G4HUP

DG8 Masthead Pre-amplifier

By GM3SEK

Technical Manual

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Unit Specifications

Model Ref Masthead VHF Pre-Amplifier DG8 2

Serial No

Input Frequency	144	MHz
Input Intercept	+10	dBm
Receive Function		
Noise Figure[1]	typ 1.2	dB
Gain (Max)[1]	typ 16	dB
Transmit Function		
Through loss[1]	<0.05	dB
Input VSWR	Typ <1.1:1	
Forward RF Power	750	W (JT65 rating)
Supply Voltage[2]	10 – 15	V
Supply Current[3]	typ 140	mA @ 13.8vdc

Notes:

1 Gain and Noise Figure measurements made with HP8970A and 346A Noise Head

2 DC Power to the preamp is provided via the coaxial feed cable. A suitable DC injector (Bias Tee) with adequate forward RF power handling is required at the system end of the feeder.

3 This figure is the sum of the relay currents (active on Rx) and the amplifier operating current.

Scope of Document

This document is intended to provide all necessary information to guide users in the construction and installation of all variants of the G4HUP VHF Masthead Pre-Amplifier Model DG8 in normal operation.

Units are supplied with all electronic assembly and alignment completed, and protected with a conformal coating. All required hardware for completion is also supplied, including a permeable vent for the case.

This document is relevant for DG8 assembly kits only. For the construction details for DG8 Short Kits, please refer to GM3SEK's article at http://www.ifwtech.co.uk/g3sek/vhfdx/dg8-preamp-v7-4.pdf Important information needed for the completion of this kit will also be found in this document.

Reference data can be found on the DG8 pages of the G4HUP web-site, including any identified issues or problems – http://g4hup.com/DG8/DG8.html.

DG8 Amplifier Versions

There is currently only one version of the DG8 design supplied in assembly kit form. This version is for operation in the 144MHz (2m) band.

DG8 Amplifier Description

The DG8 masthead mounting pre-amplifier, and the concepts behind it fully described in the article in Radcom Plus Issue 1 by the designer, GM3SEK. An updated copy of this article can be found at the link above.

The DG8 Assembly kit is supplied as an aligned RF module, with the necessary extra parts to complete the project. There is no further adjustment required by the user with the exception of optimizing the system gain via an on-board preset resistor.

Since the concept of this pre-amplifier is based around eliminating the connectors mounted on the external case of the unit, there are no connectors supplied with the kit. The antenna cable and shack cable connect directly on to the PCB, and are supported through the case wall in cable glands. The antenna cable from the preamp can run directly to the antenna system feedpoint.

For convenience, you may wish to break the cable to the shack close to the pre-amp, for maintenance purposes. You should use in-line connectors for this, as these are much easier to weatherproof to a satisfactory standard than case mounted connectors.

A drilling template is supplied to assist with marking out the case ready for final assembly – see Fig 1.

DG8 Final Assembly

There are three stages to the final assembly.

1 Prepare the case. Using the template mark out and drill the 16mm dia holes in the case lower part for the two cable glands. Note that the PCB is mounted off-centre to allow for the RG400 coax link.

2 The permeable vent should be mounted on a side face of the box for best performance. In a convenient part towards the end of a side face, mark and drill a 12mm hole for the permeable vent. Mount the vent low on the side wall, so that it will be below the level of the PCB once the unit is assembled. This reduces the risk of the vent backnut fouling the PCB. There is no need to drill the 2mm dia breathing holes that GM3SEK mentions - the vent replaces them, and stops any insects etc getting into your enclosure.

3 Solder the 4 brass 0.25" tags onto the lower side of the PCB, either side of the input and output connections - these will be the ground connections for the shield of each coax.

4 Mount the cable glands in position and tighten them up. Run each of the cables through the glands - pull plenty of cable through at this stage.

5 Follow the details in Stage 5 of GM3SEK's document to prepare and connect the two cables to the PCB. Make sure that you have them the right way round!

6 Once this is completed, follow the adjustment procedure described in the Power-up and Alignment procedure of the GM3SEK document. Stage 2 tells you the conditions to prepare, and then you only need to do stages 9 and 10, since all other alignment has been completed.

7 Although the PCB assembly has already been given a covering of Conformal Coating, you may want to apply another coat to seal the cable ends at this stage.

Your DG8 is now ready to install on your antenna system.

Important Note

The preamp has been fully aligned, so no adjustment of any of the four cores will be needed. It has been optimized in a 50R test system, using HP noise measurement equipment and a purpose designed test fixture.

If your antenna is not well matched, you may appear to get an improved performance by adjusting the core of the input bandpass filter, L1 - DO NOT DO THIS! This will degrade the filtering of the system. You will get the best benefit by working to improve the match of your antenna system, not by adjusting the pre-amp!

Change History

Date	Iss No	Comment	Author
14 Feb 2-16	0.A	First Draft version	G4HUP
24 Feb 2016	1.0	Revised to V1	G4HUP
1 Jun 2016	1.01	Minor typo corrections, link updates, Fig 1 revision	G4HUP

End of text – Diagrams follow

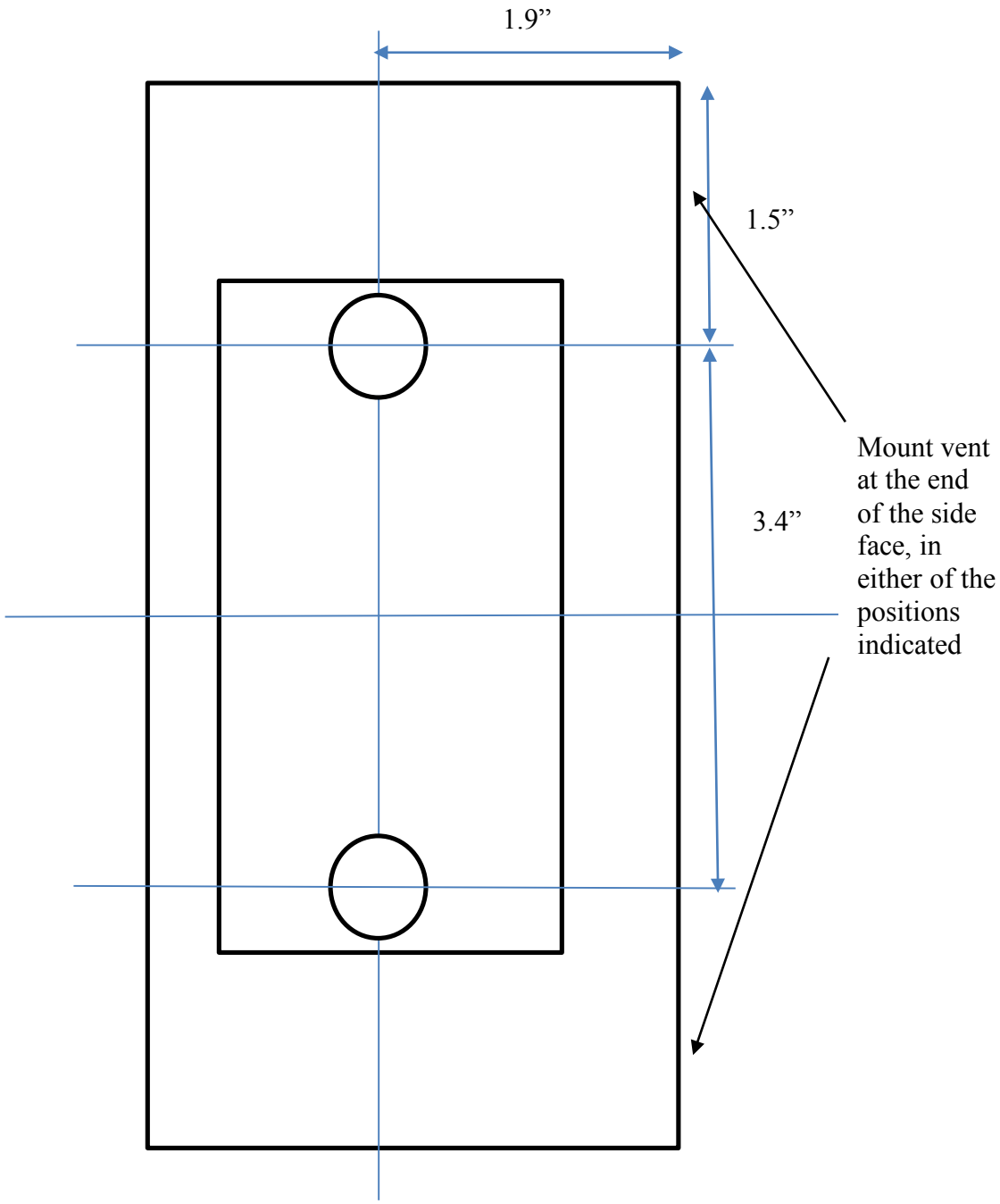

Fig 1 – Drilling dimensions for underside of box – NOT TO SCALE!