Interfacing an S-Com 7330 to a Motorola MSF-5000 Digital Capable Station
(As implemented by Justin Reed (NØUJQ) for the K-Link Repeater System, February 2011)

This instruction set assumes you have a working repeater or base station station ready to go.
- If this is a base station, be sure the T/R switch is disabled (unhook the power lead) or removed completely from the station. Repeaters and 4 wire (duplex) stations will not have the T/R switch.
- Program your station with the TX and RX frequencies required for your site.
- Program your Receive (decode) PL tone (Leave the TX as carrier only, the 7330 will encode for you)
- Do not set a CWID , Time out timers, etc., on the station. The 7330 will handle these.
- Program the station as a 4 wire (or full duplex) station. The repeater function MUST be DISABLED.
- Your station RX and TX should be aligned for best performance and on frequency as per the manual.
- You will need the RVN-4077 Field Programming Software (RSS) and a RIB/cable to plug into the Control/Mic jack on the front of the MSF5000, plus a service monitor and Fluke multimeter.
- You need a DB-9 male and DB-25 male connector, and some shielded interface cable
- If your station has J2 connector on the backplane, build the following cable:

S-Com Radio Port			MSF5000 J2 connector on backplane	
Func.	Pin	Color	Pin	Function
RXA+	1	White	2	Line 2 Output +
COR	2	Violet	23	RDSTAT (Carrier + PL)
DEC	3	Green	N/A	Not connected
PTT	4	Red	12	External PTT
TXA+	5	Blue	6	Line 1 Input +
RXA-	6	Orange	3	Line 2 Output –
ENC-	7	Brown	20	Gen TX Data –
ENC+	8	Yellow	21	Gen TX Data +
TXA-	9	Black	7	Line 1 Input –
	9	Drain	19	Logic Ground

- If your station does NOT have J2 on the backplane, skip to page #4
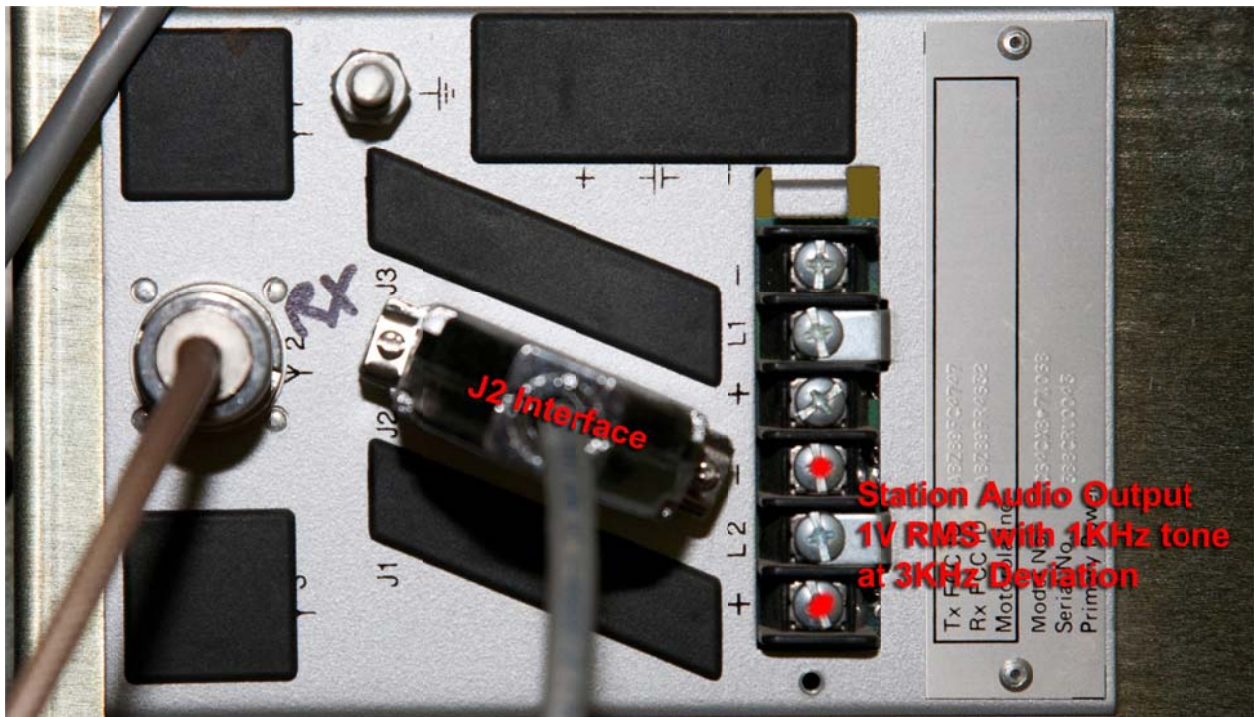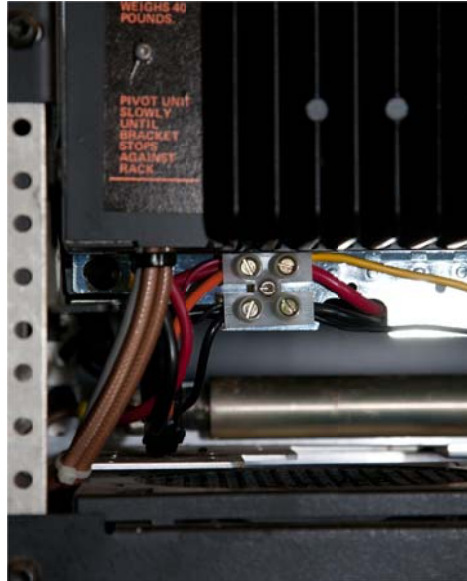

Photo above shows J2 on the backplane, and the L1 and L2 remote audio test points. L2 is station RX audio.

Make a power cable for your 7330 using the Phoenix plug supplied with the 7330. One possible place to get power is at the terminal block that the TX PA power leads are connected to just below the PA deck (pictured below, center):

Configure your 7330 jumpers as indicated (assuming Radio Port 1 is being used):

J10	Audio Delay**	-bridge-
	RXA Normal	-bridge-
	RXA Flat	-bridge-
	All others open	

J37	CTCSS (not logic)	–bridge-
J34	TXA Normal	-bridge-
J25	COR1 pullup	-open-
J26	CTCSS1 pullup	-bridge-
J31	COR1 polarity	-open-
J33	PTT1 polarity	-open-

** Be sure the Audio Delay adjustment R220 is NOT set to minimum. Set it to 1/3 open for now.

Connect the 7330 to the MSF5000 using the cable you built. Make sure your transmitter has a dummy load (or service monitor with 50ohm load) connected. Load your programming script (or a quick setup script) into the 7330, be sure to set the CTCSS encoder OFF while making the following adjustments.

Fire up your laptop, load RSS and connect via your RIB to the station.

- Flip the PL DIS switch (front of secure capable station panel) UP
- Remote audio squelch EEPOT should be set (using RSS) so that there is no COR/RDSTAT activity in the absence of carrier. Monitor the status using the 7330's COR LED. Be sure to set the squelch slightly higher than the ambient noise level.
- Repeater audio squelch EEPOT should be set at or higher than the remote audio squelch, as having this set too low could introduce slight hiss in the background of your repeat audio. NOTE: Repeat squelch has no effect on this installation except for introducing background hiss if not set high enough.

- Local Squelch EEPOT should be set at or higher level than the remote audio squelch to prevent squelch noise in the local speaker.
- Repeat Audio level should probably be set to minimum, although I did not adjust this on the test unit.
- Check that the L1 Remote audio transmit EEPOT is set somewhere in the middle of the range (NOT zero).

Using a service monitor, inject a 1000 uV on-frequency signal with 1 KHz tone at 3 KHz Deviation (plus PL tone if used) into the Receive jack on the backplane.

- Station RX Audio level output L2 (next to J2 depicted in photo on previous page) should be 1V RMS with a 1KHz tone at 3KHz deviation. If your level varies, you may adjust it with RSS. (Look for remote audio line output EEPOT)
- Measure RX audio level in the 7330 at TP9 and adjust R30 for 1V peak to peak
- Set the 7330 TX audio pot R109 to maximum temporarily, this should fully drive the transmitter. Adjust the TX deviation EEPOT in RSS for 4.4KHz. Then turn R109 back down to mid-position.
- Turn off signal momentarily to reset timeout timer and continue:
- With 1 KHz tone at 3 KHz deviation, monitor the transmitter deviation. If it's near 3Kz, make a slight adjustment to R109 to set deviation to 3KHz, keeping R109 in the middle 2/3 of the adjustment range. If more radical adjustment is required, use RSS to adjust the Remote TX audio EEPOT so that R109 can be left near halfway.
- Program the 7330 with the CTCSS encoder ON and set to the tone frequency your site requires. Generate an unmodulated signal to key the repeater and set CTCSS level to .6 KHz deviation using R90.
- Using two radios (one to transmit and one to monitor the output) key the repeater and unkey while adjusting the audio delay R220 just high enough to fully eliminate the squelch crash. On an MSF5000 this should not normally exceed 50% of the range of the pot.
- Set the PL DIS switch on the Secure Capable Station panel back to the center position. Now verify that the repeater requires PL to access (if PL is used).
- Your MSF5000 and 7330 should be playing well together and ready to go.
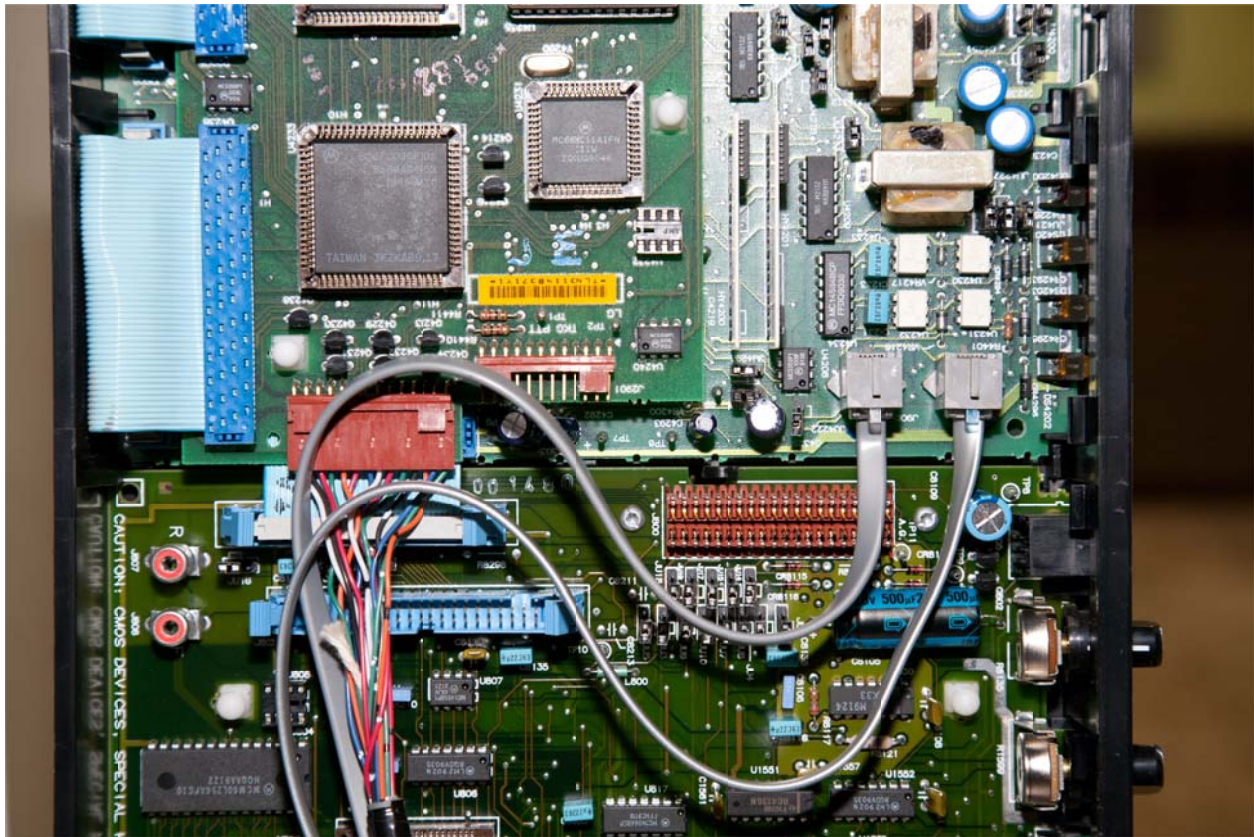
This photo shows the connections to the TTRC and remote audio board coming in from J2 on the backplane. If you are missing J2 (or the entire backplane) you will need to interface the 7330 directly to these plugs. J2900 is the reddish brown plug at center left, J900 is the Remote TX audio input (left 4 pin modular jack) and J901 is the Remote RX audio output (right 4 pin modular jack). You will NOT need to install separate audio isolation transformers, as the station's remote audio board already has them installed.

If your station does not have J2 and you need to wire directly to the TTRC and audio board, you'll need two modular plugs and a molex plug and pins that fit J2900 pictured above.

The cable wiring between 7330 and the TTRC are as follows:

S-Com Radio Port			J2900 on TTRC		J900/901 on remote audio board
Func.	Pin	Color	Pin	Function	
RXA+	1	White		Line 2 Output +	J901
COR	2	Violet	8	RDSTAT	
DEC	3	Green	N/A	Not connected	
PTT	4	Red	12	External PTT	
TXA+	5	Blue		Line 1 Input +	J900
RXA-	6	Orange		Line 2 Output –	J901
ENC-	7	Brown	5	Gen TX Data –	
ENC+	8	Yellow	6	Gen TX Data +	
TXA-	9	Black		Line 1 Input –	J900
	9	Drain	3	Logic Ground	

With the completion of this cable, go back to page 2 and begin station/controller setup and alignment.