

JUMA 100W PA

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Purpose

This is the fourth document in this series that describes the build and testing of the JUMA PA100-D in a step by step process with thoughts and ideas based on my build of the 100W PA. Most of the graphics are from the JUMA website¹ and are placed in the order of the build as it progressed. Other photographs are those taken by myself during the build of the PA100-D.

This document aggregates the information provided on the JUMA website into a single document with additional commentary by myself. Thanks also to Ed (WA4MZS) for review comments which have been included.

Each section of the document provides the schematic diagram, the PCB layout, parts list and then the installation instructions. Testing of the module if applicable is in the latter part of the document.

Frequency Sense Module

General

The F-sense module is used only in digital model PA100-D. The board has three functions.

1. Frequency sensing

The board provides a clipped RF signal at suitable level for the digital control module for automatic band detection. The transformer T1 is used to pick up the exciter RF signal. The diodes D1 to D4 with the resistors R1 and R2 keep the F-sense RF signal at proper level for the digital control board.

2. RS232 connection

The jack type socket J2 provides RS232 connection for JUMA TRX2 or PC connection for firmware programming. There are two jumper blocks which are used to select between straight and cross connected TXD and RXD wiring. The jumper selection allows the use of a commercial jack - jack audio cable for the TRX2 RS232 connection. This jumper position is marked "NORMAL" on the board. When the RS232 connections is used to update the firmware with a PC, the "PROGRAM" jumper position should be selected. This way the JUMA TRX2 PC cable can be used. See the PC cable wiring.

3. Band DC voltage input

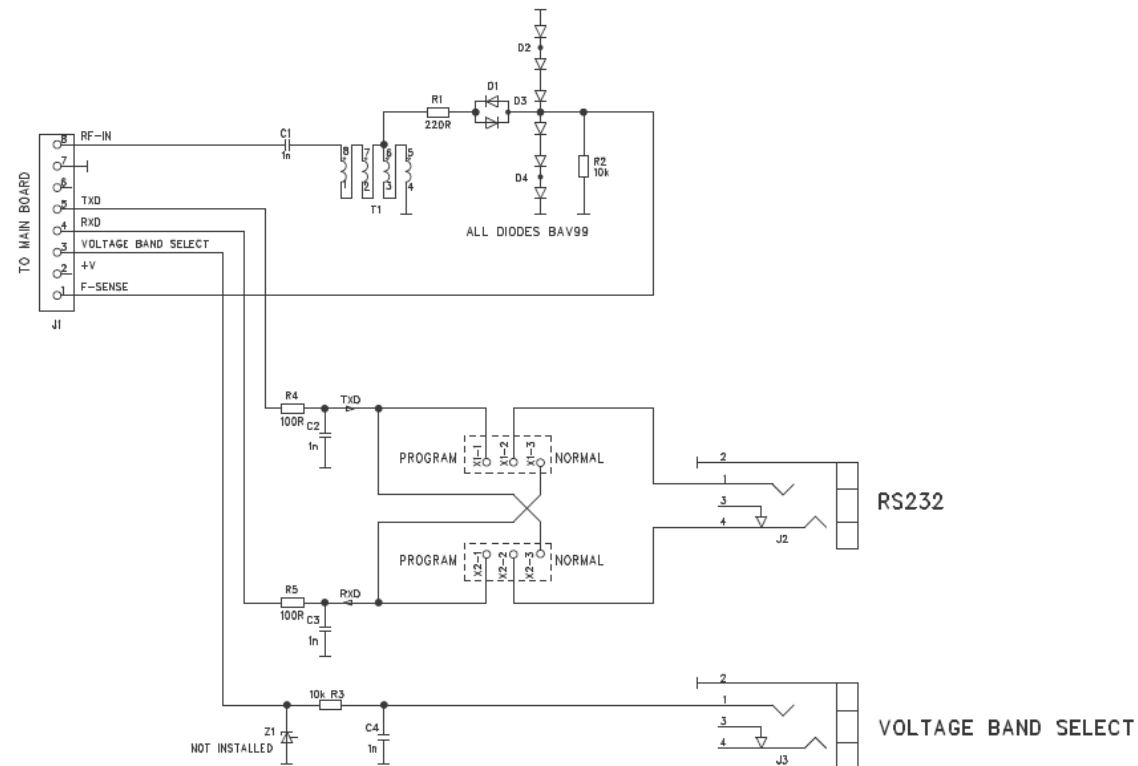
The jack type socket J3 provides Yaesu FT-817 (or similar) type DC band selection input. The DC voltage is connected into the jack tip terminal. Yaesu FT-817 band data DC voltage levels (nominal values) are provided below:

BAND	VOLTAGE
1.8 MHz	0.33 V
3.5 MHz	0.67 V
7 MHz	1.00 V
10 MHz	1.33 V
14 MHz	1.67 V
18 MHz	2.00 V
21 MHz	2.33 V
24 MHz	2.67 V
28 MHz	3.00 V

NOTE: Voltage tolerance for JUMA PA100 is ± 0.10 V.

NOTE: Band voltage levels below 0.23 V and over 3.10 V are not valid band data for PA100-D

¹ <http://www.jumaradio.com/juma-pa100/>



Drawn	2008-10-26	JUMA PA100 100W LINEAR AMPLIFIER FREQUENCY SENSE BOARD		OH7SV	
Design	OH7SV			Rev	B
Sheet	1/1	SCHEMATICS			
Copyright Matti Hohtola OH7SV 2008. This header must appear unaltered in all publications					

Figure 1 JUMA-PA100 Frequency Sense Module Schematic Diagram

PCB Layout

The PCB layout for the Frequency Sense Module is shown in Figure 2 and Figure 3.

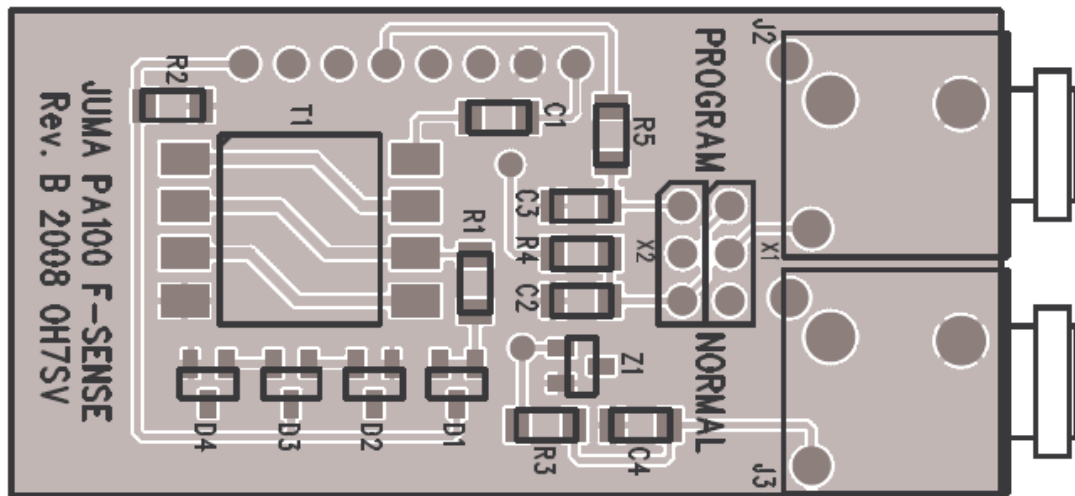


Figure 2 Frequency Sense Board – Top View.

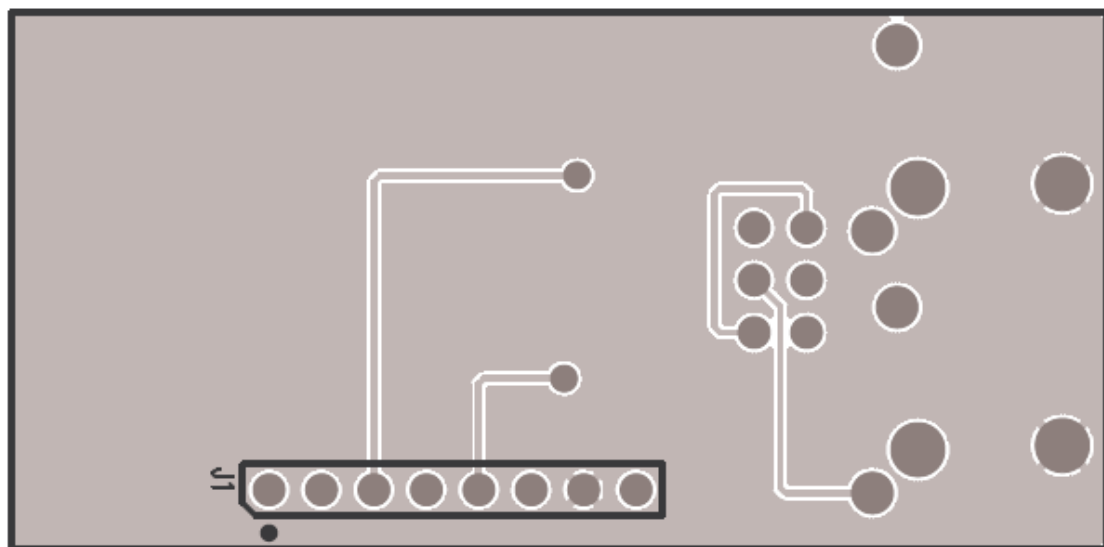


Figure 3 Frequency Sense Board – Bottom View.

Components

There are only a small number of components on the Frequency Sense Module and these are provided in the table below. Note again that this table provides the order of installation.

JUMA PA100 f-sense part list for PCB Rev. B, update 2008-12-01 (install in this order)

Part number	Value / type	Qty	Description	Picture
R4 R5	100R	2	SMD resistor size 1206 1%	
R1	220R	1		
R2 R3	10k	2		
C1 C2 C3 C4	1n	4	Ceramic capacitor size 1206 X7R or G0G	
D1 D2 D3 D4	BAV99	4	Dual Si-diode SO23	
Z1	Not installed	0	Not installed	
T1	WURTH 744-205	1	RF transformer (signal filter with 4 windings)	
J2 J3	3.5 mm stereo jack socket Schurter 4832-2320 or 4832-232, Farnell 152204	2	Align with the rear panel during soldering	
X1 X2	Pin header 2x3 (or 2 pcs 1x3)	1	Snippet of Tyco Electronics 5-826632-0, Farnell 3418560 or MOLEX 90131-0775, Farnell 9733680	
Jumper	Pitch 2.54 mm	2	For RS232 selection	
J1	Pin header 1x8, long pins Pin length 14 mm above PCB	1	Assemble to the bottom side	
Plug	3.5 mm stereo	1	For Band Data input	
Cable with stereo jacks (audio cable)	Straight 3.5 mm jack - jack cable Length approx 0.5 m	1	RS232 connection from JUMA TRX2 to PA100	
PCB		1	JUMA pa100 f-sense PCB	

Take care with the orientation of the transformer as it is non-symmetric. I used the orientation from the transformer label in Figure 8 to correctly orientate mine.

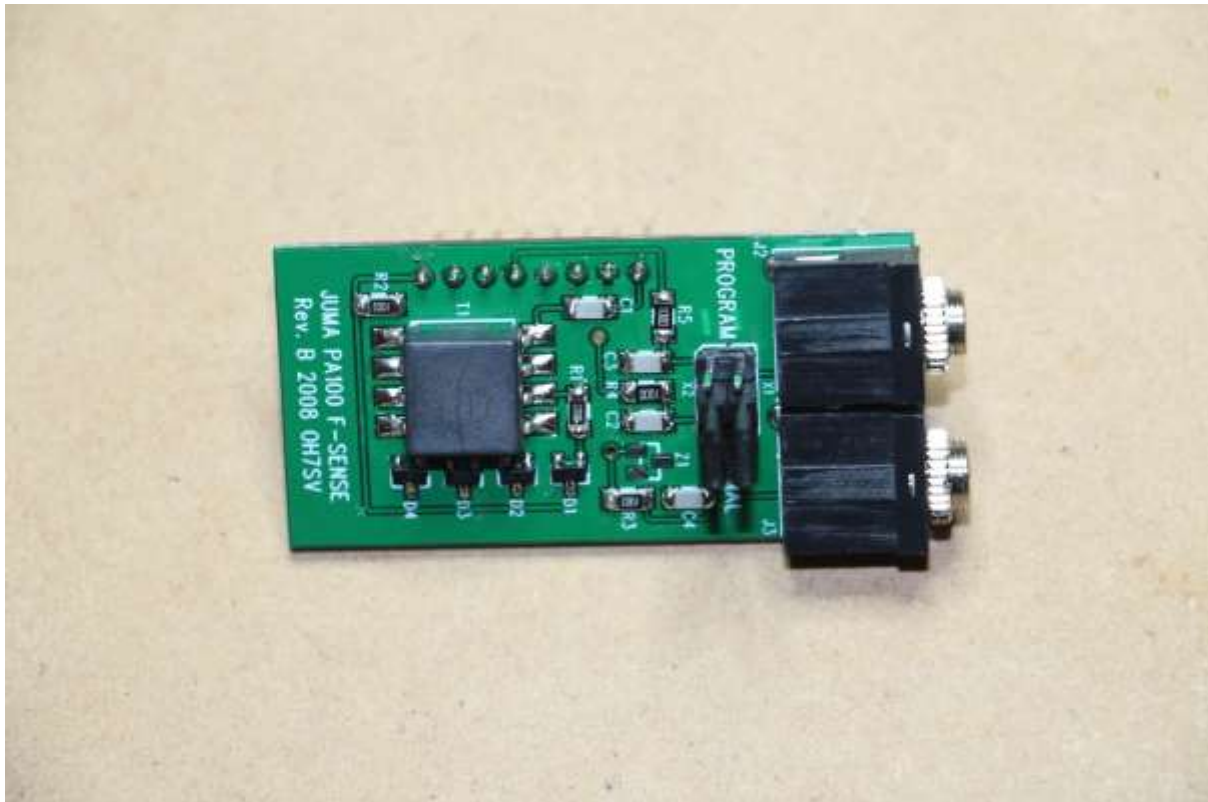


Figure 6 Frequency Sense Board with all components on top of PCB fitted.

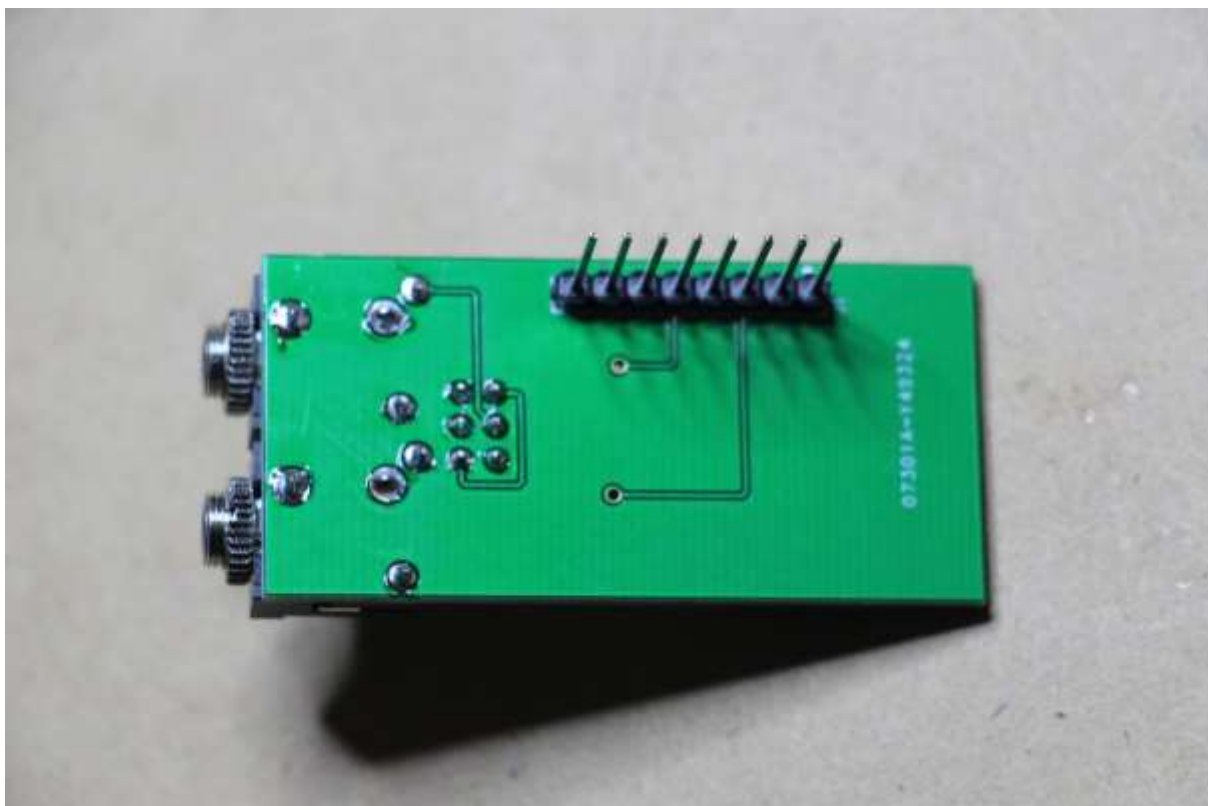


Figure 7 Frequency Sense Board with all components on bottom of PCB fitted.

NOTE make sure that the orientation of the 1x8 pin header is the correct way around.



Figure 8 Frequency Sense Board – Top View with all components mounted.



Figure 9 Frequency Sense Board – Mounted on Min Board.

Testing

There is not much to test on this board so a good visual inspection for shorts is all that is required.