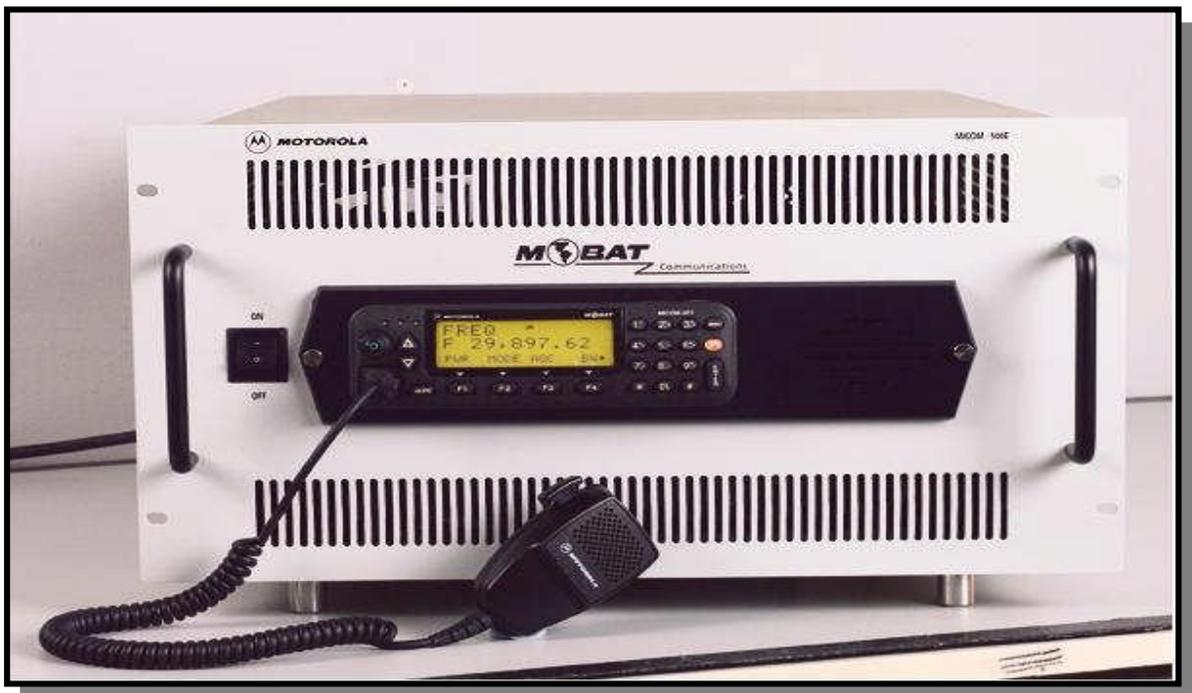




## HF-SSB MICOM-500E Model G761AA / G762AA

This manual is an appendix to the Micom 2E-Trunk Owner's Manual 6802952C60

# HF-SSB MICOM-500E



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## INTRODUCTION

The transceiver is a complete unit that includes Micom-2ET, 500watts amplifier , power supply, enclosed together in a 19” drawer. The control head of the radio is placed on the drawer’s front panel. The unit includes a movable drawer, which allows to detach the control panel of the radio and moved up to 5 meters away (cable extension included).

The transmitter amplifier is microprocessor controlled, doing the following functions:

- Adjust amplifier input sensitivity
- Monitor heat, VSWR, and under voltage conditions,
- Setting the power output via the channel power setting (Max, High, Medium and Low)

## GENERAL SPECIFICATION

Power Output:	1.6-30MHz: 400W PEP and average
Band Switching:	Fully Automatic
Input Voltage:	220 /110VAC
Cooling:	Cooling fans
T/R Switching time:	10mS nominal
Band Switch time:	15mS nominal
Protection:	Input over drive under voltage (adjustable): Factory default 10.0 VDC Amplifier module Current imbalance VSWR faults Frequency out of Specified range over current over temperature.

יש להוסיף שרטוט אורכד מצורף במקום דף זה

## HF-SSB MICOM-500E COMPONENTS

### 1. MICOM 2E-Trunk

For Micom 2E-Trunk specification see user manual 6802952C60

### 2. 500W HF Linear Amplifier Unit

Input Voltage: 14 VDC  
Power Output: 1.6-30MHZ: 500W PEP and average  
24-30MHz reduced performance up to -2dB.

The power amplifier is fully protected by microprocessor control. This circuitry dynamically monitors all amplifier parameters, and provides adjustments and protection against high VSWR, under voltage, over current and high temperature conditions.

**Current-** protection against over current condition (exceeding 100 amps) and current imbalance between amplifier modules (exceeding 20%). When one of these two conditions exists, the amplifier turns off-line. To reset the transceiver, power down the amplifier and restart the unit.

**Volt** - protection against under amplifier turns off-line. To reset the transceiver, power down the amplifier and restart the voltage condition (less than 10 VDC). When this condition exists, the unit.

**VSWR** – when a sampled VSWR exceeded 4:1 and the power reflected back to the amplifier is higher than acceptable, the amplifier turns off-line. To reset the transceiver, power down the amplifier and restart the unit.

**Temp** - protection against over temperature condition

**Atten** – as input RF power level increases beyond 60-70 watts, the attenuation increases automatically. The Attenuate remains engaged until the input drops to 30 watts.

**ALC Control-** provides adjustable ALC feedback voltage.

A positive voltage is present on the Amplifier line for use with the equipped transceiver for ALC input control.

PTT keying mode and Band input filter selection enabled automatically. Band switching time is typically 15 msec or less.

This automated capability is ideal for remote or unattended operating site application.

### 3. DC Power Supply

Model:	EWS1500-15
Nominal Output Voltage:	15V
Maximum Output Current:	100A
Maximum Output Power:	1500W
Input Voltage Range:	85~132 VAC / 170~265 VAC (Selectable), 47~63 Hz

**110/220 VAC power supply** - if need to convert the power supply from 220VAC to 110VAC, please detached the 110/220VAC panel at the rear panel of the unit and short the A and B terminals.

The ON/OFF switch on the front panel of the unit, enables to turn the power supply output on and off.

Note that, when the dc output power supply is on OFF mode, the internal power supply fans still work.

### 4. Junction Box

The junction box enables the connection of up to four external devices simultaneously, in addition to headphone, to the accessory port of the MICOM –2 (e.g. modem, phone patch.)

**Potentiometers adjust** - Potentiometers are used to adjust the received audio levels (one of each connector). Each potentiometer is associated with a connector as follows:

ACC. -J1:	RX1
ACC. -J2:	RX2
ACC. -J3:	RX3
ACC. -J4:	RX4

The potentiometers are located on the rear panel of the MICOM-500E.  
For more details see Service Manual 68P02952C55

**PERFORMANCE SPECIFICATIONS for 400W TRANSCEIVER****GENERAL**

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Frequency Range XMIT	1.6 – 30 MHz
Frequency Range RX	0.1 – 30 MHz (0.1 - 1.6 MHz reduced spec)
RF Input Impedance	50 Ohms
Number of Channels	200 SIMPLEX or HALF DUPLEX
Scanning <sup>1</sup>	5 groups with up to 100 channels per group, including 1 guard channel. Programmable scan rate: 1 - 5 sec. per channel, in 1 sec. steps
Frequency Stability	0.6 PPM @ -10° to 60°C
Frequency Drift (Aging)	1 PPM/year
Synthesizer Lock Time	10 msec. Max
Frequency Resolution	10 Hz
Operating Temp. Range	-10° to +60°C
Storage Temp. Range	-30° to +70°C
Humidity	95% @ 50°C
Remote Control Interface	RS232C (Optional)
Modes of Operation	J3E SSB R3E PILOT H3E AME J2A CW J2B RTTY, ARQ, FEC, PACKET, MCW B8C FAX, DATA, FSK
Operating Voltage	14VDC
Dimensions	
Height (mm/inch)	265/10.43
Width (mm/inch)	422/16.61
Depth (mm/inch)	508/20
<b>CURRENT CONSUMPTION @ 14 VDC</b>	
XMIT Voice (500 W P.E.P.)	100 Amp
Receive Full Audio	2 Amp
Squelch	1.7 Amp

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<sup>1</sup> ALE specification see user manual 6802952C60

**TRANSMITTER**

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Output Power	400W P.E.P. and average +1dB to -2dB
Reduced Power Levels	400W, 350W, 300W, 200W (RSS programmable)
Audio Bandwidth <sup>2</sup>	350 to 2700 Hz at -6dB
Audio Bandwidth Ripple	3 dB
Intermodulation	-24 dB / 400W P.E.P
Spurious Emissions	-60 dB / 400W P.E.P
Carrier Suppression	-50dB / 400W P.E.P
Undesired Sideband Suppression	-55dB / 400W P.E.P
Audio Distortion	2.5%
1/2 Power Mic. Sensitivity	15 to 125mV (RMS)/600 Ohms
Hum & Ripple	-50 dB
Inband Noise	-60 dB (30 Hz BW)
TX/RX Switching Time	10 msec
Tx Tuning Adjustments <sup>3</sup>	None

**RECEIVER**

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Sensitivity (SINAD) SSB	0.5 $\mu$ V for 10 dB SINAD (0.35 $\mu$ V Typical. Note 1) 0.1 - 1.6 MHz with reduced performance
1/2 Rated Power Sensitivity	1 $\mu$ V for 2.5W audio at speaker
Selectivity <sup>2</sup>	- 6 dB @ 350 to 2700 Hz -60 dB @ -1 kHz; +4 kHz
Image Rejection	-80 dB
IF Rejection	-85 dB

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<sup>2</sup> See Micom 2E spec. for more Bands widths.

<sup>3</sup> For tune procedure wait about 2 sec when stepping from one channel to another before transmitting.

**RECEIVER** (continued)

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Undesired Sideband Rejection	-55 dB @ -1 kHz
Spurious	-80 dB
Intermodulation	-80 dB
Crossmodulation	-100 dB @ 100 kHz
Desensitization	-100 dB @ 100 kHz
Reciprocal Mixing	-100 dB @ 100 kHz
Audio Power at Speaker	5W @ 2.5% distortion
RGC Range	5 $\mu$ V to 1V (2 dB change in output level)
RGC Time Constants	Attack time 10 msec
Voice	Release time 1500 msec
Data	Attack time 10 msec
	Release time 10 msec
Squelch	Constant SINAD (digital)
Clarifier Range	$\pm$ 200 Hz
Receiver Tuning Adjustments	None
Maximum Antenna Input	20 kV transient, 100V RMS for 2 minutes

**CONTROLS**

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Standard and optional: volume, on/off, scroll, squelch, scan, USB/LSB, call, monitor, priority, func and accessory/programming connector.

*Specifications subject to change without notice.*

## 400W TRANSCEIVER MODEL COMPLEMENTS

M81AMN0KV5AK	Micom 2E-Trunk
FDN6125A	Amplifier 500 watts
FPN5585A	Power supply
FRN5865A	Junction box
01MB000027	Cables
01MB000029	Chassis
01MB000030	Miscellaneous
FMN1615A	Microphone

## TROUBLE SHOOTING

In case of malfunctioning, perform the following steps (refer to the Maintenance section in MICOM-2E Owner’s manual, Motorola publication number 6802952C60).

1. Turn OFF and ON the radio switch to reset both the radio and the amplifier.
  2. Use BITE (Only Low RF test)
  3. Refer to the User Troubleshooting Chart.
  4. Follow the troubleshooting procedures in this section, which provide instructions for isolating faulty boards.
- Troubleshooting a board at component level should be performed according to the notes on the relevant schematic diagram.

FAULT	ADVICE
CURR trip off-line VOLT trip off-line	Ensure power supply maintains voltage greater than 11.0VDC <i>under load</i> . Check DC cable connections.
VSWR trip off-line	Check integrity of antenna and feedline connections. Check for evidence of arc-over or dielectric breakdown of feedline. Ensure antenna is resonant (<2:1 SWR) at the desired operating frequency.
Amp TEMP led is on.	Reduce drive level or duty-cycle. Ensure fan unit is operating properly.
No PTT Keying	Ensure transceiver, amplifier and DC supply all utilized a common ground.

## **RADIO MODIFICATION**

Modifications that had been taken in the radio, in order to integrate it with the 400W amplifier.

1. Omit R325 and R326 from the High-power board.
2. Add 150 $\Omega$  in parallel to R274.
3. Add diode in the ALC section.
4. Increase C127 to 4.7  $\mu$ F, R189 to 12K $\Omega$  and decrease C117 to 10 $\mu$ F.
3. Omit L1FL22 from the LORD board.
4. Add 10K $\Omega$  in parallel to C7018.
5. Jumper between R1FL22 and L1FL22 junction to the radio ALC circuit.

## **RADIO TUNING PROCEDURE**

Before operating the 400W transceiver, a calibration procedure should be taken. An IBM PC and RSS (Radio Service Software) package, FLN2514, are required to align the radio.(factory setting)

1. On the accessories section, please mark the check box of the “1kw Amplifier”.
2. There are 4 steps of power outputs as noted above. If you need to perform a power calibration, please refer to the power calibration procedure in the MICOM-2E RSS manual.
3. Only the “Low RF test” can be tested. Do not use the “Full test” and the “Channel test”.
4. On the option section, please mark the check box of the “power data level” to “LOW” in order to reduce the sounding and data communication power output to 200W.

## **ALE**

Automatic Link Establishment (ALE) is an embedded feature inside the Micom-2E/R ALE family of mobile/fixed station HF-SSB radios.

Through the combined use of channel scanning, selective calling and Link Quality Analysis, ALE automatically selects the best available communications link. It is no longer necessary for an operator to be familiar with the varying factors, which affect high frequency (HF) propagation between two points.

Each ALE equipped Micom-2 ALE family radio stores a matrix of Link Quality Analysis (LQA) scores for all other stations in the HF network. Memorized LQA scores are derived from an analysis of channel "soundings" which are periodically transmitted by each network station. When an operator selects the individual or net call address of the receiving station, ALE automatically determines the optimum available channel and automatically initiates calling procedures. Sending and receiving operators are alerted when a communication link has been established.