Interfacing the Masters Communication RA-42 Interface to the Motorola MSF5000

If you ordered the kit, then please note the one mod I made before you install R21 pull up resistor. I added a BAT43 diode in series to keep the Raspberry Pi from pulling DB9-7 low if power is lost. We are using that pin for TXIhibit line to the repeater. This provides a means to disable the repeater remotely. See the photo below for placement.

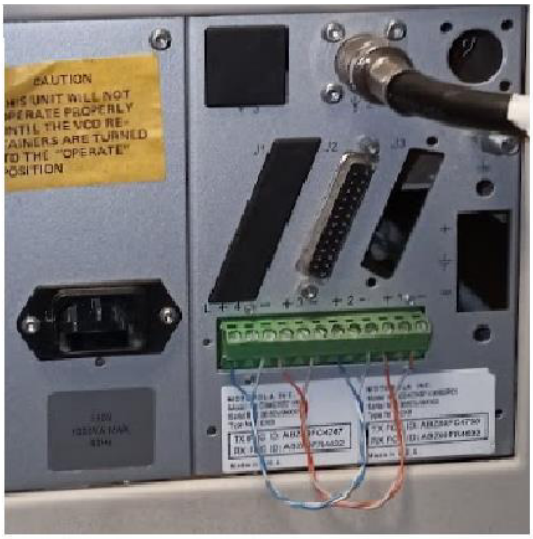
MSF5000 J2 DB-25 connector RA-42 DB-9 Interface *(Custom Cable)*

Pin	Function		Pin	Function
2	Line 2 Output +	*(1)	6	Disc_In
3	Line 2 Output -	(Shield)	8	GND (Shield)
5	TX Inhibit		7	Local Control Out
6	Line 1 Input +	*(2)	2	Audio_Out Left
7	Line 1 Input -	(Shield)	8	GND (Shield)
9	Spare Output	*(3)	4	CTCSS_In
12	External PTT		5	PTT_Out
19	Logic Gnd		8	GND
23	RDSTAT (Carrier + PL)		3	COS_In

*(1) [RX Audio] - Inject a 1 Khz tone @ 3 Khz deviation +PL into the receiver and adjust EEPOT #C Line-2 output for a level of 1V P-P.

*(2) [TX Audio] - adjust EEPOT #7

*(3) Set the Spare Output to MUXA3B2 in the code plug for R1 PL detect.



Our repeater was configured with a QRN8911A board in addition to J2 system connector. This proved to be an interesting challenge to get audio to pass through J2 DB-25 System Connector. I'm sure there is a reason for this configuration, but it escapes me.

I used Line1 and Line2 wire-line pairs to pass audio into and out of the repeater. Later I discovered I had to jumper Line1 to Line3 and Line2 to Line4 of the terminal block to get this to work. I'm sure there may be other solutions for this problem.

I will provide a pinout of that cable assy on a later page, as well as the cable from the DB25 to DB9.

Set the repeater for Full Duplex 4-wire operation as well as the jumpers on the TTRC board for 4-wire operation. I used shielded wire for audio in the cable from the DB25 connector of the repeater to the DB9 connector of the RA-42.

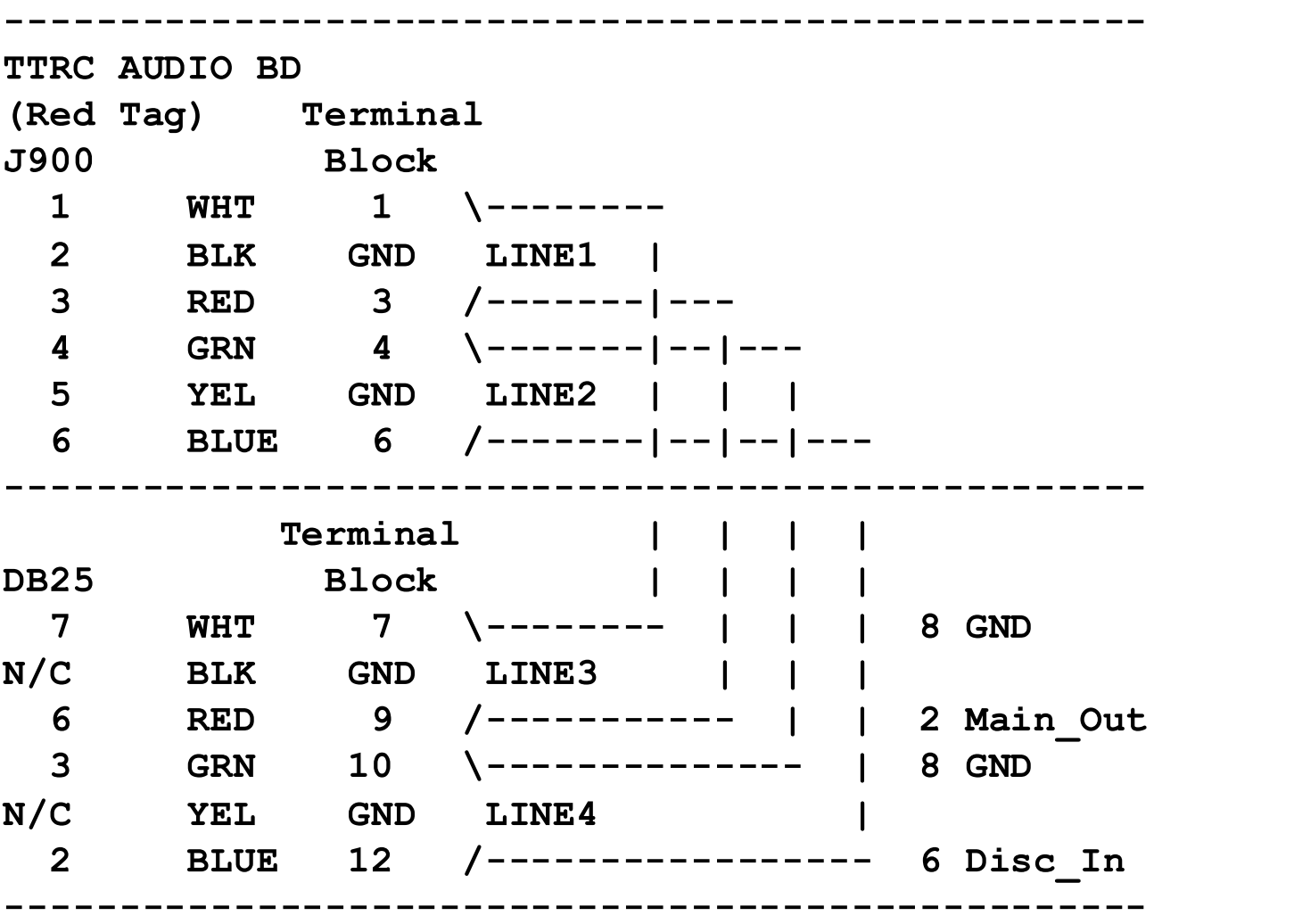
SimpleUSB settings (your mileage may vary)

RX Level:	**125**	**TX B Level:**	**50**
preemphasis:	**yes**	**deemphasis:**	**no**
plfilter:	**yes**	**dcsfilter:**	**no**
rxboost:	**no**	**PTT:**	**Active LOW**
COSFROM from:	**usbinvert**	**COS (input):**	**Active LOW**
CTCSSFROM from:	**usb**	**CTCSS (input):**	**Active HIGH**

Pinouts from J2 DB25 system connector, the RJ11s, and associated 12 pin terminal block on UHF machine.

J2900 TTRC Logic Bd		DB25 J2 system conn		DB-9 RS-42	
1	GRN/BLK	17			
2	BLUE/BLK	18			
3	ORG/BLK	19	Logic GND	8	GND
4	BLK/WHT	5	TX INHIBIT	7	PC_OK
5	GRN/BLK	20			
6	RED/BLK	21			
7	WHT/BLK	22			
8	BLUE	23	RDSTAT	3	COS_In
9	RED/WHT	9	SPARE OUTPUT	4	CTCSS_IN
10	ORG	11			
11	GRN	24			
12	RED	12	External PTT	5	PTT_Out
13	BLACK	25			
14	WHITE	13			
Conn Shell/Gnd		1			

TTRC AUDIO BD J901		DB25 J2 system conn
1	WHT	8
2	BLK	N/C
3	RED	10
4	GRN	15
5	YEL	N/C
6	BLUE	14



To solve the audio path problem, jumper Line1 to Line3 and Line2 to Line4 at the terminal block as indicated by the dashed lines in the pinout diagram above.

There is another style of terminal block that only has a 6 pins. I haven't tested that one yet, but suspect no jumpers will be required and everything will be more straight forward.

Jumpers on RA-42 interface.

JU1 - Position B
JU2 - Position A
JU3 - Position B
JU4 - ON
H1 – Middle Position
H2 – Middle Position

Mod for TX Inhibit signal

Add a BAT43 diode in series with R21. The cathode of the diode goes to DB9-7 and the anode goes to R21 which is tied to +5V. See photo above.

Edit the following files for Hamvoip:
/etc/asterisk/simpleusb.conf - add the following line

gpio8=txctcss

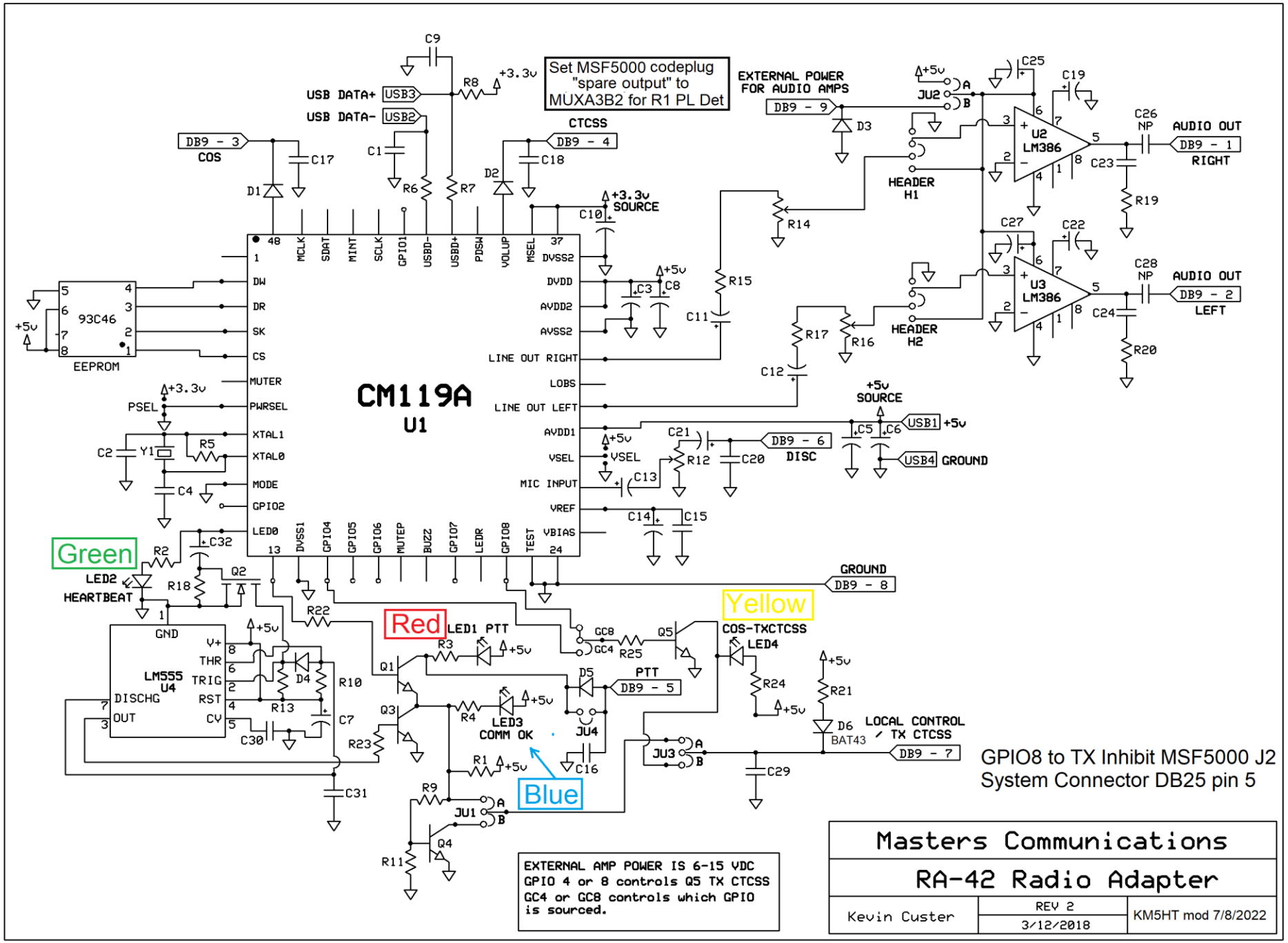
/etc/asterisk/rpt.conf

; Disable the repeater through GPIO 8 on CM119A chip
XXXX=cop,61,GPIO8=1
; Enable the repeater through GPIO 8 on CM119A chip
YYYY=cop,61,GPIO8=0
-- *Where xxxx and yyyy are the function numbers.* --

Also in the asterisk client command line:
CLI> rpt cmd <node> cop 61 GPIO8=1 ; Disable repeater
CLI> rpt cmd <node> cop 61 GPIO8=0 ; Enable repeater

73 Steve, KM5HT

https://www.masterscommunications.com/products/radio-adapter/ra42.html
https://www.masterscommunications.com/products/radio-adapter/txt/ra42-DB9-pinout.txt


Set MSF5000 codeplug "spare output" to MUXA3B2 for R1 PL Det
CM119A
U1
EEPROM
93C46
LM555 U4
U2 LM386
U3 LM386
EXTERNAL POWER FOR AUDIO AMPS
HEADER H1
HEADER H2
AUDIO OUT RIGHT
AUDIO OUT LEFT
USB DATA+
USB DATA-
CTCSS
COS
+3.3v SOURCE
+5v SOURCE
DISC
GROUND
Green
LED2 HEARTBEAT
Red
LED1 PTT
Yellow
COS-TXCTCSS LED4
LED3 COMM OK
Blue
PTT
LOCAL CONTROL / TX CTCSS
BAT43
GPIO8 to TX Inhibit MSF5000 J2
System Connector DB25 pin 5
EXTERNAL AMP POWER IS 6-15 VDC
GPIO 4 or 8 controls Q5 TX CTCSS
GC4 or GC8 controls which GPIO is sourced.
Masters Communications
RA-42 Radio Adapter
Kevin Custer
REV 2
3/12/2018
KM5HT mod 7/8/2022