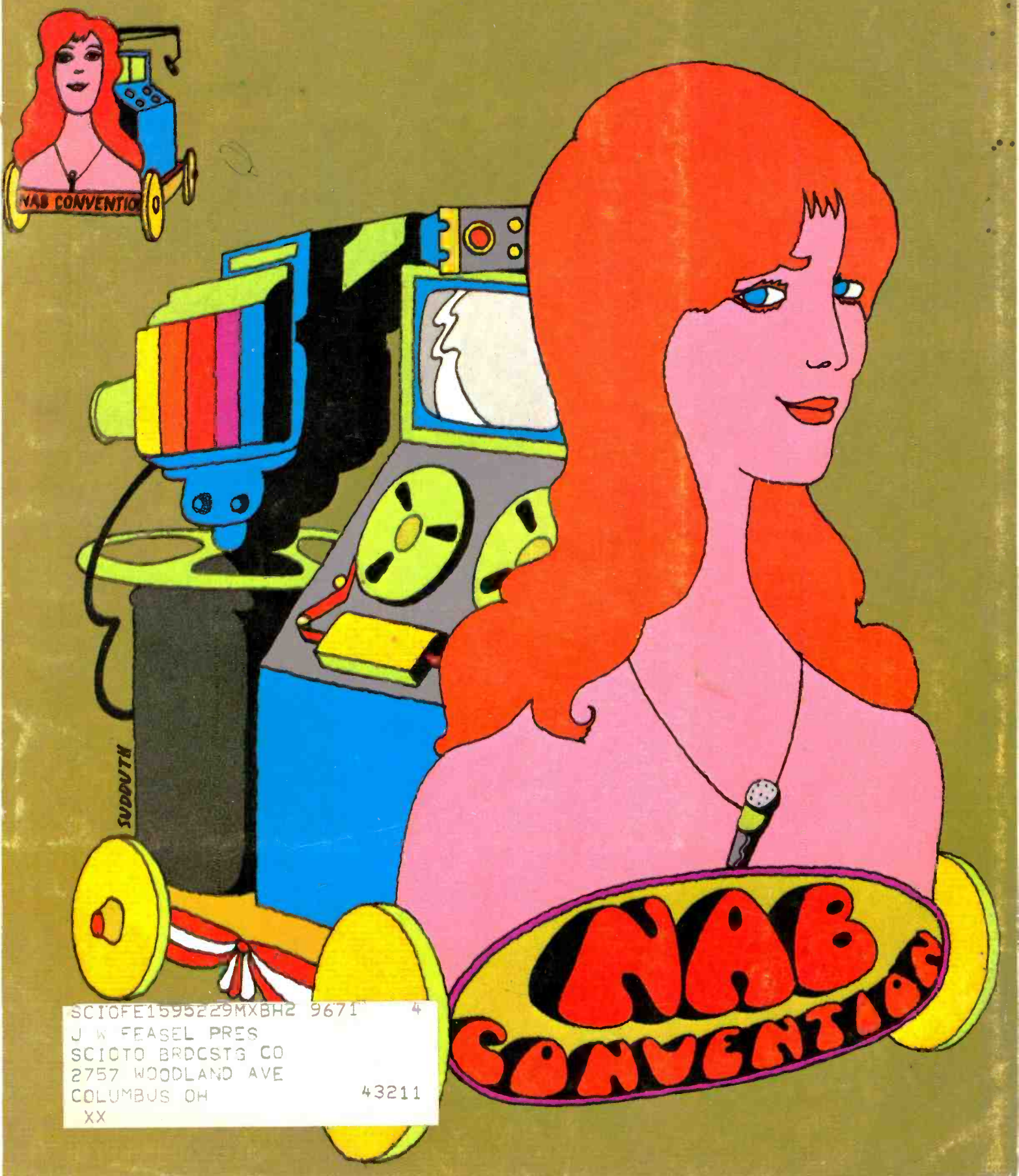
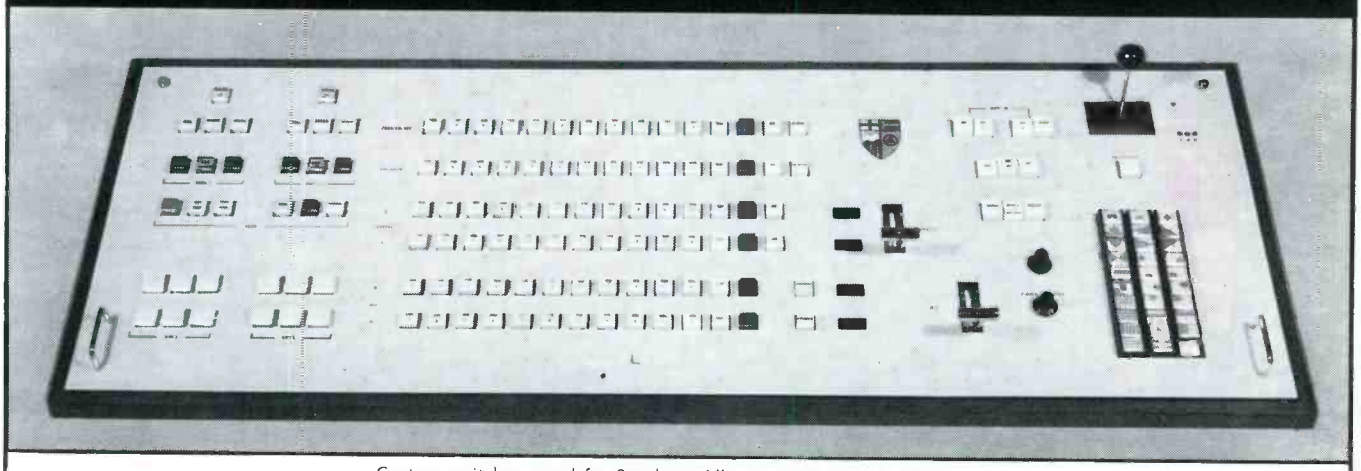
A MACTIER PUBLICATION / APRIL 1968

BM/E

THE MAGAZINE OF BROADCAST MANAGEMENT/ENGINEERING



Meet the video switcher a perfectionist gets excited about.



Custom switcher panel for Southern Alberta Institute of Technology

It isn't really surprising that the first piece of equipment a station engineer shows to "visiting firemen" is usually his custom-designed R.H.L. VSB-3 Series Video Switcher.

There are so many things about it that turn him on.

The personalized control panel where room for future facility expansion can be provided.

The remarkable system design flexibility that makes it possible for him to start with what he needs then expand to suit his future requirements by the easy addition of plug-in modules. (Think of the economy.)

The precise system timing and equalization. Every path through the switcher is timed with electronic delay switching and equalized to give him the only thing he'll buy. **Perfection.**

Vertical Interval Switching. Superior. Complete. Nothing to add. Period.

The bridging input drivers with looped inputs, providing monitor access to actual input signals and very low impedence feeds to crosspoints.

The unique R.H.L. Duty Cycle Integrator which samples the energy content of the signals and derives a D.C. component to minimize bounce.

The electronic tally control. Electronic logic gates control signal-source cueing, delay switching and provide a contact closure available for other purposes.

And more. For instance: the tally lights on the rack electronics and control panel are in exactly the same relative position for instant identification. (Local operation of crosspoints is available by replacing tally lights with miniature lighted push-buttons.)

Every unit is backed by a five-year guarantee and carries this extra bit of assurance — every component operates well below normal rating and must meet our rigid quality control requirements.

NAB BOOTH NUMBER 244-246

Richmond Hill

a subsidiary of **RIKER** video industries

RICHMOND HILL, 100 Parkway Drive South, Hauppauge, Long Island, N.Y. 11787 (516) 543-5200

Circle 15 on Reader Service Card

NAB

INSTANT CONVENTION GUIDE '68

Exhibit Floor Plans
Exhibiting Manufacturers
Equipment Source Guide
Management Program Agenda
Engineering Program Synopsis
Special Events

Prepared to aid your convention coverage by

BM/E

BROADCAST
MANAGEMENT/
ENGINEERING

NAB

Exhibits & Hours

Sunday—10:00 a.m. to 7:00 p.m.
Monday—9:00 a.m. to 7:00 p.m.
Tuesday—9:00 a.m. to 7:00 p.m.
Wednesday—9:00 a.m. to 5:00 p.m.

Use this handy alphabetical listing of manufacturers, booth numbers (in parentheses) and extension phone numbers to find exhibitors fast. A quick-reference product guide to the show starts on page 21.

*See advertisement in this issue of BM/E

Addressograph Multigraph Corp. (231) • 5-2700
*Advance Industries (319) • 5-2751
*Albion Optical Co. (252) • 5-2701
*Alford Manufacturing Co. (208) • 5-2702
Allied Impex Corp. (421) • 5-2665
Alma Engineering (408) • 5-2666
*Altec Lansing (207) • 5-2703
Ameco, Inc. (310) • 5-2752
*American Electronic Laboratories, Inc. (313) • 5-2753
*American Enka Corp. (409) • 5-2667
*AMP, Inc. (308) • 5-2754
Ampex Corp. (Normandie Lounge) • 5-2614
Andrew Corp. (220) • 5-2704
Arriflex Corp. of America (311) • 5-2755
*Audio Devices, Inc. (232) • 5-2705
*Ball Brothers Research Corp. (214) • 5-2706
Belar Electronics Laboratory, Inc. (204) • 5-2708
*Borg-Warner Corp. (217) • 5-2709
Brand-Rex Div. American Enka Corp. (409) • 5-2667
*Broadcast Electronics, Inc. (303) • 5-2756
Broadcast Skills Bank (F)
*CBS Laboratories (307) • 5-2757
CCA Electronics Corp. (236) • 5-2711
*Central Dynamics Corp. (413) • 5-2668
Century Lighting, Inc. Div. of LCA (122) • 5-2617
Chrono-Log Corp. (246) • 5-2712
Cleveland Electronics, Inc. (119) • 5-2618
Cohu Electronics, Inc. (326) • 5-2758
*Collins Radio Co. (209) • 5-2713
*Conrac Corp. (107) • 5-2619
Continental Electronics Mfg. Co. (200) • 5-2714
*Cooke Engineering Co. (420) • 5-2669
Craftsman Electronic Products, Inc. (318) • 5-2759
*Davis & Sanford Co., Inc. (120) • 5-2620
Delta Electronics, Inc. (205) • 5-2715
Disan Engineering Corp. (423) • 5-2670
Dresser Crane (206) • 5-2716
*Dynair Electronics, Inc. (211) • 5-2717
Effective Communication Systems, Inc. (324) • 5-2760
Eimac Div., Varian Associates (406) • 5-2688
*Electronic Engineering Co. of California (C) • 5-2602
Electronics, Missiles & Communications, Inc. (309B) • 5-2771
Entron, Inc. (320) • 5-2772
F & M Systems Co. (419) • 5-2671
*Fairchild Recording Equipment Corp. (314) • 5-2773
*Filmline Corp. (124) • 5-2621
*Fort Worth Tower Co., Inc. (315) • 5-2774
*Gates Radio Co. (221) • 5-2718
Gauss Electrophysics, Inc. (418) • 5-2672
*General Electric Co. (102) • 5-2622
Gotham Audio Corp. (236) • 5 2719
*Granger Associates (222) • 5-2707
The Grass Valley Group, Inc. (113) • 5-2623
Gray Research & Development Co. (414A) • 5-2673
The Harwald Co. (225) • 5-2720
*Hewlett-Packard (227) • 5-2721
Houston Fearless Corp. (116) • 5 2624
I.G.M. (224) • 5-2722
*Ingersoll Prod. Div., Borg-Warner (217) • 5-2709
ITT Electron Tube Div. (425) • 5-2674
Jampro Antenna Co. (305) • 5-2775
*Jerrold Electronics Corp. (322) • 5-2776
Johnson Electronics, Inc. (243) • 5-2723
Kaiser CATV Corp. (321) • 5-2777
*Kalart Co./Tele-Beam Div. (416) • 5-2675
Kliegl Brothers Lighting (100) • 5-2625
*Lenkurt Electric Co., Inc. (402) • 5-2676
Listec Television Equipment Corp. (427) • 5-2677
MaCarTa, Inc. (212) • 5274
The Machlett Laboratories, Inc. (106) • 5-2631
*Magnecord/Telex/Viking (317) • 5-2784
Marconi Instruments (228) • 5-2725
Marti Electronics (237) • 5-2726
*McCurdy Radio Industries, Inc. (309) • 5-2778
*McMartin Industries, Inc. (235) • 5-2727
*Memorex Corp. (312) • 5-2779
Microwave Associates, Inc. (115) • 5-2626
D. B. Milliken (Teledyne) (405) • 5-2678
*3M Co., Magnetic Products Div. (248) • 5-2728
3M Co., Mincom Div. (247) • 5-2728
Mole-Richardson Co. (401) • 5-2679
Moseley Associates, Inc. (223) • 5-2729
*National Guard Bureau (I)
Nippon Columbia Corp. of America (410) • 5-2680
*North American Philips Co., Inc. (AKG) (325) • 5-2780
The Nortronics Co., Inc. (238) • 5-2730
Optical Imports, Inc. (203) • 5-2731
*Packard Bell Electronics Corp. (240) • 5-2732
*Philips Broadcast Equipment Corp. (304) • 5-2781
Power-Optics, Inc. (114) • 5-2627
Q-TV Sales & Distributing Corp. (118) • 5-2628
Quick-Set, Inc. (242) • 5-2733
Radio Corporation of America (101) • 5-2630
*RCA Electronic Components (117) • 5-2629
*Rank Taylor Hobson/Albion Optical (252) • 5-2701
Raytheon Co. (106) • 5-2631
*Richmond Hill Laboratories, Ltd. (412) • 5-2685
*Riker Video Industries, Inc. (246) • 5-2712
Rohde & Schwarz (241) • 5-2734
*Rohn Systems, Inc. (229) • 5-2735
*Rust Corp. (251) • 5-2736
Sarkes Tarzian, Inc. (104) • 5-2632
Scantlin Electronics, Inc. (422) • 5-2681
Schafer Electronics (210) • 5-2737
*Seeburg Music Library, Inc. (215) • 5-2738

Shibaden Corp. of America (244A) • 5-2739
Shure Brothers, Inc. (213) • 5-2740
***Sony Corp. of America** (109) • 5-2633
Sparta Electronic Corp. (306) • 5-2782
Spindler & Sauppe, Inc. (327) • 5-2783
Standard Electronics Corp. (112) • 5-2634
Sylvania Electric Products, Inc. (250) • 5-2741
Tape-Athon Corp. (239) • 5-2742
Tapecaster Electronics (230) • 5-2743
The Technical Materiel Corp. (424) • 5-2682
***Tektronix, Inc.** (111) • 5-2635
***Tele-Beam Div./Kalart Co.** (416) • 5-2675
***TeleMation, Inc.** (D & E) • 5-2604
Telemet Co. (249) • 5-2744
Tele Pro Industries, Inc. (414) • 5-2683
Telequip Corp. (244) • 5-2745
Telesync Corp. (218) • 5-2746
Television Zoomar Co. (105) • 5-2636
***Telex/Magnecord/Viking** (317) • 5-2784
Texas Electronics, Inc. (407) • 5-2684
Townsend Associates, Inc. (110) • 5-2637
Transface Process Co. (411) • 5-2686
Trompeter Electronics, Inc. (404) • 5-2687
U.S. Air Force (H)
U.S. Army (G)
U.S. Navy (K)
U.S. Treasury Dept. (J)
Utility Tower Co. (234) • 5-2748
Varian Associates (406) • 5 2688
Vega Electronics Corp. (306) • 5-2782
Videometrics, Inc. (415) • 5-2689
***Viking/Telex/Magnecord** (317) • 5-2784
Vikoa, Inc. (316) • 5 2785
***Visual Electronics Corp.** (301, 302, 303) • 5-2756
Vital Industries, Inc. (202) • 5-2749
***Ward Electronic Industries** (201) • 5-2750
Westbury CATV (309A) • 5-2786
Wilkinson Electronics, Inc. (200A) • 5-2795

PRODUCTS AT NAB

Use this handy guide to locate specific products fast.

Amplifiers: Audio, Remote
Broadcast Electronics, Inc.
Disan Engineering Corp.
Fairchild Recording Equipment Corp.
Gates Radio Co.
Marti Electronics
Moseley Associates, Inc.

Amplifiers: Compression and Limiting
CBS Labs
Vega Electronics Corp.

Amplifiers: Cueing and Intercom
Altec Lansing
Fairchild Recording Equipment Corp.
McCurdy Radio Industries, Inc.
RCA
Sparta Electronic Corp.
Ward Electronic Industries

Amplifiers: Monitor
Altec Lansing
Broadcast Electronics Inc.
CBS Labs
Collins Radio
Disan Engineering Corp.
Marti Electronics
Sparta Electronic Corp.

Amplifiers: Special-purpose
Broadcast Electronics, Inc.
Fairchild Recording Equipment Corp.
Jampro Antenna Co.
Gray Research & Development Co.
Marti Electronics
Moseley Associates, Inc.
Rust Corp.
Ward Electronic Industries

Amplifiers: Video Distribution
Ball Bros. Research Corp.
Cohu Electronics, Inc.
Craftsman Electronic Products, Inc.
TeleMation Inc.
Ward Electronic Industries
Vital Industries, Inc.
Richmond Hill Labs, Ltd.

Amplifiers: Video Processing
Ball Bros. Research Corp.
CBS Labs
Central Dynamics Corp.
Disan Engineering Corp.
Jampro Antenna Co.
Standard Electronics Corp.
Vital Industries, Inc.

Antennas & Accessories
Alford Mfg. Co.
Collins Radio Co.
Disan Engineering Corp.
Gates Radio Co.
Jampro Antenna Co.
Moseley Associates, Inc.
RCA
Townsend Associates, Inc.

AUDIO CONSOLES
Disan Engineering Corp.
Fairchild Recording Equipment Corp.
Gates Radio Co.
Granger Associates
McCurdy Radio Industries, Inc.
Nippon Columbia Corp. of America
Philips Broadcast Equipment Corp.
RCA
Sparta Electronic Corp.
Visual Electronics
Ward Electronic Industries
Wilkinson Electronics, Inc.

Audio Equalizers
Altec Lansing
CBS Labs
Collins Radio Co.
Fairchild Recording Equipment Corp.
Gray Research & Development Co.
Marti Electronics
Rust Corp.
Shure Brothers
Sparta Electronic Corp.

Audio Switching
Rust Corp.
Sparta Electronic Corp.
Tape-Athon Corp.
Trompeter Electronics, Inc.

Audio Tape Accessories
AMP Inc.
Broadcast Electronics Inc.
CBS Labs
Fairchild Recording Equipment Corp.
Gates Radio Co.
Gauss Electrophysics Inc.
Gotham Audio Corp.
Gray Research & Development Co.
McCurdy Radio Industries Inc.
McMartin Industries, Inc.
Philips Broadcast Equipment Corp.

Audio Tape Equipment
Ampex Corp.
Arriflex Corp. of America
Gauss Electrophysics Inc.
Gotham Audio Corp.
IGM
3M Co.
Nortronics Co., Inc.
Q-TV Sales & Distributing Corp.
Sparta Electronic Corp.
Tape-Athon Corp.
Telex/Magnecord/Viking

Audio Turntables
Gates Radio Co.
Gotham Audio Corp.
Shure Brothers
Sparta Electronic Corp.

Automation Systems & Equipment
AMP Inc.
Central Dynamics Corp.
Chrono-Log Corp.
Cohu Electronics, Inc.
Disan Engineering Corp.
Gates Radio Co.
IGM
MaCarTa, Inc.
Moseley Associates, Inc.
RCA
Rust Corp.
Sarkes Tarzian Inc.
Schafer Electronics
Tape-Athon Corp.
Trompeter Electronics Inc.
Visual Electronics
Ward Electronic Industries

Cables and Connectors
Andrew Corp.
Boston Insulated Wire & Cable Co.
Brand-Rex Div., American Enka Corp.
Listec Television Equipment Corp.
RCA
Technical Materiel Corp.
Townsend Associates Inc.
Trompeter Electronics, Inc.
Vikoa Inc.

CCTV Equipment
Alford Mfg. Co.
Ameco Inc.
Ampex Corp.
Andrew Corp.
Craftsman Electronics Products, Inc.
Dynair Electronics, Inc.
Entron Inc.
IGM
Jerrold Electronics Corp.
Kaiser CATV Corp.
Philips Broadcast Equipment Corp.
Technical Materiel Corp.

Components
Alford Mfg. Co.
Andrew Corp.
Cleveland Electronics, Inc.
Continental Electronics Mfg. Co.
Nortronics Co., Inc.
RCA Electronic Components
Wilkinson Electronics, Inc.

Equipment Buildings & Shelters
Advance Industries
Fort Worth Tower Co., Inc.
Rohn Systems, Inc.

Film Processing Equipment
Albion Optical/Rank Taylor Hobson
Filmline Corp.

Film Slide Equipment
Albion Optical/Rank Taylor Hobson
Allied Impex Corp.
Arriflex Corp. of America
General Electric Co.
Harwald Co.
Houston Fearless Corp.
Listec Television Equipment Corp.
D. B. Milliken
3M Co.
Packard Bell Electronics Corp.
Philips Broadcast Equipment Corp.
RCA
Spindler & Sauppe, Inc.
Technical Materiel Corp.
Tele-Beam Div., Kalart Co.
TelePro Industries Inc.
Telesync Corp.

Filters & Networks
Alford Mfg. Co.
Collins Radio Co.
Gray Research & Development Co.
Jampro Antenna Co.
Sparta Electronic Corp.
Ward Electronic Industries
Wilkinson Electronics Inc.

Generators: Special-purpose
Cohu Electronics, Inc.
Delta Electronics, Inc.
Moseley Associates, Inc.
Richmond Hill Labs, Inc.
Standard Electronics Corp.
TeleMation, Inc.

Generators: Sync
Cohu Electronics, Inc.
Richmond Hill Labs Ltd.
Riker Video Industries, Inc.
TeleMation Inc.
Visual Electronics

Hardware
Berkey-ColorTran Inc.
Borg-Warner Corp.
Boston Insulated Wire & Cable Co.
Brand-Rex Div., American Enka Corp.
Broadcast Electronics, Inc.
Continental Electronics Mfg. Co.
Davis & Sanford Co., Inc.
Delta Electronics, Inc.
Gates Radio Co.
Listec Television Equipment Corp.
Technical Materiel Corp.
Trompeter Electronics, Inc.
Wilkinson Electronics, Inc.

Headsets
Gotham Audio Corp.
North American Philips Co., Inc.
Telex/Magnecord/Viking

Lighting: Studio and Set
Berkey ColorTran Inc.
Boston Insulated Wire & Cable Co.
Century Lighting, Inc.
Kliegl Brothers Lighting
Mole-Richardson Co.
Sylvania Electric Products Inc.

Lighting: Tower
RCA
Rohn Systems Inc.
Utility Tower Co.

Logging Equipment
Gates Radio Co.
Moseley Associates, Inc.
Rust Corp.
Tape-Athon Corp.

Magnetic Tape Accessories: Video
Electronic Engineering Co. of Calif.
Gotham Audio Corp.

Magnetic Tape: Audio
Ampex Corp.
Audio Devices, Inc.
3M Co., Magnetic Products Div.
Sony Corp. of America

Magnetic Tape: Cartridges
Audio Devices, Inc.
Effective Communications Systems, Inc.
TelePro Industries, Inc.

Magnetic Tape Cartridge Equipment
Broadcast Electronics, Inc.
Collins Radio Co.
Disan Engineering Corp.
Granger Associates
MaCarTa Inc.
Sparta Electronic Corp.

Magnetic Tape Equipment: Video
Ampex Corp.
RCA
Shibaden Corp. of America
Sony Corp. of America
Sylvania Electric Products, Inc.
Visual Electronics

Magnetic Tape: Video
Ampex Corp.
Memorex Corp.
3M Co.
Sony Corp. of America

Measuring and Test Equipment
Alford Mfg. Co.
Ball Bros. Research Corp.
CBS Labs
Cohu Electronics, Inc.
Continental Electronics & Mfg. Co.
Delta Electronics, Inc.
Hewlett-Packard
McMartin Industries, Inc.
Marconi Instruments
Optical Imports, Inc.
RCA
RCA Electronic Components
Richmond Hill Labs Ltd.
Riker Video Industries, Inc.
Rohde & Schwarz
Shibaden Corp. of America
Tektronix Inc.
Television Zoomar Co.
Videometrics Inc.
Wilkinson Electronics Inc.

Mobile TV Equipment
CBS Labs
RCA
Sylvania Electric Products Inc.
Technical Material Corp.
Wilkinson Electronics Inc.

Microphones
Altec Lansing
Gotham Audio Corp.
North American Philips Co., Inc.
RCA Electronic Components
Shure Brothers
Sparta Electronic Corp.
Vega Electronics Corp.

Microwave Equipment
Collins Radio Co.
Jerrold Electronics Corp.
Lenkurt Electric Co., Inc.
Marti Electronics
Microwave Associates, Inc.
Moseley Associates, Inc.
RCA
Raytheon Co.
Rust Corp.
Sarkes Tarzian Inc.
Visual Electronics

Microwave Accessories
Alford Mfg. Co.
Andrew Corp.
Central Dynamics Corp.
Microwave Associates Inc.
Varian Associates

Microwave Reflectors (Passive)
Advance Industries
Fort Worth Tower Co., Inc.
Rohn Systems Inc.

Miscellaneous
Andrew Corp.
Disan Engineering Corp.
Gotham Audio Corp.
Texas Electronics, Inc.

Monitors: A-m & Fm
Collins Radio Co.
Delta Electronics, Inc.
Gotham Audio Corp.
McMartin Industries, Inc.

Multiplexers
Ball Bros. Research Corp.
General Electric Co.
Jampro Antenna Co.
TeleMation Inc.

Office & Maintenance
Addressograph Multigraph Corp.
Transface Process Co.

Packaged Program Services
National Guard Bureau
U. S. Air Force
U. S. Army
U. S. Navy

Power Supplies, Regulators & Generators
Disan Engineering Corp.
Technical Materiel Corp.

SCA Equipment
Disan Engineering Corp.
Johnson Electronics, Inc.
McMartin Industries, Inc.
Marti Electronics
Moseley Associates, Inc.
Seeburg Music Library Inc.

Speakers, Monitor
Altec Lansing
Broadcast Electronics Inc.
Gotham Audio Corp.

TV Accessories
CBS Labs
Central Dynamics Corp.
Houston Fearless Corp.
Jampro Antenna Co.
3M Co.
Power Optics Inc.
RCA
Sony Corp. of America
Technical Materiel Corp.
Trompeter Electronics, Inc.
Visual Electronics

TV Cameras: Mono & Color
Ampex Corp.
CBS Labs
Cohu Electronics Inc.
General Electric Co.
Packard Bell Electronics Corp.
Philips Broadcast Equipment Co.
RCA
Shibaden Corp. of America
Sony Corp. of America
Sylvania Electric Products, Inc.
TeleMation Inc.

TV Camera Accessories
Boston Insulated Wire & Cable Co.

TV Camera Lenses
Albion Optical/Rank Taylor Hobson
Optical Imports, Inc.

TV Camera Stands, Tripods, Pedestals, Mounts
Davis & Sanford Co., Inc.
Houston Fearless Corp.
Listec Television Equipment Corp.
Quick-Set Inc.
Television Zoomar Co.

TV Camera Tubes
Cleveland Electronics, Inc.
RCA Electronic Components

TV Monitors, Mono & Color
Albion Optical/Rank Taylor Hobson
Ampex Corp.
Ball Bros. Research Corp.
Ball Bros., Miratel Div.
Conrac Corp.
Hewlett-Packard
Nippon Columbia Corp. of America
Philips Broadcast Equipment Corp.
Shibaden Corp. of America
Sony Corp. of America
TeleBeam Div., Kalart Co.

TV Projectors: Large Screen
Gray Research & Development Co.

Towers: Broadcast Antenna
Advance Industries
Andrew Corp.
Dresser Crane
Fort Worth Tower Co., Inc.
Rohn Systems, Inc.
Utility Tower Co.

Towers: Microwave
Dresser Crane
Fort Worth Tower Co., Inc.
Rohn Systems, Inc.
Utility Tower Co.

Transmitters: A-m
American Electronic Laboratories Inc.
Collins Radio Co.
Continental Electronics Mfg. Co.
Gates Radio Co.
Granger Associates
RCA
Technical Materiel Corp.
Visual Electronics
Wilkinson Electronics, Inc.

Transmitters: Fm
American Electronic Laboratories Inc.
Collins Radio Co.
Disan Engineering Corp.
Gates Radio Co.
Granger Associates
RCA
Standard Electronics Corp.
Townsend Associates, Inc.
Visual Electronics
Wilkinson Electronics, Inc.

Transmitters: TV
RCA
Standard Electronics Corp.
Technical Material Corp.
Townsend Associates, Inc
Visual Electronics

Transmitting Power Tubes
ITT Electron Tube Div.
Machlett Laboratories, Inc.
RCA Electronic Components
Varian Associates

Translators
Electronics, Missiles & Communications, Inc.
Granger Associates
Townsend Associates, Inc.

Video Special Effects Equipment
Ball Bros. Research Corp.
Central Dynamics Corp.
Richmond Hill Labs Ltd.
Riker Video Industries, Inc.
Telesync Corp.

Video Switching
AMP Inc.
Ampex Corp.
Central Dynamics Corp.
Cohu Electronics Inc.
General Electric Co.
IGM
Jampro Antenna Co.
MaCarTa Inc.
Philips Broadcast Equipment Corp.
RCA
Richmond Hill Labs, Ltd.
Riker Video Industries, Inc.
Sarkes Tarzian Inc.
Schafer Electronics
Sylvania Electric Products, Inc.
Telemet Co.
Trompeter Electronics Inc.
Visual Electronics
Vital Industries, Inc.
Ward Electronic Industries

Visual Cueing & Displays
CBS Labs
Telesync Corp.
Visual Electronics

During NAB Week, drop in to visit us in the BM/E suite (room 1106A) at the Conrad Hilton

Be sure to see BM/E's recap of the NAB Convention and exhibits in our next issue

NAFMB
Convention Papers Presented At The Palmer House

Friday, March 29

9:00 a.m. REGISTRATION—Grand Foyer, 6th Floor

10:00 a.m. Adams Room—How the Fm Broadcasters Should Sell the Retailer Richard B. Schlesinger, vice president, Carson, Pirie Scott & Company, Chicago
The Small Market Agency Looks at Fm Edwin D. Gimzek, president & general manager OAC Advertising, Inc., Binghamton, New York
How a Station Should Sell Its Rep Representative from a leading rep firm.

5:00 p.m. Open Mind—Adams Room—John V. B. Sullivan, President, Metromedia Radio, New York

Saturday, March 30

9:00 a.m. The Pre-Sell—Adams Room Research-RADAR Study: Joshua J. Mayberry, director of Research, American Fm Radio Network, New York. Programming: Marlin R. Taylor, music director, Kaiser Fm Stations, WJIB-Boston, KFOG-San Francisco.

10:15 a.m. Newspapers As a Radio Promotion Vehicle: Ronald Sack, director, Advertising, Promotion, Publicity & Program Development, ABC Owned & Operated Stations, New York. How To Promote Effectively Through Your Own Station Facilities: John T. Lawrence, Jr., general manager, Fm Division, Taft Broadcasting Company, Cincinnati, Ohio. What Can You Do About Your Identity Gap? Philip Lesley, president, The Philip Lesley Company, Chicago, Illinois. Sales Promotion Devices: Paul Moyle, vice president, Brown & Bigelow, Saint Paul, Minn.

2:30 p.m. How To Use Outdoor Advertising: Jay H. Smolin, director of Information, Institute of Outdoor Advertising, New York. Using Direct Mail: John Mecchella, vice president, The Dartnell Corporation, Chicago. Using Television to Promote Fm: Chet Campbell, director, Advertising, Promotion & Publicity, WMAQ-TV, Chicago. Who Says Egg Heads Can't Merchandise: Lee J. Walters, executive vice president & account management supervisor, Stern, Walters & Simmons, Inc., Chicago. Two Steps Before The Sell: Don LeBrecht, manager, WBT-FM, Charlotte, North Carolina. How To Make A Presentation: Paul Martin, director of Promotion, Triangle Stations, Philadelphia, Pa.

Sunday, March 31

10:45 a.m. SCA & Stereo Monitors: Harold Kassens, assistant chief, Broadcast Facilities Division, FCC. Electro-Writer: Edward West, manager, Educational Division, Victor Comptometer.

11:45 a.m. Getting There By Degrees (Or Them That Gives-Takes): David Yellin, director of Speech and Drama, Memphis State University, Memphis, Tenn.

At-A-Glance Guide

NAB

AND NAFMB ASSEMBLIES, TECHNICAL SESSIONS AND OTHER CONVENTION FEATURES COMPILED BY BM/E

All meetings and functions are NAB programs meeting in the Conrad Hilton unless otherwise noted

Friday, March 29

9:00 a.m.—Grand Foyer (Palmer House)—NAFMB Registration.

9:30 a.m.—Adams Room (Palmer House)—NAFMB Program.

10:00 a.m.—Adams Room—NAFMB; "Sell Me:" How the Fm Broadcasters Should Sell the Retailer, The Small Market Agency Looks at Fm, How a Station Should Sell Its Rep.

12:00 noon—Grand Foyer—NAFMB Reception.

12:30 p.m.—Monroe Room—NAFMB Luncheon.

2:30 p.m.—Adams Room—NAFMB Membership Meeting.

5:00 p.m.—Adams Room—Open Mind.

6:00 to 7:30 p.m.—Monroe Room—Cocktail Party.

Saturday, March 30

9:00 a.m.—Adams Room (Palmer House) NAFMB; The Pre-Sell: Research-Radar Study, Programming.

10:15 a.m.—Adams Room—NAFMB; The Sellers: Newspapers as a Radio Promotion Vehicle, How to Promote Effectively Through Your Own Station Facilities, What Can You Do About Your Identity Gap?, Sales Promotion Devices.

12:15 p.m.—Grand Foyer (Palmer House)—NAFMB Reception.

12:45 p.m.—Monroe Room (Palmer House)—NAFMB Luncheon: Major Armstrong Awards Program.

2:30 p.m.—Adams Room—NAFMB; The Sellers: How to Use Outdoor Advertising, Using Direct Mail, Using Television to Promote Fm.

4:15 p.m.—Adams Room—NAFMB; The Sell: Who Says Egg Heads Can't Merchandise, Two Steps Before the Sell, How to Make a Presentation.

6:00 to 7:30 p.m.—Red Lacquer Room (Palmer House)—NAFMB Cocktail Party.

Sunday, March 31

8:00 a.m.—Lower Lobby (Conrad Hilton)—NAB registration.

9:30 a.m.—Great Hall (Pick Congress)—NAFMB Management Program.

10:45 a.m.—Great Hall (Pick Congress)—NAFMB Engineering: SCA & Stereo Monitors, Electro-Writer.

11:45 a.m.—Great Hall (Pick Congress)—NAFMB Education: Getting There by Degrees.

2:30 to 5:00 a.m.—Great Hall (Pick Congress) (All NAFMB registrants invited to attend)—NAB Fm Day Program: Report from the NAB Fm Radio Committee Chairman, Report From the FCC, Fm—Fundamental Management, New Fm Technical Developments, Operation Go!

Monday, April 1

10:30 a.m. to 12 noon—Grand Ballroom—General Assembly.

12:30 to 2:30 p.m. International Ballroom—Management Luncheon

12:30 to 2:00 p.m.—Williford Room—Engineering Luncheon.

2:30 to 5:30 p.m.—Grand Ballroom—Radio Assembly: Small Market Radio Workshop.

2:30 to 5:00 p.m.—Waldorf Room—Television Assembly: Report—NAB Future of Television Committee, On Target Television, Secondary Market Televlsion Workshop.

2:30 to 3:40 p.m.—Great Hall (Pick Congress)—Radio & Television Technical Session (concurrent): Opening of the Conference, NAB Engineering Advisory Committee Report, Report of the Canadian Telecasting Practices Committee.

3:45 to 5:00 p.m. Gold Room (Pick Congress)—Television Automation Workshop (concurrent session).

3:45 to 5:00 p.m.—Williford Room—Television Assembly (concurrent session): Radio -Television Labor Relations Workshop.

3:45 to 5:00 p.m.—Avenue West (Pick Congress)—Radio Automation Workshop (concurrent session).

Tuesday, April 2

9:00 a.m. to 12 noon—Grand Ballroom—Mangement Radio Assembly: Report of the Chairman of the Radio Board, Your Part in Armed Forces Radio, Meet "Miss National Radio Month," The Radio Code and You, Billing $325,000 in a Town of 13,000, The Role of the Community Broadcaster, Creative Freakout for Radio.

9:00 a.m. to 12 noon—Gold Room (Pick Congress)—Radio Technical Session: Dual Reliable A-m Transmitters, Digital Frequency Monitoring for A-m/Fm/TV, Automatic Logging of Directional Antenna Parameters, Galvanized Steel and Paint Specifications for Transmission Antenna Towers, A New Circularly Polarized Fm Transmitting Antenna, Aspects of Audio Testing.

12:30 to 2:30 p.m.—International Ballroom—Management Luncheon

9:00 a.m. to 12 noon—Great Hall (Pick Congress)—Television Technical Session: Optical Multiplexing Theory and Practice, A New Modular Portable Lighting System, Processing Techniques for Correction of Video Signal Defects, New Advances in the Art of Television-Measuring Techniques, Color Video Switching Systems, Plumbicon Broadcast Color TV Equipment.

12:30 to 2:00 p.m.—Williford—Engineering Conference Luncheon

Wednesday, April 3

9:45 a.m. to 12 noon—Grand Ballroom—Television Assembly: Television Board Elections, Presentation of the Station Award, Report of the All Industry Television Station Music Licensing Committee, Target 50 Million, Self Regulatory Service on Three Fronts, Election Results.

9:00 a.m. to 12 noon—Gold Room (Pick Congress)—Technical Session: The New WAGA-TV Facility, A New Approach to TV Color Camera Design, New TV Measurement Techniques Using Existing Studio Monitoring Equipment, Review of Vhf-TV Remote Control Tests, FCC/Industry Panel.

12:30 to 2:30 p.m.—International Ballroom—Mangement Luncheon: Annual NAB Business Meeting.

12:30 to 2:00 p.m.—Williford Room—Engineering Luncheon: Engineering Award Presentation.

2:30 to 4:30 p.m.—Grand Ballroom—Management and Engineering Session: Conference '68—Broadcast News.

7:30 p.m.—International Ballroom—NAB—Broadcast Pioneers Banquet (Management and Engineering).

NAB

ENGINEERING PROGRAM

For complete conference schedule, see quick reference chart on pages 26-27

Your 1968 Convention Committee

Co-Chairmen: **Daniel W. Kops,** Kops-Monahan, New Haven, Conn., **John T. Murphy,** AVCO, Cincinnati, O.
MEMBERS:
Norman P. Bagwell, WKY-TV, Oklahoma City, Okla.
Eldon Campbell, WFBM-TV, Indianapolis, Ind.
Charles E. Gates, WGN, Chicago, Ill.
Carl E. Lee, Fetzer, Kalamazoo, Mich.
Roy E. Morgan, WILK, Wilkes Barre, Pa.
A. F. Sorenson, WKRS, Waukegan, Ill.
Donald A Thurston, Berkshire, North Adams, Mass.
Charles H. Tower, Corinthian, New York, N.Y.
Willard E. Walbridge, KTRK-TV, Houston, Tex.
Jack S. Younts, WEEB, Southern Pines, N.C.

Monday, April 1

General Assembly

(Management and Engineering Conferences)

10:30 a.m. to 12 noon
Grand Ballroom
Doors open at 10:00 a.m.

Music by: WGN Orchestra, Robert Trendler, director

Presiding: Daniel W. Kops, Kops-Monahan, New Haven, Conn., Convention co-chairman, vice chairman, Radio Board

Salute to Distinguished Service Award Recipient:

Dr. Norman Vincent Peale

Presentation of the NAB Distinguished Service Award to:

Lowell Thomas

Remarks: Mr. Thomas

Engineering Assemblies Luncheon

12:30 to 2:00 p.m. Williford Room

Presiding: Clure H. Owen, ABC, New York, N.Y.

Speaker: Dr. George H. Brown, Executive Vice President, Research and Engineering, RCA, Princeton, N.J.

Radio-Television Technical Session

2:30 to 5:00 p.m. Great Hall (Pick Congress)

Presiding: Benjamin Wolfe, vice president for Engineering, Westinghouse Broadcasting Co., Inc., New York, N.Y.

Coordinator: LeRoy A. Bellwood, director of Engineering, KOGO Radio & TV, Time-Life Broadcast, San Diego, Calif.

Opening of the Conference
Vincent T. Wasilewski, president, NAB

NAB Engineering Advisory Committee Report
Malcolm M. Burleson, chairman, vice president for Engineering, Metromedia, Inc., Washington, D.C.

Report of the Canadian Telecasting Practices Committee
Glen Robitaille, CFPL-TV, London, Ontario, Canada

Concurrent Workshop Sessions
Radio Automation Avenue West
Television Automation Gold Room

Radio Automation Workshop

(Management and Engineering Conferences)

3:45 to 5:00 p.m. Avenue West (Pick Congress)

Moderator: Robert J. Sinnett, vice president for Engineering, WHBF AM FM-TV, Rock Island, Ill.

Panelists: N. Elmo Franklin, Gates Radio Company, Quincy, Ill.; Danny Coulthurst, International Good Music, Bellingham, Wash.; Paul C. Schafer, Schafer Electronics, Chatsworth, Calif.; Ben Enochs, WDXL, Lexington, Tenn.; Welton M. Roy, WHBQ, Memphis, Tenn.; Ronald E. Crider, WMJR, Ft. Lauderdale, Fla.

Television Automation Workshop

(Management and Engineering Conferences)

3:45 to 5:00 p.m. Gold Room (Pick Congress)

Moderator: Benjamin Wolfe, Westinghouse Broadcasting Co., Inc., New York, N.Y.

Panelists: B. van Benthem, AMP Inc., Harrisburg, Pa.; Kenneth P. Davies, Central Dynamics, Ltd., Pointe Claire, Montreal, P.Q., Canada; James O. Moneyhun, Sarkes Tarzian, Inc., Bloomington, Ind.; Deane B. Moore, CBS Television Network, New York, N.Y.; Theodore Sorrells, WMAL-TV, Washington, D.C.; James C. Wulliman, WTM— AM/FM/TV, Milwaukee, Wis.

Tuesday, April 2

Radio Technical Session

9:00 a.m. to 12 noon Gold Room (Pick Congress)

Presiding: Leslie S. Learned, MBS, New York, N.Y.

Coordinator: George G. Jacobs, Corinthian, Tulsa, Okla.

Dual Reliable A-m Transmitters
Juan C. Chiabrando, CCA Electronics Corp., Gloucester City, N.J.

Digital Frequency Monitoring for A-m/fm/TV
Gart Bowling, Collins Radio, Dallas, Tex.

Automatic Logging of Directional Antenna Parameters
Ogden L. Prestholdt, CBS Radio, New York, N.Y.

Galvanized Steel and Paint Specification for Transmitter Antenna Towers
Thomas F. Shaffer, American Zinc Institute, New York, N.Y.

A New Circularly Polarized Fm Transmitting Antenna
Peter K. Onnigian, Jampro Antenna, Computer Equipment Corp., Sacramento, Calif.

Aspects of Audio Testing
Fred L. Zellner, Jr., ABC, New York, N.Y.

Television Technical Session

9:00 a.m. to 12 noon Great Hall (Pick Congress)

Presiding: John T. Wilner, Hearst, Baltimore, Md.

Coordinator: Robert J. Sinnett, WHBF AM/FM/TV, Rock Island, Ill.

Optical Multiplexing Theory and Practice
D. W. Rohrs, General Electric, Syracuse, N.Y.

A New Modular Portable Lighting System
George L. Benkowsky, CBS Television, New York, N.Y.

Processing Techniques for Correction of Video Signal Defects
L. J. Baun, RCA, Camden, N.J.

New Advances in the Art of Television Measuring Techniques
Dr. Herbert Mangold, Rohde & Schwarz, Passaic, N.J. (To be presented by R. Feldt, president)

Color Video Switching Systems
Robert Butler, NBC, New York, N.Y.

Plumbicon Broadcast Color TV Equipment
Michael T. Fisher, Philips Broadcast Equipment Corp., Paramus, N.J.

Engineering Conference Luncheon

12:30 to 2:00 p.m. Williford Room

Presiding: James D. Parker, CBS Television Network, New York, N.Y.

Speaker: General Emmett O'Donnell, Jr., USAF (Ret.), president, United Service Organizations, Inc. (USO), New York, N.Y.

Wednesday, April 3

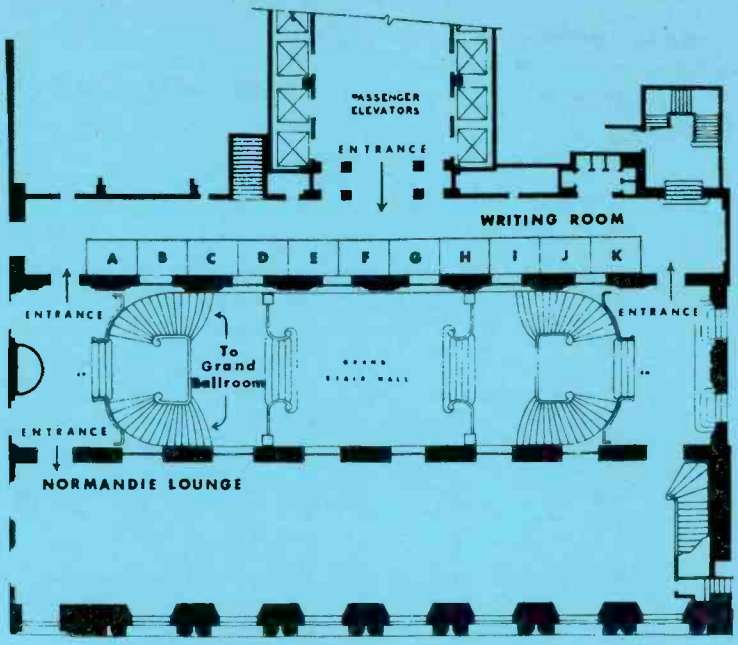
Engineering Luncheon

12:30 to 2:00 p.m. Williford Room

Presiding: Albert H. Chismark, Meredith Broadcasting Co., Syracuse,

Continued on page 34

Writing Room/Normandie Lounge



WRITING ROOM
(Second Floor)

F	Broadcast Skills Bank
C	Electronic Engineering Co. of California
A-B	Front Projection Corp.
I	National Guard Bureau
D-E	TeleMation Inc.
H	U.S. Air Force
G	U.S. Army
K	U.S. Navy
J	U.S. Treasury

Normandie Lounge
(Second Floor)

Ampex Corp.

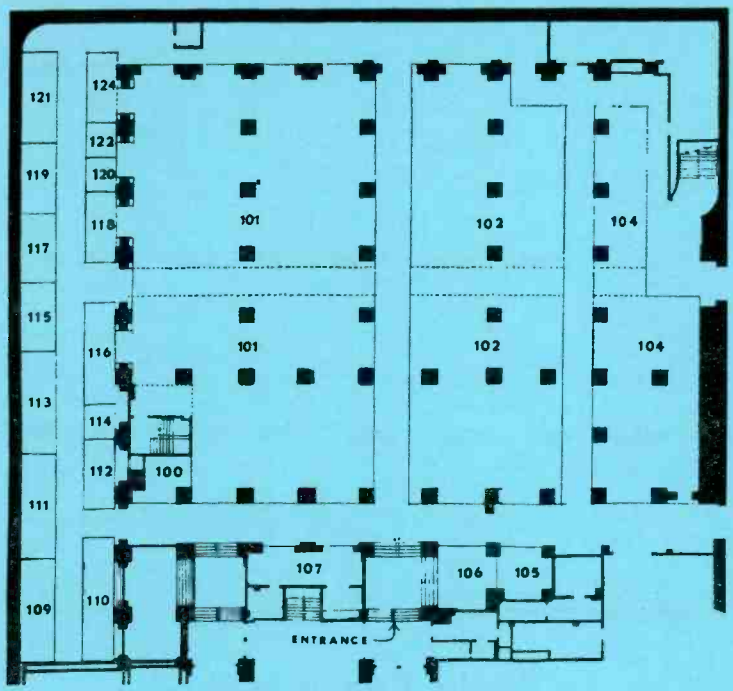
EAST EXHIBIT HALL
(Lower Level)

121	Berkey-ColorTran
122	Century Lighting, Inc.
119	Cleveland Electronics, Inc.
107	Conrac Div., Conrac Corp.
120	Davis & Sanford Co., Inc.
124	Filmline Corp.
102	General Electric Co.
113	The Grass Valley Group, Inc.
116	Houston Fearless Corp.
100	Kliegl Bros. Lighting
106	Machlett Labs/Raytheon Co.
115	Microwave Associates
114	Power Optics, Inc.
118	Q-TV Sales & Distributing Corp.
101	Radio Corp. of America, Broadcast & Communications Products Div.
117	Radio Corp. of America, Electronic Components Div.
106	Raytheon Co.
104	Sarkes Tarzian, Inc.
109	Sony Corp. of America
112	Standard Electronics Corp.
111	Tektronix, Inc.
105	Television Zoomar Co.
110	Townsend Associates, Inc.

WEST EXHIBIT HALL
(Lower Level)

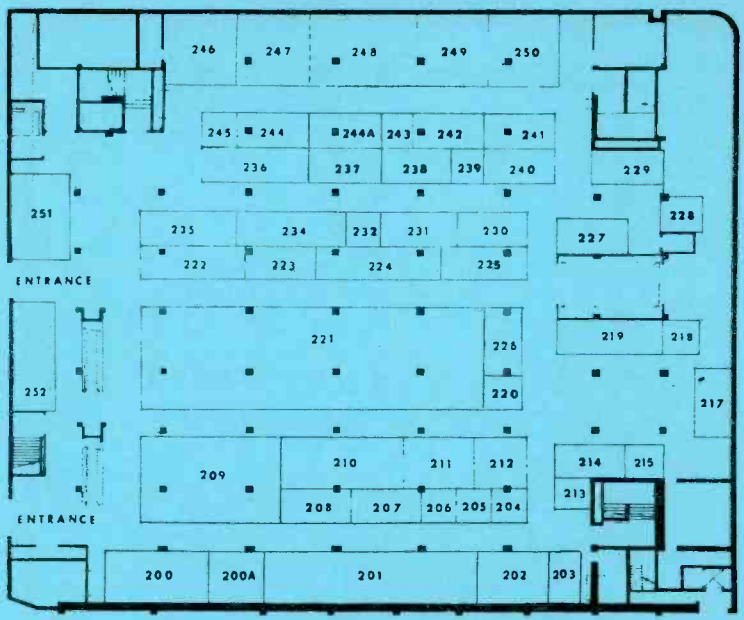
231	Addressograph Multigraph Corp.
252	Albion Optical Co.
208	Alford Mfg. Co.
207	Altec Lansing
220	Andrew Corp.

East Exhibit Hall

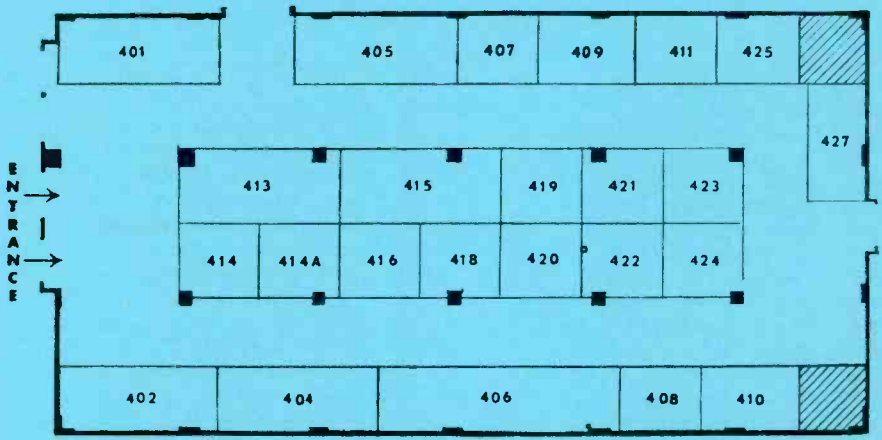


232	Audio Devices, Inc.
214	Ball Bros. Research Corp.
219	Ball Bros., Miratel Div.
204	Belar Electronics Lab. Inc.
217	Borg-Warner/Ingersoll Products Div.
245	Boston Insulated Wire & Cable Co.
236	CCA Electronics Corp.
246	Chrono Log Corp.
209	Collins Radio Co.
200	Continental Electronics Mfg. Co.
205	Delta Electronics
206	Dresser Crane, Hoist & Tower Div.
211	Dynair Electronics Inc.
221	Gates Radio Co.
226	Gotham Audio Corp.
222	Granger Associates/Bauer Broadcast Div.
225	The Harwald Co.
227	Hewlett Packard Co.
224	IGM (International Good Music, Inc.)
243	Johnson Electronics, Inc.
212	MaCarTa, Inc.
228	Marconi Instruments
237	Marti Electronics
235	McMartin Industries
248	3M Company
247	3M Company/Mincom Div.
223	Moseley Associates, Inc.
238	Nortronics Co., Inc.
203	Optical Imports
240	Packard Bell Electronics
242	Quick-Set, Inc.
244-246	Richmond Hill Labs Div., Riker Video Industries
241	Rohde & Schwarz Sales Co.
229	Rohn Systems, Inc.
251	Rust Corp.
210	Schafer Electronics
215	Seeburg Music Library, Inc.
244A	Shibaden Corp. of America
213	Shure Bros. Inc.
250	Sylvania Electric Products, Inc.
239	TapeAthon Corp.
230	Tape Caster Electronics
249	Telemet Co.
218	Telesync Corp.
234	Utility Tower
202	Vital Industries
201	Ward Electronics
200A	Wilkinson Electronics

West Exhibit Hall



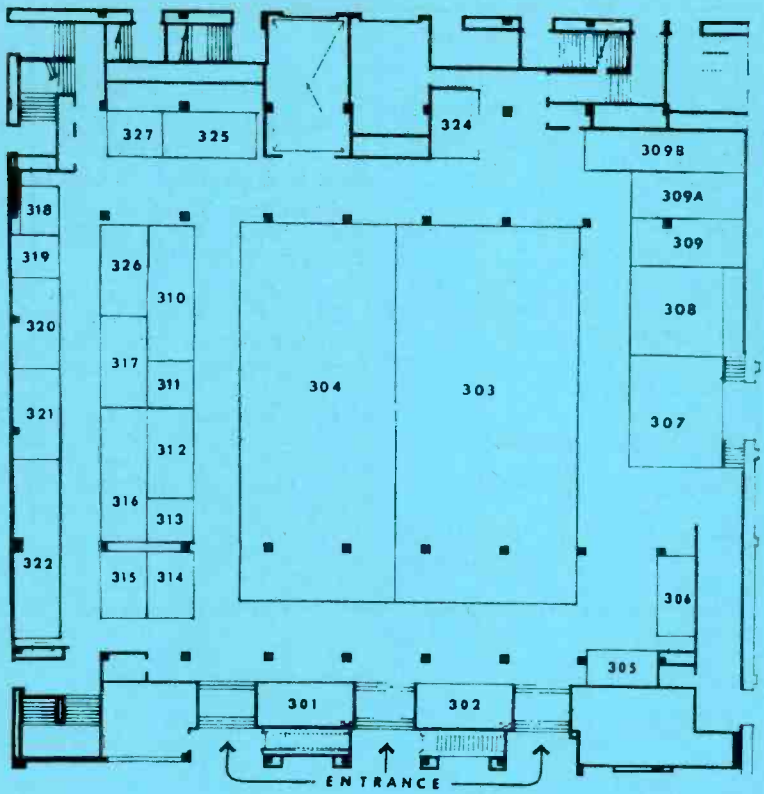
North Exhibit Hall



CONTINENTAL ROOM (Lobby Floor)

319 Advance Industries
310 Ameco Inc.
313 American Electronic Labs, Inc.
308 AMP, Inc.
311 Arriflex Corp. of America
303 Broadcast Electronics, Inc.
307 CBS Laboratories, Div. of Columbia Broadcasting System, Inc.
326 Cohu Electronics
318 Craftsman Electronic Products, Inc.
324 Effective Communication Systems, Inc.
309B Electronics, Missiles & Communications, Inc.

Continental Room



320 Entron Inc.
314 Fairchild Recording Equipment Corp.
315 Fort Worth Tower Co., Inc.
305 Jampro Antenna Co.
322 Jerrold Electronics Corp.
321 Kaiser CATV Corp.
309 McCurdy Radio Industries, Inc.
312 Memorex Corp.
325 North American Philips Co./AKG
304 Philips Broadcast Equipment Corp.
306 Sparta Electronic Corp.
327 Spindler & Sauppe, Inc.
317 Telex/Magnecord/Viking
306 Vega Electronics Corp.
316 Vikoa, Inc.
301, 302, 303 Visual Electronics Corp.
309A Westbury CATV Corp.

NORTH EXHIBIT HALL (Lower Level)

421 Allied Impex Corp.
408 Alma Engineering
409 Brand Rex Div., American Enka Corp.
413 Central Dynamics Corp.
420 Cooke Engineering Co.
423 Disan Engineering Corp.
406 Eimac Div., Varian Associates
419 F&M Systems Co.
418 Gauss Electrophysics, Inc.
414A Gray Research & Development
425 ITT Corp., Tube Div.
402 Lenkurt Electric Co.
427 Listec TV Equipment Corp.
405 D. M. Milliken Co.
401 Mole-Richardson Co.
410 Nippon Columbia Corp. of America
422 Scantlin Electronics, Inc.
424 Technical Materiel Corp.
416 Tele-Beam Div., Kalart Co.
414 TelePro Industries, Inc.
407 Texas Electronics, Inc.
411 Transface Process Co.
404 Trompeter Electronics, Inc.
406 Varian Associates
415 Videometrics, Inc.

NAB Engineeering Program

Continued from page 29

N.Y., conference committee chairman

Presentation of Engineering Award to: Howard A. Chinn, director of General Engineering, Engineering and Development Department, CBS Television Network, New York, N.Y.

by:

George W. Bartlett, NAB vice president for Engineering

Speaker: Edgar T. Martin, engineering manager, Broadcasting Service, U.S. Information Agency

Radio-Television Technical Session

9:00 a.m. to 12:00 noon Gold Room (Pick Congress)

Presiding: William H. Trevarthen, NBC, New York, N.Y.

Coordinator: Clure H. Owen, ABC, New York, N.Y.

The New WAGA-TV Facility

Hugo A. Bondy, WAGA-TV, Atlanta, Ga.

A New Approach to TV Color Camera Design

John Poole, Ampex Corp., Redwood City, Calif.; Max Berry, ABC, New York, N.Y.

New TV Measurement Techniques Using Existing Studio Monitoring Equipment

B. van Benthem, AMP Inc., Harrisburg, Pa.

Review of Vhf-TV Remote Control Tests

Richard J. Anderson, KTTV, Los Angeles, Calif.; William D. Kelly, WNEW-TV, New York, N.Y.; Wallace F. Wurz, KMBC-TV, Kansas City, Mo.

FCC/Industry Panel

Moderator: Malcolm M. Burleson, Metromedia, Inc., Washington, D.C.

Panelists: Charles Abel, KFMB-TV, San Diego, Calif.; Wallace E. Johnson, FCC Broadcast Bureau; Harold L. Kassens, FCC Broadcast Facilities Division; Harold G. Kelley, FCC TV Applications Branch; Neil M. Smith, Kear & Kennedy, Washington, D.C.; A. Prose Walker, Collins Radio, Arlington, Va.

General Assembly

(Management and Engineering Conference)

2:30 to 4:30 p.m. Grand Ballroom

Presiding: Grover C. Cobb, KVGB, Great Bend, Kan., Chairman, NAB Board of Directors

"Conference '68—Broadcast News"

Moderator: Theodore N. McDowell, Manager of News and Public Affairs, Evening Star Broadcasting Co., Washington, D.C.

Panelists: Jay Crouse, president, RTNDA, WHAS, AM-TV, Louisville, Ky.; Matthew J. Culligan, president, MBS, New York, N.Y. Member, NAB Radio Board; Reuven Frank, vice president, News, NBC, New York, N.Y.; Jack Harris, president, KPRC-TV, Houston, Tex.; Elmer Lower, president, News, ABC, New York, N.Y.; Edward P. Morgan, chief correspondent, Public Broadcasting Laboratory, Washington, D.C.; William Small, manager, CBS News Bureau, Washington, D.C.

NAB–Broadcast Pioneers Banquet

(Management and Engineering Conference)

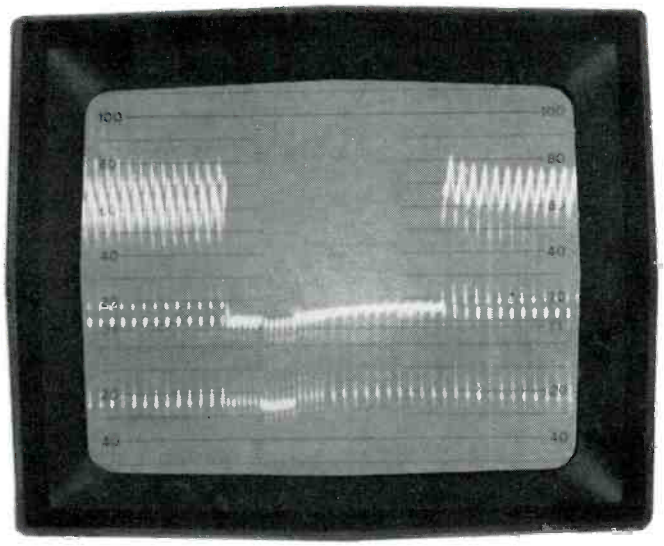
7:30 p.m. International Ballroom

PLEASE NOTE

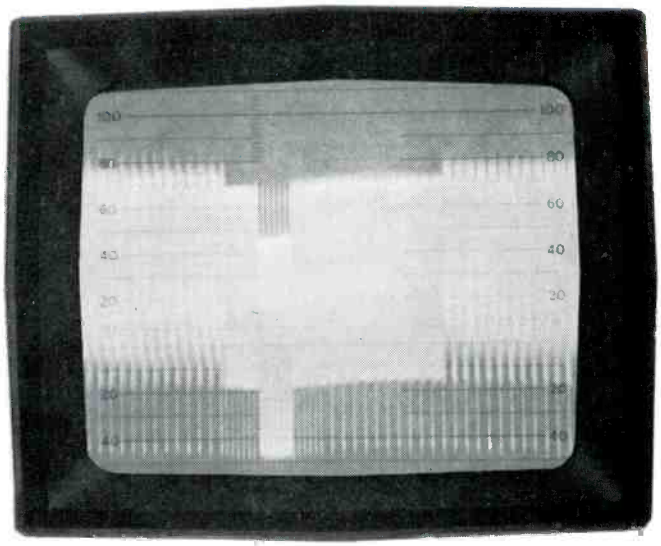
There is no Convention programming on Tuesday afternoon to permit all registrants the fullest opportunity to visit the Exposition of Broadcast Equipment and to meet with Association members and exhibitors who are listed in this directory.

Each Convention session will start promptly as listed. It is urged that you be on time for all sessions.

WORKS...
WHEN YOU NEED IT MOST!



Triggers on clean signals.



Triggers on noisy signals, too!

NEW All-Solid-State hp 191A TV Waveform Oscilloscope triggers faithfully and locks on video signals from network, studio, remote, or transmitter—*even when the signals are noisy!* With the 191A's digital field select, you can look at an individual line and know you're seeing what you want to see! Look at VITS by using the discrete LINE SELECT for lines 16 through 21. The 20 kV acceleration potential in the CRT gives you a bright, crisp trace—even when you're looking at fast-rise-time sine-squared T/2 pulses, at X25 magnification.

Use the 191A as your station standard. The all-solid-state 191A was designed in cooperation with broadcasters to meet broadcast requirements. It is the new standard in VITS measurements—with reliability proven by interstate TV transmission companies. Use it to calibrate your other monitoring equipment, and for color or black-and-white setup measurements. It requires only 70 watts for operation—and needs no fan for cooling. You can rack mount it, or stack it without providing extra ventilation!

Use the 191A to make your VITS measurements with 1% accuracy. High tolerance filter design, the constant phase delay amplifier and the parallax-free 8 x 10 cm internal graticule combine to give you this accuracy. Use it on remote telecast, too. It has a temperature operating range of −4°F to +149°F.

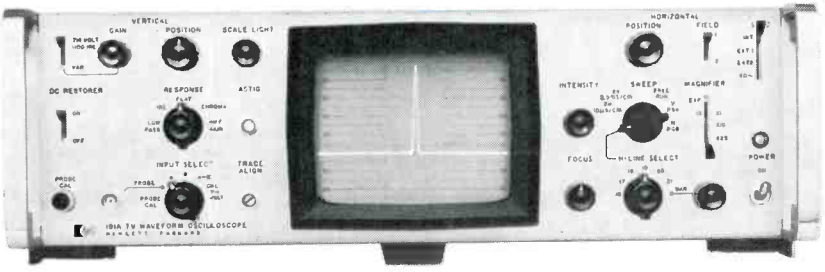
Use the 191A probe input on the front of the scope and the 10′ hp 10009A Probe for troubleshooting composite TV waveforms. Probe tip is WECO Type 477B connector for easy connection to patch boards. Troubleshoot your equipment without disconnecting feed-through broadcast signals.

You'll find the 191A is more expensive than other scopes, but when you compare all the advantages and features, you'll know it's worth every cent! It's the scope designed to meet today's requirements and tomorrow's demands! Contact your hp field engineer for full specifications. Or, write to Hewlett-Packard, Palo Alto, California 94304, Tel. (415) 326-7000; Europe: 54 Route des Acacias, Geneva. Price: hp Model 191A TV Waveform Oscilloscope, $1475.00; hp Model 193A (similar to KS19763 except for nomenclature) for interstate television signal relayers, $1550.00; hp Model 10009A Probe, $50.00.

087/21

HEWLETT hp PACKARD

An extra measure of performance



Circle 17 on Reader Service Card

APRIL 1968/VOLUME 4/NUMBER 4

BM/E

BROADCAST MANAGEMENT/ ENGINEERING

This month's cover: The NAB Exhibit extravaganza again. Behind every pretty girl there is a product. A description of many starts on page 35.

Mactier Publishing Corp.
820 Second Ave., New York, N.Y. 10017, 212 661-0450

Publishers also of:
BROADCAST EQUIPMENT BUYERS GUIDE
EEE
ELECTRONIC PROCUREMENT

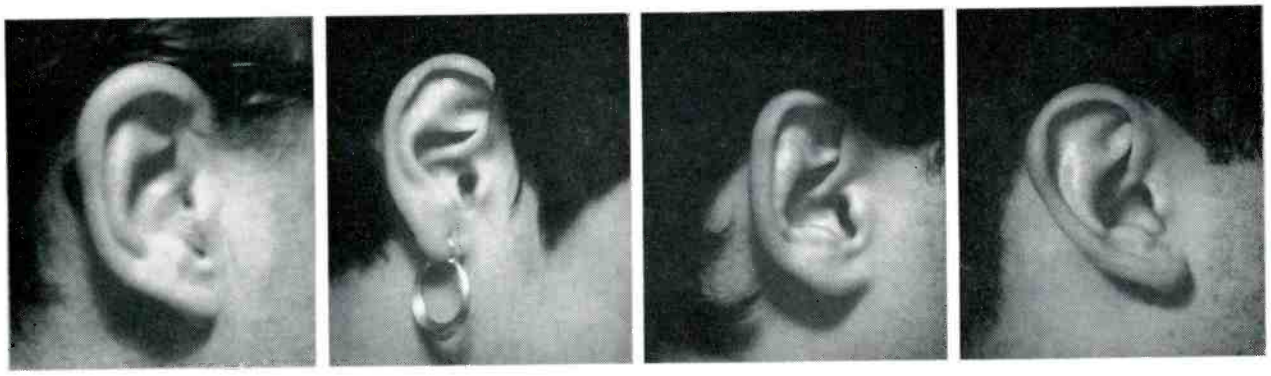
BPA

BM/E, Broadcast Management/Engineering, is published monthly by Mactier Publishing Corp. All notices pertaining to undeliverable mail or subscriptions should be addressed to 820 Second Ave., New York, N.Y. 10017.
BM/E is circulated without charge to those responsible for station operation and for specifying and authorizing the purchase of equipment used in broadcast facilities. These facilities include a-m, fm, and TV broadcast stations; CATV systems; ETV stations, networks and studios; audio and video recording studios; consultants, etc. Subscription prices to others are: U.S., its possessions and Canada—$5.00 one year, $9.00 two years; elsewhere—$7.50 one year, $14.00 two years.

Controlled Circulation postage paid at Duluth, Minn.

NOW...

Guarantee your audience's listening comfort



Our Automatic Loudness Controller delivers the sound that's right for every ear. Automatically eliminates excessive loudness. Unconditionally guaranteed!

No doubt about it. Other devices can control volume and modulation levels. That's what they're for.

But only one instrument can analyze and automatically control loudness levels.

Ours.

Reason? We designed it "from human ears". At CBS laboratories, we tested every conceivable sound sensation: Frequency content. Peak factors. Ballistic response. Combinations of complex signals. All the characteristics that affect even the most sensitive ear.

Result? An instrument so "humanly" perceptive it automatically keeps loudness levels under control. And does it inaudibly. Keeps your audience in their chairs . . . listening comfortably. No constant jumping up and down to flip the dial. They enjoy continuous listening pleasure.

Give this remarkable instrument an operational test yourself. Install it. And use it *free* for 30 days. You *will* believe your ears. It's guaranteed. Unconditionally.

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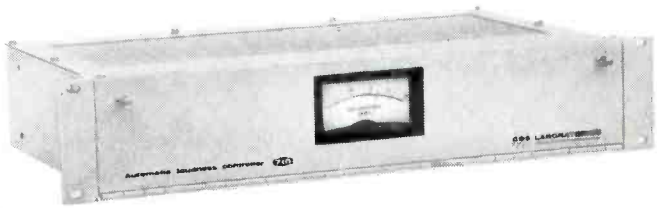
PROFESSIONAL PRODUCTS

CBS LABORATORIES

Stamford, Connecticut

A Division of Columbia Broadcasting System, Inc.



Circle 18 on Reader Service Card

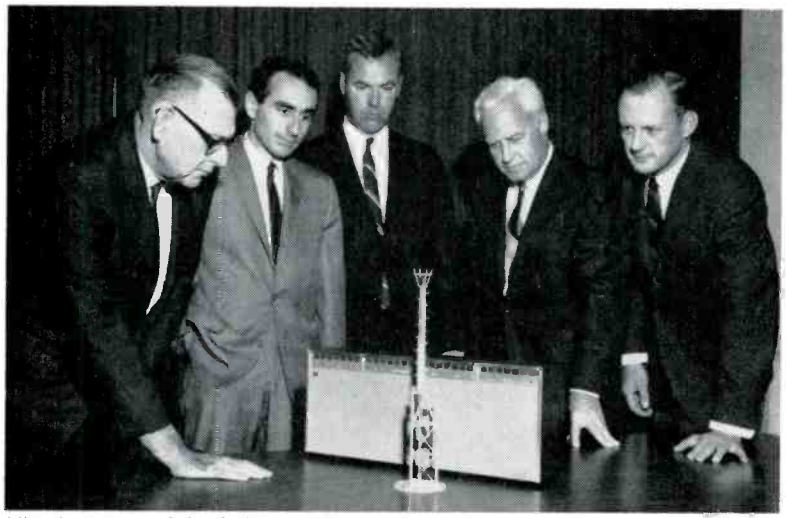
BROADCAST INDUSTRY NEWS

Johnson Names Public TV Board

Frank Pace, Jr., former Secretary of the Army and Director of the Bureau of the Budget, and now president of the National Institute of Social Science and a member of the President's Foreign Intelligence Advisory Board, has been named to head the 15-man board that will direct the Corporation of Public Broadcast. The President completed the appointments to the Board by naming John D. Rockfeller 3rd, Erich Leinsdorf, Jack Valenti, Joseph A. Beirne, Robert S. Benjamin, Roscoe C. Carroll, Michael A. Gammino, Mrs. Oveta Culp Hobby, Sol Hass, Joseph D. Hughes, Carl Sanders and Frank E. Schooley. Dr. Milton S. Eisenhower and Dr. James R. Killian Jr. were appointed previously. In an interview, Mr. Pace cautioned against expectations of overnight miracles and said he envisioned noncommercial television as a gradually growing social asset. He stressed that expansion of noncommercial TV could not solely be a corporation undertaking, urging active support by private business and the individual viewer. The Carnegie Corporation and the Columbia Broadcasting System have each donated $1-million to the Corporation that will be available when the articles of incorporation are filed. And it is expected that the Corporation will ask Congress for the full $9-million authorized by the Public Broadcasting Act, rather than the $4-million recommended by the President. The President did recommend $20-million to be appropriated for fiscal 1969 and $12.5-million for 1969 construction of ETV stations. NAEB President William G. Harley was pleased that the President gave such strong support to the act and said he hoped that the 1968 and 1969 appropriations would be restored to their original authorization. In addition, Chalmers H. Marquis, executive director of the Educational Television Stations Division of the NAEB, has proposed to the administration the formation of a National Advisory Committee of professionals in the ETV industry.

U.S.C. Buys Most Powerful Transmitters

For its Philadelphia (WPHL-TV), San Francisco (KEMO-TV), and Pittsburgh (WECO-TV) stations, U.S. Communications Corporation has purchased RCA's new 110-kW TTU-110A—the world's most powerful television transmitter. The $1.2-million contract makes the transaction one of the major transmitter purchases of all time. At Philadelphia's channel 17, the transmitter will be coupled with RCA's giant new 40-gain antenna, the combined facility developing 4,000,000 watts of effective radiated power. Engineering estimates predict that the massive power boost will make channel 17's city- and Grade-A-countours superior to all three vhf channels in the market. Use of the new transmitter in San Francisco's channel 20 will follow Philadelphia by a few weeks at 4,500,000 watts. Three more maximum power transmitters will probably be ordered for the company's other stations in Cincinnati, Atlanta and Houston. (See photo.)



Viewing a model of the newly purchased transmitter are: Robert E. Leach, director of engineering for U.S. Communications; Leonard B. Stevens, vice president of Operations of U.S.C.; Joseph L. Castle, chairman of the Board for U.S.C.; Edward Tracy, vice president for broadcast sales for Radio Corporation of America and Andrew Inglis, vice president of engineering and merchandising for RCA.

NAB Directors OK TV Code Recommendations

The Television Board of Directors of the NAB approved the recommendations of the Television Code Review Board by limiting the number of commercials that may be scheduled consecutively to four within programs and three during station breaks and changing the method of counting multiple product commercials using the sole criterion of whether the commercial is constructed to appear to a viewer as a single commercial. The Board also approved the TV Code amendment prohibiting the mail order advertisement of firearms and ammunition, and voted to refer back for further analysis an engineering feasibility study of demands by land mobile services for additional spectrum space now allocated to uhf television. Also

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Prepare news, sports scores, titles, weather, election returns and other video displays in milliseconds! The new Visual Electronics Information Systems require no camera chains or artwork — a result of the magic of magnetic memory cores, integrated circuits and other new techniques.

Complete Visual Information Systems provide for data preparation and storage ahead of time, with immediate pushbutton access for video display. The Visual system retrieves pre-programmed data instantly, performing digital-to-video conversion for direct display on the screen. Data stored in the memory core for future use can be changed and up-dated at will, directly from the keyboard. Thus, you combine the speed of pre-preparation and instant selection for TV display with the flexibility of making last-minute revisions.

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on the spectrum space issue, the Board said that the recent report of the Land Mobile Advisory Committee of the FCC did not fulfill its prime function of seeking better utilization of frequencies already allocated to land mobile services, and urged early staff preparation of research projects planned for obtaining additional information to rebut the land mobile assertions.

ACTS Launches Membership Drive

The All-Channel Television Society is coupling a membership drive with a new associate membership status for those not directly involved with uhf broadcasting.

The Society plans to welcome new associate members at the upcoming NAB Convention in Chicago, March 31-April 3. On Tuesday morning, April 2, ACTS will host a breakfast, followed by a three-hour series of panel sessions consisting of the "Uhf Station Start Up Period (Equipment, Programming and Personnel)" and "Money Making Techniques."

ACTS will also have a hospitality suite open from noon until midnight, Sunday through Wednesday of the Convention week.

Ampex and Norelco Enter at Grenoble

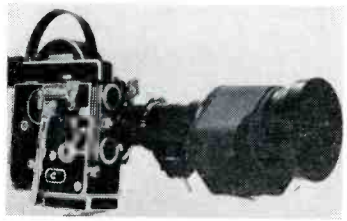
For its exclusive coverage of the Winter Olympics in the U.S., ABC used Ampex's BC-100 "Scrambler" portable color camera, HS-100 slow motion disc recorders for color instant replay with stop action and slow motion, and VR-2000 high band color recorders, while keeping eleven of its Norelco cameras busy. Thirty-two additional Philips Plumbicon cameras were leased in Europe for use in the Olympics. Present at all events were Philips loudspeakers, amplifiers and tape recorders, and also Philips closed circuit monochrome TV equipment for monitoring events. French movie theatres used Eidophor machines to show big-screen video pictures of the Olympics—the same Philips projectors used in the live theatre screen of boxing events in the U.S.

NAB Backs Use Of Subaudible Tones

The NAB has urged the FCC to adopt a proposed rule that would permit remote-controlled a-m radio station to transmit some of the telemetry signals by intermittent subsonic tones. The NAB noted that test conducted by WSM, Nashville, Tennessee, over a 90-day period attest to the validity of the use of subaudible tones for remote metering of a-m transmitters. While telemetry information can be transmitted by wire, "such a physical connection is subject to impairment or destruction by storms, fires or other accidents or disasters." Substitution of radio transmission techniques for remote control "reduces the hazards of interruptions due to wire-line failures."

NAB Merges Conferences, Clinics

The Radio Board of Directors of the NAB approved the merger of the Association's Spring Radio Program Clinics into the annual NAB Fall Conferences, which will be extended to two full days this year. The eight fall conferences currently scheduled are: Oct. 17-18, New York City, New York Hilton; Oct. 21-22, Los Angeles, Ambassador; Oct. 24-25, Denver, Denver Hilton; Oct. 28-29, St. Louis, Sheraton Jefferson; Nov. 11-12, Cincinnati, Sheraton Gibson; Nov. 14-15, Dallas, Dallas Hilton; Nov. 18-19, Atlanta, Atlanta Marriott; Nov. 21-22, Washington, D.C., Statler Hilton.



On p. 6 of the January/68 issue, BM/E published a photo of a helicopter TV STL, made by Microwave Associates tested for WCNY, Syracuse, N.Y., by a GE engineer. What was not indicated in the information BM/E received, nor mentioned in the caption, was that Dynasciences Corporation, Blue Bell, Pa., manufactured the lens-mounted image motion compensation system. The compensator reduces or eliminates blurring of the transmitted picture caused by vibrations transmitted to the camera by the aircraft. Heart of the system is a liquid prism whose faces move in such a way as to compensate for undesirable motions of the sensor. The system is shown above mounted on a 16mm film camera.

Marconi to Build Earth Stations for Intelsats

An order worth $4.8-million for construction of two communications satellite earth stations at Bahrain in the Middle East and Hong Kong has been given to Marconi Co. by Cable and Wireless Ltd.

Cable and Wireless will operate the stations as part of a global scheme which will provide telephone, television and data links, using principally Intelsat II and Intelsat III synchronous satellites, to be launched into synchronous orbits over the Pacific, Atlantic and Indian Oceans.

Each station will have facilities for the transmission of up to four carrier signals and the reception of up to 32. Each of these carriers may have a capacity of 24, 60 or 132 separate communication channels. Initially Hong Kong will be equipped for the reception of eight carriers each with a standby. Bahrain will be equipped for the reception of four carriers, each with a standby. Only the Hong Kong station is expected to handle television signals although Bahrain could have the facility added at a later date.

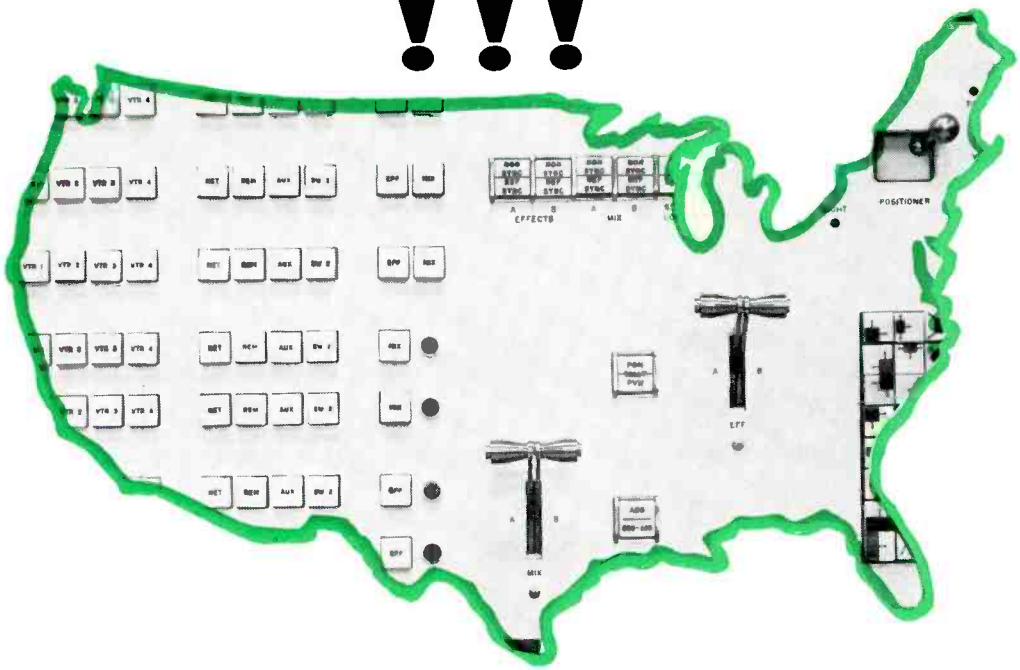
The tracking accuracy of the installations is 1.2 min of arc in any direction at low wind speeds. The system achieves a tracking accuracy of 1.8 min of arc in winds of 50 mi/hr, gusting up to 70 mi/hr. Only at wind speeds above this value, would the system have to cease operation.

The speed at which the dish will track will be completely variable and controlled by variable speed motors. The system will generally have to track at speeds in the region of 0.05 degrees/min, the deviation-drift speed of synchronous satellites. However, tracking speed can be increased to a maximum of 10 degrees/min; and up to 60 degrees/min if the dish is being moved to a new position.

The transmitting tube is designed to provide peak saturation at the 12-kW level, although operationally a figure lower than this will normally be used. The beam width at 4000 MHz (the receiver band) is approximately 10.5 min of arc (measured between 3-dB points) and 7.5 min of arc at 6000 MHz (the transmission band).

The receiver will cover the complete satellite communications band from 3700 MHz to 4200 MHz, which includes all possible

coast-to-coast * the switch is toWARD switchers !!!



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Ward Electronic's all solid-state vertical interval switchers are years ahead. Hard to believe? Once you've checked the features and compared the performance of our switchers, you'll understand why so many major TV stations are switching to, and with Ward.

Here are only a few of the many features you will find of special interest in our Studio, Master Control and Routing Switchers.

- Automatic Composite / Non Composite Input Handling Capability
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- Spare 75 ohm clamped output from each input
- Two Independently Equalized Outputs per buss
- Additive / Non Additive solid state mixing amplifier
- Automatic Direct take when attempting to mix non synchronous sources
- Each buss self-contained with individual power supply, trigger pulse generator, latch and tally circuits
- Transient-less vertical interval switching
- Low Impedance, transmission line type input buss

*Write for a list of the TV stations that have switched to Ward, . . . and complete switcher specifications.

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signals from both Intelsat II and III. The receiver's dish-mounted parametric amplifier will consist of three identical gallium arsenide varactor diode stages, connected in cascade. These three stages will be mounted together with their associated circuitry, inside a low temperature enclosure. This is a closed-cycle cryogenic system which will use gaseous helium, operating at approximately —257°, close to the liquid helium temperature.

Broadcast-CATV Fact Book

Among the interesting facts contained within the 67 information-packed pages of "Broadcasters and CATV," January 1968, is that there are 789 broadcasters (group stations tabulated individually) with CATV interests, representing 1266 systems and franchises and 750,334 subscribers. In addition, a summary of findings of a special analysis of Binghamton television audiences reveals that the presence of CATV in a community served by uhf television does *increase* the viewing of uhf stations in total amounts ranging as high as 69.3 percent.

The booklet, prepared by Radio and Television Division of Triangle Publications, Inc., contains an updated special study based on a June 1966 report submitted to the NAB board of directors, and seeks to clarify the true attitude of U.S. broadcasters with respect to CATV. The data presented are derived from listed published sources.

Copies of "Broadcasters and CATV" may be obtained by writing to the Triangle Broadcast Center, 4100 City Line Avenue, Philadelphia, Pa.

Circle 300 on Reader Service Card

Multiple Ownership Rules Retained

The problem of concentration of ownership of television broadcast stations in the top 50 markets will be dealt with on a case-by-case basis "within the standards of the multiple ownership rules," the FCC has announced. The Commission has terminated the proceeding proposing amendment of the multiple ownership rules.

Fm 'Nonduplication' Waiver Extended

Twenty-seven fm stations with "daytime-only" a-m ownership affiliations in the same area were granted temporary waiver of the 50 percent nonduplication requirement last March 9, 1966. The FCC has recently ruled these waivers will run through the remainder of their current license terms. The nonduplication rule says, in effect, that fm stations in cities of 100,000 or more may duplicate no more than 50 percent of the weekly programming of their a-m affiliates in the area.

Guide to Broadcast Announcing

Aspiring as well as veteran newsmen, disc jockeys, commercial announcers, program directors and broadcast executives will find a wealth of valuable, down-to-earth material in the 288 pages of "The Man Behind The Mike." Written by Hal Fisher—experienced developer of broadcast talent,—the hard-cover book contains over 40

drills and 21 lessonlike chapters chocked full of easy-to-read information and exercises for the development of skills needed by beginners for that first on-air job in broadcasting. Old-timers, too, will benefit from such chapters as "You—The Producer," What About TV?" and "Advancement Opportunities."

Progressing from the introductory chapter "Is Broadcasting For You?", the guide assists the reader evaluate his abilities in terms of what is required to beat competitors. For those who decide broadcasting *is* for them, "The Man Behind The Mike" provides the tools essential to the art of announcing.

"The Man Behind The Mike," 1967, is available for $9.95 from Tab Books, Blue Ridge Summit, Pa. 17214.

Circle 301 on Reader Service Card

165 New Land Mobile Channels

Recent FCC action adds approximately 165 new channels to the Public Safety, Industrial and Land Transportation Radio Services in the 450- to 470-MHz band. Police will get 36 new channels. The additional frequencies were developed by reducing the channel width from 50 to 25 Hz. Licensees will have until June 1, 1968, when the frequencies will be available for assignment, to reduce deviation in their transmitters to permit them to operate under the new system.

IES Meet Set

The Fourth Annual Theatre, Television and Film Lighting Symposium, sponsored by the Illuminating Engineering Society, will be held May 26-28 at the Barbizon-Plaza Hotel, New York. The program includes readings of technical papers, panel discussions and a lighting progress show.

Network TV Up In '67; Radio About Even

379 advertisers spent 1.5-billion on network television in 1967; 36 of them were first-time users of network television. The 379 spent 6.3 percent more than the 367 did in 1966. Major sports telecasts sent advertiser expenditures for weekend daytime periods up 12.6 percent over 1966. But the first nine months of 1967 for spot and network radio were running about the same as last year. Spot radio had estimated revenues of $221.8-million, 0.6 percent behind the first nine months of 1966. Network radio was off 0.5 percent for the same period.

Continued on page 126

FOCUS ON **CATV**

FCC Gets Tougher On Nonduplication

The FCC is now insisting that CATV be used to implement FCC allocation plans. Henceforth, they will require that cable TV systems give nonduplication protection to local channels even if those channels provide no usable signals to any part of the CATV community. Until now, lack of adequate signals in a given community was considered grounds for waiver of the nonduplication rules.

The Commission emphasized that this policy "is based upon the

all-important peg of local service." Channels that benefit by the new protection will be required "to ascertain and serve as a local outlet for the community in question (e.g., through appropriate news and public service announcements, etc, coverage)."

These statements were made in a cease-and-desist order issued against four CATV systems in the Scranton-Wilkes-Barre, Pa. area serving the communities of Shenandoah, Mahoney City, Ashland and Brockton.

The Shenandoah, Ashland and Mahoney City systems were ordered to stop carrying Philadelphia channels that duplicate Wilkes-Barre-Scranton channels. Further, the Ashland system was ordered to carry the local channels. However, the Brockton system, with only 5-channel capability, will be permitted to continue operating as before, providing the local channels limited protection.

The Commission indicated that this extension of the nonduplication rule is a new policy saying, "To the extent that prior rulings have not taken into account the allocation policy so important to the public interest, they are superseded."

New Microwave Rules Bar CARS Origination

Amid a great deal of internal and external controversy, the FCC also set up new regulations for common carrier microwave licensees serving CATV systems.

The Second Report and Order on Microwave says that CATV-serving carriers in the 4000- to 6000-MHz band must move to the 10,700- to 11,700-MHz band by Feb. 1, 1971. Since the higher frequencies will require shorter hops, it will be more expensive.

To the consternation of the CATV industry, the second order failed to provide for CATV origination via microwave. The community Antenna Relay Service (CARS) created by the first and second orders is restricted to carrying off-the-air channels. Operating in the 12,700- to 12,950-MHz band, CARS is for CATV systems that provide their own microwave relays.

However, the FCC does allow locally originated CATV programs to be transported by common carrier microwave.

Within the Commission, dissenting opinions were voiced by Commissioner Lee Loevinger, Nicholas and Robert Bartley.

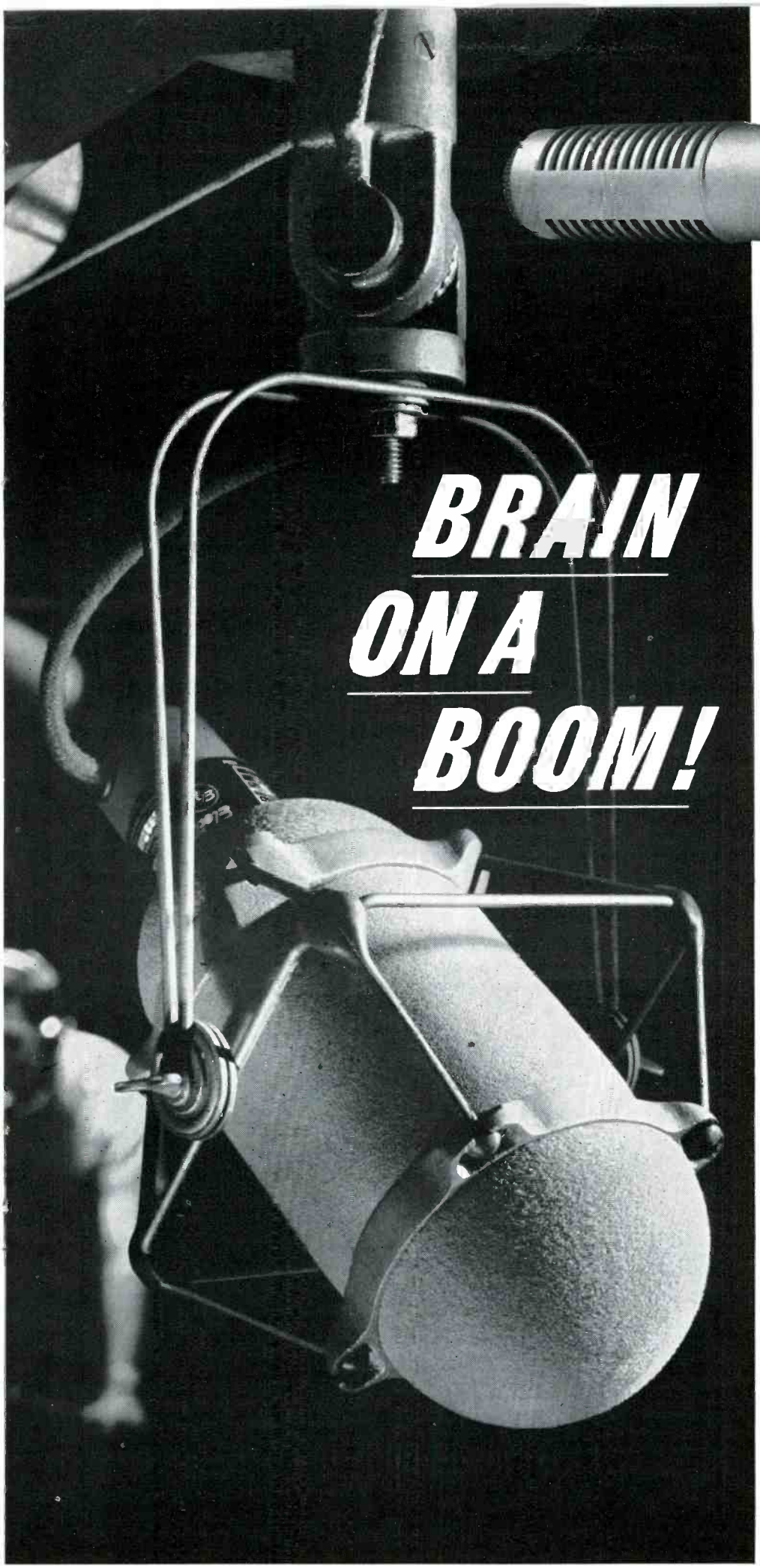
Loevinger's remarks were scathing. He said that it is "Paradoxical and ironic that the Government is telling the U.S. Supreme Court in two separate cases that CATV should be providing locally originated service at the same time that it is taking technical facilities for such service away from CATV."

He complained that the issue of origination was being divided "by technical sleight of hand."

And Commissioner Johnson said that "the FCC is clearly warning the CATV industry." If you had any interest in developing CATV as a new source of television programming, forget it, the FCC intends to fight at every turn attempts to encroach on territory reserved exclusively for the broadcast industry."

CATV Future Seen To Be Rosy

A new film made available by NCTA says that cable television is "in the forefront of the revolution in communications technol-



New E-V Model 668 Dynamic Cardioid Boom Microphone

with built-in programming panel!

It's just like having 36 microphones in one, at the end of your boom! Simply match the computer-style programming pins to the color-coded jack field inside the new E-V668. You'll get any combination of flat response (40 to 12,000 cps), bass and/or treble rolloff, treble rise, and 80 or 8,000 cps cutoff. The 668 built-in passive equalizer matches response to need precisely without loss in output level—mixes perfectly with any other microphone.

The 668 cardioid pattern is symmetrical in every plane with excellent rear cancellation at every program setting. Two independent Continuously Variable-D* systems provide this uniformity, yet permit high output (—51 dbm) for distant pickup without added equipment or special cables.

Light in weight and small in size, the 668 with integral Acoustifoam™ windscreen and shock mount minimizes shadow problems while allowing noise-free fast panning, indoors and out. Its 1 lb., 11 oz. weight eliminates "fishpole fatigue" and counterbalancing problems.

The 668 is guaranteed UNCONDITIONALLY against malfunction of any kind—even if caused by accident or abuse—for two years. And, like all E-V Professional microphones, it's guaranteed for life against failure of materials or workmanship.

The E-V 668 is the result of a three year intensive field testing program in movie and TV studios from coast to coast. It has proved itself superior to every other boom microphone available. Find out why with a no cost, no obligation trial in your studio. Call your E-V Professional microphone distributor today, or write us direct for complete specifications.

NEW! MODEL 667A identical to Model 668 except sharp cutoff filters and HF-rolloff eliminated. List price: Model 667A, $345.00; Model 668, $495.00 (less normal trade discounts).

* Patent No. 3115207 covers the exclusive E-V Continuously Variable-D design.

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ogy." FCC Commissioner Johnson, who is featured in the film, cites the advantages of CATV including: 20, 40, or even 80 channels; a potential capacity to reach limited audiences; and the ability to free some frequencies presently used for broadcasting.

Speaking at the 1968 National Winter Convention on Aerospace and Electronic Systems (Wincon) in Los Angeles, H. J. Schlafly, Teleprompter vice president, called CATV "The Minority Media."

Schlafly predicted that cable systems will carry educational programs, entertainment, community service, stored information delivery and electronic marketing into American homes.

He said, "Today, system planners consider that 160 MHz or more of signal capacity is necessary. As the 'minority medium' develops, it is believed that many times that amount may be required."

Paraphrasing our late President Kennedy, Schlafly said, "I respectfully suggest that the FCC should ask not what CATV must delete to protect the profit picture of a broadcaster, but what it must carry to protect the interests of the public."

New CATV Origination Figures Revealed

A statewide survey conducted by the Florida CATV Association shows that nine of 15 systems originating programs report only "nominal monthly expense." The others estimated origination operating expenses at $100 to more than $500 per month.

These costs were offset by four systems who run advertising with average revenues ranging from $100 to $1000 per month. Sexier of the systems surveyed, however, are prevented from selling ad time by their franchises.

TeleMation, Inc., of Salt Lake City, Utah, in their first issue of "Pacesetters," a monthly newsletter, also reported on a CATV origination survey. They got 21 responses out of 32 questionnaires sent to CATV managers involved in origination.

The responses indicated that the local approach is considered to be most important. "Put as many local people on TV as possible" was the prevailing attitude. Programs originated included art shows, bingo, seasonal programs, folk singers, piano lessons, sports, films and school activities.

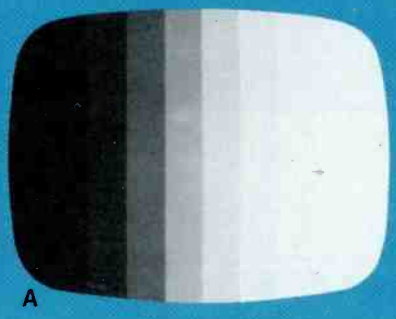
Most systems (80 percent) owned two or more cameras and the same percentage used EIA or industrial sync. The average studio was reported to be 615 square feet and monthly operating costs ranged from $250 to $1000.

Vumore Video, Inc. is busy building a 412-mile underground system in Colorado Springs, Colorado.

The system, said to be the largest underground cable TV system ever attempted, is expected to be completed in about nine months. Tom Johnson, Vumore director of promotion reports that they have already signed 8000 subscribers, out of a potential 30,000.

HEWLETT hp PACKARD

Communications Test Equipment Puts Your Broadcasting Facility In a Better Competitive Position



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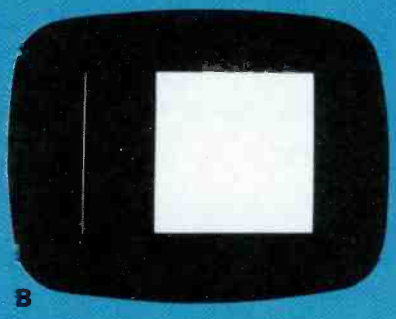

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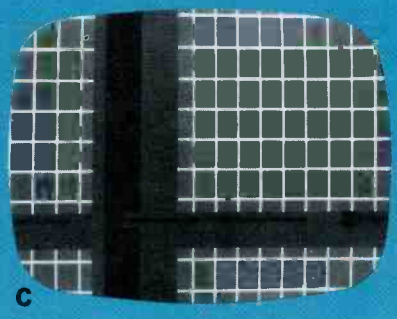


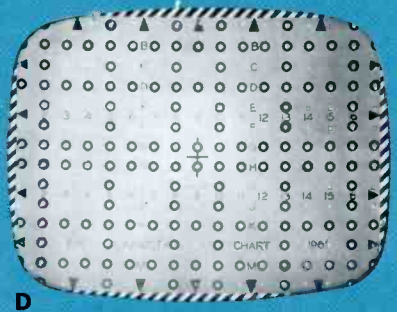
C

A Keyed back porch clamp assures less than 1% black level shift for 100% video amplitude change.

B Displays sine² T/2 pulse without distortion.

C Pulse cross display—standard on hp 6947A, optional on hp 6946A.

D Ball and dot display shows linearity and lack of distortion.



D

Hewlett-Packard knows how competitive radio/television has become. To put you *ahead* of your competitors, hp has electronic measuring instruments—designed and carefully built to provide you with the greatest possible usefulness, accuracy, convenience, dependability *and dollar value!* Shown in these pages are only part of the instruments specifically designed for broadcasters' use—to help you continually improve the quality of your broadcasting service—from measurement of incoming signals to measurement of signals through your antenna!

For more information on Hewlett-Packard electronics measuring instruments for the broadcasting industry, visit the Hewlett-Packard display in Booth 227 West Exhibit Hall, NAB Show. Or, write to Hewlett-Packard, Palo Alto, California 94304. Europe: 54 Route des Acacias, Geneva.

Now Has Two Video Monitors to Set New Patterns of Performance

Now there are two! hp has added a new 14-inch picture monitor to the line. Use either the 14" hp 6947A or the 17" hp 6946A monitor in conjunction with the hp 191A TV Oscilloscope to form a complete television monitoring system. All three instruments meet interstate telco transmission specifications.

The hp monochrome picture monitors give you consistent image quality, all-solid-state maintenance-free circuitry, display linearity independent of size adjustment, automatic sync on both North American and CCIR Standards, deflection circuits with feedback *active* over entire raster. hp 6946A is 17 7/16" wide x 15½" high x 20⅛". Price: $950; for pulse cross display, add $45. hp 6947A is 17 7/16" wide x 10½" high x 20⅛". Price on request.

Circle 25 on Reader Service Card

Precision Impulse Sound Level Meter Performs To International Standards

The new hp 8052A/8062A Sound Level Meter makes difficult acoustic measurements more accurately, more meaningful—and easier. It meets international standards — actually exceeds both IEC Recommendation 179 and the new German standard DIN 45633.

This new meter makes rms, peak and impulse sound measurements. It has A, B, C or A, N, C weighing factors, a variety of detection modes, and a selection of rms time constants. It is portable, works with pushbutton ease, and reads directly—without conversion factoring—over a full-scale sensitivity range of 30 to 140 dB. Selectable response is flat from 5 Hz to 20 kHz.

Make spectral distribution measurements by adding hp 8055A Octave Filters. When filters are added to the meter, they can be selected singly or in combination by pushbutton to simplify measurements.

Prices: hp 8052A (line power), $680; hp 8062A (rechargeable battery power), $730; hp 8055A Octave Filters, $550; hp 15109 Omni-Directional Microphone Preamp, $270.

8052A Impulse Sound Level Meter with **8055A** Octave Filter

Circle 29 on Reader Service Card

Solid-State Signal Sources

The first stable Wien-bridge oscillator came from Hewlett-Packard. Now they have two new all-solid-state oscillators. Both give you 0.5% (0.05 dB) flatness—FET's in the bridge for improved stability—less than 0.1% (—60 dB) distortion—balanced output—sync in/out without degradation in specifications.

The new **hp 204C** Oscillator can be line or battery operated and has a frequency range of 5 Hz to 1.2 MHz, 5 Vrms output. The new **hp 209A** generates simultaneous sine and square wave outputs over a frequency range of 4 Hz to 2 MHz. Amplitudes are independently adjustable. Output voltage is 10 Vrms for sine wave; 20 V peak-to-peak for square wave. Price: hp 204C, $250; hp 209A, $320.

209A Oscillator

204C Oscillator

Circle 30 on Reader Service Card

088/10

For a demonstration of the Hewlett-Packard communications instruments, visit the NAB Show Booth 227 in the West Exhibit Hall.

HEWLETT hp PACKARD

COMMUNICATION INSTRUMENTS

NAB CONVENTION PRODUCTS

NAB Convention Preview information was obtained from the respective manufacturers. Some Exhibitors are not mentioned, however, either because their booth space was not confirmed at press time, or because they preferred to announce new products at the Convention itself.

Albion Optical Co., Inc. (Booth 252)

Albion (U.S. sales distributor for Rank Taylor Hobson) is showing new "R" package for Varotal V & XIV zoom lenses, Rank Clintel's Mark VIII color slide scanner, professional color TV monitor and Tariff color film electronic processing equipment. Albion says Tariff processing amplifier will be of particular to U.S. broadcasters because it permits calibrated differential film gamma adjustments to compensate for processing laboratory errors.
Circle 200 on Reader Service Card

Allied Impex Corp. (Booth 421)

Allied Impex (U.S. distributor Bauer) has Bauer's automatic 16mm telecine projector in operation, demonstrating built-in light control feature and fully automatic cueing system. Also on deck is the Bauer 16mm Double Band projector, with program control unit.
Circle 201 on Reader Service Card

Altec Lansing (Booth 207)

A new broadcast and recording console—the 9200A—, studio monitor speakers, a new condenser mic, two new performer type mics and Acousta Voicing filters for tuning sound systems to their surroundings are Altec's offerings.
Circle 202 on Reader Service Card

American Electronic Laboratories Inc. (Booth 313)

Information on AEL's line of a-m and fm transmitters, with power ranges from 10 W to 50 kW is available. Also at the booth is AEL's FM20KB 2-kW fm broadcast transmitter, measuring a compact 76 × 55 × 33 in.
Circle 203 on Reader Service Card

AMP Incorporated (Booth 308)

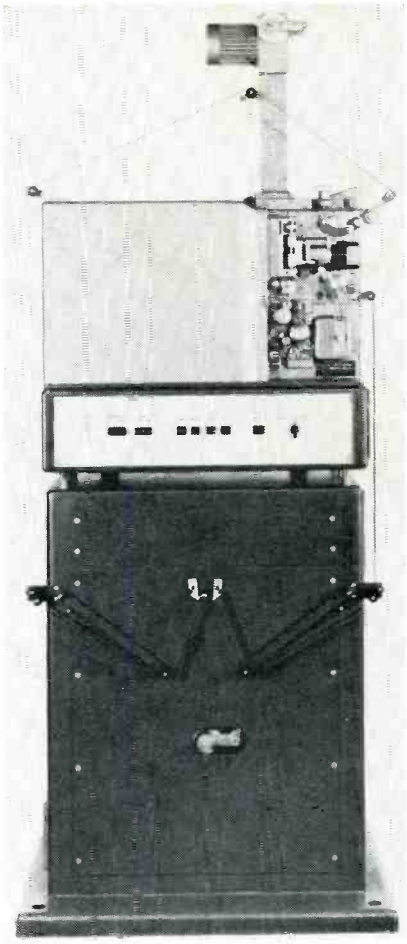
Automatic Broadcast programming is the main theme of the AMP display. Complete computer control of all audio-video switching operations in a master control television studio is feature demonstration. System employs a Digital Equipment Corporation PDP-8 computer with a ferrite core memory capacity of 8192 words. Also on display is an SCR controlled video switcher; a preset video switcher; an audio output unit, used in conjunction with the a-m audio matrix; machine controls; and a transition rate control unit.
Circle 204 on Reader Service Card

Ampex Corporation (Normandie Lounge)

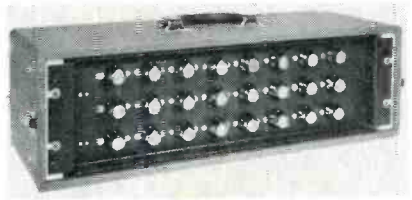
After you get past live-model demonstration of color cameras in Mardi Gras motif, Ampex has a full stable of video and audio gear to keep most any NABer busy inspecting. High band VTRs, videotape portable cameras, stop/slow motion video disc, transmitters, translators, and amplifiers will cover video lineup. Audio components will include recorder/reproducers, speakers, amplifiers, a mixer, tape and a full line of commercial sound products.
Circle 205 on Reader Service Card

Andrew Corp. (Booth 220)

High power, low loss 8-in. Heliax for vhf/uhf TV applications is on hand for NABer inspection. Transmitter power rating of cable ranges from 250 kW on channel 2 to 70 kW on channel 35.
Circle 206 on Reader Service Card



Bauer 16mm automatic telecine projector.



Altec Lansing's Acousta Voicing filters.

Ampex AG-600 recorder.

Audio Devices, Inc. (Booth 232)

Attractions include demonstrations of Audiopak Model tape cartridge and sound tape.
Circle 258 on Reader Service Card

Ball Brothers Research Corporation (Booth 219)

New products include TVB 14-in. color monitor and Mark 10 video processing and automatic gain control amplifier. Other products on deck include MC19 color monitor, Mark VII color special effects generator, Mark IX and Mark IX-A video and pulse distribution amplifiers, Mark 81 video signal multiplexer, Mark 21 waveform monitor, Mark VI-A and Mark VI-AR monochrome special effects generators, TU series general purpose monitors and TPB series professional broadcast monitor.
Circle 259 on Reader Service Card

Berkey-ColorTran (Booth 121)

Things are illuminated with a full overhead grid system of "quartz" lighting fixtures and accessories at Berkey-ColorTran. Also showing are two lighting dimmers.

Boston Insulated Wire (Booth 245)

New at the BIW booth is information on camera cable service and improved custom fabricated camera patch panels. Items ready for inspection include television camera cables, connector and terminated camera cable assemblies, a variety of adaptors to allow any camera to operate on any cable system, molded rubber connectors for studio and outside broadcast lighting equipment and precision video coaxial cable.
Circle 260 on Reader Service Card

Broadcast Electronics, Inc. (Booth 303)

Demonstrations of Spotmaster 5000, cartridge player, Five Spot and Ten Spot multicartride reproducing equipment hold the attention of NABers at the BE booth. Also on display are RA4CB remote amplifier and Portapack I cartridge equipment, the TP-1B tape cartridge loader and the TT-20B turntable pre-amplifier.
Circle 207 on Reader Service Card

CBS Labs (Booth 307)

Equipment for controlling audio levels and peaks, video enhancers, masking amplifiers and information on mobile TV systems are on hand at the CBS Labs booth.
Circle 208 on Reader Service Card

CCA Electronics Corp. (Booth 236)

Exhibiting representative transmitters from its line of a-m and fm types, fm antennas, monitoring equipment and accessories. Also on hand are age and limiting amplifiers, remote control and SCA and a live demonstration of CCA's stereo generator.
Circle 209 on Reader Service Card

Central Dynamics Corp. (Booth 413)

Feature display of the Central Dynamics is demonstration of a fully operational TV broadcast automation system with simulated on-air programming designed to put the system through its paces in any mode from a one-event manual to an infinite-series of pre-programmed events. A wide variety of video processing and switching equipment is also on deck.
Circle 210 on Reader Service Card

Chrono-Log Corp. (Booth 246)

STEP system for station break automation, introduced at NAB/67, is on hand to show TV people how to tranquilize "panic-periods."
Circle 214 on Reader Service Card

Cleveland Electronics (Booth 119)

Highlight is demonstration of printed-circuit cards for color applications. Other attractions include display of basic camera vidicon, image orthicons, lead oxide tube and vidicon camera chain capable of register within 2 channels. Demonstration shows lineup of color camera components being inserted and operated.
Circle 261 on Reader Service Card

Cohu Electronics, Inc. (Booth 326)

See 3V color cameras, video switching systems, video distribution equipment, a color bar generator, a color encoder and a sync generator.
Circle 262 on Reader Service Card

Collins Radio (Booth 209)

New products unveiled by Collins at NAB include frequency and modulation monitors, an audio control system, a remote production console and the Twintape cartridge system. Other gear to be on hand includes transmitters and a circularly polarized fm antenna.
Circle 211 on Reader Service Card

Continental Electronics Mfg. Co. (Booth 200)

A big 50-kW a-m transmitter—Continental's type 317C—is on hand for NABers shopping for a big signal. More modest 5- and 10-kW types also are ready for inspection.
Circle 212 on Reader Service Card

Cooke Engineering Company (Booth 420)

Equipment on display includes AD2-A audio distribution amplifier and coaxial switching equipment.
Circle 263 on Reader Service Card

Craftsman Electronic Products, Inc. (Booth 318)

CATV gear including directional taps with choice of 12- or 20-channel operation, TV line extenders, matching transformers, outdoor and indoor splitters, and a complete line of connectors and accessories is Craftsman's offering.
Circle 213 on Reader Service Card

Davis & Sanford Co., Inc. (Booth 120)

Topic of conversation at the D&S booth is tripods, wall and ceiling mounts, dollies for monitors and receivers. A new lightweight cradle head, available in three sizes, for balancing cameras is being unveiled.
Circle 215 on Reader Sevice Card

Delta Electronics (Booth 205)

Test equipment, rf components and an interesting receiver/generator is on display in Delta area. Receiver/generator was developed in response to broadcast engineers need for portable combination signal generator and receiver for use with antenna impedance measuring bridges.
Circle 216 on Reader Service Card

Disan Engineering Corp. (Booth 423)

Wide range of gear graces Disan Engineering area. Categories include automation systems, audio consoles, portable broadcast studio, cartridge machines, amplifiers and monitors. The 440 PAC gives station breaks, exact time, network fadein, fadeout, news, weather and headlines. Programmed memory selector permits easy changes in program sequence.
Circle 217 on Reader Service Card

Dynair Electronics, Inc. (Booth 211)

CATV equipment of many descriptions is on deck at the Dynair display. Several firsts—including a solid-state modular TV domodulator; a remote switcher fader; a mini series line of amplifiers, a fader, a switcher and a speaker; a new long-line video cable transmission system and Series 4000 CATV head end equipment—are being unveiled.
Circle 218 on Reader Service Card

We now make the Plumbicon® Camera Tube here...

NEW AMPEREX ELECTRO-OPTICAL PLANT, SLATERSVILLE, RHODE ISLAND

The Amperex Plumbicon camera tube is broadcasting's most accepted pickup device for live colorcasts. In fact, by year-end, 80% of all live color broadcasts will originate with Plumbicon-equipped color cameras.

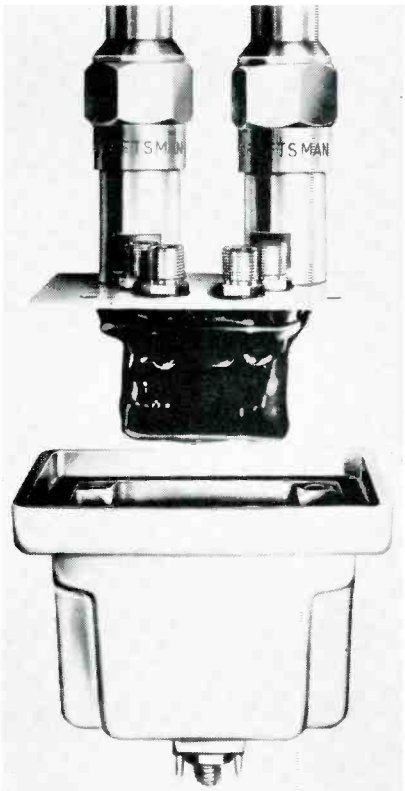
To meet the ever-increasing demand for this device, a new manufacturing facility has been built and is in production in Rhode Island.

This new Amperex facility is more than just the world's most modern electro-optical production plant. Here, some of the world's most advanced research and development is conducted on TV pickup devices, image intensifiers and other light sensitive components. As the Plumbicon camera tube is the measure of our past success, so it is also the direction of our future.

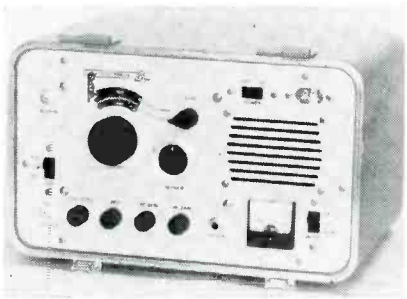
If you would like to know more about our new electro-optical facility or about the products produced here, write to: Product Manager, Electro-Optical Devices Division, Amperex Electronic Corporation, Slatersville, R.I. 02876.

Amperex®
TOMORROW'S THINKING IN TODAY'S PRODUCTS

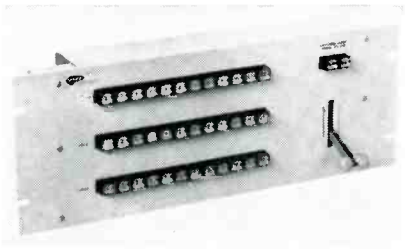
Circle 31 on Reader Service Card

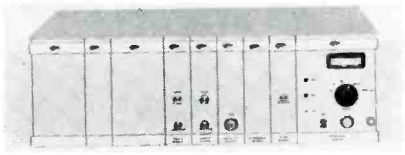


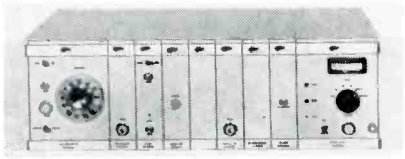
Craftsman's 800A/800 directional taps.

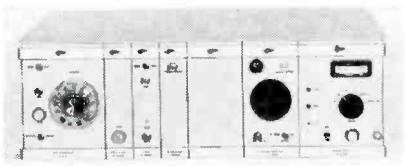


Delta's Operating Impedance bridge and the RG-1 Receiver-Generator.



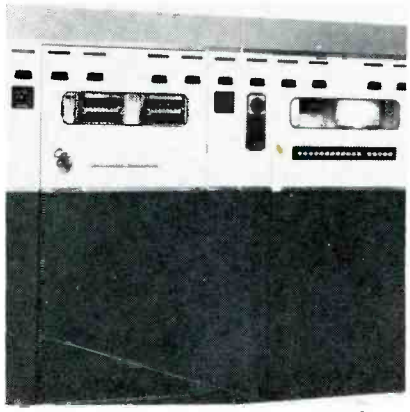






Dynair's Switcher-Fader control panel and the 4000 Series video modulator, converter and demodulator.

Display panel from Chrono-Log.



Continental's 50-kW Type 317C.

Disan's 106 audio console.

Gauss Electrophysics, Inc. (Booth 418)

Series 1200 high-speed magnetic tape duplicators and a newly-developed Model 1260 high capacity endless tape loop bin is on hand in the Gauss Electrophysics area for NABers' inspection.

Circle 223 on Reader Service Card

General Electric Company (Booth 102)

A new live color television camera, new retrofit kits for existing live color cameras, new distribution switching equipment, a new color optical film multiplexer, and transmitters with new solid-state drivers are being introduced. More than 30 monitors carry the demonstration to eight areas. In addition to live stage show, exhibit includes an operating TV studio control room, a film island featuring a new color optical multiplexer operating with two color film cameras, a new distribution switcher, a tape-programmed quality control demonstration, a private live TV camera demonstration room for customers, and audio, transmitter pickup tube, and antenna displays.

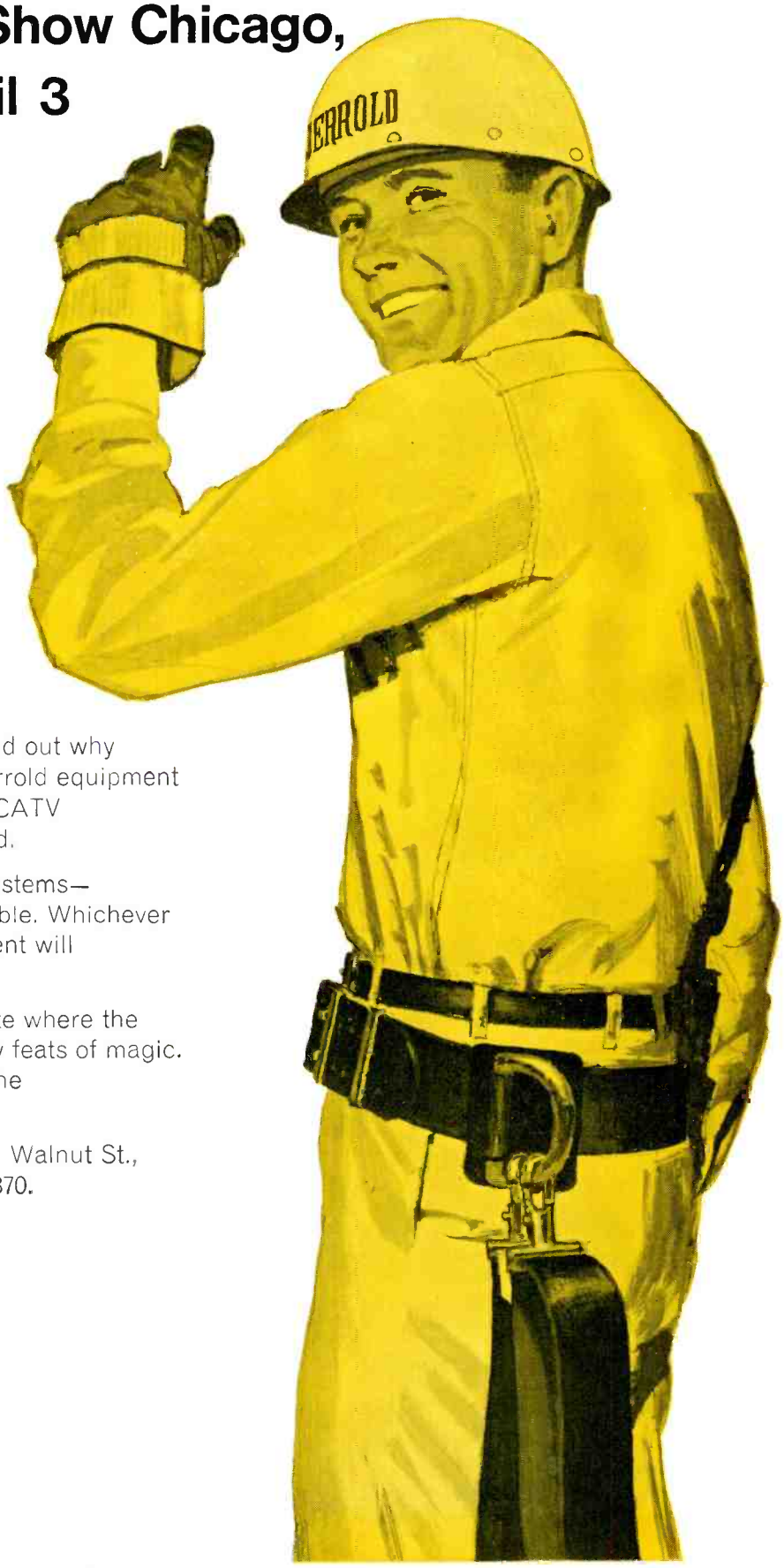
Circle 264 on Reader Service Card

Gotham Audio Corp. (Booth 226)

Several foreign and widely diversified audio products are being displayed by Gotham. In addition to the Neumann condenser mics, a Studer tape recorder and the Gotham OY rack-width monitor speakers are featured. Also on hand are EMT's studio turntable, the SE-200 professional stereo fm tuner and test equipment and tape accessories.

Circle 224 on Reader Service Card

Calling All Broadcasters Visit Jerrold at the '68 NAB Show Chicago, March 31 to April 3



Drop in at the Jerrold booth and find out why broadcasters in CATV use more Jerrold equipment than that supplied by all the other CATV equipment manufacturers combined.

Learn the facts about 20-channel systems—mid-band, single octave, or dual-cable. Whichever option you choose, Jerrold equipment will provide the best possible system.

Come join us in our Hospitality Suite where the popular Don Allen will perform new feats of magic. The Jerrold Hospitality Suite is in the Conrad Hilton, Rooms 2022-23-24.

Jerrold Electronics Corporation, 401 Walnut St., Philadelphia, Pa. 19105. (215) 925-9870.

JERROLD **FIRST IN CATV**

a GENERAL INSTRUMENT company

Circle 32 on Reader Service Card

Electronics, Missiles & Communications (Booth 309B)

Translators—vhf and uhf types—are the theme of the EMCEE display. A new 1-kW translator is being unveiled. Complete line of translators ranging from 1 W to the new 1-kW model are on hand.
Circle 219 on Reader Service Card

Entron, Inc. (Booth 320)

Engineering services are the topic of conversation in the Entron area. The company's line of solid-state CATV equipment are on display.
Circle 220 on Reader Service Card

Filmline (Booth 124)

A new Ektachrome—the FE-15—is being introduced at the Filmline booth. Less than seven feet long, the FE-15 processes color news film at 15 ft/min, and sells for less than $10,000.
Circle 221 on Reader Service Card

Gates Radio (Booth 221)

A new audio console—the TV-15—featuring TVS-6 submixer panels, is being introduced for the first time at the show by Gates. Demonstrations of a completely automated radio station are being presented in the Gates area.
Circle 221 on Reader Service Card

Granger/Bauer (Booth 222)

A new solid-state stereo fm exciter featuring plug-in cards, two-channel SCA capability and "fail-safe" stereo and a new compact 10-kW a-m transmitter are being revealed.
Circle 225 on Reader Service Card

Grass Valley Group (Booth 113)

Feature attractions are video switching system with complete dc coupling and wide range of accessories; a video special effects system offering complete pattern selection, colored inserts, chroma key and contouring of keyed signals; and a video FET mixer, permitting split lever fades to monochrome.
Circle 226 on Reader Service Card

Gray Research and Development Co. (Booth 414A)

Highlight of Gray Research display is Micro-Trac stereo tone arm. Display includes a recorded story of Micro-Trac using a Micro-Trac tone arm. An impedance matching preamp, broadcast equalized and other Gray tone arms are included in the display.
Circle 227 on Reader Service Card

Harwald Co. (Booth 225)

Mark X automatic film inspection machine, with editing facilities is feature attraction. Also on display are the Mark IVS/S inspection machine and a film cleaner. Supply and accessory items for TV film and news departments are included. Live demonstrations of equipment are being presented.
Circle 228 on Reader Service Card

Hewlett Packard (Booth 227)

Test and measurement equipment for the broadcaster is H-P's theme. New units include an impulse sound level meter, a 14-in. picture monitor and two compact general purpose oscillators. The impulse sound level meter measures rms, peak, and impulse sounds, and reads directly over a range sensitivity of 30 to 140 dB. The new picture monitor is compact and rack-mountable and has pulse-cross display as standard. A waveform monitor compatible with the picture monitor also is on display. One of the oscillators is of particular interest because it's a solid-state version of the original Wein-bridge oscillator built by H-P in 1939. Other test gear includes a 0.1- to 100-kHz function generator, a special broadcast distortion analyzer, a broad array of voltmeters, a cable fault locator and a frequency counter type approved by the FCC as a frequency monitor.
Circle 229 on Reader Service Card

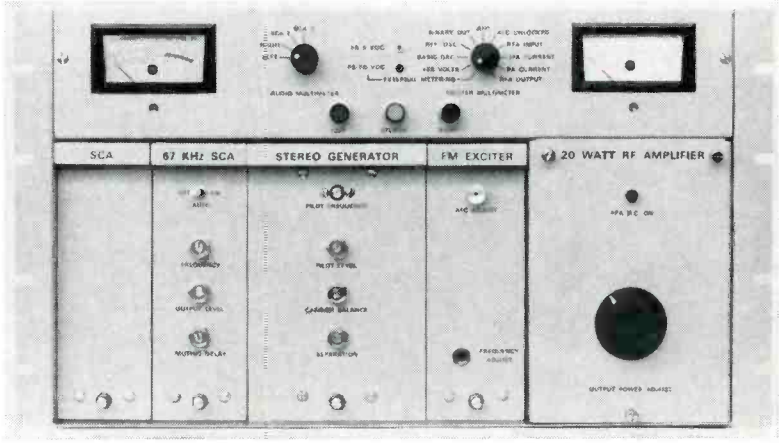
Houston Fearless Corporation (Booth 116)

Feature display item is premier showing of the "Mini-Color" news film processor. Unit features compactness and simplicity of operation. A PD-8 pneumatic pedestal is in an operative configuration.
Circle 230 on Reader Service Card

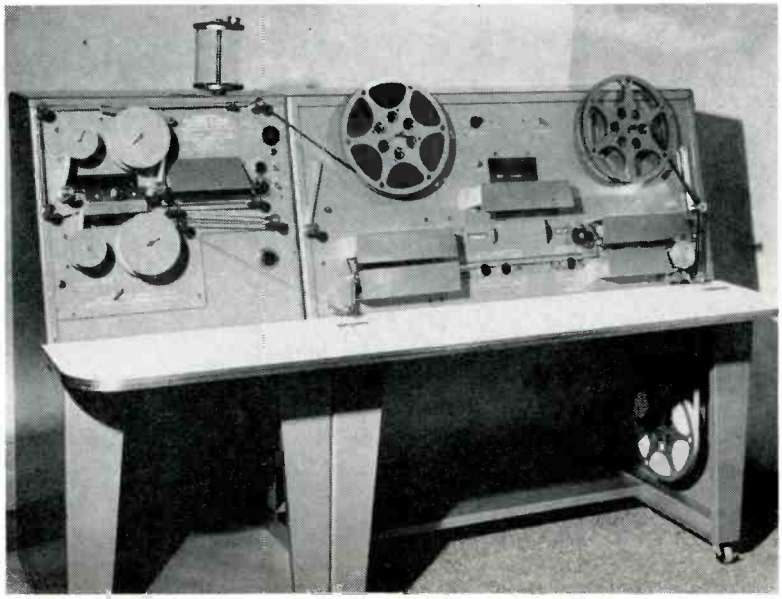
International Good Music, Inc. (Booth 224)

Some tasty sounds are emanating from the IGM area where the Series 600 audio control system, with punch-card-actuated 60-5 random select feature not previously shown, is on display. The Series 500 system with 50-3 random select and the IGM 362 logger with cartridge and touch-tone encoder also are on hand. The tasty sounds are a continuous audition of the IGM program services including *Jazz Quartet, Americana* and *Downbeat*.
Circle 231 on Reader Service Card

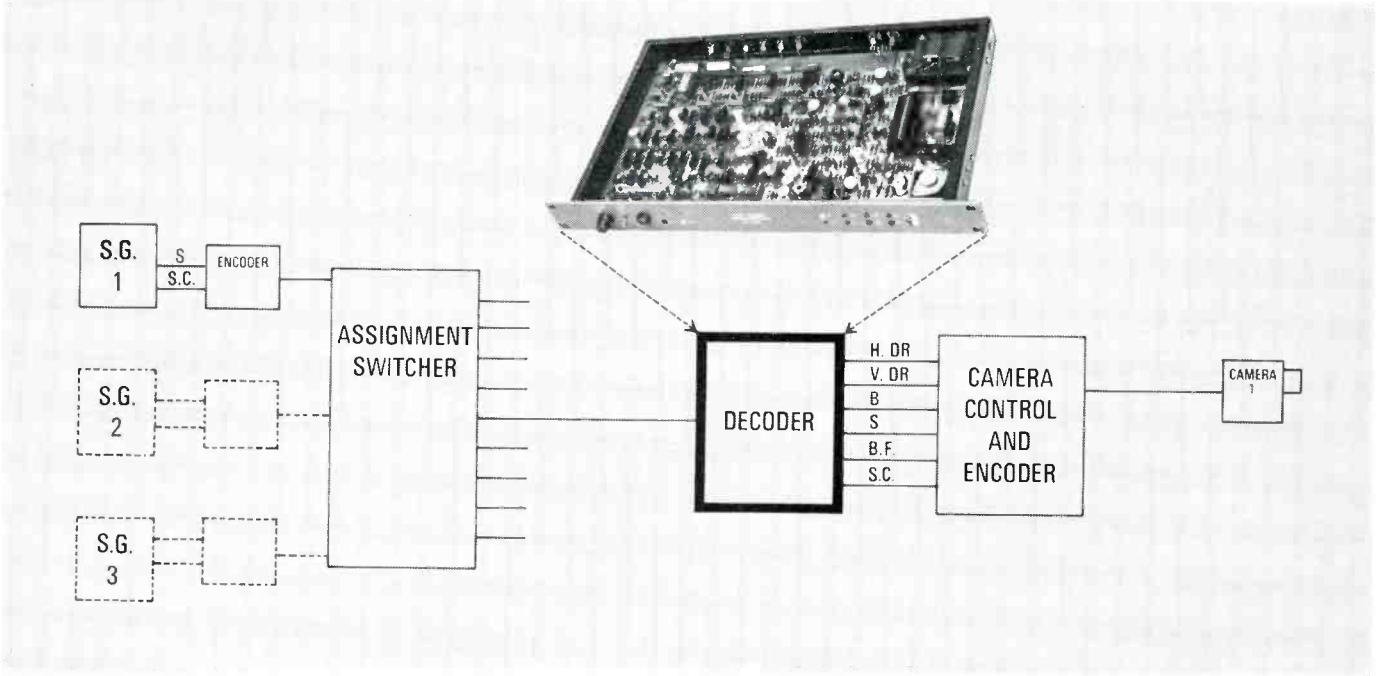
Granger Associates' SCA generator



Harwald's Protect-O-Film editor.



This is our new 2200 "Sync-Line" pulse distribution system



and this is all you need to adjust it

Here's a totally new timing distribution system—as far removed from the usual unwieldy octopus as simple arithmetic from calculus. It does this:

1. Reduces the complexity of the pulse assignment switcher from six levels to one.
2. Reduces to a single line the cable from the pulse distribution system to the camera.
3. Makes system planning easier. Sophisticated design enables all pulses to be advanced/retarded relative to incoming signal—a UNIQUE FEATURE.
4. Makes installation easier, by eliminating delay line equalization and cable length trimming.
5. Saves you money, both in capital cost and in installation.

We'll be happy to talk it over with you. In fact, if you'd like to discuss your systems problems with people who really understand them, give us a call—or drop us a line.

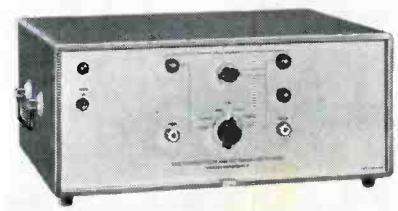
The "SYNC-LINE" is another example of craftsmanship by Central Dynamics—international leader in terminal equipment of advanced design.

CENTRAL DYNAMICS CORPORATION

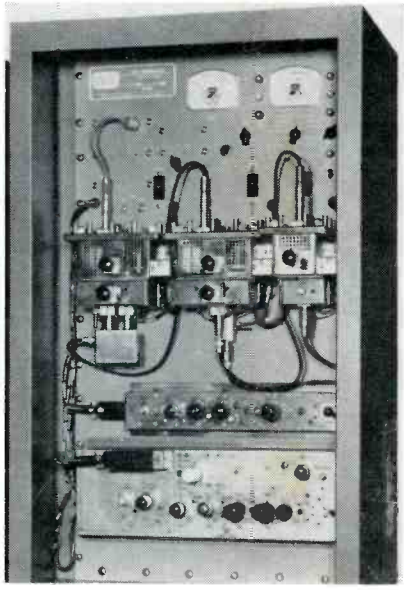
HEAD OFFICE: 903 Main St., Cambridge, Mass. 02139

Circle 33 on Reader Service Card

Marconi's sin² pulse & bar generator.



Uhf translator from Emcee.



Jampro Antenna Co. (Booth 305)

Highlights are High-Channel Batwing, uhf Zig Zag Panel, 2-5-GHz Zig Zag; circularly polarized fm shunt fed; circularly polarized fm parallel fed types.
Circle 265 on Reader Service Card

Johnson Electronics, Inc. (Booth 243)

Integrated-circuit fm receivers and a solid-state fm tuner are highlights of the Johnson display. Also on deck are a new Johnson-Aire education receiver—a portable type with self-contained speaker, antenna and provisions for automatic tape recorder accessories.
Circle 232 on Reader Service Cad

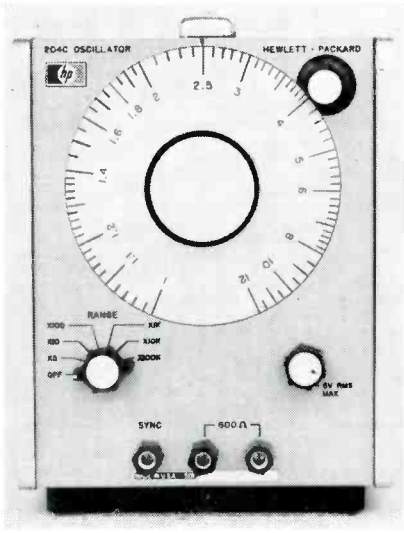
Lenkurt Electric Co., Inc. (Booth 402)

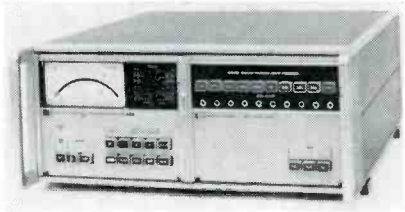
Microwave video transmission links are topic of conversation in Lenkurt area. Two types of links—the 75A and the 76—are ready for inspection.
Circle 233 on Reader Service Card

Listec Television Equipment Corp. (Booth 427)

Vinten pedestal, operating on compressed air, and Hokushin TC-510D telecine projector are attractions at Listec booth. Projector incorporates features including reverse running at full speed, automatic rotation of film

H-P's 204C Oscillator and 8055A octave filter.





loop, automatic replacement of exciter lamps and built-in test tone.
Circle 234 on Reader Service Card

Marathon Broadcast Equipment (Booth 324)

Constant-tension continuous tape cartridges are theme of the MBE display. Three basic models—the 300, 600 and 1200—with various footages ranging from 25 to 1200 ft, permitting playing times from 40 s to 32 min at 7½ in./s are the attractions.
Circle 235 on Reader Service Card

Marconi Instruments (Booth 228)

Featured by Marconi are a sine squared pulse and bar generator and a color gain and delay test set. Live demonstrations of the new products will be of interest to engineers. Other products on display include a TV sideband analyzer and a video sweep generator.
Circle 236 on Reader Service Card

McCurdy Radio Industries, Inc. (Booth 309)

Audio for the TV industry is main feature of McCurdy display. A TV intercon system, a TV audio production console and a TV audio console are available for inspection. Also on deck are monitor amplifiers, preamplifiers, equalizers and power supplies.
Circle 237 on Reader Service Card

McMartin Industries, Inc. (Booth 235)

See complete line of fm monitoring equipment and introduction of a new rebroadcast receiver, the TBM-1000A. Also included in display are fm stereo rebroadcast receivers, rf amplifiers, fm multiplex receivers, STL receivers, fixed frequency fm receivers, TV audio receivers, selective programmer, SCA generator and audio amplifiers.
Circle 266 on Reader Service Card

Microwave Associates (Booth 115)

A new line of microwave relay equipment MA-2B and a new solid-state 13-GHz system for CARS operation will be on display. Live coder STL demonstrations going on. Hot item is a wireless microphone immune to flourescent lamp noise.
Circle 267 on Reader Service Card

3M Company-Magnetic Products Division (Booth 248)

Tape and tape accessories are the thing here. Complete line of professional audible range tape, closed-circuit videotapes and accessories are on display. Featured attraction is 399 Color Plus Tape: A new exclusive video plastic shipping case with free-floating rotating discs is being introduced.
Circle 268 on Reader Service Card

Moseley Associates, Inc. (Booth 223)

New from Moseley is the PCL-303-B/C transmitter and receiver companion units, the PCL 202 aural STL for foreign fm applications and the 890- to 960-MHz monaural or stereo STL. Also available are Model ADP-101 digital automatic transmitter logger and remote control units.
Circle 238 on Reader Service Card

North American Philips Co., Inc. (Booth 325)

Philips' AKG Division is showing a variety of microphones. Model C451E mic is being introduced. Mic features removable cardioid capsule that's interchangeable with an omnidirectional type. Also on display at AKG is their line of two-way version for automatic tape recorder

continued on page 119

"Background music sales up 80% in six months with Seeburg"

ROBERT RATCLIFF, Executive V. P., Manager, STATION WKPT, KINGSPORT, TENNESSEE.

And that's not all. Bob Ratcliff has been in the Multiplex background music business since 1961. Accord- to Bob, he has tried everything there is to try in tapes. Never satisfied, he found difficulties in programming, limitation in selections, and the common problems which are inherent in tapes. Seven months ago this seasoned station manager decided that there must be an easier way, and called Seeburg.

Easiest installation he ever made. "I'm glad I switched—for a lot of reasons. Counting the testing we did, we hooked the Seeburg unit up in one day. The chief engineer said it's the simplest installation we ever did."

Maintenance down to a minimum. "Because Seeburg is enclosed, maintenance is much, much lower, less demanding, less exacting than any other equipment. There are no dust problems, and, of course, there are no heads. We only touch the machine about once every three months to add the new Seeburg records."

Reduced customer complaints by 90%. "We've found Seeburg recordings a lot better . . . better selection and better sound. We don't get 10% of the complaints we formerly received about the music, either. With Seeburg's three libraries, we have over 3,300 selections with which to work."

Programming is a snap. "We're on the air 24 hours with our background music. With Seeburg's automatic program timer we can run from 15 minutes to 24 hours on any one of their libraries. We change from one library to the other to provide our customers with tailored music by simply presetting our automatic timing device."

Seeburg sound sells easier. "Seeburg's background music, I believe, and I've listened to all of it . . . is better than any other I have heard, and, it's easier to sell. I've increased my background music business by 80% in six months without adding additional personnel. Seeburg is just a much better product."

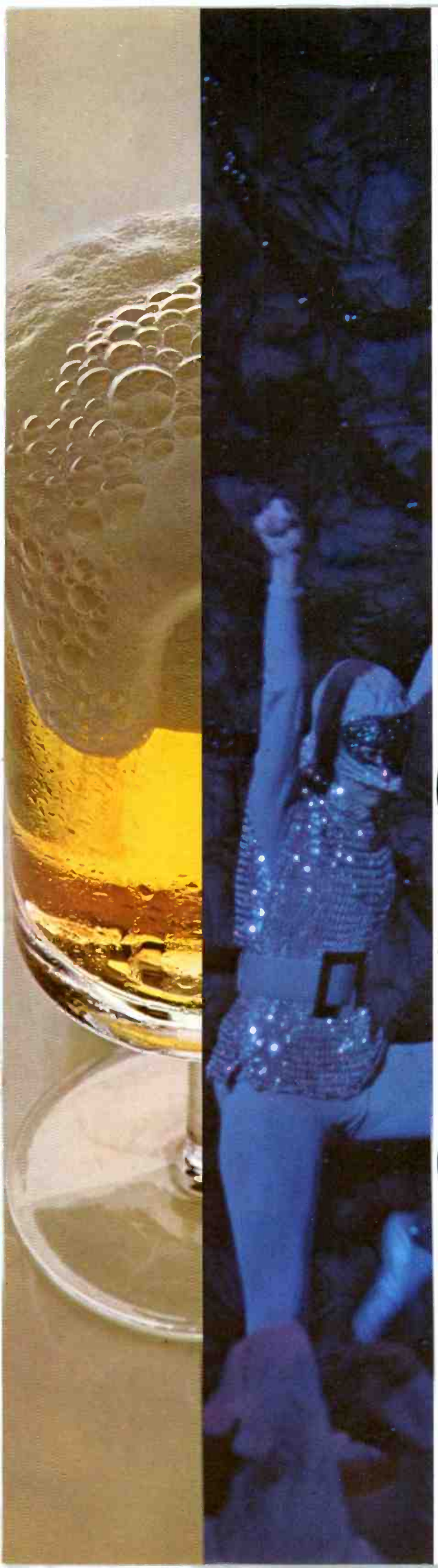
Write your own success story. Contact Mr. Hards at Seeburg to find out how you can increase your profits in the background music market. Find out about a fully protected Seeburg franchise for the easiest-to-sell background music in the world.

See Seeburg at the NAB Convention in Chicago, Booth No. 215, or write Seeburg Music Library, Inc., 1500 North Dayton Street, Chicago, Illinois 60622.

SEEBURG Serving America Musically Since 1902

Circle 34 on Reader Service Card

Circle 35 on Reader Service Card →



ELECTOGRAPHY

Videotaping has gotten so good, it has a new name!

Tape is more versatile than ever!

Everybody knows the key advantages of video tape. You work fast. You see your work as you go. You can be more daring and experimental.

But perhaps you didn't realize how sophisticated the art of videotaping has really become: You can edit instantly . . . electronically . . . frame by frame. You can use slow motion, fast motion, stop motion and reverse action. You can go out on location. And you can combine all types of existing footage (stills, film) with new footage.

Now, the most life-like color yet: "Scotch" Brand Color Tape Plus.

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60-dB attenuation for harmonics is adequate. It recognizes that greater power may make it more difficult for individual communities to find vhf channels on which to operate translators without mutual interference. In this regard, it should be noted that in the absence of offset carrier operation, such as is used with regular television stations, there is a greater interference potential—the loss being 17 decibels. This means that a 10-watt translator would be the equivalent of a 500-watt regular television station so far as co-channel interference potential is concerned. Further, the service range for a similar increase in power increases by a relatively small amount so that a point of diminishing returns is soon reached so far as translator operation is concerned. In view of the foregoing, comments were invited on the proposal (1) to increase the permissible power of vhf translators to 10 watts, (2) on the impact that such an amendment might have on the availability of frequencies for translator use, and (3) on the desirability of imposing geographical limitations on the areas where such translators could be utilized.

Type-Accepted Equipment May Be Required

Consideration of the possibility of increasing the authorized power of vhf translators leads to a question regarding the status of the equipment to be used. In 1960, in order to lessen the impact of the vhf translator rules on existing repeater operations, the Commission provided that construction permits could be issued for custom-built transmitters which had not been type accepted. Section 74.750 (d) (3) of the Rules presently provides a procedure for type accepting such transmitters after issuance of a construction permit but prior to issuance of a license. Since many translator operators have been unable to comply strictly with the technical requirements for type acceptance, the Commission has found that this procedure is unsatisfactory. As a result, the Commission has experienced undue delays in processing applications involving custom-built equipment with the further result that the processing time for all translator applications has been extended. While this result was an unavoidable consequence of rapidly legalizing more than a thousand existing repeaters, the Commission sees no reason to continue to cope with this problem; it noted that there are now a variety of inexpensive type-accepted translators available. Consequently, to assure the use of acceptable equipment, and thus shorten the processing time for all translator applications, the Commission proposes to require that all applications for new translator stations specify the use of type-accepted equipment. Custom-built equipment could still be proposed, but only if it was type accepted prior to the filing of an application for construction permit. Comments have been requested on this proposal.

Origination of Local Announcements

It has been suggested periodically that the translator rules be amended to permit translators to originate both programs and advertising. The

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Commission is now considering these possibilities. Since financing is a substantial handicap facing translator operators, thereby discouraging the wider use of translators, parties proposed that the Commission authorize the origination of program material on translators. However, they misunderstood the technical operation of a translator, and, as a result, made proposals which exceed a translator's capabilities. A translator does nothing more than convert or "translate" a television signal to another channel and retransmit it. This type of operation does not require that the translator be able to maintain frequency tolerance and band width requirements, and the present rules do not require the use of equipment designed to satisfy these requirements. (See *Notice of Proposed Rule Making* in Docket No. 16424, Microwave Relays to Translators, FCC 66-41, 1966.) On the other hand, if such a transmitter is modulated with locally generated program material, maintenance of frequency tolerance and band width requirements would be an immediate problem. Thus, in net effect, proposals to permit translators to originate programs are proposals for the further relaxation of the technical requirements for television broadcast stations to permit the use of inexpensive and technically inferior transmitting equipment. Unless it can be demonstrated that these standards are high enough to provide a quality picture and to prevent interference, the Commission is not disposed to change them. It will, of course, give careful consideration to any comments designed to make such a showing. However, *in the absence of a persuasive showing in this regard, the Commission will not authorize the origination of program material on translator stations.*

Nonetheless, the Commission believes it is necessary to take what action it can to assist translator operators in securing their financial base so that the benefits of this valuable auxiliary service can be fully realized. The most logical new source of revenue for translator operators would appear to come from the origination of some sort of visual announcement; for example, solicitations of funds for the maintenance of the translator or announcements to the effect that the translator operation is subsidized by one or more local merchants. Brief announcements or "credits" could be presented in the form of slides or still pictures with comparatively inexpensive signal generating and scanning apparatus which could be substituted for the signal normally transmitted by the translator. While the technical characteristics of the modulating signals generated by such apparatus would not meet the requirements of the Commission's Rules, the Commission believes that they could be tolerated if limited to brief periods and infrequent intervals. However, in view of the difficulties which could arise from even such limited operations, *the Commission believes it necessary to limit this proposal and to authorize it only for use with uhf translators.* Three additional considerations support this limitation: (a) vhf translators are relatively less expensive than uhf translators, so there is less need to seek additional financial support for them; (b) the Commission is of the view that uhf translators are to be encouraged where possible; and (c) most important, should there by an improper operation in the uhf band the translator would not interfere

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with the critical safety frequencies which would be vulnerable to a malfunctioning vhf translator. (For example, on September 14, 1967, the Commission granted its first rule waiver whereby a uhf translator station in Florida was permitted to broadcast visual announcements for seven days in the form of still slides to solicit public financial support. The announcements, not to exceed sixty seconds duration, were broadcast daily between 7:00 P.M. and 9:00 P.M. on schedule half-hour station breaks. A visual monitor was employed on the transmitted signal at all times, and a report on public reaction to the operation was made to the Commission. Sources at the Commission indicate that the report was inconclusive —possibly because other advertising efforts were in progress at the same time.)

The question of the time when these announcements would be transmitted would be one for mutual agreement between the translator operator and the primary station. Since there are periods of time devoted to purely local advertising, it seems likely that agreement could be reached for the use of this time for translator announcements. Additionally, noncommercial stations rebroadcast by translators should also be permitted to agree to the use of specific times for such announcements. *Consequently, the Commission will consider amending the rules, governing uhf translators, to permit the limited transmission of local slides or still pictures and voice announcements* containing advertising, public service announcements, acknowledgements, and other similar material by automatic means—for brief periods of time, not to exceed twenty seconds, at intervals of no less than one hour.

Use of Translators as Relays—'Chain' Translators

One of the serious difficulties facing translator operators is the fact that in some areas a satisfactory signal may not be available for rebroadcast. One way to bring television signals to such areas is by rebroadcasting the signals of one or more translators. Variations of this system are in wide use; however, there is an upper limit to the number of translators which can be used for this purpose due to the poorer signal to noise ratio. Section 74.731 (c) of the Rules prohibits the use of translators solely as relays but permits them to be used incidentally for this purpose provided they also serve the general public. While this rule has generally been effective, it does not provide the best signal to communities at the far end of a particular chain. If there are locations, which could get more or better signals from a translator relay system, *it may be in the public interest to permit such operation*, and the Commission will consider this possibility. *Nonetheless, the Commission will generally adhere to the policy that translators should serve surrounding areas*—even if they are being used by other translators as a pickup point, and *a convincing showing of the need for pure relay operation would be required.* The Commission has invited comments on the question whether Section 74.731 (c) of the Rules should be amended to allow the use of translators as relays—where a showing is made that this is the most feasible method of obtaining a usable signal in the area for which service is proposed. *Continued on page 56*

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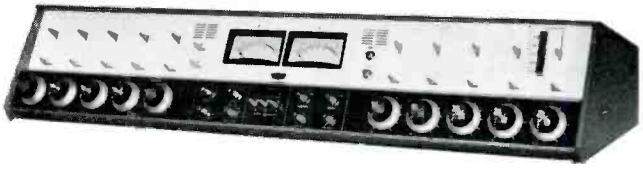
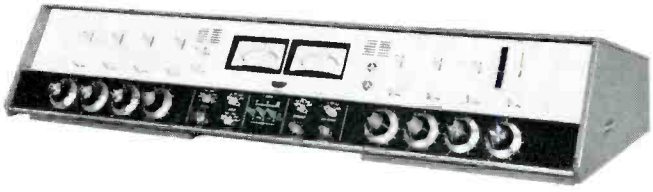
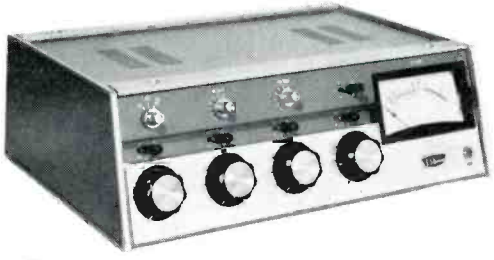


SINGLE-CHANNEL, AGC REMOTE AMPLIFIER (PE-2100)
Solid-state, portable AGC remote amplifier for on-the-spot news and sports applications. Accommodates 2 low-level and 2 high-level inputs, balanced or unbalanced. Outputs consist of one headset feed and one balanced output at program level which may be fed directly to a telephone line. Simple operation and automatic (or manual) gain control permits remote or local operation by non-skilled operators.



DUAL CHANNEL STEREO STUDIO CONSOLE (SS 4370)
Accommodates 28 stereo inputs / 8 mixers. Two 10 watt monitors. "Instant-select" intercom with push-to-talk operation. Two stereo mixer buses allow dual channel stereo operation with external program amplifiers.



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Comments Requested by the Commission

In view of the foregoing, the Commission invited comments from interested parties on the following proposed rule changes:

(a) Amend Section 74.732 (e) (1) to permit regular television broadcast licensees to own and operate vhf translators beyond their predicted Grade B contours in situations where the translator would not be located in another station's predicted service area;

(b) Amend Section 74.732 (e) (1) to permit regular television broadcast licensees whose signals are being rebroadcast to contribute to the operating and maintenance costs of established vhf translators without regard to location;

(c) Amend Section 74.735 (a) to raise the maximum allowable power for vhf translators located west of the Mississippi River and in Alaska and Hawaii from one (1) to ten (10) watts transmitter peak visual power;

(d) Amend Section 74.750 (c) (2) to require, with respect to more than one (1) watt vhf translators, that all emissions appearing on frequencies more than 3-MHz above and below the upper and lower edges of the assigned channel be attenuated no less than 50 decibels (the present requirement is 30 decibels);

(e) Amend Section 74.731 (c) to permit the use of translators solely as relays when necessary to carry the desired broadcast signal to another translator to be rebroadcast;

(f) Amend Section 74.750 (d) (3) which provides for licensing of non-type-accepted vhf translators transmitters, to provide that all applications for new translator stations specify the use of type-accepted equipment; and

(g) Amend Section 74.731 to permit uhf translator operators to engage in limited origination of local slides or still pictures and voice announcements containing advertising, public service announcements, acknowledgments, and other similar material by automatic means and for brief (not to exceed twenty (20) seconds) periods of time, at intervals of no less than one hour.

In addition, the Commission invited comments concerning the appropriate role of translators in television transmission and broadcasting, and particularly concerning the following specific suggestions or proposals:

(a) The limitations, if any, to be imposed upon translator duplications of regular television stations' programming;

(b) The limitations, if any, to be imposed upon vhf translators in areas with predicted uhf service;

(c) Whether there are any special requirements which should be adopted with respect to the use of translators rebroadcasting educational television broadcast stations;

(d) Whether translator licensees should be permitted to originate program material, and, if so, subject to what increased technical requirements; and

(e) Whether the television station licensee whose signal is being rebroadcast should receive a preference over other applicants for a translator authorization in case of conflicting requests.

Conclusion

While comments were due in August 1967, the Commission has not acted on the above and comments on same are still welcome. It is apparently safe to conclude that, absent abundant and convincing comments to the contrary, the Commission will adopt rules (1) insofar as it will not hamper the growth of uhf, permitting as much expansion of translators as is technically feasible and (2) creating as much competition as possible for CATV systems. ●

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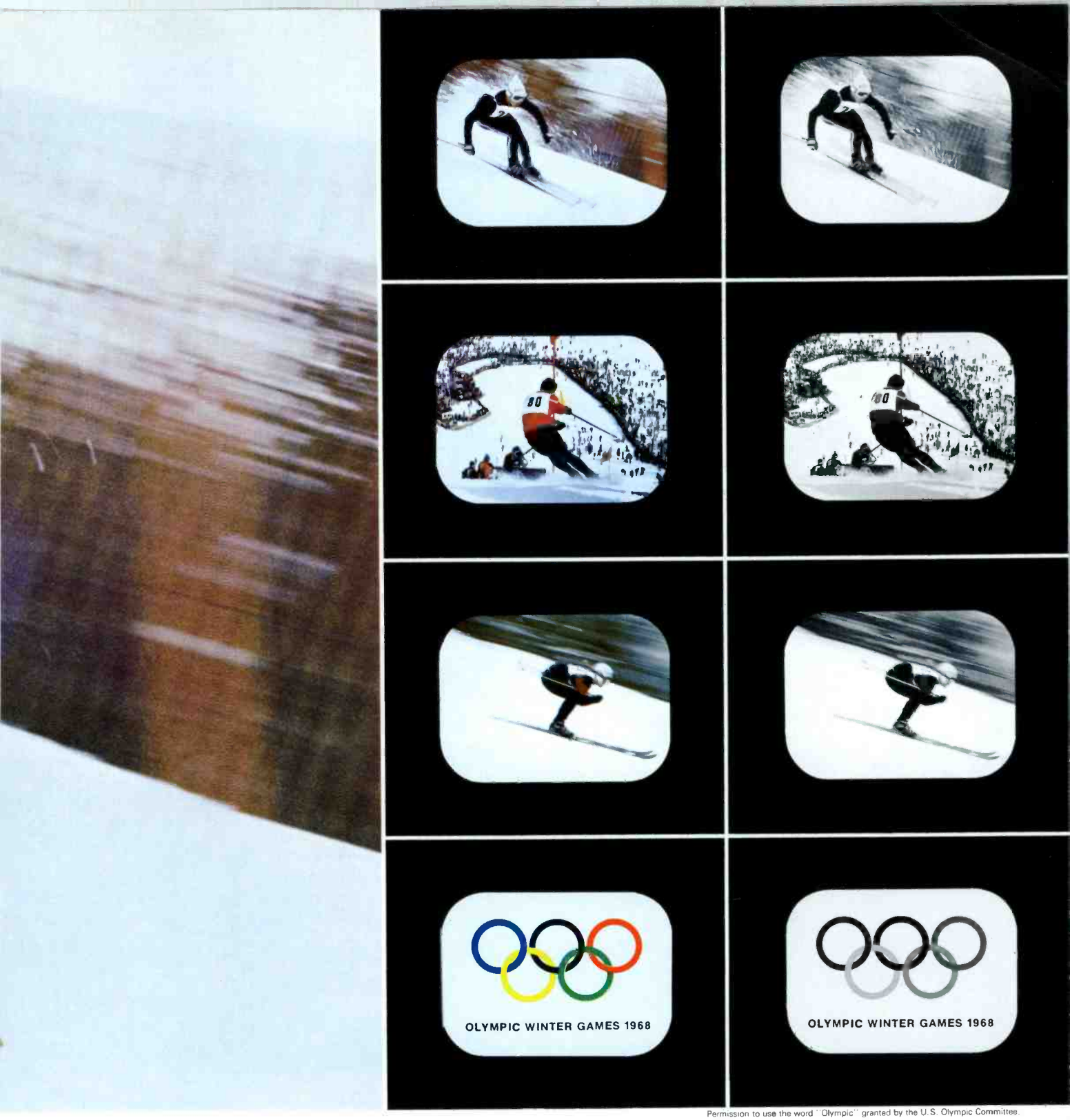

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Telecine Quality Deplorable, CBC Tells SMPTE

Any Ideas On Improving Telecine Quality?

The SMPTE report indicates something must be done about the quality of 16mm films being shown on TV.

BM/E will explore some solutions in the June issue. We are eager to hear from any readers who have thoughts on this subject. Please send us your ideas on or before April 15. Or see us at NAB, Suite 1105A-1106A.

The SMPTE 2nd Annual Color Television Broadcasting Conference, plodded its way evenly for 1½ days, January 26-27, then erupted into a strong closing climax late Saturday afternoon. Two Canadians charged that far too much film material is so bad that it is beyond the range of correction by telecine paint pot controls. Lloyd C. Harrop, supervisor of TV Technical Operations, described the efforts of CBC to optimize telecine reproduction. Rodger Ross, of CBC staff and active SMPTE standards man, then pleaded for TV broadcasters to force film distributors and film processors to improve their product.

Progress toward standards, new developments in color equipment and broadcast methods and tutorial sessions dominated the two-day conference which has, under the sponsorship of Detroit SMPTE, with the cooperation of Wayne State University (last year University of Michigan), became the year's leading color broadcasting conference.

Among the highlights were these:

Standards

- CBC report that adoption of standard operating procedures for telecine will improve quality.
- SMPTE announcement that series of new test patterns will be out by mid 1968.
- Eastman Kodak report that ME 4 process for color news film can be closely controlled for optimum results.
- NBC News disclosure that it is studying the smaller Super 8mm camera as a new standard for news reporting.
- Network Television Committee (Bell Labs-Networks) announcement of new report No. 5 which contains recommended test signals to check out transmission systems.
- Inability of SMPTE to force any standard format for helical scan recorders.

New Developments

- Method of measuring color tape noise revealed by Memorex engineers—could become new standard.
- Visual Electronics' approach to slow motion and stop action playbacks in color described.
- Construction details of hand-held portable color Plumbicon TV camera (Norelco) disclosed.

Tutorial sessions on lighting included: discussion of color temperature effect on color quality by S. Bonsignore of CBS; discussion of color contrast range and ability of TV cameras to handle range by Fred Sacks of GE; basic lighting pointers by Joseph Tawil of Colortran and Carl Gatti, lighting director of WNEW-TV; and CBS films (two) on color contrast and color lighting pointers. Other tutorial sessions compared various international color standards, techniques for recording the various standards and satellite transmission experience.

Brief progress reports on film-to-tape and tape-to-film transfers were made by spokesmen from Acme Film Labs, Vidtronics Div. of Technicolor, and Reeves Sound Studios.

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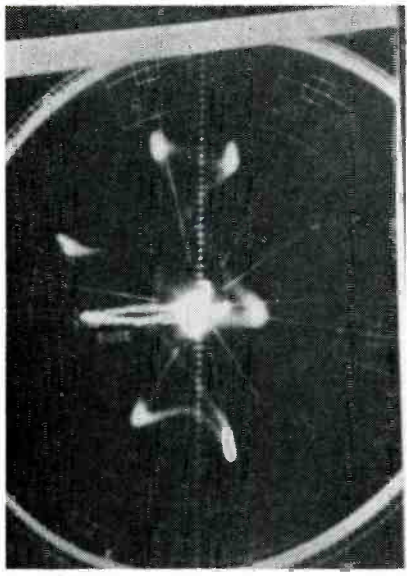


1. SMPTE panelists chew over color television film problems.

2. Current film dyes will not permit telecine operator to line up by Vectorscope.

Repeat papers (originally delivered at the 17th Annual Broadcast Symposium) included "Effect of Transmitter Performance References in the NTSC system" by T.M. Gluyas of RCA (See *BM/E*, November 1967, p. 11) and "Methods of Correcting Signal Errors in Quad Color Recording" by J.R. West of RCA.

Telecine Status Quo Challenged

The general tenor of the conference was to describe things the way they were; discontent emerged only when the state of affairs of telecine came up. L.C. Harrop of CBC and vice-chairman of the Canadian Telecasting Practices Committee was not happy with the status quo. He charged that the variety of color balance and density ranges in 16mm film (standard in Canada and used by most broadcasters in the U.S.A.) was almost unbelieveable. "Why no RP7 for color film?" he asked. Development of a recommended practice is difficult Harrop admitted. "But is anyone really working on it?" he challenged. Harrop continued, "Do we not know enough about end densities and their measurements to specify them? And why should we shy away from specifying a transfer characteristic? Agree on color balance, Harrop said, and then agreement on brightness values could come. The SMPTE's Color Reference Film (Series No. 3), although useful, is not held to close enough tolerances to be used as such standard. (A.E. Alden of SMPTE reports a committee is working on a 20-30,000 foot single scene film with tolerances sufficient for laboratory test purposes.)

Rodger Ross, CBC, following Mr. Harrop to the rostrum, urged upon telecine operators the same procedures used with videotape recorders. Optimum quality for VTRs requires the playing of a standard test tape and peaking the controls for best results.

As a bare beginning to more satisfactory telecine broadcast, Ross urged broadcasters to adopt a Color Telecine Operation Procedure which in effect gives a standard "zero position of all knobs." With a departure point from which to work and some prescreening of the 16mm material, proper adjustments of the paint pot settings can be judged.

If the film is beyond the range of paint pot setting don't use it, Ross urged. Carelessness and incompetance in making 16mm film is responsible for much of the poor quality, Ross said. If the broadcaster keeps accepting film without complaint, distributors or film processing labs won't improve. Currently everybody passes the buck and no one does anything. Ross urged TV stations to blow the whistle and asserted that if standard setting up procedures were followed, operators would know when film quality was unacceptable.

Large differences in spectral response of color cameras and telecine projectors (even with equipment of the same manufacturer) compounds the problem and filter correction systems may have to be used. At the present time, Ross said the six basic film colors—cyan, magenta, yellow, blue, red and green cannot be located in the appropriate Vectorscope boxes. What is needed, said Ross, is an objective system of telecine setup using a color bar slide. This would permit prescreening the material and then matrixing the equipment (by push button) to correct for film deficiencies. Europe is doing something like this now Ross said and he pleaded, "We've got to control the input: we can't continue letting the viewing public do the knob twisting."

The challenge to standardizing telecine was summed up by Harrop. He said the following must be done:

- End densities and transfer characteristic must be specified.
- Taking characteristics must be specified and may have to be shaped by matrixing units for different film stock.
- Dichroics and tolerances must be specified. Once again varia-

tions may be correctable with a matrixing unit.

- Viewing conditions should be specified and, if possible, a relationship established between the film projected image and the electronic image.
- Unless an A-B judgment can be made once the screen and electronic images are related, a panel will have to be used to select an optimum reproduction.

Later several panelists including Dr. Henry Kozanowski of RCA, Dick Putnam of GE, Earl Kage of Eastman, and R.J. Ringer of Technicolor, agreed that the problem existed but revealed some annoyance that Ross demanded a solution. There is no simple answer, Putnam said. "A lot of people contribute to the problem," he said, "the film lab, the TV system, the producer, the lighting man. It is an overall system problem and no one really understands what's going on."

Kage added that programs done for TV can be beautiful but that the industry is broadcasting or rebroadcasting much that was not intended for TV. Ringer included the advertiser as a culprit because he will alter color balance just to get his product hue right. Another panelist added that the problem is that 16mm film processors are set up primarily to produce audio-visual material for pleasing subtraction projection systems.

Ross said all he wanted was something on the leader to be equivalent to the color bar strip recorded on videotape.

(During the first dav's panel on network transmission in response to why network color looked better than local color, F.J. Cudlipp blamed the 16mm film processor. The networks insist on adherence to rigid specs. When the local station buys a 16mm color print there is too often too much magenta or cyan. Or if you splice in a local sponsor message it's nearly impossible to match colors. Cudlipp's advice: play the film chain into a videotape recorder and work the saturation knobs on playback.)

Art Versus Science for Lighting

The only other time[1] during the convention that "what ought to be" rather than "what is" came close to emerging was during the discussion on lighting. Dr. Kozanowski tried to ruffle fellow panelists Tawil and Gatti who earlier demonstrated how to light TV scene, with a question "What ever happened to the light meter?" Gatti, who considers himself an artist rather than a technician put the question down with the retort, "Yes, somebody is always coming along and trying to mess up the scene." Engineers in the audience deferred to the artist, at the moment but there was some grumbling the next day about the appropriateness of such sessions at a technical conference.

A videotape presentation by Sol Bonsignore of CBS, New York, demonstrated that 2600°K color temperature is the lowest that can be tolerated in lighting. Bonsignore concluded that the human eye can't discern small variation in color temperature unless a norm is available for side by side comparison. Combinations of color temperatures differing by as much as ±100°K do not degrade the picture. The speaker also showed that video control of color temperatures can adjust for some variation in temperature. For example, on the low end of the range, 2800°K hues can be adjusted to match 3100°K hues and at the high end, hue deviation caused by 3400°K can be made to appear a standard 3100°K hue.

37 Varieties of Helical Scan

Helical scan VTRs came up for close review. Generally broadcast conference have ignored this type. Charles Anderson, of Ampex, put the slant track or helical scan recorder in perspective this way. "A tolerably good picture with relatively low cost can be achieved. As quality is raised to match that of quadruplex recorders, cost and complexity approaches that of the quad."

Anderson described the various approaches to helical scan recorder design (now numbering 37) as tradeoffs and compromise. "Various different approaches gain you a little, but give you a little too," Anderson said. There is not clearly one outstanding way to do the job, Anderson concluded—that's why there are 37 varieties.

Other Fallout from Panel Experts

All three New York network stations put out identical hue and saturation signals when transmitting from the same single source (overseas or domestic) says F.J. Cudlipp of NET and formerly ABC.

The standard color bar test signal is probably the most important test NBC has, says Warren Phillips, in coordinating the 30 tape machines, 27 film chains and 25 color cameras in the Radio City complex. All equipment is switch back and forth between studios and color bar signal is constantly used throughout the day for level and phasing check.

If you think your transmitter is affecting hue, check your transmitters to make sure there are no resonant circuits near the 3.58-MHz subcarrier.

If you're an affiliate putting out a poor color signal don't suspect the telco. Check your stab amp. If input looks ok and the output shows 50 units of differential gain, this will kill skin tones. If the 3.58 MHz multiburst is over 40 percent it will contribute noise.

The 3.58-MHz subcarrier transmitted by all networks is more stable than most station frequency counters. Trust it.

A specification on dropout for tape for quadruplex machines is in the works. No plans for such a spec on tape for helical machines.

Tests by NET have determined head life to be about 334 average hours with a 10 mil notch tip head at 7½ in./s. This is about 5-10 hours longer than that obtained at 15 in./s. (Heads were run to 1 mil before the gap. Thirty heads involved in test.)

Look for some standard tapes for VTRs. Two for monochrome (7½ and 15 in./s), one for low band (15 in./s) two for high band (7½ and 15 in./s). Signals will include 15 seconds of voice count, two minutes of color bar, two minutes of multiburst, two minutes of $\sin^2$ window reference stair step 358 and two minutes of color bar again.

Don't expect helical scan tape format interchangeability—unless Howard Hughes buys up all manufacturers and forces it.[2]

Chairman of the conference was John F. X. Browne, Roland Renaud and Fred Remley were responsible for papers. Publicity was handled by Warren Hoppel and conference coordinator was Robert Moutrie.

[1]Exception: During the panel discussion on network transmission Tom Keller of WGBH blasted Bell and the networks for continuing to accept 5 kHz as the audio bandwidth.

[2]Suggestions of Howard Town, NET.

Detuning Radiation Structures

By L. David Oliphant

Re-radiation must be cured if directional patterns are to be maintained.

RE-RADIATION IS A PROBLEM confronting more and more stations within the last few years in their maintenance of directional patterns. Re-radiation must be dealt with before the directional pattern can be adjusted to any degree of satisfaction (as outlined in the article by Barry Atwood in the January issue, page 35.)

Just what is this re-radiation problem which is plaguing radio stations? It's a population explosion type problem. Twenty or more years ago radio transmitters were built out in the country with very few buildings, or power lines about. Now the city or its suburbs is spreading out to these transmitter sites. And with this growth comes power lines and power poles, water tanks, etc. There are metal power poles, and guy wires. On the wooden poles are ground wires running the length of the pole. If these metal poles, guy wires, or groundwires are in the path of the strong side or path of the radio pattern, they will reflect or re-radiate the signal into the weak or null portion of the pattern. This reflected signal can be phase additive, or phase subtractive (or at any point in between) with the signal from the antenna array. Hence re-radiation can cause the reading at a certain point on the radial in the null to be high, or low, or relatively unaffected. When field strength readings are made along a radial in the null, as is done in making proofs of performance on directional patterns, the re-radiated signal can be phase additive at one point, phase subtractive at another and somewhere in between at other points causing the readings to be widely varying. They may be high at one point and low at another instead of holding a straight line relationship, or nearly so. If the problem is serious enough, the FCC will not accept the proof of performance. Fig. 1-A shows re-radiation from one source and Fig. 1-B shows re-radiation from several sources.

Several stations are being confronted with this problem. I am personally aware of six radio stations including KOMA fighting this problem. Besides KOMA, two are 50-kW and the others are 5-kW stations. So while this may have been at one time a problem only for high powered stations, 5-kW stations are facing it also.

Controlling Re-radiation

How can this problem of re-radiation be controlled to get the directional pattern into satisfactory adjustment? One is often tempted to take a hack saw and cut the ground wire. But there are always those who frown on that since the ground wire is protection to the power line equipment. Similarly, one can't dynamite the offending water tower. That leaves the solution of detuning the metal power pole, or the ground wire of wooden poles, or the guy wires, as the case may be.

Let's start with a wooden pole with a ground wire, Fig. 2-A. To detune a pole it is necessary to attach a wire near the top of the ground wire. Bring the wire to the opposite side of the pole, drop it to within 5 feet or so of the ground and staple it to the pole. It is important that the wire be as far from the ground wire as practically possible. Theoretically, to be perfect, it should be nine feet away from the ground wire. Of course that is impractical. Next place a capacitor between the detuning wire and the ground wire of such a size as to bring the rf current in the ground wire below the point of juncture to a minimum. See Fig. 2-B.

This brings up the problems of how to measure the rf current in the ground wire and what size capacitor to use. First I will describe the meter to be used to measure the rf current. Such a meter is illustrated in Fig. 3-A. It consists of a tuned loop of about six turns, though this number may vary with the frequency. This loop is tuned to the frequency of the station. Alongside the tuned loop is a pickup loop of one turn of wire which goes to the selector switch, diode, multiplying resistors, and the meter.

This is built into a wooden box as shown in Fig. 3-B. The tuning capacitor for the tuned loop is set in the center of the box and the leads of the loop go to it. The leads of the pickup loop are run to a terminal strip on which is mounted a 1N34 diode. A lead goes from the diode to the selector switch on which is mounted the multiplying resistors. A lead goes from them to the meter. The other side of the meter connects to the pickup loop. The meter used has a 0-1 mA movement. This has proven very satisfactory. A more sensitive meter can be used. A O-500 mA scale was found to work quite well. (If the meter can be taken apart, the meter face can be taken off and a new scale pasted on.)

To calibrate the meter, go to a pole that has been equipped to be detuned. The detuning capacitor should be variable to get different readings of the rf current to ground. Cut the ground wire about six inches above the ground and insert a standard rf meter (I use one with a 0-250 mA

Mr. Oliphant was transmitter supervisor of KOMA, Oklahoma City, when he prepared this article. He is now chief engineer of KELI, Tulsa.

range). Vary the detuning capacitor until you get some satisfactory reading, say 200 mA. Place the box meter next to the wire with the notches across the wire. Then select the proper multiplier resistor to get this box meter to read the same as the standard (200 mA). Once this is done, vary the detuning capacitor to see how well the box meter tracks with the rf meter. (With the meter mentioned, they should track together very well.) For the 0-5 A scale range, use a multiplier resistor ten times the value of the one used in the 0-500 mA range. The 5-A scale is not critical as to accuracy since poles are detuned to have a ground current somewhere in the 0-500 mA range. Adding 0-100 mA scale is desirable as some poles can be detuned to read in 50 mA or less. After the calibration, splice the cut back together.

The Actual Detuning

The object of detuning is to bring the ground current in the ground wire, the metal pole, or other object of re-radiation to a minimum. Thus the box meter and its loop are placed as close to the ground as possible (and far away from the detuning loop.) The method is not perfect but can bring the re-radiation down where it can be tolerated. The capacitor current rating depends a lot on the location of the pole and how much current will flow through the capacitor.

The problem of what poles shall be detuned, type capacitances to use, etc., remains. This is determined by the individual situation, the strength of tightness of the pattern, ratio of the strong side of the signal to the back side, nearness of the pole to the antenna array, etc. The chief engineer will have to work that out with the consultant. [See also box, Specific Detuning Problems.]

The current flowing through the capacitor is the circulating current and can be several times the amount of the current flowing to the ground when the pole is detuned. This circulating current determines the size of the capacitor and what type to use. In a 50-kW field, the current can be several amperes and a G-2 capacitor is advisable.

One way of going about detuning a ground wire is to get a capacitor somewhat smaller than necessary and parallel it with a variable capacitor (or capacitor decade) that may be tuned through the point of minimum ground current. Another alternative to extending the capacitance range

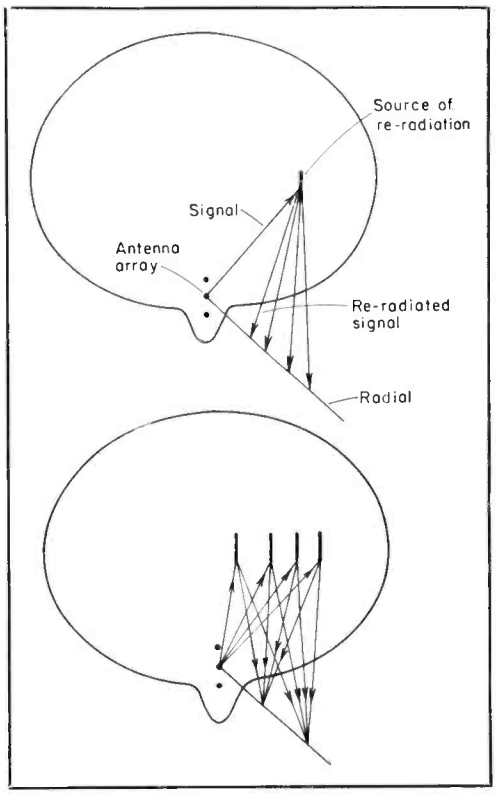


Fig. 1A and 1B. Re-radiation from single source (top) and several sources (bottom).

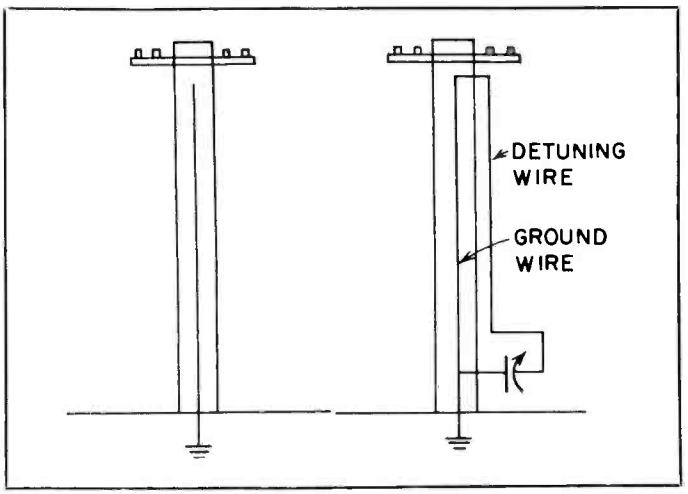


Fig. 2A and 2B. Pole with ground wire (left) and with detuning wire and capacitor (right).

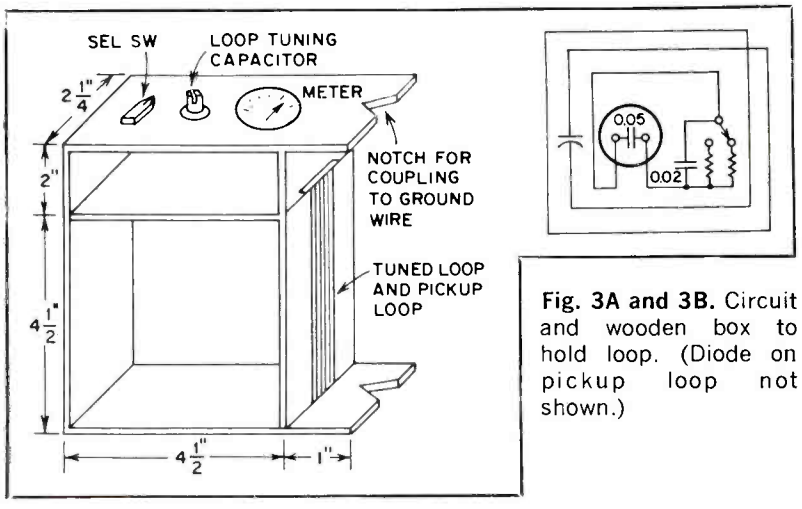


Fig. 3A and 3B. Circuit and wooden box to hold loop. (Diode on pickup loop not shown.)

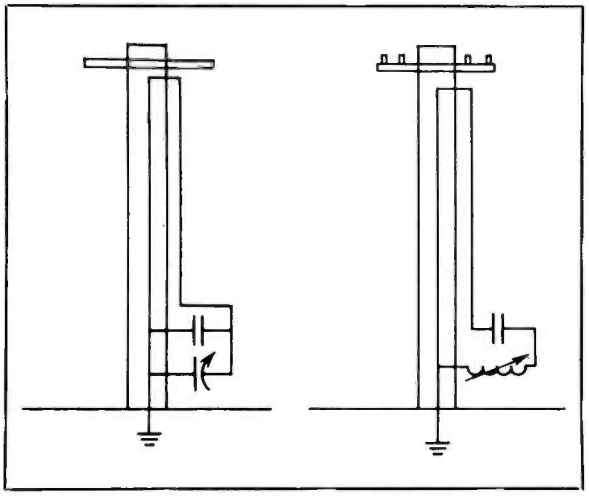


Fig. 4 (left). Variable capacitor is tuning unit.
Fig. 5 (right). Coil in series detunes circuit.

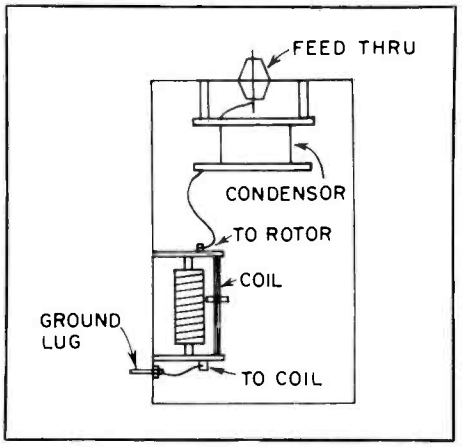


Fig. 6. Capacitor and coil in box.

Specific Detuning Problems*

By Perley W. Tribou,
director of engineering
Storz Broadcasting Co.

*Extracted from a paper delivered at the Western Broadcast Symposium of IEEE, Los Angeles, Calif. November 1967.

If a pole line is suspected of re-radiating, do not check one or two poles, but check them for some distance. Many times you could be a half mile or more from the transmitter plant and find a pole that has a large amount of current in it. The distance from the transmitter could vary according to the station power, etc. In other words, we have found hot poles a mile and a half from a transmitter that is radiating 50 kW of power into a directional array.

In one situation, we had to detune over 150 structures to get the array back to a stable condition. We make approximately 300 re-radiation measurements a month. If a high reading is found in monitoring, check for a defective tuning box. Generally you will find that it has been hit by lightning and the capacitor destroyed.

A good detune adjustment should have a reduction of 10 to 1 in current flow. There are times when this value cannot be reached and a lesser value has to be accepted. In the detune adjustment, when the correct one has been reached, the meter will show a rise in current and then fall very rapidly to a minimum. This null or minimum is normally very sharp. Be sure to keep your portable loop meter far enough away from the detuning loop so no coupling will be experienced. The current in the detuning loop will increase many times as the loop is tuned. As an example, a pole with 500 mA flowing to ground could have 2 to 3, or more amperes of current circulating in the detuning loop after the rf current flow to ground has been cut off.

On an electric line, after each pole is detuned, be sure to recheck all the poles in that line because, as the current flow is cut off in one, it will change in others. On most occasions it will be reduced, but there have been occasions when the current in untreated poles would increase instead of decrease.

In the four-legged steel tower used by power companies, each one of the four legs must be treated on an individual basis. When a leg has been detuned, it causes the current to be higher in the others. A most important consideration in this type of tower is where the bracing ties into one point. All of the horizontal, diagonal and vertical members must be bolted together at the place where the detuning box is installed. If this is not done, current can get by the cut-off point and your detune is not very effective. Each detuning box may have to be adjusted a number of times until the optimum detuning has been reached. Total amount of current flowing in all legs indicates the amount of current flowing in the tower.

It is also important to check all towers that appear to need treating because the current flowing in all of the towers will change as a tower is completely detuned. As an example, a power company erected a new high line within 800 feet of an antenna array. There were 26 towers 113 feet high in this line. A decision was reached that the maximum allowable radiation from any of these towers should not exceed 5 mV/m at a mile. This meant that the total current flowing in any one tower could not exceed 200 mA. We have been successful in accomplishing this with the normal detuning configeration, even though some of the towers had over 1 A of current before any detuning, and the closest tower had nearly 2 A. As it finally turned out, we had to detune 15 of the 26 towers involved. If for any reason a structure of this type does not detune properly with the method just discussed, there are some other procedures that can be followed. Two detuning wires can be installed on each leg and connected to a single detuning box. If this fails, an additional detuning wire can be attached down the center of the face of the tower closest to the array. This could have its own detuning box. In our case we had the full co-operation of the power company involved. They supplied all of the hardware for the detuning loops and also the installation. The station supplied the detuning boxes.

A third type of structure is the television tower. The towers are normally tall, and it takes very little current flowing to create a problem. As these are normally grounded towers, they can be treated the same as the others, but a more sophisticated physical installation should be used. In most cases there is more than one station signal on the structure, so in order to determine whose they are and the magnitude of each, place a Nems-Clark 120-E or

and still get a tuning situation is to use a variable coil (such as the Johnson 229-202-1) between the capacitor and ground. This is more satisfactory than the variable capacitor in parallel with a fixed unit as it is not as critical as to tuning and stays in adjustment better. This can be mounted in a metal box of proper size. Fig 4 illustrates a fixed capacitor shunted by a variable. Fig. 5 shows the coil in series with the capacitor. Fig. 6 shows the capacitor and coil mounted in a box. One disadvantage of the coil is that it will get dirty and make poor contact. Then the coil will have to be taken out and cleaned.

In certain situations, a fixed capacitor can be used and tuning accomplished by sliding the capacitor leads up and down on the pole attached to ground and detuning wires until minimum ground current is accomplished. Or place a calibrated variable capacitor across the ground and detuning wires and determine the size necessary. Then use the nearest fixed capacitor size and again slide the capacitor lead up and down as suggested to secure minimum current.

If the poles to be treated are metal power ones of the four legged variety, it will be necessary to put the detuning wire on each leg and detune each one. Attach the wire near the top on the leg held away by insulator standoffs and detune each one. Attach the wire about a foot away from the leg and bring it down to about five feet of the ground. Then attach the detuning capacitor between the wire and leg. As the legs are detuned the re-radiation current is chased around to the undetuned legs until all are detuned. ●

equivalent field intensity meter in close proximity to the base of the tower with the loop headed directly to the tower (not over 1 foot away). Tune the meter over the entire tuning range and record the readings. This will indicate what signals are on the tower.

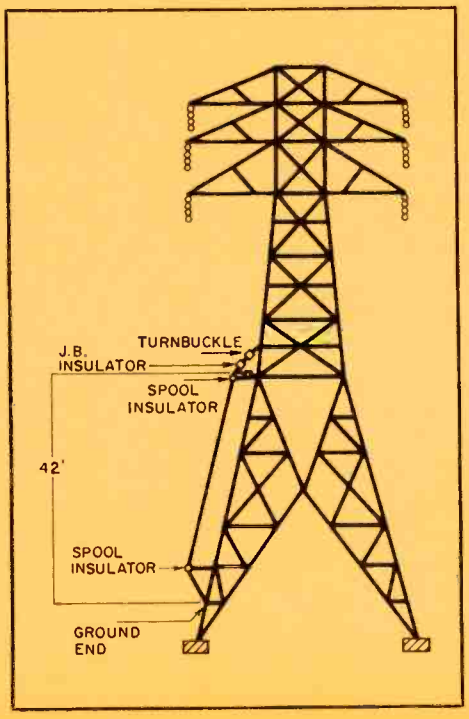
In order to show the magnitude of the signal you want to detune, a meter and circuit should be constructed with the appropriate filters in it to bypass the unwanted signals to ground and leave only the one to the detuned showing in the monitor meter.

The procedure used for detuning two 800-foot TV towers located within 0.75 miles of one of our transmitters is as follows. The towers were treated with three chokes or detuning loops. These are separated and a pickup loop installed. The current in the pickup loops is fed back to the TV transmitter building where the meter has been permanently installed for monitoring purposes. An RG8/U line was used from the pickup loops to the meter. With the ability to monitor the readings daily, it is easy to keep a close check on conditions of the detuning on the towers. The detuning loops were approximately 180 feet in length with two vertical wires held off each leg about 18 inches. The wires that form the detuning loops should be at least No. 4 copper, either solid or stranded. In some cases aluminum wire can be used. In some areas aluminum wire will be more susceptible to corrosion. This should be carefully checked before the installation. The top end of the loop is connected directly with the tower at each leg. The lower end of the loop is connected together with a horizontal wire around the tower. This connects all the vertical wires to a common point. This in turn is connected to the detuning box. The detuning box is grounded to the tower. The pickup loops are made of ¾-in. copper tubing about 8 × 3 feet and are mounted on insulators. This is very similar to the sampling loops used on a-m towers.

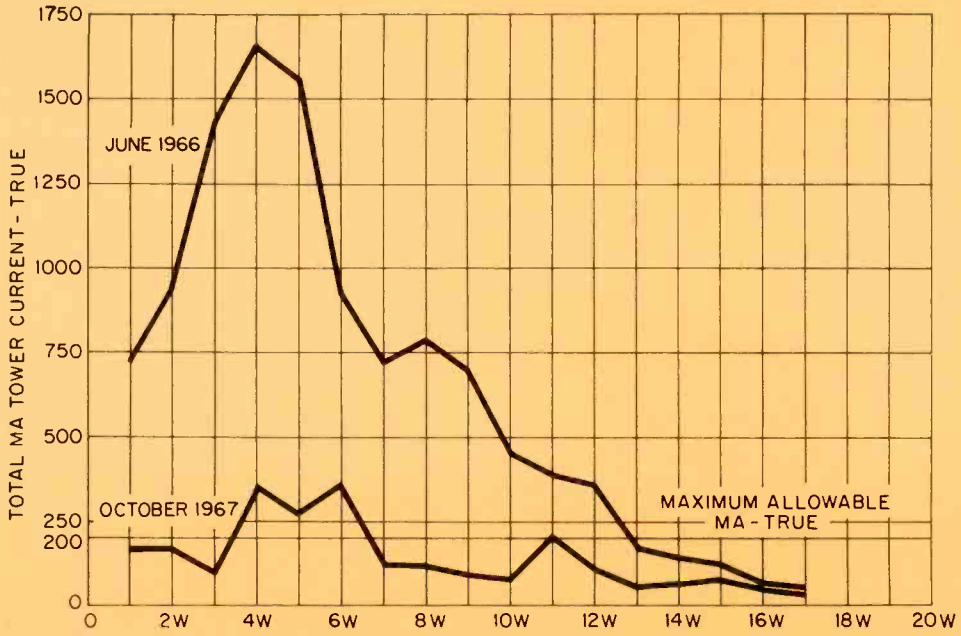
Detuning is performed by adjusting the capacitor in the tuning box to the minimum indication on the meter in the building. It takes two men to accomplish this and some form of communication. This should be done to all loops. Generally, these will have to have more than one adjustment, as there are mutuals between the detuning loops. More than one loop should be used. The total depends upon the height of the tower.

It is easier, physically, to run all the vertical wires to the base of the tower anchor, by some convenient method, and install turnbuckles to tension the lines. The loops can be formed by adding some type of strain insulators—pyrex, fiberglass and epoxy, or the old standby, Johnny Ball insulator—all work equally well. Be sure to bond the upper end of each of the detuning loops to the tower at each leg.

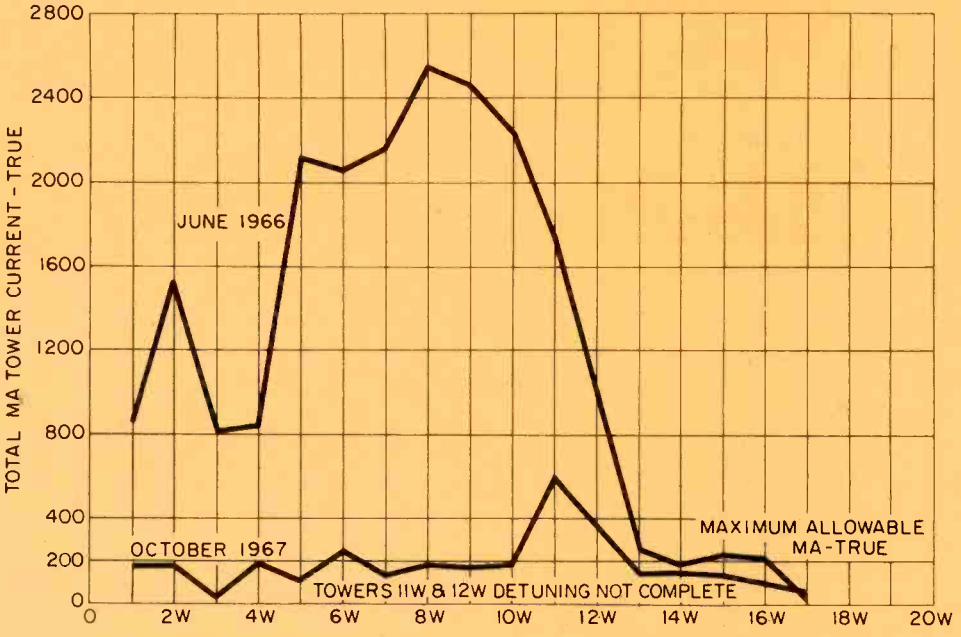
To point out the reaction of a line of steel



Detune wire attachment for four-legged steel transmission line.



Tower current before and after. Source is 5-kW directional antenna, daytime. Numbers on abscissa refer to pole numbers.

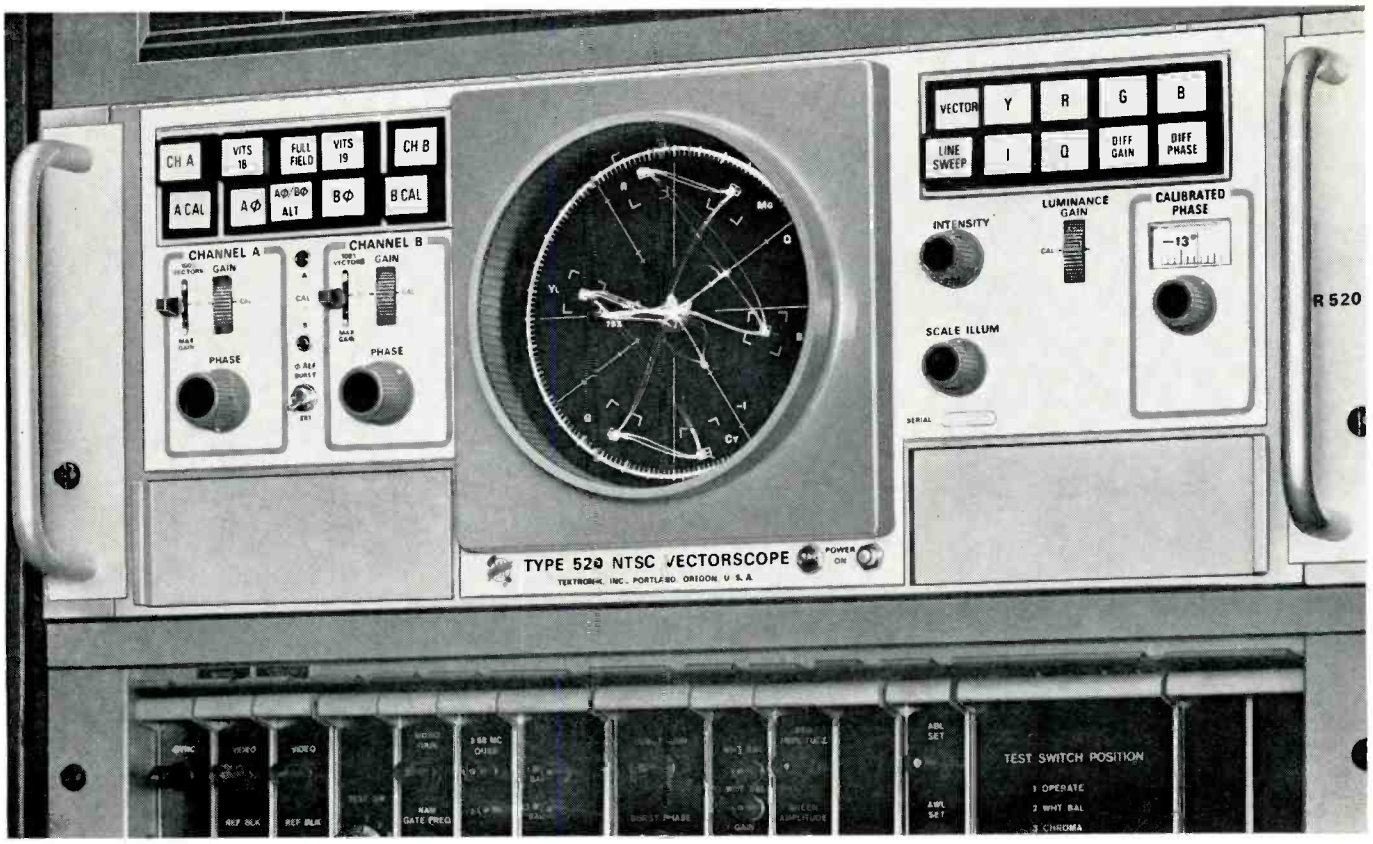


Same towers as above except nighttime readings, before and after, shown.

towers, the following work has just been concluded on a double line of towers. These were a little different than the four-legged variety. These towers were held upright by four guys and came to a pivot point at the base. They were 88 feet high overall, each tower supporting one set of high lines with one shield wire or ground wire at the very top. This problem was discussed with the power company and it was their decision to insulate the shield wire from the towers and at the same time install an arc gap. We felt at that time this would be the ultimate solution on this set of towers. The area was swampy and accessible only by marsh buggy or helicopter and detuning would be nearly impossible, so this seemed to be the best approach to the problem. The two sets of high lines ran at right angles through one of our major lobes on the nighttime DA, in an area where there was nearly 1 V of rf signal.

The power company proceeded to insulate the shield wire with excellent results. The current in all the towers is now below a maximum allowable that we established per tower and no further work is required.

Another type of problem developed in detuning at a baseball park. Each of eight 85-foot four-legged steel towers was top-loaded with a bank of flood lights. We were unable to do an acceptable detuning on any of these towers for some unknown reason. This project was undertaken in the months of December and January when ground conductivity was high. The below zero Minnesota weather did not help a bit. It turned out that the reason for our inability to detune any tower in this group was that all towers were tied together with an overhead ground wire and all transformers (one on each tower) were connected by a common hot line. In order to overcome this problem, a network consisting of a coil of wire and a capacitor (fixed) was added at each tower in both the ground line and the hot line. This isolated the towers from each other, thus making detuning possible. The detuning of these structures was done by the same method described for the four-legged towers on a high line.



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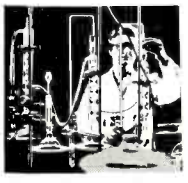

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Circle 48 on Reader Service Card

Uhf Revisited

By William L. Walker

THE UHF SEGMENT of the television industry has had ups and downs—to say the least—over the past 15 years. During the 1962 series of NAB Fall Conferences, Jim Hulbert talked about this general topic under the title "What's in it for U?" Two years ago, I talked about "The Economics of Uhf," with special attention to the then new proposal for small community stations on channels seventy to eighty-three.

The attitude toward uhf stations varied widely in 1965. After one meeting, one person said that I painted too dismal a picture for the future of uhf. He said that I should not be so pessimistic—my comments could be injurious to operating uhf stations. Another broadcaster praised the talk and said that he thought it was one of the most upbeat discussions of uhf he had heard, and that he thought he might put together an application for an unused U channel in his home town. Both listened to the exact same talk.

That 1965 talk (see *BM/E*, April 1966, p. 70) contained some predictions on the future of uhf. Let's take a look at those estimates, and see how they stack up today. First, our estimates of operating uhf stations.

Fig. 1, dashed line shows we predicted a steady growth from 97 to 300 in five years with no fluctuation. The black solid line beneath shows what has happened to date. One-hundred-twenty-eight uhf stations were in operation by Fall 1967, representing more than a 30 percent increase over 1965. While this figure of 128 is somewhat lower than it should be to make a neat chart, it must be remembered that at that time there were 151 outstanding CPs for uhf stations. This actual growth line should continue its upturn, and cross the prediction line in advance of 1970.

Sets with Uhf Ability

Another prediction of two years ago was on the percentage of television sets with uhf capability, Fig. 2. Here again, the dashed line shows our prediction of the percentage of sets in use which would have uhf capability, topping out sometime in 1971 at about 95 percent. This is probably as close to theoretical saturation as we will reach within a reasonable period of time. The solid line shows what has happened and it indicates our estimates were somewhat optimistic.

While the failure of uhf capability nationwide to grow as rapidly as predicted is somewhat deflat-

Mr. Walker is director broadcast management. Material presentedd her was first delivered to the NAB Fall Conferences.

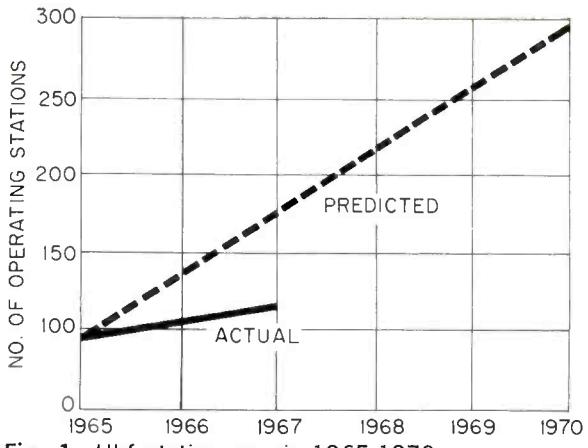

Fig. 1. Uhf station on air 1965-1970.

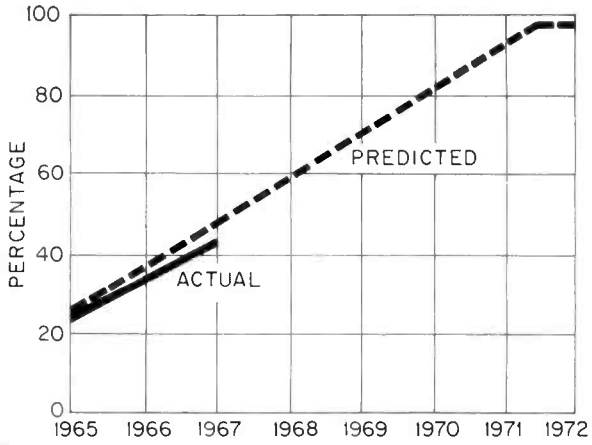

Fig. 2. Television sets with uhf capability.

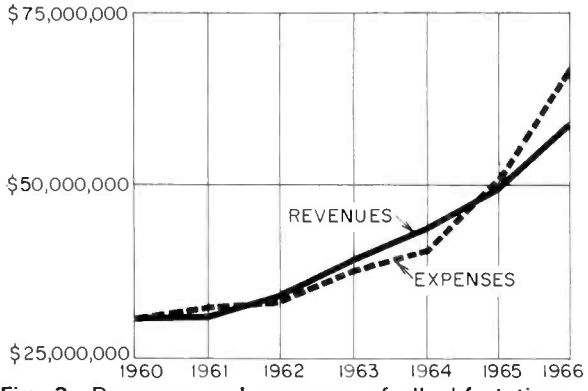

Fig. 3. Revenues and expenses of all uhf stations.

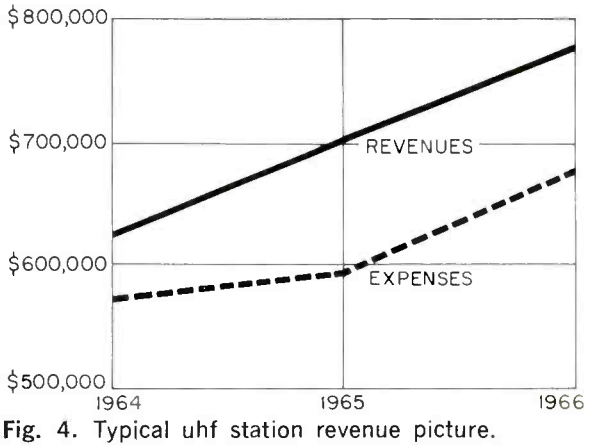

Fig. 4. Typical uhf station revenue picture.

ing, there are encouraging signs. The American Research Bureau sweep for February-March of this year came up with some interesting statistics on individual markets. While the old established all-uhf market has gone along for years with 95- to 100-percent uhf set penetration, this sweep showed uhf impact in the formerly all vhf markets.

As an example, Washington, D.C., where four, pre-freeze, vhf stations have been joined in comparatively recent years by three U's, one of which is educational, the ARB sweep came up with a 61-percent conversion rate. Detroit, a similar situation, is reported at 57-percent uhf.

Of the 62 top markets listed by ARB, the lowest penetration shown is 24 percent for Roanoke-Lynchburg, Virginia. The hilly terrain and the mileage separation between the two cities making up the market may account for this.

All in all, there is nothing in the picture of growth of uhf stations or uhf penetration to cause pessimism. Both point to increased future growth.

One can really sense the spirit of optimism in uhf. The recently announced sale of a uhf outlet for a record price of $6,850,000, indicates that some are backing this optimism with cold, hard cash. If this continues, we may have to forget that uhf stands for ultra high frequency—uhf is really ultimately high finance, if it is not already so!

In addition to the record $6-million plus sales price, uhf revenues reflect a steady growth. Unfortunately, expenses also increase.

Revenue vs Expense

We have in Fig. 3 the total revenue and expense figures for 1960 through 1966 for the uhf segment of the industry. The solid line is revenue. The dashed line expenses. While revenues almost doubled, from just over $30-million to just under $60-million in the seven years, expenses more than doubled. That total expense figure of more than 67-million dollars last year should indicate that uhf is no longer small business.

Admittedly, these figures showing uhf stations operating at a collective loss in three of the seven years are downbeat. However, it should be remembered that the number of operating, reporting uhf stations increased in this period from 76 to 114 stations. That is exactly a 50-percent increase. It is our opinion that these losses, especially in the past two years, largely reflect the costs of getting new stations on the air and underway.

Our special NAB financial reports for uhf, giving data on the typical, or median, uhf station, present a somewhat better picture, Fig. 4.

Here we have the revenue (solid line) and expense (dashed line) picture for the typical U for 1964, 1965, and 1966. These figures go back only for those three years. They were not compiled earlier.

We see that the typical U increased revenues by about 25 percent in the three years, while expenses increased by less than 18 percent. Result, the typical uhf operator increased his profit margin from 9.4 to 14.5 percent.

At first glance, it may seem these two sets of figures are contradictory. Not so. They point up the fact that uhf itself is now composed of two segments. The new stations swell the industry totals for revenues and expenses, but add little to the profit side of the ledger as they strive toward the break even point. The FCC figures emphasize this.

In the meantime, the typical station is an old established uhf operation. It reflects continued improvement in its record. As there are more of these "old pros," who started 10 to 15 years ago, the NAB figures here shown reflect a stable, profitable, established business, with a good record of progress and growth.

Now we come to the question of the "New Breed," which swelled the ranks following the adoption of the all channel set law. How are these newcomers faring?

Here is the summary of the typical "new breed" uhf station last year; that is, one which went on the air within the past five years. Revenues, $785-thousand; expenses, $1.1 thousand; deficit last year, $316-thousand.

Of interest is the fact that these newer stations report higher median figures for both revenues and expenses. The reason apparently is that the established, successful stations operate in medium to smaller markets, while these newer operations are in the larger markets. While there is more money to be made in the metropolitan centers, it also costs more money to operate in such an environment.

The entrepreneur who plans to construct and operate one of these stations would do well to look to his financing before starting. The late Henry Kaiser, after his adventure in the auto manufacturing field, said that he and his associates expected to put $50-million in the project. But, he said, they expected that amount of money would at least make a ripple in the pool. Well, it will not take $50-million to make a success of one of these metro uhf outlets, but the ownership had better have more than a shoestring before dipping a foot in the water. The tombstone of many a defunct uhf should read "died from insufficient capital."

The encouraging thing about the new U's is that they are able to generate revenues on the scale reported. More than three quarters of a million dollars is a lot of money. This is especially true when one considers that there has been a ceiling on uhf revenues to date.

Due to the combination of market size, conversion of receiving sets, and similar factors, no uhf station to date has turned in revenues of more than 2-million dollars in any one year.

One friend of mine, a veteran uhf operator, assures me that his outlet will break that barrier this year. This will be one more milestone in the long, sometimes discouraging route that uhf has followed, but it is one which truly shows that uhf has followed, but it is one which truly shows that uhf is on the move, and should continue to grow. ●

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Guide To CATV Cable Selection:

Part II

PART I of this series covered basic factors involved in the selection of CATV cables. We defined impedance, attenuation, return loss, moisture resistance, flexibility and resistance to environmental conditions. The basic types of CATV cables and their applications were discussed, but no specific model numbers or brand names were mentioned.

This article will cover the cables made available by some of the CATV industry's leading suppliers. To compile this information, *BM/E* contacted every manufacturer in the industry. We asked them to send us cable descriptions and specifications and invited them to tell us why they thought their cables were better than competitive products.

No attempt was made to evaluate or to test manufacturer's claims. Indeed, objective evaluation is virtually impossible, since it would involve testing each model number of each manufacturer under a wide variety of environmental conditions and over a period of many years. Even with tests like this, evaluation would be difficult, since so many subjective factors are involved.

Fortunately, there is no credibility gap in the CATV cable industry. Published specifications, features and characteristics are consistent with theoretic parameters and with specifications for cables used in other industries. Moreover, CATV designers are able to use published specifications to plan systems that deliver good pictures to subscribers. Finally, the various manufacturers agree fairly closely in specifying the characteristics of similar types of cables.

Here in alphabetical order is what the cable manufacturers have available and what they themselves have to say about their wares.

Alpha Wire and Cable

Alpha makes a wide variety of wires and cables, including a number of RG-59 and RG-11 types. The CATV industry uses Alpha cables primarily for drop lines (see Fig. 1). They offer almost every type of drop cable used by the CATV industry, including four different jacket types (Polyethylene, ordinary Vinyl, –50°C Vinyl, and Noncontaminating Vinyl); copper clad steel or pure copper center conductors in two different sizes; and optional integral messenger cables. The attenuations of Alpha drop cables are specified as follows:

Type	Center Conductor Size	Dielectric Core	Attenuation In dB/100 60 MHz	216 MHz
RG-59	#22 AWG	Solid	2.6	5.2
RF-59	#22 AWG	Foam	2.3	4.3
RG-59	#20 AWG	Foam	2.1	4.1
RG-11	#14 AWG	Foam	1.1	2.4

Alpha cables are notable for using, on an optional basis, a rodent repellent jacket. Rodents, of course, cause millions of dollars worth of cable damage.

According to Jerome I. Cohn, Alpha product manager, the rodent repellent "has proved to be 95-percent effective."

In describing overall Alpha quality, Cohn says, "Modern electronic in-process control and monitoring equipment continuously supervise each phase of the manufacturing cycle. All parameter variations are automatically recorded—providing a record for each foot of cable that is produced."

Ameco

One of the best known CATV equipment manufacturers and turnkey system builders, Ameco, began manufacturing cable less than two years ago. However, they produce almost every type of cable needed to build a CATV plant. (They make no cables with integral messengers as yet.)

Ameco makes seamless aluminum sheathed cables (see Fig. 2) with and without jackets and messengers. All of their aluminum sheathed cables use foam dielectric and pure copper center conductors. Attenuation is specified as follows:

OD	Attenuation in dB/100 ft. Ch 2	Ch. 13
0.412 in.	0.75	1.52
0.500 in.	0.61	1.26
0.750 in.	0.41	0.88

Ameco drop cables are available with PE or PVC jackets, copper clad steel or pure copper center conductors, and solid or foam dielectrics. They also offer a choice of 81- to 96-percent shield coverage.

The 0.0253 in. copper clad steel center conductor cables with solid dielectric are specified at 2.5-dB/100 ft attenuation at 50 MHz and 5.2 dB at 200 MHz. The 0.032-in. pure copper center conductor cables with foam dielectric are specified at 1.8 dB/100 ft at 50 MHz and 3.7 dB/100 ft at 200 MHz.

S. A. Mills, vice president of Engineering and Production for Ameco Cable, Inc. feels that there is a strong need for universally accepted CATV standards.

"During the past few years, the CATV industry has grown in both size and complexity," he writes.

"With this growth, there has been a corresponding increase in the variety of cable constructions used in the systems. Varying installation conditions, system demands, personal preference, and manufacturing techniques have increased the number of cable configurations to well over 150 types. It is unlikely that this trend will subside. On the contrary, new demands and advances in technology will promulgate new cable constructions."

Mills points out that several organizations, including IPCEA, REA and the NCTA, have established committees to develop universal cable standards.

"We believe," he says, "that during 1968, CATV standards and specifications will be generated either by one of these organizations or by other interested parties."

Ameco offers a booklet "CATV Cable Code Guide" which classifies some 125 CATV cable types.

1—Drop cables, with and without integral messengers, are available from most CATV cable manufacturers.
2—Solid seamless aluminum sheathed cable is manufactured by Ameco, Amphenol, Phelps Dodge, Superior, Times and Vikoa. Jackets and messenger are optional.
3—Amphenol's BC/U cables are thin seamed outer conductor and drain wire.
4—Anaconda Sealmetic cable uses their aluminum tape chemically bonded to outer jacket.
5—Phelps Dodge Spirafil II uses polyethylene helix. It can be pressurized for protection against moisture.

Where to Get Further Information

Alpha Wire
711 Lidgerwood Aveune
Elizabeth, N.J. 07207

Ameco Cable, Inc.
4645 W. Van Buren
P.O. Box 6760

Amphenol Cable Division
6235 S. Harlem Avenue
Chicago, Illinois 60638

Anaconda Astrodata Co.
Box 3772
Anaheim, California 92803

Belden Corp.
415 S. Kilpatrick Ave.
P.O. Box 5070A
Chicago, Ill. 60680

ITT Wire and Cable Division
172 Sterling St.
Clinton, Mass. 01510

Phelps Dodge Copper Products Corp.
300 Park Ave.
New York, N.Y. 10022

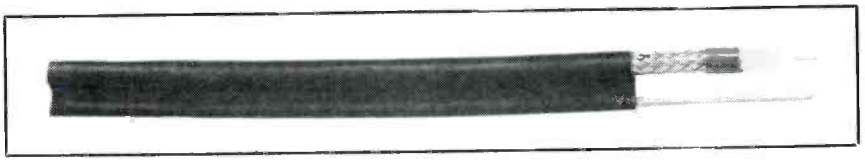
Plastoid Corp.
42-61 24th St.
Long Island City, N.Y. 11101

Rome Cable
421 Bridge St.
Rome, N.Y. 13440

Superior Continental Corp.
P.O. Box 489
Hickory, N.C. 28601

Times Wire and Cable
Wallingford, Connecticut

Vikoa
400 9th Street
Hoboken, N.J. 07030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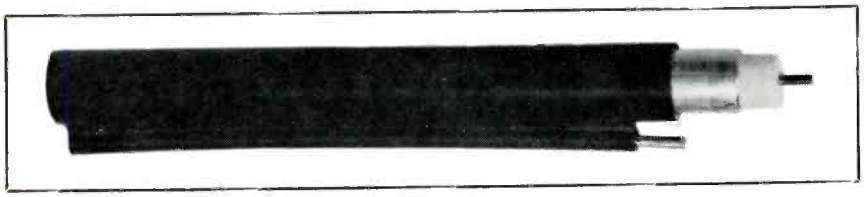
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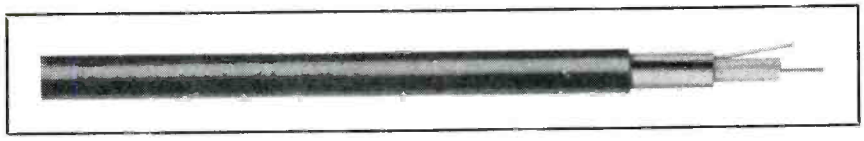
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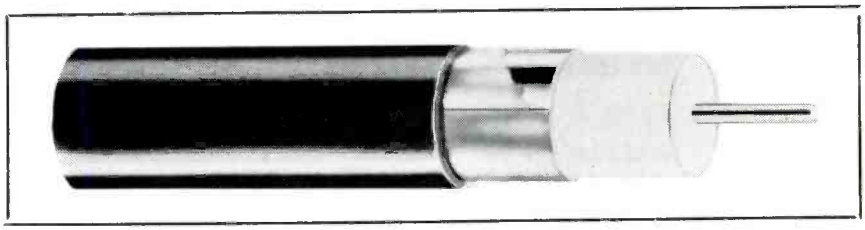
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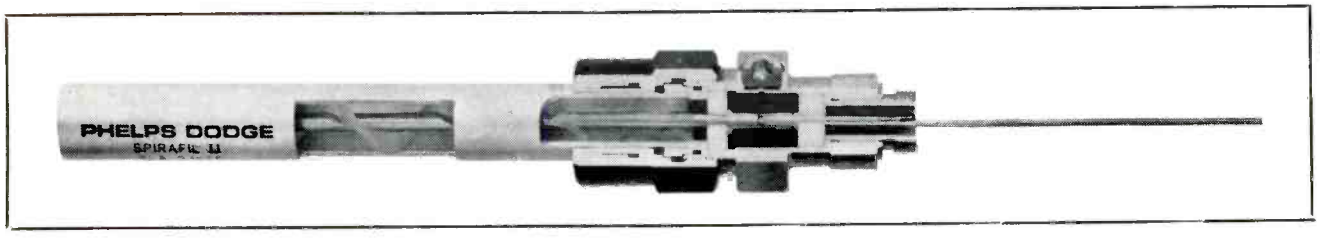

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Amphenol

Amphenol also makes a full line of CATV cables. For trunk lines, they offer solid aluminum sheathed cables in the usual three diameters, with and without jackets. For drop lines, they offer several types of RG-59 cables. All of their drop cables use copper covered steel center conductors, and integral messengers are optional.

Amphenol offers two unusual cables. BC-59/U and BC-6/U (see Fig. 3) are drop cables with 100-percent shielding. They use a light seamed aluminum outer conductor which, according to Amphenol, makes them 35-percent lower in weight than ordinary RG-59/U, yet lower in loss. BC-59/U attenuates signals by 4.4 dB/100 ft at channel 13, while BC-6/U causes 3.6-dB/100 ft attenuation at that frequency.

They also make a flexible corrugated aluminum sheathed cable with OD's of 0.412 and 0.500 in.

Anaconda Astrodata

Anaconda Astrodata makes a CATV cable that is truly unique. Sealmetic cable (see Fig. 4) uses a thin aluminum tape as the outer conductor. According to Anaconda, the construction of this cable depends upon Zetabon, a thermoplastic copolymer clad metal providing a positive moisture barrier. Zetabon is a 2 mil thickness of copolymer coating on an 8 mil aluminum tape. It is longitudinally folded completely around the dielectric to provide the outer conductor with a 360-degree coverage, plus approx ¼-in. overlap.

During extrusion of the polyethylene outer jacket, the copolymer becomes chemically active and upon cooling produces a 360-degree molecular barrier around the outer conductor, insuring protection of the dielectric integrity. The copolymer provides a hermetic seal between the overlapping portions of the aluminum outer conductor.

The outstanding characteristic of Sealmetic cable is its flexibility. Sealmetic cables are available in four ODs. The following attenuations are specified:

Cable Size OD	Attenuation in dB/100 ft. at 216 MHz
0.412 in.	1.59
0.500 in.	1.26
0.625 in.	0.99
0.750 in.	0.89

Anaconda foresees a sharp increase in the number of underground installations. E. Mark Wolf, chief engineer of Anaconda's Communication division, makes two points in this connection.

"The molecular structure of polyethylene has a most important bearing on its performance underground. Today we have sensitive tests for environmental adequacy of polyethylene, and have learned that high molecular weight polyethylene must be used for underground cables."

"Polyethylene coverings must be properly applied if they are to act as impervious barriers between the soil environment and the cable core. To prevent the jacket from acting as an osmotic membrane permitting moisture vapor to be transmitted through it, it must be in complete and intimate contact with the core. One of the best means for achieving this condition is the use of an adhesive bond between the polyethylene jacket and the underlying aluminum shield."

Belden

Belden also makes a number of drop cables for CATV. The cable they feature is 8228 Duo Foil, described by an engineering department spokesman as follows:

"Belden Duo Foil consists of two sheets of aluminum foil laminated to a center reinforcing sheet of high strength polymeric film. For ease of termination, and for increased reliability, four evenly spaced copperweld drain wires are applied spirally over the shield. The spiral application of the drain wires provides better flexibility of the cable when compared to drain wires which are applied parallel to the cable."

"Belden 8228 Duo Foil shielded cable actually has the same interior construction as foam RG-6/U type cable, but the outside diameter is the same as RG-59/U. Attenuation is even lower than that of foam RG-6/U with a braid shield because of the better rf characteristics of Duo Foil."

8228 Duo Foil is specified as causing an attenuation 1.6 dB/100 ft at channel 2 and 3.3 dB/100 ft at channel 13.

ITT Wire And Cable Division

ITT makes a complete line of trunk, feeder, and distribution cables. According to Donald C. Alexander, vice president of Engineering, the unique feature of ITT cable is the process of aluminum sheathing.

At ITT Wire and Cable the aluminum sheath is formed from a moving ribbon of aluminum, welded from a continuous process. This feature enables us to turn out aluminum sheathed cable many thousands of feet long, limited only to shipping reel capacities. Long lengths require fewer splices, connectors and amplifiers; keep signal distortions at a minimum and insure stable, predictable performance and reliability. The manufacturing process also insures uniformity of sheath and excellent moisture protection."

ITT welded seam aluminum cable is available in 0.412-, 0.500- and 0.750-in. ODs. They specify approximately the same attenuation as does Ameco for similar sized solid aluminum sheathed cables. ITT also supplies jacketed and messengered cables.

Phelps Dodge

Phelps Dodge makes two basic lines of CATV cables, Foamflex, which is similar to other solid seamless aluminum sheathed cables and Spirafil II. (see Fig. 5). Spirafil II uses a solid polyethylene helix which completely covers the solid copper

center conductor without interruption. However, as can be seen from the illustration, most of the dielectric between the center conductor and the shield is air. The outer conductor is a solid aluminum sheath and this is covered by a polyethylene jacket. Spirafil II is also available with an extra "steel armor" corrugated jacket covered by another polyethylene jacket.

The big danger of an air dielectric cable is the possibility of moisture getting into the cable. However, F. W. De Turk, market manager of Phelps Dodge, says that Spirafil II "provides lower attenuation and higher return loss guarantee than any other cables offered to the CATV industry. In addition, it can be pressured so as to provide a positive method for moisture protection."

Specifications for Spirafil II cable are as follows:

OD	Attenuation in dB/100 ft at Channel 13
½ in.	1.00
¾ in.	0.73
1 in.	0.55

Superior

Superior pioneered the use of corrugated copper shielded cables. However, they also make solid aluminum sheathed cables, a full line of drop cables and armored submarine TV cables.

"Coppergard" cables use a solid copper conductor, foam dielectric, and a corrugated copper shielding covered by a black polyethylene jacket. For underground installations these cables use a "water-bloc" low loss flooding compound and high molecular weight polyethylene jackets.

Their submarine cables use a bare solid copper conductor, solid high molecular weight polyethylene dielectric; "water-bloc" low loss flooding compound; 0.005-in. corrugated copper shield longitudinally applied; an inner jacket of high molecular weight black polyethylene; jute bedding; spirally applied galvanized steel armor wires; and an outer jacket of high molecular weight black polyethylene. Superior "Coppergard" cables are also available in various sizes with integral messenger supports. Attenuation is specified as follows:

Model #	Jacket OD	Attenuation in dB/100 ft at Channel 13
4910	0.405 in.	1.85
4920	0.480 in.	1.50
4930	0.650 in.	1.15
4940	0.870 in.	0.85

Superior house drop cables use copper covered steel centered conductors in solid or foam dielectrics. They are available with and without integral messengers.

Times Wire And Cable

Times Wire and Cable makes a broad line of CATV trunk, feeder and drop cable. They are the leading advocates of solid seamless aluminum sheathed cable. Comparing seamless cables with seam welded aluminum cables they say, "Pinholes will most likely be present in seam welded conductors, though in good quality welds perhaps 1 per 10,000 ft may be the frequency. We do not feel that a few pinholes per thousand feet will affect the electrical characteristics. However, depending on the weld and how tightly the outer conductor is drawn down, there might be a possibility that vapor could follow the weld. We do not feel that the welded seam would seriously affect the flex life of the cable when used within the specified bend radius. In general, the overall strength of seam welded cables will be slightly less than that of seamless. The seam welded cables may not be perfectly round. Sealing should not be a problem, though may be slightly more difficult than with seamless. The main advantage of the seam welded construction, of, course is longer lengths."

Bob Burton of Times says, "The popular JT-1750 cable is now available with copper clad aluminum center conductor as a standard feature. A major benefit in using this same metal for the center and outer conductors is that the contraction ratio is more stable over extremes of temperature and thus minimizes pullout."

He goes on to state that, "The ultimate in low loss drop cable is the unique JT-207DT. This cable provides a maximum of 3.2-dB attenuation/100 ft at channel 13. For improved shielding and lower loss the JT-207DT is made with a longitudinal copper tape over the dielectric. Over this is an open round wire braid."

He points out that shielding is important, saying, "Poor shielding leaves the system prone to picking up direct off-the-air signals and other external interference from generators, electrical equipment and auto ignitions. To avoid these problems, systems designers should insist on having at least the full braid that is recommended in military specifications for cables the same size as the drop cable."

Vikoa

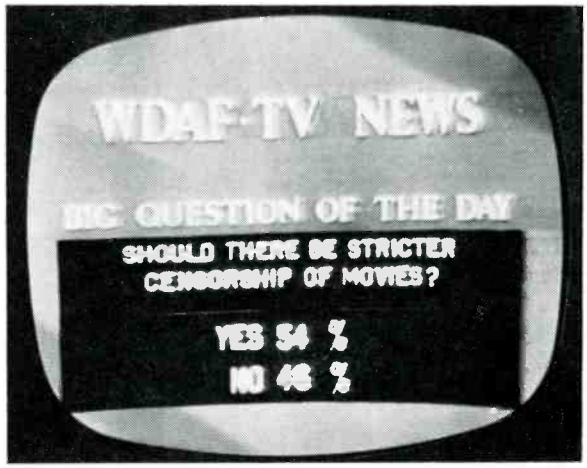
Vikoa features Vikal solid aluminum sheathed cables. Vikal is available in the three most common CATV sizes (412, 500 and 750), with and without jackets and with and without built-in figure-8 messenger wires. Vikoa also offers an unusually wide range of drop cables including solid and foam dielectrics, single and double shields, and single and double jackets. Integral figure-8 messenger wires are optional on most Vikoa drop cables.

Generally speaking these are the cables available to the CATV industry today. You pays your money and you takes your choice. In making your choice, however, it pays to spend as much time on selection of cable as you do on selection of amplifiers and other CATV hardware. Remember, amplifiers are relatively easy to replace while cables should be a permanent part of the CATV plant. •

WDAF-TV's Big Question

By Robert J. Wormington

Telephone voting is controversial, but WDAF-TV is developing refinements and improved methods of sampling public opinion by phone voting. Asking a "Big Question" nightly on news programs, WDAF-TV has attracted thousands of new viewers virtually overnight.



Typical announcement of Big Question results as it appeared on TV screens of Kansas City viewers recently.

NOTHING seems to travel quite so fast or so far as a good idea—especially when that idea attracts thousands of new viewers, virtually overnight, to your station. The so-called *Big Question* poll, as taken daily by television, has proven to be that kind of an idea. Within weeks, big questions were being asked of television audiences daily by at least one station in just about every major (and many minor) cities of the country.

Our station was one of those that jumped in feet first with its own big question posed and later answered on our news programs.

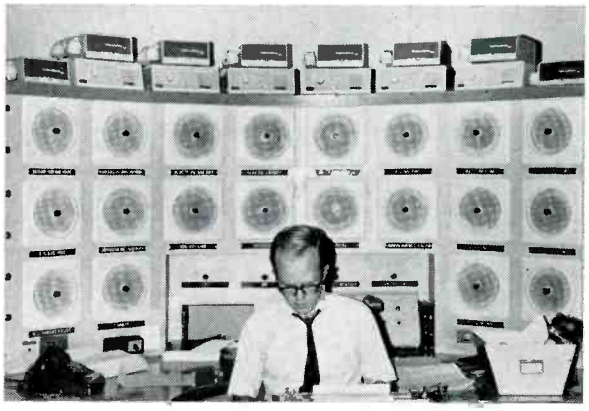
The idea was unquestionably successful. The very first night, switchboards were jammed by people dialing to record their votes over our poll telephones.

We quickly added more lines and more answering equipment, sufficient to handle up to 15,000 calls per night. Without doubt, the device has stimulated interest in our two evening news programs and has brought us new listeners as intended.

As a temporary audience building device, the *Big Question* has obviously earned its speedily established reputation. However, we believe that the idea and the methods used to record answers to the question can be a good deal more than that. Used responsibly, the technique can provide a genuine community service of long-range benefit to the community served and to the television broadcasting industry.

Author Wormington is general manager of WDAF-TV, Kansas City.

Bill Leeds, news director of WDAF, shows how mechanical counters are attached to framework at one side of installation. Each counter is hooked up to one Code-a-phone. Seven similar counters are mounted to other side.



Installation of 14 Code-a-phones on top of other communications room equipment at WDAF-TV in Kansas City. Units are available from Ford Industries, Inc., Portland, Ore.

If we had not anticipated advantages like this, in fact, we would not have invested as heavily in automatic answering equipment. Other stations that use automatic equipment to tabulate votes, I understand, are leasing that equipment. If the idea should turn out to have only short-term benefit for them, they can turn the equipment back without having made a large capital investment.

We started our program by purchasing outright six Code-a-phones. Each of these units has a three-minute answering announcement capability and can also accept two hours of messages from those calling.

The response to the new service was so great that these machines proved inadequate to handle the volume. Therefore, we acquired eight additional Code-a-phones of a different model. These units have an announcement capability only, representing a smaller unit investment. All 14 of our Code-a-phone units have been purchased outright. This will have important money-saving advantages.

We made this investment in part because we believe that the big question idea will be around intermittently, if not continually, for some years to come. We believe this opinion-sampling tool can be made even more significant through regional or even nationwide programs. And we anticipate use of this equipment in other ways such as marketing studies, and by inviting specific responses from listeners. For this, the Code-a-phones with the two-way message capability will be invaluable.

Our method of presenting the *Big Question* at present is to ask it first on the 6:00 to 6:30 P.M. news program. We try to pose questions of controversy and wide interest such as, "Do you believe college students should be exempt from the draft?" We have presented a number of political questions, with several bearing on the comparative popularity of principal candidates for President. Others have asked opinions about capital punishment, use of marijuana, and similar subjects.

We usually present the question no sooner than the middle of the program, urging viewers to telephone their views as a "yes" or "no" response. If their vote is "yes," they are instructed to dial the telephone number that will automatically register that decision. Calls to a second telephone number register a "no" vote.

The answer is announced during our 10:00 to 10:30 P.M. news program, again during the latter part of it. Accordingly, this gives those wishing to vote at least a four-hour period in which to register their decisions.

The automatic answering equipment is used to acknowledge each individual's telephone call by a pre-taped response. When the telephone rings, the announcement thanks the caller and informs him briefly that his vote has been registered as "yes" or "no" as the case may be.

In our studio, those calls are accepted on the 14 Code-a-phones. Seven machines are installed to respond to the "yes" number, the other seven to the "no" dialed number. If the first machine is already answering when a call comes in, the

second call is automatically answered by the second Code-a-phone, and so on down the line. When a question of exceptional interest is being voted upon, virtually all units will be busy answering during the entire four-hour period.

Obviously, if we did not have an arrangement like this, we would have to hire 14 individuals to answer 14 different telephones to do the same thing. This would be many times more costly.

Actual tabulation of the results is done by mechanical counters mounted to each side of the panel on which the Code-a-phones are placed. Each counter is connected to one Code-a-phone in such a way that each call registers one digit on the counter.

This arrangement does impose limitations, of course. We cannot receive more than 15,000 total votes on any one night. Nevertheless, that is still a lot of votes, since one machine can record seven calls in the time that it takes to dial that number once.

As a public opinion poll, the *Big Question* has one obvious weakness: there is no way of limiting the number of times one individual can vote. On issues where a highly vocal, well organized minority wants to make its influence felt, there is no way whatever to prevent a group of people from "loading" the results. When we posed a question about control of firearms, for example, the final tabulation was probably unrepresentative. Again, where there is a vote one way or the other of landslide proportions, the full extent of the landslide could probably not be measured, at least with equipment which we now have available.

It is also doubtful that the *Big Question* can maintain its high degree of interest day after day. Inevitably, you get down to questions of comparatively trivial interest. And the basic idea itself becomes less interesting.

Nevertheless, this does not by any means indicate that the program idea should be abandoned when interest fall-off does occur. To us, it means simply that it will be discontinued for a period of time, then brought back later. New issues and new questions will renew its interest at another time.

One of the major advantages of the method is quantity. In an area such as Greater Kansas City with a population of about 1,500,000, 15,000 votes is a comparatively large slice of public opinion. Moreover, if a number of different stations throughout the country collaborated on a specific important question, the results could be even more significant.

This, I believe, represents a real opportunity for service to the television industry. If a number of different stations in cities throughout the country collaborated on such a poll, the results could be significant under the right circumstances. This would especially be the case if consistent trends were visible in the results, indicating that they did indeed represent a reasonably accurate sampling.

Utilizing the larger Code-a-phone with the two-way message capability, we will also be able to set up a program along "Letters to the Editor" lines. With this, we could ask viewers their opinions on a specific subject, then invite them to telephone in their thoughts on that. Calls would be recorded on the automatic equipment. These would then be transcribed, and the best or most interesting would be read on the program.

Still another idea would be to poll viewers on subjects of consumer interest, such as their general desires in household appliances. A nationwide television poll could also be arranged in the same way, to answer specific marketing or consumer questions.

Other applications and ideas could undoubtedly be generated, with a little applied imagination. This is the kind of equipment that stimulates such ingenuity, once you have learned to use it and to understand its possibilities. ●

Disaffection With System Among Phone Pollsters

Though the prospect of being able to ask questions on the air and come up with numbers ostensibly representing totals of telephoned yes or no votes dialed by listeners on the issue at hand is attractive, two stations formerly employing telephone-call tallying equipment have withdrawn the service.

WCCO-TV, Minneapolis-St. Paul, began asking a nightly news question on September 3, 1967—racking up a total of 700,000 calls from listeners purportedly expressing opinions on questions asked by WCCO newscasters. After conducting a private survey on the accuracy of the telephone news question, George Rice of the station's news department, commented that telephone voting "is a disservice to the community."

WCCO-TV said "farewell—without regret—to the news question" on December 21.

Joining WCCO-TV in its mood of disenchantment with the phone-in survey technique, WBTV (TV), Charlotte, N.C., announced the termination of a similar service after 114 votes were tabulated on a nonexistent question when the on-air question was not being asked because of a telephone company request to keep the lines clear at a time when bad weather was anticipated. It took WBTV just six weeks to make up its mind to discontinue telephone surveying.

Newspapers, too, have had similar problems with straw polls. At least one New York State Congressman has had to deny any connection with a poll conducted by a local newspaper, saying, "The poll is only based on the chance number of readers who choose to express their opinions. Government decisions cannot be based on polls. The only sure guide is an election."

Leading spokesman and advocate for the vote-by-phone system, Paul Martin, national director of advertising and promotion for Triangle Stations, admits to "plenty of problems," for example, "improperly phrased questions," but defends the potential of the relatively new and unrefined technique, saying it "will eventually be a valuable kind of procedure."

How Two Schools Use TV Equipment

Mesquite, Texas, set up a $500,000 ITV system and uses the 2500-MHz ITFS system. Parsons, Kansas, relies on videotape recorders or the local cable TV system and a mobile van for distribution.

INSTRUCTIONAL TELEVISION, ITV, is growing. The equipment may range from one videotape recorder and a camera, or one videotape recorder only, to complete studios with several cameras, videotape recorders, telecine chains, mobile vans and a transmitter capable of sending out four programs simultaneously.

In most cases, ITV is being used to supplement the existing media and does not replace or alter the role of the classroom teacher. Nevertheless, the uses to which television is put and the equipment used vary. Mesquite, Texas, and Parsons, Kansas, are good examples of the similarities and contrasts.

Mesquite Independent School District transmits 21 hours of programs daily to more than 15,000 students in 18 elementary, junior high and senior high schools, broadcasting over three channels from a 7500-sq-ft ITV building.

Parsons School District has less than 2500 students (the total population of Parsons, Kansas is 13,929). Many of the students can be classed as culturally unprivileged. To achieve needed flexibility, a completely mobile closed circuit TV system was designed. The mobile van is a 1967 Chevrolet truck. Schools within the district can be interconnected by the cable TV operator in Parsons, CableVision. The van is driven to the head end and the videotape recorder feeds the system. Homes, of course, can tune in on these same programs.

Mesquite has drawn heavily from Diamond Power for its equipment needs. Parsons considers the Sony PV-120U and EV-200 videotape recorders the backbone of its system.

How Mesquite and Parsons Got Started

When the idea for instructional television at Mesquite first came to mind in 1962, Ralph H. Poteet, district superintendent, set out to learn all he could about the medium in education. At the time, all he knew about TV was its tremendous impact on children and its vast potential in education.

Not very much was known about TV in education then and what information did exist was hard to track down. In his quest, Poteet, a 38-year-old former biology teacher and one-time high school football coach, traveled extensively throughout the country to study equipment, facilities and systems for school television.

As a result of his studies, Poteet decided that an ITFS system based on broadcasting TV programs over the airways, rather than by point-to-point transmission through cable, would be more economical for Mesquite.

CCTV would have given Mesquite the same control as the 2500-MHz ITFS, but Poteet decided that leasing the cable from the telephone company would be more expensive than owning a transmitter. Four channels have been allocated to Mesquite.

Mesquite hired Taft Broadcasting Engineering Company of Houston to engineer and draw up specifications for the system. Taft had experience with 2500-MHz TV systems. With ITV hardly out of its gestation stage, Poteet was looking for all the experience he could find before giving birth to the new system.

Poteet wanted one firm to be responsible for installation and maintenance of the entire system. If anything went wrong, he wanted to go to only one man for adjustments.

Taft, who won the contract in closed bidding, drew up specifications for all equipment except the TV receiver in each classroom.

In contracting for the TV receivers, all major TV manufacturers were called in and told that a 560-set order would go to the company that gave the best proposal. The school not so subtly pointed out that the brand name would be viewable to thousands of students.

Mesquite asked that the TV manufacturer set up one local distributor to be responsible for servicing all sets and for adding all new TV sets required during the next five years—about 150 per year based on planned school expansion.

Wesley M. Beck, assistant superintendent of schools, headed the group that studied TV at Parsons.

The skeleton staff traveled as far as Anaheim, California, to study the methods of other schools using ITV. After examining equipment of all types, Beck and his group of innovators selected the Sony PV-120U and EV-200 Videocorder systems from Sony Corporation of America as suitable for the Parsons undertaking.

Bill Daniels, a representative of Alexander Electronics in Prairie Village, Kansas, acted as consultant, as did Don Reedy, director of the Audio-Visual Department of Parsons State Hospital and Training Center. To give the school district's ITV plan its needed flexibility, they designed a closed-circuit TV system that was completely mobile, operated from a 1967 Chevrolet van.

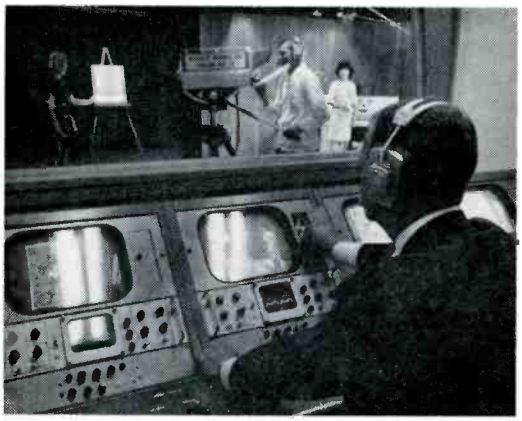
Funding

Funding came remarkably easy for Mesquite because of an open door policy long maintained by superintendent Poteet, who believes the school system must keep parents aware of policy and procedure and explain why they are being implemented.

One way he does this is by sending home a brochure every six weeks along with the child's report card, detailing what they are preparing to do. He and all school administrators welcome the chance to appear before the public at every opportunity.

This public relations program with the com-

MESQUITE



Left top. Mesquite has a $1/2-million ITV system. Here Jim Frehner directs TV program from control room at Mesquite's new ITV building.

Left below. During TV taping of elementary Spanish class, students operate all equipment as part of a training program. TV cameras are rugged and simple enough for handling by novices, yet produce pictures of sufficiently high quality to be telecast to classes over Mesquite's ITV system.

Right top. While student changes film reel on film projector, to be telecast by one of two Diamond Power TV film chains (on table in center of photo), a second student checks monitors and prepares to transmit film over one of three Mesquite ITV channels. Micro-Link 2500-MHz transmitter is at right.

Right below. As part of their training schedule, students prepare background material and other visuals for instructional television programs telecast over Mesquite's ITV system.

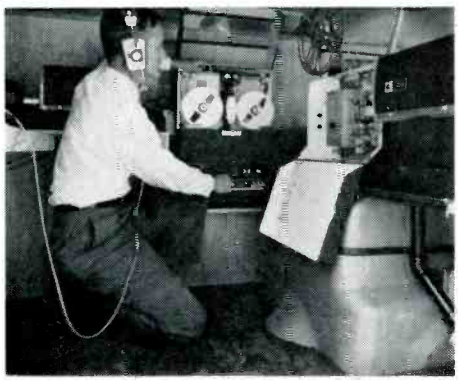
munity was largely responsible for carrying, by a six to one majority, the bond issue which included financing an ITV system. In a $10-million bond election in 1963, $500,000 was allocated for investment and implementation of TV into the high school system.

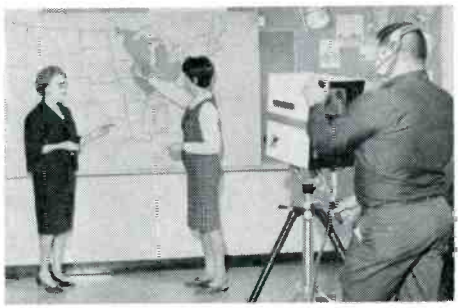
In addition to the bond issue for actual purchase of physical equipment and facilities, Mesquite receives $1.50 per student per year from Federal and State funds for maintenance of TV equipment. The school district also has received $47,000 from the Federal Government under a Title III Planning Grant for its innovation and exploratory approach to education.

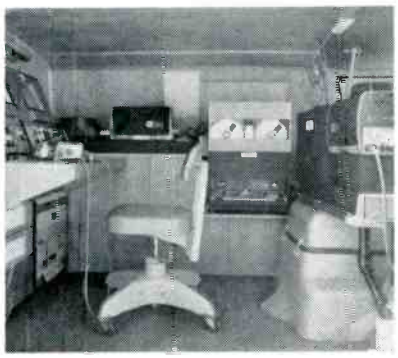
Beck, of Parsons, investigated the possibility of partial Federal funding under the Elementary-Secondary Education Act of 1965. The Kansas State Department of Education agreed to the spending of funds if the Parsons Board would match the money dollar for dollar. They did, from their fund for educational research and development.

"We lease all our equipment right now," Beck says, "even to the Chevy van. Our Federal funds are only available for three years, but at the end of that time we expect to be self-supporting and to own our own equipment. Like any business venture, most of the expense comes right at the beginning. As we expand our services, the cost per student becomes lower, our income increases,

PARSONS







Left top. The Parsons School District uses a mobile television recording studio to capture material on videotape throughout the local area. Here, the schools' TV crew prepares a program on the operations of the local fire department.

Left below. The van has modern facilities for transferring material from film to videotape for broadcast on the schools' closed-circuit television system. The images on the film are transferred to 2-inch videotape on the Sony PV-120U Videocorder. Tapes often include the outputs of three cameras. Three Sony 9-inch monitors are used.

Right top. Mrs. Margaret Newbanks (left) and Mrs. Linda Ney (right) are the two Parsons teachers assigned to the television classroom program. They work closely with other teachers to prepare programs coordinated with normal classroom teaching needs. Here a geography program is being taped in the district's television equipped classroom.

Right below. The Parsons School District has found the compact van studio an ideal solution for the problems of preparing educational TV material for students. It gives the system maximum flexibility. The van may be driven to the CATV head end for cable distribution.

we have greater experience so that tapes are produced more quickly and less expensively . . . and the ITV program will avoid duplication of teachers and equipment that would normally be necessary. The program is almost self-liquidating."

Curriculum Objectives; Teachers Role

Most TV programs of Mesquite are 15 to 30 minutes in length and are geared to specific grades and supplement all subjects taught in grades one through 12, except physical education. Programs are either film clips or lessons prepared by the "master-teachers."

Mrs. Wanda Vassallo, teacher-coordinator, is responsible for determining the needs of the system's teachers and for scheduling programs to fit their needs. As such, she confers with district teachers for program suggestions and with the "master-teachers" on how a lesson should be presented, what it should include and how long it should run.

Mrs. Vassallo sends out TV schedules to all Mesquite teachers two weeks in advance of the programs, detailing what programs are to be shown, channels over which they will be seen and times at which they will be seen. To give classroom teachers greater flexibility, most programs are scheduled more than once.

Along with the schedule, Mrs. Vassallo sends out a color-coded guide for each program outlining the purpose of the film or lesson, suggestions on how to prepare the class for the lesson, suggested follow-up activities, questions and answers relating to the program and the length of time the show will run.

TV programs go into the classroom at the option of the teacher, Jim Frehner, director of Instructional Television, at Mesquite, stresses.

"TV is most effective as a means of enriching existing teaching methods rather than replacing them.

"The individual teacher must remain the hub of all education and should have a free option on TV. All our system does is make TV programs available and advise the teacher how to get the most out of them. The rest is up to the teacher."

The one exception is elementary Spanish which is mandatory for grades three through six. With TV, one Spanish teacher tapes lessons for presentation to all classes. These lessons are then reinforced by classroom teachers who need not have previous Spanish training.

"Otherwise, we would have to find at least 15 elementary school Spanish teachers to cover the district—an almost impossible task," Frehner says.

One of the biggest demands by grade school teachers for TV lessons in Mesquite is the presentation of science experiments. Elementary school teachers need help, not with actual instruction, but with experiments which often cannot be set up in the classroom. Frehner points out that film clips, as well as tapes of lessons, are exchanged without charge by school districts with ITV systems and that the University of Texas has a free videotape library.

In selecting personnel for the ITV system, Poteet says that it is important that they have a thorough educational background, not one in TV production.

"The techniques of TV can be acquired in six to eight months. The techniques of teaching cannot. Also, the staff should be thoroughly versed in the school system in which they are involved."

Parsons uses instructional television to improve and enrich the curriculum of all their elementary school students. One aim was to upgrade the cultural level of the disadvantaged students without removing them from the normal school program.

In January 1967, the first ITV production was beamed to 468 fifth and sixth grade students in six different schools—a program locally written, locally directed, and locally produced. "It was really the only answer, in spite of the problems involved," Beck says. "We needed to put excellent teaching into every classroom. There are 16 different disciplines to teach at Parsons. Busy teachers need assistance. We had to give our disadvantaged students some experience with life outside this immediate area. It was something we had to do."

The first taped programs were in the social studies area, for the benefit of the cultural gap which needed closing, but plans for the future include art and music, languages and physical education. "Most of our schools can't offer courses like this," Beck says, "because they haven't the budget to hire such teachers. With ITV, four districts can hire one music teacher or one art instructor and have him coordinate instruction over TV."

The first program—and many succeeding ones—was not limited to the schools in the Parsons district. It was beamed over the local CATV system, Cablevision of Parsons, and enabled parents to see what was happening in the classrooms. They, too, are enthusiastic. While they hesitate to visit a school and watch classes in progress, they are deeply concerned with their youngsters' curriculum. Now they can share a part of their children's experiences.

"The mobile unit has been particularly helpful

for our needs," Beck says. "To transmit over Cablevision, we drive the videotape recorder to the transmission studio. With the flexibility of the van, we can take students on vicarious trips to the zoo, or to any outlying location we choose."

An important use of the videotape recorder is in taping assembly programs which can then be shown to all schools in the district, rather than having a special guest travel from school to school repeating the program.

The classroom teachers of Parsons were enthusiastic, and some of them worked nights to put the first shows together. Cameramen and floormen were recruited from nearby Labette County Community Junior College.

"One of the most important elements in a project like this is cooperation," Beck says. "The two studio teachers who prepare the lessons confer with the classroom teachers who will be using them. The classroom teachers tell us what they want to see on tape, to fit in with their textbook lessons. The studio teachers visit the classrooms to help the teachers use ITV to best advantage. We give them lesson guides two weeks in advance of the presentation, so they know what to expect and how to prepare for it.

"We hold workshops, too, where the teachers actually see the tapes and learn how best to use them. The teachers have been really enthusiastic about the program."

Technical Details

The physical facilities of the system at Mesquite are as elaborate as many commercial television stations and include two production studios and a specially equipped experimental classroom where programs originate. These programs are taped for later scheduling or telecast live with four Diamond Power studio TV cameras. Two Diamond Power film chain cameras transmit film over the three channels.

The system has two control room production booths, one for each studio, and each is fully equipped with camera controls, monitors and special effects generators. Facilities include a temperature and humidity controlled tape storage room and a work room for producing graphics, visuals and other stage background material.

Micro-Link 2500-MHz equipment is used. The total ITV system is worth $500,000.

One requirement for the system was that TV cameras had to be reliable and sophisticated enough to give high quality reproduction, yet simple and rugged enough to be operated by high school students.

These students are trained by the director of instructional television at Mesquite, Jim Frehner, to operate cameras, to learn TV lighting, set design, visual preparation and directing. They earn $1.25 per hour paid from Federal funds under a Youth Corps type program.

This not only keeps the students in school and trains them for future jobs, but it also cuts down on operating expenses at Mesquite. To hire journeymen cameramen would be prohibitive, Frehner says.

Students for cameramen, however, should not imply that programs are amateur or substandard.

"If the programs are not professional in every way, the children will lose interest in them," Frehner points out.

As mentioned, the Parsons system is largely in a mobile TV van. The van has modern facilities for transferring material from film to videotape for broadcast on the schools' closed-circuit television system. The images on the film are transferred to 2-inch videotape on the Sony PV-120U Videocorder. Tapes often include the output of three cameras. Three Sony 9-inch monitors are used. The Parsons School District has found the compact van studio an ideal solution for the problems of preparing educational TV material for students. It gives the system maximum flexibility (such as driving the van to the CATV head end for cable distribution).

A long range goal of Parsons is to become the Instructional Television Center for the State of Kansas. Beck says, "From this first school district we'll branch out to serving all four school districts in Labette County. Then we'll expand to the nine counties in Southeast Kansas, and from there . . . no telling where we can go. We hope to be preparing videotapes that any system in the State can use. All that a school district needs to participate is a Sony Videocorder."

Compatibility of equipment is important. A lot of restricted little production areas might result if compatible equipment isn't used. Parsons has given Sony a boost in Kansas.

Parsons hopes in its second year of operation to begin to bank tapes. They expect in the future to see videotape production centers throughout the country, which can exchange tapes on different subjects. Probably some centers will specialize . . . producing only Fine Arts tapes or Science or Music.

The advent of the ITV project has some additional side benefits. The districts have worked together more compatibly than ever before. All four superintendents worked together through the summer and fall of 1966 to set up this program. The local newspapers heralded it as a fine example of community cooperation, and the public has accepted it and backed it whole-heartedly. ●

Youthful as it is compared with radio and recording, television has developed valuable facility designs and production techniques that can give radio and recording the production edge needed to compete successfully.

WITH SO MUCH EMPHASIS on the presentation of visual information, the audio world must constantly introduce new, more advanced techniques. Borrowing from television's hard won store of experience is an easy method of updating studio practices and facilities. In order to retain its audiences, radio must present tight, slick, smooth sound. Most radio stations must operate with so called "combo-men," i.e., announcer-engineers, in order to keep operating costs down. It has been my experience that, with just a little thought, significant improvements can be made in the following six areas by adapting proven video techniques.

TV Tips For Broadcast and Recording Studios

By Oliver Berliner

Studio Warning Lights. Most recording studios have a switch by which the recordist actuates a a light outside that warns visitors not to enter during a take. Unfortunately, he often forgets to turn it on or off, with the result that visitors become confused and in most cases have gotten into the bad habit of totally disregarding the warning light. This situation can be eliminated by arranging the wiring so that the warning lamp goes on only when the RECORD button on the tape recorder is pushed; thus only during recording (and *not* during playback or rehearsal) will the warning light be energized.

Visitors. While most control rooms provide chairs for VIP visitors, a provision should be made for unexpected or uninvited ones. Windows between the control room and the hallway, as well as between the studio and the hallway, will serve nicely to pacify such visitors, many of whom have business with the musicians or the producer. Curtains or blinds should be provided for closed sessions.

Intercom Facilities. One of the most handy facilities for the session producer is a hookup permitting him to talk to the bandleader during a take without interfering with the recording. This frequently is necessary when a musician or vocalist is a shade off-mic or when someone must be cued during a take. Many times, in studios without this facility, a producer tries frantically to attract someone's attention during a take, and then has to stop and start all over again because of inability to catch the artist's eye. By providing a single headphone, normally worn by the bandleader, the A&R man can advise the leader of any cues or minor deficiencies and the leader is easily and quickly able to signal the appropriate party. A telephone type boom mic worn by the A&R producer or an extra microphone and amplifier system is the solution.

Monitoring. Studio monitoring systems should be designed to permit *monophonic* monitoring of stereo recording without disturbing the multichannel separation. Many engineers find themselves in disagreement with experienced producers because they fail to realize that this method provides better orchestral balance.

Illumination. The control room lighting should be on a dimmer. Even with fluorescent lights this is possible, and tends to provide greater comfort for the producer and the recordist, who often are under considerable strain.

Console Layouts. The layouts of many present-day studio consoles have reached unmanageable proportions. There is no need to mention here the multiplicity of controls and indicators found in modern, up-to-date, 4-channel or 8-channel studios. It should also be unnecessary to mention that much of the facilities are preset and never touched after the time of initial adjustment. Therefore, controls and indicators that fall into this category should be mounted on subpanels and *not* located on the mixing panel. The advent of light-sensitive resistors makes this possible by eliminating the need for extensive audio-circuit interconnections, with all their associated drawbacks. It goes without saying that any console built today that has any audio wiring on the mixing panel, except for the vu meters, is already out-of-date.

Small-Station Operation

The small station, facing tough competition from television and larger radio stations, must make the most effective use of its personnel to survive. In most cases this means a disc jockey has to read the program log, make accurate and continual entries in it, select records, cue records, talk on the telephone, play records, cue recorded spots, select and read live announcements, talk about the records, set up and operate one or two tape recorders, take periodic transmitter readings and log them, adjust the transmitter occasionally, change defective phonograph needles occasionally, check the tower lights, check the temperature, tear the news off the teletype machine, edit and read the news, and give station identification at the FCC-required intervals!

It would seem logical to try to make this

Author Berliner heads SounDesign Engineers, consultants in audio, video and theatrical lighting system design. He is a member of the SMPTE and is a co-founder of the West Coast (now the Los Angeles) Section of the Audio Engineering Society.

man's tasks easier, and that such efforts would result in better programming.

Regrettably, most stations today apparently have to rely on stock, inflexible, off-the-shelf consolettes, though some manufacturers are comcoming around to the building block concept. Equipment designed to be universal in application rarely meets *all* the requirements of any *specific* application.

One of the most useful conveniences normally omitted in consolettes is a *foot*-operated microphone on-off control. Having this footswitch frees the hands of the disc jockey to hold a pencil for log entries, turn script pages, cue-up and start turntables, cross-fade or segue various sources, start a recorder, etc.

An extremely worthwhile supplementary facility is on automatic "dipping" of all audio sources when the microphone is turned on for voice-over announcements. (This procedure is *not* voice-actuated.) Not only does this make the announcer's job much easier but it definitely speeds up and smoothes out operations. Consoles having light-sensitive resistor gain control systems permit easy incorporation of this provision.

Most important television stations have installed programmers to see them through the critical station-break and commercial announcement periods, the most difficult part of studio operation. By presetting an elaborate and expensive sequences, machines and other program sources are activated and deactivated at the proper time and in the proper order. Radio, by its very nature, is *always* in the commerical announcement period. Stations that have consoles utilizing light-sensitive resistor gain control systems can now use a simple, small and inexpensive programmer which can present 10 to 100 events. With a little thought and by proper electronic design, this programmer may be switched in and out of the circuit, and may have the sequence of events changed or added to at any time.

Most stations do at least occasional remote broadcasts, and virtually all radio broadcasters have to engage in production—particularly in the preparation of sometimes intricate spot commercial announcements for local advertisers. Sample spots are often made in order to try to sell a potential sponsor. These spots usually consist of live announcements integrated with music and jingles furnished on discs by transcription services. Station identifications are usually prepared in this way and serve to spruce up the sound and give the station a particular image. Many small stations do not have the equipment or the space to do this properly. However, by including an audition channel (usually lacking in stereo boards), commercials and the like may actually be produced in a station's single studio while a live show is on the air. Naturally, the appropriate recorder and turntables are switched to the audition buss, and the visitor's microphone usually serves for the voice portion.

This additional buss is especially useful when setting levels coming in on a remote. Often the studio man is unable to set incoming remote line levels before the studio goes on the air; thus the remote's level wanders widely during its first few minutes on the air. Having an audition buss with the same gain as the program buss, and with a vu meter on it, at least temporarily solves the remote-source-level problem by virtue of the fact that the remote gain setting is pre-determined on the audition buss, and then the remote is switched to the on-the-air (program) buss.

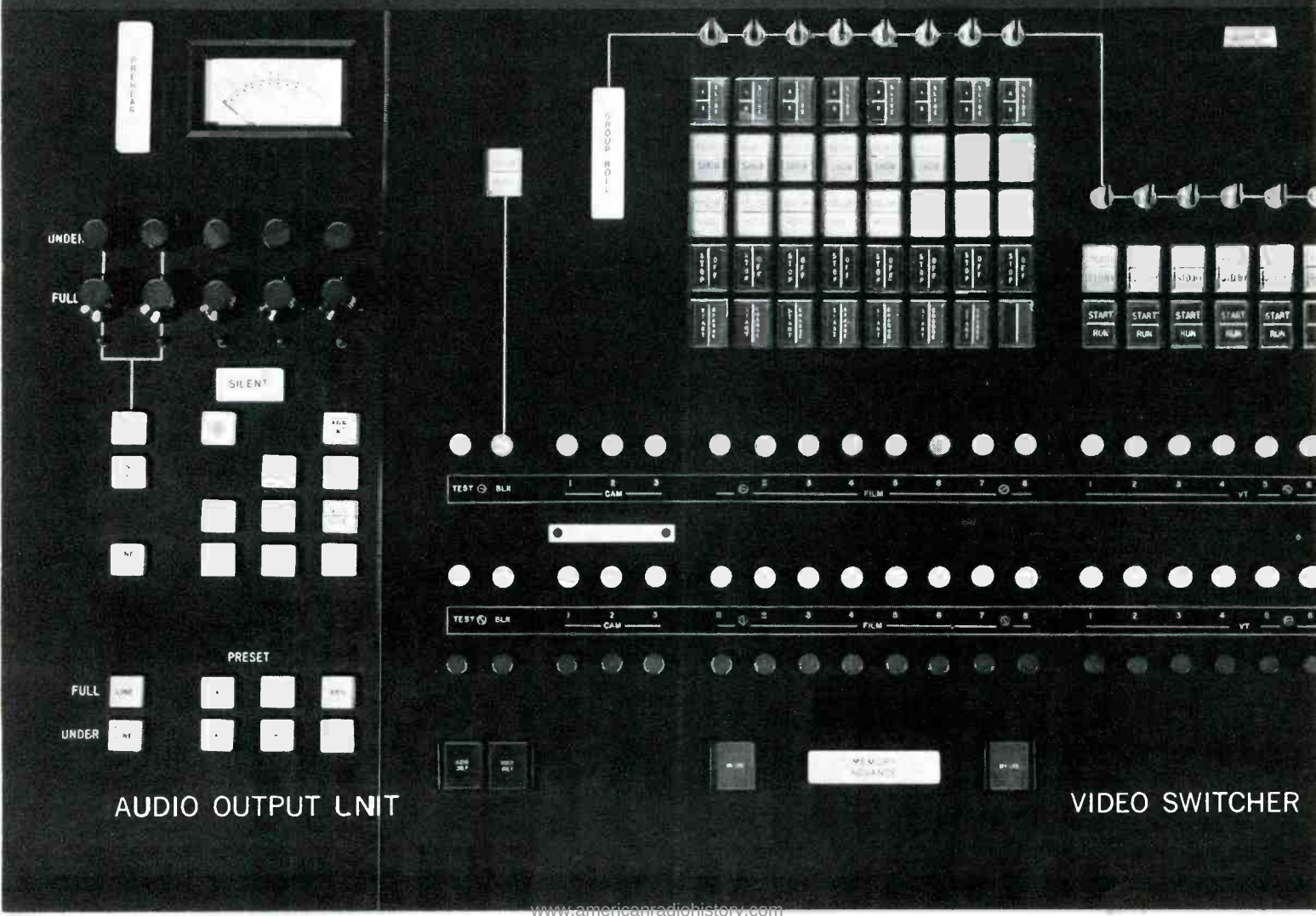
There are but a handful of radio stations that provide a lavalier microphone for their disc jockeys. While such a thing may for a few days after its introduction be somewhat encumbering to the disc jockey, he will quickly find that it offers far more advantages than this one (possible) disadvantage. The use of a lavalier permits the announcer to talk while his body is in any position or location, and regardless of what direction he is facing. Often he finds himself leaning over to cue a record, or threading-up a tape on the recorder at the exact instant he should be talking on the air. Even if he is in position and facing the console at such a time, he must always face the proper direction with a fixed-position microphone. The lavalier microphone eliminates all these problems and eases the arduous task of the disc jockey.

While a discussion of the uses and abuses of the vu meter is inappropriate here, it should be mentioned that only meters having so-called "B" scales should be used for program level monitoring. The "A" scale meters, where the vu scale is on top and thus predominant, are designed for use in test/measuring equipment. An audio operator is concerned only with percent modulation and takes no actual vu readings; thus the 0- to 100-percent scale should be used in program level monitoring, contrary to the notions of many equipment designers, particularly tape recorder manufacturers.

Fm-stereo operations involve an interesting problem in the broadcast of monophonic discs. In this instance identical information is delivered at full level to both stereo channels, the monophonic records and all mono sources, including the announce microphone, come out quite noticeably louder than the stereo discs. When splitting a monophonic source to both stereo channels, this problem can be solved by the insertion of a pad which attenuates the feed to *one* of the channels by 3 dB. The audio operator should then be instructed to set levels by the vu meter on *only the nonattenuated channel*, since the level on the other channel will automatically be 3 dB lower. It is virtually impossible for a listener to notice that the mono source is 3 dB weaker on one of the stereo channels; and yet monophonic sources will no longer be louder than true stereo sources. Each stereo turntable should have a STEREO–MONO switch that effects the 3 dB attenuation of one channel when playing a monophonic disc.

These are some of the ways in which the radio and recording industries can profit their younger but bigger brother. ●

Sophisticated programming with one-man operation ...from AMP



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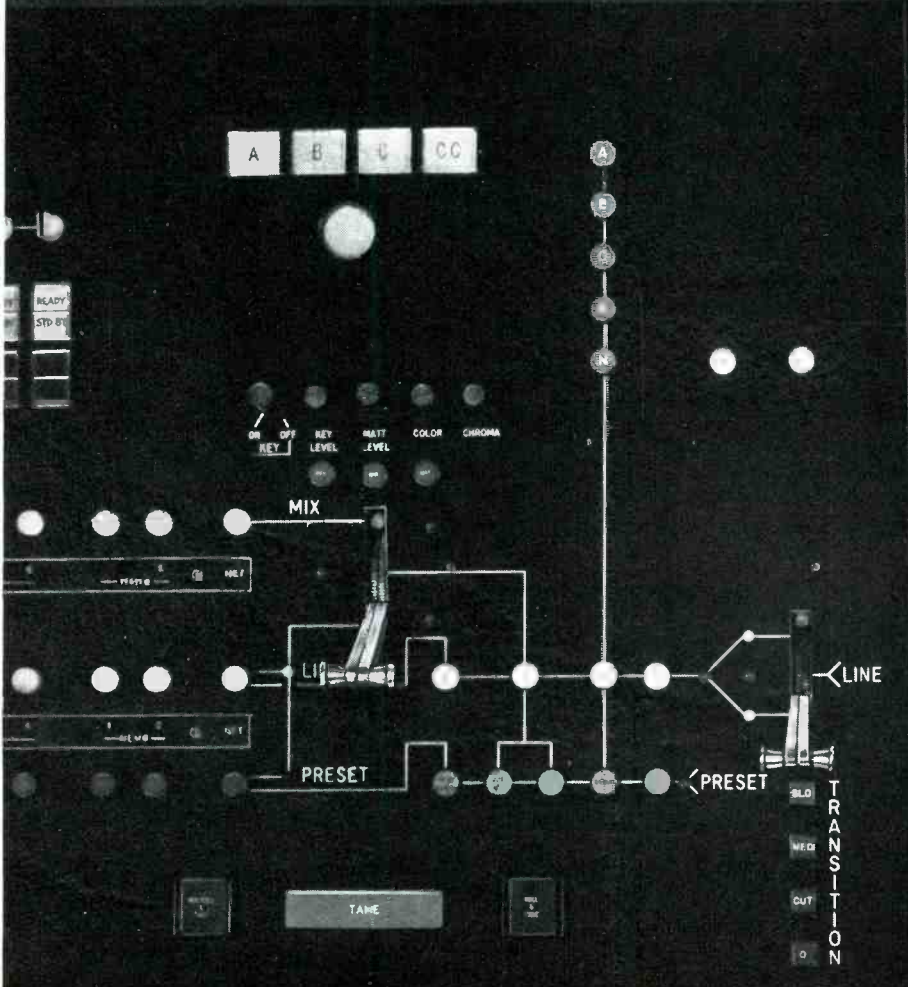

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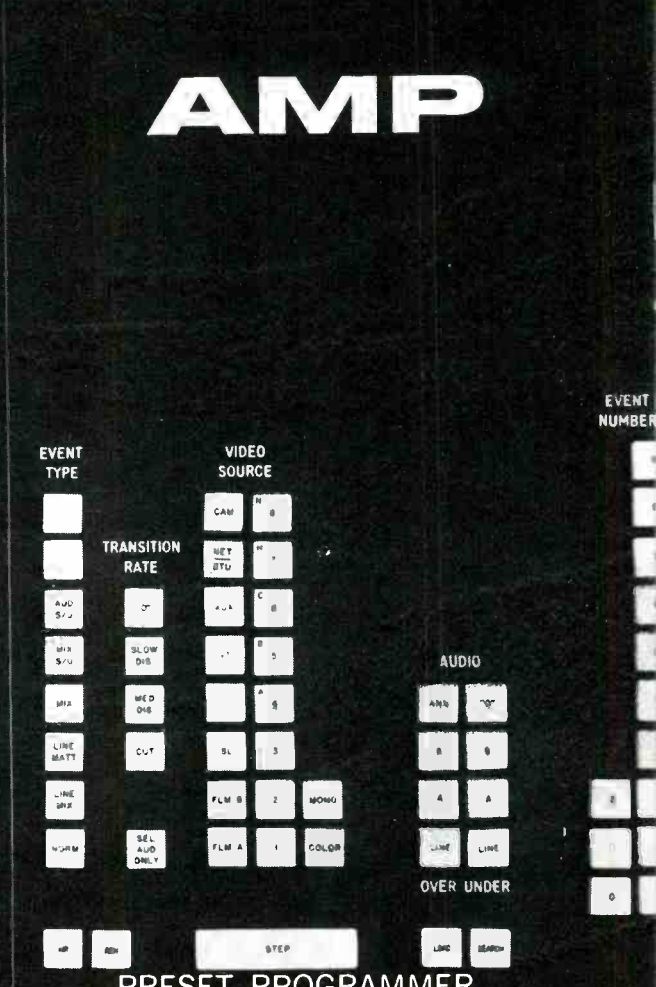

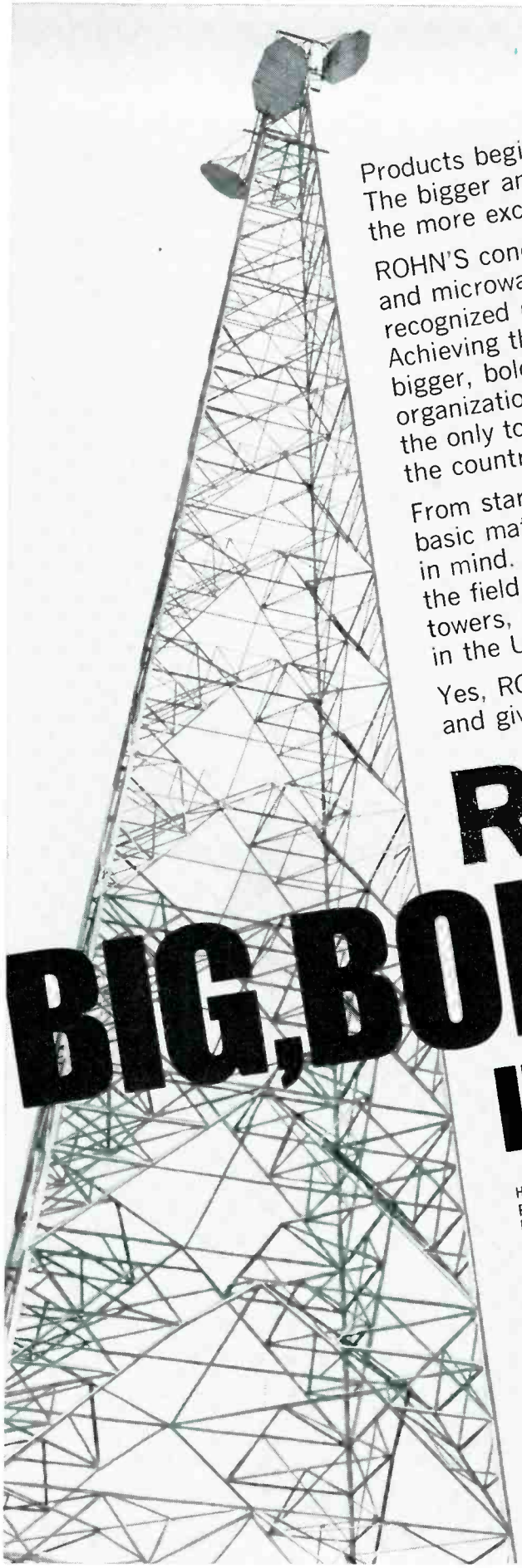

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The bigger and bolder they are
the more exciting the product.

ROHN'S concept of communication and microwave towers is based on the recognized need for TOTAL SERVICE. Achieving this has always been one of the bigger, bolder ideas motivating the ROHN organization . . . an idea that makes ROHN the only totally integrated tower source in the country today .

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Circle 50 on Reader Service Card

← Circle 49 on Reader Service Card

BROADCAST EQUIPMENT

CCTV Camera, Monitor and VTR

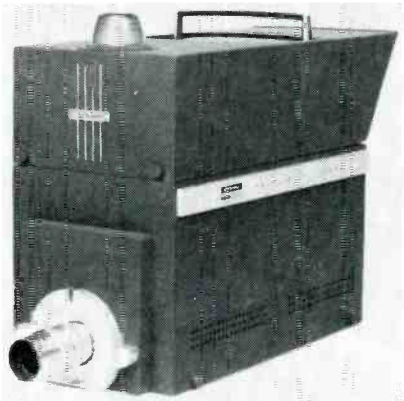
The Apeco Tele-Tape twin-head helical scan VTR can record and play back monochrome video through a TV set or an Apeco monitor, or it can be used with a video camera. VTR uses ½-in. tape, providing one hour's play on a 7-in. reel. Tape speed is 7.5 in./s, and complete tape can rewound in 3½ min. VTR resolution is better than 300 lines.

Features include stop-action, tape counter, control for adding sound after taping and an audio and video level meter. The Apeco 1000 Electric Eye camera delivers over 500 lines of resolution, and a built-in electric eye adjusts the lens automatically within the full range of each f stop. The camera also features a 25mm, fl.4 lens. Basic system consists of camera, VTR and monitor, and is available from Apeco, Evanston, Ill., for $1485.

Circle 114 on Reader Service Card

Lightweight Monochrome Camera

Production of the 3200 Series self-contained Plumbicon TV camera has been announced by Cohu Electronics, Inc., San Diego, Calif. Available with or without viewfinder, the 3200 Plumbicon camera is designed for use in remote and studio broadcasting or closed-circuit operation.

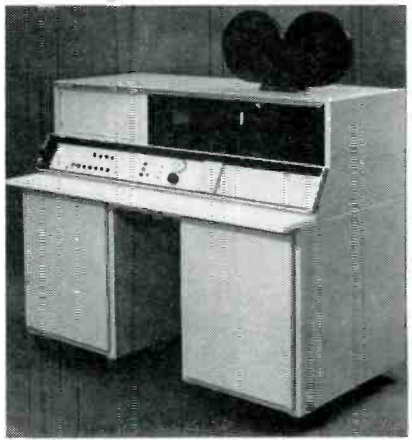


Solid-state camera weighs 32 lb with viewfinder, and has 600-line resolution. Usable picture can be produced in 0.1 fc illumination on Plumbicon face. Basic 3200 camera may be transformed into a general purpose studio unit with the addition of a compact 5-in. snap-on viewfinder. Base price, including viewfinder and less tube, lens and cable, is $3375.

Circle 103 on Reader Service Card

Video to Film Recording System

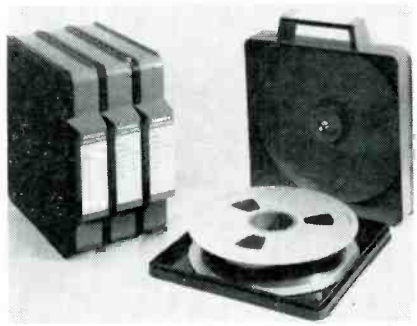
The DBM-R1 video film recording system, made by D.B. Milliken Co., Arcadia, Calif., produces quality 16mm film from video display. Heart of system is DBM-64A camera that eliminates shutter-bar problem. Camera uses principle of compressed air to transport and stabilize film in less time than standard television blanking period. Signal requirements are 1-V composite video into 75 ohms, or +7-V noncomposite video into 75 ohms and −2 mixed sync into 75 ohms. Camera has magazine capacity of 2400 ft.



Circle 102 on Reader Service Card

VTR Reel Carrying Case

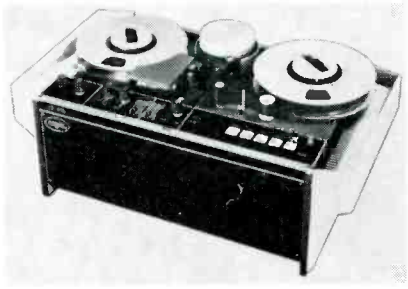
A plastic carrying case for shipping and storing two-in.-wide videotape has been placed on the market by Ampex Corp., Redwood City, Calif. The case is designed for shipping, storing and carrying videotape used with four-head broadcast videotape recorders, and CCTV VTRs. The compact 14- × 16- × 3-in. shock resistant case holds tape reels up to 12½ in. dia. Features include easy-opening twist lock, a sturdy handle for convenient carrying and a reuseable addressing surface.



Circle 110 on Reader Service Card

Low-Cost VTR Records NTSC Color

The VR-400, from General Precision Systems, GPL Division, Tarrytown, N.Y., is an NTSC color and monochrome helical-scan magnetic tape video recorder/reproducer, claimed to be the only machine in its price class that has self-contained full NTSC capability. Available in eight configurations, the GR-400 ranges in price from $3850 to $4600. Designed by IVC, VR-400 recorder's

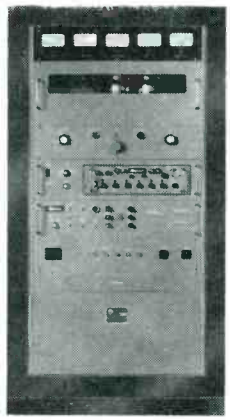


Basic model is portable, and records and plays back monochrome video only. Version at top of price range mounts vertically in rack, and records NTSC color with slow and stop motion. One intermediate model priced at $4250 has all features of top-priced model except model slow motion.

Circle 100 on Reader Service Card

Wide-Band, Multimode Xmtr Runs 10 kW

The BCT-10AK, made by Technical Materiel Corp., Mamaroneck, N.Y., is a 10-kw, air-cooled, multimode transmitter designed to provide high-fidelity transmission in the 450- to 2000-kHz range, while employing advantages of compactness, simplicity and economy of operation. Single-knob tuning control coupled with digitally-controlled synthesized



exciter, make it possible to retune to a new frequency within a matter of seconds. Versatility of multimode exciter provides operation in cw, a-m, ame, ssb, isb, and fsk modes. Frequency indicator displays instantaneous reading of carrier frequency. Power can readily be reduced with rf gain control for any desired output power level, while still maintaining 100-percent modulation, with nominal distortion.

Circle 101 on Reader Service Card

Test Pattern Illuminator

A precision test pattern illuminator that provides 100-percent setup and performance control for both color and monochrome TV studio cameras has been developed and manufactured by Tele-Measurements, Inc., Clifton, N.J. The Tele-Pat IV-B, used in conjunction with TM-300 series 8- × 10-in. test slides, provides basis for precision setup of all color cameras now being used in the broadcasting industry. Operating on

NBC NETWORK NEWS IN COLOR WAS A HARD ACT TO FOLLOW.

THEN WHO-TV BROUGHT LOCAL COLOR NEWS TO DES MOINES.

"We knew that a lot of WHO viewers were seeing NBC network news in color. Our early-evening half hour of local news backed up to it, so we decided to make the switch to full color," says Robert Wilbanks, WHO-TV News Director. "Our viewers were pleased with the change, and we couldn't be happier with the results both then and now."

Lisle Shires, Chief News Photographer, tells more about the switch. "It was very easy. And in more than a year of operation I don't think we've had a bad piece of color film. We can shoot everything in color that we did in black-and-white. If anything, the Kodak color films have given us even more latitude."

As far as process ease with Kodak ME-4 chemicals, Ward McCleary, Promotion Manager for the station, takes up where Shires left off. "Ask the network crew about that. Since we are a primary NBC network station, they used our lab for processing footage from the National Farmers' Organization convention held in Des Moines. We got nothing but compliments on the process, the lab, and the quality."

WHO-TV had expert Kodak assistance when they switched to color. Kodak technical help is always just a phone call away. Your station will probably go to color sooner or later. Call Kodak before it gets any later.

Kodak

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The Electrodyne **Modular series** employs the latest integrated circuit differential amplifier design techniques and has been developed for **maximum quality**, **function integration** and **reliability**. Any of Electrodyne's 6 Input Modules offer the folowing, used with any of 8 Switching Modules, our LA-602 Program Amplifier and our ACN-1P or ACN-2P Combining Network they provide all the electronics and channel switching necessary for a **basic** Audio-Control Console.

All Electrodyne Input Modules share these features. Each are completely **interchangeable** and wire to the same plug. All provide isolated echo send output with independent level control. All draw less than 40MA at 24VDC and are available without input attenuators.

The 309L, 509L and 709L incorporate a low noise microphone preamplifier, an input switch for selection of line or microphone input, —10db and —20db to accommodate various microphone output levels.

Low frequency equalization point of the 409L and 509L is 100Hz and the high frequency point is 10kHz. Low frequency equalization points of the 609L and 709L are selectable at 40 or 100Hz and the high frequency points are selectable at 1.5, 3, 5, or 10kHz.

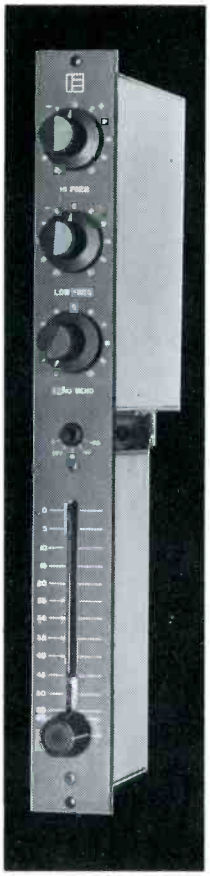
The 609L and 709L have a coaxially mounted switch which selects echo send output from before the attenuator or after the program amplifier.

These all silicon, solid state integrated circuit amplifiers have been proven in high-reliability military and computer systems, and records of **tens of millions of hours without failure** are not uncommon. These amplifiers operate well below their maximum output capacity. Substantial amounts of feedback around each amplifier provide extremely low distortion, while insuring the highest circuit stability. Units are virtually insensitive to wide variations in power supplies, ambient temperatures, capacitive and inductive loads. All plug contacts on the printed circuit board are nickle-rhodium for added dependability while all switching contacts used have a proven reliability of over **one million** operations.

209L
Line Level Input

309L
Line level or microphone input.

409L
Line level or 2 frequency equalization.



509L
Line level or microphone input, 2 frequency equalization.

609L
Line level input, 6 frequency equalization.

709L
Line level or microphone input, 6 frequency equalization.

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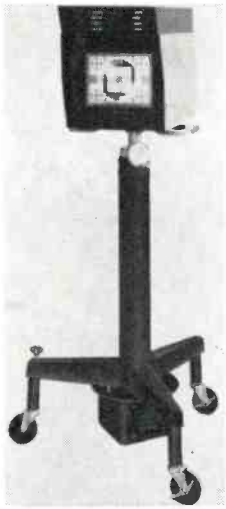
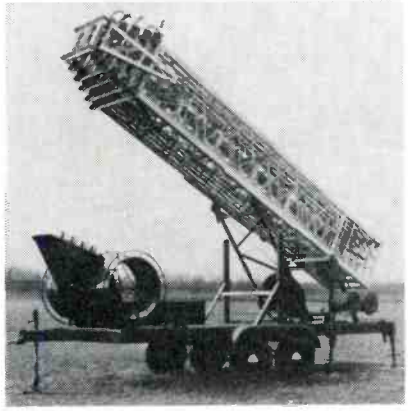


a 115-V power supply fully regulated to within ±0.2 percent, the Tele-Pat IV-B has a color temperature rating of 3100° K, adjustable from 2900° K to 3300° K. Variable light output of 250 ft Lamberts, ±4 percent, can be regulated from 0 to 400 ft Lamberts. Quartz light source shows little or no aging effects to both output and color temperature.

Circle 105 on Reader Service Card

Trailer-Mounted Tower

A 100-ft portable, quick-erect tower has been developed by Andrews Towers, Inc., Fort Worth, Tex. The tower is mounted on a trailer and can be pulled by a pickup truck of 1-ton capacity. Tower consists of six 20-ft sections with an overall height of 105 ft. It can be varied from 25 to 105 ft in 3-ft increments, and is designed to support two six-ft parabolas in a 100 mi/hr wind. Tower is compact enough to go into small area, and can be operated in conjunction with a TV van at sports or news events. The 100-ft tower can be utilized to provide service for short periods of time for television pickup and for mobile radio coverage pattern. The tower can be erected by five men in approximately three



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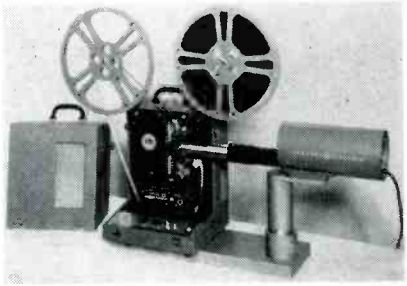
Circle 55 on Reader Service Card

hours, and can be in full service within four or five hours. Cost of the tower is $20,000.
Circle 107 on Reader Service Card

TV 16mm Projector

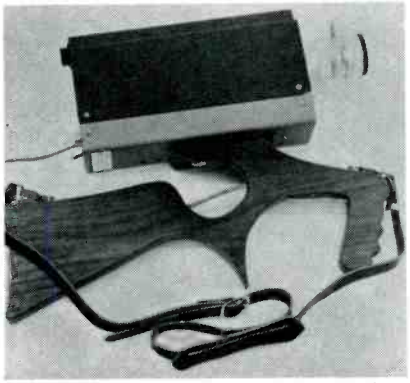
Model 1500 16mm projector for broadcast and CCTV use is offered by L-W Photo, Inc., Van Nuys, Calif. Equipped with a special TV shutter and synchronous motor, the projector is fully compatible with the 60-scan rate of TV broadcast. Unit offers precise projection at 24



ft/s and either optical or magetic sound playback. Features include 2300-ft film capacity, solid-state amplifier with 30- to 20,000-Hz frequency response, solar cell sound pickup with "fine tuning" control, mic and phone inputs, easy-out film gate with fingertip control, fast power rewind and lifetime lubrication. A 2-in., f1.6 coated lens with field flattener is standard equipment. Price is approximately $1600.
Circle 108 on Reader Service Card

Low-Cost CCTV Vidicon Reflex

Model 6104 vidicon camera has built-in reflex viewfinder with advantages of video camera equipped with more expensive electronic viewfinders, at a cost of $300. Craig Corporation, Los Angeles, Calif., markets the unit with accessory rifle

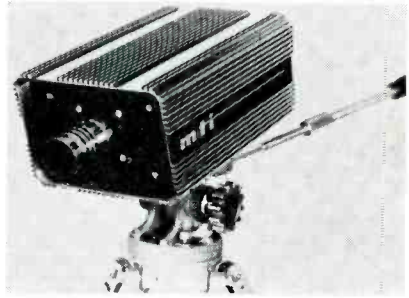


butt and other types of handgrips. Unit provides more than 400-line horizontal resolution. Features include automatic light compensation

and electronic focusing, fully stabilized to compensate for variation in temperature and line voltage. Eight-lb unit accepts any C-mount lens.
Circle 111 on Reader Service Card

Camera Has Self-Contained EIA Sync

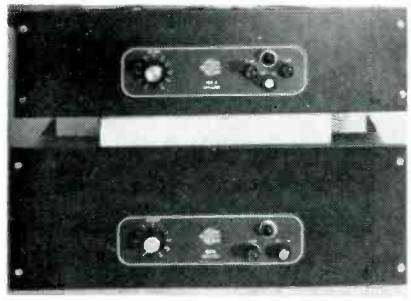
Maryland Telecommunications, Inc., Cockeysville, Md., announces the availability of Model VC-41 low-light level vidicon camera with self-contained EIA syncronization. Camera has 800-line resolution, and meets EIA RS-170, sections 3.3.3 to 3.3.10 inclusive. Weighing 13 lb,

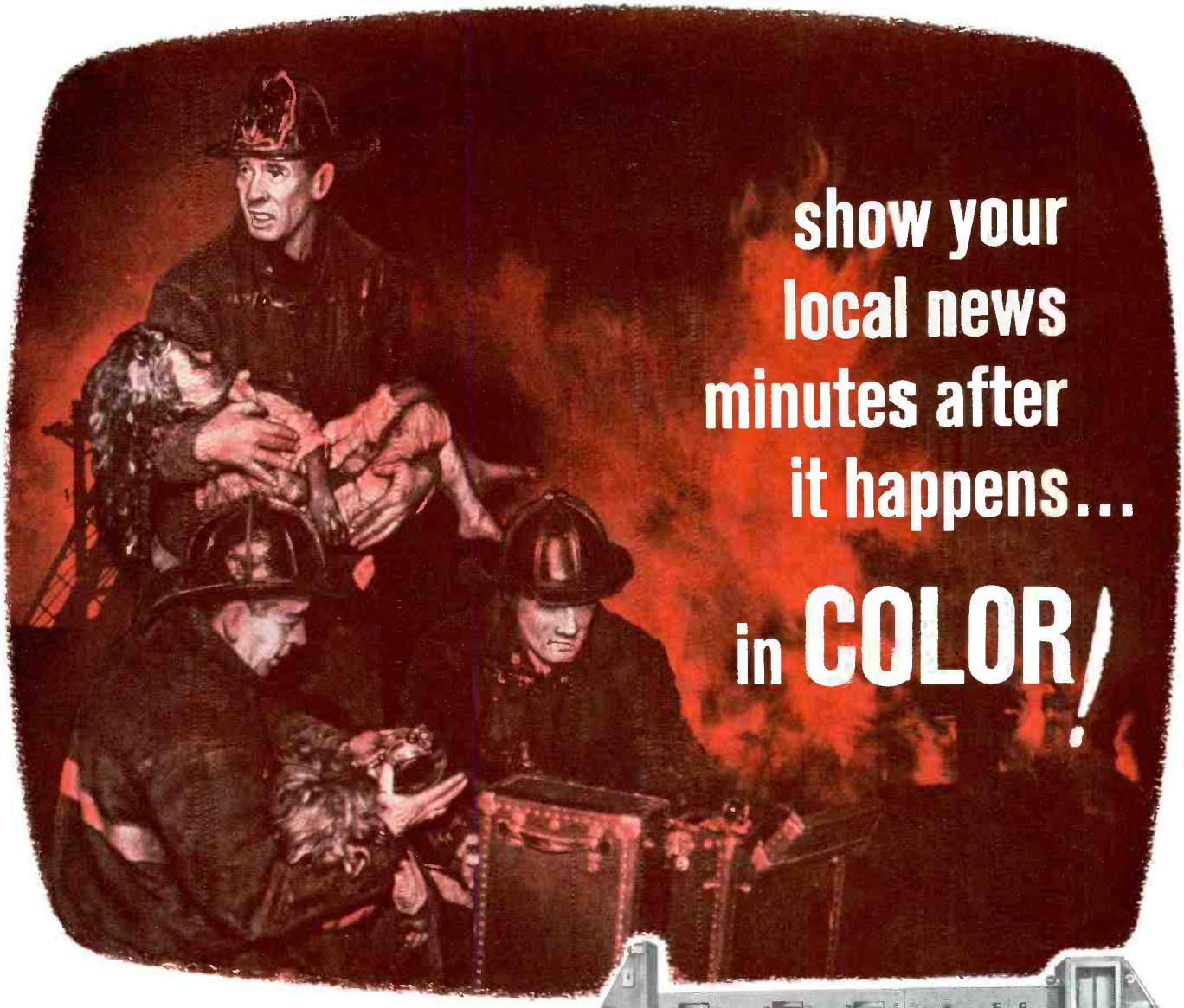


camera is handy for portable broadcast remote operation. All operating controls are located on the camera and have been minimized for simplicity, including beam current, target voltage, electrical and optical focus adjustments, and power switch. VC-41 with S-V-110 pre-selected vidicon is priced at $2495.
Circle 109 on Reader Service Card

Standby Audio Amplifiers

Two solid-state audio power amplifiers particularly suitable for use during power failures, blackouts or other emergencies have been announced by Altec Lansing of Anaheim, Calif. In the event of ac power failure, audio amplifiers immediately transfer to the dc power source. When ac power has been restored each will automatically return to ac power operation, furnishing a trickle-charge to the supplementary battery power. The new Altec amplifiers, designated 1593A and 1594A, have power ratings of

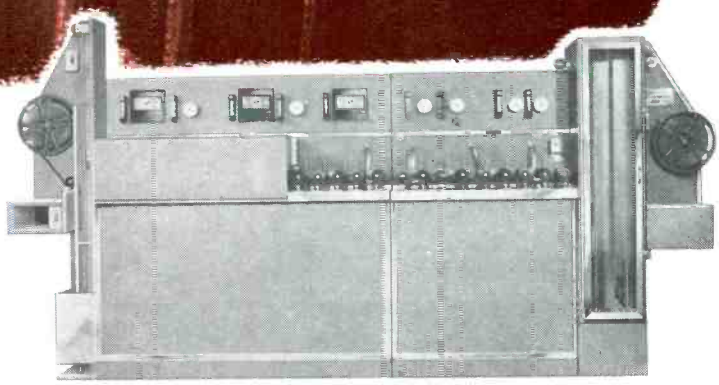




show your local news minutes after it happens... in COLOR!

You can do it easily...with a TREISE COLOR PROCESSOR!

Now that big things are happening in network color, the logical next step for your station is to film your local news in color. You'll gain added interest from your community . . . enhance your value to advertisers . . . and brighten your profit picture. Treise makes it possible by offering you a fully automatic, professional quality processor that will have your local news "on the air" in color within minutes after the exposed film is loaded in the processor. This compact, self-contained unit can be operated in a 17′ x 9′ area, requires only simple plumbing and electric plug-in, and is so foolproof, anyone can run it!



Check these features: Warms up in only 20 minutes (instead of the usual 2 to 3 hours) • stays on temperature automatically • only processor in its price range that meets or exceeds all Kodak color requirements • even provides 50% additional first-developer time to permit full utilization of new EF Ektachrome film • operates up to 40 fpm (the ideal speed for most TV station needs). Want more data?

Write for free catalogs on Model MTV-30 (illus) and Model MT-20 (up to 70 fpm), plus our full line of color and B&W processors and accessories.

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50 and 100 W, respectively. Both amplifiers operate on 120/240-V, 50/60 Hz ac power lines or 28-V dc power. Total harmonic distortion over range of 45- to 20,000-Hz range is 1 percent. Both amplifiers have a selectable high-pass filter with a cut-off frequency of approximately 500 Hz, activated by a chassis mounted switch equipped with a locking plate.

Circle 104 on Reader Service Card

ITV Antenna

A new omnidirectional antenna which provides a broad, fully vertical pattern to at least 15° below horizontal has been introduced for Instructional Television Fixed Service (ITFS) by Technical Appliance Corp Shelburne, N.Y. The ETO-11H is 2500-MHz antenna, assuring uniform coverage of all locations within a 360° azimuth without requiring oversize receiving dishes at close-in locations. Antenna distributes energy in the vertical plane with a gain of 10 dB at the horizontal, and has gain variations no greater than 1.5 dB through the entire vertical plane. ETO-11H weighs 40 lb, and measures 43- × 4-in. dia.

Circle 106 on Reader Service Card

Controller For Fm Two-Way Radio

General Electronics Communication Products Department, Lynchburg, Va., is adding a new line of low-cost wall-type and desk-top remote control system, called "Deskon," for fm two-way radio systems. All solid-state, and designed to control remotely-placed two-way radio base stations over telephone line, Deskon

comes in familiar telephone style, with features found in larger consoles. All Deskon models are equipped with intercom as a standard feature, which enables up to five consoles connected in parallel to be used like an office intercom system without tying up air frequency.

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The Performance Picture Looks Great with BIALKON Orthicons

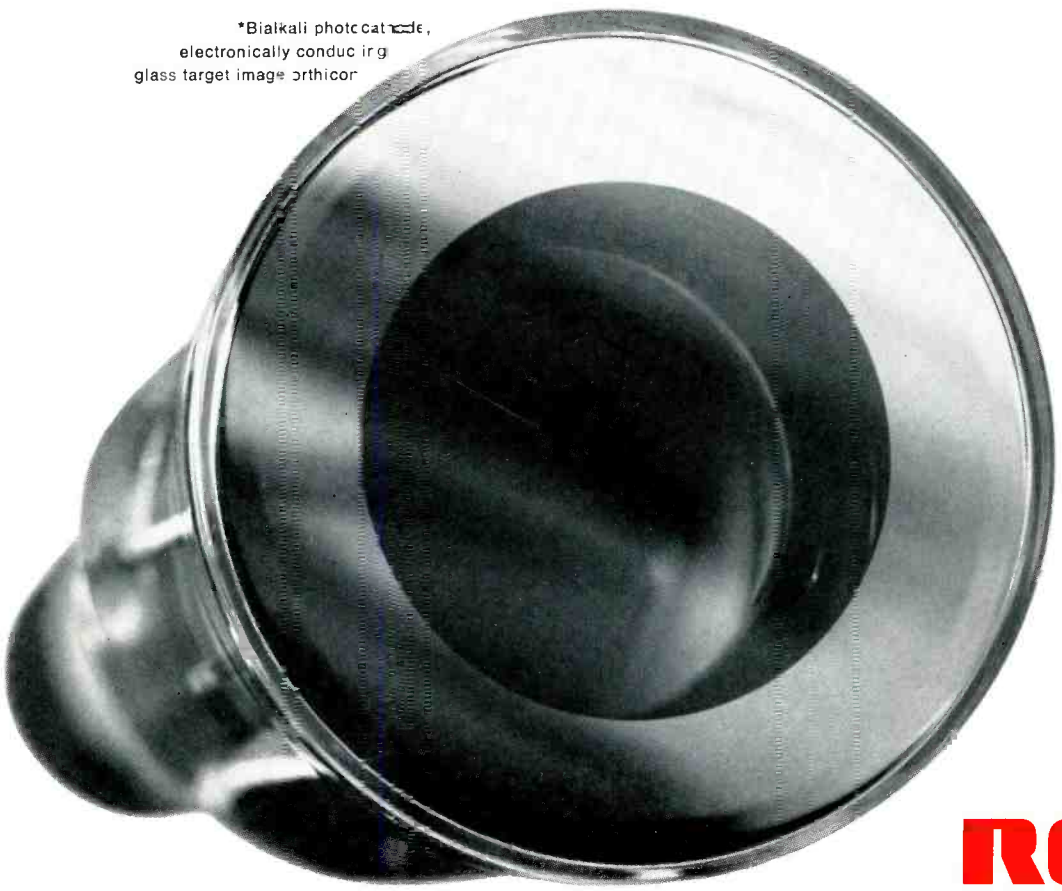
- New warranty—now extended to 1800 hours
- New non-stick capabilities mean long, long life
- No linear decline in sensitivity
- Five BIALKON camera tube types* now can replace 80 industry types

You get more with RCA BIALKON orthicons—in initial performance, hours on-air per your dollar, and in-camera stability. Be sure you hear the full RCA BIALKON story; stop in to see us at NAB Booth #117.

Also see your RCA Field Engineer for full information about the five BIALKON camera tube types, now available from your RCA Broadcast Tube Distributor.

RCA Electronic Components, Harrison, N.J. 07029.

*Bialkali photocathode, electronically conducting glass target image orthicon



RCA

NAMES IN THE NEWS

ITT Wire and Cable Division announces the appointments of **Robert N. Haidinger** as vice president, administration; **H. Allen Kelly** as district manager, Ohio and Michigan; **Robert E. McCall** as comptroller and **William A. Nicoll** as vice president and director-marketing. ITT Industrial Laboratories Division announces the appointment of **Dr. Robert L. Hirsch** as laboratory director. **M. M. Gaito** has been appointed as group general manager of ITT Data Services Worldwide. James R. McNitt, president of ITT subsidiary, announced the election of **Paul B. Twomey** and **Valerian F. Podmolik** as vice presidents of ITT World Communications Inc.

William H. Johnson

Donald H. Palmquist

William H. "Bill" Johnson and **Donald H. Palmquist** have been advanced respectively to the positions of director of marketing and marketing manager for high fidelity and musical instrument products, A. A. Ward, president of LTV Altec, Inc., announced recently. **D. J. Lawson** and **Morris E. Roth** have been elected vice presidents of Ling-Temco-Vought, James J. Ling, board chairman and chief executive, announced recently. LTV Ling Altec has elected **Roscoe G. Haynie** to its board of directors.

Thomas & Betts Co. announces the appointments of **Robert B. Ackerman** as supervisor of cost and **Owen L. Taylor** as vice president for engineering.

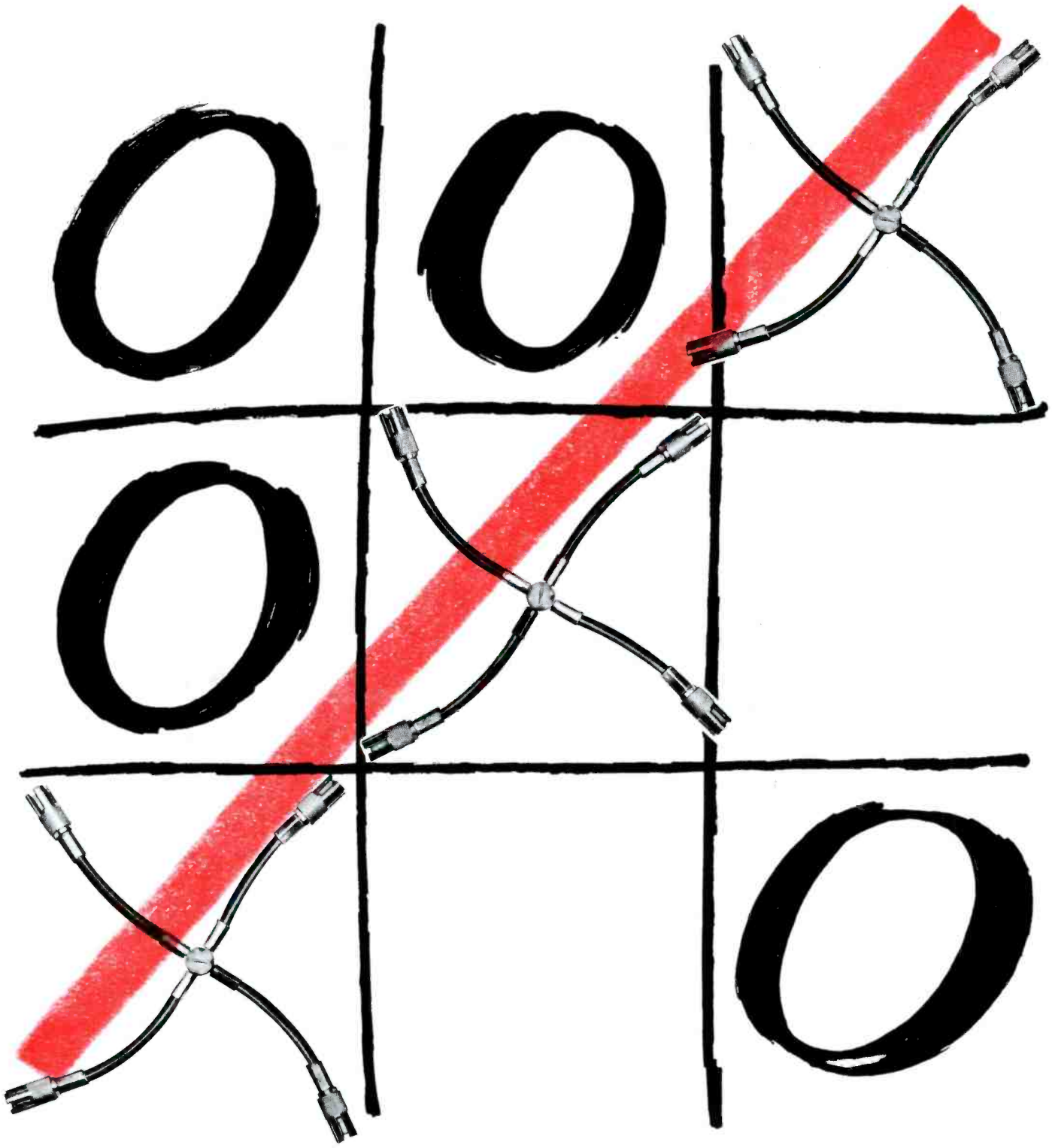
James L. Kimball

James W. Barnes

James L. Kimball has been named vice-president-engineering and **James W. Barnes** appointed chief engineer of Cohu Electronics, President William S. Ivans recently announced.

Harry Fine, assistant chief of the FCC's Research Division has been elected Fellow of the Institute of Electrical and Electronic Engineers.

Circle 62 on Reader Service Card →



Another winning line from Cooke

Program RF or video circuits with patch cords? Then look to Cooke for a complete line of reliable, low-cost patching equipment. You get all these advantages: • Extremely high density coaxial patch fields with 100% flexibility • Extra ease of installation and maintenance, thanks to push on/pull off connectors for all external cabling • Excellent electrical characteristics for low-loss patching of very high frequencies. And . . . most important of all, famous Cooke quality in the patching jack and all the complementary hardware.

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nounced by Kaiser was the appointment of **Bruce W. Geddes** as producer-director at WKBF-TV, Cleveland.

Carter G. Elliott has been named manager, public relations and advertising for International Video Corporation.


T. Douglas Casey


Andrew C. Verock

T. Douglas Casey has been appointed controller of Craftsman Electronic Products, Inc. according to Daniel N. Mezzalingua, president of the company.

Andrew C. Verock has been appointed chief engineer, Overhead Products, Anaconda Wire and Cable Co., it was announced by Herbert C. Witthoft, vice president of engineering and research.

Dr. Peter C. Goldmark, president of CBS Laboratories, a division of Columbia Broadcasting System, Inc., has received a national award from the U.S. Office of Economic Opportunity for his efforts in the war on poverty.

Bill Anderson has joined the Public Broadcast Laboratory as a producer.


Lynd J. Carter


Dr. A. Zaffaroni

Walter J. Fitzpatrick has been promoted to manager, northeastern distribution zone, and **Robert A. Sickler** has been named to replace him as Los Angeles district sales manager at General Electric's Electronic Components Sales Operation. GE also announces the appointment of **Lynd J. Carter** as district sales representative of the company's Visual Communications Products Department.

Dr. Alejandro Zaffaroni has been elected to the Memorex Corporation Board of Directors according to Laurence L. Spitters, president and chairman of the Board. Memorex also announces the appointments of **William A. Koenig** as sales engineer, Washington D.C. area and **Robert B. Williams,** sales engineer, Westmont, N.J. office.

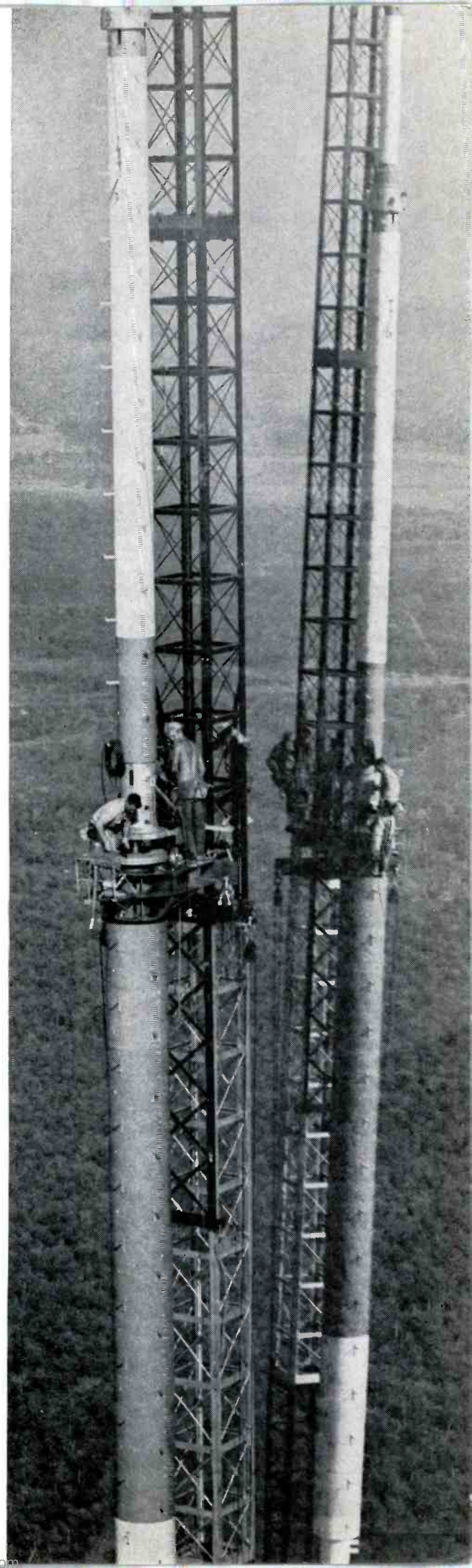
We're not suggesting twin TV towers...

—But if twin TV towers are what you want, we know how to build 'em!

Ask any Stainless' customer. Since 1947 we have supplied guyed and self supporting structures of every imaginable type, size and shape—from AM radiators to the world's tallest and most sophisticated supports for TV, microwave, CATV.

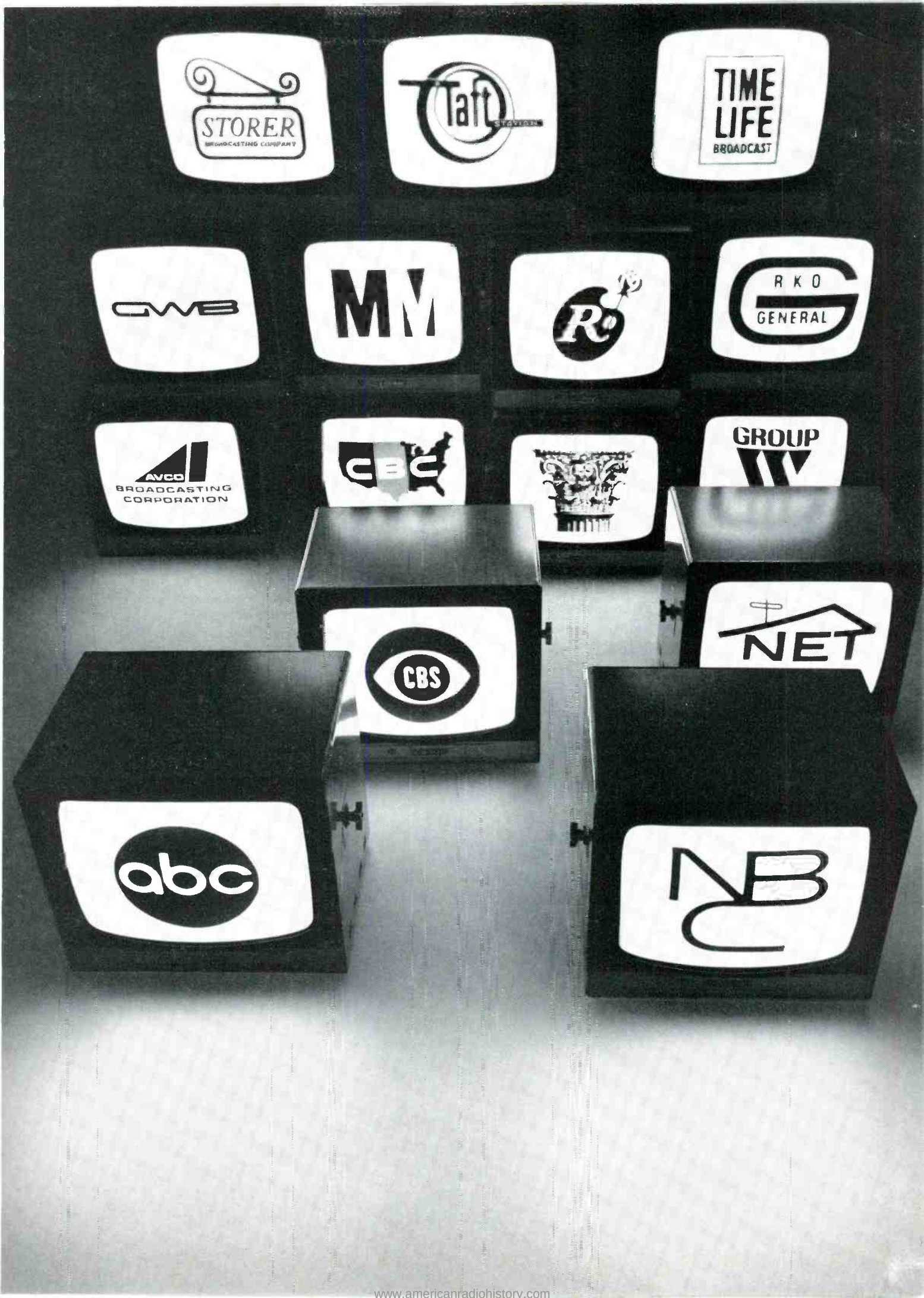
We do suggest you take advantage of this valuable experience, no matter what your tower needs may be. Ask for details.
See Stainless, Inc., North Wales, Pa. 19454
In Canada: Walcan, Limited, Toronto.

Stainless, inc.



Unique exposure during erection of one of Stainless' tall TV towers.

Circle 65 on Reader Service Card



BROADCASTERS SPEAK

Sirs:
Re: "Changes in Stations' Id's," p. 14, Jan/68 *BM/E*.

With respect to TV station id's, both visual and aural announcements are required at the beginning and end of the individual TV station's broadcast day. For example, if the station commenced operation at 6:00 A.M. through 1:00 A.M. the following day, the foregoing (visual and aural) announcements would be required at 6:00 A.M. and 1:00 A.M.

As to the remaining station identification announcements required during the hours between 6:00 A.M. and 1:00 A.M., they may be given either visually or aurally; of course, the station may also broadcast these announcements both visually or aurally.

In regard to sign off requirements after network programming, additional programming may be presented on a local station after the network announces it has terminated its programming without signing off and signing on. The station merely continues with the additional local programs, and signs off at the end of the broadcast day.

John N. Papajohn
Booth & Lovett
Washington, D.C.

Sirs:
Regarding tetrodes versus triodes.

There has been a consistant amount of material devoted to the virtues of triodes over tetrodes and vice versa.

Abnormally high among the complaints voiced against the tetrode is its low life time versus the triode, particularly the 4-250A and/or the 4-400A versus the 833A.

Some of us fail to recognize that the Eimac tetrodes must run red hot or the basic function of the gettering action of the plate will fail in a short time. To avoid this problem, operators would want to load the tetrodes to a visible orange, or failing this, to drop the plate dissipation level of the type tube. For example, to run a 4-65A in place of a 4-250, etc.

In the meantime, it would seem that certain manufacturers of transmitters would be well advised to omit tetrodes in the final class C modulated stage. I have not heard a decent sounding tetrode final stage that has as consistantly *high-level modulation* and *low distortion* as a similar power level transmitter using triodes. For example, the classic mid-thirties 833A tube is still used in the Gates transmitter because it modulates at a much higher level all day long better than any tetrode 1-kW transmitter on the market. However, it might be noted that the new transmitter would operate a lot better if more grid drive were provided to the

EECO ON TIME® equipment...

cuts video tape editing costs 75%

EECO's new ON-TIME Video Tape Editing and Control System can now be used with *either* quad-head or helical scan recorders. This means drastic cost reductions — 75%, in many cases — by permitting pre-editing on the helical scan unit, reserving the more costly quad-head machine time for final edit. EECO's ON-TIME pre-editing feature provides a work print and an editing log which allows you to make more than 30 edits per hour on your quad-head recorder. *Edit directly on video tape . . . no tape-to-film and film-to-tape transfers . . , no messy 24 frame-to-30 frame conversion table.* "EECO Time" recorded on the cue track of your video tape lets you find scenes quickly, controls electronic splicing to the precision of one frame, and accurately controls tape transport "stop" and "start" times. Get more information on EECO's money-saving ON-TIME system, and arrange for an early demonstration on your own recorder.

INSTRUMENTS DIVISION
ELECTRONIC ENGINEERING COMPANY OF CALIFORNIA
1601 EAST CHESTNUT AVENUE · SANTA ANA, CALIFORNIA 92701 · (714) 547-5501

See the ON-TIME System in action at the NAB Show, Booth C, Writing Room

Circle 69 on Reader Service Card

final stage as, for example, in the older Gates transmitters. Operators would do well to insure high grid drive to final class C modulated stages to get good quality audio modulation with a high *positive* percent of modulation.

One of my basic complaints against the design of the tetrode transmitters on the market is the failure to properly modulate the screen grids of their modulated final stages. But while we are talking about transmitters, I believe that anyone is fooling himself if he thinks he can get the same response out of *any* type of linear amplifier as he can get with the basic and simple high-level type of transmitter.

Of course, this is my own opinion, but when I get ready to buy a new 5-kW transmitter here, you can be well assured it will be a triode high-level modulated stage in the final amplifier. The purchase of a tetrode in the final stage would be, of course to me, a waste of money in cranking up from 1-kW to modulate the tetrode stage all the time at an average level that is consistantly high and in the meantime get the audio sounding good. In fact, there is one transmitter on the market using tetrodes that has a consistantly poor sound all across the country. It just sounds bad: hollow and tinny.

The business of saving power dollars and modulation transformers is, I think, a lot of bunk: The broadcaster is after a strong audio and a clean signal. For the ease and simplicity of operation over many, many years, there is no excuse for any other consideration than a high-level stage using a triode(s) in the final amplifier for standard broadcast band operation. The money saved on various rehashed Dorherty transmitters or on certain 1-kW linear models just isn't worth the endless headaches and low audio and distortion that invariably occurs. Of course, handwaving sells the transmitter, but our market doesn't buy the transmitter, the market buys the sound and the service area. For a few more power dollars over a year, the station gross will be far fatter.

Bob Hoover, PE
Owner
KPUL-AM-FM
Pullman, Washington

Sirs:

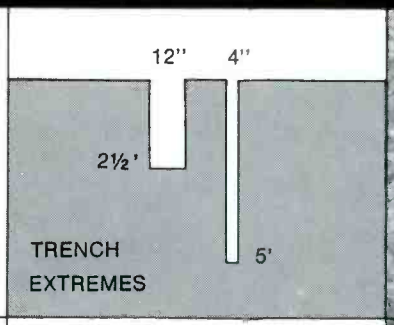
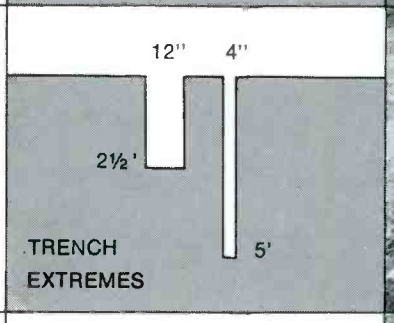
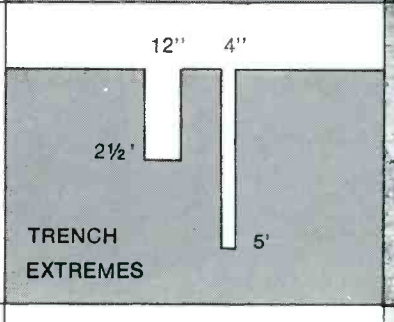
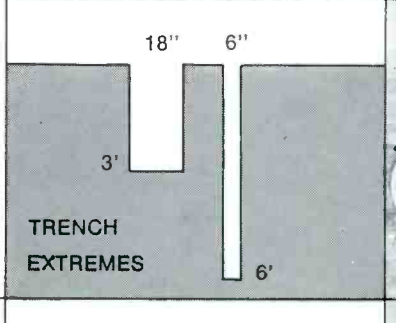
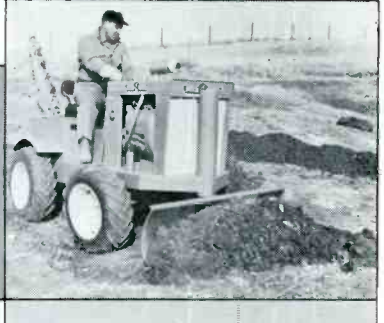
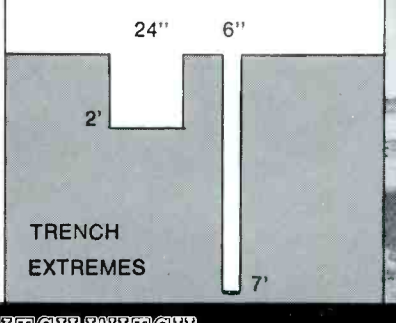
Your magazine is truly the most informative and educational magazine for broadcast engineering and management.

Just recently, through the coupon in *BM/E*, I purchased the new book, "The Man Behind the Mike." It is an outstanding book that I am recommending to everyone.

In your last issue (Jan/68 *BM/E*), the article on CATV antennas mounted on a broadcast tower was very very interesting. I had often wondered about how this could be done. It seems that the folded unipole

ONE OF THESE DITCH WITCH TRENCHERS WILL MEET YOUR JOB REQUIREMENTS!

DOLLAR FOR DOLLAR, DITCH WITCH OFFERS MORE TRENCH FOR YOUR MONEY!

"C" & "M" SERIES Low-cost handlebar trenchers you can take anywhere. Self-propelled; rubber-tire mounted; 3 digging speeds; rugged & compact. Two models in both the "C" and "M" series.	**7** or **9** or **12** **HP**	**10** FEET PER MINUTE*		
H12 A three-wheel, riding-type trencher with superior mobility, maneuverability and digging capability. Power steering; hydraulic boom; variable crowd control; rubber-tire mounting. Will not damage street or lawns.	**12** or **18** **HP**	**12** FEET PER MINUTE*		
J20 Small-machine economy with big-machine productivity! Power steering; 4-wheel drive; 3-speed digging chain plus reverse; good ground clearance; hydraulic backfill blade; rubber-tire mounted; optional boring unit attachment. A maneuverable machine that will trench, backfill and bore.	**18** **HP**	**18** FEET PER MINUTE*		
V30 Everything rolled into one! Power steering; 4-wheel drive; hydraulic backfill blade; 4-speed digging chain plus reverse; highly mobile. A powerful machine built for every job. PLUS . . . VIBRATORY PLOW/BACKHOE/BORING UNIT ATTACHMENTS	**30** **HP**	**24** FEET PER MINUTE*		
R60 The rugged one! Greater power, production speed and mobility. Optional heavy-duty 4-speed standard or automatic transmission; variable crowd control; hydraulic backfill blade; power steering. DETACHABLE TRENCHER ASSEMBLY MEANS EASY CONVERSION TO VIBRATORY PLOW or BACKHOE.	**60** **HP**	**40** FEET PER MINUTE*		

*Maximum rate at average depth under average soil conditions.

DIVISION OF **CHARLES MACHINE WORKS, INC.** • **DITCH WITCH** • **1817 ASH STREET, PERRY, OKLA. 73077, USA**

Circle 72 on Reader Service Card

The Best keeps getting

New PE-350 Live-Color Camera.

Chroma enhancement on all color channels. New optics. New preamplifiers. And customer-oriented conveniences. That's a peek at General Electric's new PE-350 live color camera. It's the result of wide industry acceptance of the PE-250, plus two years of GE engineering development.

The new PE-350 has enhancement on all 3 chroma channels—not just the red channel. New optics and new preamplifiers give you the best sensitivity in the industry.

The PE-350 has an eight-position color filter wheel to compensate for color temperature changes. Instantly adapts to light changes from high noon to dusk.

And we've added a host of customer-oriented conveniences to the PE-350. Two more talent tally lights are installed under the lens; the color filter wheel can be quickly adjusted by the operator's hand wheel on the right side of the camera housing. And for access to the viewfinder yoke and the high-voltage power supply, a weatherproof hatch is located on top of the camera housing.

New PE-250 Retrofit Kits. Protect your investment—add two years of advanced design to your PE-250 in a few hours of modifications.

Hundreds of present PE-250 owners can take advantage of the improved performance capability of the new PE-350 camera with the choice of 3 kits. There's a kit to update your optical system and circuitry. And two kits that make your PE-250 as modern as a PE-350 for remote telecasts.

Better at General Electric.

New from General Electric—15 KW VHF transmitter with solid-state circuits. Greater reliability, less maintenance and better performance.

We've got new solid state drivers. We replaced 91 tubes with high-reliability silicon transistors, retaining only a few long-life high power tubes.

And the new TT-515 transmitter has built-in direct crystal control of audio and visual carrier frequencies. A pair of TT-515 transmitters are ideally suited for 30 KW parallel operation.

New Video Distribution Switcher. Top performance, computer logic, readily adaptable to automation.

The new TS-301-A Video Distribution Switcher is designed to meet expanding programming needs. Solid-state and modular, the new distribution switcher handles a minimum of 10 inputs and 6 outputs to a maximum of 100 inputs and 96 outputs. New computer logic circuitry saves wires and connections, reduces maintenance.

The new TS-301-A gives clean, sharp switching due to solid-state design. Excellent performance results from superior isolation of inputs and outputs, lower signal-to-noise ratio, better overall frequency response, and lower differential phase and gain. GE-56B

New Color Optical Multiplexer. The most versatile in television.

Four projector inputs, 2 color camera outputs—unparalleled film programming flexibility. Ideal where space is at a premium, the PF-12-A color multiplexer makes four projectors do the work of six. In a single 8′ x 8′ film island, 2 film projectors and 2 slide projectors can feed into 2 color film cameras—all in color.

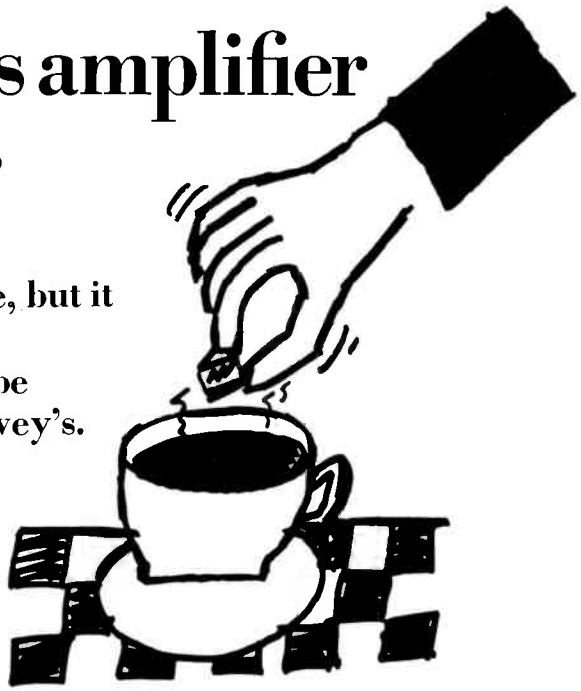
You can use one projector and one color film camera on the air and at the same time use the other projectors and camera for previewing, recording, or rehearsals. Should one camera become inoperable, you can immediately switch any projector to the other camera, without losing air time or going to monochrome.

Visual Communication Products Department

GENERAL ELECTRIC

Electronics Park, Syracuse, New York 13201

Don't drop this amplifier into your coffee.



It may look like a sugar cube, but it tastes like an amplifier.

An operational amplifier to be specific. One of the many at Harvey's. And despite its tiny size, it's a no-compromise piece of equipment with low noise and low distortion.

The audio field, in general, will probably be seeing a lot of these sugar cube amplifiers in months and years to come. But Harvey's customers have had a taste of them for some time already.

The product specialists at Harvey's have been recommending and using these operational amplifiers as a matter of course lately.

And Harvey's has been making available and recommending a lot of other fantastic products of miniaturization too.

The new FET limiters, for example. In addition to being ultra-compact, they're also ultra-fast with ultra-low distortion. And although they're not exactly ultra-cheap, we bet they cost a lot less money than you're probably afraid you'd have to spend.

And we've got the new FET condenser microphones. And all the new tape recording equipment you've been reading about.

(Harvey's is prepared to supply you with complete 24-track tape set-ups, high-speed duplicators, and packaging equipment for cassettes and cartridges faster than you can decide where you're going to put them.)

Call Harvey's often. And if you're not already on our mailing list, get on it.

Harvey's can keep you in touch with products so new, you may find some of them a bit hard to swallow.

Harvey Radio Co., Inc.

Professional A/V Division, 2 West 45th St., New York, N.Y. 10036 (212) JU 2-1500

Circle 74 on Reader Service Cad

← Circle 73 on Reader Service Card

method could be used in many cases. It would eliminate the many problems of crossing that cantankerous base insulator.

I am looking forward to receiving more issues of *Broadcast Management/Engineering*.

Keith R. Greiner
KLGA, Algona, Iowa

Sirs:

I have read with interest the comments of Ben Akerman, William McAulay, and Alan Roycroft regarding life expectancy of 4-400A.

Maybe I'm just lucky, but I have had none of the troubles which they mention. We use 4-400's in Bauer, RCA and Collins 1-kW transmitters, and average better than 10,000 hours service per tube. One of these transmitters performed rather dubiously until we discovered that the filament voltmeter read 0.3 of a volt high. It behaved like a different rig once the tubes has a full 5 volts on the filaments. We have also found that when a 4-400A has passed its prime in the output stage, it may still be used as a modulator for several more months.

I hope that none of your readers will have the sad experience that we had with some PL 175A's. The manufacturer made such glowing claims that we purchased four of them and put a pair in the final of WLAV's BTA-1R, and WLYV's Collins 20V. After approximately 1600 hours, both transmitters developed bad audio distortion and negative carrier shift, apparently due to insufficient emission. Replacement with standard 4-400A's cleared the trouble in both transmitters. Anyone want some slightly used PL 175A's?

Charles A. Sprague
Operations Manager
WLAV Radio
Grand Rapids, Mich.

Sirs:

Pertaining to Mr. Paul Schuett's (KWG, Stockton, California) letter in your February 1968 issue in which he sang praises for the 833A tube, I, too, am among the praise singers for this reliable tube.

We do technical consulting (for radio), rebuild old equipment, and do contract engineering. All totaled, we of the transmitters use 4-400 tubes while the others use the 833A. We have found that in most of our failures with the 4-400, a failure was a complete failure, while with the 833A, there has almost always been advance warning. The 833A would become gradually "gassy," sound bad, or efficiency become low—no sudden failures as with the 4-400. In 1965, I was able to use an 833A pulled from service in 1958. Normally this would not be done, however, one particular station would run the tubes until they would no

longer work at all so you could say an emergency caused us to have to use the old tube. (By the way, this station no longer this.)

Perhaps singing the praises of the 833A tube does not seem to accomplish much, however, someone is going to be in the market for a new transmitter some day and I expect that if he knows of the reliability of the 833A tube, he may save many dollars by purchasing a transmitter using these tubes.

Thanks for letting me "bend your ear."

Walter L. Johnson, Jr.
Tri-Tronics
Lillington, N.C.

Sirs:
This note of appreciation is long overdue. I look forward to each issue of *BM/E*.

Would it be possible to obtain the May issue of *BM/E*? Somewhere along the line my copy has gotten lost.

Congratulations on a fine publication.

John A. Columbus
Pres. & C. E.
WPUV Radio
Pulaski, Va.

On the way, J. C.

Sirs:
Mr. Bob Purvis, managing director of Purvisonic Sound has shown me copies of your magazine which prove more than interesting.

If convenient I would appreciate being placed on the mailing list as soon as practicable.

As a member of The North American Idea Bank we often hear reports out of *BM/E* and this make us feel more so how important your magazine would be to us in this market.

K. S. Bales
Public Relations
6KYNA
Perth, Australia

Sirs:
. . . I am chief engineer of Gem Radio Stations. I installed the equipment and set up the entire facility of two new stations in less than a year's time for Gem Radio. One of our stations is in Lincoln, Nebraska, KLOL, and WPOK is located in Pontiac, Illinois. The Managers of the stations get copies of *BM/E* and some of the time I get to see the magazine and sometimes I don't. From the copies I have seen, the material contained is very interesting and in a sense, necessary to keep up with the goings on in the industry.

I think the column of FCC rules and regulations is very fine. Information on new equipment is informative, and also the items written by the people who are professionals in their fields is most enjoyable reading matter, and a sure thing for future reference.

I feel I am missing out on some good things by only occassionally getting to see *BM/E*. Please let me know whether I qualify or not for the complimentary subscription.

Just a bit of information that might be helpful to engineers in making field measurements when tuning a directional on the close-in points. No doubt some have found the difficulty we ran into. That is, not being able to follow a radial for a distance of two miles through farm crops, especially corn that may be ten feet tall, in the summer or early fall. When we ran into this problem we found a solution by using two cane fishing poles with flags tied to the tops and mirrors tied to the mid-points. By holding the pole and mirror above the corn at arm's length we were able to spot the towers and keep on the radial. Also a big help was pair of CB walkie-talkies we attached to the poles so that we were always in contact with each other, and able to keep in a straight line. Our method of measuring the distance employed two men, each pulling a measured length of line 1/20th of a mile long. Maybe others have come up with other devised methods of accomplishing the same thing. I'd like to hear some of them.

George E. Poulet
Chief Engineer
KAGE, KLOL, WPOK
Winona, Minn.

AKG two-way microphones

An exclusive concept*

In the **AKG** two-way microphone system, the total response range has been subdivided between a high frequency and a low frequency transducer, each of which is optimally adjusted to its specific range (similar to a two-way speaker system). The two systems are connected by means of a cross-over network with the cross-over frequency at 500 Hz.

The cross-over network is housed in the lower portion of the microphone. In case of the D-202E and D-224E, the output circuit of the microphone contains an electrical bass attenuator to permit a reduction in low frequencies.

This unique arrangement achieves a number of previously unobtainable performance characteristics for cardioid dynamic microphones:

Flat frequency response over the entire audible range. The low as well as the high frequency system is optimally adjusted to its specific frequency range and the cross-over point, at 500 Hz, is unnoticeable.

Linear off-axis response. Sound reaching the microphone 90° off-axis is reproduced naturally. No frequency discriminating characteristics, which commonly arise from dynamic microphones, are audible.

Uniform front-to-back discrimination. The two-way system maintains a front-to-back discrimination of at least 20 db over its entire range, even in the critical low frequency and upper mid-range area.

Write for complete two-way microphone data.

AKG

MICROPHONES • HEADPHONES

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NORTH AMERICAN PHILIPS COMPANY, INC.
100 EAST 42nd STREET, NEW YORK, NEW YORK 10017

D-200E

The basic two-way microphone. Incorporates all inherent features of the two-way technique: smooth frequency response; linear off-axis response; uniform front-to-back discrimination.

$69.00 Net

D-202E

Professional two-way microphone. Extended, smooth frequency response. With bass roll-off of — 20 db at 50 HZ. With sintered bronze cap which functions as windscreen, is waterproof and protects magnets from iron particles and dust.

$130.00 Net

D-224E

Studio two-way microphone. Exceptional wide and smooth frequency response, normally expected only from condenser microphones. With bass roll-off switch and compensating windings to eliminate the effects of magnetic stray fields.

$185.00 Net

*U.S. Patent No. 3,204,031

2-68

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AEL Delivers the Complete CATV Package

From feasibility studies . . . through turnover of fully operational systems . . . AEL's CATV sales group, systems engineering staff and nationwide engineering service organization will provide a total Turnkey package . . . or any part on an individual basis.

FEASIBILITY STUDIES are conducted to determine the technical and economic practicability of installing and operating a system in a given community.

PRELIMINARY COST ESTIMATES are prepared (once feasibility has been established) which take into consideration both construction and operation.

FRANCHISE ASSISTANCE and guidance are available for prospective system owners and operators.

APPLICATION ENGINEERING, including theoretical and on-site signal strength surveys, strand routing maps and utility make-ready studies are conducted by experienced field engineers.

SYSTEM DESIGN Data obtained from application engineers is carefully analyzed, and complete system construction drawings are prepared. Materials lists, labor estimates and complete construction cost breakdowns are submitted with all system construction proposals.

SYSTEM CONSTRUCTION Thoroughly experienced field engineers and skilled construction crews combine their abilities to install CATV systems quickly and efficiently. Proof of performance tests are conducted at each stage of construction and for the completed system.

FINANCING plans are flexible . . . designed to fit the specific requirements of individual customers.

CUSTOMER SERVICES feature free technical training for operating personnel, system management consulting, maintenance engineering and a full range of engineering services for existing CATV systems.

For information on complete Turnkey packages, engineering and construction services, and COLORVUE CATV equipment, write today . . . or call 215/822-2929.

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CATV DIVISION
American Electronic Laboratories, Inc.

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Correspondence: Post Office Box 552CL, Lansdale, Pennsylvania 19446

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Sylvania Electric Products, Inc. (Booth 250)

See mobile television studio with TWP 9B cameras, TV console videotape and portable lighting kit.
Circle 274 on Reader Service Card

Tape-Athon Corp. (Booth 239)

Featured are the Programmer III and introduction of a new program logger that uses 15/16 to 15/32 in./s speeds and is capable of recording one to eight channels up to 384 hours on a 10½-in. reel. Also on hand is Model 5000 automation broadcast system.
Circle 251 on Reader Service Card

TeleMation, Inc. (Writing Room, Booths D & E)

A host of new products being unveiled includes TMM-211 Optical Multiplexer, TSE-100/TVS-212 camera matching system, TMC-2100 monochrome vidicon camera and TMV-529 waveform display keying device. Other products include TSG-2000C EIA synchronizing generator, using digital computer techniques; a video crossbar switcher; an optical multiplexer; a universal camera control; a video control center and a portable sync generator.
Circle 275 on Reader Service Card

Tele Pro Industries (Booth 414)

Attractions are Presidential Lecturn, 6000 automatic sequential front and rear projection system, XLS-1 xenon light system, 6000 long throw lenses, RA-100 and RA-500 random access slide projectors, RA-60 random access slide changer. Twin 6000 projectors and Fidelipac cartridges. Twin 6000 projector system uses dissolves, fades, superimposures and flashes. It can project front and rear screen, using polariod or color slides. Fidelipacs on display have playing lengths from 10 seconds to 32 minutes.
Circle 252 on Reader Service Card

Tektronix, Inc. (Booth 111)

Type 528 waveform monitor and Type 520 PAL Vectorscope are premiering. Also ready for inspection are Type 453-MOD 127C 50-MHz, dual-trace, portable oscilloscope and Types 529 and RM529 waveform monitors.
Circle 279 on Reader Service Card

Telesync Corp. (Booth 218)

Attractions at Telesync are synchronous prompting equipment, horizontal-vertical color effects crawl and color background projection system. Effects crawl gear carries positive and negative copy prepared on an office electric typewriter in an internally lighted translucent drum. Background projection system uses 35mm slide projected onto a high gain retroreflective screen.
Circle 253 on Reader Service Card

Television Zoomar Co. (Booth 105)

Highlights are TV Colorgard Mark I and II, HOB color camera pedestal for remote trucks, TVP pneumatic pedestal and Zoomar modulation transfer function meter. MTF meter is a completely automatic objective approach to lens measurement and evaluations and can be operated by relatively unskilled personnel. Lens to be tested is positioned in the instrument and a modulation transfer function is registered automatically on a graph. Meter interprets lens resolution and contrast capabilities.
Circle 254 on Reader Service Card

Continued on page 125

Circle 84 on Reader Service Card →

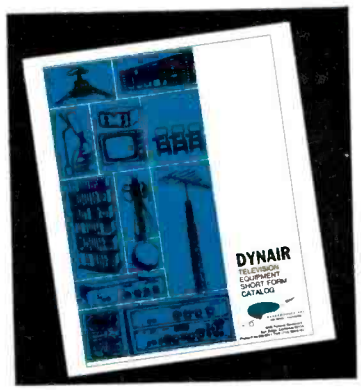
If you specify television equipment, you need a copy of DYNAIR's new catalog.

It's yours for the asking.

By concentrating its efforts on the technical area of video signals, DYNAIR Electronics, Inc., has achieved a unique position of leadership in the television industry. A major supplier to every facet of TV—broadcast, community antenna, closed-circuit, educational and industrial—DYNAIR's years of experience have resulted in the development of many new design concepts. DYNAIR equipment is generally considered by industry experts to represent the current state-of-the-art design approach.

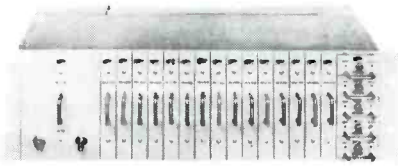
Units for signal distribution . . . signal switching . . . signal modulation . . . and RF demodulation are offered by DYNAIR for every operating requirement or budget level. This is field-proven equipment, used around the world.

To introduce ourselves and our equipment, may we send you our new TV Equipment Short Form Catalog? It's the first step in showing you what we can do in breadth . . . and in depth . . . for *your* video signals.

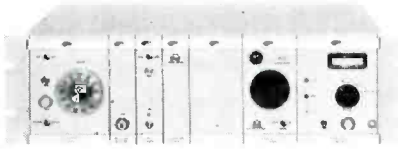


Typical DYNAIR TV equipment for any budget....any TV problem

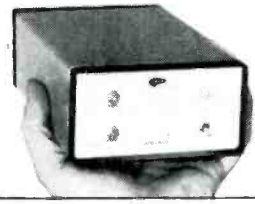
Series 5110 Solid-State Remote Controlled Switchers . . . expandable to installations of any number of inputs and outputs



Series 4000 Solid-State Modular CATV Head-End Equipment for processing, modulating and demodulating television signals



MINI-Series CCTV Equipment . . . a broad group of compact, low-cost units ideally suited to industrial and educational applications



See DYNAIR'S complete line of TV equipment at the NAB Show: Booth #211, West Exhibit Hall, Conrad Hilton Hotel—Chicago, Illinois, March 31st-April 3rd.

DYNAIR ELECTRONICS, INC. SAN DIEGO, CALIFORNIA

DYNAIR ELECTRONICS, INC.

6360 Federal Boulevard, San Diego, California 92114
Phone (714) 582-9211, TWX (714) 583-8101

Circle 81 on Reader Service Card

ment handles typical broadcast day. Three middle-of-the-road formats including *Image*, *Touch of Velvet* and *Pop Concert* is soothing visitors in the Schafter area.
Circle 246 on Reader Service Card

Seeburg Music Library (Booth 215)

Background music equipment and Model SABMC studio for background music for use via phone lines and fm multiplex are on deck in the Seeburg area. Also on display is the AP-1 component capable of playing fifty 12-in. 33⅓ LP records.
Circle 247 on Reader Service Card

Shibaden Corp. (Booth 244A)

All new from Shibaden: Color camera PMZ-12-C-2 (Plumbicon), color bar dot generator, DZDP analyzer and a TV test signal generator.
Circle 272 on Reader Service Card

Shure Brothers, Inc. (Booth 213)

Feature attraction is the display of Shure Professional Microphone Line as well as stereo disc reproducers, tone arms, and accessories. Also in the spotlight are the new SE-20 solid-state stereo transcription preamplifier and the new M67 microphone mixer/remote amplifier.
Circle 273 on Reader Service Card

Sparta Electronic Corp. (Booth 306)

Feature attraction is complete showcase broadcast studio audio control center incorporating many new products, including a recently-introduced Sparta-Matic tape cartridge system, speech input audio consoles, turntable systems and a reel tape recorder.
Circle 248 on Reader Service Card

Spindler & Sauppe, Inc. (Booth 327)

Spectrum 32 35mm slide projector, designed specifically for color television broadcast chain integration is making its debut. Also on hand are the 322 and 332 slide projectors.
Circle 249 on Reader Service Card

Standard Electronics Corp. (Booth 112)

First solid-state fm transmitters in 250-W and 1-kW power levels are being introduced in the Standard area. Two new transmitters are being added to Standard's TV line: a 10-kW visual with a 1-kW aural and a 10-kW with 2-kW aural.
Circle 250 on Reader Service Card

mics (Models D-200E and D-224E), incorporating integral 500-Hz crossover.
Circle 239 on Reader Service Card

Optical Imports, Inc. (Booth 203)

Optical Imports (distributors of Angenieux optical equipment) is displaying a complete line of Angenieux lenses for broadcast television and associated equipment. Included are a standard lens, a wide angle lens, one for close focusing and a lens with an 18:1 zoom range. In addition, a diascope for camera testing in remote locations as well as studio environments is on display.
Circle 240 on Reader Service Card

Packard Bell Electronics Corp. (Booth 240)

New products include PB-100 color film chain (triple-vidicon), used in conjunction with multiplexer for slides and 16mm film and PB-940 high resolution monochrome camera. Other products are PB-9200 viewfinder camera with 9:1 zoom lens, PB-920 surveillance camera, low-cost switchers and lenses.
Circle 269 on Reader Service Card

Philips Broadcast Equipment Co. (Booth 304)

Watch first-hand the man pack color Plumbicon camera in action. See Also a video switching demonstration using the pre-programmed union system from Telecontrol Corp.
Circle 270 on Reader Service Card

Quick-Set, Inc. (Booth 242)

Tripods, pedestals, dollies, wall and ceiling mounts, pan and tilt heads, cradle heads and special purpose mounts are on hand for inspection. Featured are Models 6475 Gibraltar crab pedestal and the 6245 cradle head.
Circle 241 on Reader Service Card

RCA (Booth 101)

New color TV studio and transmitting equipment is the highlight of RCA'S exhibit. For the uhf broadcaster, RCA is showing for the first time its "Omni-Max" transmitting system which combines a 110-kW transmitter with a recently-introduced 601-gain Polygon antenna to produce an omnidirectional signal of 5 MW. In the studio area RCA is showing its newest equipment for producing "state-of-the-art" color pictures "live" and from tape and film. A monochrome studio will be used for demonstration of RCA's "Professional Television" product line.
Circle 242 on Reader Service Card

Rohde & Schwarz (Booth 241)

Four new instruments are being unveiled by R&S, including: standard video test generator, pulse bar generator, all solid-state video standard level generator and all solid-state stereo fm relay receiver. Also on display are TV channel signal generator, standard demodulator, group delay test set, video noise meter, differential phase/gain meter, stereo coder & decoder and fm signal generator.
Circle 243 on Reader Service Card

Rust Corp. (Booth 251)

Automatic logging, remote control and video switching are areas covered with appropriate equipment at Rust. The RC-2400 remote control unit well could be most complete remote control system available. The AL-400 Autolog displays 24 hours of readings. System is mounted on a 3½-in. standard panel and is designed to operate continuously for 62 days. RMS Video/Audio switcher is operating in conjunction with monitors displaying monochrome and color video.
Circle 244 on Reader Service Card

Sarkes-Tarzian (Booth 104)

Attractions are automation equipment, digital special effects, digital video processing, color studio cameras, color film cameras and digital switching systems.
Circle 271 on Reader Service Card

Scantlin Electronics, Inc. (Booth 422)

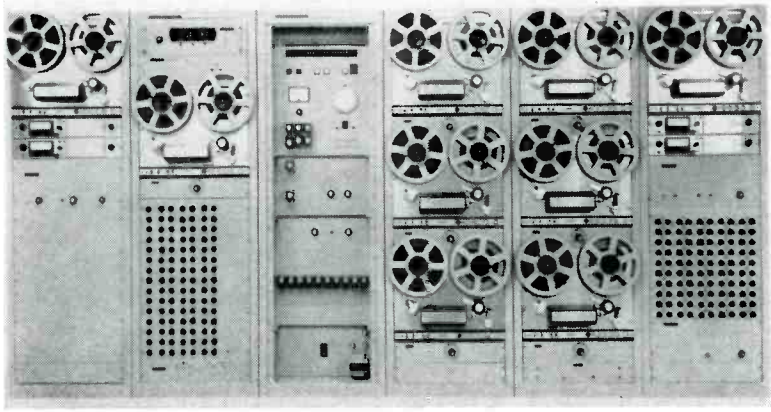
Videotype systems for TV and CATV are the attraction at Scantlin. CATV system produces 24-hour news wire, stock ticker or original local news and advertising. All program formats feature alpha-numeric character formation. TV system for TV consists of a character generator, keyboard/reader and monitor package capable of displaying titles, news flashes in color live on network TV. Both systems are compact, automatic and require no camera.
Circle 245 on Reader Service Card

Schafer Electronics (Booth 210)

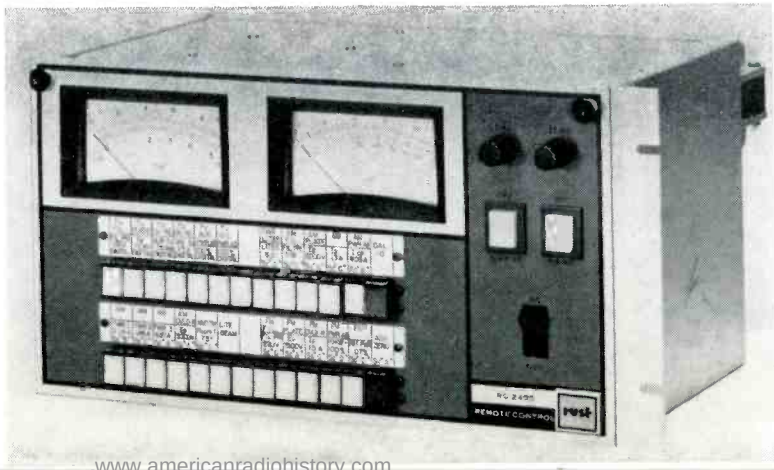
Automation systems and auditions of the Schafer tape music library are attractions. Schafer 800 is in full operation, demonstrating how equip-

Continued on page 120

Schafer's automation system.



Rust's RC-2400 Remote Control.



Look at the Difference

Unretouched photographs of 21" studio monitor. Photographic data: Rolleiflex C-3, CPS color negative film — ASA 100, 1/15 second at f/5.6

...after 3M Color Dropout Compensation

Here's what 3M's Color Dropout Compensator does for your VTR reproduction:

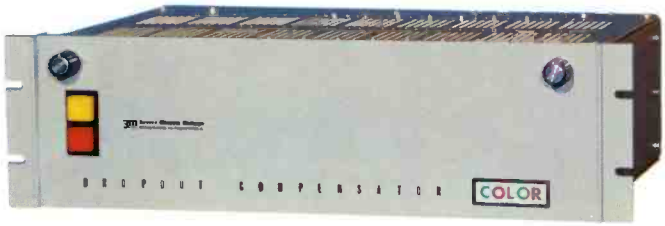
Look at this unretouched composite photograph of a studio monitor. It shows, at the left, a videotape playback with 13 electronically recorded-in dropouts. These dropouts were created by a special test generator which attenuates the RF level to the record driver. On the right, these dropouts have been completely restored by the DOC.

The black dropouts shown on the left are followed by a complete loss of color-lock in the direct color recovery equipment. Since these dropouts include horizontal sync and color burst, they cause transient color flashing not ordinarily attributed to the dropouts themselves. Even shallow dropouts can create a similar problem due to loss of side-band information.

Only the 3M Color DOC corrects all these effects.

After compensation, note the precise color match and complete freedom from switching transients. Also, the dropout disturbance to the time correction unit has been eliminated. Proc amp and servo stability are improved to such a degree that it is possible to play this tape in full intersync or pixloc mode.

In the compensated half of the photo, compare the replacement material with the original signal two scan lines above the dropout due to a *complete* frame being photographed. Try to find the 13 switching transients.



The 3M Color Dropout Compensator is the only system available that can provide proper color and luminance replacement. For details write for the booklet, "Compensating for Dropouts in Color Television Recording."

Mincom Division 3M COMPANY
300 SOUTH LEWIS ROAD • CAMARILLO, CALIFORNIA 93010

See it at NAB

Rank Taylor Hobson Varotal V lenses now fit all major TV cameras

Hurray!

That means that I can keep my favorite Varotal V lens when I buy my new camera. No matter what I choose?

Right. In addition to all monochrome cameras and RCA color cameras, our lenses now fit General Electric, Norelco, Sarkes Tarzian and Marconi color cameras.

And that means when I buy a new camera and need a new lens, I can order the camera with a Varotal V?

Right again. Our lens fits 2-tube, 3-tube, and 4-tube color cameras. Image Orthicon, Plumbicon, and Vidicon.

How did you do it?

With a new Lens-Pak developed by Rank Taylor Hobson.

Does it work as well as a lens without the pak?

Better. The focal length of the Varotal lens can be easily changed by finger-tip control. And the Lens-Pak has a "ride the rails" device that allows "close-up" focusing to less than 1 inch.

Hmmm. Sounds like something I should look in on.

Fine. Why not look in on us at the N A B Show, Booth 251.

* * *

While you're there, we'll show you the newest thing in color T.V. monitors and in color title card and transparency scanners. And we have another electronic device on display that takes unusable color film and applies calibrated gamma correction to make the film acceptable for T.V. use.

ALBION OPTICAL COMPANY
260 N. ROUTE 303 WEST NYACK, N. Y.
Sole U. S. Agents for

Rank Taylor Hobson

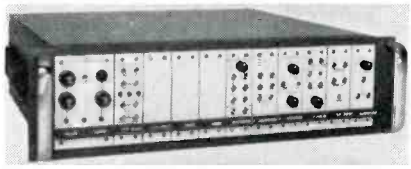
Circle 85 on Reader Service Card

Trompeter Electronics, Inc. (Booth 404)

Attractions are audio, audio and rf patching systems and components as well as switching matrices.
Circle 255 on Reader Service Card

Videometrics, Inc. (Booth 415)

Video test signal generating equipment is attraction at Videometrics. Equipment incorporates what Videometrics calls advanced concepts in video test signal generating equipment. Features include polyburst, a modulated 20T pulse test signal, linearity generator and sine-squared pulse and window generator.
Circle 256 on Reader Service Card



Videometrics' test signal generator.

Vikoa, Inc. (Booth 316)

Complete line of CATV cable and electronic equipment and turnkey components are ready for inspection. New Futura line of amplifiers, directional tap, hybrid splitter is being introduced. Also on deck is local origination equipment.
Circle 276 on Reader Service Card

Visual Electronics Corporation (Booth 301-303)

See visual information systems including Videograph character generator, Ready-File and Master-File memory storage devices. Also on hand are Model VM-90 slow-motion/stop-action color video disc recorder. Complete line of a-m/fm broadcast transmitters, including new 55-kW uhf type with solid-state driver, and "advanced" video switching systems are being unveiled. Complete line of audio consoles, regular line of VTRs, digital sync generators, French microwave equipment and accessory products also are on deck.
Circle 277 on Reader Service Card

Vital Industries (Booth 202)

Vital is displaying what it says is the largest video switching system shown at an NAB convention, including a production switcher incorporating: special effects, double re-entry, automatic sync adding with clamped inputs, add/nonadd mixing system, automatic mix inhibit on nonsynchronous signals, black burst generator and cutbar operation.
Circle 257 on Reader Service Card

Wilkinson Electronics (Booth 200A)

A game of chance—namely a raffle for a premiering air flow monitor—is attracting chance-taking NABers to the Wilkinson area. New fm harmonic filters are among the items being unveiled. Other products ready for inspection include a solid-state, a-m frequency monitor, a solid-state a-m modulation monitor, a satellite rf amplifier for rebroadcasting in shielded areas, a solid-state, 2-W rf amplifier and the 4N1 field meter.
Circle 278 on Reader Service Card

As this issue goes to press . . .

Riker Video Industries, Inc. has announced a merger with Richmond Hill Laboratories, Ltd., Toronto, Canada with Riker Video Mfg. Div., Hauppauge, N.Y.

Richmond Hill is displaying video switching, mixing and special effects control equipment and a wide range of video processing and test equipment at **Booth 412.** Circle 280 on Reader Service Card

Riker products—including TV switching systems, special effects and synchronizing and test signal generators—is on display at **Booth 246.** Circle 281 on Reader Service Card

BUSINESS OF ETV

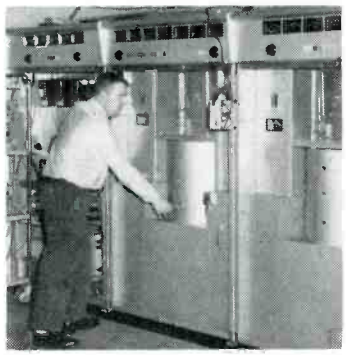
Newton N. Minnow Addresses Convention. Approximately 800 broadcasters from college radio stations across the country attending the 29th Annual Intercollegiate Broadcasting System Convention on March 30 heard Dr. Newton N. Minow, former FCC chairman, address the Luncheon Banquet at the Palmer House in Chicago.

First ITFS Technical School. Thirty-four engineering-contractors, consulting engineers, and school and college audio-visual technologists recently attended the industry's first technical school on instructional television fixed service (ITFS), conducted in Philadelphia by the Educational and communications Systems Division of Jerrold Electronics Corporation.

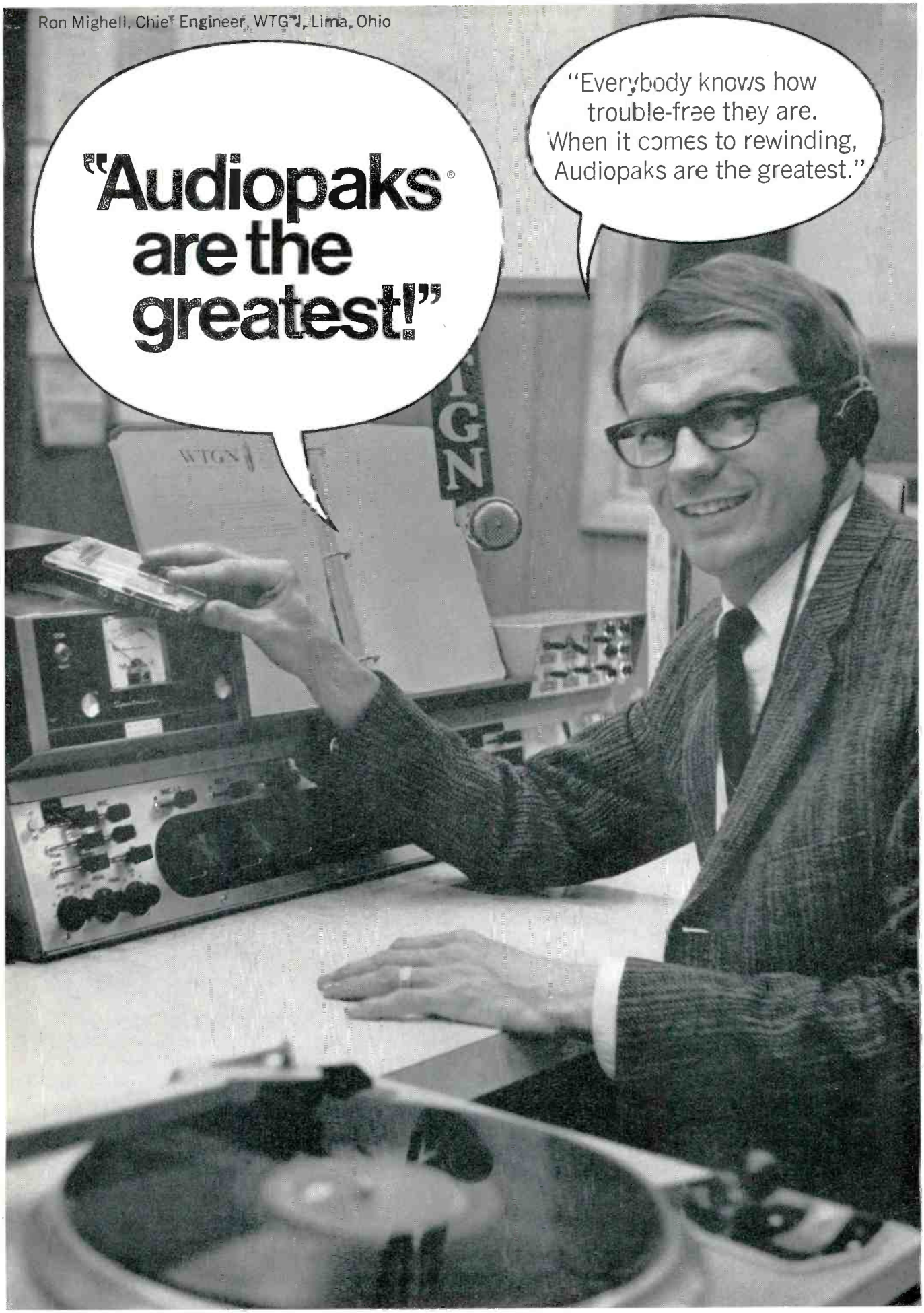
The sessions included demonstrations of Jerrold's new omnidirectional transmitting antenna, solid-state exciter, power supply and transmitter, parabolic receiving antenna, and receiver converter.

"The success of this first ITFS school in Philadelphia," according to Vroman Riley, manager of the Division, "has led the company to plan a similar school, October 14-18 at Redwood City, California, to serve engineers in the West."

New Course Available. Communications & Education, a widely acclaimed telecourse dealing with



One of twelve powerful TV transmitters RCA is supplying to the State of Kentucky's new educational TV network, is shown above. The transmitter is designed for uhf television service and when used with the appropriate broadcast antenna is capable of radiating 1,000,000 watts of effective radiated power.



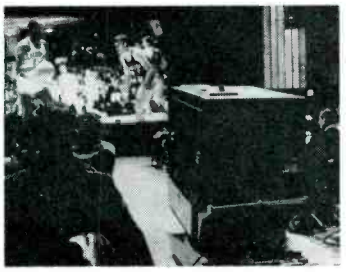
Circle 89 on Reader Service Card

mass media communications and their relationship to education, has been added to the Great Plains National Television Library at the University of Nebraska in Lincoln. Charles A. Siepmann, professor emeritus of New York University's School of Education, is television teacher for this 30 lesson series of 30 minutes each aimed primarily for presentation at the college level.

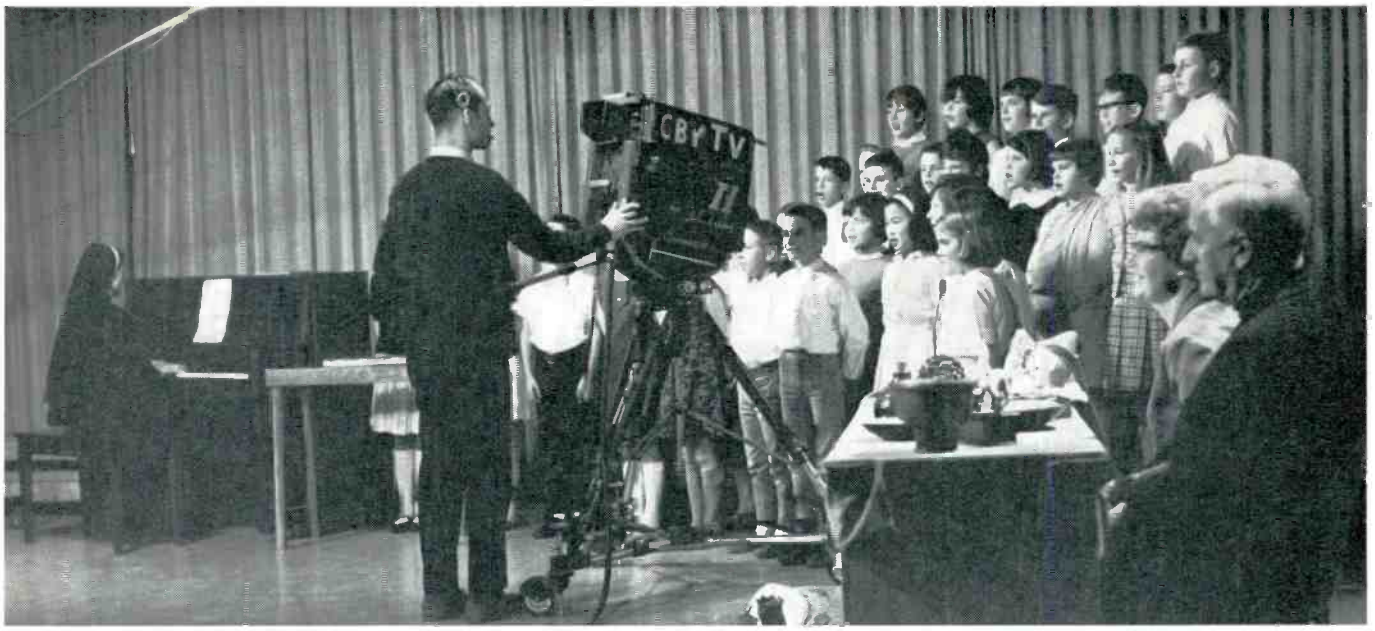
RCA Has New Desk-Top Television Teaching Center. A new type of educational television in which students watch TV lessons produced by their instructor within the classroom itself has been demonstrated by RCA. The desk top control center gives the teacher instant access to a number of TV lesson sources, from which he can select and show on TV monitors pictures from a "live" TV camera or from TV tape or film.

NAEB Studies Tunisia. A five-man team from the NAEB, including President William G. Harley, has gone to Tunisia to review the feasibility of the application of technology in the formal educational system of the country. The team will also investigate the possible use of television in adult education and community development.

Jerrold Building ITV for Palm Beach. The Palm Beach, Florida, county schools soon will have an ITV network servicing classes over widespread areas stretching from the Atlantic Ocean to Lake Okeechobee, which will surpass that of any other school system in the country. A four transmitter system now under construction on a turnkey contract basis by Jerrold Electronics Corp. is expected to be in operation early this spring.



Columbia University is using closed-circuit TV and large-screen projection to bring live basketball to its student body. The games will be shown live on a large-sized screen by an Amphicon Systems projector installed in the Columbia Gym.



SONY UNITES A COMMUNITY

-AT KCBY-TV

KCBY-TV, Channel 11, Coos Bay/North Bend, Oregon, serves 23,000 homes in the sparsely settled logging areas stretching over 100 miles along the Pacific Ocean in southwestern Oregon. A prime function of the station is uniting these scattered viewers via intercommunity activities of general interest.

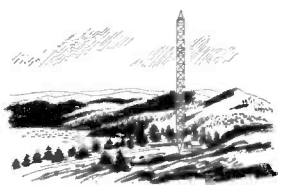
A Sony BV-120 Videocorder® is helping to knit this audience together.

Says KCBY's commercial manager Gary Young: "We hope to help newcomers become adjusted to our region so that we can have a more unified community spirit. This can only happen if they see us and themselves in action. That's one reason why our Sony Videocorder is so valuable to us."

Chief engineer Glynn McCready states: "The Sony Videocorder fits in perfectly with our type of operation, where simplicity, portability and sturdiness are important. The BV-120 meets all these requirements. We have over 700 hours on the Videocorder and have not had a single major problem. When 70 percent of your programming is on tape and you have only one machine, you know how important it is!"

No matter how large or small your audience, to find out how you can bring them together—profitably and practically—call or write us today.

For complete details on this application, ask for APB 107.



SONY®

RESEARCH MAKES THE DIFFERENCE

SONY CORPORATION OF AMERICA
VTR DIVISION
47-47 Van Dam St., Long Island City, New York 11101

Circle 92 on Reader Service Card

BUSINESS OF **BC**

RCA Execs Predict Gains. John B. Farese, executive vice president, RCA Electronic Components and Devices, sees 1968 industry sales of $2.5-billion in electron tubes and solid-state components. 1967 sales were $2.4-billion. "During 1960," he said, "industry component sales were at the $1.3-billion mark and climbed to $1.8-billion in 1965. Over the next five years we expect a slight decline in electron tube sales which will be more than offset by an increase in the sales volume of solid-state components." He felt the strong demand for color television picture tubes would continue, while predicting significant gains in the sale of integrated circuits and industrial tubes during 1968. The general manager of RCA's Industrial Tube Division also saw increased sales for 1968. Clifford H. Lane forecast that the electronics industry will sell at least $350-million worth of tubes for military, industrial, broadcast and scientific equipment this year, exceeding the 1967 record of $340 million.

Corinthian Buys Book Publisher. The publisher of "The Hertz Survival Manual for Traveling Businessmen" and other books sponsored by corporations, Renaissance Editions, Inc., 527 Madison Ave., New York, has been acquired by Corinthian Broadcasting Corporation. Renaissance, privately owned by Burton Richard Wolf, was founded in 1966 by Mr. Wolf, who will continue as president.

Astatic Acquires Phono-Cartridge Operation. The patent rights of Euphonics Corporation, San Juan, Puerto Rico, and all production tools, materials, and equipment involved in the manufacture of ceramic cartridges and needles have been acquired by The Astatic Corporation, Conneaut, Ohio. Euphonics will now concentrate on the field of electronic control devices.

Visual Electronics Expands. A specially-designed videotape recorder manufacturing facility for the expanding Visual Electronics' line of high band color VTRs has been set up in Sunnyvale, California. The VTR Division's technical staff has been increased and a Videotape recorder training school for customers has been established as part of the expansion program.

Superior Plans New Plant. Plans have been announced for construction of a new plant near Keller, Texas, 15 miles north of Fort Worth by Superior Continental Corporation, Hickory, North Carolina. Construction will begin this year on the plant that will house the Communication Apparatus Company, one of Superior's manufacturing divisions, which produces CAC telephone products.

Continental Acquires Pickard & Burns. Continental Electronics Manufacturing Co., subsidiary of LTV Electrosystems, Inc., Dallas, has acquired substantially all of Pickard & Burns Electronics, with plants in Waltham and Lawrence, Mass. Pickard & Burns was formerly a division of the Gorham Division of Textron, Inc.

Meet AEM's High-performing Ultra-reliable Space-saving Economical

VIDEO DISTRIBUTION AMPLIFIERS

The new series of five video distribution amplifiers from Applied Electro Mechanics combines high reliability and outstanding performance in compact, low-cost units (available in both rack-mount and portable configurations). Silicon semi-conductors are used throughout, and the amplifiers exceed all NTSC color and monochrome specifications.

The amplifiers distribute to six isolated outputs, permitting a substantial savings in space and cost; each input and output line has its own front panel test jack.

Both rack-mount and portable models are available with a "Sync Add" option, and the rack mount series also includes a remote gain version which may help you solve a perplexing cable routing problem. All models carry their own regulated AC to DC power supply.

PRICES: RACK-MOUNT SERIES — DAR-1 Standard, $340.00; DAR-2 Sync Add, $365.00; DAR-3 Remote Gain, $395.00. PORTABLE SERIES — DAP-1 Standard, $350.00; DAP-2 Sync Add, $375.00; Rack-mount models are just 1¾″ high. Portable units are 8″ wide, 5½″ deep and 5″ high.

For complete information and specifications, call or write:

APPLIED ELECTRO MECHANICS, INC.
2350 Duke Street
Alexandria, Virginia 22314
PHONE: (703) 548-2166

Circle 94 on Reader Service Card

Color Problems?

AEM HAS THREE NEW ANSWERS

LAP AMPLIFIERS—Here's the new LDA-series of lap-dissolve amplifiers that AEM developed especially for color. Photo-electric cells, remotely controlled by DC circuitry, assure a velvety transition between two inputs. All solid state (silicon semiconductors exclusively), the LDA provides the signal handling characteristics of a high performance distribution amplifier. Differential phase and gain do not change even during the lap interval. Embarrassing color shifts and level changes become a thing of the past. And the price is just as attractive as the performance: LDA-1, $555.00; LDA-2 (sync adding), $585.00.

COLOR SENSORS—We are introducing a Color Sensor attachment to the LDA amplifiers which samples both incoming channels and then closes a relay when *either* input has color burst . . . gives your switching system the information it needs to react properly. LDA-1 with Color Sensor, $595.00; LDA-2 with Color Sensor, $625.00.

BURST GENERATOR—Our new black Burst Generator with CONTROLLED chroma background will allow you to control color fades to black or any hue. The variable chroma feature also acts as a source for coloring backgrounds of monochrome slides and movies. Color Burst Generator, just $595.00; standard black Burst Generator, $545.00.

Call or write for more information about AEM video equipment. Feature for feature, there is nothing comparable on today's market!

APPLIED ELECTRO MECHANICS, INC.
2350 Duke Street, Alexandria, Virginia 22314
PHONE: (703) 548-2166

Circle 95 on Reader Service Card

LITERATURE of INTEREST

For additional data, circle No. shown on Reader Service Card.

Baseband squelch unit is described in data sheet from Radio Engineering Laboratories. **151**

Propagation forecasts, shortwave tips and timely features on international shortwave broadcasting are the attractions of "The Bulletin"—a monthly periodical from Radio New York Worldwide, WNYW. Sample copies are available for the asking. **152**

"A Guide to Effective Training for Instructors" is a 65-page book containing chapters on communication, group motivation and control and evaluation. Book is available from International Correspondence Schools for $2.95. **154**

Phono cartridge cross-reference manual with 6600 cartridge listings shows all Sonotone cartridges cross-referenced to competition cartridges in Section I. Section II lists all Sonotone cartridges referenced to turntables. **155**

Crystal video detectors, useful selection data and theory of operation are presented in 7-page booklet from AEL. **156**

CCTV as used by WFLD to add dimension to TV news is explained in technical application bulletin (8-85) from Cohu Electronics. **157**

Union contracts in the electrical and electronics industry negotiated between July 1966 and June 1967 have been analyzed by Imberman and DeForest. The survey uses analysis to predict that one out of five union contracts negotiated in 1968 will be rejected by union members in companies of 100 or more employees. **153**

ITV system installation using 16 channels at Appalachian State Teachers College is illustrated and explained in 7-page booklet (ECSD-C-8020) from Jerrold. **160**

Transmitting and industrial tube specifications are presented in attractive 33-page Genalex Catalog C from Metropolitan Supply. **161**

Microwave tube and device specifications, including components applicable to ETV and satellite communications, are tabulated in 19-page Genalex Catalog B from Metropolitan Supply. **162**

CRT specifications for TV and waveform monitors and wide variety of other applications included in 15-page Genalex Catalog A from Metropolitan Supply. **163**

Video control unit that processes video from, and controls four CCTV video sources is presented in brochure from TeleMation. **164**

Automated audio instruction equipment is topic of data sheet from Cognitronics. **165**

Pedestal with removable legs for color camera remote operations is topic of data sheet from TV Zoomar. **166**

CATV operation involving more than 12 channels is the subject of "Tech Topics," Vol. 2, No. 1 from Ameco. **167**

Multipath fading is interestingly explained in Vol. 16, No. 11 of the Lenkurt "Demodulator." **168**

"What's New on Smoking in Films" is the title of a Department of Health, Education and Welfare pamphlet available for 5 cents each, or $2.20/100 copies. **170**

BM/E CLASSIFIED MARKETPLACE

CLASSIFIED ADVERTISING RATES

DISPLAY CLASSIFIED ADVERTISING: $22.50 per inch 1x; $22.00 per inch 3x; $21.00 per inch 6x; $20.00 per inch 12x. ALL OTHER CLASSIFIED ADVERTISING 25¢ per word; minimum $3.00. BLIND BOX NUMBER No extra charge. Replies sent to address below will be forwarded to you. PAYABLE IN ADVANCE; send check with order. CLOSING DATE: 5th of 2nd month preceeding issue date.

BM/E, Monterey and Pinola Avenues, Blue Ridge Summit, Pa. 17214 Phone 717/794-2191

BUSINESS OPPORTUNITIES

FRANCHISE DISTRIBUTORSHIPS FOR SEEBURG BACKGROUND MUSIC

We are expanding our distributor territories, and offer to those who qualify franchises for background music, with phone lines, FM Multiplex, or on-premise systems.

Complete details forwarded on request: Address:

Joseph F. Hards, Vice Pres.
SEEBURG MUSIC LIBRARY, INC.
1500 North Dayton Street
Chicago, Illinois 60622

FOR SALE: Correspondence School in Radio-TV. Fully operating. Cash deal or public stock. Write: Box 468-1, c/o BM/E, Blue Ridge Summit, Pa. 17214.

HELP WANTED

Established western manufacturer and distributor needs SERVICE MANAGER. Must be experienced in:
Broadcast Studio Equipment, Including VTR Color TV Equipment
Supervision of Technical Personnel
Limited travel. Excellent benefits. Salary dependent on qualifications. Send resume to Box 468-25, c/o BM/E, Blue Ridge Summit, Pa. 17214.

We are a rapidly expanding organization with rapid advancement opportunities and top pay for really good engineers. As a bonus we have the best hunting, fishing, and climate in the last unspoiled area of the United States. Present openings: 1 chief engineer and operating engineers for a new television station. Other openings will be available in the near future. Phil Parmelee, Engineering Supervisor. Western Broadcasting Company, Box 1503, Missoula, Montana.

ENGINEERS—TV—Sunny California. Discover job security, and a new way of life in California. Have top openings for qualified Maintenance Engineers, especially Video Tape and Live Color Video. Send resume or letter to The AMPS Agency—3924 Wilshire Boulevard, Los Angeles, California 90005. 388-3116
By Broadcasters—for Broadcasters

Ass't chief engineer needed for aggressive UHF station in Nation's Capital area. Must know all types of equipment and be able to take over supervision of engineering department functions. Good salary and opportunity for future advancement. Send resume and references to Box 468-26, c/o BM/E, Blue Ridge Summit, Pa. 17214.

IMMEDIATE OPENINGS — Qualify for any of the following positions: Technicians for RCA closed Circuit Television equipment — Camera men — Maintenance men — Video Tape Men — Video Engineers. RCA Rep. 143-08 94th Ave., Jamaica, New York, or (212) 297-4344.

First Class men, all levels, for maintenance only. No mike work. If you have experience we will pay for it. If you need experience we will train you. Pleasant operation. East Coast. Box 468-27, c/o BM/E, Blue Ridge Summit, Pa. 17214.

HELP WANTED (continued)

BROADCAST SALES ENGINEER

Exclusive territory for sale of rapidly expanding line of broadcast equipment requires highly motivated, sales-minded individual with strong technical knowledge of equipment primarily to AM, FM, and TV stations. Leading company with history of high profit and rapid growth.

Salary plus commission—with full fringe benefits and travel expenses paid. An equal opportunity employer. Send resume to Box 468-29, c/o BM/E, Blue Ridge Summit, Pa. 17214.

Combo man wanted. Accent on announcing, but some basic technical knowledge desirable. Atlantic coast area. Box 468-28, c/o BM/E, Blue Ridge Summit, Pa. 17214.

Studio Technicians for all color VHF. First Class license required. Will train for color operation. Send resume to WSAZ-TV, P.O. Box 2115. Huntington, W. Va.

Wanted—Experienced announcer for 5,000 watt station. Must have good references. Contact Greeley N. Hilton. Manager, WBUY Radio, Lexington, N.C. 27292.

POSITIONS WANTED

Experienced chief engineer wants position with good station. Married, draft exempt, home owner, good credit, no problems, 2½ years present employer. Experience includes: AM directionals, 100kw FM stereo, station construction, maintenance, familiar all types equipment, proofs, FCC applications, Rules and Regulations, construction of equipment, remote control operation, new FCC presunrise rules and equipment, automation; Schaffer and ATC, supervision of other engineers, six years experience, best of references. Salary negotiable depending on opportunity. Want responsibility along with title, not just title alone. Right man if you have an honest operation. No junk stations! Write direct: William Christman, 2512 Thornton Road, Charlotte, N.C.

I have graduated from Career Academy of famous broadcasters as of February 3. I have my 3rd class endorsed license and have announced the news at the University of Wisconsin. Age 23. Would like $90.00 a week to start. Would be interested in work at other locations. I enjoy being a Rock or MOR disc jockey. Donald H. Hoyt. 2428 East Linnwood Ave., Milwaukee, Wisconsin 53211. ED 2-3641.

Sales oriented-general manager. Columbia University graduate—14 years broadcasting experience—9½ years managerial experience and 4 years general manager of UHF TV indie operations. I have excellent in depth experience in all areas of television operations. Highly interested in relocating with an aggressive-sales oriented TV station, only in major markets. Box 468-15, c/o BM/E, Blue Ridge Summit, Pa. 17214.

Notice . . . major markets . . . this market of 600,000 most successful and sought after personality is looking. I am one of the nation's best air salesmen. My resume will back that up. Ratings, references, family, five years with last station. I believe being a pro is more than a 40 hour week. Box 468-16, c/o BM/E. Blue Ridge Summit, Pa. 17214.

Like some professional dedication? 17 years television. On-air news director, writing, shooting, editing film. Sales liaison and PR. Rockies or western. News VTR, resume. Box 468-18, c/o BM/E, Blue Ridge Summit, Pa. 17214.

Kovacs-type TV personality/writer. Brilliant. Funny. Reasonable. Box 468-24, c/o BM/E, Blue Ridge Summit, Pa. 17214.

POSITIONS WANTED (cont'd.)

Pro with excellent references and track record seeking general manager position medium to small market. All phases. Sales . . . programming . . . administrator AM & FM markets. Prefer Midwest. Interview at my expense. Box 468-17, c/o BM/E. Blue Ridge Summit, Pa. 17214.

Producer/Director 7 yrs. TV. Producer Director/cameraman, editor/writer 5 yrs. industrial/documentary films requires challenging, responsible, creative position. Bud Tramill, 220 N.E. 4th, Hillsboro, Oregon.

Negro dj, mature, personable, good voice. NYC Broadcasting school grad. 3rd endorsed. Willing worker needs break. Available immed ately. Preferably East Coast. Box 468-2, c/o BM/E, Blue Ridge Summit, Pa. 17214.

Attention—N.Y.C., D.C., Phila. All pro newsman. Major market background. Network delivery. Hot actualities. In studio-outside. Box 468-22, c/o BM/E, Blue Ridge Summit, Pa. 17214.

Career Academy New York grad. Good voice. Strong commercial delivery. 3rd phone endorsed. Willing to work hard for experience. Dan Sanders, 90 Sand Lane, Staten Island, N.Y.

Producer-director: fourteen years experience. Heavy Live, tape, color. Artist, set designer. Announcer-performer. Desires any major market. Box 468-3, c/o BM/E, Blue Ridge Summit, Pa. 17214.

D.J. Announcer, young, bright, ambitious. New York Broadcast School graduate, experience, ready to relocate, 3rd endorsed. Box 468-12, c/o BM/E. Blue Ridge Summit, Pa. 17214.

Experienced jock . . . all phases . . . married . . . vet . . . seeking advancement. Virginia or Maryland . . . Don Wilson, 1705 W. 7th. Frederick. Md. ph: 662-6382 after 6.

College student desires summer work in broadcasting. 2 yrs. experience in radio. Peter Kahlenberg, Brockert 03, Platteville. Wisconsin 53818.

11 years experience, 2 years Midwest State Capitol, 36 network film-tape stories in 1967, age 26. 3½ years college. Box 468-4, c/o BM/E, Blue Ridge Summit, Pa. 17214.

Good voice announcer dj, newscaster. Reads well, writes good copy too. Family man, no floater. Will relocate. Box 468-5, c/o BM/E, Blue Ridge Summit, Pa. 17214.

Negro announcer, authoritative newscaster, family man, tight board, non-floater, non prima donna. Graduate of New York broadcasting school. Have third class ticket. Box 468-19 c/o BM/E, Blue Ridge Summit, Pa. 17214.

Authoritative newscaster DJ. announcer third class ticket, non-floater, family man. Jazz or popular music. Box 468-21, c/o BM/E, Blue Ridge Summit, Pa. 17214.

Young experienced television announcer wants to settle southern coastal USA or islands. Weather, booth, sports, news. Box 468-20, c/o BM/E. Blue Ridge Summit, Pa. 17214.

FROM THE EDITOR

Solving Manpower Problems & Salvaging the Ghetto Cities

Finding manpower to operate broadcast stations is an old and perennial problem. It was a big topic at the NAB State President's Conference the other month.

Paradoxically, at the same time there is underemployment of nonwhites in the industry. The NAEB was acutely aware of this at Denver last November and has since appointed a task force to try to do something about it.

Last month, the National Advisory Committee on Civil Disorders recommended that broadcasters recruit Negroes into broadcasting and promote those who are qualified to positions of significant responsibility. The Committee said "recruitment should begin in high schools and continue through college, where necessary aid for training should be provided." The Committee's purpose, of course, was to improve broadcasters' coverage of Negro activities and the Negro community so that the white majority might sense the degradation, misery and hopelessness of life in the ghetto. A side, self benefit to the broadcasters in doing this will be a larger manpower pool from which to draw.

Many broadcasters did an admirable job last year of seeking jobs for disadvantaged youths both within and outside the industry. We hope their effort continues and indeed steps up.

Broadcasters will have an excellent chance to explore minority group recruitment, training and employment by visiting with Broadcast Skills Bank at NAB. Look up George E. Norford at Writing Room, Booth F. Broadcast Skills Bank is a joint effort of ABC, CBS, NBC, Group W and Metromedia. National offices are at 90 Park Avenue, New York, N.Y. 10025.

Probing the NAB Exhibits

We've not been privy to everything that's going to make the NAB Convention this year—Ampex is one hold-out—but we've seen and heard about enough to know that there will be some real show stoppers—and we don't mean the girls.

General Electric will show a new remote controlled PE-350 camera. Microwave Associates will have a prototype of a new wireless microphone now in production for CBS. It operates at 950 MHz and is immune to interference from fluorescent lights. CBS Labs will have a color mask processor to compensate for color distortion of cameras and telecine chains. Whether EVR equipment will be shown is still a secret. AMP will have a 8192-word commercial computer on hand controlling an automated video switching system. Telecontrols' preset video switcher will be operating at Philips' booth.

Radio automation equipment will reflect further refinement and flexibility over last year's exhibits. Disan is a new source.

Visual Electronics will show its slo-motion stop-action disc recorder and French microwave equipment. Television Zoomar will show a meter that evaluates lens contrast capabilities.

For the latest look in antennas, don't miss Jampro's circularly polarized fm antenna, nor RCA's uhf 60 gain Polygen that radiates 5 megawatts. An aural stereo STL over a single link will be shown by Moseley.

New miniature color film processors will be shown by Houston Fearless and Filmline.

For new approaches to test equipment, don't miss H-P's impulse sound meter. If you don't know what a polyburst generator is, look up Videometrics (at Central Dynamics).

To sit down and chat, look up *BM/E* at Suite 1105A-1106A.

James A. Lippke

TAA1 Preamplifier

The TAA1 Preamplifier is a completely transformerless audio line amplifier with highly desirable characteristics. Input: 150 or 600 ohms balanced, or bridging. Output: 150 or 600 ohms balanced. Gain: 40 db. Response: flat through 20 kHz. Distortion: less than ½%. Power: 18 DBM. It is shown above in the module rack which occupies only 5¾ inches of rack space. The TAA1 sells for $130.00 and the mounting frame sells for $100.00 F.O.B. Nashville, Tennessee. For complete information, write to:

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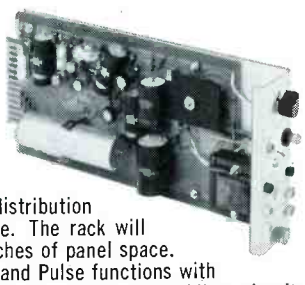
Circle 1 on Reader Service Card



TDA7 Video/Pulse Distribution Amplifier

The TDA7 is a completely transistorized distribution amplifier constructed as a plug-in module. The rack will hold 10 TDA7's and occupies only 5¼ inches of panel space. Each plug-in unit handles both the Video and Pulse functions with the flip of a switch. Provision is made to add a sync-adding circuit directly to the TDA7. This should be specified as TDA9. The individual TDA7 plug-in units are $295.00 each F. O. B. Nashville and the mounting frame, which accommodates up to 10 units, sells for $270.00. For complete specifications and information on other accessories, write:

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Circle 2 on Reader Service Card

TC1 Clamping Amplifier

The TC1 Clamping Amplifier employs tip clamping to remove low frequency signal deficiencies without disturbing burst and other chrominance information in or about back porch levels. The clamped stage utilizes a field effect transistor driven by a balanced bridge circuit. This advanced design technique produces highly effective and stable clamping. The TC1 Clamping Amplifier sells for $325.00 F. O. B. Nashville. For complete information, write to:

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Circle 3 on Reader Service Card

TCA3 Transistorized Camera Amplifier

The dependable TCA3 has almost become standard equipment in all image orthicon cameras. It replaces the vacuum tube preamplifier and is designed so it may be quickly mounted within available space in the camera without permanently disabling the vacuum tube amplifier. This cool little amplifier, about the size of a package of cigarettes (101 mm), can add years to the life of cameras. The TCA3 sells for $295.00 F. O. B. Nashville, Tennessee. For complete specifications and information write:

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608 NORRIS AVE. • NASHVILLE, TENN. 37204 • PH.: (615) 254-3365

Circle 4 on Reader Service Card

TBG2 Black Burst Generator

The brand new TBG2 Black Burst Generator allows you to go to black and back with perfection. The TBG2 has two outputs available for added versatility, and each has burst phase and burst amplitude adjustments so the two feeds can be matched under any condition. The TBG2 has the industry's only continuously rotatable phase control, and it's accurate to within one degree. All the controls are on the front panel and can be locked. The unit is small, compact and lightweight. So is the price . . . $475.00 F. O. B. Nashville, Tennessee. For complete information, write to:

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Circle 5 on Reader Service Card

TVA1 Transistorized Video Stabilizing Amplifier

The TVA1 Stabilizing Amplifier with its associated plug-in units offers the highest level of performance and versatility for studio and transmitter use. The TVA1 removes all low frequency disturbances such as hum, bounce and tilt by sync-tip and back-porch clamping. The compact TVA1 chassis accepts 4 plug-in units. Five plug-in units are available covering the entire range of needs from input amplifiers to stripped video units. The TVA1 Stabilizing Amplifier (less plug-ins) sells for $1380.00 F. O. B. Nashville, Tennessee. Plug-in units range from $240.00 to $450.00 each. Write for complete information to:

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Circle 6 on Reader Service Card

TDA2D Video/Pulse Distribution Amplifier

The now-famous TDA2 Distribution Amplifier, in use at most television stations and networks, has a recently added feature. The "D" stands for Differential Input, which we added to the TDA2. And not only did we add a differential input, we subtracted $30.00 from the price. Instead of $325.00, we're selling the new improved TDA2D for $295.00 F. O. B. Nashville, Tennessee. The compact TDA2D fits neatly into 1¾ inches of panel space and produces virtually no heat. Write for complete information to:

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Circle 7 on Reader Service Card

TSA1 Clamping/Equalizing Video Amplifier

The TSA1 Clamping/Equalizing Video Amplifier is completely transistorized and designed with the most modern circuitry. It is designed to process signals from microwave, mobile gear, master control or feed-corrected signals to the input terminals of a television transmitter. It has a self-contained regulated power supply. Tip clamping is employed which does not disturb burst and other chrominance information in or about blanking or back porch levels. The TSA1 sells for $850.00 F. O. B. Nashville, Tennessee. Write for complete specifications and information to:

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If you don't have pretty models to put these EMCOR® *Modular* Enclosure Systems together, do it yourself. The result will be as attractive and efficient. ■ Apply psychology in the use of our colors, and create any environment you want in your installation. For example, for a relaxing and thoughtful mood use Blue or Olive Green; for a soft, warm feeling use Tan; for elegance, try Gold. Black is dignified, White pure and clean. ■ And you can use our new colors functionally to codify operations as to input or output information, or to identify operator responsibilities. ■ "Human engineering" is another EMCOR asset. Our "people-watching" engineers studied the human form and have designed cabinets that cut down on mental and physical fatigue for that extra measure of efficiency. ■ Write for complete details on the new EMCOR colors and "human engineering." EMCOR Reg. U.S. Pat. Off.

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