

Digital Modes with PowerSDR

Bill Tracey (kd5tfd)

bill@ewjt.com

<http://ewjt.com/kd5tfd>

PowerSDR and Digital Modes

- Hook it up – works great
 - Been running digi for about a year
 - Great fun, 1 watt SDR1K + HF Packer
 - Lots of folks get interested when you tell them ‘Rig here is SDR 1000, a Software Defined Radio’
- PSK 31 with a 90 hz filter is great
- Need 2 sound cards
 - 1 SDR 1000 – Hi Quality (Delta 44)
 - 1 for Digital Mode Program (eg MixW)
 - Garden variety Sound card will work fine

Obligatory Screen Shot



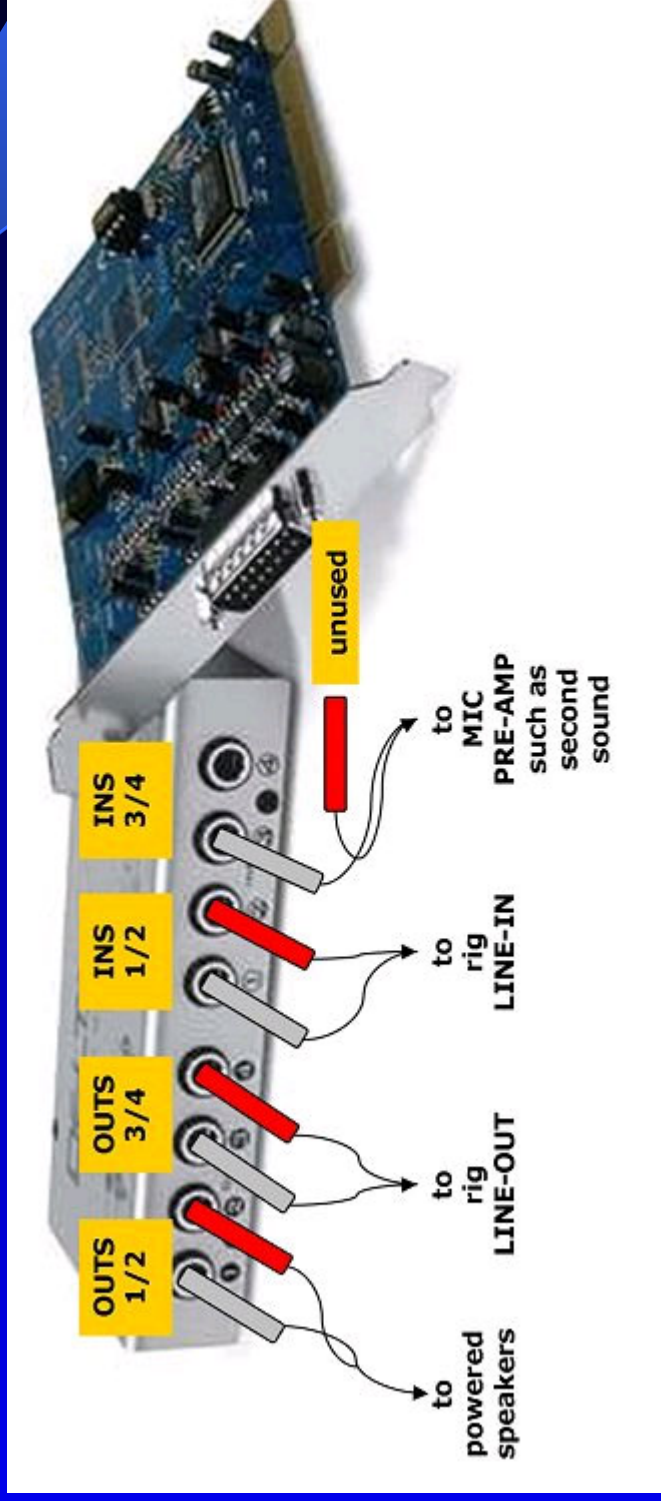
Hookup – Delta 44

Split speaker out

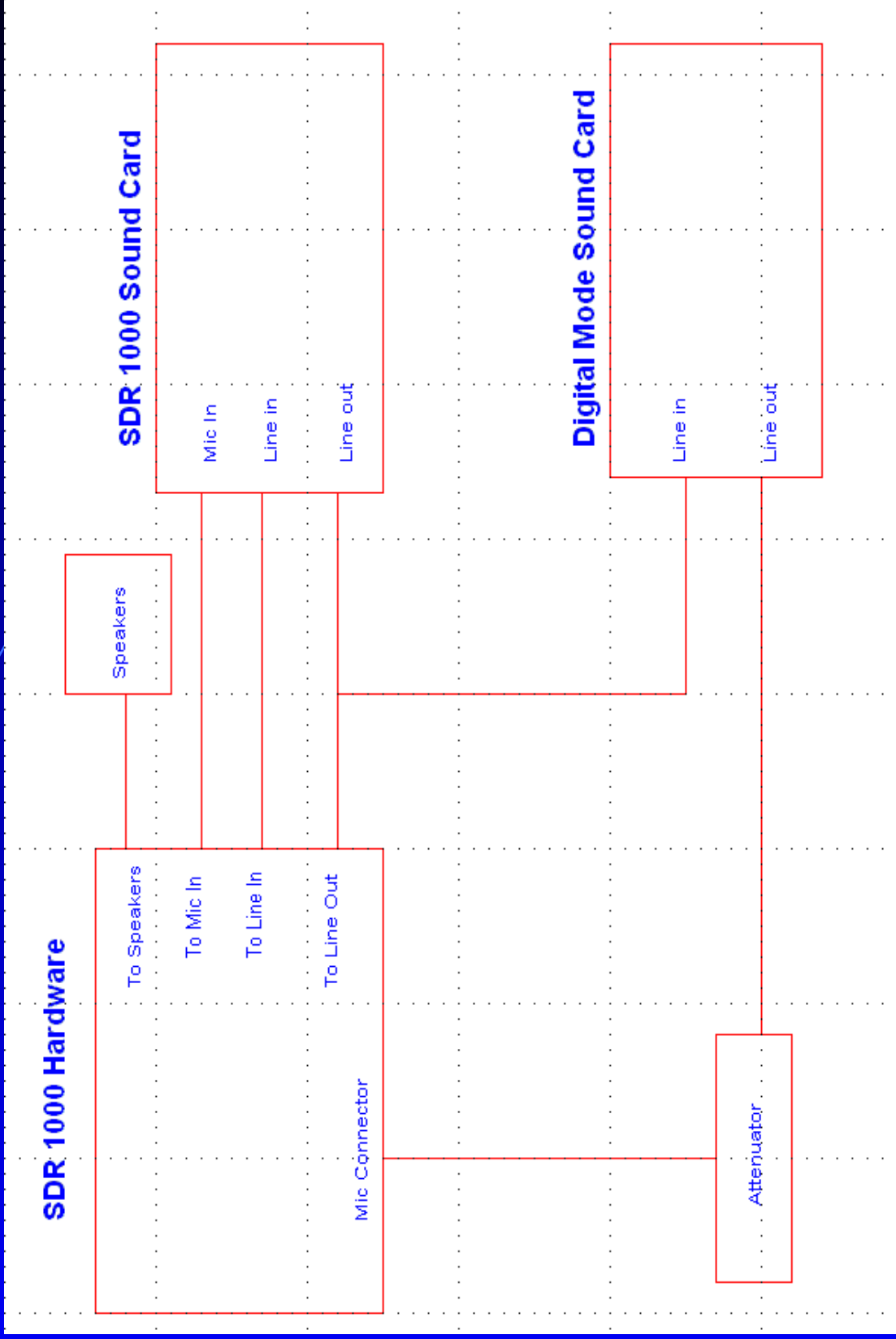
From Delta 44 (Out 1,2)

And feed to Line in on Digi
Mode Sound card

Line out of Digital Mode sound
Card goes to In 3,4 of Delta 44
(only 3 is used in current
PowerSDR code)



Hookup – non Delta 44



CAT Control

- PowerSDR now has Computer Aided Tuning (CAT support)
- Allows external program to control radio via Serial Port
 - Tuning, Mode Selection, Filter Selection
 - If you can do it on the console, you can do it via CAT
- For PowerSDR/SDR 1000 use Virtual Serial Port from Phil Covington (N8VB)
- Provides a pair of virtual serial ports connected back to back
- <http://www.philcovington.com/SDR.html>

CAT Control Setup

- Install vCOMM
 - Phil's install notes a must read!
- Configure PowerSDR
 - Setup Menu, CAT Control tab
 - Enable CAT control, select one of the vCOMM ports
- Configure Digi Mode program
 - Specifics Vary by program
 - Make sure to tell it to use other side of vCOMM port pair

CAT – not just for digi modes

- CAT also used with many logging programs
- Also for Rig Control Programs
 - Ham Radio Deluxe, DX Commander, others
- We emulate a Kenwood Radio
 - Some programs know about extended PowerSDR commands – eg. Ham Radio Deluxe
- See Bob Tracy's (K5KDN) site for latest CAT command set:
 - <http://www.btracy.com/SDR1K.htm>

“Bit Bang Mode”

- Simple Keying of SDR 1000 can be done via “Bit Bang” mode
- Setup is on CAT Control Tab
- Only needed for programs that want to key radio via Serial Port
- Digipan is an example of a Bit Bang PTT program

Digital Radio Mondiale

The screenshot displays the PowerSDR software interface with several key components:

- Top Panel:** Shows RX Meter (TX Meter) with a signal level of -66.5 dBm. It includes a frequency display at 7.042500 MHz and a power display at 9.800000 W. The main display area shows a waterfall plot with a signal centered at 7.042500 MHz.
- Left Panel:** Contains various settings and status indicators:
 - DRM Mode: B (DRM)
 - Intermediate Digits: 2 (2-100)
 - SDC: AMSC Mode
 - Prst Level: B (A)
 - Number of Streams: 1 (0)
 - Received Line: 0 (0)
 - Service ref: 0 (0)
 - MSC CRC, SDC CRC, FRC CRC, Frame Sync, Time Sync, and I/Q Interface status indicators.
 - 20.0 dBm, 11.99579 Hz, 0.29 Hz, 0.03 Hz / 3.78 mHz.
 - Sample Frequency Offset: 0.03 Hz / 3.78 mHz.
 - Droppler / Dolby: 0.03 Hz / 3.78 mHz.
- Right Panel:** Shows a plot of Input PSD (Power Spectral Density) versus Frequency [kHz]. The plot shows a signal centered at approximately 7.0425 MHz.
- Bottom Panel:** Contains various settings and status indicators:
 - Channel: Low F 200000
 - Frequency: High F 230000
 - Step: 7.000000
 - Delay: 0000
 - Mode: DRM
 - File: 200Hz
 - DRM Level: 0 to 60 dBm
 - DRM Mode: DRM
 - DRM Level: 0 to 60 dBm
 - DRM Mode: DRM
 - DRM Level: 0 to 60 dBm
- Overlay:** A large black overlay with white and red text reads:
 - dream** logo
 - Volker Fricke, Alexander Kupper
 - Darmstadt University of Technology
 - Institute for Communication Technology
 - DRM from CBC**
 - DRM from CBC (AAC24 kbps-8BR Mono / English / Current Affairs)**
 - DRM from CBC (AAC24 kbps-8BR Mono / English / Current Affairs) [20.96 kbps]**
 - AAC24 kbps-8BR Mono / English / Current Affairs**
 - DRM from CBC**
 - Bit Rate: 20.96 Kbps EEP / ID-0**
- Bottom Right Panel:** Shows a list of stations with columns for Station Name, Time [UTC], Frequency [kHz], Target, Power [W], Country, Site, and Language. The list includes stations from Europe, North America, and Germany.
- System Tray:** Shows system icons including CPU usage (74%), memory usage, and network status.



Digital Radio Mondiale



- Digital Shortwave
- Dream DRM decoder
 - GPL Licensed, <http://drm.sourceforge.net/>
- To use
 - Configure Dream
 - Set SDR 1000 to DRM mode
 - Listen on speakers connected to Digi card
 - 9800 khz mid to late afternoon usually has DRM sigs – check program guide in Dream

Future Enhancements

- vSound from Phil Covington (N8VB)
 - Virtual Sound card for digi mode program to talk to
 - No more cables
- Alternate input support on Delta 44
 - Pull input from In #4
 - TX2 CAT command, X2 PTT switch?

Far Out Enhancements

- Pactor Notch
 - Detect robots and notch ‘em automagically
- Multi Receive
 - One channel for wideband receive – multi decoder
 - One for narrow filter on signal to work
 - Need to get a modified PSK program
- Adaptive Pass Band Filter
 - Scan passband and look for weak digi sigs
 - Adapt Pass band filter to normalize sigs
- What else?
 - Exploit flexibility of SDR technology

Credits

- Folks that added CAT control, Bit Bang to PowerSDR
 - Phil Covington (N8VB)
 - Bob Tracy (K5KDN)
 - Bill Tracey (KD5TFD)
- And the folks responsible for PowerSDR
 - Gerald Youngblood (K5SDR), Eric Wachsmann (KE5DTO), Bob McGwier (N4HY), Frank Brickle (AB2KT), others
- Open Source GPL code makes it possible

Questions?