



TAPR/ARRL DCC 2011 Update

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CAO and DSP FlexRadio

Topics

- Company News
- New Hardware Systems
- PowerSDR™ 2.0 Features
- PowerSDR™ Upcoming Enhancements

We're Growing!

- Doubled Shipments
- Doubled Office Space 1 June
- Largest Dayton Activity ever
- Streamlined Logistics Center
- New Key Employees
 - Graham Haddock
 - Neal Reasoner
 - Lori Hicks



Amateur Radio Products

- FlexRadio Prominent on Air
- FLEX-1500 Shipping in Volume
- FlexControl™ Shipping
- PowerSDR™ 2.0 Gold
- On plan for Quarterly PowerSDR updates



FLEX-1500

- Introduced before Dayton 2010
- Monumental success!
- We had a lot of trouble keeping up with the demand
- Turned conference room into shipping HQ



FLEX-1500 Ships



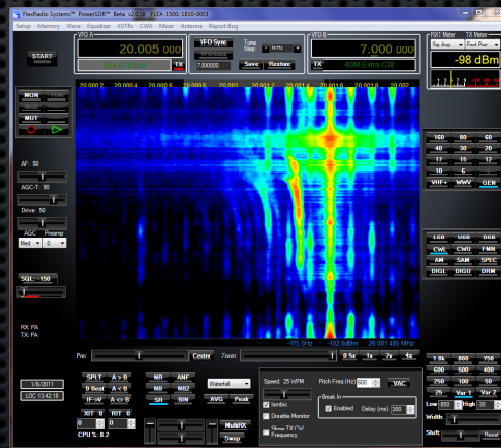
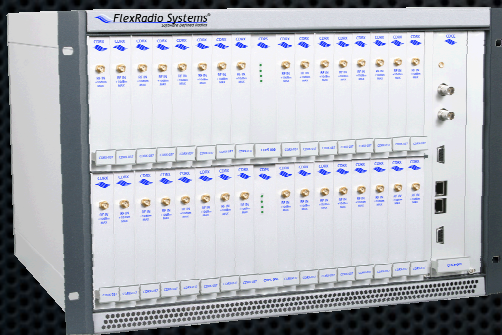
Introducing FlexControl™

- Full-Time PowerSDR Tuning
- Programmable Multi-Knob and Push Buttons
- Mode and Status Indicators
- Ergonomic Design
- USB 2.0 Interface
- Custom PowerSDR and DDUtil driver support
- Compatible with FLEX-Series Radios



Commercial/Government Products

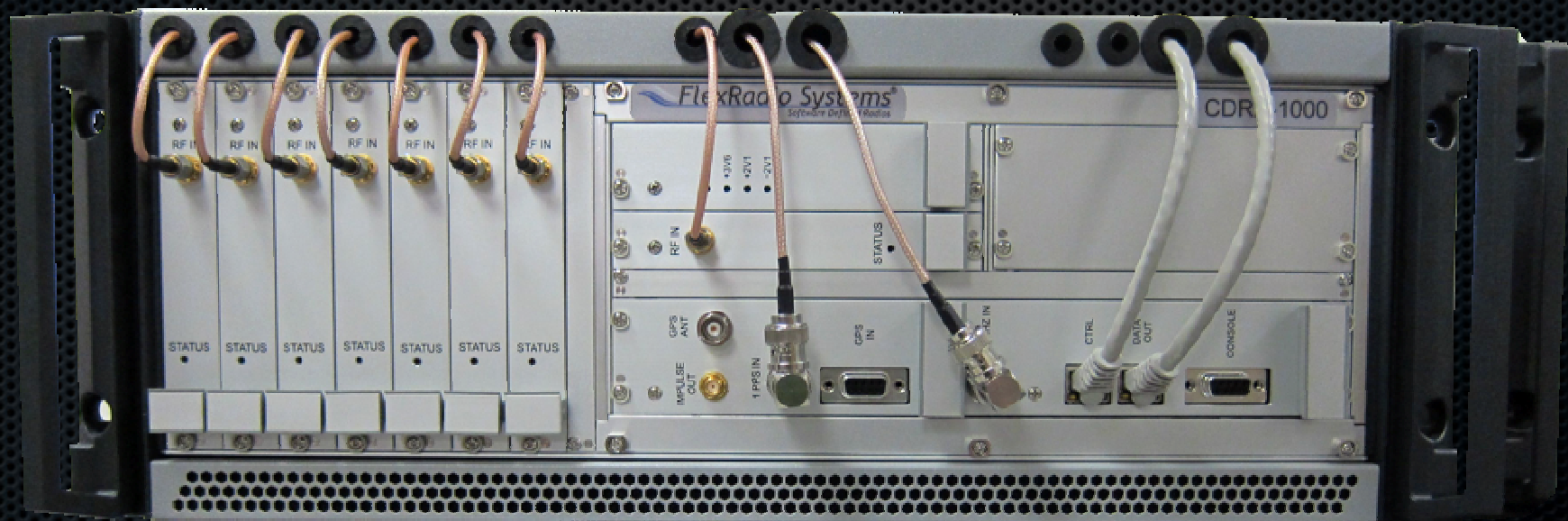
- CDRX-3200 and SERX shipping to U.S. Government
- CDRX-1010 shipping to a U.S. System Integrator
- HF Ionosonde Prototype using FLEX-5000A
- New Contract for a 24 channel, Wideband L-Band RX



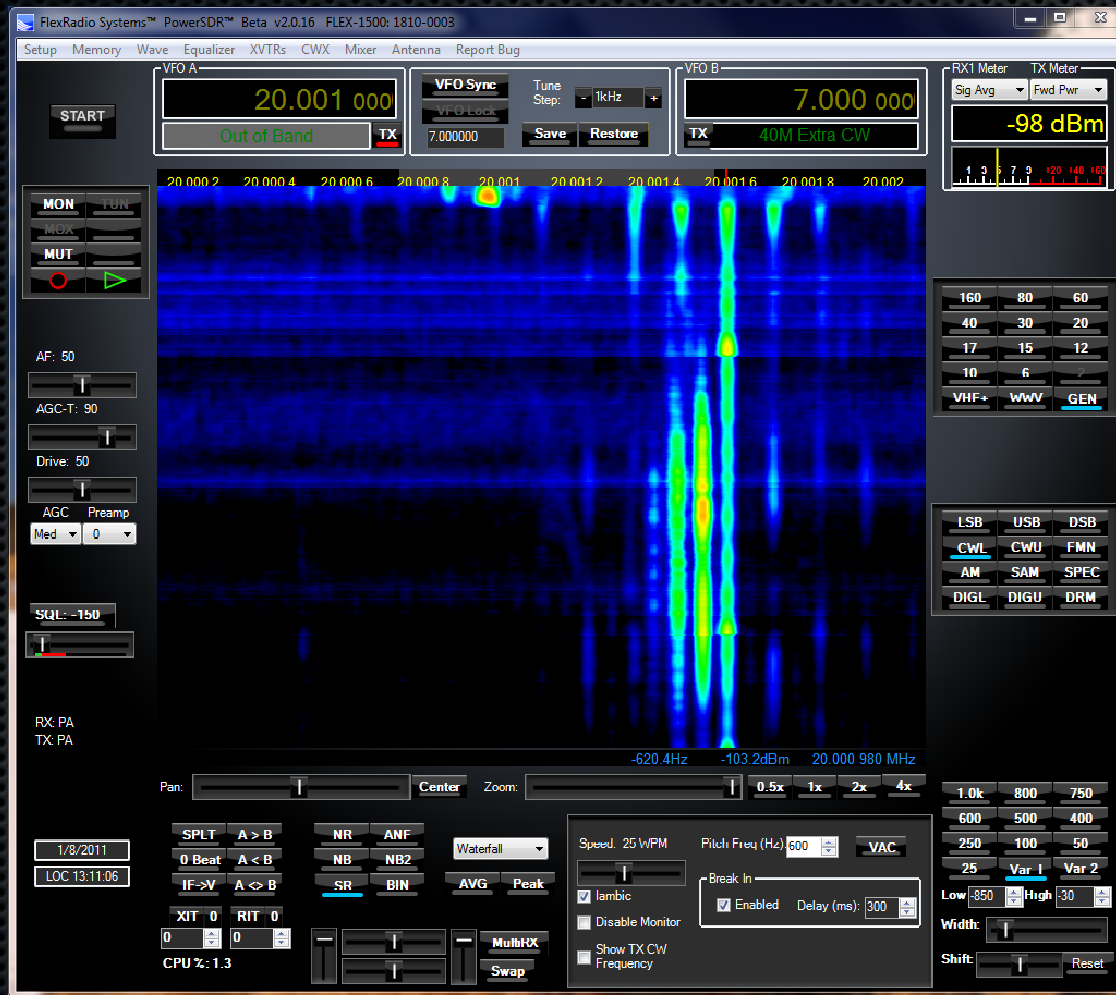
CDRX-1000

- 10-Channel Synchronous, Coherent Tuning receiver
- Same basic design as CDRX-3200
- 100kHz-100MHz Input
- >100dB 2-Tone, 3rd order dynamic range
- 1 GbE Output, independent routing
- **HF Direction Finding**
- **OTHR**

CDRX-1000



Sporadic E Layer Ionosonde



PowerSDR 2.0

FlexRadio Systems
Software Defined Radios

See it - Work it - Log it

Tune In Excitement !

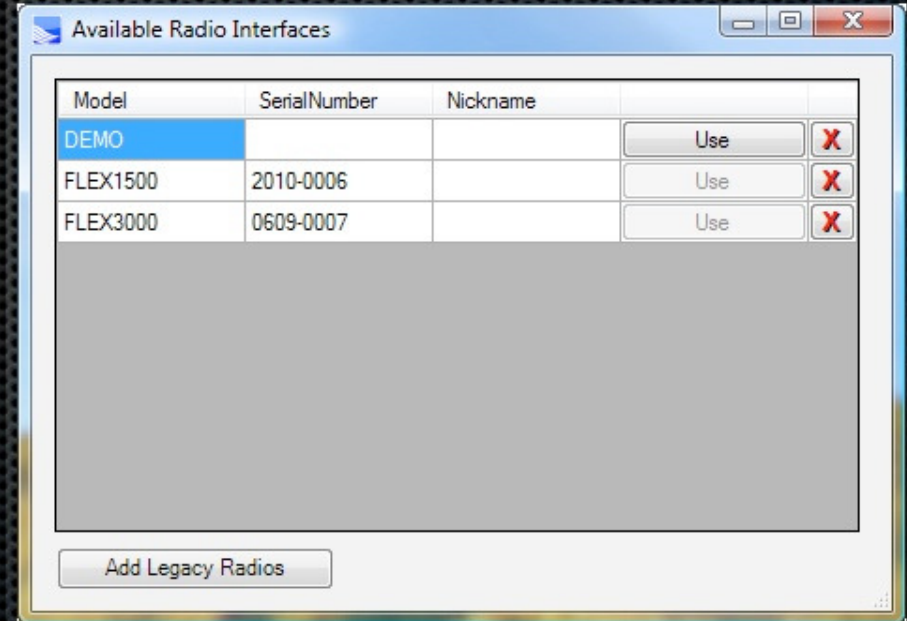
New User Interface & Skins

- New exciting look
- Uses “skinning” technology with replaceable:
 - Buttons
 - Backgrounds
 - Images
 - Colors



Multi-Radio Launch

- Recognizes multiple radios you have used
- Allows running both a FLEX-1500 and another FLEX at the same time
- Settings across radios are preserved



Automated WBIR

- Direct Conversion has significant benefits over superheterodyne in preservation of linearity
- Single drawback: near-in images can't be rejected with traditional band reject filters
- WBIR software written by N4HY eliminates this problem, nulling images to the noise floor

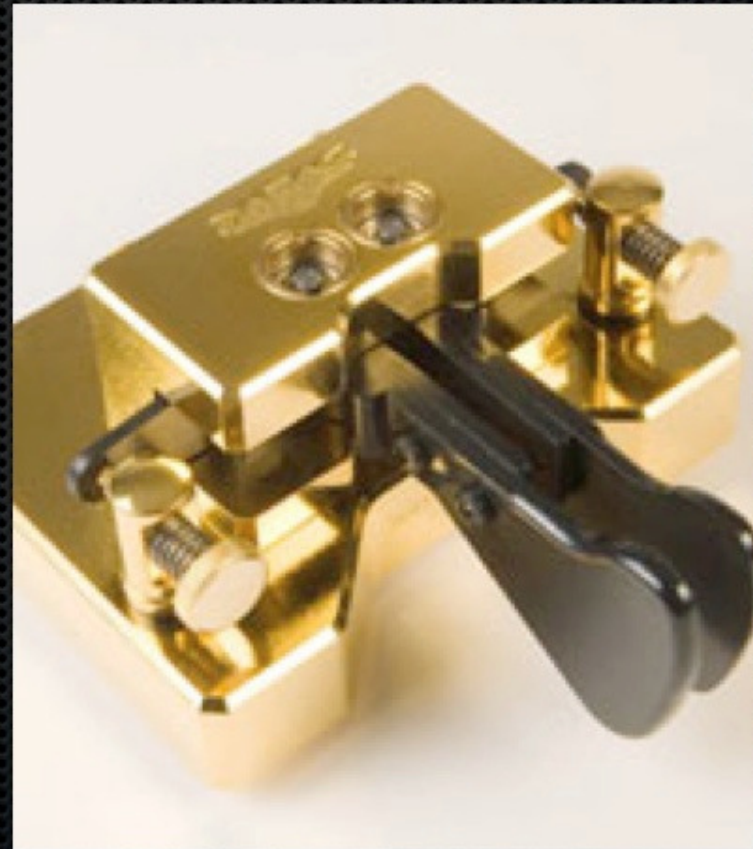
Enhanced ALC Algorithms

- Absolute power control
- The setting you set for max power determines power out



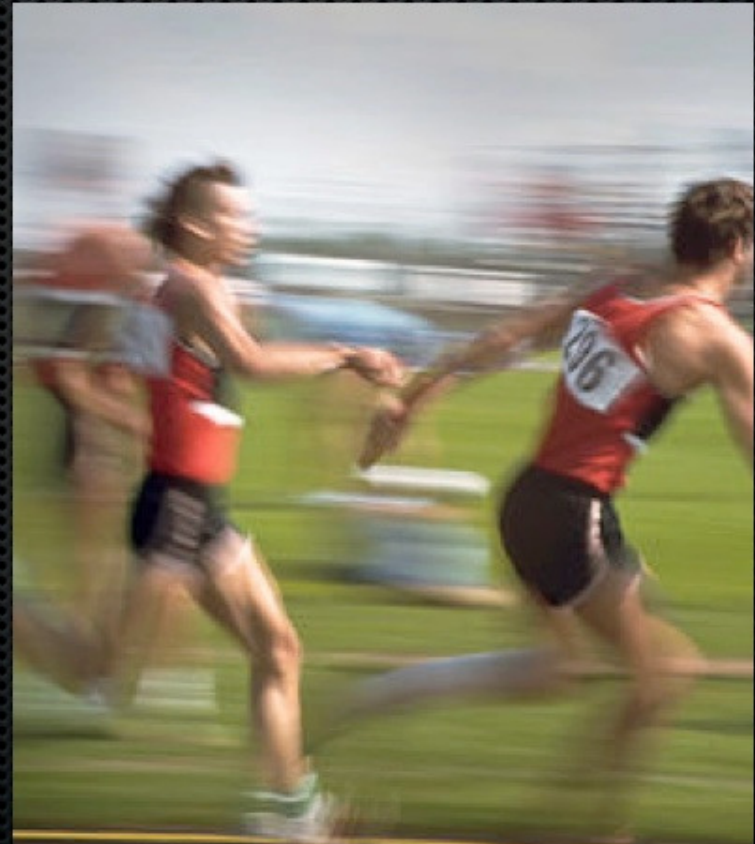
Completely Rewritten CW

- CW code was studied and summarily thrown away
- Rewritten from the ground up



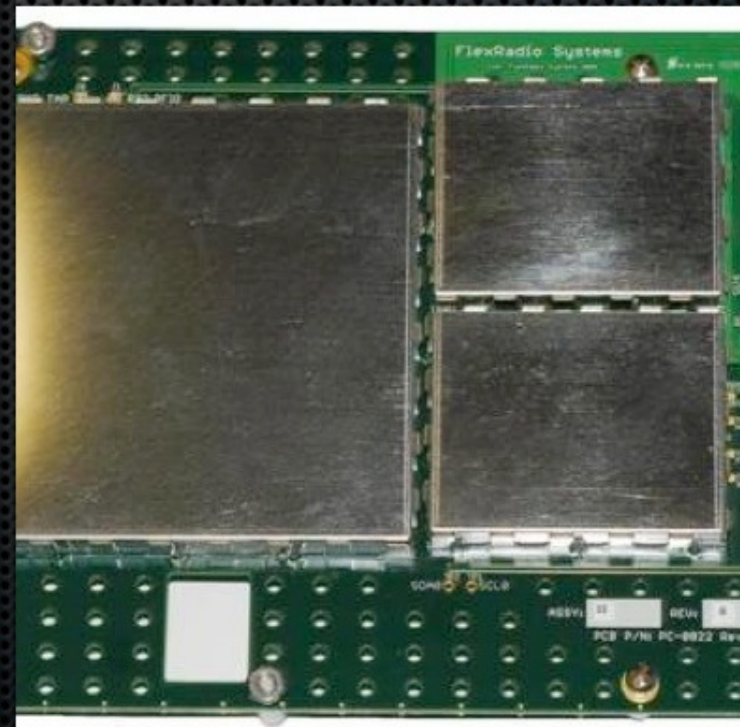
Improved TX/RX turn around

- Important for CW and digital modes
- Algorithm chooses MIDI when available and falls back to PAL if necessary



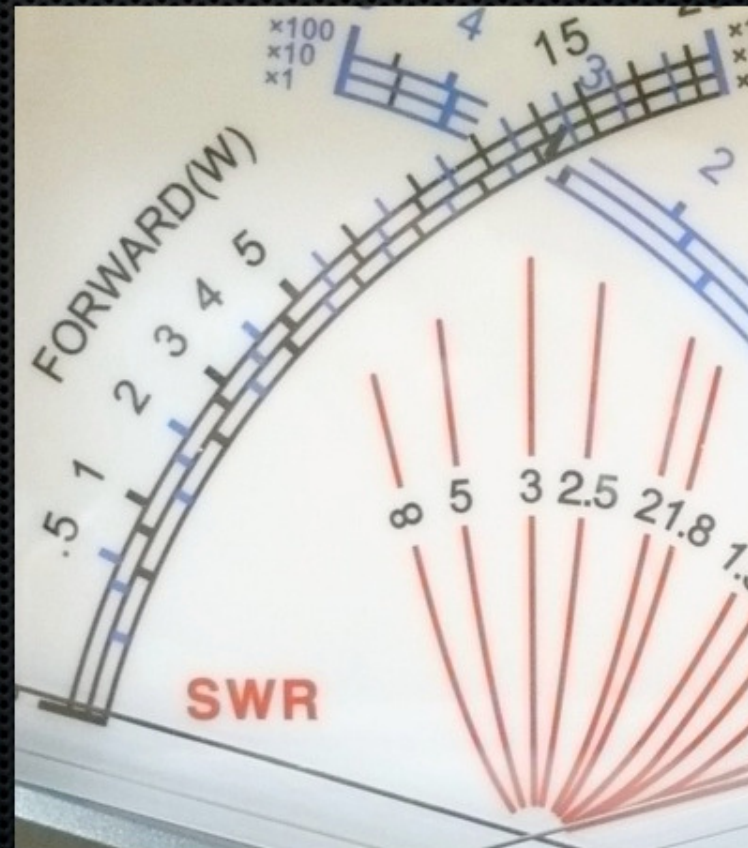
Synchronous Recording

- Record RX1 & RX2 synchronously and play both back
- Use ESC (Enhanced Signal Clarity™) on recorded IQ



Greatly improved F3K ATU

- Completely new algorithm
- Your 3:1 ATU is now a 7:1 or greater ATU
- Memory tune
- Antenna profiles
- F5K improved also



FLEX-1500 Support

- Complete support for FLEX-1500 functions
- Integrated custom USB driver
- Designed for low latency from the start
- Excellent CW performance



Integrated Installer

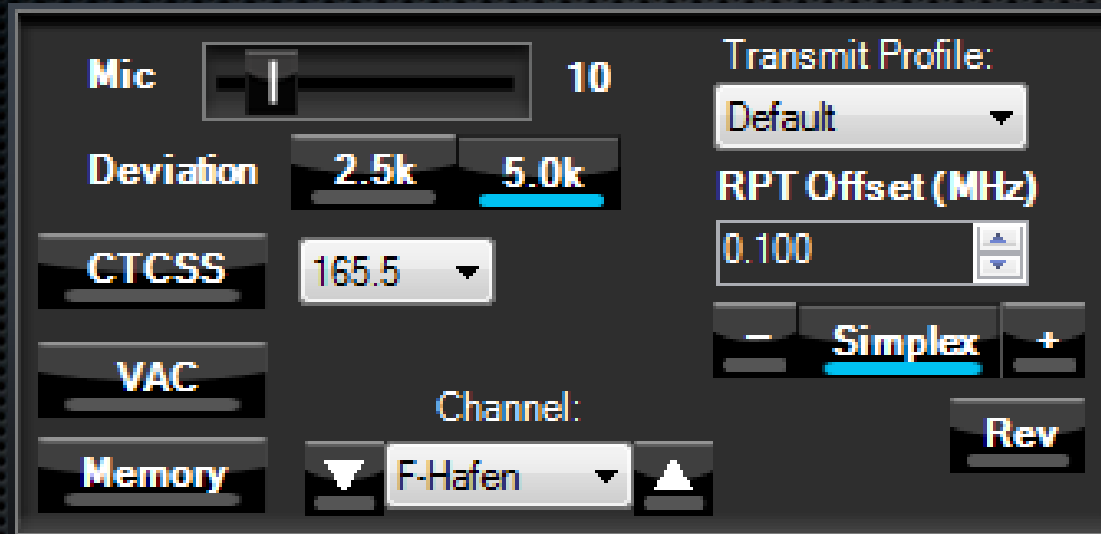
- Installs PowerSDR™, Drivers, Skins, etc. in single install
- Standard wizard-based Installer



PowerSDR 2.1

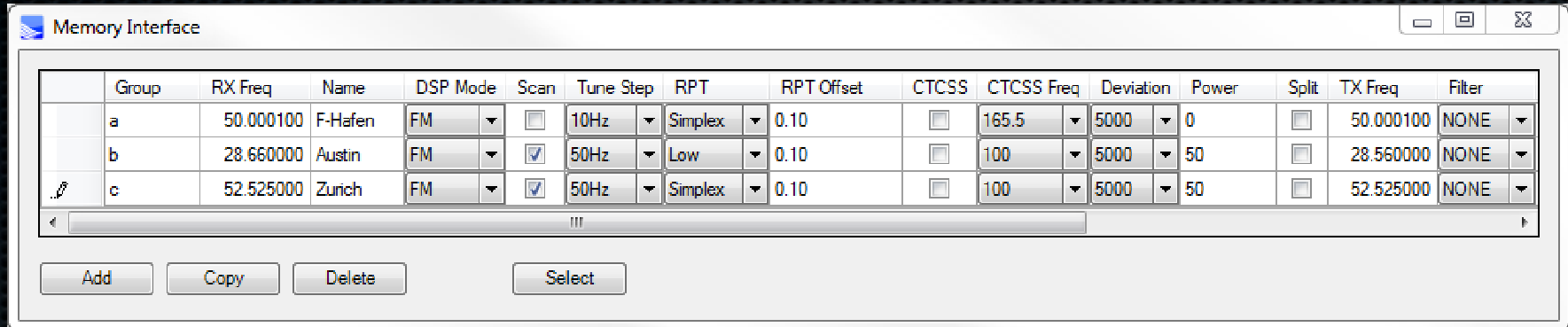
- Completely Re-factored FM Modes
 - Updated Pre-emphasis / De-emphasis
 - Added CTCSS tones
- New FM Mode Forms
- New Memory Management Form
- Re-factored Audio output level mixing
- Several bug fixes and improvements
- In Final “Release Candidate” status
- Target release July 1, 2011

New FM Mode Panel




- Quick Memory Channel recall
- Transmit Profiles
- Repeater Offsets
- CTCSS Control

Memory Management Form



The screenshot shows a software window titled "Memory Interface" with a table of channel settings. The table has 16 columns: Group, RX Freq, Name, DSP Mode, Scan, Tune Step, RPT, RPT Offset, CTCSS, CTCSS Freq, Deviation, Power, Split, TX Freq, and Filter. There are three rows of data, labeled a, b, and c. Below the table are four buttons: Add, Copy, Delete, and Select.

	Group	RX Freq	Name	DSP Mode	Scan	Tune Step	RPT	RPT Offset	CTCSS	CTCSS Freq	Deviation	Power	Split	TX Freq	Filter
	a	50.000100	F-Hafen	FM	<input type="checkbox"/>	10Hz	Simplex	0.10	<input type="checkbox"/>	165.5	5000	0	<input type="checkbox"/>	50.000100	NONE
	b	28.660000	Austin	FM	<input checked="" type="checkbox"/>	50Hz	Low	0.10	<input type="checkbox"/>	100	5000	50	<input type="checkbox"/>	28.660000	NONE
	c	52.525000	Zurich	FM	<input checked="" type="checkbox"/>	50Hz	Simplex	0.10	<input type="checkbox"/>	100	5000	50	<input type="checkbox"/>	52.525000	NONE

Buttons: Add, Copy, Delete, Select

- Channel GROUP names (Sort by Group)
- Channel Names
- Repeater Offsets including unusual Splits
- Wide and Narrow FM deviation
- Programmable Power and filter levels

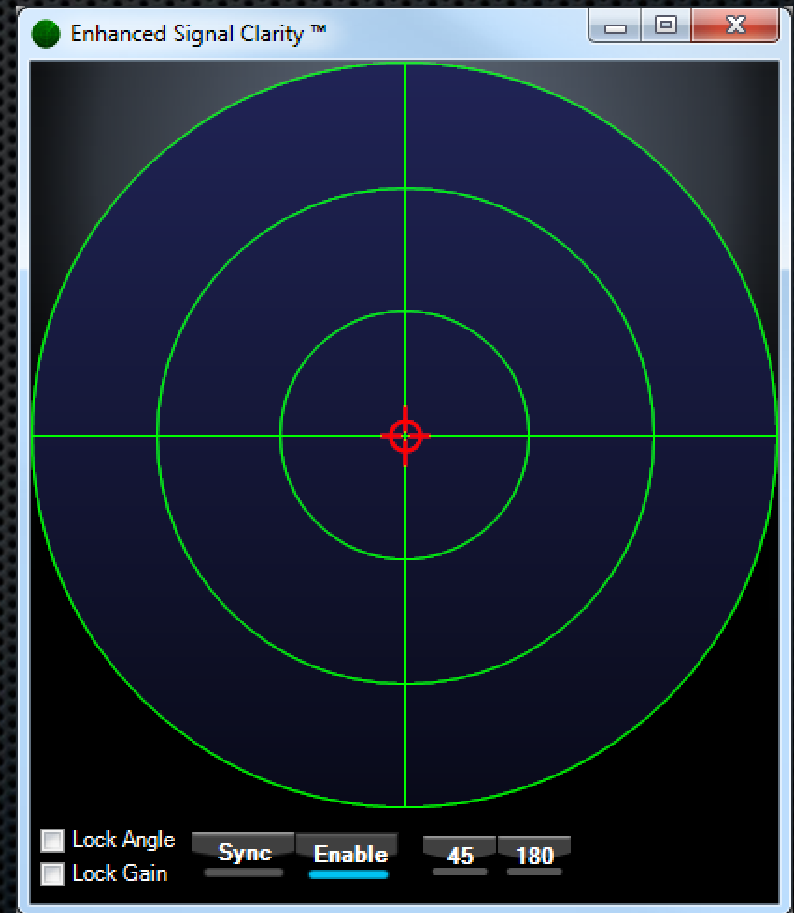
PowerSDR 2.2

Escape the Noise!™

- Enhanced Signal Clarity™ functionality
- Tracking Notch Filters
- In Alpha status
- Target release Sept, 2011

Enhanced Signal Clarity™

- Synchronous Receivers are the KEY!
- Available on FLEX-5000-RX2 Configurations
- New ESC features:
 - Noise Notching
 - Beam Forming
 - 45deg. and 180deg Phase Angle Quick Jump



Tracking Notch Filter

- Most notches are IF or Audio notches
- The notch moves (not stationary)
- If you notch a birdie or a noise source, then move off frequency, the notch is useless — you have to retune notch stopband

Introducing the TNF

The screenshot displays the FlexRadio Systems PowerSDR software interface. The window title is "FlexRadio Systems™ PowerSDR™ Beta v2.0.23 Base SVN: 4501+ Built by N5AC Demo". The interface includes a menu bar with options like Setup, Memory, Wave, Equalizer, XVTRs, CWX, UCB, FlexControl, and Report Bug. The main display area is divided into several sections:

- VFO A:** Shows a frequency of 14.226 994 MHz and a mode of 20M SSB. It includes VFO Sync, VFO Lock, and Tune Step controls.
- VFO B:** Shows a frequency of 7.000 000 MHz and a mode of 40M Extra CW.
- Spectrum Display:** A central plot showing signal strength across a frequency range from 14.223 to 14.232 MHz. A red vertical line is positioned at 14.227 MHz. The plot shows a signal at approximately -118.4 dBm.
- RX1 Meter:** Displays a signal strength of -99 dBm.
- Controls:** Includes various knobs and buttons for AF, AGC-T, Drive, AGC, Preamp, SQL, BCI Rejection, and Transmit Profile. The TNF (Tone Noise Floor) control is highlighted in blue.
- Filters:** A grid of filter options including LSB, USB, LSB, CWL, CWU, AM, DIGL, DIGU, and DRM.
- System Information:** Shows the date (5/19/2011), time (LOC 06:46:50), and CPU usage (25.4%).

Suppressing Birdies & Noise with Tracking Notch Filters

Birdies



TNF Controls



Working TNF Controls

Pressing +TNF Adds Notch
to Center of Passband



Working TNF Controls

Drag the notch to the
desired frequency



Working TNF Controls

Move mouse up/down to
increase/decrease the notch width



Working TNF Controls

Add a second notch by clicking
+TNF again



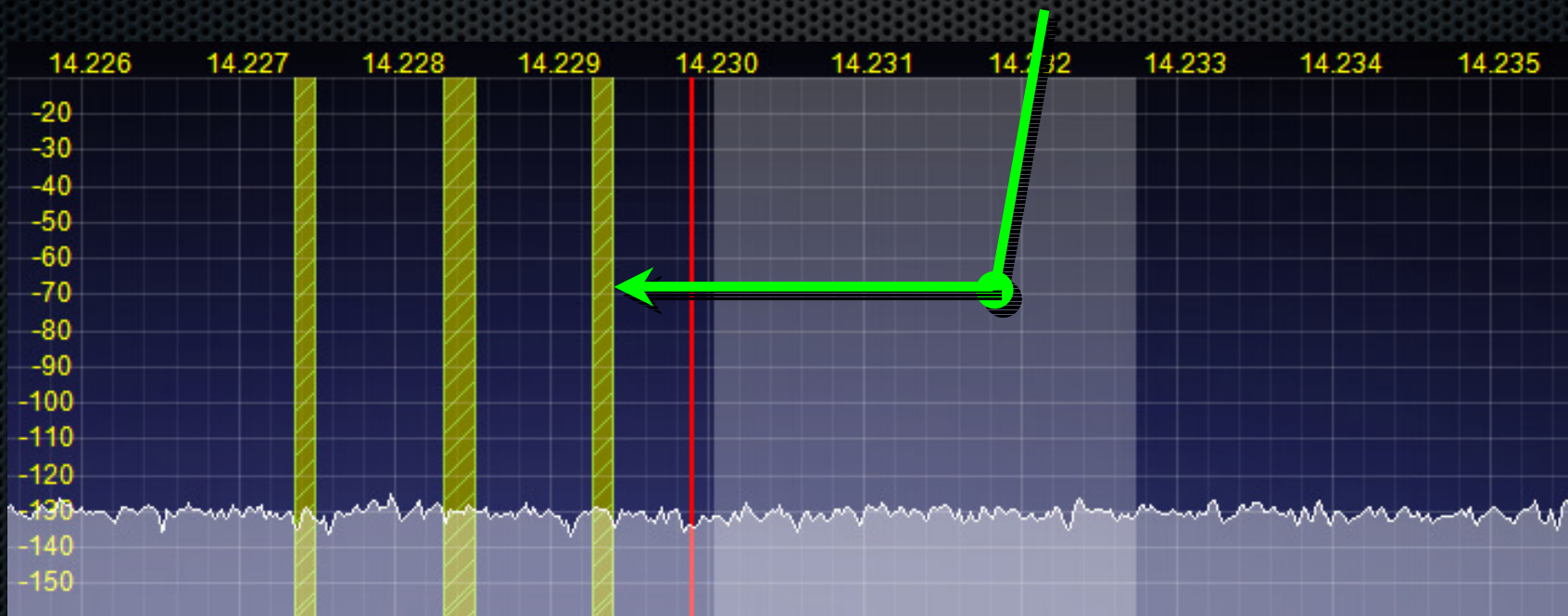
Working TNF Controls

Add as many as you like!



Working TNF Controls

As you tune, the TNF follows *RF*, not *IF/Audio*



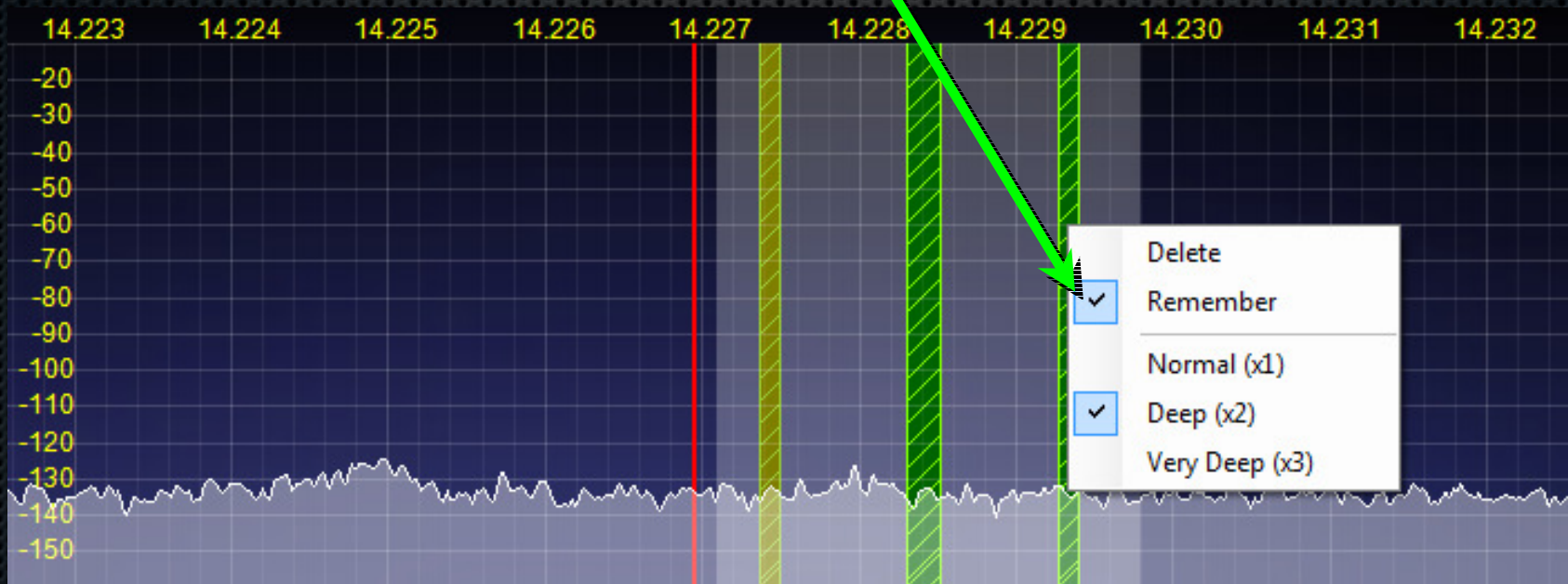
Working TNF Controls

Vary the depth of the notch



Working TNF Controls

Remember notches
(permanently get rid of noise!)



Questions?