

HF BPF 01_Busses and Rails

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Busses and Rails Introduction

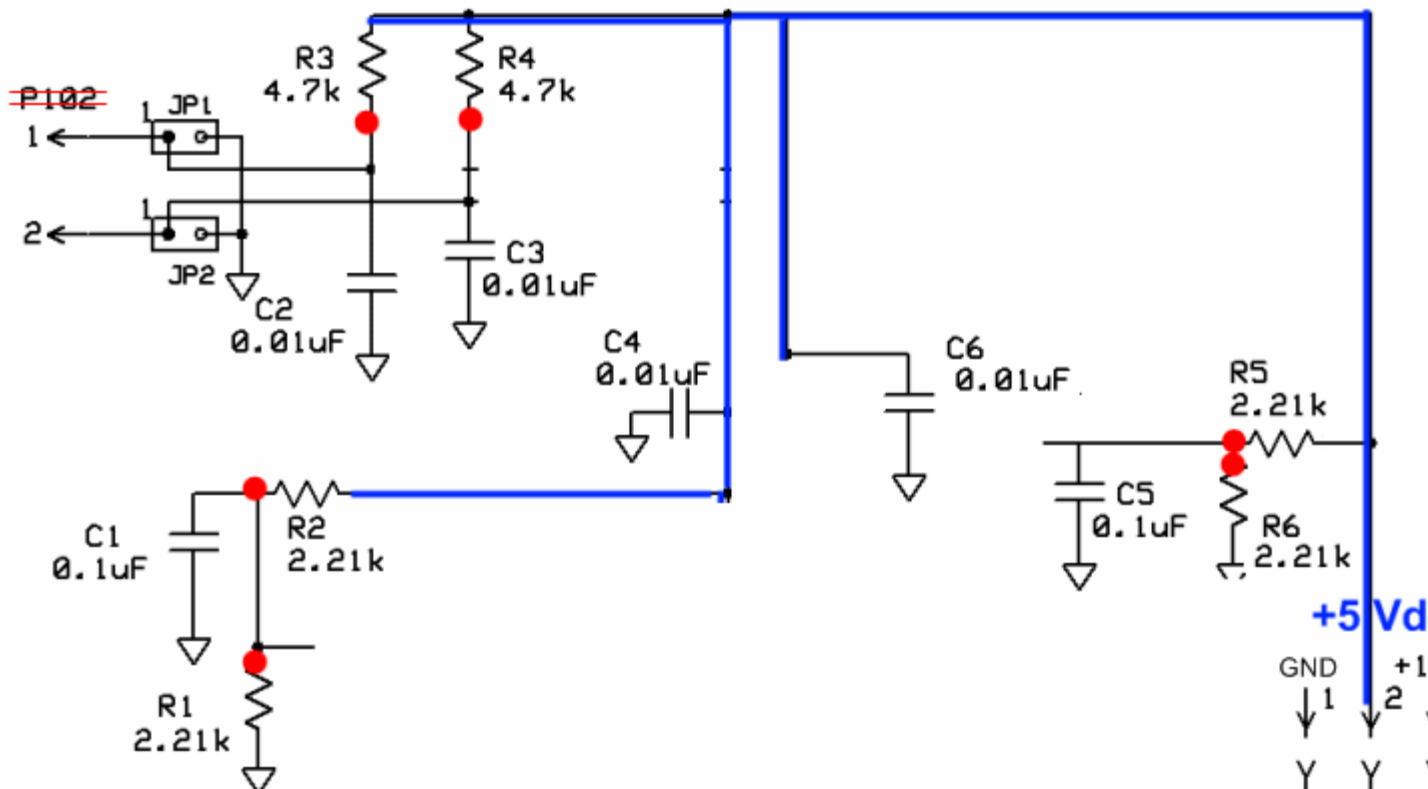
General

This stage provides the infrastructure "backbone" needed to support the switches and band filter chains.

Busses and Rails Schematic

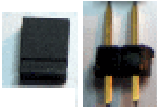
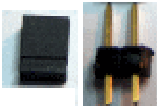
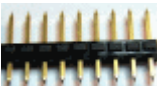
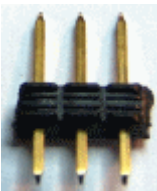
(Resistor testpoints (hairpin, top, or left-hand lead), as physically installed on the board, are marked in the schematic with red dots)

([Click for Full Schematic](#))



Busses and Rails Bill of Materials

Detailed Bill of Materials

Check	Designation	Component	Marking	Category	Orientation	Notes	Circuit
☐	C01	0.1 uF	black stripe 	SMT 1206			Busses and Rails
☐	C02	0.01 uF		SMT 1206			Busses and Rails
☐	C03	0.01 uF		SMT 1206			Busses and Rails
☐	C04	0.01 uF		SMT 1206			Busses and Rails
☐	C05	0.1 uF	black stripe 	SMT 1206			Busses and Rails
☐	C06	0.01 uF		SMT 1206			Busses and Rails
☐	C19	0.01 uF		SMT 1206			Busses and Rails
☐	JP1	header, 2-pin w/jumper		jumper			Busses and Rails
☐	JP2	header, 2-pin w/jumper		jumper			Busses and Rails
☐	P100	header, 9-pin		header			Busses and Rails
☐	P101	header, 3-pin		header		Pins: 1=gnd; 2=+5 Vdc; 3=+12Vdc. From V9.0 J2	Busses and Rails
☐	R01	2.21 k 1/4W 1%	r-r-br-br-br 	1/4W	E-W		Busses and Rails
☐	R02	2.21 k 1/4W 1%	r-r-br-br-br 	1/4W	W-E		Busses and

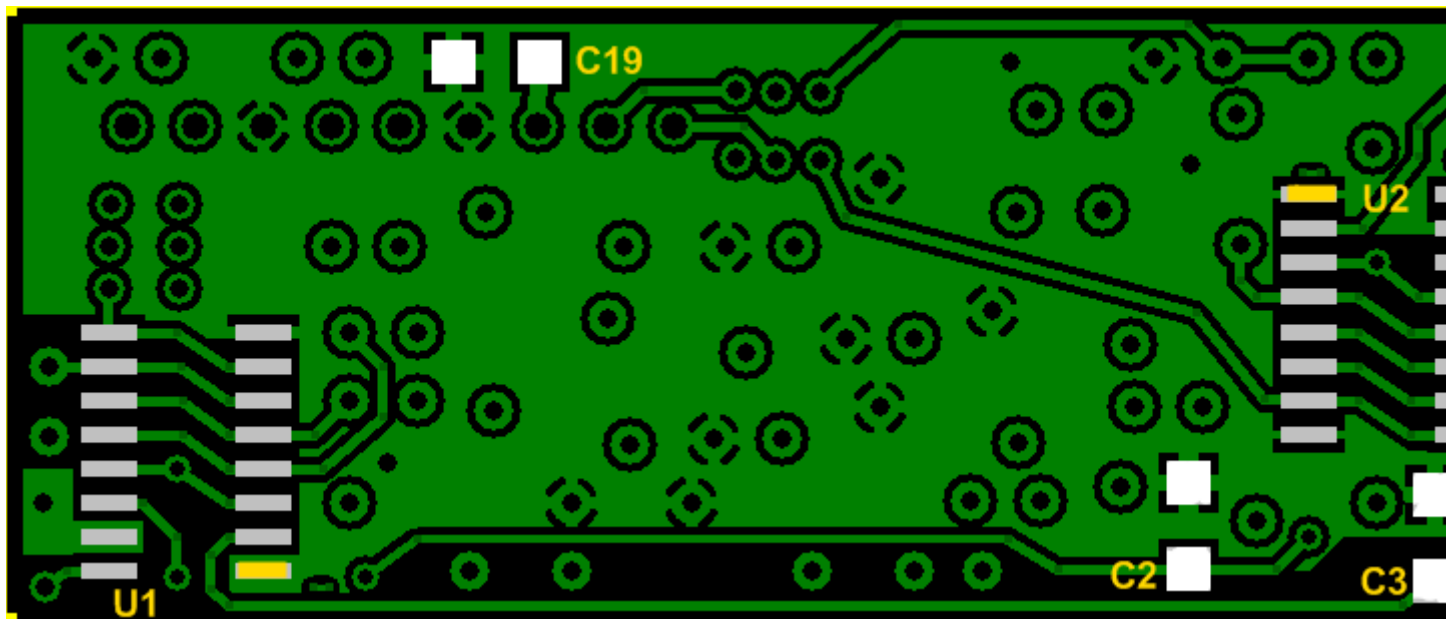
							Rails
☐	R03	4.7 k 1/4 W 5%	y-v-r-gl 	1/4W	W-E		Busses and Rails
☐	R04	4.7 k 1/4 W 5%	y-v-r-gl 	1/4W	W-E		Busses and Rails
☐	R05	2.21 k 1/4W 1%	r-r-br-br-br 	1/4W	W-E		Busses and Rails
☐	R06	2.21 k 1/4W 1%	r-r-br-br-br 	1/4W	E-W		Busses and Rails

Busses and Rails Summary Build Notes

- Install Bottomside SMT Caps
- Install Topside SMT Caps
- Install Resistors
- Install Connectors
- [Test the Stage](#)

Busses and Rails Detailed Build Notes

Bottom of the Board

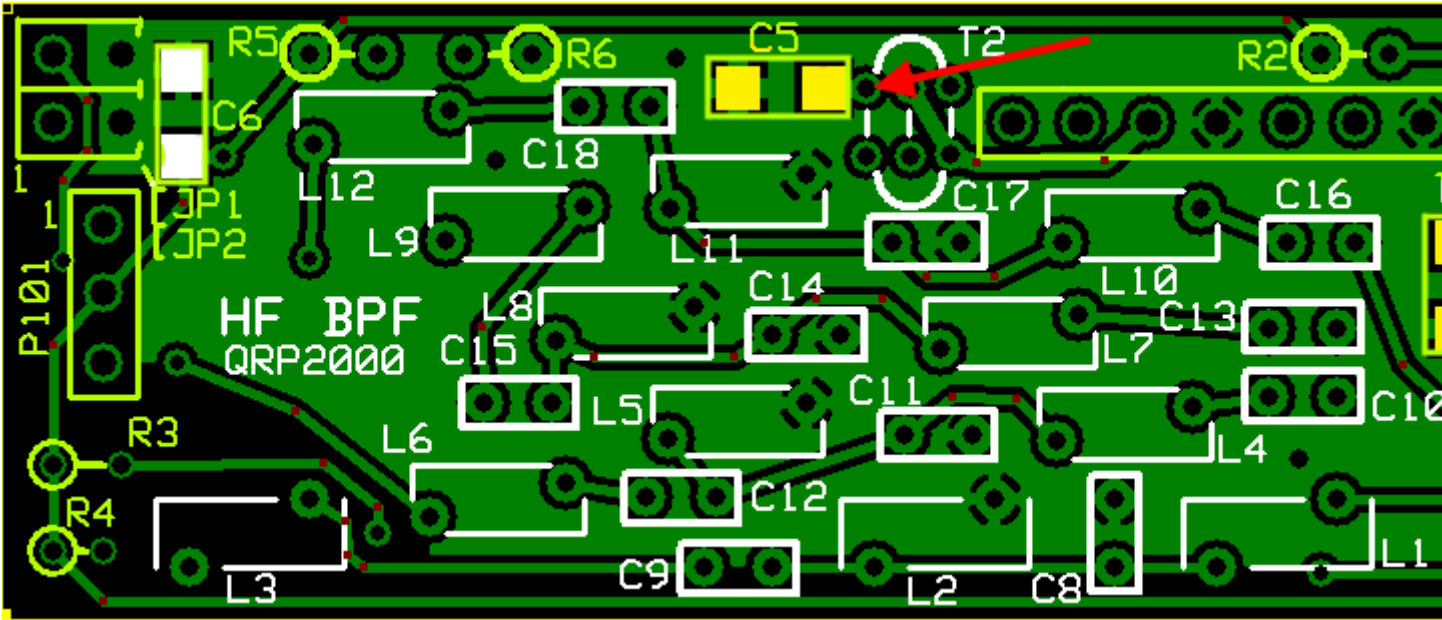


Install Bottomside SMT Caps

See graphic above: pads for 0.01 uF caps are white

Check	Designation	Component	Marking	Category	Orientation	Notes
☐	C19	0.01 uF		SMT 1206		
☐	C02	0.01 uF		SMT 1206		
☐	C03	0.01 uF		SMT 1206		

Top of the Board



Install Topside SMT Caps

See graphic above: pads for 0.01 uF caps are white

Take great care in soldering C5 and C1 to the board. The right-hand end of C5 and the top end of C1 are very close to thru-holes for T2 and T1 (see red arrows on the topside board view), respectively. You do NOT want to inadvertently splash solder into these holes (transformer mounting is hard enough without having to deal with solder residue blocking the holes). The author used a fine-pointed, wooden toothpick to block the holes when soldering these caps.

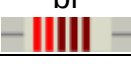
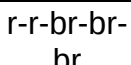
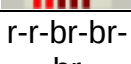
Check	Designation	Component	Marking	Category	Orientation	Notes
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☐	C06	0.01 uF		SMT 1206		
☐	C01	0.1 uF	black stripe 	SMT 1206		
☐	C04	0.01 uF		SMT 1206		
☐	C05	0.1 uF	black stripe 	SMT 1206		

Install Resistors

Resistor Orientation Codes

Note the orientation ("NS" means the resistor barrel is in the "northern" hole and the hairpin lead is in the "southern" hole. Orientation codes "WE", "EW", and "SN" operate in a similar fashion

Check	Designation	Component	Marking	Category	Orientation	Notes
☐	R01	2.21 k 1/4W 1%	r-r-br-br-br 	1/4W	E-W	
☐	R02	2.21 k 1/4W 1%	r-r-br-br-br 	1/4W	W-E	
☐	R03	4.7 k 1/4 W 5%	y-v-r-gl 	1/4W	W-E	
☐	R04	4.7 k 1/4 W 5%	y-v-r-gl 	1/4W	W-E	
☐	R05	2.21 k 1/4W 1%	r-r-br-br-br 	1/4W	W-E	
☐	R06	2.21 k 1/4W 1%	r-r-br-br-br 	1/4W	E-W	

Install Connectors

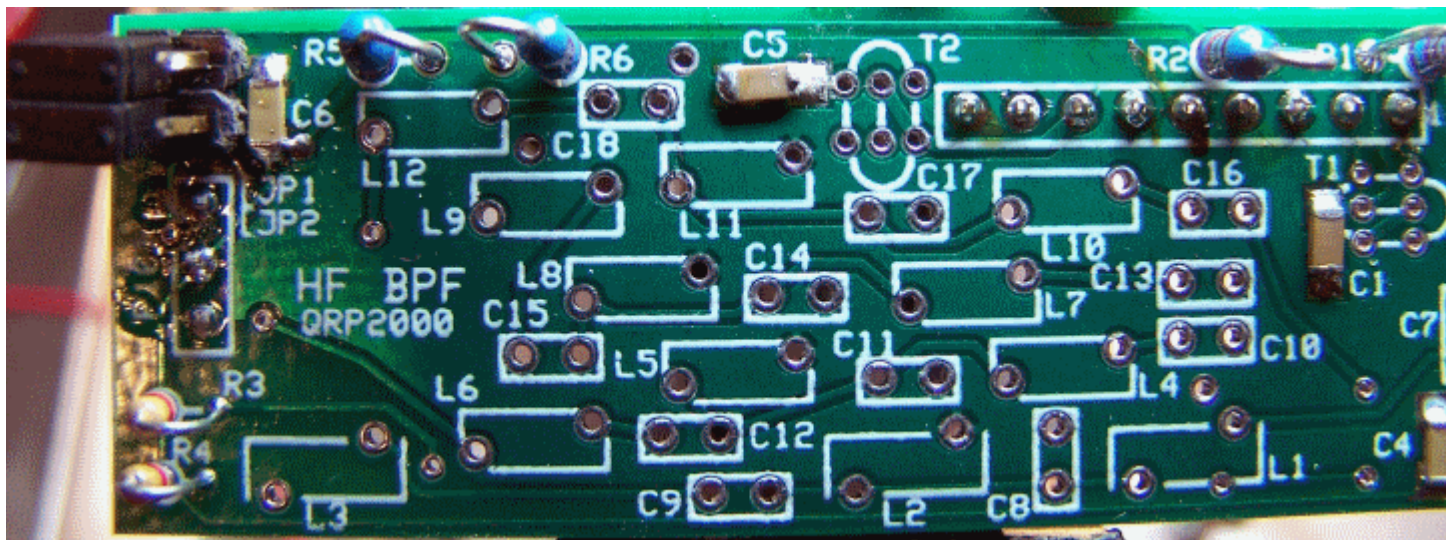
- JP1 & 2 installed to board top, with Pins pointing upwards
- P100 & 101 installed to bottom of board, with pins pointing downward (so as to ultimately mate with the V9.0 board)

- Once the firmware for the V9.0 RX is rewritten to provide the control signals for the BPF switching, JP1 and JP2 will be connected via a cable to the (male) J3 on the V9.0 RX board

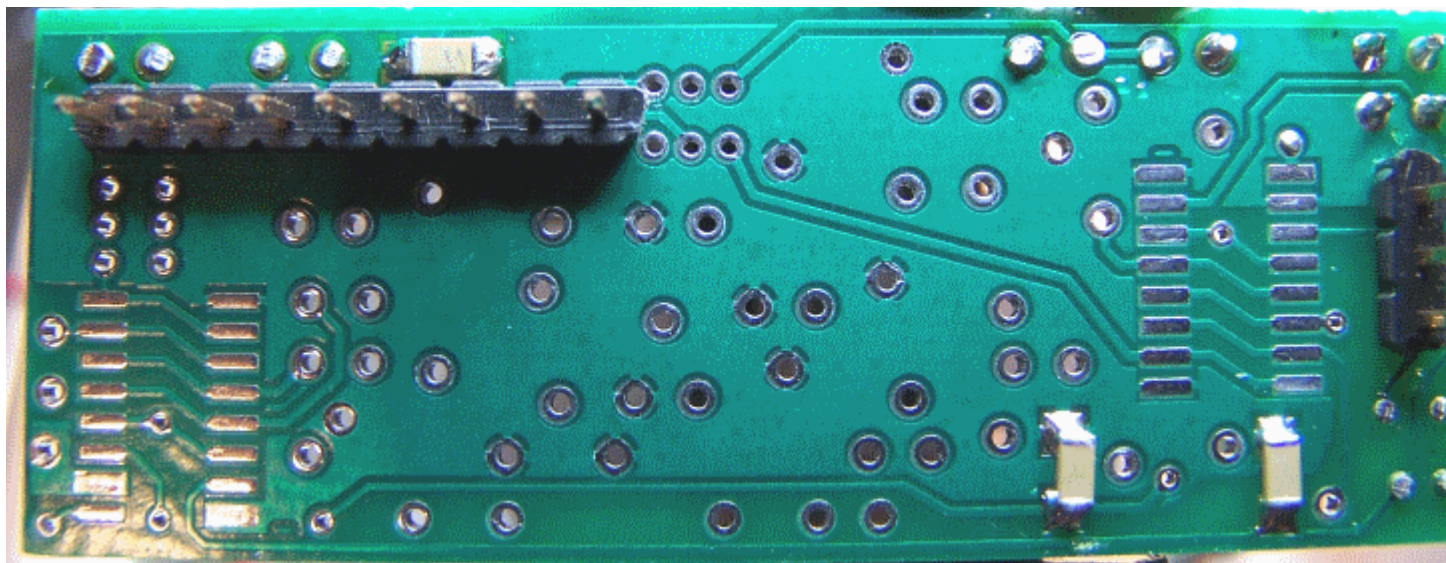
Check	Designation	Component	Marking	Category	Orientation	Notes
☐	JP1	header, 2-pin w/jumper		jumper		
☐	JP2	header, 2-pin w/jumper		jumper		
☐	P100	header, 9-pin		header		
☐	P101	header, 3-pin		header		Pins: 1=gnd; 2=+5 Vdc; 3=+12Vdc. From V9.0 J2

Busses and Rails Completed Stage

Top of the Board



Bottom of the Board



Busses and Rails Testing

Visual Check

Test Setup

Using very good lighting and magnification, carefully inspect the solder joints to identify bridges, cold joints, or poor contacts.

Resistance Tests

Test Setup

The following tests help validate there are good solder joints and no shorts on the power rail and should be passed before applying power to the HF-BPF board. If these tests are passed, you can be pretty sure the voltage tests will succeed.

Test Measurements

Testpoint	Units	Nominal Value	Author's	Yours
P101-pin 2 to P100 pin 3	k ohms	2.21	2.21	
Right-hand pin of JP1 to P100 pin 3	ohms	0	0	
Right-hand pin of JP2 to P100 pin 3	ohms	0	0	
R4 hairpin to P101 pin 2	k	4.7	4.72	

	ohms			
R3 hairpin to P101 pin 2	k ohms	4.7	4.63	
JP1 left-hand pin to P101 pin 2	k ohms	4.7	4.63	
JP2 left-hand pin to P101 pin 2	k ohms	4.7	4.72	
C5 right-hand end to P101 pin 2	k ohms	1.7	1.64	
C1 top end to P101 pin 2	k ohms	1.7	1.65	

Voltage Tests

Test Setup

This test assumes you have a [V9.0 Lite + Xtall RX board](#) that has been completed through (at least) the power supply stage. This is required because you want to test the "fit" of P100 and P101 to their corresponding jacks (J1 and J2) on the RX board and the RX board is a convenient source of regulated 5 Vdc power.

- Test the installation of P100 and P101 for "fit" by plugging the HF-BPF board into J1 and J3 of the V9.0 RX board
- Make sure JP1 and JP2 are un-jumpered. This should ensure that R3 and R4 cause Pins 1 of JP1 and JP2 to be pulled up to the 5 volt rail.
- Apply power (9-12 Vdc) to the V9.0 RX board
- Measure the voltages with respect to ground according to the table below (you can use either of the right-hand pins on JP1 or JP2 as a convenient ground connection)

Test Measurements

Testpoint	Units	Nominal Value	Author's	Yours
P101-Pin2	Vdc	5	4.96	_____
R6, hairpin lead	Vdc	2.5	2.48	_____
R1, hairpin lead	Vdc	2.5	2.48	_____
R3, hairpin lead	Vdc	5	2.96	_____
R4, hairpin lead	Vdc	5	4.96	_____

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