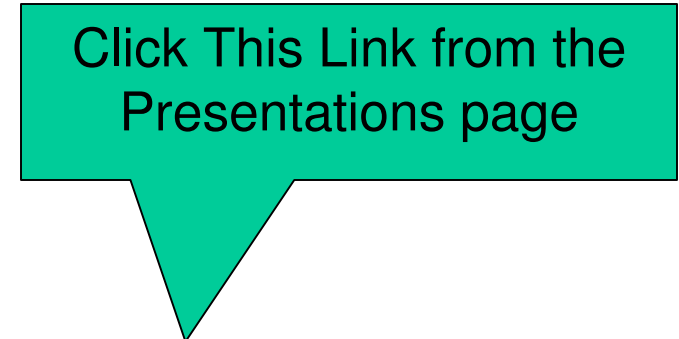
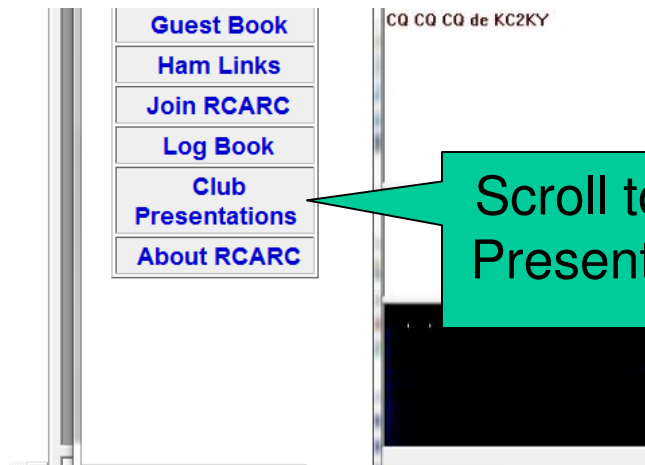


PSK-31 Workshop



This presentation is Available on the Radio Central Web Page: www.rcarc.org



- **Getting Started in PSK-31 by Neil KC2KY** [View with Adobe Acrobat...](#)

Why PSK31?

History

Original Software

Digi-Pan

Multi-Mode Programs

Theory

Setting Up a Station

Digi-Pan Basics

Tuning

Multi-Channel Mode Monitor

Macros

Logging

WHY PSK-31 ?

PSK-31 is a Keyboard to Keyboard Chat Mode Similar to RTTY

Performance is better than traditional Baudot, especially for rag chewing

PSK-31 uses the full ASCII character set

Backspace gets sent out so you can fix your mistakes

Minimum cash outlay to get on PSK-31 – PC, Rig, Interface Box

Several shareware and freeware programs are available

History of PSK-31

PSK evolved from “SLOWBPSK”, a phase shift keying mode invented by Pawel Jalocho, SP9VRC

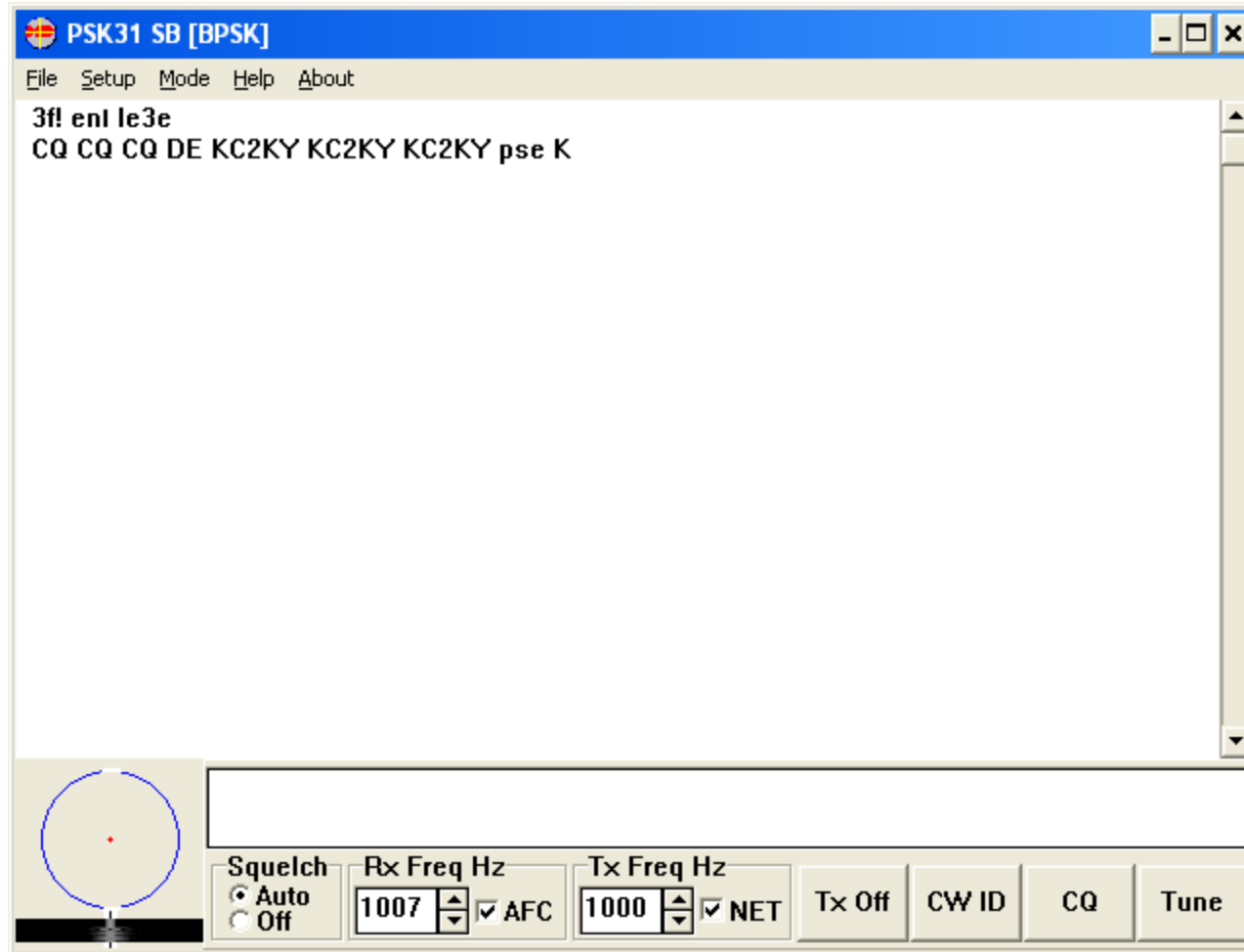
SLOWBPSK ran on a Texas Instruments DSP evaluation module (EVM)

1998 - Peter Martinez, G3PLX, created an adaptation of SLOWBPSK that would run on a Windows PC with a sound card, making PSK31 accessible to a great many more hams

1999 Skip Teller, KH6TY and Nick Fedoseev, UT2UZ, introduce DigiPan, which enhances the G3PLX program with the ability to monitor and tune signals with the PC

2000 to Present – Further improvements as well as cheap, commercially available rig interface boxes have exploded onto the scene

Original Peter Martinez PSK31-SB software, Introduced to the Ham community in 1998



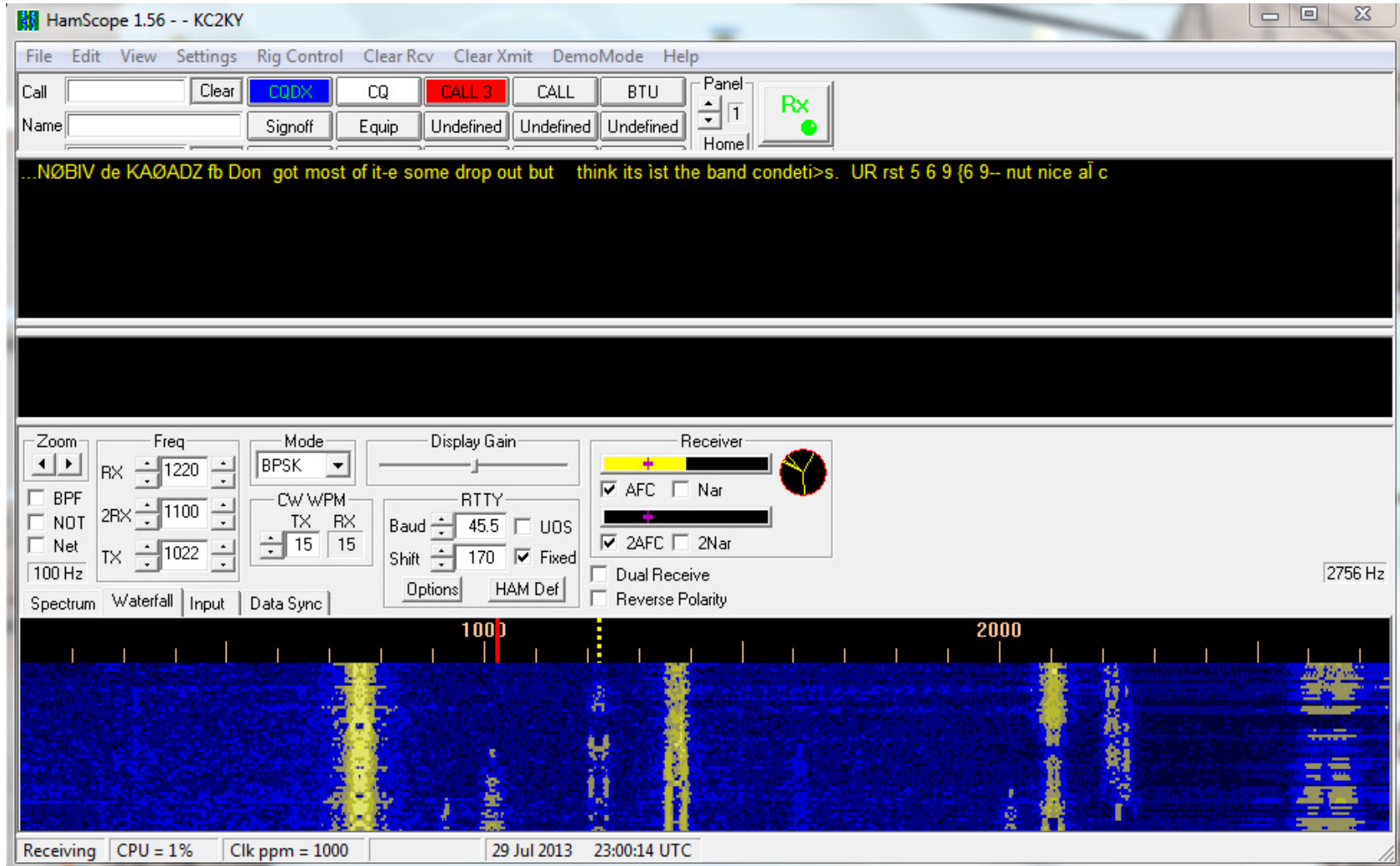
Latest Version of Digi-Pan

The screenshot displays the Digi-Pan software interface for station KC2KY. The window title is "KC2KY - DigiPan". The menu bar includes File, Edit, Clear, Mode, Options, View, Lock, Configure, and Help. Below the menu bar is a row of control buttons: Lookup, CQ, Call 3, Call, BTU, Signoff, Tune, Brag, T/R, Squelch, Clear, and Multi. A table for call logs is visible, with columns for Call, Name, QTH, Rec'd, Sent, Band, and Notes. The current band is set to 20m. The main text area contains the following messages:

```
CQ CQ CQ de KC2KY KC2KY KC2KY  
CQ CQ CQ de KC2KY KC2KY KC2KY  
CQ CQ CQ de KC2K
```

The bottom section of the interface features a waterfall display showing frequency from 14071 to 14074 kHz. A yellow vertical bar indicates the current frequency at 14071 kHz. The status bar at the bottom shows: TX, RX: 1006.9 Hz, IMD, Sq, AFC, Snap, BPSK31, 01/04/2013, 01:54:24 z.

HamScope – Introduced in 2001, Latest Version 2007



FLDigi – Introduced in 2004, Latest Version 2012

The screenshot shows the FLDigi software interface for station KC2KY. The main window contains a text message:

several years ago. Have been off the air for 20 years and got back on in Summer of 2011.
Retired from teaching 13 years ago after 36 total years at junior and senior high schools.
Age 70 and was a band director and pipe organ builder (second career).
In retirement I am a church organist for 2 large area churches.
So back to you Hugo and how copy?
KB8YLO DE WU0U KN WU0U de KB8YLO
FB ON RETUR

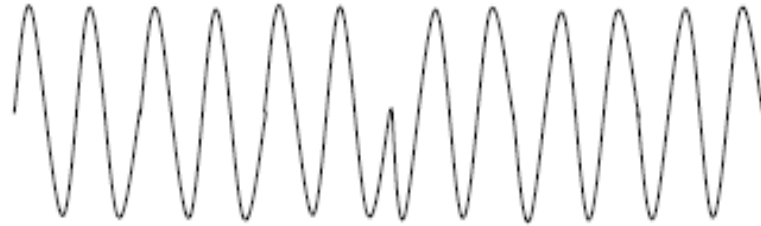
Below the text is a waterfall display showing a frequency range from 14070.5 to 14073.0 kHz. The display shows a strong signal at approximately 14070.759 kHz. The interface includes various controls for frequency, mode, and signal processing.

Key interface elements include:

- Menu bar: File, Op Mode, Configure, View, Logbook, Help
- Frequency input: Enter Xcvr Freq, Freq 14070.759, On, Off 2251, In, Out
- Call and Operator fields: Call, Op, Az
- Mode and Qth: USB, Qth, St, Pr, Loc
- Waterfall display: Frequency range 14070.5 to 14073.0 kHz
- Control buttons: CQ, ANS, QSO, KN, SK, Me/Qth, Brag, T/R, Tx, Rx, TX
- Signal processing: WF, -40, 60, x1, NORM, 759, QSY, Store, Lk, Rv, T/R
- Status: BPSK31, s/n 18 dB, imd -30 dB, -3.0, AFC, SQL

PSK-31 Waveforms

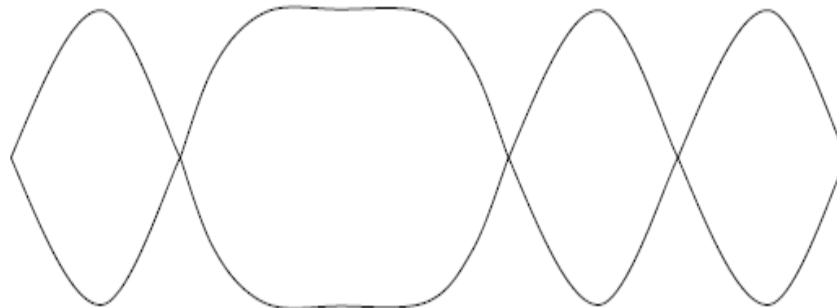
Phase Shift
Keying



Shaped Phase
Shift Keying



PSK-31
Envelope



5 bit RTTY Codes

Code	Letter	CCITT No.2 Figures
00000	N/A	N/A
00001	E	3
00010	LF	LF
00011	A	-
00100	Space	Space
00101	S	,
00110	I	8
00111	U	7
01000	CR	CR
01001	D	WRU
01010	R	4
01011	J	Bell
01100	N	.
01101	F	!
01110	C	:
01111	K	(
10000	T	5
10001	Z	+
10010	L)
10011	W	2
10100	H	£
10101	Y	6
10110	P	0
10111	Q	1
11000	O	9
11001	B	?
11010	G	&
11011	Figures Shift	Figures Shift
11100	M	.
11101	X	/
11110	V	=
11111	Letters Shift	Letters Shift

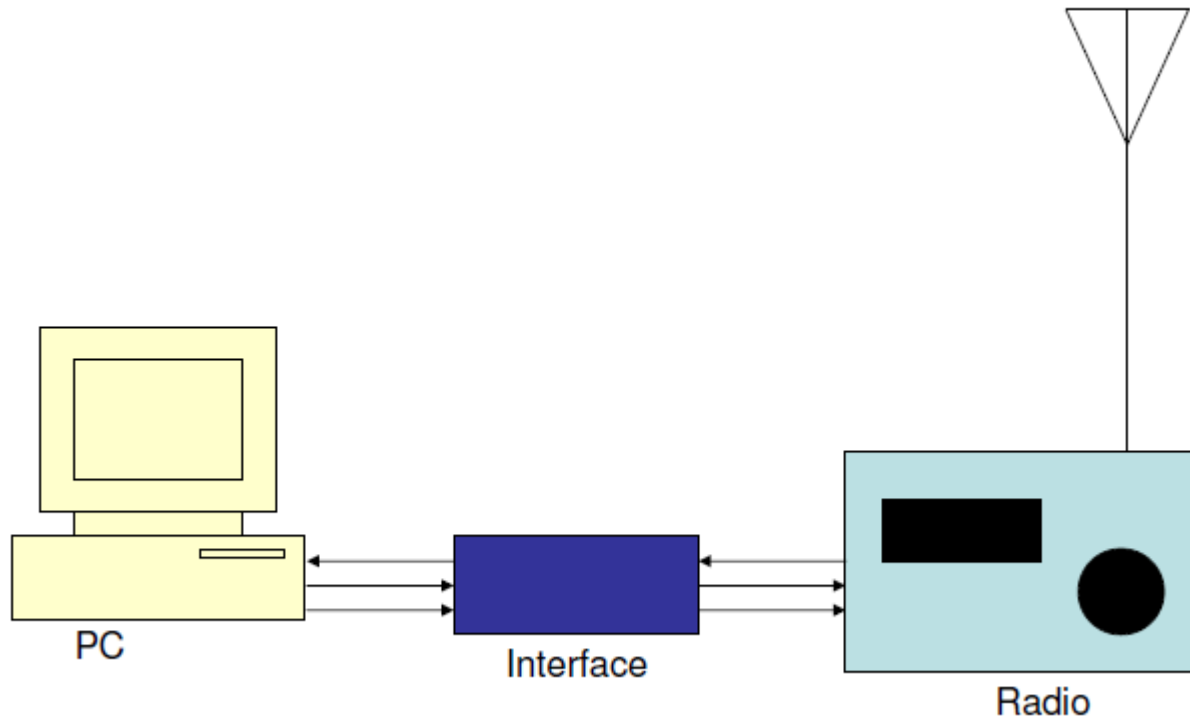
PSK 31 "Varicodes"

SP 1	C 10101101
! 111111111	D 10110101
" 101011111	E 1110111
# 111110101	F 11011011
\$ 111011011	G 11111101
% 1011010101	H 101010101
& 1010111011	I 1111111
' 101111111	J 111111101
(11111011	K 101111101
) 11110111	L 11010111
* 101101111	M 10111011
+ 111011111	N 11011101
, 1110101	O 10101011
- 110101	P 11010101
. 1010111	Q 111011101
/ 110101111	R 10101111

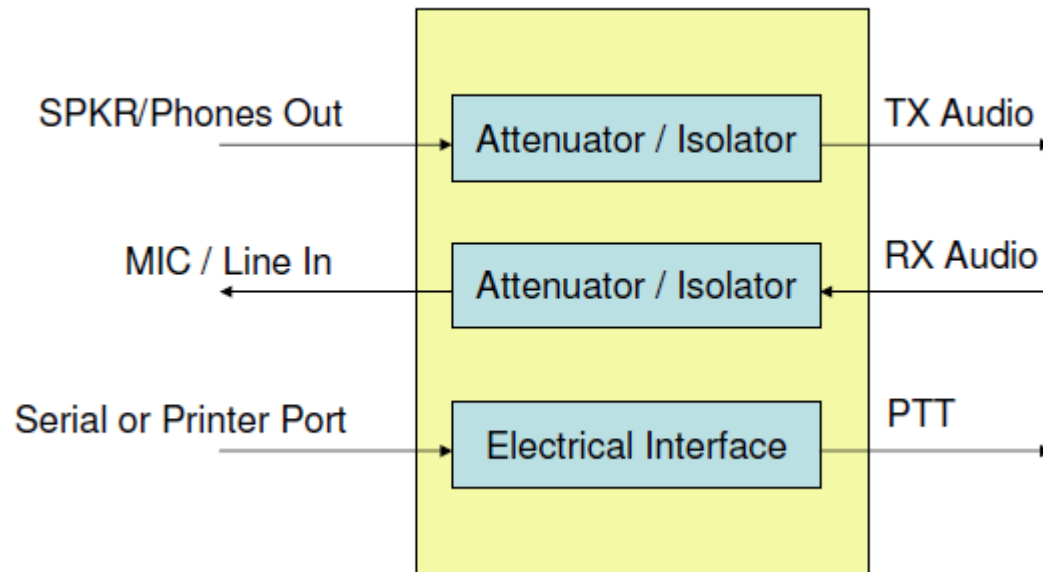
0 10110111	S 1101111
1 10111101	T 1101101
2 11101101	U 101010111
3 11111111	V 110110101
	W 101011101
4 101110111	X 101011101
5 101011011	Y 101110101
6 101101011	Z 101111011
7 110101101	[1010101101
8 110101011	\ 111110111
9 110110111] 111101111
: 11110101	^ 111111011
; 110111101	_ 1010111111
< 111101101	. 101101101
= 1010101	/ 1011011111
> 111010111	a 1011

? 1010101111	b 1011111
@ 1010111101	c 101111
A 1111101	d 101101
B 11101011	e 11
F 111101	s 10111
g 1011011	t 101
h 101011	u 110111
i 1101	v 1111011
j 111101011	w 1101011
k 10111111	x 11011111
l 11011	y 1011101
m 111011	z 111010101
n 1111	{ 1010110111
o 111	110111011
p 1111111	} 1010110101
q 110111111	~ 1011010111
r 10101	DEL 1110110101

PSK Station Setup



PSK Interface Box



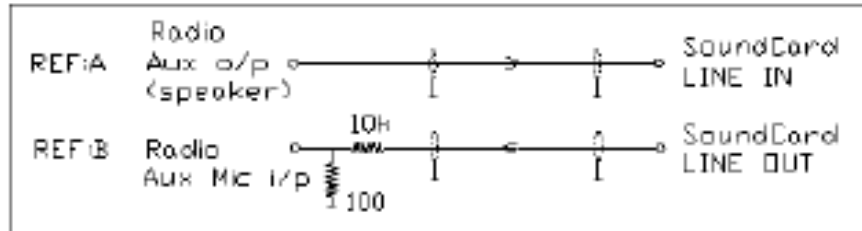
PSK Interface – Easy to homebrew

Several Inexpensive “Store Bought” Units Available

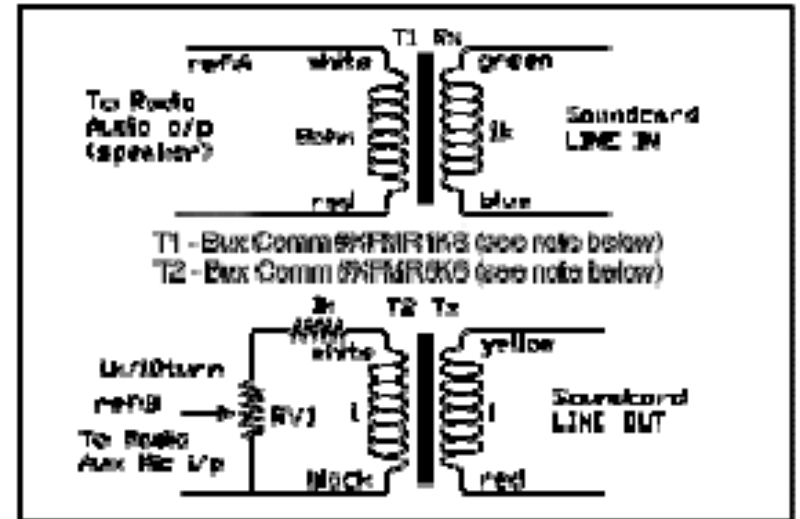
Can be used for several other digital modes, not just PSK-31

Circuits for Homebrew Interface Boxes

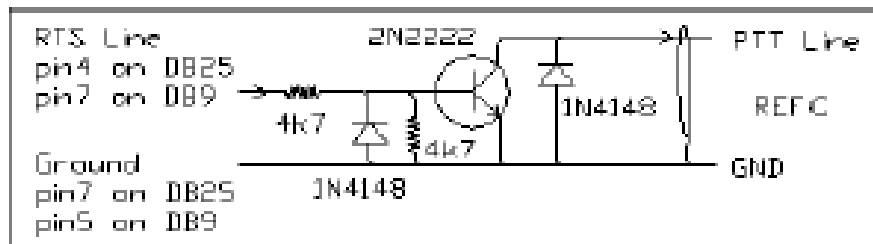
Simplest



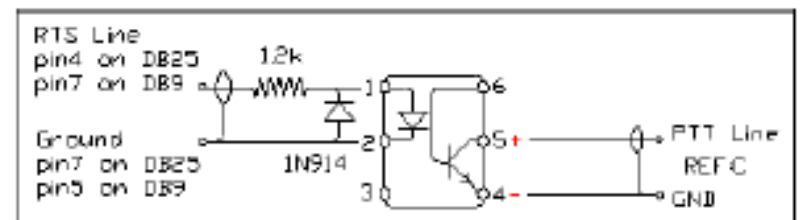
Isolation Transformers for Audio



Add Serial Port PTT Control



Opto-Isolator for PTT



Commercial Digital Mode Interfaces



RIG Basics

Increase TX drive until RF output power stops increasing, then back off a little

Maximum power – 50% of rig’s “rated” power (wattmeters rarely show peak power)

Speech Processor – OFF!

Leave RIT and XIT turned off

Use rig’s Freq LOCK function if available – let the PC take care of frequency control

Start with widest filter

AGC – Slow or OFF

For very weak signals, go to narrow filter. You may need to adjust the IF Shift to center the filter over the station of interest

Recommended PSK-31 Frequencies

PSK31 HF Frequencies		PSK31 VHF Frequencies	
Band	Frequency	Band	Frequency
160 meters	1.838 MHz	6 meters	50.290 MHz
80 meters	3.580 MHz	2 meters	144.144 MHz
40 meters	7.035 MHz	1.25 meters	222.07 MHz
30 meters	10.140 MHz	70 centi-meters	432.2 MHz
20 meters	14.070 MHz	33 centi-meters	909 MHz
17 meters	18.100 MHz		
15 meters	21.080 MHz		
10 meters	28.120 MHz		