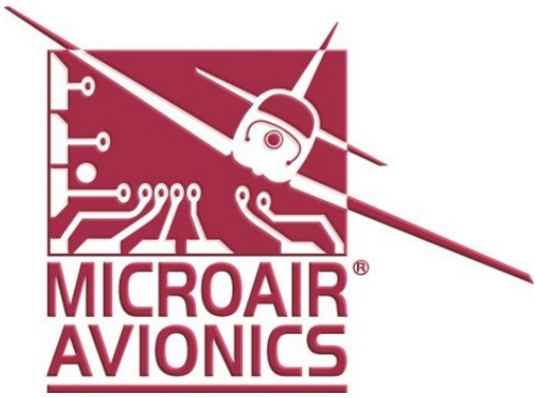

M760REM-01-0

Airband VHF Transceiver
User Manual

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1.0 Introduction

The M760REM-USER describes installation, data interface, and operation of the transceiver.

The M760REM-USER is a controlled document and may not be chnaged without the prior consent of Miroair Avionics.

2.0 Development History

The M760REM is a development of the Microair M760 Airband Transceiver. This development replaces the human interface display assembly, with a serial data interface.

The M760REM retains the serial data SL30 interface from the M760, for control over the active frequency, standby frequency, and dual monitor mode.

The serial data interface replaces all controls normally accessible from the display assembly, with serial command codes. A third party control unit can use these commands to maintain full control and operation of the M760REM.

Existing controls and interfaces such as the microphone audio in, headphone audio out, and PTT line remain unchanged from the original M760.

3.0 Installation

The M760REM has no display or human interface control. The unit can fixed to any appropriate aircraft structure which is inside the aircraft cabin. The M760REM should be located clear of air vents or cabin heating, and should not be subject to outside weather. For pressurised aircraft, the M760REM shall be located inside the pressure hull, in a temperature controlled space.

3.1 Mounting

The M760REM has mounting flanges with four M4 x 10 (5/32” x 3/8”) slotted holes.

3.2 Connection

Electrical connection is made using a Sub-D15 connector, which is held in place using thumbscres or lock bolts (4-40).

The RF connection is made using a 50 ohm BNC connector.

3.3 Location

The location of the M760REM should consider access to the adjustment trimpots for microphone gain, sidetone level, and headphone aduio level. Consideration should also be given to the connector and cable bending radius for the wiring harness and coax cable.

3.4 Antenna

The M760REM is compatible with any TSO C37d/C38d compliant Airband antenna. The coaxial cable shall be 50 ohm (eg RG58/RG400).

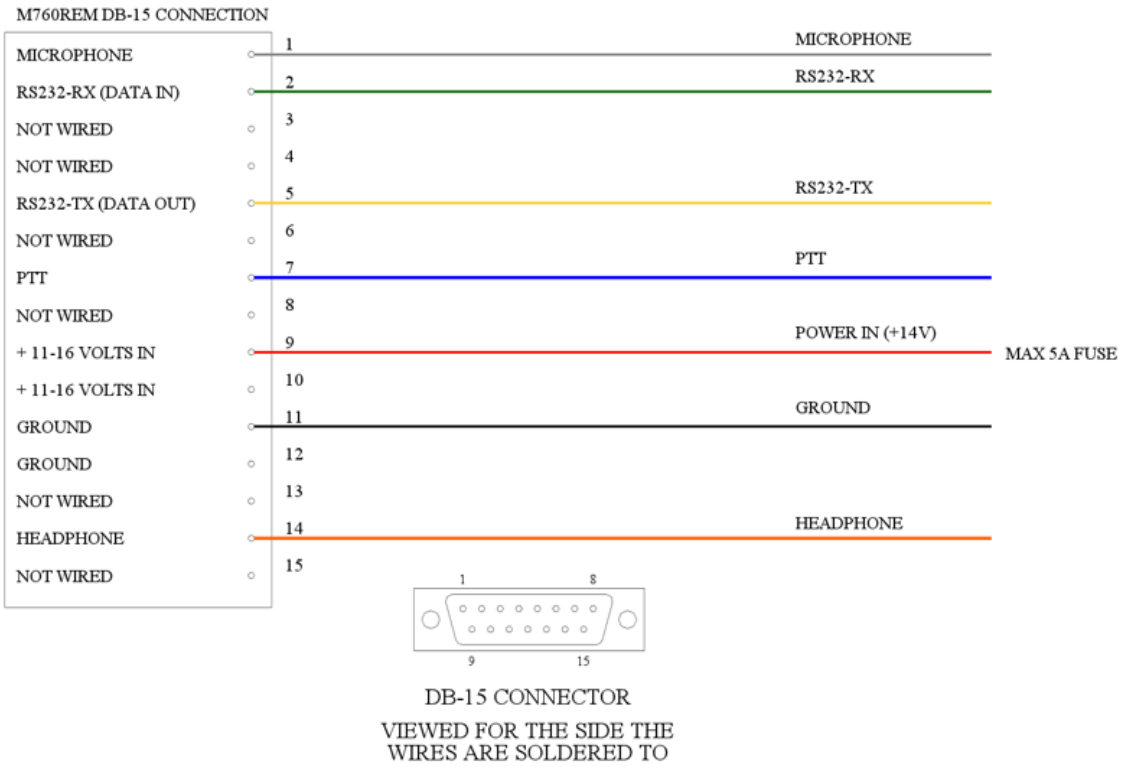
3.5 Wiring

Microair recommends the use of the Mil-Spec wiring for all lines, and installaed in accordance with the techniques described in FAA AC43-13-2A

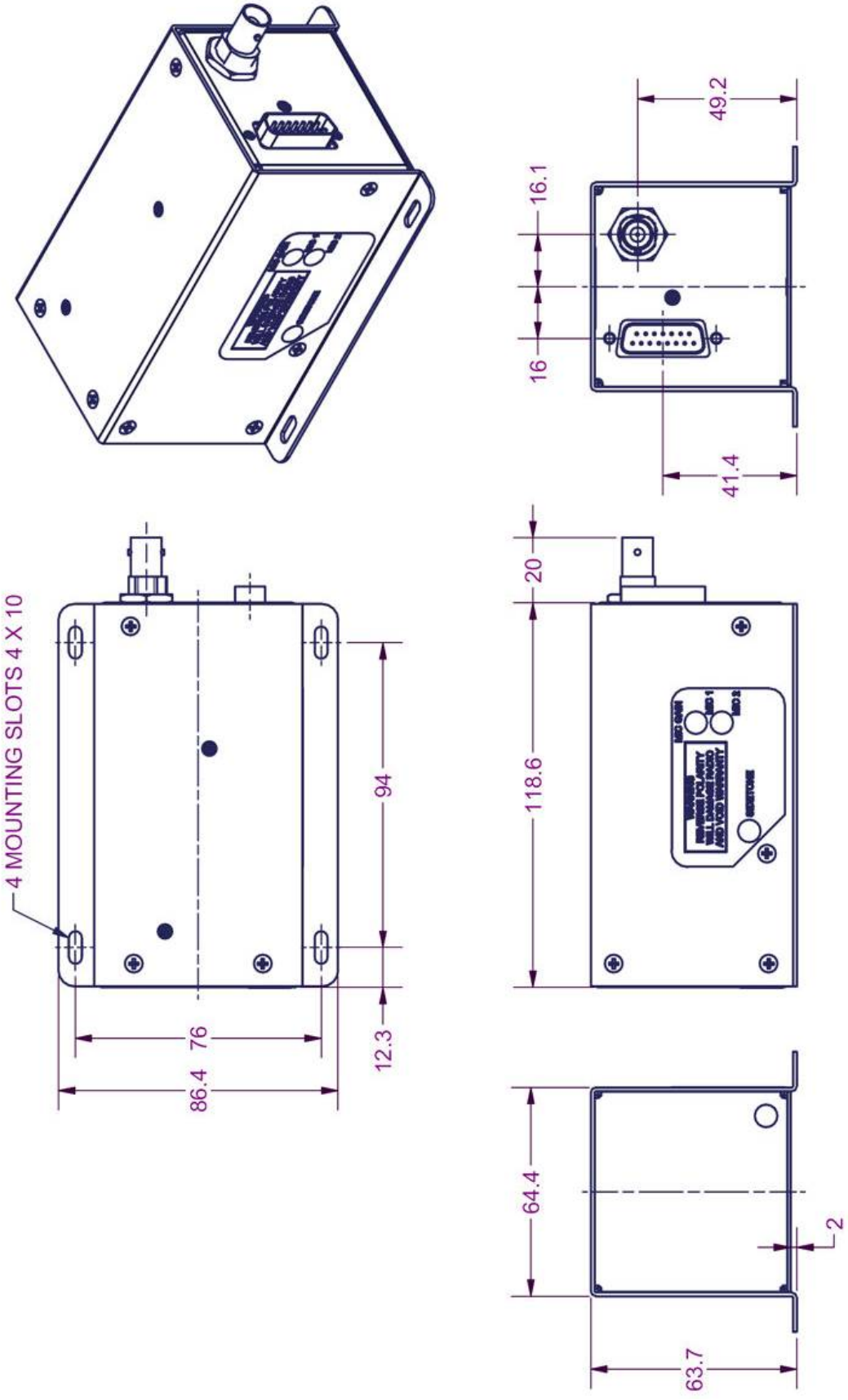
Pin	Line	Wire
1	Pilot Microphone	Electret or amplified dynamic
2	RS232 RX	RS232 TX (data in)
5	RS232 TX	RS232 RX (data out)
7	PTT	<3Vdc to activate
9	Power	+14V (do not exceed 16Vdc)
10	Power	+14V (do not exceed 16Vdc)
11	Ground	Aircraft Ground
12	Ground	Aircraft Ground
14	Headphone	Line level Audio (typical 100mW into 600Ohms)
BNC	Aerial	RG58C/U 50 ohm Coaxial Cable

All wiring is connected by soldering to the DB15 connector. Inspect the solder cup side of the DB15 carefully to determine the pin numbering.

3.6 Wiring Diagram



3.7 Technical Drawing



4.0 Transceiver Control

The M760REM is fully controlled via the following connections:

- RS232 Serial Data Interface
- PTT line
- Microphone Audio Input
- Headphone Audio Output

4.1 RS232 Serial Data Interface

Data Rate: 9600 Baud
8 bit
Parity = none
Stop = 1 bit
Flow = none

The M760 supports the basic SL30 command set for transceiver control.

SL30	Command	Description
Input	$PMRRV24iidda<chksm><CR<LF>	Request for Data Output
Input	$PMRRV29mka<chksm><CR<LF>	Set Standby Comm Frequency & Function
Input	$PMRRV42mka<chksm><CR<LF>	Set Active Comm Frequency & Function
Input	$PMRRV51<ss><chksm><CR><LF>	Set Squlech Level
Output	$PMRRV32S<ss><chlsm><CR><LF>	Reports Squelch Level
Output	$PMRRV20<chksm><CR<LF>	Reset function (M760 ready for data)
Output	$PMRRV35mkmkas<chksm><CR<LF>	Comm Transceiver Status

4.1.1 Transceiver Function

In both the set standby and set active commands the “a” field represents the transceiver function:

N = Normal Transceiver receives and transmits on the active.
M = Monitor Transceiver receives on both active and standby, and transmits on active.
0 = Unchanged Transceiver function setting not changed

Hence it is possible for the external equipment (if it supports these commands fully) to change the active and standby frequencies, and switch the M760Q in and out of monitor mode.

4.1.2 Transceiver Status

The Comm Transceiver Status command contains the "a" field for the transceiver's status:

R = Normal receive	Normal receiver mode – monitor function inactive
M = Monitor service	Monitor function active
T = Transmit enabled	PTT button is down - transmitting
S = Stuck mic	Transceiver transmitting for longer than 45 seconds
F = Comm failure	Transceiver inoperative

IMPORTANT NOTE
After 45 seconds of transmission, the M760Q will flash the red LED TX annunciator. During this period the transceiver status will default to S (stuck mic).

4.1.3 Set Squelch Level

$PMRRV51<ss><chksum><CR><LF>

Where <ss> is the ASCII representation of the seven bit squelch value.

Each four bit nibble is added to 0x30 (30 hex). The most significant nibble is transmitted first:

Example *If the squelch value is to be set to mid-scale (64 decimal, 40 hex) <ss> would be 40 (0x34 0x30)<chksum> the message checksum, including message identifier through data characters. The two digit checksum is generated by adding all values of valid characters together ignoring carry (if any). This value is converted into two encoded hex characters (0x30-0x3F).*

A command to set the squelch value to mid-scale (0x40) would result in the command string of **$PMRRV51??>4<CR><LF>**

4.1.4 Report Squelch Level

$PMRRV32S<ss><chksum><CR><LF>

Where S indicates it is the Squelch value is being reported.
<ss> is the ASCII representation of the seven bit squelch value.

Each four bit nibble is added to 0x30 (30 hex). The most significant nibble is transmitted first.

Example *If the squelch value is to be set to mid-scale (64 decimal, 40 hex) <ss> would be 40 (0x34 0x30)<chksum> the message checksum, including message identifier through data characters. The two digit checksum is generated by adding all values of valid characters together ignoring carry (if any). This value is converted into two encoded hex characters (0x30-0x3F).*

A report to a command to set the squelch to mid-scale will report the following string **$PMRRV32S407=<CR><LF>**

The M760UAV will automatically report the new value of the squelch setting immediately following a Set Squelch Command. There is approximately a 100mS delay between processing the command and reporting the new value.

4.2 PTT Line

The M760REM PTT line is designed to activate the transmitter when the PTT falls below 3Vdc. The line may be completely grounded if required.

4.3 Microphone Audio Input

The M760REM provides a 9Vdc bias voltage for Electret or Amplified Dynamic microphone types. Where the M760REM is to be connected to an Audio Panel type equipment, the optimum input is line level (1V P-P).

The microphone gain and sidetone are adjustable via the trimpot(s) which can be accessed via the small hole(s) in the side of the chassis.

4.4 Headphone Audio Output

The M760REM will deliver line level audio out. The level is adjustable via the trimpot which can be accessed via the small hole in the front plate.

5.0 Specification

Radio Type	Amplitude Modulation (AM) Aircraft Transceiver	
Channels	760 channels - 25KHz spacing	TX: 118.000 – 136.975MHz RX: 108.000 – 139.975MHz
Receiver	RTCA/DO-186B Class D	
Transmitter	RTCA/DO-186B Class 4	
TX Frequency Stability	0.4 ppm (0.00004%)	
Frequency Control	Microprocessor controlled: phase lock loop / voltage controlled oscillator	
Memories	99 programmable memories Active & Standby channels with Dual RX monitoring function	
Priority Key	Fast access to memory 25 (typically 121.500MHz)	
Power consumption	Receive (no signal) 100 mA Transmit 1.8 A	
Input Voltage	10.7 – 16.0 Volts dc Minimum operation 10.7V (receive only)	
Power output	5.0 – 5.5 Watts carrier – no modulation	
Modulation	70% (nominal)	
VSWR Tolerance	< 5:1	
Receiver sensitivity	>20dB SINAD @ 1.0uV	
Receiver Selectivity	± 3.75KHz @ 3dB ± 8.75KHz @ 90dB	
Microphone Types	Electret or Amplified Dynamic	
Headset volume output	Adjustable: up to 100mW output into 600 ohms	
Temperature range	-20 - +55 degrees Celsius	
Dimensions	W-87mm H-64mm D-119mm (plus 35mm for harness) W-3.4” H-2.5” D-4.7” (plus 1.5” for harness)	
Weight	338 grams 13 ounces	