
3	Set the inner control knob one step clockwise
4	Rotate the outer control knob until required 'MHz' appears in same window
5	Similarly rotate knobs until the required 'Hundreds of kHz' and '25 kHz' appear in the right hand window

## ANTENNA TUNING USING THE TUAAM AND ARFAT

2.4.3 The TUAAM can tune to the matching transformer and internal pigtail between the transformer and antenna socket, in the antenna Base No. 31. It is important to check that there is an antenna fitted in the antenna base.

### POWER TUNING

2.4.3.1 Rotate the POWER switch to the TUNE position and return it immediately to the minimum RF output power required. This will cause the TUAAM to tune to the antenna.

The TX indicator lamp will light while the TUAAM is tuning. This should be completed in approximately 3 seconds. Wait until the TX indicator lamp has gone out before using the RT 353.

### SILENT TUNING

2.4.3.2 During Radio Silence conditions rotate the POWER switch to the TUNE position and return it immediately to the 0 position. This will cause the TUAAM to tune in to a dummy load which will allow the radio only to receive signals.

The TX indicator lamp will light while the TUAAM is tuning. This should be completed in approximately 3 seconds.

At the end of Radio Silence use the Power Tuning procedure shown above to cause the TUAAM to tune to its antenna.

- a Do not change frequency while the TUAAM is tuning.
- b The TUAAM will be caused to tune if:
  - (1) the power supply to the RT 353 is interrupted.
  - (2) the control cable connections between the RT 353 and the TUAAM are interrupted.
- c If the TX lamp stays alight for 10 - 12 seconds this indicates that the TUAAM was unable to match to its antenna and has carried out a silent tune into its dummy load. The antenna system should be checked for completeness or damage at the earliest opportunity.
- d If the TX lamp stays on for longer than 12 seconds a fault is indicated in the TUAAM, ARFAT, Cables or RT 353.

OPERATION

IN HARNESS

2.5.1 Instructions for the various methods of operation are detailed in the Clansman Radio Control Harness Handbook, Army Code No. 61172.

OUT OF HARNESS - LOCAL CONTROL

2.5.2 Connect the Audio equipment (Headset/Handset) to the AUDIO sockets on the RT 353.  
Set the REMOTE switch to the LOCAL position.  
Press the pressel switch to Transmit; the TX lamp should glow.

## REMOTE CONTROL (Fig. 7)

2.5.3 Connect the cable to the terminals marked REMOTE on the RT 353. If the remote unit is already connected to the cable a check must be made to ensure the wires have been connected to the correct terminals. This is done by connecting audio gear to one of the radio sockets on the set and with the REMOTE switch at REM or AUTO listening for a call tone. If this is heard the polarity of the wires is NOT correct and they should be removed from the terminals and each inserted into the opposite terminal to which it was connected before.

If a local monitor is required connect the audio equipment to the AUDIO sockets on the RT 353.

Set the REMOTE switch to the REM position when the termination of the cable at the remote position is by one of the following:

Remote Control Harness, Remote Personal Unit,  
Remote Combining Unit, or Adaptor Radio Telegraph.

The Remote operator must press his pressel switch to transmit over the radio link.

For speech to a local operator without transmitting over the link the remote operator must press his CALL button. The local operator must then switch to IC for intercommunication.

The operator at the radio may call the remote operator without transmitting over the air by switching the REMOTE Switch to IC and depressing it to the CALL position. The switch will return to the IC position. The operator is required to operate his pressel switch in the normal manner.

## INTERCOMMUNICATION FROM A REMOTE POSITION

2.5.4 For intercommunication between the Local Monitor and the Remote Operator, hold the REMOTE switch in the CALL position, then release the switch so that it returns to the IC position. When the remote operator wishes to reply he will switch to IC before doing so. Each operator must press his pressel whilst speaking.

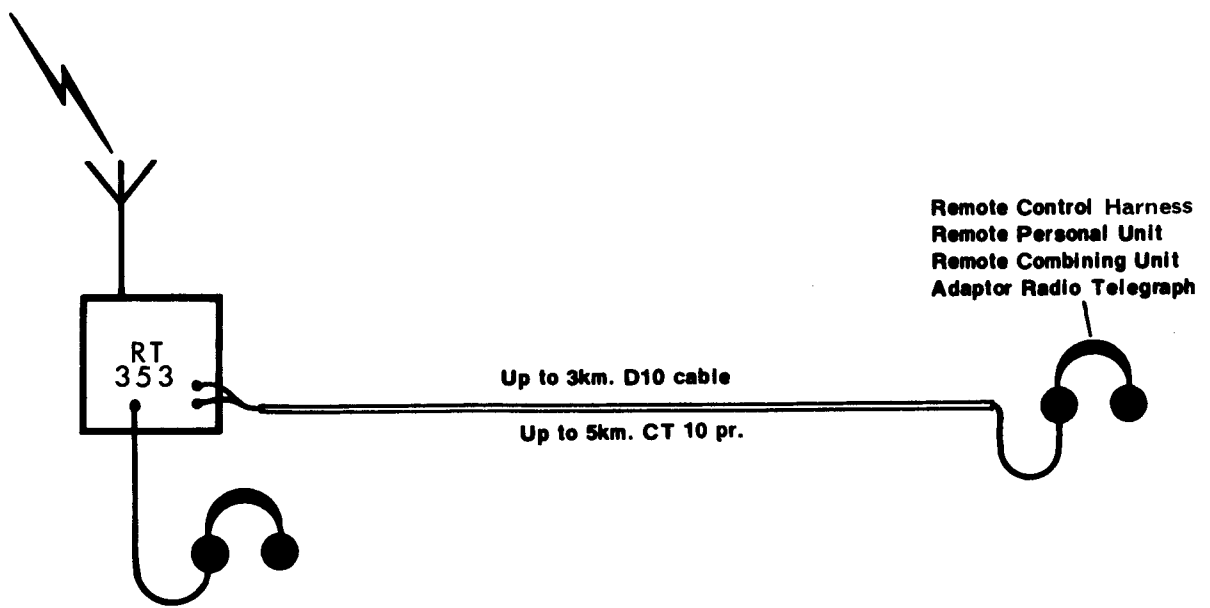


FIG. 7 REMOTE CONTROL



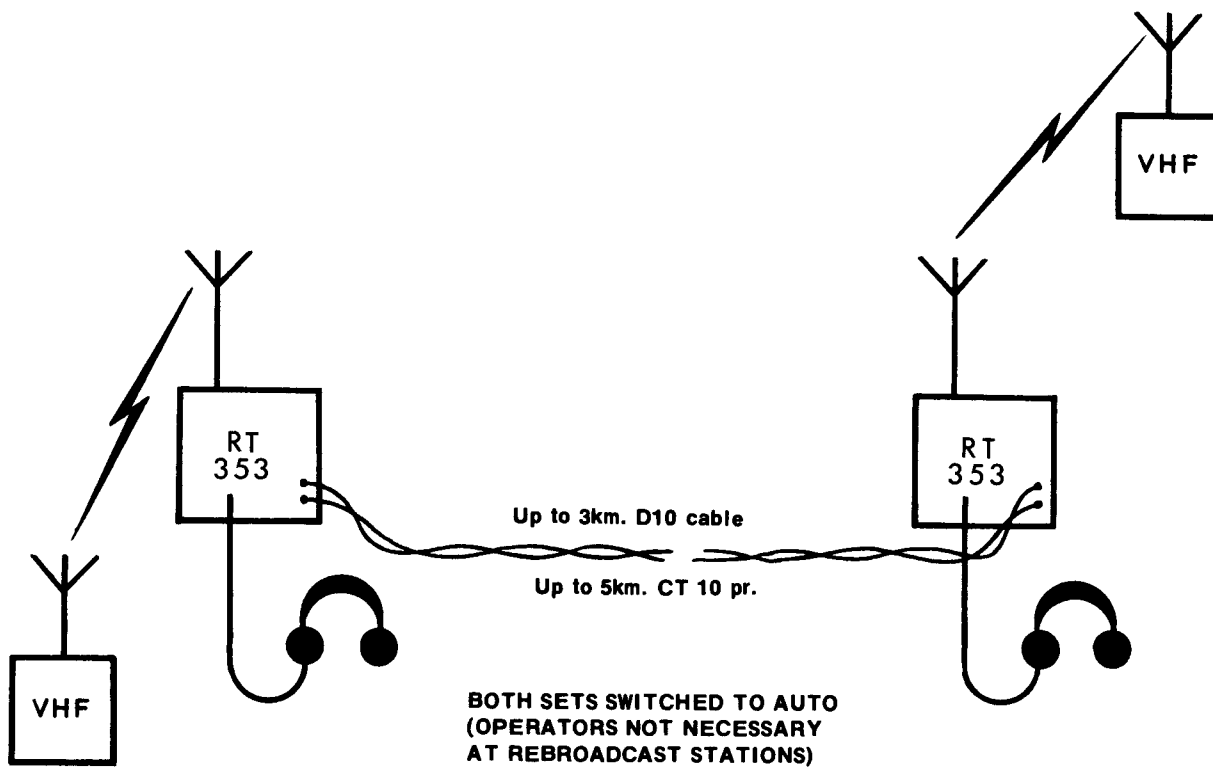


FIG. 8 AUTOMATIC REBROADCAST

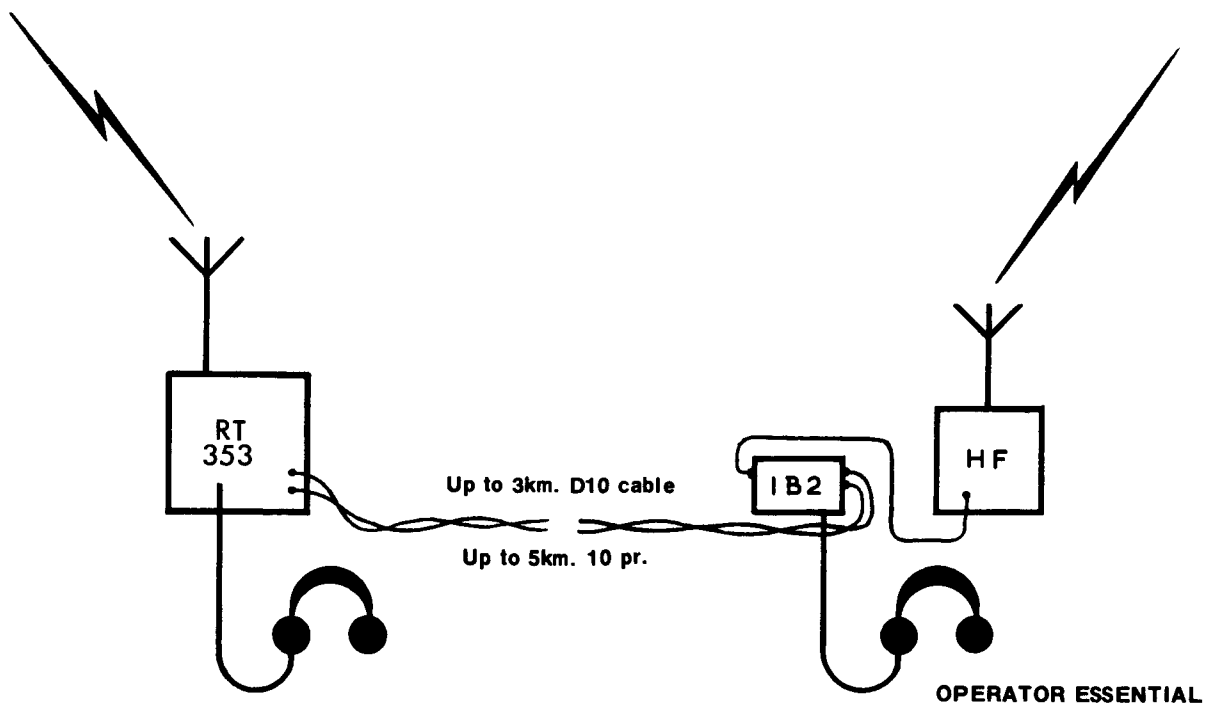


FIG. 9 MANUAL REBROADCAST

## REBROADCAST

### AUTOMATIC REBROADCAST (Fig.8)

2.5.5 Automatic rebroadcast means that when one set receives, it passes the received signals together with the dc switching current along the cable, which automatically switches the remote set to Transmit.

For automatic rebroadcast the cable must be terminated by another RT 353, a PRC-351, or an Interconnecting Box 2-radio (IB2) connected to another VHF radio.

Set the REMOTE switch to the AUTO position.

Automatic rebroadcast with an HF radio is not possible.

### REMOTE REBROADCAST

2.5.6 Connect the cable to the terminals marked REMOTE on the RT 353. The second of the two radios to be connected to the remote cable should be used to check the polarity of the cable. This is done by connecting the audio gear to one of the audio sockets on the set and with the REMOTE switch at REM or AUTO listening for a call tone. If this is heard the polarity of the wires is NOT correct and they should be removed from the terminals and each inserted into the opposite terminal to which it was connected before.

If a local monitor is required connect the audio equipment to the AUDIO sockets on the RT 353.

### MANUAL REBROADCAST (Fig.9)

2.5.7 For manual rebroadcast the cable will normally be terminated by an IB2 connected to an HF radio. An operator will control the IB2 Transmit switch.

Set the REMOTE switch to the REM position.

Manual rebroadcast although possible with a VHF remote radio is not normally desirable, but could be used if the automatic circuitry was not functioning correctly.

TELEGRAPH OPERATION

2. 5. 8 When the RT 353 equipment is required to be used for passing telegraph information, an Adaptor Telegraph Radio (ATR) Unit will be required. Information on the use of this Unit will be found in the user handbook supplied with it.

GROUND STATION OPERATION

2. 6. 1 The equipment can be removed from a vehicle for operation as a ground station, eg for use in a building, or in the open as a re-broadcast station.

REMOVAL FROM A VEHICLE

2. 6. 2 Disconnect all leads from the front panel of the RT 353. Remove the radio from the mounting bars. Remove two signals batteries. Remove the Ground Mounted Monopole antenna and the special battery lead. The Ground Mounted Monopole antenna and the special lead should be stowed in the vehicle whenever the possibility of ground operation is envisaged.

Remove the required audio gear eg Headsets, Handsets.

CONNECTING UP

2. 6. 3 Various antenna systems can be used. Information on the different systems will be found in the User Handbook, 'VHF Antennas for Clansman' Army Code No. 61388.

Place the RT 353 radio in a suitable operating position and carry out the following:

ORDER	OPERATION
1	Set the POWER switch to the OFF position
2	Connect the batteries using the special battery lead to the 28V socket on the front panel
3	Connect the coaxial cable from the Antenna to the ANT/ARFAT socket
4	Connect the audio gear to the AUDIO sockets on the RT 353. (An audio extension lead is available which can be inserted between the audio gear and the audio sockets when required)

## SETTING UP

## 2.6.4

ORDER	OPERATION
1	Set switch to LOCAL except where Remote operation is required
2	Set the TEST switch to RX SIG
3	Set MODE switch to NARROW unless alternative position is required
4	Set up frequency (see page 19 for detailed information)
5	Set POWER switch to minimum RF output level needed
6	Adjust GAIN control to required audio level
7	Wait 40 seconds

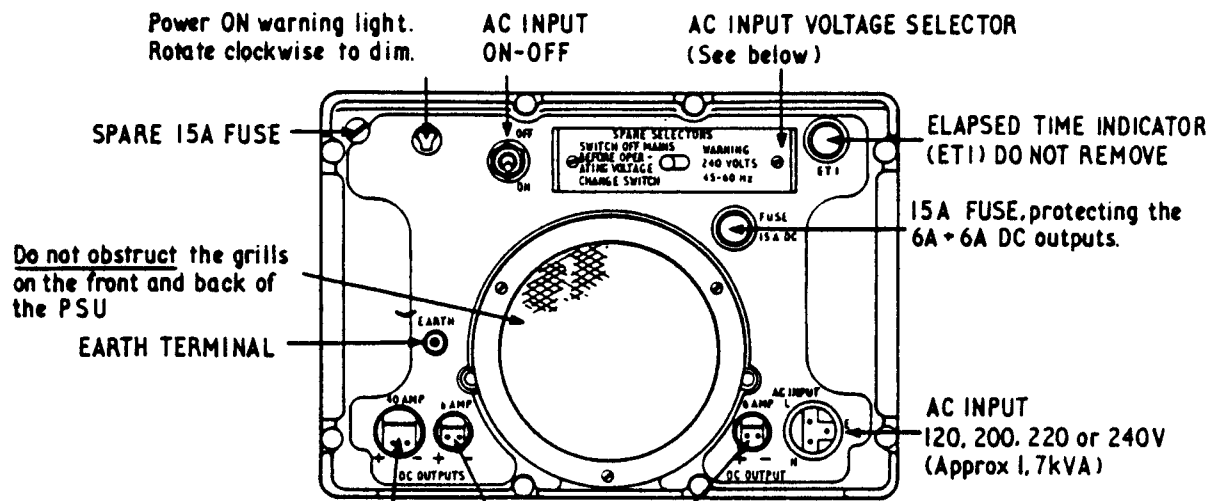
## OPERATION

2.6.5 The set is now ready for operation. Press the pressel switch to transmit; the TX lamp should glow.

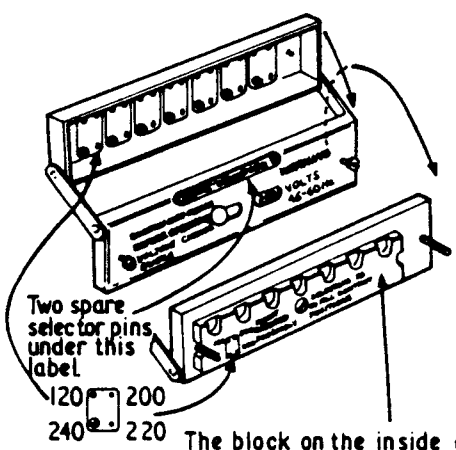
A ground station may be operated from a remote position (2.5.3) or as a rebroadcast station (2.5.5 to 2.5.7) except that manual rebroadcast is not possible without an IB2 which is normally used in the vehicle installation.

ALTERNATIVE POWER SUPPLY

2.7 AC PSU as used with the UK/VRC 322 radio, can be used to power up to two UK/VRC 353's from the mains, eg for use when the radio station is set up in a building.



- To set the input voltage :-
1. Unscrew the two captive screws and drop the front cover.
  2. Turn over the cover. The diagram on the plastic block shows the position of the selector pins for a given input voltage.
  3. Screw the 7 selector pins in the 7 contact plates in the position to give the required input voltage.
  4. Locate plastic block so that new voltage setting is shown in cover window.
  5. Replace cover.



The block on the inside of the cover is free to slide or rotate about its central pin; so that when the cover is screwed back in place, the 7 cutouts in the block will match the heads of the 7 selector pins and allow the cover to screw down. At the same time, the voltage selected will be indicated in the window in the cover. The cover can be properly replaced only when all 7 pins are in the same relative position.

FIG. 10 USE WITH AC PSU

CHAPTER 3

PREVENTIVE MAINTENANCE

GENERAL RESPONSIBILITY

3.1 No equipment can be expected to work properly unless it is kept in first-class condition by regular servicing conscientiously carried out. This is the responsibility of the NCO or man who is in direct charge of the equipment and NOT that of the workshop or repair staff though they may be called upon to carry out certain servicing tasks.

3.2 To guide the NCO or man responsible for servicing (ie preventive maintenance) and to ensure it is carried out regularly, signal equipment is serviced on a task system. The tasks in the case of the VRC 353 are simple and few and are detailed below.

3.3 Instructions regarding the supervision of servicing, frequency of carrying out each task, and recording the completion of tasks will be issued by unit commanders. Army Form B.2661 can be used for recording purposes.

3.4 The RT 353 is a fully sealed radio and it must not be opened except in workshops.

OPERATOR SERVICING

3.5 This maintenance is to be carried out daily and before setting up a radio station.

3.5.1 Ensure that the air flow through the radio is not obstructed. If necessary the air duct may be cleared by removing the radio from the mounting bars, standing the radio face down, and pouring clean water into the rear vents, allowing the dirty water to flow out of the front air intake. (NB Water must not come into contact with terminals on the face of the set).

3.5.2 Carry out a visual check of the radio, AF equipment, Harness, ARFAT and TUAAM including all RF coaxial cables, connectors and battery and earth leads. Ensure that there is:

- a No wear, fraying or damage to cables and connectors.
- b No looseness of cables and connectors.
- c No damaged pin or socket in male and female connectors and terminals.
- d No dirt in any plug or socket.
- e No screw or nut missing from the cases of the equipment or their controls.

## RESTRICTED

3.5.3 Check that the transmit indicator lamp (see 2 of Figure 3, CONTROLS AND CONNECTIONS) is serviceable.

3.5.4 Check that the antenna components are serviceable and correctly assembled and connected.

3.5.5 Ensure that the power supply equipment is properly maintained and, if necessary, check that an adequate supply of POL is available.

### USER CONFIDENCE CHECKS

3.6 The Clansman Condition Test Set enables the user to check the overall battleworthiness of his equipment by means of a simple series of tests. A check of Transmitted power can be carried out using the test set alone. Checks of receiver sensitivity, modulation and demodulation, frequency setting and RF continuity from the radio through the antenna system, can be carried out using the test set in conjunction with another working Clansman radio of similar frequency coverage.

The checks use aural and visual means of indicating the performance of the radio.

The checks can be carried out without removing the radio or the inter-connecting cables from a vehicle installation.

The use of the Condition Test Set is detailed in the user handbook provided with it. Abridged user instructions appear on the lid of the test set.

### ALARM

3.7 If the set detects a fault the frequency window illumination will be made to flash and the audio output will be alternately muted and not muted in time with the light. The particular fault can be determined by use of the TEST switch. (See 2.1.6) Further information on fault location is to be found in Chapter 4.

### MONTHLY TUNING CHECKS

3.8 When the set is placed into store or is not expected to be used for long periods it must be given a monthly functional tuning check at the following frequency settings:

- (1) 32.000MHz
- (2) 48.000MHz
- (3) 70.000MHz

3.8.1 To carry out these checks a condition test set is to be used and operated in accordance with the instructions shown in User Handbook, Army Code 61655.

CHAPTER 4

CORRECTIVE MAINTENANCE AND FUNCTIONAL CHECKS

GENERAL PROCEDURES

4.1 The procedure outlined in this chapter is to be followed when checking set and ancillaries. These checks might be done as part of the preventive maintenance procedure described in Chapter 3 or in the event of set failure. They are designed to enable an operator to quickly prove that the set is functioning correctly or to localise the fault if it is not. The following points are to be observed at all times.

- (1) The user will not open sealed equipment under any circumstances.
- (2) The set will not normally be removed from its parent installation in order to perform maintenance.
- (3) The user will only take remedial action where this is stated to be specifically within his capability.
- (4) The user is not to make adjustments or replace items unless he can make a confirmatory test.



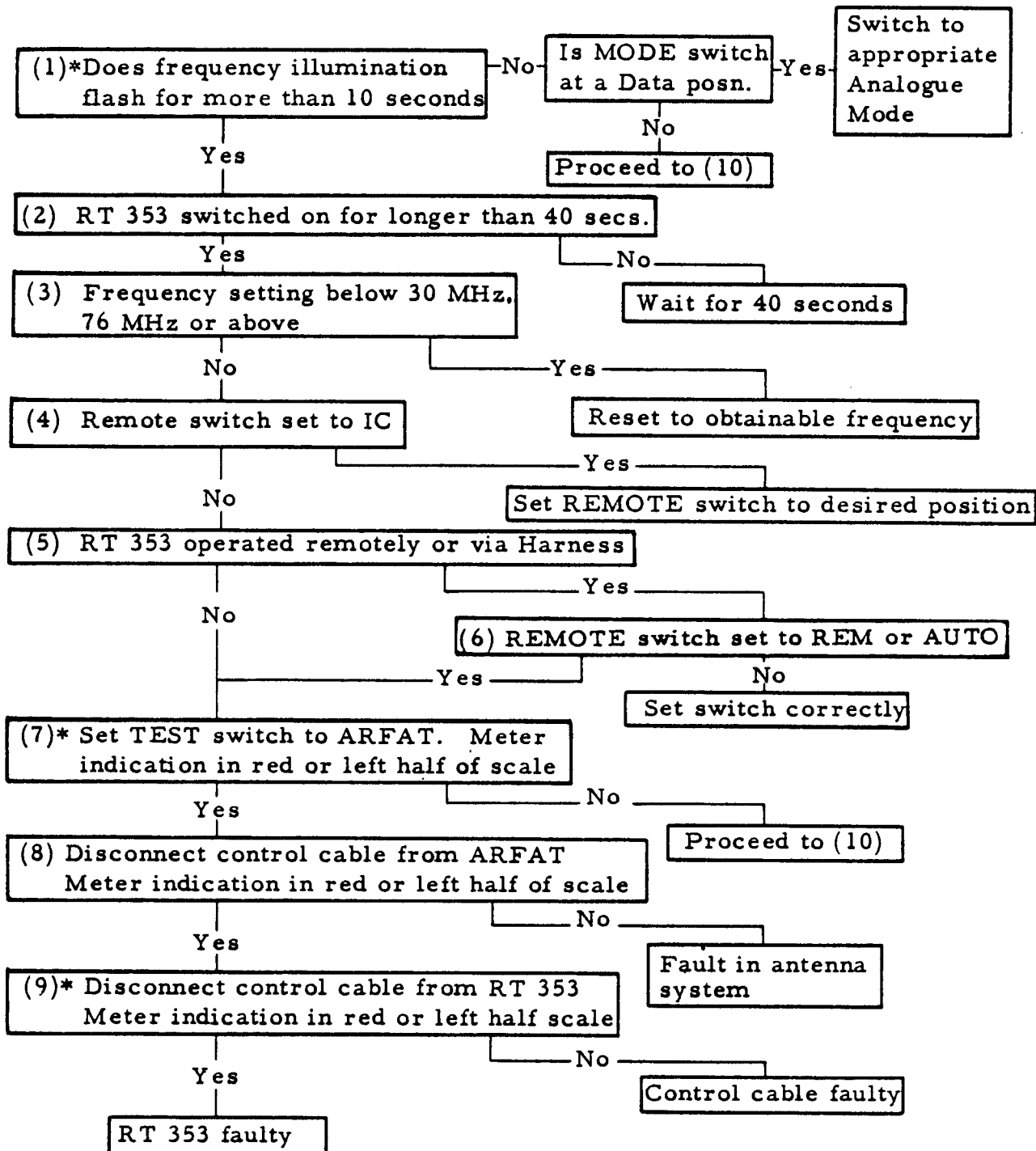
FUNCTIONAL CHECKS

4.2 It is assumed that the RT 353 has been connected up as detailed in the Handbook and that one or other of the following fault symptoms are apparent:

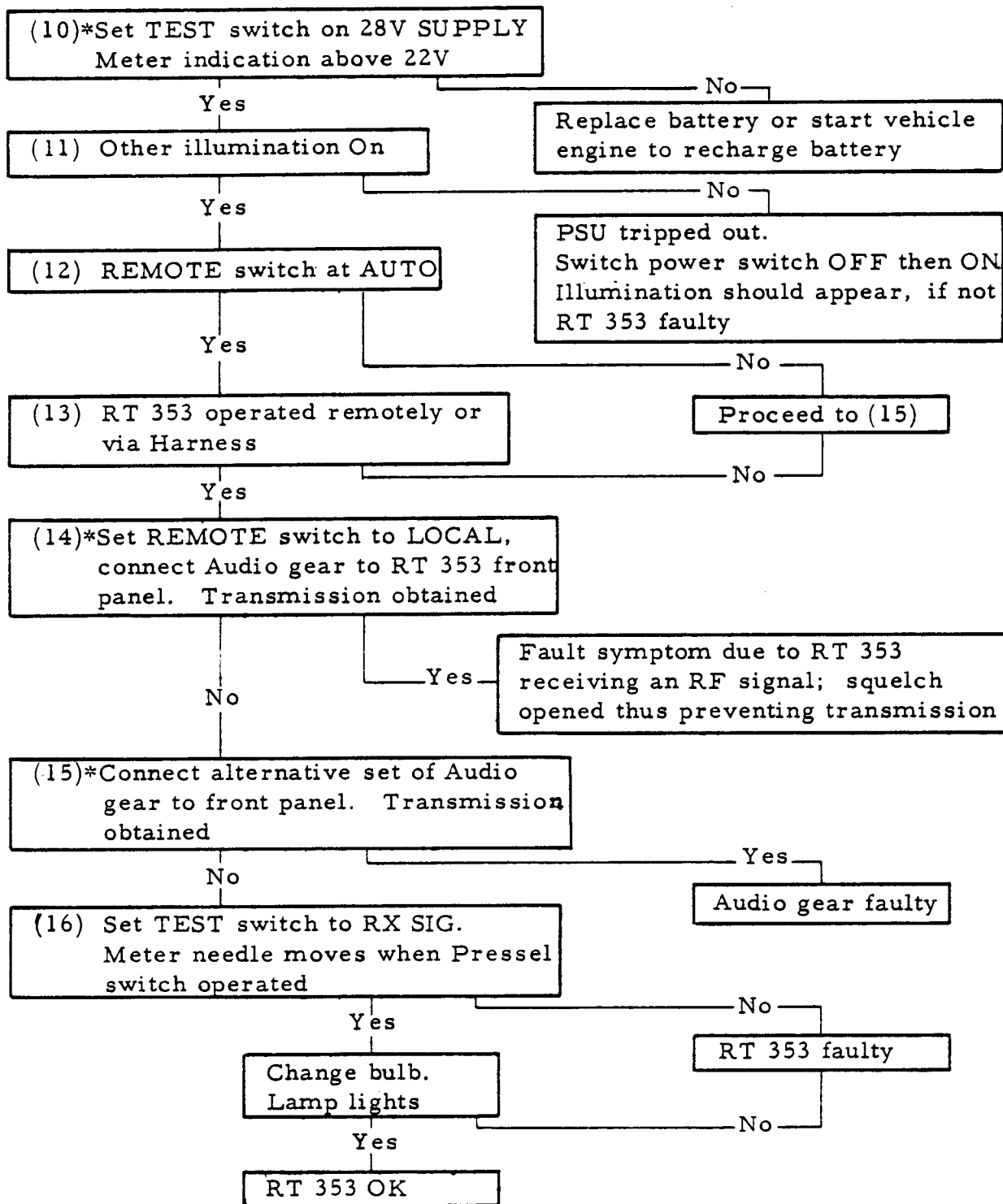
4.3 FAULT 1, No Transmission

Symptom: TX lamp does NOT light when pressel switch is pressed and the TEST switch is set to a position other than LAMPS OFF or OVERRIDE.

Note: Press pressel when asterisk \* shown.

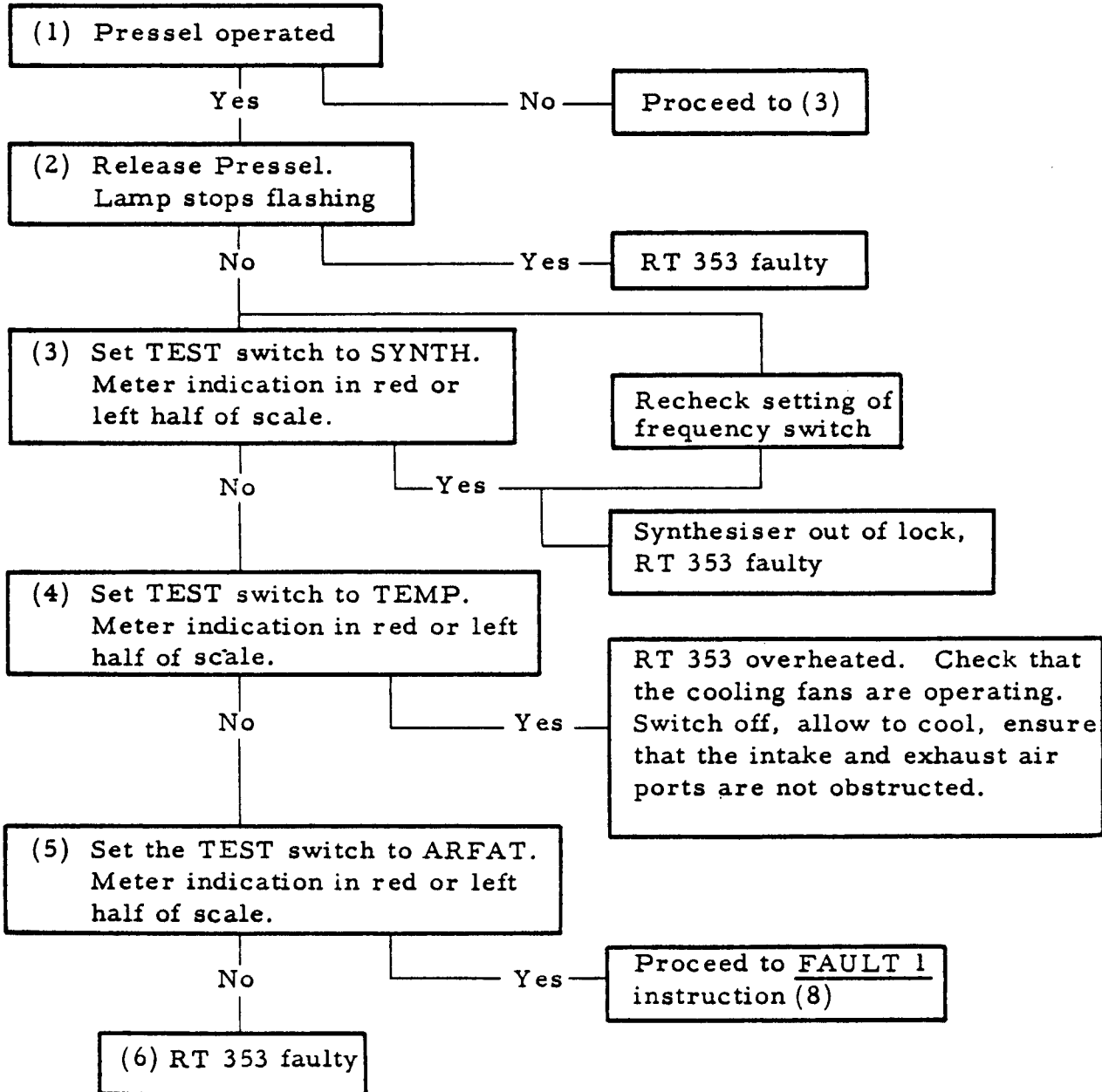


FAULT 1, No Transmission (Contd )



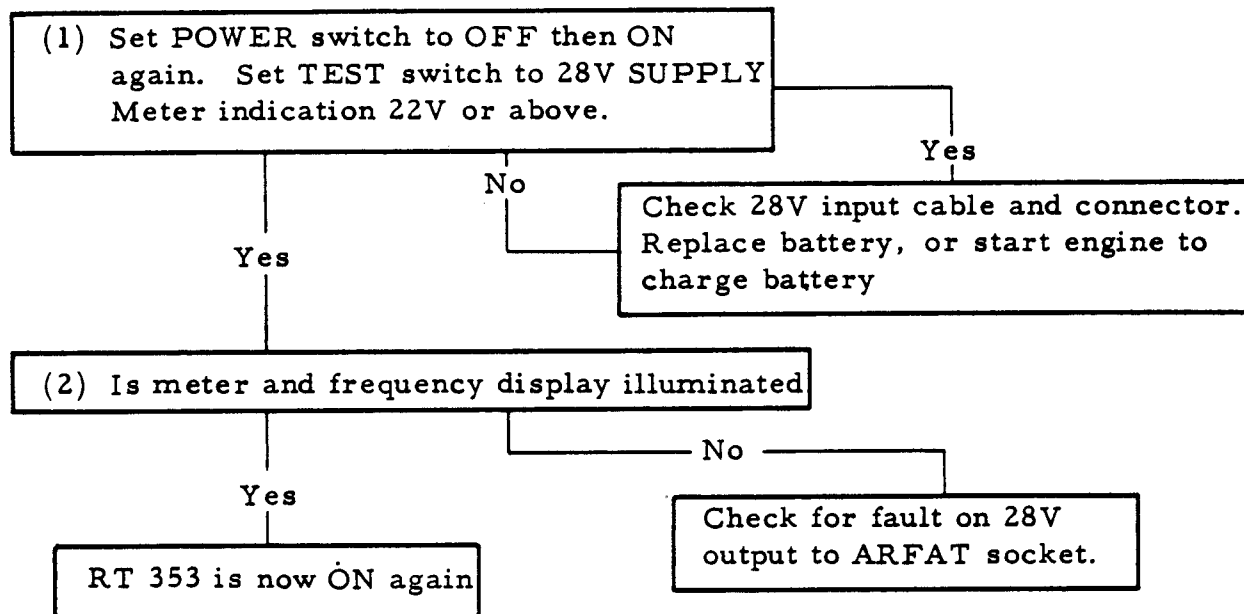
4.4 FAULT 2

Symptom: Frequency display illumination flashes for more than 10 seconds



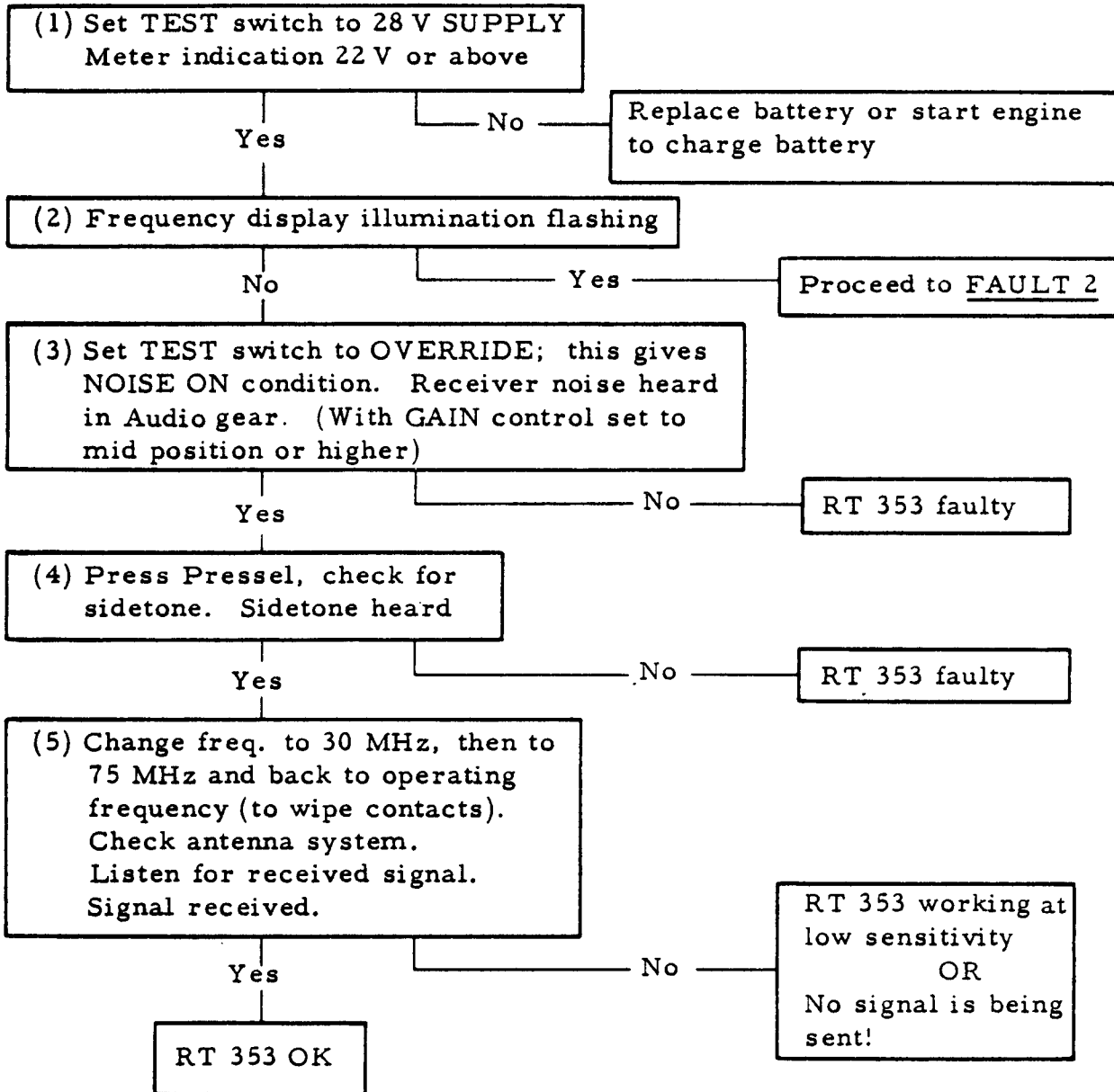
4.5 FAULT 3

Symptom: Radio will not switch ON, or repeatedly 'trips out'



4.6 FAULT 4

Symptom: No Signal received



# IDEAS SUGGESTIONS DEFECTS

**YOU are the user of this equipment – can it be improved?**

If you have any good suggestions about this or ANY Signals equipment, the Ministry of Defence Army Department are interested.

## **Ideas and Suggestions**

If you can suggest:

- (a) an improvement in design or shape,
- (b) a better method of installation, operating or servicing,
- (c) other equipments which might do the job better,

the procedure is quite simple – pass it to your OC or Adjutant for transmission to the local Chief Signal Officer.

It will remain YOUR idea.

See the Signal Equipment Performance Report (AF B63), details for completion of which are found on the cover of the pad.

## **Defects**

If there is something wrong with the equipment AS IT STANDS, other than a fair wear and tear fault, it is a defect

Again, don't keep it to yourself, pass it to your OC. The procedure for him to follow is given in EMER Management N200. (AFG3660 is the form to use).

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