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May, 1975/75 cents

NAB highlights

page 18

NAB video roundup

Digital tape timing

Parallel FM transmitters

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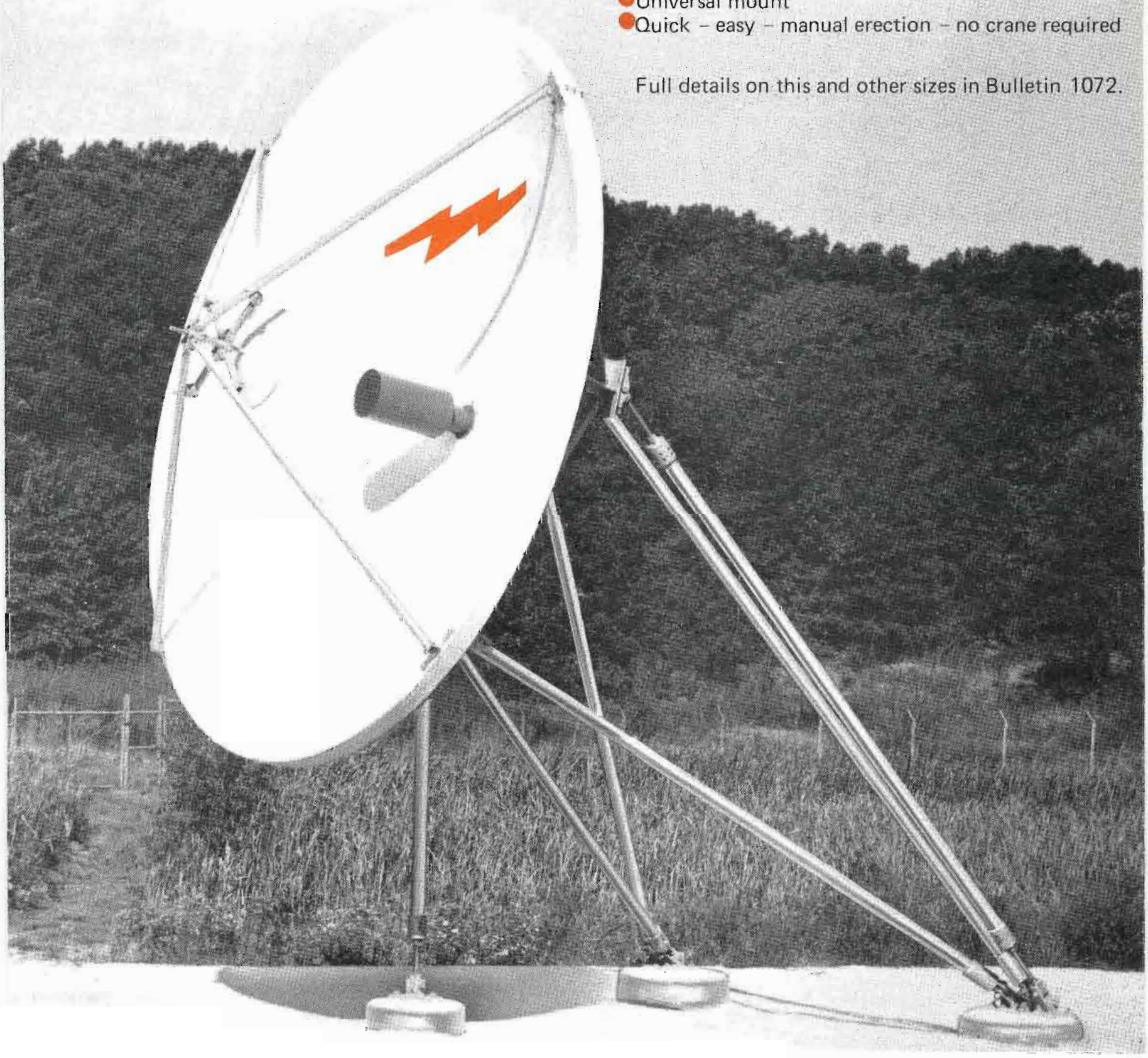

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BROADCAST ENGINEERING®

The journal of the broadcast-communications industry

May, 1975 Volume 17, No. 5

About the cover

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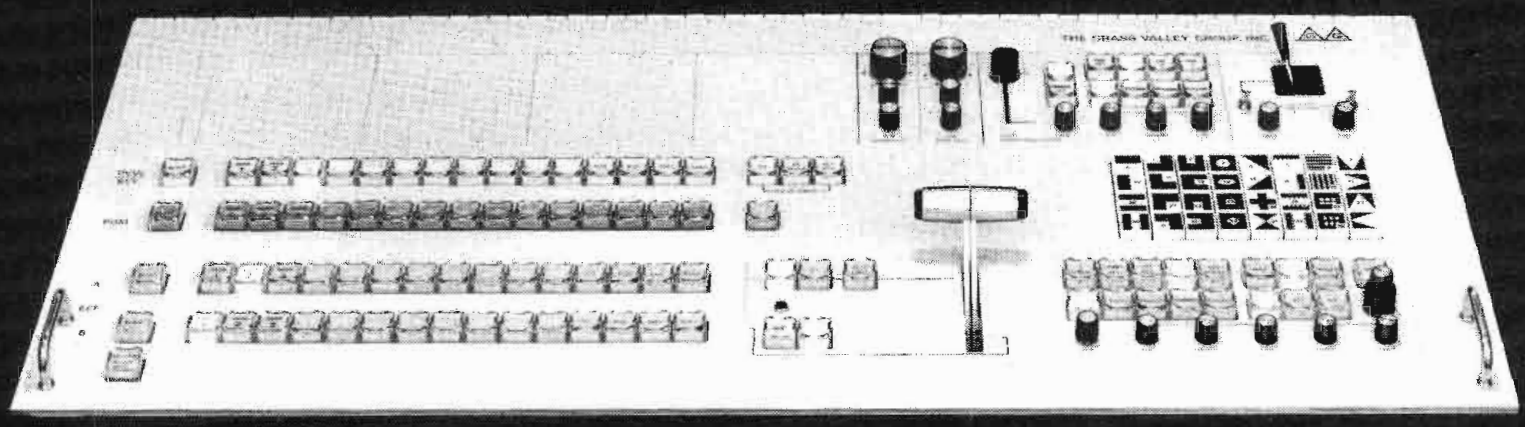

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May, 1975/By Howard T. Head and Harold L. Kassens

Inquiry Set on VHF "Drop-Ins"

The Commission has announced an inquiry into the feasibility of dropping in a substantial number of new VHF TV channels in the top 100 markets. The inquiry was instituted in response to a petition by the United Churches of Christ, based on studies by the White House Office of Tele-communications Policy (OTP) indicating that it would be technically feasible to add some 80 VHF assignments in the top 100 markets (see April 1974 B.E.).

Previous studies by the Commission and by industry trade associations cast a serious doubt on the technical feasibility of adding the additional VHF channels without serious interference consequences. The Commission has stressed that new channel assignments must provide technically and financially sound outlets. In its inquiry, the Commission has invited comments on the technical feasibility of the use of directional antennas and precise carrier offset. Comments are also invited on the impact of VHF dropins on further development of the UHF.

Cable Non-Duplication Rules Revised

The Commission has made major changes in its cable television network program exclusivity or non-duplication rules. The general effect of the revision is to provide greater flexibility for cable systems, especially in smaller markets.

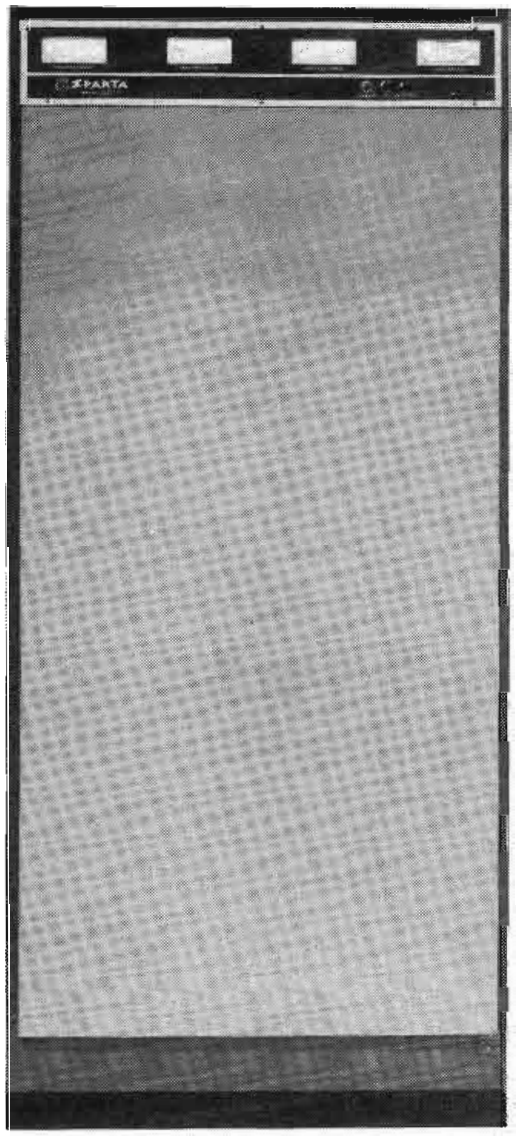
The previous rules provided a series of non-duplication priorities based on the location of the cable system's community within the principal city, Grade A and Grade B contours of the television broadcast station. The new rules abandon the contour concept, and substitute instead the concept of a specified zone of protection. This zone extends to 35 miles for television stations licensed to major markets, and to 55 miles for television stations licensed to smaller markets.

Smaller cable systems will be exempted from the new rules. Any system which serves fewer than 1000 subscribers from its head end will be exempted from the non-duplication rules, compared with a previous exemption for systems serving fewer than 500 subscribers.

(Continued on page 6)

"Nothing astonishes men...

so much as common sense and plain dealing", wrote Ralph Waldo Emerson. We'll settle for impressing our common sense on you with a few features of the Sparta Model 701B. Plain facts, more than anything astonishing, always explain better why Sparta broadcast equipment should be compared to that of other makers before you arrive at a buying decision.



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(*Continued from page 4*)

Commission Investigates Automatic Broadcast Station Transmission Systems

The Commission, with a Notice of Inquiry, has set the machinery in motion to permit the use of automatic transmission systems at AM, FM, and TV broadcast stations. The Inquiry is the culmination of industry efforts dating back to 1968.

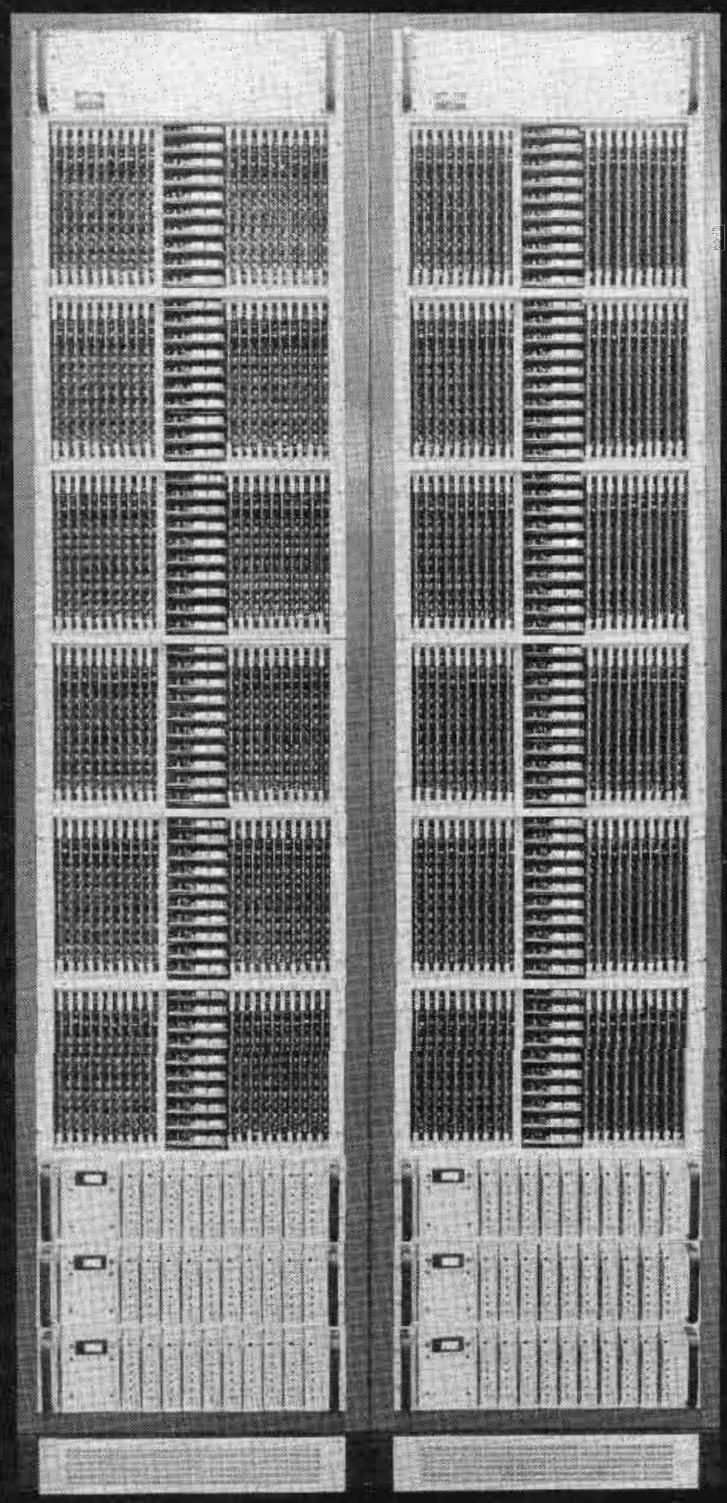
The Commission's Inquiry covers a wide range of topics, many of which have been addressed in previous studies. These include the automatic recording of parameters, the control of power and modulation levels, the extent to which AM directional antennas might be operated automatically, and compliance with EBS requirements.

Considering the breadth of the Commission's Inquiry, action on the proposal, favorable or otherwise, is likely to encounter substantial delays.

Short Circuits:

The Commission has ruled that FM broadcast stations cannot be held responsible for situations where interference to TV reception is caused by the generation of FM harmonics in TV receivers...The National Association of FM Broadcasters (NAFMB) has petitioned the Commission to prohibit cable systems from carrying aural entertainment programs...A cable system in New York State has filed suit charging illegal "pirating" of its pay-TV programs...The Commission has proposed a new simplified form for AM and FM license renewals...The Commission has declined to issue type approval for an inexpensive wireless microphone kit operating in the FM broadcast band...The Commission has given a short-term license renewal to an AM station charged with broadcasting unsubstantiated weather reports; promoting a lottery; conducting a contest which disrupted traffic; operating without a licensed operator; and failing to properly supervise operations. Shucks--nobody's perfect....

While there were a few manufacturers making sales at the New Orleans version of the NCTA national convention, the show as a whole was far off on attendance. At times the exhibit area looked more like only salesmen were attending. NAB convention, as this issue reports, was quite the opposite. At least three companies are now ready to supply versions of the newly required EBS equipment that should make a lot more sense than what's in use in many stations today....On latest list of FCC citations, logging continues to lead the pack...watch for BE to cover in more detail....



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Remote rules streamlined

Remotes And Land Mobile Demands

The NAB has commended the Federal Communications Commission for proposing to streamline some of its rules on broadcasting's remote operations and has urged it to move ahead to simplify the rest.

At the same time, it objected to efforts by the American Petroleum Institute and other land mobile services to share in frequencies now allocated exclusively to broadcasting for such essential services as remote coverage of local news, sports events and public service programming.

In comments filed with the FCC, the Association said the Commission's proposal for simpler regulations for remote station pickups was a "first step in...streamlining the rules" and recommended that similar action be taken on inter-city relays, auxiliary TV and other types of remote broadcasts.

The marked expansion of news, sports and public service programming, coupled with mobile, handheld cameras, it said, has resulted in increased on-the-scene coverage requiring high-quality interconnections between remote sites and the main studio.

NAB commended FCC for modifying its pickup rules, including elimination of a requirement that remote pickups be under the supervision of a licensed operator, saying such changes were "long overdue."

Part 73 changes

As a result of the continuing study by its Task Force on reregulation of broadcasting, the Commission has revised, deleted and relaxed certain provisions of Parts 1 and 73 of its rules.

The rule changes concern auxiliary and alternate main transmitters, and defective antenna (phase) monitors.

Auxiliary and alternate main transmitters:

Licensees who retain old transmitters for auxiliary or alternate main purposes after installing a new main transmitter, no longer need file an application or pay a filing fee for such use. Instead they must notify the FCC and the Engineer in Charge of the district in which their station is located within three days after the former main transmitter is ready for auxiliary or alternate main use.

Defective antenna (phase) monitors:

Paragraph (c) to Section 73.69 was amended to state that if conditions beyond the control of the licensee prevent restoration of the monitor within the allowed 60 days, an informal request must be made with the Engineer in Charge for such additional time as may be required for completion of repairs.

Certain editorial changes were made with respect to television booster station applications, filing of contracts with chief operators and other engineering personnel, station identification rules, and remote control operation rules for television stations.

The changes become effective May 9, 1975.

Zoom in!

You may ask what Fairbanks, Alaska has in common with Houston, Texas...the answer is local representation of the American Society of TV Cameramen. Right! Thanks to the columns of **Broadcast Engineering,** the word is getting around and applications are coming in from points as diverse as Alaska, Texas, Florida, Washington (state & D.C.) , etc, etc, etc....Keep sending them in.

TAKE 2!

While applicants from the areas mentioned above are considering steps to form local ASTVC chapters, our readers will be happy to learn that our first chapter (outside of the NY metropolitan area) is almost ready to receive its charter from the national office. And this institution, which has produced many leaders, is a leader itself with the formation of this first chapter. We refer to West Point, the home of the U.S. Military Academy.

Briefly, the story is this: Some years ago, the Instructional Support Division of the Academy set-up a CCTV net for the purpose of training implementation and information, for the cadets and other designated personnel. More recently, the system "went color" with an ultra-modern system that can hold its own with any of the commercial outfits around the country.

TAKE 3! (EJ...Growing Pains Really Hurt!)

March 1st was the approximate date and "Jurisdictional Dispute" is the approximate issue. This date saw several of our fellow ASTVC members, working at WOR-TV (NYC) become involved in what may prove to be one of the first, and most unique, **labor disputes** centering on the **labor pains** and "birth" of electronic journalism.... (LIVE Journalism).

Go To Black!....

American Society of TV Cameramen, Robert Zweck, Box 1189, Radio City Station, New York, N.Y. 10019.

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Plans underway for SMPTE conference

The 117th Technical Conference and Equipment Exhibit of the Society of Motion Picture and Television Engineers (SMPTE) will be held at the Century Plaza Hotel in Los Angeles, Sept. 28 to Oct. 3.

1975 marks the first year in which the SMPTE will hold only one Conference instead of two. The SMPTE recently adopted a new policy calling for annual instead of semiannual conferences in recognition of the rising costs to exhibitors and other participants attending the conferences.

SMPTE Editorial Vice President Gerald G. Graham, National Film Board of Canada, and Conference Vice President Harry Teitelbaum, Hollywood Film Co., jointly announced appointments of key chairmen for the 117th Conference. Julian Hopkinson, Agfa-Gevaert, was named Program Chairman; Robert Gustafson, Consolidated Film Industries was named Local Arrangements Chairman; and Warren Strang, Hollywood Film Co., was named Exhibit Chairman.

Hopkinson said he expects the Conference technical program to be one of the largest and most comprehensive in SMPTE history. Concurrent sessions will be the rule rather than the exception. Hopkinson also said that he expects a program of 160 papers on all areas of motion picture and television technology. The program will include, for the first time, a special "mini-conference" session for students and technicians on all subjects covered at the Conference as a whole.

Gustafson, as Local Arrangements Chairman, is putting together his committee to handle the details of Conference planning, from sound recording and projection, to the luncheon and banquet, to the ladies program.

According to Warren Strang, the new Exhibit Chairman, the 117th Exhibit will be the biggest SMPTE show in recent years, possibly the biggest ever.

For information on the SMPTE Conference and Exhibit, write to SMPTE Conference, 862 Scarsdale Ave., Scarsdale, N.Y. 10583.

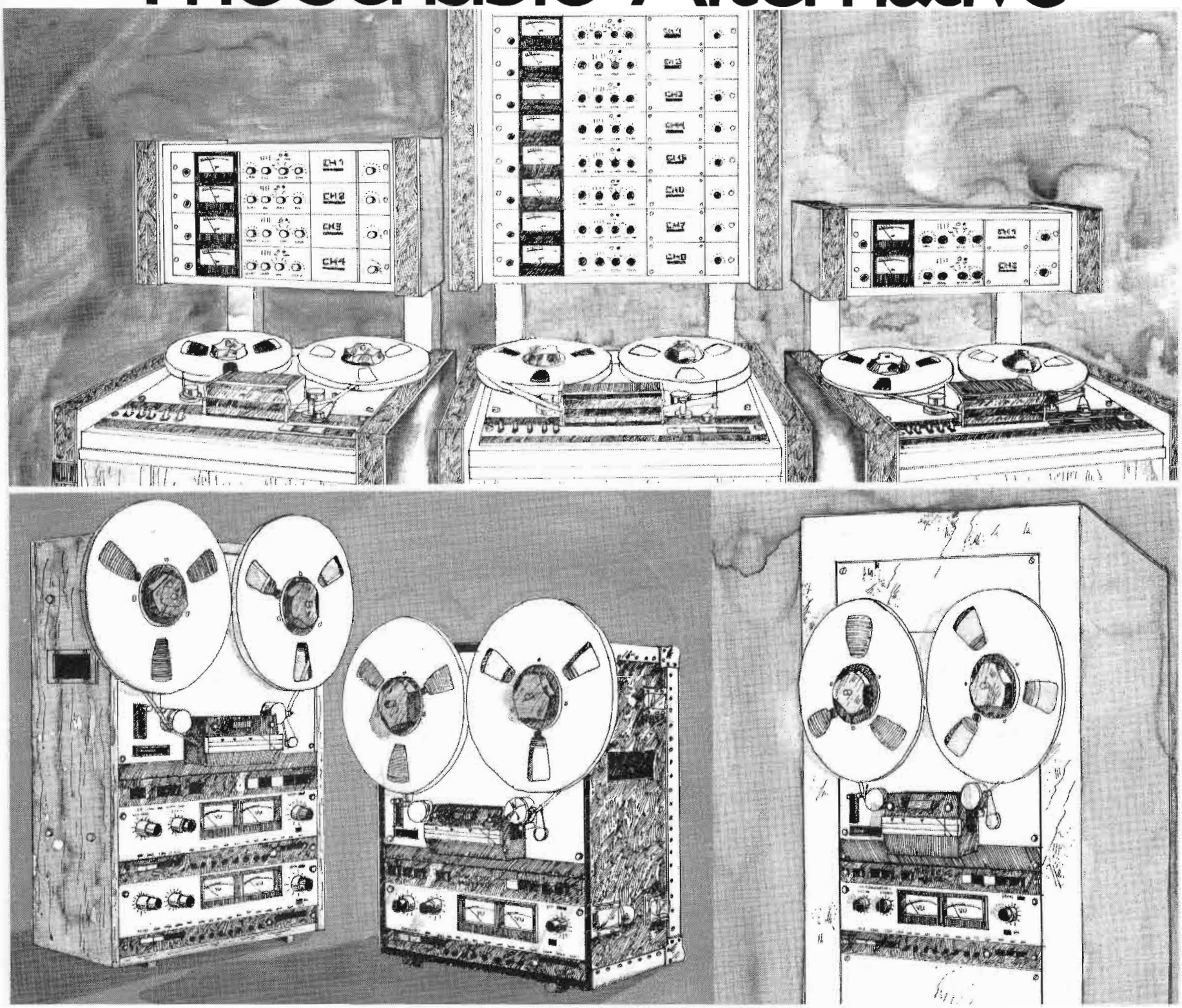
NAB wants longer 3rd class ticket license period

The National Association of Broadcasters has petitioned the Federal Communications Commission to extend its provisional third class operator license from one to three years.

In addition, it was requested that outstanding certificates be extended to three years from the date of issuance.

NAB said the extensions are needed because of the "increased complexity of the present examination, the shortcomings of the government published study guide and the difficulties faced by the provisional license holder in obtaining a regular five year license within the allotted one-year period."

The Sensible Alternative



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Certification explained at NAB

SBE's Certification Workshop, held April 8 in Las Vegas, drew capacity attendance despite the 8 a.m. starting hour. Jim Wulliman and John Wilner outlined the newly adopted certification standards, and these will be detailed in the June issue of SBE's new bi-monthly newsletter, **The Signal.**

All members are, of course, intended to be included in the newsletter mailing, and anyone who did not receive the April issue is urged to contact Virginia Doss, Assistant Secretary, SBE, P.O. Box 88132, Indianapolis, Indiana 46202, in order that she may update her records to include any members who may have been overlooked. It is further hoped that response to **The Signal's** maiden-issue questionnaire will continue to provide constructive input to Jeanne Smith at the Editorial Office in Washington, so that she can produce an effective communication vehicle which will benefit all members, new as well as old.

Officers elected for 1975-76

Let us introduce Glenn Lahman, the newly elected president of SBE. As engineering manager for KDKA/KDKA-TV and Group W Productions in Pittsburgh, he spends his time supervising the technical operation of the stations, the Group W Productions' tape duplication center, and the physical plants.

Before joining Group W, he worked at radio stations in Ohio and Upper Michigan. Lahman joined Group W in 1957 when WAAM(TV) Baltimore, Maryland (now WJZ-TV) was acquired and worked there as chief engineer until 1965 when he was transferred to WBZ-TV, Boston, as chief engineer. He made a brief stop in Philadelphia where he supervised the building of the Mike Douglas studios at KYW-TV.

In 1967, Lahman transferred to Pittsburgh where he currently holds the position of engineering manager.

Mr. Lahman graduated from Valparaiso Technical Institute following World War II, having previously attended Ohio Northern University and the Dodge Radio Institute. His war service was spent at various installations in Europe, where he reached the rank of Master Sergeant of Communications, Second Armored Division.

Recently as executive vice president of SBE, he participated on the certification committee and in past years he also served as president of Pittsburgh's Chapter 20 of the Society of Broadcast Engineers, Secretary of the Boston Section of the SMPTE, and various other civic groups.

He is married to the former Jeanne Carré of Baltimore, Maryland, and has two daughters, Ellen, 23, USN nurse, and Paige, 16.

Eugene Hill, Oakland, California is the Executive Vice President, and James Hurley of Allison Park, Pa., is the Secretary/Treasurer.

For 1975-76 the SBE Board will include: Larry Taylor, New York; Bob Jones, Illinois; Ed Herlihy, California; Charles Morgan, Pennsylvania; James Grinnell, Illinois; Ed Karl, New York; John Lyons, New York; William Orr, Ohio; H. J. "Bart" Paine, Arizona; Robert Wehrman, Pennsylvania; Al Chismark, New York; and Jim Wulliman, Wisconsin.

Chapter reports

Chapter 1: Binghamton, New York
Chairman: Bill Sitzman, Jr.
Tyrone, New York 14887

Chapter 1's March meeting, held on the 11th, heard guest speaker Mr. Gino Ricciardelli, chief engineer for WTCZ-TV in Binghamton. His presentation, "Remote Control of Television Transmitters," included a discussion of procedures for installing and maintaining such systems with minimum trouble.

Chapter 9: Phoenix, Arizona
Chairman: Leon Anglin
Phoenix, Arizona 85001

In February, Phoenix's Chapter 9 met to hear Mr. Tom O'Hara speak on "IF Modulation and Dual Television Transmitters." During the business meeting, the chapter discussed sending a consensus letter to SBE National to voice its views on the organization and possible ways to improve it.

March's meeting scheduled a talk by Mr. Bill Montgomery of the Tektronix Company on their new 1480 Monitor and other equipment. Mr. Montgomery is also secretary/treasurer for the newly recognized chapter in San Diego.

Chapter 15: New York, New York
Chairman: John Lyons
Woodside, New York 11377

Chapter 15's March meeting, a tour of New York's Mastertone Recording Studios, provided a chance to see the process of pressing a record from master tape to vinyl. Sid Feldman, chief engineer for Mastertone (and member of Chapter 15) gave a guided tour and was on hand with a group of recording personnel to answer questions.

April's meeting, delayed one week due to the NAB Convention, featured speaker Mr. Bill McAll of Vital Industries, who spoke on "Television: What Is In the Future?"

May's meeting offers yet another tour—this time at Metromedia's WNEW-TV studio. This session will provide an opportunity to learn about the new facility and to talk to representatives from the manufacturing companies about the installation of the system.

Chapter 16: Seattle, Washington
Chairman: Harry Lewis
Seattle, Washington 98125

Seattle's March chapter meeting was a luncheon at the Norselander Restaurant with guest speaker Bill Patterson of Tektronix. His discussion/demonstration focused on two new pieces of their equipment, the spectrum analyzer and the T.D.R.

Chapter 17: Minneapolis-St. Paul, Minnesota
Joel Clark Humke, Program Committee
Minneapolis-St. Paul, Minnesota 55114

Chapter 17 held its 1975 reorganizational meeting on March 20th at the Minnesota Mining and Manufacturing Complex in St. Paul. Andrew Persoon, Richard Elliot and Daniel Cunningham, three top technical experts from 3M gave an excellent presentation on 3M research and the manufacture of audio and video tape. Refreshments for the meeting were generously provided by 3M.

Chapter 22: Central New York
Chairman: Mort Miller
Syracuse, New York 13214

Chapter 22, another group involved this month with remote-control television transmitters, held their meeting at WCNY-TV. Tektronix representatives Barry Enders and Phil Sambol demonstrated sideband and spectrum analysis using Tektronix equipment. Off-air signals were provided by WCNY.

The April meeting reviewed new developments in audio cartridge tapes and consoles which were presented at the April NAB Convention.

(Continued from page 13)

Chapter 20: Pittsburgh, Pennsylvania
Chairman: Jim Hurley
Allison Park, Pennsylvania 15101

Chapter 20's March meeting reviewed chapter business. Topics of discussion were: following up on their membership drive, making preliminary plans for the Fall regional convention, and bringing membership files up-to-date.

Chapter 26: Chicago, Illinois
Chairman: Bob Churchill
Chicago, Illinois 60601

The Chicago chapter met on March 25th, hosted by the Standard Oil Company of Indiana. Mr. Ray Lichter and the engineering staff of Rich Engineering provided an opportunity for the group to learn about the installation of the MATV system in the second tallest building in Chicago, the Standard Oil Building.

On May 13th, the Chicago chapter and Chapter 28, Milwaukee, will hold a joint meeting at the new satellite station of the Western Union "WESTAR" in Lake Geneva, Wisconsin. Terrestrial service will be supplied by Midwestern Relay Company which provides microwave interconnection in the upper Midwest for the networks, cable companies, TVN, etc. Further details are available from either chapter.

Plans are also underway to hold a regional convention of the SBE in the Chicago area sometime later this year.

Chapter 28: Milwaukee, Wisconsin
Chairman: Bob Truscott
Milwaukee, Wisconsin 53209

Chapter 28 of Milwaukee met on March 11th at the WTMJ Auditorium. Guest speakers were Mr. Paul Rostan and Mr. Steve Detch, both of Roscor, Inc., speaking on "Electronic Journalism." The display of Ikegami minicameras, field recorders, time base correctors, and other hardware, provided an opportunity for everyone to inspect and operate some of these pieces.

Washington Metropolitan/Virginia Area Chapter
Chairman: Charles F. Riley
Alexandria, Virginia 22314

March 10th was the date of the second organizational meeting for the newly formed Washington, D.C./ Alexandria, Virginia chapter. The evening was conducted by Mr. Dennis Chamberlin of Tektronix, who reported on the new 1440 field corrector.

Best of luck to this group who only needs to hold one more meeting to become a certified local chapter.

NOTE: We would like to up-date an address that appeared in the March issue under "New SBE Chapters In the Making." The Thousand Oaks listing should now read: Mr. Paul Lee, President, P. H. Lee Associates, Inc., P.O. Box 1575, Thousand Oaks, California 91360.

Chapter 32: Southern Arizona
Chairman: H. J. "Bart" Paine
Tucson, Arizona 85717

Chapter 32's March meeting was held at the Sierra Vista Cable TV Studios in Sierra Vista. The program offered a tour of the facility by Mr. James Young, chief engineer, KTAN Radio, cable end and local origination studio.

April's meeting introduced Mr. Charles Martin of IVC who spoke on the back-space editor.

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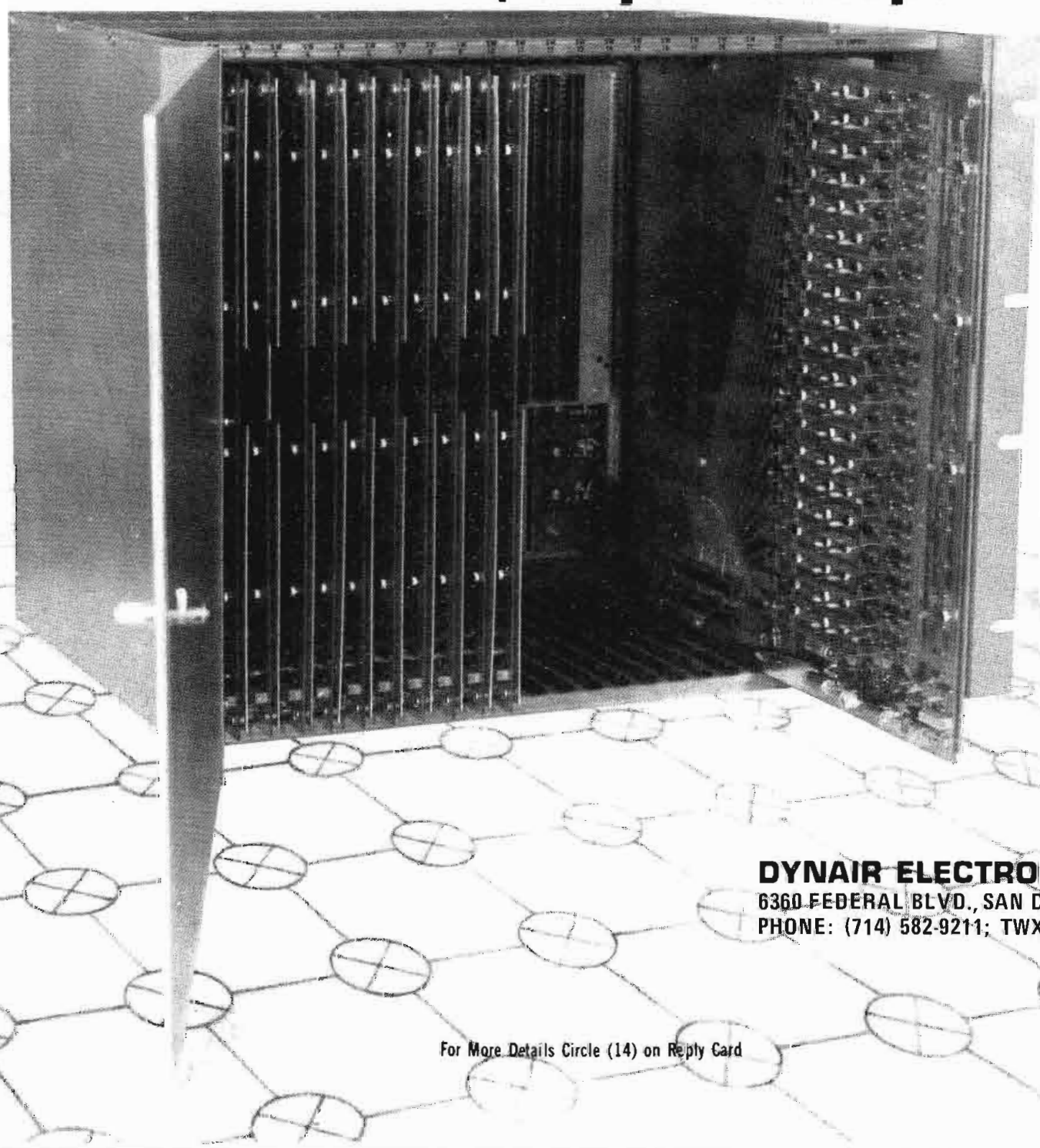

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For More Details Circle (14) on Reply Card

May, 1975

CABLE ENGINEERING

in this issue...

Junction City TV Wins Cablecasting Award

Tim Shuey, director of programming of Junction City Television, Inc., Junction City, Kansas, has received the 1975 Political Cablecasting Award of the National Cable Television Association. The award, established last year, is given for "initiative, enhancement of the concept of political cablecasting, organization and involvement of cablecasting in all levels of the political process."

The NCTA Award was given to Shuey in recognition of his work in the coordination, production and distribution of the Kansas Cable Television Association's political programming. NCTA President David Foster presented the Political Cablecasting Award plaque to Shuey at the NCTA convention luncheon in New Orleans.

Shuey helped develop the Kansas political cablecasting service last year with the distribution of a monthly video program: "Senator James B. Pearson Reports to Kansas." Through a statewide political cablecasting network the program is distributed to 18 cable systems in Kansas.

The success of the Pearson "Reports" led to production of similar programming by Gov. Bob Bennett.

Shuey also helped develop and produce a series of cablecasts to acquaint Kansas voters with the candidates during the 1974 primary and general elections. Gov. Bennett, Senator Bob Dole and Rep. Martha Keys as well as candidates for Lieutenant Governor, Attorney General and other offices appeared on the syndicated programs.

Shuey also produced and distributed a "Know the Issues" program which focused on five amendments to the state constitution.

Shuey's programs were produced using facilities and staff of Communications Services Inc., a CATV group owner which operates Junction City Television.

Three Honorable Mention Awards were also given today for political cablecasting. The recipients were:

Antietam Cable Television, Hagerstown, Maryland; Robert M. Zitter, manager. Programs on pre-election coverage of political candidates.

Montana Cable Television Association, Donald Johnson, president. Legislative coverage of the State Capitol during 1974.

CLEAR-TV, Jamestown, North Dakota; Roy A. Sheppard, system assistant manager and Christine Sheppard, program director. "Meet Your Candidates" interviews with political hopefuls.

For Latest News See Direct Current page 4

Educate your subscriber

By Kenneth Wayne

Trouble calls of a recurring nature seem to stem mostly from fine tuning problems. People believe that knobs are put on TV receivers to twist and turn so they do just that. To eliminate those time consuming costly calls to the "knob twisters", we must educate them.

The first process, of course, is to educate the cable system employee. This is easily done in the office. Usually, the new installer hasn't the faintest notion of how television works. That technology, of course, isn't necessary for him to function in his job capacity. The simplicity of attaching a cable lead in, turning on the set, and adjusting the controls is basic. If he knows that, plus how to adjust the controls properly, his work will be satisfactory.

The differentiation, for instance, between channels 2, 3, and 4 is very little, so it is evident that a receiver selected for channel 3 could well be on screen as channel 2 or channel 4. That is one reason calls come in from subscribers saying, "I've got the same station on two channels," or "I can't get channel so and so, so it must be the cable." We then send out a service technician to make the necessary fine tuning adjustment. That call across town raises the overhead for wages, fuel, vehicles, and if your system is data processed, computer services.

If that subscriber had been informed when he was initially connected, (perhaps with a little booklet some systems prepare explaining typical CATV problems vs. set problems), the call never would have been made. If the installer had taken the time to show the customer what can happen when the tuner is rotated too far into the adjacent channel, the call likewise would not have been made.

Therefore, we initially should educate the installer on how to adjust the necessary controls on a television set. Taking a novice new-hire aside for ten or fifteen minutes to explain the basic dials and knobs can eliminate a percentage of troubles as will informing the gal who answers the phone.

Your Gal Friday

The majority of cable systems are small systems with a limited staff of employees. Many have just one employee in the office, usually a female, to function as a liaison between company and customer. If she can learn to recognize the symptoms of set misadjustment vs. system failures and rectify these trouble calls over the phone when they are first received, she's overdue for a raise. It is justified in the fact that she is reducing the burden of trouble calls that are unnecessary and the technicians who are sent out on customer complaints due to set problems.

If the installer and the office girl can be taught to recognize set problems, then it is easy to have them explain to customers how to adjust a misbehaving TV. This, of course, should be one of the installer's prime concerns when he installs the cable. If he knows how to adjust the TV to the best picture, a little explanation to the subscriber while he is making those adjustments can serve for better customer relations. It also is educating the customer to be aware of set problems such as those irritating fine tuning trouble call complaints.

Other Tuning Problems

Fine tuning problems show up in other ways than with just adjacent channel difficulties. Many times, with older sets especially, a customer will have a set with a missing tuning slug. This baffles the new installer when he is fine tuning the receiver and the missing channel cannot be tuned in.

If he checks the signal on the drop with a field strength meter, he'll know that the channel is present and the problem lies in the set. At that time, it may be necessary to show the customer a picture on a test set rather than have him find out that he's paying for a channel he can't receive and believes it's the system's fault after viewing the missing channel on a neighbor's set. If that customer is not informed upon installation (of the missing slug), the system will get a trouble call soon after installation, sending out a technician to do the same job the installer should have done.

All-band FM

FM receivers are a cause of trouble calls also, especially with an all-band FM system. FM has a tendency to drift off frequency showing up mostly in the weaker distant signals. That is one very good reason why manufacturers have incorporated AFC (automatic frequency control) in FM tuners. The best way to tune in the receiver without built-in AFC is to tune the set with that option switched off. Then when the desired station is received, switch the AFC on to lock the signal in.

If the installer explains that procedure to the customer when the service is connected, it likewise will eliminate a potential future trouble call.

There are other problems that show up with tuner difficulties that most system technicians are aware of. Little "in shop" sessions with the employees (including the office staff), can help to reduce unwarranted trouble calls by sharing some very basic knowledge we all

take for granted. By educating the staff, we can educate the subscriber, hopefully, dropping the percentage of unnecessary trouble calls.

NEW PRODUCTS

Double-Band Projector

Super 8 Sound, Inc., has announced the introduction of the Super8 Double-Band Projector, which allows interlocked screening of Super 8 full-coat magnetic film and Super 8 picture film, with sync rollback.

The Double-Band Projector consists of two mechanically connected Eumig S807 projectors which can run forward, backward, or stop in perfect frame-for-frame synchronous interlock. A supporting table for one projector holds it above the other so all recording and transport controls are easily accessible from one side of the unit. This permits easy threading of picture film and sound film. The two projectors are easily separated and can be used independently.

Each projector has an inching knob to facilitate setting of start marks in the gate. Once running in sync, either projector can be in the playback or the record mode, permitting sound transfers from fullcoat magnetic film to magnetic edge stripe, or from stripe to fullcoat. The inching knob on one of the projectors also serves as a clutch, allowing the projectors to run independently.

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Studio Monitor Speaker System

The Altec Corporation's Sound Products Division announces the availability of the 9849A Compact Studio Monitor Speaker System.

Designed for all applications where extended frequency response, low distortion, and wide dynamic range are a requisite, the 9849A offers full-sized monitor advantages in a compact package.

The 12-inch bass loudspeaker is capable of producing extended low-frequency response with very low distortion, even when driven to exceptionally high power levels. The dividing network includes an RC circuit in parallel with the low-frequency load to stabilize the input impedance of the network at 8 Ohms. Frequencies above 1500 Hz are handled by a compression driver mounted on a sectoral high-frequency horn.

The high-frequency horn is located close to the low-frequency section, resulting in the smoothest possible transition from bass to treble sources.

The enclosure finish is in light gray epoxy spatter-textured paint and includes a black, demountable grille assembly. The enclosure is 24" x 20½" x 15¼" and is made from ¾" material. It has no demountable panels and is heavily braced internally.

For More Details Circle (89) on Reply Card

Split Band Distribution Amp

A new selective split band radio and TV distribution amplifier is now available from the Cable TV Division of **Belling-Lee**.

Called the Belling-Lee Hastings, the new VHF/UHF amplifier covers Bands I, II, III and IV/V in addition to short, medium and long wave bands for AM radio. The amplifier comprises four selective input channels all with individual signal level adjustments and an inbuilt stabilized and fused power unit, operating from a standard single phase 240 Volts supply. The unit employs separate amplifier circuits for UHF and VHF, with a common output, to give extremely high sensitivity and a minimum of inter-modulation products. Intermediate bands not used for radio or TV are strongly rejected by the selective circuitry. All input and output connections are fully screened to give a good signal-to-noise ratio.

Designed for installations with up to 50 outlets, the Hastings amplifier is ideal for systems serving medium-sized hotels, blocks of flats, training centers, technical colleges and schools.

For More Details Circle (90) on Reply Card

Portable Camera System

A battery operated, color portable video tape recording system is now available from **JVC**.

Others have offered parts of the system, but now JVC offers the complete system with excellent capabilities and flexibility.

The camera has almost all of the features you would expect in a studio camera, yet it is small enough to be hand held. To keep the size of the camera down, the control circuitry was placed in a separate control unit. Total weight of the two is 11 lbs. The camera uses a newly developed color-system which provides higher resolution, a high signal to noise ratio and excellent sensitivity, resulting in exceptionally accurate color reproduction. It used regular 2/3" electrostatic focus vidicons, offering a much smaller optical package. The CCU unit converts the luminance and chrominance signals from the camera head into NTSC signals. These are available for recording or channeling into a display.

For More Details Circle (91) on Reply Card

Oscilloscope

Tektronix, Inc., announces the 10 MHz, dual-trace Telequipment D32 Oscilloscope, one of the smallest and least expensive oscilloscopes of its kind. The D32 has features normally associated with instruments twice its size and can be one of the best buys for the cost-conscious buyer.

Well-suited for service work, the dual-channel D32 offers 10 MHz bandwidth, vertical sensitivity ranging from 10 mV/div to 5V/div in 9 calibrated steps, (19 sweep speeds from 500 ns/div to 500 ms/div, extended to 100 ns/div with a X5 magnifier). Other D32 features include flexible triggering, automatic selection of chopped or alternate modes (depending on sweep setting).

Its 8 x 10 division crt (0.7 cm per division) covers nearly one third of the front panel. The D32 offers a choice of battery or AC line operation with up to 4 hours continuous operation when working from its six rechargeable "D" cell batteries. The batteries, probes (2 each), and a molded front-panel protective cover are all included as standard equipment.

The D32's uncluttered front panel makes the instrument easy to use and ideal for use by those unfamiliar with oscilloscopes as well as experienced technicians. Lightweight and small (4"H x 9"W x 11"D), the D32 can be carried easily by either its three-position handle or an optional carrying case with a shoulder strap.

Simple operation, portability, and low cost make the D32 an excellent choice for cost-conscious service applications in industrial manufacturing, computer peripherals, telephone and teletype, and TV and radio equipment. It should also be considered for process control equipment, production line testing, and for educational laboratories.

For More Details Circle (92) on Reply Card

Introducing the TC-50 live color camera!

The new TC-50 is a top-of-the-line broadcast quality prism camera at medium-line price. A neat trick? Right—Harris has applied imaginative design to give you superb color fidelity and picture sharpness, along with operator convenience and flexibility, without unnecessary frills or seldom used automatic features.

Let us give you complete information. Write Harris Corporation, Broadcast Equipment Division, 123 Hampshire Street, Quincy, Illinois 62301.

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COMMUNICATIONS AND INFORMATION HANDLING

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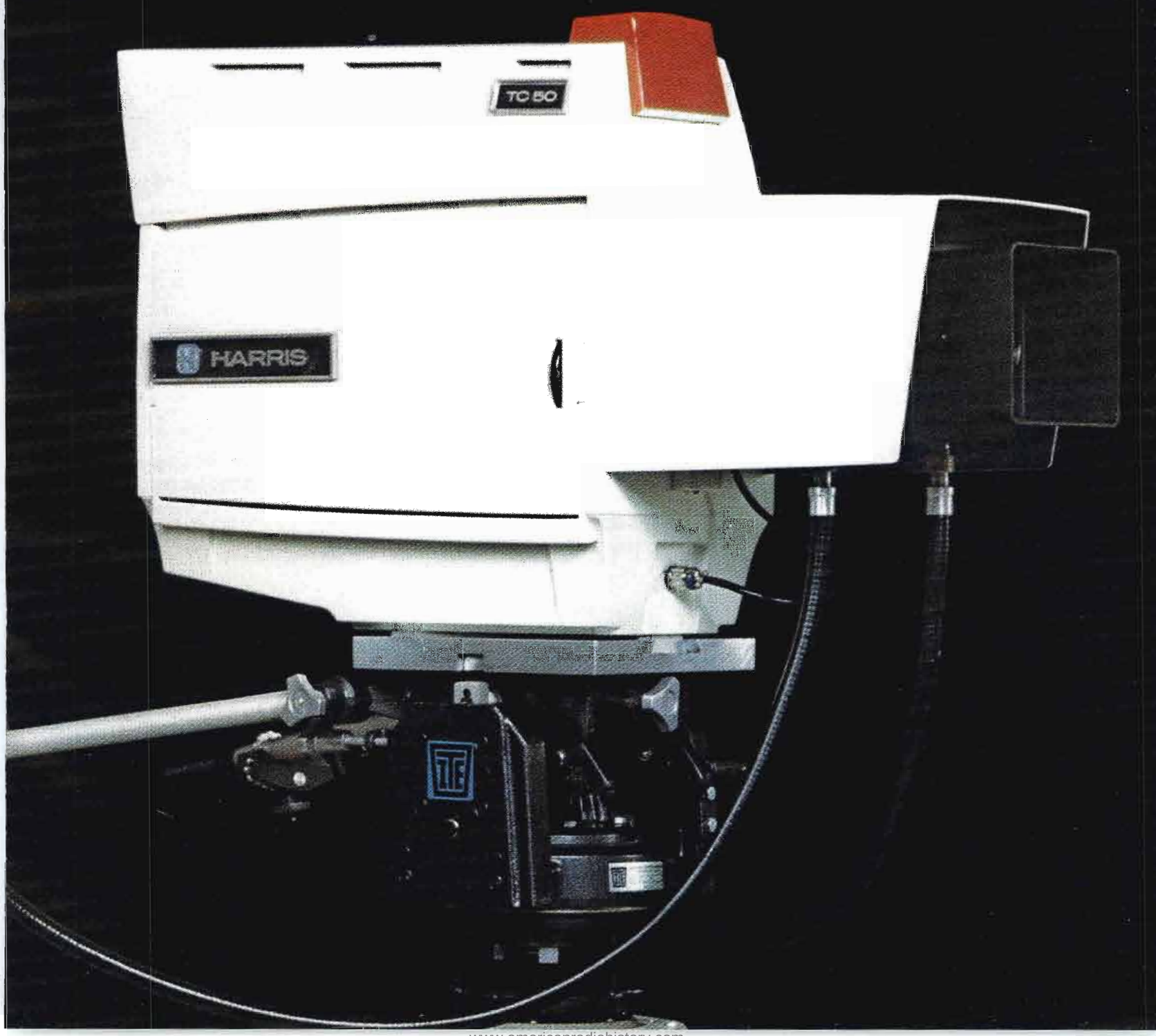

NAB convention highlights

The Las Vegas version of the NAB national convention lived up to expectations. Attendance was high, although there were—as expected—more West Coast and fewer East Coast attendees than usual.

From the equipment exhibition side, there were few surprises. The exceptions will be covered later in this issue. The greatest buying activity was around the video booths where LIVE (live instant video electronics) equipment held the spotlight.

Unfortunately, the exhibition area was arranged so that as you came into the hall, all you could see were the expansive booths of some of the industry giants. It certainly took a long time for the crowds to filter down to the smaller booths, where a variety of interesting products were on display. As time and space permits **Broadcast Engineering** will be covering that equipment in upcoming issues.

Meanwhile, it didn't go unnoticed that the broadcast industry is doing quite well these days. In fact, some of the basic factors that have had an adverse effect on our national economy have had just the opposite effect on the broadcast industry. While this is true, it doesn't diminish the fact that broadcasters still are concerned about other industry factors that hang heavy on us all.

Wasilewski On The Attack

The President of the National Association of Broadcasters accused the "enormous and swollen federal government" of a widespread effort to inhibit broadcasters and the communications media in general.

At the opening general assembly of NAB's 53rd annual convention, Vincent T. Wasilewski said "there seems to be a determined and unremitting search for ways to get at broadcasting—to cut it down, tie it up, restrict it and inhibit it."

He said this is being done through the Antitrust Division of the Justice Department, the Federal Communications Commission, the Federal Trade Commission, consumer and campaign reform laws, the FCC's Fairness Doctrine, the imposition of heavy license fees, intrusions into programming and a complex, controlling license renewal procedure.

The NAB president also asserted that broadcasting is protected by the First Amendment and dismissed accusations by those who consider broadcasters arrogant in demanding First Amendment rights.

"If the First Amendment does not apply to broadcasting," he said, "then it will not apply to anybody. The truth is that in arguing freedom of speech and freedom of press, we are not really arguing for our own rights, we are arguing for the people's right to know and hear, their right to have channels of communications, information and opinion unencumbered by government."

Wasilewski said the government should critically look at itself "to

see if some of its powers have been extended too far, if some of them have been unwisely used, if some of the limitations on that power have not been evaded."

He itemized several actions that the government has taken or has under serious consideration:

- The Congressional ban that removed cigarette advertising from the broadcast media.
- The Federal Trade Commission proposal that ingredient and nutritional information be included in virtually every radio and television food commercial.
- Continuing demands to do away with all commercials on children's programs.

He said proposals by consumer groups should be looked at very critically by Congress and the regulatory agencies "and not merely adopted blindly because someone has put the politically pleasing label 'consumer' on them."

Many proposals are excellent, Wasilewski said, but others are "ineffective, counterproductive, punitive, half-baked and stupid. Congress and the federal agencies should distinguish between those that help solve problems and those that do not, between those that are reasonable, and those that are unreasonable. Too often, it has not made that distinction."

The NAB president also criticized pay cable television for its version of the free enterprise system.

He said that in an effort to associate themselves with free enterprise, "pay cable television entrepreneurs have been crying about free and open competition." By their definition, he said, competition "involves building a wired network using as a base programs that have been paid for and distributed by broadcasters."

Wiley Invites Input

Richard E. Wiley, chairman of the Federal Communications Commission, opened the traditional FCC panel at the Small Market Radio session with a call for continued dialogue between the FCC and broadcasters.

He said this has been most helpful and cited as an example the FCC proposal that would exempt stations in markets under 10,000 from the ascertainment rule.

The chairman told delegates that many changes made by the Commission have been useful to the broadcasters and have helped them in the marketplace.

FCC, he said, recognizes that not all stations are alike and should not be regulated in the same way.

Appearing with the chairman were chiefs of several FCC divisions: Wallace E. Johnson, Broadcast Bureau; Richard J. Shiben, Renewal and Transfer Division; Martin I. Levy, Broadcast Facilities Division; William B. Ray, Complaints and Compliance Division and Paul Putney, assistant chief for Law, Broadcast Bureau.

Presiding was Wayne C. Cornils, KFXD, Nampa, Idaho, incoming chairman of NAB's Small Market Radio Committee.

NAB

(Continued)

Ray told the audience that comments are being received by the Commission on daytime only stations applying for night time broadcasts and increased power. He said action is expected shortly. He also said power increases may be feasible by existing stations that meet technical rules.

Shiben warned against using only one delegate to represent a number of stations in a community to determine area problems for all stations by talking to community leaders. He said, however, it is permissible for representatives of stations to meet with civic heads at the same time. The problem, he said, should be resolved soon when FCC requires that licensees meet with community leaders on a more regular basis spread out over the three-year license period.

Shiben also explained that unsigned letters of complaint against stations, if they contain possible valid criticism, are taken seriously and are checked out. He admitted that this could hold up granting renewal.

Levy and Shiben both advised the broadcasters to prepare their renewal forms carefully with or without a lawyer or communications attorney. The main reason for deferral, it was pointed out, is that the papers are not prepared correctly.

Small Market Advice

The Small Market Radio session of the NAB convention got off to a swinging start with a humorous, yet factual, skit on license renewal difficulties.

The message of the one-act, five-person play—which was interrupted repeatedly by laughter and applause—was that applications should be prepared correctly to avoid delayed renewal and excessive material should not be included when filing.

The cast: Dick Painter, KYSM, Mankato, Minn., in the role of a small market broadcaster; John Summers, NAB general counsel, as Painter's Washington attorney; Valerie Waddlelove of NAB's Radio Information Office as the secretary; and, playing themselves, Wallace E. Johnson, FCC Broadcast Bureau chief, and Richard J. Shiben, chief of the FCC's Renewal and Transfer Division.

A surprise appearance was made at the conclusion by FCC Chairman Richard E. Wiley who approved Painter's application.

Paul E. Reid, WBHB, Fitzgerald, Ga., outgoing chairman of NAB's Small Market Radio Committee, presided at the session.

Several important points in filing for renewal were made by the players:

- Do not include excessive documents such as awards given stations or lengthy information on interviews with local community leaders. All that is needed is the name, position and organization.
- Be limited on general public ascertainment surveys. Describe how they are conducted, how many people were consulted and a random sampling of the public throughout the area.
- Stations also must determine what community problems are, then let the FCC know what is being planned for on air, the anticipated time segment and the duration and frequency of programming.
- When making technical alterations, the Commission should be informed. For example, when replacing the exciter unit in the transmitter, prior FCC approval is needed. If an antenna monitor is replaced, the Commission should be notified beforehand, the meter read, the monitor replaced, another reading taken and then the results should be sent to the FCC for approval.

It also was pointed out that present rules do not recognize the use of automatic transmitters and final approval by the FCC is not expected in the immediate future. However, FCC proceedings began last week to permit such systems.

Stereo AM

First public demonstrations of a proposed AM stereo transmitting system were conducted by **RCA Broadcast Systems** recently for visitors to the National Association of Broadcasters convention.

Byron E. Fincher, Manager, Radio Station Equipment, said today's emphasis on sound quality is sparking renewed interest in upgrading AM transmissions and RCA's proposed stereo system is one means of improving AM sound at the receiver. Broadcasters visiting the RCA exhibit were able to hear the stereo effect with headsets.

In outlining design considerations for an AM stereo system, Fincher stressed the need for compatibility with existing monophonic receivers. "Any monophonic AM receiver should be able to receive stereo broadcasts with no degradation of performance," he said.

Other considerations include effects of out-of-band radiation to adjacent channels, conversion of existing transmitters for stereo operation, quality of the stereo signal, and the cost, performance and reliability of receiver designs, Fincher said.

The proposed RCA system is capable of multiplexing two discrete left and right signals on the broadcast carrier. These signals are then received by the AM stereo receiver and channeled to the respective left and right speakers. Monophonic receivers would deliver a composite signal to a single speaker.

Fincher noted that appropriate industry standards would have to be developed and Federal Communications Commission approval obtained before AM stereo broadcasts could become a reality.

An incredible breakthrough: ¾-inch videocassette teleproduction.

Yes, incredible to all those people who thought it would never happen.

And there were a lot of them.

Because the popular myth had it that truly professional electronic editing on videocassettes was technically impossible.

Well, that's another myth exploded. By the Sony VO-2850 U-matic® Mastering Recorder and Editor.

Not only does it save you a generation by doing everything within one format, it's also so pro that you have to see it to believe it.

Therefore, we want to say right away what we usually save for the end of an ad:

Write us on your letterhead. Tell us to arrange a demonstration. Mail to Sony Corporation of America, Video Information Center BE-055 P.O. Box 1594, Trenton, N.J. 08607.

See it for yourself. Then you won't even have to read on.

Broadcasters are already using it.

The advantages of the VO-2850 U-matic system have been recognized by the broadcast industry.

The system is already changing broadcasters' mastering and editing methods for electronic news gathering.

That's how good it is.

But for you, maybe the best is yet to come.

A system so good, you don't have to buy it all.

The entire VO-2850 system consists of two editors and their Remote Automatic Editing Controller (RM-400).

But you can also use just *one* editor. (Buy the rest of the VO-2850 system whenever you're ready.)

With one unit, you have a mastering recorder that gives you complete teleproduction capability with full electronic editing.

Rotary erase heads, capstan servo, vertical interval switcher for noise and roll free edits. Editing flexibility for all channels (video and two audio) separately, all together, or in any combination.

Still-frame. Slow motion with optional RM-400. Feather-touch, solenoid push button operation. Full auto rewind. U-format interchangeability, reliability, and economy.

S/N ratio for audio and video is a guaranteed 45 dB. *Guaranteed,* because we know you'll get better.

Incredible. But true. The Sony VO-2850. It has ended the generation gap, very professionally.

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Sony® U-matic® Color Videocassette System.

All TV reception simulated.

NAB

(Continued)

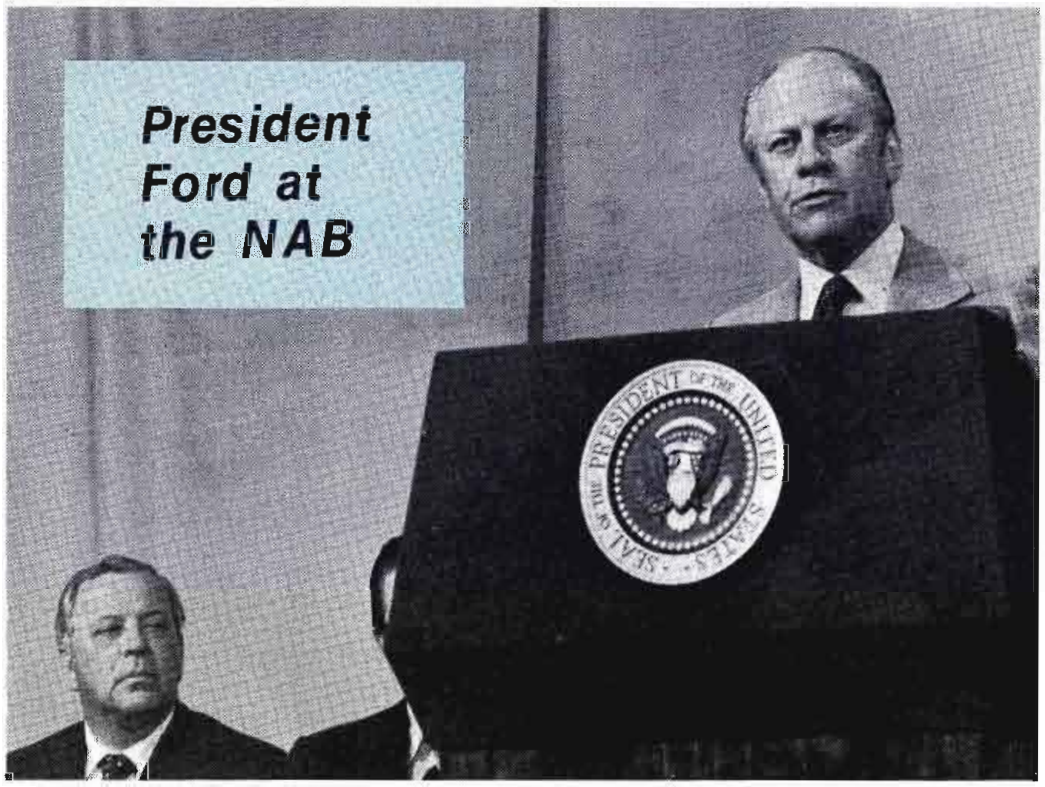
Engineering Advisory Committee Report

Progress made by NAB's Engineering Advisory Committee on a variety of issues ranging from automatic transmitters and electromagnetic radiation to tower icing and TV subtitling were reviewed for broadcast engineers.

Committee Chairman Robert W. Flanders, vice president for engineering, McGraw-Hill Broadcasting Co., Indianapolis, Ind., submitted the report during the Broadcast Engineering Conference being held as part of the 53rd Annual Convention.

Flanders said subcommittee data supporting a move to automatic transmitters has been submitted to the Federal Communications Com-

continued on page 66



"...the deficit is like gambling...Running a deficit of some $100 billion is gambling with the nation's economic strength"

President Ford addressed the convention with an economic message of warning and little cheer. Rather than deal with industry problems, the President attacked Congressional spending and the version of the tax bill he was compelled to sign. The following are excerpts from his speech.

"This convention represents an opportunity for your industry to share problems, technological innovations, and trends in the broadcasting business. Your industry has a unique challenge because of its power and influence in the Nation. But like all other businesses, you are concerned about the stability of our economy, which influences your ability to survive and to serve your customers.

"This audience represents the spectrum of American business from the small radio or television stations serving a few thousand to the large stations serving millions. But whether the budget you work with is large or small, you understand the Nation's economic difficulties well.

"The first part of my economic recovery recommendations last January, a prompt tax cut, is now law. The second and equally important part was the restraint of Federal spending by cutting back $17 billion in existing programs and by a one-year moratorium on all new spending, except in the critical field of energy and emergency needs.

"I signed the tax cut bill, because it was urgently needed to stimulate the economy. I was concerned about the quality of the legislation Congress passed, because it cost $7 billion more than requested. That means $7 billion less in tax revenues and adds that amount to the Federal deficit.

"Our continuing concern in the over-stimulation of the economy through excessive Government spending. The Administration's projected deficit was $52 billion or $1 billion per week. With the tax cut, the deficit would be closer to $60 billion if the Congress authorized no new spending.

"It now looks as if Congress will undertake an entire series of new spending initiatives despite my request for a moratorium. A possible deficit of $100 billion is projected. That would be a disaster.

"Such a huge deficit is alarming because of the impact it would have on the money market. When the economy is weak and private credit demands are low, the Administration's projected deficit could be financed without encouraging inflation. But when the economy turns up, as we anticipate in the second half of the year, any larger deficit will consume money available for the private sector, drive up the interest rates and regenerate more inflation.

"Adding to the deficit is like gambling. If the deficit for next year were only $50 billion, we run a small risk of reigniting the fires of inflation. But, every time your Congressmen and Senators add a new spending program or otherwise increase the deficit by a few billion more, the inflationary odds go against us. Running a deficit of some $100 billion is gambling with the nation's economic strength."

9 REASONS WHY YOUR PRESENT LENSES JUST BECAME OBSOLETE.

The remarkable new Fujinon lenses with EBC are revolutionizing the television industry, and here's why:

1. Glass — Any lens can only be as good as the glass it's made from. So, to assure ourselves that we get absolutely the finest quality glass, we make our own. Traditionally, glass manufacturers use clay crucibles for the melting of their raw materials. However, at the extremely high temperatures required, reactions take place between the clay and the molten glass resulting in minute optical impurities in the finished glass. At Fujinon we use expensive platinum crucibles, thus eliminating all possible reactions between glass and clay.

2. Computers — The designing of sophisticated lenses involves calculations that would take an expert mathematician years to complete. Therefore, at Fujinon, one of the most modern computer installations in the world constantly works to maintain the superb quality of our lenses.

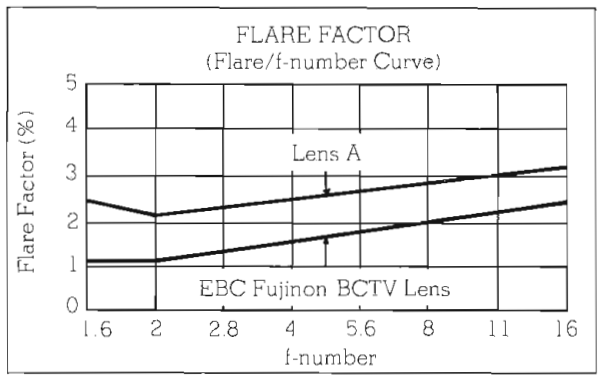
3. Electron Beam Coating — Fujinon's unique and exclusive coating process is the most advanced in the world, and it holds several advantages over conventional coating systems: One is that thinner and more uniform coatings can be applied. Another is that there is a greater range of substances that can be used for coating. Thirdly, a greater number of coatings can be applied to a surface.

Lens Surface (k)	Transmittance (%)			
	Uncoated T=(0.95)^k	Single Layer T=(0.98)^k	Triple Layer T=(0.995)^k	EBC T=(0.998)^k
2	90	96	99	99.6
4	81	92	98	99.2
6	73	88	97	98.8
10	59	81	95	98.0
20	35	66	90	96.0
30	21	55	86	94.1
40	13	45	81	92.3
50	8	36	78	90.4
60	5	30	74	88.6

Fujinon lenses with Electron Beam Coating (EBC) can have up to 11 separate coatings; and it is these coatings that make our lenses the almost perfect transmitters of light.

4. Optical Transfer Function — The exceptional performance resulting from the Electron Beam Coating of Fujinon lenses can be measured in several different areas. The optical transfer function is a measure of total lens performance; resolution, sharpness plus various kinds of aberration and contrast. By this critical criterion the Fujinon lenses clearly deliver superior optical performance.

5. Flare Factor — This is stated as the percentage of the light reflected by the lens' surfaces, the inside of the lens' barrel and the internal mechanism.



Here again Fujinon lenses have lower flare figures than comparable conventional lenses.

6. Spectral Transmission — Color definition is determined by the degree to which a lens transmits the various wavelengths in the light spectrum. Fujinon's use of rare earth elements in making their optical glass; plus their exclusive Electron Beam Coating make their lenses the ultimate in color transmission.

7. Fringe Transmission — One common drawback to many zoom lenses is inferior fringe transmission, especially in their extreme wideangle position. Not so with Fujinon lenses and their Electron Beam Coating. These lenses enjoy outstanding fringe transmission.

8. '72 Winter Olympics — The exceptionally fine picture quality transmitted from Sapporo, Japan during the '72 Winter Olympics was acclaimed by both the public and commercial broadcasting companies the world over. Fujinon zoom lenses were utilized throughout by NHK (Japan Broadcasting Corporation), which originated the coverage of the Games.

9. First Time Available in the U.S.A. — Up until now you may not have been very familiar with Fujinon broadcast lenses, but there's a very simple reason why: This marks the first time they'll be available in the United States. So if you want to get the jump on your competition by a marked improvement in the quality of your picture transmission, then your next lens has got to be a Fujinon.

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At the NAB....

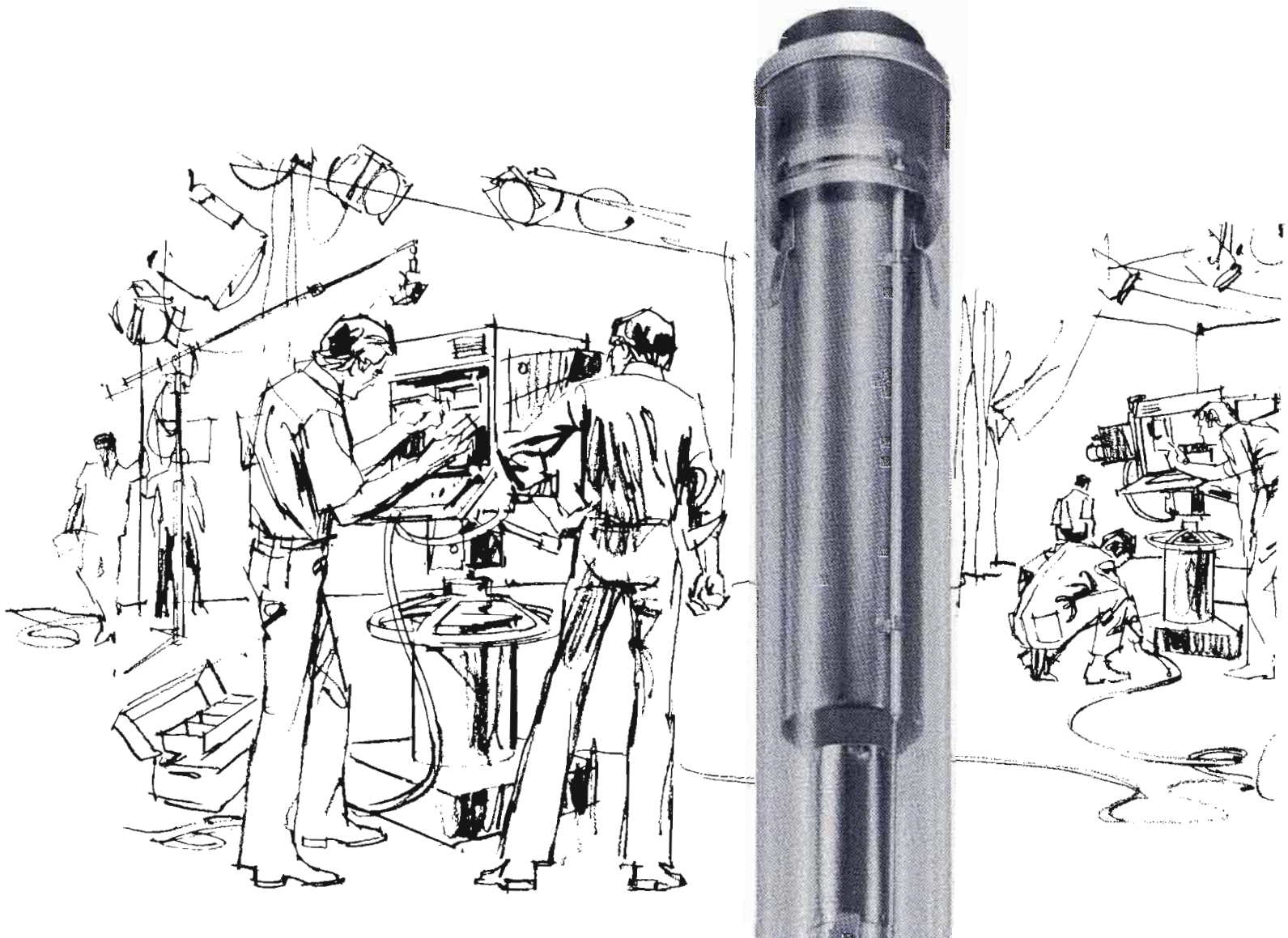
Spotlight on video

By Joe Roizen

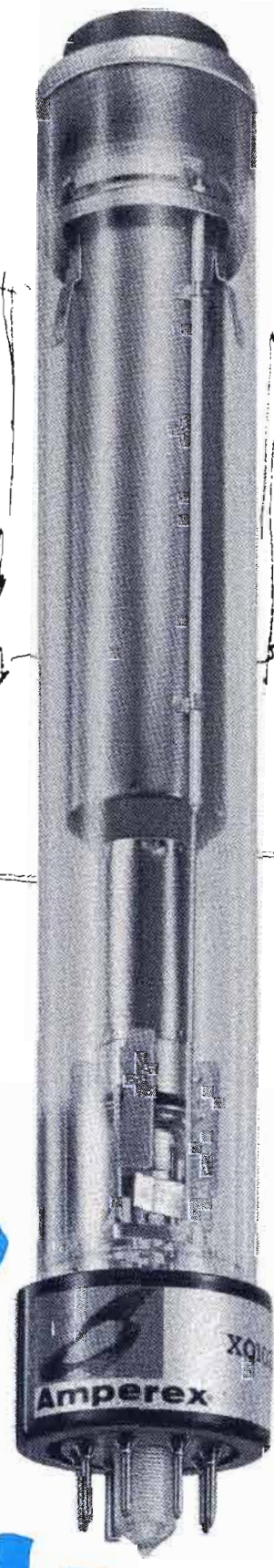
By all accounts, this year's NAB convention in Las Vegas was a resounding success, both in terms of exhibitors' satisfaction with the sales figures and potential business that was chalked up. A series of interviews with most of the major and minor equipment manufacturers' representatives revealed that while they approached the show in Las Vegas with some trepidation, concerned that the NAB delegates would be more interested in the local entertainment than the serious business of reviewing the equipment and making hardware commitments, it turned out happily that these fears were ungrounded. As a matter of fact, the reverse seemed more true.

Fun city offers little day time diversion other than the incessant slot machines. It is only in the evening when the exhibits are closed that the big show attractions draw visitors like a huge magnet. As a result, booth traffic during exhibit hours was heavy, particularly in the larger booths. In addition, hardware salesmen appreciated the opportunity of being able to entertain customers in the plush surroundings provided at the extravaganzas Las Vegas is so famous for.

The general concensus was that the facilities at the convention center for putting on an equipment exhibit were excellent. The personnel managing and operating these facilities were extremely cooperative in getting booths set up and there was apparently little of the usual union or jurisdictional problems that exhibitors have encountered in the more traditional NAB locations such as Chicago and Washington. The convention center provided an adequate single level display area for all of the booths, which made it easy for visitors to get at least a quick glimpse of everything available, and about the only low key criticism was the fact that the



Some day, somebody may imitate the Product...



...but nobody will ever duplicate the Service!

And in TV Broadcasting, it's the service behind the product...that keeps the product out front

On the way to selling more than 30,000 Plumbicon* TV camera tubes, we learned how important Service is to the broadcaster. The first thing we learned was about availability — No TV station, commercial or educational, can ever afford to shut down an operation while "waiting for parts." Plumbicon tubes are instantly available, at all times, through local franchised distributors and through Amperex factory sales representatives.

And we learned the importance of the name Plumbicon to TV stations who have come to depend on it as their assurance of consistent performance and quality.

Because no product is ever "good enough," we taught ourselves to build smaller and smaller Plumbicon tubes that provide performance standards similar to the original (we're down to ⅔ inch tubes now,) and we learned to produce tubes with reduced comet tailing, with higher resolution and modulation depth, with extended-red response, and with minimum lag. Contemporary camera tubes outperform the original Plumbicon by a wide margin.

We learned that the TV camera user is concerned about the operation of his camera . . . not merely about the performance characteristics of our tubes. So we provide him with a wide range of expert and valuable information, in print and via our field engineers, to help him get the most out of his TV camera-system. Plumbicon users who are about to install a new camera need only give our field engineering staff a call and we'll have an expert there to help with the job.

Our franchised distributors, (your own local businessmen,) are carefully selected for their ability to support Plumbicon TV camera systems with on-the-spot customer support and service. We, in turn, support our distributors with two kinds of "seminars" for Plumbicon camera users. One is on video tape, the other is presented "live" by an Amperex field engineer. The purpose of both is to maximize the value of Plumbicon camera systems.

Finally, we learned that the best way to deal with warranty questions was to design the warranty for the customer's benefit — not to protect ourselves . . . and even then, to interpret the warranty in the customer's favor whenever possible. For example, a customer may return any Plumbicon tube for testing (even one that's technically out of warranty) and we'll subject it to a complete technical evaluation at our expense . . . and send the customer a detailed engineering report on the tube.

Yes, we've learned a lot about the importance of Service in the ten years, in the more than 30,000 tubes sold, in the 600-plus TV stations served, since the Plumbicon tube won the Emmy award. Little wonder, then, that the Plumbicon, after all this time, still offers the best all-around package of performance, price, reliability and service available. Little wonder, then, people keep on saying, "There's only one Plumbicon."

Electro-Optical Devices Division, Amperex Electronic Corporation, Slatersville, Rhode Island 02876, Telephone: 401-762-3800

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There is only one Plumbicon

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* Reg. T.M. of N.V. Philips of the Netherlands

major equipment manufacturers had their displays all grouped near the front of the hall while the smaller suppliers were strung out behind them. This tended to create a traffic pattern that concentrated around the larger vendors (RCA, Ampex, Philips and Harris/Gates), with secondary and smaller traffic flow into the aft section where suppliers like Recortec, Digital Video, Data Disc, etc. were located.

While attendance was supposedly lower than at previous NABs, in terms of registered delegates, it was quite obvious that those attending were from higher levels of management and that they had come to the show with the serious intent of buying something. Most vendors admitted with surprise that a great deal of their equipment sold right off the floor. The mix of visitors was somewhat different than in previous NABs; there were virtually no European network representatives, probably the result of both the shrinking economy and the imminence of the Montreux exhibition next month; however, there were large numbers of Canadian, Mexican, and Latin American customers who were busily evaluating the latest in hardware technology to see how it applied to their needs.

A review of all of the hardware on display gave the impression of a general equipment character that could be better described as evolutionary rather than revolutionary. Most of it had been seen before, but the purveyors have ironed out the bugs or slicked it up for production. They were offering it anew with well polished presentations, many of which showed the signs of careful preparation and specific customer tailoring. There were, of course, a few unique approaches to television equipment which were being presented, either for the first time or by a new manufacturer in a particular field but these tended to be few and far between.

Without question, Electronic (LIVE) Journalism is still the center of attraction and virtually every major supplier has now entered this field with something to enhance portability, improve ease of operation, or cut cost. The VTR battle between proponents of various systems and formats continues full tilt, even with a few new entries, and the major studio color camera market has expanded to include several more suppliers new to the domestic scene, such as Thomson-CSF.

The foremost impression gained from the look at the exhibits of the Las Vegas NAB was, "What recession!". According to all accounts, things looked good on the monitor screens as well as in the cash register.

Color Cameras

The increasing variety of color cameras that are available to the broadcaster in a wide range of price and complexity must surely make it difficult for a hard decision in selecting a particular brand or model. Virtually all of the color cameras on display in the $40,000 and up price bracket showed good to excellent quality pictures when directly viewed on precision monitors adjacent to them. It took careful analysis of some of the operational features to determine why one should buy an $80,000 plus camera rather than its smaller, more economical counterpart, often on the same stand. Pictures coming from top of the line: Ampex, CEI, Fernseh, Gates, IVC, Marconi, Philips, RCA and Thomson cameras all looked good. Each, however, claimed special reasons or significant advantages over their competitors.

A new entry into the U.S. market, the Thomson TTV-1515, claimed and displayed automatic, continuous registration through the use of light markers inserted by fiber optics into the prismatic imaging system. The camera can also send pictures over six thousand feet of triax cable, using a 46 channel digital multiplexer. Fernseh claimed similar characteristics for their new camera, in addition to an established position in a growing number of American studios which use their KCU and KCR series of cameras.

The Ampex camera demonstrated low light level response with special bias lighting for the plumbicons, and CEI claimed equivalent performance to much more expensive cameras in their new professional and uniquely packaged Model 285, which they offer as a studio camera for under $50,000.

IVC showed a companion portable camera to go along with their 7000 series and which had many interchangeable features. The Marconi booth was showing the Mark 8B in which new yokes and better delay lines produce better registration and a video signal to noise ratio of 50 dB. Their hand-held camera, which can be separated from its backpack by a 150 feet and then feed three thousand feet of cable to an interchangeable Mark 8 CCU, is an $80,000 package. RCA's TK45 and the portable 45P version were also on display.

There was no shortage of lower price cameras dedicated to Electronic Journalism activities. The Ikegami, which has racked up a good reputation with CBS news crews, has now climbed over the $40,000 mark and makes very good pictures for this application. Competing with it are similar cameras available from Asaca, Hitachi, Philips, RCA, and others. A surprising bit of news was that the Philips LDK11 is actually made by Asaca who have apparently withdrawn a model they had planned to produce in addition to their Model 3000 which was in their booth. The Norelco unit uses two-third inch plumbicons while the Asaca camera uses Caldecons. Asaca claims 20-30 cameras in use in the U.S.A.

A number of lower price color cameras directly associated with battery-operated VTR backpacks were also being shown by Sony and Akai and while these pictures are of more limited quality, they are claimed to be adequate, since they are competing with hot processed color news film and are used for relatively transitory applications.

In touring the camera exhibits, it was possible to see a variety of pieces of news program material generated in this manner in which the end result appeared to justify the means. There are, however, still a few broadcasters who are waiting for improved picture quality from a mobile package before they will shift to this form of operation. In particular, this was the opinion expressed by the Canadians and a few European visitors.

(Continued on page 30)

Any editor, film or video, can master our EA-5 helical VTR editing system in less than 15 minutes. That's a fact!

Furthermore, we will install the EA-5 system in less than an hour. And that's a fact.

How does it work?

In some respects, TRI's film approach to video tape editing will remind you of a film editing table. You edit, in a "hands on" technique, picture by picture. The electronics? 12 fool-proof buttons run the whole show. No time code. No tones. Just normal off-the-shelf tapes.

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Want more information? Contact us or the best video systems distributor in your area. Chances are he's our distributor.

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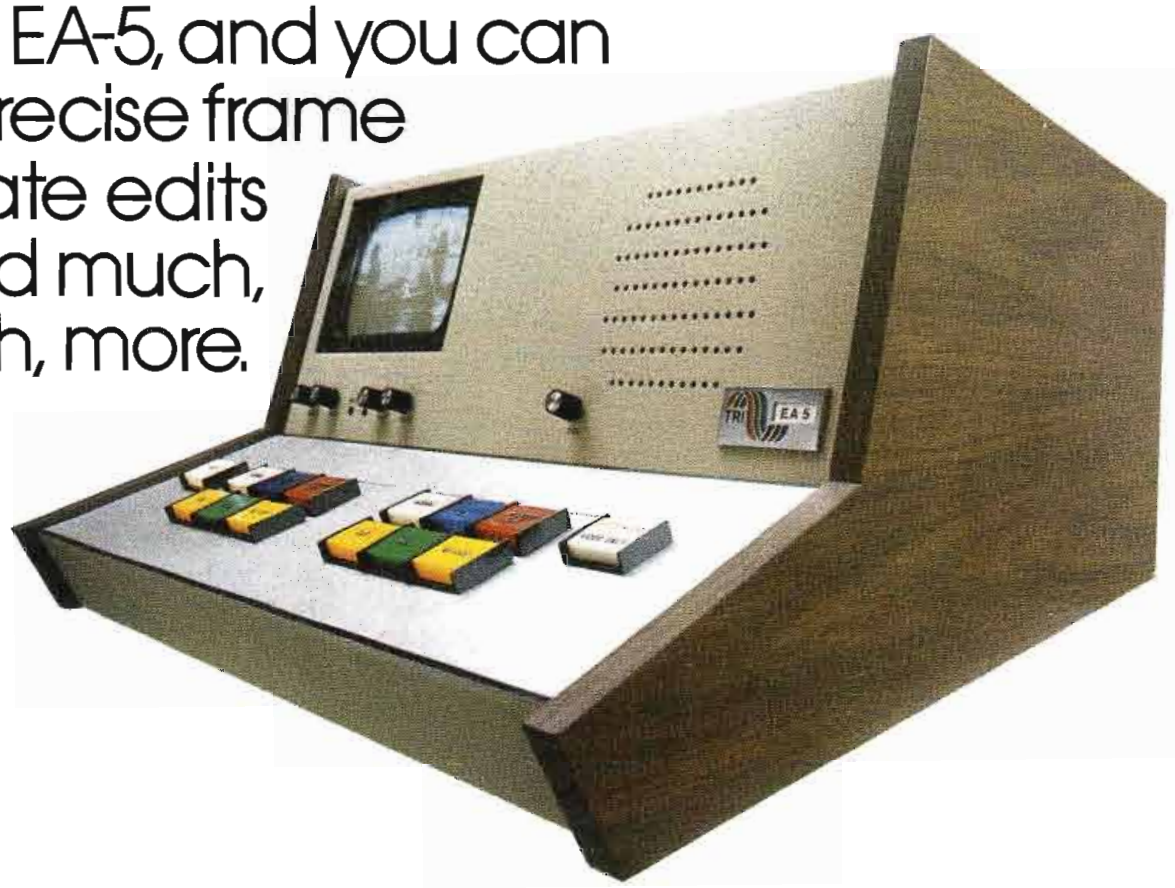
Take two helical VTR's, add our EA-5, and you can make precise frame accurate edits and much, much, more.



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Video Tape Recorders

There were some very defined trends, whose emphasis came more from what was not said than from what was, with regard to the continuing VTR dilemma of the growing multiplexity of formats. Neither RCA nor Ampex were heavily promoting (as they were last year) the 7½ ips operation for quadruplex VTR's. Having created this as an alternative with which to compete with the economic advantages claimed for the IVC 9000, they have now seemingly abandoned that approach. While it is available on demand, the emphasis in the quad world this year was on the success of the new machine configurations, such as the Ampex AVR-2 or the RCA TR-600. Ampex said they have sold one AVR-2 a day since its introduction last year and most of the 27 Ampex recorders spread around other exhibitors' booths this year were of that variety.

IVC continued to push the 9000 format for top quality broadcast applications and were able to show superb color pictures, with up to 8 MHz bandwidth, on special Conrac monitors using comb filter decoders and high resolution shadow mask display tubes. It is evident from the existent installations of IVC 9000 VTR's that they are being accepted by production houses who want maximum quality master tapes for post-production manipulation. Their major customers to date seemed to have been in that area of teleproduction operations.

In the one-inch VTR field, there are a number of new entries that are challenging the well established lines presently produced by Ampex, IVC, Sony, etc. The most unique proposal for a one-inch VTR was on display at the TRI booth. The recorder called Trichroma III uses an IVC 800 transport with a heavily modified control panel and signal electronics.

The Trichroma III's performance characteristics, which are claimed to be better than any other helical in its class and equal to some of the best quads, are achieved by inverting the position of the recorder in the normal chain of television origination equipment. The Trichroma III is connected to the RGB output of a camera, and with a specially designed signal system, applies the color signal to the tape without NTSC encoding. TRI says this eliminates all of the usual problems encountered with low cost helical VTR's, where moire and differential gain and phase impose severe limitations to the recovered NTSC signal. Since the input to the recorder has no subcarrier, all of these detrimental factors can be avoided.

The Trichroma III puts out an RGB signal which can be treated like a camera source and be encoded into any color standard for eventual transmission. This technique is referred to as the film approach to television, where a VTR must be assigned to each camera ahead of encoding rather than a single VTR at the output of the switcher.

Another unusual recorder was on display in the Asaca booth. This one appears to be a miniaturized version of a quad machine, using one-inch tape and a rotary head assembly with four heads. While the VTR and its companion electronics package has been indeed reduced to a relatively small volumatric package (about 3 cubic feet), it was quite evident from inspections of the picture playback on several successive days that the recorder incorporates all of the known quadruplex deficiencies into its smaller format: head banding in saturated chroma areas, first line hue shift, velocity errors, and color change within a specific head band were all in evidence. Asaca engineers did point out that this was a first of a kind prototype and they will, no doubt, improve the characteristics of the recorder as they continue to work with it.

Still another approach to a one-inch helical VTR was taken by Video Memory, a small California based firm located in what is generally referred to as "tape recorder alley" near San Francisco. Video Memory's machine has a format roughly similar to the Ampex 7900 series with several significant differences on the transport: first, there are no movable guides, a factor which has plagued the Ampex machines since they were introduced; second, tape movement is buffered by vacuum columns and a constant tension servo, eliminating some of the tension problems inherent in the longer scan path of a higher writing speed head drum. The recorder showed good playback images on bars or picture and took advantage of direct color recovery made possible by the use of highband frequencies. The basic machine sells for $9,400, an editing version for $13,000; it is available only in NTSC format, and requires external time base correctors if synchronous operation is desired.

Editing Systems

The variety of VTR editing devices on display again ran the gamut of simple control track pulse counting units for less than $5,000 to super sophisticated SMPTE code systems at over ten times that amount.

A comprehensive editing demonstration was shown in the CMX booth, where a specially prepared video tape patterned after the Ascent of Man TV series gave the history and present status of television programming and related it to the contemporary editing capabililities of their System 50. Three large screen Advent projectors provided the clear visual contact with the demonstrator's manipulation of the keyboard, where edit decisions were entered, the graphic display of the sequence of edits stored in the computer, and the actual rehearsal or assembly of program material with off line U-matic cassette VTR's. Even a neophyte to this field could quickly grasp the concept of address code editing from CMX's presentation.

Datatron's Vidicue series was also set up to demonstrate several levels of editing capabilities. The top of the line multiple machine control system was connected to three AVR-2's in an on line master editing configuration. A separate display area showed Datatron's approach to Electronic News Gathering, with the Vidicue controlling two Sony 2850 U-matics.

The Central Dynamics' set-up concentrated on a computer controlled interface with the Ampex ACR-25 quad cassette machine for automated programming. They also had a series of simpler address code editing systems based on the

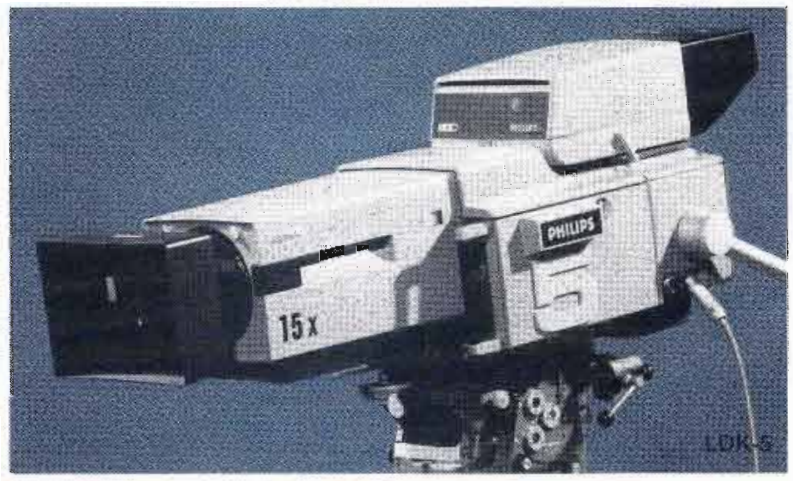
(Continued on page 34)

The New First Family

We've a new family of cameras we would like you to meet. Not one new Philips color camera, but three. They were made for each other. More important, they were made for you.

They are the culmination of an innovative heritage unmatched in our industry. There was the original three Plumbicon* tube camera. Sealed beam-split prism. Modular, all-solid-state design. Contours-out-of-green. Extended-red Plumbicon tubes, and anti-comet-tail Plumbicons. Then man-carried cameras of uncompromising quality, opening the doors to "electronic journalism." Digital control and triaxial cable—the icing on the cake.

This time, we wanted to gather all the great features, precisely mix them in cameras for specific purposes and requirements, add a number of new and worthy features, and offer you a family of studio and remote cameras exactly as you want them.



Stable, Reliable

In the LDK-5, the LDK-25 and the LDK-15 you have an uncommon commonality of components—modular design with a high degree of interchangeability between systems. They share an improved prism and optical assembly enhancing sensitivity and accuracy of alignment. Electronic color temperature control reduces filter requirements, and the extensive use of ICs and OP AMPS contribute to the family's notable stability and reliability. The cameras are designed to take full advantage of XQ1080 anti-comet-tail Plumbicon tubes with bias light, the rear-loading XQ1070s, and 41XQ image-intensified Plumbicons for remarkable low-light performance. CLUE (color line-up equipment) means fast, efficient set-up. Of course, you have a variety of zoom lenses.

Successor to the PC-100, the LDK-5 is the ideal remote camera, operating on triax with automatic cable compensation eliminating timing problems even beyond a mile. Its built-in memory maintains settings for up to a week without external power, and a narrow-band data channel provides for control via a standard telephone pair or narrow-band radio link.

Like the LDK-5, the LDK-25 has the same low-profile, tough but light (and we might add, elegant) head castings that distinguish the PC-100, with tiltable, rotatable and remotable viewfinder. Lower in cost than the LDK-5, the LDK-25 is ideal for field, studios and production firms where the sophistication of triax is not required or TV81 is already installed. Automatic correction circuitry takes care of iris, white and black balance and centering; variable matrixing is optional.

Then, the portable LDK-15 affords complete flexibility as it interfaces with either the LDK-5 or the LDK-25 C.C.U. with *absolutely no compromise in performance*. With a small portable processing unit, it will even operate independent of either C.C.U.

That's only the beginning. We want you to meet the family in person and see exactly why Philips continues to be recognized, worldwide, as the ultimate in broadcast cameras. Write or telephone.

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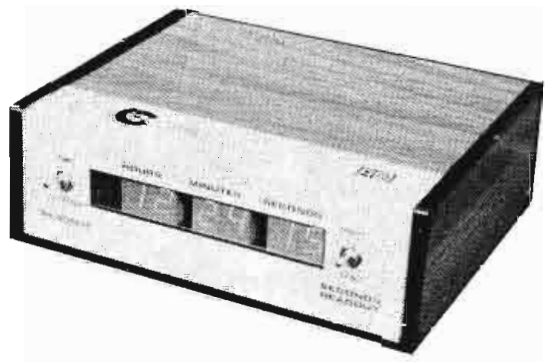

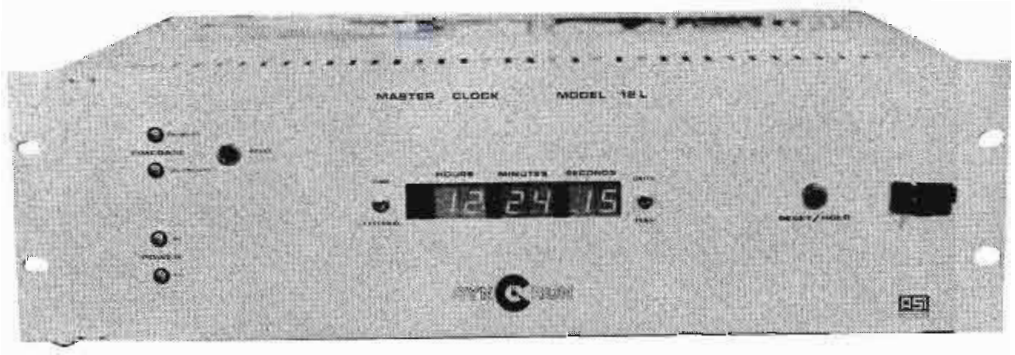

As a broadcaster, time is important to you. It's the commodity you sell. You define it in dollars and cents, so you measure it carefully. But careful measurement costs money too. If you've priced the digital master station clock systems currently on the market, you know what we mean. It's about time somebody did something about it. So we did.

Introducing the ASI **SYNCRON** Master Clock System. Our's is a full feature system with all the accuracy, versatility and reliability you'd expect but at a cost you can afford. We even included some features you can't get anywhere else. Like our unique optional Electronic Thermometer that allows our Master Clock and interconnected Remote Readouts to display time or the outside temperature at the flick of a switch. A real convenience for the busy disc-jockey! Then there's our Forward/Back Timer option that allows the same timer information to be displayed on any number of Remote Readouts simultaneously. Thanks to this "zoned timing" technique, TV stations can now display time remaining in a production to on-camera talent and crew members alike, eliminating the need for cue cards. Yet another option turns any **SYNCRON** Master Clock into a Data Transmission System allowing digital information distribution for display or equipment control purposes.

SYNCRON's standard features are pretty impressive too. Just check this list:

- BCD/FSK data transmission to remote digital readouts using a single pair of *unshielded* wires.
- Switchable "seconds" readout allowing the last two digits on both the Master Clock and Remote Readouts to be displayed conventionally or only once each ten seconds to reduce eye fatigue.
- Illuminated AM/PM indicators on 12 hour format models (24 hour models also available)
- Two models with external time base provisions and 2 models with 60 Hz power line synchronization as a secondary standard.

There are more features like these and more options too. Yet with all of this flexibility, you can order a **SYNCRON** Master Clock and five remote readouts for only $2,300.00. That's about $1,625.00 less than you'd have to pay for the high priced system with similar capability. In fact, for less than the price difference alone, you could add our Forward/Back Timer, Electronic Thermometer, and Digital Data Transmission options plus four more Remote Readout units to the **SYNCRON** System described above!

Get the whole **SYNCRON** System savings story. Write today or use the postage free information request card at the back of this magazine. We'll be glad to send you all the details immediately. After all, time is money. But isn't it nice to know that time has just become a lot cheaper? It's about time.

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Unretouched monitor photograph of an off-the-air ABC network program, November 26, 1974, at 2:20 P.M.

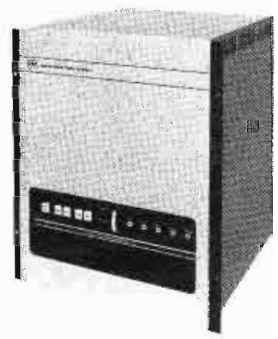
Electronic Video Compression is no Big Thing!

It's just another little first from CVS. It lets you shrink a video picture and place it where you want it.

Video Compression is a capability optionally available with the CVS 600 Digital Video Synchronizer. Now you can not only lock an incoming asynchronous signal to station synchautomatically but reduce that video signal to one-fourth size and locate that picture in any position on the CRT.

There are 5 fixed locations for the compressed picture and one "wild card" position. The "wild card" position can be located anywhere within the frame and is operator controlled and totally variable. The output of the Video Compressor is keyed for mixing with other signals.

With the addition of the CVS 600-2 Video Compressor, a whole new world of special effects has been opened...



The CVS 600 and the Video Compressor are now in production. If you would like some literature on the products or would like to see a video tape of what it's all about, just let us know.

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(*Continued from page 30*)

SMPTE recommended practices.

Ampex appear to have abandoned the RA-4000 in favor of interfacing with a variety of OEM editing units that can be applied to their quad or helical VTR's. The RCA machines used EECO editing consoles that also work with address code techniques and can be connected to non-RCA recorders as separate editing devices.

In the lower price category, at least four options were available. A Datatron "starter" package of code generator, reader and manual controller provided the minimal cost entry into SMPTE address code editing.

Non-code editors were also available from TRI, Recortec and Dynasciences; the latter two are new suppliers of such equipment. The TRI unit which was introduced last year is intended for open reel helical machines where manual (hands on) rocking of the tape can identify specific fields to edit on. This device counts control track pulses to initiate the electronic edit. TRI calls this the film approach to video tape editing, as the action is somewhat similar to a movieola. Recortec's unit is aimed at quad VTR's that have been equipped with their "R" mod or non-slippage type tape transports like the AVR-1. The Dynasciences' editor/programmer claims to be adaptable to all VTR's from half-inch EIAJ to two-inch quadruplexes.

Video tape editing has indeed come a long way from the days of Edivue and the razor blade!

Author's Note

A report of this nature is necessarily limited because it is impossible to interview in depth every individual at each booth. We have attempted, however, to get the best possible impression of what is happening in the video field through discussions with many of the people who were exhibiting at NAB.

We would, therefore, like to express our sincere appreciation to those people who cooperated whole heartedly and gave us some of their valuable time during an otherwise very busy schedule.

Digital Devices

The most innovative technology in handling TV signals is in the area of digital conversion of the analog input and then performing all sorts of "black box" magic on it before sending it back out over the program line.

The normal complement of digital time base correctors, most of which were seen at last year's NAB were again on display. CVS featured their Model 504 for which they now claim basic patents that would seem to make all other manufacturers of such equipment in violation of their rights. Ampex, Television Microtime, Digital Video, KSN and IVC showed their digital TBC's, CVS notwithstanding. Many of the units now handle

heterodyne color and interface with a growing variety of helical and quad recorders.

The most interesting digital TV signal manipulations are not in the TBC's, but in a new breed of devices known as frame synchronizers. These units, now offered by CVS and NEC, store a full frame of information and permit total synchronization of remote inputs with studio operations. In the CVS unit, an additional option permits image compression to one quarter of the picture area and the reduced size image can be located anywhere in the full frame if desired. This opens up a new broad front of programming possibilities not previously available.

A future potential claimed by Digital Video Labs is the computerized manipulation of television images through an accessory that will allow access to stored digitized TV signals on a random basis. It will then be practical to turn a TV image back to front, left to right, etc. just by inserting the correct logic train into the system. Today, this is only possible with graphics and with considerable complexity.

Color Monitors

A well-prepared presentation on precise colorimetry in color television monitors was the major attraction in the Conrac booth, where a wide variety of professional and industrial/educational monitors were on display. In large size screens (19" & 25"), Conrac's range includes an RHX model that has a high resolution face-plate and with RGB inputs can display over 750 lines of resolution. In 12" Trinitrons, the 5500 series competes with the Tektronix 650, which continues to be a major force in the broadcast field. Tek had a wide variety of these on display, with many options for inputs, outputs or coding standards.

Barco showed their line of professional monitors, which feature plug-in decoders to cover all the color standards now in use around the world. The Ball Brothers series of broadcast monitors were also exhibited.

Beyond these four manufacturers and excluding some European monitors, which are not normally sold in the U.S.A., there were a series of lower cost units that are either ruggedized receivers or lower cost monitors built around well known and reliable receiver chassis. These include such units as Amtron, Sony, Unimedia, World Video, etc. A number of these monitors were spread about in various exhibitors' booths, where image display rather than image analysis was required.

Some New Items

Grass Valley Group have carried chroma keying to an unbelievable height by differential signal control that permitted a model to smooth out the ruffles in a color bar pattern electronically inserted behind her. They can even produce pseudo shadows on non-related images. One can only wonder how this technique can reduce set building costs by using slide backdrops and properly instructed talent.

Data Disc, another newcomer to

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Don McGuire records a telephone "beeper" news report on a cart. At the same time, the electronic timer (right center), interfaced to a recorder, is timing the audio cut. It then holds the readout until the next recording.

Automatic audio tape cart timing

By ***Don McGuire****/KYW Radio, Philadelphia*

Station KYW in Philadelphia is one of the Group W all-news format radio stations. To the Engineering Department, this format results in a very large volume of telephone beeper recordings, cassette dubs, etc., on to audio tape cartridges. In addition, we record all our commercial, public service, and promotion announcements on carts. And all these carts must be timed out for scheduling purposes. Thus the great need for timing the material **during recording** to save time.

Initially, we met the need with mechanical timers interfaced to the cart recorders with only a 24V relay, but this only started and stopped the timing in step with the start and stop of the transport. This arrangement soon taught us the desirability of a timer which would reset to zero automatically each time a new cart was recorded, so the operator would not have to remember to do it.

We also thought it desirable for the timer to **not** add the cart's cue-up time to that of the recording, saving the operator from having to note the readout immediately before he cued the cart. The availability of simple, low cost, all electronic digital readout timers made possible these features and more.

The cart recorders used at KYW are the current Gates Criterion 80 and its predecessor, the old ATC Criterion machines, both extremely popular with broadcasters.

For our new timer, we chose the ES400 ten minute timer manufactured by ES Enterprises of Inglewood, Calif., because of its simplicity, and low cost (it's even less expensive in kit form). But above all, we chose it because its controls are all normally-open momentary pushbuttons which can be paralleled indefinitely without circuit modification and without affecting operation of its internal controls.

We also unknowingly gained the availability of two unused NAND gates in their Z3 (SN7400) which we "steal" for our interface. The two external connections we need to Z3, as well as pin strapping, are made with Circuit-Stik, with terminals formed by donut pads with center holes drilled for wires. The only other modification to the timer board is the lifting of resistors R4, R5, and R6 (2.7 Kohm) which feed 5V to the control buttons, which our interface supplies instead.

Timer Interface

With that interface, shown schematically in Figure 1, we now realize the following features. Regardless of the existing state of the timer, even if left running, it will stop and reset to zero upon insertion of a cart into the recorder. Timing starts when cart is started the **first** time thereafter. Timing stops when (1) the operator stops the machine manually, or (2) machine cues up, or (3) either the beginning or end of a Secondary (150 Hz) or Tertiary (8 kHz) Cue tone recorded on the cart (user's option), whichever one of the three occurs first.

When remainder of cart is run out to cue up, the timer does **not** restart. Instead it holds its readout until the operator either inserts another cart or puts the machine in Record mode for another cut on the same cart.

In the playback only mode, the timer gives us only the program material timing without that of the

Management Highlights

Here we describe the design and implementation of a work and time-saving system to time audio tape cartridge recordings during the recording process. A digital timer is interfaced to the recording machine so as to display an automatic readout with some unique and practical features, at a very low cost.

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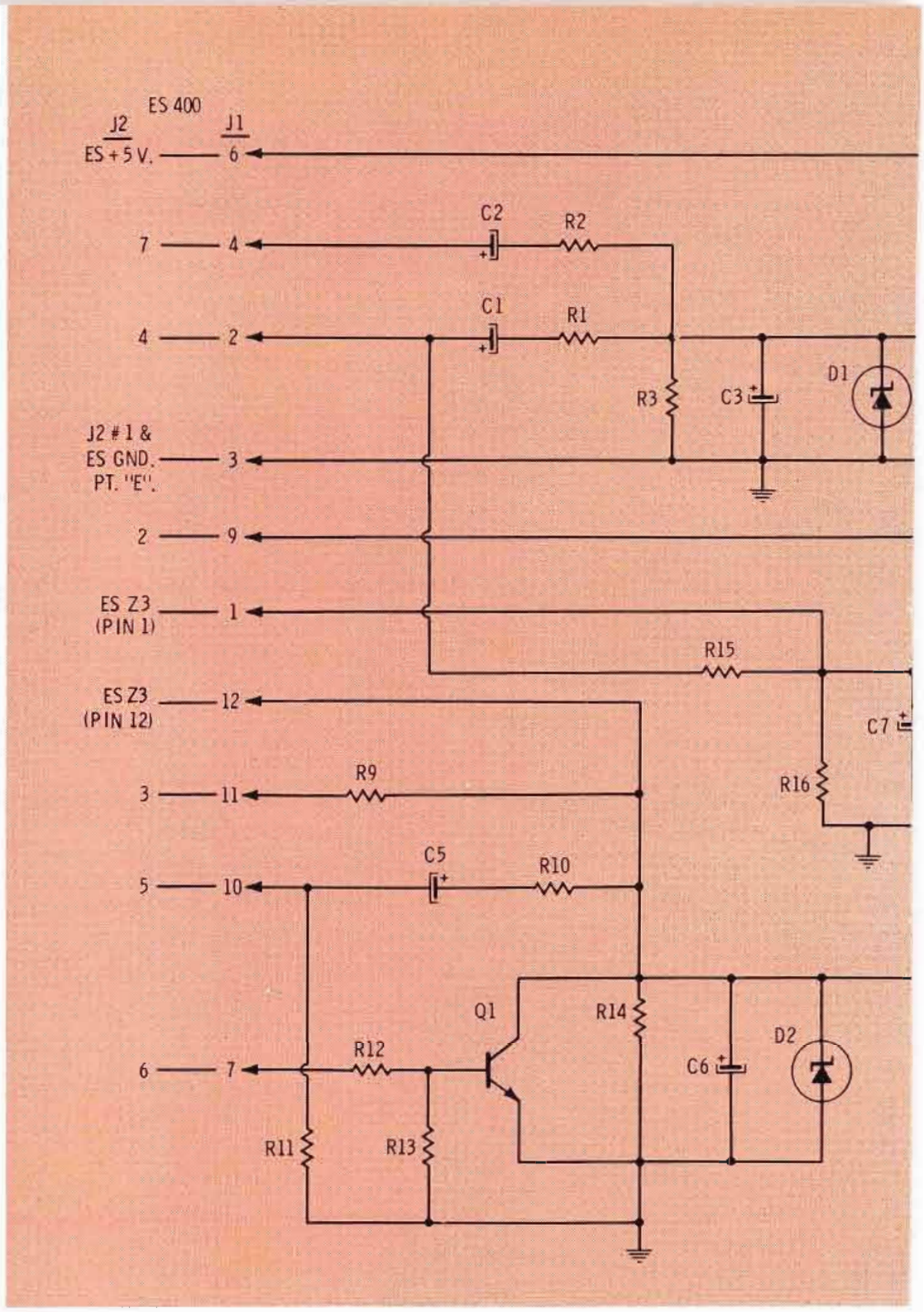


Fig. 1 Timer/recorder interface schematic.

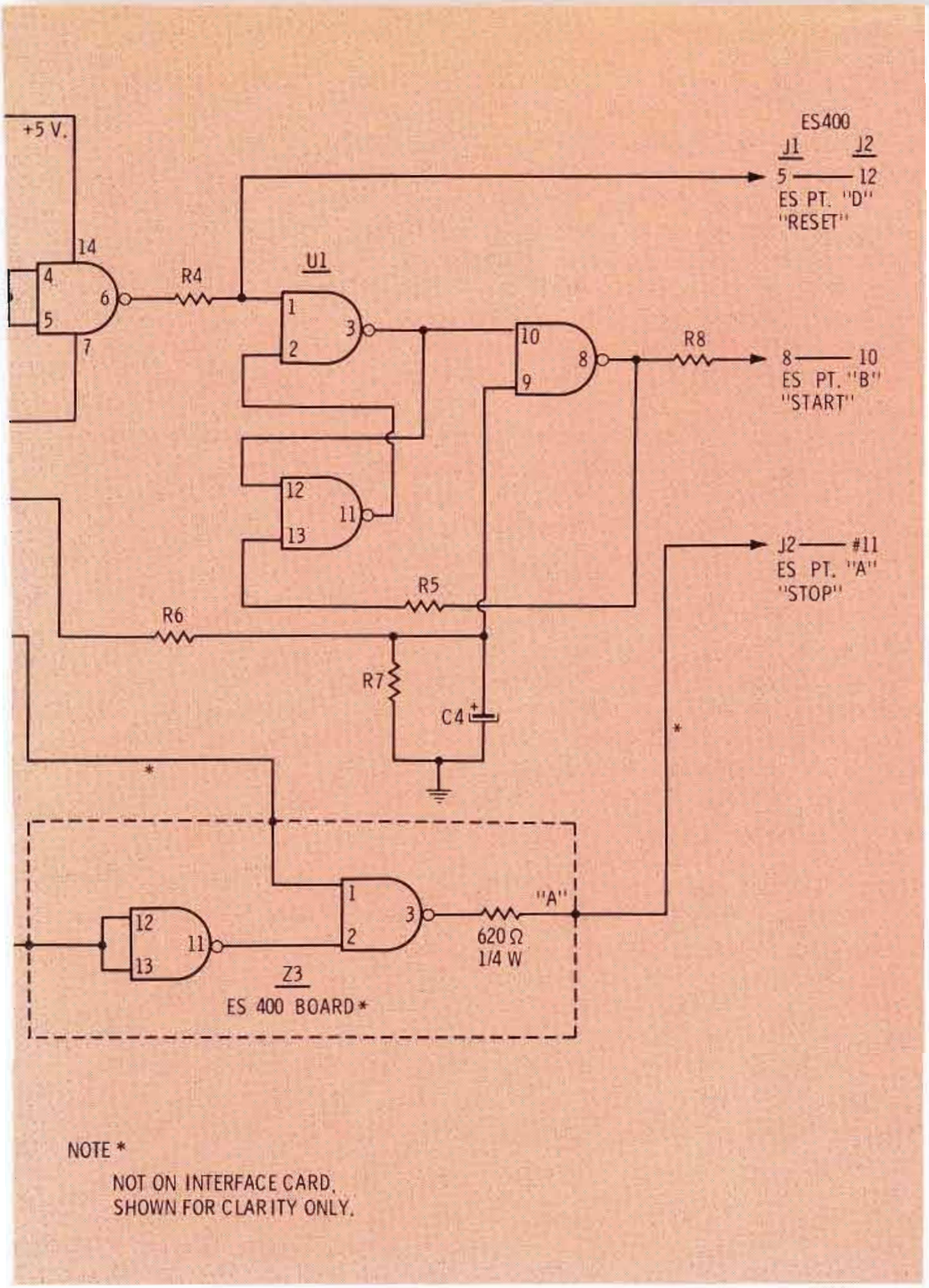
"dead" tape remaining, provided some auxiliary cue is recorded at the end of the program material. The operator timing the cut need not be present to hear the end of the audio. Effectively, without the operator ever touching the timer, it times out only what he desires, ignoring what he doesn't, and holds that readout until it **must** be reset. While he normally needn't manually operate the timer, its circuitry allows complete manual operations at all times.

Inserting The Cart

Referring to Figure 1, upon insertion of a new cart, the pins 4 and 5 inputs of NAND gate 1, here used only as an inverter, are pulsed high via the charging of C1, causing the output to pulse to a low state in parallel with the timer's "Reset" button. It also "sets" the flip-flop formed by gates 2 and 3 so that a logic "1" state now appears at one input of NAND gate 4 (pin 10).

When the cart is started, the other input (pin 9) also goes high, resulting in a logic "0" output in parallel with the "Start" button. This "0" state is also applied through delaying resistor R5 to the "reset" input of the flip-flop. This returns the pin 10 input back to "0" and the output high, so the entire circuit is set up for the next cycle.

When the cart was first inserted, a "1" state also appeared on the pins 12 and 13 inputs of the timer's



unused Z3 (within dashed enclosure in Figure 1), also as an inverter, resulting in a "0" at its pin 2 input. Also, via R15, etc., a cart insertion puts a "1" state on pin 1 input of the same gate. Therefore, a "1" state exists at the pin 3 output, which parallels the "Stop" button of the timer. Timing then stops upon the transport stopping via the momentary loss of the high at pins 12 and 13, going to a "0" state, causing pin 2 to go high. Combined with the high on pin 1, which exists only when a cart is in the recorder, the resulting output is a momentary low in parallel with the timer's "Stop" button.

As we said, starting the cart again after once stopping does not restart the timer, because the flip-flop is not "set" again until either another cart is inserted, or the recorder is put into "Record Set". This action also pulses gate 1 inputs by the charging of C2, thereby resetting timer readout to zeroes and setting up flip-flop for timing the next cut.

Timer Stops

There is another way the timer stops. At KYW, we record an 8 kHz Tertiary Cue during the last 5 seconds of every announcement so that **both end** at the same time. This is to operate a cueing light in the studio for the air man. Because of this, we added C5, R10 and R11 connected so that, upon the transport reading the cue tone, the appropriate cue relay applies

24V to and charges C5. When the cue tone ends coincident to the program audio, the cue relay removes the 24V, allowing C5 to discharge back through protection Zener D2, reducing the existing "high" at pins 12 and 13 inputs of Z3 to a "low" in the same way as the momentary "low" caused by the stop circuit of R9. So although the cart continues running to cue up to end or to next cut, the timer reads out only the audio portion.

Criterion Modification

As the description of the stop circuit now stands, the timer stops when, in the case of the older ATC machines, the cart stops upon either cue relay operation or manually operated stop button. But in the case of the current Gates Criterion 80s, the timer stops only when the cart is stopped manually, and not upon automatic cue-up. This problem prompts the only modification needed to the Criterion 80: the bringing out to its Remote Control socket J1 lead from the low side of Run Relay K1 coil, which is the wire on pin 11 of the 1 kHz Cue Sensor card. It appears to the author to be the only way we can easily and simply obtain a usable **pulse** that occurs **only** when the machine cues up.

Referring to your Gates manual, you'll see that when the Primary tone is read by the sensor, the run relay (K1) transistor driver Q9 is turned off, thereby opening the K1 coil return. In the process, the inherent delay of the contact opening permits a very brief pulse of 24V to appear at the low side of K1 coil, through the coil itself, from the holding contacts. With this positive pulse, which appears only upon automatic cue, and reduced by R12 and R13 of the interface, we pulse Q1 to saturation thereby shunting out the "high" existing at pins 12 and 13, the same as the other stop modes.

Interface transistor Q1 serves another requirement of those stations that use the beginning rather than the ending of a Secondary or Tertiary Cue to coincide with the end of the program track, for other switching purposes. By increasing the value of R10 and connecting as in Figure 2, the initial application of 24V to C5 will result in a positive pulse to the base of Q1, due to C5 charging. Q1 thus shunts gate inputs the same as Criterion 80 cue-up. Of course, whichever of the two Cue tones you use, Secondary or Tertiary, you merely connect the junction of C5 and R11 to the proper pin of the transport's remote control socket.

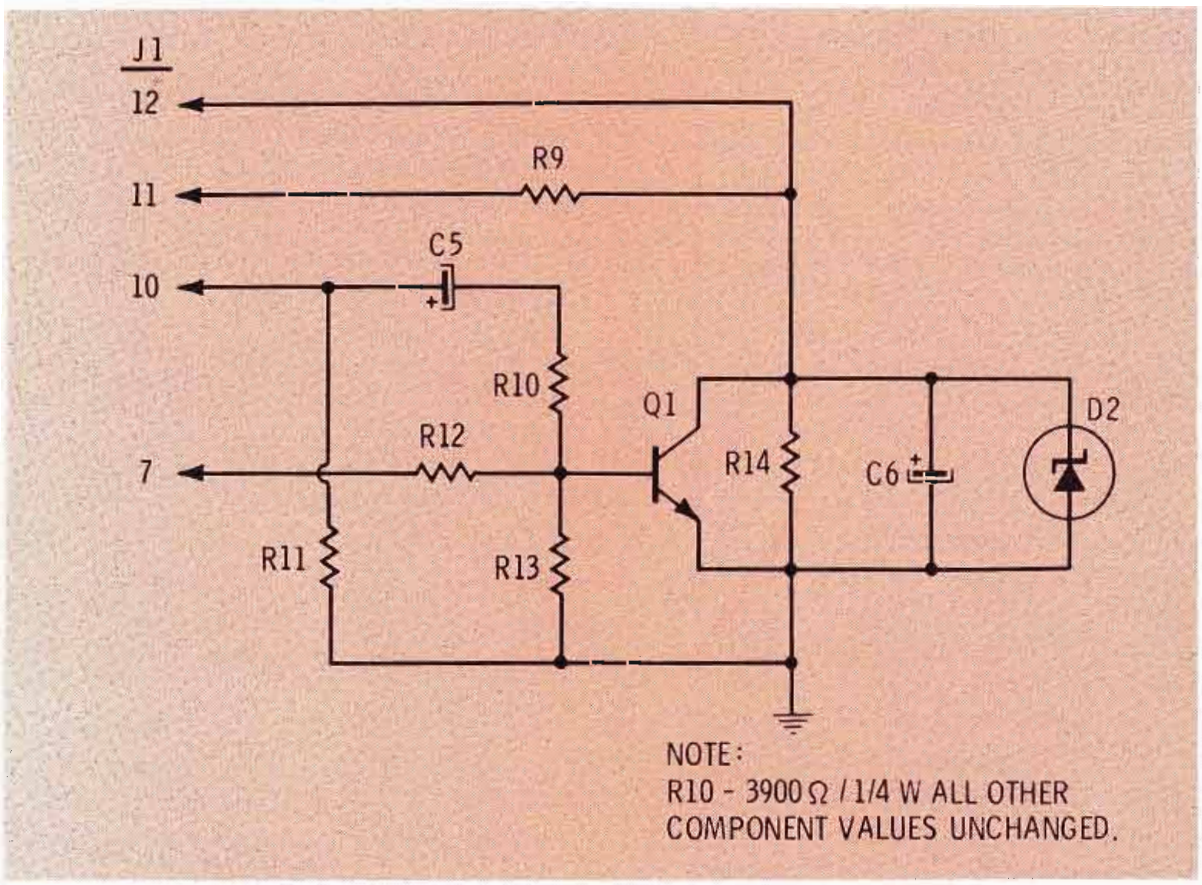


Fig. 2 Alternate connection of R10 when using start, rather than end, of auxiliary cue for switching.

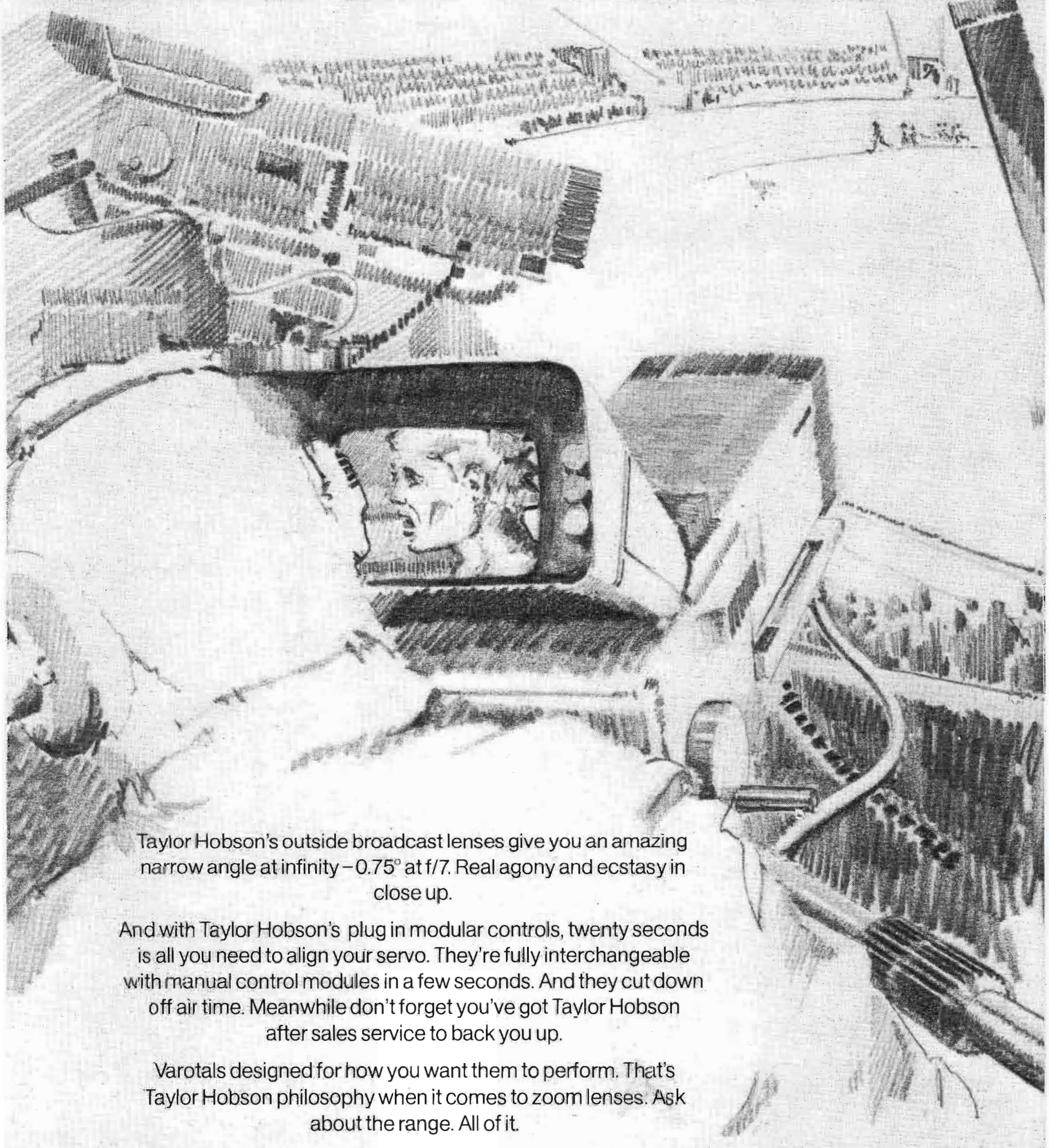
In the interface schematic Figure 1, resistors R1, R2, R6, R9, R10 and R15 are necessary for voltage division down to TTL level from 24V. C1, C2 and C5 derive the necessary pulses as already described. C3, C4, C6 and C7 are filters necessitated by the fact that the "24V" available from the older ATCs is actually fullwave rectified AC not filtered DC as in the case of the Gates Criterion 80s. One feature we wanted, if at all possible, was the ability to use any timer with any connecting cable to either type of machine, giving us a complete interchangeability of all elements of the system.

Returning to Figure 1, Zeners D1 and D2 protect the gate inputs from rising above 3.9V, giving us a good square pulse in addition. R4, R8 and the 620 Ohm resistor added on ES board from pin 3, Z3, to termination point "A" ("Stop" button) only serve as protection for the gate outputs when the timer's manual buttons, internal or remote, are used. All component value are non-critical to an extreme.

Now that we had the circuit that fulfilled our requirements, and a Vector Board prototype having been successfully tested for many months, we next fabricated a plug-in etched circuit card containing the 27 components needed on a card measuring 2 11/16" by 1 5/8", shown in the photo Figure 3. This card is mounted vertically inside the ES400 in space thoughtfully left us by the manufacturer. We need to help by moving the 6.3V power transformer to the rear vertical surface of the chassis, next to the added Amphenol 12-pin "octal" socket J2, as we show in photo Figure 4. This socket gives us access not only to the seven connections necessary to interface the card to the cart machines, we've also wired extensions of the Start, Stop, and Reset buttons (pins 10,11 and 12 respectively) for additional remote operation of the timer.

The remaining two pins of J2 are left unused and available for other purposes. As for example, to slave another remotely located timer, of possibly another type, for production purposes. The plug-in card connector, mounted on ¼" stand-

THE INFINITY CLOSE UP



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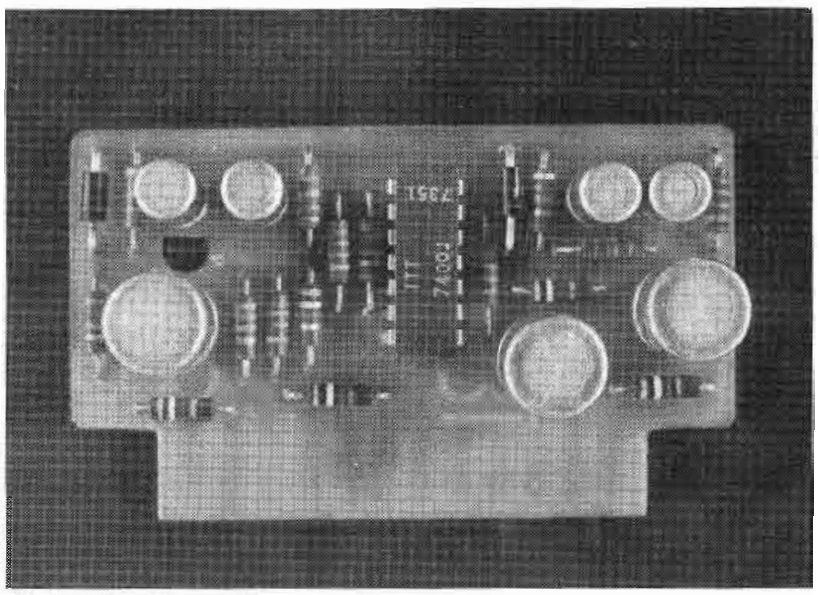


Fig. 3 Interface plug-in card.

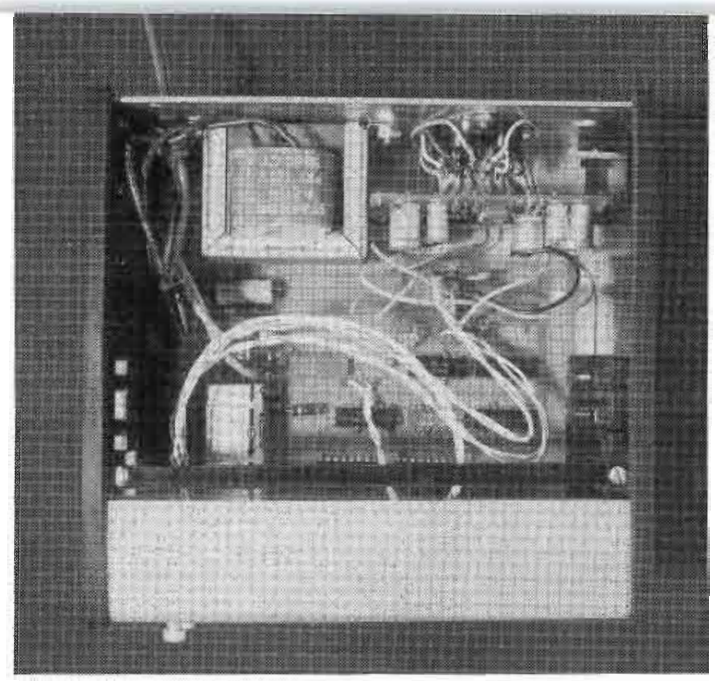


Fig. 4 ES400 timer completed, with interface card and socket J2 added.

offs, is positioned for enough clearance to easily fit the card between the cabinet side and the power transformer. We cut off the unneeded outside "loop" on the J2 socket lugs, retaining one loop for soldering wires from the J1 card connector and the ES board, to give more clearance between the card and J2.

The entire wiring job goes together quite easily, now that we have an etched circuit card that permits us to "go into production". The card will contain provision for both of the two possible connections of R10, using the one you require, which the one photographed does not contain.

Connecting Cables

All that's left to complete the project is to tabulate for you the connecting cable wiring from timer to ATC or Gates machines, in Figure 5. Note that one wire of the cable goes to the Record Amplifier remote control socket J2. For neatness, I ran this wire down to the transport's Jones plug and merely spliced it to the proper conductor of the seven conductor cable inside the plug shell.

I might also just pass along one trick I used to more easily modify the Criterion 80 to bring out the K1 relay coil lead we need. Because we at KYW don't use the Secondary Cue tone, and also because I hate digging into the 15 leads on remote socket J1, I made the modification by lifting the white wire coming from pin 15, J1, off of pin 8 of 150 Hz Cue Sensor card socket J7, moving it to pin 10, J7, unused but for card polarity keying. Then I ran a short white wire from pin 10, J7, to pin 11, J6, the 1 kHz Cue Sensor card socket. I elected to use pin 15 of remote socket J1 because that pin is unused in the ATC machine's remote socket, to preserve our complete interchangeability. (We really "lucked out" as all the other connections we need appeared on the same numbered pins for both models.) But however you do your modificaiton wiring, **go by the schematic.**

CABLE CONNECTIONS

FUNCTION	ES400 - JR	TO	ATC & GATES CRITERION
GRND. (COMMON)	PIN #1		PIN #1 - J1 TRANSPORT
START	PIN #2		PIN #2 - J1 TRANSPORT
STOP	PIN #3		PIN #3 - J1 TRANSPORT
CART IN	PIN #4		PIN #4 - J1 TRANSPORT
TERT. Q 24V. / SEC. Q 24 V.	PIN #5		PIN #13 - J1 TRANSPORT FOR TERT. Q * / PIN #11 - J1 TRANSPORT FOR SEC. Q *
CRITERION 80 Q	PIN #6		PIN #15 - J1 TRANSPORT
RECORD SET	PIN #7		PIN #2 - J2 RECORD AMP

* NOTE :
FOR TERT. Q — STRAP PIN #2 TO PIN #12.
FOR SEC. Q — STRAP PIN #2 TO PIN #10.

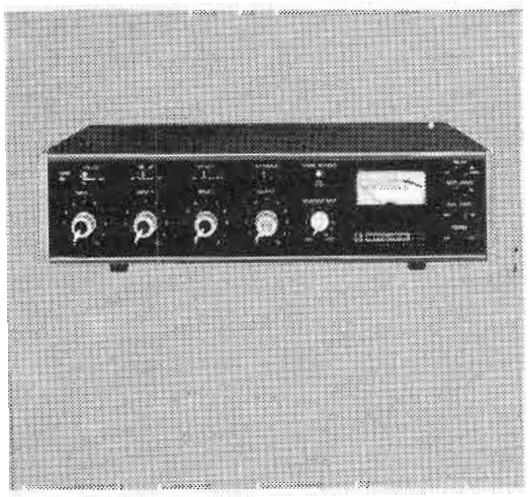
Fig. 5 Interconnection of timer to cart recorder via 7-conductor cable.

For Other Machines

While I've referred throughout this article to particular makes and models, I believe the interface circuit is such as to be readily adaptable to others of similar circuitry and remoting provisions. However, the implementation may not be quite as easy. For example, in interfacing another timer not having two unused NAND gates available, you could replace the two inverter gates with transistors, and then use the freed gate 1 (in the drawing) as the gate feeding the "Stop" circuit (pins 1 and 2 inputs, Z3, on the drawing).

In any event, I hope you will try the interface circuit and let me know how you fare. I'd also like your suggestions for improvements. If you don't already have a better system, you'll find this automatic timing setup a great time and effort saver. If you do have a better system, please let us know about that too!

Crowd controller.



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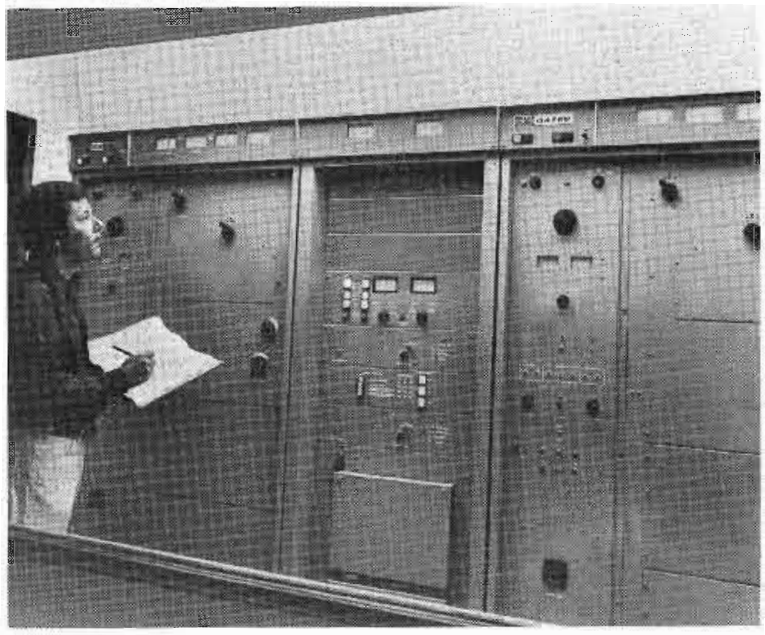
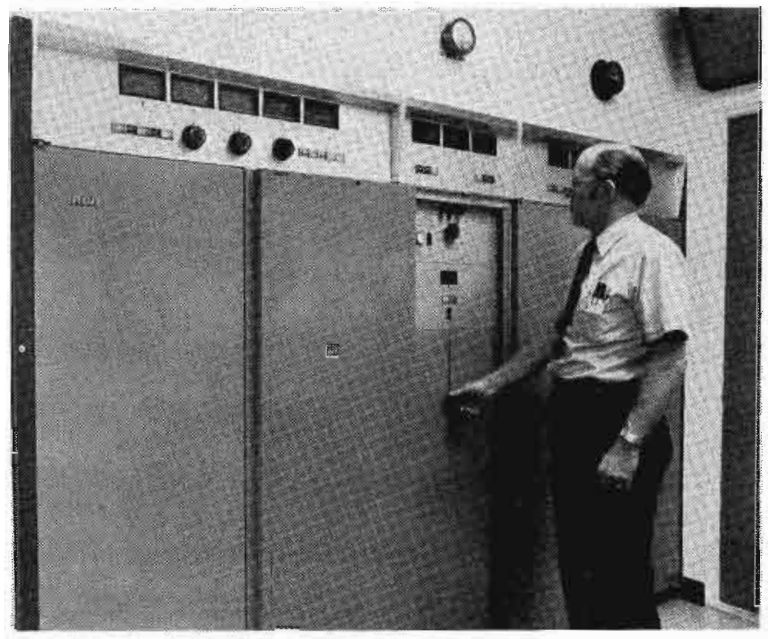


The Harris (Gates) FM-40H3 was one of the first parallel FM transmitters to be offered as a stock item. This one has been in operation at KJOI in Beverly Hills since 1971.



RCA's parallel configuration is available in a number of power levels. This arrangement is shown in use at ABC's WDAI in the John Hancock Building in Chicago.

Parallel FM transmitters:

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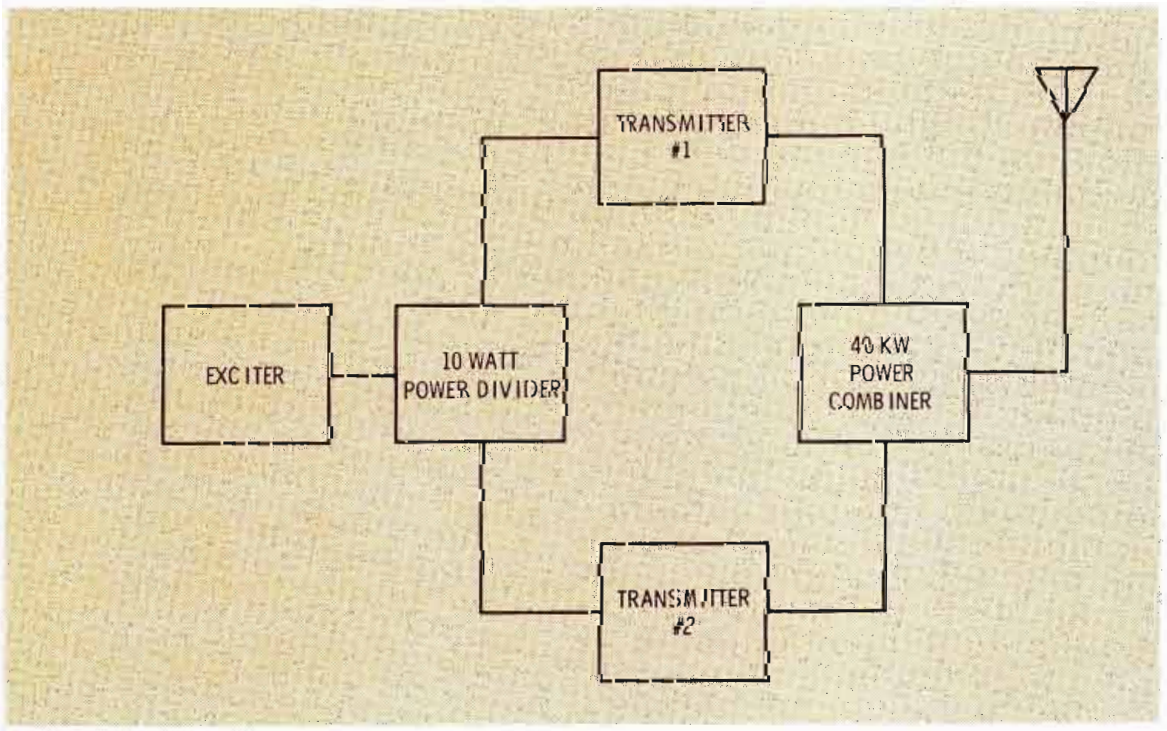


Fig. 1 The basic arrangement for dividing the exciter input and combining the power output of parallel FM transmitters.

The use of parallel FM transmitters has been a reality for many years, but until recently they've received only limited usage. Today, the changing climate of FM broadcasting has suddenly made it a very attractive alternative to the conventional single transmitter. Accordingly, an understanding of its innerworkings may prove timely to those contemplating the purchase of a new transmitter.

The number of FM's appearing among the dominant stations across the country increases almost daily as FM finally comes into its own. Making large capital investments for the purpose of increasing coverage area has become for the first time, not only a noble gesture, but a profitable venture. In a forceful move to put themselves on an equal footing with AM, large numbers of FM stations have made massive increases in power and converted to dual or circular polarization. Transmitter power requirements have

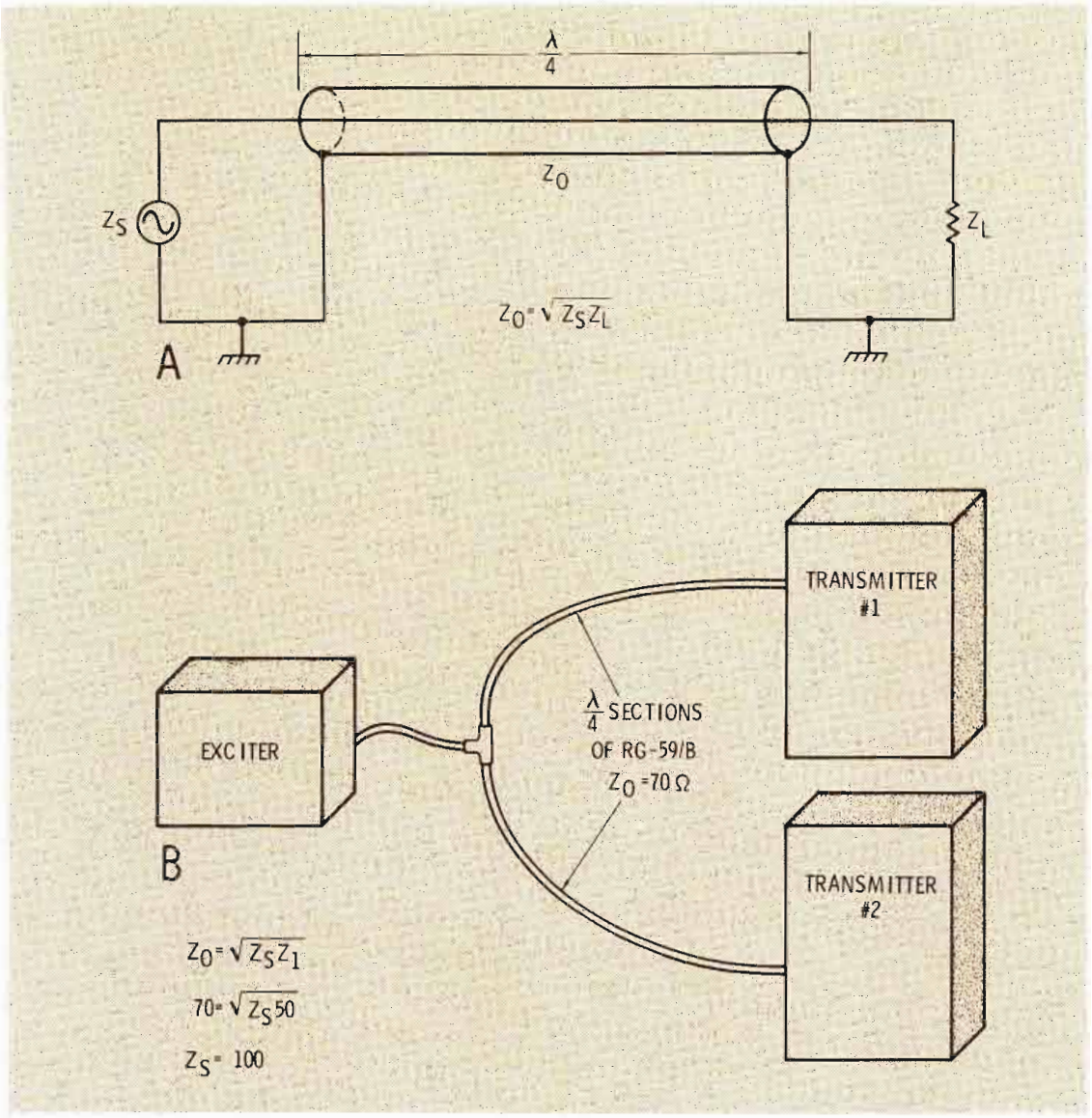


Fig. 2 At "A", unequal source and load impedance can be matched. At "B", two 100 Ohm loads are paralleled to effect an acceptable load to the exciter.

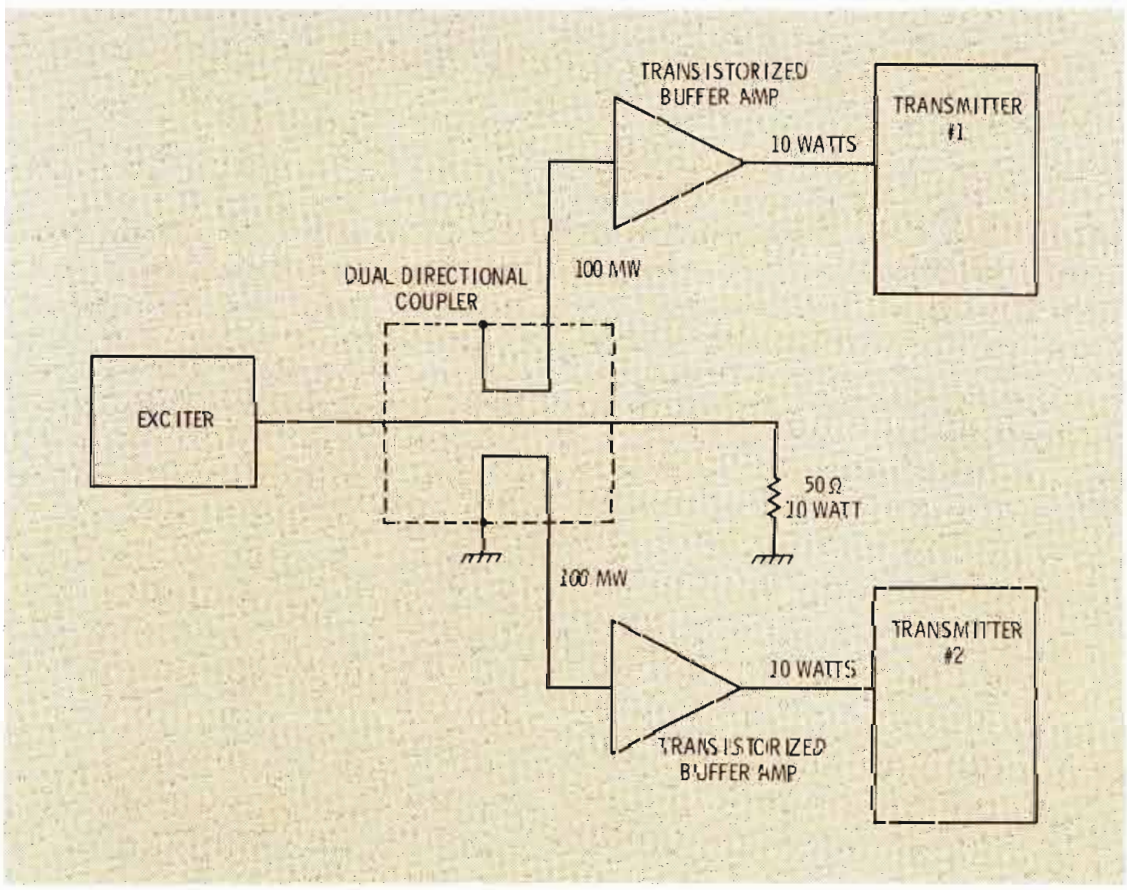


Fig. 3 Two 100 milliwatt samples are obtained from the coupler and fed to a pair of buffer amplifiers.

skyrocketed as a result, often doubled or tripled. This has been sufficient to push the needs of a substantial number of stations above the 20 to 25 kilowatts available from a single transmitter. To fill the need for higher power capabilities, some equipment manufacturers are opting in favor of paralleling two transmitters, rather than retool for a single 40 kilowatt unit.

In addition to the obvious economic advantages, this solution offers the broadcaster transmitter redundancy; besides having a higher carrier power than was previously possible, an FM broadcaster with this system who suffers a catastrophic failure of one transmitter is still on the air at reduced power with the other. In most cases this lessened signal is still sufficient to blanket the primary service area. Some enterprising broadcasters have taken advantage of this built-in back-up by ordering tandem transmitters for lower power levels, even where the need could have been filled by a single unit. Two 10 kilowatt transmitters have been paralleled for 20 kilowatts TPO (transmitter power output), two fives for ten, and so forth.

A Look Inside

While today's parallel powerhouse is essentially no more than two identical smaller transmitters with a common control cubicle placed between them, the obvious question of how to get two transmitter outputs into one feedline introduces two new pieces of hardware. The first must divide the exciter output into two equal, constant-phased parts while maintaining proper exciter loading. The other must constructively combine the two transmitter outputs while presenting the proper load to each. Figure 1 illustrates the arrangement in its simplest form.

Each manufacturer has devised a slightly different method of dividing the excitation. By far the simplest is the **quarter-wave-transformer** used by Collins in its 831H-1. It takes advantage of the ability of a quarter-wave line to transform impedances. Any source and load of unequal impedance can be properly matched by a quarter-wave section of line having a characteristic impedance equal to the square root of the product of the source and load impedances: $Z_O = \sqrt{Z_S \times Z_l}$ where Z_O is the characteristic impedance of the line, A_S is the source impedance, and Z_l is the load impedance (see Figure 2a).

Collins has used this property to transform the 50 Ohm input impedance of each transmitter to 100 Ohms using a section of 70 Ohm line (RG-59/B). The two 100 Ohm loads are then paralleled to effect a load of 50 Ohms, which is acceptable to the exciter (see Figure 2b). Twenty watts of exciter output provides sufficient drive to both transmitters without intermediate buffer amplifiers.

AEL uses a dual directional coupler for the power divider in its FM-25/25KD. Exciter output is fed through the coupler and terminated in a 10 Watt load. Two 100 milliwatt samples are obtained from the coupler and fed to a pair of transistorized buffer amplifiers which in turn drive two transmitters (see Figure 3). This approach offers the added advantage of providing total isolation between the transmitter inputs.

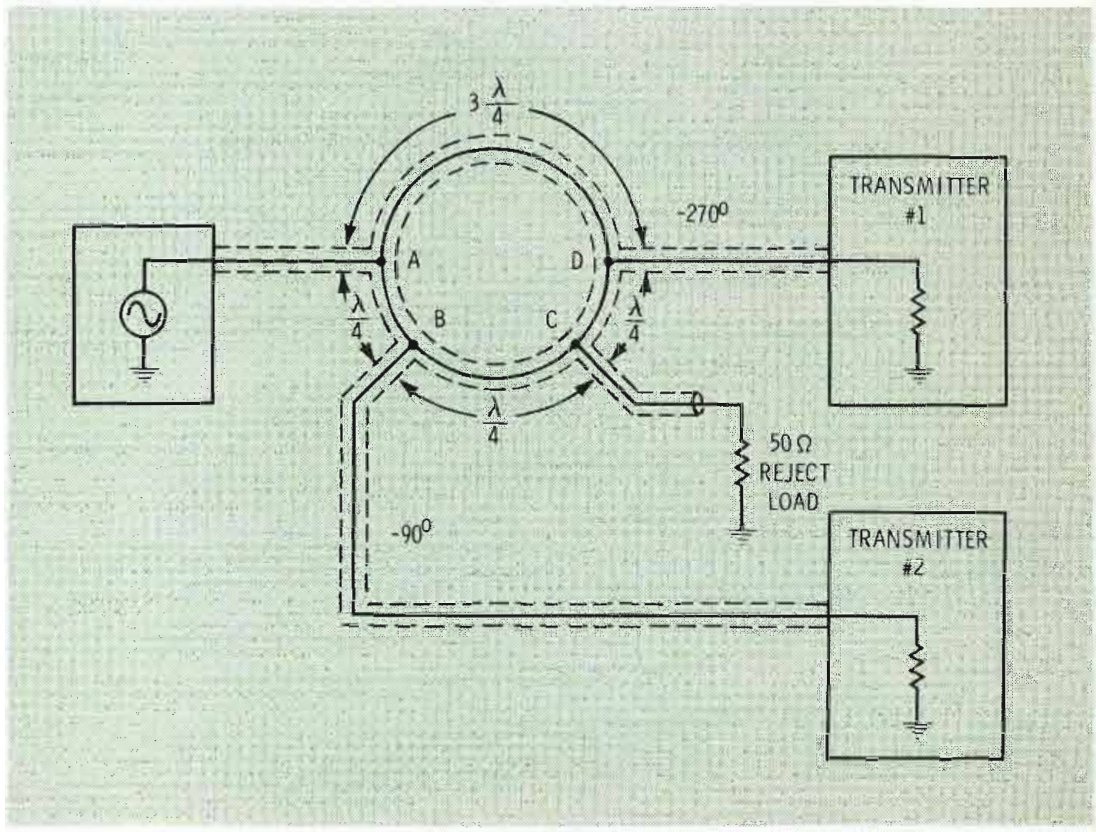
RCA has solved the power division puzzle in yet a third way with a **ring hybrid.** The hybrid is an essentially lossless device used to combine two input signals **or** to divide one input signal into two output signals. This version, the ring hybrid, consists of a series of quarterwave sections of coaxial line arranged in a ring as shown in Figure 4; hence the name.

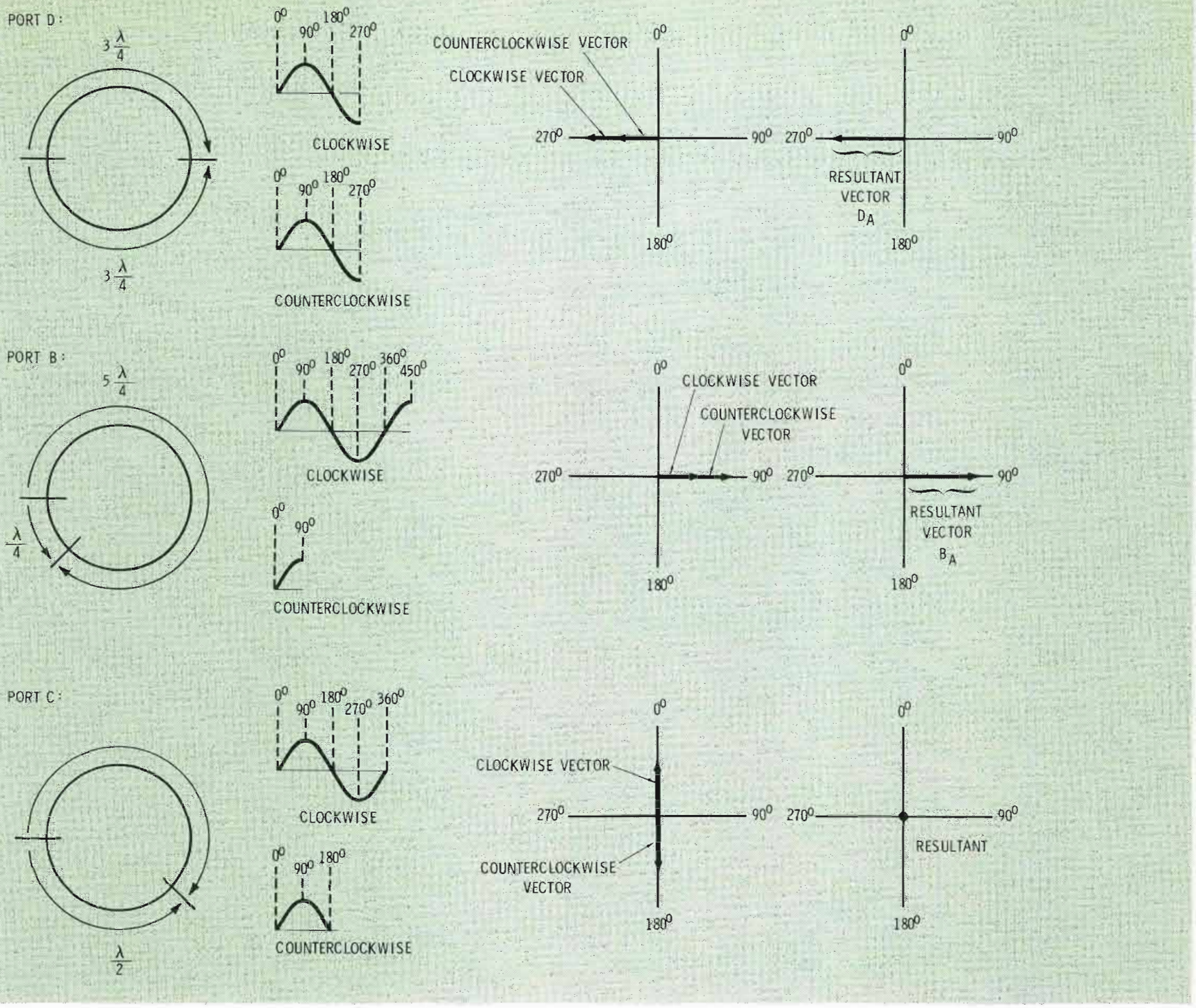
An input introduced at port A will propagate at the same rate in both directions around the ring. Both waves will arrive at output D displaced 270° (three-quarter wavelengths) from the input. They are added vectorially to produce an output of the same phase. We shall call this resultant **principal vector D_A** (output at port D introduced by port A). This output is used to excite transmitter #1.

Waves arriving at port B are displaced from the input by 450° and 90°. Four hundred and fifty degrees simplifies to 90° and the waves are again in phase with each other. They are added to produce resultant principal vector B_A. This output excites transmitter #2. Notice that there is a constant phase relationship of exactly 180° between outputs B and D.

Output port C is terminated in a 50 Ohm load. This is the **reject** load and serves as the balance point of the hybrid. The clockwise and counter-clockwise propagating waves arriving at port C are dis-

Fig. 4 The ring hybrid shown here consists of a series of quarterwave coax sections arranged in a circle.





placed from the input by 360° and 180° respectively. The waves cancel by vector addition and the output to the reject is zero **provided that** outputs B and D are terminated in the characteristic impedance of the ring. Mistermination of either output will cause standing waves and unbalance the hybrid. As a result the vectors do not cancel completely and power appears in the reject. This property is cleverly used to match tune the input networks of the two transmitters. After both driver grids have been roughed in by tuning for maximum grid current, final adjustment is made by tuning for zero reject power as red on the wattmeter in the reject line.

It is worth noting at this point that all propagation-dependent matching devices, including the

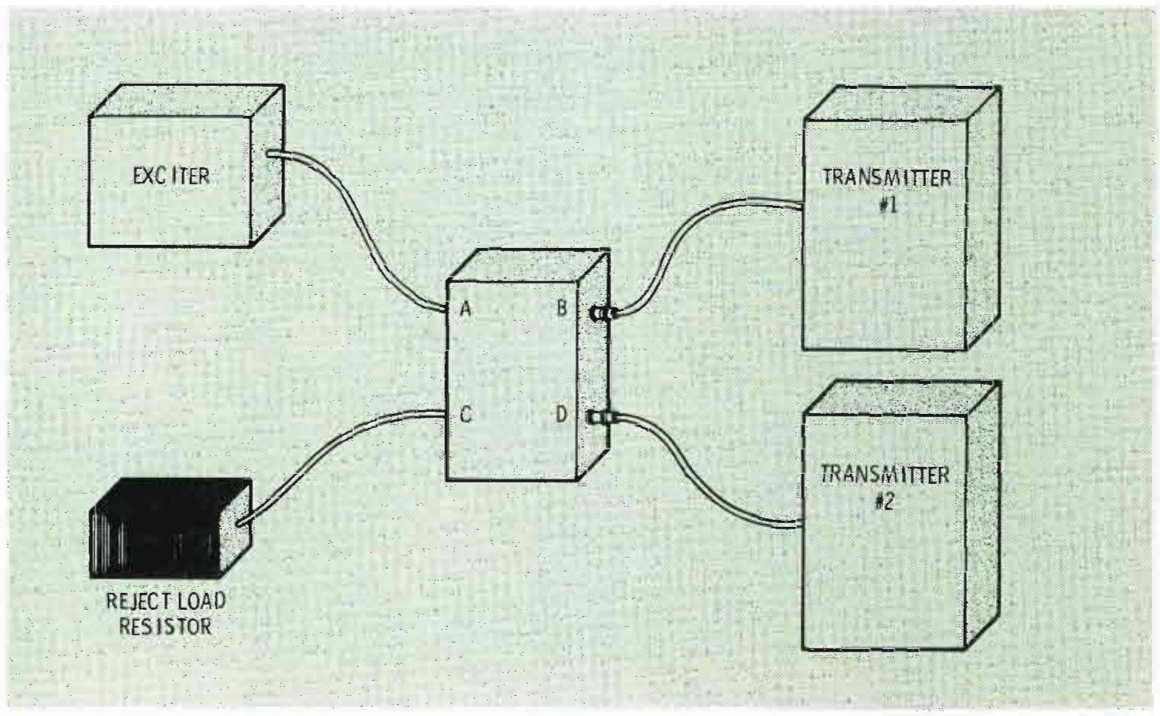


Fig. 5 The Gates power division plan relies upon the current-phase relationship of two tightly coupled inductive loops.

quarter-wave transformer and the ring hybrid, function only at or very near the frequency for which the line sections are cut.

The RCA exciter produces 15 Watts of drive which is sufficient to drive both transmitters without intermediate buffer amplifiers.

Harris (Gates), in its unique design boosts the exciter output first to twenty watts in an intermediate buffer amplifier. Power division is then accomplished in a prefabricated electromagnetically-coupled hybrid as in Figure 5. This device performs identically to the ring hybrid, although the approach is somewhat different and more complex. The electromagnetically-coupled hybrid relies on the current-phase relationship of two tightly coupled inductive loops for its power division and output phase relationship.

Recombining

Unlike the 10 Watt level where efficiency is a minimal concern and 3dB comes cheap, efficiency becomes a primary consideration when choosing a method to recombine. With a typical power transfer efficiency of 99 percent, the hybrid lends itself well to this task also and has been the unanimous choice of all four manufacturers.

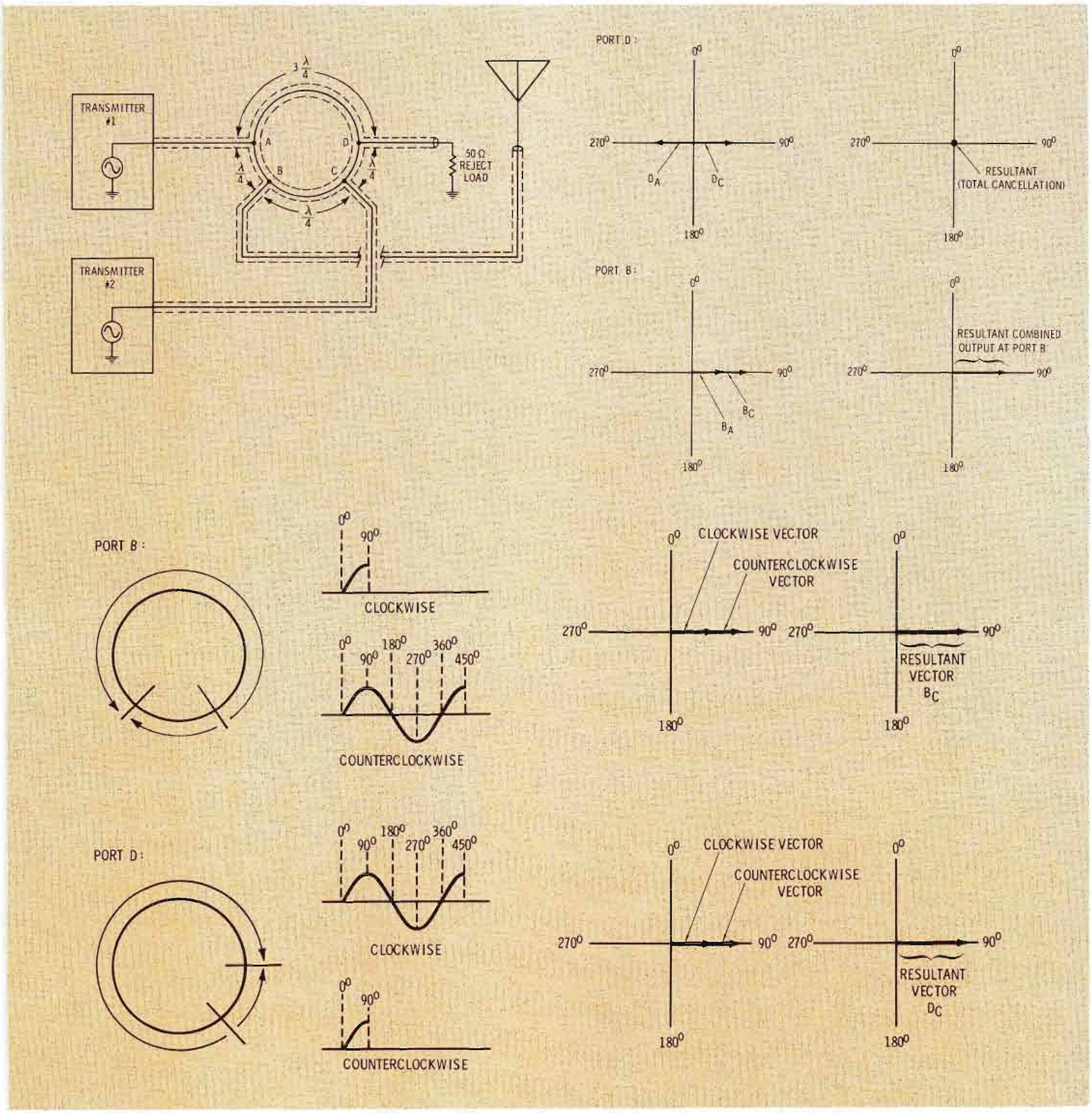
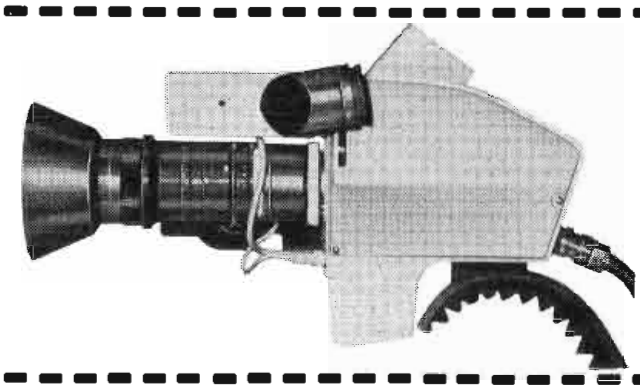


Fig. 6 To create the recombining hybrid, the reject load is removed from port C and a second current generator is connected in its place. This input should be exactly in phase with the input at port A.



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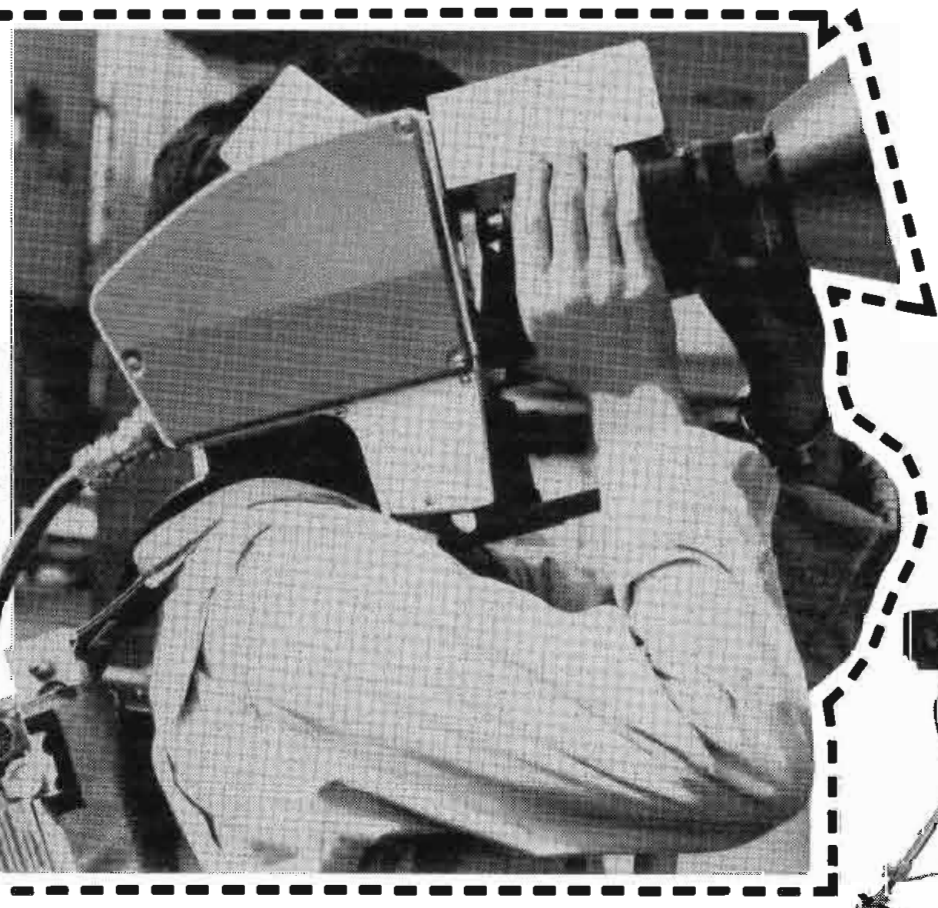

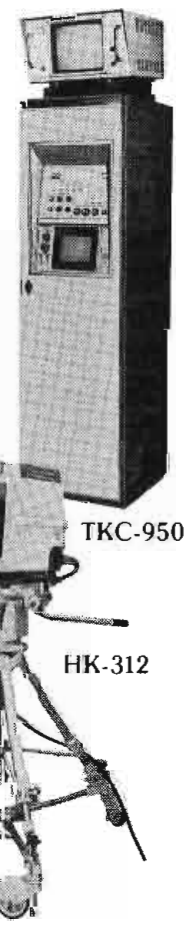

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A ring hybrid of quarterwave line sections heavy enough to carry 40 kilowatts would be a most unwieldy beast. As a result, the electromagnetically coupled hybrid is again used. While the internal wave mechanics of the coupler go beyond the scope of this article, its operation is identical to that of the ring hybrid and we may continue to refer to it for analysis.

To create the recombining hybrid, the reject load is removed from port C and a second current generator is connected in its place. This input should be exactly in phase with the input at port A (see Figure 6).

Ignoring the input at A for the moment, the clockwise and counterclockwise propagating waves from input port C arrive at output port B delayed by 90° and 450° respectively. These add in phase to form principal vector B_C (output at B induced by C).

The same analysis of port D yields principal vector D_C.

Reconsidering the input at A, we find that there are two principal vectors present at port D: D_A and D_C. D_A has a phase with relation to the inputs of -270°. D_C has a phase of -90°, exactly 180° out. If input power at A equals input power at C, these vectors will have equal amplitude and will cancel completely leaving zero output at port D. D is then the reject port when the hybrid is used in the combining mode.

Vectors B_A and B_C are present at output port B. Both have a phase with relation to the inputs of -90° and will add constructively. Port B becomes the combined or antenna output when the hybrid is used in the combining mode.

Excepting heat losses, combined output power will equal twice the input power at A or C, and reject power will equal zero; provided the original requirements are still met: 1) input power at A equals input power at C, and 2) inputs A and C are in phase.

Maintaining these two conditions constitutes balancing the output hybrid and is the key to parallel transmitter operation. If these conditions are not met, but one knows the magnitudes and phase relationship of the two inputs, output may be determined by the formula:

$$n = 100\left[\frac{1}{2} + \frac{\sqrt{a}\cos\theta}{a+1}\right]$$

Where **n** is output power expressed as a percentage of total input power, **a** is the power ratio of the two inputs, and θ is the phase angle.

If only one of the criteria is violated, the formula can be simplified. If a = 1, then:

$$n = 100\left[\frac{1}{2} + \frac{\cos\theta}{2}\right]$$

If θ = 0, then:

$$n = 100\left[\frac{1}{2} + \frac{\sqrt{a}}{a+1}\right]$$

It is safe to say that these formulae are purely academic as one will seldom if ever use them in day-to-day operation; however, the graphs of the latter two equations as shown in Figure 7 are helpful in demonstrating the functional relationships of the hybrid.

It is interesting to note that if either input is shifted 180° out of phase, no power appears at the antenna and all power appears at the reject.

The hybrid discussed thus far is a **0° hybrid** (the inputs are in-phase) as used by Collins in its 831H-1. The remaining manufacturers utilize a **90° hybrid.** Operation of this device is identical to that of the 0° hybrid with two exceptions: 1) for proper operation, input C will lag input A by exactly 90°, and 2) sine must be substi-

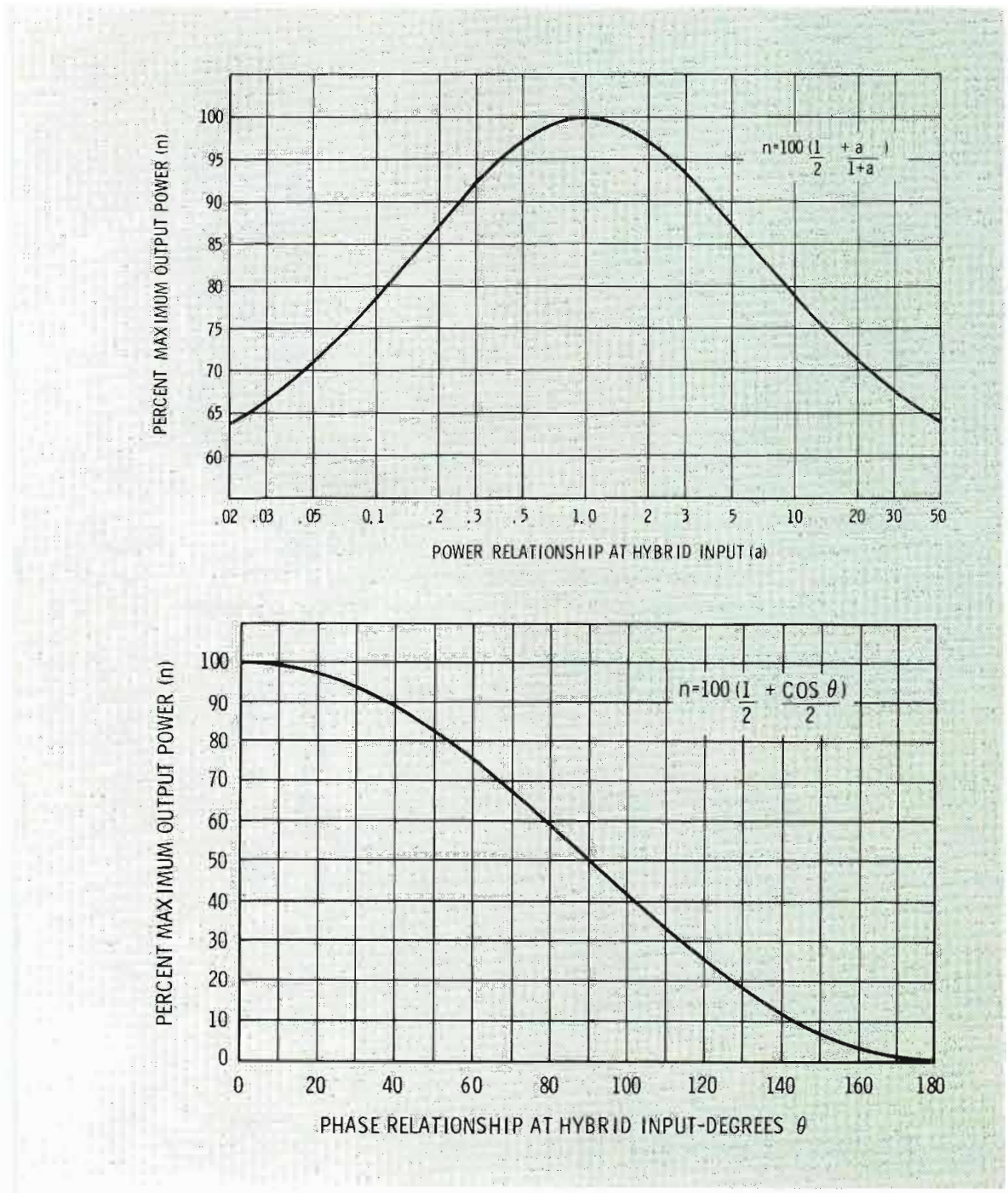

Fig. 7

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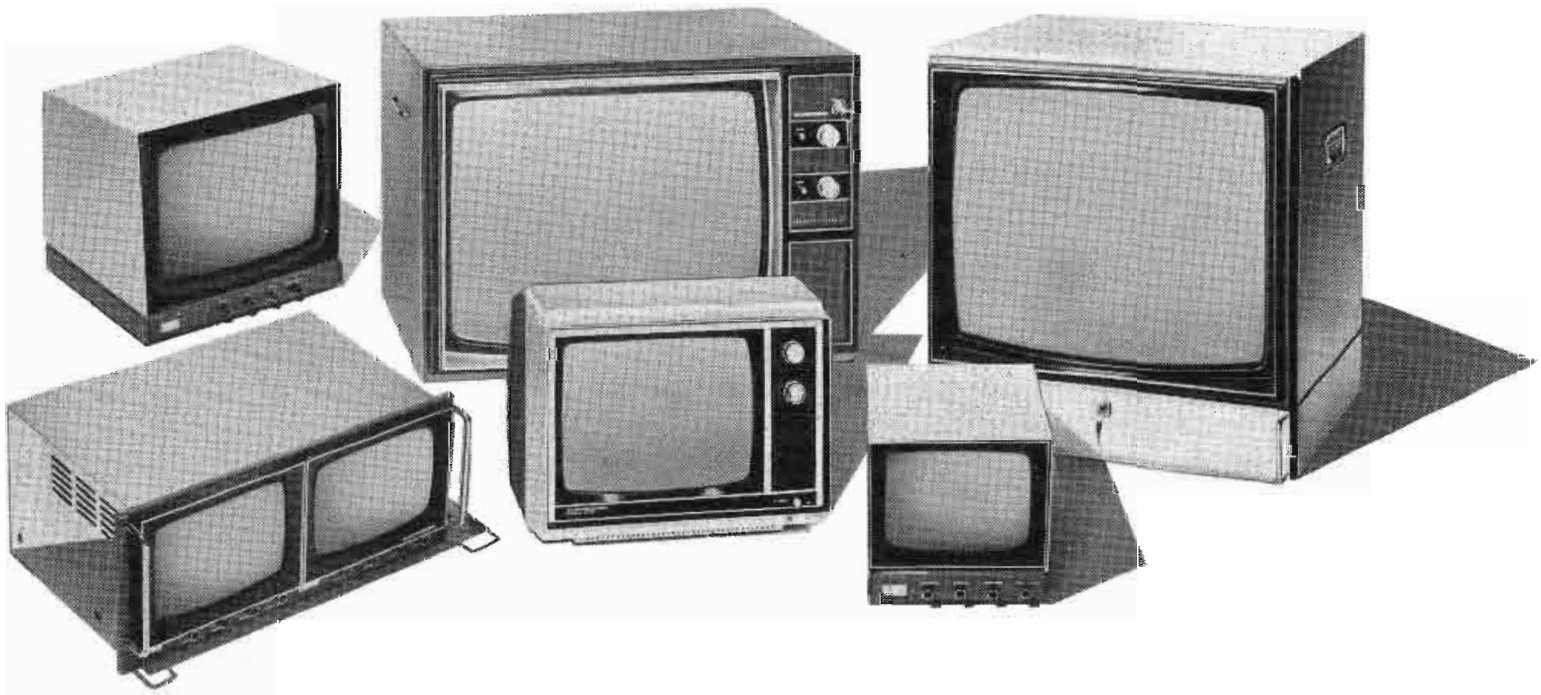

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tuted for cosine in the output power formula.

One Down - One To Go

Let's consider what happens in the event of a failure of one transmitter. Two 20 kW transmitters paralleled for 40 kW will deliver only 10 kW to the antenna if one transmitter shuts down, not 20 kW as one might suspect. Lacking the second current generator (transmitter), the hybrid operates in the divider mode, splitting the remaining 20 kW of input equally between ports D and B, which are now the reject and antenna respectively. The maximum power dissipated by the output reject load occurs at this time. Accordingly, the power rating of the reject will be equal to or greater than one-half of the output power of one transmitter. A 40 kW transmitter will have a 10 kW load or larger.

These loads are forced-air cooled at their full rating. However, during two-transmitter, balanced-hybrid operation, reject power drops to only a few watts and simple convection cooling becomes sufficient. As a result, the cooling fans can be thermostatically controlled to operate only when the load temperature exceeds and preset value.

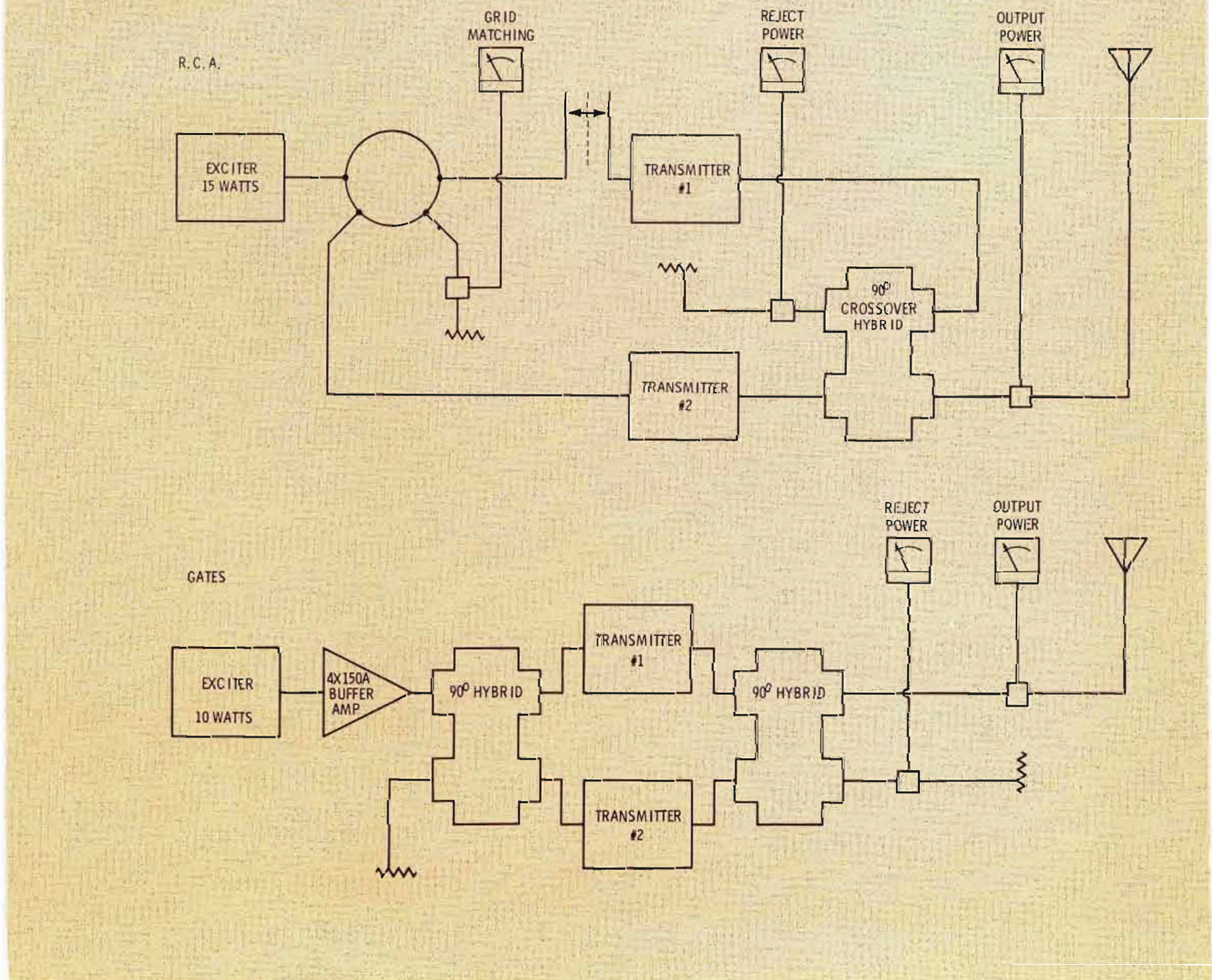
During single transmitter operation, the hybrid provides a degree of isolation to the inoperative transmitter (typically 25-35 dB), allowing it to be worked on while the other transmitter continues to operate.

Achieving The Balance

By definition, reject is zero when the hybrid is balanced. As a result, achieving this condition is simply a matter of inserting an in-line wattmeter between the hybrid and the reject load, and adjusting transmitter balance and phase relationship for zero reject power.

Maintaining equal power is simply a matter of trimming the output of one transmitter to match that of the other. The phase parameter, a little more complex, is a function of four factors: 1) output phase rela-

Fig. 8 The basic parallel transmitter arrangement of Figure 1 has now developed into these four variations.



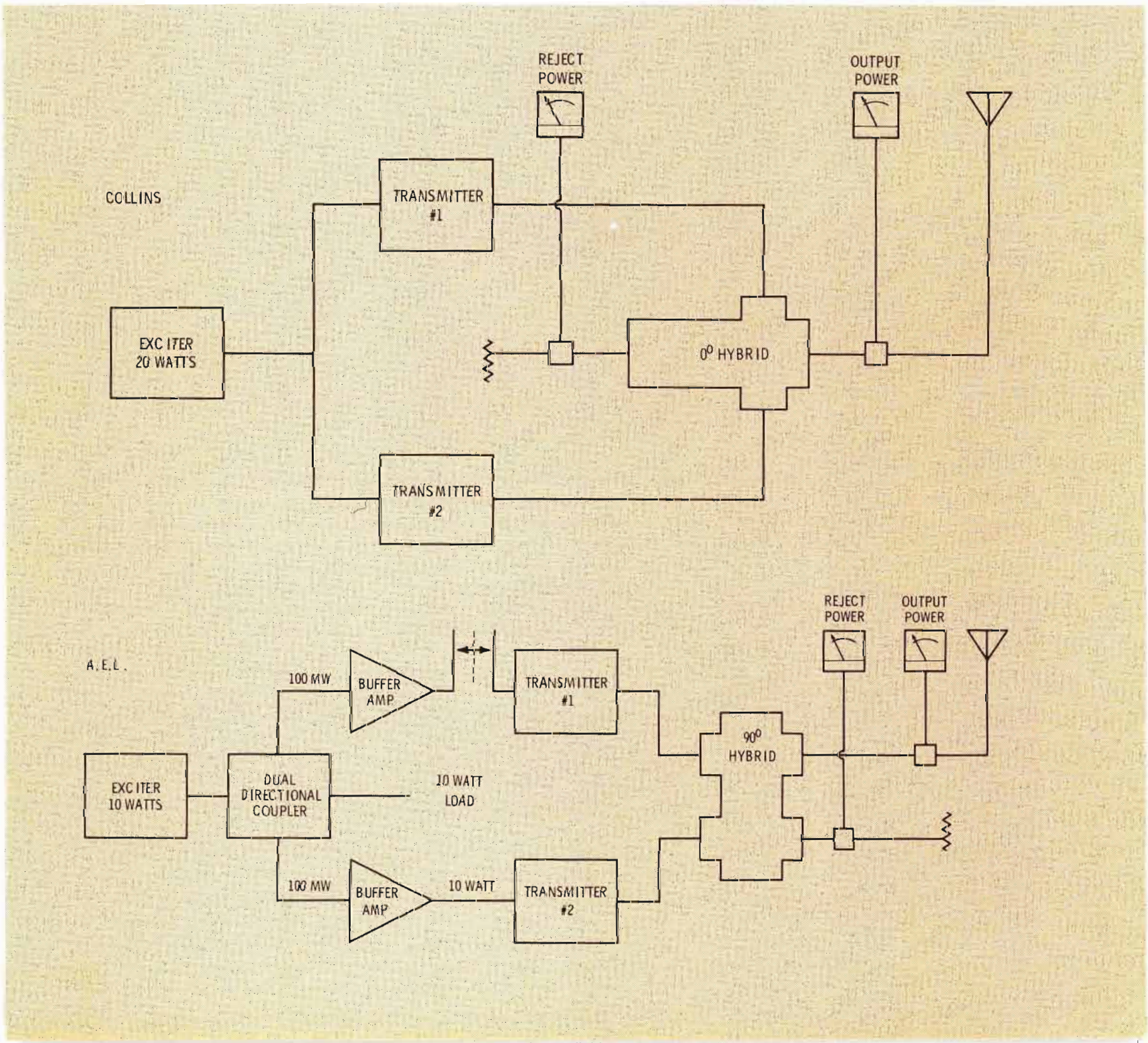
tionship of the input power divider, 2) any length difference of the coax lines feeding the transmitters, 3) unequal amounts of phase delay in the two transmitters, and 4) any length difference in the feedlines between the transmitters and the combiner. Of the four, three are fixed by design. Only the transmitter phase delay is likely to change after installation.

A particular transmitter operating on a particular frequency, with a given setting of the tuning controls, will have a constant finite phase relationship between the input and output signals. Hypothetically, a second identical transmitter operating on the same frequency will exhibit the same phase relationship; however, due to component tolerances, tube aging, and tuning differences, such is seldom the case. Some field-variable means must therefore be provided to compensate for unequal phase delay of the transmitters.

Manufacturers are divided into two camps on how to accomplish this goal. Collins and Gates take advantage of the natural phase shift induced by an LC network as it is tuned to either side of resonance, and utilize it to advance or retard the output phase of one of the transmitters. Both transmitters are tuned up at the desired power in the same manner as if they were individual units. The PA plate tuning of one transmitter is then readjusted for the proper phase as indicated by minimum reject power. Due to the low loaded Q of the PA network, the vernier PA plate tuning affects phase more rapidly than tuning.

AEL and RCA insert a General Radio "Trombone Line" in the excitation input line to one transmitter. The Trombone Line, sometimes known as a "Line Stretcher", is quite similar in both appearance and function to the slide of a trombone. By varying the position of the slide, the electrical length of the line, and hence the input phase to the transmitter, is adjusted.

The basic parallel transmitter in Figure 1 has now developed into four detailed variations in Figure 8.



Avoid those visible color faults

By Walt Skowron and Jim French

Maintaining consistent color phase is a "must" to keep normal fleshtones when you use special effects, supers and chroma key during a color production. Various cable lengths and amplifiers can create delays and different burst angles according to their location in a color video system.

FCC specifications stipulate that the color burst phase must be within 10 degrees of the 3.58 MHz reference, a reasonable, easily achievable specification. However, additive and subtractive burst angles could equate total system errors that are greater than 10 degrees. Phase shifts greater than 5 degrees can distort normal fleshtones, creating visible color faults. These could result from normal aging of various components throughout the system.

Color sub-carrier burst phase requires close attention to prevent visible color faults (objectionable hue shifts) during a production. The Vectorscope is commonly used to observe the burst phase of cameras, VTR's and other production equipment. The Vectorscope is referenced to the 3.58 MHz signal from a sync generator and is commonly connected to the output of a switcher to verify the phase of its many inputs.

Usually, the one and only Vectorscope is connected to the output of the switcher or line during a production. Ideally, a Vectorscope should be located at these many locations: video control center, time-base corrector, each H-phased video tape recorder and output of the switcher to give the engineer an opportunity to observe color faults (phase) in all of these locations.

If a Vectorscope is not available, a less accurate method could be used when phasing color cameras. Using a Color bar generator (NTSC standard) or Black burst from a switcher or sync generator and splitting the screen with an effects generator the hue will be modified as the split is initiated or started. Adjust phase in the encoder or camera until no change of hue is noticed. This same procedure should be repeated with each camera or video input and compared to the split screen reference source (Color bars or Black burst). Although this method is quick and can be performed daily as needed without a Vectorscope, it should be considered only when a Vectorscope or burst phase-meter is not available.

A burst-phase meter is a low cost compact replacement for a Vectorscope when phasing color cameras or in a majority of other applications. Similar to a Vectorscope, the burst-phase meter requires only AC power and loop-thru video and sub-carrier inputs. Instead of a CRT display, an analog meter indicates phase shift in the video burst relative to the sub-carrier. A front panel zero adjust permits nulling the meter to a chosen re-

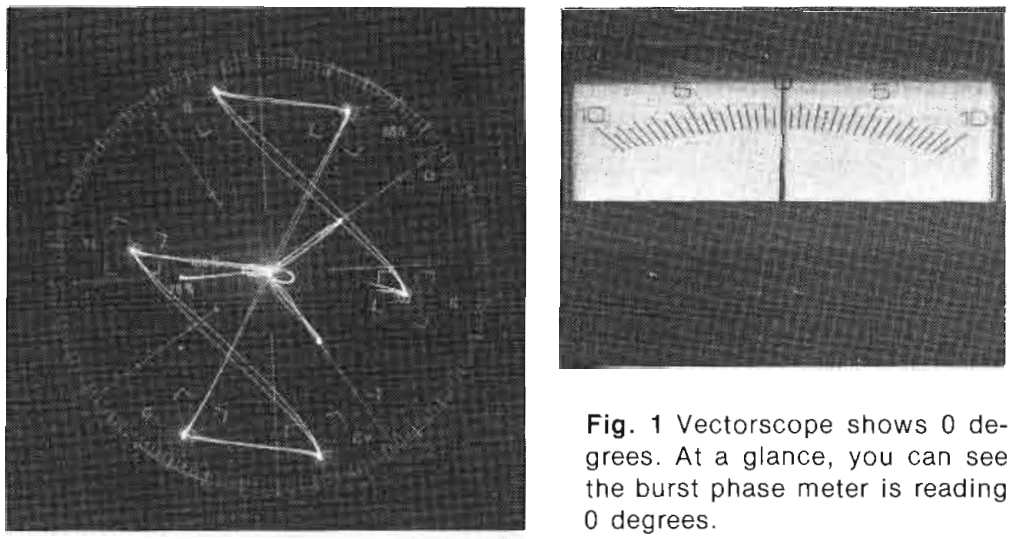


Fig. 1 Vectorscope shows 0 degrees. At a glance, you can see the burst phase meter is reading 0 degrees.

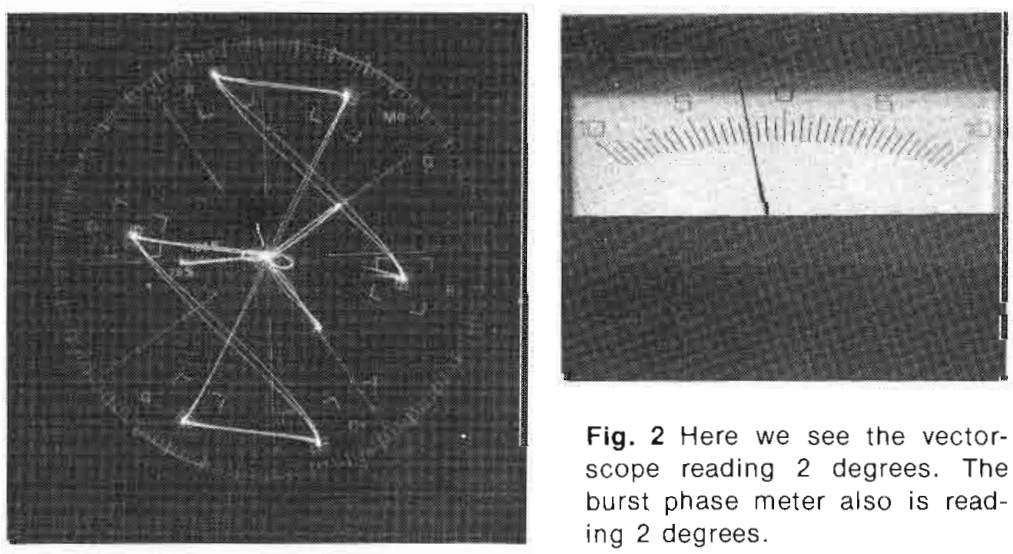
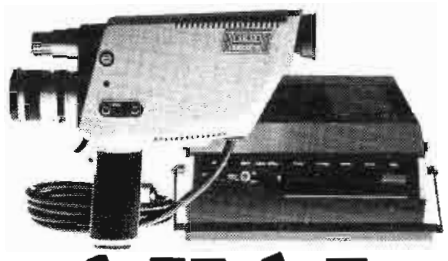


Fig. 2 Here we see the vectorscope reading 2 degrees. The burst phase meter also is reading 2 degrees.



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Gordon F. Galbraith, WXLT
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Larry Estepa, WLYH
"We'll be saving about $11,000 per year in film costs with the Akai VTS-150."

C. Stephen Currie, WCBD-TV
"On film costs alone we're saving about $15,000 a year with the VTS-150."

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Table 1

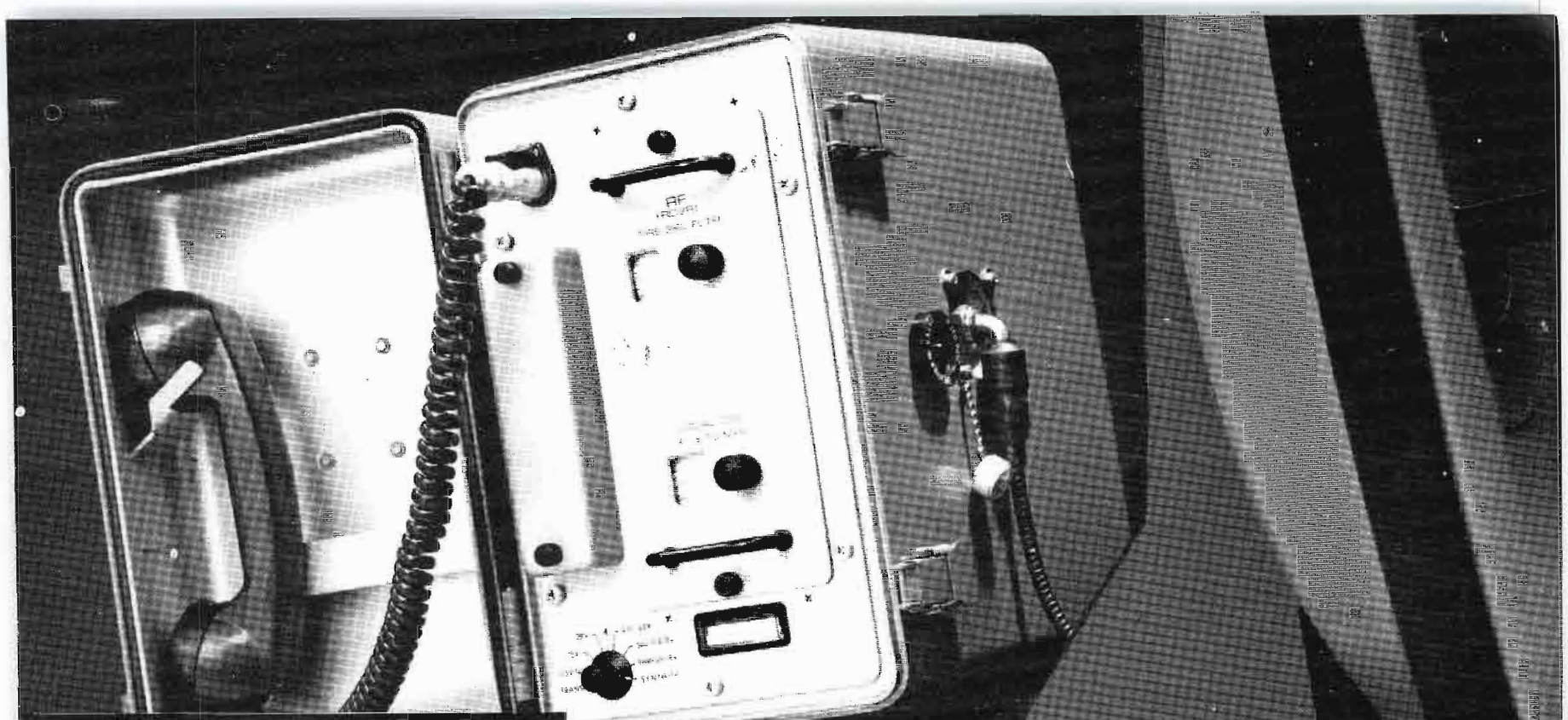
Features	Burst Phase Meter	Vectorscope
Operation	Unskilled operator	Tech/Engineer
Weight	Less than 2 lbs.	More than 20 lbs.
Size	Small	Large
Cost	Under $400	$1,500 to $3,000
Applications		
Switcher, Camera Phase	Yes	Yes
VTR Phase	Yes	Yes
Encoder/Color Bar Set-up	Phase only	Yes
Benefits		
Phase Range	180° (360° with coax delay line)	360°
Warm up time	30 seconds	5 minutes
Phase Accuracy	1/2 degree	1-2 degrees
Calibration Frequency	Monthly	Daily

ference video signal, such as NTSC Color bars. Other signals which are then switched to the burst-phase meter video input may be adjusted to match the burst-phase of the reference.

The burst-phase meter permits an accurate method of adjusting video equipment. (See Figures 1 and 2.) Accuracy of a burst-phase meter is typically 1/2 degree. After initial calibration the burst-phase meter can be used to verify burst-phase before and during a production.

The burst-phase meter and Vectorscope are both ideal instruments to measure and adjust burst-phase. Those who own Vectorscopes will find that their scope is mandatory for Color bar and encoder set-up; however, for general purpose applications the color burst phase meter's accuracy and simple operation should make it a welcome addition in the many locations where burst-phase errors need to be observed.

The table below compares the features, applications and benefits of each.



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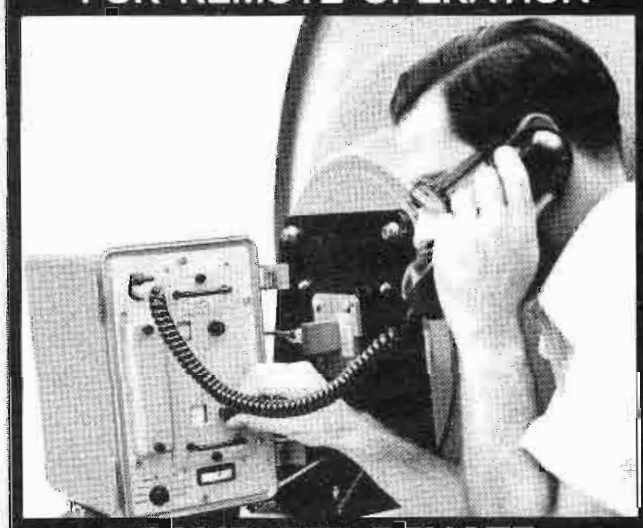

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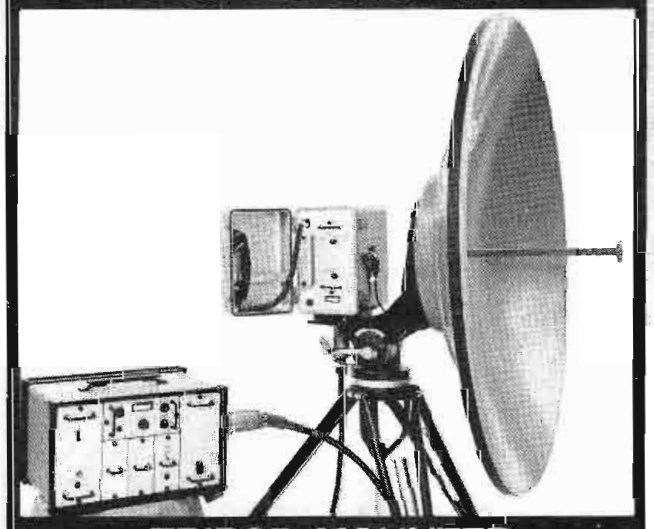

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BE records the birth of a midnight special

By Dennis Ciapura

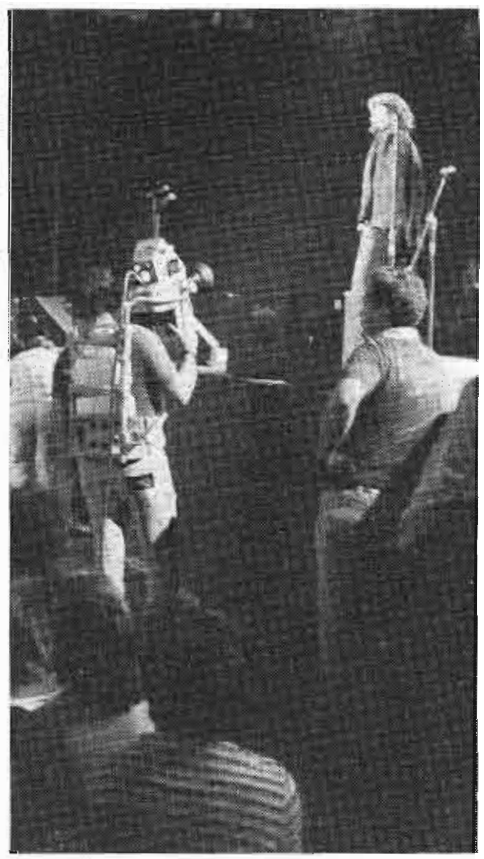
Not too many years ago, top rock groups avoided TV remotes like the plague and often for good reasons.

Many of these groups had millions of dollars invested in an image, that intangible and fragile gossamer veil of illusion that the PR people so carefully weave. This image has two components that are physical and a third which is almost mystical. The physical components are the sound that the group makes and the visual impact of the act and these together with the publicity effort form the third component, mass appeal.

In the early days, TV was ill-equipped to transfer the physical components with sufficient accuracy to convey the image. One of the biggest shortcomings was in the audio. Even though millions of records were sold based on what came over a 4-inch speaker in AM radios, TV viewers often observed that many groups didn't "sound the same" on TV. The reason for the difference was no mystery: the TV audio crew attempting to mix it live simply couldn't duplicate a studio job with multi-track mixdown, EQ and effects. As a result, many TV rock shows began to use the record itself for audio while the performers "mouthed along", hopefully in sync.

The sonic bash was usually obvious to the viewer as more and more people observed that "they're not really singin' that". Most of the rock groups are literally colorful as well as artistic, so in the days prior to high color set penetration, part of the visual impact was also lost. We've all seen some shows where the production and stage work left something to be desired: I even remember one broadcast where the electric guitars and amps had no cables attached! Since the audio came from a record, somebody must have figured it wouldn't matter.

Clap for the Wolfman! Wolfman Jack warms up the audience before the show begins.



Note the portable camera in use here adds another dimension to the show.

Something New

All of this describes exactly what the "Midnight Special" broadcast **IS NOT**. The "Midnight Special" audio is definitely "pro" and the video is super. This program was the first to make successful network music in the early, early morning time slot and has been doing so for three years. The success of the production is obvious, so, we decided to find out how it was done, how the "image" is preserved. Scores of the world's top musical groups have appeared on the "special" indicating that the old wall that kept many groups off TV has been broken down, largely due to improvements in technology along with a production technique that gets it all together and puts it in the living room, image intact.

When we heard that a taping would be done at the University of Chicago, in the gym no less, **BE** decided to take a look at how a "Midnight Special" is born under what are probably the most adverse conditions.

The program is produced for NBC by Burt Sugarman Inc. of Los Angeles and is a team effort in the purist sense of the word. The Chicago taping involved several companies, each a specialist in it's field. About 90 percent of the technical personnel came from WMAQ-TV in Chicago. Unit manager Tom Hulbert and his production crew came in from NBC, Burbank, California. Wayne Smith, field operations supervisor for WMAQ handled the logistics problem of getting all of the necessary people and equipment on the scene and operating, and what an operation that is.

Video control was provided by WMAQ and occupied two tractor trailer type vans. Olympic produc-

This is the mobile multi-track studio of Metro Audio.

tions of Berwyn, Illinois was the video tape contractor with two Ampex 1200's and auxiliary equipment in another van of their own.

The audio was fed out of the gym to a fourth van, the mobile audio control center of Metro Audio Inc. of Detroit.

The audio portion of a TV music program is critical and Metro handles the situation with aplomb from its nerve center nickname, "The Capstan Roller". Inside this rather sophisticated van are two Scully 16-track recorders. A Scully two-track, a custom built 16-channel board with 24 microphone inputs, stereo pan pots, EQ on every channel and all of the auxiliary equipment needed to produce a truly professional multi-track master.

Chuck Buchanan, Metro's owner, and Metro engineer Scott Smith spent about two years getting the system together and came up with an amazingly flexible mobile audio unit. The van even has closed circuit TV gear as well as the usual audio talk-back facilities. Mixing for the "Midnight Special" was done by Joe Ralston from Burbank who is one of the top audio men in the industry.

A New Art

After the video is edited, the mono mix-down of the multi-track master is transferred along with any additional "sweetening", onto the video tape in sync with the video. The Metro van is, of course, equipped with crystal controlled sync.

For distribution along the network, two dubs are sent to New York and the master and one dub are sent to Burbank. Two copies of the tape are always playing at each

This is a tight view inside the Olympic van, including two VTR's and complete switching and video monitoring.

Inside the video control van, this is how the engineers see the show.

origination point so that an alternate program feed is available in the event of VTR failure.

Looking Ahead

One of the most incredible aspects of the Chicago "Midnight Special", was the amount of work involved. No less than ten acts were taped in two days of production! Our photos were taken during the March 12th session which included John Mayal, The Strawbs, Wet Wille, Bonnie Bramlett and Roxy Music; all taped in one night! Actually, the session lasted until 2:10 AM the following morning. Rehearsals started at 3:00 in the afternoon and taping began at 8:30 PM, so, you can imagine the amount of human energy that was expended that cold day in Chicago.

If the end is good, the end justifies the means. In the case of the "Midnight Special", the network has found the product more than good for three years. Rock music on TV has come a long way and has actually developed into an art all its own. As we all look forward to stereo audio for TV, I can't help but think about all of those 16-track masters just waiting for a stereo mix-down!

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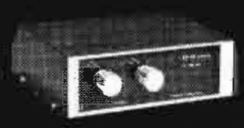
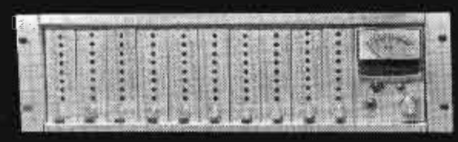
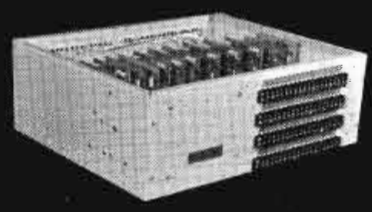


TURNTABLE PREAMPS

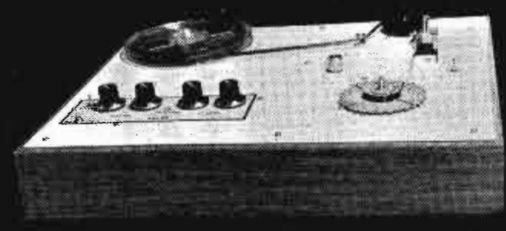
MIC & LINE AMPLIFIERS



AUDIO DISTRIBUTION AMPLIFIERS



AUDIO CONSOLES & CONTROLLERS



AUTOMATIC TAPE CARTRIDGE & CASSETTE LOADERS

STUDIO MONITOR AMPLIFIERS

REMOTE POWER CONTROLLERS

TEN DAY FREE EVALUATION AND 2 YEAR GUARANTEE
INSURE YOUR UNCOMPROMISED SATISFACTION

TURNTABLE PREAMPS

Preamps costing almost 3 times more will not compare with these units. RIAA/NAB equalized ±1db, 0.5MV sensitivity at 1KHz for +4dbm out, balanced outputs, —75db s/n at 10mv in, 0.05% distortion, +21dbm max. out. Internal power supply.

MP-8E Mono $86 SP-8E Stereo $137

MIC & LINE AMPLIFIERS

Dual function and superb performance. Inputs for mic and line, ±0.5db response 10Hz-20KHz, 67db gain on mic channel(s) +26db gain on line inputs. Balanced inputs & outputs, +21dbm out max, 0.1% distortion. Internal power supply.

MLA-1E Mono $98

MLA-2E Dual Mono/Stereo $139

AUDIO DISTRIBUTION AMPLIFIERS

From 1 in/6 out to 20 in/80 out in one small package. Whatever your distribution requirements we have an answer. All units meet or exceed the following specifications: Balanced bridging/matching inputs, balanced 600ohm outputs, ±0.5db response 10Hz-20KHz, ±3db 5Hz-40KHz, 26db gain, +21dbm out. max. capability, 0.1% or less distortion, outputs isolated by 80db, hum and noise 90db down referenced to +21dbm out. Internal power supplies.

DA-6/E	Table top. 1 in/6 out.	$131
DA-6R/E	Rack mount. 1 in/6 out.	$149
DA-6BR/E	Rack mount. 1 in/6 out. Individual level controls for each output.	$165
DA-6RS/E	Rack mount. 1 in/6 out stereo or 2 in/12 out mono.	$229
DA-16BR/E	Rack mount. 1 in/8 out stereo or 2 in/16 out mono. Individual output level controls, selectable metering & headphone monitoring.	$287
DA-2080/E	Rack mount main frame with protected power supply, metering & headphone monitor. Will accept up to 10 slide in modules. Each module has 2 inputs & 8 outputs. Individual output level controls & selectable meter switch. Up to 20 in/80 out.	
DA-2080/E	Main Frame	$150
DA-2080/E	Modules 2 in/8 out	$135 ea.

AUDIO CONSOLES & CONTROLLERS

Our new series 35 audio controller introduces a new concept in audio mixing. Allows separation of controls from the audio functions. Controls can be placed in any convenient location in the studio, while electronics may be mounted anywhere for easy maintenance & hookup. Remote DC control for completely unaffected audio.

This versatility gives you a custom designed console at a standard production model cost.

Features include; 8 channels, mono, dual channel mono, stereo, dual channel stereo, or combinations; paralleling 2 units for quad, fail safe power supply & plug in interchangeable cards.

Performance specifications are; 0.3% or less distortion, 124dbm equivalent noise on low level channels, approximately 25w power consumption, —70db crosstalk, balanced bridging/matching inputs & response within ±2db 20Hz-20KHz. Series 35 audio controllers start at $1200.

AUTOMATIC TAPE CARTRIDGE AND CASSETTE LOADERS

So easy to use & accurate that our largest winder competitor has been using one of these to load their own carts.

Eliminates guesswork. Set the dials to the length desired. The exact amount of tape is fed onto the cart or cassette hub and then shuts off automatically. Also has exclusive torque control for proper tape pack on different size hubs. Winds at 30 IPS.

ACL-25/E $185

Winders also come in higher speed models (ACL-60 series). Same operation as above but winds at 60 IPS. Accepts 14" pancakes.

ACL-60T/E	(tone stop only)	$266
ACL-60B/E	(Blank tape loader)	$331
ACL-60BT/E	(for both prerecorded and blank tape)	$375

STUDIO MONITOR AMPLIFIERS

Exceptional reproduction! Internal muting. ±2db response from 20Hz-40KHz. 25w music power, 20w RMS into 8 ohms. Hum & noise 65db below rated outputs.

Distortion less than 0.25% at less than 20w out, 1% or less at 20w. Works into 4-16ohms. Balanced bridging inputs, variable bass contour, internal overload & short circuit protection.

SMA-50/E	Table top (mono)	$125
SMA-500/E	Rack mount (mono)	$142
SMA-1000/E	Rack mount (stereo-40w)	$196

REMOTE POWER CONTROLLERS (DUAL)

Safe, transient free means of controlling 110V/AC. Turntables, on the air lights, etc.

PR-2	(toggle switch on/off)	$39
PR-2B	(momentary contact actuation)	$54

Give us a call or write today for further details. You'll be money and performance ahead.

CALL COLLECT — (916) 392-2100

WRITE — 3516-C LaGrande Boulevard
Sacramento, California 95823

RAMKO RESEARCH

For More Details Circle (36) on Reply Card

put a **NEW ENGINE** *in your* **VTR**

Are you impressed with the superior tape handling of a vacuum buffered VTR?

For 6% of its cost Recortec R-Mod will *Upgrade* your present VTR to provide

- **RELIABLE REMOTE OPERATION**
- **ELIMINATION OF TAPE STRETCH**
- **HANDLING OF TWO HOUR REELS**
- **CONSTANT SHUTTLE SPEED**
- **FRAME ACCURATE ELECTRONIC TIMER**
- **ACCURATE PLAYBACK OF CUE SIGNAL**
- **AUTOMATIC END-OF-TAPE SENSOR**
- **CONSISTENT LOCK-UP TIME**

R-MOD is a modification package which can be easily installed in the field to provide constant tension for your quadruplex VTR.

R-MOD is derived from reliable hardware used in other proven Recortec products such as

VIDEO TAPE CONDITIONER

VIDEO TAPE EVALUATOR

VIDEO TAPE TIMER

Recortec has handled your tape cleaning for years—now, with R-MOD on your VTR, we'll handle your tape cleanly for years.

See us at

NAB in March

International TV Symposium at Montreux in May.

RECORTEC, INC.

777 PALOMAR AVENUE • SUNNYVALE, CALIF. 94086 • PHONE (408) 735-8821

For More Details Circle (85) on Reply Card

(Continued from page 35)

broadcast TV showed a slo/stop motion unit that uses super hi-band frequencies and performs all the functions of an HS-100, and a few extra, at a somewhat lower price than the Ampex unit. RCA had a CCD color camera on display that made a relatively low resolution color picture of about 150,000 picture elements; however, it could be zoomed electronically by changing the scan area instead of altering the optics. Color CCD cameras are still a few years away, but this demo was impressive as a "state-of-the-art" visual report to the visitors in RCA's booth. Another RCA innovation now available is a fully automatic color correction system for telecines, which worked very well. RCA would not disclose at this time what principle was used to acomplish this important improvement in televised film quality.

The Business Climate

Virtually every exhibitor interrogated claimed that this NAB had a better business climate than those of the last few years. Some manufacturers gave out numbers for orders closed on the floor. Others expressed surprise at how much of the show gear was snapped up by buyers. Every 30:1 Schneider lens being demonstrated on eight different makes of cameras were sold.

Skirpan announced the sale of the largest lighting control system for a domestic studio, ABC's TV-1 in New York. This installation has 360 channels with 130 programmable cues per channel.

Data Disc sold their first unit to a Greyhound racing track in Florida, and Video Memory claimed customer commitments for at least 100 VTR's, mostly from dealers and distributors. Digital Video also said the same number of their TBC's were sold to prospective reps and users.

Richmond Hill Laboratories are now marketing their production switchers through RCA and were pleased with show results.

Bill Orr of CMX expressed satisfaction that ABC has joined the ranks of the other two networks in committing to an off line system that will be used for program editing. Their large screen display attracted most of the networks' top engineering people, including Dave White and Joe Flaherty of CBS, Frank Fleming of NBC, and Jules Barnathan of ABC, as well as Marcel Auclair of the CBC and Maurice Doucet of CTV in Canada.

CDL's new automation control for the ACR-25 is already working in a Metromedia station in Minneapolis. Some of their other products were en route to WGBH, Iowa State, NET, etc. Ken Davies said that this is the first year that people are beginning to understand post-production with automated equipment. He suggested that there was a great need in this area for some standardization so the great variety of new products now emerging could interface easily with each other.

Thomson has acquired CBS Labs, which Michel Boxberger, their U.S. subsidiary president said would give them an R & D base in the United States. They expect to continue to not only produce CBS Labs products, but to market them in the rest of the world through their own sales network. In the

future, they may even assemble Thomson products at the labs if tariff conditions make that advisable.

More Canadian companies are having an impact on the broadcast market. This was evidenced by the booths featuring Central Dynamics, Editel, Digital Video and McCurdy equipment, to name a few.

Marconi's Tom Mayer announced their exclusive worldwide licensing by IBA to produce and market the DICE digital field store standards converter which will change NTSC to PAL or vice-versa at the push of a button. Delivery of this half million dollar unit will start in the second quarter of 1976. They will show the first unit in Montreux in May.

TRI claimed to have over 250 EA-5 editing consoles for helical recorders in users' hands since their introduction of this device last year. Their demonstrations of the Trichroma III often drew SRO crowds at their booth, even though it was practically at the far end of the exhibition hall.

Summary

NAB 75 started with a general concern for the present state of the economy and a specific apprehension that choosing Las Vegas as a convention center would diminish attendance or reduce interest of the delegates to the business at hand.

Neither of these factors proved to be true; notwithstanding the obvious entertainment attractions that abound in America's capital of fun, there was a marked air of sobriety that reflected itself in the detailed interest NAB visitors took in the products on display. At every booth, there seemed to be more serious discussions between broadcasters and manufacturers of the pros and cons of the products and their utility to the end user.

The Ford visit no doubt helped to boost attendance and his luncheon speech was to a packed ballroom with over 2,300 NAB members attending.

The general mood was one of controlled optimism that the broadcast industry would continue to do well in spite of the general recession that some other industries are now going through. Charles Steinberg of Ampex summed up the situation by saying that the "buying mood" of broadcast managers had improved, and almost every other executive on the suppliers' side, from Moscarello of IVC to Maddison of CEI, echoed those remarks, with statements like: "best show ever", "biggest sales in a long time", "good potential contacts", and so on.

NAB has now had two conventions away from the major population centers, both of which provided improved exhibit facilities. It will be interesting to see how the return to Chicago next year, with the new arrangement of having the exhibit at McCormack Place, will work out.

New Harris studio

Harris Broadcast Equipment Division recently completed two additions to facilities in Quincy, Ill. totalling 28,000 square feet. One is a complete TV studio; the other is a warehousing complex.

The studio is designed to demonstrate Harris color TV cameras under broadcast studio conditions. Customers are seated in the studio and may observe actual production progress while viewing the televised picture on two monitors.

NAB

(Continued from page 22)

mission and an FCC notice of proposed rule-making is expected soon. He noted that NAB's position was supported in a separate filing by the Electronic Industries Association, which represents radio and TV set manufacturers.

He said the Radio Re-Regulation Subcommittee also has filed data with the FCC backing NAB's support of remote control of AM broadcasting facilities, revised procedures to permit third class operator examinations at Civil Service Commission test centers, and improved methods of measuring FM and TV aural modulation.

The Advisory Committee Chairman also described tests undertaken to measure and control electromagnetic radiation from broadcasting antennas to meet standards of the federal Office of Safety and Health Administration.

Actual measurements from three network antennas atop Chicago's Hancock Building and "theoretical" readings by computer from the even taller Sears Building in Chicago, he said, were financed by NAB and now are being studied for a cross-substantiation filing to be submitted to the FCC.

Flanders said the severe icing of broadcast towers continues to be a matter of concern to broadcasters. NAB-funded research is continuing, he said, but has been hampered by the "warm winter and minimal icing conditions" experienced during the past winter.

He then turned to proposals for the subtitling of TV pictures—to provide the hard of hearing means of "reading" information provided audibly to others in the TV audience. Captions appearing at the bottom of the screen would not be seen by the average viewer; only by the hard of hearing who would be supplied with a special decoder.

Flanders said the Joint Committee for Inter-Society Coordination, representing commercial broadcasters, and the Public Broadcasting Service have field-tested and studied captioning systems devised by the Bureau of Standards and by the Hazeltine Corp. of Greenlawn, N.Y. A report, he said, "is due momentarily."

NAB's Captioning Subcommittee and JCIC's Ancillary Signal group, he said, also will evaluate experiments now underway by BBC—the British Broadcasting Corp.— in cooperation with London's Independent TV network.

Other topics Flanders covered include NAB filings on the sharing of broadcast channels with land mobile users.

The committee, he said, argued that any channel splitting should be weighted on the side of broadcasters to meet their ever-expanding needs and that frequencies assigned to land mobile on a "reserve basis" should be restored to the exclusive use of broadcasters. The committee, he said, rejected land mobile's arguments that it is in "desperate need for space" and that existing remote pickup channels assigned to broadcasters are "lightly used."

Pending Dockets Reviewed

Pending dockets at the Federal Communications Commission involving technical matters of interest to broadcasters were reviewed for broadcast engineers by James D. Parker, a member of NAB's Engineering Advisory Committee.

Parker, CBS - TV staff consult-

ant, telecommunications, New York, first reviewed the basic procedures involved in FCC rule making "to encourage you as individual broadcasters to participate and to make your views known."

Recalling FCC's establishment of its "Part 73 Task Force" in April, 1972, Parker said the effort at re-regulation of radio and television has resulted in several orders relaxing the rules on a number of technical matters. These include the frequency of meter reading and inspection of transmitting equipment, logging requirements, auxiliary transmitter testing, visibility of transmitter operation of unattended TV auxiliary broadcast stations, posting of operator licenses, and inspection, calibration and testing of TV remote control equipment.

A considerable number of actions still are pending, ranging from elimination of the requirement for meters on indicators on AM modulation monitors to possible changes in TV signal specifications to facilitate international program exchange and the operation of remote pickup broadcast stations.

Electro Sound offers two-year warranty

Electro Sound, Inc., manufacturer of professional audio tape recorder/reproducers, tape mastering and high speed tape duplicating equipment and theater sound systems, has announced that it will issue a full two-year warranty on its ES-500 Series of recorder and reproducer products.

In making the announcement, Robert W. Cochran, vice president of marketing and sales, stated that "this is the first time in the history of the audio recording industry that such an extensive warranty program has been offered. We feel that the Electro Sound ES-500 systems have achieved a degree of reliability that allows us to warrant our products for this length of time. This warranty, effective on all new machines purchased after March 31, will cover any defects in parts and workmanship, with the sole exception of the record/reproduce heads. This includes the capstan idler assembly as well as all other hardware and electronics."

Hewlett Packard technical tapes available

Just released is the 24-page 1975 catalog of video tapes on technical electronics subjects now offered by Hewlett-Packard. More than 200 titles are listed; there is a tutorial series on transistor theory, tapes on troubleshooting solid-state circuits, a tutorial series on digital electronics, many tapes on general measurement techniques, and medical electronics, and a series on using and servicing specific instruments. Many are available in languages other than English, and in color. Standard formats are ½" EIAJ-1 and ¾" "U-Matic" video cassette; others can be ordered.

The catalog is available without charge from INQUIRIES MANAGER, Hewlett-Packard Company, 1501 Page Mill Road, Palo Alto, California 94304.

NEW PRODUCTS

The equipment listed in this month's column was on display at the NAB convention in Las Vegas. Since there were so many products on display, and we want to bring so many of them to your attention, the next several issues will continue the NAB products coverage.

Product information is available on all these items, so all you need do for further information is to circle the appropriate item numbers on the Reader Service Card in the back of this issue.

If there are particular equipment categories you would like to see more information on in these pages, drop a note to the editor, Ron Merrell, and we'll do our best to round up the newest versions.

Before we get into the NAB new products, there are two items that need to be pointed out. First, the new address and telephone number for Wilkinson Electronics is: 7th Street & Chestnut Avenue, Chester (Trainer), Pa. 19013. Phone: 215 497-5100. Also, Thomson-CSF has purchased CBS Labs, so CBS Labs will now be known as Thomson-CSF Labs.

AM Stereo Monitor

In keeping with the newest AM innovation, **Belar** has developed an AM stereo monitor. As mentioned in another section of this issue, RCA demonstrated an AM stereo system. Of course, at this point, much still depends upon how the FCC will handle AM stereo. However, manufacturers already are prepared to gear up.

For More Details Circle (100) on Reply Card

Video Switching System

Vital Industries displayed their VIX-1 video switching system. This system was designed for use in studio production, remote vans, tape dubbing, editing, on-air (with AFV option), and dual switching operation (feeding line with Pgm Bus and taping from Mix/effects Buses).

The VXI-1 features 13 inputs (12 plus color background) on Pgm Bus, 4 key input selections, 4 Buses (Pgm, Mix A & effects A&B, 9 inputs), 8 effects patterns, linear dissolve edge with no spikes or edge transients, and effects pattern border.

The unit also handles preset effects pattern limits, effects entry into mix, and has a built-in black burst and color background generator.

For More Details Circle (101) on Reply Card

Modular Audio Automation Controller

Control Design Corp., has introduced their CD28APM automation controller, and it's a state-of-the-art concept in broadcast automation. The CD28APM is fully solid state, with a modern MOS memory to store program information.

This system gives the operator instant access to 2000 events or features from 12 different sources and may be expanded to 8000 events from 96 sources, including multiple cartridge units, reel-to-reel tape machines, single play machine, the network, etc.

In addition to controlling reel and cart units, the CD28APM controls all random access into cart machines. All multiple machines can be selected ahead of the actual operating program. Each machine is ready for instant use.

All entries into the memory are made with a standard 10-digit key board and 12 simple buttons. The memory withstands power failures by automatically switching to internal battery operation. The system has been designed to operate under the most severe RF interference fields and in extreme temperatures.

For More Details Circle (102) on Reply Card

Time Base Corrector

EduTron has developed a new time base corrector system with a velocity compensator, processing amplifier, and sync generator.

Called the TBC 110, this unit can be used with any helical scan VTR, whether you have H-locked, V-locked or line-locked reel-to-reel or cassette recorders.

The internal velocity compensator continuously adjusts the error correction line by line to prevent color streaking and to reduce velocity error across the entire horizontal line. This is built-in, not an option.

For More Details Circle (103) on Reply Card

Clock/Timer

ESE has developed an up and down counter. That's right, the ES-300 will count up to 100 minutes, as well as from 100 down.

This counter also will allow stops, resets and advances. The key to flexibility is that the counter can be stopped, advanced, set and reset from seconds as well as minutes. ESE also has counters with similar capabilities that can hit 10 minutes (ES-400) and 60 minutes (ES-510).

For More Details Circle (104) on Reply Card

Automatic Remote Cassette Handler

Central Dynamics has a new, unique computer program system that controls 2 Ampex ACR-25's and is an optional accessory to the System 100. Known as ARCH, the system is the master link to the full closed-loop communication, control and monitoring system between an ACR-25 and System 100.

This two-way communications and control data link between two computers is referred to as the "hierarchal" approach in computerese; namely, computers can serve as a communications channel between higher levels of supervision, and also perform as discrete, multi-task controllers.

The capabilities of the ACR-25's dual transports and 24 bin random access are fully realized when interfaced with ARCH.

For More Details Circle (105) on Reply Card

Synchronizer

Automated Processes displayed their Minimag II synchronizer. The unit employs the SMPTE time and control code to automatically synchronize and interlock any two multi-track tape machines, video or audio, sprocketed or unsprocketed.

The unit can be used for maintaining sync for audio "sweetening", including offsets, as well as for: simulcasting TV and stereo FM; remote overdub recording; and for combining an audio mix with a visual medium.

Features include: code generator locked to external video, 50/60 Hz line, or internal crystal, preset in hours, minutes, seconds, frames; 24-hour capture range; master and slave positions that read out simultaneously on two displays; and lockup time of from 2 to 3 seconds.

For More Details Circle (106) on Reply Card

Video Sweep Generator

Datatek introduced their D-630 video sweep generator, a self-contained generator with internal or external sync and blanking. The unit features a wide sweep range that is variable up to 10-0-20 MHz or 20-0-10 MHz with excellent linearity, variable sweep rates, reversible sweep, and manual sweep.

It includes comprehensive marker facilities with fixed markers at 1 MHz and 5 MHz intervals, color and aural subcarrier frequencies, with two continuously variable stop markers and an external marker input.

For More Details Circle (107) on Reply Card

PAL Color Monitor

The **Electrohome** ECV-25P PAL color monitor features a solid state chassis and 315 sq. inch picture tube. Operating and dynamic convergence controls are concealed behind the lockable front panel. The "professional" unit is capable of receiving signal inputs from two cameras and utilizes a camera "A" or "B" selectron switch. Convergence is at better than .75% of picture height and linearity at better than 2%. R.G.B. definition is exacting to professional standards which would be demanded in television studio installations, educational and industrial locales, hospitals or university television centers.

For More Details Circle (108) on Reply Card

Video Graphics Storage System

Datavision Video Products, Mincom Division, 3M Company has introduced and demonstrated their new D-8000 Video Graphics Storage System.

The equipment creates a high-contrast (black & white) video picture of logotypes or line illustrations for direct presentation on television. Additionally, the D-8000 will convert camera images and continuous tone photographs to black and white video art.

According to Frank D'Ascenzo, Sales Manager, "The D-8000 makes it practical for broadcasters to store logotypes and line art in video form for presentation when required. Presentation can be in black-on-white or white-on-black format."

The unit uses the input from any standard, industrial grade, black and white TV camera and converts it to digital information for storage. Designed for use with the Datavision D-4000 Random Access Disc Memory, the system can store up to 30 pictures on each low cost diskette (floppy disc). The D-4000, part of the Datavision D-3400 Video Titling System is currently in use by Broadcast TV stations nationwide. With the D-8000, it is now possible to store both character-generated alpha-numeric information and camera-generated artwork on the same diskette memory.

The D-8000 has a digital memory capacity of 8,192, 10-bit data words. The System is designed to store up to 7,680 transitions representing a fairly complex graphic input.

For More Details Circle (109) on Reply Card

Digital TBC

Television Microtime, Inc., a subsidiary of Andersen Laboratories, Inc. of Bloomfield, Connecticut, announces the availability of the Microtime 640 as a new-generation wide-window TBC, with the ability to correct any non-segmented helical format. Its correction range of three TV lines allows special effects operation with capstan servo'd helicals, locking to "house" sync. In addition, it contains a color sync generator with a genlock function, allowing simple cassette playback or coherent dubs to quad from no-lock VTR's.

The 640 features simplified operation with all-front panel controls, allowing proc-amp set-up, and playback mode function changes to be made without opening the unit.

A unique feature of the Microtime 640 is its ability to interface with any heterodyne V-locked VTR without the requirement of feeding the VTR a CW, or 3.58 MHz control signal. The advantage of this function is that no costly and possibly damaging modifications are necessary on the VTR.

Options to the 640 include the Microtime 720 line-by-line Velocity Error Corrector and the DOC-6 Drop-Out Compensator Module. The 640 is quoted at $12,500 and carries a four-week delivery schedule.

For More Details Circle (110) on Reply Card

Portable Video Camera

Sony Corporation of America has introduced a compact, lightweight, portable monochrome video camera with a large built-in 1.5 inch viewfinder, zoom lens and electret condenser microphone.

The new hand-held camera, which replaces the AVC-3400, is intended primarily for use with the ½" EIAJ AV-8400 VideoRover, and the widely accepted AV-3400 Portapak.

Advantages of the new camera include excellent resolution of over 450 lines, and signal-to-noise ratio in excess of 42dB. The built-in zoom lens has a lower wide-angle setting of 12.5mm with a maximum telephoto figure of 50mm. Additional features include a specially designed noise-free electrical recording start switch, battery check lamp in the viewfinder and automatic sensitivity control.

For More Details Circle (111) on Reply Card

Broadcast Noise Reduction System

A new broadcast noise reduction system is now available from **dbx.** Called the model 142, this system is a two-channel compressor-expander.

For More Details Circle (112) on Reply Card

PEOPLE IN THE NEWS

The election of **Gerard E. Veneman** to the Board of Directors of Sola Basic Industries was announced recently by the company. Also from Sola Basic Industries, **Robert D. Falconer** has been appointed Assistant Manager-Advertising and Sales Promotion at the corporate headquarters in Milwaukee, Wisconsin....Audiotronics Corporation has announced the appointment of **Gerard R. Grindinger** as Manager, Advertising and Sales Promotion. In its expansion of customer services, Auditronics Systems Division, Memphis, announced the appointment of **Bill Hamilton** as Regional Sales Manager based in Philadelphia.

Telemation, Inc. has announced the appointment of three managers in that firm's Corporate Marketing Division, Salt Lake City, Utah. **Donald F. Smith** has been named National Broadcast Marketing Manager, **Eugene A. Reich** will manage TeleMation's Product Management Group and **Collin C. Chamberlain** has been appointed Advertising/Public Relations Manager.

Robert E. Fisher has been promoted to general manager of Belden's Electrical Division, based in Westchester, Ill., and **Johnston Scott** is going to succeed Fisher as general manager of the Corporation's Canadian subsidiary, General Wire & Cable Co., Ltd....SC Electronics announced the appointment of **Roger Gabbei** as Mid-Western District Manager, TV Products.

Arthur A. Schubert, Jr., has recently joined Ward-Beck Systems, Limited, in the position of Director of Engineering....American Data Corporation, an Airpax Company, has announced the appointment of **Ed Miller** as Sr. Sales Coordinator. Also from American Data Corporation, the appointment of **Joe Ryan** as the Regional Sales Manager for the Southeastern United States and Puerto Rico and the appointment of **W. C. (Bill) Wiseman** as the Regional Manager for the Western United States including Alaska and Hawaii were announced.

Snider Corporation, headquartered in Little Rock, Arkansas, has announced the appointment of **Charles G. "Chuck" Gardner** as Vice President, Marketing and Corporate Development, for the broadcast oriented corporation....**Joseph C. Ciccone** has been appointed northeastern regional sales manager for Electro Sound, Incorporated....**Leslie S. Minkus** has joined Advanced Systems Incorporated (OTC) as treasurer....CCA Electronics Corporation has announced the appointment of **A. W. Trueman** to the position of Director of Engineering.

Sony Corporation of America has named **Don Thorkelson** an assistant vice-president in the video products division....**Roger S. Bessette** has been appointed as President of Transcom Electronics Manufacturing, Ltd. of St. Jerome, Quebec, Canada, a wholly owned subsidiary of Lynch Communication Systems Incorporated....**Clifford Hopper** has joined

PEOPLE IN THE NEWS

Coastcom as National Sales Manager....Consolidated Video Systems, Inc. has named **John F. Harris** as National Sales Manager.

Spindler And Sauppe' Inc. has announced the appointment of **Robert E. Ertel** as National Sales Manager....**Philip W. Bolster** has joined General Cable Corporation's Cornish Wire Products division as division manager of industrial relations....**Stephen A. Merrill** has been named General Manager of American Cable Television, Inc.'s system serving Eloy, Arizona, and soon to be serving Casa Grande, Arizona, residents.

Allan Land, vice president of T/R, Inc., Zanesville, Ohio, has been named to the Committee on Pay-Television of the National Association of Broadcasters....**James T. Magee** has been named Vice President of the Electronic Industries Foundation, a non-profit organization established in January in Washington, D.C. The Foundation, will pursue educational projects and scientific research relative to electronics in the public interest....The Electronic Industries Association will open a West Coast office in Los Angeles, California, effective April 1, 1975. **Frank D. Langstroth** is to be EIA's Vice President for West Coast Operations...EIA Communications Division has elected its 1975 officers. **Sidnery Topol,** President, Scientific-Atlanta, Inc., has been elected Chairman of EIA's Communications Division. **C. Travis Marshall,** Vice President and Director of Government Relations, Motorola, Inc., has been elected EIA Vice President, representing the Communications Division.

The highly prized Maker Of The Microphone Award for 1974 has been presented to **Edgar Villchur** for his creation of the acoustic suspension loudspeaker principle which revolutionized the HiFi and professional audio worlds by making possible for the first time a wide-response loudspeaker of compact (often called "bookshelf") size.

Charles R. Rudd, Jr. has been elected Treasurer of Superior Continental Corporation, Hickory, North Carolina....Warner Cable Corp. has named **Ed E. Bookout Jr.** as manager of the cable television systems serving Kingsport, Erwin and Greeneville, Tenn. and Abingdon, Galax and Saltville, Virginia.... **Samuel Cooper III** has been appointed Assistant General Counsel of the National Cable Television Association....General Cable Corporation has named **Stephen J. Breckley** as manager of facilities planning ...Jackson Communication Corp. has named **Walter Baxter** Executive Vice President of the corporation.... **Leo J. Cunningham,** formerly Director of Taxes for Teleprompter Corporation, has joined National Semiconductor Corp. as Director of Taxes with international responsibility for all tax and insurance matters.

Your Comments and Ideas Are Welcome At Broadcast Engineering

bookreview

Broadcast Announcer 3rd Class FCC Study Guide, by Jim Ashe, is a comprehensive all-in-one FCC study guide for the Third Class FCC permit. It includes coverage of elements 1, 2, and 9, plus applicable FCC Rules & Regulations and extracts from the Communications Act of 1934.

The law requires a Third Class ticket as a practical minimum for many radio station jobs in the broadcasting business. An engineering degree isn't required to get a Third Class permit, but an applicant must know some basics relating to how a radio broadcast station works and what it does. But there's a problem about acquiring those basics: The broadcast game is a rather closed circle. At one side of the circle there is the law: a condensed set of rules about how things are to be done. At the other side there is the practical on-the-job work and responsibility. Each is connected to the other in such a way that to the beginner who knows little about either, the whole business doesn't make much sense.

This book brings it all together in a logical, sensible way that tells the reasons behind the rules. It goes beyond the test questions and answers to show the real-life responsibilities of today's broadcast announcer—what applicants have to know and do to get that coveted "ticket" and progress in a broadcasting career.

This book is available in hardbound and in paperback through Tab Books, Blue Ridge Summit, Pa.

For More Details Circle (113) on Reply Card

The Video Primer, Equipment, Production And Concepts, written by Richard Robinson is about a new communication technology: inexpensive video equipment used to record and reproduce information.

The language of electronics has become the language of communications, and must be used in order to explain the potentials of the equipment and the methods utilizing it. The author has tried to express much of the terminology and information into the language most of us possess through our everyday use of hi-fi equipment and TV sets.

The book is divided into three modular sections which are more or less independent of each other. Professional Basics (Chapters 1-11) provides an insight into the potential of the equipment as you begin to use it and apply your own aesthetics to it. TV Eye (Chapters 12-18) covers working with the equipment on a practical level. A Glossary is included to further explain the terminology of video equipment and so provide an expanded, ready reference to video tools.

The book is available from Links Books, a division of Music Sales Corporation, New York.

For More Details Circle (114) on Reply Card

NEW PRODUCTS

Switcher

Shintron announces the Model 367 Chromatic Post-Production Switcher. It is a total color production switcher with a built-in helical genlock NTSC sync generator and a SMPTE edit code generator/reader in one rack mount package. Shintron developed the Model 367 especially for the rapidly growing post production applications. Designed to be the central piece of a post-production system, Model 367 facilitates editing, identifying and assembling of tape libraries.

The heart of the color switcher is a 4-input 3-bus organization with totally vertical-interval switching by momentary contact lighted push buttons. The switcher has an additional key input and a complete tally system. Its rear panel interfaces with UHF, BNC, Sony and Panasonic connectors.

The genlock sync generator is a "ratelock" type used in professional equipment, and has a genlock indicator for genlock or internal state.

SMPTE edit code generator reader writes full edit code as well as reads incoming code from playback. The digital display of SMPTE code is on the front panel.

For More Details Circle (115) on Reply Card

AGC Amplifier

Wilkinson Electronics, Inc., displayed their line of transmitters as well as an array of other equipment, including the GCA-1/S AGC Amplifier. Other equipment will be covered later.

The GCA-1/S automatically rides gain without regard to peaks. It has an exclusive RMS detector that preserves the dynamic range, and it will not adjust gain if audio signal is removed. Along with a wide (30 dB) range of automatic adjustment, the unit causes no "pumping" or audible effects.

It's fully solid state, and features very low noise and no hum, with very low distortion at any gain setting.

For More Details Circle (116) on Reply Card

Phase Stabilized Sampling Lines

Phase stabilized sampling lines for antenna monitoring sampling systems are now available from **Cablewave Systems.**

Selected coaxial cables have been subjected to a simulated aging process to minimize the change in electrical length when exposed to time and

temperature variations. By reducing the phase changes prior to electrical trimming and permanent installation, a major cause of antenna tuning errors is essentially eliminated.

The coaxial cables for sampling line application include both copper corrugated and smooth wall aluminum cables with either air or foam dielectric.

Air dielectric coaxial cable exhibits less phase/temperature variation than the foam dielectric type. This is due to less dielectric and, as a result, less change in phase velocity. Foam dielectric coaxial cable, however, exhibits a sufficiently low enough change in phase/temperature variation to be used equally well as sampling lines. Additionally, air dielectric coaxial cable generally requires pressurization and any variation in pressure will produce a change in phase length. Since concern generally exists with phase lengths relative to each line, loss of pressure in one of the sampling lines can result in a significant phase length change.

For More Details Circle (117) on Reply Card

Master Clock System

Master clock systems sure aren't what they used to be. The Syncron system from **Audio Services Inc.,** is a good example.

Models 12E and 12L offer digital time display in a 12-hour format with front panel indication of AM or PM, while models 24E and 24L display time on the 24-hour format. All models come with ±2 seconds per month. But that's just the beginning.

12E and 24E have provisions for connection of external time bases. Upon power failure, accuracy is protected by automatic switchover.

The options are impressive: forward/backward timer; digital data transmission system; electronic thermometer; or a combination of all three.

For More Details Circle (118) on Reply Card

Noise Reduction In Tape Carts

Among the new products introduced by **Ampro Corporation** are units utilizing Dolby B Noise Reduction. The first of these is the Model CT3547DNR Automatic Tape Cartridge Recorder/Reproducer. A high quality Ampro deck is combined with a side-mounted encoder permitting suppression of signal-modulated noise effects and tape hiss, an additional 9dB over Ampro's usual low S/N ratio.

For More Details Circle (119) on Reply Card

Trichroma Recording System

Television Research International, creators of the EA-5 Editing Control System, announced the Trichroma III™ Recording System, developed specifically for professional teleproduction. The recording system may now become an integral part of the camera with NTSC encoding after the VTR.

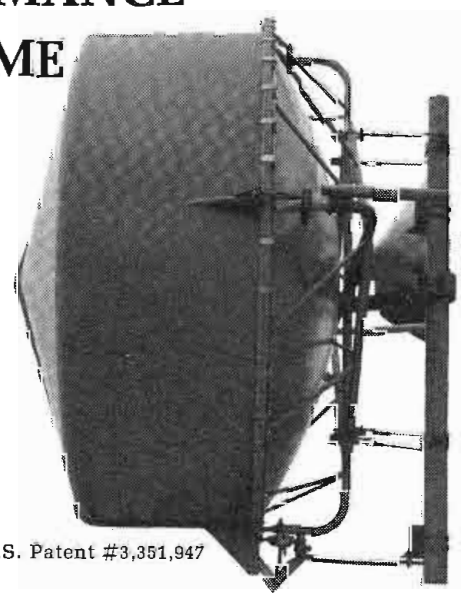
With standard 1" video tape, the video recording system features full broadcast bandwidth and performance specifications with a signal-to-noise ratio greater than 50 dB. Normal color degradations such as moire, differential phase and gain, are restricted only by the output encoder's own performance specifications.

The Trichroma III™ incorporates two 15 kHz audio channels with an elaborate noise reduction system providing a signal to noise ratio in excess of 60 dB. Each audio channel is independently editable.

A digital up/down tape counter that reads control track information is provided as standard equipment. An optional feature of the Trichroma III™ provides standard SMPTE time code which is recorded on the control track and provides automatic

(Continued on next page)

For More Details Circle (58) on Reply Card



For More Details Circle (59) on Reply Card

NEW PRODUCTS

tape search and Auto Code Load™. The Auto Code Load™ feature allows continuous readout of program time when assembling an edited master tape.

The system was designed to withstand multiple generation dubbing with virtually no degradation to the video signal-to-noise ratio.

The Trichroma III™ when used in conjunction with the EA-5 Editing Control System provides the flexibility and simplicity of film style teleproduction.

For More Details Circle (120) on Reply Card

Color Film Camera

TeleMation demonstrated their TCF-3000 color film camera in an impressive display that included handling the SMPTE color test series.

The SMPTE source material was used to demonstrate critical performance parameters: gamma range, gamma tracking, white shading, colorimetry, black shading, noise, enhancement, auto white and black level control.

The TCF-3000 met the test and was well accepted by attendees.

For More Details Circle (121) on Reply Card

Studio/Remote Camera

Hitachi Shibaden introduced a ⅔-inch Saticon three-tube studio and portable remote camera in one package.

The 13-pound camera head accepts the following add-on modules to make up a full NTSC studio camera: process pack, AC power pack, 5-inch viewfinder, and studio lens on a unified base plate.

Audio, video and digital command signals share the same coaxial cable.

In the field, the camera head mounts onto a shoulder harness with a 1½-inch electronic viewfinder and a 10:1 zoom lens. The process pack with DC power pack rests on the operator's back.

For More Details Circle (122) on Reply Card

Video Tape Tension Corrector

Avtel Division of Andersen Laboratories introduced the Dynatel Automatic Tension Corrector for ¾" U-matics and certain ½" and 1" video recorder/players. Now, with the Dynatel modification, one of the major drawbacks to using lower cost U-matics and VTR's in broadcast applications is eliminated because Dynatel automatically and continuously reduces tape tension error to ± 1 microsecond in these lower cost VTR's.

For More Details Circle (123) on Reply Card

Video Tape Editing System

CMX Systems announced a number of technical and operational improvements to their revolutionary System/50, "off-line", video tape editing system. The announcement was made by Donald E. Prather, General Manager of CMX Systems and Vice President of Orrox Corporation.

Prather reported a new system option permitting storage of up to 999 events representing edit decisions in the system's minicomputer. "This increased storage capacity facilitates editing complex television shows and minimizes the need to segment a show during editing." A half hour television series, such as **Chico and The Man** typically contains 125 to 150 edit decisions. A one hour television special commonly contains 300 to 500 edit decisions or transitions. Transitions may be cuts from one camera to another or may be complex transitions between scenes of a show.

An additional major feature announced by CMX now permits frame advance, or "jogging" while in this mode. "An Editor can 'jog' through a scene virtually on a frame-by-frame basis" according to Prather.

The CMX System/50 produces a color "workprint" in video cassette format. A frequent practice in the broadcast industry is to produce a "workprint" during an initial editing session on a show. The "workprint" is then submitted to the producer and/or director for review and approval, and frequently, modifications to the program are required. CMX an-

nounced improved re-edit capability including a function which permits the operator to scan the list of edit decisions.

For More Details Circle (124) on Reply Card

Insertion Test Signal Analysis

The **Philips Test & Measuring Instruments** PM 5578 insertion test signal analysis unit is a precision measuring instrument performing continuous measurements of the distortion on television chains or other television equipment.

Up to 21 types of distortion can be measured.

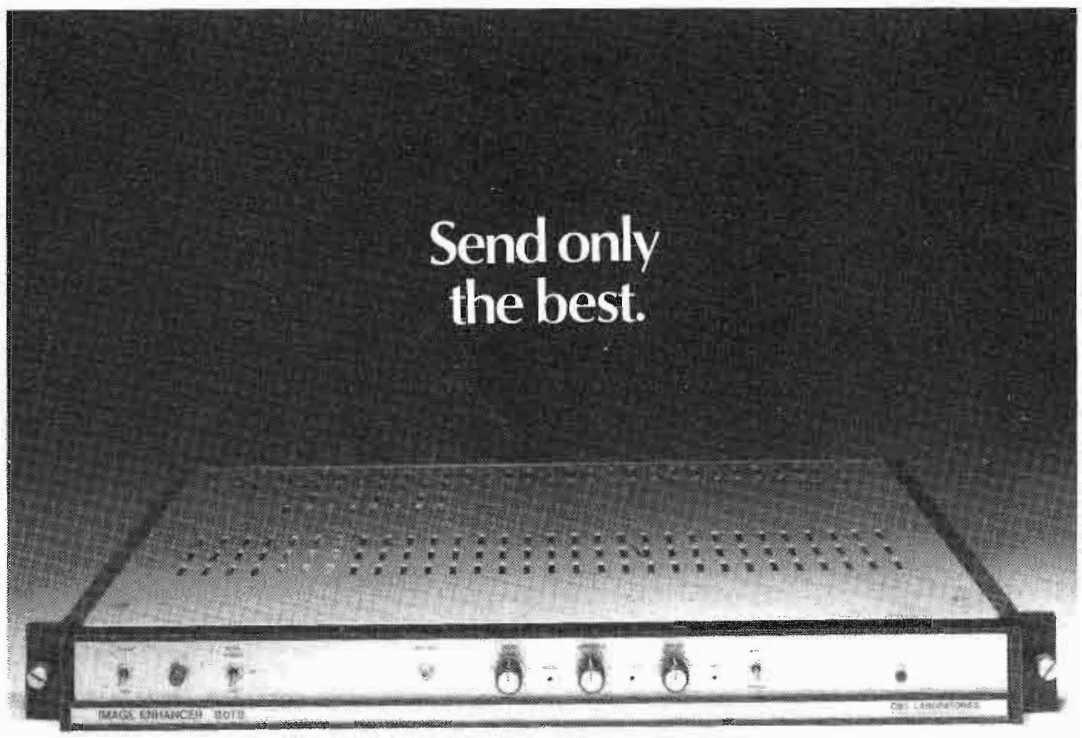
The instrument may be used whereever video equipment have to be checked, adjusted or constantly supervised, such as in switching centers, transmitter locations, TV workshops and laboratories.

Each system parameter, selectable by rotary switch, may be read directly on the instrument through a built-in digital display.

For More Details Circle (125) on Reply Card

Cross Pulse Generator

Model CPG-1 is a new low-cost cross-pulse generator from **Video Aids Corp. of Colorado**, which enables use of any video monitor to display cross-pulse signal.



CBS Laboratories Mark IV Image Enhancer is preferred by most TV stations. Because it sharpens both vertical and horizontal detail. And improves picture resolution as well as color fidelity. The Mark IV, with unique "crispened-comb" filter, separates chrominance from luminance, providing sharper contrasts with more defined picture detail. Available for all monochrome and color cameras. From CBS Laboratories, of course.

CBS LABORATORIES
A Division of CBS, Inc.
227 High Ridge Road, Stamford, Connecticut 06905

For More Details Circle (126) on Reply Card

Ideal for checking VTR tension and skew error, observing head switching noise and line-to-line jitter. Sync used can be immediately identified for clipping, overshoot, ringing or sync discrepency in equalization and seration sync pulses. External sync input available (option:01) to observe errors in composite sync relative to a master sync generator, as well as checking QUAD playback errors and verifying time-base correction.

Video input: 0.5tol .5Vp=p video loop-thru. Sync input: (option:01 only) 3.0 to 5.0Vp-p loop-thru. Video-output: Composite video, 75 Ohm input Z,0.3V delayed sync and blanking to produce cross-pulse. BNC connectors.

For More Details Circle (126) on Reply Card

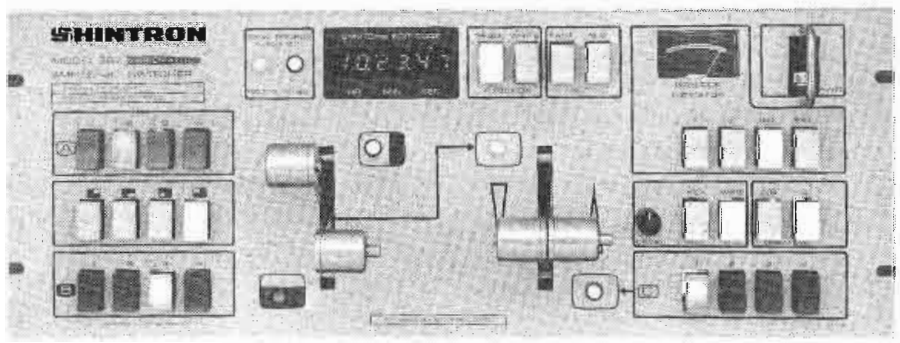
Broadcast Camera

Marconi Electronics, Inc. showed their Mark VIII-B fully automatic broadcast color camera, which is in widespread use in the U.S., Canada, and around the world. The camera now employs a high yield lithium-niobate delay line in the aperture corrector. This results in a very low-noise system enabling the camera to produce better than 50dB signal-to-noise ratio pictures, overall.

For More Details Circle (127) on Reply Card

For More Details Circle (52) on Reply Card

End the identity crisis in your videotape library
Model 367 Post Production Switcher



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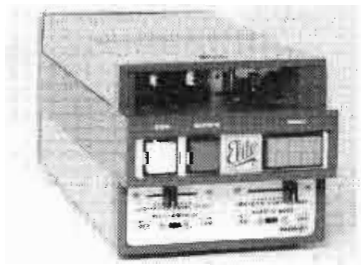

All new electronics — All new mechanically Reliable Hall-effect motor — Heavy cast frame — Electronic solenoid damping — Variable pitch control.

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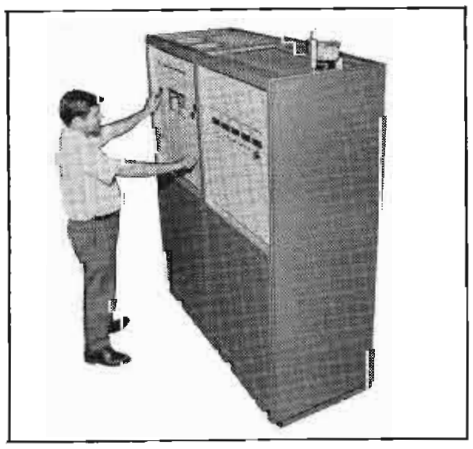

Continental's new 5/10 kW AM transmitter is setting records for acceptance. It has performance and efficiency, with the cleanest sound around. Listen to Continental: quality talks.

Continental Electronics

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BOX 17040 DALLAS, TEXAS 75217

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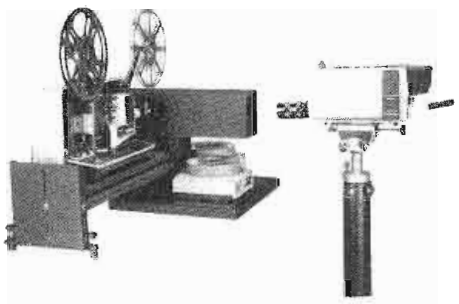
BUHL

A FILM CHAIN WITHOUT A DEDICATED CAMERA



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BUHL

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2" Video Tapes – $2.19/hour

If you could buy a 1-hour quad tape, certified free of drop-out and edge damage, for $2.19, you would be smiling!

That could be your out-of-pocket costs to clean, evaluate, and certify used tape currently gathering dust in your inventory with the Magnetek Tape Cleaner and Evaluator. It's like buying tape for $2.19 per hour.

Customers report Magnetek cleaning removes up to 70% of video drop-out while it winds, repacks and tensions tape. You will clean and evaluate a 1-hour tape in 10 minutes without supervision: A three-pen graph recorder profiles video drop-out and audio and control track damage to facilitate extraction of damaged sections quickly and accurately.

Television Equipment Associates, Inc
Box 1391 • BAYVILLE N.Y. 11709

Phone 516-628-8068

* *Includes Magnetek depreciation, materials, labor and production.*

For More Details Circle (72) on Reply Card

The Room-Stretcher Caper

Ruth Schaeffer, Pres., **Storeel Corp.** of Atlanta, Ga., and her engineering staff burned a barrel of midnight oil getting ready for NAB the Ampex version of their high-density "Room Stretcher" storage system. Shortened full-scale models were constructed, a display stand complete with tile floor covering and lights was erected, all the bugs worked out, and the entire system was then disassembled and packed into crates and boxes for early shipment to Las Vegas.

Interest in the Ampex system (which follows an RCA Room Stretcher already introduced and installed in many locations) ran high, and Ms. Schaeffer anticipated heavy traffic. Heavy traffic she had...but no display. Part of the shipment arrived Monday, the rest Wednesday and THURSDAY...just in time to ship it back to Atlanta! From what we saw, the system is both unique and flexible.

If you have a spare crying towel, send it to Ruth with a request for her new catalog and descriptive sheets of the Room Stretcher.

For More Details Circle (129) on Reply Card

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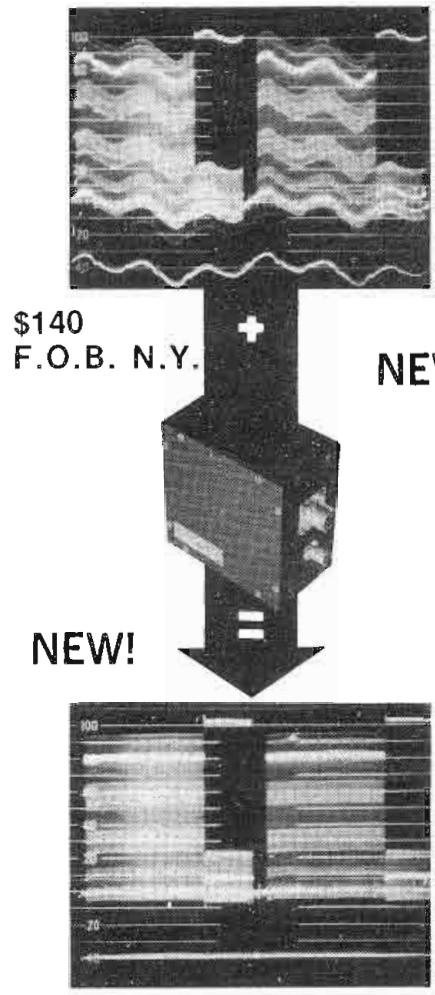
STOP GROUND-LOOP HUM!



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HSC 1

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Minimum classified charge, $2.00.

For ads on which replies are sent to us for forwarding, there is an additional charge of $2.00 per insertion, to cover department number, etc., which is printed in advertising copy, and processing of replies.

Classified columns are not open to advertising of any products regularly produced by manufacturers unless used and no longer owned by the manufacturer or a distributor.

WANTED

WANTED: All surplus broadcast equipment especially clean A.M. & F.M. transmitters, contactors, capacitors. Surpluss Equipment Sales, Clark & Potomac Phase monitors. 2 Thorncliffe Pk. Dr. Unit 28 Toronto 17, Ont; Canada 1-73-tf

COLLEGE F.-M. educational 10 watt station is in desperate need of studio equipment or money to purchase equipment. Tax exemption status. Contact Mark Cash WABR FM, Box 116, Tifton Georgia 31794. 4-75-2t

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EQUIPMENT FOR SALE (CONT.)

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TV MICROWAVE LAMBA PACIFIC, ONE WATT OUTPUT, 6 to 7 GHz, 6.1 MHz audio subcarrier, tube type. In good working condition with new VA220D Klystron. For information: CKRT-TV Ltd., 1 Frontenac Street, Riv.-du-Loup, Quebec, Canada. 5-75-1t

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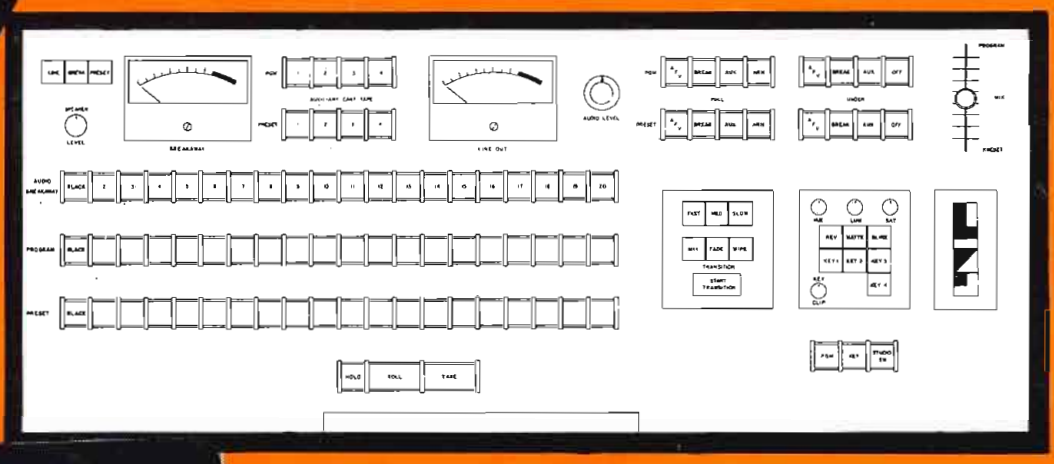

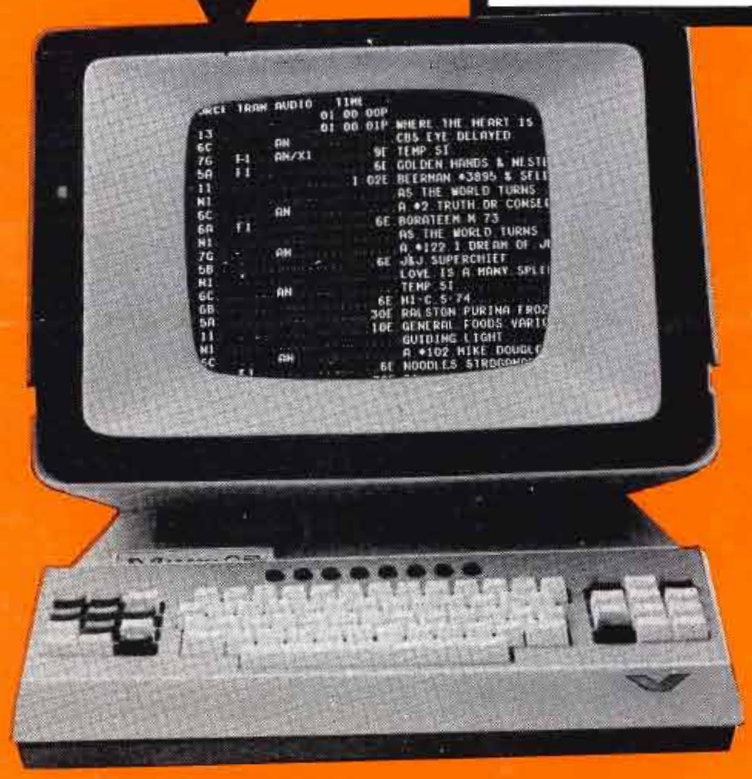

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