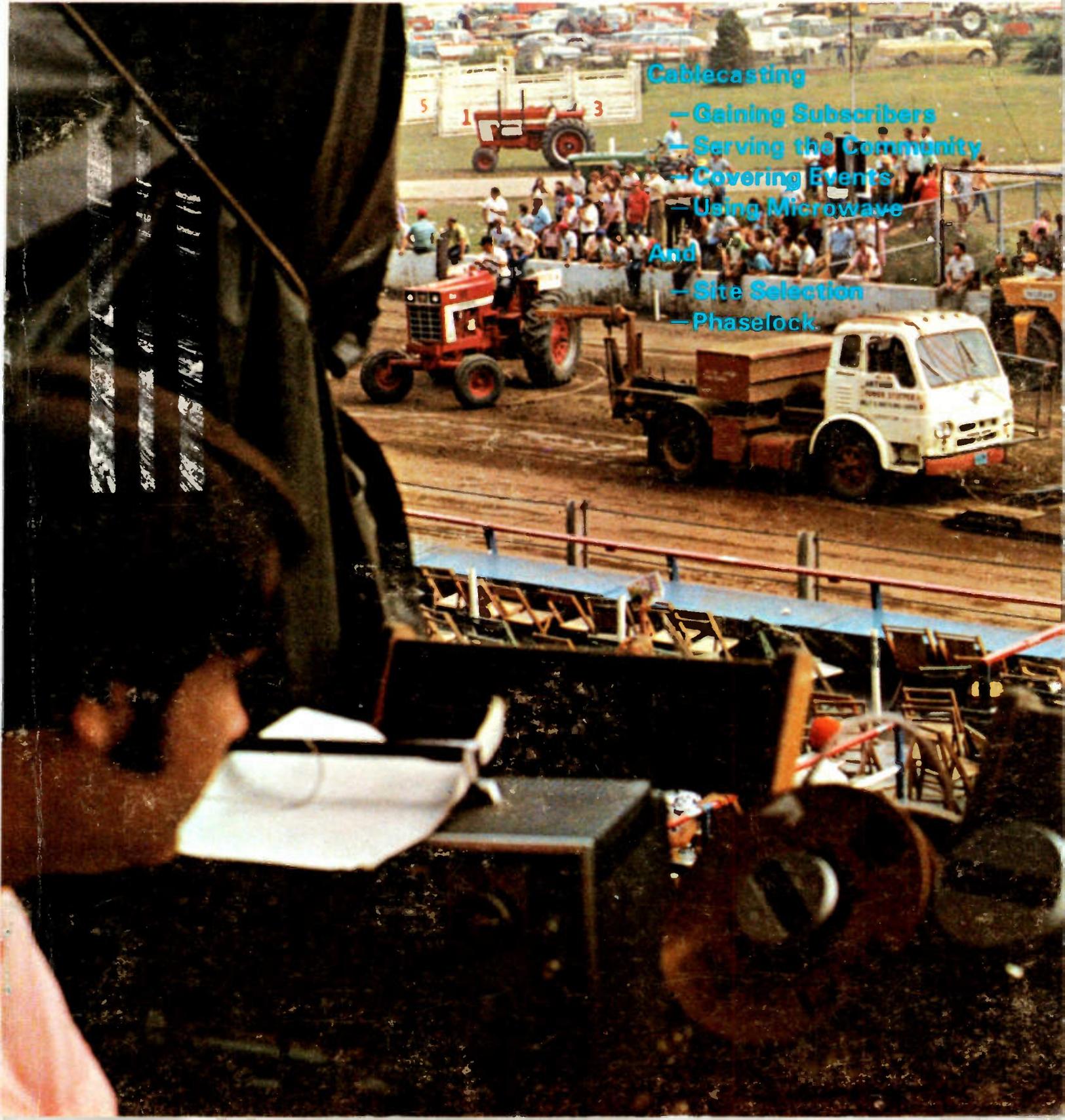


TV Communications

The Professional Journal of Cable Television



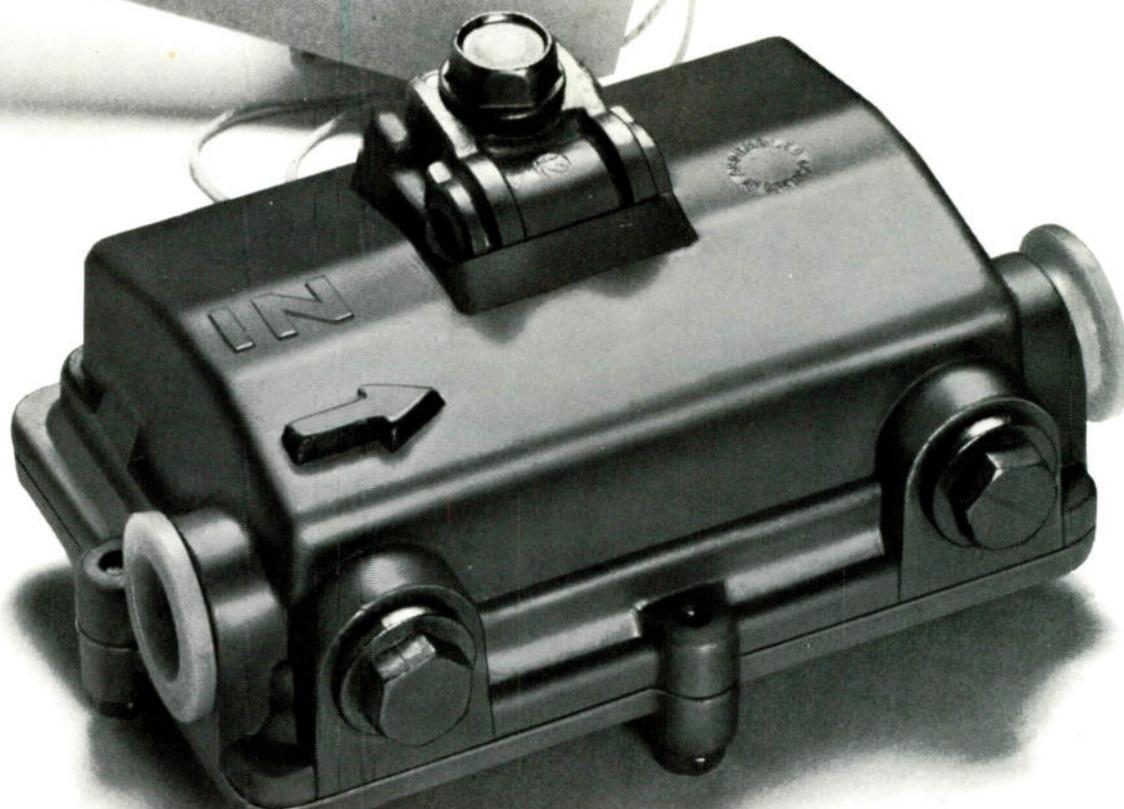
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Now you can brighten up those darkest channels, and get paid for it, too! Because the Theta-Com 100 Series provides the kind of information your subscribers want the most: weather, news, financial reports and community bulletins.

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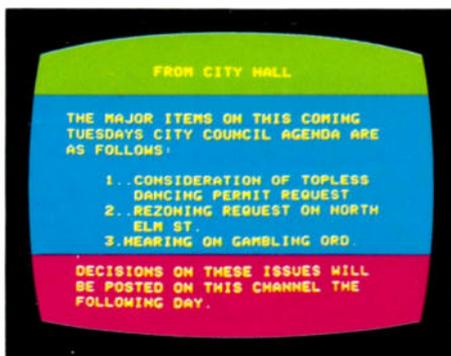
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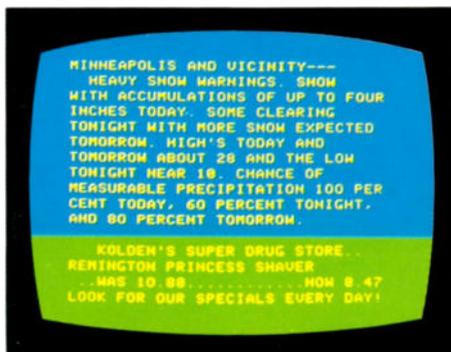
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full pages on the D-100, and 32 four-line messages on the other 100 Series units. And they are repeated automatically on a sequential basis, or updated as frequently as desired.

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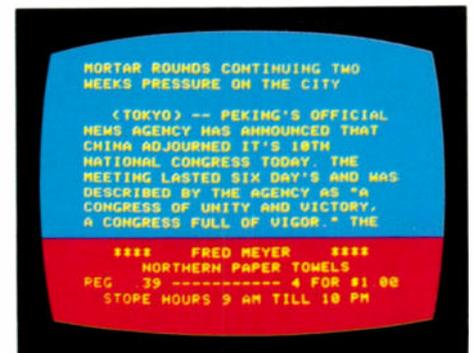
WEATHER FORECASTER, Model F-100: Provides weather forecasts direct from the National Weather Service Wire.



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Avantek's noninterfering CATV Remote Automatic Sweep System offers plant diagnosis in two modes—swept frequency response and spectrum analysis.

This versatility, coupled with lightweight rugged portability, allows you to perform preventative maintenance while substantially reducing trouble and service calls.

The equipment will typically pay for itself in less than one year through better system performance and increased profits.

Only Avantek's CR/CT-1000 system is field-qualified to perform all of these tests:

Spectrum Analysis The CR-1000 (photo) may be connected at any test point in your CATV system to detect undesired or spurious signals (beats). The instrument performs the function of a costly spectrum analyzer in the measurement of intermodulation products as low as -66 dBmV.

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Remote Sweep The Model CT-1000 Cable Transmitter, connected at the headend, continuously transmits a low-level, noninterfering, sweeping signal to all points of your CATV system. The Cable Receiver detects and displays this signal, giving the operator an instantaneous picture of his system response between the headend and the point where the receiver is connected. Avantek's innovative circuit design provides for signal tracking without scan loss.

Spurious Radiation The CR-1000 is designed to quickly measure spurious emissions from your CATV system as required by the FCC.

Return Loss (VSWR) The system, in conjunction with a directional coupler, is capable of making swept return loss measurements on any component installed in your CATV system.

Component Isolation

Avantek's system can be used effectively to isolate bad subscriber taps and splitters.

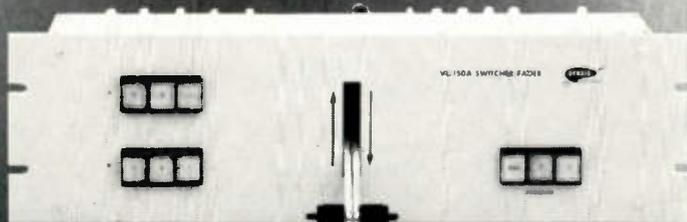
Signal-to-Noise Ratio Operating in the spectrum analyzer mode, the CR-1000 Cable Receiver efficiently measures signal-to-noise ratio on your CATV system.

Find out how the CATV Remote Automatic Sweep System can benefit your operation through versatile, cost-effective, easy operation anywhere in your system under extreme environmental conditions. Call the Avantek sales office or field representative nearest you collect.

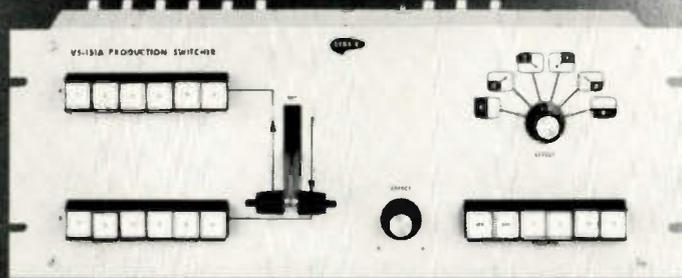
Avantek Eastern Region Office, Falls Church, Virginia (703) 533-2260; **Avantek Central Region Office**, Shawnee Mission, Kansas (913) 362-9511; **Avantek Western Region Office**, Santa Clara, California (408) 249-1354; **Corporate Headquarters**, Santa Clara, California (408) 249-0700. In the Southeast, call **Gentry Associates**, Huntsville, Alabama (205) 534-9771; Orlando, Florida (305) 894-4401; Burlington, North Carolina (919) 227-2581. In Canada, call **Fred Welsh Antenna Systems**, B.C.

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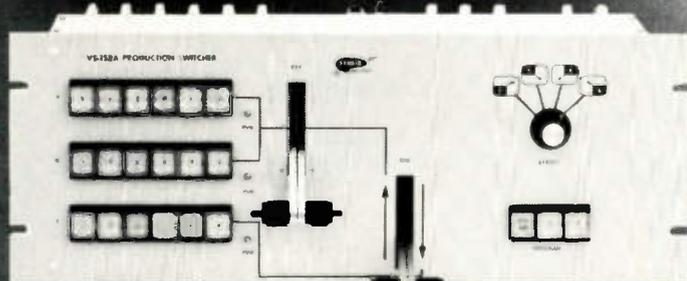
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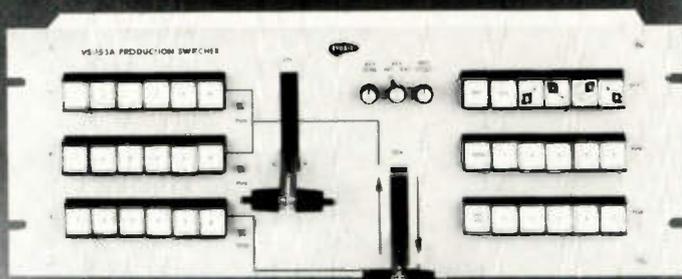
VS-150A VIDEO SWITCHER-FADER



VS-151A PRODUCTION SWITCHER



VS-152A PRODUCTION SWITCHER



VS-153A PRODUCTION SWITCHER

That's right. If you build switchers by the 100's, you can build a better switcher for less. And, DYN AIR produces more switchers in the lower price range than any other manufacturer. We planned it that way.

Proof? You'll find it fast when you check the prices of comparable equipment of other manufacturers. For the same capability, you will pay considerably more. And you probably won't get the quality and reliability of DYN AIR equipment.

You won't find cheap, troublesome sliding fader potentiometers on DYN AIR program switchers; we use quality gear-driven, locking split-lever controls. Nor will you find other inexpensive and unreliable components. The 150 Series uses the latest silicon solid-state devices available — over 80 percent of which are integrated-circuit form — and they are mounted on aerospace quality glass-epoxy circuit boards. Vertical-interval switching and fully color delay compensated too . . . the kind of equipment you can depend on for continuous broadcast quality.

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DYN AIR

OCTOBER 1973, Volume 10, Number 10.

TV Communications

The Professional Journal of Cable Television

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As a member of the Audit Bureau of Circulations, our circulation records and practices are subject to the scrutiny of regular field audits and the discipline of ABC-determined standards.



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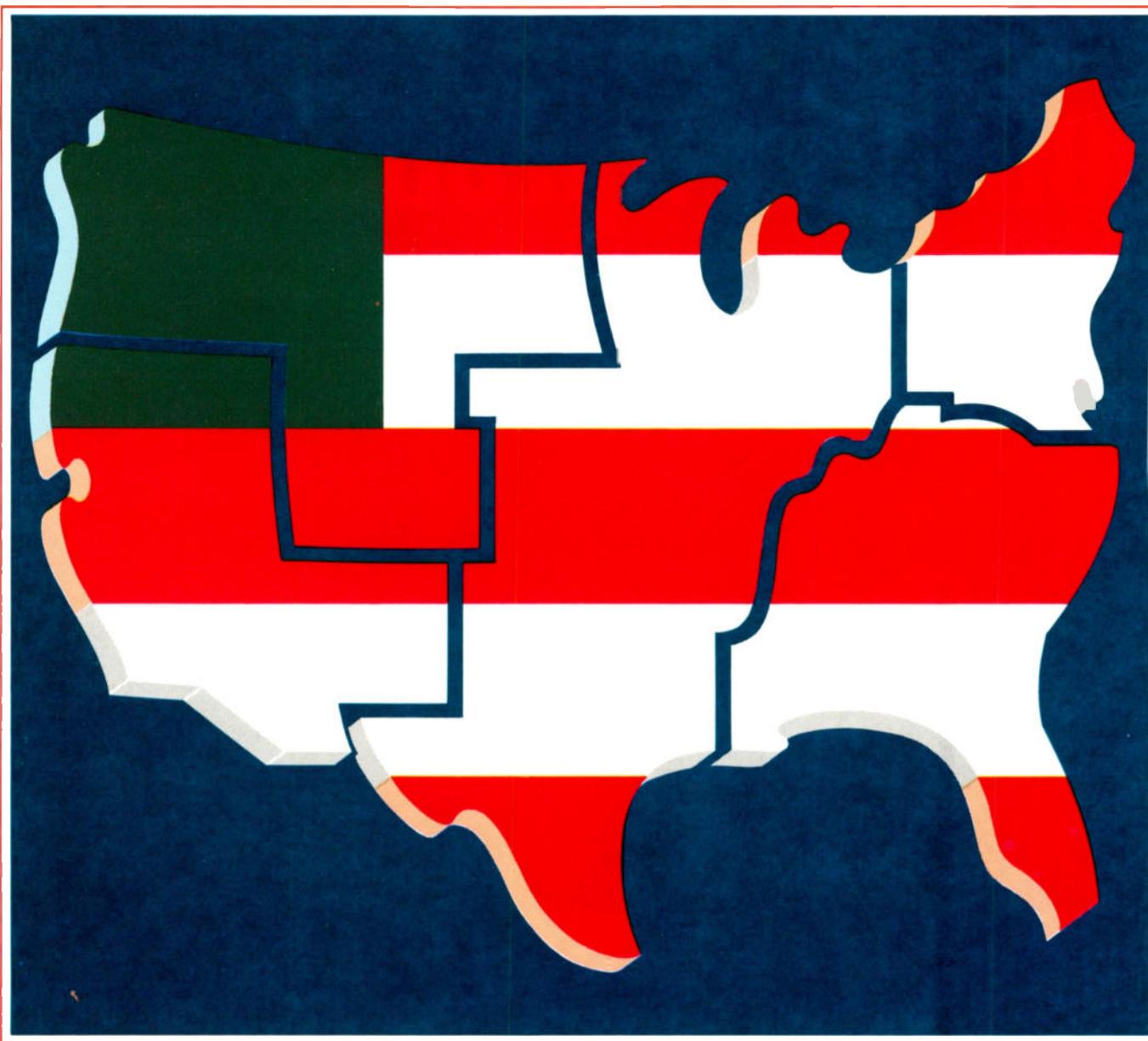
This Month's Cover...

1st Illinois Cable of Springfield went to the fair, the Illinois State Fair, and TVC's Ruth Steinberg went along to report on how the new system has used local origination to boost subscriber penetration and crack the competition from the larger broadcasting markets. See *Turning L/O into a Marketing Tool* on page 32.

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were surprised
that they can service
their whole system
with just one man.**

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GTE SYLVANIA

Update

CATV APARTMENT TV SYSTEMS

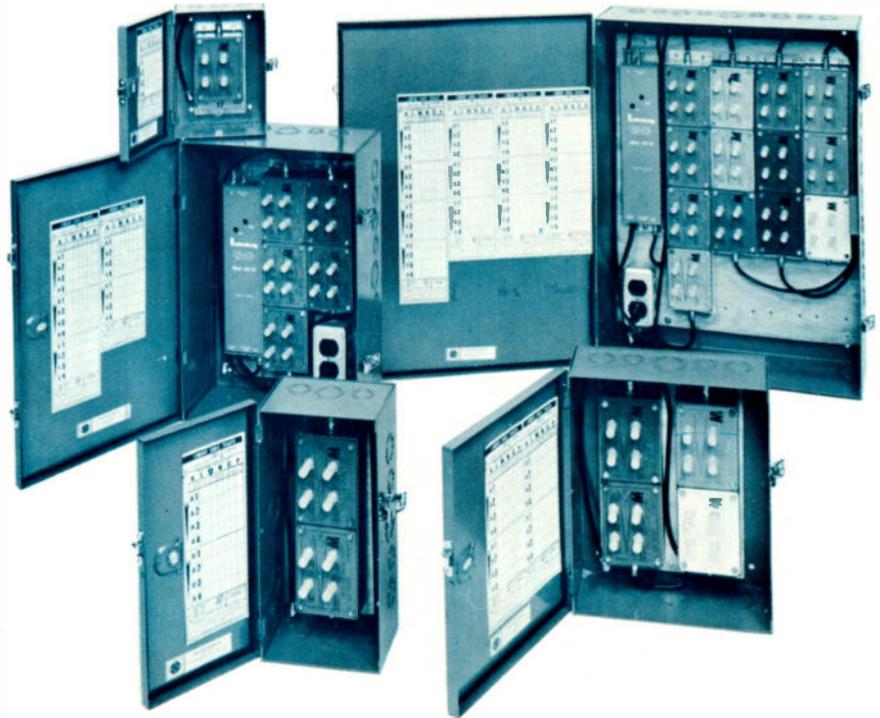
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The TVC Viewpoint

EDITORIAL



Robert A. Searle
Publisher

Resolutions : The Tonkin Gulf Touchdown

The Congress, in one of its recent rare agreements with the President, overwhelmingly, and remarkably quickly, passed the so-called professional blackout bill . . . which, as every viewer in a market with a professional football team knows, is really anti-blackout. While this editor lives in Denver, Colorado and is an avid Denver Bronco fan (and, I might add, gave up two season tickets . . . four rows and eleven seats apart . . . in futility after trying to negotiate for adjoining bench spaces), I must question the ultimate wisdom of the joint houses of Congress knuckling under to a popular, but ill-conceived, wish.

Without trying to defend the autocratic practices of sports owners who leech off their host cities (county stadiums, special access freeways and other tax supported benefits), it does not seem a constitutional right of every citizen of a community boasting a pro team that he be allowed to watch the team play home games without paying for a ticket. This is not, of course, the first time the government has told a business how it must be marketed and to whom; yet it seems the height of arrogance to "experiment" with a business only because it is popular.

The first weekend the bill was in effect, 50,000+ ticket holders kept their ducats. The second weekend, characterized by magnificent weather, nearly 10,000 stayed home. That's 120,000 cans of beer that weren't sold by concessionaires . . . and 80,000 boxes of popcorn, 65,000 bags of peanuts and 100,000 soft drinks, at least.

But, more ominous, the bill is bad news for cable. If the blackout lifting does not adversely

affect ticket sales (and no one will really know until the start of the 1975 season) it is certain to doom professional sports on pay-cable . . . or even cable. That would mean less revenue for both the sports team owner and the cable operator; and fatter billings for local broadcast stations.

While the anti-trust status of professional football provided the rationale for Congressional interference, the real pressure came from the Number One Washington Redskin's fan, President Richard Nixon. Last winter, the President, through press secretary Ron Zeigler, suggested to National Football League czar Pete Rozelle that the blackout of the Super Bowl be lifted or perhaps the President would suggest that Congress do so. (The President spent New Year's at his San Clemente White House, blacked out because of the L.A.-played Super Bowl; it was the Washington Redskins vs. the Miami Dolphins in the Coliseum.)

Rozelle gave in.

But when the season approached he fought. And lost.

The President, when he is in Washington on game day, can now watch the Redskins in the comfort of the Oval Office.

I watched the Broncos home game on my own television in my den . . .

But it still seems wrong.

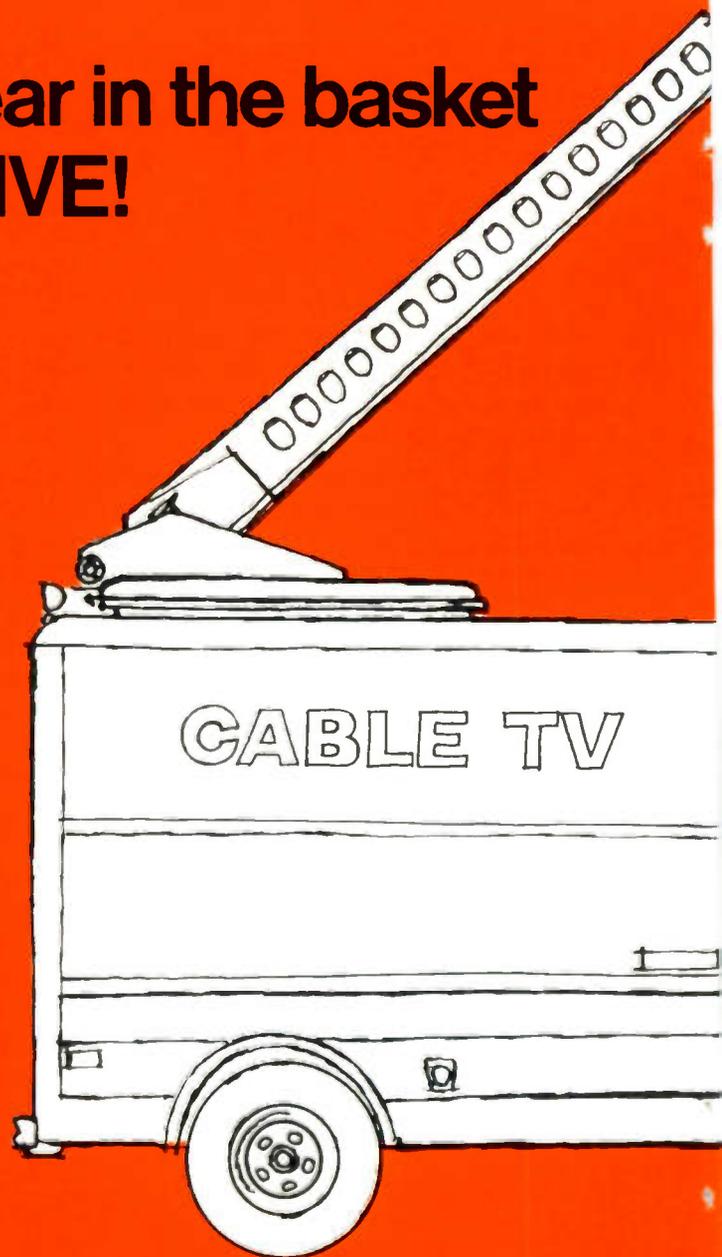
One Congressman noted that the last time legislation passed both houses of Congress so quickly it was the Gulf of Tonkin Resolution . . . later used to justify the Vietnam War.

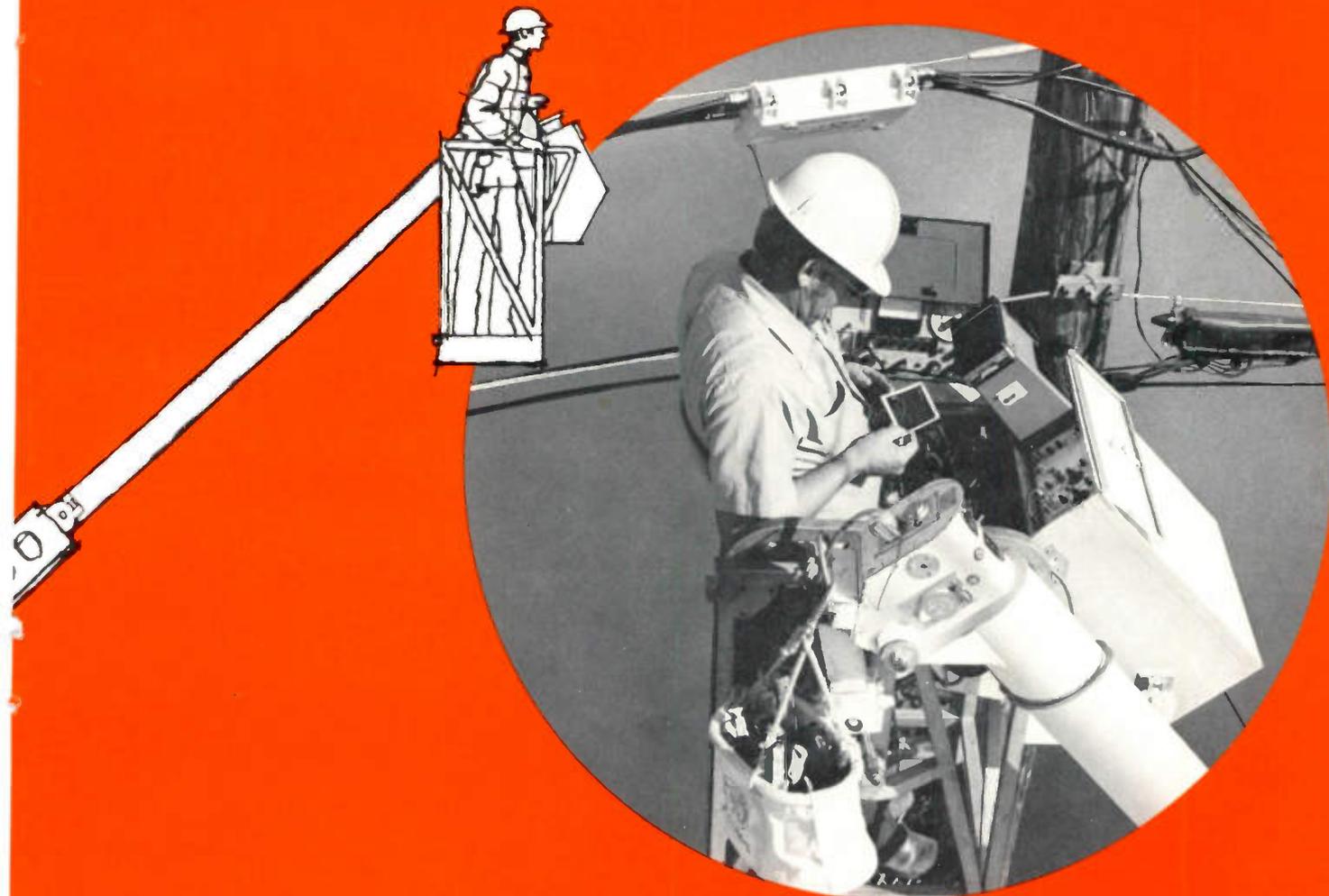
Perhaps the blackout bill will justify a full scale war on pay and cable television.

Now 1 man can sweep your system faster than 2 men.

How? with sweep gear in the basket
...a TELSTA EXCLUSIVE!

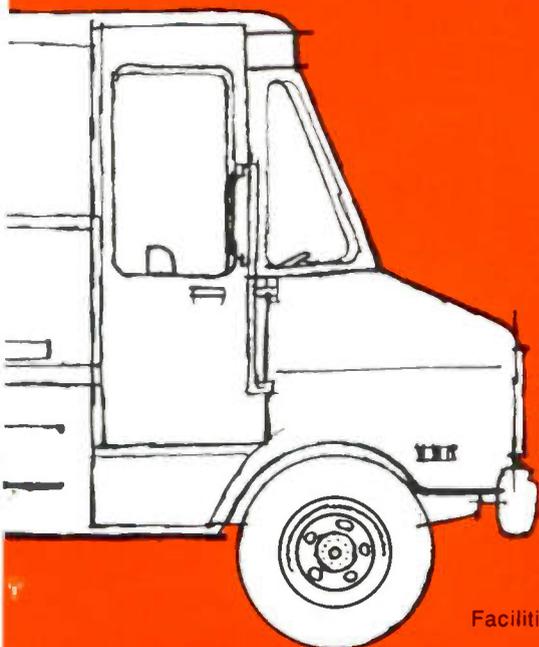
Here's a new way to maintain high picture quality and reduce your manpower costs. Sweep your system directly from a Telsta Aerial Lift basket, equipped with a specially-designed removable sweep module. The technician never leaves the basket and he doesn't need a second man. You can order your Telsta installed on a 1-ton conventional truck or van. You'll get low maintenance and a long working life (we call it up-time, as opposed to down-time). You'll get power in the basket, too... 1500W for your sweep gear and tools. You get 34 feet of working height, 22 feet of horizontal reach and 720° rotation. Drop us a line today at P.O. Box 666, Westminster, Colo. 80030, or if you're really in a hurry, call (303) 427-3700. On our nickel.





Here's what you put in the basket that makes it work so well:

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- Tektronix Model 5103N/D11 Storage Oscilloscope
- Tektronix Differential Amplifier Model 5A20 N
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Perspective

on the news



Paul Maxwell
Executive Editor

In wake of TelePrompTer troubles the lack of standardized accounting procedures in the cable television industry looms as problem needed to be solved first: before copyright, two-way, blue sky, marketing . . . everything. National Cable Television Association's new financial affairs committee will discuss problem at early October board of directors meeting. Look for suggested solutions to take some time, though, there are too many differing opinions to result in immediate proposals.

But, need for standardized procedures is clear. From New York City's Waldorf Towers (where Jack Kent Cooke and his accountants are praying for TPT) to the suddenly income-barren homes of 650+ former TPT employees, the TelePrompTer troubles are bad news for the cable industry at large. TPT will survive, indeed, probably gain in strength (one TPT executive ventured that most of the firings were the jettisoning of excess baggage). Yet the Securities and Exchange Commission and New York Stock Exchange investigations, triggered by TPT's financial vice president Robert Todd and controller William Trust, do not help the other cable stocks . . . most at all-time lows.

Air will clear, though. Barring a major recession next spring and summer, cable will be back in high gear.

President Nixon nominated James Quello to Nicholas Johnson's FCC chair, finally. Quello toured the Hill; found some Senators favorable, others, like Commerce committee Chairman Warren Magnuson (D-Wash.), not so.

Should be quite a hearing . . . when it happens. White House didn't exactly rush nomination to Senate . . . Senate is unlikely to rush it through. Opposition continued to surface just before nomination became official. NCTA President David Foster, while hewing to a "statesmanlike" line, suggested that nomination might not be for the best. Expect more cable opposition to surface. So far Quello has shied away from talking at length with cable while being much more open with broadcasters. Even if cable does not attack nomination, Quello may stumble.

A broadcaster, any broadcaster, as the next Commissioner defies logic; from any but the most partisan over-the-air viewpoint.

Back upstairs goes copyright: the Department of Justice has kept its cable activity curve on an upward swing (something that does not bode well for Viacom/CPI and Cox/LVO plans) with its urging of the Supreme Court to jump back into the copyright inbroglia, again. Justice, in the person of solicitor general Robert Bork, urged the Court to grant TelePrompTer's petition for review of the appeals court ruling inventing the differentiation between local and "distant" signals. Of course, Bork's filing might must be another administration dig at Congress for its failure to enact new copyright legislation.

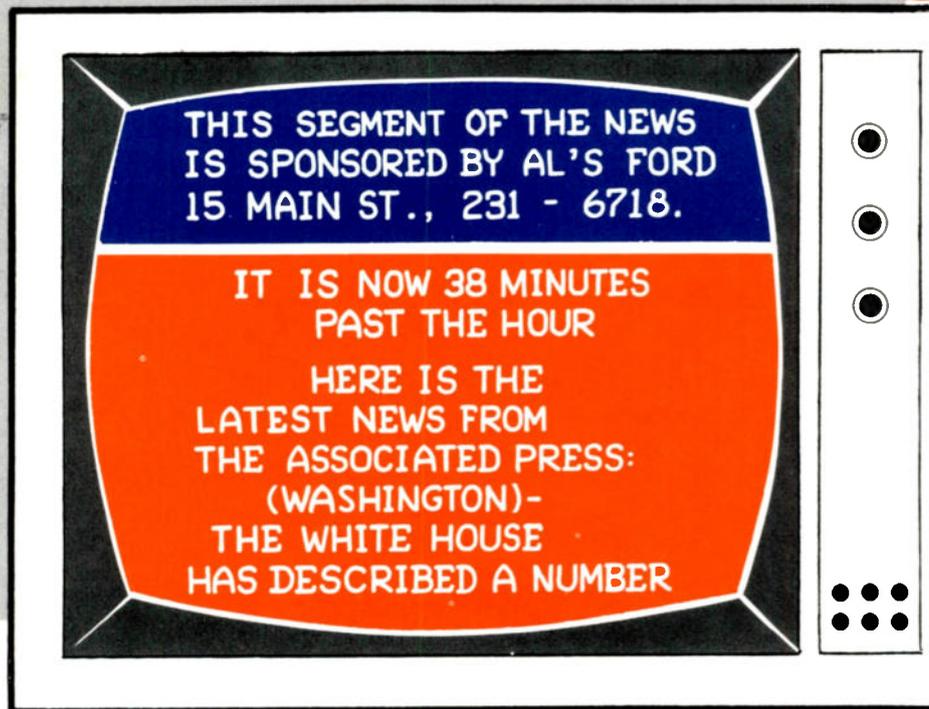
Copyright hearings — the cable oriented sections — happen again October 3. With that, the FCC reception, the new NCTA small operator committee contingent and the board of directors — the first week of October will be cable week in Washington.

OTP's Tom Whitehead floated another new idea the other day . . . in an interview with an AP correspondent Whitehead suggested an alternative to cable in providing more channels of VHF TV to the public: allocate, or "drop-in" more channels. Maybe he thought of that after he read the eleventh million draft of the fabled cable report . . . authored by that phantom cabinet.

The Service that knows what time it is...



NewsCable



AP NewsCable viewers now receive this little innovation in service while they're watching the news—an exclusive time-check appearing at random every few minutes throughout the day and night, 24 hours a day.

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Did you know that AP NewsCable is the only service that automatically and instantly "keys in" news bulletins from any point on earth, including your own locality? We interrupt the normal flow of news to do it. When we say instant news, we mean it.

Viewers of a news channel have the most voracious news appetite of anybody except maybe news editors. That's why our news editors are on the job around the clock for CATV.

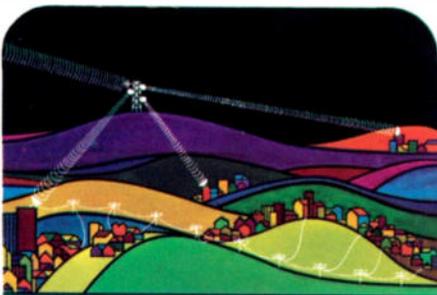
AP NEWSCABLE...with your choice of service on AP-owned-and-maintained equipment, or on receiving units provided by all fine manufacturers of character generators.



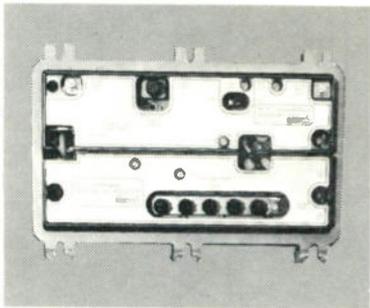
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Management Guidelines



Time For a Change ?

Change for the sake of doing something different will seldom have worthwhile results in business at any level or of any size or type. Special reasons for making such alterations should always be present as an important element involved in the decision to institute such a change.

Doing so also requires procedures along careful guidelines. The more which can be applied the sounder will be the basis for your change and the greater its chance of being successful.

Have a very good reason for the change every time. Be sure that the purpose is clear and factual before any step is taken even on the decision to make that change itself. Your reason may well be kept confined within the area of the firm's business at all times. Changes made to please someone, for publicity purposes, to combat a step by competition, etc., may have value but always of a very limited nature.

Question whether or not a partial change in the method of procedure could attain results as well as a complete revamping of the whole structure. It is a very good question to ask before moving ahead.

Usually an investigation in depth of the old method is required to highlight such valuable assets still remaining in even an out-moded procedure. Their contribution to the new scheme of things can often be the major assurance for success.

Keep hunches and guesswork out of all steps taken in any business change being made even though it is minor in nature. These are the pitfalls to probable disaster every time they are used.

Even where a "hunch" has in

itself led to the awareness of a need for change in procedure or method, the process of making a decision is best kept free of this weak decision maker at all times.

Be very certain that the decision has not been brought about by a temporary reversal or unpleasant experience which has clouded the real picture. Not all reverses or negative situations require change in method or procedure to assure there will be no reoccurrence. Many other elements are contributors. All can best be recognized and properly assessed *before* the big decision to make a change is made.

Talk over the idea of the change with someone else close to the problem. Another viewpoint can often add good ideas. This proves worthwhile not only while determining whether or not a change is needed but also in developing the basic elements of the new procedure after you decide to move ahead.

Be sure of the cost factors involved not only on the process of making the change but in operation of the new procedure after it has been adopted. Far too many steps have been taken for very good and sufficient reason only to discover later on that the tremendously high costs have so far offset these other gains as to make them valueless to the company.

Never assume that the new way will be a better one than the old. Research it from every angle before anything is started. "Whatever we do couldn't be anything but an improvement," presents a viewpoint loaded with fallacies which remain until they surface after the new procedure has gone into effect.

FVC

PROOF-OF-PERFORMANCE AND YOUR TOTAL TEST EQUIPMENT NEEDS

The TEKTRONIX Proof-of-Performance Package will also work for you for systems installation and regular maintenance, in addition to its proven usefulness at proof time. The Tektronix Proof-of-Performance Package is planned to give you more than just a proof package. In addition to meeting all parts of FCC §76:605, the package does:

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2. Bench sweep for amplifier and extender repairs.
3. Amplifier specification tests
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 - b. Cross-modulation
 - c. Noise figure
 - d. Return loss
 - e. Gain
 - f. Bi-direction performance
 - g. Intermodulation and 2nd order
 - h. Hum
 - i. Tilt ranges
 - j. AGC range and tracking
4. Cable specification testing.
 - a. Loss
 - b. Flatness
 - c. Return loss
 - d. Shield effectiveness (relative)
5. Field strength meter calibration.
6. Modulation depth (AM).
7. Deviation (FM and T.V. Sound).
8. Field surveys (antenna).
9. Headend processor alignment UHF or VHF.
10. Bandpass filter evaluation and alignment.
11. Antenna response.

Isn't it about time you and Tektronix solved your test equipment problem? We think so, that's why we have published a booklet of proof-of-performance procedures. If you haven't received a copy, just ask your local Tektronix Field Engineer for "no loose ends", or write: Art Andersen, Tektronix, Inc., Box 500-A, Beaverton, Oregon 97005.

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CATV News Briefs

A Summary of News from CATV, the Newsweekly of Cable Television

TelePrompTer Under SEC, NYSE Investigation: The Securities and Exchange Commission suspended trading of TelePrompTer Corp. stock following an announcement by TPT that it plans to cut construction allocation by some \$15 million dollars. Despite TPT's insistence that there were no "unannounced adverse developments concerning TelePrompTer's business, assets or earnings," the SEC suspended trading of the company's stock Sept. 7 and announced it was investigating TelePrompTer. The New York Stock Exchange launched its own investigation. Financial analysts attributed TPT's problems to increased expansion, the rising cost of borrowing money and extremely poor penetration rates in its systems. Rumors of TPT's difficulties have reportedly led to the unloading of large blocks of TPT stock in recent months by institutional buyers. Fuel was added to rumors of corporate problems as numerous lay-offs and dismissals of TPT employees throughout the country were reported. TelePrompTer officials met with SEC representatives in Washington, and, although the substance of the meeting was not discussed, TPT subsequently requested that the SEC continue its suspension until Sept. 26, to allow the corporation to compile information on the financial health of the company that the SEC is requiring TPT to release as a supplement to its announcement of construction cutbacks. The SEC again extended the suspension to run through October 7, still waiting for a promised TPT statement on financial condition of the firm. In the wake of the SEC, NYSE investigation, TPT was hit with a \$50 million class action damage suit brought in U.S. District Court in Manhattan by a group billing themselves as "the Independent Investors Protective League of New York." Defendants named in the suit were the accounting firm of Touche, Ross and Co. and three TPT officers. Defendants were charged with "widespread fraud in construction program," and "misappropriation of corporate funds." (CATV 9/17 p7, 9/24 p7, 10/1 p3).

Quello Nominated to FCC Seat: James H. Quello, 59 year-old former manager of WJR-AM & FM in Detroit, was named to a seat on the Federal Communications Commission. The nomination is subject to congressional approval and some people are taking a strong stand against Quello's nomination. Outgoing Commissioner Nicholas Johnson has been joined by Ralph Nader in his effort to halt Quello's appointment. According to a member of Senator John Pastore's staff, "hundreds" have written to the senator to express their view of Quello. However, the senator's staff did not disclose how the mail was running. (CATV 9/24 p3, p4)

Warner Realigns Top Management: Citing the need for "an added management tier at the executive level," Warner Cable Corporation president Alfred R. Stern moved up to chairman and chief executive officer, making way for new Warner Cable president Gustave M. Hauser. Hauser's background includes a diversity in law, finance, and all phases of telecommunications and corporate management. (CATV 9/17 p11, p28)

Viacom and CPI Agree to Merge: Viacom International, Inc. and Communications Properties, Inc. announced an agreement in principle in which CPI would be merged into Viacom. Under terms of the proposed merger, CPI shareholders will receive six-tenths of one share of Viacom for each share of CPI stock held. The merger, subject to the execution of a final agreement and to the approval of stockholders of both companies, would add CPI's 187,000 subscribers to Viacom's total of 260,000, putting the company in or close to second place in the MSO list. CPI officials indicated that they had not obtained a

pre-clearance of the merger from the Justice Department, creating the possibility of a repeat of the ATC-Cox scenario. (CATV 8/27 p3, p8)

Cox Finds New Merger Partner: Cox Cable Communications and LVO Cable Inc. executed a letter of intent calling for a merger of LVO Cable into Cox Cable. Under terms of the agreement, one share of Cox Cable stock would be exchanged for each of LVO's 1,880,000 outstanding shares. As a result, LVO Corp., which currently holds 59 percent of LVO Cable, would own 11.2 percent of Cox Cable. Cox Broadcasting Corp.'s holding of two million shares of Cox Cable currently represents ownership of 56.2 percent of the cable company, but consummation of the merger would reduce that percentage to 45.5. Announcement of the merger plan followed by less than three weeks a similar announcement made by Viacom and Communications Properties. The proposed merger between Cox and American Television and Communications Corp. was called off five months previously. (CATV 9/17 p3)

NCTA and Telcos Break the Ice: Initial meeting between NCTA representatives and telephone and utility companies on the issue of pole attachment agreements were "informative and as constructive as possible under the circumstances," according to NCTA assistant general counsel Steve Gold who chaired the meeting. NCTA's Pole Line Negotiating Committee initiated talks with AT&T, General Telephone, and Continental Telephone to discuss procedures for the FCC-mandated negotiations on pole attachment problems. (CATV 8/27 p3, 9/17 p3)

CCTA Takes Stand: The California Community Television Association Board of Directors and general membership unanimously passed a resolution stating the position and policies concerning the negotiations over pole attachment rates and practices with the utilities industry. If pole attachment rates were allowed to increase to \$7.50 per year, as the utilities proposed in the 1971 national settlement, CCTA statistics show that subscriber rates would have to increase to over \$11.00 per month in order to maintain pole rental costs at their current percentage of subscriber revenue. CCTA President Don Williams noted that pole attachment practices, rates and rearrangement cost could have a more devastating impact on the financial viability of cable television than copyright since in many urban systems a pole attachment rate of \$7.50 would represent 30 percent of the systems' operating costs. (CATV 10/1 p7)

NAB and Pay-TV: After announcing an all-out effort to ensure "no diminution of free television service to the public", Willard Walbridge, Chairman of the National Association of Broadcasters anti-pay television committee, rejected NCTA president David Foster's challenge to publicly debate the issue. Walbridge explained a forum for debate already existed in the Federal Communications Commission. He also announced a new name — the Special Committee on Pay Television — and a new strategy. SCPTV plans to employ an executive director and an independent public relations firm. It also hopes to enlist the aid of a public advisory board and to foster subcommittees in government relations, public relations, information/research, media relations and funding fields. The principal purpose of the committee, Walbridge said, is "the protection of the American public . . . not cynical self-interest." As a result, the NCTA executive committee adopted a resolution primarily resolving "that NCTA calls upon all groups,

organizations, and individuals committed to freedom of consumer choice and a wider variety of television programming to oppose these efforts to retard development of subscription cablecasting.” (CATV Sept. issues)

Broadcasting Revenue Soared in 1972: According to an FCC financial data study on TV broadcasting profitability, pre-tax profits jumped 41.9 percent over 1971 and network earnings more than doubled. Higher profits were attributed to higher revenues coupled with general cost-cutting, including the increased use of re-runs. (CATV 8/27 p7)

FCC Approves Five Domsat Systems: The FCC recently authorized the construction of five additional domestic satellite systems. Applications granted were those filed by American Satellite Corporation; RCA Global Communications, Inc. and RCA Alaska Communications, Inc.; GTE Satellite Corp. and National Satellite Services, Inc., a subsidiary of Hughes Aircraft Co.; AT&T; and Comsat. (CATV 9/24 p7)

Bork Supports Supreme Court Review: U.S. Solicitor General Robert H. Bork filed a memorandum with the Supreme Court supporting its review of the Columbia Broadcasting-TelePrompTer Copyright decision. The decision held that the importation of signals by cable systems constituted a performance of those signals and thereby incurs liability for copyright infringement. TPT had previously sought review of the decision. Bork said that decision, held by the Second Circuit Court of Appeals, raises important questions about the application of the Copyright Act to Television signal distribution by CATV systems. The extent to which CATV systems should incur copyright liability for distributing television programming beyond its normal reception area, said Bork, “has great practical significance for the CATV industry, television broadcasters, copyright owners, and ultimately, the viewing public.” (CATV 9/24 p3)

NCTA Releases L/O Survey: Nearly 20 percent of all cable systems now originate programming on a regular basis, according to a recently-released NCTA “Local Origination Directory 1973.” The survey shows that over 3,750,000 subscribers are provided with a national average of 21.1 hours of locally originated programming per week. This represents a five-hour increase in average weekly programming time over 1971, the last year for an NCTA local origination survey. The directory lists include individual systems, their technical capabilities, number of hours of programming per week, and the types of programming carried. Copies of the report are available from NCTA at \$2 for members, \$4 for non-members. (CATV 9/17 p13)

Dr. Goldmark Receives Governors’ Citation, Announces 1976 Sat Plan: The National Governors’ Council on Science and Technology awarded a special citation to Dr. Peter Goldmark, president and director of research of Goldmark Communications, for his work on the New Rural Society project. The project is an experiment into the uses of telecommunications to revitalize rural towns and stem the migration of people from rural to urban areas. Dr. Goldmark, during a Sept. 21 address to the International Electronic and Electrical Engineers, described his newest communications brainchild — the creation of a domestic

CATV News Briefs

satellite system linked by cable TV networks and large-screen theatres to show live international cultural events for America's Bicentennial, and, ultimately, to form the nucleus of a nationwide telecommunications system. (CATV 10/1 p11)

Blackout Ban Goes into Effect: Even with a supporting cast, National Football League Commissioner Pete Rozelle couldn't sway Torbert Macdonald's Communications Subcommittee and anti-blackout legislation became effective for the 1973 NFL season. Representative Harley Staggers, chairman of the Commerce Committee, introduced the legislation. The Staggers blackout bill outlaws blackouts when all tickets to games which have been made available 30 days prior to the beginning of the season are sold out seven days before the season opens. (CATV Sept. issues)

NATO Versus Pay-Cable: Seeking to separate ownership of cable and pay-cable delivery systems, the National Association of Theatre Owners, Inc. submitted three petitions to the New York State Cable Commission. NATO also recommends that the Commission "require the operation of the cable TV channel on a common carrier basis so that the channel will be available to all potential users on fair and equal terms and conditions." In a separate petition NATO sought a cease and desist order against the Warner system in Olean to prohibit that system from providing pay services until rates can be set according to New York state law provision permitting the state commission to issue orders necessary for the accomplishment of its statutory purpose. In both petitions NATO charged that cable system with predatory pricing, making films available for as little as 20 cents per person and passing costs along to the entire system and thus to all subscribers. NATO feels this alleged pricing will eventually result in the demise of the Olean theatres, picture viewing opportunities and a host of other evils. In its final petition, NATO wants the Commission to reject TelePrompTer's proposal for its Mount Vernon franchise to provide an additional channel on a subscription basis for carriage of Madison Square Garden events. The proposed carriage is on a pay basis and, according to NATO, an example of internal siphoning since the same events are offered to Manhattan subscribers as part of the basic service. Actions by any state commission on pay-cable rules would raise serious jurisdictional questions but NATO contends that the FCC's preemption of such rulemaking by lesser jurisdictions does not apply to state intervention in the rate-setting practices of pay-cable. (CATV 9/24 p8)

Financial Developments: Dr. John C. Malone, president of Tele-Communications, Inc., announced first half revenues of \$12,458,000, 47.5 percent above the \$8,446,000 reported for the same period in 1972. Net earnings showed a 1973 increase of 68.3 percent and net earnings per share were 13 cents after provision for preferred dividends . . . American Television and Communications Corporation has reported record profits and revenues for its fourth quarter and the year ended June 30, 1973. Net income during the 1973 fiscal year totaled \$2,120,965, equal to 60 cents per share of common stock . . . Revenues for the six months ended June 30, 1973, for Comcast Corp., reached \$2,951,191, an increase of eight percent over for the same period in 1972 and a net income increase of seven percent . . . UA-Columbia Cablevision net income for three quarters of operations ending June 30, 1973, totaled \$595,000 or 39 cents per share . . . All-time high six months financial results were reported by Essex International, Inc., highlighted by sales of over \$423.8 million, earnings per share of \$1.22 and net earnings of over \$22.3 million . (CATV Sept. issues)

BIDIRECTIONAL CABLE TV SYSTEMS

SINGLE TRUNK SINGLE FEEDER SUB-SPLIT

Bidirectional services can be provided via a single sub-split cable Return signals are assigned to the 5 to 30 MHz band. The full 50 to 300 MHz band is retained for forward channels.



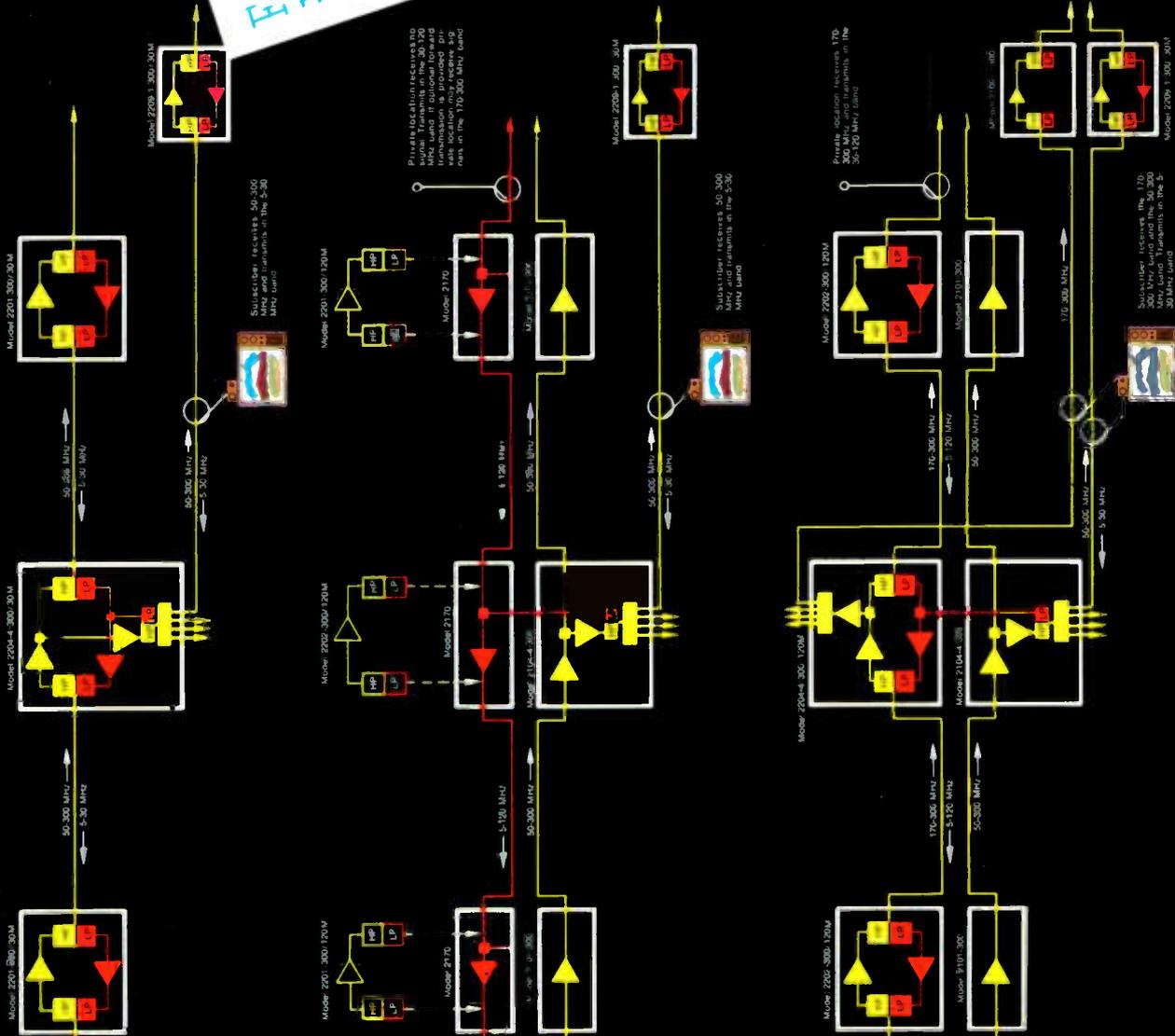
DUAL TRUNK SINGLE FEEDER MID-SPLIT with optional forward on Cable B

The installation of dual trunks creates a physically separate trunk path for the 5 to 30 MHz subscriber-generate signals and can provide a 30 to 120 MHz capacity for specialized "return-only" applications. If the return trunk cable is mid-split for bidirectional transmission, the dual trunks can also receive the 5 to 30 MHz band and generate signals in the 30 to 120 MHz band.



DUAL TRUNK DUAL FEEDER MID-SPLIT

For the subscriber service by both feeder lines, the mid-split trunk dual-feeder system provides forward channels in the 50 to 300 MHz band of cable A and the 170 to 300 MHz band of cable B. The subscriber may generate signals in the 5 to 30 MHz band and receive the 5 to 30 MHz band and forward channels in the 30 to 120 MHz band.



CENTURY AMPLIFIERS

Model 2204-300/120M
Sub-split, bidirectional
Bridge with 4 output
channels



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(also required)
Supply
Model 2170
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and 2171



Model 2104-300
Forward Tune Amplifier
Station with sub-split 4-output
modules bridge



Model 2116-4
AGC Tune Amplifier
2116-4 Duplex Bridge
4-output



Model 2105-300
Power Supply
Model 2105-300 derived by
replacement of module
2118 by 2113 MGC Trunk
Amplifier



Model 2204-300/120M
Mid-split, Bidirectional Trunk
Station with 4-output Bridge
modules



Model 2176
AGC Tune Amplifier
2176 AGC Reverse Trunk
Amplifier



Model 2177
Microsplit Filter
(also required)
Supply



Model 2124
Power Supply

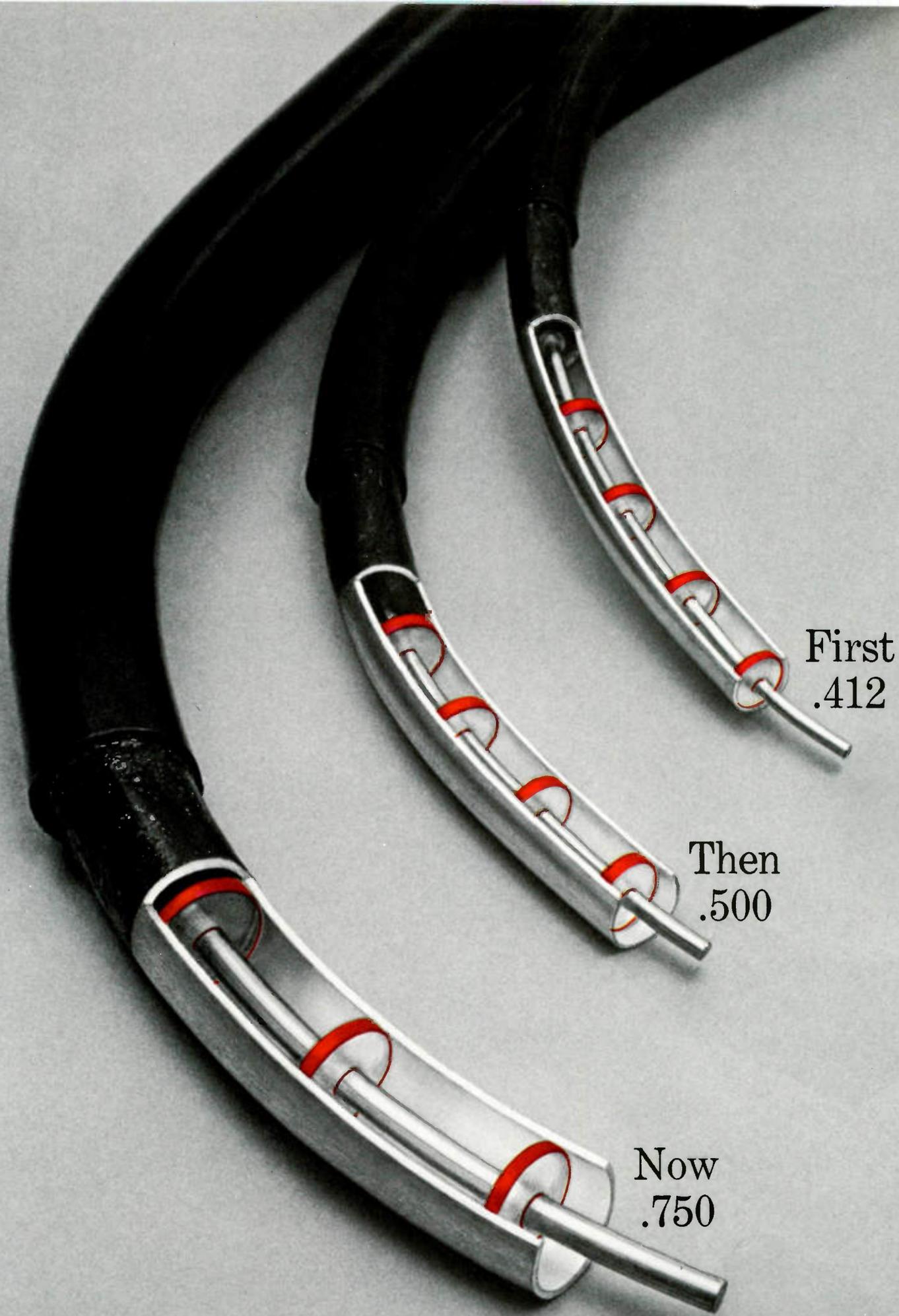


NEW 2109 LINE AMPLIFIER



The Century Model 2109 line amplifier can be used in both conventional and bidirectional systems in either application. It provides a full 50 to 300 MHz band for forward channels. Built-in duplex filters allow easy conversion to sub-split, bidirectional operation by means of a dual output directional tap and a dual output option. The 2109 and the entire Century line achieve superior performance and reliability due to the use of microcircuits.





First
.412

Then
.500

Now
.750

INTRODUCING THE NEW .750" FUSED DISC* COAX CABLE.

It's just one more reason why you owe it to yourself (and to your subscribers) to talk to us first if you're planning to install new plant or replace obsolescent trunk cable.

We'll show you that our new 3/4" big brother to the .412" and .500" Fused Disc cables does more for you than your present 1" foam or 3/4" "low-loss" trunk cables. And without asking you to pay a premium.

We offer you levels of high performance available only with our precision engineered and manufactured, electrically uniform .750" Fused Disc.

Here's what we mean:

- You get absolute protection against moisture migration along your cable.
- You get an unqualified guaranteed SRL of 35 dB or better.
- You get an impedance tolerance of only $\pm 1/2$ ohm.
- You get 95% velocity of propagation.
- You get better echo level performance.
- You get low attenuation values (see chart).
- You get ease of installation.

- You get investment dollar savings.
- You get maintenance dollar savings.
- And you can get long, long lengths.

**.750" FUSED DISC CABLE
MAXIMUM ATTENUATION VALUES,
PER 100 FEET @ 68°F.**

frequency MHz	55	83	100	175	211	250	300
db	.37	.47	.52	.72	.80	.88	.99

Now that .750" Fused Disc cable is available along with our .412" and .500" you can build a Fused Disc system from headend to subscriber tap.

For more information, or if you'd like to see a short film showing how easily Fused Disc cable can be installed, call your nearest General Cable sales office or write: General Cable Corporation, Department 200-130, 730 Third Avenue, New York, New York 10017.

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LOCAL KEYBOARD MESSAGE

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DW-2300-2

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LOCAL NEWS

KEYBOARD

MESSAGE



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DW-2300-6

LOCAL KEYBOARD MESSAGE

WASHINGTON UNITED MINE WORKER PRESIDENT ARNOLD MILLER SAID TODAY HE WILL CONCENTRATE ON COAL MINE SAFETY AND FRINGE BENEFITS SUCH AS SICK PAY, RATHER THAN WAGES, IN CONTRACT NEGOTIATIONS NEXT YEAR IN THE COAL INDUSTRY.

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MSI
TELEVISION

LETTERS

Dear Bob:

I believe it is time for the cable industry to enlighten the public, and solicit their support of cable TV.

Broadcasters, film owners, telephone and various regulators have been chipping away at cable, completely free of public scrutiny. We have failed to tap the most powerful source of advocacy available.

While Congress may not offer more than token response to cable operators, these legislators will react to the probes and prodding of their constituencies.

I've enclosed a letter written by one of my subscribers to several of his representatives in Congress. I believe the letter is effective because it was obviously written by a concerned citizen and not "pre-composed" by an organized group. Certainly, it indicated that the author is not an expert on cable history. But, this letter will be better received by the Congressman than had it been professionally drafted by the NCTA.

When my subscribers complain to me about non-duplication and other disruptions of an otherwise good service, I will refer them to their Congressman. But I will allow them to express their views in their own words. I hope other operators will take this approach.

James W. Meador, Jr.
Hampton Roads Cablevision Co.
Newport News, Virginia

Dear Paul:

I wish to thank you for the unbiased and totally objective manner in which you have handled the news reporting on CATA; and myself.

It has been written that starting a new association is an uphill climb. And that it is a great deal of work. Both of these statements are true... in spades! I never really appreciated those wise souls within the industry who tried to warn me of what lay ahead. But I certainly do now!

As you noted in your kind profile, I am basically a tower-climbing, drop-installing kind of guy. I have never been what you might call a recluse, but public appearances and running a flag up the pole have never been my strong suit.

Yet in spite of all this, CATA is off the ground and steering a straight course for a better Community Antenna Operator situation with the cable industry.

And, frankly, your objective reporting and kind words have helped. I thank you for that.

Kyle Moore
Community Antenna Television Association 

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Turning L/O Into A Marketing Tool

In Springfield, Illinois, local residents get good reception from both St. Louis and Peoria. So the local cable system, 1st Illinois Cable, decided to use local origination to crack the competition and gain new subscribers.

*By Ruth Steinberg
Managing Editor*

1st Illinois Cable TV of Springfield, Illinois opened the doors of its local origination studio on April 1st. During a selected week in June, the cable system averaged one-half minute per hour of advertising — and that's not a bad figure for a studio that had been in operation for just two months.

1st Illinois Cable is an affiliate of Communications Properties, Inc. According to Curt Melcher, general manager of the system, that's one of the reasons the cable system has been able to jump headlong into local origination. "CPI has been just great. They've given us all the support we needed to implement our concept of local origination."

That concept could be the blue-

print for other systems in medium-sized cities that want to begin local origination. Springfield is number 65 on the list of top-100 markets. It is already serviced by one local broadcast station, and with a good antenna, residents of the city are able to pick up network channels from St. Louis and Peoria. So a good local origination channel in the Springfield area could mean more subscribers to the cable system — but that channel had better be good.

The original local origination concept was formulated two years ago. Curt Melcher explained, "Local origination has been a failure industry-wide because it lacked all of the factors that people have come to recognize as television — consistent scheduling,

regularity, etc. Also, the quality of the cable picture was not up to par. Television has subtly educated its viewers for about 30 years; they are used to seeing a certain level of technique. When a viewer spends \$500 for a TV set, running across the room to adjust the color becomes an annoyance. Having equipment that basically generates a stable picture is important. Cablecasting was not delivering technical quality or operational regularity consistent with what the TV viewer was used to seeing."

Having defined the basic concept, Melcher explained, the next step was to find the physical facility that could house the various functions of the operation. 1st Illinois Cable had been located in



Tom Stephens, Program Manager, is seen through the control room window as he interviews TV-VII staff members while open house visitors look on.

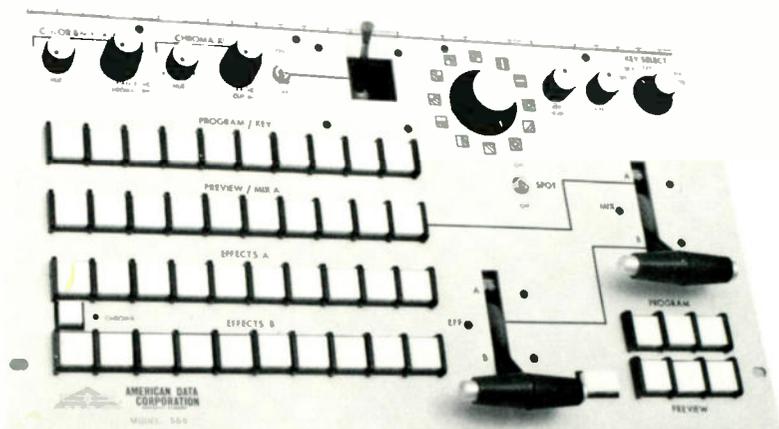
MODEL 556 PRODUCTION SWITCHER

Features

Ten Inputs – Composite – Non-Composite Loop-through (Expandable to 16) • 4 Buses-Program/Key, Preview/Mix A, Effects A, Effects B • Vertical Interval • 12 Pattern Effects Including Circle, Joy-stick positioner and Spotlight • 3 Input Downstream Keyer for internal-external-Matte and Chroma Keys • Blink Key • Cutbar • Black-Color Background Gen. • Effects behind Chroma Key • Effects into Mix or Effects or Mix on Program reentries • Program and Preview Output Switching • Program and Preview Tally • Split handle supers or fade to black • Processing Amplifier on Program Channel • Fully Color-timed•Control Panel 10.5 x 19.0 x 4.5 • Electronics package requires only 10.5 inches of vertical rack space.

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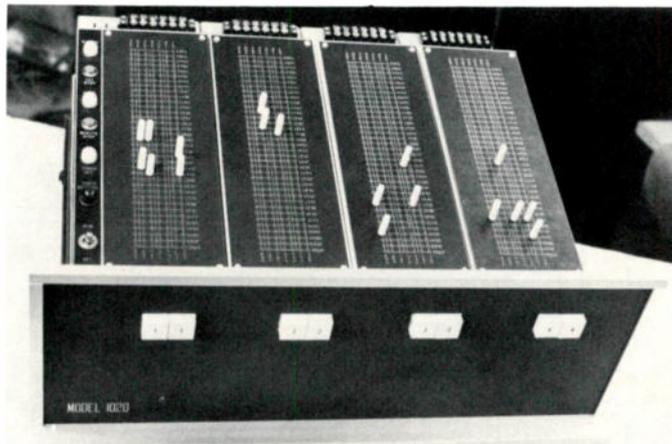


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Make The Switch To SESCO!



MODEL 1020 AUTOMATIC CHANNEL SWITCHER

LIFETIME GUARANTEE! The SESCO Model 1020 Automatic Channel Switcher (ACS) is the new standard of the industry, and the most reliable unit available today. This SESCO Product is covered by warranty to the original purchaser against defective materials and workmanship for the natural life of the equipment with the exception of pilot lamps and fuses! Read on.

The SESCO ACS solves multitudes of switching problems. It provides the answer to nonduplication requirements called out by the FCC. Each channel of the ACS will switch off an input source at a designated time and switch on another source at the same time, or at a different time. And the ACS switches with millisecond accuracy.

The ACS system is expandable because of its modular construction. Basic timer memory switching (1 to 4 channels) is provided in one slide-out chassis 7" x 19". Extra channels are available with the addition of one or two more slide-out chassis.

The process for timer set up is very simple. Just plug in the ACS, set the operation switch to set, and the timer sets itself. Programming memories for minutes and days is done by push switches and two service lamps. Switching, accurate in milliseconds, can be easily accomplished by nontechnical personnel.

The matrix memory board controls time period. Each channel is programmed by placing a diode pin at the intersection of the day and minute segments. The switching operation will now take place automatically. This permits programming each channel a week in advance. For as long as the weekly format remains the same, the pins remain in place.

MECHANICAL SPECIFICATIONS

7" x 19" rack mounting on slide-out tracks
7" height x 19" width x 16" depth, weight 26 lbs.
A new concept in local origination



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a 1500 square foot building. The new facility has 9000 square feet, of which 3200 house the entire local origination operation.

Selecting Equipment

Melcher went on to explain: "Once we had the facility, we began choosing equipment. We looked at side-by-side demonstrations, manufacturers' specifications, operational features, and the economics. We patterned the design concept of the equipment package around those functions one would find in a TV station. Physically, there's a studio, a studio control room which contains only the equipment for studio production, and a master-control and tele-cine, which contains line switching, monitoring and projection equipment. This allows us to be on the cable and simultaneously produce and videotape other programming. Necessary test equipment is also contained in the master control room."

The complement of basic equip-

ment includes four Norelco LDH-1 cameras. Two cameras are used in the studio, and two make up part of the film island. Each film island is also equipped with Eastman Kodak 16mm. projection equipment, plus Spindler and Sauppe 35 mm. equipment, as well as an add-on capability for super-8.

The VTR complement includes three IVC Model 825's one IVC 960, and one Sony 1600 cassette player. The studio also has a trade-out agreement with a local independent producer for Sony 1/2-inch, Panasonic 1/2", and Ampex 1-inch equipment, although none are presently utilized.

There is a Central Dynamics Laboratory 800 Series production switcher, which includes a 32-pattern special effects generator, encoded chroma keying and a background generator. An MSI character generator is interfaced to the switcher. The system uses Conrac picture monitors, Tektronix waveform monitors, and a Tektronix vectroscope.

Audio equipment is by Sparta, and includes a Model 820 console, two cartridge playback machines, and one-cartridge record-playback machine. The studio also has one Ampex reel-to-reel audio machine. All of the lighting is by Berkey-Colortran.

Melcher explained the system's commitment to sophisticated video equipment: "This is the only way we feel we can deliver the kind of technical quality that people will watch."

No Formula

He added, "We don't feel that we have 'the formula.' A system in a town of 10,000 could never hope to embark upon a project like this. What we have done is based upon the market conditions in Springfield. We must use local origination as an offering to our customers that will make them want to subscribe to cable."

Having acquired the studio equipment, as well as a building in which to house it, the next logical

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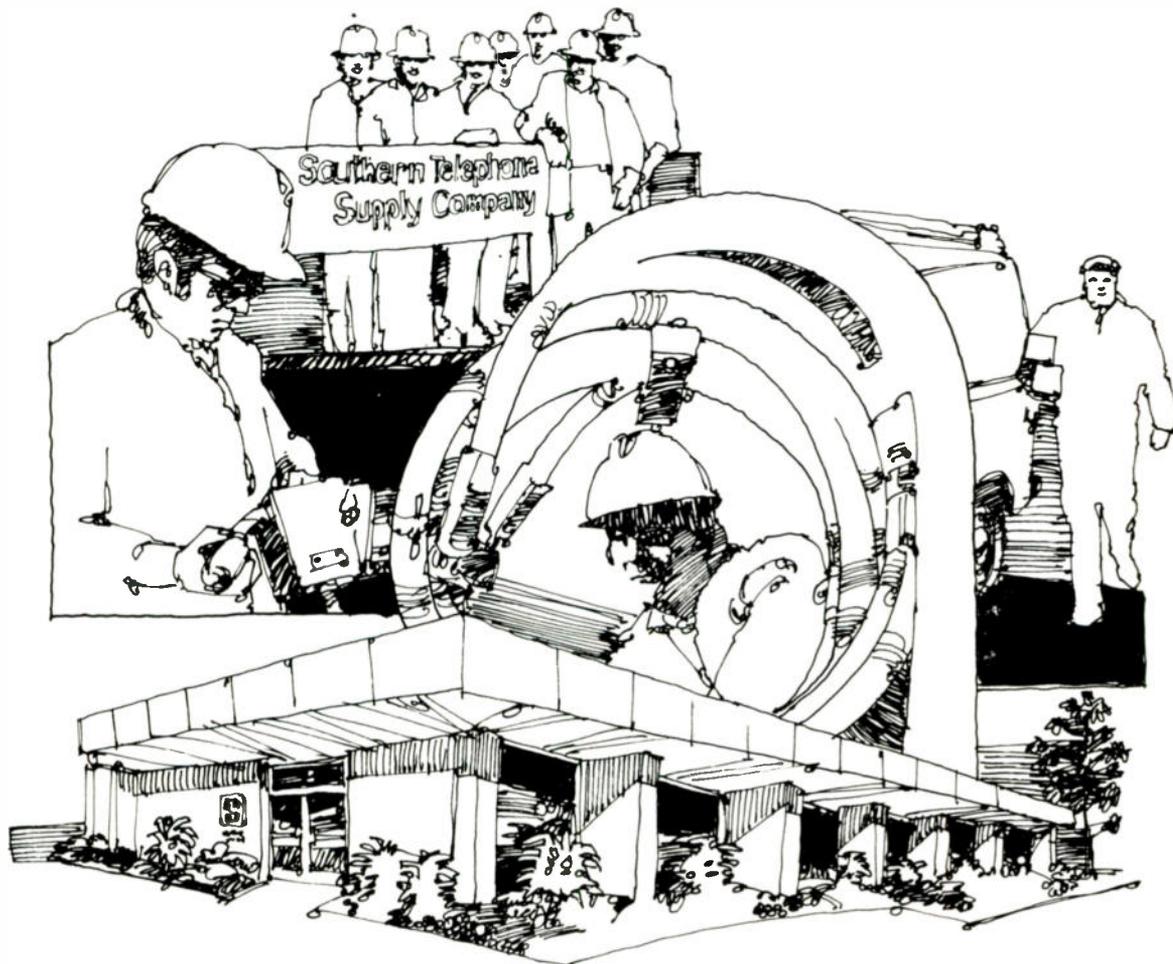
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Michael A. Kwedar, City Corrdinator, representing the city of Springfield, cuts the piece of video tape signifying the sign-on of TV-VII. From left: Tom Stephens, Program Manager; Mr. Kwedar; Curl Melcher, General Manager; Jack Vines, Television Engineering Corporation.

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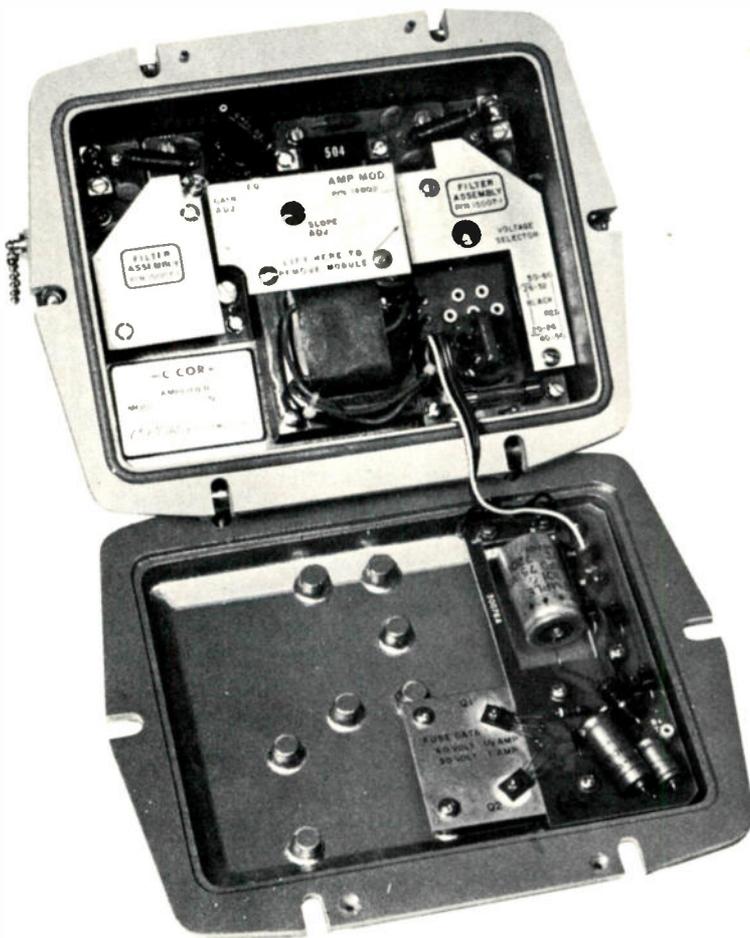
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step, according to Melcher, was to acquire a staff. "Because we felt that in effect we were creating a TV station, we wanted people with programming production and program knowledge." Presently, 1st Illinois Cable employs 11 people in its production facility. "We felt if we were to deliver the goods, it was going to take a staff somewhat larger than the norm," Melcher explained. Included in this full time staff are a program director, a production coordinator who handles various producing

responsibilities including traffic control, a production supervisor for actual studio production, and an engineer whose sole responsibility is the maintenance of local origination equipment.

The production unit also has its own full time salesman, who is responsible for selling advertising — spot sales and sponsorships — and for selling the studio's production facility that can produce training films and other non-cable-cast material. He stressed that the advertising salesman is in no way

concerned with subscriber sales or any other kind of revenue acquisition.

1st Illinois Cable TV's channel VII believes it's the first cable system of its size to employ a full time public affairs director. Valerie Baird describes her job as one of "building enthusiasm", "We rely on the public. You've got to handle them like they really matter. If they realize that they're important and their ideas are useful, that's one more link to the community."

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Citizen Participation

Part of building that community rapport is the Citizens' Programming Advisory Committee. The Committee was selected by the members of the various Springfield civic and special interest groups. Requests were sent to over 40 different groups asking that they submit the name of a person from their membership who might be interested in serving on the committee. Approximately 35 organizations in the Springfield area responded. Once a name was submitted, a letter was sent to that person requesting biographical information. The names and biographies of the committee candidates were assembled into ballot form and returned to the various organizations. Each organization was asked to select ten persons. The ten receiving the most votes were then elected to the committee.

Valuable Asset

The resulting committee has been a valuable asset to TV-VII (1st Illinois' pseudo-call letters for its local origination channel) in planning its public affairs and community interest programming. At present, it is kicking around ideas for a program to deal with the issues and problems of senior citizens, and it hopes to be instrumental in the development of more children's programming on the cable channel.

TV-VII began programming on April 1st of this year. "Our programming concept has its

emphasis on the local community," explained Melcher. "This does not mean, however, that every program has to be a discussion or evaluation of an earth shaking issue in the community. We classify our locally produced programming into four basic categories — public affairs, community activities, local sports, and general entertainment."

Cable Fare

Some of the programs that TV-VII has produced are:

Rock On — an American Bandstand-type program that each week features a different high school in the area. Music for the program is live about 3/4 of the time.

Marty's Place — a country and western entertainment program.

Happy People — a talk show geared to local musicians, the local theater guild, and local sculptors.

Springfield Safari — an animal show. This show has run the gamut from discussions with local veterinarians about pet care to actually having animals on the program. "We've had an eight-foot boa constrictor, cats, dogs, rabbits, ducks and chickens on the show," says Melcher. "Not all at the same time, however."

Tee Off — a how-to program which features a local golf pro and his guests.

The show that Melcher spends the most time describing is *On 7, At 7*. "It's more or less a potpourri for public affairs. There are always numerous things happening in Springfield. There are always issues in the community. We envision this show as our public affairs strip."

On 7, At 7 programmed an exclusive half-hour interview with local returned POW, Roy Ziegler. During the last school board election, several shows were set aside to interview each of the school board candidates. *On 7, At 7* has even done programs about cable TV — the progress of the rebuild of the system, what Channel VII was, and what it has hoped to become. Melcher adds, "One night, we had the chief engineer for the system on, and invited

people to call in if they had any questions, or if they were having difficulties with the cable. That prompted a few service calls that night."

TV-VII also does a variety of sporting programs. "This year, we taped the semi-finals of the Mid-America Hockey League games that were held in Springfield. Next year, we hope to do all the games," says Curt. TV-VII is also working with the local school districts to bring a well-rounded high school sporting program to

the cable channel. "We feel it's important to give our attention to all the sports. We hope to do baseball, tennis and wrestling, as well as football and basketball next year."

"At the request of our subscribers, we do show a feature movie package. We have also obtained some programming which has been done by other cable systems. This includes a racing package featuring boat, automobile and motorcycle races. We find these to be very popular, partly since they



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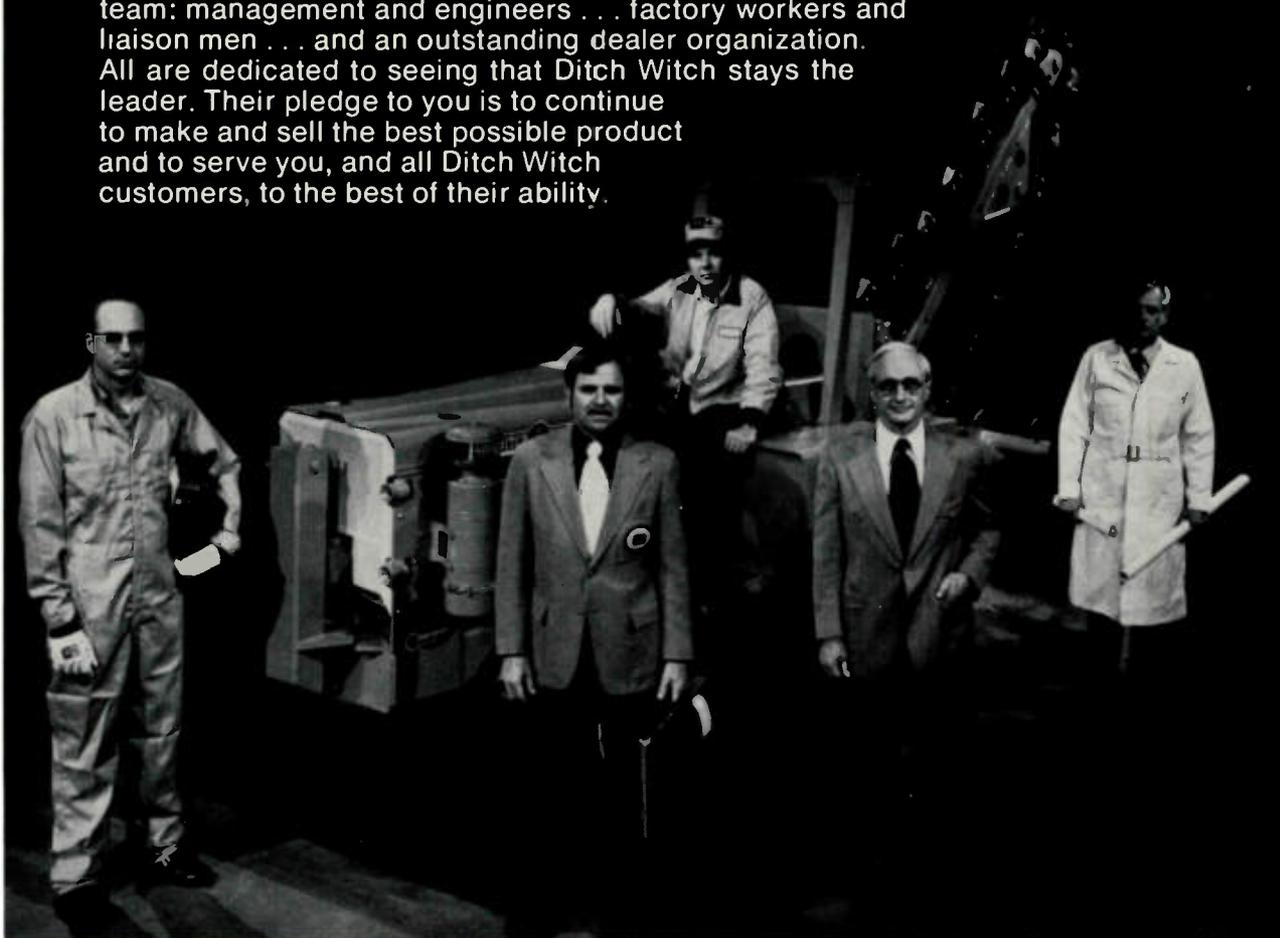
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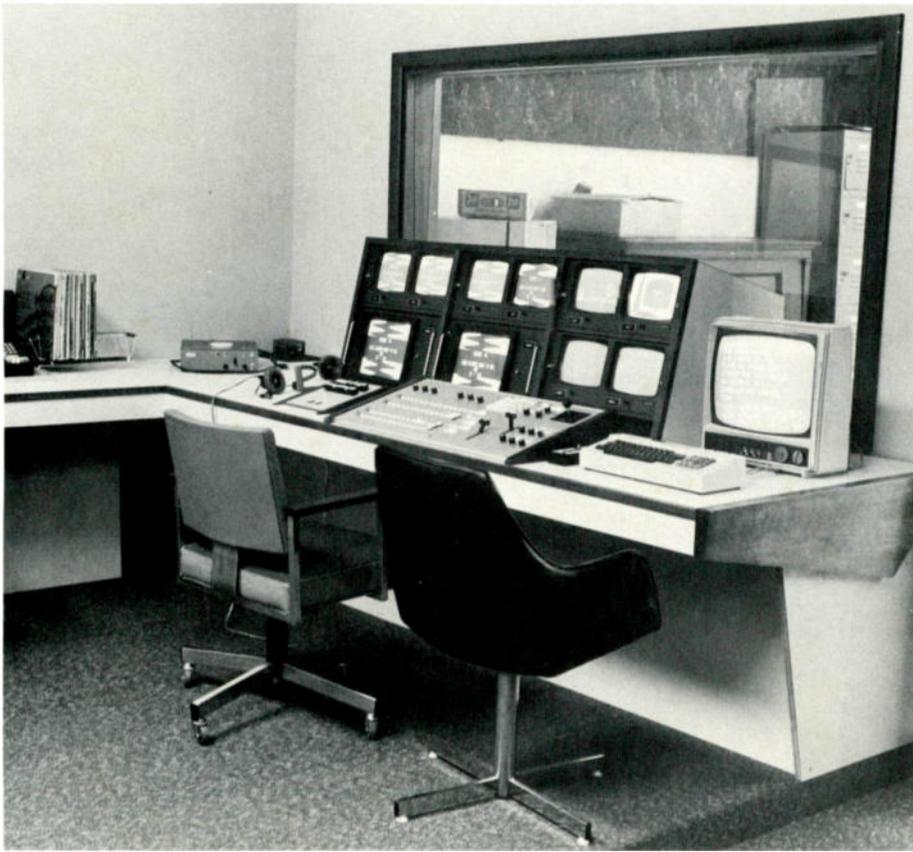


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TV-VII's studio control room includes a Central Dynamics laboratory video switcher, Conrac and World video monitoring, and Sparta audio equipment.

are on a local scale as opposed to the big national events."

And finally, there is the Fair. The Illinois State Fair, held in Springfield every year, is one of the biggest events of the year, and 1st Illinois Cable TV covers it in full. From the opening day parade to the talent contests to the tractor pull (see this month's cover); from harness racing to the USAC races, 1st Illinois Cable TV provides more comprehensive coverage of the fair than any of the other local media. Valerie Baird, TV-VII's public affairs director, says, "Isolation is the worst thing that can happen in an industry like this." In just a few short months, TV-VII has succeeded in involving important members of the community in their production planning. In addition, they are making a concerted effort to really cover the local community and its affairs. If the system continues to operate under that philosophy, it just might serve as a model to other system operators who are really ready to believe that they are in fact in the origination business.

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*Kodak Ektachrome EF film 7242

John Cardenas, station manager, Cable Vision 6 (a subsidiary of CableCom General), Santa Rosa, California; Mel Copeland, sales manager; Robert Moore, free-lance cinematographer; Frank Perez, store manager.



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'Everything Is Beautiful In Its Own Way'

Looking for a real challenge, Montana Video of Billings took on, for the first time, the challenge of providing video tape coverage of the Miss Montana Scholarship Pageant for cablecast.

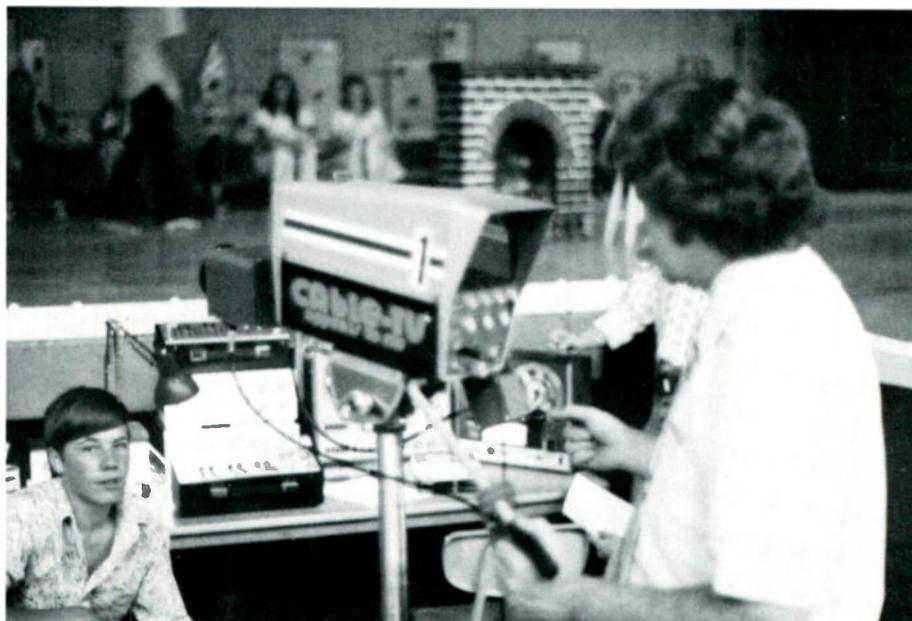
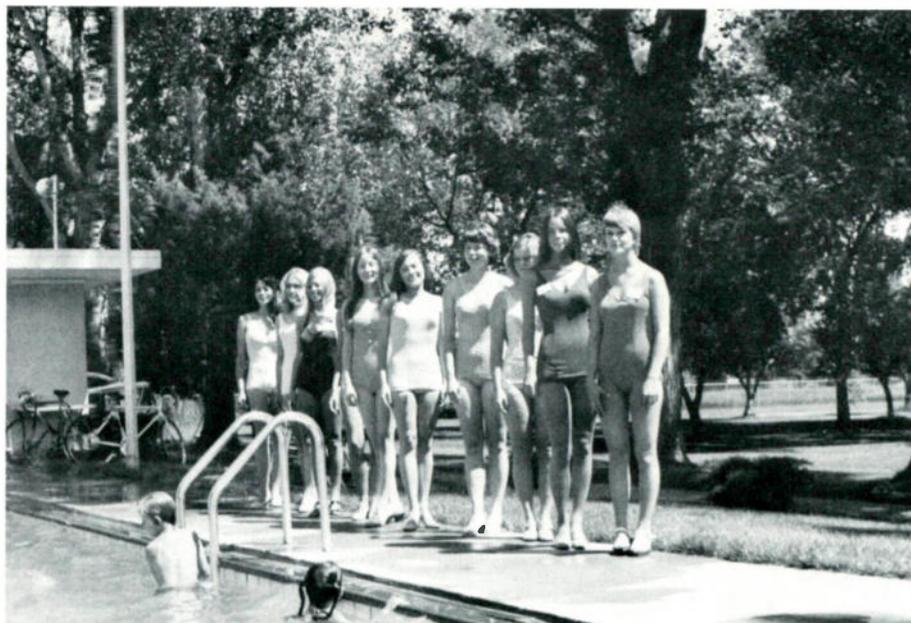
*By Scott R. Blair
Montana Video*

Good evening ladies and gentlemen. Welcome to the Billings West High School Auditorium for the 1973 Miss Montana Scholarship Pageant . . ." It was weeks before these words were heard when cable manager Bob Towe, pageant director Jack Lawson, and myself met for the first time to discuss the televising of the largest pageant in the state. This meeting was historic, in that no one since the start of the pageant had ever attempted complete video tape coverage.

The first question to present itself was that of equipment. Did we possess enough equipment to adequately produce television coverage? For one week we tried to adapt all extra equipment available to us to serve our needs. These attempts proved to be fatal due to a partial lack of sync.

It was then discovered that our regular studio equipment would lend itself to ease of portability. We decided at that point that it would be advantageous to remove our Telemation Multicaster switcher, three TM cameras, Sony SEG-2 special effects generator, Sure mic mixer, and two IVC video tape machines to the auditorium projection booth to set up production control.

With that taken care of we moved on to co-ordinating our efforts with those of the pageant staff. With the advanced information supplied to us by the pageant people, we diagrammed our coverage. Approximately one hour of time was designated as pre-pageant





activities utilizing the studio as well as Sony "Rover" porta-pack. This enabled us to present a brief look at the events that took place leading up to the pageant and also provided some insight into each of the girls' personalities.

One week before the pageant Bill Caligari, Associate Producer for the Miss America Pageant, arrived in Billings to direct production of the pageant and a production meeting was called. It was at this meeting that all of our problems were brought to light, and light would soon be our biggest problem. The pageant production leaders were very cooperative, and offered their assistance in every way.

Publicity for the pageant was one aspect in which Montana Video did not expect to get involved. However, newspaper coverage, press conferences, public service announcements, and other behind the scenes arrangements were handled by Montana Video's Jackie Bennett, who also serves as a member of the pageant board.

During the first part of the week, the only commodity we ran short of was time. Even through the pre-pageant activities were stretched out through the week, normal cablecasting still took place with a concerted effort to have those programs falling at the end of the week pre-recorded. This allowed us to strip the studio and have it operative in the auditorium in time for all of the major rehearsals.



room, which we shared with the follow-spot operator, was the location of Camera No. 2 and the talent. The inner room, its only access to the lower floor being a small spiral staircase, housed the production switcher, the graphics camera, the video tape machines, and the auditorium air conditioner. This last item produced a problem which was not recognized. Nine minutes into the pageant with the room temperature in excess of 95 degrees, our number one vtr over-heated and locked up. Rapidly our spare machine was put into action.

It was a perfect recording despite the heat thanks to the many hours of preparation spent by all. Following the pageant there were a few well deserved moments of relaxation, and then back to work. All of the equipment had to be returned to the studio and set up for for the telecast of the pageant the next day. With that accomplished in record-breaking time, all of us retired for a bit of cool refreshment.

TVC

Friday night was scheduled as the final dress rehearsal for the pageant. It was at this point that we discovered that there was a major deficiency of lighting. I made careful notes of the weak spots and we continued to block our final shots, which we taped for viewing by the Montana Video production crew and the pageant lighting director on Saturday.

Two hours before the start of the pageant, the cable production crew and I met at the auditorium. We were assured that all of the equipment was in perfect working order, and that our problems with lighting were taken care of as well as they could be.

We were located in the auditorium projection booth which is a two room affair. The outer



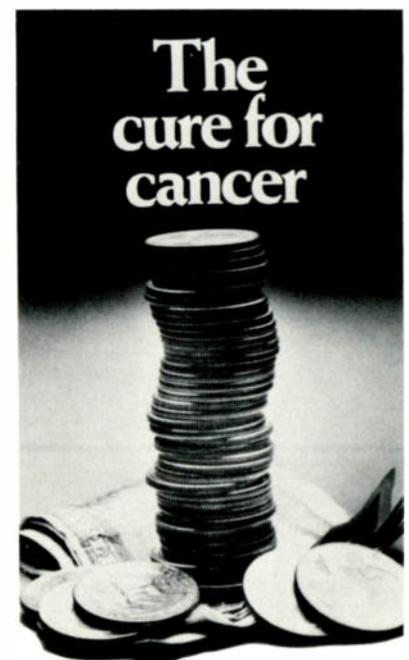
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As the Horn Is Bent, So Grows the Coverage

By replacing traditional phone lines with a microwave relay unit, Western TV Cable was able to maintain a vital two-way video link between its remote location and the system's studio.

Last May's special city council election in South San Francisco, Calif., saw a new technological innovation unfold for that city's cable tv subscribers. As part of Western TV Cable Channel 3 election night return coverage a portable microwave unit was used to provide a live video link between city hall where the ballots were being tabulated and the Western TV Cable studios.

The idea of using microwave for Western's local origination pro-

gramming had been developing for some time due to the large amount of remote programming done by the system. In fact, because of the great amount of interest in local city government among Western's subscribers, city council meetings are taped and replayed in full the following night. When Keith Davis, Chief Engineer for Western TV Cable, heard of the elaborate plans for the election night coverage from Program Director, David Da Prato,

he brought up the possibility of using microwave for the city hall reports rather than the conventional means of telephone lines.

A few phone calls by Keith to Michael McDaniel, Marketing Manager for Soladyne International, Inc. explaining the planned use of their duplex microwave system, brought immediate response from Fielding Hedges, Manager of Telecommunications for Soladyne. Hedges made a call to Puerto Rico to have a demonstration unit



Final installation of the microwave unit provided two-way communication between the studio and remote location.



The transmitter was installed on the roof of city hall after quick work to repair the damaged horn.

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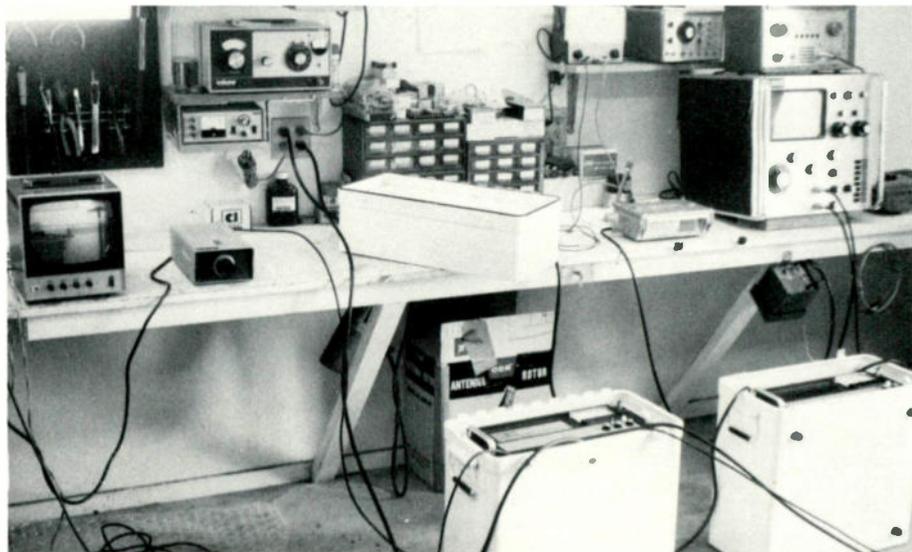
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As a part of Western TV Cable Channel 3 election night return coverage a portable microwave unit was set up to provide a live video link between the city hall where the ballots were being tabulated and the Western TV Cable studios.

located there shipped to South San Francisco. Unfortunately, by the night before the election the unit had not arrived. Another quick call to Hedges and the problem was solved. In 12 hours Hedges had assembled another unit and he along with the Mike McDaniel were on their way to Western TV Cable.

The election day setup and test were remarkably well at the Channel 3 studios, until a strong wind toppled the receiver onto the roof bending the unit's horn at right angles. A new horn from San Diego would have arrived too late for the cablecast, so Keith Davis brought the bent horn to a nearby auto body shop to have it straightened. When the horn was reinstalled the studio tests showed the microwave unit, even with the now scarred horn, was working.

Quick Installation

Next came the installation of the transmitter on the city hall roof. Total set up time for the Soladyne microwave unit including physical installation, was something just over 30 minutes. The resulting picture to the studio from city hall as remarkable and no technical difference could be discerned. The final installation also provided full two way communication between the studio and remote location.

The production concept behind the microwave link was to allow Channel 3 to process city hall return information more quickly and accurately and in greater amounts than would have been possible through conventional means.

Firsthand Analysis

The microwave link was used to allow "on the spot" reporting by Channel 3's city hall reporter, utilizing Channel 3's "Porta Studio" and borrowed TM-2100V Cameras through the courtesy of Bob Snader from Telemation of California, Burlingame. The microwave link made possible a dialogue to evolve between the anchormen in the studio and the city hall reporter. In this way a first hand analysis could be given on developing situations. This, along with the milling crowds in the city hall foyer and the bustle of city clerks and office workers, was the technique that lead to the inherent excitement of the production.

According to Da Prato, microwave is one of the most exciting technical innovations to hit local origination to date. Microwave then applied correctly and creatively opens up whole new avenues for providing new and better concepts in local public service and information programs for Cable TV subscribers. 

JUST THINK!

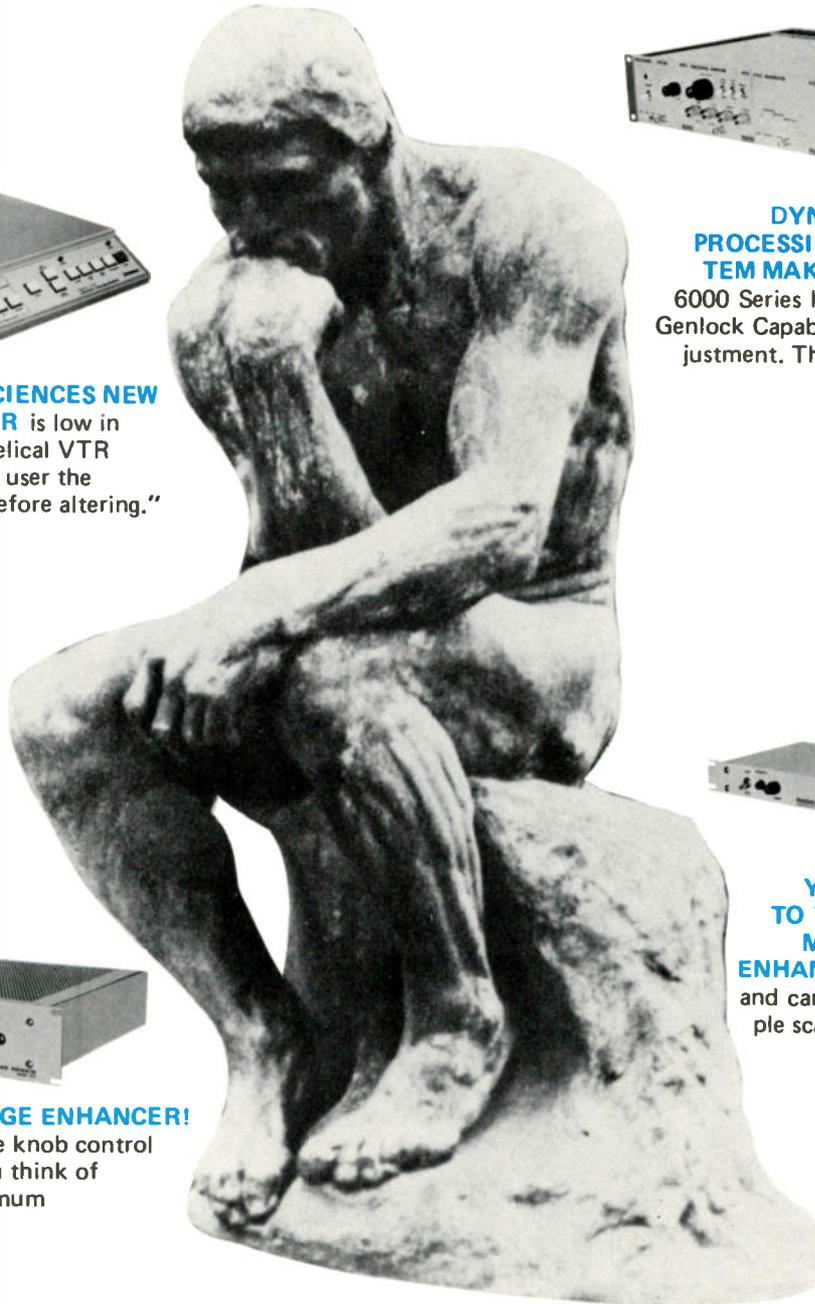
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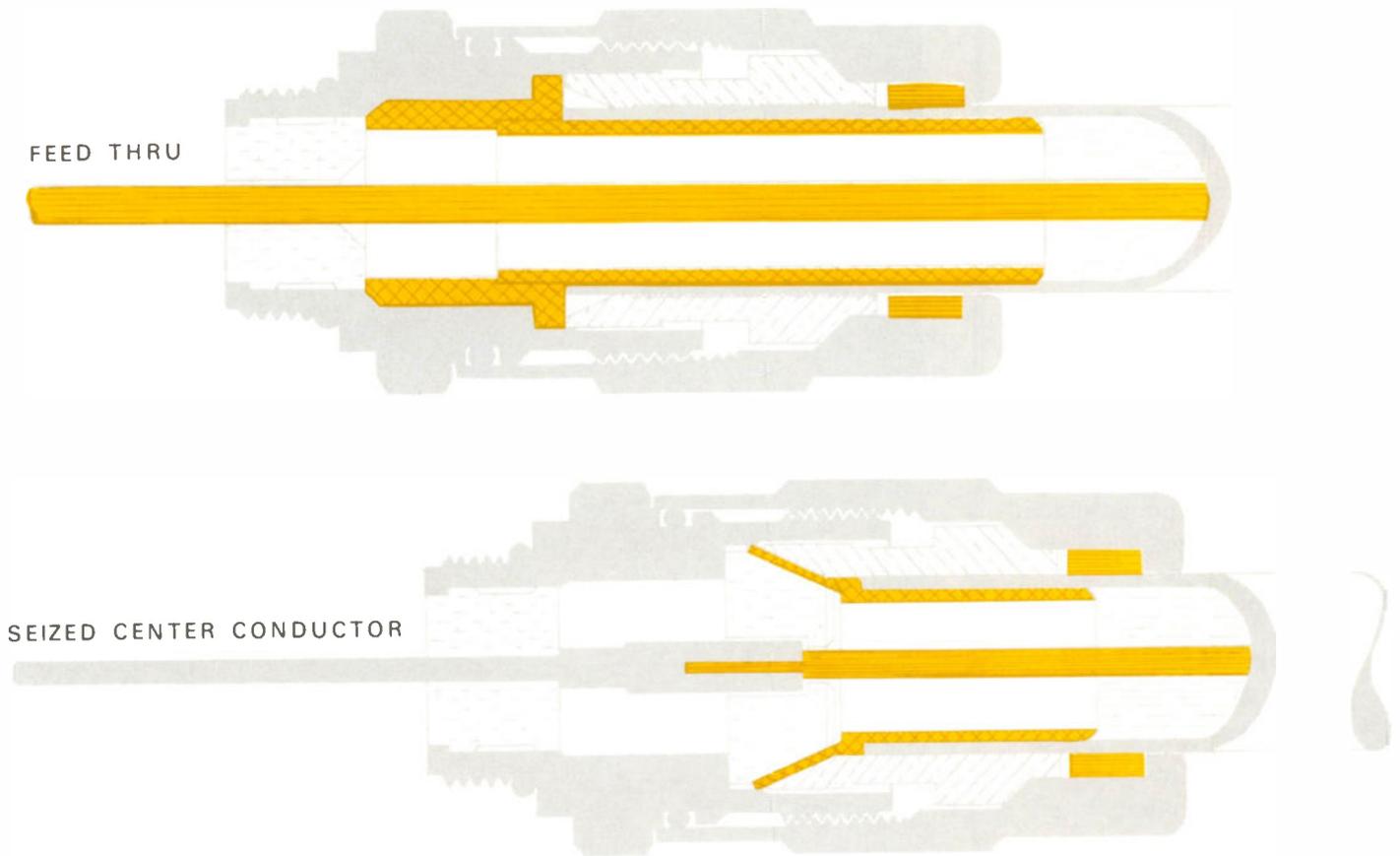
Focusing on current problem areas and other matters of community interest, CV7, a department of Empire State Cable TV in Binghamton, New York, has begun a series of on-the-street television productions in locations throughout the city and other municipalities served by the cable company.

Getting to Know You

The theme of the neighborhood television production effort is "Getting To Know You" and carries the byline "See It on 7." Local TV personality, Yvette Akel, acts as hostess, aided by Barbara Oldwine and John Barnes of "Compendium," as well as Bill Parker of "Mr. B's Backyard." The initial programming effort is taking place in Binghamton with the "Getting To Know You" crew working its way to other areas. The first cablecast dealt with "Topic Program" — the proposed ban on parking on Clinton Street! The second show which CV7 brought to the subscribers of the system at the neighborhood level was a presentation from the Senior Citizens Center on Clinton Street. Problems of housing, living

Prior to "air" time, TV 7 cameraman Keith Walter rehearses his shots from Empire's aerial lift.

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Backed up by a highly professional sales effort, CV 7 is bringing cable to the people with a new series of on the street local origination programs.

on fixed income and obtaining medical care were discussed.

The shows are aired on cable the day they are produced between 7 & 8 p.m. on Channel 7, and repeated twice the following day, 10 to 11 a.m. and again at 7 to 8 p.m.

Local Sales Effort

The on-street program is coupled with a sales effort at the neighborhood level by the cable system. This facet of the program provides job opportunities for high school, college, and young adults in support of the summer job program sponsored by New York State Employment Service Broome County Youth Bureau. The sales force has been given professional sales training which will become an invaluable tool for

their use now and in the future. Another aspect of this program is the opportunity provided by the cable system for local merchants to advertise in conjunction with the program.

Alain Onesto, Producer & Director for CV7 is responsible for this facet of the campaign. The CV7 crew will endeavor to produce commercial spots on location for inclusion in the programs.

Elliott Brodsky, Director of Programming for CV7, says that this kind of campaign is unique in the cable TV industry. Commenting further, Mr. Brodsky said, "This kind of program brings Cable to the people and opens the way for individual and community expression." He predicts the continuation of this effort through the fall season and as a scheduled regular show on the system in the future.

TVG

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PUBLISHED more membership aids—the Marketing Workshop transcript, the Cablecasting Guidebook, the EEO primer, the Federal fund report and others.

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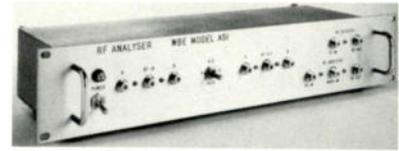
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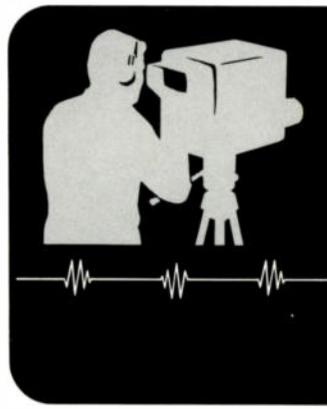
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STUDIO

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Low Light Cameras

Two low light level cameras for taping under extremely difficult light conditions — one of them equipped with an automatic iris and a six-to-one zoom lens, and the other a C-mount usable with a variety of optional fixed or zoom lenses — are available from AKAI America, Ltd., 2139 E. Del Amo Blvd., Compton, CA 90220.

The camera, used in conjunction with an AKAI ¼-inch video tape deck and an ultrasonic wave sensor, comprise a major part of a new intrusion detector system that allows police and surveillance personnel to video-tape at night using light from the street lamps or automobile headlights.

The camera with the automatic iris is the VC-200. According to Robert R. Owen, executive vice president of AKAI America, it utilizes a 2/3-inch silicon target vidicon and is burn-free and highly sensitive.

"The automatic iris allows the camera to video-tape from starlight to full sunlight," Owen said, explaining that the camera adjusts automatically to any light level. "At night, the camera can be used with assurance because it is built to record at extremely low light levels. But it can also be used in bright sunshine, like any video camera."

"Either camera can monitor doorways, darkened corridors or cells and identify objects despite the low level of available light," he continued.

The C-mount has been designated the VC-115ST and, like the VC-200, is used to record on an AKAI-110 ¼-inch, black-and-white tape deck, or can be viewed directly on a monitor. In both cameras, the viewfinder is a 1½-inch built-in picture tube that also provides instant playback from the VTR.

Owen said the price of the system has not yet been determined. But he said both cameras will be sold separately, as well as part of the system with the ultrasonic wave sensor and tape deck.

In another development, the cameras will also be used with monochrome VTRs in the current AKAI video line to reduce dramatically the weight of the tape package. The electronic viewfinders of both cameras are used for playback to eliminate the three-inch instant replay monitor which normally attaches to the deck. Weight of the new deck and camera, without lens, is less than 14 pounds.

Owen emphasized that the new lightweight system must utilize either the VC-200 or the VC-115ST cameras. "Our service clinics can modify existing decks to eliminate the replay monitor, but the new camera(s) is a necessary part of the system," he said.

A handy leather carrying case for the deck portion of the new system also is available, with a strap for easy over-the-shoulder carrying.



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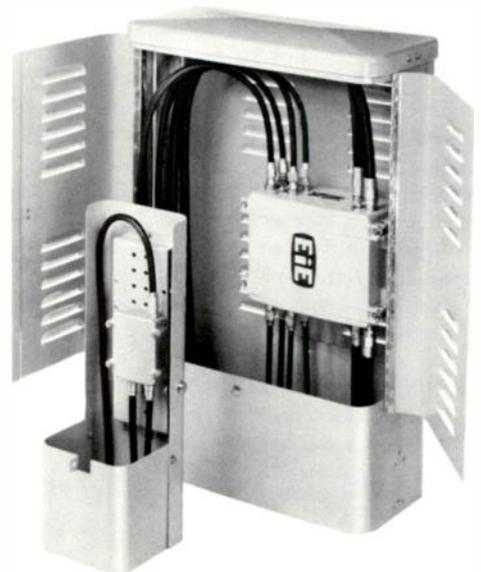
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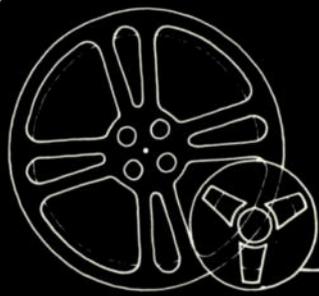
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**CATV
Programming**

software news and tips

**Aspen Conference
Sees Promise**

Testing the concept of an "electronic box office" to support high-quality cultural programming on cable was called for by a conference on "The Humanities and Arts on Cable" held at Aspen, Colorado.

While the growth of cable is creating new opportunities for access to programming in the humanities and arts, the potential for such programming is not likely to be realized without a concerted effort to overcome present barriers and to develop new financial incentives. The conference also recommended creation of a national task force to promote high quality programming on cable.

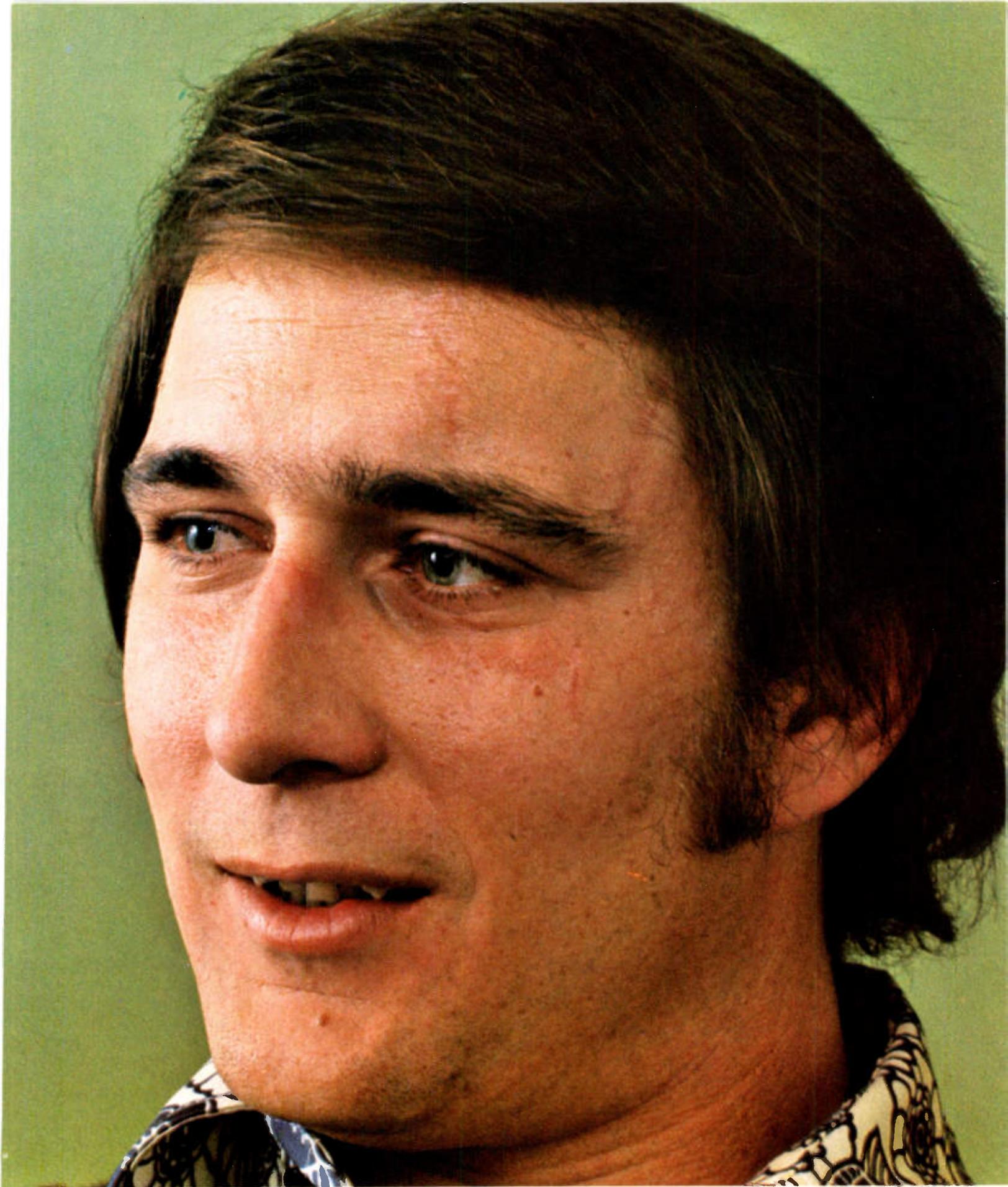
The conference concluded that a continuing place on the cable for humanities and arts programming can be best secured by means of a non-profit enterprise that would acquire (and possibly produce) programming for cable distribution. In particular, the possibility of pay programming suggests a new market mechanism — the "electronic box office" — which would allow cable customers to support directly high-cost, high-quality programming that does not have mass audience appeal.

The development of a humanities and arts pay cable service does face a number of significant barriers. The future of pay cable is clouded at present by FCC regulations that reflect the objections of broadcasters and theater owners to pay television in any form. If these regulations stifle the development of entertainment-

based pay cable, more specialized services may never be realized.

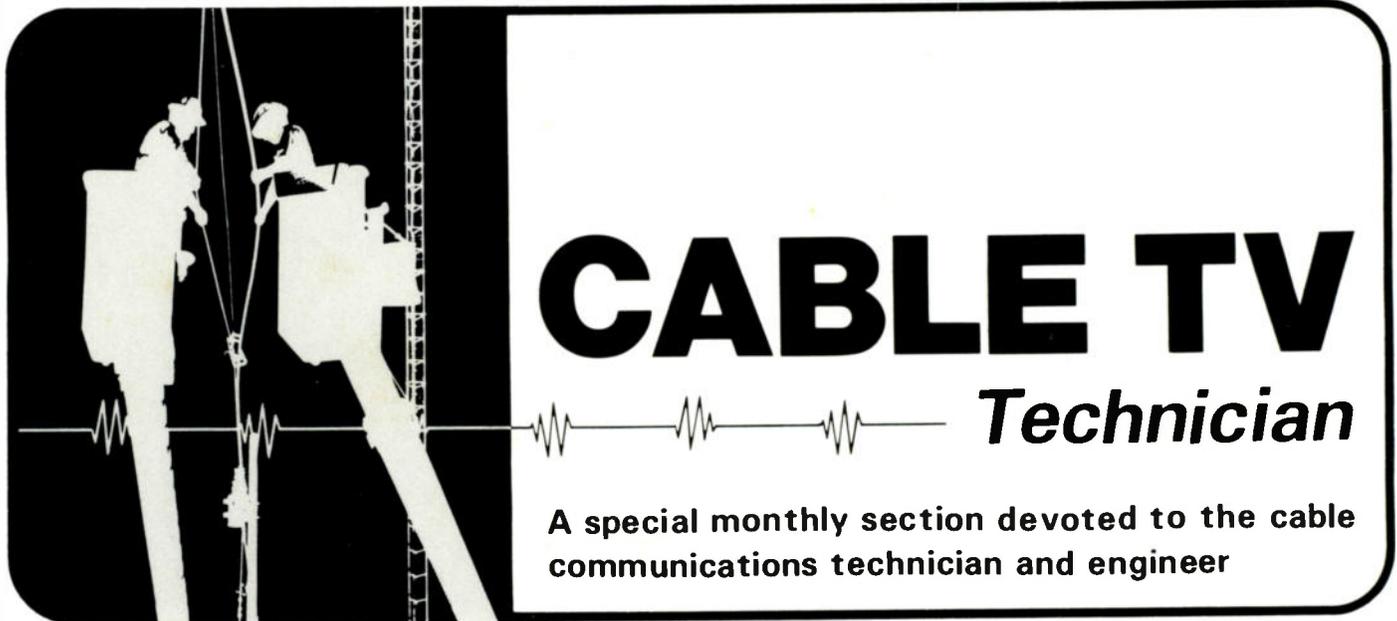
A second group of barriers involves the problems of acquiring previously produced programming for cable distribution. While excellent cultural programming exists, there are not now well-developed mechanisms by which it can be obtained; it is even difficult to learn what programming exists and where. In addition, the rights for cable distribution must be negotiated with a variety of institutions, unions, and individuals. Finally, the nature of the present cable market — which is fragmented into nearly 3000 systems, most of which are not interconnected — adds considerably to the cost of program distribution.

A project presented at the conference is developing a prototype "electronic box office" to offer performances from New York's Lincoln Center over existing cable channels. The conference viewed and discussed a broad variety of other programs on the humanities and arts, including cultural programming created by domestic and foreign producers; experimental video productions involving new electronic techniques; and a special series, "Channel A for the Arts," to be shown this fall on New York City's municipal cable channels. The New York City project, supported by the New York State Council on the Arts, demonstrates the importance of subsidies to bring local community arts and cultural presentations to all cable subscribers. 



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Selecting Antenna Sites: Theoretical v. Empirical

The FCC has helped a little by deciding what signals you can carry on your system; but still, sufficient data is imperative in making that critical decision on where to build.

*By James E. Summers
Applications Engineer,
Scientific-Atlanta, Inc.*

There are a number of times when it may be extremely important for the operator of a CATV system to obtain an accurate indication of the level and quality of television signals received at a given location. By far this is most important during the planning stages for the construction of a new system. Unlike the considerations of the possibility of adding an additional channel to an existing system where some familiarity with the signal is common, the owner of a new franchise is often faced with the problem of making a decision regarding the carriage of unfamiliar signals. Unfortunately, the FCC has made the decision simpler for many operators by the adoption of the thirty-five mile rule. Even though the option of choosing the stations to be carried is not open to these system operators, and the proximity to the transmitting stations clearly indicates strong and reliable signal levels, it is a generally accepted practice to conduct signal evaluation measurements at proposed antenna sites within these major market

areas to reveal the presence of potential interference with the received signal. Because of the financial importance to the system operator of his decision to attempt to carry or not to carry signals from specific stations, it is imperative that he have sufficient data available to enable him to make a proper decision.

The assertion of the need for obtaining reliable information regarding the availability of usable television signals is not likely to stimulate any controversy. The significant question, and the one to which we shall address ourselves in this paper, is the determination of the sources of this data, the techniques of its derivation, and the resultant reliability of each method.

Generally speaking, there are two basic survey classifications: the theoretical, which involves the utilization of mathematical models; and the empirical, which is based upon a series of physical measurements under specific and controlled conditions. There are a number of variations of empirical

survey techniques, but these generally fall into two broad categories determined by whether the measurements are ground-based or airborne. Each of these alternatives will be discussed in some detail, with special attention given to the advantages and limitations of each.

There are both logical and chronological justifications for considering the theoretical, or as they are often called, "paper surveys," first. Long before any decision is made to conduct actual on-site measurements, often even before an attempt to obtain a franchise is initiated, there is normally some type of theoretical determination of the potentially available signals. This may involve no more than a simple look in a factbook to obtain an idea of the proximity of the proposed system to the Grade A and B contours of nearby stations. It may, on the other hand, involve a comprehensive computer analysis of all television signals originating within a radius of 300 miles or more. In any event, there is a practical necessity to formulate some preliminary guidelines prior to proceeding with system planning or the commitment of expenditures of time or money.

In Its Simplest Form

Theoretical survey techniques can take many forms. As indicated, they may be nothing more than a brief scan of station coverage data, which can be obtained from a number of publications. While giving an outline of the areas having signals of predicted usable levels, there are no provisions in this method for taking into consideration the effects of receive antenna height and gain, nor is there a convenient way to estimate the presence or extent of co-channel interference or the problems to be encountered as a result of strong adjacent channel signals. Derivation of this additional information requires more sophisticated and involved procedures.

Over a period of years, the accumulation of a mass of empirical data has enabled the construction of a number of mathematical models allowing the calculation of received signal levels under a wide range of propagation conditions. Because prediction techniques have been developed independently by a number of different persons and groups with different specific purposes in mind, there currently exist a number of distinct mathematical methods of calculating propagation path loss. Some of these require a minimum of computation, relying primarily upon the use of graphs and nomographs. Other methods consist basically of groups of equations, with visual displays being used only to represent those functions whose curves are not readily duplicated by means of equations. One such method, and the one Scientific-Atlanta has chosen as the foundation of our computer program, has been developed by the National Bureau of Standards and published in their Technical Note 101, *Transmission Loss Predictions for Tropospheric Communication Circuits*.

For a number of years, until the availability of electronic computers became commonplace, theoret-

ical signal surveys required a great amount of manual paper work. The initial step was to locate and identify all television stations within a zone surrounding the receiving site in which reception was considered feasible, normally having a radius of from 100 to 150 miles. At the same time, stations presenting potential co-channel interference were identified. This information could be derived in a number of ways. It was not unusual for individuals who were periodically required to make a number of surveys of this type to maintain a number of maps, one for each channel, upon which they marked the location of each station. As long as the vast majority of stations were confined to the VHF channels this was not too difficult. However, the difficulties connected with maintaining twelve maps made it generally impractical to attempt to keep up with UHF stations in this same manner.

Involved and Time Consuming

A second method of locating and identifying desired and undesired signals, while easier to maintain, is often more involved and time consuming to use. It consists of locating the proposed receiving antenna site on a map, using this point as the center of a circle having a radius equal to the distance to be surveyed, and then conducting a state by state search of a factbook to determine those stations lying within the circle.

Once the stations to be considered have been identified, by whatever means, the second step is to determine as accurately as possible the distance and angular bearing between the receiving antenna site and the transmitting antenna. There are, naturally, a number of ways in which this can be done. One common method is to locate both the transmit and receive locations on an accurate map, typically an aeronautical sectional or topographical chart, and determine the bearing and distance by measurements from the map. This method, while generally satisfactory at smaller distances, usually less than one hundred miles, becomes cumbersome at greater distances, because the scale of maps of this type often requires that the more distant co-channel stations be measured across two or more charts. In addition, all attempts on the part of cartographers to represent the features of a spherical earth on a flat piece of paper are destined to only partial success, regardless of the projection technique used, and all introduce errors in both bearing and distance in measurements made from the resulting maps. In the case of the maps mentioned, this error is negligible at distances beyond this. Road maps and other commonly available maps are typically more subject to this problem and should only be used with caution.

The alternative to utilizing maps to obtain bearing and distance measurements is to take the geographical coordinates of the transmitting and receiving locations and mathematically calculate the desired information. To be completely accurate in this, it is necessary to use spherical trigonometry. Because of the unfamiliarity of many people with spherical

trigonometry, techniques have been devised to approximate the same results using plane trigonometry and certain correction factors. One such method is generally used by the FCC in determining distances and is presented in a number of sections of the Rules and Regulations.

Once the distance has been determined, the remainder of the input data should be readily available. The additional factors of principle interest are channel number (frequency), transmitter power, transmitting antenna height, receiving antenna height and gain. Although these are the primary variables contributing to the propagation path losses, there are a large number of additional factors influencing the calculations. As a result, the mathematical computations involved are sufficiently numerous and complex to make manual calculations impractical for more than one or two stations.

The unknown element in predicting received signal levels is the determination of the amount of loss incurred along the propagation path. One of the primary contributing factors in path loss is distance. Separation between transmitting and receiving antennas is of two-fold importance. In addition to the fact that signal levels decrease with distance, this separation is also a prime determinant of which propagation mechanism dominates, a factor which establishes the rate of signal decrease with increasing distance.

There are three distinct propagation mechanisms, each with its own mathematical model. When a radio

line-of-sight situation exists between transmitting and receiving antennas, free space loss is the dominant path attenuation. An approximation of line-of-sight distances can be made utilizing the equation

$$D = \sqrt{2 H_t} + \sqrt{2 H_r}$$

where H_t = transmitting antenna height in feet and H_r = receiving antenna height in feet.

At distances beyond line-of-sight out to an average of 95 to 100 miles, diffraction serves as the dominant propagation mechanism. At distances beyond approximately 100 miles, scattering becomes predominant.

There is insufficient space to work through the chain of equations involved in propagation path loss calculations here. One point which needs to be made, however, is that there is not necessarily a clear demarkation between the zones of dominance. There are areas of overlapping influence. This means that it is often necessary to calculate loss for each mechanism to determine which dominates. This is indicated by the mechanism having the lower loss.

Recognizing the difficulties involved in manually making signal level computations, Scientific-Atlanta developed and introduced in 1967 a convenient slide-chart calculator which has subsequently become familiar to a large segment of the CATV industry. This useful device made it possible to compress the time required for determining predicted signal levels from several hours to a matter of a very few minutes. Admittedly, some simplification of the mathematical

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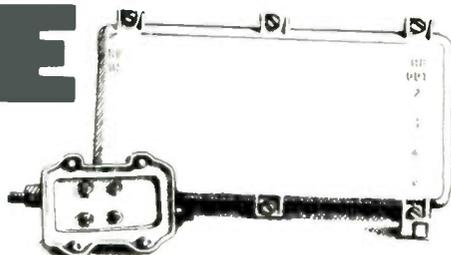
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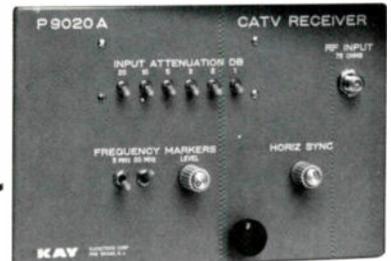
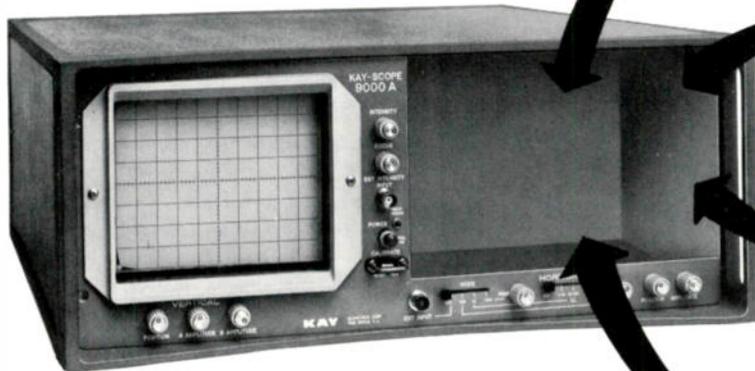
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The P9059A

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The P9040A is a low-cost spectrum analyzer plug-in, covering the range from 500 KHz-300MHz. It offers a 70 db dynamic range, digital IF attenuator, digital center frequency readout and built-in frequency and level calibration.

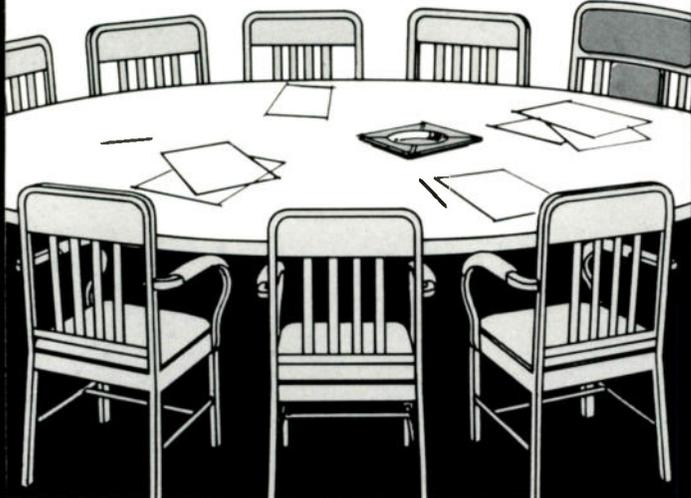
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model was necessary for the sake of convenience. The resultant loss of accuracy was minimal and the reliability of the levels predicted is evidenced by the increasing confidence expressed by knowledgeable CATV engineers in the answers derived by this method.

Computer Time-Sharing

Although the use of the slide-chart calculator was a vast improvement over the laborious manual procedure, an increasing interest in and demand for theoretical surveys clearly indicated the need for an even faster and more convenient method of obtaining this information. The recent developments in the computer industry and the advent of time-sharing computers offered an ideal solution to the problem. High speed computers with large storage capacities were suddenly available to smaller users who could never justify the purchase or lease costs of such equipment.

Utilizing the equations set forth in Technical Note 101, a program was developed which produced a theoretical signal survey which was both comprehensive and accurate. Implementation of the programs required that a large data storage file be created containing pertinent data on each television station. With all of the other necessary information now available internally to the computer, the only data input required to develop the survey is the geographical coordinates of the CATV antenna site and the height at which the antenna calculations are to be made.

The steps which the computer follows in producing the survey follow very closely those described for the manual technique. The first step is to identify all stations within a designated area, normally within 300 miles of the CATV location, although any other mileage standard can be specified. This is done by calculating the distance from the receiving site to each television station by the precise great circle path method. Data on each station within the designated zone is abstracted for further inclusion in the propagation path loss calculations.

Based on Performance Criteria

Once the path loss has been determined, an antenna model is selected according to certain performance criteria written into the program. The computer then points the chosen antenna toward the desired station for a given channel, normally the station nearest to the receiving site. Then the signals of the desired and co-channel stations are corrected on the basis of measured antenna gain and directivity, to indicate expected levels at the output terminals of the designated antenna mounted at the chosen height.

The computer survey offers the most comprehensive and accurate theoretical signal analysis ever available. There are a number of limitations which must be pointed out, however. First the mathematical models used are not without discrepancies in their

descriptions of the natural world. Nature is recalcitrant, it stubbornly resists all attempts to force it into the confines of mathematical formulas and equations and demonstrates its independence by being unpredictable.

Secondly, there are certain variable factors in the loss equations which are subject to change from day to day and from one site to another. For example, the dielectric constant of the earth over which the propagation path passes is subject to rapid changes, such as would result following the passage of a weather front. In order to facilitate the application of the computer technique to a large number of different locations having variations in such factors, the computer program was written in such a way as to utilize national long-term averages for these factors. In addition, height-above-average-terrain values are used for both the transmitting and receiving antennas in order to approximate the effect of propagation over smooth earth.

Unique Site Characteristics

Finally, the computer survey offers no way in which local reception problems, such as ghosting and electrical noise, can be accurately predicted. Each site has a character unique to that location. The proximity to busy highways, high-voltage transmission lines, or two-way radio transmitters can often be determined from maps or other data, but in many

cases the exact influence of these upon the quality of the received signal can only be evaluated by on-site observations.

Comparison of signal level predictions made by the computer and signal levels actually measured following antenna installation indicates an average deviation of less than 6 dB. The cases of widest variance, as might be expected, are generally limited to those propagation paths having factors which are not approximated by the national or long-term averages specified in the program. The largest number of incidences in which the predicted levels deviate from those actually measured are at sites located relatively near to the transmitting station. For some as yet undetermined reason, there seems to be a corresponding increase of accuracy with increasing distance. The result is that if there is to be inaccuracy encountered in the computer survey, the odds are that this will occur in connection with a strong local station where received levels are generally not critical rather than from a distant station with a marginal signal level.

Ground Survey

Undoubtedly the most common type of physical survey consists of a series of signal measurements made at or near a proposed antenna site using an antenna of known performance elevated to a convenient height, generally 40 to 100 feet, by means



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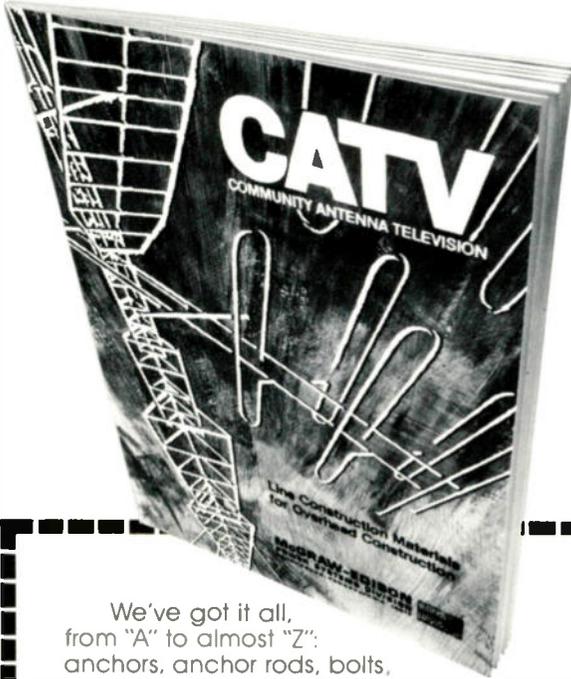
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of a portable mast or tower. The received signal is split with a hybrid power divider to provide simultaneous inputs to both a calibrated field strength meter and a portable television receiver. The received signal level is recorded, either manually or by use of an optional strip chart recorder. At the same time, the quality of the signal at the television receiver is evaluated and any interference is noted as to type and degree of severity.

Evaluation of received signal quality and the classification of degrees of interference contain an acknowledged element of subjectivity. An experienced CATV engineer, for example, may notice and classify as objectionable an interfering beat not even apparent to the average viewer. For this reason, it is imperative that the observer be as specific as possible in setting forth the criteria used in the evaluation.

This procedure is normally repeated periodically, usually every hour or every half hour, for each potentially usable signal. The period of measurements can vary from four hours to several days, depending upon specific conditions. For those signals determined to be strong and interference free, a small sampling is sufficient. When the desired signals are weak or when interference is encountered, it is often advisable to extend the survey period to obtain a larger sampling.

With most measurement techniques it is necessary to correct the raw data obtained to ascertain the actual strength of the received signal. This is due to the fact that the influence of many components in the survey equipment varies with changes in frequency. The gain of the antenna, for example, generally will vary from channel to channel. While the variation from one low-band channel to another may be negligible, there is typically a difference of approximately 2 dB from the low to the high bands. Part of this additional gain of the high band is offset by the increased attenuation in the coaxial cable at these frequencies. The result of these variations is that there can be a significant difference between a measured level of +10 dBmV on Channel 2 and the same level measured on Channel 13.

Dependent upon the reference selected for determining the test antenna gain, the application of the correction factor will give the received signal level for a reference dipole or isotropic source. In addition to standardizing the measurements of the different channels, having the information available in this form facilitates easy determination of signal levels to be received on antennas having different gains.

Aerial Surveys

As far as the equipment setup and signal measurements are concerned, there is no basic difference between ground-based and airborne survey techniques. The obvious difference lies in the fact that the measurements are made at heights not generally achievable using portable towers or masts. This means that utilization of airborne measurements allows observation of signals received at or near the height of the proposed antenna.

At first glance this appears to be the ideal survey technique. Unfortunately, there are some important difficulties introduced by the aircraft to be used. Aerial surveys commonly use helicopters, although fixed-wing aircraft can and are sometimes used for this purpose. The basic problem encountered in either case is devising a satisfactory method of attaching the survey antenna to the aircraft. Because of its unique design, the helicopter offers a wide variety of solutions than the fixed-wing airplanes.

The principle concern is to mount the antenna as far as possible from the rotor blades while still allowing for normal operation of the aircraft. There are several reasons for the importance of maintaining this maximum separation. Of special concern with regard to the survey measurements is the effect of signals reflected from the revolving blades. At best, the resultant variations in signal level are annoying to the observer and under some circumstances can make accurate measurements and evaluations of signal quality quite difficult, if not impossible.

In addition, by keeping the distance as great as possible, the antenna can be protected from the force of the downdraft. Since most antennas normally used for such surveys are of the common broadband design intended for home use, the antennas are seldom designed to withstand the strain and pressures which can be encountered during a helicopter survey.

A method of antenna mounting which has been used with success is to install the antenna on a special fixture suspended between the landing gear struts

under the fuselage so that the antenna clears the ground when the helicopter is at rest. Variations of this approach include extending the antenna several feet forward on a boom or schemes to allow the antenna to be retracted during take-off and landing, but to be extended down and away from the aircraft during the in-flight measurements.

Because the cockpit space of most helicopters is limited, it is necessary that the survey equipment be both compact and designed for convenient operation. In addition, such equipment must normally also have a self-contained power source.

Utilization of fixed-wing aircraft for airborne surveys produces similar, but often more restrictive, problems. The helicopter is a unique aircraft. Like the bumblebee, it is aerodynamically a flying wonder. It is designed for utility rather than beauty, and only a few models could be classified as being streamlined. As a result, it can safely fly with a wide range of objects protruding from it or suspended beneath it. It takes off and lands at low rates and offers a wide range of flying speeds all the way down to almost motionless hover.

Fixed-wing aircraft, on the other hand, are designed according to more restrictive aerodynamic principles. Their streamlined configuration is very important to their flight capabilities. The addition of externally mounted objects, such as survey antenna, can be made only within certain limitations. This is important, not only as far as it puts an additional load upon the available engine power, but also



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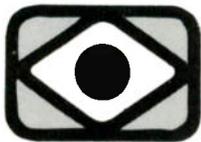
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because the direction, extent and point of influence of forces exerted upon the aircraft by an external object can be extremely critical for its safe operation. Unfortunately, the average CATV engineer has no experience with aerodynamics and is in no position to fully evaluate the problems which might result from making the antenna attachment.

Regardless of type of aircraft used, the basic procedure is the same. Once the antenna is mounted and the test equipment is aboard and the setup connections completed, it is advisable to go through the measurement procedures a couple of times on the ground to insure proper operation of the equipment and to allow the operator to become acquainted with the motions to be involved in an unfamiliar environment. Flight time is expensive and the fuel capacity of the aircraft is limited. Therefore, it is wise to try to eliminate as many potential problems as possible while still on the ground.

One additional important point to be checked prior to taking off from the airport is to ensure that the site to be surveyed is clearly marked in such a manner as to be obvious from a height of several hundred feet. Regardless of familiarity with the site from the ground, there is a tendency for landmarks and other distinguishing characteristics to look different from the air. The terrain often takes on a common appearance when viewed from above, making it difficult for even an experienced pilot to identify a particular unmarked location on the ground. It is unlikely that even if the site were not marked that the pilot would miss it by far, but there seems to be little justification for leaving this important element of the survey to chance.

Direct Flight Path

Once airborne, and the survey site has been reached, a normal procedure is for the aircraft to circle away from the station whose signal is to be measured, so that a flight path directly toward this station will pass over the survey site at a predetermined altitude. During the period in which the airplane is approaching the site, the observer should fine tune both the television set and the field strength meter in order that all will be in readiness for making the actual measurements above the site. During the pass over the site, the flight speed should be as slow as possible to maintain a constant altitude and bearing.

At this point the question undoubtedly is raised, if a helicopter is used, why not just hover over the site at the various heights to be surveyed. There are a number of reasons why this is seldom done. First and foremost is a matter of safety. Very few helicopter pilots are willing to hover at heights generally chosen for aerial surveys, typically within the range of from 300 to 700 feet. Their principle concern is possible equipment failure. At these particular heights there would likely be no possibility of recovering safely from such an emergency. In addition, helicopters are particularly susceptible to wind. A sudden gust could place the aircraft and its passengers in jeopardy. In

terms of the survey itself, it is often difficult to maintain a constant height, bearing, and attitude of a helicopter while hovering, especially in the presence of wind.

For these reasons, and very likely a number of others, the fly-over technique is normally used. In this respect the only difference between using a helicopter and a fixed-wing airplane would probably be in the flight speed involved. Generally the helicopter is capable of slower flight under these conditions, giving a slightly longer period in which to make the measurements.

Advantages And Disadvantages

Just as the advantages of the additional available antenna height are obvious, the disadvantages and limitations are fairly apparent. The most obvious of these is the fact that actual measurements for any given station are short in duration and the total period over which measurements are made is limited. As a result, slow fades and periodic variations in signal level may be missed in an aerial survey which would have been noted in longer observations on the ground.

A second disadvantage has already been indicated, the effect of the rotor blades, and to a lesser extent the propeller, upon the received signal level. It is often difficult to differentiate between fast-fades, airplane flutter, and other received variations, and that induced by the survey aircraft. When this problem is compounded by ignition noise from the engine, accurate analysis of the received signal quality and the presence of external interference becomes quite difficult. To further complicate matters, the cockpit of a helicopter or airplane is designed to provide a maximum amount of visibility. As a result, the ambient light levels are normally very high, making it that much more difficult to see the presentation on the television set screen.

A third disadvantage is not quite as obvious as the others. One of the requisites for accurate survey measurements is the use of an antenna of known performance. If we have an antenna which has been evaluated on an antenna test range under normal operating conditions, we can mount this antenna on a tower or mast with confidence that the measured performance will be effectively duplicated. Once we mount the same antenna on a helicopter, however, we can only guess at what may have happened to the gain, directivity, front-to-back ratio, and other significant parameters of the antenna. By necessity, the antenna is mounted sufficiently close to the aircraft to be influenced to some extent by it. There is no practical way in which to make a valid determination of the changes of performance produced. This means that the results of all aerial surveys must be accepted with caution.

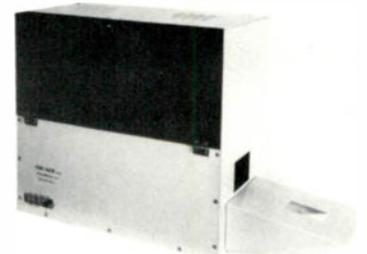
So it turns out that aerial surveys are not quite the marvel they appear to be. There is a trade-off of the advantage of greater height for uncertain results. This sacrifice of reliability for the sake of height has a technically feasible solution. The solutions, however, could prove to be both expensive and time

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consuming. It is questionable whether the demand for aerial surveys will justify the costs in the near future. In the meantime, we must look for a more practical approach to the problem.

Each of the survey techniques discussed has advantages and limitations. The theoretical survey, especially when computer derived, has the advantage of being comprehensive. It also provides highly accurate bearing and distance information to stations of interest. It provides generally reliable predictions of received signal levels. But the primary advantage lies in the fact that it is available, either free or at low cost, from several equipment manufacturers. This means that the information can be available during the earliest planning stages, even before funding for the system has been appropriated. The clear limitation to any theoretical survey is that there is always the possibility that conditions unique to any given location can produce signal levels significantly different from those calculated. The theoretical survey, like all theories, must be validated by empirical means.

In summary, each survey technique has a specific function and can make an important contribution to knowledge of signals available at any given location, but each also has limitations, as does the entire survey approach. We can only do like our friend the weatherman, who carefully makes his measurements and calculations and forecasts clear weather, but takes his umbrella along when he goes out, "just in case".

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Part I

... And Two Phaselocks In Every Home

With increased demand for use of more available channels, application of phaselock principles becomes increasingly important. Fortunately, it is becoming economical.

By James O. Farmer
Scientific-Atlanta, Inc.

Phaselock is not new to the electronics industry. The first practical applications were coherent detectors in homodyne radio receivers built in the 1930's. However, the circuit complexity of a phase locked loop is so great that until recently the technique was restricted to a few specialized applications. Now, thanks to progress in components and circuit techniques, phaselock is becoming economical for a wide range of applications.

CATV application of phaselock includes precision demodulation, minimizing the subjective effects of strong local TV signals, and various phase locked headend schemes. This paper is concerned with only one of these applications of phaselock: minimizing the subjective effects of a strong local signal leaking into a subscriber's television set. This leakage problem has required the cable system to distribute strong signals on channels which are not locally used for TV broadcast. This off-channel conversion for cable distribution eliminates the leakage problem at the expense of available cable channels. New FCC rules and increasing program availability to cable systems have

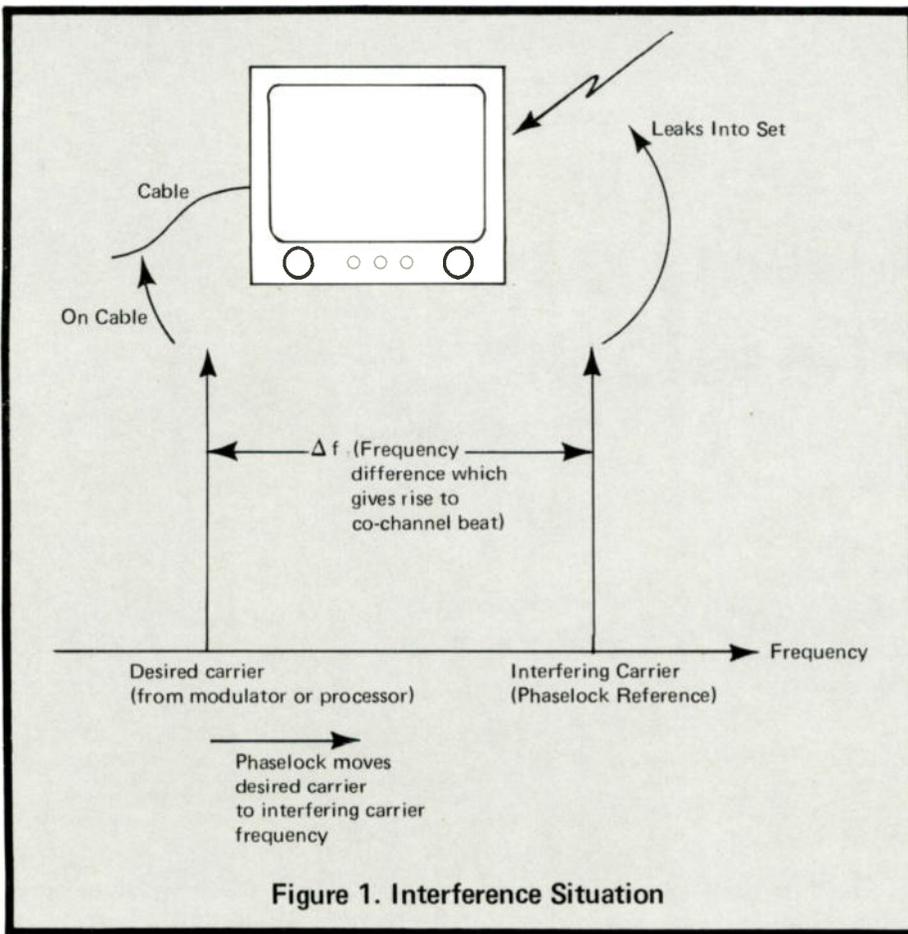
created pressure to use these fallow channels for some type of locally originated program. If the cable channel carrier is not exactly at the frequency of the interfering carrier, a co-channel beat will be seen on the subscriber's set.

Figure 1 illustrates the situation where two video carriers close together in frequency are present simultaneously. The signal on the left is the desired carrier, perhaps carrying a weatherscan picture. To the right is an interfering carrier which has leaked into the subscriber's TV set. When the two signals are detected, their frequency difference will create a component Δf in the video. This shows up as black and white co-channel lines in the picture. The severity of the co-channel beat is dependent upon the relative levels of the two signals, and upon their frequency separation, Δf . Phaselock can be used here to force the desired carrier to the frequency of the interfering carrier, reducing Δf to zero and eliminating the co-channel beat.

How do we accomplish this? Figure 2 is a simplified block diagram of a phase locked modulator. A sample of the interfering signal is picked off the air and

applied to a fairly narrow band-pass filter. This filter removes all energy except the picture carrier and some of the luminance sidebands. The remaining signal is the reference, which is applied to a phase detector. The output of a voltage controlled oscillator is also applied to the phase detector. The output of the phase detector is a d.c. potential proportional to the cosine (in this case) of the phase difference between the reference signal and the voltage controlled oscillator (VCO) output. This phase error is applied to a loop amplifier (normally configured as an integrator for low frequencies), whose output is the VCO control voltage. Since the amplifier has very high gain at low frequencies, it will act on the VCO in whatever manner is necessary to reduce the phase error to nearly zero.

Thus, the VCO output is required to maintain a strict phase relationship to the reference signal, and hence must operate at the same frequency. The VCO output is then applied to the modulator, and the remaining modulator operation is identical to that of a non phaselocked unit. In the case of Scientific-Atlanta's Model 6300 PL Modulator, the modulation is



performed at the 45.75 MHz intermediate frequency, which is then upconverted to the desired channel. A common local oscillator is used for up conversion and for down conversion of the reference. This assures phase coherency. For stability the VCO used is a voltage controlled crystal oscillator (VCXO).

Use of the reference signal directly instead of locking another oscillator to its frequency is not practical. This is because a band-pass filter cannot be realized that will adequately strip all modulation sidebands off the reference, maintaining this characteristic over all combinations of reference drift, time, and temperature. In this respect, the phase locked loop operates as a tracking filter, since its output is at the frequency of the input, and all sidebands can be suppressed to an arbitrary degree. Even so, the output can track the input carrier over a greater range than the effective filter bandwidth.

Before a phase locked situation can exist, the VCXO must be made to run at the same frequency as the reference. Figure 3 defines some terms that are appropriate to the acquisition of phase lock. This figure is a spectrogram centered on the free running frequency of the VCXO; as this frequency changes, it will appear to stay fixed, but other features of the spectrogram will move. The free running frequency is the frequency at which the VCXO would run if no control voltage is applied from the loop amplifier. When power is first applied, or when the reference carrier first becomes available, the loop must somehow move the VCXO frequency to the reference frequency before phase lock can be achieved. Also shown in Figure 3 is the frequency of the reference, which might appear anywhere in the spectrogram.

The detailed process of bringing the VCXO into lock is quite complex and beyond the scope of this paper. However, a brief discussion of the process involved is in order. The difference between the reference and free running VCXO frequencies is defined as Δf . If the frequency

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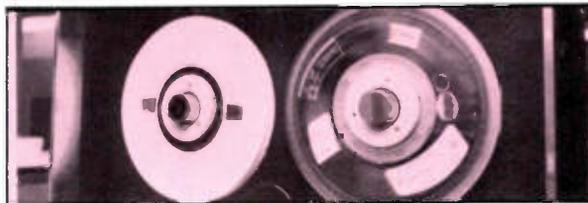
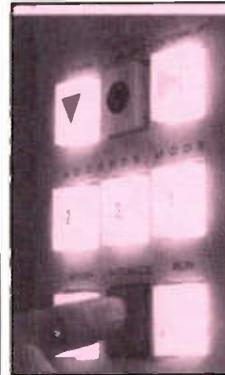
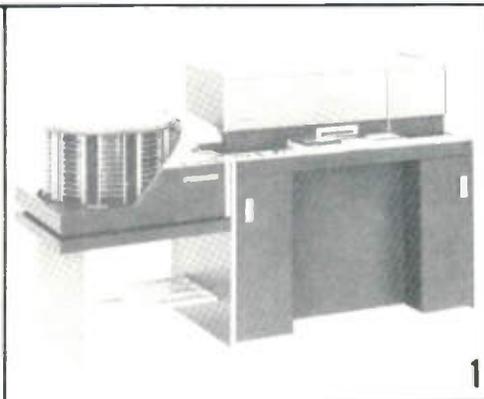
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And there are new ideas constantly flowing from our evergrowing staff of talented people like (6) Dick Ross, our new Director of Special Projects, and Linda Johnson (7) Customer Service Representative and Gil Salyer (3) Supervisor for Computer Operations.

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Spotmaster and Revox have joined forces to develop this ruggedized, rack-mounted version of the A77 stereo recorder specifically for broadcast use. Choose the standard version, or the Dolby model with its incredible 70 dB S/N ratio. All basic parts except heads, capstan and pressure roller are guaranteed for life. Your choice of 2- or 4-track stereo operation at 7-1/2 and 3-3/4 ips. Other speeds, full-track heads, accessories optional. Call or write:

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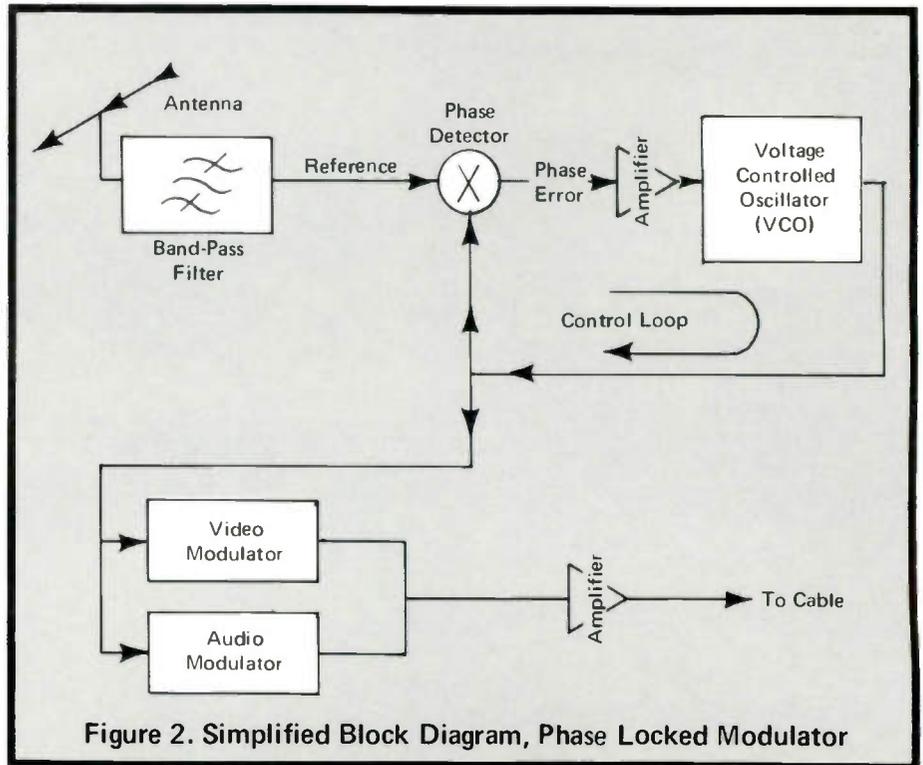


Figure 2. Simplified Block Diagram, Phase Locked Modulator

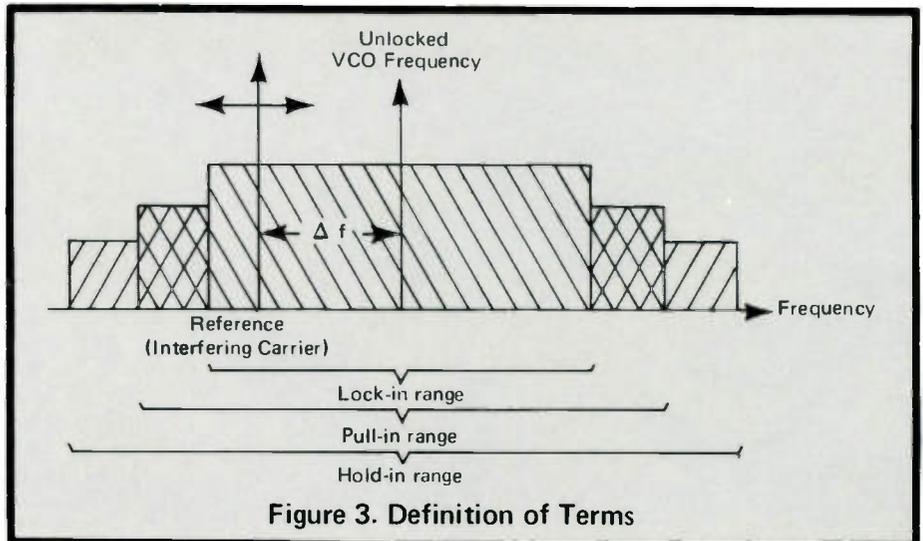


Figure 3. Definition of Terms

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Lawrence Weakland, president of Cambria TV Distribution Co., is shown in front of monastery (right) which serves as nerve center for 5,200 CATV subscribers.



If there's one thing Larry Weakland, President of Cambria TV Distribution Co., believes in, it's quality hardware to support cable television systems.

That's why Larry and his Supervisor of Operations, George Misurda, specify Preformed support products — Telesplices, Teletaps, Telegrips, False Dead ends, Strand Splices and GUY GRIP® dead-ends — to survive the storms, floods and temperature extremes of Central Pennsylvania.

Larry installed his first cable TV system in 1955. It served 30 subscribers. Today his company pipes TV to more than 5,200 subscribers in 22 Cambria County communities. Hub of the system is an abandoned monastery atop a 2,020-ft. elevation outside of Carrolltown, Pennsylvania. The building houses administrative offices, warehouses, broadcasting studio, antennas, company vehicles and construction equipment.

Larry also has his own line crew. They prefer Preformed support products because there isn't a safer, easier, quicker way to make installations at the pole, house or tap. Preformed's exclusive helical design and unique gripping principle prevent kinks and bending that cause "snow" or picture distortion. Crewmen merely wrap on Preformed hardware for a quick, permanent, carefree installation.

Preformed cable connectors hold 100% of the rated breaking strength of RG-59/U coaxial cable and are designed to meet high wind and ice loading conditions. Larry's crew installed their first Preformed connectors back in 1957 and they're still performing to specifications.

"Model cable construction," say the utility company inspectors who check the Cambria crew's work on telephone and power transmission poles.

If you're concerned about the reliability and excellent appearance of your plant, benefit from Larry Weakland's experience. Specify Preformed support products the next time you plan a cable system.

Write for bulletin SP-2073. PREFORMED LINE PRODUCTS COMPANY, 5349 St. Clair Avenue, Cleveland, Ohio 44103. Dial 216-881-4900.

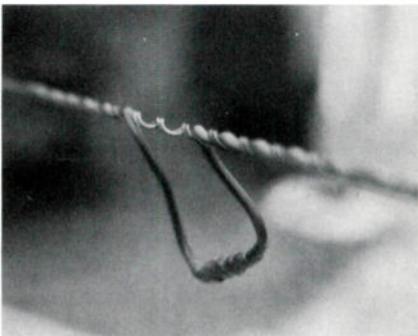
"No short cuts to delivering quality cable TV," says Larry Weakland



Two GUY-GRIP® dead-ends support Cable TV messenger strand on utility pole. Note how slim silhouette blends into the messenger strand.



Service wire is safely and neatly brought into house with two TELEGRIPS. Unique helical construction cradles cable to prevent "snowy" distorted picture.



TELESPLICE provides a quick, in-line hook-up that restores full mechanical strength when repairing severed RG-59/U coaxial cable or joining short lengths of cable. Twists on in a jiffy without tools.



Easy-to-install FALSE DEAD END is wrapped on by hand without cutting the strand. Mechanical strength equals the strand on which it is applied. Slim profile improves appearance.

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difference is sufficiently small, the control loop is able to rapidly bring the VCXO into lock. The range over which this can be accomplished is called the lock-in range. For all practical purposes, the lock-in range is roughly equal to the loop bandwidth, which should be small in order to improve rejection of the reference sidebands. If the initial frequency difference is within the lock-in range, the loop will rapidly acquire lock.

If the initial frequency differ-

ence is out of the lock-in range but within the pull-in range, the loop can theoretically lock if given enough time. However, in this range practical considerations of amplifier offset and noise are such that lock generally cannot be achieved without additional circuitry. Outside of the pull-in range, lock cannot even theoretically be achieved without additional acquisition circuitry. However, once lock is achieved, the loop is able to hold lock over a much wider range, known as the hold-in

range. This is the frequency difference over which, after lock is achieved, Δf may drift and still permit the loop to remain locked. For the most useful type loop, the hold-in range is not a function of loop dynamics, but rather is a function of saturation levels of loop amplifiers or other components in the loop. Within certain practical bounds, the hold-in range may be made arbitrarily large.

Without Intervention

Proper acquisition circuitry may be used to aid the loop in locking up at any frequency in the hold-in range. An adequate acquisition (and hold-in) range is one which permits acquisition under the worst possible initial frequency error, Δf , due to all causes. This acquisition must be without operator intervention. In order to determine the required acquisition range, we will develop a worst case error budget, taking into account all known sources of frequency error. Table 1 lists the major contributors to the error budget. The first source of error is the 1 kHz frequency tolerance imposed upon the broadcast station. Although not a frequency error, we will add in the 10 kHz broadcast carrier offset.

If the acquisition range is insufficient to handle the carrier offset, then the offset must be specified when ordering the phase lock equipment or when transferring it to a different location. To the above tolerances must be added the drift of the VCXO, which might reach 5 kHz at the higher channels. This may be drift reduced to 0.2 kHz with a highly stable VCXO enclosed entirely in an oven. However, an oven is undesirable because the higher temperature will accelerate component failure, and will also increase power consumption. In addition, an oven stabilized oscillator must be allowed to warm up after turn-on or a power failure.

Another error which must be taken into account to insure that the operator does not have to "break" the phase lock after installation, is the initial frequency setting of the VCXO. 

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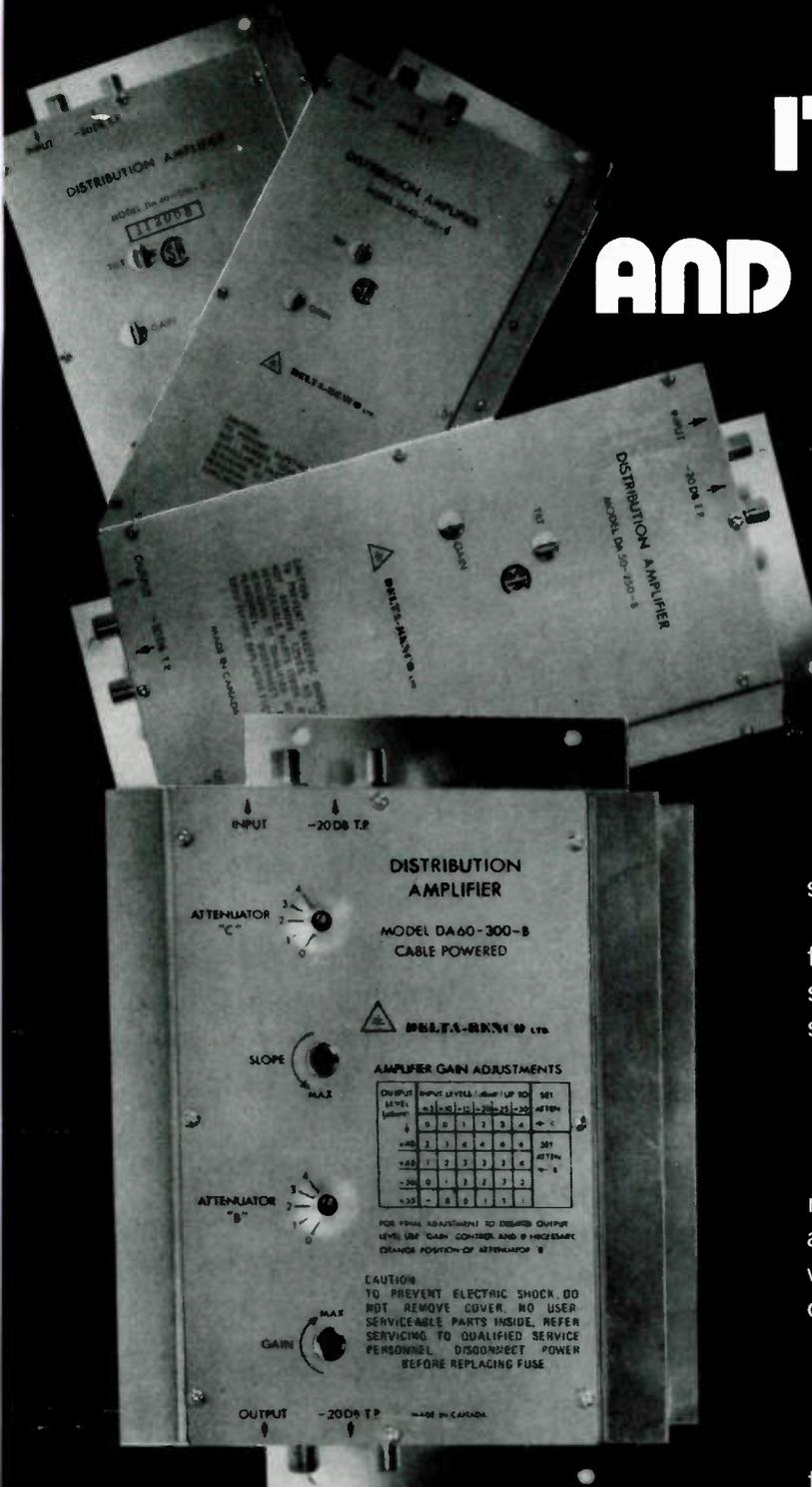
MOBILTS offer fast delivery and uniformity. We promise delivery on time. Many options are available in size, outside finish, wiring and ventilation. You owe it to yourself to write for full specifications on these rugged, versatile head-end buildings. You'll find one exactly suited to your needs...at an economical price.



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PRODUCT REVIEW

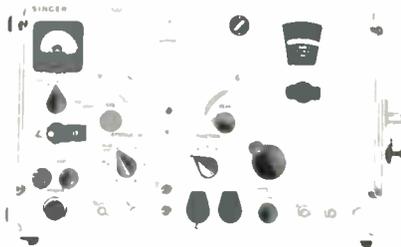
NEW COMPONENTS FOR CABLE TELEVISION SYSTEMS

AUTOMATIC SWITCHER: SESCO, INC.

SESCO 1020 Automatic Channel Switcher which solves a large number of other switching problems besides providing the answer to non-duplication requirements of the FCC, has been introduced by SESCO, Inc., P.O. Box 518, Friday Harbor, WA 98250. Easy to program and connect to existing systems, the 1020 ACS is expandable from basic one channel up to twelve. The timer sets itself by operation of a set switch; and programming for days and minutes is accomplished by push switches. A matrix memory board controls the time period, each channel being programmed by inserting a diode pin at an appropriate, easy-to read, segment. Accurate, (millisecond) switching takes place automatically. Permits channel switching program one week in advance. Designed for local or remote control operation, the SESCO 1020 ACS will operate over telephone lines or other 2-wire metallic path, and will control coaxial switch, diode switch, relay, or direct on-off amplifier control. With the exception of pilot lamps and fuses a lifetime guarantee is offered under normal use.

PORTABLE RFI ANALYZER: SINGER INSTRUMENTATION

A portable RFI analyzer which can make measurements in the range 10 kHz to 250 kHz, with sensitivity of 0.014 μ V, is announced by Singer Instrumentation, 3211

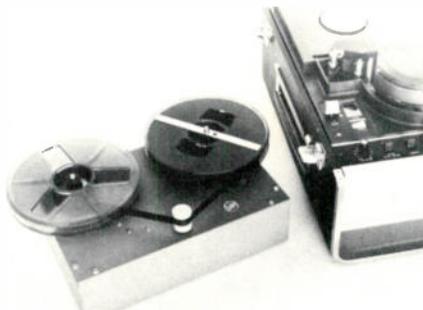


S. Lacienege Blvd., Los Angeles, CA 90016. Formerly manufactured under the Stoddart brand name, this instrument is known as Model NM-12AT. It is ideal for determining the source and analyzing the characteristics of radiated and conducted interference. The NM-12AT is line or battery-operated and can be used 40 hours without re-charging. For field work, the instrument can be carried on the chest with a neckstrap, leaving both hands free to operate controls and to carry the

probe. This way of using the NM-12AT is particularly suitable when trying to locate a source of unwanted radiation. The instrument meets appropriate Mil-Spec requirements and provides average, quasi-peak and peak field intensity measurements. Calibration equipment is unnecessary because the instrument incorporates its own solid-state, spectrally flat impulse generator.

EIAJ REWINDER: ULTRA AUDIO

Ultra Audio Products, Box 921, Beverly Hills, CA 90213, has introduced a rewinder for EIAJ video tapes that eliminates the serious problem of headwear, tape damage



and picture dropouts resulting from abrasion caused during tape rewind when it scrapes against all heads on a helical-scan video tape recorder. The "AutoWinder" not only solves this problem and prolongs head and tape life, but saves time by rewinding an hour's tape in about a minute, with automatic slowdown and shutoff at tape's end. Its smoother wind also minimizes tape edge-damage. R-1 will rewind 1/4" and 1/2" audio tapes, too.

DIODE ARRAYS: NATIONAL SEMICONDUCTOR

Two new monolithic integrated circuits from National Semiconductor Corp., 2900 Semiconductor Dr., Santa Clara, Ca. 95051, offer the circuit designer the flexibility of designing with individual components combined with the excellent matching characteristics of monolithic circuits. Called the LM3019 and the LM3039, the two new circuits contain individually accessible diodes grouped for convenient use. The LM3019 diode array contains six diodes; four are connected in a full wave bridge configuration and two are completely uncommitted. The LM3019 is intended for use in modulators, mixers, and in analog switches. It is designed

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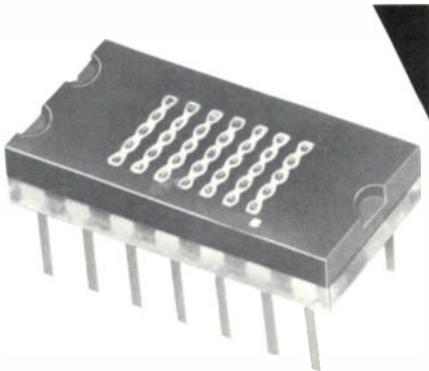
Comm/Scope Company

Division of Superior Continental Corporation

for use over the -55 degrees C to 125 degrees C temperature range and is packaged in a 10-lead TO-5 can. Any single diode has a 20 milliwatt power dissipation, and the total power dissipation for the LM3019 is 120 milliwatts. Typical reverse breakdown voltage is six volts for any diode and 80 volts between any diode and the substrate. The LM3039 contains six ultra-fast, low capacitance silicon diodes on a single monolithic substrate. Five of the diodes are independently accessible, and the sixth shares a common terminal with the substrate. As with the LM3019, monolithic construction insures excellent static and dynamic matching of the diodes, making the array extremely useful for a wide range of applications in communications and switching systems. Reverse recovery time is typically 1 nanosecond, and the DC forward voltage of the diodes is matched within 5 millivolts. Power dissipation is 100 milliwatts each for a 600 milliwatt package total, and the diodes have a typical reverse breakdown voltage of 7 volts. Applications include balanced modulators or demodulators, ring modulators, and high speed diode gates and analog switches. The LM3039 is for operation over the -55 degree C to 125 degree C temperature range and is packaged in a 12-lead TO-5 can. The LM 3019 is priced at \$1.18 in quantities of 100; the LM3039 sells for \$1.17 in the same quantities. Delivery for both is from stock.

LED DISPLAYS: IEE

Industrial Electronic Engineers, Inc. 7720 Leona Ave., Van Nuys, CA 91405, manufacturer of display devices, have added an easy-to-read, true-form Alpha Numeric



display package to their comprehensive line of LED flat pack displays. The Series 1704 is arranged as a 5 x 7 array with XY select and decimal. The single plane, wide angle, high visibility unit is encapsulated in clear or red plastic on a 14 or 16 pin DIP flat pack. The highly legible true-form characters are 0.3" (7.62 millimeters) high and decode simply from USASCII or EBCDIC inputs.

PAN-TILT CONTROL: VICON

Vicon Industries, Inc., 130 Central Ave., Farmingdale, NY 11735, has developed the

TV Communications

Model V121PTV Vector Solving Pan and Tilt Joystick Control for use with their Model V350PTV Servo Controlled Variable Pan and Tilt Drive. The new pan and tilt control



electronically senses the speed of both pan and tilt motion simultaneously as well as the deflection of the joystick to permit movement of the pan and tilt in a direct line at any desired speed. The model V121PTV is ideally suited for following movement. It is simple to operate, offers full direction and speed control and full power at all speeds. Delivery is off-the-shelf.

LOW-LIGHT TUBES: EMITRONICS, INC.

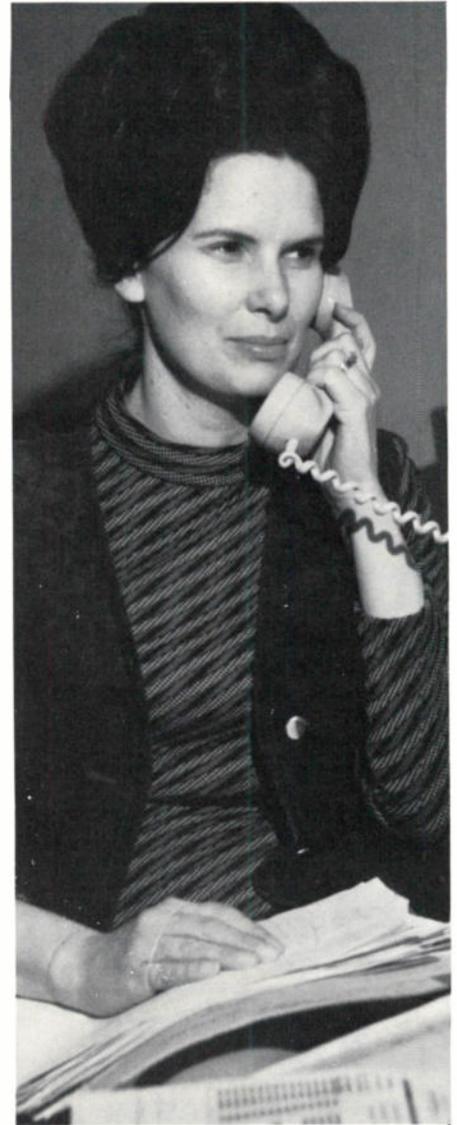
Featuring daylight to half-moonlight capability, the EMI Ebitron camera tube introduced by Gencom Division, Emitronics, Inc., 80 Express St., Plainview, NY 11803,



has a trialkali photocathode with extended red response. Electrons from the photocathode are focused on a special target by a multi-element image section operating at an overall EHT of 12 to 14 KV. The target gives a gain of several hundred times, obtained by electronic bombardment induced conductivity. The read out section utilizes a conventional 1/2-in. vidicon gun, together with standard 1/2-in. scanning and focus coils.

CABLE SPACER: PANDUIT CORP.

A new cable spacer is the latest accessory from Panduit Corp., 17301 Ridgeland Ave., Tinley Park, IL 60477, complementing the company's complete line of PAN-TY(R) and STA-STRAP(R) cable ties and accessories. The spacer Part No. CSH is used to separate large diameter electrical cables. It can also be used to separate wire bundles. Another application is to separate hydraulic hoses. The large slots also permit the accessory to be used for hanging cables, wire bundles or hoses while at the same time performing the spacing



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Calendar

OCTOBER

3-4, Kentucky CATV Assn. fall meeting,
Continental Inn, Lexington, Ky. Contact:
Patsy Judd, PO Box 414, Burkesville, Ky.
42717.

5, New Mexico CATV Assn. meeting,
Greenbriar Hotel, White Sulphur Springs,
W. Va. Contact: Boots Cousins, TPT of
Fairmont, PO Box 907, Fairmont, W. Va.
26554.

15-17, Mississippi Cable TV Assn. annual
convention, Broadwater Hotel, Biloxi,
Miss. Contact: Tracy Merrell, Laurel
Community Antenna System, PO Box
2547, Laurel, Miss. 39440.

15-18, North East Regional Expo, Granit
2 Hotel, Kerhonkson, N.Y., Contact:
Rochelle Nezin, NCTA.

23, Virginia Cable TV Assn. meeting,
Holiday Inn-Crossroads, Richmond, Va.
Contact: Randy Tucker, PO Box 358,
Staunton, Va. 24401. 703/886-7493.

29-Nov. 1, North Central Regional Expo,
Arlington Park Towers, Arlington Heights,
Ill. Contact: Rochelle Nezin, NCTA.

NOVEMBER

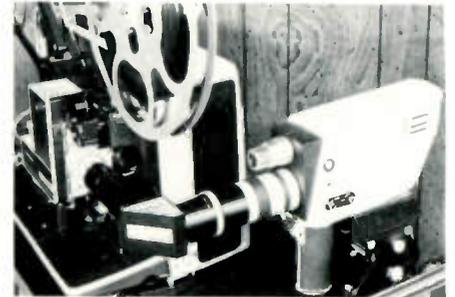
15-17, Mid-American Regional Expo,
Crown Center Hotel, Kansas City, Mo.
Contact: Rochelle Nezin, NCTA.

28-Dec. 1, Western Cable Television Show
and Convention, Las Vegas Hilton Hotel,
Las Vegas, NV. Contact: California
Community Television Association, Suite
207, Walsh Center Building, 3137 Castro
Valley Blvd., Castro Valley, CA. 94546.

function. The spacer can be secured with any
of 12 different standard or heavy
cross-section PANDUIT(R) cable ties. The
CSH spacer is available in standard pigmented
black nylon; also available in weather-resistant
black nylon. Standard packages are 100 with
bulk packages of 500. The spacer measures
1/2" x 5/8" x 2-1/8". In addition to the full
line of cable ties and accessories, Panduit
manufactures PANDUCT(R) plastic wiring
duct and PAN-TERM(TM) terminals. All
products are sold through authorized Panduit
stocking distributors nationwide.

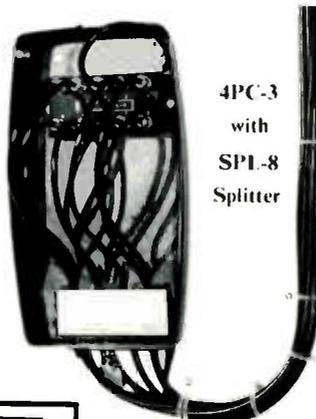
**VIDEO ADAPTOR:
AKAI**

A television camera adaptor that transfers
color film and slide projections to any color
video tape format is being marketed by AKAI
America, Ltd., 2139 E. DelAmo Blvd.,



Compton, CA 90220. The video tele-cine
adaptor, called the VLC-8, retails for \$199.95
and is now in distribution through AKAI
master distributors. One end of the tele-cine
adaptor attaches to the camera lens and the
other end interfaces with any projector lens.
It makes no difference whether it's
8-millimeter or 16-millimeter, color film or
slide. Heart of the VLC-8 system is AKAI's 5
3/4-pound, inexpensive color video camera.
The CCS-150S camera is equipped with an
automatic iris that compensates for varying

IN-FIELD INVENTORY CONTROL



4PC-3
with
SPL-8
Splitter

**Cable Split Apartment
House Terminal Boxes**

- 4PC-3 Up to 4 apartments
4 outlets per apartment
- 8PC-3 Up to 8 apartments
4 outlets per apartment
- 12LT-1 Up to 12 apartments
1 outlet per apartment
- 24LT-1 Up to 24 apartments
1 outlet per apartment



Patent No. 3,610,810

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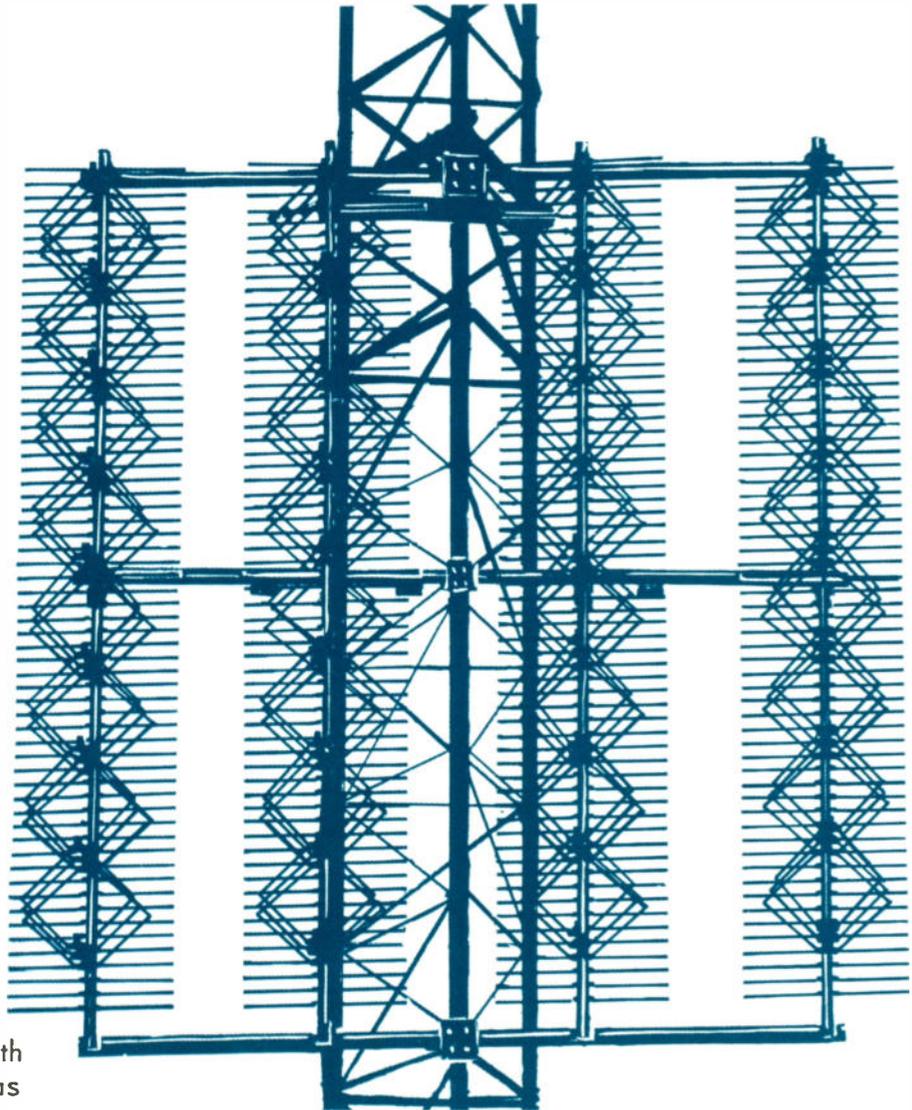
Ask about our 100 ampere-hour battery, in 4 and 6 volt sizes. Call 414/228-2394. Or write, Sales Department, **Telcell** Batteries, Globe Battery Division, Globe-Union Inc., 5757 North Green Bay Avenue, Milwaukee, Wisconsin 53201.



GLOBE BATTERY
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2-SZZ	2-BAY	22.6
1-SZZ	SINGLE	20.0

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Solve reception problems with
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The new Lindsay ZIG ZAG antenna series is the most advanced antenna design yet developed. It provides more gain and reliability than any other antenna for a given size, with substantially reduced wind resistance due to its unique design.

Actual tests show gains in excess of quad stacked eight foot parabolic dishes.

The Zig Zag antenna's closely controlled impedance permits full realization of the noise figure benefits provided by the best "Low Noise" preamplifiers available today. (Some antennas throw away this benefit).

Side and rear lobes are kept to a minimum to assure maximum rejection of interfering signals.

The extra high gain, low VSWR and flat response will give the utmost

performance in UHF and VHF reception. (VHF - highband only.)

A compensated phasing system maintains maximum performance and keeps antenna on frequency even under ice loading conditions.

The narrow spaced grid type reflector screen provides solid performance and prevents distortion of the antenna's radiation pattern due to the mounting structure.

The vertical plane design permits direct mounting onto a tower leg and makes fine adjustments easy. Another advantage of the tower hugging feature is the provision of faster and safer installations.

The Lindsay ZIG ZAG antenna series is constructed of special high strength aluminum alloy. The mounting clamps are heavily plated and

generously massive in size and have non-slip teeth to keep the antenna "on target". The U-bolts take up to 3"OD masting (larger diameter upon request). Supplied with 'F' connectors.

Before shipment, all ZIG ZAG antennas are carefully tuned on our antenna test range for maximum performance. They are available in arrays of 4-stack (quad), 2-stack and single antennas. For further information and specifications,

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NCTI ANNOUNCES NEW CAREER division

In order to better serve all those men who believe in the future of CATV technical services, NCTI announces a new Career Division specializing in the individual man's needs. The new Installer Technician and the Broadband System Operator courses containing 128 lessons, quality craftsman tools and high quality Heathkits are now available for purchase by men wanting to enter the CATV industry, improve job prospects with current employers or change jobs and move on up. Experienced men can gain prior credit for study with NCTI or any bonafide resident or correspondence school. Inexperienced men can benefit from "hands on" work with the "tools of the trade."

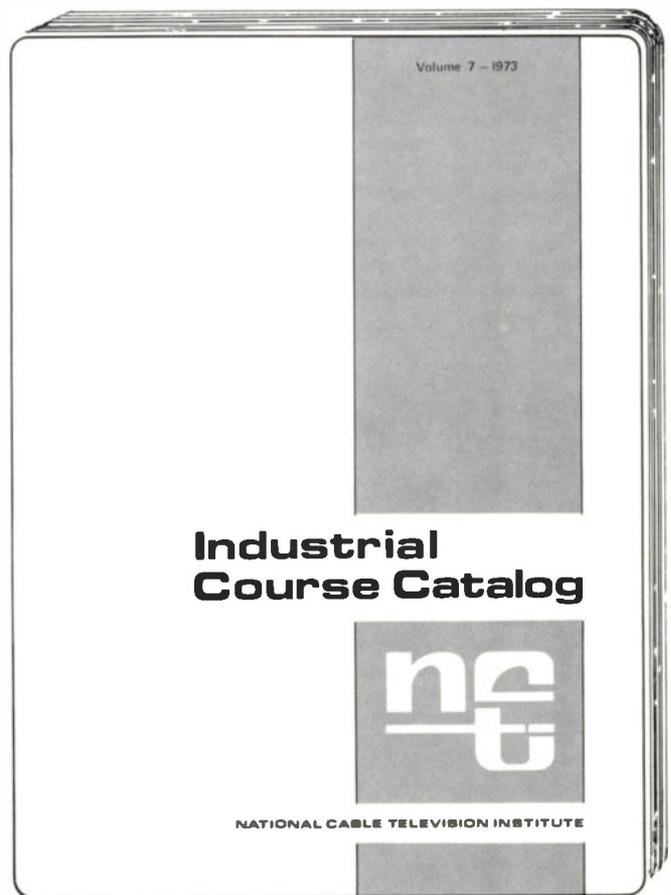
Get with the technical men who make the CATV industry work. These two courses duplicate all of the NCTI materials available to the industrial purchaser. Complete Phase I and you can install and can troubleshoot customer complaints. Complete Phase II and you can design a system and direct its construction.

Worried about solid state and FCC tests? The kit work in these courses will give you the basis to deal with today's problems. The Cable Tech subscription included with the course will help you solve tomorrow's problems when they arise.

The only way to advance beyond the Career Program in CATV is an EE degree. But we have EE's, 1st and 2nd 'phone license holders, broadcast engineers and "old hands" enrolled and studying the same material because the industry trusts our training.

Whatever your level, whatever your need, if you don't want to get left behind... if you don't want or can't get an employer to sponsor your study... if you want a Career and not just a job, write or use the response card number below.

These Career Program courses are approved for veteran's training.



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light levels in color film to give faithful reproduction of the film and the camera is compatible with any video tape system, so the tele-cine adaptor can be used to transfer color film to AKAI's exclusive 1/4" format as well as any other tape format. The CCS-150S retails for \$3,995. The tele-cine adaptor allows anyone with color film libraries to convert to the television medium easily and inexpensively. Included in this category are educational institutions, industrial training films of all kinds, the Armed Forces training film library; and the film-making industry itself.

DISTRIBUTION RINGS: GENERAL MACHINE

The development of two new types of distribution rings for inside wire cable and cross connection wire has been announced by General Machine Products Co., Inc., Trevoise, PA 19047. The new rings have proven highly successful in field testing in supporting inside wire cable and distributing cross connection wire in both new and existing installations. Unlike previous distribution rings, these new units are split to greatly facilitate placement and removal of the wire from the rings. They are available in both single and double ring types. The double ring models enable one of the segments to be used for the distribution of cross connection wire. The new GMP rings can be easily attached virtually anywhere the cable or cross connection wire must run. They can be screwed to the back board or metal

chain grip of terminal frames or fastened to concrete or wood. Field experience indicates that these improved rings can effectively replace the old style U-shaped rings previously used to support inside wire cable and cross connection wire.

MODULAR DISPLAY CONTROLLER: ANN ARBOR TERMINALS

A new modular Series 204 Display Controller from Ann Arbor Terminals, Inc., 6107 Jackson Road, Ann Arbor, MI 48103, is specifically intended for superimposing alphanumeric data on ordinary TV picture video in cable TV, closed-circuit TV, video tape recording, and annunciator applications. Models are available in five standard Input/Output configurations: (1) Parallel RO, *Character Addressable Load*; (2) Parallel RO, *Burst Load*; (3) Parallel RO, *Cursor Addressable Load*; (4) Serial RO, *Cursor Addressable Load*; or (5) Serial KSR, *Cursor Addressable*. Free-standing keyboards and video monitors are available separately. When these are not required (as installations where they already exist) the user will benefit from additional cost savings. All Ann Arbor products are covered by a standard two-year end-user warranty. The Series 204 features an alphanumeric display repertoire of 64 alphanumeric characters. Up to 16 lines with 32 characters per line may be displayed, and all 512 characters are stored in the internal MOS dynamic shift register memory. 

Literature

A new full-color brochure on the Gelox cable reclamation system is now available from **Communications Technology Corporation**. The Gelox system, which reclaims in-place cable by pushing water out and jelling to form a water barrier, is described fully as one which requires no pre-purging chemicals or labor. The Gelox compound used in the system is detailed as to its electrical properties and physical characteristics, along with test data, charts of test results, cable filling recommendations, approximated per-foot reclamation cost, and ordering information. Features of the Gelox system include the fact that it is a re-enterable polyurethane compound — not petroleum based; it will not harm conductor insulation or plastic connectors; it is safe for personnel with 0% apparent free TDI content; and it does not stink. The system is complete and includes Gelox compound, Gelox injection tank, cable injection fittings for 8 cable diameters, and Gelox clean-up solvent. A Gelox brochure will be sent on request. Write **Communications Technology Corporation**, 2237 Colby Avenue, Los Angeles, Ca. 90064.

A new brochure, entitled, **MICRO VCO'S** is offered free by **American Electronic Laboratories, Inc. (AEL)**, Hybrid Microelectronics Laboratory. AEL'S six page brochure provides descriptive data, features and application information for AEL's line of thick film hybrid voltage controlled oscillators (MICRO VCO's). Each model's input and output, stability, power line, and environmental performance characteristics are listed. In addition to mechanical and ordering information, the brochure includes Standard Frequency Tables for IRIG Proportional Bandwidth Subcarrier Bands, as well as IRIG and AIA Constant Bandwidth Subcarrier Bands. Address requests to **American Electronic Laboratories, Inc.**, MS/1123, P.O. Box 552, Lansdale, PA. 19446.

The National Cable Television Association has published a 51-page booklet called **Cable Television and Education: A Report from the Field**. The book reports on what is actually going on today in the field of cable TV and education. It gives examples of how cable TV is being used as an "electronic highway" between school and home, library and home, and campus and home. It discusses ways cable TV can act as a teacher's helper by allowing more intelligent use of television facilities in the classroom. The book also contains a bibliography of publications on cable TV and education, a glossary of cable TV terms, and excerpts from the FCC rules on educational cable channels, along with an explanation of the rules. The report was written by Anne Hanley under the auspices of the NCTA Educational Cable Television Committee. Individual copies of the report may be ordered, free of charge to Association members, from the NCTA.

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THE CATV

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Operations Manager with extensive administrative, technical and communications experience. Prefer graduate engineer but will accept applications if experience commensurate with the job we are offering. Contact Leo Hoarty, Buckeye Cablevision (419) 531-5121, 1122 N. Byrne Road, Toledo, Ohio 43607.

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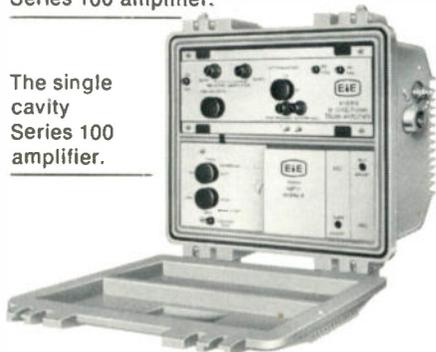
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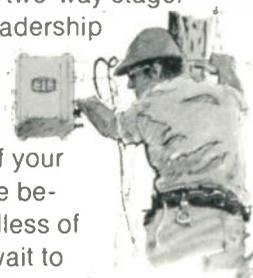
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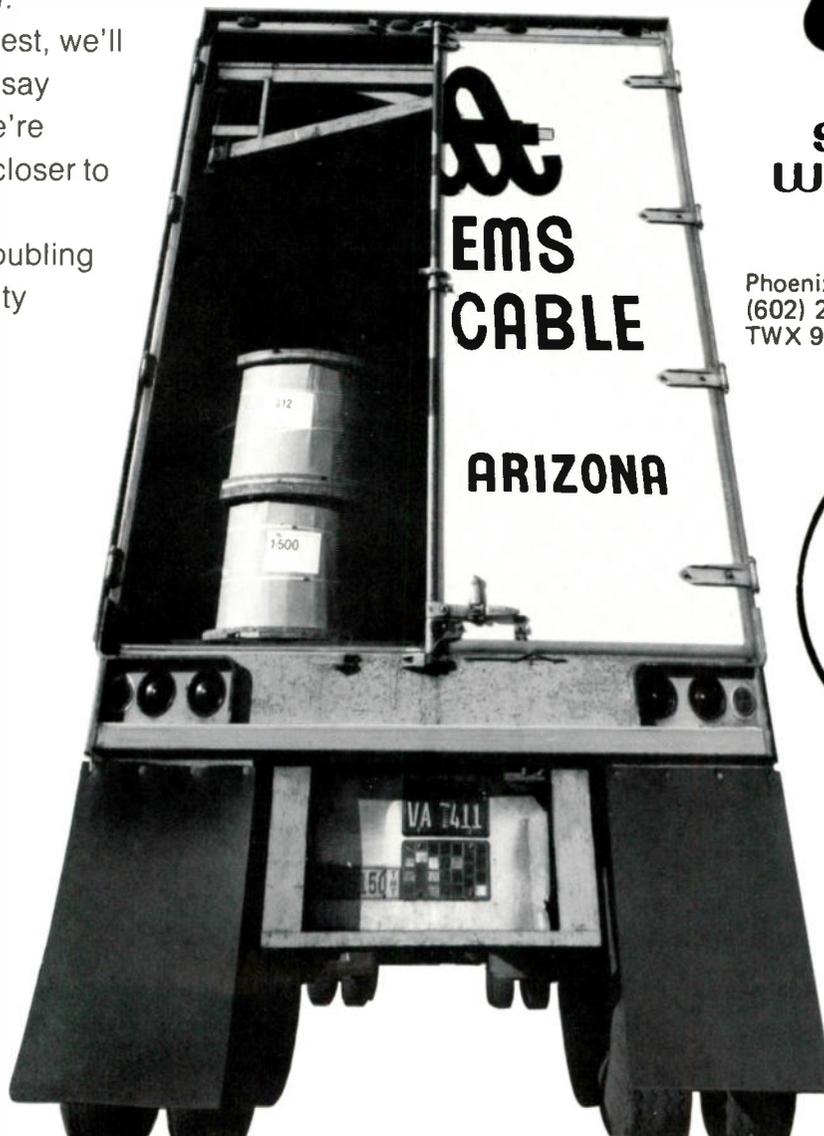
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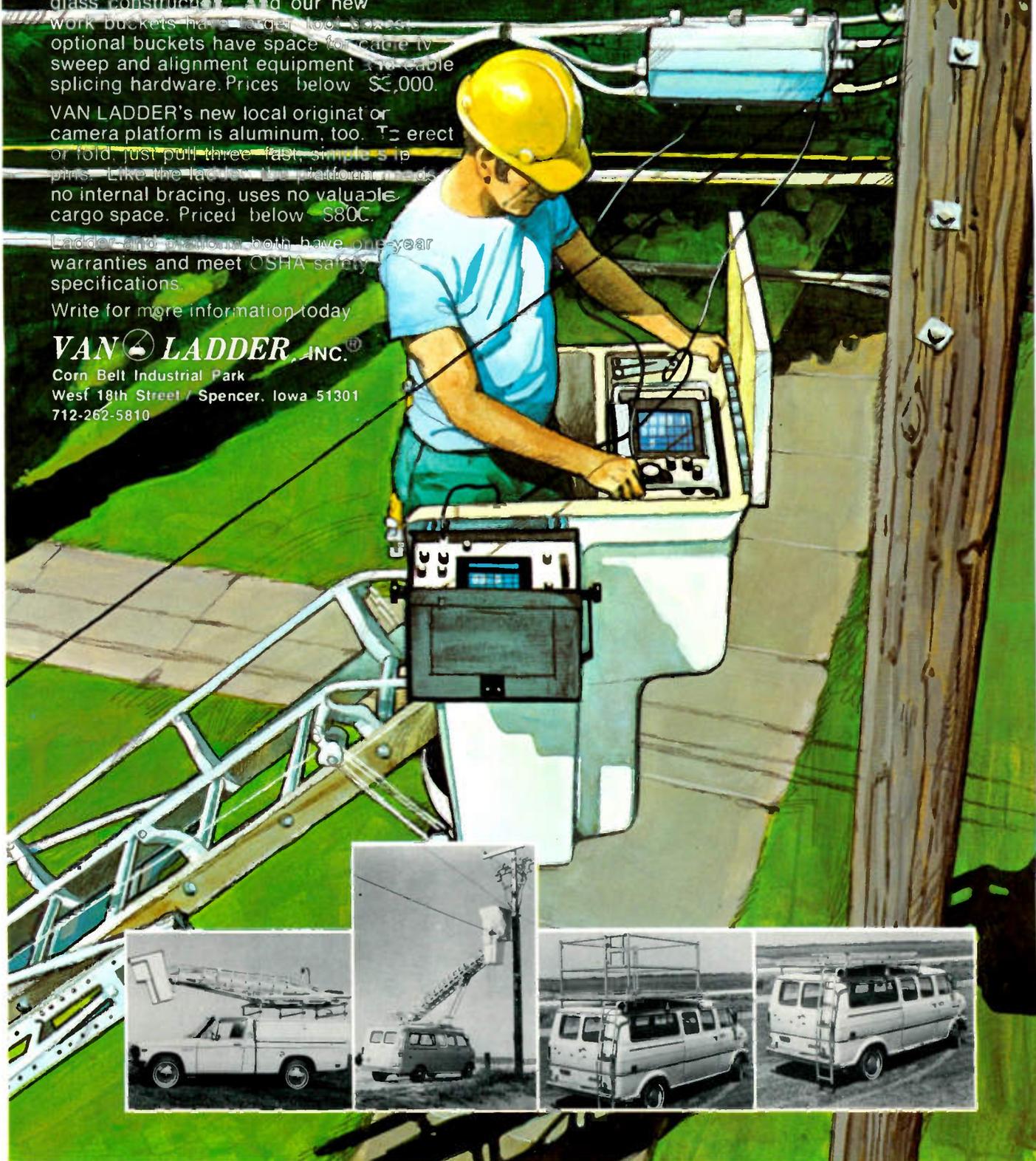
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HOW MANY EVENTS COULD YOU COVER WITH A PORTABLE AM MICROWAVE SYSTEM?



Quite a few we would guess. Some of our customers are covering important city council meetings, election returns, special sports events and other local origination features with the portable version of our compact AM microwave system. In some areas, the portable system is being used for standby emergency restoration service.

Our system is truly portable. The simplex system shown here weighs only 31 lbs. and the accompanying control console only 40 lbs. The entire system can usually be set up and on the air in less than 30 minutes. The tripod can be extended to clear a six foot guard fence for clear line of sight shots. With a 2-foot antenna, the system has a range of about 6 miles.



This is the identical Soladyne microwave equipment that is serving MSO's across the country in permanent installations. For more information, call Fielding Hedges, at (714) 279-7872.

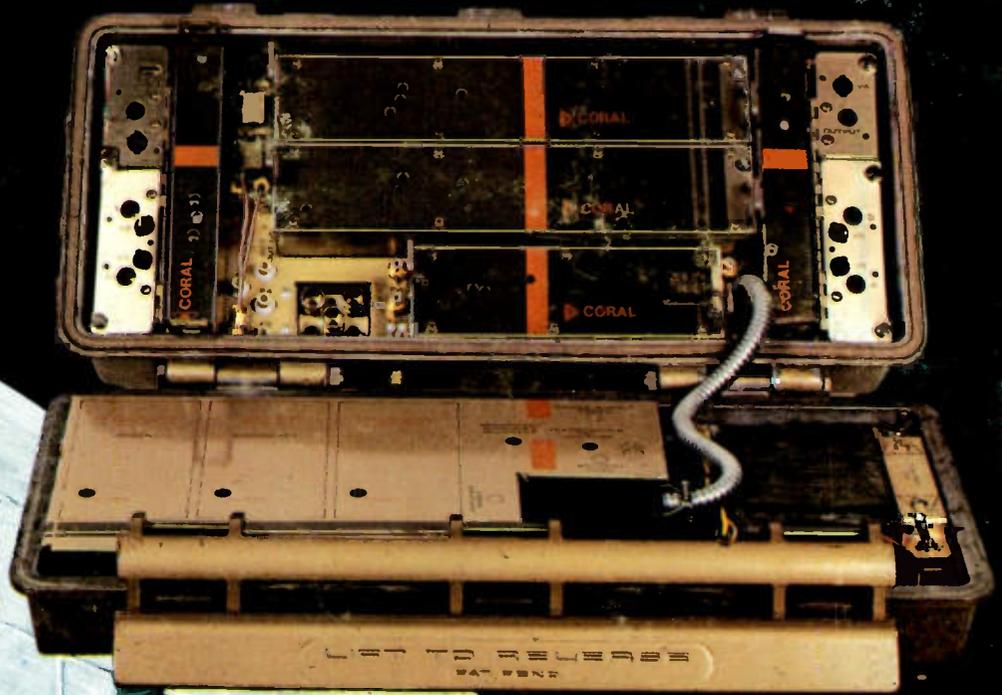
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