

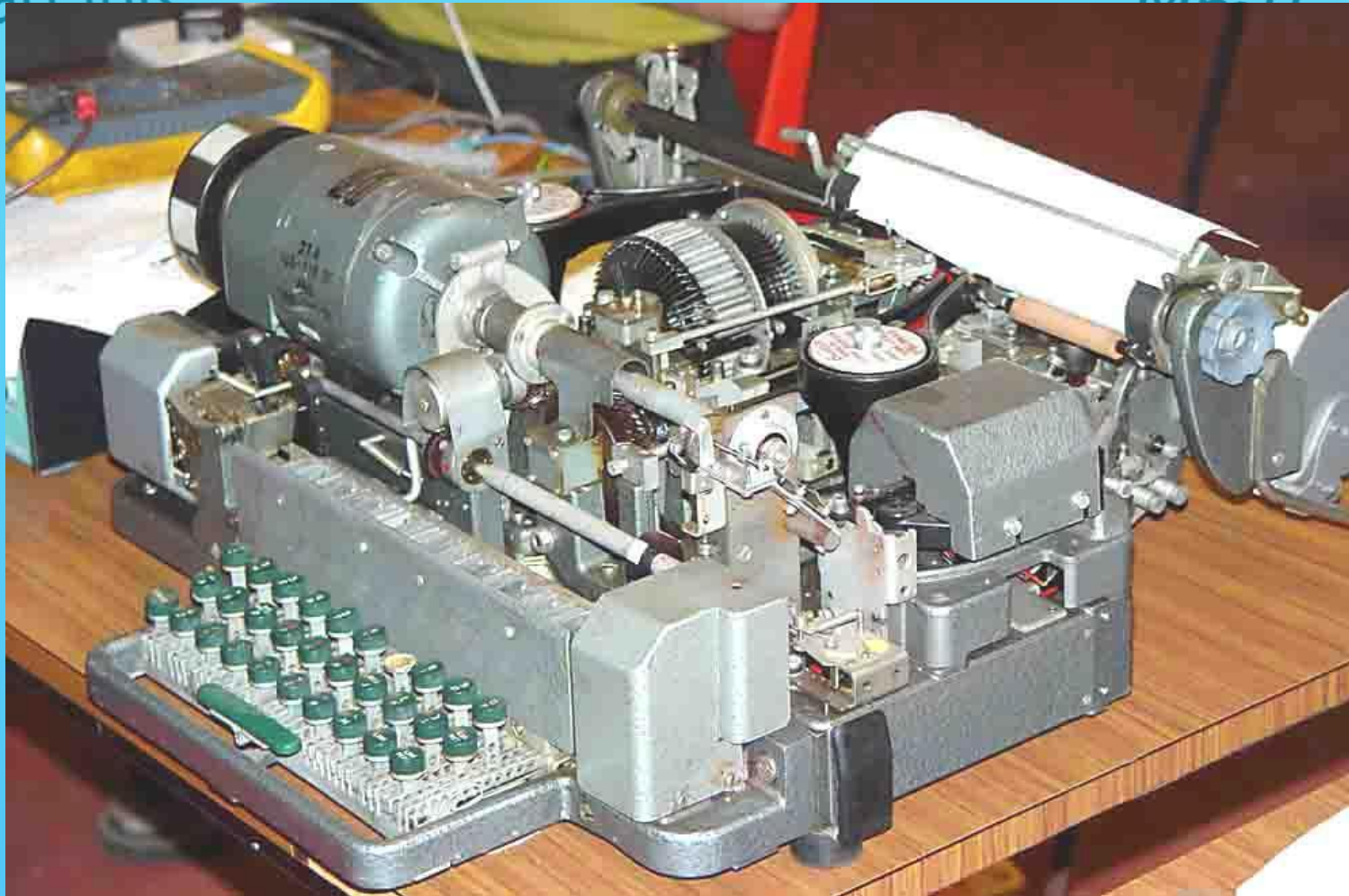


Data for Dummies



Mmvari Ink

Mmvari Ink



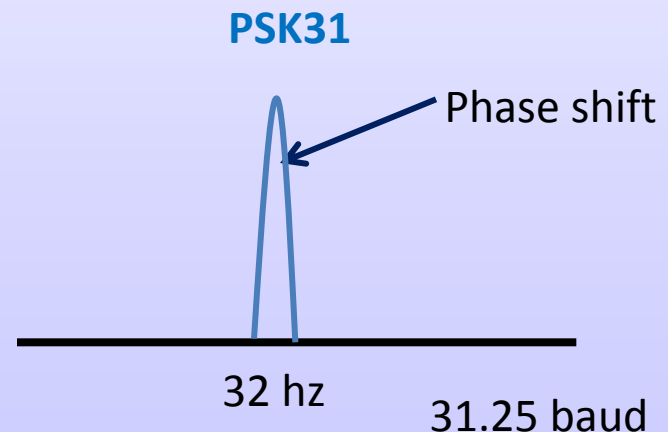
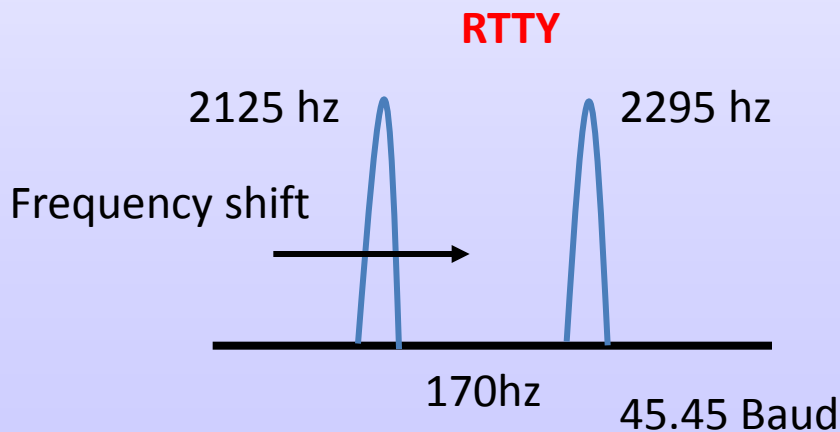
Data for Dummies

- Data modes are an interesting alternative and provide a good mix of computing and radio.
- Also good modes for working DX with low power and an average station.
- There are several modes but primarily PSK 31 (Phase Shift Keying) and RTTY (Radioteletype)

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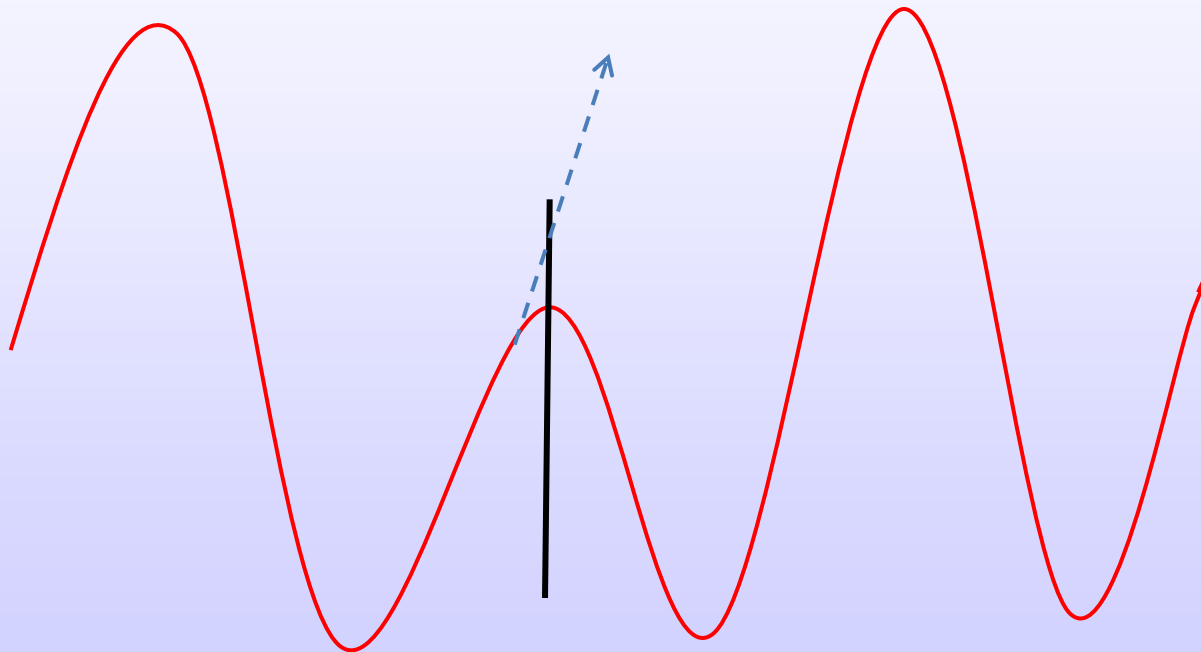
What is needed?

- Radio, Computer with software and an Interface
- What is a 'Data' signal?



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What's Phase shift?



Change of phase

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- Whilst PSK31 and RTTY are the most popular data modes there are many others, such as
- PSK63)
- MFSK)
- MT63) **All AFSK of varying coding schemes, bandwidths and data rates**
- OLIVIA)
- Packet)
- Also includes SSTV

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Your message is created by the computer using an appropriate data code for the mode in use and then transmitted.

For instance RTTY uses a 5 bit code at a rate of 45.45 baud (only UPPER case letters and Numbers + punctuation).

PSK uses a 7 bit code (Varicode) at rate of 31.25 baud (256 ASCII characters ie UPPER and LOWER case etc)

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- On RECEIVE these signals are passed from the RX audio output to the audio input of the computer and decoded/displayed using appropriate software for the mode.
- This is normally via a data interface
- Note: PSK uses USB
RTTY uses LSB if on AFSK
or FSK

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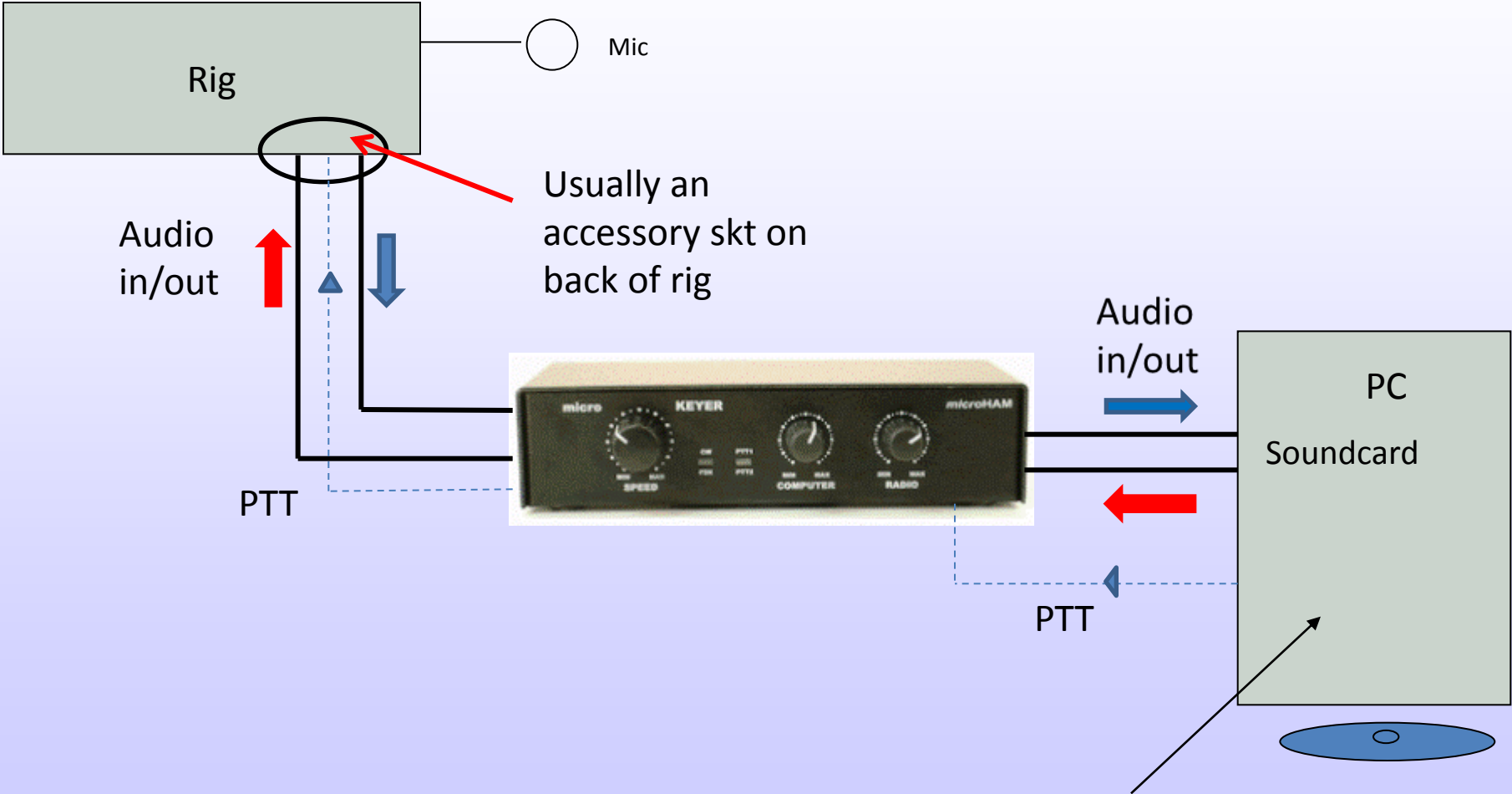
Interfaces

- Wide range available from simple kit to a unit containing built-in CW keyer, Soundcard etc
- Assess your requirements, ie
- Modes to be used?
- Type of rig, CAT control, FSK or AFSK?
- Contesting or General operating?
- Computer and ports available....normally USB now
- How much you want to spend?

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Software set up (downloaded off Internet)

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FSK versus AFSK?

- All data modes use AFSK (Audio Frequency Shift Keying) ie Audio generated tones passed from computer to radio
- However, RTTY is built into some rigs and uses FSK (Frequency Shift Keying). The computer now switches the pure radio carrier frequency to generate the characters.
- FSK is preferred if available but assumes interface device is capable of this.

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Setting up - This is where the fun starts!

- You need to understand the processes and the logic of what you are trying to do with the Radio, Computer/software and Interface.
- Although someone may set it up for you it is essential to know your way around for when it stops working just before you want to use it!

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Typical processes are

Setting up the radio for Data operation –

Modes, filter settings, power levels, Frequencies + settings for CAT communication if in use.

Computer – Software settings, interface drivers, ports, audio levels

Interface – connectors, gain settings, links

Unfortunately there are a lot of settings which all need attention

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Which Software?

- Many software packages around on Internet. Some are free, others need to be purchased.

ie MixW, Digipan, DXLab, Multipsk, Writelog...

Recommend following free programs initially

MMTTY for RTTY

MMVARI for PSK

Download and install from

mmhamsoft.amateur-radio.ca/pages/mmtty.php

N1MM for Contest work from

www.N1MM.com

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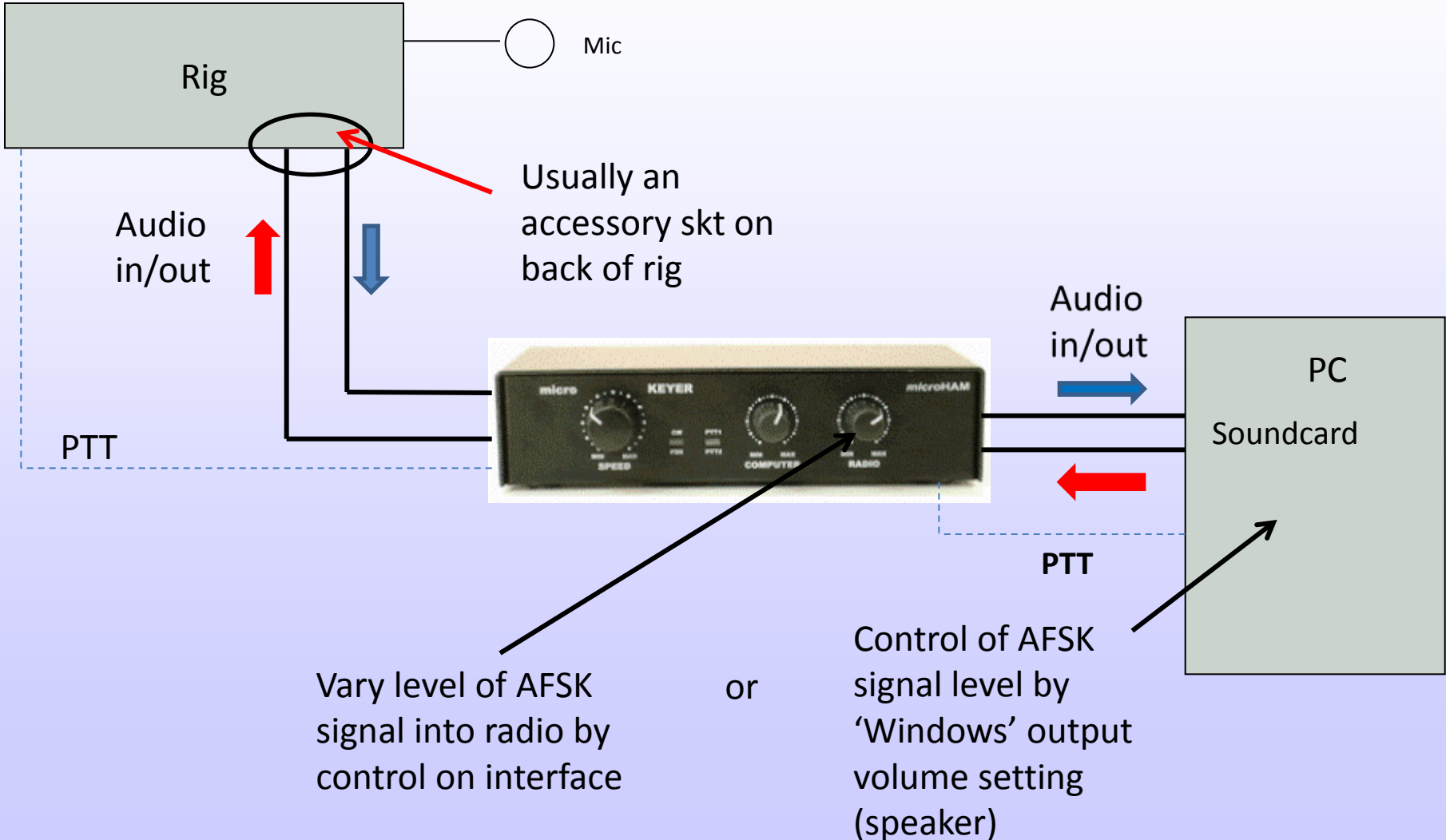
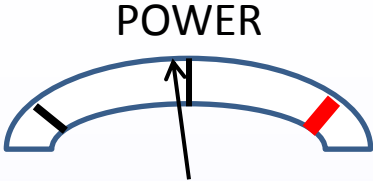
Live testing and operation

REMEMBER Data modes are **100% Duty Cycle!**

Run power output at about 30 – 50% of full power.

In AFSK, turn up rig power setting to 100w then control *actual* power output using audio level of AFSK signal into radio. This is usually done by either Windows volume or by a control on the interface. Bring up to eg **40w** on a 100w rig. Keep ALC reading minimal. Too much Audio will create a distorted transmitted signal with interfering side products.

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- Try receiving PSK data first by setting radio to a PSK frequency, ie 14.070Mhz
- Your software will produce a Waterfall display showing the 2.5khz audio spectrum output
- Adjust the receive gains using a combination of RF gain on RX, interface and 'windows' audio input settings.



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- Do not retune RX and make sure RIT is switched OFF. Click on a station showing on the waterfall display
- Information should show on data screen

As you will see many stations can occupy the 2.5Khz audio spectrum
.....very spectrum efficient!



CQ CQ CQ de G3LDI G3LDI G3LDI

PSK31 using a spectrum display

The screenshot shows the VE5KC software interface. At the top, the title bar reads "VE5KC (VE5KC.MDT) - MMVARI beta ver 0.28". Below the title bar is a menu bar with "File", "Edit", "View", "Options", and "Help".

The main control area includes several sections:

- TX(F12)** and **TXOFF** buttons.
- BPF** (Band Pass Filter) controls with three waveform icons.
- Carrier(Hz)** controls: RX 1253, TX 1254, and a **Carrier** dropdown.
- AFC** (Automatic Frequency Control) and **NET** buttons.
- Speed** control: 31.25.
- Timing(ppm)** control: 0.
- ATC** (Automatic Tone Control) button.
- FFT** (Fast Fourier Transform) controls: W.F. (Window Function) and Sync.
- Resolution Bandwidth** controls: 500, 1K, 2K, 3K.

The **Spectrum Display** shows a frequency range from 0 to 2500 Hz. A prominent signal is visible at approximately 1250 Hz, marked with a blue diamond. The signal is identified as PSK31.

Below the spectrum display is a **Call Log** area with fields for "QSO", "Data", "Find", "Clear", "Call", "Name", "His", "My", and "List". The current call is "YV4GLD".

The **Chat Log** area shows the following messages:

- CQ CQ CQ de YV4GLD YV4GLD YV4GLD
- pse K
- YV4GLD YV4GLD YV4GLD de VA7ET VA7ET VA7ET
- CQ CQ CQ de WA6OVP WA6OVP WA6OVP
- pse K
- CQ CQ CQ de YV4GLD YV4GLD YV4GLD
- pse K
- CQ CQ CQ de VE5KC VE5KC VE5KC pse K
- CQ CQ CQ de VE5KC VE5KC VE5KC pse K

At the bottom, there is a **Message Pad** with a grid of buttons for sending messages (CQ, CQ2, 1x1, 2x2, RRR, BTU, M8-M12, M9-M12, M21-M24, M25-M28, M29-M32, M33-M36).

The status bar at the very bottom displays: "Page1 S/N=25dB 11025.00Hz NONE ANSI RX FREQ(Left click), open the popup menu(Right click)".

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- For transmission – the program normally has message macros for sending CQ, Calling and various exchanges ie Name/QTH, rig info etc etc These need to be set up first.
- These aid qso's, particularly if a slow typist.
- Carry out a test with a local station to ensure all functions are working correctly and data is in correct polarity and a clean signal is being transmitted

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Style of QSO

- HF operation on Data tends to be fixed content Macro driven, although LF and communication with English speaking ops can transfer into direct keyboard use.
- Use Lower case on PSK, it is quicker than Upper case. Also, CAPS on PSK is like ***shouting!***

Data for Dummies

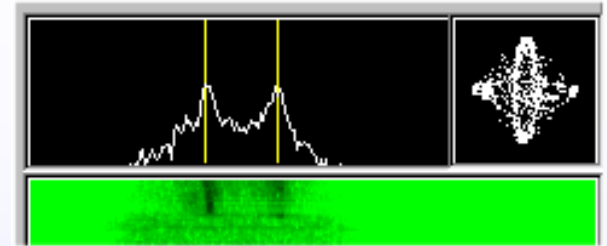
- **RTTY**

Select RTTY software.

If using MMTTY, display will be a 'Spectrum display' plus crossed loops for ease of tuning in the station. Others use waterfall display.

Data speed will be noticeably faster so Macro use is important and will need to be set up.

You need to tune each RTTY station on radio



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- Various parameters need to be set up
- Transmit data rates, port for PTT, soundcard selection, Macros, etc

Much of this is done under menu setting called ***'MMTTY Setup'***

- Many web sites available with help on settings

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KX2A [cqrlty.mdt] - MMTTY Ver1.59A

File[E] Edit[E] View[V] Option(O) Program(P) Help(H)

Control	Demodulator (IIR)				Macro					
FIG	Mark	2125	Hz	Type	Rev.	HAM	1X2	Report	SK	RY
UOS	Shift	170	Hz	SQ	Not.	BPF	2X3	Begin	EE	M14
TX	BW	60	Hz				DE2	Over	M11	CQ2F7
TXOFF	LPF	45	Hz	ATC	NET	AFC	UR599	Equip	M12	CQ1F6

QSO Data Init Call Find Name My 599 His 599 14

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B-'/2;&.5680
;s92(7h07?1(
"7-MPVGX
GGKQWFYUKYAUCYQHWQXMA,CWNMXWTs1;()4C2h6.37-N RQDJVOMG4;"2,"&2278!9OKQZI79'h;?&6.246$7'61:(1;?'6?
41)!(h17
.9)("s1Ih:
&;7'&!JE
YQOMYMWYBXQBNGSMNUY/'9/IVJ
GHYZMEBWQ911;(&?UGUUX
AXUCTKCOQKWB(/?.h?1.h""1!?.10-h.1:/2h.?RWU?7FJUCCBs;):'
XVSWYKOUZCGTGYUXKYDBSURPLPSAGGVFXK":h"IGUWBCISQJFYSPQJN0)/96.hh.;V6OG?.2/PS
J
YY
JC_
```

Clear 2X3F2 BeginF3 ANS BTUF5 Edit Wait

Start ZD7... C:\... mth... Mm... MM... MM... Pain... 7:07 PM

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- **Where to find Data transmissions**
- **3.5Mhz** 3.580 PSK, 3.583 – 3.620 RTTY/other
- **7Mhz** 7.040 – 7.060 Narrow band modes
- **14Mhz** 14.070 PSK, 14080 -14.099 RTTY/other
- **21Mhz** 21.070 PSK, 21080 - 21.099 RTTY/other
- Note: PSK = USB, RTTY = LSB.....*or FSK*

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MMTTY set up

www.aa5au.com/rtty.html

<http://n1mm.hamdocs.com/tiki-index.php?page=Digital+-+MMTTY+for+RTTY+support>

MMVARI set up

<http://n1mm.hamdocs.com/tiki-index.php?page=Digital+-+MMVARI+for+PSK+and+other+modes&structure=N1MM+Logger+Manual>