



DX University
Visalia California – 2013

DX Academy



Station & Antenna Considerations

Ned Stearns AA7A

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Ned Stearns AA7A



First licensed in 1963 at age 12, he has been a serious Dxer since 1974.

Top of the Honor Roll, 5BWAZ, Satellite DXCC, and the first ever 11-band DXCC (160 through 2 meters, inclusive).



Dxpeditions in 1979 as AA7A/VP2A ; 1999 as 3B9R ; 2000 as K5K.

Member of the VooDoo Contest Group since 2005. Currently the team co-leader and station designer.

Serves as a director on the NCDXF.

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Topics



Radios



Antennas



Other Station Elements



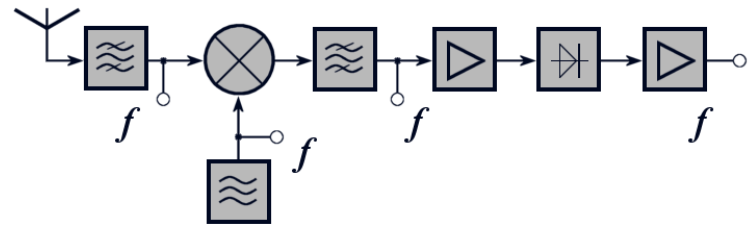
Station Layout

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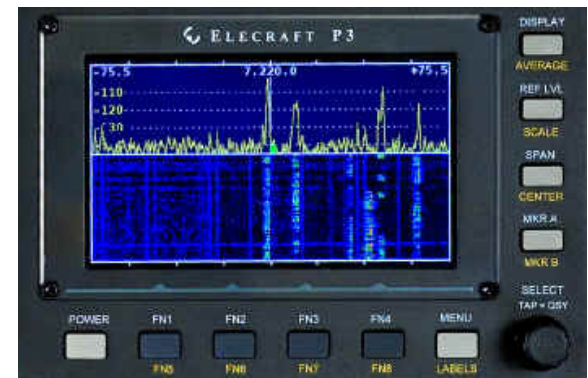


Radio Equipment - Receivers

- Critical receiver requirement
 - Selectivity
 - Dynamic range
 - Split frequency operation



- Advanced capability
 - Second receiver or sub-receiver
 - Diversity reception
 - Panadapter displays
 - Software Defined Radios (SDR)

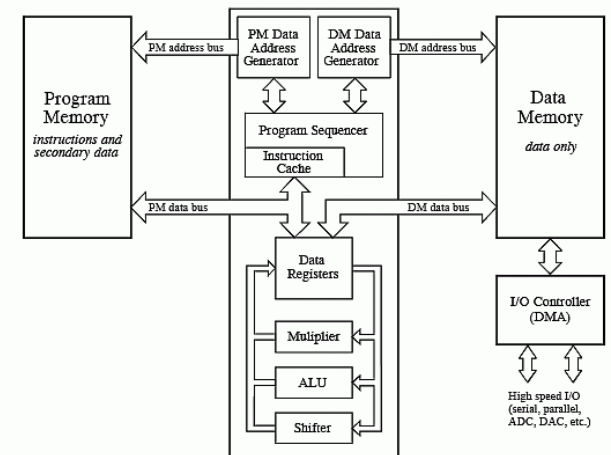
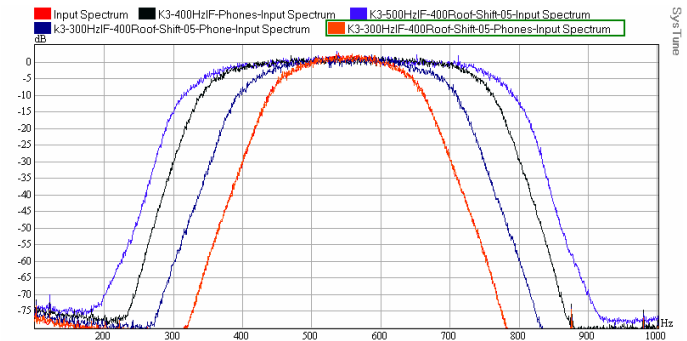


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Receiver Selectivity

- Roofing Filters
 - Limits power applied to non-linear receiver elements
- Digital Signal Processing
 - Bandpass filters
 - Notch filters
 - Noise Reduction algorithms
 - Noise Blanking



Receiver Dynamic Range

- One simple definition: Blocking Dynamic Range
 - Copy a weak signal simultaneously with a high level, off-channel signal
 - Ratio signal amplitudes when degradation of weak signal starts

Radio	BDR, dB
Elecraft K3	139
Ten Tec Orion II	136
Yaesu FTdx9000D	127
ICOM IC-7800	115
ICOM IC-756PROIII	101

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Transmitter - Critical Requirements

- Power level
 - Heat is the root to most component failures
 - Consider operating radios well below maximum power levels
- Modulation Quality – How good (or wide) is your signal?
 - Undesirable sidebands – clicks or ϕ noise will get you noticed
 - Reduce audio distortion – audio processing may result in higher average power but can result in lower understandability
- Consider covering all the operating modes
 - Traditional modes (CW, SSB, AM, RTTY) are native
 - New modes (e.g. PSK, JT65) may require external modems

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Antennas

- Requirements related to effective DXing
 - Pattern matching propagation path to DX
 - Pattern reducing effects of interference
 - Efficiency
- General characteristics
 - Efficient antennas are likely to be narrowband
 - Antennas are the best investment in your station
 - Reliability can be more important than performance
 - Higher antennas work DX better than lower ones

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Low frequencies antennas (160 & 80 m)

- Transmit antennas
 - Verticals
 - Dipoles (as high as possible)



Low frequencies antennas (160 & 80 m)

- Receive antennas
 - Beverages
 - Loops
- Ground-independent antennas
 - Flag/pennants
- Ground-dependent antennas
 - Shortened vertical arrays
 - Ewe



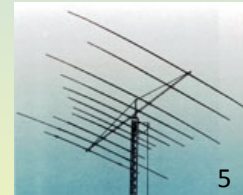
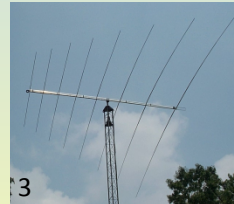
Antennas - HF

- Monoband antennas
 - Full size: Yagi¹
 - Shortened: Moxon²



Antennas - HF

- Multi-band antennas (Fixed)
 - Hexbeam¹
 - Spider beam²
 - Log periodic³
 - Quad⁴
 - Multiband Yagi⁵



Antennas - HF

- Adjustable
 - StepIR



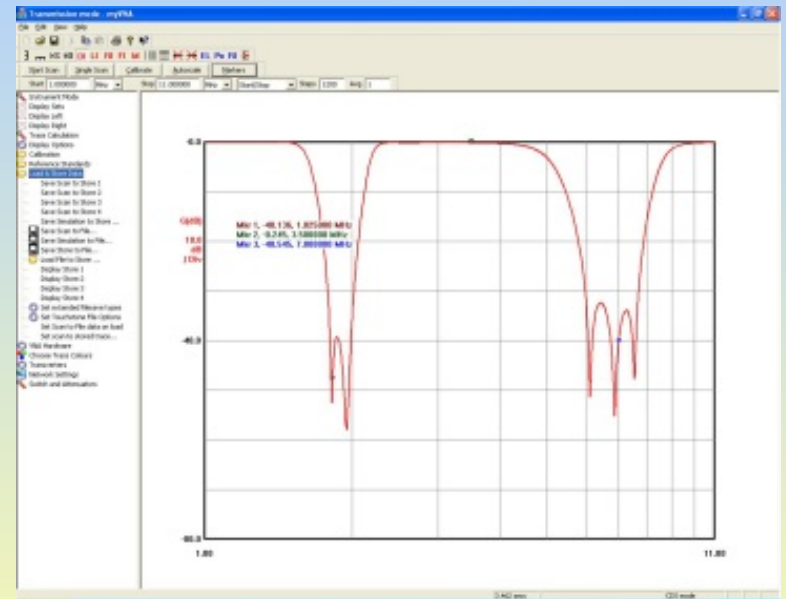
Other Station Elements

- Grounding
 - Nearby lightning strike protection
 - Shock hazard mitigation
 - Audio ground loop reduction



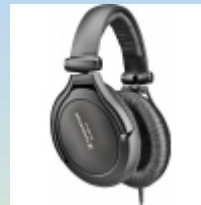
Other Station Elements

- Filtering
 - Harmonic suppression
 - BCI reduction
 - RF overload
 - RF damage mitigation



Other Station Elements

- Audio Transducers
 - Headphones / speakers
 - Microphones
 - PC CODECs



Station Layout Considerations



Reduce stress and strain

Organization of equipment
Neck strain reduction
Minimize eye strain



Ambient sound

Fan noise
Clunking relays



Lighting

Must see the radio knobs
Must see keyboards



Posterior comfort

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AA7A Station – 10 Feb 2012 (at 1646 Z)



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AA7A Station – Operator Focus



Secondary Focus

Primary Focus

Secondary Focus

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Station & Antenna Considerations

Happy Hunting!

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