

BECKER

AVIONICS, INC.

VHF Ground Station TG480-(025)-(XX)

Installation and Operation

Manual TG480-(025)-(XX)
Issue 1 April 2007

FIRST ISSUE AND CHANGES

Issue . . . 1 April 2007

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Section 1 GENERAL INFORMATION

1.1 Introduction

This manual TG480XX.01 describes the VHF ground station TG480-(025)-(XX).

The manual TG480XX.01 "Installation and Operation" contains the following sections :

Section		DV 480XX.01
1	General Information	X
2	Installation	X
3	Operation	X

1.2 Purpose of equipment

The VHF ground station TG480-(025)-(XX) is a fixed ground station for speech communications in the VHF frequency range of 118.000 MHz to 136.975 MHz.

The ground station is designed for airport and airfield use and can be used as a main transceiver on landing fields and as a standby unit on airports and for special tasks within the scope of air traffic control.

1.3 General description

The VHF ground station is designed for mounting in 19-inch rack systems or in an ATC desk.

The VHF ground station is designed to operate on a AC supply voltage of 115 V or 230 V \pm 10% /50-60 Hz. In DC operation, the VHF ground station is designed to operate on a voltage of 13.75 V [TG480 - (10) or 24V, TG480 - (20), TG480 -(50)].

The control circuit switches over to external DC voltage if the AC voltage supply fails. If an internal battery is fitted to provide an emergency power supply, it will still be possible to maintain T/R communication for several hours if the AC and external DC supplies fail. The necessary charging circuit for the battery is located inside the TG480 - ().

GENERAL DESCRIPTION

1.3.1 General description of CORE Module

- A. The VHF transceiver has been developed as a single block unit. The dimensions correspond to the standard instrument diameter of 58 mm. All controls and indicators are located on the front panel. The rear of the unit holds the equipment connector and the antenna socket.

- B. After it is switched on, the unit performs a self test. All segments of the display flash during the self test. If faults are detected, the LCD (liquid crystal display) displays a fault code for approximately five seconds. The VHF transceiver then automatically activates the mode set before it was switched off.

- C. The VHF transceiver is fitted with a single superheterodyne receiver. A squelch (muting) circuit suppresses transmitters or disturbances below a certain field strength. The switching threshold can be set. The squelch function can also be switched off.

- D. The transmitter is designed to be wideband over the 118.000 MHz to 136.975 MHz range. The transmitter output power is ≥ 5 Watt. The sidetone is automatically switched to the headphone output during transmission.

- E. The oscillator frequency of the receiver and the the transmitting frequency of the transmitter are generated by a VCO (voltage controlled oscillator). This is monitored by a digital frequency evaluation circuit. This digital frequency processing operates in conjunction with a microprocessor.

- F. The microphone inputs are designed for both dynamic and standard microphones. The inputs are connected to a dynamic volume compressor which keeps the modulation voltage constant over a wide input voltage range.

- G. The frequency indication is by means of a liquid crystal display (LCD). The required operating frequency is set using the MHz and kHz frequency selector switches. The MHz rotary switch engages at 1 MHz steps and the kHz rotary switch at 25 kHz steps. The VHF transceiver also contains a memory device for storing 99 different frequencies which remain stored even with the unit switched off without an auxiliary battery.

- H. The VHF transceiver also contains a monitoring stage for the supply voltage which is activated when the VHF transceiver is switched on. If the supply voltage drops below 10.5 V, the segments of the LCD begin to flash.
- I. In the mode 3, the supply voltage and temperature is displayed in the bottom line of the LCD.
- J. The AF auxiliary input enables AF signal switching of auxiliary units in the aircraft. The switched AF signals can, however, only be monitored in the reception mode.
- K. If illumination of the LCD is required, this can be connected either directly to the supply voltage or via a dimmer.
- L. The scan function can be switched on in the service mode and called up in mode 2. The active frequency is shown in the top line of the display and the bottom line shows the associated storage channel with the preset CS. In the scanning mode the stored frequencies in the storage channels are scanned in succession at 200 ms intervals. When an evaluatable reception signal is found, the VHF transceiver remains on this frequency until an evaluatable reception frequency is no longer present. It then begins to scan all the stored frequencies again in 200 ms intervals. In the service mode, the hold time between the end of an evaluatable signal and the continuation of the scanning of the next channels can be set to between 0 and 60 seconds.

M. Special functions

VHF transceiver contains some special functions which can be set in the service mode.

- | Adjustment of volume IC, sidetone, AF auxiliary and the sensitivity of dynamic microphone.
- | The switch-on threshold of the squelch can be set in the service mode.
- | The frequency setting can be inhibited. The VHF transceiver then operates onIH.The VHF transceiver also contains a monitoring stage for the supply voltage.
- | The storage of frequencies in the storage channels can be inhibited.
- | Stored frequencies can be erased.
- | Access to the service mode can be interlocked with a 4-digit password.
- | The scan function can be switched on.

1.4 Technical data

1.4.1 Technical data general, power supply

AC-Operating voltage 115 V or 230 V \pm 10% 50/60 Hz

DC-Operating voltage
 TG480 - (10) 12 V . . . 16 V TG480

TG480 - (20), TG480 - (50) 24 V +20% -10% Current

consumption at 115 V AC
 max. Rx = 65 mA
 max. Tx = 300 mA
 max. Rx = 250 mA
 max. Tx = 1,5 A
 max. Rx = 250 mA
 max. Tx = 1,8 A

TG480 - (10)

TG480 - (20)

Current consumption at 230 V AC

TG480 - (10) max. Rx = 170 mA

max. Tx = 0,9 A

TG480 - (20) max. Rx = 170 mA

max. Tx = 1.1A

TG480 - (50) max. Rx = 170 mA

max. Tx = 3A

Current consumption at 13,75 V DC

TG480 -(10) max. Rx = 200 mA

max. Tx = 1800 mA

Current consumption at 24 V DC

TG480 - (20) max. Rx = 200 mA

max. Tx = 4,5 A

TG480 - (50) max. Rx = 200 mA

max. Tx = 9,0 A

Battery int./U = 12.0 V (optional) max. Rx = 240 mA

max. Tx = 1800 mA

Fuse

PS 24V 15A

DC 24V 15A

DC-DC 15V 5A

AC 120V 10A

AC 120V Spare 10A

Protection against wrong polarity at DC external voltage

Frequency range	118.000 MHz - 136.975 MHz
Frequency tolerance	≤ 15 ppm
Channel spacing	25 kHz
Number of channels	760
Number of channel memories	99
Antenna impedance	50 Ω

1.4.2 Technical data environmental

Operating temperature range	- 15° C . . . + 50° C
Storage temperature range	- 40° C . . . + 70° C
Humidity (operating)	≤ 95% / 40° C without condensation
Humidity (storage)	≤ 95% / 40° C
Operating altitude	
Operating	- 200 . . . 3500 m
Transport	- 200 . . . 10000 m

1.4.3 Technical data receiver

Sensitivity	
m = 60 % / 1 kHz	≤ 5 μV (EMF) $\frac{S+N}{N} \geq 10$ dB
Selectivity	
± 17 kHz	≥ 40 dB
± 25 kHz	≥ 60 dB
Intermodulation	≥ 65 dB
IF frequency	21.4 MHz
IF bandwidth	≥ ± 8 kHz
Squelch	adjustable (dependant on carrier)
AF output power asym. (Speaker)	≥ 2 W 4 Ω (adjustable)
AF output power sym. (Headphone)	≥ 0.1 W 600 Ω (adjustable)
Distortion	≤ 10 %
Spurious emission	- 57 dBm (2 nW)

1.4.4 Technical data transmitter

Transmitter power output VSWR 1:1	
TG480 - (10)	≥ 10W
TG480 - (20)	≥ 20W
TG480 - (50)	≥ 50W
Tolerable VSWR	2 : 1
Modulation type	A3E
Modulation factor	≥ 80% and ≤ 100%
Distortion	≤ 10 % ≤ 15% TG480 - (50)
Duty cycle	1 minutes transmit- and 4 minutes receive mode
Carrier noise level	≥ 35 dB
Spurious emissions	≤ 54 dBm (4 nW)
Dynamic Mic.	≤ 2mV symm . (dynamic compressor)

1.4.5 Technical data mechanical

Dimensions	
Case	448 x 350 x 89 mm
19 Zoll unit	483 x 350 x 89 mm
Antenna connector	N-female
Weight (without options)	8.5 kg

1.4.6 Technical data battery operation (option 101)

Nominal voltage	12 V DC
Capacity of internal battery	
transmit/receive ratio of 1 : 4	typ. 3 hrs.
transmit/receive ratio of 1 : 9	typ. 5 hrs.
standby mode	typ. 8 hrs.
Number of internal batteries	1
Battery type	Lead battery 2,2 Ah

1.4.7 Option 2-wire remote control (option 102)

Max. length of wire	≤ 10 km
Impedance	600 Ω

1.4.8 Option multi-wire remote control

Max. length of wire	≤ 100m
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1.4.9 Option recorder control OP 104

Audio output recorder	100 mV at 47kΩ (adjustable)
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1.4.10 Scope of delivery

VHF ground station TG480 - (10) or VHF ground station TG480 - (20) or VHF ground station TG480 - (50)	Stock no.: 940.437-926 Stock no.: 940.436-926 Stock no.: 940.435-926
Fuse 3.15 AT	Stock no.: 788.074-392
Fuse 4 AT	Stock no.: 769.304-392
Fuse 10 AT	Stock no.: 912.109-392
Cable connector (DC connection)	Stock no.: 724.890-277
Mains cord (AC connection)	Stock no.: 295.728-277

1.5 Accessories

Antenna connector (N-male)	Stock no.: 716.502-277
Hand dyn. microphone with cable with 5-pole DIN connector 1PM012	Stock no.: 344.214-951
Shure 514B dyn. mike	Stock no.: 901.402-350
Lighting protection, IS-50NXCO	Stock no.: 962.704-283
Antenna 1A049	Stock no.: 812.064-952
Notch-Filter	Stock no.: 889.407-918
DTR 40-FD Remote Control (CPI)	Stock no.: 919.442-951
DTP1-C, DC term. panel (CPI)	Stock no.: 919.443-951

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Section 2 INSTALLATION

2.1 Installation in a Tower ATC desk

2.1.1 General

The VHF ground station can be incorporated in a tower air traffic control desk depending on the type of the latter. The following instructions thus apply only in a general way.

Caution

Installation and cabling of the VHF ground station shall only be done by skilled avionics personnel.

Removal of the covers of the VHF ground station and repairs of this equipment shall only be done by skilled avionics personnel.

2.1.2 Pre-installation check

Inspect the unit prior to installing the VHF ground station in an ATC desk, to establish whether it has suffered damage during transportation.

2.1.3 Visual inspection

Before commencing operation visually examine the unit paying particular attention to the following defects:

1. Dirt, dents, scratches, corrosion or broken attaching parts, damaged paintwork on housing, parts of the housing and panel.
2. Dirt or scratches on the identification plate, front panel, LCD or inscriptions.
3. Dirt, bent or broken pins, displaced inserts of plugs and sockets.
4. Dirt and mechanical damage to pushbuttons and operating knobs.

2.1.4 Setting up the VHF ground station

The VHF ground station can be set up either flat or in a slant plane (using the collapsible legs) on a table.

After setting up the equipment shall be connected to a potential equalization bar via an earthing lead having cross-section of 10 square millimeters. The earthing connection is located on the rear panel of the equipment.



Before connecting the antenna to the equipment statically discharge the antenna and the antenna feeder line by connecting both the connector housing and the inner conductor of the antenna line to the earthing connection on the rear panel of the equipment.



Connect the microphone to the microphone jack.

If the equipment has option 101 incorporated, the attached fuse has to be installed in the battery fuse holder (Refer to Installation of fuse for battery).

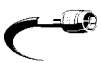


Connect the cable plug "DC extern" to the jack "DC extern" on the rear panel of the VHF ground station. Connect the other end of the DC supply voltage.

CAUTION

Do not confuse the polarity!

An adequately dimensioned cable of 1,5 mm² and higher shall be used for this purpose



Connect the supplied power cord first to the VHF ground station and then to AC power outlet.

NOTE

There is no ON/OFF switch provided on the VHF ground station. If an external supply voltage, either AC or DC is applied, the VHF ground station is in the stand by mode. By means of the ON/STANDBY switch on the front panel the equipment can be switched ON or in the stand by mode. If a battery is installed in the VHF ground station and the AC- and DC-external supply voltages are switching off and by mistake the ON/STANDBY switch in the ON position, the equipment is running on the internal battery.

2.1.5 Installation of fuse for battery (option 101)

To prevent unintended switching ON of the VHF ground station during transport and thus discharging the battery the fuse will be removed before shipping. Please insert the enclosed 12 amperes fuse into the fuse holder no. 2 on the back panel of the VHF ground station.

2.1.6 Mechanical Installation of the VHF ground station in an ATC desk

The 19-inch table model may be installed in an Air traffic control desk at any time. By means of a 4 mm Allen-type wrench remove the four screws (1) and the handles (4). Refer to Figure 2-1. Remove the two adaptors "FRONT" (3) and replace them by the 19-inch adaptors (5). The 19-inch adaptors are supplied with each unit.



Fig. 2-1 Mechanical Installation on 19-inch adaptors

2.1.7 Hints for installation of the VHF ground station in an ATC desk

Refer to 2.1.4.

2.1.8 Connection of external PTT switch or PTT foot switch

The PTT key can be connected either to the microphone jack on the front panel or to DB connector on the rear panel.

Microphone jack	See fig. Jack J4	
PTT DB connector	Pin 4	PTT
	Pin 5	GND

2.1.9 Installation of antenna system

For safety reasons the antenna system should be installed only by specialist personnel or a specialist firm. The correct installation and grounding of the antenna system is an essential precondition for trouble free functioning of the VHF ground station.

2.1.10 Lightning protection

To protect the VHF ground station from lightning strike or static discharge at the antenna, a lightning protection element is to be fitted in the supply cable. The housing of the lightning protection element is to be connected at the grounding terminals via an adequately sized cable to the potential equalisation rail of the building or other ground.

Lightning protection element with N standard terminal and replaceable gas discharge cartridge.

Order No. 887.870-277

Replacement cartridge up to 40 W transmitter power

Order No. 887.889-277

2.1.11 Grounding the VHF ground station

The grounding terminal (M5 screw with nut) which is clearly marked with the grounding symbol is located on the back. The VHF ground station is to be connected via this terminal to the potential equalisation rail of the building or system to provide a low ohmic and low inductive connection. An adequately dimensioned cable of 10mm² coloured green/yellow shall be used for this purpose.

Note:

The relevant safety precautions shall be observed.

2.1.12 Over Voltage Protection

There is an over-voltage protection function built-in. After over-voltage protection activates, a minimum time lapse of 1 min. from the moment of switching off the input is required before any input can turn on the supply again. Over-voltage protection setting is fixed at 115% - 135% nominal.

2.1.13 Tuning Instructions for the co-location filter

Item Description:

The co-location filter is a two section tunable BPF. Helical resonators and variable capacitors make up the resonant sections which have a tuning range from 116-150 MHz.

Tuning Instructions:

The co-location filter is normally shipped tuned to a center frequency of 116 MHz, if the channel is not specified. When units are to be tuned outside the factory, it is advisable to use a network or scalar analyzer set to the appropriate frequency range and span as required.

There are 2 adjustments that control the resonant frequency of the filter. They are identified on the envelope drawing as "C1" and "C2," which are capacitors. The only tool required is a small slotted screwdriver. There is a protective cap over the capacitor with an access hole for a screwdriver.

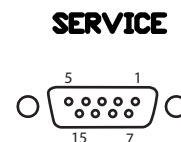
Using the screwdriver, rotating the capacitor in a clockwise direction increases the capacitance of that particular section, lowering the frequency of operation. Conversely, rotating the capacitor in a counterclockwise direction decreases the capacitance of that particular section, increasing the frequency of operation.

When tuning the filter to a specific center frequency, it is convenient to set the analyzer to the desired center frequency with a 5 or 10 mhz span. Depending on where the filter is presently tuned, adjust C1 accordingly until a peak in the response is noted on the analyzer at the desired center frequency. Adjust C2 in a similar fashion until the bandpass response is centered and the return loss null is about 18 dB. No other adjustments are required.

2.2 Pin connection front/rear plate

2.2.0 Service connector wiring

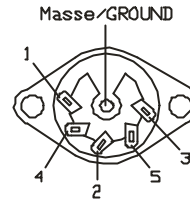
Pin	Description
1	Vcc
2	TXD
3	RXD
4	SQL (COR)
5	GND
6	RF Tx
7	ALARM
8	V-FOR
9	V-REF



Note: TG480 Series RS 232 Adapter must be used if Service port is to be used with a computer.

2.2.1 Pin connection mike connector J 25 (MIC)

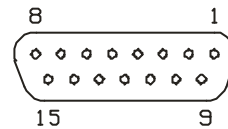
Pin	Description
1	GND
2	MIKE HI
3	HEADPHONE
4	MIKE LO
5	PTT



2.3 Pin connection rear side

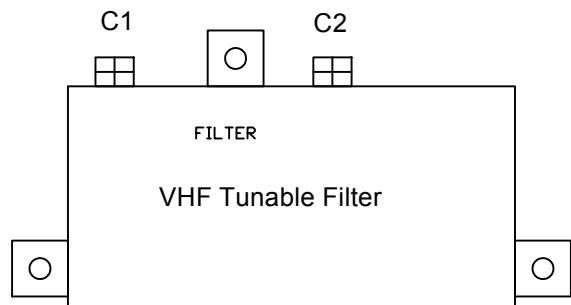
2.3.1 Pin connection remote control J 19 (REM/REC/RS232)

Pin	Description
1	+ 15 VDC - Switched
2	Tx Data
3	Rx Data
4	PTT
5	GND
6	Rx Audio
7	Tx Audio
8	SQL -COR - Active Low
9	REC AF
10	AF GND
11	STD Mic
12	AF-HI
13	AF-LO
14	AF-ASYM
15	DC GND



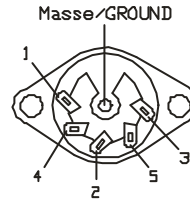
2.3.2 VHF tunable Filter (Optional)

	Description
C1	VHF tunable filter adjustment
C2	VHF tunable filter adjustment



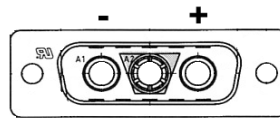
2.3.3 Pin connection recorder connector J 23 (RECORDER)

Pin	Description
1	Audio Tape
2	GND
3	PTT 2
4	PTT 1
5	PTT 3



2.3.4 DC EXT. INPUT connector wiring

Pin	Description
1	- Negative
2	NC
3	+ Positive

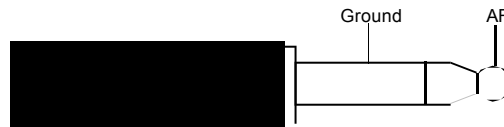


Plug for MICRO jack (J3) (∅ 6.35 mm):

JK34 - ELNO (150 00163) Plug PL55-300 (150 00146)

The listening is via a 600 ohms headset and it is not required to keep the earphones on during test.

The output level can be set with the volume potentiometer.

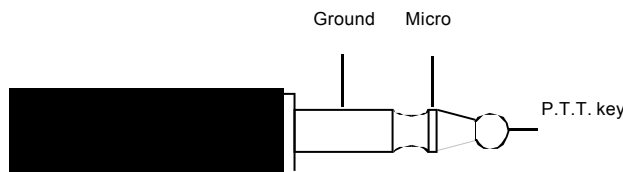


PLUG FOR HEADSET JACK

Plug for MICRO jack (J4) (∅ 5.25 mm):

JK33 - ELNO (150 00164) Plug PL68-301 (150 00145)

It allows the transmitter to be used from the front panel. When the operator presses the mike transmission push-button he can control the whole unit irrespective of the signal status in the remote control plug with the exception of the transmission inhibition.



PLUG FOR MICRO JACK

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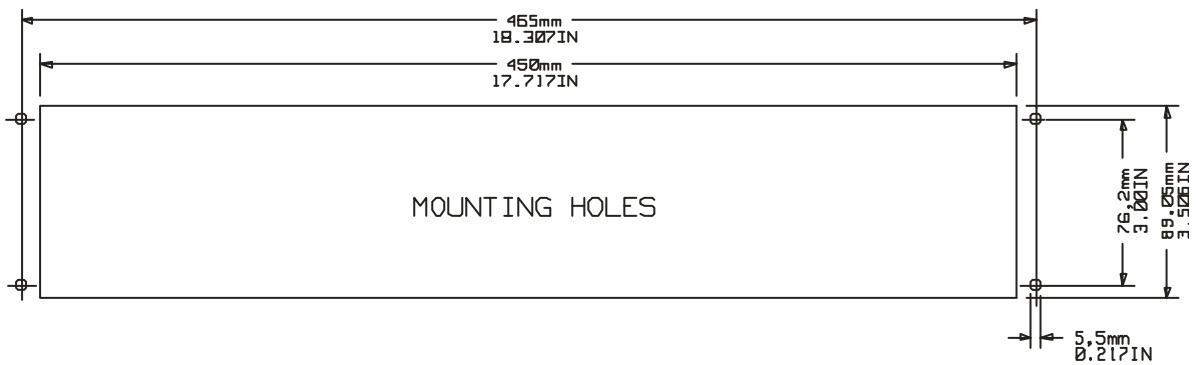
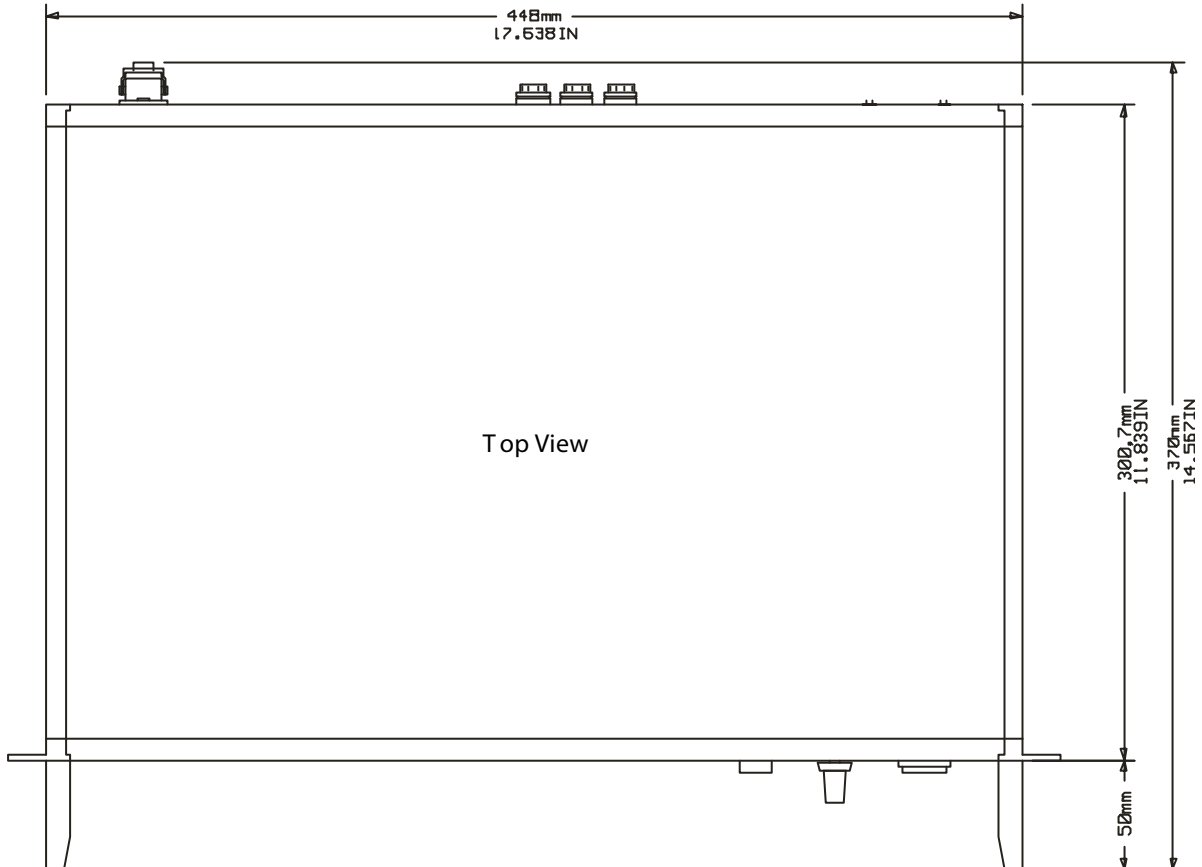
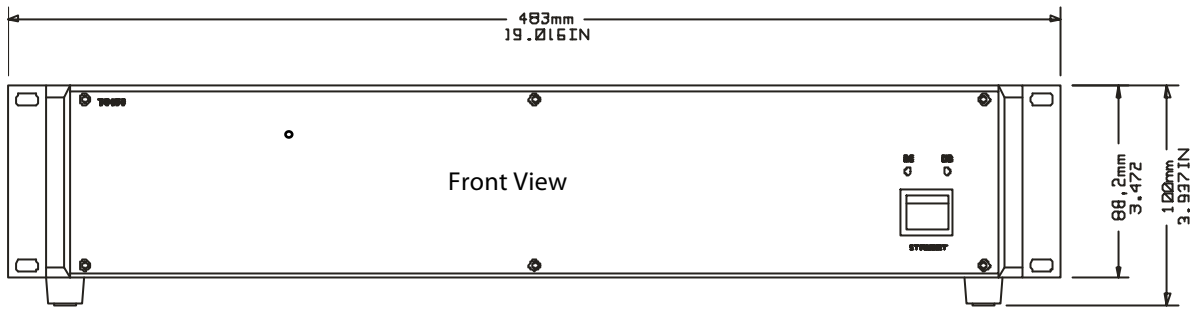
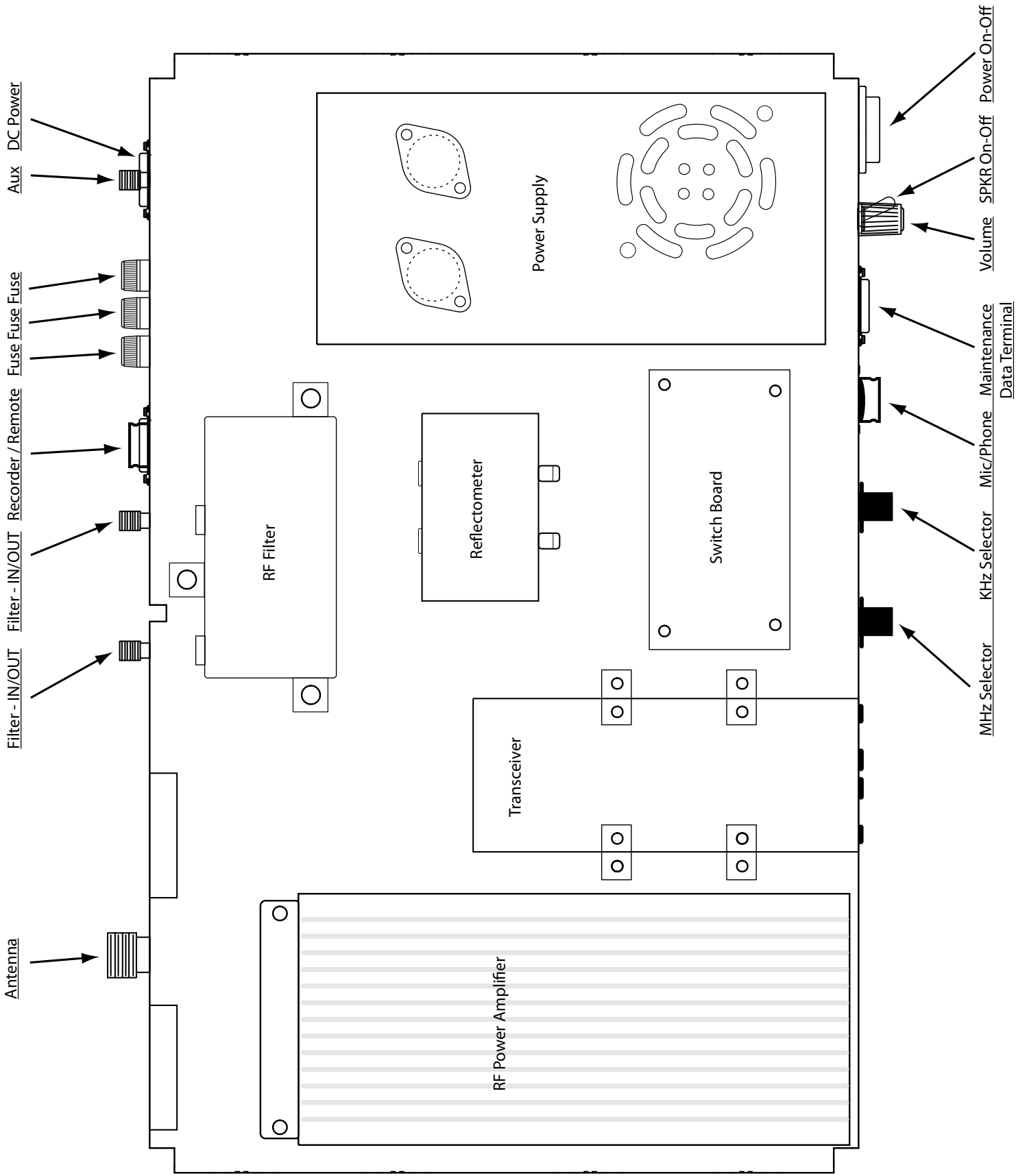


Fig. 2-5 Di men sions TG480 -()

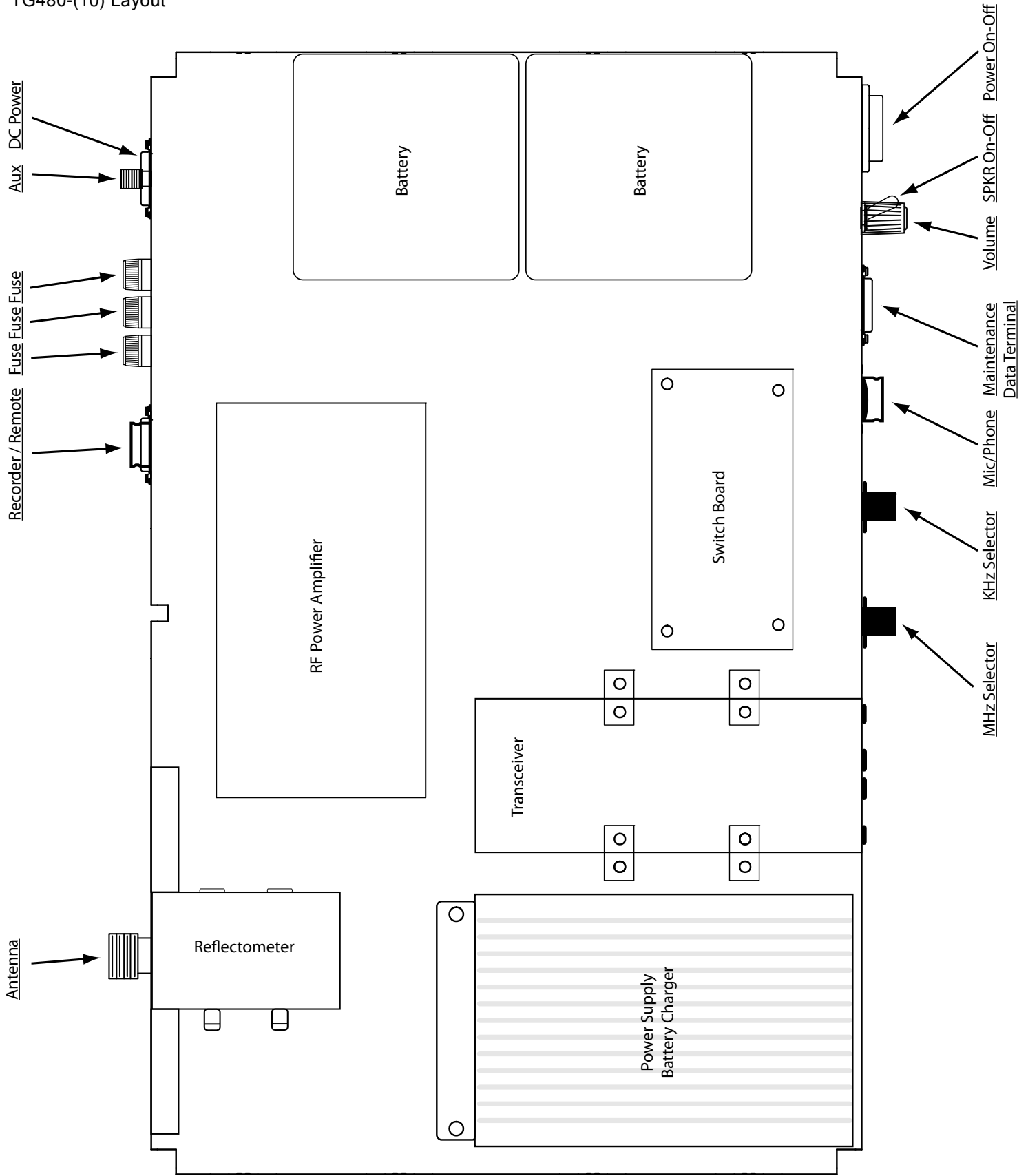
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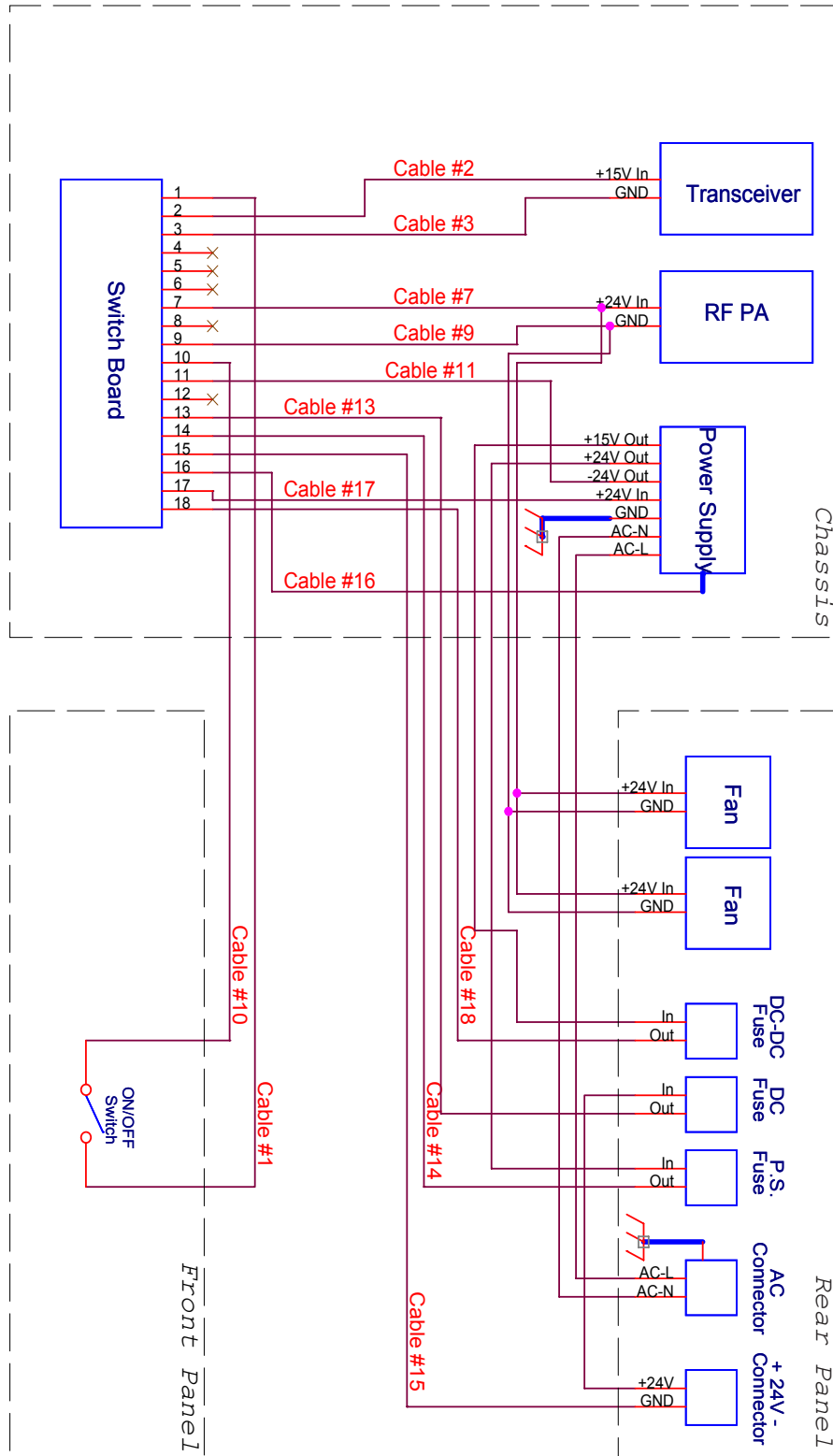
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TG480 - (XX)

TG480-(10) Layout

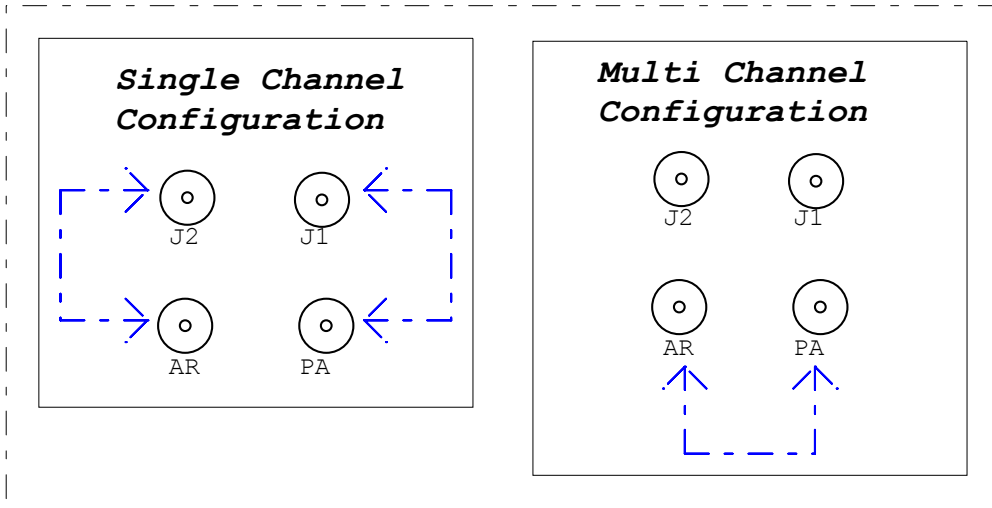


TG480 AC/DC Cabling



Legend:
 DC - Direct Current
 AC - Alternating Current
 PS - Power Supply
 PA - RF Power Amplifier Input

Configuring RF Jumper:



RF Cabling:

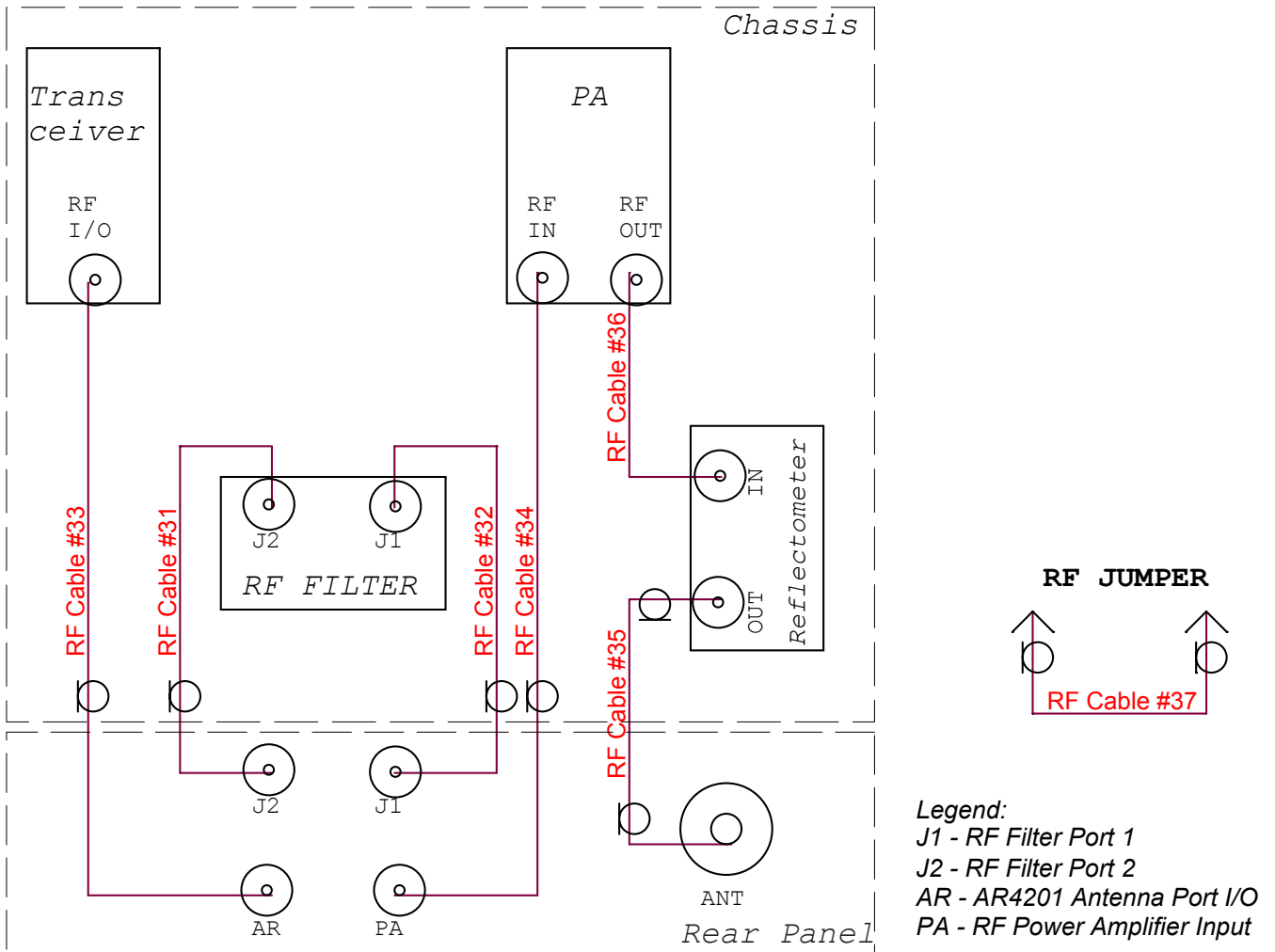


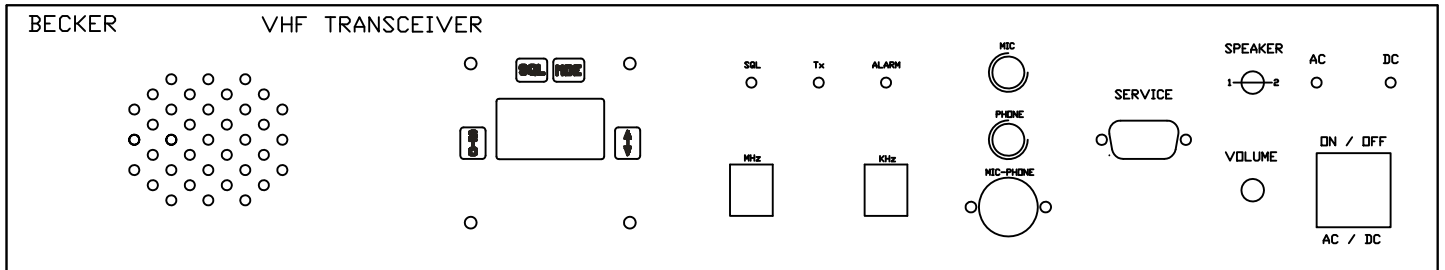
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3.1 Controls and Indicators

OPERATION

1. Controls and indicators



2. Meaning of symbols on controls and indicators

A. Controls



Function key

Selection of mode



Exchange key

Mode 1:
Exchange of preset frequency and active frequency.

Mode 3:
Switching between temperature and operating voltage indication.



Store key

Storage of set frequency or in Mode 2 a change between the channel selection mode and scan mode.



Squelch key

Switching the squelch on or off. When the key is pressed, the bottom line indicated ON or OFF



Frequency selector












Switching the indicated frequency in 1 MHz. (lever switch) steps or the storage channel upwards or downwards in steps of 10.















Frequency selector

Switches the indicated (lever switch) frequency in 25 kHz steps or the storage channel by 1 step in each case upwards or downwards, without carry over.





B. LCD (liquid crystal display) elements

	(top line)	Indication of active transmission/ reception frequency (active fre- quency).
	(top line)	Transmission indication (transmis- sion button is pressed).
	(bottom line)	Indication of preset transmission/ reception frequency (preset fre- quency).
	(bottom line)	CH indication steady : indicates the storage channel.
	(bottom line)	CH indication flashes : if the initiated storage operation is not completed by pressing the store key.
	(bottom line)	Indication that the selected stora- ge channel is not occupied.
F	(bottom line)	Indication of temperature in °Celsius or °Fahrenheit
		Indication of supply voltage.
		
V 11.7		Indicating segment flashes. Supply voltage ≤ 10.5 V
	(bottom line)	Indication of scan function
	(bottom line)	Indication ON
	(bottom line)	Indication OFF
		

3.2 Meaning of symbols on controls and indicators

	ON/standby switch	Switching the ground station ON/OFF
Speaker		
	Speaker switch	Switching the speaker ON/OFF
	Volume control	Adjustment of volume
	Alarm LED	Load mismatch > 2:1, Low power operation (red)
	Tx	Comes on during transmission (red)
	SQL	Comes on when there is an evaluatable reception signal (green)
	AC	Comes on when AC supply voltage is applied (yellow)
	DC	Comes on when the external DC supply voltage is applied (yellow)
SERVICE		
	Service	Maintenance port
	Mic	Microphone socket, Head set
	Phone	Headset socket
	Mic/Phone	Microphone / Headset socket

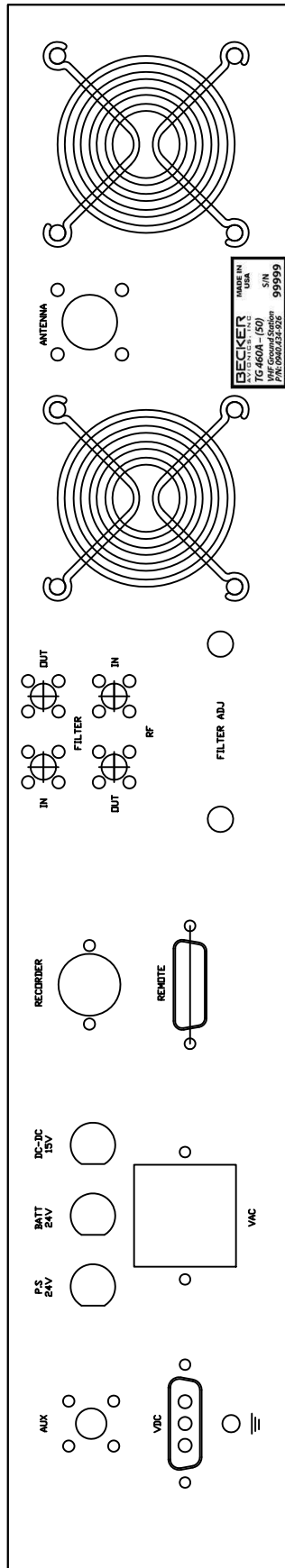
C. Rear of unit

	ANT	50 Ohm N female antenna connector
	Remote	15-pin D subminiature Programming and remote control options
	Filter	SMA female connectors. Filter IN & Filter OUT
	RF	SMA female connectors. Core RF OUT & PA RF IN

3.2.1 Over-voltage protection

There is an over-voltage protection function built-in. After over-voltage protection activates, a minimum time lapse of 1 min. from the moment of switching off the input is required before any input can turn on the supply again. Over-voltage protection setting is fixed at 115% - 135% nominal.

REAR PANEL



Ground terminal: Allows to connect the unit with the ground

Fig. 3-2 Rear side

3.3 Operating instructions

3.3.1 Switching on the VHF ground station

- (1). Switch on the VHF ground station using the ON/OFF switch.

CAUTION

After the VHF ground station is switched off using the On/STBY switch it goes into standby mode. All indicators go out except the AC or DC LED diode which continues to remain on depending on the type of supply voltage. To remove all current from the VHF ground station requires the supply voltages to be switched off externally and the fuse of the built in battery removed from the fuse holder. If a battery is installed in the VHF Ground Station and the external supply voltages are disconnected and switch by mistake the ON/STANDBY switch in the ON position, the equipment is discharging the internal battery

- (2) The segments of the LC display will blink with the power supply voltage having dropped down to 9V d.c. Following the blinking period the self-test is conducted. With low supply voltage this test period can last up to 20 seconds. If the test is positive, the transceiver automatically switches to the mode which was activated before switch-off.

If the test result negative, the LCD will display the first fault report for approximately five seconds. If further faults were detected during test, the corresponding fault reports will be displayed additionally. After is playing the last fault report the equipment will switch automatically to the operating mode which was activated before switch-off.

- (3) The following fault signals are possible :

E1	Processor defective
E2	Synthesizer failed
E3	Fault in EE-PROM
E4	Controller (PIC) audio assembly defective

- (4) The various modes are comprehensively described, together with the setting of the equipment configuration in the service mode, in the Annex to the General Operating Instructions.

B. Transmit/receive mode

- (1) Set the frequency of the local ground station in the preset display and press the exchange key. Rotate the VOL control to the centre position.

NOTE : If the error message E2 appears in the top line during operation, the synthesizer is not latching and further R/T operations no longer possible. The VHF transceiver must be check in the next service station

- (2) Operate the transmit button and call the ground station. Hold the microphone close to the lips for optimum speech transmission.

NOTE : The arrow in the top line of the display indicates transmit mode. During transmission a protective circuit prevents a frequency change or frequency channel change even if the frequency selector switch is rotated. The keying functions on the control panel are also inhibited.

- (3) Set the correct reception volume using the VOL control whilst the ground station is answering.
- (4) Switch on the squelch (press SQL key again). Weak reception signals and reception noises are suppressed. The switch-on threshold of the squelch can be set in the service mode.

NOTE : When changing the mode or the frequencies (PRESET- ACTIVE frequency) the change is automatically stored 2 second after the last change took place. Due to this delay changes which were made immediately before switching off the transceiver will not be memorized. Exception: Memory actions as storage by pressing the STO key.

C. Operation of intercom mode

- (1) Switch on the IC switch (external).
- (2) Operate the intercommunication (IC).
- (3) If necessary, the IC volume can be adjusted to the noise level of the aircraft (for adjustment refer to service mode).

D. Audioauxiliary input

A second and third radio unit (navigation receiver) can be monitored simultaneously via the audio auxiliary input. During transmission the auxiliary input is switched off from the audio end amplifier. If necessary, the input sensitivity can be matched to the noise level of the aircraft (for setting refer to service mode).

E. Jamming of transmit button

- (1) The VHF- transceiver is fitted with a protective circuit to protect against jamming of the transmit button or a short circuit on the key supply line. For continuous transmissions exceeding two minutes the protective circuit automatically switches from transmission to reception. This avoids the switched channel being blocked.
- (2) It is possible to activate the transmitter again immediately by re-pressing the transmit button. In the event of a fault, this is only possible after the short circuit has been cleared or the transmit button released.

CAUTION : In Stock to be able to continue transmitting even with the transmit button jammed, the VHF Transceiver must be switched off and then back on again. After that the VHF transceiver then continues to operate in the transmit mode for a further two minutes.

F. Flashing of the LCD

- (1) If the power supply for the VHF transceiver drops below 10.5 V, the display begins to flash. This flashing indicates, when operating on batteries for example, that the batteries require recharging. In practice the display begins to flash in the transmit mode because this is when the power consumption is greatest. If the power supply again increases above 10.5 V, the flashing ceases.
- (2) Because the discharge curves of the batteries are very dependant on the type of battery, e.g. lead or nickel/cadmium accumulators, and the ambient temperature also influences the discharge curves, it is not possible to state precisely how long the VHF transceiver continues to be fully functional after the LCD begins to flash.
- (3) When transmitting, the batteries can be completely discharged after a few transmission cycles but during reception functioning is still guaranteed in most cases for approximately 1 to 2 hours after the flashing begins. At 10 V supply voltage the unit still continues to function at reduced transmission power.

G. Operation of the various modes

- (1) The VHF transceiver performs various functions which are covered by individual operating modes. The mode is selected by briefly pressing the MDE key. If it is pressed for a long time (more than 1 second) this selects mode 1.

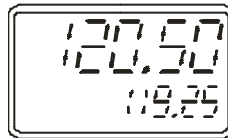
(a) Modes:

- 1 Standard mode (display of active and preset frequency), setting the preset frequency and storing frequencies in the storage channels.
- 2 Display of the storage frequencies in the storage channels or calling up the scan function.
- 3 Display of temperature (option), power supply voltage and active frequency
- 4 Service mode, for setting the equipment configuration.

NOTE : When changing the mode or the frequencies (PRESET-ACTIVEfrequency) the change is automatically stored 2 second after the last change took place. Due to this delay changes which were made immediately before switching off the transceiver will not be memorized. Exception: Memory actions as storage by pressing the STO key.

(2) Mode 1 (standard mode)

- (a) The last displayed active and preset frequencies appear in the LCD display.



- (b) The preset frequency (bottom line) is set using the MHz and kHz frequency selector switches.
- (c) When the exchange key is pressed, a change from the active to the preset frequency occurs. A further operation of the key cancels the frequency change.

Storage operation

- (d) Pressing the STO key.
The active frequency remains displayed in the top line. The VHF transceiver is ready to transmit and receive on this frequency. The preset frequency appears flashing in the bottom line. The required frequency can be set using the kHz frequency selector (steps of 1) or the MHz frequency selector (steps of 10). Pressing the STO key.
The next free channel is shown flashing "ch". Press the STO key. The selected frequency is stored in the free speaker channel and the storage process is ended. A no memory channel is free, the highest assign memory channel is selected automatically.

or

select the channel to be overwritten using the kHz frequency selector and press the STO key. This means that this channel will be overwritten with the new frequency and the storage process ended.

Note

If no input takes place within approximately seven seconds, the VHF transceiver switches to the previously set mode.

Leaving the mode

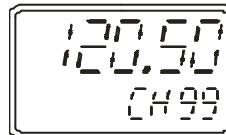
To leave the mode, press the MDE key.

(3) Mode 2 (display of fixed frequencies in the various channels)

(a) Channel selection mode

NOTE : If in mode 2 the scan function is switched on in the service mode, no storage operation can be activated in this mode.

- 1 Select mode 2 using the MDE key. The last indicated storage channel appears in the bottom line of the LCD and the stored frequency is shown in the top line. The VHF transceiver is ready to transmit and receive on this frequency.



- 2 Select required channel using the kHz frequency selector (steps of 1) or the MHz frequency selector (steps of 10). Free channel (no frequency stored) will be skipped when selected.
- 3 If the Scan function is not activated, the storing function can be initiated by pressing the STO-Key. Refer to description of mode 1.

Note The top line indicates the active frequency. The active frequency indicated in the bottom line is flashing. Select the desired frequency can be set using the kHz frequency selector or the MHz frequency selector.

- 4 Exit from mode 2 is achieved by pressing the MDE key.

(b) Scan function

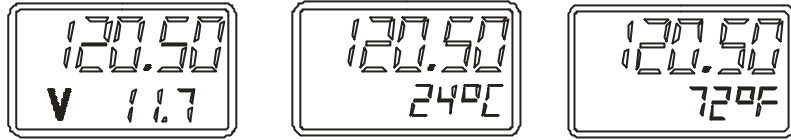
Note: When operating the scan mode observe the regulations for the aviation radio service

- 1 If the scan function is activated in the equipment configuration, pressing the STO key changes from the channel selection mode to the scan function. In the scan function, the frequency appears in the top line of the display and the associated channel with the preset CS is shown in the bottom line.
- 2 In the scan function, either all the occupied storage channels or a required range of storage channels can be scanned. The scanning range is specified in the service mode. The various storage channels are scanned in 200 ms intervals. If the microprocessor finds a carrier in one of the channels, it holds a short on this channel and checks whether an evaluatable signal is present. If no evaluatable signal is present, it switches to the next channel and then reverts to the 400 ms intervals (milliseconds range). In the event of an evaluatable reception signal being received the VHF transceiver remains on the storage channel until an evaluatable reception signal is no longer present. After a hold time 0 to 60 seconds (can be set in the service mode) the scanning of the storage channels at 200 ms intervals begins again. The set squelch level is the criterium for an evaluatable reception signal, regardless of whether the squelch is activated or not.
- 3 The VHF transceiver is equipped with channel priority. This function can be switched ON or OFF in service mode SF 18

NOTE: If an adequate signal is required on the priority channel with option channel priority switched ON, the VHF transceiver automatically leaves the SCAN mode and is ready for transmission and receive on this channel. For return to the SCAN mode, again press the STO key.

- 4 The scan function is terminated by pressing the STO key. The VHF transceiver then begins to operate again in the channel selection mode - the CS in the bottom line goes out and CH appears. Exit from mode 2 is accomplished in the same way as described in the channel selection mode.

(4) Mode 3 Indication of supply voltage or temperature (option)



When the exchange key is pressed, a change from the supply voltage and temperature indication occurs.

NOTE : If no temperature sensor is connected, this mode is skipped when the exchange key is pressed.

- (a) The supply voltage and temperature is continuously measured. Indication occurs only in mode 3. The mode is selected by briefly pressing the MDE key once or several times (corresponding to the previous state) the active frequency on which the VHF transceiver is ready for operation is shown in the top line and the measured voltage/temperature is displayed in the bottom line. The display in °C or °F can be set in the service mode.
- (b) The active frequency (top line) can be changed using both frequency selector switches. A storage operation is activated using the STO key. This procedure is described in mode 1.
- (c) To exit mode 3 it is necessary to press the MDE key.

(5) Service mode (equipment configurations)

The service mode is meant to enable the ground technicians to set the equipment configuration and must not be used in flight.

(a) The following settings can be changed or set:

SqL	Setting the switch-on threshold of the squelch
SIdE	Setting the sidetone volume
aU	Setting the audio auxiliary volume
IC	Setting the IC volume
SF5	Calibrating the temperature sensor
SF6	Setting the addressable storage locations
SF7	Setting the temperature display in °C or °F
SF8	Switching on the scan function
SF9	Setting the hold time after completion of a call in the scan mode
SF10	Release the frequency setting (channel selection only)
SF11	Release the frequency storage
SF12	Erasure of stored frequencies
SF13	Setting the "channel start" of the scanning range
SF14	Setting the "channel end" of the scanning range
COdE	Entering a password to interlock the equipment configuration.
SF16	Dynamic mike input sensitivity
SF17	Inhibiting the transmit mode for one or more memory channel
SF18	Channel priority ON/OFF switch (option)
FSqL	No function
SF20	Speaker muting switch ON/OFF
SF21	Increase the audio power output
- . -	Indication the software version and change status

NOTE : The equipment configuration SqL, SIdE, AU, IC and SF16 settings given in the service mode are set by the factory as basic settings using standard values. If reversion to the standard values is required, the portable VHF Transceiver must be switched off and switched on again simultaneously pressing the STO and MDE keys. This does not overwrite the password.

If no temperature sensor is connected, the mode SF5 and SF 7 is skipped when the mode key is pressed.

If the SF8 scan function is not activated, than the function SF9, SF13 and SF14 will not be displayed.

The settings SF 17 and SF 18 are optionen. When the optionen are not activated, the mode SF17 and SF 18 is skipped when the mode key is pressed.

(b) Calling up the service mode

Switch off the VHF transceiver. Hold the mode key (MDE) pressed and at the same time switch on the unit. The VHF transceiver switches to the service mode without a unit test. SqL appears in the top line and the switch on threshold of the squelch is shown on the bottom line.

NOTES :

- The settings are selected in steps by briefly pressing the MDE key in the service mode. If the MDE key is pressed at the end of the setting, the setting SqL then appears. If a direct return to the SqL setting is required the MDE key must be pressed for at least one second.
- If settings are not activated, (e.g. scan function) this mode is skipped by pressing the mode key.
- In the service mode the VHF transceiver operates independently of the settings on the control panel, on the frequency which was last set as the active frequency. Wenn the PTT-Key is pressed in the service mode, the display indicates in the top line the active frequency
- The user can interlock his equipment configuration settings with the aid of a password. The VHF transceiver is delivered from the factory without a password. Section CODE "Entry of password for interlocking the equipment configuration" describes how to enter a password.

1 Setting the squelch threshold

- a If function SqL is called up, the following displays appear.

Top line	SqL	
Bottom line	00 to 200 (HI sensitivity LO)	Standard value 130

- b By means of the kHz switch, the squelch threshold can be altered upwards or downwards in steps of 5. The set value is stored by pressing the STO key.

2 Setting the sidetone level

- a Call up the SIdE function using the MDE key. The following displays appear.

Top line	SIdE	
Bottom line	00 to 63 (LO level HI)	Standard value 32

- b Using the kHz switch, The sidetone level can be altered upwards or downwards. The set value is stored by pressing the STO key.

Upwards serial No.: 1500 Press the PTT key and set the correct sidetone volume using the kHz switch. The sidetone level can be altered upwards or downwards. The set value is stored by pressing the STO key.

3 Setting the audio auxiliary level

- a Call up the AU function using the MDE key. The following displays appear.

Top line	AU	
Bottom line	00 to 63 (LO level HI)	Standard value 63

- b Using the kHz switch, alter the audio auxiliary level upwards or downwards. The set value is stored by pressing the STO key.

4 Setting the IC level

- a Call up the IC function using the MDE key. The following displays appear :

Top line	IC	
Bottom line	00 to 63 (LO level HI)	Standard value 32

- b The IC level can be changed upwards or downwards using the kHz switch. The set value is stored by pressing the STO key.

5 Calibrating the temperature sensor

- a If no temperature sensor is connected, this mode is skipped when the mode key is pressed.
- b Calibration is only necessary if the sensor has been retrospectively fitted or replaced.
- c After calling up using the MDE key, the following display appears.

Top line SF 5

Bottom line Measured temperature

- d Measure the ambient air temperature of the sensor by means of a suitable thermometer and set temperature display on the LCD. To this measured value by means of the kHz frequency selector. The entry is stored by pressing the STO key and of the temperature sensor is calibrated .

6 Setting addressable storage locations 1 to 99.

- a Call up the function using the MDE key. The following display then appears.

Top line SF 6

Bottom line 1 to 99

- b The number of the storage channel between 1 to 99 can be selected as required using the kHz switch and stored by pressing the STO key. If the number of storage channels is limited and if channels outside the limited area have already been used, these can no longer be called up. The data in the channels outside the area continues to remain stored and it can be re-used at any time by lifting the restricted area.

7 Setting the temperature display in the °C or °F.

- a If no temperature sensor is connected, this mode is skipped when the mode key is pressed.
- b Call up function SF 7 using the MDE key. The following displays appear :

Top line SF 7

Bottom line °C of °F

- c The required display is selected using the kHz switch and the selection is stored by pressing the STO key.

- 8 Switching on the scan function
- a If the SF8 scan function is not activated, than the function SF9, SF13 and SF14 will not be displayed.
 - b Call up function SF 8 using the MDE key. The following display appears.

Top line	SF 8
Bottom line	OFF or On
 - c Select the required function using the kHz switch and store the selection by pressing the STO key.

OFF = scan function off
On = scan function on
- 9 Setting the hold time in the scan function (only displayed, if SF8 is activated).
- a Call up function SF 9 using MDE key. The following displays appear :

Top line	SF 9
Bottom line	0 .0 to 60.0
 - b The hold time can be set as required between 0,0 ..0,9 seconds using the kHz seletor switch and between 0..60 seconds using the MHz selector switch. The set value is stored by pressing the STO key.
- 10 Inhibiting the frequency setting (channel selection only).
- a Call up function SF 10 using the MDE key. The following displays appear :

Top line	SF 10
Bottom line	OFF or On
 - b Select the required function using the kHz key and store the function by pressing the STO key.

OFF= Frequency setting not possible. The VHF transceiver can only work on the frequencies stored in the individual channels.
On = Frequency setting possible (standard setting).

11 Inhibiting the frequency storage

- a Call up function SF 11 using the MDE key. The following display appears.

Top line SF 11

Bottom line OFF or On

- b Select the required function using the kHz switch and store the selection by pressing the STO key.

OFF = The storage of frequencies in the individual channels is not possible. The VHF transceiver can only work on the set frequency.

On = Storage of frequencies in the individual channels is possible (standard setting)

12 Erase stored frequencies

- a Call up function SF 12 using the MDE key. The following display appears.

Top line SF 12

Bottom line CH channel number

- b Select the channel to be erased using the kHz (steps of 1) or MHz (steps of 10) switch. The stored frequency is erased by pressing the STO key.

13 Setting the "channel start" scanning range (only displayed, if SF8 is activated).

- a Call up function SF 13 using the MDE key. The following displays appear :

Top line SF 13

Bottom line CS channel number

- b Select the starting channel, using the kHz (steps of 1) or MHz (steps of 10) switch, at which the scan function is to begin. The starting channel is stored by pressing the STO key.

Note

When this function is set OFF, the active and preset frequencies which were set last remains are available in Mode 1

- 14 Setting the “channel end” scanning range.(only displayed, if SF8 is activated).
- a Call up function SF 14 using the MDE key. The following displays appear :
- | | |
|-------------|-------------------|
| Top line | SF 14 |
| Bottom line | CS channel number |
- b Using the kHz (steps of 1) or MHz (steps of 10) switch, select the end channel at which the scan function is to stop. Store the end channel by pressing the STO key.
- 15 Entry of password to interlock the equipment configuration.
- a Call up the COdE function using the MDE key. The following display appears.
- | | |
|-------------|---------|
| Top line | COdE 15 |
| Bottom line | 0 |
- b Set any 4-digit numerical code using the kHz (steps of 1) or MHz (steps of 10) switch. Store the numerical code by pressing the STO key.
- NOTE : As soon as a password is given an 0 appears in the bottom line when the service mode is called up. The numerical code must then be input using the MHz or kHz switch. If the VHF transceiver detects a false numerical code, it automatically switches to the last mode. If the password is to be erased or changed, this is done by calling up the service mode using the old password. The COdE function is then chosen and either an 0 is entered everywhere or the changed numerical code is entered.
- 16 Setting the dynamic mike input sensitivity
- a Call up function SF 16 using the MDE key. The following displays appears :
- | | |
|-------------|---|
| Top line | SF 16 |
| Bottom line | 00 bis 63 Standard value 32
(LO sensitivity HI) |
- b The dynamic mike input sensitivity can be changed upwards or down-wards using the kHz switch. The set value is stored by pressing the STO key.

- 17 Inhibiting the transmit mode for one or more memory channel (option)
- a Call up function SF 17 using the MDE key. The following displays appears :
- | | |
|-------------|-------------------|
| Top line | SF 17 |
| Bottom line | CS channel number |
- b Using the kHz (steps of 1) or MHz (steps of 10) switch, select the desired channel for inhibiting the transmit mode. Store the channel by pressing the STO key. Several channels can be selected on priority channels. The letter T appears in the bottom line before CS. When the STO key is pressed again, the inhibiting transmit mode is canceled. The letter T is not appears in the bottom line before CS.
- 18 Channel priority ON/OFF switch (Option)
- a Call up function SF 18 using the MDE key. The following displays appears :
- | | |
|-------------|-------------------|
| Top line | SF 18 |
| Bottom line | CS channel number |
- b Using the kHz (steps of 1) or MHz (steps of 10) switch, select the desired channel. Store the channel by pressing the STO key. Several channels can be selected on priority channels.
- 19 FSqL no function
- 20 Speaker muting switch ON/OFF
- a Call up function using the MDE key. The following displays appears :
- | | |
|-------------|-----------|
| Top line | SF20 |
| Bottom line | OFF or On |
- OFF = Speaker muting on
On = Speaker always switched on
- b Select the function using the kHz switch. Store the required function by pressing the STO key. This selection becomes active after ending the service mode.

4. Safety instructions

The following instructions must be followed for safe operation of the VHF transceiver:

- A. Switch off the unit when starting or shutting down engines.
- B. A speech test is to be performed before start up and it should be noted that if the speech test is carried out close to the ground station the results may be positive even if the antenna cable is broken or short-circuited. At a distance of 5 to 10 km no connection will be made.
- C. Use a loud voice for speech communication and hold the microphone close to the lips. Otherwise cabin noise can be intrusive and make understanding difficult.
- D. Use only microphones or headsets which are suitable for use in aircraft. In aircraft made of wood or synthetic materials or in gliders or helicopters, incoming radiation on the equipment antenna can affect the integrated amplifier of the microphone (feedback). This is noticeable in the ground station by whistling and/or heavy distortion. The described disturbances can occur in different ways on the different transmission channels.
- E. Transmit buttons can stick and cause continuous transmission. Therefore, when transmitting ensure that the arrow in the top line on the left next to the active frequency display disappears when the transmission button is released.

Blank

3.4 Safety instructions

The following instructions must be followed for safe operation of the VHF station:

- | A speech test is to be performed before startup and it should be noted that if the speech test is carried out close to the ground station the results may be positive even if the antenna cable is broken or short-circuited. At a distance of 5 to 10 km no connection will be made.
- | Use a loud voice for speech communication and hold the microphone close to the lips. Otherwise cabin noise can be intrusive and make understanding difficult.
- | Use only microphones or headsets which are suitable for use in aircraft. Incoming radiation on the equipment antenna can affect the integrated amplifier of the microphone (feedback). This is noticeable in the ground station by whistling and/or heavy distortion. The described disturbances can occur in different ways on the different transmission channels.
- | Transmit buttons can stick and cause continuous transmission. Therefore, when transmitting ensure that the LED display (red) disappears when the transmission button is released.

Warning

- | High voltages inside refer servicing to qualified personal
- | Disconnect power inout before servicing

FINAL INSPECTION / TEST

TG480-(20) VHF Transceiver

***PART NUMBER: 0940.436-926**

SERIAL NUMBER: _____

1. TRANSMITTER TEST

TX. Carrier Power (Without Modulation):

	VSWR 1:1	VSWR 2:1	Freq. Offset
Requirements:	20 +/- 5W		< 1200 Hz

118.000 MHz	_____ W	_____ W	_____ Hz
127.500 MHz	_____ W	_____ W	_____ Hz
136.975 MHz	_____ W	_____ W	_____ Hz

Modulation and Distortion:

***Dynamic Mike (1 kHz / 10mV audio input)**

	VSWR 1:1		VSWR 2:1	
	Mod.%	Dist.%	Mod.%	Dist.%
Requirements:	85 +/-5 %	< 5%	85 +/-10%	< 10%

118.000 MHz	_____	_____	_____	_____
127.500 MHz	_____	_____	_____	_____
136.975 MHz	_____	_____	_____	_____
Over modulation:	_____ (none)	_____ (none)	_____ (none)	_____ (none)

***Standard Remote Mike (1 kHz / 775mV audio input)**

	VSWR 1:1		VSWR 2:1	
	Mod.%	Dist.%	Mod.%	Dist.%
Requirements:	85 +/-5 %	< 5%	85 +/-10%	< 10%

118.000 MHz	_____	_____	_____	_____
127.500 MHz	_____	_____	_____	_____
136.975 MHz	_____	_____	_____	_____
Over modulation:	_____ (none)	_____ (none)	_____ (none)	_____ (none)

	Min.	Requirements	Max.	Measurements
--	------	--------------	------	--------------

Modulation AF Response:

***(127.5 MHz, 775mV, 1 kHz)**

fmod.=	100 Hz	20		_____ dB
	350 Hz		6	_____ dB
	500 Hz			_____ dB
	1000 Hz	0		_____ 0 dB

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2500 Hz		6	_____ dB
4000 Hz	20		_____ dB
Transmitter Compressor:			
*(10mV - 30 mV, 1kHz)	dif. fmod.=	5	_____ %
*(775mV – 1V, 1kHz)	dif. fmod.=	5	_____ %
Automatic Shutdown:		2 minutes	_____ min
Tx Alarm:	OK		_____

2. RECEIVER TEST

Sensitivity (SINAD)

(1000 Hz, 30% mod., AF Level = 775mV, 3uV EMF)

118.000 MHz	12dB	_____ dB
127.500 MHz	12dB	_____ dB
136.975 MHz	12dB	_____ dB
SQL Sensitivity: (Squelch opens at):		*5uV _____ uV

AGC Characteristic:

(127.5 MHz, 1000 Hz/30%, AF Level=775mV)

(5 uV – 100 mV EMF)	3dB	_____ dB
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Bandwidth:

(127.500 MHz / 1uV EMF / 400Hz / 80% / 0 dB AF output)

(Increase RF output by 6dB)

Higher frequencies	8	_____ kHz
Lower Frequencies	8	_____ kHz

	Min.	Requirements	Max.	Measurements
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Selectivity:

(127.500 MHz / 1uV EMF / 400Hz / 80% / 0 dB AF output)

127.475 MHz	60	_____ dB
127.525 MHz	60	_____ dB

(127.500 MHz / 1uV EMF / 400Hz / 80% / 0 dB AF output)

(Increase RF output by 40dB)

Higher frequencies		17	_____ kHz
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*TG480-20 S/N _____

Lower frequencies 17 _____ kHz

Audio Output Power and Distortion factor:

(127.500 MHz / 100 uV / 1000 Hz / 85%)

AF at 600 Ohms ≥ 7 _____ V

Distortion @ 7V: 10 _____ %

Audio Reponse:

(127.5 MHz / 100uV / 1000Hz / 30%)

350 Hz -6 _____ dB

1000 Hz _____ 0 dB

2500 Hz -6 _____ dB

4000 Hz 18 _____ dB

3. CONTROL PANEL TEST

Display: (all digits flashing) OK _____

MDE Key: OK _____

Freq. Selection: 1MHz OK _____

1KHz OK _____

Exchange Key: OK _____

Service Mode:

- SF1 Setting the switch to ON
 Threshold of the squelch OK _____

- SF2 Cal. The temp. sensors OK _____

- SF3 Setting the addressable storage location OK _____

- SF4 Setting temperature display OK _____

- SF5 Switching on the scan function OK _____

- SF6 Setting the hold timer after
 completion of a call in the scan mode OK _____

- SF7 Inhibiting the freq. setting
 (Channel selection only) OK _____

- SF8 Inhibiting the frequency storage OK _____

- SF9 Erasure of stored frequencies OK _____

- SF10 Setting the "channel start" of

the scanning mode	OK	_____
- SF11 Setting the "channel end" of the scanning mode	OK	_____
-SF12 Entering a password to interlock the equipment configuration	OK	_____
-SF13 Set Sensitivity for Dynamic Mike	OK	_____
-SF14 Inhibit Tx for Memory-Channels	OK	_____
-SF15 Set Channel Priority ON/OFF	OK	_____
-SF16 Set Squelch Fast Mode	OK	_____
Panel illumination:	OK	_____
AC/DC Switchover	OK	_____

4. ACCESORY FUNCTIONS

a. 15 VDC (500mA)	12		16	_____
b. RS 232		OK		_____
c. PTT (Gnd-Active)		OK		_____
d. COR (Low-Active)		OK		_____
e. Tx Audio				
(%Mod, 0dB/775mV)	70		95	_____
Over modulation:		none		_____
f. Rx Audio (dB)	-9	0	1	_____
g. Recorder Output				
Tx Audio (dB)	-9	0	1	_____
Rx Audio (dB)	-9	0	1	_____

Remarks:
 AR4201 S/N: _____
 RF Power Amplifier S/N: _____
 Reflectometer S/N: _____
 Bandpass Filer S/N: _____
SINGLE CHANNEL OPTION
 Frequency: _____ MHz
 Internal band pass filter Yes:_____ No:_____

The TG480-20 has been tested successfully and is ready for operation.

Test Equipment Used:

DESCRIPTION	SERIAL NUMBER
MARCONI RADIO TEST	132628/032
TEKTRONIX 485 OSCILLOSCOPE	B144152
BIRD 4431 WATTMETER	8849
DCR-25B DC POWER SUPPLY	1256

Tested by: _____ **Title:** _____ **Date:** _____

Inspected by: _____ **Title:** _____ **Date:** _____

FINAL INSPECTION / TEST

TG480-(50) VHF Transceiver

***PART NUMBER: 0940.435-926**

SERIAL NUMBER: _____

1. TRANSMITTER TEST

TX. Carrier Power (Without Modulation):

	VSWR 1:1	VSWR 2:1	Freq. Offset
Requirements:	50 +/- 5 W		< 1200 Hz

118.000 MHz	_____ W	_____ W	_____ Hz
127.500 MHz	_____ W	_____ W	_____ Hz
136.975 MHz	_____ W	_____ W	_____ Hz

Modulation and Distortion:

***Dynamic Mike (1 kHz / 10mV audio input)**

	VSWR 1:1		VSWR 2:1	
	Mod.%	Dist.%	Mod.%	Dist.%
Requirements:	85 +/-5 %	< 5%	85 +/-10%	< 10%

118.000 MHz	_____	_____	_____	_____
127.500 MHz	_____	_____	_____	_____
136.975 MHz	_____	_____	_____	_____
Over modulation:	_____ (none)	_____ (none)	_____ (none)	_____ (none)

***Standard Mike (1 kHz / 775mV audio input)**

	VSWR 1:1		VSWR 2:1	
	Mod.%	Dist.%	Mod.%	Dist.%
Requirements:	85 +/-5 %	< 5%	85 +/-10%	< 10%

118.000 MHz	_____	_____	_____	_____
127.500 MHz	_____	_____	_____	_____
136.975 MHz	_____	_____	_____	_____
Over modulation:	_____ (none)	_____ (none)	_____ (none)	_____ (none)

	Min.	Requirements	Max.	Measurements
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Modulation AF Response:

***(127.5 MHz, 775mV, 1 kHz)**

fmod.=	100 Hz	20		_____ dB
	350 Hz		6	_____ dB
	500 Hz			_____ dB
	1000 Hz	0		_____ 0 dB

***TG480-50 S/N _____**

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2500 Hz		6	_____ dB
4000 Hz	20		_____ dB
Transmitter Compressor:			
*(10mV - 30 mV, 1kHz)	dif. fmod.=	5	_____ %
*(775mV – 1V, 1kHz)	dif. fmod.=	5	_____ %
Automatic Shutdown:	2 minutes		_____ min
Tx Alarm:	OK		_____

2. RECEIVER TEST

Sensitivity (SINAD)

(1000 Hz, 30% mod., AF Level = 775mV, 3uV EMF)

118.000 MHz	12dB	_____ dB
127.500 MHz	12dB	_____ dB
136.975 MHz	12dB	_____ dB
SQL Sensitivity: (Squelch opens at):		*5uV _____ uV

AGC Characteristic:

(127.5 MHz, 1000 Hz/30%, AF Level=775mV)

(5uV – 100 mV EMF)	3dB	_____ dB
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Bandwidth:

(127.500 MHz / 1uV EMF / 400Hz / 80% / 0 dB AF output)

(Increase RF output by 6dB)

Higher frequencies	8	_____ kHz
Lower Frequencies	8	_____ kHz

	Min.	Requirements	Max.	Measurements
--	------	--------------	------	--------------

Selectivity:

(127.500 MHz / 1uV EMF / 400Hz / 80% / 0 dB AF output)

127.475 MHz	60	_____ dB
127.525 MHz	60	_____ dB

(127.500 MHz / 1uV EMF / 400Hz / 80% / 0 dB AF output)

(Increase RF output by 40dB)

*TG480-50 S/N _____

Higher frequencies 17 _____ kHz
 Lower frequencies 17 _____ kHz

Audio Output Power and Distortion factor:

(127.500 MHz / 100 uV / 1000 Hz / 85%)

AF at 600 Ohms ≥7 _____ V

Distortion @ 7V: 10 _____ %

Audio Reponse:

(127.5 MHz / 100uV / 1000Hz / 30%)

350 Hz -6 _____ dB

1000 Hz _____ 0 dB

2500 Hz -6 _____ dB

4000 Hz 18 _____ dB

3. CONTROL PANEL TEST

Display: (all digits flashing) OK _____

MDE Key: OK _____

Freq. Selection: 1MHz OK _____

1KHz OK _____

Exchange Key: OK _____

Service Mode:

- SF1 Setting the switch to ON
 Threshold of the squelch OK _____

- SF2 Cal. The temp. sensors OK _____

- SF3 Setting the addressable storage location OK _____

- SF4 Setting temperature display OK _____

- SF5 Switching on the scan function OK _____

- SF6 Setting the hold timer after
 completion of a call in the scan mode OK _____

- SF7 Inhibiting the freq. setting
 (Channel selection only) OK _____

- SF8 Inhibiting the frequency storage OK _____

- SF9 Erasure of stored frequencies	OK	_____
- SF10 Setting the "channel start" of the scanning mode	OK	_____
- SF11 Setting the "channel end" of the scanning mode	OK	_____
-SF12 Entering a password to interlock the equipment configuration	OK	_____
-SF13 Set Sensitivity for Dynamic Mike	OK	_____
-SF14 Inhibit Tx for Memory-Channels	OK	_____
-SF15 Set Channel Priority ON/OFF	OK	_____
-SF16 Set Squelch Fast Mode	OK	_____
Panel illumination:	OK	_____
AC/DC Switchover	OK	_____

4. ACCESORY FUNCTIONS

a. 15 VDC (500mA)	12		16	_____
b. RS 232		OK		_____
c. PTT (Gnd-Active)		OK		_____
d. COR (Low-Active)		OK		_____
e. Tx Audio				
(%Mod, 0dB/775mV)	70		95	_____
Over modulation:		none		_____
f. Rx Audio (dB)	-9	0	1	_____
g. Recorder Output				
Tx Audio (dB)	-9	0	1	_____
Rx Audio (dB)	-9	0	1	_____

Remarks:

AR4201 S/N: _____

RF Power Amplifier S/N: _____

Reflectometer S/N: _____

Bandpass Filer S/N: _____

SINGLE CHANNEL OPTION

Frequency: _____ MHz

Internal band pass filter Yes:_____ No:_____

The TG480-50 has been tested successfully and is ready for operation.

Test Equipment Used:

DESCRIPTION	SERIAL NUMBER
MARCONI RADIO TEST	132628/032
TEKTRONIX 485 OSCILLOSCOPE	B144152
BIRD 4431 WATTMETER	8849
DCR-25B DC POWER SUPPLY	1256

Tested by: _____ **Title:** _____ **Date:** _____

Inspected by: _____ **Title:** _____ **Date:** _____