



RADIO PAPERS.NET

Engineering conferences, such as the annual NAB Broadcast Engineering Conference (BEC), offer broadcast engineers a great opportunity to learn about the latest technologies and techniques for building and maintaining radio station facilities. But what's an engineer to do between shows? An online resource hosted by the trade journal Radio Guide (Sedona, AZ, www.radio-guide.com) called "Radio Technology Papers" (www.radiopapers.net) offers a wide array of links to technical papers from manufacturers and broadcast engineering consultants. Given below is a list of sites included along with an example of what is covered there. Those interested in receiving automatic notices of new paper postings can go to www.radiopapers.net/signup.html.

- **Acoustics First Corporation** – offers a full range of acoustical materials including sound absorbers, barriers, diffusers, and specialty products. Articles on the Website include "Acoustics, Part II: Cost-effective Acoustical Treatments for your Home Studio by Nick Colleran."

- **Altronic Research** – manufacturer of resistive loads and test equipment. Technical papers include "Preservation and Corrosion Prevention Techniques For Air-Cooled RF Loads."

- **Audio-Technica** – developer of audio transducer technology, and manufacturer of microphones, wireless microphones, headphones, mixers, and electronics. Wireless mic application notes include an interactive, computer-based application for selecting wireless microphone frequencies to avoid frequency conflicts with local TV stations (see graphic for sample output from this application).

The following Wireless channels/frequencies should work in this area:

Series: 1900

Freq. Code	Frequency (MHz)	Freq. Code	Frequency (MHz)	Freq. Code	Frequency (MHz)
44C	944.100	47C	947.100	51M	951.550
44Q	944.700	48N	948.600	51U	951.900
45A	945.000	49S	949.800	58F	735.600
46E	946.200	50L	950.500	58G	735.950

Freq. Code	Frequency (MHz)
58K	736.650
58L	737.000

SOURCE: AUDIO-TECHNICA

- **Belden** – was formed in July 2004 through the merger of Belden Inc. and Cable Design Technologies Corp. Belden manufactures high-speed electronic cables. Technical papers include "How Wire Fails" (note – the link on the radiopapers.net Webpage for Belden is broken – correct link is www.belden.com/03Products/03_WhitePapers.cfm).

- **Bext** – specializes in the marketing and servicing of high quality radio frequency transmitters for radio and television broadcast. Technical papers include "FM Antenna Interbay Spacing - Modifying Spacing to Solve Downward Radiation and Other Problems."

- **Bird Electronic** – manufacturer of radio frequency instrumentation. Technical Application notes include "RF Broadcast Measurement Technologies for Digital Broadcast Systems."

- **Broadcast Electronics (BE)** – BE makes products for program generation, audio and data management, inter-facility transport, and analog and digital transmission. Technical papers include "Second Harmonic Measurement Techniques" (note – the link on the radiopapers.net Webpage for BE is broken – correct link is www.bdcast.com/support/white_paper.php).

- **Broadcast Signal Lab** – broadcast engineering consulting firm providing FCC application services, facility design & construction, and continuing signal quality monitoring & maintenance. Digital radio white papers include “Considering Measurement Requirements for IBOC Radio.”
- **Chris Scott and Associates** – a small design and consulting firm specializing in radio broadcast. White papers include “Will a New FM Antenna Help My Coverage?”
- **Comrex** – makes remote and studio equipment for telephone line communications. Technical notes include “POTS vs. ISDN & Some Tips for both.”
- **du Treil Lundin and Rackley** – broadcast consulting engineering specializing in frequency allocation and signal coverage optimization of broadcast stations, and propagation studies for broadcast facilities and antenna system design. Technical papers include “AM Directional Antenna Essentials.”
- **Econco** – tube manufacturer Econco offers on its Web page a copy of its “Tube Topics” handbook.
- **Eimac** – designs and manufactures a broad line of Power Grid Tubes for broadcast transmitters. Application and technical papers include “Conditioning of Large Radio-Frequency Power Tubes.”
- **Electronics Research Inc. (ERI)** – provides passive RF and structural support engineered solutions. A group of engineering tables are provided including “Site Plot Plan: Typical Guy Wire Radius and Acreage by Tower Height in Feet.”
- **Evans Associates** – consulting engineering firm specializing in communications networks design. Technical library includes the “Evans Technology Glossary.”
- **Freeland Products** – performs transmitter tube rebuilding. Offers a tech note entitled “Tips for Better Tube Performance.”
- **Graham Brock** – broadcast technical consulting firm based in GA. Posted on their Web page is an archive of monthly newsletters.
- **Jampro Antennas/RF Systems** – manufactures RF components including FM antennas, combiners, towers, and filters. Their online technical library includes “On-line calculation and conversion” applications including “HD Radio High Level Combining” (see example at right).
- **Harris Broadcast** – manufacturer of radio products and integrated systems. White papers include “A Planning Guide: Determining the Best IBOC Migration Path for Your AM or FM Radio Station.”
- **Hatfield & Dawson** – a consulting engineering firm with a specialized practice in telecommunications and electromagnetic engineering. Technical documents include “FM Blanketing Interference, A Case Study of Problems and Solutions for a Typical High Power FM Station” (note – the link on the radiopapers.net Webpage for Hatfield & Dawson is broken – correct link is <http://www.hatdaw.com/downloads.html>).
- **iBiquity** – developer of in-band/on-channel digital radio broadcasting technology. White papers include “Conversion Requirements for AM & FM IBOC Transmission” (note – the direct link to iBiquity whitepapers is www.ibiquity.com/broadcasters/quality_implementation/iboc_white_papers).

Jampro HD High Level Combined Radio Calculator

INPUTS	
Analog ERP	16.990 dB
Digital ERP	-3.010 dB
Antenna Gain	7.40 dB
Analog Antenna Inp	9.09 dB
Digital Antenna Inpu	-10.41 dB
Coax Feet	500 ft
Analog Coax Loss	0.62 dB
Digital Coax Loss	0.62 dB
Coax Efficiency	86.70 %

50 kW ERP
5.5 Times Ant Gain
500 Meters or Feet Length
0.124 dB/100 Ft. loss
93.7 MHz Frequency

- **Jennings Technology** – manufacturer of non-thermionic vacuum components including vacuum and gas filled capacitors and relays, vacuum interrupters, vacuum contactors, vacuum coaxial relays, switching matrices, and test and measurement equipment. Tech notes include “Handling Guidelines Fixed and Variable Vacuum Capacitors.”
- **Kintronic Labs** – supplier of AM/medium wave and short wave radio broadcast antenna systems. Technical papers include “Testing Results of the Low-Profile KinStar AM Broadcast Antenna.”
- **LBA Group** – provides broadcast consulting engineering services and manufactures high power RF antenna system equipment for medium wave (AM) and short-wave broadcasters worldwide. Online “toolbox” includes “FAQs about AM Protection.”
- **Moseley Broadcast** – designs and manufactures wireless communications equipment for the Radio and Television Broadcast industries. White papers include “Hitless Space Diversity STL Enables IP+Audio in Narrow STL Bands.”
- **NRSC** – the National Radio Systems Committee studies and makes recommendations for technical standards that relate to radio broadcasting and the reception of radio broadcast signals. A link to the published NRSC Standards is included.
- **Prophet Systems** – provide digital automation systems and products to broadcasters. White papers include “Archiving Audio Records.”
- **Richard Fry** – Website of a “retired” broadcast engineer. Technical papers include “FM Radio RF System Planning.”
- **Sandman Telcom** – specializes in “hard-to-find” telecom products, problem solving tools, accessories, test equipment, telephone repair parts and the training needed to use these products. Technical bulletins include “Eliminate Radio Interference on Phones.”
- **Shively Labs** – products include FM broadcast antennas, translators, branched and balanced multistation combiners, patch panels, filters, compressor-dehydrators, transmission line, coaxial components, isocouplers, directional couplers, and related RF equipment. Technical bulletins include “Comparison of Mechanical vs. Electrical Beamtilt.”
- **Telos Systems** - develops and manufactures DSP-based technology for sending and receiving high-quality audio via the dial-up telephone network. Technical papers include “Studio Structures for Surround Broadcasting.”
- **TFT Inc.** – manufactures monitoring, STL, and EAS equipment for the broadcast industry. Included in their Web link are a number of application notes relating to their EAS products.
- **Tieline** – manufactures high-quality remote broadcast digital audio codecs. Technical tutorials include “Making a Stereo Connection over Two POTS Telephone Lines.”



**Deadline for NAB2007
Call for Proposals
Extended Until
November 8**

If you have a suggestion for a presentation for the 2007 NAB Broadcast Engineering Conference you still have time to submit it. For additional information on how to submit your suggestions just go to the NAB Call for Proposals Web site at: <http://www.nabshow.com/nab2007/callForProposals.asp>.