

# **Improving Station Efficiency through Gadgetry**

**Written & Presented by K6XX  
16 July 2003**

# Who am I? Why am I up here?

- K6XX; ex-N6IP, WN6HPF
- Mostly HF, CW, contests
- No, I don't have an answer to that question!



# Types of "Gadgetry"

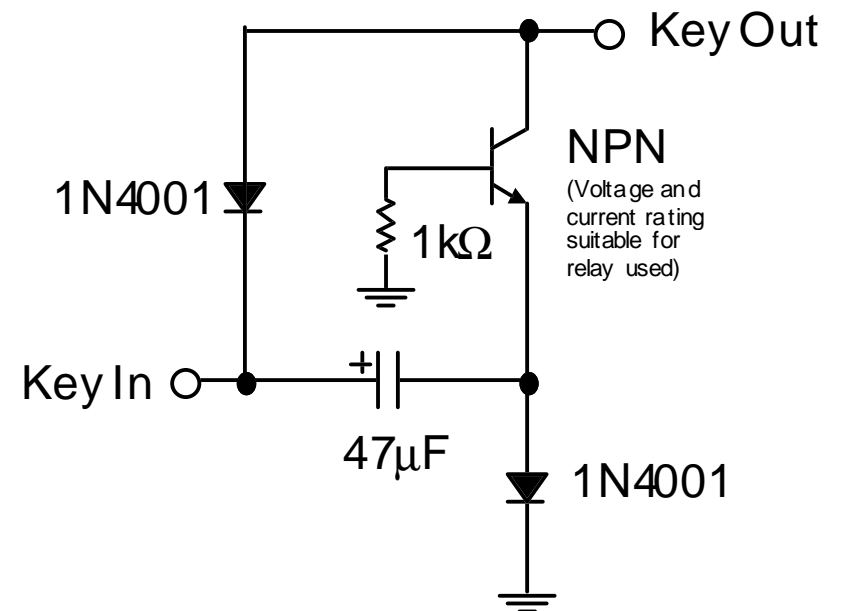
- Accessories that improve performance
- Accessories that ease operation
- Building to save \$\$\$
- Not all accessories are circuits...

# Faster Amplifier Switching

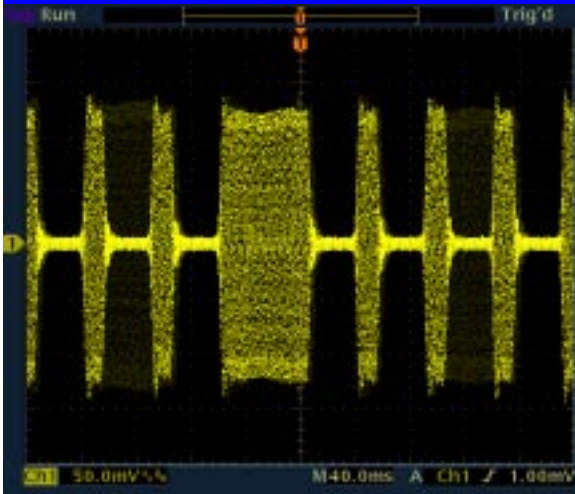
Use an Ameritron? TL-922?  
L-4B?

This circuit drives the amplifier's switching relay faster so your first syllable or dot is maintained.

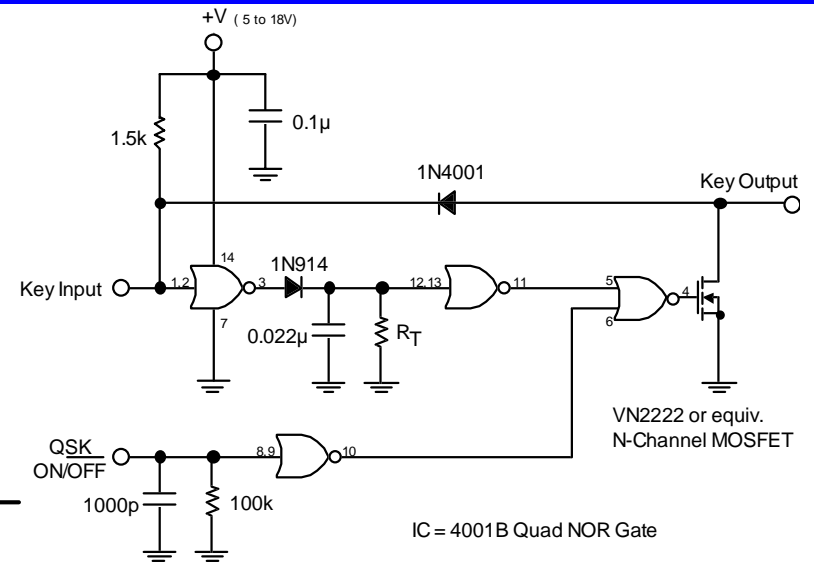
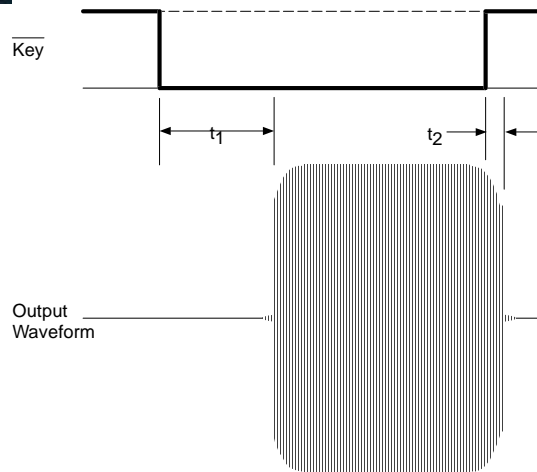
<http://www.k6xx.com/radio/fastrely.html>



# Fixing Poor Rig Keying



IC-756PRO Keying (QSK)



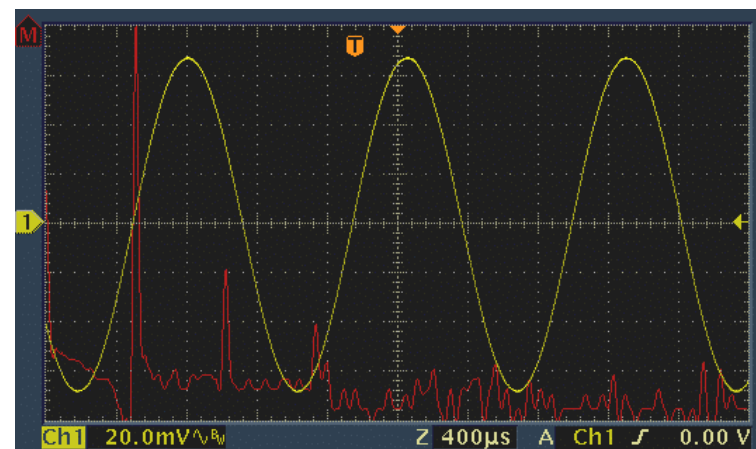
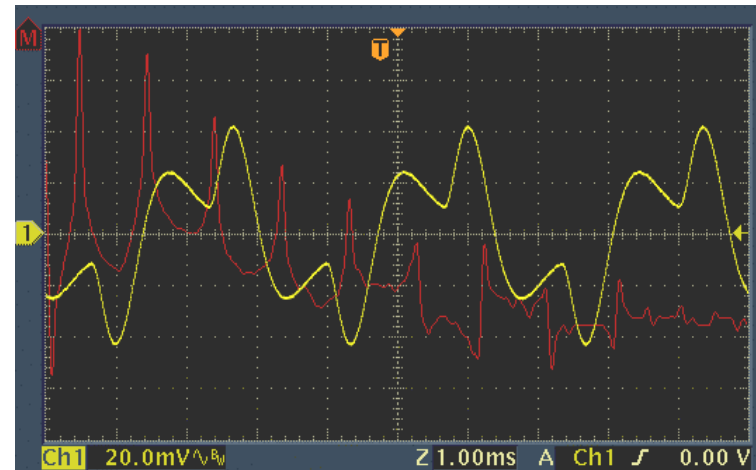
<http://www.k6xx.com/radio/betrqsk.html>

# Distorted Sidetone

Its hard to zero beat with a distorted reference tone.

(FT-1000MP)

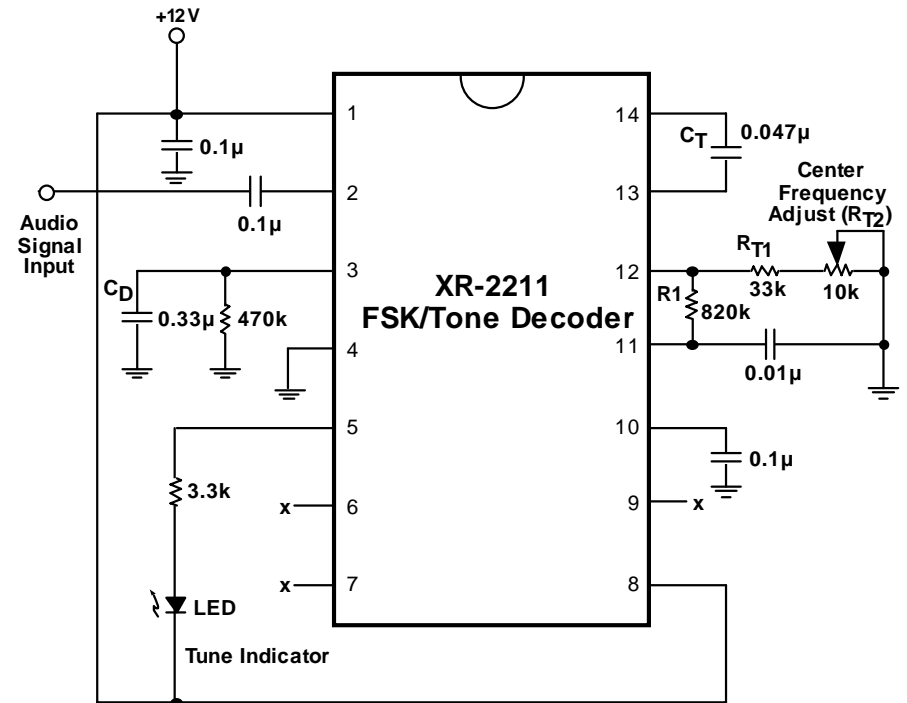
Solve with better filtering.



# Visible CW?

This circuit helps you tune in a CW signal—even if it has significant harmonic distortion.

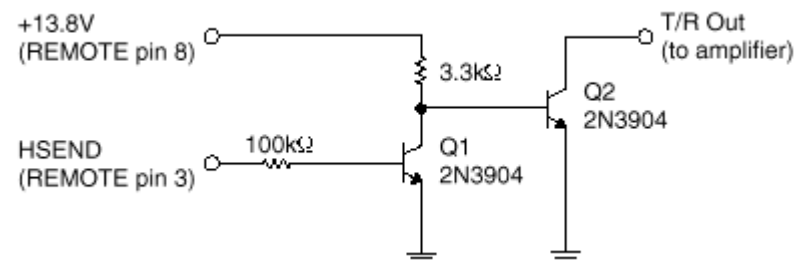
<http://www.k6xx.com/radio/vizicw.html>



# Adding Amp Switching to IC706

Want to drive an external amplifier with your IC706?

Two transistors let you.



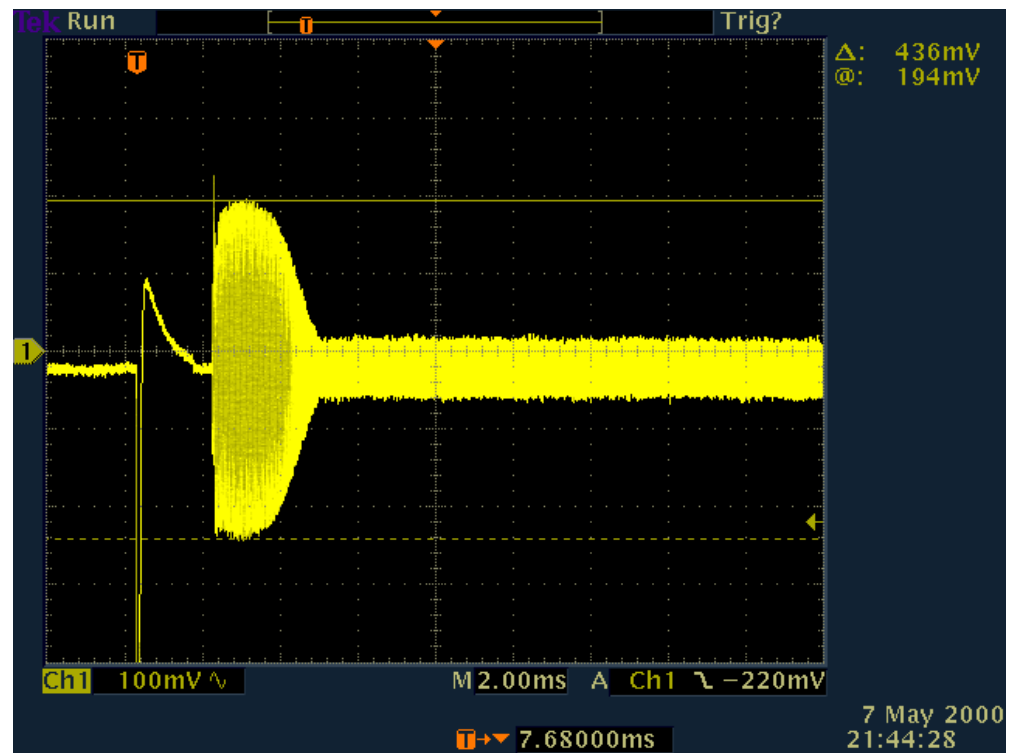
<http://www.k6xx.com/radio/ic706amp.html>



# Throw in the towel...

Output power  
set to 7W.

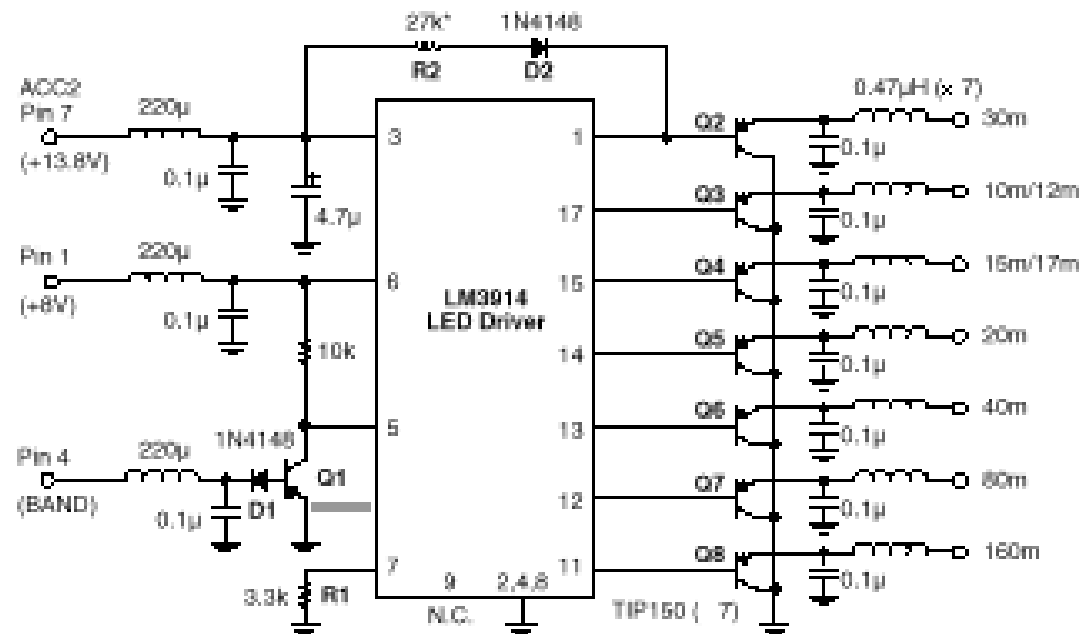
Peak initial  
surge = 130W  
(!!!!!!!!!!!!!!!!!!!!)



IC-706 MkII Overshoot on initial key-down

# Band Decoder for Icom

This circuit uses an inexpensive LED bar graph driver to decode Icom's BAND voltage.

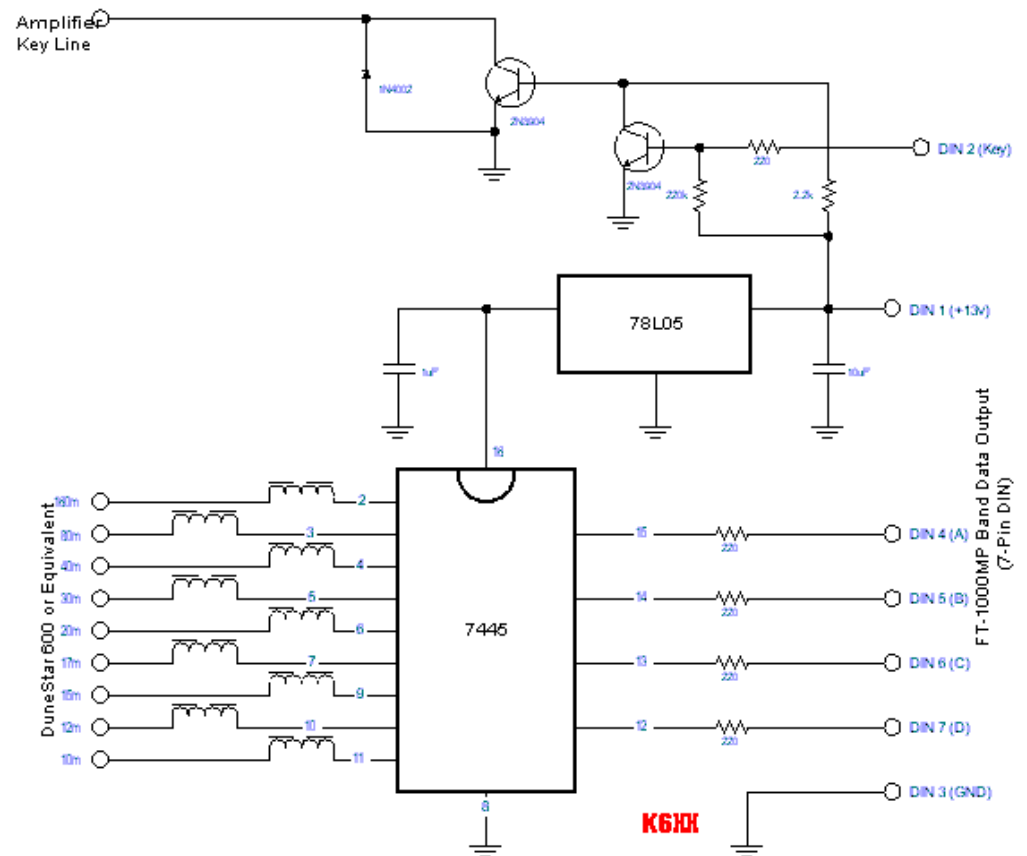


<http://www.k6xx.com/radio/icbsciv.html>

# FT-1000MP Band Box

Provides band decoding and solid state T/R switching

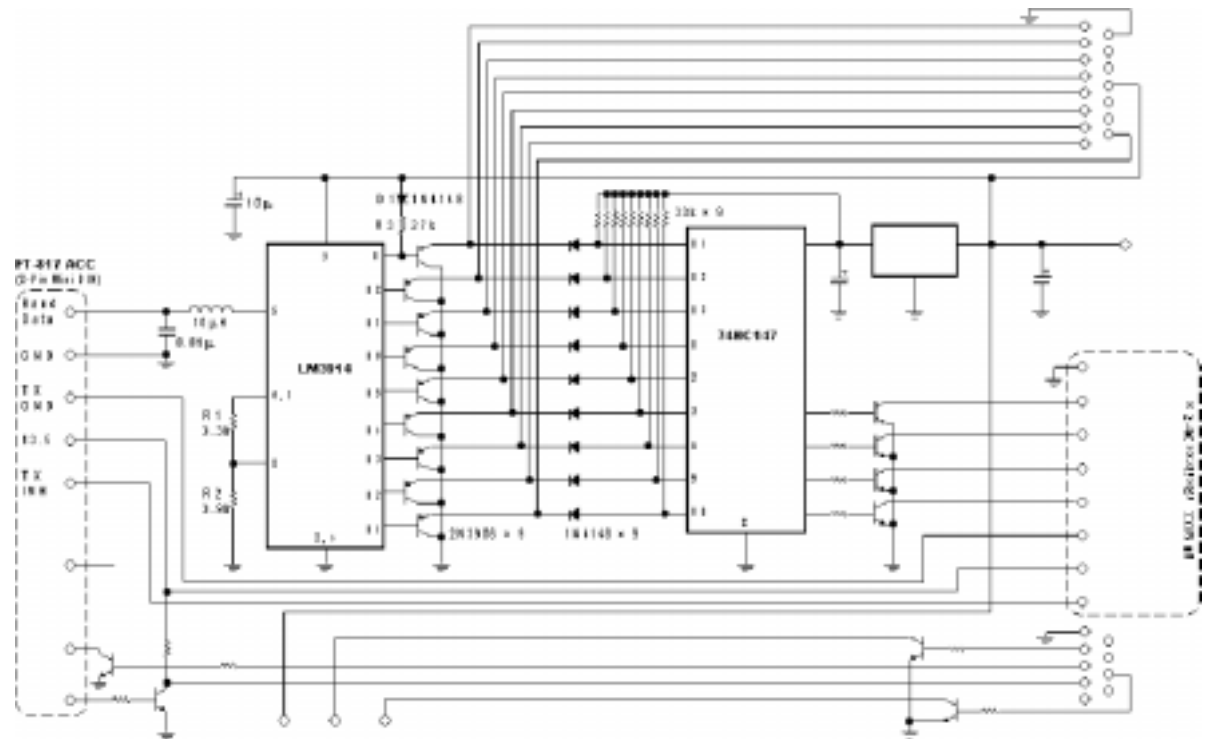
<http://www.k6xx.com/radio/mpbandbx.html>



# FT-817 Interface Box

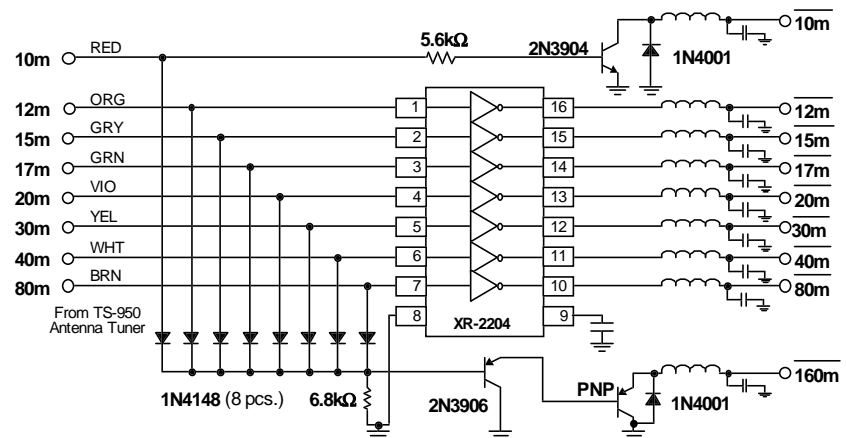
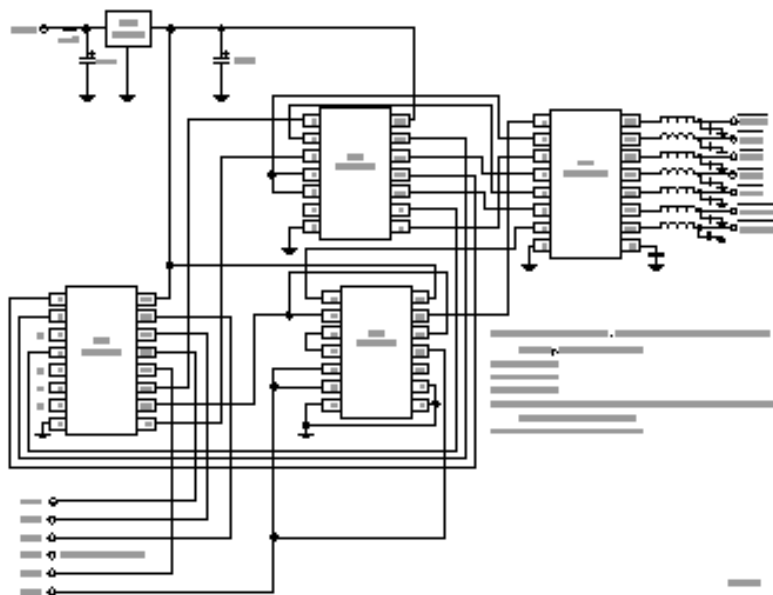
The FT-817 needs an interface for band data, RS-232 data, and a T/R line.

<http://www.k6xx.com/ft817/817box.html>



# Kenwood Band Decoders

Kenwood rigs don't provide any band data, so we have to dig inside the rig for such information.



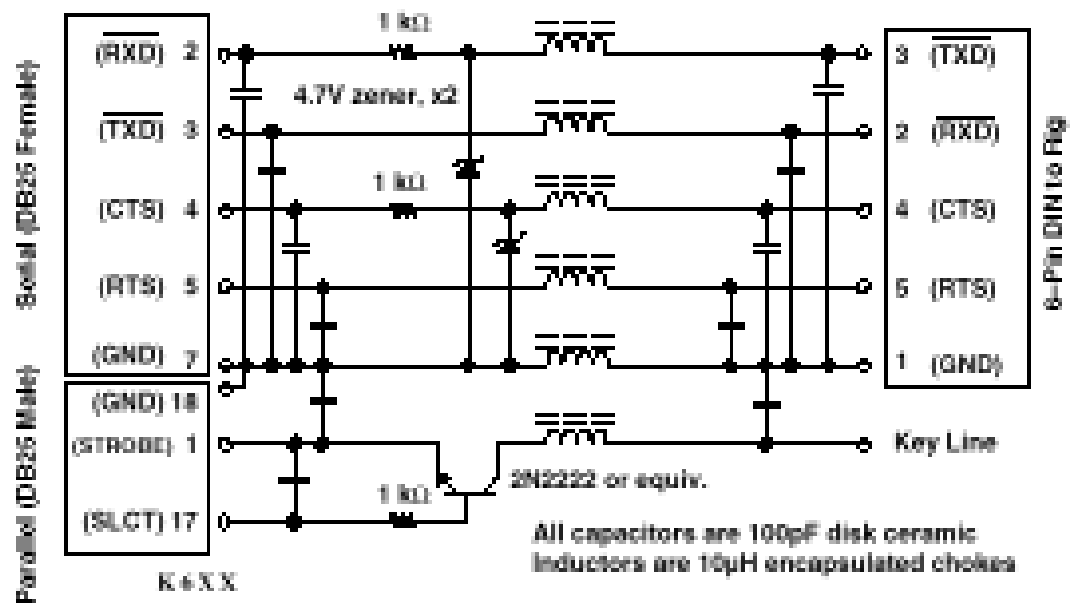
All capacitors are 0.01 $\mu$ F ceramic. All inductors are 100 $\mu$ H encapsulated.  
The IC is an array of seven medium current, medium voltage Darlington NPN transistors. Separate NPN transistors may be substituted, as shown for the 10m band.

K6XX

# Kenwood Serial Interface

This circuit allows connecting an RS-232 serial cable to a TS-940/440 or more recent Kenwood transceiver.

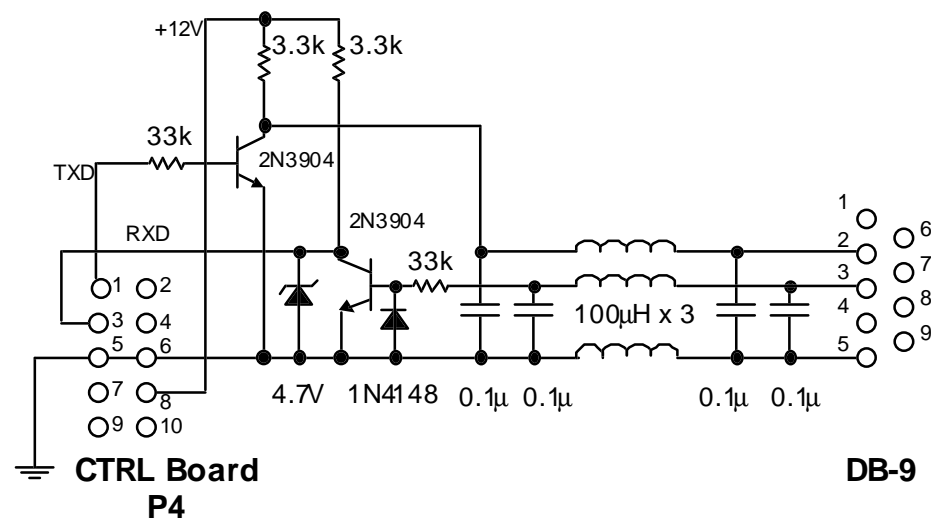
[http://www.k6xx.com/radio/pctsi\\_nfc.pdf](http://www.k6xx.com/radio/pctsi_nfc.pdf)



# K2 Serial Port

From Elecraft: \$89

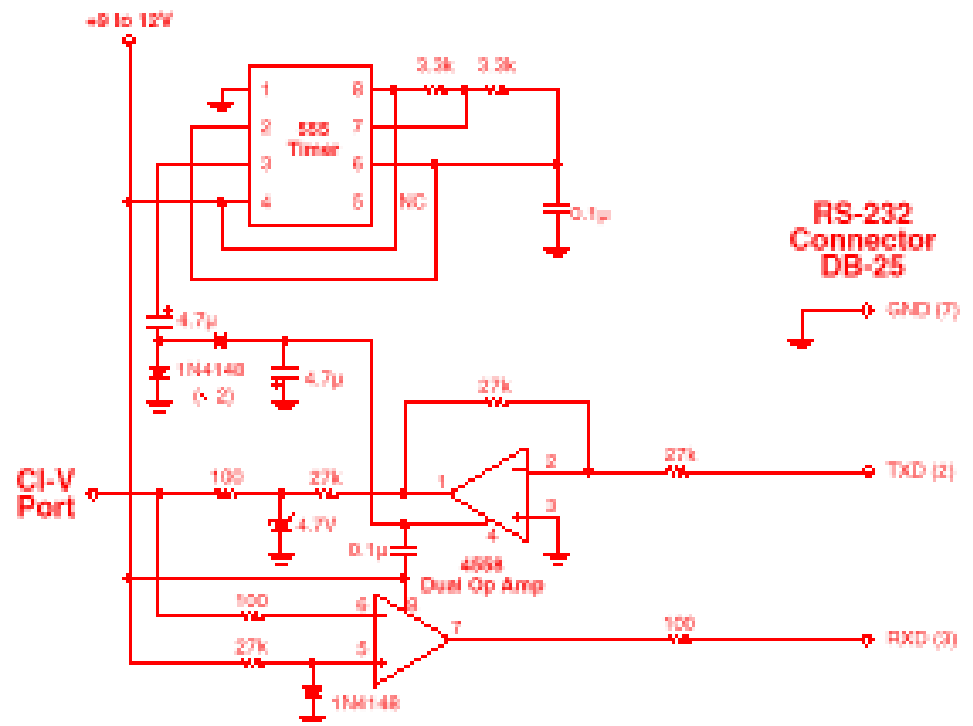
Homebrew: \$0.089



# Implementing CI-V

A dual op amp implements the CI-V interface, used in Ten-Tec and Icom rigs.

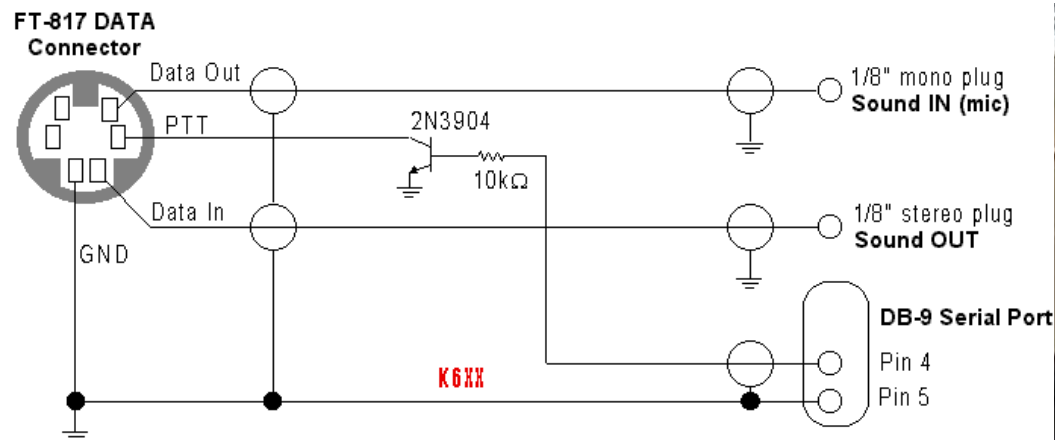
<http://www.k6xx.com/radio/icbsciv.html>





# Cables, cables, cables

FT-817 AFSK Cable (for PSK31, MFSK, Baudot, etc. with PC Sound Cards)



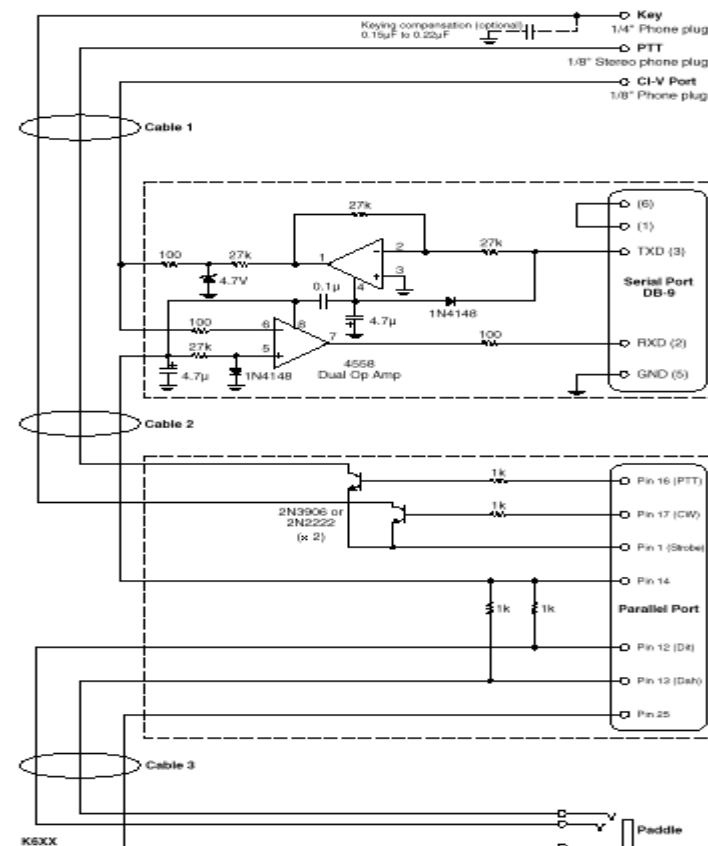
<http://www.k6xx.com/ft817/817accy.html>

# IC-706 "Contestpediton" Cable

This cable implements serial interface, CW keying with paddle input, and keying-correction.

(Why? Beats carrying lots of accessories on an airplane!)

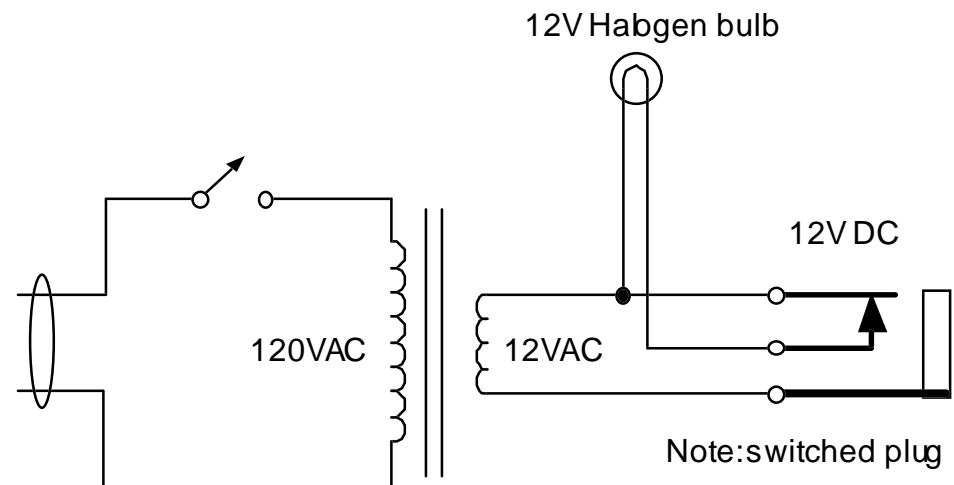
<http://www.k6xx.com/radio/tr706cb1.html>



# Field Day Lamp

A solar powered Field Day, no noisy generators... but no simple, quality lighting either.

Convert a 120VAC halogen desk lamp to a 12V halogen field lamp.



# "Soft" Operating Aids

- Labels on antenna switches
- Band limits/Band plans
- Prefix list
  - ITU Prefixes
  - Amateur Radio Common Prefixes
- "Cheat Sheets"
- GeoClock on a separate monitor

# Keyer Operating Guide

BUTTONS	COMMANDS		ACTION	
	●●○○ Function	○○●● Inquiry		
		/B	–	<b>K6XX</b> Short Break (Pause to resume) Check Memory Left Decrement S/N Set Function Speed nn WPM Programmed Gap (0 = letter; 4 = word) Hand key mode Keying compensation (nn ms) Toggle Mute; review Mute status Set S/N; send S/N; review S/N Pause n.n seconds Long break (button to Resume) Set Speed nn WPM; review Speed Speed Down n WPM Speed Up n WPM SideTone (500-990 Hz; Hz/10) Tune (key down) Set Zero/Nine mode for S/N Send msg1; GOSUB1; review msg1 Send msg2; GOSUB2; review msg2 Send msg3; GOSUB3; review msg3 Send msg4; GOSUB4; review msg4 Reset
○●●○	–	–	C	
	D	/D	–	
	Fnn	–	F	
	–	/Gn	–	
●○○○	H	–	–	
	Knn	–	K	
	M	–	M	
	Nnnnn	/N	N	
	–	/Pnn	–	
	–	/R	–	
	Snn	/Snn	S	
	SDn	/SDn	–	
	SUn	/SUn	–	
	Tnn	–	T	
○●○○●	X	–	–	
	Zn	–	Z	
●○○○	1	/1	1	
○●○○	2	/2	2	
○○●○	3	/3	3	
○○○●	4	/4	4	
●●●●				

<http://www.k6xx.com/radio/scmosii.pdf>

# FT-817 "Cheat Sheet"

## FT-817 Simplified Operating Guide

K6XX

8 December 2000

### Display Icons

Top Row: Voltage –OR– active VFO; operating mode  
 Second Row: Frequency; R on the right side denotes the rear (SO-239) antenna jack is active  
 Third Row: Meter mode (S-meter, POver, ALc, SWr, MO(deviation meter); icons for Fast tuning (running man) or Lock (key) on the right side  
 Fourth Row: Icons for Dual Watch; Repeater Offset & direction; PL tone; Tone Squelch; DCS; Power-off timer; Transmit power step; Split frequency (black "battery"); Battery/Charge (white "battery")

### Operating Menu Items

(critical items in **BOLD**)

Operating Menu access: Momentarily push **F**

⇒Exit: select an item –OR– momentarily push **F** again

⇒⇒ Operating menu keys are available even when legends are not visible

A	B	C
<b>A/B VFO toggle</b>	<b>A=B (equalize VFOs)</b>	<b>SPLit mode toggle</b>
Memory Write	Mem. Clear (skipped during scan)	alphanumeric TAG
STOre freq. into quick memory bank	RCL quick memory frequency	start Programmable Memory Scan
RePeater shift enable (hold to set offset)	REVerse split	TONe enable (hold to set frequency)
ScaN initiate	PRiority scan	Dual Watch (alternate between two receive frequencies)
Spectrum Scope Monitor (hold to set mode)	Smart searCH (find/store active frequencies)	Auto Range Transponder (hold to set mode)
<b>Intercept Point Optimization (bypass rx preamp)</b>	<b>ATTenuator toggle</b>	<b>NARrow filter toggle</b>
Noise Blanker toggle	AGC selection	[none]
<b>PoWeR selection</b>	<b>MeTeR selection</b>	[none]
<b>VOX toggle (hold to set delay)</b>	<b>BreaK-in toggle (hold to set delay)</b>	<b>KeYeR (hold to set speed)</b>
<b>CHaRGe initiate (hold to set charge time)</b>	<b>VolTmeter display</b>	<b>DISPlay large numerals for frequency</b>
Tone searCH (find pl frequency)	initiate DCs searH	[none]

### Important Menu System Items

Menu System access: Push & Hold **F**

>Exit: Push & hold **F** to save or push **G** to cancel without saving changes

Number	Pneumonic	Notes
04	<b>AM&amp;FM DL</b>	Enable main dial for tuning AM & FM modes
05	<b>AM MIC</b>	Adjust mic gain for AM mode
06	<b>AM STEP</b>	Select AM mode tuning step size (SEL knob)
07	<b>ANTENNA</b>	Select Front or Rear antenna connector
10	<b>BACKLIGHT</b>	Forces the backlight ON/OFF, or Auto (turns on for 5 sec upon key press)
11	<b>BATT - CHG</b>	Select battery charge time
13	<b>BEEP VOL</b>	Adjusts acknowledgement beep volume
14	<b>CAT RATE</b>	Select data rate for serial port
15	<b>COLOR</b>	Select Blue or Amber backlight
16	<b>CONTRAST</b>	Select display contrast
17	<b>CW DELAY</b>	Adjust CW T to R recovery delay (also available from operating menu)
19	<b>CW PADDLE</b>	Select which side of paddle sends dots
20	<b>CW PITCH</b>	Adjust center frequency of CW tone
21	<b>CW SPEED</b>	Adjust sending speed of internal keyer (also available from operating menu)
25	<b>DIG MIC</b>	Adjust mic gain for digital modes (AFSK)
26	<b>DIG MODE</b>	Select RTTY/PSK/User defined digital mode
29	<b>FM MIC</b>	Adjust mic gain for FM mode
30	<b>FM STEP</b>	Select FM mode tuning step size (SEL knob)
33	<b>MAIN STEP</b>	Select Fine (10Hz) or COARSE (20Hz) main tuning frequency increment
34	<b>MEM GROUP</b>	Enable grouping memory into banks of 20
35	<b>MEM TAG</b>	Edit memory channel alphanumeric tags
37	<b>MIC SCAN</b>	Enable scan start by UP/Down keys on mic
38	<b>OP FILTER</b>	Enable accessory filter
39	<b>PKT MIC</b>	Adjust mic gain for packet operation
40	<b>PKT RATE</b>	Select 1200 or 9600bps packet data rate (RF)
41	<b>RESUME</b>	Select scan delay before resume
42	<b>RPT SHIFT</b>	Set repeater shift
43	<b>SCOPE</b>	Select continuous or every 10 seconds for spectrum scope
44	<b>SIDETONE</b>	Adjust level of CW sidetone
45	<b>SQL/RF - G</b>	Toggle between RF Gain and Squelch functionality
46	<b>SSB MIC</b>	Adjust mic gain for SSB operation
47	<b>SSB STEP</b>	Select SSB mode tuning step size (SEL knob)
48	<b>STONE FREQ</b>	Select CTSS tone frequency
49	<b>TOT Time</b>	Adjust Time-out Timer time
50	<b>VOX Delay</b>	Adjust voice mode T to R recovery delay (also available from operating menu)
51	<b>VOX Gain</b>	Adjust sensitivity of VOX
52	<b>EXTEND</b>	Enable access to extended menu items (53 to 57)

<http://www.k6xx.com/ft817/ft817cs.pdf>

K6XX—July 2003

# Current Projects at K6XX

- Antennae (never ending)
- Automatic antenna selection matrix (multi-stn)
- Two-rig-on-one-band lockout
- High  $P_{REFL}$  lockout
- K2 speech processor
- Streamline QSLing
- Find time to get on the air

# Your Assignment

- Examine your station
- Review old QST, CQ, Ham Radio mags for ideas
- A well-stuffed junkbox is helpful!
- Get to the electronics flea markets
  - Foothill (2nd Saturday, Mar. to Oct.)
  - Livermore (1st Sunday)



**That's All,  
Folks...**