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Operating PSK

PSK is a digital mode of increasing popularity – its the **King of Modes!**

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Introduction

- This presentation is a compilation of what I've learned about PSK over the last three years doing several thousand QSOs.
- Its my hope that hams not currently operating on HF will become active through this exciting new mode.

What Is PSK?

- This digital mode introduced by Peter Martinez G3PLX and uses phase modulation and special character coding
- Allows robust narrow bandwidth keyboard “chat” between two stations
- Bandwidth is equal to the baud rate (BPSK31 is 31Hz)
- Originally designed for a Windows soundcard using an SSB transceiver with PSK signal generated and received as an audio tone

PSK mode

- Similar in visual appearance to text messaging on a computer using narrow bandwidth
- Doesn't require good hearing by users
- Operates extremely well under low power – 30 watts is generally the maximum for average use and will get you around the world. I use 20 watts.
- Users tend to be very friendly and very helpful
- Equipment is very modest and software can be free or at low cost

What Equipment is Needed?

- Transceiver capable of SSB and monitoring of ALC at about 20 watts or less (can be an older second hand rig)
- Computer running Windows or Linux
- Interface between the computer and the transceiver (can be home made)
- HF antenna (I use a wire very successfully)
- Software (good freeware is available)

Some PSK Hardware

- **Interface**

- Can be home-made
- Signalink
- Rig Expert
- Rig Blaster
- US Interface Navigator (by KK7UQ)



- **Meter** (Useful accessory, but not essential)

- IMD Meter available as kit or assembled from KK7UQ available through US Interface



External Sound Card Interface

- **US Interface Navigator**
 - Contains an external soundcard
 - Very easy to adjust once set up
 - High quality reliable signal in all digital modes



Some PSK Software

Software	Comment	Source
MixW	Many different digital modes. Logs QSOs and handles eQSL and LOTW. Costs about \$50 – if you buy it download it through their US internet site!	www.mixw.net
Digipan	Soundcard freeware. PSK31 & PSK63. Monitors multiple channels, logs QSOs. Can view multiple QSOs simultaneously	www.digipan.net
Hamscope	Soundcard freeware. PSK31 & RTTY.	www.qsl.net/hamscope/HamScope.html
Hamradio Deluxe (PSK31 DeLuxe)	Soundcard freeware. PSK31. Part of a suite - links to logging program	hrd.ham-radio.ch
WinWarbler	Soundcard freeware. PSK31 & PSK63 & RTTY. Part of a suite - links to a logging program	www.qsl.net/winwarbler
MultiPSK	Soundcard freeware. Many digital modes. Can link to some digital logging programs	f6cte.free.fr

Typical MixW Screen Components

Macro buttons
log &
current contact

receive text box

transmit text
box

waterfall

The screenshot shows the MixW software interface with the following components:

- Menu Bar:** File, Edit, Mode, Options, View, Configure, Help
- Macro Buttons:** A row of buttons including AutoQ, Q1, Call, Call, Info, Ring, Stop, Clear, Tx, Rx, Settings, Group.
- Contact Log Table:**

Mode	Freq	Date	UTC Time	Call	Name	QTH	PSKtype	PSKtype	Status
HFSS	14001400	30.04.2001	20:50:25	DL4HAD	D4HLS	HILLEN/DACH	500	500	
HFSS	14001400	30.04.2001	20:50:24	DL4HPT	D4HLS	Homburg	500	500	
HFSS	14001400	30.04.2001	20:50:16	EA2BPP	FIDEL	SARAGALDO	500	500	
HFSS	14001155	30.04.2001	20:41:37	EA2BLS	MIGUEL	AVILA	500	500	
- Receive Text Box:** A text area displaying received messages, including "ORZPSG de JHPOR" and "ORZPSG de JHPOR".
- Transmit Text Box:** A large empty text area for entering messages to be transmitted.
- Waterfall:** A spectral display showing frequency over time, with a prominent signal at 14000 kHz.
- Other Add-ons:** A globe icon in the bottom right corner with text "EA EU-14-37 2G1".

other add-ons

Some Screen Components

```
e r P e a e u e e e e m t  
e e c e e a n t n i - C a e t ,  
C Q r Q C d e W o Q L i t s B 2 Q L L i n W I  
C Q C Q C Q d e W B 2 Q L L W B 2 Q L L i n W I  
C Q C Q C Q a e e a o e d Q - L W B 2
```

“Intelligent” software detects call signs and can even tell if you have worked the particular call before by changing the colour of text.

1456	BPSK3	14072.435	04/03/2006	19:35:53	WA5EC
1457	RTTY	14085.421	04/03/2006	20:59:20	W8TTY
1458	BPSK3	7071.548	05/03/2006	03:40:01	

atde t o o e e a

cq cq cq de VE7AXU VE7AXU
cq cq cq de V

Screen also shows in ‘real-time’ in a separate box what text is being transmitted by you in a separate text box.

PSK Flavours

- **PSK 31**: most common format
- **PSK 63**: really fast, wider bandwidth but less common than PSK31, mainly in contests
- **PSK125**: extremely fast but very uncommonly encountered.
- There are several other PSK 'flavours' that are proprietary to specific software. Except in contests they are almost never encountered.

Operating Macros

- **What Is A Macro?**
 - A script of commands that runs when clicking on a button or key that can used over and over
- **Macro Setup**
 - Usually PSK software has the capability for users to edit macros or build them from scratch
- **Format for Screen Display**
 - Very useful for avoiding repetitive typing and to speed up on-air or contest exchanges

PSK Best Practice

- **CQ?** Don't send too many cq's at one time, be brief and frequent. Send and listen – send and listen.
- **Upper or lower case?** Lower case is sent faster, and upper case looks as though you are 'shouting'
- **Proximity to other signals** Try not to interfere with adjacent signals – keep your distance.
- **Listen first** As in any transmission listen first to make sure you are not on top of an ongoing QSO. If you discover that you have done this accidentally, move off the frequency.
- **Power** Try to use 20 watts or less to communicate with the whole world. Less is more in PSK and you will desensitize receivers for everyone else (over long distances).
- **Tuning up** Don't tune up or test a signal in the PSK area – move well away from the action and then move back in when you are ready.

More Best Practice

- **Pileups**
- **Ending a QSO** Keep it short and sweet,

Suggested Operating Macros (1)

Label	Example Macro	Comment
long CQ	<p>cq cq cq de VE7AXU VE7AXU VE7AXU cq cq cq de VE7AXU VE7AXU VE7AXU cq pse k</p> <p>(Opinions vary concerning the number of repetitions of cq or callsign.)</p>	<p><i>This gives enough signal for another station to tune in and see the CQ. The last CQ is in case the other station tuned in late and missed the CQ at the front of the exchange. Can be over used. Put in a carriage return and a 'clear' at the end.</i></p>
short CQ	<p>cq cq cq de VE7AXU VE7AXU cq pse k</p> <p>(by including a cq at the end a browsing station will see that this is a cq without having to wait for a repeat)</p>	<p><i>This is useful on the second sending of the CQ for stations that may have noticed the presence of the signal and needed time to retune. Faster turn around. Put in a carriage return and a 'clear' at the end.</i></p>

Suggested Operating Macros (2)

Label	Example Macro	Comment
BTU	btu [hiscall] de [mycall] kn	<i>For turn over to other station. Put in a carriage return and a 'clear' at the end.</i>
response (long)	[hiscall] [hiscall] de [mycall] [mycall] [mycall] pse kn	<i>Respond to CQs or QRZ? Put in a carriage return and a 'clear' at the end.</i>
response (short)	de [mycall] [mycall] kn	<i>Useful for pileups, contests or clarification to QRZ? Put in a carriage return and a 'clear' at the end.</i>

Suggested Operating Macros (3)

Label	Example Macro	Comment
QRZ?	QRZ? QRZ? de VE7AXU pse again k	<i>for use when a weak signal is being received and you want another shot at an exchange. Put in a carriage return and a 'clear' at the end.</i>
73	Thanks for the QSO [hisname] etc. etc. 73 73 73 de [mycall] sk sk sk	<i>Good-bye! Can be elaborate or simple. Can include QSL information or various good wishes. Put in a carriage return and a 'clear' at the end.</i>
QSL info	QSL direct or via buro – good in QRZ.com – no eQSL pse! (or maybe eQSL only pse!)	Give QSL preferences such as “good in QRZ.com” or “eQSL only” or “gud via buro”. Used in conjunction with other macros or typed statements.

Ragchewing Macros (what to say)

- Optional macros might include:
 - a brag file is used to list out all the gear in your shack. Actually, unless you are asked about it I think the sending of this file often simply allows both stations time to log the call and look each other up in QRZ.com – maybe the information isn't as interesting as it seems (would you be interested in receiving it?).
 - detailing your ham experience (start date etc.) is something that can trigger a nice exchange.
 - text telling about the place where you live is also a nice way to introduce Canadian geography to others.
 - what you do for a living or for hobbies and activities is an old standby and is always good for initiating a ragchew.

PSK Contests

Most contests seem to lump PSK in with other digital modes – or with the CW mode category. Some of the ‘dedicated’ PSK contests include:

- PSK Fest (January)**
- PSK31 Flavors (April)**
- Three Day Weekend (June)**
- 40 Meter Sprint (July)**
- 80 Meter Sprint (September)**
- 160 Meter Sprint (October)**
- TARA Rumble (October)**
- PSK Deathmatch (December)**
- There is a lot of PSK activity during the ARRL Field Day**
- There is currently no PSK category for the RAC Canada Day contest or other RAC contests.**

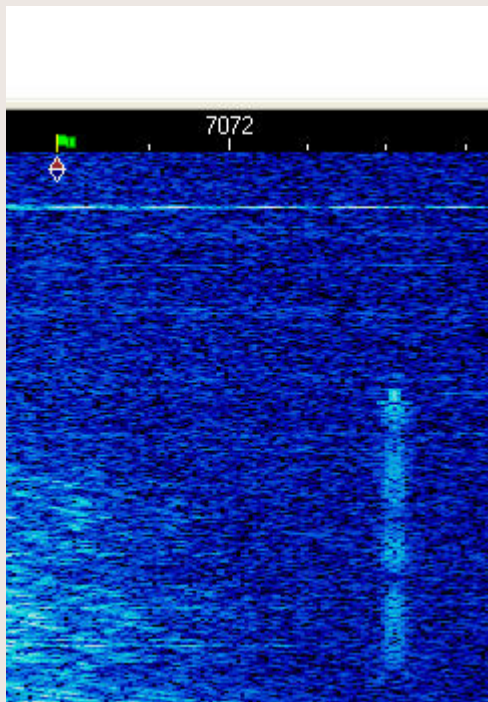
Some Suggested Contest Macros

Each contest is different (similar to RTTY) but suggest setting up the following macros to increase fun:

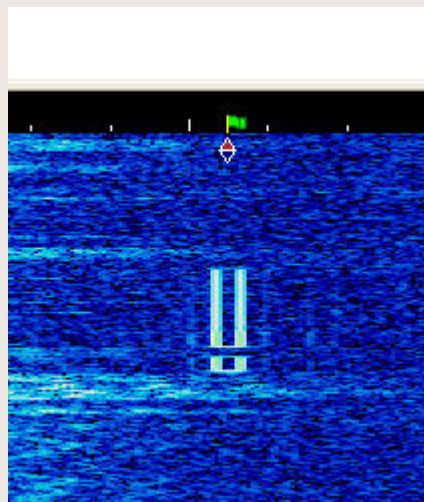
- cq test de VE7AXU VE7AXU k
- pse copy 599 # # QSL? de VE7AXU
- agn agn (or my #?) pse de VE7AXU
- qsl de VE7AXU sk
- tu & gl de VE7AXU qrz?

Submit your log afterwards via email

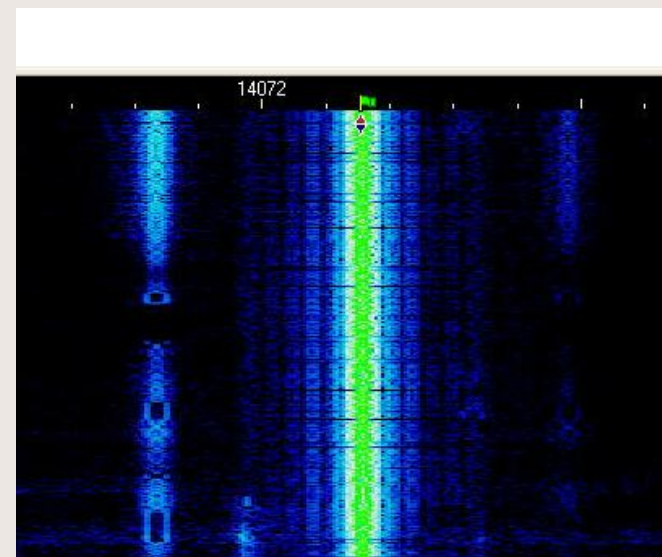
Operating Screen Examples



Noise and weak signal



Empty carrier



**Over-driven signal
(too wide)**

PODXC “070 Club”

- **What is it?**
 - A free ‘virtual’ group of about 650 members
 - Very friendly and helpful
- **Where?/link**
 - www.podxs.com/html/070club.html
- **Activity**
 - Camaraderie & info sharing
 - Promoting PSK activity
 - Active award program (free)
 - Great regular friendly contests
 - A great active PSK Yahoo reflector also worth joining
- **How to join (requirements)**
 - Need to have logged 50 PSK QSOs and submit a record with a scan of one QSL card to join



PSK Awards

- **WAS / DXCC both available for digital modes**
- **070 Club Awards (many endorsements & awards)**
- **EPC awards series (European PSK Club has 2000+ members and is free)**
- **many others**



Suggested Operating Frequencies

- **160m - 1838**
- **80m - 3580**
- **40m - 7035 & 7070**
- **30m - 10142**
- **20m - 14035 & 14070**
- **15m - 21070**

Frequencies are often quoted with xxxx.15, as an artifact of old software that needed a fixed frequency but this is no longer necessary as we can tune directly now.)

Improving CQing Success

- Use the W6RK digital spotting site ([HTTP://data.w6rk.com](http://data.w6rk.com)) and post yourself if you aren't getting any action
- DX clusters sometimes have PSK spots but they are often few and far between
- Adopt a good PSK operating style
- Members in a PSK or digital Group often send out emails to members with tips and notifications of DX and other information

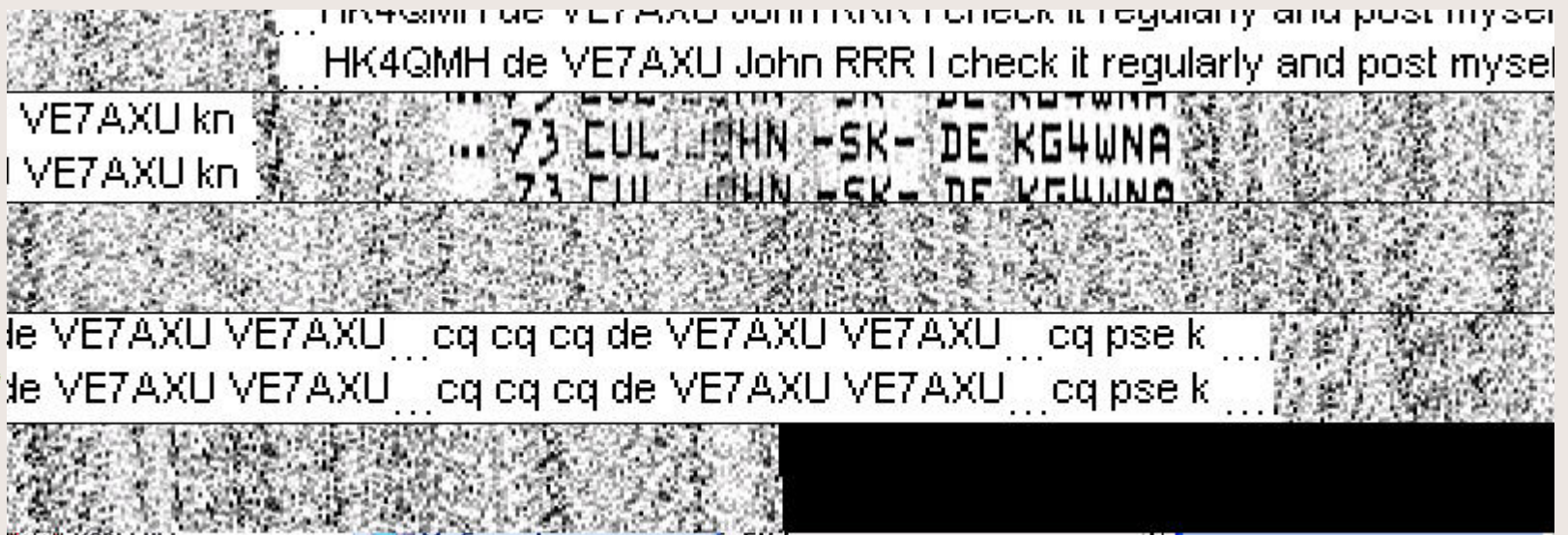
After PSK What?

- **RTTY**
 - Great contests – lots of excitement and action
 - Good DX contacts – something new almost every day
 - Rapid speed and action creates excitement
- **Hellschreiber**
 - Slow speed odd format
 - Not good in poor propagation conditions
 - Activity days at least once a month
- **MFSK**
 - Faster exchange, good in poor conditions
 - Always one or two qso's up 1kHz or so from PSK frequencies

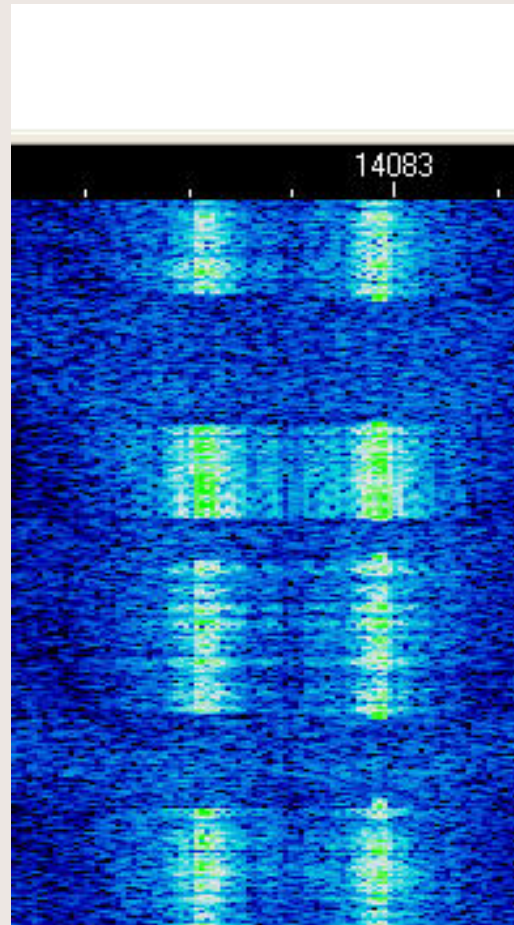
Some Other Digital 'Flavours'

MFSK16, DominoEx	RTTY
QPSK and other flavours	WSJT65
Olivia: 2K, 1K, 500, 250,125 baud	Packet
Contestia: 2K, 1K, 500, 250,125 baud	Amtor/Pactor
RTTYM	SSTV: many styles
Throb	Hellschreiber: Feld Hell, FM Hell 245, FM Hell 105, PSK Hell
MT63: 2K, 1K, 500	CW
Clover (related to PSK)	Stream

Example Hellschreiber signal



Example RTTY signal



Conclusion

I hope that all hams will try this exciting mode. It doesn't take a lot of equipment and it has many facets that could keep you fascinated indefinitely:

- Excellent DX even in solar low periods**
- Nice awards**
- Great Contests**
- Great Rag Chew**
- Emergency use for health & welfare messages**

When (or if) PSK gets dull – then try all the other digital modes!