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January, 1969
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January, 1969
One of a series of brief discussions by Electro-Voice engineers

BUILD A BRIDGE WITH AIR
ROBERT JACKSON
Project Engineer, Microphones

If you closely examine a modern microphone, you'll often find some bits of cloth, fiberglass wool, felt, air and metal employed in the air stream. These porous materials are usually included to add an acoustic resistance to the design, either to control frequency response by damping the diaphragm, to control polar pattern by shifting phase, or both.

Despite the ubiquitous presence of these materials, they are difficult to control precisely. The relative porosity of cloth, felt, or other "loose" materials can vary widely, even in a single bolt of material. Unless the actual acoustic resistance of a given piece of material is known, it may be impossible to accurately predict the performance of a microphone.

Measurement of acoustic resistance is not normally an easy task. The conventional approach is to measure the air flow rate through a sample of material, using a source of constant air pressure. But the flow rate is dependent on both resistance and air pressure (thus a measurement made at high pressure may bear no useful relationship to the behaviour of the same material at low pressure). In addition, absolutely constant air pressure is difficult to achieve and maintain.

Indeed, it is rare that an absolute measure of acoustic resistance is needed. More often it is desired to compare a new microphone assembly with a "standard" either for lab development or quality control. And so a technique has been developed to provide comparative measurements with ease and accuracy.

In essence, the new instrument developed in the pneumatic equivalent of a Wheatstone bridge. A source of air pressure is connected to two tubes with equal, fixed acoustic resistance. Joining these tubes is a differential pressure meter (designed to measure air flow through the meter). The "standard" microphone and the unit under test form the other two legs of the bridge. Air passing through these microphones is exhausted into the atmosphere to provide the return path. Accuracy is unaffected by variations in air pressure (although sensitivity increases with higher pressure).

This new measurement technique offers several significant advantages to E-V engineers. Materials can be tested as installed in their acoustic environment (including the case and internal structures). More accurate adjustment of resistance permits mass assembly of more sophisticated designs. Closer control of production quality can also be achieved for higher product uniformity. In addition, time spent in trial and error can be reduced when developing new designs.

For reprints of other discussions in this series, or technical aid on any E-V product, write: ELECTRO-VOICE, INC., Dept. 293V
638 Cecil St., Buchanan, Michigan 49107

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LETTERS
TO THE EDITOR

John Morgan's short article in the October issue of BE reminds me of a piece which appeared in one of the Amateur journals several years back, on basically the same topic.

It was labeled "The impertinent corollary of Finagle's third law of applied electronic technology" (which incidently states that anything that can go wrong will go wrong).

As I remember it, the corollary went this way:

A) In any given shipment of parts, the part which either is back-ordered or arrives broken will be the part most vital to the operation of the equipment as a whole; and will be the single part without which the other parts cannot operate.

B) Any new part, which arrives defective and is installed by mistake will malfunction in such a way that the maximum amount of harm is done to the maximum number of components.

C) Any part designed to interchange with, or take the place of, any other part, won't.

D) Any parts which require a special tool to install will either not fit the tool, or will arrive the day after you break the tool.

These would be awfully funny, if they weren't so damn true.

John King
Chief Engineer, KGAL

Who's Who?

In the November issue of Broadcast Engineering, the byline for the WTMJ automation article was given to Phil Dean. Actually, Jim Wulliman, the WTMJ CE, deserves the credit. Phil Dean, of Phil Dean Associates, is not a member of the WTMJ Staff. Jim deserves extra credit, too. Converting to automated switching requires a tremendous amount of engineering time and effort. We can all benefit from their experience.

John Morgan
Chief Engineer, WTMJ
Q: what video distribution amplifier has all these features...

- Lowest cost per output
- Six identical source terminated outputs
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- Hum bucking input for 46 db ground loop rejection
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AES: serving audio engineering

The Audio Engineering Society is the only professional society devoted exclusively to audio technology. Its members include leading engineers, scientists and other authorities in audio in this country and abroad. AES influence and position in the field of audio is worldwide.

Prior to the organization of the Audio Engineering Society, the need for a technical organization devoted exclusively to the profession of audio engineering was definitely asserting itself. Audio, as a distinct and separate branch of the profession of communication engineering, had come of age. It was not merely asking recognition, since this had been virtually accomplished. It was seeking a forum for discussion and interchange of ideas.

The Beginning
As an indication of the general feeling, a letter from Frank E. Sherry, Jr. was published in Audio Engineering magazine. It recognized the need for and suggested the organization of an audio group. This letter, entirely unsolicited, brought forth many replies of agreement.

At this time, C. J. LeBel, a professional engineer of notable standing, discussing the situation with his friends and associates, was inspired to test the case. He interviewed many audio engineers in the New York area, and made an open bid for support of a new society in the letter columns of Audio Engineering magazine. The general appropriations and encouragement he received constituted the real beginnings of the Society.

A meeting of interested audio engineers was called for January 8, 1948 at the Hotel Sheraton, New York City. A steering committee was appointed: C. J. LeBel, John D. Colvin, C. G. McProud, Norman C. Pickering, Chester A. Rackey.

In February, the formal organization meeting was held at the RCA Victor studios at 155 East 24th Street, New York City. A gratifying and unexpectedly large turnout, 137 persons, assembled at this meeting.

Membership in the Audio Engineering Society steadily increased from 722 in October, 1948 to 1,000 in 1952, 2,000 in 1957, 3,000 in 1965, and now it is over 4,000.

The first West Coast Convention was held in 1954. Two Conventions have been held annually since that time. The Spring Convention is held on the West Coast and the Fall Convention in New York City. Exhibits have been a part of these Conventions for a number of years.

AES Journal
The Audio Engineering Society started to publish its own Journal in January 1953. Started as a quarterly, it contains engineering studies and reports from audio authorities in the United States and abroad. Topics in the forefront of audio news reach the Journal promptly and are given treatment that reflects their importance.

The AES serves members, industry and the public by stimulating and directing advances in this vital technology. It makes new developments promptly and widely known through semiannual technical sessions and through the AES Journal, a professional publication.

Conventions
AES conventions are held twice each year—in the Fall in New York City and in the Spring on the West Coast. Both include a full program of technical sessions for the presentation and discussion of papers describing current research and developments in audio. Exhibits of professional equipment from manufacturers here and from other countries give AES members a first-hand look at the latest products for audio application.

The 36th convention of the AES is scheduled for April 28—May 1, 1969 at the Hollywood Roosevelt Hotel in Hollywood, California. In October, the 37th convention will get underway on the 13th in the New York Hilton in New York City.

Membership
Honorary Memberships and Fellowships are given for past contributions to the profession.

Qualifications for membership in the Audio Engineering Society are as follows:

A Member may be any person active in audio engineering who has an academic degree, or its equivalent in scientific or professional experience in the field of audio engineering and its allied arts, and who is familiar with the application of engineering principles and data in that field.

An Associate may be any person interested in the objectives of the Audio Engineering Society.

A Student may be any student interested in audio engineering and enrolled in a recognized school, college or university.

At the present time the scope of the Society's concern, while still including the areas delineated at the time of its organization 20 years ago, has expanded in order to keep pace with new technological developments in audio and in order to better meet the Society's responsibility to the engineering community and to society at large.

The membership of the Society includes engineers, scientists, administrators, and technicians involved in research, development, design or operation of all forms of audio apparatus and systems; executives, sales engineers, and technical personnel involved in the production, marketing and installation of audio equipment; and educators who use audio apparatus in teaching or who teach acoustics, electronics, or other sciences basic to audio engineering, sound reproduction and allied fields.

The AES serves its membership by offering opportunities for the exchange of technical information, for self-improvement and for professional recognition. The vigorous and progressive state of audio technology at this time will surely be matched by the growth and contributions of the Society during the next two decades of its existence.

For further information on AES membership, write to: Audio Engineering Society, Room 428, 60 East 42nd Street, New York City, 10017.
IBS: Worldwide collegiate broadcasting

The Intercollegiate Broadcasting System (IBS) is the trade association of collegiate and educational radio stations in the United States, Canada, and overseas. The System has members east to Holland and west to Australia. IBS was founded in 1939 by 13 college radio stations to act as a trade association, assisting the stations in obtaining national advertising, representing them to the FCC, and furnishing information to other schools interested in educational radio or constructing campus stations. The System is a non-profit Rhode Island corporation.

There were high points in activity and membership in 1948 and 1955, and during these periods IBS member stations enjoyed many augmented services, including particularly increased national advertising revenue and many fine IBS-produced program series.

Until the more recent past, however, IBS membership never grew very large, because the number of college and university stations cooperating in the media beyond the local station's bounds was small. Before 1963 the record membership was 1955's 105 member stations. Since then IBS has grown to over 350 members, representing a 400% increase in the past 4 years.

Although these statistics are impressive, the real story of IBS growth is in the area of its services to the industry. These include the availability of IBS printed forms, the College Radio Placement Service (an annual poll of commercial stations on their requirements and qualifications for summer positions), a programming service, Iota Beta Sigma national honorary, an annual National Convention, College Radio magazine (published monthly during the academic year), and FCC representation . . . especially Call Letter reservation. The System strives to expand both the depth and the scope of its programs and services . . . instituting new services and improving existing ones.

IBS Services

Two services of particular interest to new stations are the IBS general, technical and sales consultation service, and the IBS Master Handbook. The MH is a complete manual of station operation encompassing programming, sales, technical, and administrative information. Since IBS's inception, a prime effort has been to furnish stations with technical data and assistance. The System has technical requirements (as well as other codes) for Voting membership, and a significant portion of the MH is devoted to engineering information.

IBS has also developed a regional activity and runs periodic regional conferences. Regions publish newsletters, run programming exchanges, regional sales offices, and even news networks.

A recent addition to IBS services is being instituted by the Record Company Relation Department. The RCRD is publishing a weekly IBS Charts & Review section as a feature of College Radio magazine. In addition, the RCRD will furnish to Record Manufacturers' promotional offices data on IBS member stations.


Production session of the Chicago convention. Left to right are Mike King, Richard Orkin, Bruce Swedien and Ken Nordine.

Membership

Industry Affiliate membership is another new facet of IBS. As a result of a complete revision of IBS organizational structure and By-Laws two years ago, the System offers Affiliate membership to firms in the industry wishing to cooperate with our membership. Three classes of Industry Affiliate membership are offered.

As outlined in the By-Laws, a broadcast group related to an institution of higher or secondary education, or an organization whose purpose coincides in whole or in part with that of the System is eligible for membership. IBS does not offer individual membership. Station dues are $45 per year.

Conferences in IBS's 14 regions are held once a year, and a National Convention is held each spring. This year, IBS will hold its 30th annual national convention, dubbed Convo 30, in Washington, D.C. In recent years the convention has been held in conjunction with either the International Radio and Television Society's College Major's Conference in New York, or the national convention of the NAB. Last year's convention was held in Chicago March 29-31, and delegates were admitted to the NAB exhibit floor Sunday, March 31. Among speakers were former FCC chairman Newton Minow, Broadcasting editor Sol Taishoff, Comm. Lee Loevinger, Cox Broadcasting's J. Leonard Reinsch, Steinman's Clair McCollough, WCFL's Ken Draper and Jim Stagg, Chickenman, SIO's Roy Danish, and Gates' Loring Fisher and George Yazell.

Convo 30 will be held March 21-23, 1969 at the Washington Hilton in Washington, D.C., again in conjunction with the NAB show. The convention is organized into sessions on industry trends and segments, workshops on station management, programming and engineering, music industry and equipment exhibits and a general caucus, as well as a Dinner Banquet.

Further information on the IBS may be obtained by writing to: Intercollegiate Broadcasting System, Bethlehem, Pa.
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IEEE: Looking to the electronic future

Back in 1884 a group of engineers got together and formed an organization. And for all their interest, they couldn't have guessed that their organization, to be known as the Institute of Electrical and Electronics Engineers, would become a national organization. From there, it spread across the world until today there are more than 160,000 members.

Unlike many organizations designed to meet the needs of one specific area of broadcasting, the IEEE includes those not yet in the field. Currently, there are student branches of the IEEE at more than 300 institutions of higher learning around the world.

Throughout the year the many sections of the IEEE hold many meetings, conferences and symposia for the purpose of keeping all members informed on the latest innovations, experiments, and possible future directions.

While many groups have split into specific interest areas, they remain aligned with the IEEE. And this includes Canadian broadcasters. The call is out now for technical papers for the International Electronics Conference scheduled for Oct. 6-8. The conference is sponsored by the Canadian Region of the IEEE. (Summary and abstract of paper should be sent to: Dr. Rudi de Buda, International Electronics Conference, 1819 Yonge Street, Toronto 7, Canada.)

Fifteen nationally prominent industrial and military executives have been named to the 1969 Winter Convention on Aerospace and Electronics System (WINCON) advisory committee. The 10th annual conference is slated for Feb. 11-13 at the Biltmore Hotel in Los Angeles.

Frederick Stevens, WINCON general chairman and vice president of Northrop Corporation, said the following men have agreed to serve on the panel: Dr. William F. Ballhaus, president, Beckman Instruments; Lt. Gen. Austin W. Betts, Army chief of research; Hon. Alexander H. Flax, assistant secretary of Air Force research and development; Hon. John S. Foster, Defense Department director of research and development.

Dr. Eugene G. Fubini, vice president and group executive, IBM; Adm. I. J. Galantin, USN, chief of Naval material; Dr. Ivan Getting, president, Aerospace Corp.; Adm. J. J. Hyland, USN, Pacific Fleet commander in chief; A. Carl Kotchian, president, Lockheed Aircraft Corp.

Hon. Russell D. O'Neill, USAF, commander, SAMSO.

Dr. William H. Pickering, director, Jet Propulsion Lab.; Dr. Allen E. Puckett, executive vice president, Hughes Aircraft Co.; and Dr. Henry E. Singleton, chairman of the board, Teledyne, Inc.

WINCON provides a forum for the exchange of ideas on current development, problems and solutions in the electronics field.

A concurrent classified symposium, sponsored by the Air Force and Hughes Aircraft Company, will offer additional opportunities for technical discussions for those who qualify.

IEEE members mutually join in sponsoring a variety of meetings—local meetings for Section members, a special symposia and conferences for those active and interested in particular technical fields, and gen-
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Want more information and complete specifications? Write or call (217) 222-8200 for complete information.
IEEE members flood to convention in the New York Hilton.

Typical technical program session of IEEE.

eral meetings that provide a cross-section of all IEEE interests.

The International Convention and Exhibition is the world's largest technical meeting of electrical and electronics engineers. It is held in New York City each March. Its four-day program consistently draws over 50,000 scientists and engineers who come together to discuss and learn about the latest developments. More than 850 exhibitors provide a backdrop of technological displays which complement the technical sessions.

Meetings

Throughout the year the IEEE groups sponsor, or cosponsor with other appropriate organizations, a number of major conferences in their special areas of interest. These meetings provide members with two distinct advantages: they eliminate duplication, thus making it easier to concentrate on meetings in special fields; they provide thorough coverage of specific topics. Typical examples of this type of meeting are: the International Solid State Circuits Conference; Joint Automatic Control Conference; INTERMAG, Spring and Fall Joint Computer Conferences; Winter Power Meeting.

Special annual meetings sponsored by IEEE Regions and Sections bring members a smaller-scale equivalent of the annual International Convention and Exhibition. These meetings are held in locations that are geographically close and convenient to members.

Many of the activities for members of IEEE are concentrated locally in one of the more than 197 IEEE Sections. These Sections, which are the heart of local activity in the IEEE, have a number of interests such as career guidance, inspection trips to nearby laboratories and plant facilities, and the continuing technical education of their members. Usually they hold monthly meetings at which prominent speakers present the latest findings on technical subjects.

There are many ways the Sections can serve members. They provide local versions of IEEE standing committees, and provocative all-day meetings that attract hundreds of engineers.

The Medal of Honor, the Institute's equivalent of a Nobel Prize, and the Major Annual Awards aim at the recognition of individual achievements having general significance for the profession. The Field Awards recognize unusual accomplishment in a particular field of interest to the society. Names such as, Marconi, De Forest, Kennelly, Westinghouse, Bell, Tesla... to name but a few, indicate the level and caliber of these awards. The Prize Paper Awards recognize publications significant for their excellence.

In addition, the IEEE Awards program plays an active role in the
selection of nominees for other scientific and engineering awards not exclusive to IEEE, but of interest to you and your colleagues.

Spectrum

IEEE Spectrum is a monthly magazine which contains technical articles on the limitless variety of subjects of interest and importance to its diverse readership. Since Spectrum is the general or "core" publication of the IEEE, its articles are written so as to be meaningful to a wide audience of electrical and electronics engineers and scientists.

Articles range from those reporting on new developments and reporting the state of the art in specific fields, to those which have primarily a tutorial content. Regular news sections give information about the IEEE and the activities of its units and members as well as other news of the profession and the industry. Also included are abstracts of papers appearing in other IEEE publications, book reviews, and letters to the editor.

Membership

Interest in electrical/electronics engineering is the fundamental requirement for membership in the IEEE. The degree of interest will determine the grade of membership for which one should apply.

Registered undergraduate or graduate students enrolled in regular courses of study in electrical engineering, electronics, radio, and allied branches of engineering or the related arts and sciences may apply for student membership.

For admission or advancement to Associate grade, the applicant must satisfy the IEEE that he is interested in and capable of rendering service to electrical engineering, electronics, radio, allied branches of engineering or the related arts and sciences and that his admission to this grade will contribute to the welfare of the IEEE.

Member is a professional grade limited to those who have demonstrated professional competence in the fields of electrical engineering, electronics, radio, allied branches of engineering, or the related arts and sciences.

Senior Member is the highest professional grade for which application may be made. This grade requires experience or attainment reflecting professional maturity.

The grade of Fellow is one of unusual professional distinction and is conferred only by invitation of the Board of Directors upon a person of outstanding and extraordinary qualifications and experience in the fields of electrical engineering, electronics, radio, allied branches of engineering, or the related arts and sciences.

For further information on the IEEE, write to: The Institute of Electrical and Electronic Engineers, Inc., 345 East 47th Street, New York, N.Y. 10017.
NAB:
Serving broadcasters and the public

The National Association of Broadcasters has one major aim in mind—to best serve the public interest of those who tune in on the nation's more than 270 million radio receivers and 75 million television sets.

The NAB started in a modest enough way with a handful of members, back in 1922. A non-profit organization, its goal was "to foster and promote the development of the arts of aural and visual broadcasting in all its forms; to protect its members in every lawful and proper manner from injustices and unjust exactions; to do all things necessary and proper to encourage and promote customs and practices which will strengthen and maintain the broadcasting industry to the end that it may best serve the public."

Association activities center on this aim, and today NAB has among its members over 3,800 radio and television stations throughout the 50 states.

Growing Pains

The National Association of Broadcasters grew out of a need to deal with the growing pains of this fledgling communications industry. The pioneers who organized it, along with the late Eugene F. McDonald, Jr. as the first president, concerned themselves with bringing order out of a chaotic situation which existed at the time. The chaos resulted from the undisciplined use of air waves. Without adequate channels or frequency separations, radio was becoming a barrage of sounds in the night, and appeared unlikely to be able to fulfill its role as a great medium of mass communication. Laws pertaining to radio were inadequate because they were designed to cope only with the problems of safety of life at sea and ship-to-shore communication. With the enactment of the Radio Act of 1927—which was the beginning of the American system of broadcasting as we know it today—a way was devised to apportion the radio spectrum through station licensing but still avoid government control of a station's business operations or its programming.

Structure

The Association's Board of Directors is composed of representative radio and television broadcasters who are elected by their fellow members. This Joint Board has its own chairman, and is subdivided into a Radio and a Television Board, each with its own chairman. Members of the NAB set the policy and make the decisions on industry-wide matters through the Board. The NAB also has an extensive committee structure, enabling it to utilize the specialized knowledge of its members in considering industry problems and in offering recommendations to the Board of Directors.

Function of NAB

The function of the National Association of Broadcasters is to represent the industry before Congress, at the White House and before administrative agencies. It has been the channel through which the industry has been moved to alert the public to the effectiveness of radio and television, both as informational and entertainment media and as a means to help move the nation's goods and services. In this latter function it proves to be a very important source in stimulating and boosting the national economy.

Another vital function of the NAB is to oppose schemes to convert the American system of broadcasting from a powerful means of free communication into a medium of special interest enjoyed by a privileged few who can pay for their programs. In its stand against pay television, the Association has had the general support of the public and the leaders throughout the country.

Goals Achieved

The NAB also has been instrumental in promoting various activities leading to the betterment of the communications industry. Some of these are:

1. Instituting voluntary codes for radio and television which provide broadcasters with guidelines in determining acceptable programming and advertising practices.
2. Upholding the American system of broadcasting, free from government censorship.
4. Obtaining more liberal acceptance of radio and television
Okay, so my studio's boomy on the bottom end. With my ear I can equalize as good as anybody.

Sure. But "close" is good only in horseshoes. It used to be okay in equalizing, too. But that was before a revolutionary new method called Acousta-Voice. Acousta-Voice is a scientific and acoustically sophisticated method of tuning a sound system to a room in much the same way that an organ is voiced to the particular auditorium.

So? So think about it. You know that a studio, even with identical equipment in every room, has different sound characteristics in each of these rooms. You have to compensate, by ear, for each of those sound characteristics.

Now, what if every room could be made the same acoustically, in effect? Acousta-Voice has done it for Century Records. Two stereo disc mastering rooms, and the quality control room have been Acousta-Voiced. That's three rooms. All exactly the same.

Century Records' Chief Engineer, Bob Metcalf, says Acousta-Voicing gives you the same base to start equalizing from. Now that's a real edge in itself, especially if what you're working on has been recorded in other than studio conditions. You know, like a gym, a club, a cafeteria or outdoors.

Another thing. The fatigue factor is very low with an Acousta-Voiced studio. The ear stays fresh much longer because due to uniform frequency response the loudness doesn't have to be raised to hear a detail. That means the monitor doesn't have to be up so high. Metcalf has installed A-B switches in all three rooms. The difference is amazing.

If a person is really fussy about sound, an Acousta-Voiced studio should be investigated. You don't have to wait to build a new studio. It can be done right now. But only by certain Altec factory-trained CE Sound Contractors who've invested a lot of money in test equipment and a lot of hours in very intensive training.

So, for full information about Acousta-Voice, write to Altec Lansing, 1515 So. Manchester Ave., Anaheim, Calif. 92803.
coverage of public proceedings.
5. Improving the industry's relationship with public service groups.
6. Achieving fair labor relations laws and wage-hour regulations.
7. Improving the efficiency of broadcasting operations by gaining authorization by the FCC for remote control for radio and television stations, drafting engineering and recording standards universally acceptable by the broadcasting industry, and introducing simplified program and engineering logs which meet FCC requirements.

Conventions
Since 1923 the Association has held annual spring conventions attended by top management of the industry. Later additions to the convention are the Broadcast Engineering Conference and the exposition of broadcast equipment. Each fall six conferences are held throughout the country for management and for those station executives who will move into managerial positions in the future. The 1969 schedule of meetings for NAB are as follows:
- 47th Annual Convention, March 23-26, held at the Shoreham and Sheraton Park Hotels, Washington, D.C.; and the six fall conferences—October 23-24, held in Chicago at the Palmer House; October 27-28, Boston, at the Statler Hilton; October 30-31, Atlanta, at the Atlanta Marriott; November 13-14, held at Dallas at the Marriott; November 17-18, scheduled for the Brown Palace in Denver; and November 20-21, held in Portland, Oregon at the Sheraton Portland.

Radio and Television Codes
Both the radio and television codes were designed after many months of patient and time-consuming efforts by NAB committees. The Television Code Review Board, of nine outstanding broadcasters from station and networks, and the Radio Code Board, consisting of 11 leading station and network executives, supervise respectively, the Television and Radio Codes.

The purpose of the Radio Code is "cooperatively to establish and maintain a level of radio programming which gives full consideration to the educational, informational, cultural, economic, moral and entertainment needs of the American public to the end that more and more people will be better served."

Composed of eleven members, the Radio Code Board is authorized and directed "to recommend to the Radio Board amendments to the Radio Code: to consider in its discretion any appeal from any decision made by the Code Authority Director with respect to any matter which has arisen under the Code, and to suspend, reverse, or modify any such decision; to prefer formal charges, looking toward the suspension or revocation of the subscription and/or Visual Symbols, to the Radio Code by a subscriber; to be available to the Code Authority Director for consultation on any and all matters affecting the Radio Code."

The Chairman and members of the Code Board are appointed by the President of NAB, subject to confirmation by the Radio Board, and may include no more than two members as representatives of subscribing nationwide radio networks. All Code Board members are selected from subscribers to the Radio Code. Eligible subscribers are any individual, firm or corporation which operates a radio broadcast station in the United States or its dependencies. Such eligibility is subject to the approval of the Radio Board. Each station or network merits one subscription.

Subscriber fees are in accordance with the existing schedule at a given time, and under such conditions as are determined from time to time by the Radio Board.

The purpose of the Television Code is "cooperatively to maintain
a level of television programming which gives full consideration to the educational, informational, cultural, economic, moral and entertainment needs of the American public to the end that more and more people will be better served.

Subscribers who are eligible consist of any individual, firm or corporation engaged in the operation of a TV broadcast station or network, holding a construction permit for a television broadcast station in the United States or its dependencies. Subscribers are subject to approval by the Television Board of Directors. Again—one subscription is given for each station and/or network.

Affiliate subscribers are composed of individuals, firms or corporations engaged in the production or distribution, lease or sale of recorded programs for television presentation, subject to approval of the Television Code Review Board, which is a committee of not more than nine members, all of whom are subscribers to the Television Code. Appointed by the Television Board, they may include one member from each of the subscribing nationwide television networks. Meetings shall be at least twice a year on a date determined by the Chairman.

The National Association of Broadcasters also accepts associate members in fields allied to broadcasting.

Present Officers and Executive Committee

Present officers of the NAB are as follows: President, Vincent T. Wasilewski; James H. Hulbert, vice-president and assistant to the president; Everett E. Revercomb, secretary-treasurer; Stockton Helffrich, director of Code Authority, New York; George W. Bartlett, vice-president, engineering department; Paul B. Comstock, vice-president, government affairs department; Douglas A. Anello, general counsel, legal department; Dr. Harold Niven, vice-president, planning and development; John M. Couric, vice-president, public relations service; Charles M. Stone, vice-president radio department; Howard Mandel, vice-president, research department; William Carlisle, vice-president.

television department; William L. Walker, director of broadcast management department; and Alvin M. King, station relations department director.

The executive committee members are: Grover C. Cobb, Chairman of the Joint Board of Directors, KVGB, Great Bend, Kansas; Richard D. Dudley, Chairman of the Radio Board of Directors, Forward Communications Corporation, Wausau, Wisconsin; Donald A. Thurston, Vice Chairman of the Radio Board of Directors, WMNB, North Adams, Massachusetts; Charles H. Tower, Chairman of the Television Board of Directors, Corin-thian Broadcasting Corporation, New York, New York; Harold Essex, Vice Chairman of the Television Board of Directors, Triangle Broadcasting Corporation, Winston-Salem, North Carolina; John F. Dille, Jr., Immediate past Chairman, Joint Board Communicacna Group of Indiana, Elkhart, Indiana.

Further information on the NAB may be obtained from its Washington headquarters at 1812 K Street, N.W. Washington, D.C. 20006.

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"PEAK AMPLIFIER: CIRCLE ITEM 12. CATALOG GC-68A: CIRCLE ITEM 13 ON TECH DATA CARD"

January, 1969
The National Association of Educational Broadcasters met in Washington, D.C. late in November. And the more than 4,500 members who attended were treated to demands, forecasts and basics.

McGeorge Bundy, president of the Ford Foundation, set the stage by telling NAEB members that jumping from the pony express to the jet age will not be an easy task for educational broadcasters. Bundy warned that the transition would require major adjustments in operational procedures and program scheduling.

And there was a concern among members that perhaps too much emphasis was being placed on program origination, especially in the northeastern megalopolis centers. Aware of this opinion, Bundy said that the Ford Foundation will not forget about educators “west of the Hudson River.”

The Ford Foundation has been a consistent donor to ETV, thus it was not unusual that Bundy complained that there is not yet a final decision on future financing for the Corporation for Public Broadcasting. The initial $5 million set aside by Congress is $35 million short of the funds recommended by the Carnegie Commission.

Bundy further complained that there is still only one national programming center. He added that there are still only a few ETV stations with major independent programming strength. Then hitting at financing again, Bundy said that there was too much dependence on donations from the Ford Foundation. But in concluding his address, Bundy announced that Ford Foundation grants will continue to be given to local stations, NET, and Public Broadcasting Laboratory.

Calling much of current commercial television and radio programming “pure, unadulterated trash,” Secretary of Health, Education, and Welfare Wilbur J. Cohen challenged educational broadcasters to come to grips with the nation’s pressing social problems.

Secretary Cohen said much that we see and hear is unworthy of our people, our ideals, and our potential. "If some of it just reached the heights of being a wasteland, it would be making progress," he said.

Secretary Cohen cited racial inequality and discrimination as the most crucial domestic problem demanding national solution. He told the educational broadcasters they must deal with it if equality of opportunity is to become a reality.

The Secretary counted off six other vital national issues which must command the attention of communicators. They are:

- The widespread presence of poverty.
- The future of the American system of education.
- The inadequacy of our health care system.
- The poor quality of our environment.
- The communication gap among the races, and between the young and old, the poor and well-to-do.
- The inability or unwillingness of essential institutions to respond promptly and effectively to the needs of society.

According to Secretary Cohen, many national problems are rooted in ignorance. He said the mass media must understand and accept their special responsibility to inform and enlighten society if these problems are to be mastered.

“I believe educational television has a unique and priceless opportunity in this regard,” the Secretary told the broadcasters. “We need your imagination and your creativity. You can bring to every classroom and every living room the kinds of knowledge, experience, and insight that can widen the dialogue and help find the common ground for solutions.”

FCC commissioner Nicholas Johnson warned educational broadcasters that there are alternatives to noncommercial broadcasting. He said that it might be more economical to purchase time on the commercial networks in order to reach a wider audience. Or it might be as reasonable to put these funds into some cultural activities.

Pointing to the need for educational broadcasters to think conscientiously about justifying their position on receiving government funds, Johnson continued his warning. Cable TV, home audio tapes, and movies are additional alternatives to educational broadcasting.

Other convention speakers included Sterling McMurrin, chairman of the Commission on Instructional Technology; Jesse Jackson, executive director of Operation Breadbasket; Nathan Wright, national...
Problem: Studio phasing

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Circle Item 14 on Tech Data Card

January, 1969
McGeorge Bundy, president of the Ford Foundation, promises ETV continued backing for 1969.

James B. Tharpe, president of Visual Electronics, presents the Second Annual Educom Scholarship award to Zbigniew Koryzma at the national convention.

Bill Clark, Chadron State College, inspects equipment exhibit.

Award of $1,000 was presented to this year's winner—Zbigniew Koryzma, a student at Covell College, University of the Pacific at Stockton, California—at a special reception hosted by Visual during the convention.

Information on NAEB membership may be obtained by writing to: National Association of Broadcasters, 1346 Connecticut Avenue, N.W., Washington, D.C. 20036.

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Want to move up fast in broadcasting?

This free book may change your life

It takes the mystery out of getting the FCC License you need for security and success

No wonder you're interested in a career in broadcasting. It puts you right "where the action is"—behind the scenes of show business, news reporting, politics. You meet famous people. You're the first to know the big news about fires, riots, plane crashes. You get to hear wonderful music. You feel in contact with an audience of thousands.

And one of the most secure high-pay jobs in the field is that of the licensed Broadcast Engineer. He's the key man required on the job by the United States Government.

New job opportunities are opening up constantly for qualified license-holders. Many more will be needed to operate and maintain the countless new UHF-TV stations expected to begin operation, now that all new TV sets can receive UHF.

So if you dream of making broadcasting your life work, you need that Government FCC License.

But how do you go about getting it? Where do you apply, and when? How do you get ready for it?

To help you, we have published a 24-page booklet, "How to Get a Commercial FCC License." It tells you exactly which types of licenses and permits are issued by the Federal Communications Commission, and what kinds of electronic equipment each type allows you to operate and maintain.

You will learn which subjects must be mastered for each kind of license. Thirty typical exam questions will give you an idea of the level of training required. You'll be told where and how often the exams are held, and how to find out about the exams held nearest your home.

Frankly, the FCC exams are rough if you're unprepared. Two out of three applicants fail to pass. Some fail seven or eight times.

But with the right preparation, it's easier than you would imagine. Better than 9 out of 10 CIE-trained men pass the exam with no difficulty. Our record is so good that we are able to promise every student in writing: after completing your CIE course, you'll be able to pass your FCC exam, or CIE will refund your tuition in full.

We'll send you a free copy of our school catalog in addition to your free FCC booklet. Then you can see for yourself how thorough our home study courses and teaching methods are. No obligation, of course.

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January, 1969

Circle Item 15 on Tech Data Card
**GOOD-BYE KINE**

**HELLO EBR-100**

Television raster lines (right) enlarged from 16mm film frames.

Lower: EBR-100 recording on 3M fine-grain (less than 0.1 micron) electron recording film. Top: kinescope recording on television recording film. Line-to-line spacing in both pictures is approximately 0.00058 inches or 14.7 microns.

**TRANSFER LIVE OR TAPE TV TO 16 MM FILM ELECTRONICALLY AND GET PRINTS WITH 1000-LINE RESOLUTION.**

3M's new Electron Beam Recorder is the first system to produce 16mm monochrome film copies comparable to the original live or video tape signal. It has no energy-wasting optical system. It employs direct electron bombardment of the film, eliminating phosphor granularity, face-plate halation and camera-lens losses and distortions.

The 3M Brand EBR-100 far surpasses the conventional kinescope in reproduction quality and in the ability to produce consistently good films. It opens new horizons for TV taping and mass film distribution for educational and training purposes.

The EBR-100 is a machine that every major TV studio, dubbing center, film lab and government communications center will want to employ. Easy to install, completely self-contained.

Direct beam monitoring provides simple, positive adjustment of exposure and gamma. Secondary electrons imaging the film target verify that focus, size, and linearity are correct. You can choose between a direct positive or a film negative with the flick of a switch. The system also is switchable from US standard 525-line to European 625-line requirements.

The EBR-100 records on low-cost fine grain film. Overall resolution exceeds 1000 lines. The film uses conventional processing and is shown on standard 16mm projectors.

The unit is 68 inches tall, 46 inches wide, 34 inches deep, weighs approximately 1000 lb. and costs about $55,000. Optical or magnetic sound is available at extra cost.

For details, call our EBR-100 Information phone. The number is (805) 482-1911, ext. 216. Or write to EBR-100 Dept. at the address below.

Mincom Division

*January, 1969*
<table>
<thead>
<tr>
<th>Company Name</th>
<th>Address</th>
<th>City, State, Zip</th>
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<tbody>
<tr>
<td>ATV Research</td>
<td>13th &amp; Broadway</td>
<td>DAKOTA CITY, ND 68731</td>
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<tr>
<td>Acoustic Sound Co</td>
<td>15 North Tyler</td>
<td>SAN ANGELO, TX 76903</td>
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<td>Acme Film &amp; Video Tape L</td>
<td>1161 N Highland Ave</td>
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<tr>
<td>Advance Industries</td>
<td>2301 Bridgeport Drive</td>
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<td>Advanced High Voltage Co</td>
<td>9635 Yolanda Ave</td>
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<td>Aerovox Corp</td>
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<td>Alco Electronic Prod Box 1348</td>
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<td>Alcom Inc</td>
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<td>Alford Mfg Co</td>
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<td>Roontron Electronics</td>
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IMMEDIATE DELIVERY!

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These Delay Lines have the highest ratio of time delay to rise time that has ever been built in a Lumped Constant Line. Unlike other types of high ratio lines, the Lumped Constant Delay Line has a passband from D.C. to its cutoff frequency and maintains a constant delay over these frequencies. These lines are also unique in that they offer relatively low insertion loss.

LOWPASS FILTERS—SERIES “FL”

Size: 1¼ x 7 x ½ inches
Impedance: 100Ω
1db maximum ripple in passband
1db maximum insertion loss (referenced to 350Ω)
20db Min. Attenuation at 3db cut-off Freq. x 1.15
40db Min. Attenuation at 3db cut-off Freq. x 1.4

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LOW-PASS FILTERS—SERIES “FH”

Size: 1¼ x 7 x ½ inches
Impedance: 100Ω
1db maximum ripple in passband
1db maximum insertion loss (referenced to 350Ω)
20db Min. Attenuation at 3db cut-off Freq. x 1.15
40db Min. Attenuation at 3db cut-off Freq. x 1.4

<table>
<thead>
<tr>
<th>Maximum 3db</th>
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<th>Minimum 40db</th>
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<tbody>
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<td>5</td>
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</tr>
</tbody>
</table>

LUMINOUS CABLE FILTERS—SERIES “FL”

IMMEDIATE DELIVERY!
The “FL” & “FH” Filter Series are a group of 9 Pole Tchebycheff Low & Highpass Filters which are diminutive in size. Both Filter Groups contain components made to meet the requirements of the latest applicable MIL-Specs and conform to the best electrical and mechanical design practice.

A VERY USEFUL APPLICATION is the series connection of a Lowpass & Highpass unit to produce an effective Bandpass Filter.

ALL FILTERS LISTED CAN BE DELIVERED FROM STOCK

HIGHPASS FILTERS—SERIES “FH”

Size: 1¼ x 7 x ½ inches
Impedance: 100Ω
1db maximum ripple in passband
1db maximum insertion loss (referenced at 30 megs)
20db Min. Attenuation at 3db cut-off Frequency
40db Min. Attenuation at 3db cut-off Frequency

<table>
<thead>
<tr>
<th>Maximum 3db</th>
<th>Minimum 20db</th>
<th>Minimum 40db</th>
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<tbody>
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<td>3.0</td>
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</tr>
</tbody>
</table>

CUSTOM-BUILT FILTERS

Freq. Range: 1 Kilocycle to 50 Megacycles.
Construction: Epoxy encapsulated or hermetically sealed in steel cans.
Delivery: Prototypes can be delivered in one week.

TO ORDER SPECIFY “FL” FOR LOWPASS OR “FH” FOR HIGHPASS AND THE CUT-OFF FREQUENCY.

Circle Item 17 on Tech Data Card
IT PREMIUM DUTY TRANSMITTING TUBES
There when you need them

Communications has been our business for almost fifty years. We understand what it means to run at reduced power when you lose a transmitting tube and we have what it takes to get you back to full power faster. What's more, mesh cathode construction and double vacuum processing used on all of our newer tube types is designed to keep you at full power longer.

A partial listing of the popular types of ITT tubes available appears below. Call or write for a complete catalog and the name of the nearest ITT Regional Tube Specialist. He's prepared to discuss ahead of time the means for delivering factory fresh tubes to you when you need them fast.

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
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<td>F-8550</td>
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<td>F-7007</td>
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</tbody>
</table>

ELECTRON TUBE DIVISION
P.O. Box 100, Easton, Pennsylvania 18042
Operating remote control? Be safe and sure with the

NEW! ALL SOLID-STATE RF AMPLIFIER FROM WILKINSON!

Features of the Model TRF 1A:
- VERY LOW DISTORTION AND CARRIER SHIFT
- BROAD GAIN CHARACTERISTICS
- EXTREME STABILITY • EXCELLENT SELECTIVITY
- ULTRA LINEARITY

PRICE: $395

For complete details write:

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1937 MacDADE BLVD.
WOODLYN, PA. 19094

PHONE (215) 874-5236 874-5237

Circle Item 19 on Tech Data Card

January, 1969
Replace Your Present AM Monitor with a

* AM MODULATION MONITOR

The Metron Model 506B-1 Amplitude Modulation Monitor is a high quality instrument, field-proven for several years,

- FCC Type Approval 3-127
- Compact — Only 5¼” high on a standard 19” rack
- All solid state circuits — silicon transistors for greater reliability
- Low Cost — only $550.00.

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1051 South Platte River Drive
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(303) 744-1791 • TELEX 04-5729

Circle Item 20 on Tech Data Card

PREVENT CATASTROPHIC FAILURES IN YOUR AMPEX AG-440!
An unfortunate characteristic of solid-state power supplies is that they can go into over-voltage and "run away". This happened to a recording studio recently. Result: 3 out of 4 amplifiers and power supply severely damaged. Surely needed recorder out of service 3 days. Repair cost of $230!
The use of one inexpensive Ultra Audio CB-440 OverVoltage Detector permanently protects you against power supply run away. Removable any time, it may be inserted instantly into your AG-440's power supply with no rewiring, no special tools, no technical skill.
Just $53.50 at your Ampex authorized dealer or from
ULTRA AUDIO PRODUCTS, DEPT. (B)
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L.A., CALIF. 90046
PHONE 213/276-2726
Price & specifications subject to change without notice.
Give your production people a Vital Industries switcher and make them feel like "Cecil B. De Mille". The VIX-108 vertical interval switcher is like a computer...a real money-making production tool. You no longer have to search and wonder if your video is composite or non-composite, synchronous or not, equalized re-entry or not, burst on black or not, etc. The VIX-108 thinks for you and minimizes errors caused by the unfamiliarity of the operator with color electronics.

FEATURES:

- Extensive use of integrated circuits with solid state cross points for long term stable performance.
- Basic matrix housing 108 crosspoints and associated logic and output electronics, comes in "5/4" of rack space and has no coax inter-connections. This means no delays of signals in any path and no crosstalk.
- Production oriented design with automatic sync and clamping on all inputs for bounce-free switching of video with varying luminance levels.
- True composite additive/non-additive mixer with automatic inhibit of non-synchronous dissolves.
- Fade network color to network black burst with automatic inhibit.
- Fade to monochrome, maintain color burst or choose to drop color burst. Only one reshaped burst and constant level sync during all dissolves.
- Custom built production or routing switching with the latest state of the art accessories designed as an integrated system are all furnished by Vital Industries, Inc.

OTHER VITAL PRODUCTS:

- VI-1000 video proc. amp. with automated features.
- VI-500 stab. amp. with AGC.
- Video and pulse distribution equipment.

Selecting the right switcher is Vital

Play it safe...Call N. Donoyan

VITAL INDUSTRIES, INC. 3614 SOUTHWEST ARCHER ROAD GAINESVILLE, FLORIDA 32601 - PHONE (904) 376-1581

January, 1969
PRODUCT DIRECTORY

A listing of over 600 products and services compiled from questionnaires completed by the manufacturers.
**END COLOR FIDELITY HEADACHES**

HFM1 HIGH FIDELITY COLOR MIXER:
The first in Videon's growing family of high fidelity color systems.

Make mixing, blending, fading and lap dissolving easy. Automatically prevent loss of color fidelity and eliminate elaborate preset of color shots.

The HFM1 performs three channel mixing of color video with absolutely constant output video level throughout a continuous video fade (to black or to a third signal). The operator can fade or mix continuously while the HFM1 automatically corrects the subcarrier phase of each signal to preserve the color balance. Input signals may be selected rapidly and at random giving the director unrivaled and immediate high fidelity color mixing. The HFM1 does not require any preset delay equalization of video signals.

Portions of HFM1 available individually are:
1. **AP4 Auto Phaser:** Maintains constant subcarrier phase when switching or mixing video signals of different phase at the input.
2. **MA2 Mixer:** A three channel Mixing Amplifier with a constant output video level.
3. **FA1 Fader:** Mixes or fades remotely two video signals.
4. **PS10 Rack Frame:** Custom wired; 19" x 3.5" x 15" D.

All available on 30-day free trial offer.

The rapidly growing new line of Videon's High Fidelity Color Products includes:
- Color Encoders & Color Bar Generators
- Burst Adders
- High Fidelity Distribution Amplifiers
- Switching Matrices
- Automatic Programming Devices
- Chroma Pulse Generators
- VIT Systems

Watch the next issue for the latest in our new High Fidelity Color Systems.

**$4450**
IMMEDIATE DELIVERY

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140 E. Main St., Huntington, N.Y. 11743
(516) 427-6285

*Trade Mark; Patents Pending*
The Spotlight is on
Spotmaster
Superior Tape Cartridge Recording
and Playback Equipment

COMPACT 500 C SERIES—Completely solid state, hand-sensed 500 C equipment features functional styling and ease of operation, modular design, choice of 1, 2, or 3 automatic electronic cueing tones, automatic record pre-set, separate record and play heads, A-B monitoring, biased cue recording, triple zener controlled power supply, transformer output . . . adding up to pushbutton broadcasting at its finest. Spectral and performance equal or exceed NAB standards. Record-play and playback-only models are available.

STACK-MOUNTED 500 C MODELS—The 500 CR rack models offer the same Model C design and performance features and are equipped with chassis slides ready to mount in your rack. Each unit slides out for easy head and capstan cleaning and other routine maintenance. All 500 C models carry iron-clad full-year guarantees.

ECONOMICAL 400 A SERIES—Now even the smallest stations can enjoy Spotmaster dependability with the low-cost, all solid state 400 A series, available in compact record-play and playback-only models. Performance and specifications are second only to the 500 Series. For complete details about these and other Spotmaster cartridge units (stereo, delayed-programming and multiple-cartridge models, too), write, wire or call today. Remember, Broadcast Electronics is the No. 1 designer/producer of broadcast quality cartridge tape equipment . . . worldwide!

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METRICS DIV
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SINGER PROD CO INC
WARD ELECTRONIC INDUS

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COLLINS RADIO CO
DYNAR ELECTRONICS
KAY ELECTRIC CO
METRICS DIV
ROHDE SCHWARZ SALFS
SINGER PROD CO INC
TEKTRONIX INC
HEWLETT PACKARD CO

Analyzers, Video
R & K INSTRUMENTS INC
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CUSH CRAFT
JERROLD ELECTRONICS CORP
KAI SER CKX CORP
KATONA ELECTRONICS CORP
PRUZAN CO
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TELE-CINE INC
VIDCOMP INC
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APPLIED ELECTRONICS
VITAL INDUSTRIES
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AMFRO INC
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FINNEY CO
G C ELECTRONICS
GATES RADIO CO
JAMPRO ANTENNA CO
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MARCONI DIV
MARTI ELECTRONICS
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R F SYSTEMS
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SCALA RADIO CO
SINGER PROD CO INC
SITCO ANTENNA CO
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ANDREW TOWERS INC
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MICRO LINK DIV
MICROWAVE ASSOC INC
MICROWAVE ASSOC INC
NARDA MICROWAVE CORP
PRODELINE INC
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SINGER PROD CO INC

Antennas, Mobile
ANDREW CORP
ANDREW TOWERS INC
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R F SYSTEMS
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SINGER PROD CO INC

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AMPLIFIERS

• Six 75 ohm Outputs
• Input-Pulse Level Meters
• Full Front Panel Operation

PD Series Pulse Distribution Amplifiers provide six outputs and feature unique input-pulse level meters permitting continuous monitoring of pulse deterioration even though the regenerated output pulses may not yet be affected. Exceeding all NTSC color and monochrome specifications, the units also feature full front panel monitoring of all input and output cables, notation cards for routing records, and low input pulse acceptability.

Circle item 24 on Tech Data Card
Fairchild introduces a complete new line of noiseless attenuators with 7 new advantages: 1. Transistorized drives require only minute current to actuate circuit. 2. Multi-channel operation with common light sources to all channels guarantees tracking to within ½ db between channels. 3. 4 channels or more can be driven by a single actuator. 4. Infinite resolution from 0 – oo. 5. Plug-in light source allows instantaneous replacement. 6. Improved mechanical construction of slide faders' precious metal sliding contacts gives long trouble free life, offers adjustable feel. 7. Plug-in, remote, and slide-wire models range from one to four channels and are designed with ultimate versatility in packaging; compact cards range in size from 1⅛” x 4” to 5¼” x 6⅞”; housings from 7” x 1½” x 1¾” to 7” x 1½” x 3”.

All Fairchild Lumiten attenuators use the same light principle. As light intensity is made to vary, cadmium sulphide cells within the circuitry effect identical and simultaneous variations of the audio signal. The Fairchild Lumiten is, in fact, as noiseless as a beam of light.

Fairchild Lumitens (available in 600 and 150 ohms) include: 668I Attenuator, 668 PAN-2 Pan Pot Actuator, 668 ACT Remote Cell Actuator, 668 STII Stereo Attenuator, 668 RSB Remote Stereo Attenuator, 668 MC 4-channel Master Control Attenuator card, 668 RAB Remote Attenuator packaged on compact PC card, 692 D1 Single Remote Attenuator, 692 D2 Two independent Attenuators. Slide Wire Fader: SWL 600 (600 ohm L pad).

Contact your Fairchild Recording Distributor or write FAIRCCHILD RECORDING EQUIPMENT CORPORATION, Dept. BE-1, 10-40 45th Avenue, Long Island City, New York 11101.

Circle item 25 on Tech Data Card.
if you need attenuators you need this catalog!

AUDIO AND RF ATTENUATORS TO MEET ANY REQUIREMENT

Here in one compact and informative 28 page booklet is all the data you need to select a Precision Audio and RF Attenuator for your individual application. Reference Charts, Circuit Diagrams, Types and Uses, Current and Voltage Ratio Tables, Ratings, Etc., make this a handy and invaluable reference.

SEND FOR YOUR FREE COPY TODAY.

TECH LABORATORIES, INC.
Palisades Park, New Jersey • Tel.: (201) 944-2221 • TWX: (201) 947-0825

January, 1969
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IN CARTRIDGE SYSTEMS

MC-104 MULTI-CARTRIDGE
PLAYBACK
Four independent transport modules, each
with its own direct motor/capstan drive
transport & individual transistORIZED program
and cue amplifiers. Vertical cabinet or
horizontal rack mountings $1650. Stereo Model $2095.

300C PLAYBACK
Solid state amplifiers, relays and bias
stages. 1000 Hz
stop cue tone
standard. 2nd &
3rd cue tones
available. For rack or
custom cabinet installation $550.
Record/Playback Model $795.

800C RECORD/PLAYBACK
Ultra modern, compact design. Easy access to
plug-in heads and transistORIZED modular
circuitry. 3 way tape
guide head mount.
Direct motor/capstan
drive transport. $675.
Playback Model $995.

BP-22 SALESMAN’S
PORTABLE PLAYBACK
Make your sales presentations
more impressive. Demonstrate your
programming and production skills on AC or
battery power, instantly.
Housed in slim style
attache case. Makes
selling easy. $189.50

SEE ALL OF SPARTA’S NEW LOOK!
Write or call for complete product brochure.

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B & B INSTRUMENTS INC
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CHRYSLER LEG CO
CUM ed MUICU INC
D H MUICU INC
INDUSTRIAL INSTRUMENTS
KAY ELECTRIC CO
MANNONI DIV
MANNONI MUICO AND VIDEO
MM S S M M INC
NCLA BROADCAST CORP AND
R E M R AB INC
NICA VIDE U INDUSTRIES
SAKES TANGENT INC
TECH LABORATORIES INC
TELESCON CORP
TRUMPETER ELECTRONICS
WEINSCHEL ENGINEERING CO

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U. S. ELECTRONIC COMPONENTS
SYLVANIA LIGHTING PROD

Bellums
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AMERICAN ELECTRONICS CORP
B & B INSTRUMENTS INC
BRAUNAUER MUY CO INC
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MICROLAB INC
MU SOUND INC AND DIV
MU VIDEO INC

Base Station
COLLINS RADIO CO
KAY ELECTRONICS
MOBLEY ELECTRONICS
NCLA BROADCAST CORP AND
R E M R AB INC

Batteries, Dry Cell
BUNGESS BATTERY DIV
PB CECO INC
NCLA ELECTRONIC CORP AND
RONM SALES CORP

Batteries, Lead Acid
PB CECO INC

Batteries, Nickel Cadmium
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PB CECO INC

Circle Item 27 on Tech Data Card

Circle Item 27 on Tech Data Card
This completely automated programming system
WILL TURN YOU ON AT A PRICE YOU CAN AFFORD

The MaCarTa Automatic Programming System is completely flexible. Carousel units provide for a combination of live programming with pre-programmed material, or for all-day operation without attention. No dead spots either, because one Carousel is indexing while another is in operation... for perfect continuity.

In addition, the System features the Carousel Programmable Random Selector Control Cell. This unit provides for control of as many as five Carousels. Controlled by color coded aluminum program "chips" the cell has a 200 unit memory, quick change magazine and permits fast, last minute changes. It reduces cartridge handling to a minimum. Chips are automatically restacked ready for replay.

Call or write today for complete details and information on the modest investment involved compared to other automatic units.

SONO-MAG CORPORATION
1011-1013 West Washington St. Bloomington, Illinois 61701
Telephone 309-829-7115
MANUFACTURING ENGINEERS

January, 1969
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Specify Superior Extended Spectrum Coaxials for continuous coverage to 300 MHz and beyond.

Only Superior Extended Spectrum Coaxials give you a full, continuous transmission range to 300 MHz and higher. That's 84 MHz more than you get with most standard coaxials. And with no discontinuities at any frequency.

This broad-range transmission capability is built-in today. And it gives you ample room to grow tomorrow. With new CATV channels, Broader ETV and ITV programming, More CCTV for business and industry, Data transmission. Remote control telemetering. Alert and alarm systems. Traffic and highway control networks.

Extended Spectrum Coaxials are now available in the right construction for every application. With exclusive Coppergard or Alumagard shielding. In aerial or direct burial types. When you buy coaxials today, be sure they offer full-range performance with no gaps. Specify Superior Extended Spectrum Coaxials. The ones with the extra room built-in.

For information and prices, write or call: Superior Sales and Service Division P.O. Box 2327 Hickory, North Carolina 28601 Phone 704/328-2171

SUPERIOR CONTINENTAL CORPORATION

Circle Item 29 on Tech Data Card

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PH CECO INC
32 E ELECTRONIC COMPONENTS

Blowers and Fans
AMECO INC
BUD MADIU INC
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32 E ELECTRONIC COMPONENTS
LECTRIC MILD LAMS INC

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AEROVISO CORP
ULMENAL MADIU CO
HEATH CO
HONEYWELL INC
LECTRIC MILD LAMS INC
MUNDE SCHWARZ SALTS

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AEROVISO CORP
ULMENAL MADIU CO
HONEYWELL INC
LECTRIC MILD LAMS INC

Boxes, Decade, Resistor
AEROVISO CORP
ULMENAL MADIU CO
HEATH CO
HONEYWELL INC
LECTRIC MILD LAMS INC
TECH LABORATORIES INC

Bridges
ALFUMO MG CO
AMECO INC
BLUNDEL TONGUE LAB INC
CULLINS MADIU CO
DELTA ELECTRONICS INC
DELTA ELECTRONICS INC
32 E ELECTRONIC COMPONENTS
GENERAL MICROWAVE CORP
GENERAL MADIU CO
HEATH CO
LECTRIC MILD LAMS INC
LEXFRO COMPAQNEE GEN
MUNDE SCHWARZ SALTS
WLENSCHEL ENGINEERING CO

C

Cabinets, Metal
ALME FILM VIDEO TAPE L
AMECO INC
BUD MADIU INC
CATV EQUIPMENT CO
CANAHA ELECTRIC CO
CULLINS MADIU CO
DU VAL FIT CORP
ENCLSOURE CORP
EQUIPMENT
WAILES RADIO CO
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MLA BROADCAST COMM PHD
MUSAID MENTIC INSTRUMENT DIV
SINKER PROD CO INC
TERNAID HUDSON ELECTRIC
VENT RAK INC
WAIDE ELECTRONICS INC
M WILSON CORP

Cabinets, Storage, Disc
ALME FILM VIDEO TAPE L
BURRE JAMES
WAILES MAGDU CO
GRIMNAN FIXTURE CO
NEUMAID PROD CORP
H WILSON CORP

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ALME FILM VIDEO TAPE L
BURRE JAMES
PH CECO INC
WAILES MAGDU CO
GRIMNAN FIXTURE CO
NEUMAID PROD CORP
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Cabinets, Storage, Magnetic Tape
ALME FILM VIDEO TAPE L
AAMAG ULTRU ELECTRONICS
BUD CRAFT ELECTRICAL
CULLINS MADIU CO
CULLINS MADIU CO
GATES RADIO CO
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GRIMNAN FIXTURE CO
MAGNETIC PROD DIV
NEUMAID PROD CORP
SINKER PROD CO INC

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H WILSON CORP

Cabinets, Storage, Slide
BURRE JAMES
GAF CORP
GATES RADIO CO
GRIMNAN FIXTURE CO
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CULLINS MADIU CO
GATES RADIO CO
GRIMNAN FIXTURE CO
JENSEN MG DIV
SUPERSCOPE INC

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ALPHA WIRE
AMPHENOL CORP
BIRNBACH CO INC
ROSTOID INSULATED
GENERAL CABLE CORP
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AMPHENOL CORP
ANDREW TOWERS INC
BFLAPN CORP
BIRNBACH CO INC
ROSTOID INSULATED
AND ELECTRONICS CO
G C ELECTRONICS
GENERAL CABLE CORP
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INC DIV TRW INC
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LISTEC TV EQUIP CORP
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SINKER PROD CO INC
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TWOPHETEK ELECTRONICS
VIKOA INC
WAIDE ELECTRONICS INC
WLENSCHEL ENGINEERING CO

Cable, Camera
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ROSTOID INSULATED
CRUBLON ELECTRONIC CBL
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SAXTON PROD INC
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TIMES WIRE AND CABLE
VIKOA INC

Cable, CATV, Hardware
AMECO INC
AMPHENOL CORP
ANACONDA ELECTRONICS
BIRNBACH CO INC
COLUMBIA ELECTRONIC CBL
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ENTRON INC
GENEAL CABLE CORP
INC DIV TRW INC
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XCELITE, INC., 118 Bank St., Orchard Park, N.Y. 14127
In Canada contact Charles W. Pontoit, Ltd.
Circle Item 30 on Tech Data Card

January, 1969
If our 4-tube color great... who'll buy You might.

It all depends on

The TK-42 is the camera for the broadcaster who must have the most accurate and realistic color reproduction of a sponsor's product. This is the camera that delivers crisp, clean color in almost perfect degree. Now, over 400 are in use by top TV stations. It's the camera with the big I.O.—that gives top resolution and eliminates the need for contouring. Better than any other camera, it handles the problem of large contrasts between highlights and shadows, or variations in light levels.

Now let's look at the TK-44A. This is the lightweight, easy-to-handle, simple to set-up, color camera. It solves different problems.

It's the latest design in 3-tube cameras. It uses RCA's exclusive "contours with a comb" that produces snappy, brisk colors without raising the noise level. It weighs in at only 98 pounds (without the lens), ideal for field use. And RCA has as many lenses for both field and studio applications as you will ever need. The TK-44A also has built-in "Chromacomp" that will precisely color-match the output of the TK-42, or of any other color camera. "Chromacomp" can also produce striking special color effects.

Call your RCA Field Man for complete information. Or write: RCA Broadcast Equipment, Bldg. 15-5, Camden, N.J. 08102.

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camera is so our new 3-tuber?

your needs!
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CINF SONIC SOUND INC
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MAGNETIC PROD DIV
MARATHON BROADCAST EQUIP
MACARTA INC
RCA BROADCAST COMM PRO
SINGER PROD CO INC
TAPCASTER
TELECOMMUNICATIONS DIV
AUDIO DRIFTS
SPARTA ELECTRIC CORP
STANTON MAGNETICS INC

Cartridges, Phone
BROADCAST ELECTRONICS
ELECTRO VOICE INC
G F DISTRIBUTOR SALFS OP
G F ELECTRONIC COMPONENTS
GAFER RADIO CO
GOTHAM AUDIO CORP
SHURE BROTHERS INC
SINGER PROD CO INC
SPARTA ELECTRIC CORP
STANTON MAGNETICS INC

Cartridge, Tape (Recording Service)
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CINE SONIC SOUND INC
MAGNA TECH CORP
SINGER PROD CO INC
SPARTA ELECTRIC CORP
STANTON MAGNETICS INC

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FIARE PRODUCTS MFG CO
METROLOGIE COMPAEGEN
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ANACONDA ELECTRONICS
APRINACO CO INC
BLOWFER TONGUE LAB INC
BRADFORD INFORMATION SYS
CATV EQUIPMENT CO
C COR ELECTRONICS
CASCAD ELECTRONICS LTD
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DYNARF ELECTRONICS
DYNARF ELECTRONICS
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ESPRESSO PRINT DIV
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INTERNATIONAL GOOD MUSIC INC
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MICROWAVE ASSOC INC
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R F SYSTEMS
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SPEAKER KENNEDY LAB
SURFACE CONSTRUCTION INC
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TELE MEASUREMENTS INC
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TEXTEK INC
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VIDEOMETRICS INC

CATV, Cable Terminals
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PRIZAN CO
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CASCADE ELECTRONICS LTD
JERROLD ELECTRONICS CO
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PRIZAN CO
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VIENA INC

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KASSER FOR CORP
MICROWAVE ASSOC INC
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BLOWFER TONGUE LAB INC
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THE CATFIL CORP
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TAPE ATHON CORP
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KASSER FOR CORP
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COMX ELECTRONICS INC
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GRL DIV SINGER GENERAL GEN ELECTRONICS
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RCA BROADCAST COMM PRO
SCANTLEN ELECTRONICS
SHARONCO INC
SONY CORP OF AMERICA
SYLVANIA COMM ELECTRONIC
TV CABLE SUPPLY CO
TAPE ATHON CORP
TAPCASTER
TARTAN ELECTRONICS CORP
TEXTEL INC
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TEXTEK INC
ULTRA AUDIO PRODUCTS
VIDEOMETRICS INC

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Manufacturers' Address List Begins on page 24

Satisfaction Guaranteed!

Professional Head Replacements for Ampex, Magnecord
Write for details

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Circle Item 32 on Tech Data Card

January, 1969

47
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ANDREW TOWERS INC
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GENERAL CABLE CORP
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TV CABLE SUPPLY CO
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INTERNATIONAL ELECTRICAL RES
SINGER PROD CO INC

Clamps, Ground
AMECO INC
BIRNBACH CO INC
DIAMOND EXPANSION BOLI
G C ELECTRONICS
PROZAN CO
SINGER PROD CO INC

Clamps, Tube
BIRNBACH CO INC
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SINGER PROD CO INC

Cleaners, Air
TFX101F CO

Cleaners, Chemical (Also See Solvents)
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TFX101F CO

Cleaners, Lens
RURKE JAMES
FR CECO INC
TFX101F CO

Cleaners, Other (Also See Solvents)
FB CECO INC
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PARRAM INC
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Coils, Antenna Loading
COLLINS RADIO CO
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Coils, Choke, RF
BARKER WILLIAMSON DIV
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TERMINAL HICKS ELECTRIC

Coils, Deflection and Focusing
ATV RESEARCH
CLEVELAND ELECTRONICS

Coils, Telephone
GULF ELECTRO SALES INC

Colorimeters
GARDNER LAB INC
HONEYWELL INC
ZOOMAR INC

Communications Systems
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Plus . . . offering the Industry's First 3-Month Guarantee On All Tape Cartridges.
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clean magnetic tape heads -- completely

send for free samples and literature.

Write, or use the reader service number under this advertisement

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- Weight: 4 Ounces
- Shielding: MJ Metal Shield, 20 DB
- Price: $4.95

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- Power: 200 MW
- Input Impedance: 8 Ohms (DC currents up to 300 MA)
- Output Impedance: 8 Ohms and 600 Ohms
- Mounting: Flanges for Printed Circuit Board
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- Weight: 7 Ounces
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- Connections: Wire Leads
- Price: $3.95

We also make a complete line of Solid State Amplifiers, Power Supplies, Oscillators & RF Boards.

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- Please send, at no cost, specifications and prices on your complete line of Solid State Amplifiers, Power Supplies, Oscillators and RF Boards.

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Address _______________________
City ___________________________
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Circle Item 36 on Tech Data Card

January, 1969
**Users Report...**

**Kustom Broadcast Console**

Users, both domestic and foreign report it is way ahead in performance, versatility, flexibility and dependability when compared with any other unit even at a higher unit cost. Six input channels. All solid state unit construction. Use on remotes or in studios.

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Taber heads for Ampex are manufactured under strict laboratory control, and offer these advantages:

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CUSTOM REQUIREMENTS

A standard Wilkinson console must meet the Wilkinson standards for value, performance, and versatility.

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Since the TACS-3 offers superior quality in a compact lightweight unit, it is ideal for studio, production use, or remotes. TAC-1B Features • All solid-state design • Low distortion • Excellent frequency response • 2 high level and 4 low level inputs • Top quality attenuators • Cue position on all faders

MODEL TACS-3 DUAL CHANNEL CONSOLE

WILKINSON

ELECTRONICS, INC.

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January, 1969

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51
SATISFYING THE HIGHEST QUALITY DEMANDS OF BROADCASTERS

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World renowned standard of broadcast and recording industries • Now silicon FET equipped • Economical ultimate announce quality • Full accessories • Battery and AC power. Price: $237.00 up

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- Variable BIFILAR Edgewound Ribbon
- Fixed TRIFILAR Edgewound Ribbon
- Fixed QUADRICULAR Edgewound Ribbon
- CAT-Line (Continuous Adjustable Transmission-Line) 2.30 MHz, also ideal as a broadcast filter component.

*All MULTRONICS coils offer these important design advantages:

1. Silver-plated Copper "windings" with anti-tarnish finish and hard soldered terminations.
2. Non-breakable Support Bars of G9 MELAMINE which combines minimum loss resistance (dissipation) with superior arc resistance.
3. TEFLOM insulation to prevent closed loops, and

Use this whole ad as a coupon, if you wish. Indicate your basic needs, including inductance and space limitations. If you want combinations of fixed and variable inductors, chances are we have them off the shelf. Special requirements we can probably handle quickly and economically. But please remember to include your name and address . . . or use the Reader Service Card.

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Model CBG-1 COLORED/BLACK BURST GENERATOR

- Provides Black Burst or Colored Screen
- Full 360° Subcarrier Accommodation
- Two Outputs
- Only 1½" High

The CBG-1 Colored/Black Burst Generator lets you go to red, green, blue or any other hue by generating a synthetic color video signal. A single control knob permits selection of black burst or variable hue screen. The CBG-1 provides adjustable burst, sync, minimum blanking, luminance, chrominance and hue, and allows the color signal to be used as background for other material. With all front panel controls and monitors, the CBG-1 features full 360° subcarrier phase shift and two 75-ohm outputs within its compact 1½" high configuration.

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JUNIOR 35. Smaller than a desk processes color slides and filmstrips up to 80 per hour. Accommodates 1 frame to 100' at a time.

You gain profit & prestige when you show local news in COLOR!

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Treise offers color processors in any size...any speed...any type to meet your TV Station needs!

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We provide color processors in any size, speed, or type—from small "desk-size" models to giant high-speed 150 ppm processors. Moreover, we will custom design or build units to meet your individual needs. If you have special requirements, our technical staff will be happy to study them and offer the best solution.
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January, 1969
The SM60 cannot be stereotyped—is equally at home in the studio or in the field—stand-mounted or handheld—in uses as diverse as outdoor sporting events and elaborate variety shows. Small wonder that audio engineers have called it one of the most versatile omnidirectional dynamics they've ever encountered, for the SM60 is a unique combination of good-looks, strength, performance and economy. The smooth, wide-range response provides cleanest, natural reproduction of both speech and music. A very effective built-in wind and "pop" filter protects against undesirable effects of close-talking. Lustrous, non-glare metallic finish and tailored-to-the-hand dimensions provide striking on-camera appearance and superior handability. Specially reinforced machined-steel case front is designed to take abuse that would ruin other microphones—you can drop it on its nose without damage to the internal structure! Efficient windscreen and front end are quickly and easily removable for cleaning. Best of all, it is priced competitively with conventional "workhorse" microphones. Why not check out an SM60 now? See your Shure Professional Products Distributor, or contact Mr. Robert Carr, Manager of Professional Products Division, Shure Brothers, Inc., 222 Hartrey Ave., Evanston, Ill. 60204—Phone 312-328-9000.

Shure SM60
VERSATILE OMNIDIRECTIONAL DYNAMIC MICROPHONE

THE LAST WORD IN WEARABLE LAVALIER MICROPHONES . . . BY SHURE

Specifically designed for radio, TV, motion pictures . . . matches well in sound with stand or desk mounted units. Smoothly-contoured, machined-steel case and recessed grille for minimum clothing noise. Exclusive snap-in mounting of microphone for greater convenience, security. "Positive Lock" lavaliyer goes on in an instant—provides simple, noiseless position adjustment. Extra-flexible, kink-free rubber cable is easily replaceable.

MODEL SM51 DYNAMIC LAVALIER

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ROHDE & SCHWARZ SALES
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dresses start

on Page 24

NEW... Type 19 Precision Antenna Monitoring System
- ±0.1 Degree Resolution
- Up to 12 Towers
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- Mercury-Wetted Relays

For further information, contact:

POTOMAC INSTRUMENTS, INC.
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Phone: (301) 889-3125

January, 1969

Circle Item 49 on Tech Data Card

Circle Item 50 on Tech Data Card
New!! UD-900
UNI-DIRECTIONAL MICROPHONE
(with tone control)

**Specifications:**
- Cartridge: DM-49
- Impedance: 600 ohms
- Sensitivity: -73db ± 2db/µ bar
- Frequency Response: 50 to 15000Hz ± 5db
- Dimensions: 50mm dia. 250 Length

For further information please write to

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**Circle Item 51 on Tech Data Card**

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- GATES RADIO CO
- RCA ELECTRONIC COMPONENT
- SHURE BROTHERS INC
- SONORAD CORPORATION
- SUPERSCOPE INC
- TURNER MICROPHONE CO
- PRIMO CO LTD
- SPARTA ELECTRIC

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**Microwave, Systems, ST.L.**
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- MICRO ASSOCIATE INC
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- RAYTHEON CO
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- SINGER PROD CO INC
- SURFACE CONSTRUCTION

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**Mobile Equipment**
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- DELTA ELECTRONICS INC
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- SINGER PROD CO INC
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- UCA ELECTRONIC
- VISUAL ELECTRONIC CORP
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- SPARTA ELECTRIC

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- ELECTRONIC MOBILE UNIT
- GENERAL TELEVISION
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- THE JANSON INDUSTRIES
- LITECC TV EQUIP CORP
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- SYLVANIA COMM ELECTRONIC
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- VISUAL ELECTRONIC CORP
- WILSON CORP

**Modulators, TV**
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- THE CATIEL CORP
- DYNAIR ELECTRONICS
- GATES RADIO CO
- KATONA ELECTRONIC CORP
- MICRO-LINK DIV
- ORBIT RADIO AND VIDEO

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- ARMOR SYSTEMS INC
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- CCA ELECTRONICS
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- COLLINS RADIO CO
- ELECTRO VOICE INC
- GATES RADIO CO
- MELCOR ELECTRONICS CORP
- POTTOMAC INSTRUMENTS INC
- RAC SERVICE CO
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**Monitors, FM Systems, Mono**
- RELAY ELECTRONIC LAB
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- COLLINS RADIO CO
- ELECTRO VOICE INC
- GATES RADIO CO
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- UTICA ELECTRONICS

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- RELAY ELECTRONIC LAB
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- COLLINS RADIO CO
- ELECTRO VOICE INC
- GATES RADIO CO
- KARG LAB INC
- MCMAHTIN INDUSTRIES INC
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- AMECO INC
- RELAY ELECTRONIC LAB
- CCA ELECTRONICS
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- COLLINS RADIO CO
- EDISON ELECTRONIC CORP
- GATES RADIO CO
- LAMPXIN INC
- MCMAHTIN INDUSTRIES INC
- MICRO ASSOCIATE INC
- SINGER PROD CO INC
- WILKINSON ELECTRIC
- HEWLETT PACKARD

**Monitors, Modulation**
- CCA ELECTRONICS
- COLLINS RADIO CO
- COLLINS RADIO CO
- GATES RADIO CO
- KARG LAB INC
- MCMAHTIN INDUSTRIES INC
- METRON INSTRUMENTS INC
- MICRO-LINK DIV
- SINGER PROD CO INC
- WILKINSON ELECTRIC

**Monitors, Phase**
- GATES RADIO CO
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- SINGER PROD CO INC
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Further proof... sound has never been in better shape!

RE55 OMNIDIRECTIONAL DYNAMIC MICROPHONE

There are plenty of good, functional reasons behind the new look of Electro-Voice professional microphones. Reasons dramatically proved by the rapid success of the Model 635A and the RE15. Now we've added the RE55 to this handsome group.

The RE55, like its predecessor the 655C, is an extremely wide-range omnidirectional dynamic. And in most electrical particulars it is not greatly different. RE55 frequency response is a bit wider, and perhaps a trifle flatter. An impressive achievement when you consider that the 655C has been extensively used as a secondary frequency response standard. Output level is 2 db hotter, and the exclusive E-V Acoustalloy® diaphragm of the RE55 can provide undistorted output in sound fields so intense as to cause ear damage.

The biggest changes in the RE55 are mechanical. For this microphone is even more rugged than the 655... long known as one of the toughest in the business. There's a solid steel case and new, improved internal shock mounting for the RE55. Plus a satin nickel finish that looks great on TV long after most microphones have been scarred and scratched almost beyond recognition.

For convenience we've made the barrel of the RE55 just 3/4" in diameter. It fits modern 3/4" accessories. It also fits the hand (and its length makes the RE55 perfect for hand-held interviews). We also provide XLR-3 Cannon-type connectors to help you standardize your audio wiring. Detail refinements that make the RE55 more dependable, easier to use.

Finally, the RE55 has the exclusive Electro-Voice 2-year unconditional guarantee. No matter what happens, if an RE55 fails to perform during the first two years — for any reason — we'll repair it at no charge.

Try the Electro-Voice RE55 today. The more you listen, the better it looks!
Four reliable reasons why experienced broadcast engineers prefer Nems-Clarke equipment ... now available from DEI

In the broadcast industry, the quality, reliability, accuracy, and durability of Nems-Clarke equipment have earned it a reputation that is unique. DEI, now manufacturing and distributing this famous equipment, can assure you that it will continue to adhere to the same high standards that built this unmatched reputation.

Field Intensity Meter Model FIM-120E A compact, lightweight, portable instrument for measurements in the 540 to 1600 kHz range. Sensitivity range is from 10 uv per meter to 10 v per meter. Performance data includes a 540 to 1600 kHz frequency range and a 10 uv/m to 10 v/m intensity range. Power supplied by internal alkaline batteries, insures operation at 32°F and below and can be calibrated at any frequency at either high or low temperatures. Both linear and logarithmic indications permit use with recording equipment. Accuracy, linearity, and stability are vastly superior to any currently available solid state field intensity meter. Over 1,000 of these field-proven units are currently in use.

Field Intensity Meter Model FIM-107A (Test Set) Includes in one portable unit a radio receiver of laboratory quality with a metered output and an accurately calibrated signal generator. It covers a frequency range of 54 to 240 mHz without band changing. Operates from automobile batteries or standard 117 vac line. Performance data includes a 1.0 uv/m sensitivity. Signal generator output level is adjustable from 1 uv to o.l.v. A calibrated dipole provides 1.6 uv/m to 16 v/m field intensity measurements at 54 mHz.

Phase Monitor Model PM-112 This new solid-state unit replaces our model 108E and monitors phase and current relationships in directional AM arrays. Adaptable to remote control. Provision for switching of day-night reference levels can be provided. Performance data includes ±1 degree phase accuracy, 0.5 degree phase resolution and 2% repeatable current accuracy. Will monitor up to 9 towers. Outputs are available for a digital voltmeter to provide increased resolution. Well over 100 of these units are now in world-wide use.

Precision Phase Monitor Model PPM-101 This unit is designed for use with critical directional AM arrays where a high degree of resolution and stability is required. Provides both phase and current indications. Contains digital counter. Nuvisor and solid-state design. Repeatable phase accuracy is ±0.1 degree, phase resolution is 0.1 degree and repeatable current accuracy is within ±0.1%. Will monitor up to 12 towers.

For full specifications, spares or service for these and other DEI/Nems-Clarke equipment, call or write today.

Nems-Clarke Equipment: Recognized as the Standard in the Broadcast Industry for Years

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Circle Item 53 on Tech Data Card
Automaticlly maintains phase-lock on raster sync and color sub-carrier between master station and any number of remotes.

Rapidframe and Chromafix utilizing ultra high stability crystal or atomic frequency standards—maintain sync for any number of remotes over any distance on low-cost Telco circuits.

INSTANT SWITCHING WITH NO PICTURE DEGRADATION OR INTERRUPTIONS.

Raster sync is maintained within 100 nanoseconds; chroma phase error is held to less than ± 1.5 degrees between cameras.

For Data Sheet on the TRACOR/SULZER CHROMAFIX AND RAPIDFRAME, write:

Industrial Instruments Division
6500 Tracor Lane
Austin, Texas 78721

NEW FROM TRACOR: To rate your sync generator carrier oscillator/time base against NBS; use the 890A low cost VLF/LF phase tracking receiver.
Only Belar—by incorporating interchangeable crystals into its unique design—offers unlimited frequency selection with just one monitor. Why be locked in by single frequency monitors when Belar enables you to choose or change frequencies according to your own requirements! Here's how . . .

1. Select the one to four frequencies best suited to your application.
2. Plug in the appropriate crystals.
3. Monitor four channels by means of push button selection.
4. To test other frequencies or to change frequencies in the future, merely plug in new crystals.

- Peak flash indicator for SCA modulation.
- Narrow band monitoring for remote telemetering.
- Wide band monitoring for background music.
- All solid-state design.
- Measures SCA frequency.

WHY DELAY? ORDER TODAY FOR IMMEDIATE DELIVERY.
this rek-o-kut b-12 gh turntable is basically unchanged for nearly 10 years

and it works, and works, and works and works and works......

Take a look through control and audition rooms of the stations in your community and count the number of Rek-O-Kut turntables that keep going and going and going. Minimum maintenance, practically no repair. Faithful, reliable sound. Year after year after year. Ask those station engineers how long they've had Rek-O-Kut installed. You'll find some of those turntables have been around a long time.

Rek-O-Kut turntables are built to take it. They are simple in design and operation, strong in construction. If you have a Rek-O-Kut now, we'd hardly be able to sell you a replacement. But we'd like to sell you another!

**Specifications:**

**Speeds:** 33 1/3, 45, 78 rpm. **Noise Level:** —59db below 5 cm/sec average recorded level. **Motor:** custom-built computer type heavy-duty hysteresis synchronous motor. **45 RPM Hub:** instantaneously removable by hand. **Pilot Light:** neon light acts as an "on/off" indicator. **Finish:** grey and aluminum. **Deck Dimensions:** 14 x 15 1/2". **Minimum Dimensions:** (for cabinet installation) 17 1/4" w. x 16" d. x 3" above deck x 6 1/4" below. **Price:** B-12 GH Turntable $124.95. S-320 Tonearm $44.95. Optional BH Base for audition room $18.95.

rek-o-kut turntables by Koss

Koss Electronics Inc.,
2227 N. 31st Street, Milwaukee, Wis. 53208
Export: Koss Electronics S.R.L.
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Circle Item 56 on Tech Data Card

January, 1969
Attention TV Stations:

We’ve got news for you!

FILMLINE’S professional color film processors now available for TV NEWS

The FILMLINE Models FE-30 and FE-50 are exciting new color film processors designed specifically for use in television station news departments. The design is backed by Filmline’s reputation as the world’s leading manufacturer of professional film processors for the commercial motion picture laboratory industry.

Now for the first time the television industry can enjoy the benefits of professional caliber equipment incorporating exclusive FILMLINE features that have paced the state-of-the-art in commercial laboratories, at a cost lower than processors offering less.

After you check these exclusive Filmline features you’ll want to install a Filmline processor in your news department NOW!

**"FILMLINE OVERDRIVE FILM TRANSPORT SYSTEM"**
This marvel of engineering completely eliminates film breakage, pulled perforations, scratches and operator error. The film can be deliberately stalled in the machine without film breakage or significant change of film footage in solutions. The heart of any film processor is the drive system. No other film drive system such as sprocket drive, bottom drive or simple clutch drives with floating lower assemblies can give you the performance capability of the FILMLINE Overdrive Film Transport System.

**"TORQUE MOTOR TAKE-UP"** gives you constant film take-up and does not impose any stress or strain on the film itself. Completely independent of the film transport system. This FILMLINE feature is usually found in professional commercial processors but is incorporated on the FE-30 and FE-50 models as standard equipment. Don’t settle for less!

**"TEMP-GUARD"** positive temperature control system. Completely transistorized circuitry insures temperature control to well within processing tolerances. Temp-Guard controls temperatures accurately and without the problems of other systems of lesser sophistication.

**"TURBO-FLOW"** impingement dryer. Shortens dry-to-dry time, improves film results, and carefully controls humidity content of your valuable (and sometimes rare) originals. Immediate projection capability is assured because the film dries flat without the usual curl associated with other film processors.

**"ZERO DOWN TIME"** The reputation of any film processor is only as good as its reliability. The combination of the exclusive and special added Filmline features guarantees trouble-free operation with absolute minimum down-time and without continual operator adjustments. Recapture your original investment in 2 years on maintenance savings alone. Filmline’s “Push the button and walk-away processing” allows inexperienced operators to turn out highest quality film.

**"MATERIALS, CONSTRUCTION AND DESIGN"** All FILMLINE machines are constructed entirely of metal and tanks are type 316 stainless steel. Heliarc welded to government specifications. The finest components available are used and rigid quality control standards are maintained. Compare Filmline features to other processors costing more money. Feature-by-feature, a careful evaluation will convince you that Filmline offers you more for your investment.

Additional Features included in price of machine (Not as extras).

- Magazine load, daylight operation
- Feed-in time delay elevator (completely accessible)
- Red brass bleach tank, shafts, etc.
- Prehardened solution filler
- Precision Filmline Venturi air squgee prior to drybox entry
- Air vent on prehardener
- Solid state variable speed D.C.
- Drive main motor
- Bottom drains and valves on all tanks
- Extended development time up to two additional camera stops at 50 FPM
- Pump recirculation of all solutions through spray bars
- Temperature is sensed in the recirculation line
- All solutions temperature controlled, no chilled water required
- Built-in air compressor

Captive bottom assemblies assure you constant footage in each solution. Change over from standard developing to extended developing can be accomplished in a matter of seconds. Impingement dryer allows shorter put through time.

Partial listing of Filmline Color Installations:—NBC—New York. NBC-Washington, NBC—Cleveland, NBC—Chicago, CBS & ABC Networks, Eastman Kodak, Rochester. Laboratories: De Luxe Labs, General Film Labs (Hollywood), Pathe Labs, Precision Labs, Mecca Labs, Color Co. Service, Capital Film Labs, Byron Film Labs, MDM, Movie Lab, Lab-TV, Technical Film Labs, Telecolor Film Labs, Guffanti Film Labs, A-One Labs, All Service Labs, NASA Cape Kennedy, Ford Motion Picture Labs.

TV Stations: WAPI-TV, KVTV-TV, WXYZ-TV, WPTA-TV, WBTY-TV, WNET-TV, WMAL-TV, WSTR-TV, WDBU-TV, WRTV-TV, WTOP-TV, WAVY-TV, KSTAR-TV, WTVR-TV, WRC-TV, WMAR-TV, WCKTV-TV, WAVE-TV, WCCH-TV, WPBF-TV, WJET-TV, WJW-TV, KGTV-TV, KEFV-TV, WNBQ-TV, KSLA-TV, WSAR-TV, WHP-TV, WHTC-TV, WHTD-TV.

"When you buy quality Filmline Costs Less"

Circle Item 57 on Tech Data Card
"The tracking was excellent and distinctly better in this respect than any other cartridge we have tested....The frequency response of the Stanton 681EE was the flattest of the cartridges tested, within ±1 dB over most of the audio range."

From the laboratory tests of eleven cartridges, conducted by Julian D. Hirsch and Gladden B. Houck, as reported in HiFi/Stereo Review, July, 1968.

To anyone not familiar with the Stanton 681, this might seem to be an extraordinary statement. But to anyone else, such as professional engineers, these results simply confirm what they already know.

Your own 681 will perform exactly the same as the one tested by Hirsch-Houck. That is a guarantee. Every 681 is tested and measured against the laboratory standard for frequency response, channel separation, output, etc. The results are written by hand on the specifications enclosed with every 681.

You don’t have to be a professional to hear the difference a Stanton 681 will make in your system, especially with the “Longhair” brush that provides the clean grooves so essential for flawless tracking and clear reproduction.

The 681EE, with elliptical stylus, is $60.00. The 681T, at $75.00, includes both an elliptical stylus (for your records) and an interchangeable conical stylus (for anyone else’s records). For free literature, write to Stanton Magnetics, Inc., Plainview, L.I., N.Y.
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January 1969
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During the 1964 National Association of Broadcasters convention, the Society's first general meeting was held. And it was at this meeting that the name was changed to the Society of Broadcast Engineers. One year later the Society was incorporated in Washington, D.C. as a nonprofit organization.

Since its beginning, the SBE objectives have been to: provide a forum for the exchange of professional discussion of mutual broadcast engineering problems; to provide for and maintain professional recognition of members; to group together broadcast engineers generally in a body to assist in the professional education, and to raise the technical standards of the broadcast engineers and to advance the broadcast technician and the novice; and to encourage a continuing interest in the broadcast engineering field by students of technical and engineering courses on broadcasting.

Membership
The grades of membership are: Student, Associate, Member, Senior Member, and Fellow. Qualifications for Member grade are at last a first class radio telephone license or equivalent and adequate experience. Detailed requirements for all grades of membership are included in the "Constitution and By-Laws," sent to all accepted members.

The cost of membership is $10, and this includes a subscription to The Journal of the Society of Broadcast Engineers.

Further information on the Society of Broadcast Engineers may be obtained by writing to: The Society of Broadcast Engineers, Inc., Box 1124, Binghamton, N.Y.

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January, 1969

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The SMPTE is a non-profit organization concerned with the engineering aspects of motion pictures, television, instrumentation, high-speed photography and the allied arts and sciences.

The objectives of the society are to provide an organization and a climate in which persons of like interests can meet, exchange ideas, and present technical papers for the advancement of, and education within, the sphere of interest of the society.

The SMPTE also provides a technical publication for the presentation of technical papers and for the maintenance of a record of progress. The organization also seeks to foster the advancement of engineering technology and to sponsor lectures, exhibitions and conferences designed to advance the theory and practice of engineering within the scope of the society.

The monthly Journal of the SMPTE is sent to all members. It contains technical articles, product information and industry news keyed to the interest of the members. Journal papers of special interest are reprinted and made available from Society headquarters.

The Journal subject matter of interest to broadcast engineers ranges over the following subject areas: Acoustics, cameras, color, lighting, sound recordings, sound TV equipment, closed circuit TV, TV recording and video tape.

Engineering committees are established to study and develop information relating to current technological problems, to define terminology, to develop standards and to recommend practices. These committees include: Color, Film Dimensions, Film Projection Practice, Instrumentation and High-Speed Photography, Sound, Television, Video Tape Recording, Television Lighting and the Standards Committee.

The Ryerson Polytechnical Institute, Toronto, Canada, will be the site of the Winter Television Conference sponsored by the Society of Motion Picture and Television Engineers, January 17-18. According to Program Chairman Harold Wright, R.R. 2, Gormley, Ont., Canada, the Conference will center on the problem areas of Color Television Broadcasting and will be broadly based, taking into consideration recent developments in techniques and equipment. Eighteen invited papers plus five panel discussions will make up the Conference Program.

Panelists will discuss five major topics in an attempt to get at basic problems that trouble broadcasters. Questions submitted to the Program Chairman will be answered by each of the panels. “Lighting,” will be evaluated by a group of lighting directors, moderated by E. Carleton Winckler of CBS. “Problems in the Application of Video-Tape Recording to Broadcasting,” are to be debated by a panel of Video-tape users and members of the SMPTE Video-Tape Recording Committee, Fred W. Remley, University of Michigan TV Center, moderator.

“Transmitters and Transmission,” will be discussed on Saturday morning by a panel of five. “Receivers,” will be described by a panel with Don Harrold, Electrohome Ltd., as moderator. “Film and Telecine,” will be moderated by Stanley F. Quinn, Canadian Broadcasting Corp., with panelists, K. Blair Benson, CBS, D. H. McRae, Canadian Broadcasting Corp., Gerow Brill, CBS, Lloyd Harrop, Canadian Broadcasting Corp., Daan Zwick, Eastman Kodak Co., and LeRoy DeMarsh, Eastman Kodak Co.

There will be two luncheons: the first, a Get-Together Luncheon; on Saturday, the Annual Television Luncheon will feature Roy Cahoon,
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the Chief Engineer of the Canadian Broadcasting Corp., as guest speaker.

Active personal membership in the SMPTE is open to qualified individuals upon application approved by the admissions committee.

Active members must qualify by a minimum age of 18; interest in the study of technical and engineering aspects of the art. Qualifications include: minimum age, 18; interest in the study of the technology of the motion picture, television, or related arts and sciences. Applicants must have as a sponsor one member or two individuals from motion picture or television industries as references. The dues are $15.00 per year.

Grade of Student is open to qualified persons, subject to admissions committee approval. Qualifications entail registration for at least a half-time program as a student in a college or university or other recognized educational institution who shows interest in the study of the technology of motion pictures, television, or allied arts and sciences. The applicant must be sponsored by one SMPTE member or reference from a staff member of the applicant's college department not necessarily a member of the Society.

The degree or grade of Fellow is made by selection of the Society. Qualified individuals with a minimum age of 30 are chosen from the Active grade who have demonstrated proficiency in and have contributed significantly to the field, attaining an outstanding rank among engineers or executives in motion pictures, television, or related industries. Approval is passed by the Board of Governors, based upon recommendation of Fellow Membership Committee. Dues are $20.00 per year.

Life membership is open to qualified Active and Fellow members upon written application approved by the Executive Committee. The applicant must be of a minimum age of 65 and is chosen from the ranks of Active or Fellow members who have retired from active business life; have been an Active or Fellow for a total of 20 years; and who have at least 5 years continuous Active or Fellow membership immediately prior to application. Qualified applicants holding the grade of Fellow will be named as Life Fellows. Qualified Active members will become Life Members. There are no dues for this category.

Honorary membership is by selection, and an individual qualifies who has performed eminent service in the advancement of engineering in motion pictures, television or allied arts and sciences. Recommendation must be made by the Honorary Membership Committee and approved by the Board of Governors.

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Madison, Wis. 53703

Association on Broadcasting Standards Inc.
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Audio Engineering Society
60 East 42nd Street
New York, N.Y. 10017

Broadcasters Foundation
589 5th Avenue
New York, N.Y. 10017

Broadcasting Foundation of America
Suite 1810
52 Vanderbilt Avenue
New York, N.Y.

Canadian Association of Broadcasters
P.O. Box 627
Station "B"
Ottawa, Ontario, Canada

Catholic Broadcasters Association
405 Lexington Avenue
Room 450
New York, N.Y. 10017

Community Broadcasters Association
3219 West State Road
Olean, N.Y. 14760

Educational Communication Association
1319 F Street, N.W.
Room 1011
Washington, D.C. 20004

Institute of Electrical and Electronics Engineers Inc.
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New York, N.Y. 10017

Intercollegiate Broadcasting System Inc.
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International Broadcasters Society
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New York, N.Y. 10017

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January, 1969
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January, 1969
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