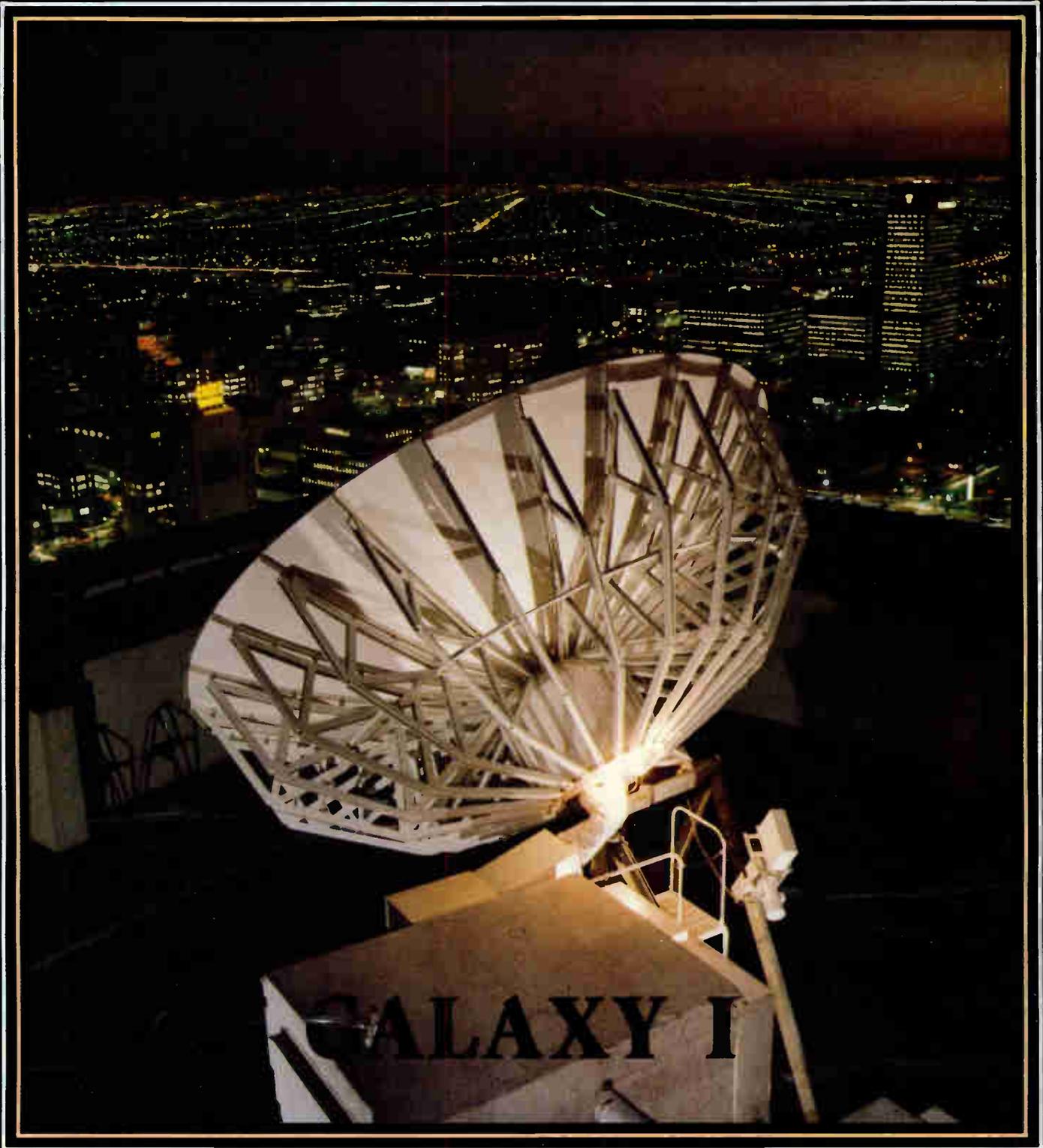


# CATJ

OFFICIAL JOURNAL OF THE COMMUNITY ANTENNA TELEVISION ASSOCIATION  
MAY 1983



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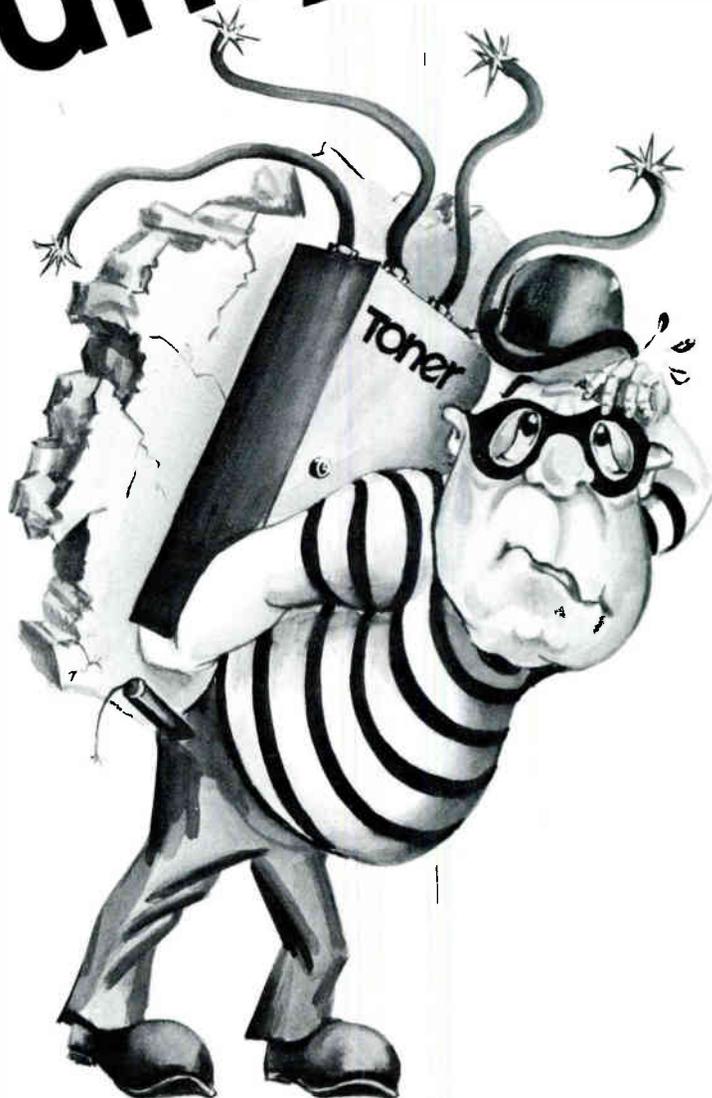
In addition, a 6dB switchable pad in both the trunk and bridger isolates ingress without disrupting the return signal path. This is an exclusive feature of Magnavox.

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CATJ, The Official Journal for the Community Antenna Television Association is published as a service for Association Members and other providing services to the industry.



See page 16



See page 44

### ON THE COVER

The cover features the GALAXY I Ready for Launch story covering the Hughes Satellite Manufacturing division and Satellite Control Center.

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*Photos courtesy of Hughes Communications, a group of wholly owned subsidiaries of the Hughes Aircraft Company.*

# —catatorial—



## S.66 - A GOOD DEAL FOR THE CITIES IF THEY WOULD JUST LOOK

---

Peter Athanas  
President of CATA

Once again, there is turmoil on Capitol Hill and in the larger communities around the country as the cable television industry and the nation's larger metropolitan areas grapple with potential cable legislation on Capitol Hill. The legislation this time is titled S. 66. It is the so-called "Goldwater Bill" as modified by an agreement that was reached between the National Cable Television Association and the National League of Cities regarding what that legislation should say. The Community Antenna Television Association supports the passage of S. 66 as modified. However, barely two weeks after the agreement was reached, the National League of Cities is already trying to pull out of the deal saying that the pressure from some of its large city members is too much, and while the agreement may be a good one, it is not good enough for the big cities.

This shouldn't come as any surprise! The Community Antenna Television Association has been trying for years to draw a distinction between the cable television industry and the industry represented by those who are building in major urban centers. These are **two different industries** — they are faced with different problems — they are attempting to accomplish different things.

The cable industry as represented by the Com-

munity Antenna Television Association is an established one. We provide service to subscribers who have clearly defined what the service is that they want, and we are providing that service and more. There does not appear to be a significant problem in the smaller communities around the country regarding cable television other than a development of overexpectations regarding what cable television is and can be in the future because of the battles raging in the larger cities. In those larger areas a new phenomenon has developed — one that sees city officials, regulators and advisors trying to define what a new broadband telecommunications industry should look like, what it should do, how much it should cost, what the services are that should be provided and, indeed, even trying to dictate what people should and should not see in their homes.

CATA does not believe that is the function of government. We believe that the large metropolitan areas have taken their power to grant a franchise in order to protect the cities, streets, and ways, and expanded it to a degree that is unconscionable at this point. We are not alone. There are court suits either in preparation or already in court around the country challenging this new trend. Responsible representatives of the cities have

already recognized that these court suits have a substantial chance of victory; that, in fact, the cities have gone too far and that some solution needs to be sought short of total elimination of the power of the cities, which is the major threat of the present law suits, in order to get the situation back under control. It was for that reason that the National League of Cities agreed to the compromise in S. 66. They recognized that they were facing two very unpleasant alternatives. One was a bill, written by Senator Goldwater and his staff, that would have restricted the cities' power even more than the compromise would, and the second was the potential of a court decision that would eliminate the power of the cities to regulate cable television altogether.

Given those two alternatives, the National League showed a great deal of foresight in making an agreement to reach an accord on provisions for cable television regulation. However, some of the large cities are not satisfied. They are not happy with the fact that the accord would result in the elimination of some of the so-called bells and whistles that they have required in their fran-

chises; not, we might point out, provisions regarding access channels or other programming advantages offered to the public, but rather the other additions that cities have found convenient to include in franchises — hidden regressive taxes, grants of money for unrelated purposes, and unfettered control of the business life of the cable operator. These large cities do not want to lose that power, and they will fight, **even their own organization**, in order to keep it.

It seems to us that it has now become incumbent on the cable television industry to explain to local officials why the National League agreement is a good one and why S. 66 should be supported. The principal reason, of course, from the city point of view, is that the alternatives are likely to be worse. Unfortunately, most city officials have not focused on the reality of those alternatives. If that is the case in your community, please contact CATA. We'll explain the full impact of the alternatives to you and then you may be able to explain it to your city council and your mayor.

S. 66 is a good bill for both the cable industry and the cities, and both sides should get the facts. □

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The Community Antenna Television Journal (CATJ)—ISSN-0194-5963—is published monthly by Television Publications, Inc., 4209 N.W. 23rd, Suite 106, Okla. City, OK 73107. Subscription price: \$18.00 per year, \$22.00 per year Canada, Mexico, and foreign is \$25.00 per year. Second class postage paid at Oklahoma City.

**POSTMASTER:** Send address change to 4209 N.W. 23rd, Oklahoma City, OK. 73107.

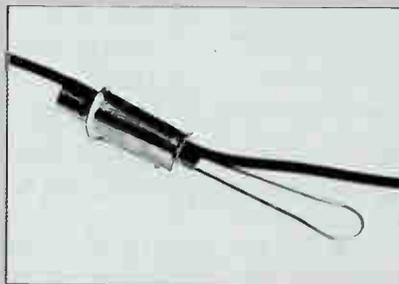
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# HOUSEDROP HARDWARE

## DESIGNED SPECIFICALLY FOR USE IN CABLE TELEVISION SYSTEMS

We expect to find new and exciting developments in the cable industry, particularly in the areas of digital electronics, satellite television, and fiber optics. The recent discovery at the Texas Cable Show of a new product line of housedrop hardware that has been specifically designed for cable television use was an unexpected pleasure. Each different item, manufactured by Sachs CATV Division and distributed by Anixter Communications, proved to be of exceptional quality, simple to work with, and as near to "goof proof" for the average cable televi-

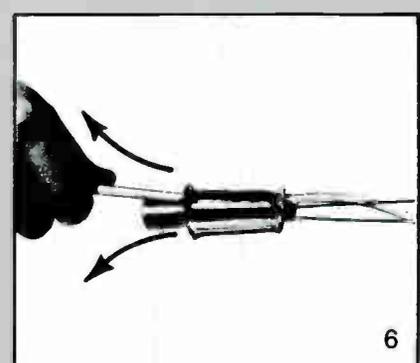
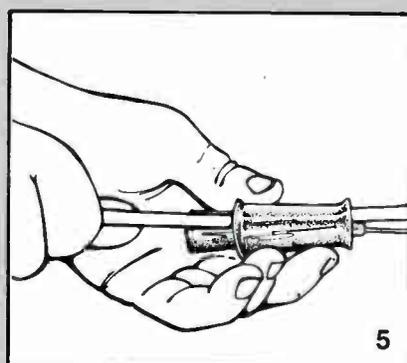
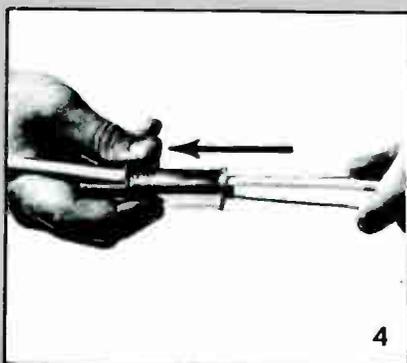
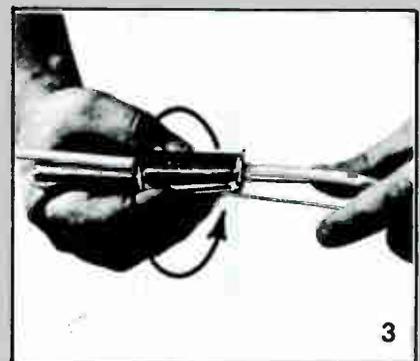
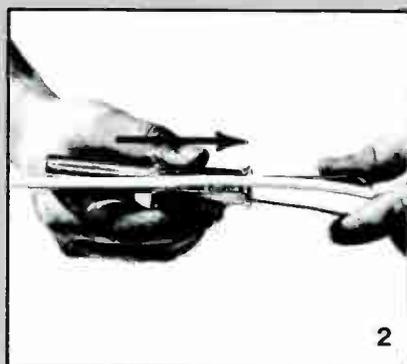
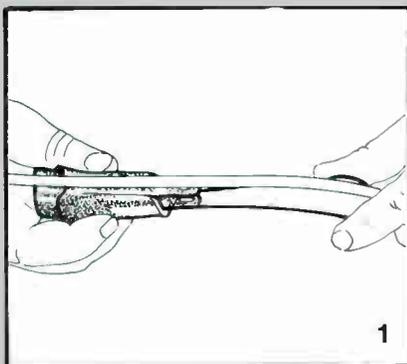
By: Ralph A. Haimowitz



PICTURE 1

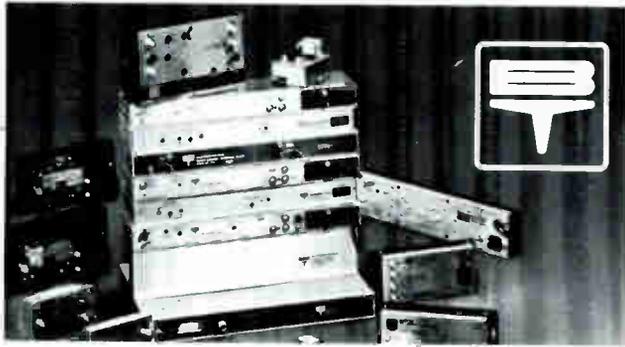
sion installer to use as we have ever seen.

This fantastic new product line was carefully engineered and tested by I.J. Sachs to meet the needs and solve the every day problems encountered in the installation of cable television house drops, from the drop clamp to the grounding strap. The CATA Engineering Office has spent several weeks testing and evaluating these products and, in every instance, found them to be an improvement over most existing drop hardware. It would come as no



### Installation Instructions

1. Place cable over inner groove.
2. Slide outer shell toward bail until it may be rotated over cable.
3. Adjust cable length to approximate position and rotate outer shell until lines straddle cable.
4. Push shell lightly to create a slight bind.
5. Adjust to final position and push shell tightly to secure.
6. Check by pulling. If slippage occurs, push shell harder to bind.



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(404) 256-0228

*This notice appears as a matter of record only.*

March, 1983

surprise to find that these products may revolutionize the entire hardware line for cable television house drops.

The **SC-02 Drop Clamp** is a two piece clamp, electro-galvanized to prevent corrosion, that is much easier to install than conventional wire grip. It also allows aerial house drop installations up to 100 feet long without the use of support strand. The clamp provides a broad surface non-slip contact with the cable by the simple act of making a pressure bind on the cable by slipping the outer shell of the clamp over the inner body and cable, and pushing the shell tight to secure it. The clamp is so designed to prevent any wear or damage to the cable caused by sway and rubbing, and does not strain, flatten, twist, or distort the cable. In tests conducted by the Quebec Industrial Research Center, the results showed "no apparent modifications of the transmitted signal when the clamp was submitted to severe tension", and the Belden company conducted TDR tests of their No. 9104 drop cable at 75 pounds of stress with no changes, except for a very slight drop of impedance under these most severe conditions. In our tests, the signals appeared to be unaffected by the stress until the cable broke near mid-span. In addition to the ease of use and speed of installation, we found the Sachs clamp handy to carry by hanging it from the installers tool belt or pouch.

Some of its many features are:

- Easier to install in all weather conditions.
- Provides a broad surface contact with cable and will not slip.
- Will not strain, flatten, twist or distort drop cables.
- Faster installation.
- Long-lasting protective finish.
- Ultimate strength exceeds strength of RG59 cable.

# CATA Announces New Seminars Schedule

CATA, under the direction of its Engineering Committee, chaired by Director Wayne Sheldon, has announced the first half of the 1983 schedule for the Basic and Advanced Technical Training Seminars. The Engineering Committee, working closely with CATA's Director of Engineering, Ralph Haimowitz, has designed the schedule in accordance with suggestions and requests received from cable operators over the country. In addition, the Southern Cable Television Association is again cooperating on the sponsorship of three of the first half of 1983 and three scheduled for the second half. The Southern Association co-sponsored two in 1982 and has selected appropriate locations to insure this valuable training, so

vital to the entire industry, be available to their membership.

There are some changes in both the Basic and Advanced curriculum as previously presented; both sessions have had an update to cover the additional technical areas where training is needed.

## REGISTER NOW!

Following is registration and information that is self-explanatory. If you wish additional information, please contact the CATA Engineering Office (305) 562-7847. Take advantage of this opportunity to add to the experience and expertise of your technical staff and thus help your system become more efficient and better maintained. Use the

registration form **TODAY** to register for the seminar more applicable to your needs and location. CATA has arranged with the hotels for reasonable housing rates, and those hotels are listed with the addresses for you to make your **reservations directly with the hotel**. Be sure to list that you are registering for the CATA Seminar so that the discounted rates will be honored with your reservation.

**Don't delay . . . take care of your registration today as each seminar is restricted to a certain number so that each attendee will have the full advantage of the equipment and laboratory facilities.**

## BASIC SEMINAR

(Monday thru Wednesday)

### TOPICS

#### SIGNAL SOURCES

Broadcast TV  
Satellite TV  
Microwave Transmission  
Local Origination

#### HEADEND

Antennas  
Preamplifiers  
Receivers  
Processors  
Modulators

Filters

Combiner

#### TRUNK SYSTEM

Coaxial Cable  
Trunk Amplifiers  
AGC/ASC  
Two-Way Systems  
Powering

#### DISTRIBUTION SYSTEM

Bridgers  
Line Extenders  
Distribution Taps  
Splitters/Couplers

#### SUBSCRIBER MATERIALS

Taps  
Drop Cable  
Transformers

Grounding Blocks  
Set Top Converters  
Splitters/Couplers  
Apartment Amplifiers

#### HOUSEDROP

Aerial Installation  
Underground Installation  
Tap Selection  
Multiple Outlets  
Bonding & Grounding

#### CONNECTORS

Connector Types  
Cable Preparation  
Proper Installation  
Signal Leakage

#### FINDING PROBLEMS

Signal Level Meters  
Common Cable Problems  
Finding Faults

#### OPERATING PROCEDURES

System Maps & Symbols  
Recording Information  
Subscriber Relations

#### LABORATORY

Equipment Identification  
Installing Connectors  
Measurements With SLM  
Troubleshooting

## ADVANCED SEMINAR

(Monday thru Friday)

### TOPICS

#### FUNDAMENTALS REVIEW

Decibels/dBmv  
Formulas  
Logarithms

#### OPERATIONAL REQUIREMENTS

FCC Technical Standards  
FCC Forms and Records  
System Records & Programs

#### SYSTEM PROBLEMS/FAILURES

Common Cable Faults  
Sheath Currents  
Impedance Mismatch  
Radio Frequency Interference  
Signal Leakage

#### LABORATORY

Days four and five are primarily devoted to hands-on test equipment sessions in the cable system laboratory where attendees actually perform the required tests and measurements.

#### EQUIPMENT

Spectrum Analyzers  
Sweep Generators  
Sweep Transmitters

Sweep Receivers  
Signal Leakage Detectors  
Frequency Counters  
Fault Finders

#### TESTS AND MEASUREMENTS

Spectrum Analysis  
Bench Sweeping  
System Sweeping  
Proof of Performance Tests  
Isolation  
Return Loss Measurements

#### SYSTEM DESIGN CONCEPTS

Coaxial Cable  
Active Equipment  
Passive Devices  
Grounding & Bonding  
Powering  
System Noise Limitations  
Crossmodulation  
Intermodulation  
Hum  
Reflected Signals

#### FREQUENCY SPECTRUM

Spectrum Conflicts  
Channel Expansion  
Frequency Restrictions

# CATA CATV TECHNICAL TRAINING SEMINAR HOTEL INFORMATION

A block of hotel accommodations has been set aside for each seminar at the hotels indicated. Please make your own reservations directly with the hotel by completing and mailing in the hotel reservation form below to the appropriate hotel. For telephone reservations, be sure to include the information that you are attending the CATA CATV Technical Training Seminar to receive the special room rates as indicated.

### BASIC

#### BATON ROUGE, LOUISIANA JUNE 13-15

**PRINCE MURAT INN**  
1480 NICHOLSON DRIVE,  
BATON ROUGE, LOUISIANA 70802  
PHONE: (504) 387-1111  
The Prince Murat Inn is located on the Nicholson Drive exit off I-10. Limousine service from airport.  
S - \$27.00  
D - \$36.00  
Sponsored by the SCTA

#### LAKE WORTH, FLORIDA AUGUST 1-3

**COUNTRY SQUIRE INN**  
7859 LAKE WORTH ROAD  
LAKE WORTH, FLORIDA 33463  
PHONE: (305) 968-5000  
Take exit 36 off the Florida Turnpike.  
S - \$33.00  
D - \$35.00  
Sponsored by the SCTA

#### ATLANTA, GEORGIA NOVEMBER 7-9

**MASTER HOST INN MIDTOWN**  
1152 SPRING ST. N.W.  
ATLANTA, GEORGIA 30309  
PHONE: (404) 875-3511  
Located at I-75/85 at 14th Street in Atlanta.  
S - \$28.00  
D - \$32.00  
Sponsored by the SCTA

### ADVANCED

#### NEWARK, NEW JERSEY MAY 2-6

**BEST WESTERN COACHMAN INN**  
10 JACKSON DRIVE  
CRANFORD, NEW JERSEY 07016  
PHONE: (201) 272-4700  
The Best Western Coachman Inn is located in Cranford, N.J. at exit 136 on the Garden State Parkway. Limousine service from airport.  
S - \$42.00  
D - \$46.00

#### RICHMOND, VIRGINIA JULY 11-15

**MASSAD HOUSE HOTEL**  
11 N. FOURTH STREET  
RICHMOND, VIRGINIA 23219  
PHONE: (804) 648-2893  
S - \$26.00  
D - \$32.00  
Sponsored by the SCTA

#### SAN ANTONIO, TEXAS OCTOBER 3-7

**LA QUINTA MOTEL**  
333 NORTH EAST LOOP 410  
SAN ANTONIO, TEXAS 78216  
PHONE: (512) 828-0781  
Located just on the east side of the airport.  
S - \$31.00  
D - \$37.00  
Sponsored by the Texas Cable Association

#### REVERE, MASSACHUSETTS DECEMBER 5-9

**HOWARD JOHNSONS MOTOR LODGE**  
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Located at the junction of Rts. C-1 and 60, 18 minutes from Logan Airport.  
S - \$47.00  
D - \$53.00

**CATA wishes to extend their appreciation to the Southern Cable Television Association (SCTA) and the Texas Cable Association, for their cooperation in sponsoring the above indicated seminars.**

CUT HERE

## HOTEL RESERVATION FORM

Please reserve the following room requirements in the name of the company or individual shown:

NAME: \_\_\_\_\_ TELEPHONE: \_\_\_\_\_  
(Company or Individual) Area Code

ADDRESS: \_\_\_\_\_  
(P.O. Box or Street No.) (City) (State) (Zip)

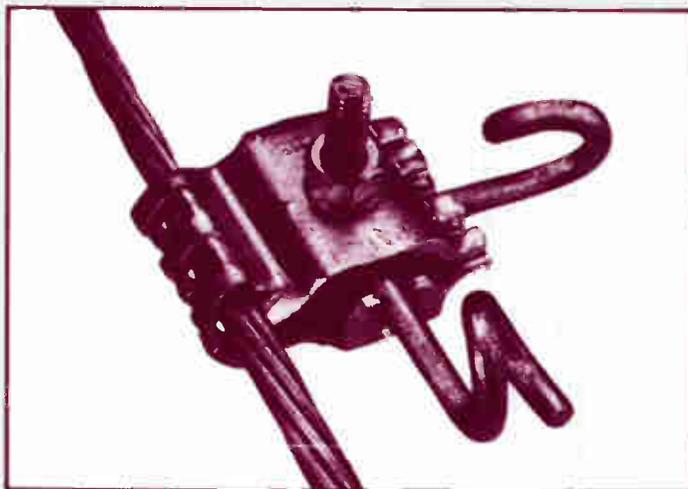
NUMBER OF ROOMS: \_\_\_\_\_ OCCUPANCY: SINGLE DOUBLE

ARRIVAL: \_\_\_\_\_ DEPARTURE \_\_\_\_\_  
(Date) (Time) (Date)

**SEND DIRECTLY TO HOTEL CATA CATV TECHNICAL TRAINING SEMINAR**

The **SC-03 Multi-Span Clamp** is used to attach the SC-02 Drop Clamp from a cable distribution span by attaching the SC-03 to the strand. The Multi-Span Clamp allows for one or two house drops to be made from the same clamp in its standard configuration, while the addition of another wind-proof drop hook could provide three drops. The design of the SC-03 has no protruding parts to damage or interfere with the supported distribution cable and is constructed

**PICTURE 2**



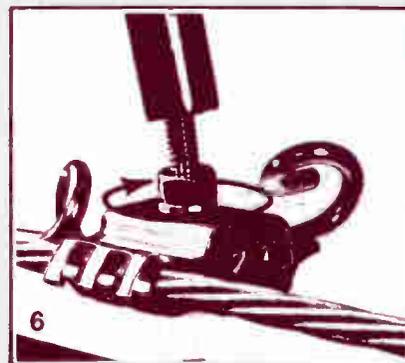
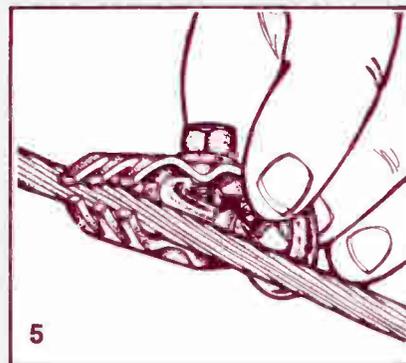
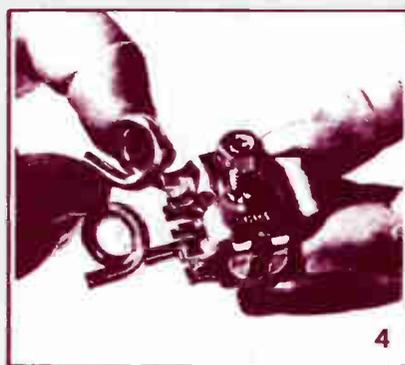
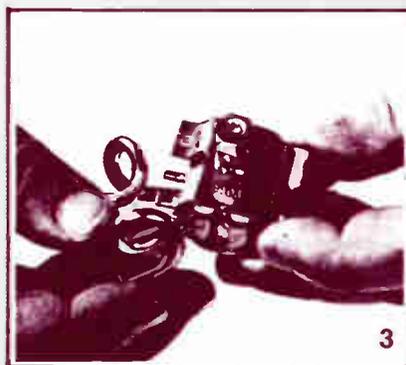
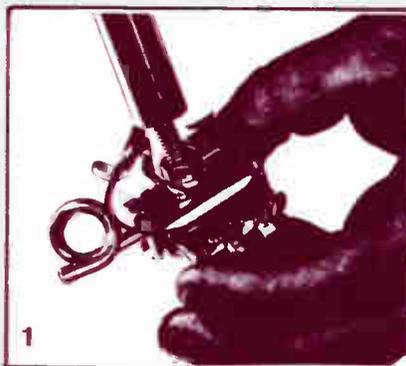
so that the clamp nut will not come off of the threaded clamp bolt when it is loosened for installation. This insures that the clamp does not fall apart into several pieces when the installer is working to install it on the strand. Another outstanding feature of the Sachs Multi-Span Clamp is that it locks on to the strand when tightened down and will not turn under pressure as other clamps do.

**The design of this clamp allows positioning on the strand messenger wire with the following benefits:**

- Does not have protruding parts which damage and interfere with the supported cable.
- Includes two wind-proof drop hooks which can be positioned for various angle installations.
- Steel clamp and hooks provide a firm positive grip.
- Hot dip galvanized to ASTM spec. 153-78 which provides a long lasting protective finish.
- Versatility of double hook design allows inventory reduction and standardization.
- Ultimate strength exceed the strength of RG59 cable.

**Installation Instructions**

1. Unscrew nut.
2. Open Clamp.
3. & 4. Position hooks to proper angle.
5. Engage and secure jaws to strand.
6. Tighten nut.



# Microdyne's New Multiple Feed System Lets You Receive Up To Five Satellites



With new programming constantly being added, you may want to pick up programs from several satellites. Previously, this would involve the expense of another dish. Now with Microdyne's new multiple feed system you may be able to add programming from additional satellites at about 1/5 the cost of a new dish.

The MSF-16 Multiple Satellite Feed System can receive up to five satellites on the same parabolic reflector when the satellites are located in close proximity. In a TVRO system designed with adequate margins, the MSF-16

will provide quality pictures on all feeds.

Existing Microdyne/AFC antennas can be easily retrofitted to accommodate this new system. Only the spars and brackets of the feed support hardware must be changed — no other antenna changes are required. This simple modification can be done by the user or by Microdyne field service personnel.

Even if you purchased your existing antenna from another manufacturer, it may still be possible to modify it for use with the Microdyne

Multiple Satellite Feed System. Please give us a call.



So, whether you are planning a new system or expanding an existing installation, the MSF-16 can provide increased capability while saving both the cost and the real estate required by a second dish.

We have prepared a brochure to help you to determine if the MSF-16 is suitable for your system. For a free copy, write on your company letterhead to Microdyne Corporation, TV Sales, Dept. F, P.O. Box 7213, Ocala, FL 32672.

**Microdyne Corporation**

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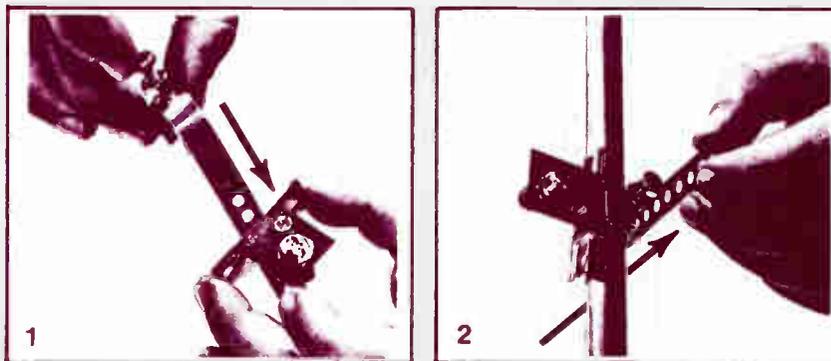
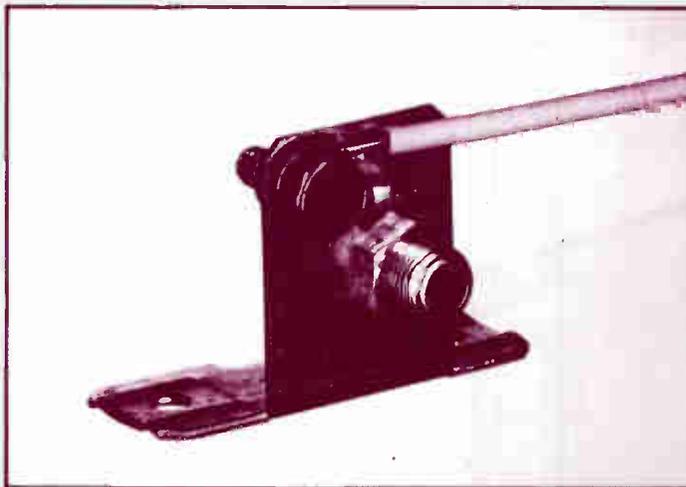
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The **SC-1281 Grounding Block** has the feature of being mounted to a flat surface such as a wall or house eaves, as well as pipe mounting to a ground rod with the additional use of the SC-13 Grounding Strap.

**PICTURE 3**

**SC-12 & SC-1281  
GROUNDING BLOCK**

The SC-12 and SC-1281 Grounding Blocks are designed to provide a positive break in the cable entry by using an F-81 connector, together with an SC-13 Ground Strap to ensure a true ground. The SC-12 is furnished less connector while the SC-1281 is furnished complete with F-81 connector. It may also be wall mounted when a mechanical/electrical break is necessary away from a ground pipe. The mounting surface portion of the block has a 3/4" width and a 2" height.

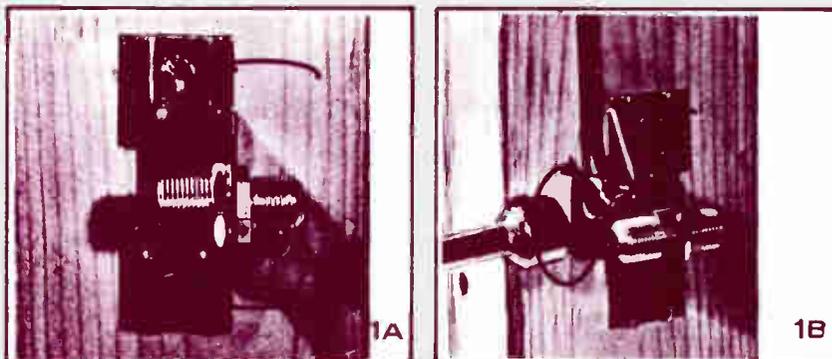


**PICTURE 4**

The **SC-1281** provides easy access to the F81 connector making it simple and quick to install and connect the drop cable "F" fittings.

**Installation Instructions  
Pipe Mounting W/SC-13**

1. Thread Copper strap, catalog #SC-13 through slot in block.
2. Proceed with Sc-13 Installation instructions.



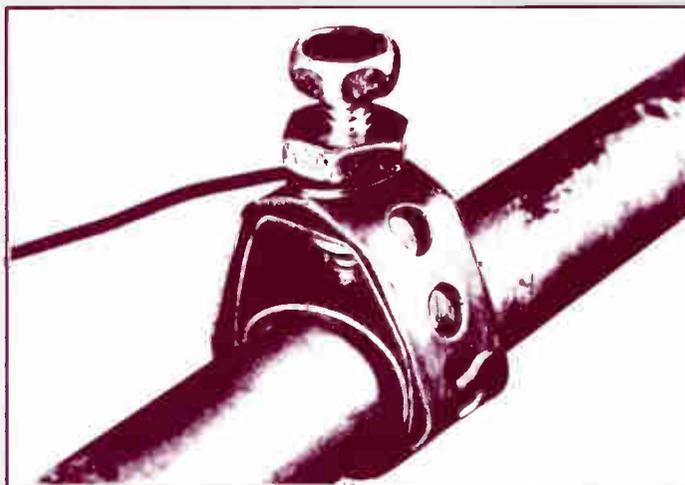
**Flat Surface Mounting**

- 1A. Use screws/nails through mounting holes to secure to wood or other material.
- 1B. Fasten one end of ground wire to grounding block screw and tighten. Complete the circuit by connecting other end of ground wire to SC-13 pipe grounding strap.

**SC-13 GROUNDING STRAP**

(Patented/Patent Pending in U.S., Canada)

**PICTURE 5**



The **SC-13 Grounding Strap** may also be used to provide an excellent mechanical ground to ground rods or cold water pipes. The ground strap is of one piece copper preformed construction that will fit pipe diameters of ½ through 1¼ in-

ches. Installation, again, is quick and simple.

Other unique items are the **SC-05** and **SC-06 Lashing Support Strap** to lash cable to strand and the **SC-07 Lashing Wire Clamp** used to terminate the lashing wire on the

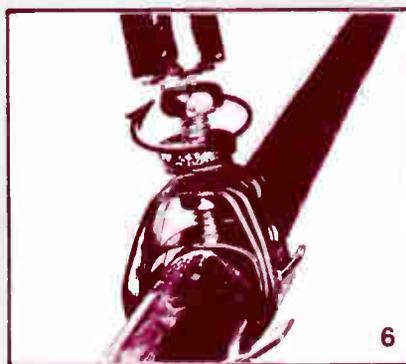
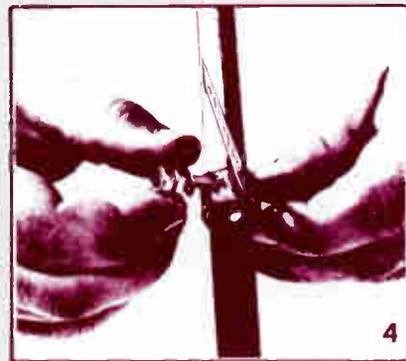
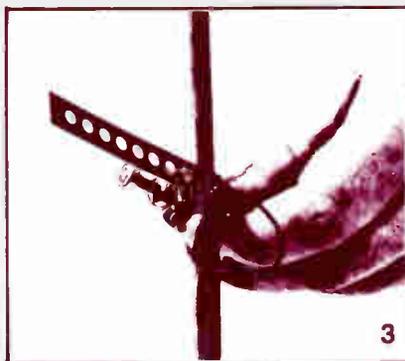
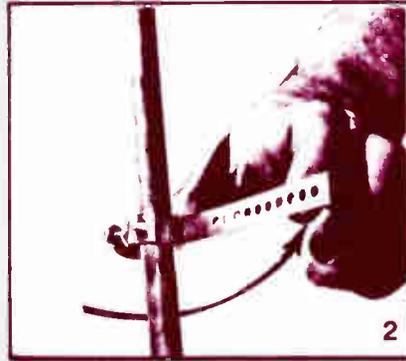
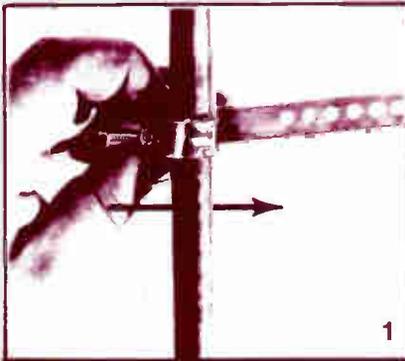
strand. The Lashing Support Straps are one piece design to eliminate the need for fastening clips and has no sharp or rough edges which prevents damage to the cable, as well as eliminating the cuts to the installer's hands that other types of straps have caused. The installation is fast and easy, providing positive locking of the strap by the dual strap slot design.

The Lashing Wire Clamp, like the Multi-Span Clamp, has positive locking to the strand to prevent rotation under stress. It will accommodate two lashing wires which are held securely with the locking action of the double nut. Double washers prevent nut tightening damage to the lashing wire.

All of the hardware, except the copper grounding strap and the aluminum lashing support strap, has a minimum of 2.1 mils of Zinc coating in the electro-galvanizing process. The standard G-90 process, has been charted by the Zinc Institute, Inc. as having a life expectancy of 8 to 40 years depending upon the environment. Sachs CATV Division will also provide upon request, a G-115 coating in their hot dip galvanize process for geographical areas that experience extreme corrosion problems. This extends the average protection period to first rust (a red powder not affecting the strength of the steel) from 10 years to a period of from 15 to 30 years.

One other major advantage throughout this entire hardware line is that all of the items have standardized nuts and bolts requiring only one tool for accomplishing installation.

The cost for Sachs housedrop hardware is price competitive with similar hardware from other manufacturers. Where the average price runs a penny or so more, this product line will end up **saving money** because of ease of use, design efficiency, time savings during installation, and life expectancy. Our overall rating for this product line is **A +**. □



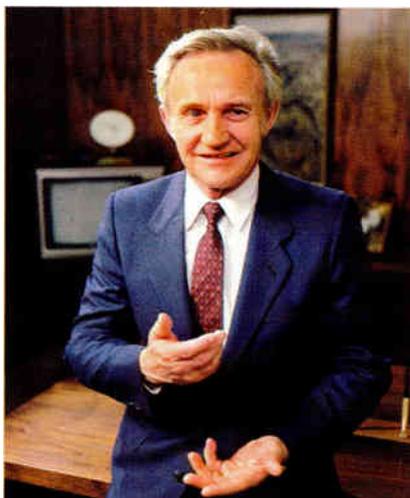
### Installation Instructions

1. Place formed portion of strap on cold water pipe.
2. Bend strap over screw while pressing in.
3. Snugly connect strap hole to the hook.
4. Remove screw and nut assembly.
5. Continue bending strap over screw hole—re-install screw/nut assembly.
6. Tighten screw snugly. Place ground wire between nut and washer and secure nut.

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*"At TCI we've always considered success in terms of how many satisfied customers we have. The numerous Avantek products we have used over the years have contributed to both the quality and reliability of our service. Our subscribers appreciate this."*

J.C. Sparkman  
Executive Vice President  
Tele-Communications, Inc.  
Denver, Colorado

**Simulchannel™ receiving systems leave some important choices to you.**

The AR1000 receiving system optimizes modular construction to increase the ease of system integration. The choice is yours. Install an ACA4220 LNA 4-GHz downconverter at the antenna, and pack up to six channels on a single space-saving receiver shelf. Avantek's original method of block conversion at the antenna reduces interference and harmonic problems, and allows less expensive transmission lines to be used.

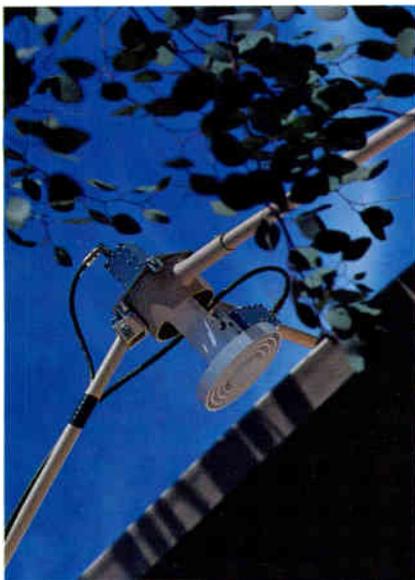
For expanding existing systems, the AR1000 incorporates a C-band downconverter in the receiver shelf that is shared by up to five receivers. In either case, channels can be added as needed to decrease start-up costs.



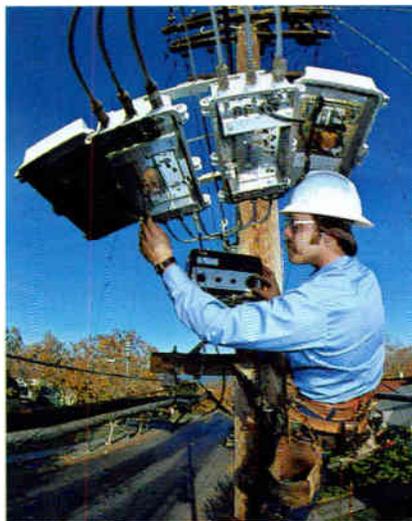
SEE US AT THE NCTA

BOOTH NUMBER 2407

Digitally synthesized tuning in both units is controlled by touch pad. And with the new Avantek telephone interface unit, you can tune each receiver remotely, either manually or by computer control. Independently select from any of 24 channels for any of 24 different receivers (up to four Avantek racks). No one else can even come close to matching that capability!



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**No Single Component Tells the Entire Avantek Story**

# GALAXY I Ready for Launch

By  
Wayne Sheldon  
Chairman  
CATA Engineering Committee

For the first time, Hughes Communications opened its satellite operations control center and satellite manufacturing facilities for an exclusive press tour. I was fortunate enough to be asked to join this very interesting program.

The visitors were greeted by Clay T. Whitehead, President of **Hughes Communications**. He stated, "It might be useful to have you in at a time when there really isn't anything hot going on and give you a first hand glance, at some leisure, at what we're doing and how we are going about doing it. We think that we have some interesting and exciting things that will be developing from a news point of view over the next year or so. Hopefully, having this opportunity to interact with our people and see our facilities will give you a little better idea what is going on behind the scenes and behind the press releases."

## **Focus on Hughes Communications**

Hughes Communications is a wholly owned subsidiary of Hughes Aircraft Company. It is a relatively

new company, only four years old, and does not yet have a satellite in orbit. By mid 1985, they will have seven in orbit, making Hughes Communications one of the largest satellite operating companies. There will be three Galaxy and four LEASAT satellites. Galaxy will serve the voice, video and data transmission needs of large corporations, long-haul carriers, cable programmers and broadcasters. LEASAT will provide worldwide tactical communications service to the U.S. Navy and other agencies of the Department of Defense.

Satellite access, however, is only half of the full communications pic-

ture. Hughes' customers need a sophisticated terrestrial network as well. Hughes Communications is developing a multi-city network of earth stations to provide their customers with the specific service they require.

Galaxy earth stations are located in Brooklyn, New York and Fillmore, California. Other stations are in various stages of development in Chicago, San Francisco, Atlanta, Dallas and Seattle. Hughes Communications plans to expand the network to other major metropolitan areas. The LEASAT ground equipment is located in Guam; Stockton, California; Norfolk, Virginia; and Hawaii.

This complete space and terrestrial network is monitored and controlled at one central location, the Operations Control Center (OCC) in Los Angeles. The OCC will direct the launch-to-orbit activities of all the Galaxy and LEASAT satellites, as well as launches of satellites owned by other companies. After a space craft is launched, the OCC will direct it ►



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CABLE EXCHANGE, located in Englewood, Colorado, is now offering a service whereby cable operators can list for sale or find used cable equipment, and this service has been enhanced by the addition of a computerized system to provide the information, list inventories, and locate products at the speed of light. The computer system is also utilized to generate a handy monthly reference catalog which lists all known available inventory from both MSO's and Independent Operators that is mailed monthly to companies or organizations interested in either listing their inventory excesses, or purchasing products at favorable prices, available immediately, directly from the exchange or through a network of agents located in convenient areas across the United States, Canada, Australia, and Europe.

CABLE EXCHANGE is providing this service not available previously, for its client companies with high speed computerized access to cable system warehouses from coast to coast. Managers and construction managers can insure that the right products are available on time without the need to maintain costly inventories of their own. This service can be very helpful to both the large MSO' and Independents, as well as the "Mom and Pop" operators everywhere!

If you are interested in obtaining information on the CABLE EXCHANGE system and how it works, or if you want to be included on the catalog mailing list, contact CABLE EXCHANGE, P.O. Box 4094, Englewood, CO. 80155. They ask that you use your cable company letterhead for proper identification for this service. You also can call (303) 694-6789. □

through transfer orbit to its final geosynchronous position 22,300 miles above the earth. Once the satellite reaches its assigned position, subsystem testing and station-keeping activities will be carried out by the OCC.

Satellite tracking, telemetry gathering and commanding are also major functions coordinated by the OCC. Shortly after launch, the OCC directs full motion antennas at remote sites to locate and track the signal from the orbiting spacecraft. The on-board telemetry stream, data describing the current health of the spacecraft via the latest on-board measurements, is then passed through the equipment at Hughes Communications' earth stations and transmitted via telephone lines to the OCC.

At the OCC the information is then processed, displayed, archived and analyzed. Decisions are made and appropriate commands are formulated. These commands might involve monitoring the health of the spacecraft, reconfiguring its status,

maneuvering it, or testing on-board equipment, including the communications payload. The commands are then routed to the earth stations via telephone lines and uplinked to the satellite.

Another function of the facility involves monitoring the performance of the satellite transponders. A transponder is the purchased or leased hardware which receives, selects, amplifies and retransmits signals. The OCC tests the down-link quality of the video signals and other communications traffic to assure constant, clear transmission.

Twenty-four hours a day, seven days a week, Hughes Communications' OCC facility monitors the status of each earth station and satellite in the communications network. At all times there will be at least two operators on duty. All of the monitoring operations are done automatically, but if anything goes beyond the preset limits, an alarm is sounded. It is the duty of the operators to make whatever decision is needed to correct the

problem and see that the proper corrective action is taken.

The busiest times are when a satellite is being transferred from the launch orbit into its final position. After a satellite is in position, in order to keep it there and to maintain proper equipment parameters they anticipate having to make about one corrective command every twenty-four hours.

Each satellite under the control of the OCC has its own dedicated monitoring and control equipment. All of this equipment is redundant so that if something fails, they have immediate backup of information. In the event the commercial power fails, they have a standby generator ready to pick up the load within 30 seconds.

### The Galaxy Satellites

The FCC has assigned orbital slots **135°W Longitude to Galaxy I** and **74°W Longitude to Galaxy II**. An application is pending for permission to launch the third Galaxy satellite. Galaxy I will be launched on a Delta 3920 rocket in early June. ▶



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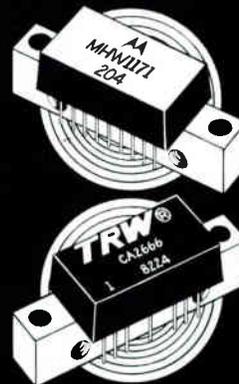
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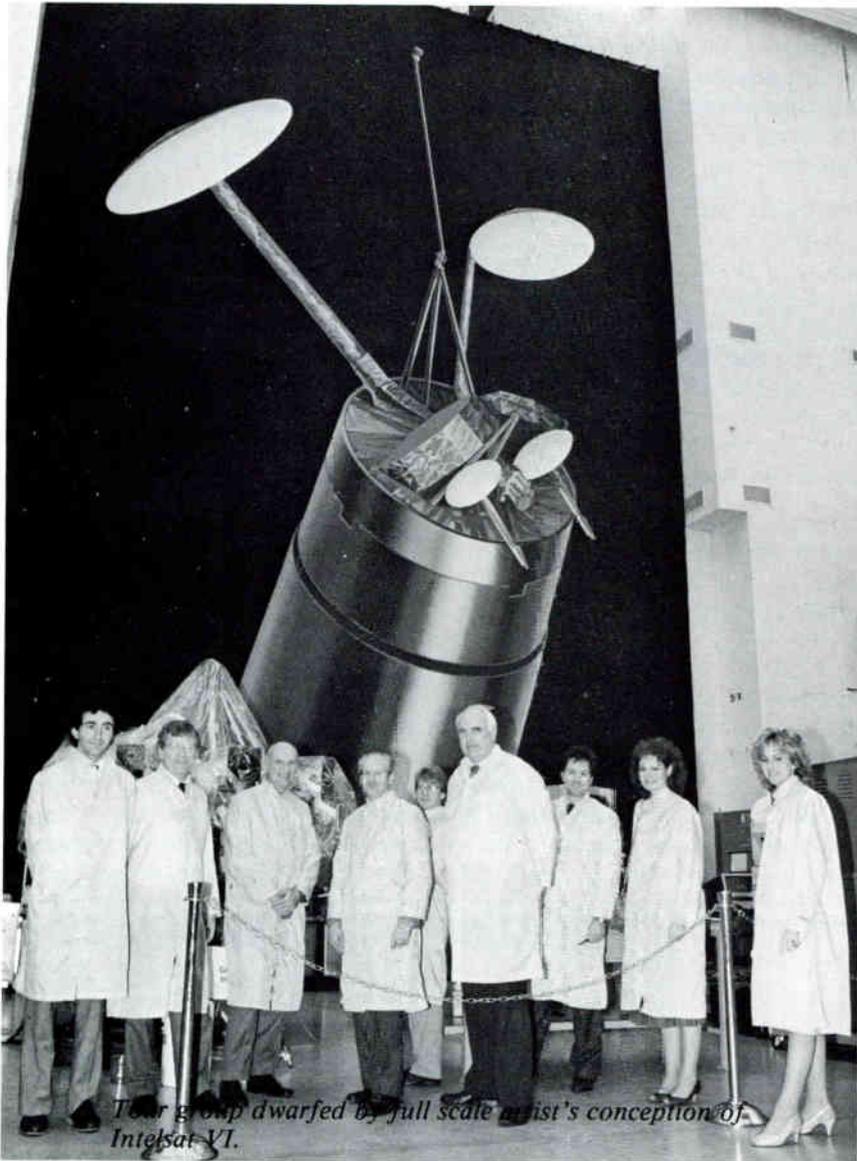
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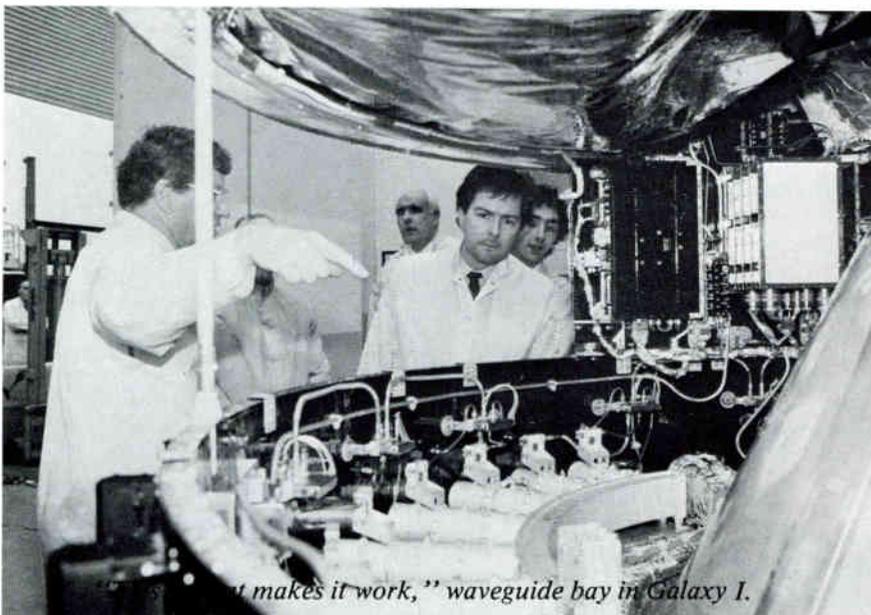
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*Four group dwarfed by full scale artist's conception of Intelsat VI.*

It will be dedicated to the distribution of cable television programming and will relay video signals in the continental United States, Alaska and Hawaii. Galaxy II, scheduled for launch later this year, will relay video, voice, data and facsimile communications in the continental United States. Alaska and Hawaii cannot be seen from the 74° slot.

Each Galaxy satellite has 24 transponders. Instead of conventional leasing arrangements, cable programmers will purchase the transponders on Galaxy I for the life of the satellite. Hughes will then have a maintenance contract to keep everything operational. Hughes plans to reserve six transponders for preemptible programming. They are to be used in the event of a complete failure of a transponder. Presumably in the event of a failure, the last on will be the first off, but that spot will probably be a lot cheaper. They would not elaborate on this as these were contractual obligations between Hughes and the users. Reliability analyses for the transponder payloads show a 50% probability that 24 transponders will be operational at the end of the nine year satellite mission life. There is a 90% probability that 22 or more transponders will be operational at the end of mission life. ▶



*"It makes it work," waveguide bay in Galaxy I.*



*Satellite control console for Galaxy and LEASAT Satellites. All control functions are performed here.*

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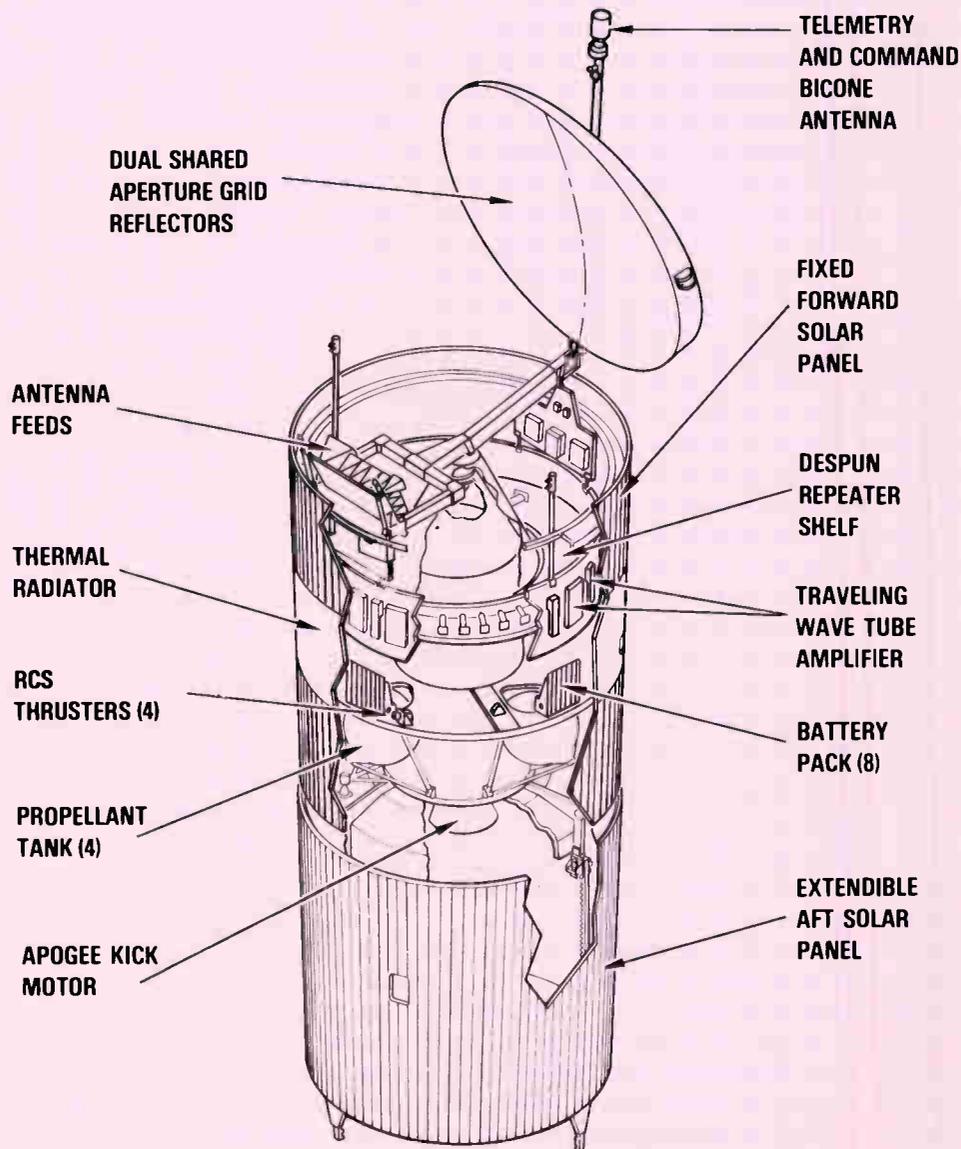


two by SIN Television Network; six by Times Inc.; two by Times Mirror Satellite programming; two by Turner Broadcasting System; two by Viacom International; four by Westinghouse Broadcasting Company, Inc.; and one by C-SPAN.

Each Galaxy satellite has two concentric telescoping cylindrical solar panels and a folding antenna which conserves valuable space on the launch vehicle. It has a diameter of 85 inches and is only 109 inches high when stowed in the launch vehicle. In orbit, the aft solar panel deploys, and the antenna reflector erects for a total height of 269 inches, or the equivalent of a two story building. The solar array of K7 cells, which generate 19.7 milliwatts per square centimeter, produces 990 watts of DC power at the beginning of life. This will decrease slightly as they age and are bombarded by solar radiation. Eight nickel cadmium batteries furnish power during solar eclipses which occur in the spring and fall. With a full load of 300 pounds of stationkeeping fuel, Galaxy weighs 1,141 pounds at beginning of life.

Based on technology pioneered by Hughes engineers, Galaxy satellites are spin stabilized. Initially the complete satellite spins like a top, but when it is placed in its final location, the communication shelf and the antenna are despun. A drive motor turns the despun portion at just the right speed so that the signals are always beamed to the proper location on earth. Earth and sun sensors are used for precise direction control. The solar panels, the batteries, fuel tanks, thrusters and frame all spin at 50 RPM. The bearing used between the spun and despun portion of the satellite is a very crucial item. You must realize that it must be lubricated to last ten years in a vacuum and maintain very low friction.

Thermal control is extremely important. In the vacuum of space there is no air to carry heat around. Everything is insulated or made of heat radiating material. The complete satellite is maintained at approximately room temperature. The main heat generators are the traveling wave tubes so there is a thermal ▶



**LOCATION OF HUGHES GALAXY I UNITS**

radiator around them. (see diagram.)

The despun repeater shelf contains all the necessary equipment for all 24 transponders. The 6GHz up-link signals are received, mixed with a local oscillator and down converted to 4 GHz. Each channel is amplified by its own Traveling Wave Tube Amplifier. These are arranged in six blocks of four amplifiers each. Each block has a

spare TWTA so that if any one of the four fails, the spare may be switched in to replace it. If a second TWTA fails in the same block, we lose a transponders. It takes about four minutes after a tube fails to switch in the spare. Each TWTA is coupled into a waveguide which in turn leads to a shaped feed horn that is aimed at the reflector antenna. The reflector is actually two separate reflectors, one behind the

other. Each is made from a series of very fine parallel wires embedded in plastic. One is oriented to reflect the vertical polarization and the other to reflect the horizontal polarization.

It was pointed out that for all this to work flawlessly for up to ten years, it takes an extreme amount of care during construction. Each and every component has to be documented from the start of fabrication

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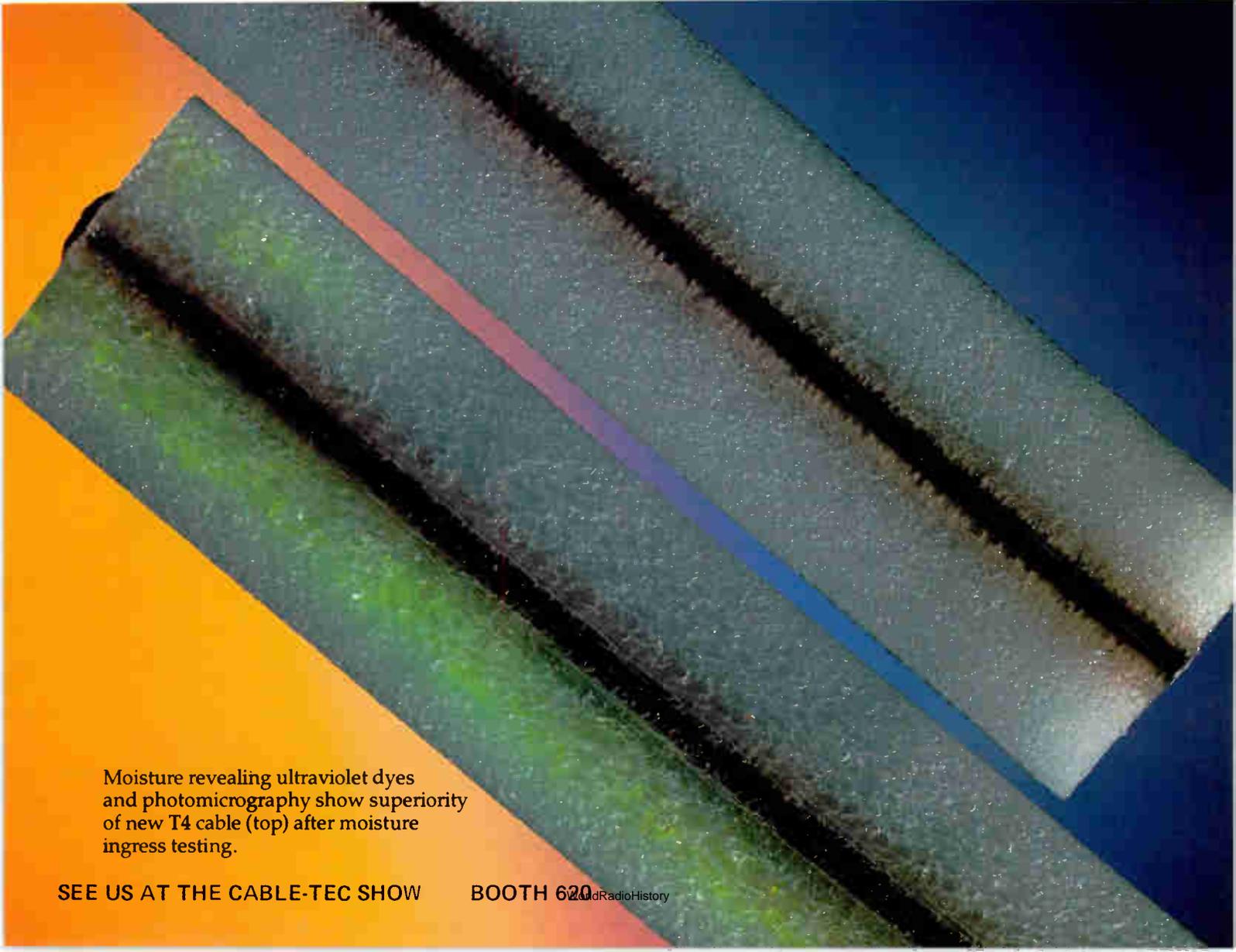
This precisely controlled conductor interface layer provides an effective moisture shield without sacrificing handling ease. T4 strips quickly and conveniently for reliable, scrape-free connections.

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to its installaion in the final assembly. If any single piece in a batch of parts fails for any reason, all construction on all similar satellites is stopped until the exact reason for failure is determined. If it is a random failure, the part is replaced and all construction resumes. If it is a generic failure, all the same parts must be changed in all the satellites. Testing is continuous. Everytime an operation is performed, the complete unit is retested. Each satellite has its own computer test set that stays with it all the way. This is on pallets and is moved through the assembly and test areas. It is even shipped to the launch site for the final test. They do not even take chances with computer differences creating a problem.

The completed satellite is tested in several ways. In one, a vacuum chamber containing a heat panel to simulate the sun is used. The satellite is spun at its normal speed in a near vacuum for about two weeks. After this everything is retested. **If anything has changed, they find out why.** Another test is the shaking platform. The satellite is placed on this and shaken to simulate launch on the rocket. It is then retested. They say, "This is how you gain confidence in the bird." It is not shipped out for launch until they are confident that it will last for its planned life.

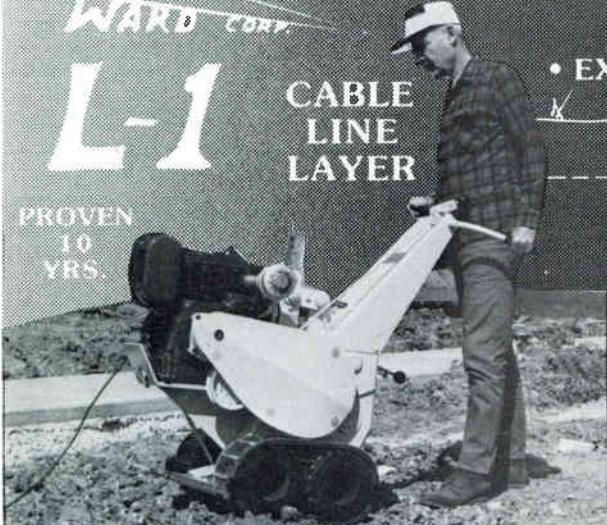
Getting a satellite from the ground to its final location in orbit is a complicated process. First the launch vehicle rockets are fired, gaining enough speed to achieve a height of somewhat over 100 miles. If nothing were done to change the speed at this point, the whole thing would just fall back to earth so the second stage rocket is fired to add enough speed to make the satellite stay in an orbit about 120 miles high. At this point the launch facility turns over the operation to the Operation Control Center. After all the parameters of the orbit are determined, preparation is made to inject the payload into the higher orbit. At the proper time a rocket is fired to add enough speed to make the satellite rise to the 22,000 mile high orbit. Again, if nothing is done, it will fall back to the lower orbit and will continue in this highly elipitical path. Sometimes a satellite is allowed to stay in this orbit for several rotations. When it is near the proper location at the top (apogee) of this orbit, the apogee kick motor is fired to add just enough speed to make the satellite remain at this height. It is then allowed to drift to its proper location where it is set up and stationkeeping begins. I have made this sound simple, but the rocket firings must be very precise and exactly timed. There are also some direction changes made to bring the final orbit into the plane of the equator.

We say that the satellite is stationary, but in truth it is allowed to drift around in a cube of space about 40 miles to the side. The Earth's gravity is not uniform and in the case of Galaxy I, makes it drift to the east. The gravity of the sun and the moon effect the orbit as does the pressure from solar radiation.

By using tone coding on their control signals, the operators at the control center can tell the location of the satellite to within a few meters. When it gets near one of the boundaries, the thrusters are fired, sending it back toward the center of the cube, hopefully with just enough push to make it go near the other side before it begins to drift back again. By doing everything right, that 300 pounds of stationkeeping fuel will last for ten years.

Getting and keeping Galaxy in proper orbit is a very wasteful proposition. At launch lift off, the total weight is 427,000 pounds. At the start of its life with a full load of stationkeeping fuel Galaxy weighs 1,141 pounds. Of this, 400 pounds is the communications shelf and antenna. In other words, it takes approximately a thousand pounds of fuel and hardware to get and keep one pound of useful satellite in orbit for ten years.

Seeing all this technology and labor makes one appreciate the cost of a transponder on a satellite. □



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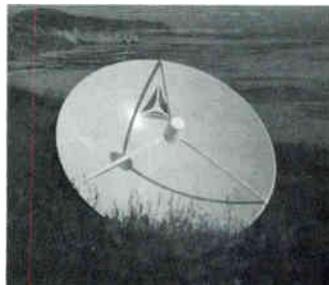


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## THE FILTERED EARTH STATION # 12

Terrestrial Interference Avoidance -

# A Comprehensive Approach

By Glyn Bostick  
Microwave Filter Co.

This time:

### The Calculated Survey

#### Last Time (CATJ, April, 1983)

We looked at TVRO system components to identify features which are TI-related. We discussed criteria for making a choice from among basic filter types (not brands) of equipment. We also suggested some ways of tightening up cases and interconnections to protect against non-antenna ingress of interference signals.

#### This Time

It was intended to discuss the various methods of pre-installation site surveying to detect TI. There are at least four of them:

- (1) The purchased professional survey
- (2) The do-it-yourself field survey with home-made equipment
- (3) The "demo-survey" using a temporary installation
- (4) The Calculated field strength survey

Reviewing my draft, describing these four methods, it is clear that just too much space would be required. Therefore, to insure thorough treatment of this important subject, we're going to break it up. This time we'll discuss (4), the calculated survey: it will be helpful in understanding the other three methods.

#### Why Do It?

The pre-installation TI field strength survey and analysis of its results, is your "last clear chance" to avoid adverse economics. If you

do not make some attempt to identify TI and predict the extent of its reception degradation, you run a 20 percent chance of buying "band-aids" at turn-on: reinstallation labor, site alterations, filters, etc. Almost invariable, the cost of these band-aids will be greater if there were no comprehensive survey-analysis to give you foresight and options: in a recent informal survey of TVRO installers, their aggregated replies indicated that one out of five of their installations experience an objectional level of TI at turn-on.

#### Relative Merit of the Four Methods

The four methods listed above are ranked in order of their relative effectiveness:

- (1) The purchase survey is conducted by a professional team who do it for a living. Their field work is guided by an extensive computerized data base: location and parameters of most potential TI sources. They are unlikely to miss any potential TI source. Their work, plus your analysis of their report, allows a close prediction of the type and extent of reception degradation you are likely to see at turn-on.
- (2) The do-it-yourself field survey runs a very close second to the purchased survey. Most large CATV systems may have the necessary equipment on hand

already. For those not fully equipped, lower cost home-made substitutes can be effective. But the total cost is likely to approach the cost of a purchased survey, considering equipment cost. For the TVRO turnkey contractor, the equipment cost can be amortized over a number of installations.

- (3) The "demo-survey", can be just as effective as (1) and (2), but the work involved, if done thoroughly, can be more extensive than the do-it-yourself survey. The "demo-survey" usually involves cooperation of the TVRO distributor. As such, it is sales oriented and hence, subject to abbreviation and rationalization.
- (4) The Calculated survey, though theoretically correct, is based on "free space" transmission, ignores the effect of intervening terrain and structures and hence, the results can differ from "nature" by large margins.

#### The Calculated Survey Explained

This method calculates the TI level arriving at the site, given the following parameters of the interfering transmitter: Antenna height, gain,

Williamsport, PA  
300 miles

Port Huron, MI  
500 miles

Norristown, PA  
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Southern New Jersey  
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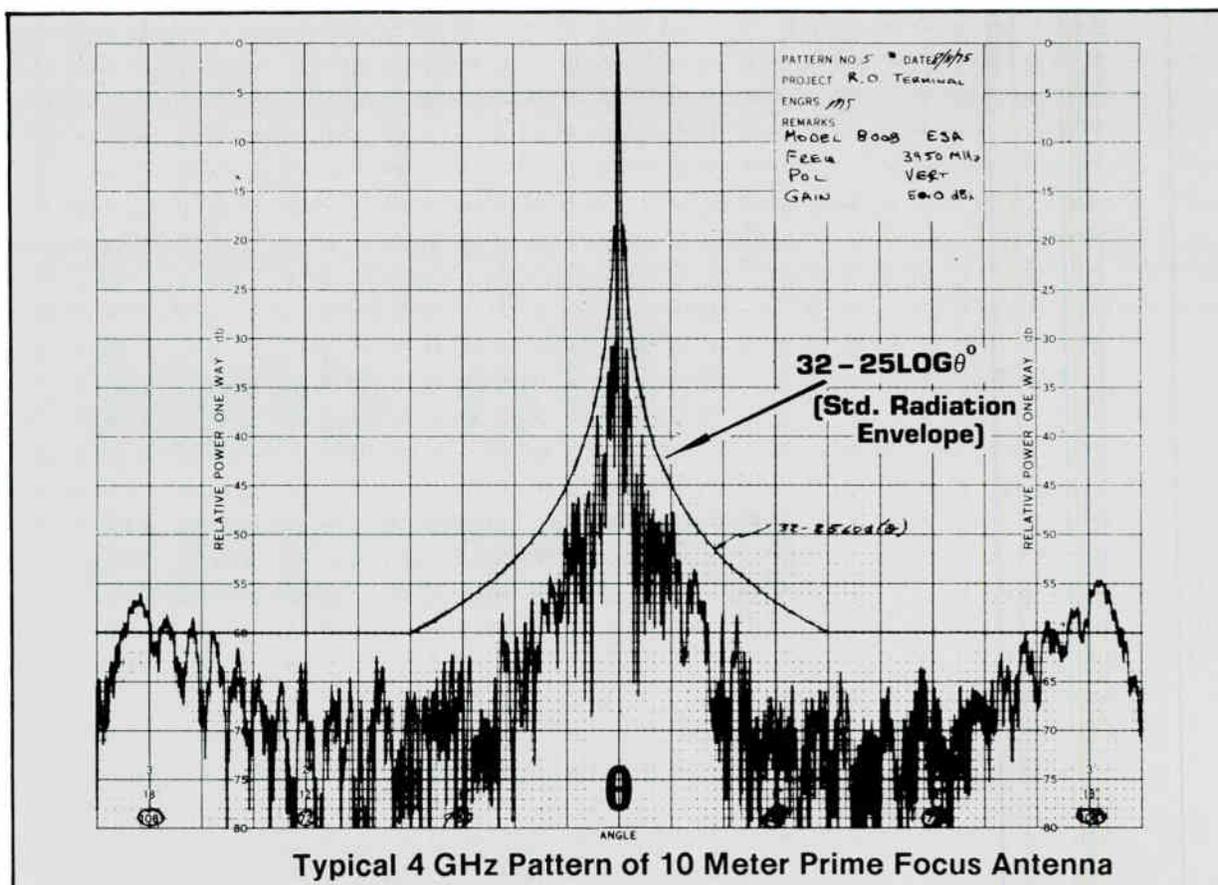
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Typical 4 GHz Pattern of 10 Meter Prime Focus Antenna

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total radiated power, distance to the TVRO site and the azimuth difference between beam pointing and the TVRO site.

It then makes a correction in TI strength based on specific TVRO pointing (azimuth and elevation) and arrives at a **relative** TI received level: the db difference between the TI signal and the satellite signal, as presented to the downconverter.

It is this **difference**, not the **absolute** TI signal strength, that creates picture degradation on the TVRO.

This is a "free space" calculation: as if the TI source and the TVRO were isolated free of the earth, its terrain and intervening structures. While it gives approximate results only, these are likely to be "in the neighborhood", and even pessimistic: the antenna radiation envelopes chosen **over-estimate** the radiation intensity from the TI source as well as the off-angle receptivity of the

TVRO.

The best use of the method is to detect catastrophically strong TI to justify resurvey by more precise means. The calculations themselves are quite simple, but obtaining the parameters of the TI sources will take some legwork.

Some of the professional frequency coordinating companies<sup>(1)</sup> have programmed very similar methods and have "chained" these programs to extensive data bases of microwave tower location, pointing and other parameters. Hence, they are able to provide reports giving bearing and signal strength of all potential sources within a prescribed radius of a proposed TVRO site. These "arm chair" surveys are usually available overnight.

**The Standard Antenna Radiation Envelope (ARE)**

For regulated earth stations, the FCC imposes a radiation envelope on acceptable antenna performance:

Off Angle  $\theta$   
Relative to  
Maximum  
Radiation

between  $1^\circ$  and  $48^\circ$   
greater than  $48^\circ$

Maximum/Field Strength  
Relative to Isotropic  
Radiator

$(32 - 25\text{LOG}\theta)$  dbi  
- 10 dbi

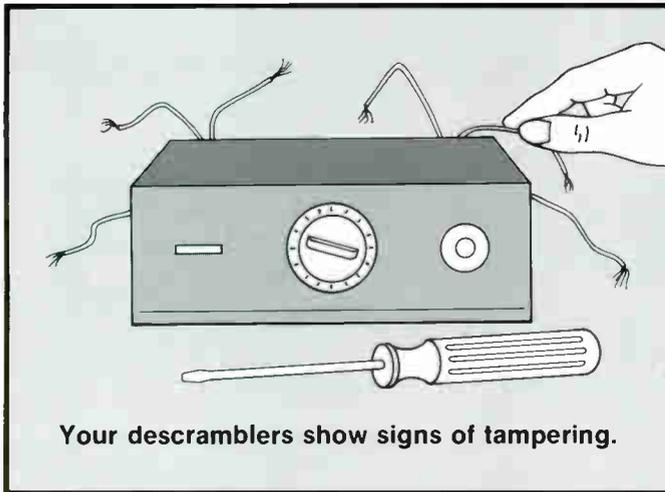
This calculation method adopts this standard even though it is pessimistic, as shown by the illustration. We use this equation to formulate two corrections for use in the calculation method:

**Correction I:** the reduction, from maximum interfering antenna radiation, at an off angle  $\theta$ :

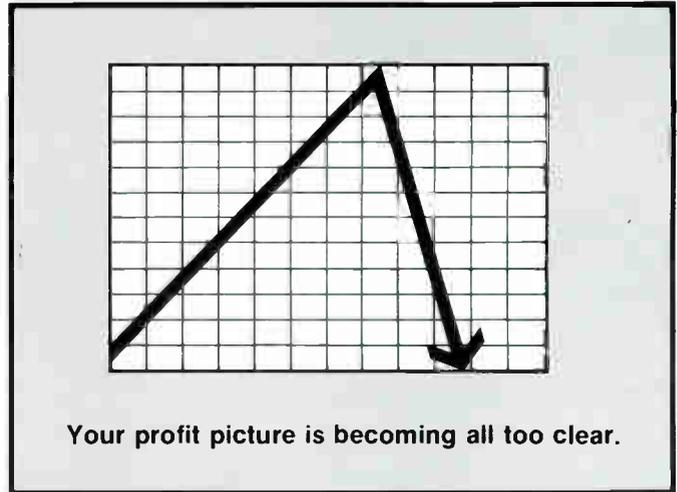
$$= (32 - 25\text{LOG}\theta - \text{GIdbi}) \text{ db}$$

Where GIdbi is the gain of the

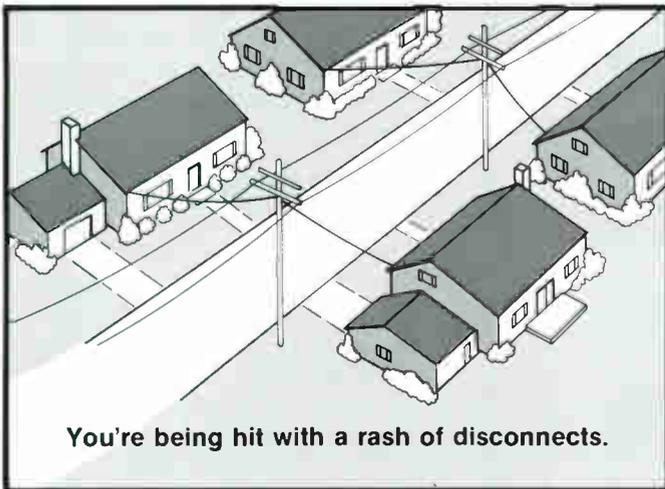
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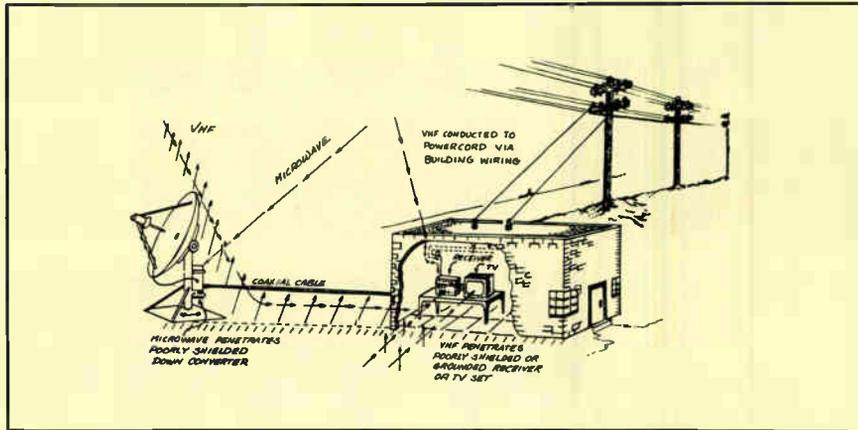
interfering antenna in db above an isotropic antenna and  $\theta'_t$  is the effective relative bearing to the TVRO site from the interfering beam axis.

**Correction T:** the reduction, from maximum receptivity, at an off angle  $\theta$ , for the TVRO antenna:  
 $= (32 - 25\text{LOG}\theta'_t - \text{GT dbi db})$

Where  $\text{GT}_{\text{dbi}}$  is the gain of the TVRO antenna is db above an isotropic antenna, and  $\theta'_i$ , is the effective bearing to the interference, relative to the TVRO beam axis.

### The TI Reference Level (TIRdb)

The TIRdb is the maximum possible relative TI and is obtained by making the beam axis of the two antennas point **directly** at one another:  
 $\text{TIRDB} = \text{EIRP(i)db} - \text{EIRP(s)db} + 20\text{LOG}(R_s/R_i) \text{ db}$   
 where: EIRP(i)db is the interference antenna's Effective Isotropic Radiated Power (in db



relative to 1 watt). This is the gain of the interfering antenna (in dbi, or db above an isotropic antenna) **plus** the total radiated power (in db above 1 watt). Since these values are typically 40 dbi and 7 db, respectively, the typical value of  $\text{EIRP(i)db} = 40 + 7 = 47 \text{ db}$ .

EIRP(s)db is the satellite's Effective Isotropic Radiated Power. This is obtained from the satellite's "footprint" at

your location. The contours of this footprint are labelled in EIRP(s)db. A typical value is 33 db.

$R_s$  is the slant range to the satellite. You can calculate this or get it from available charts, but a representative value is  $39.5 \times 10^6$  meters.

$R_i$  is the distance from the proposed TVRO site to the interfering antenna. (1 mile = 1604 meters).

What we have done here is to move the satellite closer (from  $R_s$  to  $R_i$ ) and substituted the interfering power source for the satellite power source. The result is a **difference** in level: the **maximum** level the interference can have **relative** to the original satellite signal level.

### The Received Relative TI Level

(RRTIdb)

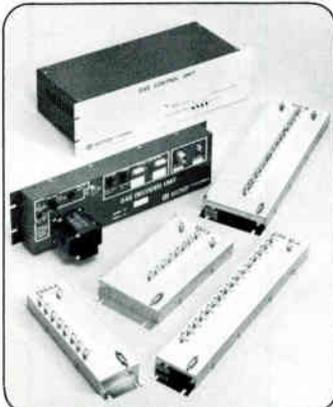
Starting with the **maximum** possible relative level (TIRdb) we will add Correction I (to put the interfering beam back where it belongs and reduce the signal incident on the site) and Correction T, (to reduce the receptivity level of the TVRO by putting its beam axis to the proper azimuth and elevation). Hence **expected received, relative TI level is:**

$$\text{RRTIdb} = \text{TIRdb} + \text{Correction I} + \text{Correction T}$$

### Example

Let's adopt the situation illustrated, including the example numbers

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$$\text{TIRdb} = 47 - 33 + 20\text{LOG}(39.5 \times 10^6/10^4) = + 85.93 \text{ db}$$

$$\text{Correction I (see illustration)} = - 22.48 \text{ db}$$

$$\text{Correction T (see illustration)} = - 42.46 \text{ db}$$

therefore:

$$\text{RRTIdb} = + 85.93 - 22.48 - 42.46 = + 20.99 \text{ db}$$

or, the downconverter will see TI 20.99 db above the strength of the satellite signal.

**Correction I:**

$$\text{Sin } \theta'_{t} = \sqrt{\text{Sin}^2\theta_{ei}\text{Cos}^2\theta_{t} + \text{Sin}^2\theta_{t}} = .0872$$

$$\therefore \theta'_{t} \approx 5^{\circ}$$

$$\text{Correction I} = [32 - 25\text{LOG}5^{\circ} - 40] = - 22.48 \text{ db}$$

**Correction T:**

$$\text{Sin } \theta'_{i} = \sqrt{\text{Sin}^2(\theta_{et} + \theta_{ei})\text{Cos}^2\theta_{i} + \text{Sin}^2\theta_{i}} = 0.522$$

$$\therefore \theta'_{i} = 31.5^{\circ}$$

$$\text{Correction T} = [32 - 25\text{LOG}31.5^{\circ} - 40] = - 42.46 \text{ db}$$

# DOES YOUR HEAD END GIVE YOU HEADACHES ?

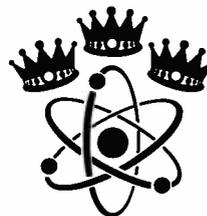
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**Other uses of the Method**

The method is useful for analyzing the report of the professional surveyor. These reports given both the expected satellite field strength (in db relative to watt/meter<sup>2</sup>) and the detected TI field strength at the site. One may convert these numbers to RRTIdb:

$$RRTIdb = (TI \text{ field strength, db w/m}) - (\text{Sat field strength, db w/m}) + \text{Correction T}$$

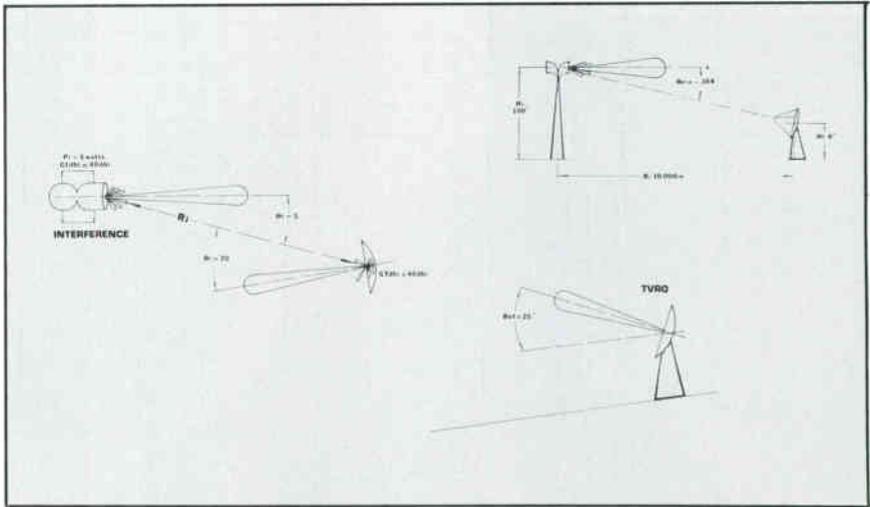
For example, suppose the surveyor's report shows these field strength levels at the proposed site:

Satellite field strength  
 - 118.00 db (W/M)  
 3750 MHz TI Field strength  
 - 85.00 db (W/M)

using the situation illustrated, the Correction T = 42.46 db so we would expect:

$$RRTIdb = - 85.00 (- 118.00) - 42.46 = - 9.46 \text{ db}$$

Or, at the downconverter, the 3750 MHz TI is 9.46 db below the satellite signal. If the TI is also vertically polarized, we know that Transponder #3 (vertically polarized at



3760) will be affected, probably with "light sparklies".

**Next Time**

We'll continue to examine the pre-installation survey. Specifically, we will examine both the purchased and the do-it-yourself field strength survey.

**Acknowledgements**

Many thanks to Chris Bostick for the sketch, to John Greatrex for the

interference illustration, to Bill Bostick for validation of the computational method and to Carol Ryan for typing and editing.

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# SATELLITE TV ANTENNAS: A New Working Environment

Regular readers will recall my problems resulting from the Sat-Finder collapse twelve months ago. All set with full "preference 3" U.S. immigration documents and no position to go to. No capital, and not enough consultancy work here in England to pay the mortgage. What I needed was someone prepared to invest in a forthcoming satellite TV boom here in the UK, or alternatively an American outfit prepared to do as SatFinder had done — to pay my way through the six-month waiting period for new visas.

The economic climate in the USA has changed since that optimistic summer of 1981. Two or three companies approached me, but 1) they would not match the freedom and the \$50k salary that were part of the SatFinder deal, and 2) they wanted me immediately, on an "H-1" visa. Now this is very different to the resident qualification I obtained in 1982. It operates as a 'work permit', renewable annually, and is tied to one job. It would mean that the US immigration authorities could, dependant on quotas and on their whim, refuse to renew the visa at

any time. While in the US I could not have worked for anyone else, and in order to apply at a future date for resident status I would have needed to return to England for the full waiting period. I was not ready to subject my family to that kind of upheaval.

Fortunately I didn't need to. British businessman Peter Gray, anxious to be a part of the coming European satellite TV wave, had attended the March 1982 TVRO show staged by STT at Fort Worth, Texas, to find out what was happening in the States. Being perhaps the only Englishman there, he found himself asked on several occasions whether he knew Steve Birkill. Very soon he did. He looked me up on his return to England, and we set about planning the direction of his new company, Satellite TV Antenna Systems Ltd.

Peter was exploring many avenues for finance. One of the most promising was what I have termed the "Welsh Connection". Having an existing factory in Wales, Peter was aware of the range of incentives offered to businesses setting up in the Principality. An offer of

the right sort of investment was eventually forthcoming from one of the Welsh institutions, Hafren, but was conditional on the company being based in Wales. With a plant in Wales and offices at Staines (near London), it was clear that I would need to relocate from my more northerly base at Sheffield, to a place somewhere between the existing premises.

As it happened, the financial backing took several months to materialize, by which time we were into 1983 and I had located a suitable spot here in Gloucestershire, on the edge of the Forest of Dean, with two acres of land secluded enough to house an "antenna farm". The house has a four-room annexe with immediate potential as the company R & D facility.

So in mid-February the terms of my contract were finally agreed, and the first weekend in March saw us moving into Stacknedge Lodge. Having engineered the habitability of the "family" part of the house, next priority was to organize the annexe. With the necessity of installing my 20-foot ADM antenna at the Welsh premises, and a visit to Las



Photo 1: The back lot at BBC Television Centre, Christmas 1982. Satellite

TV Antenna Systems' demo used 6, 3 and 1.8 meter antennas.

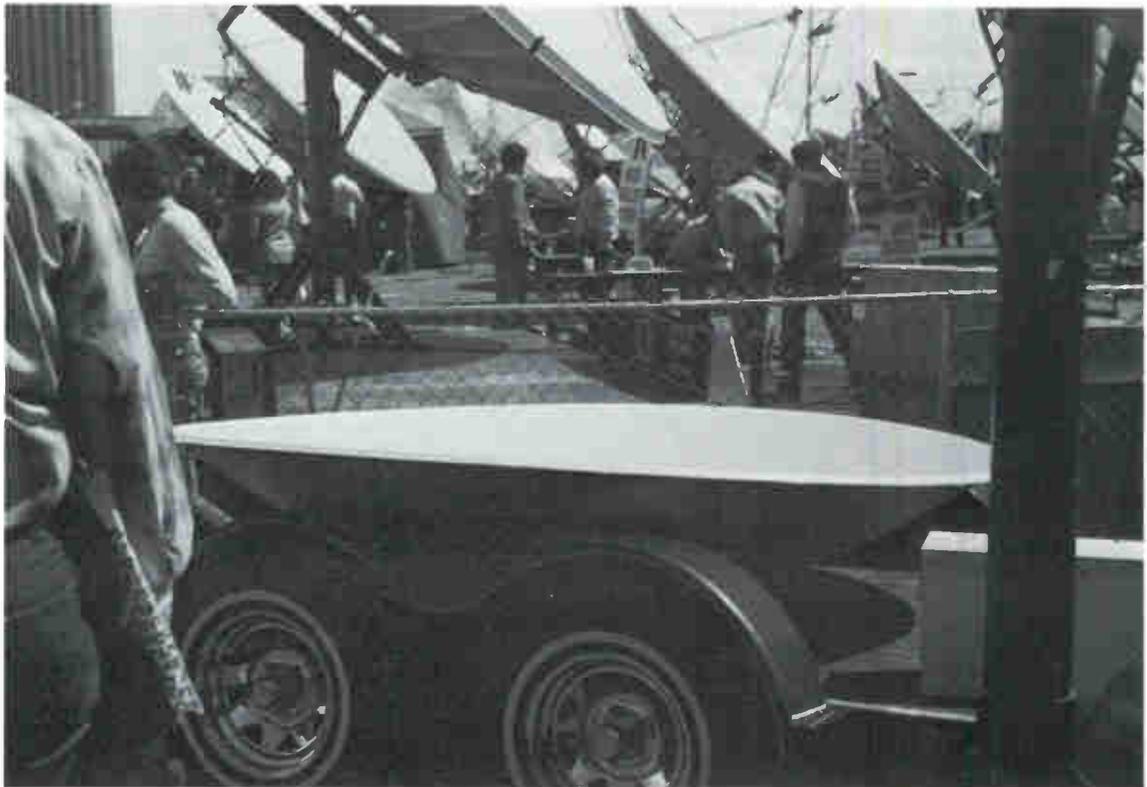


Photo 2: Some of the antennas seen at Las Vegas were better than others. This specimen might make a fair paddling pool.

Vegas for the March show, I find myself writing this with my technical library still packed in twenty-one tea-chests stacked all around the annexe. And that's my excuse for not getting too technical this month!

The coming months will see the company moving into production of a modular TVRO receiver, employing the block downconversion concept with a choice of 4 GHz, 11 GHz or 12 GHz head units, and IF/demodulator units configured for domestic or international series satellites. Consideration is being given to a version for the North American market, with 24-channel tuner and the usual 'Luxury' extras. A 12 GHz DBS receiver is also on the drawing board. Initially the European market will be for CATV grade receivers to operate with the ECS and Telecom satellites on 11 and 12 GHz. Ten transponders on the first ECS bird are being leased to European nations for program delivery to Cable outlets throughout western Europe. Sat TV Antennas

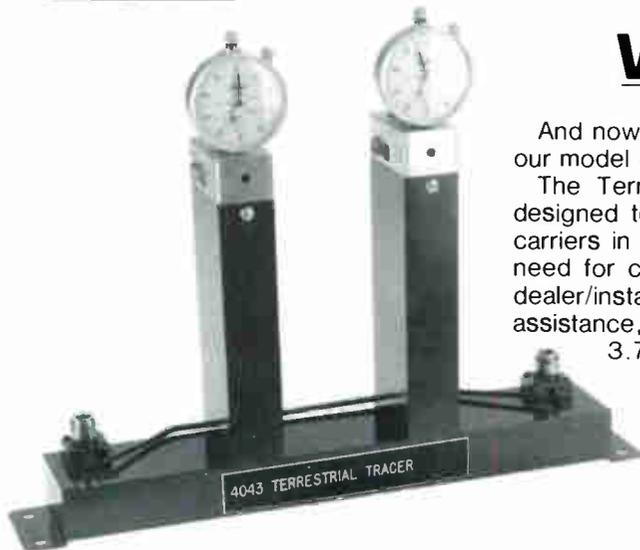
has its own 1.8 meter composite antenna line for these services, and larger antennas (2.4, 3.0, 3.7, 4.5 meters) can be supplied for installations requiring a greater margin above threshold. Otherwise the company has 4 GHz systems available, 1.2 to 3.0 meters for Gori-zont, and 6 and 7 meter systems for Intelsat reception, including the new AFRTS/CNN channel in the Atlantic region.

To illustrate the range of services, Fig. 1 is a block schematic representing the demonstration terminal assembled at the BBC Television Centre in London, for a live broadcast transmission two days before Christmas, 1982. The program looked at DBS technology, and the demonstration showed the programming presently available on satellites. Programs were received from 11 countries, including the British channel "Satellite" beamed via OTS to European CATV operators. A full report on this event appears in the May issue (number 8) of the British magazine "Satellite TV

News" (41/47 Derby Road, Heanor, DE7 7QH).

Before March 83 my only visit to any US convention or seminar had been to CATA's own CCOS-78 at Fountainhead Lodge in Oklahoma. In 1979 Bob Cooper began the independent series of Private Terminal Seminars, aimed at the then just emerging home terminal market. The shows, and Coop's publishing operation STT, were eventually taken over by Rick Schneringer of Arcadia, OK and operated on a thrice-yearly basis from various locations. The home terminal industry represented there is an odd mixture indeed, with the professional microwave houses wondering whether, with an increasing volume of their product passing through TVRO distributors, they should explore the market further. Some have already arranged package deals with distributors on an OEM basis, while themselves maintaining a low profile. The programming organizations refuse to recognize any market, even in uncabled rural areas, and press ahead

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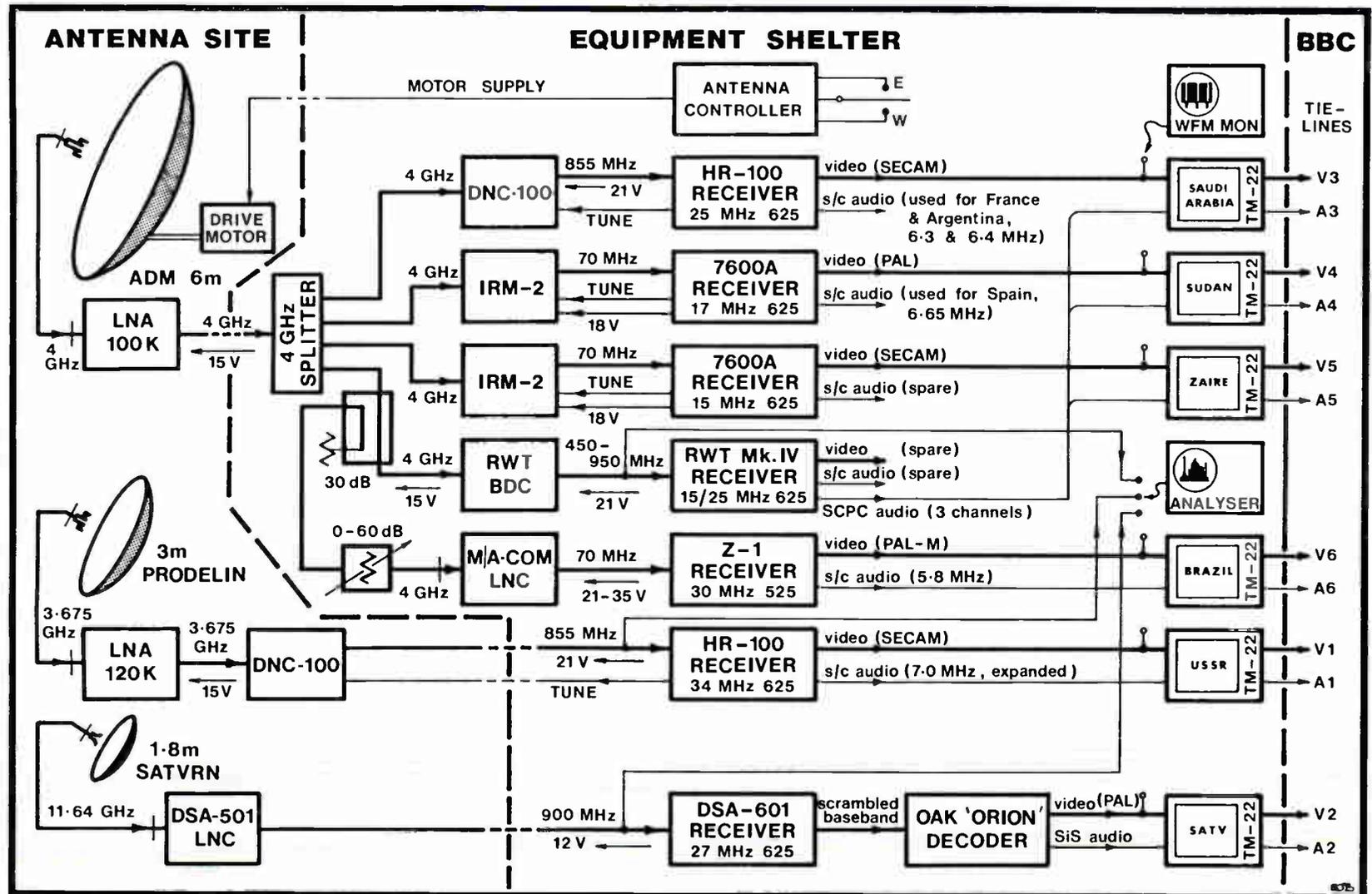
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with expensive scrambling plans to prevent unauthorized 'theft' of their services, while SPACE, the industry's own association, fights to establish legal access, stressing its members' willingness to pay for the premium satellite services. Nobody, it seems, loves home TVRO. Cable, the motion picture makers, even the new DBS operators, all see individual access to satellite services as a threat to their livelihood. But the shows, and the industry it seems, thrive.

My appearance at Las Vegas came as a surprise, it seems, to many. Not least myself — it was with only about a week to spare that Peter and I made the decision to visit the show. We needed to assess first hand the consumer-grade TVRO technology, and collect a few items we needed urgently. A week after moving in here I was aboard a train to London's Heathrow Airport. A 7 hour transatlantic flight, clear customs at New York (JFK), then a three hour wait for the flight to Vegas, arriving 10 pm local time, by which time I'd been awake 24 hours.

The show, it seems, was the biggest ever. Some 185 antennas, from 4 ft. to 20 ft., decorated the parking lot, while inside were around 250 booths plus the usual hospitality suites. The emphasis has shifted away from the do-it-yourself approach of the early shows (spherical antennas, receiver kits, technology seminars) towards a much more hard-headed business attitude, with the new generation of receivers adopting Japanese or Scandinavian styling with lots of consumer features, and the seminars addressing matters of concern to dealers and distributors. There were a few nice innovations but still rather too much garbage to be seen, especially in antennas. Again, the 'cut-throat' trend was in evidence, with certain suppliers aiming to set a new price floor by cutting quality (and profit margins) to an absolute minimum. With the introduction of less-than-ten-foot antennas, there was debate about the inevitable effects of a reduction to three or two degrees longitude in the orbital spacing of C-Band domestic satellites.

One clever fellow arrived with a four-foot dish and a standard low-cost receiver to which he'd fitted a small (about one by one-and-a-half inches) extra circuit board which performed a particular kind of IF processing. The effect of switching the board into circuit was to lower the receiver's demodulator threshold by about one and a half dB. From having noticeable impulse noise 'sparklies' the picture came clean. The guy was all set to sell the little boards at ten dollars each, but fortunately was strongly advised (just in time) by a person of considerable Industry wisdom, that here were a couple of hundred operators who would cheerfully make their own million out of the other guy's design.

With the same aim of threshold extension (in the general sense) there was no sign of the receivers a couple of firms had promised to incorporate video processing for sparkly rejection (similar to VTR dropout compensation). Both these techniques for improving marginal systems have but limited application to future US domsat operations, with the upcoming reduction in satellite spacing. If a minimum 3 meter antenna is required for adjacent satellite rejection, and the standard LNA is 120 going on 100 K, then (certainly on the newer, 'hotter' satellites) most of the USA is above threshold on a standard receiver. It is in 'off-boresight' (e.g. Central America) and international satellite reception that these techniques will come into their own. Perhaps the receiver designers should now be looking at capture ratios and immunity from co-channel interference, rather than threshold performance.

Very popular were the booths of Avantek and California Amplifier, where Hewlett-Packard automatic noise figure measurements was available for 4 GHz LNAs. Within the measurement tolerances, many people went away sadder but wiser.

A noticeable trend among the more senior distributors (Patmar, Satellite America) was to turn towards more 'respectable' TVRO outlets: hotel chains, private net-

works, apartments and condominiums, SMATV systems in general. This may be in part a response to the movie makers' lobby for scrambling, and the anticipated public reaction to scrambling's advance publicity, plus the promotion of DBS. The home TVRO industry is divided in its response to the threat. Some believe growth will continue with hardly a hiccup, or point blank refuse to believe HBO will ever make scrambling work. Others are making contingency plans.

I've always been impressed by American hospitality, but I was quite unprepared for the welcome awaiting me at the Las Vegas show. It seemed everyone there had heard of me or knew of my work. I could not make my way from one exhibit or suite to another without being stopped in the aisle, corridor or elevator by someone wanting to shake my hand. And a great many were CATJ readers who had been following this column for years. It is through CATJ that I was around at the start of the home TVRO boom, and these people seemed to appreciate that. To those readers I met and who helped to make the trip a real treat, thanks.

The itinerary was tight. On the second day of the show we had to finalize our plans for the rest of the trip. We had provisionally arranged a meeting in Washington DC on the Friday. That would have required us to make two night flights with no rest in between. A phone call from Las Vegas enabled us to postpone the Washington meeting and instead visit Harris in Melbourne, FL. That had the advantage of giving us a night's rest in Atlanta, GA on the Thursday, but we had to leave Vegas at midday Wednesday.

Harris are the people who make the "Delta-Gain" 3-meter antenna. We wanted to look at their new 6-meter Delta-Gain model, as well as the standard 6-meter Cassegrain. We were fortunate in finding the 6-meter antenna in use on the day of our visit, establishing a Ku-Band circuit via an SBS satellite. In addition to a quite phenomenal surface accuracy (for a panelled dish) the Delta-Gain employs dual-shaped

reflector technology. In the March issue I described the standard modified Cassegrain, in which the subreflector is shaped to control the main reflector's illumination profile, while the main reflector is shaped to restore a plane (in-phase) wavefront at the aperture. Well, the Delta-Gain is different. The precise details Harris are keeping to themselves, but it seems they are exploiting a near-field effect between feed horn and subreflector which maintains a low feed VSWR, while generating an annular (ring-shaped) focal region. The extra deep ( $f/D = 0.25$ ) main reflector is designed to match this annular focus. The focal

region is in fact between feed and subreflector, so the system resembles the Gregorian, but instead of a single ellipsoidal contour to the subreflector the Harris design has a toroidal concavity, to generate its ring focus. The 'cusp' remaining in the center of the toroid, pointing towards the feed, reminds me of the 'pimple' incorporated in many of the new 'splash plate' home TVRO antennas to improve VSWR. There may even be an attempt or two to copy the Harris, though this would seem pointless with a standard paraboloid dish. Independent reports on the Harris seem to verify its performance, with a distinct im-

provement in G/T over a standard prime focus antenna, bearing out the claimed aperture efficiency of 78% and a low value of antenna noise temperature.

From Melbourne we returned to London via Atlanta on the Friday night (no, we didn't get the chance to visit Cape Canaveral) and I was back here with my family Saturday afternoon. This was the first US trip since 1978 that my wife hasn't accompanied me on. Maybe next time, Carole.

So now it's down to making Satellite TV Antenna Systems work. I'll do a technical article next time . . . promise! □

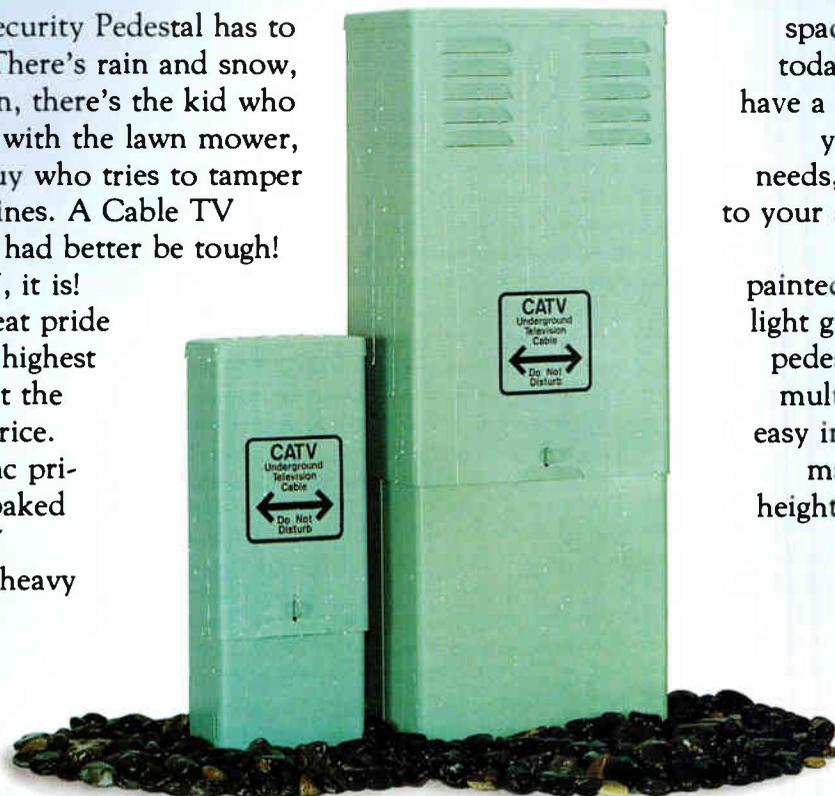
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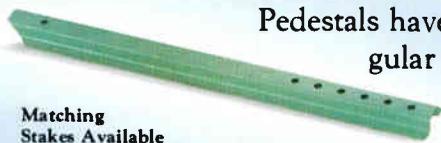
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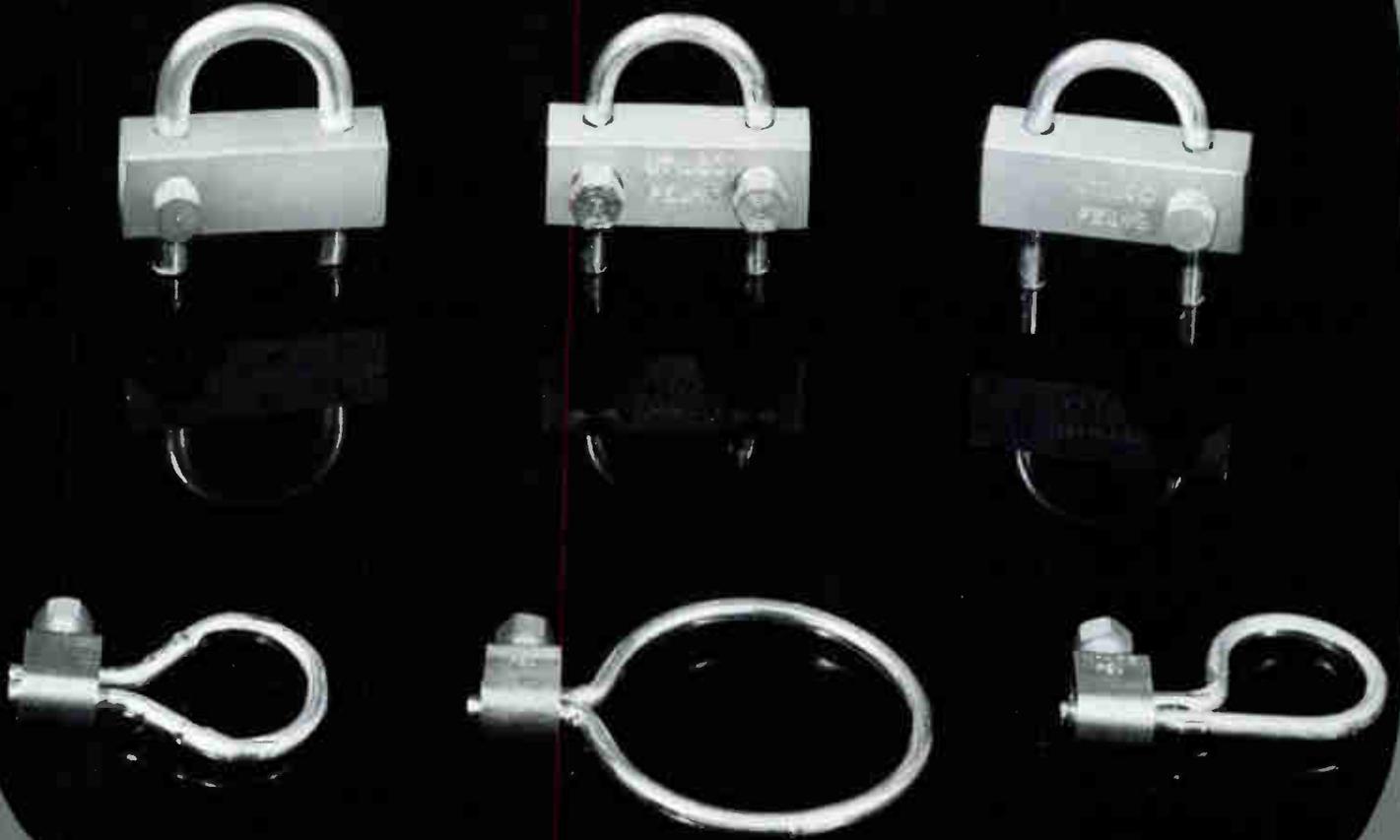
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Phone (416) 274-2341.

# UTILCO

With this month's issue, registration opens for CCOS '83 for the attendees and their families. You will find the appropriate forms within this article; a separate brochure mailing has been made as well, but we wanted to make sure that all the CATJ readers had the opportunity to register for another great CCOS.

When the CATA Board considered this area, they were pleased with the wonderful facilities that were offered, as well as the tourist attractions to entice and interest the families. While the CATA CCOS planning committee has had many offers from the metropolitan areas which cater to large conventions, the directive from the CCOS attendees' survey indicated that the resort, family-oriented setting was what was desired. This concept is what has made CCOS the success that it has been, because the attendees and their families have many wonderful experiences from these trips. We think you will be pleased with the Hot Springs area — we definitely were as we made the initial inspection of the facilities and area. Will it be too hot? Maybe — but we were there in August, and we can attest to the wonderful working condition of the cooling systems throughout the hotel and surrounding restaurants, museums, etc. And won't it be hot most everywhere? Just about — except for Colorado — many CATA members have mentioned how much they loved the Snowmass area, and we are looking at going back there soon. (They are in the process of building a pavilion which would better accommodate our exhibits and be less restrictive as

far as size as the tent was previously — so you have a return visit to Snowmass to look forward to in the future!).

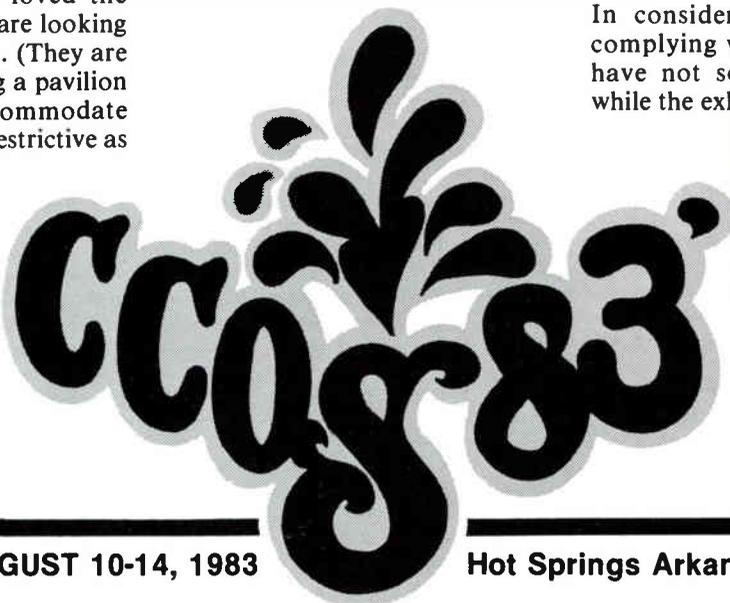
The important thing is that once again the sessions will be planned for the attendees to train and educate on basics as well as new technology, and to participate on a well-represented exhibit floor with the various vendors and suppliers of services and products. Many of the companies have been in touch to make plans for really nice hospitality functions for the whole group, as well as special things for the ladies and young people accompanying the attendees to the seminar. So, again, the plans are being formulated to provide a very meaningful schedule of worthwhile technical and management sessions and entertainment functions for the entire group.

In developing the sessions, suggestions were considered from the survey taken at CCOS '82 and from discussions and suggestions directed towards the Engineering Committee, chaired by Wayne Sheldon, working in cooperation with Ralph Haimowitz, CATA's Director of Engineering. From Ralph's teaching sessions conducted all over the United States, he has a good feel for what information and instruction is needed by the cable operators and their technical staff. The Technical schedule of sessions will include a

laboratory situation, whose resurrection from past CCOS meeting to CCOS 82 proved to be a very popular and well-attended session, and will deal with **BENCH SWEEPING**. Plans for small systems' approach to "how-to" techniques, as well as other "how-to" instructions for basics — test equipment — dealing with common cable problems — converters — fiber optics — are all part of the technical schedule of sessions.

Management sessions will be loaded with information — from tiering and packaging, scrambling satellite signals, office management and front office sales to the wide-open session called **OPEN FORUM**. From what the attendees and participants of the **OPEN FORUM** have reported from past sessions, this is truly a session where you can get down to the "nitty-gritty" — perhaps better called a "bull" session, but we've heard many former CCOS attendees remark that they learn a lot just from having the opportunity to sit down and talk to other cable operators. Some have common problems in running their systems — with equipment — with basic electronics — and this comradarie pays off as they exchange their views and ideas.

As this is the one opportunity for most of the cable operators attending to "shop" the vendors, the Exhibit Floor constitutes a very important segment of the schedule. In considering the vendors and complying with their requests, we have not scheduled any sessions while the exhibit floor is open — we



AUGUST 10-14, 1983

Hot Springs Arkansas

also like to have the vendors attend some of the sessions, and many participate in the instructional aspect as well. The vendors have many shows to attend, so the schedule has been planned to afford them every opportunity to visit with the cable operators and have ample time to display their wares. For this reason, while registration is opening on **Wednesday, August 10th**, and attendees are checking into the hotel, the exhibit floor will be open that afternoon and into the evening, before the sessions get underway the next morning. Noon-time and evening exhibit hours will be held then on **Thursday and Friday, August 11th and 12th**, while the sessions will continue **all day on Saturday** with a party that night and check-out on Sunday, August 14th, allowing ample time for the return trip.

As has taken place in the past, while the men are busy with the ses-

sions, there will be functions planned to entertain the young people and spouses, with many side-trips out of the hotel planned, as well as some functions held within the hotel for the ladies.

All in all, the schedule is filled with another CCOS program designed to offer something for everyone. It is the annual conclave of cable operators and their families and a time to renew the friendships that have been established at CCOS through the years. The CATA Committee is anticipating another memorable seminar and we urge you to register today at the reduced registration rates and to assure your place at the Arlington at the special convention rate. As part of your registration confirmation, we will send the appropriate paperwork for the hotel.

Also within this article is information concerning the hotel, which we

know will be of interest to the ladies. Many times, the ladies tell us they don't have the information about what's going on in regard to the planning; please gentlemen, take the magazine home so that the women can see what the schedule and plans for CCOS '83 are.

We look forward to hearing from you soon and hope that your schedules will allow the trip. Remember, this is a learning experience for the cable operators and their managers and techs, but also that the program is intertwined with social events that combine to make CCOS the great event that it is.

Don't put it off — register today!! As our brochure says, "Experience Hot Springs . . . It's A SUPER Natural!!" ▶



*Top Left: Magic Springs Amusement Park*

*Top Right: The Josephine Tussaud Wax Museum*

*Left: Hot Springs Promenade*

*Photos courtesy of the Arkansas Department of Parks and Tourism*



Photos courtesy of the Arkansas Department of Parks and Tourism

## ABOUT THE ARLINGTON

*Bath House Row*

The gracious Arlington Hotel is nestled in downtown Hot Springs, surrounded by the National Park of Hot Springs, directly across from the hotel. The hotel, enjoying its legendary history of pampering its guests, has been completely redecorated and renovated, complete with a new cable system installation and contains 500 rooms, with suites of various sizes available as well. Children under 18 years are free with roll-aways available.

All the sessions will be held in the ample meeting rooms scattered throughout the hotel, with the exhibit floor conveniently held in the convention center located on the mezzanine.

The Arlington prides itself on the variety of eating facilities — from the lovely gourmet Fountain Room, offering superb dining experiences of continental cuisine, to the Venetian Room, which serves everything from a casual breakfast to sumptuous dinners, to the rustic Tack Room Coffee Shop for informal and casual meals. Presented during the course of a week is a variety of specialty buffets — Italian Feast, Seafood Buffet, International Buffet to their famous Sunday Brunch.

For alternate eating, directly across and down the street from the hotel are located other restaurants, and short driving distances to the outskirts of the city take you to some of the finest restaurants in Arkansas. (The quail at Mrs. Miller's is a delightful and unusual entree!).

The famous Arlington bathhouse can be reached directly by special elevator from every floor, and a trip to Hot Springs would not be complete without at least one visit for a thermal bath. There are special health and

fitness programs presented continually at the hotel, with a fully-equipped exercise room for your use.

For extra-special treatment, there is an upper floor of the hotel called the **Arlington Club** where those who wish a lot more in personalized treatment and amenities can request their accommodations; however, convention rates on that floor do not apply. Trained hostesses are on duty to assist these guests with their complimentary continental breakfasts, and afternoon wine and cheese receptions; they can enjoy the privacy of their private lounge and rely on the hostesses for assistance to make their stay the most enjoyable and convenient.

For making your travel arrangements, flight service connects into Little Rock with shuttle service available to Hot Springs. It is a one hour trip, scheduled several times during the day. Cost is \$12. For shuttle reservations call 1-800-643-1505. Direct flights via Skyways Airlines from DFW and Memphis to the Hot Springs airport are also available, and this service is reported to be very satisfactory.

Hot Springs is served by the following interstates: 30, 40, and 55 and U.S. Highway 65.

As the registrations are confirmed, material concerning the tourist attractions of the area will be provided, along with the hotel request information. The social events planned will include many of the points of interest in and around the city, so you can be assured of a delightful experience in Hot Springs with CATA's CCOS program. Our CCOS experiences have included some of the finest hospitality available, and Arkansas will again provide the scenario for its CCOS guests as they travel to Hot Springs. You won't be disappointed.

**Three FULL Days of**  
 Technical and Management Sessions

- Thursday, August 11
- Friday, August 12
- Saturday, August 13



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- Outdoor Theatre
- Museums
- Special Demonstrations
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- Amusement Park
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- Hands-On Science Museum
- Supervised and planned outings

**Management Sessions**

on

- Scrambling Satellite Signals
- Tiering and Packaging Cable Services
- How About Adult Entertainment?
- Office Management Training Customer Representatives
- Front Office Sales Improving your Cable System Image through Your Office and Customer Reps
- Washington Update Open Forum

**Technical Sessions**

on

- New Technology of Fiber Optics
- Bench Sweeping Labs
- Common Cable System Problems
- Small System "How-to" techniques How to Adapt Inexpensive Antennas to make them perform for cable systems
- Update on the State of the Industry
- What Type Test Equipment and When Do You Need It?
- Back to Basics and How To Techniques
- Converters



**Don't Delay Register Now For CCOS 83**  
**Pre-Convention Rates**

- Cata-Members - \$75.00
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- Spouse - \$25
- Children over 16 years - \$25

\*Must furnish name of system for verification.  
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**Over 13 Hours of Exhibit Time**

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 Wednesday, August 10  
 and continuing through Friday night,  
 August 12th □



## Washington Update

*by Stephen R. Effros  
CATAs Executive Director*

The National League of Cities representing most of the major cities in the United States has reached a formal agreement with the National Cable Television Association regarding proposed language changes for legislation that has been proposed by Senator Goldwater (S. 66). The NCTA-NLC Agreement is a beauty and both organizations should be congratulated for the effort that went into reaching the agreement as well as the contents of that agreement. Should most of the provisions that have been agreed to by both parties, in fact, get translated into legislative language, there is no question that CATA will strongly support the legislation and do everything in our power to see that it is adopted by both Houses of the Congress.

This is a very complex agreement and has 19 main elements to it. We are not going to go through all of those elements here. You will probably see them in the trade press or if we have a chance in the next issue of the CATJ, we'll reprint the entire agreement. The reason for not going through all of it is that it is politically highly unlikely that some of the provisions will ever be translated into legislative language. This agreement really constitutes a wish list both for the cable industry and for the cities and while it does appear to track a lot of the concepts that are proposed in S. 66 by Senator Goldwater, there are

some areas that it goes off of that track, and we don't expect to ever see some of those in the legislative language so we're going to have to wait for that legislative language before a full analysis is worthwhile.

In brief, there have been some basic tradeoffs made between the cable industry and the cities that resulted in this agreement. The first one is that unlike S. 66 the cities will be allowed to continue the, what we call, "bells and whistles RFP process" for new franchises throughout the country. Now this is of particular importance to some of the big cities who are in the middle of franchising right now. S. 66 in its original form would have prohibited the cities from requiring or enforcing requirements that they had already included in franchises regarding, for instance, the facilities of the cable operator. Under this agreement while the city may not be able to require specific access demands other than government access in the RFP (Request for Proposal), they can accept "voluntary" offers of access by cable operators in the bidding process. Well, we all know what that means when it comes down to a bidding war in a big city. It means that access will be in there, and the agreement says that anything that the cable operator "voluntarily" offers can be enforced in the franchise. The same thing, in essence, is true of facilities. The city is allowed to specify in the

RFP the type of facility it wants built in its city. It may not require, however, and even the franchise may not contain any requirement for the provision of facilities, equipment, services or other items of value which are not directly related to cable service. Now that is a win for the cable industry since recently we've seen such requirements as the planting of 20,000 trees in order to get a cable franchise.

The bottom line on all this is that the cities under S. 66 would have lost a considerable amount of their power to negotiate an initial franchise and then enforce it contractually. This they have regained under the NCTA-NLC Agreement. What they have given up, however, is the process of renewal, and have given the cable operators a reasonable expectation of renewal in this agreement. There is a complex formula for how renewals take place and when cable operators must file and how long the city has to respond to those filings, but the key is that the franchising authority, according to the agreement, shall not deny any application for renewal or extension unless it finds one of the following: 1. That a material change in the legal, technical or financial qualifications of the operator would substantially impair the continued provision of service by the operator. 2. That the cable operator has failed to substantially comply with material terms of the franchise. 3. That the signal quality delivered by the cable system within the cable operators control has generally failed to meet FCC technical standards. 4. That the proposals for cable system facilities or the set aside of system capacity for government access are unreasonable in light of the clearly demonstrated community need for and cost of such facilities and access set aside; or 5. The proposals contained the renewal application are unreasonable.

The agreement specifically says that the incumbent franchisee shall have reasonable expectation of renewal. So, on the overall question of franchising the cable industry has given the cities the right, in this agreement, to continue on the road of the bidding contest or bidding war, and an enforceability of franchises that are resultant from that bidding war on the initial franchise, and has given the cable operator in return a reasonable expectation of renewal.

Another key tradeoff in this agreement has to do with franchise fees and rate regulation. The cable industry has won the point, if you will, on rate regulation in that the agreement says that rates may be regulated for basic service. For these purposes basic service shall be defined as local television broadcast signals, public, educational and government access channels, and any services the operator voluntarily chooses to offer in the basic service package which commitment is enforceable by contract. Rates may also be regulated for the installation and/or rental of

equipment which is necessary for the provision of basic service, however, regulated basic service rates can be automatically increased on an annual basis by an amount up to 5% or the regional C.P.I., whichever is higher, and that ability to increase rates is cumulative for up to three years. However, such an automatic rate escalator will not apply to existing franchises which have frozen the rate for basic service for a specified period of time. In addition, with regard to rates, if a cable operator's request for any additional increase in rates or charges for basic service and related equipment beyond the automatic rate escalator are not acted upon within the 90 day period following receipt of such request, the cable operator may automatically implement the proposed increase in full.

Another part of the agreement on rates, and this is a very important part, is that rate regulation of basic service shall not exist in any area where a cable system receives four local grade B television signals, including the three television networks. Now this is basically the same as the rate regulation provisions that are now in effect in Massachusetts under the Massachusetts State Commission and they have worked very well. That provision, however, would not go into effect immediately. If you are in an area where rate regulation of basic service presently exists and you're in a market with four grade B's, that rate regulation may continue for a period of five years or half the remaining life of the franchise, whichever is greater.

Finally, with regard to rate regulation all other rate regulation including second sets, sales, rentals, tiers, per channel, per program, enhanced services — all are prohibited — rate regulation of those things is prohibited at any level of government. Now that is one heck of a good provision for the cable industry!

Naturally, as with any compromise agreement, it didn't come cheaply because on the other side of the fence what the cities have won is a guarantee that they will not be limited to less than 5% of gross revenue on franchise fees. The cities, however, have been willing to give up some concessions with regard to the franchise fee and they are important for cable operations. For instance, the 5% figure applies to fees paid to the franchising authority including any fee, tax or other assessment of any kind imposed by the franchising authority upon a cable system operator or cable subscriber either solely because of their status as such or by virtue of the power to grant public rights of way. Now that would seem to limit the cities with regard to imposing an extra entertainment tax, for instance, but it does not stop the states from doing so since the wording of the agreement only applies to fees that are imposed by the franchising authority itself. Also what is important in this part of the agreement is that both the cities and the cable operators have agreed

that the cable operator may pass the entire amount of any increase in the franchise fee through to subscribers as a franchise fee, not a service fee, and may designate the total franchise fee on its bill as a separate item. That designation is something that we have been fighting for, for some time now because we feel it is only right that the citizens recognize that they are paying a tax — they are not paying money to the cable operator.

So if you step back from the NCTA-NLC Agreement, what you see is two major compromises. The cable industry gave up on the bells and whistles franchise battles for initial franchising, and the cities, in return, gave up a reasonable expectation of renewal to existing cable operators. That was one. The second was that the cable operators agreed to a 5% franchise fee with limitations in return for a limitation on the rate regulation imposed by cities.

As we noted earlier, there are lots of other provisions in this agreement. For instance, it specifically says that franchising authorities may grant one or more cable franchises, which seems to deal in some ways with the antitrust issues of the so called Boulder Case. Under cable system definition it would appear that SMATV systems could be defined as cable systems, and under other provisions in the bill they may be required to get a franchise from the city. This is one of the provisions that we already know is in trouble on Capitol Hill. The franchising authorities are restricted from demanding access in the franchise RFP, but they are allowed to accept offers, so called voluntary agreements by the operators, in the bidding process. But on the other side the cable operator may discontinue or rearrange services that have been offered, with the exception of basic service, and even then on basic service he may rearrange offerings that are specified in the franchise in any case where there has been a "significant change in circumstances". That would deal with such an issue as the 3.75% rate increase by the Copyright Royalty Tribunal that we are now facing.

Access provisions, with the exception of government access, are on a voluntarily proposed basis only, but once they are voluntarily proposed and put into a franchise the cable operator can be required to meet those franchise conditions by contractual obligation. States and political subdivisions may require reasonable efforts to interconnect systems in the area. A new federal offense is created regarding theft of service with the cable operator being named as the one who can bring a private right of action. Civil damages and criminal penalties both are established which is a major advance for the cable industry. There is an entire section on privacy, another section on shielding the cable operator from any liability for libel, slander and so on from suits arising from ac-

cess programming, and there is also a provision that says that the current exemptions for co-op or governmentally owned poles would be eliminated and there would be a requirement added that before the FCC loses jurisdiction over pole attachment, states taking such jurisdiction must have a regulatory program in place to actually implement that jurisdiction. This is another one of those provisions that we think is highly questionable when it comes to the politics of getting it into a bill. After all, we're inviting opposition from the TVA, and that's a lot of opposition.

Governmental authorities at any level under this agreement would be restricted from trying to regulate the content that any cable operator puts on his cable system or any other business activities in the relevant community except for regulations applied to others in the same type of business. There is also a provision that guarantees access entry onto the property of private developments by cable operators and assigns the job of determining the value of that access to the FCC. Again, here is one that we politically question whether that will ever see the light of day when this bill finally gets through both Houses of Congress if, in fact, it gets through both Houses of Congress.

Municipal ownership is not explicitly limited, but it is controlled with regard to the government being prohibited from controlling the content of any programming other than governmental access on a municipally owned system, and that buyback provisions and franchises may not be written at anything less than fair market value based on the ongoing business value of the system and it is designated that, that would be determined by arbitration. Foreign ownership is not explicitly limited and nothing in the legislation shall be deemed to affect existing FCC discretion or jurisdiction regarding ownership restrictions by telephone companies. The FCC is also given jurisdiction to restrict ownership by co-located television stations if concentration of media control in the area is likely to result from such cable ownership. Other than those types of ownership restrictions no federal, state or local restrictions on ownership are allowed, and that includes vertical ownership and multiple ownership.

And finally, although certainly not least, there is an entire section spelling out the jurisdictional powers of the federal, the state and the local government authorities, and a specific statement that no governmental authority shall have jurisdiction to impose on a cable system, common carrier or utility status insofar as it provides broadband telecommunications services.

All provisions of the proposed legislation would take effect on the date of enactment, except that any provision which requires a change in a cable franchise, which is in effect on the date of enactment, shall not affect such franchise until one

year after the date of enactment or the expiration of the cable franchise, whichever is earlier, or, of course, there are certain provisions that have other timetables in them.

We know that's long winded, but that's it. It's, as we said in the beginning, one heck of an agreement, and the political reality of it is that it is highly unlikely that we will ever see legislation that embodies all of the things that were agreed to between the NCTA and the NLC. So don't be surprised as we go along in this process if the cable industry appears to be "losing" ground when it comes to negotiating these issues. There is no question that there will be a lot of give and take, however, the basic provisions — things like no common carrier or utility status and franchise fee or rate regulation and renewal vs. new franchise regulation — those things we expect will survive the process of putting this into legislation.

So where do we go from here? Well, the first step is for the Senate and Mr. Goldwater's subcommittee to take this agreement, after it has been ratified by all parties, and translate it into legislative language. We will get a much better sense of what the legislation looks like and where it's likely to go at that point. Then there will be a very strong push, and certainly CATA will be a part of that push and we hope all cable operators will be a part of that push, to get the Senate to act on this bill as quickly as it possibly can. The real battleground we suspect will be in the House of Representatives. We would not be surprised to see this bill get through the Senate within two months so you will likely be hearing from us soon on supporting S. 66. Once through the Senate, however, there is a real question of what happens in the House of Representatives. Congressman Tim Wirth and his communications subcommittee do not have any deregulatory bills in front of them regarding cable television. All indications are right now that they are waiting to see what the Senate does before acting at all. It is clear that the longer this bill sits in Congress the more likely it will attract opposition. Certainly not all the cities even agree with what the National League of Cities has done in this negotiation. We can also expect opposition from local and national access groups, from the telephone companies, from the co-op pole owners and several other groups. In addition, as we have mentioned before, it is likely that any piece of legislation having to do with the cable television industry is going to be subjected at some point through the process with an attempt by the broadcasters to add a legislative provision on the "must carry" rules. Should that happen then the entire question of Copyright is also intertwined with this bill and we would hope that does not take place. The "must carry" rules have no place in this legislation and CATA will fight very hard against their inclusion in this bill. However, we can see it coming down the road!

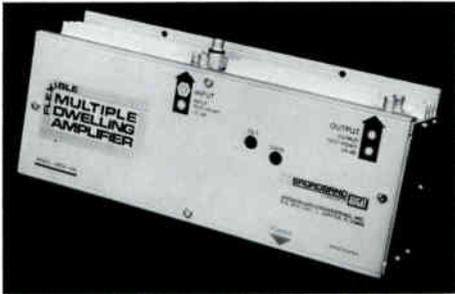
In sum, at the moment all we can do is once again say congratulations to all the parties who negotiated this agreement. It is a good agreement, it's one that CATA was familiar with as the process was going along, and we were consulted at various times as to what provisions should be included in the agreement. The next step, the legislative step, is going to be the crucial one, and it's one that all cable operators must become involved in. There is no question that this will become a controversial bill particularly in the House of Representatives before it's over. It's up to YOU to inform your Congressman of why this bill is good, assuming the legislation turns out the same way the negotiations did, and why it would be in the public interest for the bill to be adopted. We will have lots more to say on that as the process continues.

Just to make things easier for all involved, when the lobbying on this bill gets active, you will notice that as a part of this issue of the Newsletter which has, of course, been an expanded Newsletter and will cover both March and April, we have a list of all of the relevant committee members and their telephone numbers and addresses for each of the committees that we'll be dealing with either on the regulatory bills or the Copyright bills that will be coming into Congress this year. PLEASE SAVE THIS LIST — make a copy of it for your desk files and then include this copy of the Newsletter with the list in your CATA briefing book so that you don't lose it. The list contains all of the relevant information you need to either telephone or telegraph or write the various Congressmen and Senators on the key committees. You are going to be asked to do that in the near future. Be prepared!

#### **THINGS ARE HAPPENING FAST — S. 66 REWRITTEN**

Well, we didn't even have enough time to get the analysis that you just read regarding the NCTA-NLC Agreement into print before the Goldwater Subcommittee in the Senate came out with a rewritten S. 66 which, in fact, contains a good portion of that agreement. We didn't rewrite the analysis because we think it's important for you to be able to follow how this entire agreement progresses through both the Senate and the House. As we had speculated, the legislative version of the agreement is not exactly what the National League of Cities and the NCTA had agreed to. As we suspected, the pole attachment provisions are not in the bill nor will you find any provisions on cable operators getting access to private dwellings. Any mention of SMATV system regulation is also left out of the bill. However, most of the principal provisions of the bill are intact, and particularly the key ones that we outlined above are still in S. 66. There is a chance that the Goldwater Subcommittee and its parent, the full Commerce Committee which is shared by Senator Packwood, will adopt this new revised S. 66 before you get

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Designed for CATV, SMATV and MATV home-run or branching distribution systems, our Flexible Multiple Dwelling Amplifier (XMDA) boasts a number of options that will allow us to customize it to your system's specific requirements:

**Optional Gains:** Gains from 20 dB to 50 dB available. You specify the gain that will provide the best noise performance for your system.

**Optional Bandwidths:** The XMDA comes in two bandwidths, 330 MHz for systems of up to 40 channels and 440 MHz for larger systems. Thus you can use the XMDA in virtually any bandwidth system — and at the lowest possible cost.

**Optional Powering:** Standard powering is 120 VAC, but cable-powering for 30 or 60 volts is available at no extra cost.

**Power-Passing Option:** Allows you to cascade amplifiers in cable-powered situations. You can also pass control signals in some security systems.

**Variable Gain & Slope Control:** Permits you to adjust more precisely the output levels for a range of input levels.

**Plug-in Attenuator Pad:** Offers greater flexibility in system design and will accommodate a wide range of signal conditions.

**Optional Equalizer:** For greater flexibility in setting amplifier locations anywhere in your feeder system.

The XMDA also features the latest hybrids for maximum output with minimum distortion. And it is housed in a finned aluminum extrusion to remove heat quickly from active devices and extend component life.

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**BROADBAND™**  
A SUBSIDIARY OF **AUGAT**

this Newsletter. At some point, however, we have to just stop writing and get these things into print.

There was an unsuccessful effort to get the bill marked up and out of the full committee on March 22nd. However, because of some technical details a partyline squabble took place and consideration of the bill was postponed. It is not clear now when the bill will be taken up again. It could be as long as a month; that would be the next regularly scheduled session of the Commerce Committee, or Senator Packwood has indicated that he might have an interim meeting in about two weeks — that would be two weeks from March 22nd — or if the Democratic and Republican Subcommittee Staffs can get together on certain language differences, the committee could be polled on voting the bill out and it would be adopted in even less time than the proposed two weeks or one month. It would appear that there already are enough votes to adopt the bill, so it looks like the time frame for getting this bill onto the Senate floor is on schedule. Stay tuned!

## SPEAKING OF PROBLEMS . . .

If you don't think this is a problem now, you will in the future. It's our old friend signal leakage. If you've been reading CATJ consistently, you'll know that we have been telling you for a long time that if there is any rule that must be complied with from the FCC, it is the signal leakage rules. Those are the rules that the FCC considers most crucial, and those are the rules that are enforced most strenuously. Well, we're going to warn you one more time. The FCC is on a stringent enforcement campaign. They are sending out test trucks throughout the country to check for signal leakage violations. If they find them, you can bet that you will be fined. Furthermore, they are checking your files to see that you have, in fact, done your technical tests, and in some cases recently they have fined operators for falsifying logs on technical tests because they said there was no way the operator could have actually done the tests that they claimed to have done given the fact that the system was riddled with as many signal leakage problems as it was.

Our advice on this subject is very simple. Get out in the field now and do the signal leakage tests, and continue to do them. They're not only good for you and your subscribers, but they'll keep you out of trouble in the future. Signal leakage could very well be the Achilles heel of the cable television industry. There is simply no excuse for not doing the tests and cleaning up your system. If you have any questions on the signal leakage tests, how to do them, what the logs require, or anything else regarding the technical standards, call the CATA Engineering Office today. □

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\*MUST FURNISH SYSTEM NAME BELOW

ENCLOSED IS \$ \_\_\_\_\_ to cover registration for;

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SYSTEM \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_ STATE \_\_\_\_\_ ZIP \_\_\_\_\_

TELEPHONE (\_\_\_\_\_) \_\_\_\_\_

**PLEASE LIST**

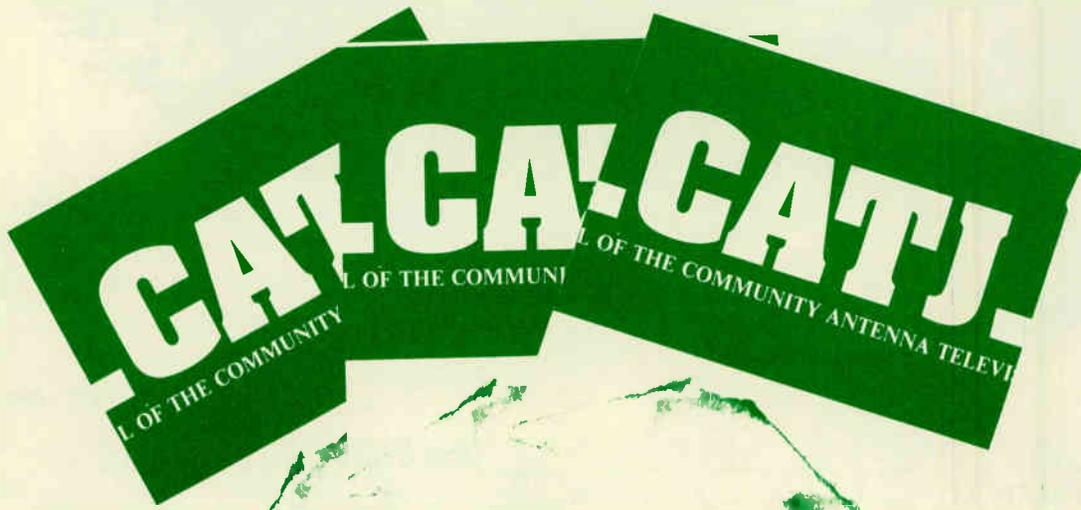
NAME of Spouse \_\_\_\_\_

NAMES of Children (and AGES) \_\_\_\_\_ AGE \_\_\_\_\_

**SEND TO: CATA CCOS 83 4209 N.W. 23rd, Suite 106, Oklahoma City, Ok. 73107  
AFTER JULY 15th, ALL REGISTRATION WILL BE \$150.**

# KNOWING YOU HAVE THE BEST

in cable technical information



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Company \_\_\_\_\_ Title \_\_\_\_\_

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Mail to: **CATJ Magazine**  
Suite 106, 4209 N.W. 23rd  
Oklahoma City, Okla. 73107

Editor  
CATJ Magazine  
Suite 106  
4209 N.W. 23rd  
Oklahoma City, OK 73107

Dear Editor:

Congratulations to Ralph for his "Message to Management" in the March issue.

It comes under the heading of "I wish I'd said that!"

One point I feel he perhaps overlooked was wages. Training and proper test equipment are of utmost importance, of course, but if this industry expects to attract and keep top quality people, it is going to have to pay them what they are worth.

Some companies recognize this and already have or are in the process of correcting the situation, but far too many are not.

As for training, I feel Ralph conducts the best one week seminars available in the industry.

Yours truly,

Max L. McLarty

Dear Mr. Simons:

I thought we had already beat this horse to death. As you say, (I am sure with tongue in cheek), a matching transformer is either an amplifier or a pad, depending on which way you measure it, just emphasizes the point that you need to keep your mind in gear when using the db?. When using the voltage formula, you must either hold the impedance constant or add in the proper correction factor; i.e.  $db = 20 \log$

$V_1$  is correct if, and only if,

$V_2$   $R_1 = R_2$ .

Incidentally, you forgot dbj.

Wayne Sheldon,  
Chairman

CATA Engineering Committee

## LETTERS

CATJ Magazine  
Suite 106, 4209 N.W. 23rd  
Oklahoma City, Okla. 73107

David N. Emberson  
Vice-President, Marketing  
Triple Crown Electronics

Dear Mr. Emberson:

Your article in the March 1983 CATJ has long been needed and I agree with the majority of it, but I do have two questions. We have systems in the northwest that are as small as one trunk amplifier. How do you define a "small cable television system"? Two trunk amps in cascade, or ten, or twenty?

You state manual design is not recommended using manufacturers amplifier levels. Why? A computer assisted design can be helpful, but is not a necessity on a "small" system.

Yours truly

Andrew G. Campbell  
Sales

Dear Editor:

For over a year, I have been trying to find a simple program for Cable TV design. I finally sat down and wrote my own program. I designed mine for the Timex Sinclair Computer as it was inexpensive and small enough to carry in a briefcase. I feel there must be many technicians and small cable operators who could use this program for system design and extensions. As the program is written in very simple basic, it can be readily adapted to any other computer using basic.

Feel free to use it any way you wish.

To Whom It May Concern:

Here is a copy of notes on my Cable TV program for designing small cable systems.

This program is designed to be used with the Timex Sinclair home computer with 2K memory only, no extra memory is needed. A printer is not needed, but is helpful.

This program can be used with any cable, ie: RG59, 412, 500, 750 and with any number of channels as the first two entries are the attenuation of the cable on the highest frequency and the lowest frequency.

You can design for any level that you would like at the tap as that is the third entry.

You can use it for trunk or distribution as your fourth and fifth entries are your starting signal levels.

The tap value that you enter on line 12 is for your reference only and does not effect the program in any way.

Lines 13 and 14 are used for tap insertion loss and also for splitters, directional couplers and in line equalizers.

Lines 25, 26 and 27 illustrate using them for an in line equalizer.

When Re-Amplifying, end program and start over.

If there are any questions or I can be of any help, please call me.

Andrew G. Campbell  
Anixter Communications  
206-251-6760  
800-426-4821 N.W. only  
800-452-9352 Wa. only

TAP PROGRAM

ENTER CABLE ATTENUATION PER 100 FT ON HIGHEST CHANNEL.  
1.11

ENTER CABLE ATTENUATION PER 100 FT ON LOWEST CHANNEL  
0.54

ENTER SIGNAL LEVEL WANTED AT TAP ON HIGHEST CHANNEL  
10

ENTER DB READING AT STARTING POINT ON HIGHEST CHANNEL  
50

ENTER DB READING AT STARTING POINT ON LOWEST CHANNEL  
45

ENTER AMOUNT OF CABLE IN FEET  
900

HIGH DB READING IS 40.01  
LOW DB READING IS 40.14  
TAP SHOULD BE 30.01

TAP LOW CHANNEL IS 30.14

ENTER TAP VALUE  
29

ENTER INSERTION LOSS HI  
0.3

ENTER INSERTION LOSS LOW  
0.3

DB HI IS 39.71  
DB LOW IS 39.84  
MORE?  
Y=YES N=NO  
Y

ENTER AMOUNT OF CABLE IN FEET  
900

HIGH DB READING IS 29.72  
LOW DB READING IS 34.98  
TAP SHOULD BE 19.72

TAP LOW CHANNEL IS 24.98

ENTER TAP VALUE  
0

ENTER INSERTION LOSS HI  
1

ENTER INSERTION LOSS LOW  
0.5

DB HI IS 28.72  
DB LOW IS 26.48  
MORE?  
Y=YES N=NO  
Y

ENTER AMOUNT OF CABLE IN FEET  
400

HIGH DB READING IS 24.28  
LOW DB READING IS 24.32  
TAP SHOULD BE 14.28

TAP LOW CHANNEL IS 14.32

ENTER TAP VALUE  
14

ENTER INSERTION LOSS HI  
0.9

ENTER INSERTION LOSS LOW  
0.9

DB HI IS 23.38  
DB LOW IS 23.42  
MORE?  
Y=YES N=NO  
N

END

```

1 REM "TAP HI LOW"
2 PRINT "TAP PROGRAM"
3 PRINT
4 PRINT "ENTER CABLE ATTENUAT
ION PER 100 FT ON HIGHEST CHANNE
L."
5 INPUT Z
6 PRINT Z
7 PRINT
8 PRINT "ENTER CABLE ATTENUAT
ION PER 100 FT ON LOWEST CHANNEL
"
9 INPUT U
10 PRINT U
11 PRINT
20 PRINT "ENTER SIGNAL LEVEL W
ANTED AT TAP ON HIGHEST CHANNEL"
30 INPUT X
40 PRINT X
50 PRINT
60 PRINT "ENTER DB READING AT
STARTING POINT ON HIGHEST CHANNE
L."
70 INPUT H
80 PRINT H
90 LET DB HI=H
100 PRINT
101 PRINT "ENTER DB READING AT
STARTING POINT ON LOWEST CHANNEL
"
102 INPUT L
103 PRINT L
104 LET DB LOW=L
110 PRINT "ENTER AMOUNT OF CABL
E IN FEET"
120 INPUT A
130 PRINT A
140 LET F=A/100*Z
141 LET C=A/100*U
142 LET DB HI=DB HI-F
143 LET DB LOW=DB LOW-C
175 PRINT
176 PRINT "HIGH DB READING IS "
DB HI
177 PRINT
178 PRINT "LOW DB READING IS ";
DB LOW
179 PRINT
250 LET TV HI=DB HI-X
251 LET TV LOW=DB LOW-X
275 PRINT "TAP SHOULD BE ";TV HI
I
276 PRINT
277 PRINT "TAP LOW CHANNEL IS "
;TV LOW
278 PRINT
325 PRINT "ENTER TAP VALUE"
350 INPUT T
375 PRINT T
400 PRINT
425 PRINT "ENTER INSERTION LOSS
HI"
450 INPUT I
475 PRINT I
476 PRINT
477 PRINT "ENTER INSERTION LOSS
LOW"
478 INPUT E
479 PRINT E
480 PRINT
500 LET DB HI=DB HI-I
501 LET DB LOW=DB LOW-E
525 PRINT "DB HI IS ";DB HI
526 PRINT
527 PRINT "DB LOW IS ";DB LOW
550 PRINT
575 PRINT "MORE?"
600 PRINT
650 PRINT "Y=YES N=NO"
700 INPUT A$
750 PRINT A$
800 PRINT
850 IF A$="Y" THEN GOTO 110
900 IF A$="N" THEN GOTO 950
950 PRINT "END"
999 STOP

```

Distributors	Manufacturers	Service Firms
D1—Full CATV equipment line	M1—Full CATV equipment line	S1—CATV contracting
D2—CATV antennas	M2—CATV antennas	S2—CATV construction
D3—CATV cable	M3—CATV cable	S3—CATV financing
D4—CATV amplifiers	M4—CATV amplifiers	S4—CATV software
D5—CATV passives	M5—CATV passives	S5—CATV billing services
D6—CATV hardware	M6—CATV hardware	S6—CATV publishing
D7—CATV connectors	M7—CATV connectors	S7—CATV drop installation
D8—CATV test equipment	M8—CATV test equipment	S8—CATV engineering
D9—Other	M9—Other	S9—Other

# Associate Roster

Note: Associates listed with \* are Charter Members.

**ADT Security Systems,**  
One World Trade Center,  
92nd Fl.,  
New York, NY 10048  
212—558-1444  
(M9 Security Equipment)

**Alpha Technologies,**  
1305 Fraser St. D-G,  
Bellingham, WA 98225  
206—671-7703  
(M9, Standby Power  
Supplies)

**AMCOM, Inc.,**  
Bldg. E, Suite 200,  
5775 Peachtree-  
Dunwoody Rd., N.E.,  
Atlanta, GA 30342  
404—256-0228  
(S9, Brokering &  
Consulting)

**Amplica, Inc.,**  
950 Lawrence Dr.,  
Newbury Park, CA 91320  
805—498-9671  
(M4)

\* **Anixter Communications**  
4711 Golf Road,  
Skokie, IL 60076  
312—677-2600  
(D1)

**Apple/Store,**  
Rte. #1, Box 156,  
Beaver Dam, WI 53916  
414—885-6249

**The Associated Press,**  
50 Rockefeller Plaza,  
New York, NY 10020  
212—621-1513  
(S9 Automated News  
SVC)

**Automation Techniques,**  
1846 N. 106th E. Ave.,  
Tulsa, OK 74116  
918—836-2584  
(M9)

**Avantek, Inc.,**  
481 Cottonwood Dr.,  
Milpitas, CA 95035  
408—946-3080  
(M8, 9 TVRO  
Components)

**Avetek, Inc.,**  
Box 188,  
Aurora, NE 68818  
402—694-5201  
(M8)

**BEI**  
P.O. Box 937,  
Olathe, KS 66061  
800—255-6226  
(M9 Character  
Generators)

**Ben Hughes  
Communications**  
P.O. Box AS,  
Old Saybrook, CT 06475  
203—388-3559  
(M6, M9)

**Blonder-Tongue Labs, Inc.,**  
1 Jake Brown Rd.,  
Old Bridge, NJ 08857  
201—679-4000  
(M1, 2, 4, 5)

**Broadband Engineering,  
Inc.,**  
P.O. Box 1247,  
Jupiter, FL 33458  
1-800—327-6690  
(D9, M4, S9)

**Budco, Inc.,**  
4910 East Admiral Place,  
Tulsa, OK 74115  
1-800—331-2246  
(D9, Security &  
Identification Devices)

**CATEL,**  
4800 Patrick Henry Dr.,  
Santa Clara, CA 95054  
408—988-7722

\* **C-COR Electronics, Inc.,**  
60 Decibel Rd.,  
State College, PA 16801  
814—238-2461  
(M1, M4, M5, S1, S2, S8)

**CCS Cable**  
P.O. Box 14710,  
Phoenix, AZ 85063  
602—272-6855  
(M3)

**CWY Electronics,**  
405 N. Earl Ave.,  
Lafayette, IN 74904  
1-800—428-7596  
(M9, D1)

**CableBus Systems,**  
7869 S.W.  
Nimbus Avenue,  
Beaverton, OR 97005  
503—543-3329  
(M1)

**Cable Graphic Sciences,**  
7095 N. Clovis Ave.,  
Clovis, CA 93612  
209—297-0508  
(M9 Character  
Generators)

**Cable Health Network,**  
2840 Mt. Wilkinson Pkwy.,  
Atlanta, GA 30339  
404—436-0886  
(S4)

**Cable-Text Instruments,**  
Div. of Telpar, Inc.,  
P.O. Box 796  
Addison, TX 75001  
214—233-6631  
(M9 Generators)

**Century III Electronics, Inc.**  
610 Neptune Ave.,  
Brea, CA 92621  
714—671-2800  
(M1, M3, M4, M5, M7, M8,  
S1, S2, S8)

**Capscan, Inc.,**  
P.O. Box 36,  
Adelphia, NJ 07710  
1-800—CABLETV or  
222-5388  
(M1, M3, M4, M5)

**Channel Master,**  
Ellenville, NY 12428  
914—647-5000  
(M2, 3, 4, 5, 6, 7)

**Comm/Scope Company,**  
Rt. 1, Box 199A,  
Catawba, NC 28609  
1-800—438-3331  
(M3)

**Communications Equity  
Associates,**  
851 Lincoln Center,  
5401 W. Kennedy Blvd.,  
Tampa, FL 33609  
813—877-8844  
(S3)

**Computer Video  
Systems, Inc.,**  
3678 W. 2105 S. Unit 2,  
Salt Lake City, UT 84120  
1-800—453-8822  
(M9)

**COMSEARCH INC.,**  
11503 Sunrise Valley  
Drive,  
Reston, VA 22091  
703—620-6300  
(S8, S9, Earth station  
placement frequency  
coordination)

**ComSonics, Inc.,**  
P.O. Box 1106,  
Harrisonburg, VA 22801  
1-800—336-9681  
(M8, M9, S8, S9)

**DF Countryman Co.,**  
1821 University Ave.,  
St. Paul, MN 55104  
612—645-9153  
(D1, S1, S8)

**The Disney Channel**  
500 S. Buena Vista,  
Burbank, CA 91521  
213—840-5080  
(S4)

**Ditch Witch,**  
P.O. Box 66,  
Perry, OK 73077  
1-800—654-6481  
(M9)

**The Drop Shop Ltd., Inc.,**  
Box 284,  
Roselle, NJ 07203  
1-800—526-4100 or  
1-800—227-0700 (West)  
(D3, 4, 5, 6, 7, 8, 9,  
M5, 6, 7, 8, 9 Plastics)

**Durnell Engineering Inc.,**  
Hwy 4 So.  
Emmetsburg, IA 50536  
712—852-2611  
(M9)

**Eagle Com-Tronics, Inc.,**  
4562 Waterhouse Rd.,  
Clay, NY 13041  
1-800—448-7474  
(M9 Pay TV Delivery  
Systems & Products)

**Eales Comm. &  
Antenna Serv.,**  
2904 N.W. 23rd,  
Oklahoma City, OK 73107  
405—946-3788  
(D1, 2, 3, 4, 5, 6, 7,  
S1, 2, S7, 8)

# Associate Roster

**Eastern Microwave, Inc.,**  
3 Northern Concourse,  
P.O. Box 4872,  
Syracuse, NY 13221  
315-455-5955  
(S4)

**Electroline TV  
Equipment, Inc.,**  
8750-8th Ave.,  
St. Michel,  
Montreal, Canada  
H1Z 2W4  
514-725-2471  
(M4, 5, 7, 9, D7, 9)

**Electron Consulting  
Associates,**  
Box 2029,  
Grove, OK 74344  
918-786-5349  
(M2, D1, S1, 8)

**Elephant Industries,**  
P.O. Box 3626  
N. Ft. Myers, FL 33903  
813-995-7383  
(M9)

**ESPN,**  
ESPN Plaza,  
Bristol, CT 06010  
203-584-8477  
(S9)

**The Entertainment  
Channel,**  
1133 Avenue of the  
Americas,  
New York, NY 10036  
212-930-4900  
(S4)

**Franey & Parr of Texas,  
Inc.,** (Formerly Doherty &  
Co.),  
One Turtle Creek Village,  
Suite 524,  
Dallas, TX  
214-528-4820  
(S9, Insurance)

**GTE Products Corp.,**  
Sylvania CATV Div.  
1790 Lee Trevino Drive,  
Suite 600  
El Paso, TX 79936  
1-800-351-2345  
(D7, M1, M4, M5, M9,  
Converters, S4, S8)

**Gardner Communications  
Corp.,**  
3506 Security St.,  
Garland, TX 75042  
214-348-4747  
(M9 TVRO Packages, S1,  
S2, S8)

**General Cable Corp.,**  
1 Woodbridge Center,  
P.O. Box 700  
Woodbridge, NJ 07095  
1-800-526-4385  
(M3)

**Gilbert Engineering Co.,**  
P.O. Box 23189,  
Phoenix, AZ 85063  
1-800-528-5567 or  
602-245-1050

**Group W Satellite  
Communications,**  
41 Harbor Plaza Dr.,  
P.O. Box 10210,  
Stamford, CT 06904  
203-965-6219  
(S4)

**H & R Communications,**  
Rt. 3, Box 102G,  
Pocahontas, AK 72455  
1-800-643-0102  
(M2, D1, S2, S3, S8)

**Harris Corporation,**  
P.O. Box 1700,  
Melbourne, FL 32901  
305-724-3401  
(M2, M9, S2)

**Heller-Oak  
Communications,**  
105 W. Adams St.,  
Chicago, IL 60603  
1-800-621-2139 \* 7600  
(S3)

**Home Box Office, Inc.,**  
7839 Churchwill Way,  
Suite 133, Box 63,  
Dallas, TX 75251  
214-387-8557  
(S4)

\* **Hughes Microwave  
Communications Products,**  
3060 W. Lomita Blvd.,  
Torrance, CA 90505  
213-517-6233  
(M9)

**Ind. Co. Cable TV, Inc.,**  
P.O. Box 3799  
Hwy. 167 N,  
Batesville, AR 72501  
501-793-4174  
(D1)

\* **Jerry Conn Associates,  
Inc.,**  
P.O. Box 444,  
Chambersburg, PA 17201  
1-800-233-7600  
1-800-692-7370 (PA)  
(D3, D4, D5, D6, D7, D8)

**KMP Computer  
Services, Inc.,**  
703 Central Ave.,  
Los Alamos, NM 87544  
505-662-5545  
(S4, 5)

**Karnath Corporation,**  
2001 Westridge,  
Plano, TX 75075  
214-422-7981 or 7055  
(S1, 2, 8, 9)

**Katek, Inc.,**  
215 Wood Ave.,  
Middlesex, NJ 08846  
201-356-8940

**Klungness Electronic  
Supply,**  
P.O. Box 547,  
107 Kent Street,  
Iron Mountain, MI 49801  
1-800-338-9292  
1-800-682-7140 (Mich)  
(D1, D8, S2, S8)

**LRG Electronics, Inc.,**  
901 South Ave.,  
Horseheads, NY 14845  
607-739-3844  
(M7)

**Larson Electronics,**  
311 S. Locust St.,  
Denton, TX 76201  
817-387-0002  
(M9 Standby Power)

**Lemco Tool Corporation,**  
Box 330A,  
Cogan Station, PA 17728  
1-800-233-8713  
(M8, 9 Tools)

**Lindsay Specialty  
Products, Ltd.,**  
50 Mary Street West,  
Lindsay,  
Ontario, Canada K9V 4S7  
705-324-2196  
(M1, 2, 4, 5, 7, 9)

**Magnavox CATV Division,**  
100 Fairgrounds Drive,  
Manlius, NY 13104  
1-800-448-5171 or  
1-800-522-7464 (N.Y.)  
(D4, 5, 7, M4, 5, 6, 7, S3, 8)

**McCullough Satellite  
Equipment,**  
Route 5, Box 97,  
Salem, AR 72576  
501-895-3167  
(M2, 9, D3, 4, 6, 7)

**Microdyne Corporation,**  
471 Oak Road,  
Ocala, FL 32672  
904-687-4633  
(M9 Satellite TV  
Receivers) |

**Microwave Associates  
Communications Co.,**  
777 S. Central Expwy.,  
Suite 1G,  
Richardson, TX 75080  
214-234-3522  
(M9 Microwave Radio  
Systems)

\* **Microwave Filter Co.,**  
6743 Kinne St., Box 103,  
E. Syracuse, NY 10357  
1-800-448-1666  
(M5 Bandpass Filter)

**Midwest Corp.,**  
P.O. Box 226,  
Clarksburg, WV 26301  
1-800-624-3845  
(D1, 2, 3, 4, 5, 6, 7, 8)

**Modern Cable Programs,**  
5000 Park St. N.,  
St. Petersburg, FL 33709  
(S4)

**Mullen Communications  
Construction Co., Inc.,**  
P.O. Box 1387A,  
Green Bay, WI 54305  
414-468-4649  
(S2)

**NCS Industries, Inc.**  
2255-E Wyandotte Rd.,  
Willow Grove, PA 19090  
1-800-523-2342  
1-800-492-2032 (PA)  
(D1, 2, D9, Used Equip-  
ment S8, 9 repair  
service)

Distributors	Manufacturers	Service Firms
D1—Full CATV equipment line	M1—Full CATV equipment line	S1—CATV contracting
D2—CATV antennas	M2—CATV antennas	S2—CATV construction
D3—CATV cable	M3—CATV cable	S3—CATV financing
D4—CATV amplifiers	M4—CATV amplifiers	S4—CATV software
D5—CATV passives	M5—CATV passives	S5—CATV billing services
D6—CATV hardware	M6—CATV hardware	S6—CATV publishing
D7—CATV connectors	M7—CATV connectors	S7—CATV drop installation
D8—CATV test equipment	M8—CATV test equipment	S8—CATV engineering
D9—Other	M9—Other	S9—Other

Note: Associates listed with \* are Charter Members.

**National Farmers Union Property & Casualty Co.,**  
12025 E. 45th Ave.,  
Denver, CO 80251  
303—371-1760  
(D9, Insurance Service)

**North Supply Company,**  
600 Industrial Pkwy.,  
Industrial Airport, KS  
66031  
913—791-7000  
(D1, 2, 3, 4, 5, 6, 7, 8)

**Oak Industries, Inc.,**  
Crystal Lake, IL 60014  
815—459-5000  
(M1, M9 Converters, S3)

**Octagon Scientific, Inc.,**  
476 E. Brighton Ave.,  
Syracuse, NY 13210  
315—476-0660  
(M9)

**Phasecom Corp.,**  
6365 Arizona Circle,  
Los Angeles, CA 90045  
213—641-3501  
(M1)

**Power and Telephone Supply Company, Inc.,**  
530 Interchange Drive  
N.W.,  
Atlanta, GA 30336  
1-800—241-9996  
(D1)

**M/A Com Prodelin, Inc.,**  
P.O. Box 100  
Claremont, NC 28610  
704—459-9762  
(M2, M3, M7, S2)

**Pyramid Industries, Inc.,**  
P.O. Box 23169,  
Phoenix, AZ 85063  
1-800—528-4529  
(M7, 8)

**Quality RF Services, Inc.,**  
825 Park Way, Suite 3,  
Jupiter, FL 33458  
305—747-4998  
(M4, S9)

**RMS Electronics,**  
50 Antin Place,  
Bronx, NY 10462  
1-800—223-8312  
1-800—221-8857 (Poleline)  
(M4, M5, M6, M7, M9)

**Reuters,**  
1212 Avenue of the  
Americas., 16th Floor,  
New York, NY 10036  
212—730-2715  
(D9)

**Rockwell International,**  
M.S. 402-101,  
Dallas, TX 75207  
214—996-5954  
(M9, Microwave/Satellite)

**S.A.L. Communications, Inc.,**  
P.O. Box 794,  
Melville, NY 11747  
1-800—645-9062  
(D1)

**Sadelco, Inc.,**  
75 West Forest Ave.,  
Englewood, NJ 07631  
201—569-3323  
(M8)

**Scientific Atlanta, Inc.,**  
3845 Pleasantdale Rd.,  
Atlanta, GA 30340  
404—449-2000  
(M1, M2, M4, M8, S1, S2,  
S3, S8)

**Showtime Entertainment, Inc.,**  
1633 Broadway,  
New York, NY 10019  
212—708-1600  
(S4)

**Southern Satellite Systems, Inc.,**  
P.O. Box 45684,  
Tulsa, OK 74145  
918—481-0881  
(S9)

**Superior Electronics Center,**  
2010 Pine Terr.,  
Sarasota, FL 33581  
813—922-1551  
(M4, S9)

**TVC Supply Co., Inc.,**  
1746 E. Chocolate Ave.,  
Hershey, PA 17033  
717—533-4982  
(D1, 2, 3, 4, 5, 6, 7, 8)

**Teledac, Inc.,**  
1575 Taschereau Blvd.,  
Longueuil,  
Quebec, Canada J4K 2X8  
514—651-3716  
(M9 Character  
Generators)

**Tele-Wire Supply Corp.,**  
122 Cutter Mill Rd.,  
Great Neck, NY 11021  
1-800—325-4868  
(D1, 2, 3, 5, 6, 7, 8, 9)

\* **Texscan Corp.,**  
2446 N. Shadeland Ave.,  
Indianapolis, IN 46219  
1-800—528-4066  
(M8 Bandpass Filters)

\* **Theta-Com CATV,**  
2960 Grand Avenue,  
Phoenix, AZ 85061  
602—252-5021  
(M1, M4, M5, M7, M8)

\* **Times Fiber Communications,**  
358 Hall Avenue,  
Wallingford, CT 06492  
1-800—243-6904  
(M3)

**Tocom, Inc.,**  
P.O. Box 47066,  
Dallas, TX 75247  
214—438-7691  
(M1, M4, M5, Converters)

\* **Toner Cable Equipment, Inc.,**  
969 Horsham Rd.,  
Horsham, PA 19044  
1-800—523-5947  
In Penna. 1-800—492-2512  
also 1-800—523-5947 (PA)  
(D2, D3, D4, D5, D6, D7)

**Triple Crown Electronics, Inc.,**  
4560 Fieldgate Dr.,  
Mississauga, Ontario,  
Canada L4W 3W6  
416—629-1111  
Telex 06-960-456  
(M4, M8)

**Turner Broadcasting System,**  
1050 Techwood Dr.,  
Atlanta, GA 30318  
404—898-8500

**Tyton Corp.,**  
P.O. Box 23055,  
Milwaukee, WI 53223  
414—355-1130  
(M6, 7)

**United Press International,**  
220 East 42nd St.,  
New York, NY 10017  
212—682-0400  
(S9 Automated News  
Svc.)

**United Video, Inc.,**  
3801 South Sheridan Rd.,  
Tulsa, OK 74145  
1-800—331-4806  
(S9)

**Video Data Systems,**  
205 Oser Ave.,  
Hauppauge, NY 11787  
516—231-4400  
(M9)

**Viewstar, Inc.,**  
705 Progress Ave.,  
Unite 53,  
Scarborough,  
Ontario, Canada M1H 2X1  
416—439-3170  
(M9 Cable Converter)

**Vitek Electronics, Inc.,**  
4 Gladys Court,  
Edison, NJ 08817  
201—287-3200

**Warner Amex Satellite Entertainment Corporation,**  
1211 Avenue of the  
Americas,  
New York, NY 10036  
212—944-4250  
(S4)

\* **Wavetek Indiana,**  
5808 Churchman,  
Beech Grove, IN 46107  
1-800—428-4424  
TWIX 810—341-3226  
(M8)

**Weatherscan,**  
Loop 132,  
Throckmorton Hwy.,  
Olney, TX 76374  
817—564-5688  
(D9, Sony Equip. Dist.,  
M9 Weather Channel  
Displays)

**Western Towers**  
Box 347,  
San Angelo, TX 76901  
915—655-6262/653-3363  
(M2, Towers)

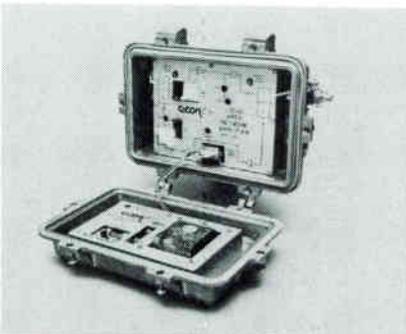
**Winegard Company,**  
3000 Kirkwood Street,  
Burlington, IA 52601  
1-800—523-2529  
(M1, M2, M3, M4, M5, M7)

**Zenith Radio Corp.**  
1000 N. Milwaukee Ave.  
Glenview, IL 60025  
312—391-8195  
(M1, 6)

# Showcase

## LOCAL AREA NETWORK AMPLIFIERS INTRODUCED BY C-COR ELECTRONICS

A new series of split-band amplifiers designed specifically for broadband local area network data systems has been introduced by C-COR Electronics, Inc. The LAN-100 series amplifiers provide for full duplex data transmission over a 5-450 MHz bandwidth. The amplifiers offer 35 dB of forward gain and 30 dB of reverse gain for data communications environments such as high-rise office buildings with large amounts of flat loss and large metropolitan area institutional networks where reverse signals are injected into a feeder cable.



From a system design standpoint, the LAN-100 amplifier provides a reverse bandpass of 5-112 MHz and a forward bandpass of 150-400 MHz which is capable of handling most LAN data transmission requirements. Similarly, the LAN-101 provides a reverse bandpass of 5-186 MHz and a forward bandpass of 225-450 MHz for extremely large data transmission needs and aggressive system growth.

Suitable for outdoor or indoor installation, the amplifier housings are made of sturdy, die-cast aluminum. Housings are fitted with both a silicone rubber gasket and a metal mesh gasket to assure protection against environmental contaminants and radio frequency interference. The LAN-100 series amplifiers are covered by C-COR's new three-year warranty. For more information, contact C-COR at (814) 238-2461. ●

## COMSEARCH, INC. FORMS NEW SUBSIDIARY

Comsearch, Inc., a privately-owned corporation and a leader in the telecommunications services industry, announced today the establishment of a new subsidiary, Comsearch™ Applied Technology, Inc. (CAT).

CAT will provide highly specialized electromagnetic interference analysis and measurement services to both commercial and government customers. The

Company will also provide support for Navy electromagnetic compatibility and fleet readiness projects. The headquarters for CAT is located at 11511 Sunrise Valley Drive in Reston, Virginia, minutes from Washington, D.C.

CAT's expertise in electromagnetic environmental control includes:

- Design of corrective methods for existing interference conditions
- Specialized EMI measurements
- Spectrum signature measurement
- Computer assisted interference analysis
- RADHAZ analysis and measurement
- EMP analysis and special tests
- MIL-STD-461 testing
- Other MIL-STD, VDE, and FCC testing
- Internal control of EMI by measurement, analysis, and corrective circuit design and fabrication

These technical services are provided by CAT engineers and technicians who use sophisticated interference prediction routines on the Company's main computer to analyze interference conditions. These computer programs are also used to assist in planning projects and analyzing and evaluating data obtained in the measurement tasks. A CAT innovation provides data communication between portable field computers and our main computer for in-field analysis capability.

Additional services in the area of special radiation hazard and power density measurements are also to be performed for customers concerned about hazardous RF levels in personnel operating areas. These tests would document existing levels in areas near microwave transmitters and satellite uplink antennas and identify any radiation hazards present that may be above safe exposure levels.

The Company takes pride in its own electronics test laboratory which features a 10x12x10 foot shielded enclosure. This laboratory provides for a variety of RF and microwave environments to test and analyze various pieces of electronic equipment. Measurement services are not only performed in the laboratory but remotely anywhere in the United States, overseas, or on board ships at sea. Data can be automatically transferred to the CAT computer for instant analysis. The subsidiary operates vans that are instrumented for field measurement.

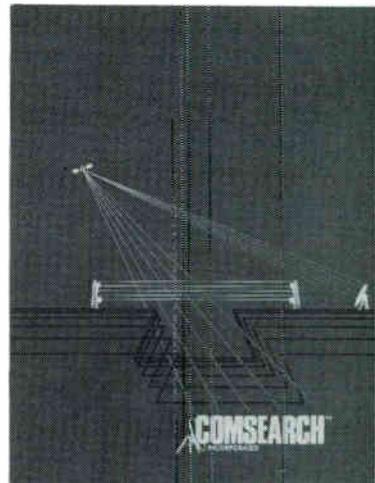
Harry L. Stemple, President of Comsearch, Inc., has named Lester Polisky, Senior Vice President and General Manager of that Company's Electromagnetic Environmental Control Division, as President of the new subsidiary. "Comsearch Applied Technology will be a unique company," said Mr. Stemple, "because the services it offers will help

solve the most complex interference problems now being encountered by the telecommunications industry and government agencies when using state-of-the-art electronic equipment. These high technology services will be provided by a dedicated team of highly professional engineers under Les's leadership. I am confident this venture will be very successful."

Founded in 1977, Comsearch, Inc., provides worldwide engineering services for all types of communications systems, in the areas of frequency coordination and interference analysis. Comsearch, Inc., will design an entire system from ground level, based on the customers' needs and specifications. The company's services are diversified and provide support and solutions to problems for customers. For more information, contact: Alice M. Gravely, Manager of Marketing Communications, Comsearch, Inc., (703) 620-6300.

## COMSEARCH PUBLISHES NEW SERVICES BROCHURE

Comsearch, Inc., is pleased to announce the release of their newest publication, "The Comsearch Services Brochure." This information will provide prospective clients and customers with a thorough overview of the company which has seen phenomenal growth, a ten-fold expansion, in the past five years.



This brochure highlights the latest and expanded service offerings in the areas of frequency coordination and interference analysis for cellular radio, land mobile, low and full power T.V., and Community Antenna Relay Systems (CARS). It also outlines the Protection Services for common carriers, operational fixed microwave (Op-Fixed), Auxiliary broadcast, cable headends, and describes their Field Services performed by the Comsearch staff of engineers and

technicians.

The standard services for earth station and terrestrial point-to-point coordination are included as well as information on Comsearch Applied Technology, (CAT), their new subsidiary. CAT is a unique company formed to provide specialized analysis and measurement services to both commercial and government customers. For further information, contact: Alice M. Gravely, Manager, Marketing Communications, 11503 Sunrise Valley Drive, Reston, Virginia 22091, (703) 620-6300. ●

### The Avoidance/Suppression of Terrestrial Interference (ASTI)

by Glyn Bostick

Today, thanks to advances in terrestrial interference (TI) research and filter technology, it is at last both economically and technically feasible to fight TI — and win! Terrestrial interference is fast becoming a major economic consideration for the installers and operators of TVRO earth terminals. Large amounts of money may be at stake when the earth station is turned on, only to discover that TI is degrading or altogether preventing the reception of desired satellite signals. Conventional wisdom used to advise packing up and moving to another site when this hap-

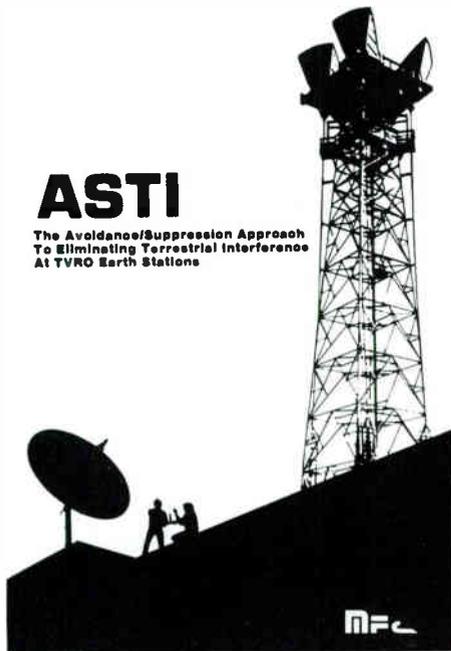
pened. TI was usually "all she wrote" for TVRO systems, and there were plenty of good sites to choose from. But now, with many of the available TI-clean sites already taken, and with the advent of a huge and still growing transcontinental microwave telephone relay system, finding another site can be impractical if not impossible. Consequently, most dollar-conscious installers and operators would rather stand and fight TI than switch to another site. Measured over a period of time, the costs involved in the ASTI approach have proved to be substantially lower than any alternative, especially in terms of dollars saved when the initial site was made operable. Furthermore, both cost and complexity of filtering to eliminate TI are lowered considerably when all essential aspects of the ASTI approach are employed.

The purpose of this volume to integrate two practices, avoidance and suppression, into a logical, unified approach that can be effectively applied in the planning and installation of any TVRO earth station system. Conscientious application of ASTI will reduce the possibility that TI will be discovered at turn-on, enhance the probability that unavoidable TI can be eliminated, and increase the effective operating quality of the TVRO system. No known bases of avoiding and/or suppressing TI are left uncovered, and such specific applications as SMATV installations are dealt with in depth.

ASTI is available for \$99 (pre-publication price, before July 1, 1983) or \$125 (post-publication price) from Howard Shippey, Microwave Filter Co., Inc., 6743 Kinne Street, East Syracuse, NY 13057. US toll-free 1-800-448-1666 (collect 315-437-3953 in NYS/CAN/HI/AK). ●

## ASTI

The Avoidance/Suppression Approach  
To Eliminating Terrestrial Interference  
At TVRO Earth Stations



pened. TI was usually "all she wrote" for TVRO systems, and there were plenty of good sites to choose from. But now, with many of the available TI-clean sites

### 1983 CATV COAXIAL CONNECTORS & ACCESSORIES BINDER OFFERED BY GILBERT ENGINEERING

A full line of coaxial connectors and accessories manufactured by GILBERT ENGINEERING of Phoenix, Arizona is described in this 3-section binder. Included is Catalog '83 (32 pages) giving complete information on Gilbert Engineering's connector product line. Also included is the 1983 Reference Table, a 20-page guide giving comprehensive coaxial cable specification information to aid the user in choosing the proper connectors for each application. Another feature of the 1983 binder is a complete set of installation instructions and data sheets on all the NEW products Gilbert has available. To receive your 1983 CATV Connector Binder — write Gilbert Engineering, P.O. Box 23189, Phoenix, Arizona 85063 or call TOLL-FREE: 800-GILBERT.

### BLONDER-TONGUE SEMINAR

May 24, 25, 26, 1983: A Blonder-Tongue MATV/CATV/LPTV/TVRO Technical Seminar will be held in Gaithersburg, MD in conjunction with L-C-A Sales. Contact Brian Dolan (301) 933-4965, L-C-A (914) 961-4700 or Gloria Rothfuss (201) 679-4000. ●

### AVANTEK TELEPHONE INTERFACE ALLOWS REMOTE PROGRAMMING OF TVRO RECEIVER

Avantek Inc., Santa Clara, CA has introduced a telephone interface, the ARI-1000, to provide remote channel selection for its AR1000 Simulchannel™ Satellite Receiver System. The unit occupies only 1.75 inches vertical space on a standard 19" rack.

When called, the ARI-1000 will answer after a user selectable number of rings. The caller must then enter a previously selected seven digit security code to prevent unauthorized access. Proper security code entry will be confirmed by a tone which indicates that the receivers are ready to accept commands for rack, bay and channel selection. Up to four mainframes (24 receivers) can be addressed by direct connection through the phone lines.



The Avantek® AR1000 Simulchannel™ earth station video receiving system is designed for CATV systems and other users who require broadcast quality reception of two or more satellite-relayed program channels. A single AR1000 receiver will receive up to six channels simultaneously, and receivers may be combined, using the same LNA/Downconverter for additional channel capacity. The unit has been FCC type accepted for direct connection to telephone lines.

The ARI-1000 is priced at \$2995, with delivery approximately 90 days ARO. For more information on the ARI-1000 Remote Telephone Interface and Avantek's complete AR1000 earth station receiving system call Bill Reardon, at Avantek, (408) 946-3080, ext. 325. ●

# Classified

## FOR SALE

**FOR SALE:** Satellite Receiver, Gardiner Comm. Model 4110, Crystal Synthesized, 24-Chan., Like New, Have All Papers, Manual. \$1500. R. Carey (619) 275-4174.

### CATV SOFTWARE

Timex/Sinclair Computer

**2K RAM PROGRAMS \$10 each**

- TVRO Pointing
- Microwave Pointing
- C/N Cascade
- 2nd Order Cascade
- 3 Beat Cascade
- Xmod Cascade

**16K RAM PROGRAMS \$20 each**

- TVRO Link Budget (with S/N Calculations)
- Microwave Link Budget (with rain fade outage)
- Plant Design Link Budget (Distortion Tradeoff)
- Cable Tech Scratchpad
- RF Tech Scratchpad

All software is user friendly, on cassette tape with clear instructions. Write for info or send check with order.

**SOFTWARE HILL P.O. Box 568  
New Brunswick, NJ 08903**

### FOR SALE

Radio Shack TRS 80 Model II Computer  
Radio Shack Line V Printer  
Radio Shack 3 Drive System  
Used very little, \$6,000.00  
Southern Wisconsin Cable Inc.  
719 Williams St. Lake Geneva, Wi. 53147  
414-248-8000

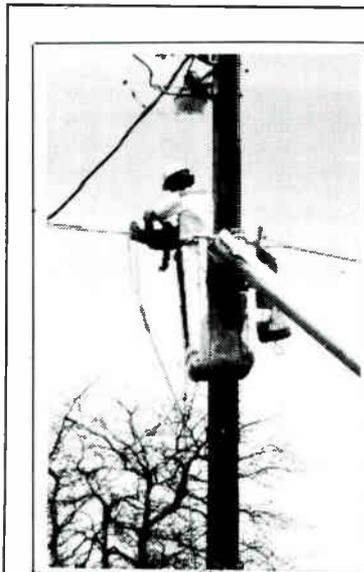
### SOLICITATION FOR CABLEVISION PROPOSALS WASHINGTON COUNTY

Washington County, N.C. is considering issuing a non-exclusive cable television franchise in Washington County outside the limits of municipalities within the County.

Persons interested in making proposals to deliver cable television service to Washington County should secure the information from the office indicated below. Proposal deadline is June 15, 1983.

County reserves the right to decline any and all proposals.

**JACK DISARNO, County Manager  
P.O. Box 1007 Plymouth, N.C. 27962**



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c/o CATJ  
4209 N.W. 23rd  
Suite 106  
Okla. City, OK 73107

## Your company can help us prevent child abuse.

**Help us get to the heart of the problem.**

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Box 2866, Chicago, Illinois 60690**

- Please send us information on how we can help.
- We want to start helping right now. Enclosed is a check for \$\_\_\_\_\_.

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ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_ STATE \_\_\_\_\_ ZIP \_\_\_\_\_



**National Committee for  
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ANY member of CATA may advertise in the CATJ classified section FREE OF CHARGE (limit of 50 words per issue — 3 issues per year.)

CATA offers three types of memberships:

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- 2.) Associate Members — pay an annual fee.
- 3.) Individual Members — pay an annual fee.

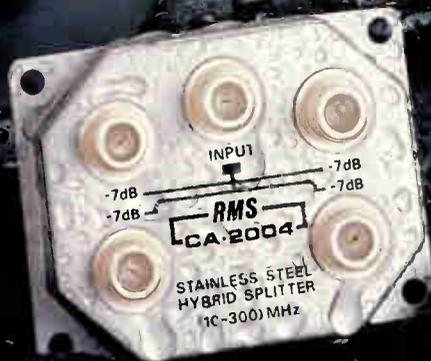
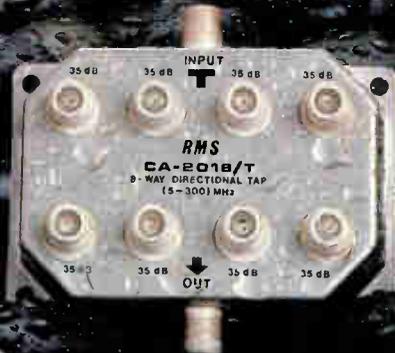
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