VK5ZLR Universal Analogue Voice HF to VHF Crosspatch



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Provide a universal automatic crosspatch between a HF SSB transceiver and a general purpose U/VHF FM transceiver.

Using an Analogue Voice Detect circuit on the HF Rx side, the output from that voice detect pulls PTT low on the FM Tx side. When the Squelch line on the FM radio pulls low, it pulls PTT low on the HF side. Audio levels are adjustable with trimpots. The HF voice detect sensitivity is adjustable with a trimpot. The crosspatch does not work with any digital modes.

Basic operation: the Crosspatch works with any radio where PTT is active low, and on the FM side the radio needs a squelch line that pulls either low or high when the squelch opens. Using DTMF control from the FM side:

- Roger-beep can be selected on/off for the HF side.
- An HF CCIR 493 selcall can be sent on the HF side (but not Rxed).
- PTT inhibit can be set for both HF and/or FM.
- Short or Long HF squelch tail can be selected.
- Selection of either Low or High FM radio squelch line.

Advanced operation: If an ICOM transceiver is used on the HF side (IC706, 7000, 7100, 7200, 7300 etc) advanced CAT control functions can be remotely activated. Using DTMF control from the FM side:

The Frequency and Mode on the Icom ca

- The Frequency and Mode on the Icom can be selected.
- The radio CAT address can be selected (and retained in EEPROM).



VK5ZLR Crosspatch connector pinouts.



VHF FM connector looking at Crosspatch



HF SSB connector looking at Crosspatch

Note: Pinouts on the HF side for Icom radios are **identical** to the SKIPPY Frequency Hopping ECCM and Selcall Controller, so a Skippy interface lead is suitable. Generally the pinouts on both sides are the similar or the same as for Tinytrack or Opentracker APRS modules, so an APRS radio interface lead may also be suitable on the FM side. ICOM CAT baudrate is 4800.

12v power is supplied to the crosspatch from either/or both radios, the 12v supplies are diode isolated from each other.

VHF FM DTMF signalling control commands v1.06

Using DTMF signaling the Crosspatch can be controlled remotely from the VHF side.

The crosspatch will return a double beep on the VHF side to acknowledge receipt of DTMF commands.

Basic operation: DTMF Commands for any HF radio *10# HF Roger Beep ON. Normal default operation *11# HF Roger Beep OFF. *12# No PTT. Inhibits PTT on both radios *13# ALL PTT On. Normal default operation *14# HF PTT Off. Inhibits PTT on the HF side *15# FM PTT Off. Inhibits PTT on the VHF side *16# Send a HF CCIR493 Selcall *17# Send a HF CCIR493 Beacon call *18# Set a long 3 second tail on the HF Squelch *19# Set HF squelch tail to short. Normal default operation *22# Set-mode on. For 1 minute. *23# FM squelch line pulls HIGH (value retained in EEPROM) *24# FM squelch line pulls LOW (value retained in EEPROM) *25# Set-mode off.

*xxxxyyyy# Loads My selcall number xxxx and the Target selcall number yyyy into EEPROM memory. Must be an 8 digit number.

In order for any DTMF commands to be received and processed by the Crosspatch, the FM radio **must not** be transmitting. Sending any DTMF tone whilst Crosspatch boots up will cause Crosspatch to enter Set-mode for one minute and both LEDs will blink. During this period neither radio will Transmit, allowing the FM squelch logic to be set with *23# or *24#.

Alternatively DTMF control tones can be injected into Crosspatch via the aux engineering channel audio input.

It is recommended that PL or DPL not be used on any of the radios on the FM side unless the audio circuits strip the PL tones off. PL tones can be passed through to the HF Tx resulting in an audio rumble, and the key-up delay due to the time taken to decode tones can be annoying.

Advanced operation: If a suitable ICOM radio is used on the HF side. CAT 4800 baud.

*00# LSB mode *01# USB mode *02# AM mode CW mode *03# *04# RTTY mode *05# FM mode *06# WFM mode *20# ICOM Rx Attenuator On *21# ICOM Rx Attenuator Off *0xxx# Changes the dial frequency of the HF Icom to Oxxx kHz. *xxxx# Changes the dial frequency of the HF Icom to xxxx kHz. *xxxxx# Changes the dial frequency of the HF Icom to xxxxx kHz. *xxxxxx# Changes the dial frequency of the HF Icom to xxxxxx kHz.

If a Baofeng UV-5R is used as the remote radio the following DTMF commands can be used to change sidebands and set CAT address:

* ^	Baofeng	Up	Arrow	goes	to	US	ЗB
*v	Baofeng	Dow	n Arro	ow goe	es '	to	LSB

*Dxx# Where xx is the ICOM CAT address. (DTMF D the MENU key) The CAT address is retained in EEPROM and becomes the default.

Advanced FM configuration with separate Engineering Channel input

In the event of very long voice overs (or rag chewing) on the HF side, it is not possible to invoke DTMF control of the Crosspatch because the FM radio is locked on Transmit. The Crosspatch has an addional Audio input to allow for separate override Engineering Channel DTMF control signals.



Crosspatch Block Diagram



Syntrx to Crosspatch Wiring Notes

2/5/2022 Crosspatch v106

PTT and MIC share the same line on the Syntrx. The Syntrx Squelch pulls HIGH when an incoming signal is received. (*23# to setup on the sspatch)

Rx audio pickoff from pin 22 of the 40 pin connector. Tx audio and PTT pickoff from pin 28 of the 40 pin connector +12v switched from pin 31 of the 40 pin connector Gnd from pin 23 of the 40 pin connector Squelch from pin 5 of the 40 pin connector

