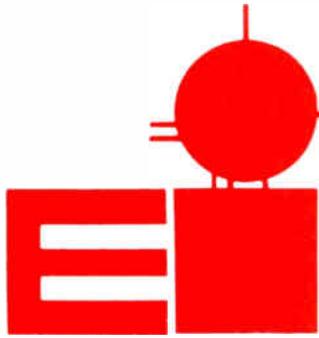


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December 1990

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An Open Letter To Broadcast Station Owners and Managers

(The following is re-printed by permission of the Society of Broadcast Engineers.)

You've got a hundred things to do and the last thing you need is something else to read. However, what you're about to read may save (or make) you money. Today's broadcast technology is expensive. You can't afford to replace equipment (or people) without spending money, perhaps money your company doesn't have or want to spend. Is there help?

TECHNICAL EXPERTISE

An important tool in operating profitable stations today is the effective use of technology. The key is effective use of technology. For that to happen, you need someone who understands both the technology and the broadcast business.

The Society of Broadcast Engineers (SBE) is an organization of professionals that pride themselves on understanding both sides of the broadcast business -- technology and profits.

It's no secret that it's tougher to operate profitably today, but there is help. That help is probably right on your staff -- your engineers.

PEOPLE ARE THE KEY

Even the best manager can't keep his or her eyes on every area of the station. That's why you employ program directors, news directors - and engineers. You expect each of these professionals to know their areas and operate them profitably.

Today's broadcast engineer can be an important partner in the drive for a profitable operation. And, SBE can help your station become more efficient (and profitable) by keeping your engineer up-to-date on critical issues and trends.

SBE SERVICES

What can SBE do for your station?

- **First.** The SBE can provide important technical training for your engineering staff. This training is custom-designed to help the engineer install, operate and purchase equipment that helps, not hurts, your bottom line.

Most SBE members attend local chapter meetings, and most meetings are held in or near to your city. Support your engineer's attendance at these meetings.

Most meetings provide a technical program, often supplied by an equipment manufacturer. Here, the engineers learn about the latest hardware, repair tips and other professional development ideas. The meetings usually take about 3 hours and are held afternoons or evenings, once a month.

The most important part of the training is the yearly convention and engineering seminars. The yearly convention provides cost-effective factory training on the equipment your station uses. You don't have to pay thousands of dollars training your staff on all of the latest hardware. The SBE conducts short, but intensive, training sessions with factory instructors on the equipment you use.

The convention will highlight the latest in broadcast equipment. More than 250 booths will be filled with the latest in broadcast and production equipment.

The cost? \$125.00 for four and one-half days of training. Can you send your engineer to an NAB convention for that price?

In addition, the conventions are held

in locations with reasonable travel and lodging costs. You don't have to spend next month's receipts just to have your staff better understand HDTV, D2 recorders or the latest in radio transmitters.

- **Second.** The SBE operates the **only** nationally recognized broadcast certification program. SBE certification is obtained only by passing rigid tests, supervised by experts in electronics. Even the military recognizes the value of SBE certification.

The SBE now operates a certification program for both the Navy and the Armed Forces Radio and Television Services. No other organization has been allowed to work with these organizations. If your engineer is certified, you know he/she has achieved a high level of competence, recognized by the broadcast industry.

- **Third.** The SBE operates a national frequency coordination program. So what you say? Next time you have an ENG remote, uplink from your satellite truck or use an RPU, remember that it's the SBE that's looking out for YOUR interests.

The SBE recently filed for a Petition for Rule Making to help ensure that stations can find and operate STL systems without interference. You may know how hard it is to find STL frequencies today. The SBE is working hard to assure that you have those needed frequencies -- and that you don't meet with interference when you go on the air.

The upcoming political conventions place a tremendous load on RPU,

(cont. to pg. 2)

Editor's Notebook



This issue's column will be a short one. Like everyone else this time of the year finds us with more projects to do than there is time to do them. In broadcasting there are always additional remotes or special promotions type things that have to be done. All this in addition to the normal equipment breakdowns and routine maintenance things that need doing. As if there aren't enough things on everyone's mind during a "normal" Holiday Season, this year we have the very real possibility of being involved in a war in the near future and rumors of a recession, more homeless people in our country, drug problems and the other types of crime that seem to be on the increase. After you've been on this earth for a few decades you eventually come to realize that the problems in the world never really go away, they just become different types of problems. Human nature being what it is I don't expect that we'll ever see the point where all the world's problems will be solved, however, as the old cliché goes "if you aren't part of the solution you're part of the problem."

Anyway, with all of the problems in the world that we have to live with and try to solve, we here at Electronic Industries would like to wish you and yours a Happy Holiday Season and a prosperous New Year. We appreciate your past business and will continue our efforts to serve you in whatever capacity we can.

We encourage you to send in your comments on broadcast related topics; and if your local SBE chapter or state broadcasting organization publishes a newsletter we would appreciate being put on your mailing list.

One last item for your consideration, we would appreciate your returning the reply card that is part of this publication. In addition to receiving the newest edition of our catalogue FREE it will give us an idea of just how many people read the newsletter and we can adjust our mailing list accordingly. **HAPPY HOLIDAYS!**

(cont'd from pg. 1)

ENG, satellite and two-way channels. The SBE will help coordinate the entire remote broadcast process so that everyone is assured of interference-free operation.

WHAT SHOULD YOU DO?

Support your engineer's work in SBE. Pay his/her membership, certification and convention fees. SBE membership is only \$30 per year. Certification fees are similar, depending upon the level desired.

The SBE convention registration fee is only \$125 for members. Support your engineer's attendance at the convention. The knowledge learned from an SBE convention can't be equalled elsewhere - at any cost.

This year's convention will be held in St. Louis, October 4-7. Plan now to send your engineer to the convention. Your station will be paid back many times over from the knowledge learned.

Why support your engineer's participation in SBE? Because SBE supports your station. If you're looking for a high return on your investment, SBE is the answer. Invest in your staff. They determine, to a large extent, how profitable your station operates. Let them and SBE help you improve that bottom line.

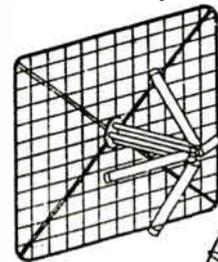
Need more information? Call the SBE office in Indianapolis, 317-842-0836.

Brad Dick,
SBE President

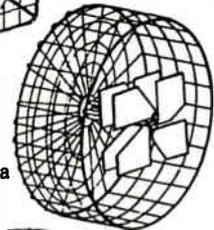


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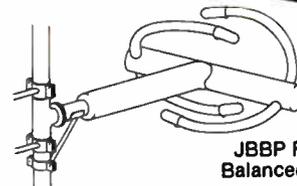
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DAB WARC-92

Preparation

FCC Adopts a Second Notice of Inquiry on WARC-92.

On October 1, 1990, the FCC released its Second Notice of Inquiry preparing for the International Telecommunication Union (ITU) World Administrative Radio Conference ("WARC-92") that deals with a number of potential frequency allocations for DAB as well as mobile, mobile satellite and aeronautical services. Comments were due December 3, 1990.

The FCC requested comments on the merits of three possible frequency allocations for DAB:

1) 728-788 MHz (UHF-TV Channels 56-66), either on a geographically shared basis or by vacating existing TV stations from these channels;

2) 1493-1525 MHz, currently used for aeronautical mobile telemetering services by both the U.S. government and the private sector for aircraft and space vehicle operations; and,

3) 2390-2450 MHz, now used by Industrial, Scientific and Medical (ISM) services—e.g., microwave ovens—airport surveillance radar, amateur and amateur satellite services.

The FCC's WARC-92 Industry Advisory Committee (IAC) submitted its First Interim Report to the FCC, along with additional information for the

FCC's use in adopting the Second Notice of Inquiry.

DAB is under study by Informal Working Group (IWG) 2 that provided information on DAB systems proposed by Satellite CD Radio Corp., Radio Satellite Services, and Strother Communications. Appended to its report was an NAB comparative analysis of terrestrial vs. satellite DAB system delivery that raised technical, economic and regulatory advantages inherent in a terrestrial system.

There is considerable polarization of opinions within the Advisory Committee. Partially as a result, the committee has limited its scope of activity to an information gathering role, without advancing any hard decisions or recommendations to the FCC. That posture is likely to continue.

FCC Adopts New FM Translator Rules

On November 8, the FCC adopted final FM translator rules.

Some of the new interference protection standards and technical requirements for FM translators include:

- maximum effective radiated power limited to 250 watts along with a limit on the distance the 1.0 mV/m contour can extend — 7 km for areas east of the Mississippi River and Zone 1-A, and 13 km for other areas of the U.S., com-

puted using 12 radials, 30° apart. These 12 radials will be used to compute maximum permissible power and to ensure that fill-in translator coverage does not extend beyond the parent station's coverage area. Computation of coverage using as many additional radials as needed will be required to demonstrate absence of prohibited overlap.

- interference criteria based on the contour overlap provisions of Section 73.508 of the rules, except that the primary station protected contours are defined as the 0.5/0.7/1.0 mV/m for B/B1/Other classes, respectively of existing FM stations. For fill-in translators, the translator's 0.5/0.7/1.0 mV/m contour cannot extend beyond the parent stations protected contour.

- TV channel 6 stations are protected by prohibited contour overlap of the translator's interfering contour (based on the desired-to-undesired ratios of Section 73.525 of the rules) with the TV 6 station's Grade B contour.

- all 80 commercial FM channels are available for both commercial and non-commercial FM translators.



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SBE 1990 Convention Record Breaking Success

The SBE 1990 convention was a recording-breaking success according to society officials. Attendance was at an all-time high, with the amount of exhibits also up from last year.

According to SBE President Brad Dick, the attendance was up by 23% from 1989 figures. Total attendance was 3727 according to Dick. Preregistration was also ahead of last year, which according to Dick, "...shows that engineers are now budgeting in advance for the SBE show."

The convention also broke new ground with the seminars arranged by first SBE President, John Battison. The three and one-half days of seminars covered new and developing technology, which will affect broadcast stations.

One big hit at the convention was the "crystal ball gazing" presentations of Mike Rau, NAB Sr. Vice President of Science and Technology. Engineers are concerned about where and how the developing technology might impact their stations. Rau outlined where he thought both DAB and HDTV were going and how stations could better prepare for them.

The Sunday morning "Preparing for a Disaster" workshop was well attended by a standing room only crowd.

Engineers from the U.S. outlined how their communities had prepared and dealt with both earthquakes and hurricanes.

Sergio Rojano, President of AMITRA, was attending the convention and addressed the crowd. He was able to relate many of his experiences of the disastrous earthquake that hit Mexico City several years ago. As a result of that disaster, many of the stations in the city have complete facilities located far away from downtown locations. This will prevent the complete loss of communications that the country suffered.

Session coordinator Battison expressed pleasure at the attendance and the quality of papers. He noted that there were more higher quality papers than ever before. Battison attributed that to the quality of attendees. He said that because many of the attendees are in highly placed positions, it was important to address the technology in a slightly different way.

The result was more papers directed to operating their facilities in more efficient and cost effective ways. "Today's engineers recognize the need to be bottom-line oriented," said Battison, "They know that equipment decisions are related more to saving costs and improving efficiency than ever before. We've been able to provide this important training, along with the nuts and

bolts sessions that we've done so well before."

Telex Buys McCurdy Digital Intercom

Telex Communications has acquired the central matrix intercom and audio distribution system product lines from McCurdy Radio Industries, Ltd. of Toronto.

"It offers a single intercom source that has the most economic and simplest of systems to the most complex, all from the same source, with the same engineers and engineering support staff," said Ronald Taylor, Telex's director of advertising.

Telex, both directly and through its RTS Systems division, has specialized in conference or party line intercommunications with some capabilities in small matrix or point-to-point communications. With the addition of McCurdy's digital central matrix products, it can now offer point-to-point communications for systems of all sizes up to 600 x 600 and with capabilities beyond, according to the company.

The McCurdy line will be managed out of the RTS Systems division in Burbank, CA. It is located at 1100 West Chestnut St., Burbank, CA 91506. Telephone is (818) 566-6700 and fax is (818) 843-7953.

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FCC News

Station Totals

As of early August, the FCC reported that there were 550 commercial VHF-TV operations, 124 non-commercial VHF's, 552 commercial UHF's and 226 non-commercial UHF operations.

The FCC added that there were 757 low power TV (LPTV) operations, both VHF and UHF, as well as 4,955 TV translator operations.

Translator Case Rejected

The FCC has said it will not even rule on a plan proposed by Anchor Media to operate an Anderson, SC, full power UHF station as a rebroadcasting satellite of a Greenville, NC, full power UHF station. The case is notable because the two stations have an area of signal overlap.

The FCC said it would not allow Anchor Media to file its plan because the plan was filed several minutes after the deadline had passed.

It is unlikely, had the filing been made in time, that the commission would have ruled in favor of the Anchor Media proposal. In late July, the FCC scrapped a plan that would have revised its rules regarding to operation of satellite stations.

Current FCC rules forbid the signal of a licensed satellite station from overlapping with the original, parent station.

The FCC also maintained that the Anderson, SC, area is not an unserved

area that was dependent on the signal from the Greenville, NC, station.

FCC Shuts Down Illegal Transmitters

FCC field engineers have shut down pirate radio stations in Michigan, Texas and California, and levied \$1,000 forfeitures on the operators.

In Adrian, Mich., Joe and Connie Mattausch were on 89.5 mhz and used the identifier "Citizens Emergency Broadcasting Service." The Mattausch's were airing a continuous tape as part of a religious counter-demonstration against a local gay activist group that was protesting the arrest of several homosexuals in an Adrian park, said Irby C. Tallant, engineer in charge of the FCC's Detroit office. The counter-demonstrators were not too subtle in their breaking of the law, said Tallant. Apparently, many demonstrators were carrying signs telling passing motorists to tune to 89.5. Tallant said his office received a tip that the station would be airing, and then waited for it to go on. It had little trouble, he said, finding the source of the transmissions.

The cases in Texas and California were what FCC Field Operations Bureau Chief Dick Smith called "typical." One Oct. 19, FCC FOB's from Dallas found George P. Hopp Jr. in Donna, Tex., broadcasting on 7435 khz (International Fixed Public Radio Service band) with call sign XERK, and in San Francisco, the field office found "The Muddy Sound of KMUD" on

7435 khz by Stephen P. McGreevy in San Rafael. Those stations were shut down, said Smith, "without much fuss."

Unlicensed or unauthorized broadcasting is a violation of Section 301 of the Communications Act and may result in fines (forfeitures) up to \$10,000 and/or criminal penalties up to \$100,000 and/or imprisonment for up to a year.

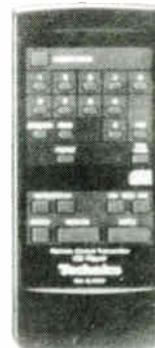
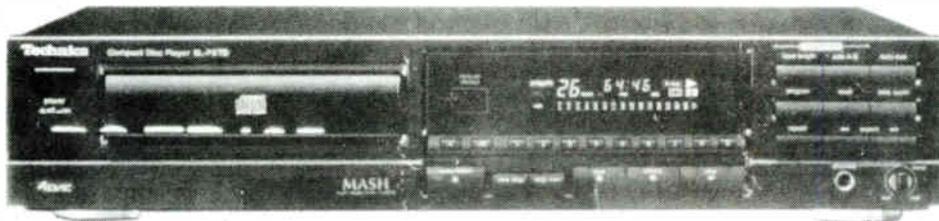
Smith said most pirate operators are detected by the FCC's nationwide monitoring network that gets a "fix" within five minutes, after which direction-finding equipment then pinpoints the exact location of the transmitter.

NEW AM BRANCH CHIEF

James R. Burtle has been appointed Chief of the AM Branch of the FCC Mass Media Bureau. The new branch chief has had experience with the FCC in field engineering enforcement, the FM Branch, and the Low Power Television Branch.



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New Rules on PCB Transformers Now in Effect

New rules governing use of PCB transformers are now in effect, according to the EPA. From now on use of high secondary voltage network PCB transformers is prohibited, (secondary voltages greater than 480 volts). If the EPA has already been notified of their existence, low secondary voltage network PCB transformers, (lower than 480 volts) have until Oct. 1, 1993 to be equipped with electrical protection or be removed, or be reclassified if the units contain less than 500 ppm of PCBs. If notification has not already been given the units are now effectively outlawed.

For detained information contact your regional EPA office, state broadcasting associations or NAB. The rules and regulations regarding PCB contaminated components may be difficult to figure out but non-compliance or just plain ignoring them can be both dangerous and/or very expensive.

Mark IV Industries buys Klark-Teknik

Mark IV Industries, Inc. has agreed on terms for the acquisition of Klark-Teknik PLC, a leading U.K.-based manufacturer and distributor of specialized electronic products for the professional audio and live entertainment markets, in a cash tender offer valued at approximately \$22.4 million. The terms include an option for Mark IV to purchase 82 percent of Klark-Teknik's stock, which is currently held by management.

Klark-Teknik, with sales of \$20.7 million for its fiscal year ended July 31, 1990, is a leader in the design, manufacture and marketing of professional audio signal processing systems and sound mixing consoles used in radio, film and recording studios, as well as public address systems.

FAA Proposes New Rules Increasing Its Notification Requirements

On August 3, 1990, the Federal Aviation Administration (FAA) released a *Notice of Proposed Rule Making* proposing to rewrite Part 77 of its rules ("Objects Affecting Navigable Airspace"), an effort that has been underway since 1977.

The proposed rules would give the FAA increased regulatory force to "protect" aeronautical frequencies from broadcast-generated interference. Comments are due on Dec. 31, 1990. The proposed changes in the FAA rules will add the study of electromagnetic effects to

the FAA's obstruction evaluation studies for new or modified structures, conforming the FAA rules with the expanded FAA scope authorized by the Federal Aviation Act amendment adopted in December 1987 by Public Law 100-223.

Over the past few years, the FAA has increasingly issued "Determinations of Hazard" for proposed FM and TV broadcast towers based upon its analysis of potential interference to aeronautical frequencies and *not* based upon standards for obstructions to navigable airspace.

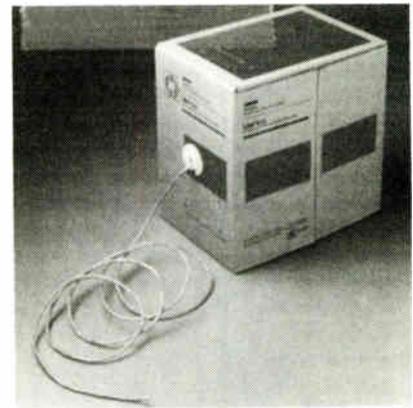
The FAA's actions have adversely affected hundreds of FM and TV applications before the FCC, delaying their approvals and resulting in extraordinary expenses by those broadcasters in their attempts to reverse these FAA actions.

Specifically, notification to the FAA is proposed for any proposed construction or alteration that involves:

- 1) a radio frequency transmitting station with an operating frequency above 30 MHz and an effective radiated power above 10,000 watts;
- 2) any initial or modified operation, including a change in the authorized frequency or effective radiated power, of a transmitting station located within 3,000 feet of an air navigation or communications aid;
- 3) any construction of a new FM or VHF-TV station utilizing an existing antenna tower; and,
- 4) any alteration, including changes in authorized frequency, effective radiated power, antenna height, and antenna type of existing FM and VHF-TV stations.

Once these notifications are received, the FAA would study the potential for interference to aeronautical frequencies using an FAA-developed interference prediction model that may grossly overestimate when interference occurs. Further, the proposed rules would allow the FAA to study the "cumulative impact" of proposed structures on "existing and planned facilities."

The FAA's proposed rules may significantly impact broadcasters with increased FAA notification requirements and subsequent adverse FAA findings of theoretically predicted electromagnetic interference, complicating broadcasters' efforts to change their facilities as they seek either FAA or local zoning approvals for new or modified tower structures, power increases, or even upgrading an existing antenna.



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Madison SBE Chapter Wins Five National Awards

The Madison chapter of the Society of Broadcast Engineers was honored last month for winning five (out of a possible seven) national SBE awards. The awards, which the Madison chapter won during the 1990 SBE National Convention in St. Louis earlier this year, were presented at the November meeting of the SBE's Madison chapter. The meeting's guest of honor, SBE national president Brad Dick, bestowed the awards, praising the group for a near-sweep of the national competition.

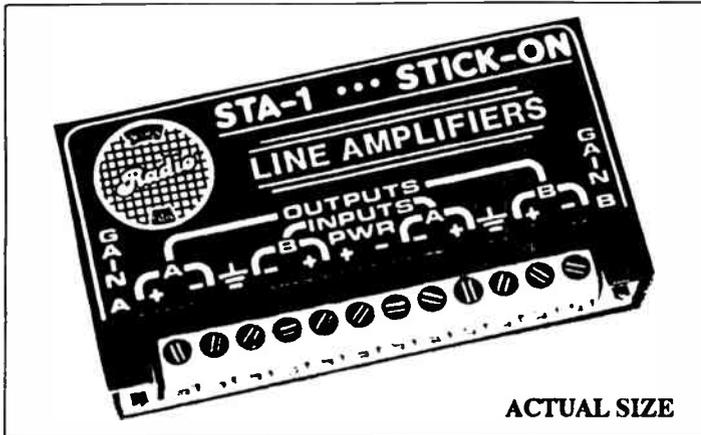
Dick commented that winning five awards out of seven possible was no easy feat as National competition this year was impressive.

The awards presented were: Best Local Chapter Newsletter; Best Local Chapter Newsletter Editor; Best Local Chapter Frequency Coordination Effort; Best Technical Paper or Article; and Best Regional Conference.



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- STA-3 Audio Power Amplifier** \$ 79.95
 - 2 equally combined unbal. Hi-Z inputs.
 - Gain and tone controls.
 - 3 Watts RMS output into 8 Ohms.
- STA-6 Audio Power Amplifier** \$ 99.95
 - 2 equally combined balanced bridging inputs.
 - Gain and tone controls.
 - 6 Watts RMS output into 8 Ohms.
- STM-1 Microphone Preamplifier** \$ 79.95
 - Mic to Line amplifier, gain fixed at 50dB.
 - Low-noise performance for cost-conscious applications.
 - Input supports phantom; Outputs; 1 bal., 1 unbal.
- STM-2 Microphone Preamplifier** \$109.95
 - Mic to line preamplifier, Gain variable to 65dB.
 - Low-noise performance for critical applications.
 - Input supports phantom; Outputs: 2 bal. lines.
- STM-DA3 Mic-Level Distribution Amplifier** ... \$109.95
 - 1 input feeds 3 outputs all at mic level (Balanced.)
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- ST-DA3 Distribution Amplifier** \$ 99.95
 - Mono: 1 Input, 3 Outputs; Stereo: 2 Inputs, 6 Outputs.
 - Adjustable gain (Up to 20dB) or loss.
 - Inputs and Outputs: Bal. or Unbal, Hi or Low-Z.
- ST-GCA1 Gain-Control Amplifier** \$ 89.95
 - Balanced bridging line input; 2 Outputs (1 mic, 1 line.)
 - Smooth "inaudible" automatic gain control (Up to 40dB!)
 - Maintains constant levels despite changes in input level.
- ST-VCA1 Voltage Controlled Amplifier** \$ 84.95
 - 2 Inputs (1 mic, 1 line); 2 Outputs (1 mic, 1 line.)
 - Remote volume adjustment with single pair and 10K pot.
 - Adjust. gain (Max 20dB line to line; 65dB mic to line.)
- ST-ACR Audio Controlled Relay** \$84.95
 - Detects audio presence to control DPDT switching contacts.
 - Balanced bridging audio input.
 - Adjust. sensitivity (mic to line level) and "release" delay.
- ST-LCR1 Logic Controlled Relay** \$ 59.95
 - Provides relay closure from logic signal inputs.
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Soundcraftsman
Symetrix

ANTENNAS

Transmitting

Bogner
ERI
Jampro
LBA

STL

Mark
Marti
Scala

RPU, & Gen. Purpose

Antenna Specialists
Channelmaster
Larsen
Marti
Scala

AUDIO INTERFACE AND

IMPEDANCE MATCHING DEVICES

Henry
Radio Design Labs
Russco

AUDIO MIXERS

Studio Consoles

ATI
Autogram
Broadcast Electronics
Electro-Voice
Ramko
Russco
Tascam

Portable/Remote mixers

Audio Technica
Electro-Voice

Gentner
Microtrak
Russco
Shure
Zercom

AUDIO PROCESSORS

Aphex
ATI
Audisar
Broadcast Electronics
CRL
DBX
Dorrrough
Eventide
Invonics
Marti
Modulation Sciences
Radio Design Labs
Ramko
Sescom
Stancor
Symetrix

AUDIO TRANSFORMERS

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Bogen
Electro-Voice
Sennheiser
Sescom
Shure
Stancor

CAPACITORS (Transmitting)

Commercial Radio Co.
Kintronics
Plastic Capacitors

CD PLAYERS

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Denon
Numark
Studer-Revox
Tascam

Technics

CLOCKS & TIMERS

Audio-Metrics
Beaverronics
Broadcast Electronics
ESE
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Hammond
Soundalier

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Tascam/Teac
Technics
Marantz
Nakamichi

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Recorders

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Tascam
Technics
Tape
Ampex
Fuji
Sony

EBS EQUIPMENT

Gorman-Redlich
TFT

FM TRANSLATORS

Robert Jones by Tepco

FM EXCITERS & STEREO

GENERATORS

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Broadcast Electronics
Inovonics
Modulation Sciences
TFT

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Astrolite
Sennheiser
Shure
Telex

JACK PANELS & PATCH CORDS

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Trimm

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Crown
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MICROPHONES-WIRELESS

Nady
Shure
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Vega

MICROPHONE STANDS & ARMS

AKG
Atlas
Atus
Audio-Metrics
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Luxo
Shure

MONITORS

Belar

BROADCAST EQUIPMENT LINE CARD (CONT.)

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Gorman-Redlich
Inovonics
Potomac
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GLB (Preselectors)
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Scala (Antennas)
TFT

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Advanced Micro-Dynamics
Delta
Marti
Potomac
Sine Systems
Symetrix
TFT

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CRL
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McMartin
Microdyne
Modulation Sciences

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Electro-Voice

Numark
University

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Micro-Trak
Omni-Mount

PAS

STL EQUIPMENT

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TFT

SURGE PROTECTORS

Eagle Hill
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TAPE CARTRIDGES

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TAPE CARTRIDGE

MACHINES

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Fidelpac
Fluke
Potomac
Sennheiser
Simpson
Tektronix
Xedit

TONE ARMS

Audio-Metrics
Audio Technica
Broadcast Electronics
Micro-Trak
Russco
Technics

TOWERS & ACCESSORIES

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Pi-Rod

Rohn
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Amperex
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General Electric

National

NTE

Phillips

RCA

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TURNTABLES

Broadcast Electronics
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QRK

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TURNTABLE CARTRIDGES

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Canare

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WEATHER RADAR & EQUIPMENT

Gorman-Redich

Rodco

Si-Tex (Radar)

Taylor (Instruments)

MEMO FROM METZ



by
David L. Metz

More Telephone Coupler Ideas

Isn't it fun now that we can play with the phone line all we want? In the past I've covered some ways to grab audio off a phone line. The previous couplers required having a phone of some kind wired in parallel to "answer," that is maintain the connection to the central office.

Here's how you can eliminate the phone all together. All you need to tell the central office that you've answered is to draw some current on the phone line (often called a loop) to pull in a relay at the central switch.

Lets review some phone basics. The switch in your phone that answers it is called the hook switch from the old days of the wall phone with a separate ear piece. The phone line is biased at about 40 to 50 volts DC in the hook down position. With the hook up your phone draws about 40 milliamperes pulling in the central office relay. I hope you've noticed all the "abouts." There's a lot of variance in phone loop resistance, impedance and voltage. The system was designed a long time ago to tolerate quite a bit of slop.

FIG. ONE shows a basic coupler I've been experimenting with. The diode bridge ensures the line will always have the correct polarity to the coupler. The 15 volt 1 watt zener diode gives the coupler a fixed current draw regardless of loop voltage. The transformer is a standard PREM SPT-124 coupler designed with high primary to secondary isolation for coupler service.

The Varistor and back to back zener diodes keep the high voltage transients out of your audio equipment. Closing the switch marked "hook" causes the coupler to connect. It can be used for either send or receive like my earlier designs.

One defect of this design is the DC current flowing through the primary. The additional magnetic flux through the transformers applications. A good solution to this problem is the addition of a second transformer called a retard coil shown in FIG. TWO.

The retard coil is a simple 600/600 ohm transformer connected with the primary and secondary in series and out of phase with one another 180 degrees. With the series windings phased this

way, the transformer acts as a very high impedance audio choke with low DC resistance. The loop current load is placed in series with the retard coil and the DC is blocked from the coupler coil with a 2 mF / 200 volt capacitor.

IMPROVEMENTS: Here are some things you can try. See if you can locate a coupler transformer with a 10 K ohm secondary. These make a better match to modern consoles. Remember that a 10 K ohm primary may give you a better signal to noise ratio off a phone line since it loads the line less. Telco people call this a bridging connection.

You could even place a nice bright LED in parallel with the line load zener to indicate that the coupler was active on a line. With a 15 volt zener, a 1,000 ohm 1/2 watt resistor should work in series with the LED.

This coupler would be nice mounted in a nice box with a gang mounted line selection switch on it. The DJ could answer a call, punch up the proper line for the coupler then close the hook switch to hold the line. After that, the studio phone won't be tied up holding a line and can be used normally.

PARTS: The FCC is fussy about the components and design of phones for good reason. They don't want something flaky hooked up to the system that could screw up someone else's service. Another reason is safety. Remember the ring voltage is 90 to 120 volts AC! And lighting and all kinds of other nasty voltages can sneak into your phone. A good source of parts is a phone. Just buy a decent one and scrap it out for the transformer, etc. The transformer in a phone is a odd hybrid wound thing so you might have to play around with the connections a mite, but that's half the fun.

Next we'll look at ring detectors, modern and ancient.

MEMO FROM METZ #53

FIG. 1

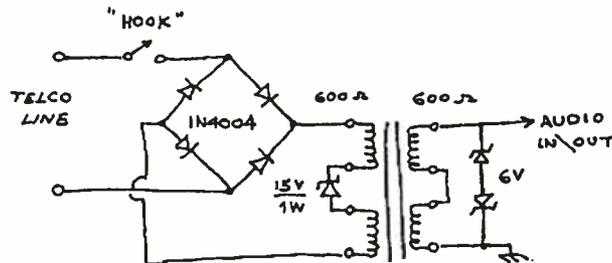
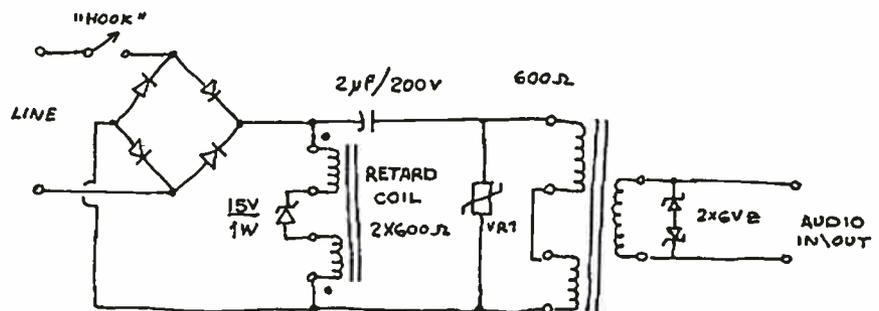


FIG. 2



VR1 14.0V VARISTOR

Digital Audio Broadcasting State of the Art in the 90's

By David C. Schaberg

We've been hearing about digital in our studios for some time and, in the last few years, the equipment has been showing up in production rooms and houses, giving sound a quality that broadcasters haven't been able to provide since radio waves were first used to send signals across the air.

Now, this same technology is being harnessed for broadcasting itself. We hear how many of the interference problems associated with AM skywave and FM multipath are going to be eliminated and stations will be able to broadcast with lower power and absolute clarity. Most of this is, indeed, true. Yet, with all new technologies, there is a need for further study and actual field tests. Then comes the regulatory jungle and, finally, if all else is said and done and everyone can come to a general agreement, we will have Digital Audio Broadcasting.

I say this with some trepidation because the FCC just does not have the people to cope with this new technology at this time. They are barely staying afloat with the current system and, as most of you know, they don't have sufficient staff in most areas to speedily process even the simplest application. Interestingly, this staff problem has gotten worse since the new fee schedule was imposed in mid-1990, proving that money won't solve the problems when the politicians get their hands on it!! Nevertheless, if the new technology is good, it will eventually prevail and give the public a better service.

If you haven't read the technical details of DAB for radio, let's just say that if you presently have a station covering about 40 miles of land, regardless of power required and whether you are AM or FM, DAB will let you cover that same 40 miles with about 1,000 watts. And, the signals won't be affected by buildings, types of terrain (within limitations) or ground-wave propagation characteristics. After the 40 miles is achieved, the signal drops off rapidly so that another station on the same channel could be put, in theory, just 80-100 miles from you and neither one would suffer any interference.

Obviously, this is a simplistic view, but it does get the basic message across that DAB could provide some measure of relief from the present difficulties that plague our AM and FM systems.

On the other end, the consumer will, of course, dictate how they receive their radio. But, once the receivers are available, there shouldn't be anyone who would want to try and maintain the present system either for FM or AM (especially). If you had the chance to

receive audio over the radio that rivals the best in home music systems, would you ever want to go back to what we have now?? I don't think so, and you as the broadcasters of the 1990s should be positioning yourselves for the year 2000 and the likely advent of DAB.

How are you likely to benefit other than the sound to the listener? By lower power bills, by simpler transmission facilities and by being able to compete on a level playing field. There won't be AM or FM, it will all be digital. So, how can you plan to be in the best position when DAB becomes available? The best guess at this time is that you should maximize your signals in every way possible so that you can show your coverage area to the Commission when it comes time to allocate the new channels. It definitely appears that existing broadcasters will have preference in allocation and it also looks like AM stations may be the first in line!! If you are an AM, you'd better get your plant in shape so that you can pull a proof showing maximum coverage area. It seems likely that the FCC will rely on data like this to provide you with your power allocation. Realize that since DAB is sent much like FM signals of today, you won't need the directional array anymore, but you will have to put up a new FM-like antenna. This also means that your signal will become circular, so you might lose some of that distant signal out in the piney woods or over the Great Plains, but you will gain solid coverage over your primary market area. Seems like a good trade-off.

For FM stations, since you are generally circular in coverage, the change to DAB won't be nearly as significant in terms of coverage area. And, you won't have to install much new equipment, so you will have an advantage over your AM friends at the outset. But, since you will both be playing with the same technology after the change, you will effectively have new competitors.

This will change the face of radio broadcasting more radically than anything in 50 years has and you had best be ready because the change will happen (subject to the caveats listed above). And, when it does, you won't want to be left with the only FM station in town!!

David C. Schaberg has been in radio broadcasting for 21 years, the past 13 as a technical consultant specializing in FM allocations. He has been a contributor to Common Point Since 1979 and welcomes your questions at (517) 393-1037. His mailing address is: P.O. Box 21055, Lansing, MI 48909.

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Ennes Workshops Successful

The 1990 Ennes Workshops were well attended according to Ennes Executive Director, Jim Wulliman. The nine sessions were sponsored by several companies and the SBE.

Wulliman noted that Ennes attendance was about 20% higher than last year. One session was originally scheduled for 25 people. By the time the workshop began, a total of 67 people were registered. The session, sponsored by Harris/Allied, was the highest attended of all workshops.

Attendees rated the quality of all of the workshops very high. In one interview, the engineer noted that the primary reason high company agreed to pay for this trip was because he was going to be trained on the new transmitter he'd just purchased.

Another said that his news director was going to attend the S-VHS workshop with him, but had to cancel at the last minute. "He wanted to be here to see how the equipment worked."

The workshops were sponsored by the following companies:

JVC Electronics: S-VHS ENG and Production Techniques, Video Design Pro: Studio Design Techniques, Andrew Corporation: Earth Station Technology, Varian/Continental: Medium-to-High-Power FM Transmitters, Delta Electronics: Understanding and Maintaining C-Quam AM Stereo Systems.

Harris/Allied: Everything You Always Wanted to Know About RF, Cupka Corporation: Management for Engineers, Markley & Associates: Radio Systems Seminar, Mitchell Vo-Technical School: Satellite Communications.

SBE officials plan on video-taping at least part of the Ennes Workshops at the 1990 convention in Houston. The tapes will then be used as chapter programs, available from the SBE training library.

DYNASCAN TO SELL MARANTZ BRAND NAME

Dynascan Corporation has entered into an agreement with Philips Consumer Electronics of the Netherlands to sell the Marantz brand name for \$8 million. Dynascan, which expects to report a gain on the sale, anticipates that the transaction will close by year end. Philips already owns rights to the Marantz name outside of North America.

Dynascan remains committed to the audio business, both through its Lloyd's brand and by continuing to develop and sell the type of products currently sold under the Marantz name. These products will be marketed under other

brand names owned by the company as well as continue to be marketed on a private label basis. Dynascan will continue to sell a line of professional tape recorders under the Marantz brand.

Headquartered in Chicago, Dynascan designs and markets consumer electronics products currently sold under the brand names of Cobra, Lloyd's and Marantz. Its Cobra unit markets corded and cordless telephones, answering machines, CB radios, radar detectors and scanners. Its Audio Group markets clock radios, portable stereos, compact audio systems, personal stereos, high-fidelity audio components and systems.

NHK To Display Major Technology Exhibit Outside Japan for First Time at NAB's HDTV World '91

NHK, Japan's public broadcasting corporation, in cooperation with the National Association of Broadcasters, will publicly display its major annual technology exhibit outside Japan for the first time at the HDTV World '91 Conference & Exhibition in Las Vegas, NV, April 15-18. HDTV World '91 is held in conjunction with the NAB annual convention, the largest broadcast exhibition and conference in the world.

The "NHK 1991 Technology Open House" will cover more than 6,000 square feet, making NHK HDTV World's largest exhibitor to date. The Open House will include prototypes of the latest in consumer and radio and television technology, including items never before exhibited in the United States such as fully three-dimensional stereoscopic television, advanced FM multiplex broadcasting and a wall-mounted 33-inch flat screen television.

NHK Science & Technical Research Laboratories, one of the largest research and development broadcasting laboratories in the world, will display their 25 technologies in cooperation with many Japanese manufacturers.

NHK's display marks the beginning of a continuing relationship with NAB conventions and exhibitions, according to Michael Rau, NAB senior vice president, science & technology, and Dr. Masao Sugimoto, director general, NHK Science & Technical Research Laboratories.



SINE SYSTEMS

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There are a number of excellent dial-up remote controls available today. However, most of them share two things in common: 1) they are fairly expensive and 2) they have a number of extra features, "bells and whistles," that many users do not need. To give the broadcaster an alternative, Sine Systems decided to develop the RFC-1. This decision occurred at the same time a new generation of microprocessors was becoming available which offered some very interesting possibilities for use in a remote control. The combination of our "No frills" design approach and the use of this microprocessor has resulted in a dial-up remote control which is ingeniously simple and very cost effective; yet it is a precision, high quality device, built to withstand many years of service.

Remote Facilities Controller,
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British Able to Receive TV Via DSB Systems

TV viewers in England have been able to receive DSB transmissions since February 1989, when Rupert Murdoch's News Corp. turned on Sky TV.

This four-channel service now reaches about 1.3 million subscribers, slightly more than the first-year estimate of 1.15 million. The four channels provide news, entertainment, movies and sports. Analysts believe it will take about three million subscribers to reach a break-even point. Operating losses in the first year of Sky TV transmission were about \$129 million.

Sky TV found early subscribers hard to convince, partly because of a lack of understanding of technology and partly due to price resistance to the cost of a satellite dish (\$450). Now the firm rents dishes for \$7.50 a month, and the response has been strong. In the first quarter of operation, 28,000 dishes were sold. By the fourth quarter of the first year, after introducing the rental option, 28,000 dishes were sold or rented.

Sky TV also serves 600,000 cable subscribers. Revenues from these subscribers must be shared with the cable system operators, making this type of subscriber less attractive to Sky TV.

Competition for sky TV has come now from British Satellite Broadcasting (BSB), a five-channel service that started

in April 1990. Broadcasting was delayed seven months later than planned because receiving equipment was not ready on time.

BSB offers light entertainment, sports, music, movies and leisure programming on its five channels. The monthly fee for the movie channel is \$16, the same as that charged by Sky TV.

Britons, who are accustomed to paying an annual license fee of about \$116 for BBC and ITV programming, have thought twice about the additional cost of the DSB services, but many are finding the extra programming worth it.

Sky TV has been signing up major advertisers such as SmithKline Beecham PLC, a pharmaceutical manufacturer, and Unilever Group, a huge consumer product firm, to enhance revenues. Contracts call for each to spend \$4 million over two years.

BSB has recently worked out a \$1.5 billion financing package to see it through the next few years until break-even is reached. That should be in 1993, with profitability reached by 1996. This has taken off some of the pressure while officials can concentrate on programming and sales of services to subscribers. Because Sky TV had a 14-month head start in broadcasting, BSB is finding it will take longer to reach profitability. There are now 16 channels available

to British viewers, including conventional, cable and DSB transmissions.

SBE Proposes Amendment To The Communications Act

At its October meeting, the SBE Board approved a proposal to undertake a lobbying effort to have Congress amend the Communications Act to require at least one FCC commissioner be an "ENGINEER". The term "ENGINEER" would be defined as one holding "Senior" or "Fellow" status in any nationally recognized engineering society, such as SBE, IEEE, SMPTE, NARTE, or SCTE, or possessing a four-year or higher engineering degree from an ABET accredited school of engineering, or registration as a Professional Engineer in any discipline in any state.

The SBE believes that an FCC with at least one Commissioner as an engineer would foster the regulatory goal of the most efficient use of the Radio Spectrum.

The SBE expects that its lobbying effort will receive widespread support from other National Technical Organizations.

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Whether you use the unit for broadcasting or teleconferencing applications, you will

appreciate its versatility and simplicity. You can access up to five lines with one TeleSwitch or link multiple units together to interface more lines. TeleSwitch will work with most business phone systems. Operation and installation are as simple as using a multi-line telephone. Because the unit uses standard RJ-11C telephone connectors, it can be installed by virtually anyone. Line status is easily monitored from the TeleSwitch control

panel. Control panel lights indicate whether the line is ringing, in use, on hold, or available. You can put calls on hold, conference callers, and even record callers by simply pressing a button.

When TeleSwitch is installed in-line with a business phone system, calls can be answered, screened, and put on hold by the regular phone system. When they are needed on-air, TeleSwitch can take the call and route it to the telephone hybrid.

TeleSwitch is the most complete, cost effective means for solving your basic call directing needs. It's easy to install, simple to operate, and built to last.

For more information on how to incorporate TeleSwitch into your phone system,

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NEW TECHNOLOGY

Expert System Speeds Detection of Electrical Network Problems

A new software package that uses artificial intelligence to help humans quickly pinpoint and solve potentially life-threatening problems in high-voltage electrical networks is now available to utility companies.

The software, developed by Empros Systems International, has been successfully embedded into an energy management system at Northern States Power, a utility company in Minneapolis. Energy management systems are widely used by utility companies to automatically control the transmission and generation of electricity.

Called the Intelligent Alarm Processor, the software uses a combination of rules and classes to create a computer-simulated model of a high-voltage electrical network.

These networks may have as many as 3000 lines, 10,000 circuit breakers and numerous components, including transformers, relays, generators and power lines scattered across hundred of miles.

When a problem occurs in electrical networks, power plant operators must manually sift through a blizzard of data. Even in routine electrical network operations, managers may encounter an overwhelming volume of data from multiple alarms generated by the same network problem.

The Intelligent Alarm Processor uses rules to filter unimportant and nuisance alarms, then generates recommendations for human operators on appropriate courses of action.

Westinghouse Makes Superconducting A/D Converter

Researchers at Westinghouse Electric Corporation's Science and Technology Center, Pittsburgh, have designed, built and successfully operated what they say is the world's first high-resolution, superconducting analog-to-digital (A/D) converter, an electronic circuit that senses continuous signals and converts them to discrete numbers of digits.

"The ability of superconductor devices to provide unprecedented combinations of high resolution and low power consumption in A/D converters shows promise for future applications in air traffic control radar as well as in the tracking of objects in space," says Donald K. Fox, director of science and technology operations.

Known as a counting converter, the one-centimeter-square integrated circuit

consists of a detector or "quantizer" that emits a pulse each time an analog input signal crosses a boundary, and a binary counter that counts the pulses and produces a digital output corresponding to the input signal.

According to Fox, Westinghouse is the first to integrate the quantizer and counter into a working superconducting converter circuit. "Our quantizer is sensitive to signals smaller than a billionth of an ampere, our counter can record up to one hundred billion pulses a second, and we can operate on a thousandth of the power of a semiconductor A/D converter, he says.

Sensitivity and speed provide high resolution, the ability to distinguish small changes in signal level and thus pick out objects that are smaller, fainter or more distant, says Fox. The 12-bit circuit has a resolution on the order of one part in 4000; previous superconductor converters only achieved one part in 64.

In tracking, the converter is the interface between an infrared camera and a computer. The camera generates electromagnetic signals in response to IR images it receives from objects in space. These electromagnetic fields cause quantum mechanical oscillations in the quantizer that are counted and converted to digital numbers by the counter, and sent to the computer. Presently mounted outside the camera, A/D converters are subject to noise that causes loss of information, reducing the sensitivity of the system.

"The extremely low power dissipation of a supervolutive circuit will enable us for the first time to put the A/D converter inside the IR camera," says Dr. gene Strull, general manager of the Westinghouse advanced technology division. "That is not possible with semiconductor technology without burdening the camera with an excessive heat load."

Funding for the converter development was provided under a contract between the Westinghouse Electronic Systems Group in Baltimore and the key technology division of the U.S. Strategic Defense Initiative Organization under its high temperature superconductor program.

The future development of home automation systems, often referred to as "Smart Houses," promise to control the functions of everyday household appliances and other types of electronic equipment, such as phones, TVs and VCRs.

Proposed by the Consumer Electronics Group of the Electronic In-

dustries Association (EIA/CEG), the Consumer Electronic Bus, or CEBus system, would use AC power lines to permit household electronic devices to talk to each other, and as a result, help residents perform routine household functions.

There were some initial concerns over the possibility that home automation devices might cause interference to household AM radio reception. However, it now appears this interference problem has been resolved. Using remedies outline by EIA/CEG, recent modifications to the CEBus system demonstrate that the devices "can be operated without ... interference."

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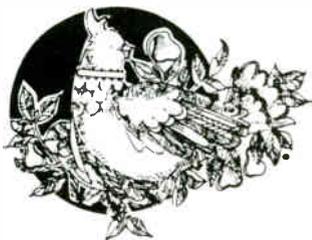
FOR SALE: 1--Pulse Dynamics remote broadcast telephone with four microphone and one aux level input \$100.00; 1--Collins 310Z-2 FM Exciter. 94.3 MHz, Excellent \$2,000.00; 1--Micro Controls PTS-10C Composite STL. 949.0 MHz, Excellent \$2000.00; 1--Micro Controls DRCR-9 Remote Control. \$1,500.00; 1--Micro Control 2001T/R 455.02 MHz, TSL. \$1,000.00; 1--CRL AM4 Mono Audio Processing System with CRL SPF-300 NRSC Adapter. Excellent \$2,400.00; 1--NLS MS-15 15 MHz Single Trace Oscilloscope with case, probe, book and battery. Good condition. \$150.00. Contact: Mark Persons, Phone 218-829-1326, Fax 218-829-2026.

WANTED: 1--Book for Radio Specialties 1163-50-5 FM Deviation Meter. Contact: Mark Persons, Phone 218-829-1326, Fax 218-829-2026.

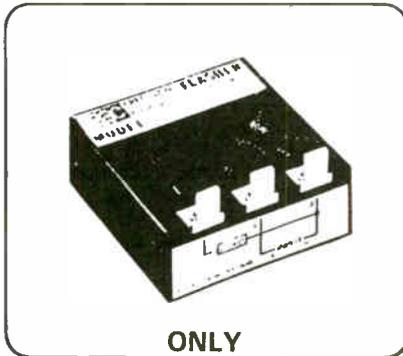
FOR SALE: Marti STL8-2 Transmitters, 2 receivers, all in good condition with manuals. \$3,500 OBO. Contact Jim Casey, WLBK, 711 N. First, DeKalb, IL 60115, 815-758-8686.

FOR SALE: (4) - 4-250 Eimac tubes, new in '85, original cartons, zero hours. \$100 each or \$300 for all four. Contact: Pete Deets, WFHR/WWRW, Phone: 715-424-1300 or Fax 715-424-1347.

USED EQUIPMENT FOR SALE AT KLSI: 1--ITC 3D Stereo cart machine with WRA record amp & spare motor, asking \$2,500 for all, 3--Dynaco PAT-4 Stereo preamps, \$30 each, 1--Sparta A-10B Monaural console, mint condition \$400., 1--Technics SP10 MKII Turntable, new in original box \$800, 1--Ampex AG-350 Monaural full track in console, good condition \$400, 1--Crown 801 full track recorder, portable with matching speaker/amp, very clean & good condition \$250, 1--Gates Studioette Monaural console, good for spare parts, missing only the VU meter, \$100. Contact: Ben Weiss, KLSI Radio Station, 3101 Broadway Suite 460, Kansas City, Missouri 64111, 816-753-0933.



SSAC B-KON-FLASH Tower Flasher



ONLY
\$48.95

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19 E. Irving - Oshkosh, WI 54901
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FEATURES

- TOTALLY SOLID STATE—No moving parts or contacts.
- ZERO VOLTAGE SWITCHING—5 to 10 times longer lamp life, no RFI due to contact closure.
- ENCAPSULATED—Protected against shock, vibration and humidity.
- HIGH SURGE CAPABILITY—Up to 300 Amperes.
- TRANSIENT PROTECTED—High immunity to "LIGHTNING".
- EASY TO INSTALL—Replaces existing types. FAST, with no special tools.
- SMALL SIZE—2" x 2" x 3/4".

DESCRIPTION

SSAC totally SOLID STATE TOWER FLASHERS have proven reliability with years of use on Radio and TV towers throughout the country. Each of these controls are built to exacting specifications using only the highest quality electronic components. Design features such as zero voltage switching, inherent fail-safe, encapsulation and long life makes these devices superior to all others.

A-220 Stereo Amplifier

Symetrix



PRICE

\$234.95

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Stringent noise and distortion specs in a compact, professional power amp.

High performance, low price. Specifically designed for video production, near-field monitoring, headphones, and small reference speakers. Stereo two channel or mono-bridged operation. Balanced XLR, balanced/unbalanced 1/4" input

connectors, barrier strip output terminals, independent or dual tracking input level controls for two channel or true stereo use. Used in video suites, television studios, radio stations, recording studios and paging/music systems.

Stereo Power Output: 20w/channel into 8 ohms 20w/channel into 16ohms. Mono-bridged Power Output: 40w channel into 8 ohms THD: 0.5% 20Hz to 20kHz S/N Ratio: 93dB (20kHz) NBW
Controls: Level 1, Level 2 Switches: Independent Dual Tracking, Power Dual Channel Mono-Bridged (rear panel)

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Analog/Digital Multimeters



Actual size

The new Fluke 80 Series (83, 85, and 87) is a high-performance family of handheld analog/digital multimeters with a powerful combination of measurement functions, including frequency, duty cycle and capacitance.

Designed for electronic as well as industrial applications, the 80 Series' durable construction and unique safety features ensure reliability and optimal performance in a variety of environmental settings.

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- **Frequency, Duty Cycle and Capacitance Measurements:** Fluke 80 Series meters have a counter for frequency measurements from 0.5 Hz to greater than 200 kHz, and duty cycle measurements from 0.1% to 99.9% of cycle. All three meters measure capacitance from 10 pF to 5 μF. Larger value capacitors may be measured using the analog display in the resistance mode.
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- **4½ Digit Mode, 1 ms Peak Min Max hold, True RMS, Back-Lit Display (87 only):** The Fluke 87 is a true-rms meter, and offers a 4½ digit, 19,999 count high resolution mode (1 rdg/sec), plus 1 ms Peak Min Max hold. The back lit display assures readability in poorly lit settings. Light automatically shuts itself off after 68 seconds, prolonging battery life.
- **Touch Hold® and Relative Modes:** Touch Hold captures the measurement, beeps and locks it on the digital display until you're ready to view it. It automatically updates with each new measurement. The Relative Mode remembers a reading and shows the change (difference) between it and any readings that follow.
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