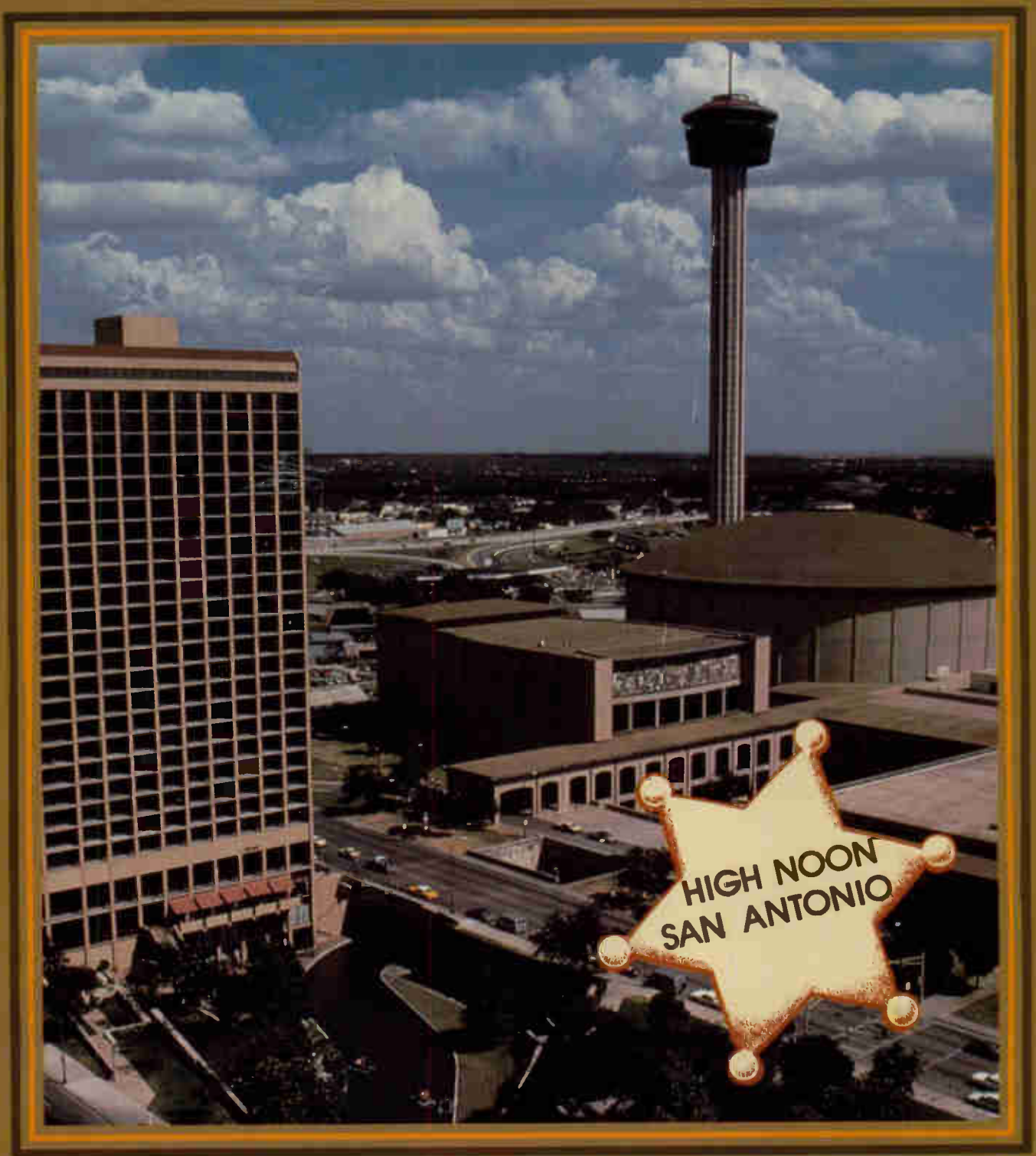
CATJ

OFFICIAL JOURNAL OF THE COMMUNITY ANTENNA TELEVISION ASSOCIATION
FEBRUARY 1983



The Big Show Down in Texas

CATJ VOL. 10 NO. 2

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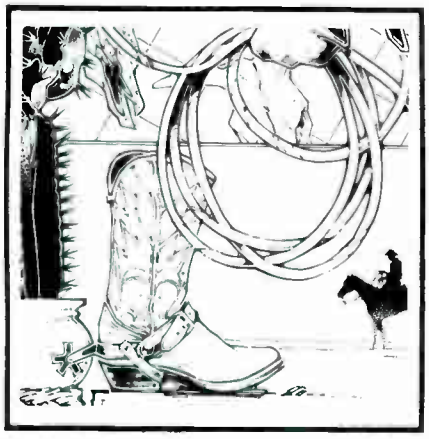

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ON THE COVER

The beauty of San Antonio once again draws cable operators from the Southwest to one of the industry's leading conventions and trade shows. "HIGH NOON" promises a worthwhile time — good business sessions, lots of exhibitors, and good times!

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catatorial

Peter Athanas
President of CATA

LOSING DISTANT SIGNALS — THE SKY IS NOT FALLING!

It is finally happening. Cable operators around the country are deciding to take off distant independent television signals rather than pay the exhorbitant fees that have been dictated by the Copyright Royalty Tribunal. The "marketplace" is now speaking loud and clear; the CRT did not really set a "marketplace" rate since, if they had, there would not be the wholesale deletion of distant signals that is now going on in the industry.

What now? Well, as you know, the cable industry with a **great** deal of help from our friend, Ted Turner, managed to wrest a little delay in the CRT decision out of Congress. Of course Ted was working in his own best interests too, since his Superstation is one of the main targets of all the effort to knock off distant signals by the Hollywood and Sports folks. But be that as it may, Ted has always been working for an interest, that ultimately helps the cable operators too, and he can't be given enough credit for the incredible job of lobbying he initiated to get the CRT 3.75% rate increase delayed from January 1st to March 15.

Nevertheless, the fact is that unless there is some sort of miracle in the next month, the absurd new CRT rate will go into effect on, appropriately, the "Ides of March". That means that if the rate increase applies to you, and if you have decided to take the additional signals you added to your system after the FCC eliminated its signal carriage restrictions off of your system to avoid the new rate, you will have to do so by midnight on March 14. Of course a lot of operators have already taken the signals off because they realized that based on Copyright Office rulings, they will have to pay for the entire 6-month period, even at the "old" rate (including the additional fees for syndicated exclusivity), if they carry those signals for even one day during the accounting period that started January 1st. That is another ruling of the Copyright Office that we would love to see challenged in Court — it is inconceivable that any court would sustain the notion that we have to pay copyright fees on programming that is not carried on the system! Yet that is what we have to do, both because of the refusal of the Copyright Office to allow us to pro-rate the fees based on that part-time carriage of a signal, or to use only the "tier" revenue as the base for payment of copyright for signals only seen on the tier. Yet they do not allow us to do that either. Both of those issues will have to be decided by the Courts. We are betting that we will win both.

But what about right now? What about the loss of those extra distant signals? Is the sky really falling? We think not. It has to be remembered that all that has happened is that we have gone back to the situation we were in in 1981, minus syndicated exclusivity. The industry was doing very well in 1981. It is not like we have suddenly lost all distant signals. We and our subscribers will survive. It is true, as we have repeatedly said, that this decision is really a slap in the face to the viewing public, and we still think that the CRT made a decision that is demonstrably not what the "marketplace" would have established as a "reasonable" rate — we also think that they violated the mandate in the Copyright Law. But none of that will be decided until after the Courts have had their say. It is unlikely that Congress will act on this issue any more until they hear from the Court.

So there you have it. There is little likelihood that the Courts or Congress will move fast enough to prevent the harm that is now being done to subscribers, who are the biggest losers in this whole thing. The cable operators must continue to fight for the rights of our subscribers, but we can also watch out for their interests by putting on other programming that in some cases is far better than what we will be forced to take off! It would be one heck of an education for everyone if we substituted C-SPAN for all of the deleted signals! Then our subscribers could really learn how this whole mess happened!

Who are the other "big losers" in this thing? Well, you may be a little surprised, but I think the broadcasters may be the ones who got the worst of all this. Why? Because as CATA has been saying for several years, it is the local broadcaster who was taken in by the Hollywood and the Sports folks. After all, that local broadcasters makes his money by selling local advertising. Cable, until now, did not sell advertising. We simply retransmitted the ads from distant markets along with the distant television progamming. Now, however, we are being forced to substitute that programming for material that has built-in local advertising availabilities. We, for the first time, are going to be seriously seeking local ad dollars in direct competition with the local broadcaster! He got snookered! If the broadcasters had been smart they would have left well enough alone — after all, they only get 4.5% of the Copyright pie, and now they are forcing us to build up our own competitive programming directly against them! It truly is incredible. The National Association of Broadcasters has led local broadcasters down the garden path in their fight against cable television im-

portation and now they find out that all they have accomplished is the creation of a formidable new competitor. It really is the ultimate irony.

As I said at the beginning of this piece, the sky is not falling. We will be taking off distant signals, that is true. And the potentially most damaging part of that is that we will crimp the efforts of some programming pioneers like Ted Turner. After all, the revenues of his Superstation are used to support CNN, and we would hate to lose that! Hopefully, support for his efforts will be as strong as his support for all of us.

The loss of diversity in independent broadcast signals will be felt most by those in the smaller television markets who have now been relegated to "second-class citizen" status again, as they were by the FCC before 1981. The addition of cable programming competition and competition for local ad dollars will be felt most by local broadcasters. And finally, since the cable industry is almost universally dropping the additional television signals rather than paying the excessive fees, the Hollywood folks won't get the extra money they thought they would be getting after all! Almost everyone would have been better off if the CRT decision had never happened. But it has, and — this too shall pass. □

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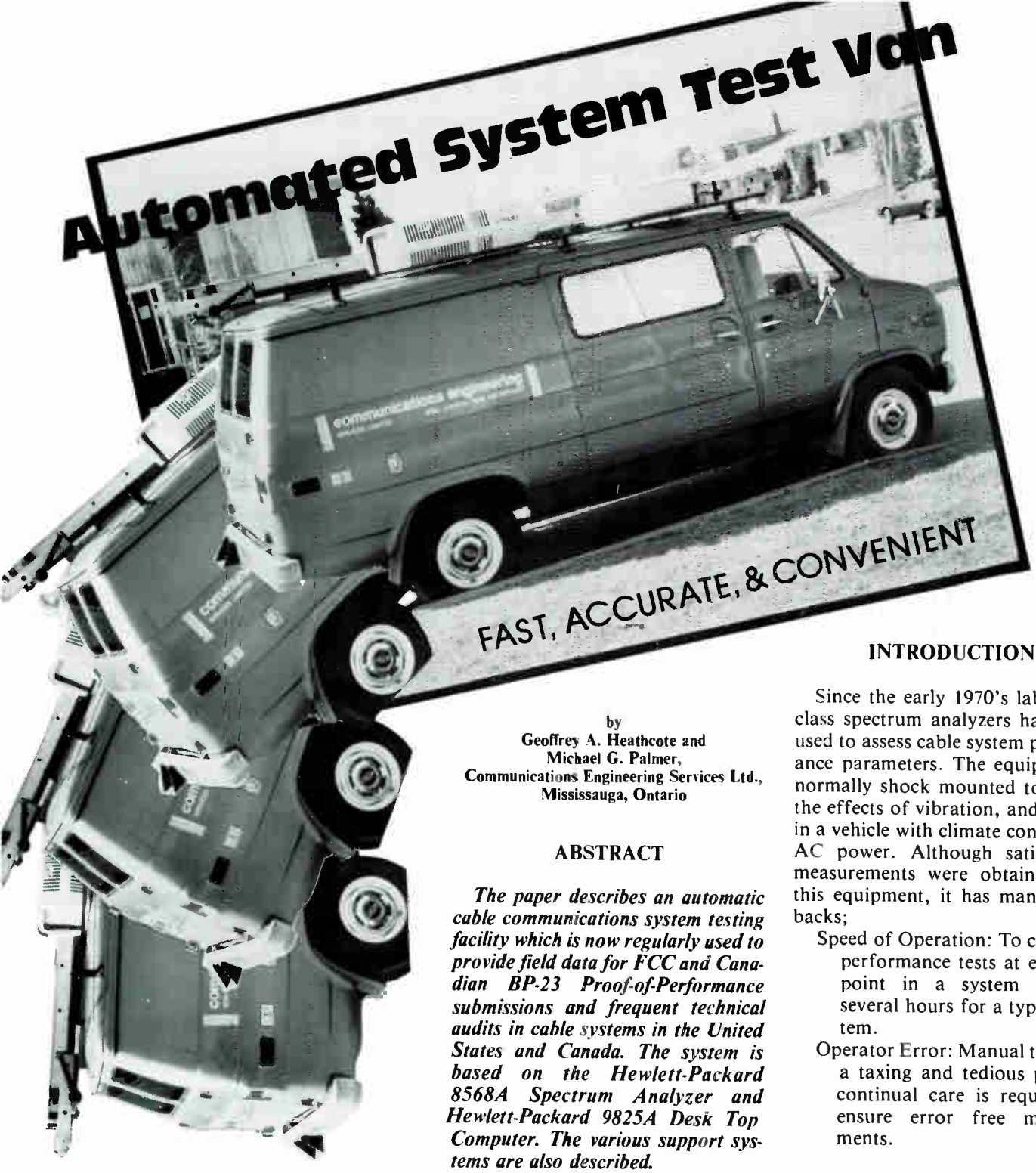
Automated System Test Van



by
Geoffrey A. Heathcote and
Michael G. Palmer,
Communications Engineering Services Ltd.,
Mississauga, Ontario

ABSTRACT

The paper describes an automatic cable communications system testing facility which is now regularly used to provide field data for FCC and Canadian BP-23 Proof-of-Performance submissions and frequent technical audits in cable systems in the United States and Canada. The system is based on the Hewlett-Packard 8568A Spectrum Analyzer and Hewlett-Packard 9825A Desk Top Computer. The various support systems are also described.

INTRODUCTION

Since the early 1970's laboratory class spectrum analyzers have been used to assess cable system performance parameters. The equipment is normally shock mounted to reduce the effects of vibration, and housed in a vehicle with climate control and AC power. Although satisfactory measurements were obtained with this equipment, it has many drawbacks;

Speed of Operation: To complete performance tests at each test point in a system requires several hours for a typical system.

Operator Error: Manual testing is a taxing and tedious process; continual care is required to ensure error free measurements.

Editor's Note

This interesting material was brought to our attention as a result of Maclean Hunter Cable TV being awarded the E. R. Jarmain Award for Innovation in Engineering presented by the CCTA, for their development of this sophisticated computer-controlled mobile test facility. This measurement system was developed by a team of engineers and technologists, representing several years of work, led by Geoff Heathcote, who is General Manager for Maclean Hunter Cable TV's Engineering Division, Communications Engineering Services Limited. Assisting him on this project, as shown, was Mike Palmer, who is one of the company's Field Engineering Specialists and who operated and refined the automated test van since its inception. This system, believed to be the first of its kind in North America, provides fast, accurate, and cost-effective analyses in both new-build and mature system operations, and accomplishes automatic assessment of how cable system performance compares with FCC specifications.

The scope of this endeavor was something CATJ felt noteworthy, and these gentlemen are to be commended for their years invested in this project and congratulated for the award as a result of this endeavor.

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Data Presentation: Following a field trip using the manual equipment, several hours of interpretation of scope photographs, field notes, and subsequent typing is required to produce the final report form.

Consistency: In spite of a comprehensive step-by-step instruction manual, variations in measurement technique occur from operator to operator.

In 1978 a new breed of spectrum analyzer became available. Of particular import in this context is the new instrument's ability to have all of its control functions fully programmable and under the control of an external computer. A test equipment package based on the Hewlett-Packard 8568A was assembled and included control computer, printer and plotter. The equipment was housed in a van with suitable AC power, climate control, shock mounting, and radio equipment.

Another major component of the system is a custom designed head-end piece. This equipment is controlled by radio from the test truck using standard telephone touch tones™, and is used to insert test carriers or sweep signals, and to delete channels where required.

Development of the necessary software to control the spectrum analyzer was based on the existing manual techniques, and has been evolving since then.

In 1982 dollars this test facility represents an investment of more than $100,000.00.

TEST EQUIPMENT

Figure 1 is a block diagram of the test equipment layout.

Spectrum Analyzer

The Hewlett-Packard 8568A lends itself to automatic control via the HP Interface Bus. The analyzer can be tuned with the precision of a frequency synthesizer while retaining analog sweep and exceptional resolution. The analyzer's control facilitates the remote operation of all function settings and the output of CRT trace information; the display itself is accessible for annotation and graphing purposes. The primary advantage of computer control is the execution of complicated or time consuming measurement routines with a minimum involvement by the operator. External control is desirable for setting the proper analyzer function values, reading data, performing any numerical manipulation required (including error correction), analyzing the results, and providing output data in a convenient format on a printer, plotter, or the analyzer CRT. All the control settings are conveniently read on the CRT display. To activate a function the user pushes the appropriate key; he/she then has the option of setting the function's value using the control knob, step keys or numeric keyboard. A "preset" button sets all analyzer controls to a convenient starting point; coupled functions such as resolution bandwidth and sweeptime

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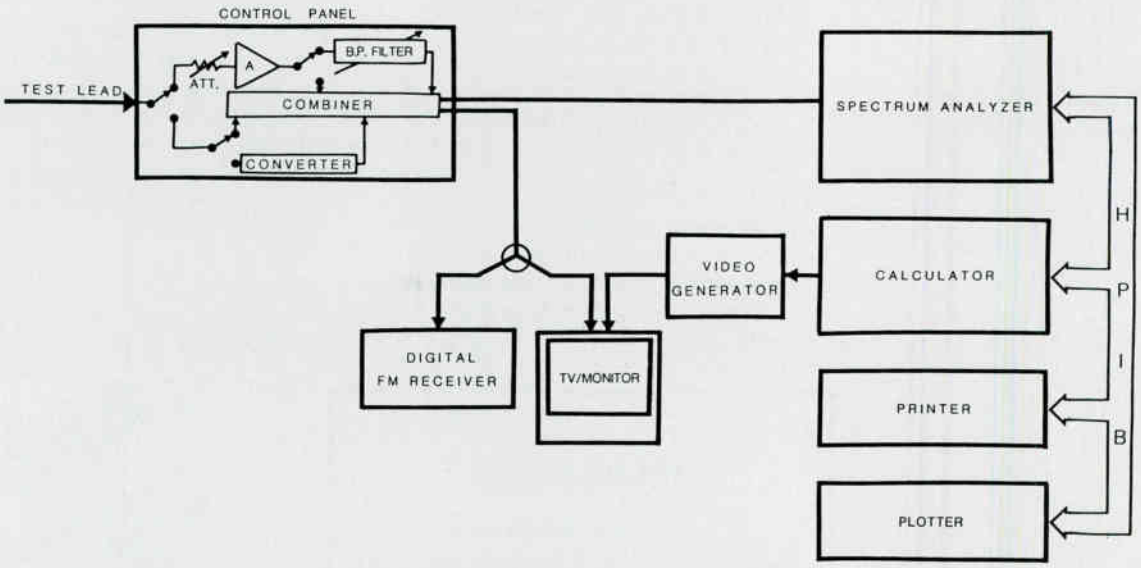
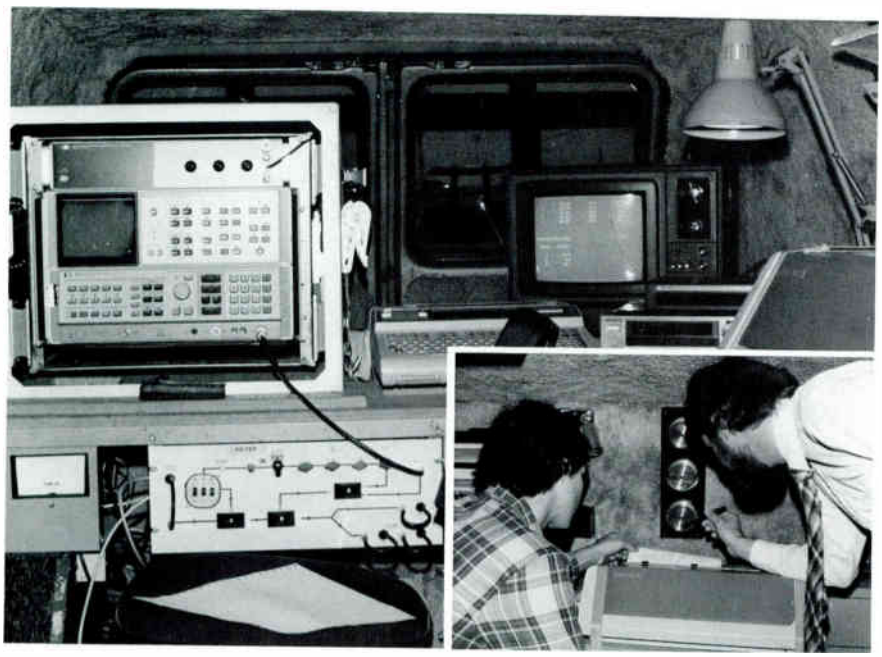


BLOCK DIAGRAM OF TEST EQUIPMENT

Fig. 1

change automatically as the frequency span is reduced to maintain a calibrated display. With the marker set to signal peak, the signal's amplitude and frequency are displayed on the CRT. A second marker, useful for modulation or distortion measurements, makes relative measurements by displaying the difference in amplitude and frequency between the two markers. Once the analyzer's controls have been adjusted, all settings can be saved in memory and later recalled to repeat measurements. A trace may be viewed real-time or stored; the function key, "max hold", displays the largest amplitude at 1001 points across the CRT over successive sweeps to aid in the measurement of cross modulation, etc.



Interior View showing some of the Mobile Test Van Equipment

Geoff Heathcote and Mike Palmer examining a print-out inside the Mobile Test Van

Desk Top Computer

The Hewlett-Packard 9825A is a desktop computer which contains built in peripheral devices. The system presently has 24K bytes of memory installed. Four ROM (Read Only Memory) slots accept a wide variety of option ROM's for additional capabilities. A 32 character LED display and a built-in 16 character thermal printer provide alphanumeric readout including both capital and lower case letters. This display is supplemented by a full video display of program functions; an interface was custom developed at Communications Engineering Services for this purpose. The high speed bidirectional magnetic tape data cartridge holds 250K bytes and has an average access time of 6 seconds to any place on the tape. Three I/O slots accept standard interface cards offering 16-bit parallel, BCD, serial, or HP-IB communication with instruments and peripherals. The HP 9825A is programmed in HPL, a high level, formula oriented language. An instruction given to the analyzer can be as simple as CF20Mz (centre frequency 20MHz).

Printer

The Hewlett-Packard 9871A high quality daisy wheel Impact Printer is used directly to print, in any form, measurement results from the micro-computer. A form feed mechanism allows for unattended operation.

Plotter

Interfaced with the micro-computer is a Hewlett-Packard 7225A Plotter, which can reproduce any CRT display, by utilizing a plotter ROM package.

Software

The system software, which was created entirely in-house, is the set of instructions for the micro-computer. These instructions or programmes control the operation of the micro-computer, spectrum analyzer and other peripherals. The programmes are written in HPL. Prior to visiting any cable system, a file is created listing TV channel number, FM frequencies of the carriers expected to be present on the system, and the system type (either standard, MPC, IRC, or HRC). As system configurations change, this file is easily up-dated by simply adding or deleting channel numbers. From this file, the micro-computer is able to deduce nominal carrier frequencies that should be present on the system and uses these frequencies as a basis to begin measurements.

When the system is turned on, a menu selection of available tests is displayed. The operator simply chooses the test he/she wishes to perform and the system will proceed either automatically or will ask for operator intervention at the appropriate points.

As an example of how this works, let's consider the hum measurement programme:

From the main menu, **SIGNAL-TO-HUM MEASUREMENT** is chosen by pushing numeric **6** on the micro-computer followed by the **"continue"** instruction. This causes the micro-computer to select the hum sub-routine. The programme asks the operator via the LED display if standard test frequencies are in use. If they are, the operator enters **1**, and

continued

"continue", if not, he is free to enter a new set of test frequencies. A menu of these frequencies is then presented to the operator and he/she is instructed to choose which frequency he/she wishes to measure. The operator makes his/her choice, signals the head-end test set to insert the appropriate carrier and also inserts a bandpass filter to reduce distortions from the analyzer itself. Following instructions from the micro-computer, the spectrum analyzer is now tuned approximately to the correct frequency and is set for a wide scan width. The process is halted and the operator is prompted to correctly tune the bandpass filter. When the operator signals that this is complete the analyzer "zooms" onto the carrier so that its final scan width is 500Hz. This is an automatic process. The display is held on the screen and the system prompts the operator to place an electronic marker on the highest visible hum sideband. When instructed to continue, the analyzer calculates the difference in level between the test carrier and the hum sideband. An appropriate correction factor is added by the micro-computer and the final result of measured hum is printed out in tabular form (see **Figure 5**), The system now selects the second test carrier frequency and the process is repeated until all the measurements have been made after which the system returns to the main menu.

The programmes are written to yield maximum convenience to the operator. English language menus and prompts are used. The programmes are halted at various times, to allow the operator to insert test carriers or other equipment. Programmes can be executed in any order, and deviations from standard test frequencies and routines are easily accommodated.

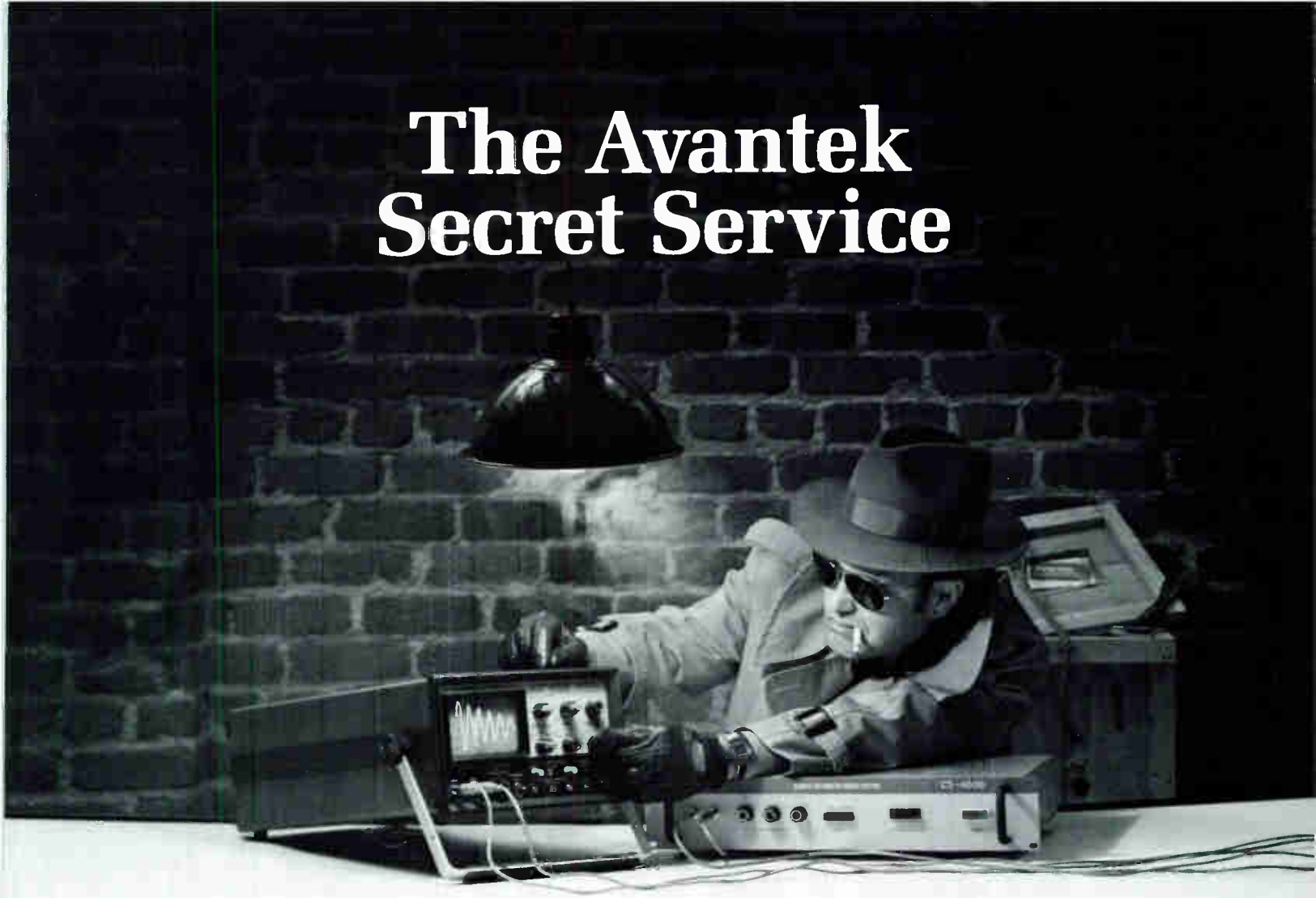
Remote Test Set

Several of the system tests require that signals be inserted or channels deleted at the head-end. In the past this has been achieved by locating a technician at the head-end, and instructing him/her verbally by radio to insert the necessary test signals. This manual signalling and head-end adjustment was slow and expensive, requiring a person full time at the head-end. The process is now accomplished automatically using a remote test set, designed and built for the purpose by Communications Engineering Services.

A block diagram of the remote test set is shown in **Figure 2.** A VHF radio receives signals from the test truck. The verbal instructions are replaced by telephone touch tones. These tones are decoded by a tone decoder chip and fed through control logic to turn on and off the various functions.

continued

The Avantek Secret Service



CATV system surveillance without bugging your customer.

Now you can sweep test your entire CATV system during prime time, or anytime with no interference to your subscribers' reception. The CR/CT 4000 low-level sweep system can automatically monitor the performance of up to 58 channel capacity systems. A low-level, non-interfering test signal below video occupies each channel for only milliseconds. The response is displayed on a portable tracking receiver. It's everything you need for regular maintenance and proof of performance including the spectrum analyzer functions of signal level, co-channel interference, cross modulation, hum, and other system conditions. The CR/CT 2000 offers the same features, but is designed for lower frequency systems.

Now, accurate measurement of scrambled carriers.

Only the Avantek SL 400 and SL 300A signal level meters can offer the same level of accuracy in measuring both scrambled and standard video carriers. Readings are based on vertical interval sync pulses rather than horizontal sync pulses, thus eliminating problems associated with other techniques.

And there's more at the Avantek store.

Many other products are available to fill out your testing and reception needs. There are instruments such as the CT 202 return-link transmitter and the CA 100B TDR cable analyzer. There are microwave components such as 3.7–4.2 GHz GaAs FET LNAs, line extender amplifiers and power dividers, and low-noise preamplifiers to increase CARS-band link performance and capacity. And now, the versatile AR 1000 TVRO earth station receiver is available with a choice of antenna-mounted LNA/downconverters, or rack-mounted downconverters for use with already-installed LNAs.

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A modified Wavetek Model No. 1067 Sweep Generator is used to generate the signal used to measure frequency response, the modification allows various sweep functions to be turned on remotely. The controls for centre frequency and sweep width are preset and are normally adjusted prior to testing. Four separate sweep ranges can be selected remotely. Responses up to 400MHz can be measured.

Up to four battery powered crystal oscillators, used for cross modulation and hum modulation measurements, can be turned on and off remotely. The oscillator levels can be individually adjusted prior to insertion in the cable system. High quality crystal oscillators were chosen for their frequency stability, high output and low current drain. The frequencies of 110, 220 and 246 MHz have been chosen for their suitability in most systems. The oscillators are modular; output frequencies can be changed by plugging in a new module.

To delete channels, as required when measuring intermodulation, the system is capable of switching on and off four AC outlets. The channel processors or modulators selected for deletion are plugged into these AC outlets.

The control logic contains timing functions to limit the duration of all of these functions, to minimize subscriber annoyance should radio contact be lost or if the operator inadvertently forgets to switch off a particular test functions.

Control Panel

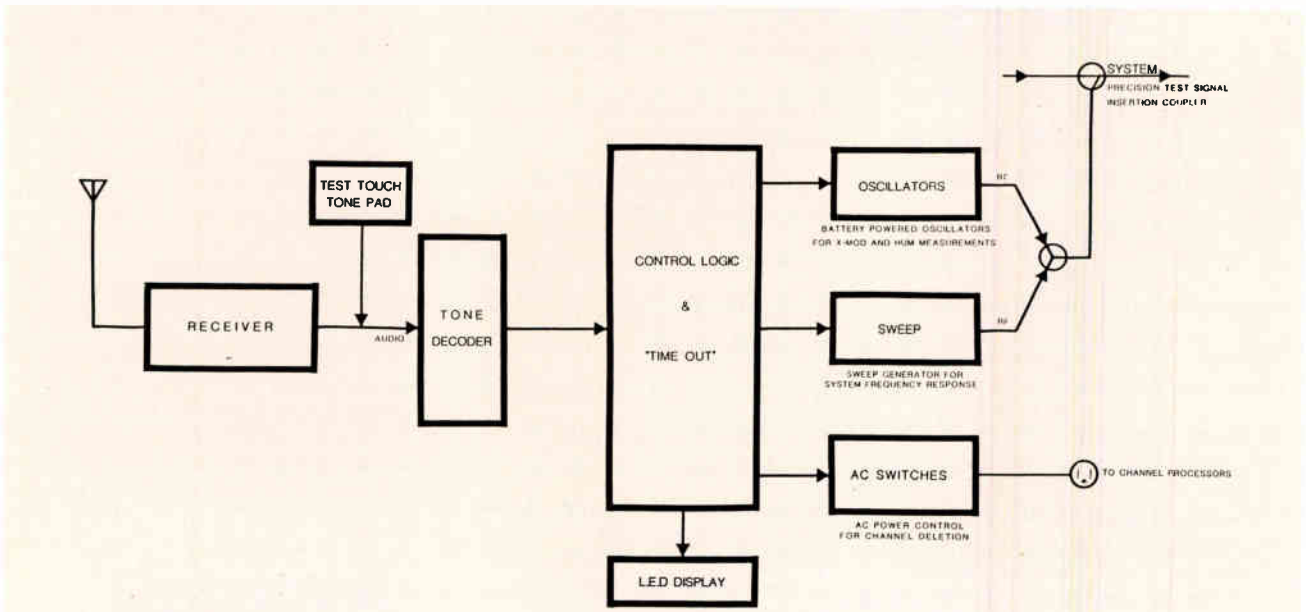
Signals are routed to either the spectrum analyzer, TV set or FM tuner using a custom made control panel. This panel is equipped to either pass the signal unaffected to the spectrum analyzer or control the signal level using a system of filters, attenuators and a broadband amplifier.

Other Test Equipment

Connections are made to the cable system using high quality RG-59 cable to simulate a subscriber drop. Tuneable bandpass filters are used ahead of the spectrum analyzer where appropriate to avoid distortion products on certain measurements. A Sony Trinitron™ TV receiver and converter combination is used to assess subjectively picture degradation. This receiver is also used as a monitor, in conjunction with a custom built interface box, to display micro computer functions in a video format. A Sony synthesizer controlled FM tuner, with digital display, is used to assess FM sound quality.

SUPPORT EQUIPMENT

The spectrum analyzer and other equipment upon which the test facility is based, is primarily intended for use in a lab environment. Our requirement called for the equipment to be transported over many miles of road, and operated at both winter and summer temperature.



REMOTE TEST SET

Fig. 2

The equipment is housed in a 3/4 ton heavy duty van equipped with 8-ply heavy duty truck tires, and a burglar alarm against theft. The inside shell of this van is sprayed with foam to provide sound absorption and thermal insulation. On top of this foam is a covering of plywood and finally an interior finish of sound absorbing material. In winter, heating is supplied by front and rear heaters from the truck's own cooling system while the truck is in motion, or from electric heaters powered by the truck's own internal generator. In summer a roof-mounted 12,000 BTU Coleman air-conditioner supplies cooling.

In the field AC power is supplied by a 6.5 kilowatt Onan generator. This unit is mid-mounted in the vehicle to improve road handling. The generator is housed in a special cabinet constructed to reduce noise and vibration from the generator. The cabinet is lined with fibreglass and contains a metal housing/baffle system to reduce sound and vibration. The generator housing also serves as a mount for the printer and plotter. Voltage regulation of the power to the test equipment is provided by a Kelk AC regulator and safety isolation is achieved using a Hammond isolation transformer.

The spectrum analyzer is housed in a custom made aluminum transportation case and is shock-mounted. All test equipment is mounted at eye level and firmly secured using aviation type hold-down straps. The equipment is arranged to be within easy reach of the operator and there is sufficient space for one or two observers.

The vehicle is equipped with a 28 foot roof mounted ladder, safety lighting and cones. Communications back to the head-end is provided by a 25 watt, four channel Motorola radio. A telephone type touch-tone pad connected to this radio is used to trigger the remote test set at the head-end.

TEST SEQUENCE

The set of test programmes written for the instrument, can be executed in any order. A page header is also normally run to label system name, date, temperature etc. Prior to testing a file containing all the channels used on the system is compiled and this file is used each time tests are made in that particular system.

To initiate a test the file containing the expected channels is read into the system from magnetic tape, and the variable information such as date, test point number etc., is typed in. This process takes about 3 minutes. At this point any one of the available programmes can be selected.

It is a usual procedure to measure visual and aural carrier levels first. If these are not close to specification, then the tests need not be continued until the signal level problem is rectified. To measure carrier frequencies and levels, the spectrum analyzer is tuned under computer control to each carrier described in the data file, automatically setting a pre-determined sweep and resolution bandwidth and then measures

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NEW

CATA Announces 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.

BASIC SEMINAR

The Basic Seminar remains at a **three-day** schedule and begins with an in-depth study of how a cable system works from signal sources to the subscriber's TV set. Included in this portion of the Basic Seminar are various sources of CATV system signals, their reception, the headend, trunk and distribution systems, and house drops, providing familiarization with the equipment requirements and usage throughout. Additional topics covered in detail are the theory of coaxial cable, minimum standards for proper house-drops (aerial and underground), use of the proper connectors and splices, understanding and proper use of a signal level meter, system operating procedures, and basic trouble-shooting procedures.

ADVANCED SEMINAR

Five days make up the Advanced Seminar which is designed for the more astute and **experienced system technicians, chief technicians, and system engineers.** System Technical Operation requirements, technical standards, and system tests and measurements are covered in detail. These subjects are taught with the assistance of equipment items such as sweep generators, spectrum analyzers, fault detectors, and signal leakage equipment. Emphasis is placed upon system problems and failures, including system design concepts, powering, bonding and grounding, and signal leakage. The first three days are devoted to the theory, with the remaining two days dedicated to a **hands-on** laboratory where attendees actually perform tests and measurements from bench and system sweeping to spectrum analysis.

Emphasis on proper cable connections, use of signal level meters, and basic trouble-shooting procedures is enhanced by an actual **hands-on** experience with the materials and equipment.

The **Basic** Seminar is designed for **installers, installer-technicians, basic systems technicians, and others such as sales and management personnel, or MATV/SMATV operators** who need to know and understand the intricacies of a cable system.

REGISTER NOW!

Following is registration . formation that is self-expla
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. ➤

REGISTRATION INFORMATION

TO enroll in a CATA CATV Technical Training Seminar,
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1) Complete the form below.
2) Enclose a check payable to CATA in the appropriate amount.
3) Mail the form and your check to:

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4209 N.W. 23rd, Suite 106
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Get Your Registration In Today To Insure A Reservation.
Attendance is limited to 50 people at Basic Seminars and 40 people at Advanced Seminars to provide proper laboratory experience.

GENERAL INFORMATION

Registration is from 8:45 to 9:00 am on the first day. All other technical sessions begin at 8:00 am and end at 5:00 pm each day. Morning and afternoon coffee breaks and all of the required materials for the technical seminars are provided by CATA.

---------- CUT HERE ----------

REGISTRATION FORM

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FEBRUARY 21-23

BATON ROUGE, LOUISIANA
JUNE 13-15

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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
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SUBSCRIBER MATERIALS
Taps
Drop Cable
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HOUSEDROP
Aerial Installation
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CONNECTORS
Connector Types
Cable Preparation
Proper Installation
Signal Leakage

FINDING PROBLEMS
Signal Level Meters
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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)

CHARLOTTE, NORTH CAROLINA
MARCH 21-25

ONTARIO CALIFORNIA
APRIL 4-8

NEWARK, NEW JERSEY
MAY 2-6

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

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

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.

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

BIRMINGHAM, ALABAMA, FEBRUARY 21-23

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BIRMINGHAM, ALABAMA 35206
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PRINCE MURAT INN
1480 NICHOLSON DRIVE,
BATON ROUGE, LOUISIANA 70802
PHONE: (504) 387-1111

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ADVANCED

CHARLOTTE, NORTH CAROLINA MARCH 21-25

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900 NORTH TRYON STREET
CHARLOTTE, NORTH CAROLINA 28206
PHONE: (704) 373-0300

The Best Western Downtown is located in downtown Charlotte. Exit 11A from I-77. Exit 38 from I-85N to I-77 to Tyron Street extension. Room Rates: $24.96 Single, $33.28 Double

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81 WEST FOOTHILL BOULEVARD
UPLAND, CALIFORNIA 91786
PHONE: (714) 982-8821

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NEWARK, NEW JERSEY, MAY 2-6

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10 JACKSON DRIVE
CRANFORD, NEW JERSEY 07016
PHONE: (201) 272-4700

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CUT HERE

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(Date) (Time) (Date)

SEND DIRECTLY TO HOTEL CATA CATV TECHNICAL TRAINING SEMINAR □

continued from page 15

frequency and level. The results of this measurement are printed out in tabular form (see **Figures 3** and **4**), and the instrument moves to the next carrier. This process takes less than seven minutes for a 35 channel system with FM's and requires no operator assistance.

For signal-to-noise measurement, after calling up the appropriate programme, the operator selects a portion of the band free of modulation or distortion where the system noise floor can be observed. The operator sets the analyzer to the nearest video channel and the analyzer measures the video level of this channel and instructs the operator to move a marker to an appropriate point in the spectrum where the system noise floor is visible and free of modulation or other spurious signals. The programme selects appropriate settings for this process. After the operator is satisfied that proper noise floor is being observed he instructs the instrument to continue, whereupon it calculates the difference between the video carrier level and the noise floor, applies an appropriate correction factor, then calculates and prints out the system signal-to-noise at that channel (see **Figure 5**). Measurements are normally made at several points throughout the band, this process takes less than one minute per measurement.

Cross modulation and hum are measured by interpretation of sidebands as measured by the spectrum analyzer. Battery powered crystal oscillators located at the head-end as part of the remote test set, are used to generate test signals for these measurements. These oscillators can be turned on and off by radio using the touchtone signalling system. The operator enters into the system the carrier frequency under test, and switches in an appropriate bandpass filter to avoid distortions generated in the analyzer itself. The spectrum analyzer locates the carrier and adjusts its instrument settings for the appropriate measurement. The operator is then instructed to move the electronic marker to the appropriate distortion sideband. The instrument's excellent frequency stability and accuracy and the max hold function in the display facilitate accurate and consistent measurements in a fraction of the time taken with manual system. This process normally takes 2 minutes per measurement. See **Figure 5** for a sample printout.

For measurements of intermodulation products, the operator signals by radio the remote test set at the head-end to delete a pre-selected channel. The spectrum analyzer

OBJECTIVE TEST RESULTS

System: TORONTO
Location: 5790 CAMPUS RD.
Temperature: -5C.
Test Point: 1
Humidity: 54
Date: 2/24/82
Gen. Weather: OVERCAST

TV CHANNELS FREQUENCY AND LEVELS

MEASUREMENT CHANNEL	VISUAL CARRIER FREQUENCY (MHz)	VISUAL CARRIER LEVEL (dBmv)	VISUAL AURAL CARRIER RATIO (dB)
2	55.244	6.7	16.0
3	61.251	6.5	15.6
4	67.250	6.3	16.8
5	77.250	6.4	15.1
6	83.251	6.2	15.1
B	127.248	6.7	15.6
C	133.248	5.5	14.9
D	139.258	5.9	15.6
E	145.258	4.6	16.1
F	151.249	4.3	15.4
G	157.244	5.2	14.8
H	163.250	5.1	15.0
I	169.253	4.0	14.9
7	175.243	4.5	15.8
8	181.250	6.3	15.8
9	187.250	4.7	15.9
10	193.248	4.1	14.7
11	199.260	3.3	14.7
12	205.248	5.4	15.2
13	211.259	4.9	15.2
J	217.236	4.0	14.7
K	223.283	4.3	16.1
L	229.244	3.0	16.3

FIGURE 3

automatically positions this channel in its display and instructs the operator to place the electronic marker on any visible intermodulation products. The ratio of any intermod products to the visual carrier is then printed out (See **Figure 5**). This process may take up to two minutes per channel.

Measurements of system sweep frequency response are made by inserting a slowly sweeping carrier at approximately the level of the aural carriers on the system. The spectrum analyzer automatically adjusts itself to operator determined presets and measures the entire frequency spectrum, or portions of it. The analyzer is arranged to be sweeping with a rate much faster than that of the test signal. Thus the analyzer detects the sweep signal many times as it sweeps through the band. This detection of the sweep signal appears as a peak in the analyzer's display, and using the analyzer's digital max hold function these peaks are stored. The entire analyzer display can then be plotted; an example of a sweep response of the lowband channels is shown in **Figure 6.** In actual use the system is normally swept in four bands, and the result of these sweeps is usually plotted on two graphs for convenience. This process would normally take 8 minutes, including plotting. For proofs of performance this plot is interpreted manually. This process is far simpler than interpretation of scope photographs, due to the clarity of the sweep line and the level and frequency scales.

These objective tests are followed by a subjective assessment of the picture and sound quality on the system. A synthesized FM tuner with digital readout is used to avoid uncertainty in the FM station under observation.

FIELD OPERATIONAL PERFORMANCE

The first step in making measurements in a cable system is the proper installation of the remote test set in the head-end. **Figure 2** shows a block diagram of this test set. Particular care is taken to ensure that the test point where test carriers and sweep signals are inserted is flat, in other words the signals are launched with the correct amplitude into the system. This is verified by measurement of signal levels and sweep flatness as the signals leave the head-end. A check is made that the radio equipment is functioning correctly, and that all the test set remote functions are in order.

Since the automatic equipment is far simpler to use than manual systems, we have found that system maintenance personnel take every opportunity to use it themselves as a diagnostic tool. The equipment can be moved quickly from amplifier to amplifier and measurements of the offending parameter made rapidly. Many persistent system faults have been cured using this technique.

Maclean Hunter Cable TV, Canada's third largest MSO makes extensive use of the system for internal technical audit. Each Maclean Hunter system in Ontario, Canada, is visited three times per year and a full assessment of cable system performance is carried out. The hard copy results delivered immediately by the system are available to the local technical manager for his ac-

OBJECTIVE TEST RESULTS

Date: 2/24/82

Gen. Weather: OVERCAST

System: TORONTO Test Point: 1
Location: 5790 CAMPUS RD.
Temperature: -5C. Humidity: 54

FM SIGNAL LEVELS

FM FREQUENCY NOMINAL (MHz)	FM LEVEL (dBmV)
88.1	-7.4
88.5	-7.1
88.9	-6.7
90.1	-7.6
91.5	-7.5
92.3	-7.3
92.7	-8.8
93.5	-8.3
94.5	-6.8
94.9	-6.9
95.7	-7.3
97.7	-6.8
98.5	-6.5
99.5	-7.0
100.3	-7.5
101.1	-6.9
101.5	-7.4
102.5	-7.4
103.3	-7.1
103.7	-6.9
104.9	-7.0
105.3	-6.9
105.7	-6.8
106.1	-7.4
106.7	-7.7
107.5	-7.5

FIGURE 4

tion, and summary results are delivered to corporate management as a technical audit.

The equipment is also used to produce the field measurements required for FCC and BP-23 Proof-of-Peformance. A typical 54 channel system can be assessed in one or two days; the hard copy output produced by the automated test system can be used directly in the Proof-of-Performance brief.

CONCLUSION

To our knowledge this automatic test facility was the first built in North America. It not only satisfies the Federal Communications Commission and Department of Communications requests for proof-of-performance testing, but also enables a regular and accurate assessment of cable system performance to be given to operating and corporate management. MSO's using this automated facility have enthusiastically endorsed its potential for cost saving through better application of manpower and capital funds. The maintenance personnel directly involved with automatic system testing have been able to quickly isolate troublesome recurring faults, and to assess the effects of changed maintenance procedures in the system.

ACKNOWLEDGEMENT

The development of this automatic test system was a team effort. The authors wish to acknowledge the contributions of various employees of Communications Engineering Services and in particular Sruki Switzer for evolving the original concept and securing the necessary capital funding. □

System:	TORONTO	Test Point:	1	Date:	2/24/82
Location:	5790 CAMPUS RD.				
Temperature:	-5C.	Humidity:	54	Gen. Weather:	OVERCAST

SIGNAL TO NOISE RATIO (SNR) MEASUREMENT	
CHANNEL	SNR (DB)
2	45.8
5	50.0
B	47.0
7	41.0
13	42.7

CROSS MODULATION LEVELS (XM) MEASUREMENT	
FREQUENCY (MHz)	XM (dB)
110.0	-57.0
220.0	-53.4

INTERMODULATION LEVELS (IM) MEASUREMENT	
CHANNEL	IM (dB)
5	-56.1
B	-58.9
L	-52.2

HUM MODULATION LEVELS (HUM) MEASUREMENT	
FREQUENCY (MHz)	HUM (dB)
110.0	-54.5
220.0	-56.0

FIGURE 5 OBJECTIVE TEST RESULTS

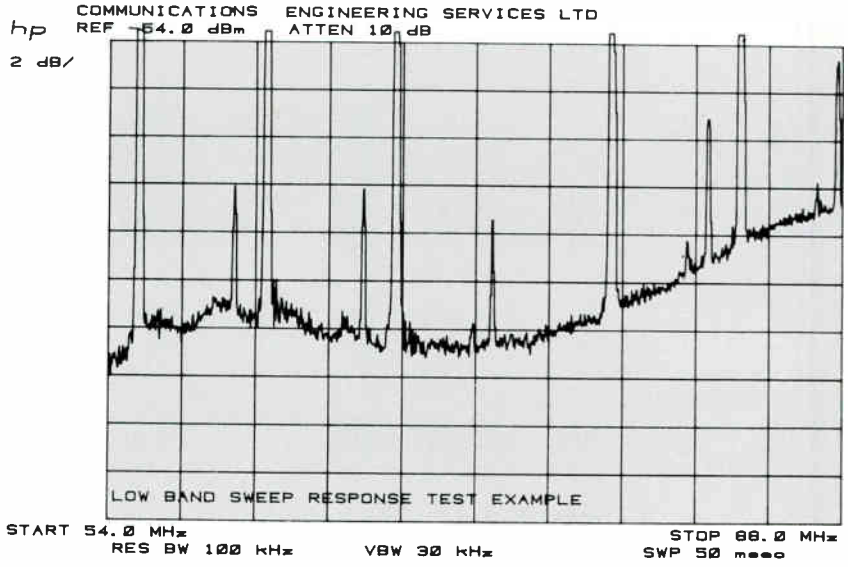

FIGURE 6

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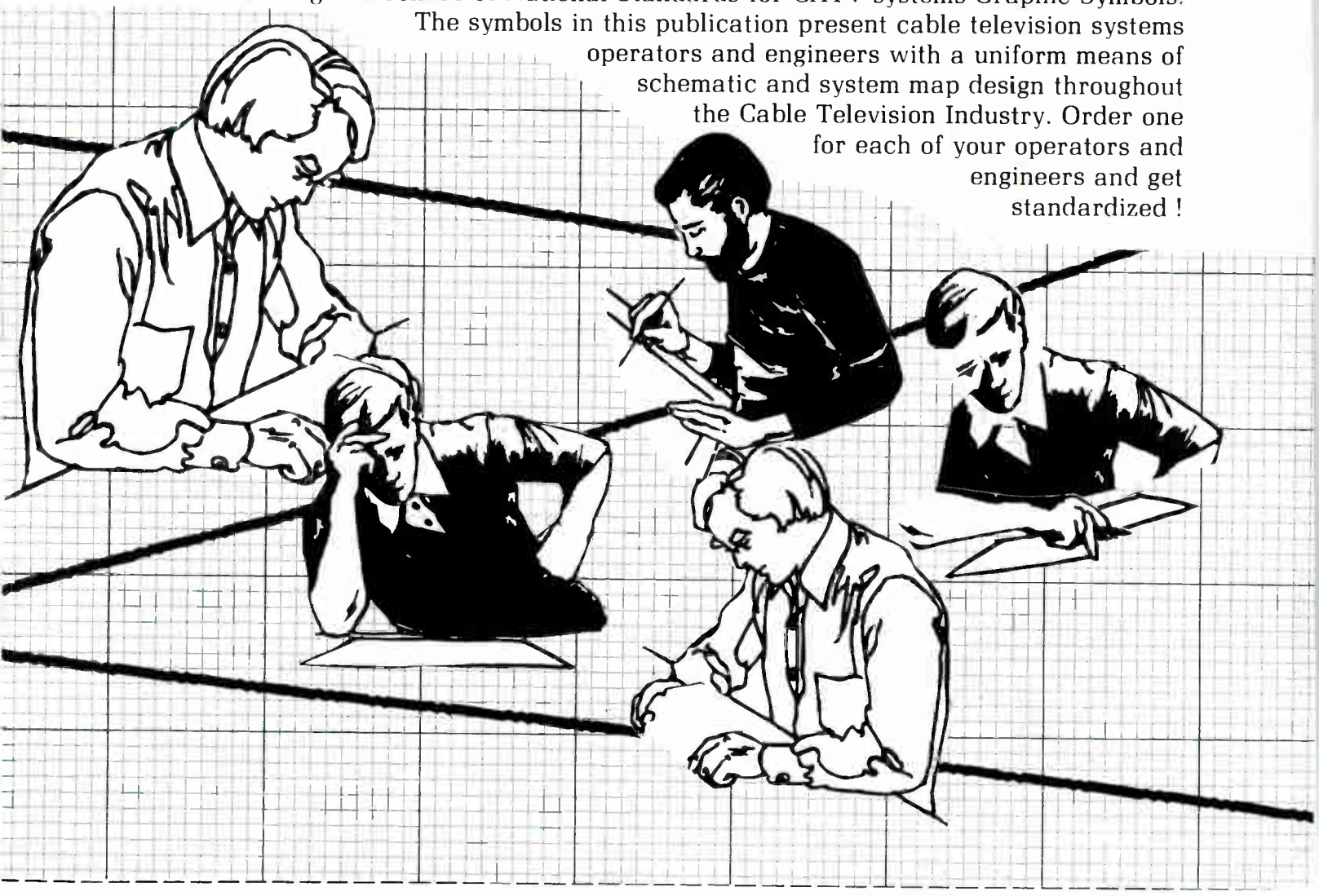

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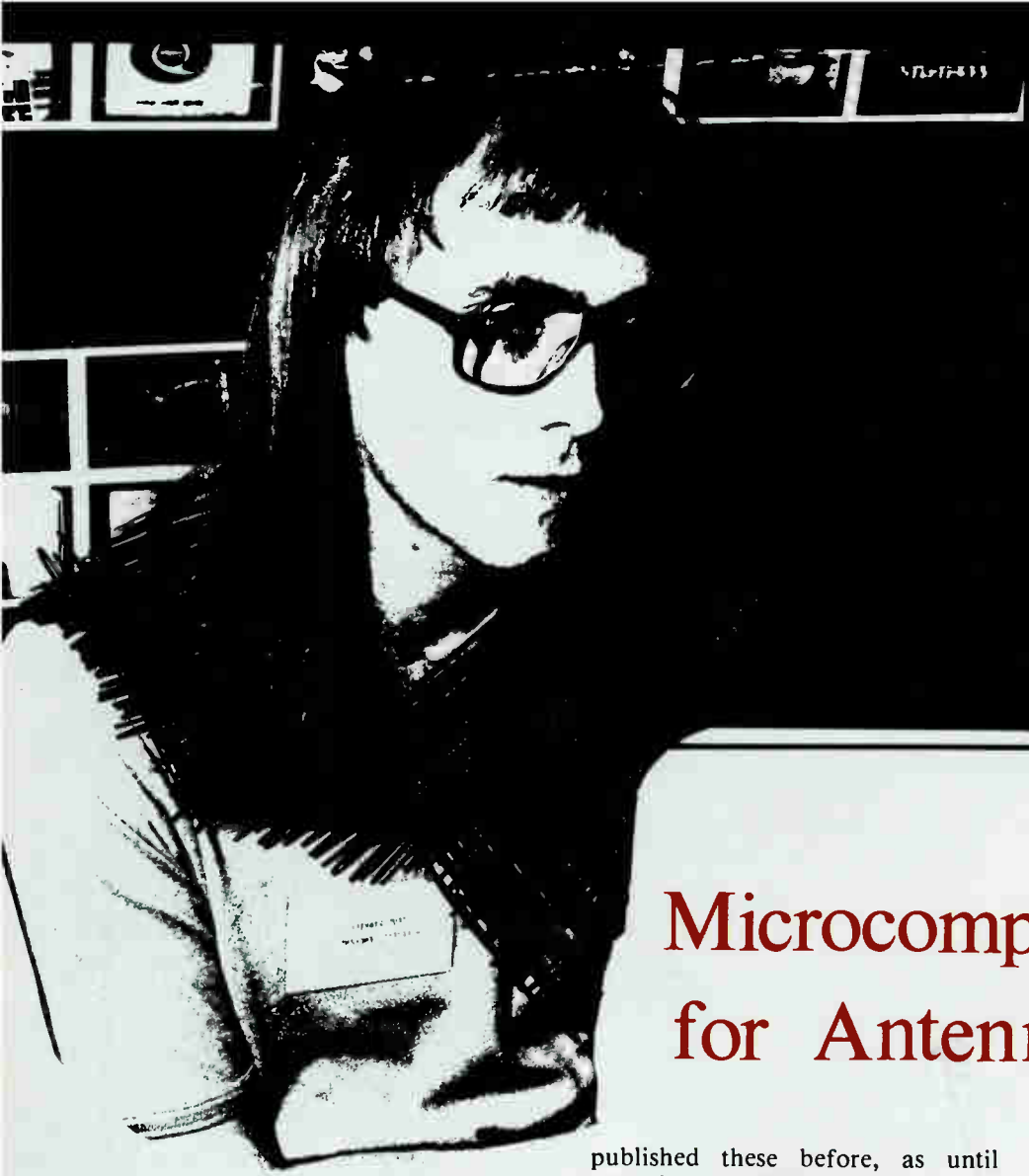


S.J.Birkill
on Experimental Terminals

Microcomputer Program for Antenna Pointing

Two years ago, I bought myself a computer. It wasn't an IBM, an Atari or a Hewlett Packard, an Apple, PET, VIC or a TRS-80. It was Sinclair's ZX81, the cheapest machine on the market to offer an acceptable range of **BASIC** commands. It was simply all I could afford. Of course it has its limitations, not the least the flat, pressure-sensitive keyboard. But the hardware is cleverly organized to put a lot of power into its small package, and with the 16K RAM pack and printer, it makes a good number cruncher.

I had soon developed two "workhorse" programs, one to compute look-angles to geostationary satellites, the other to model the Molniya orbit from its elements, and give ground track, look angle and height/range listings. I haven't published these before, as until recently the ZX81 was marketed only in Great Britain. As with most micros, the ZX81 employs its own variation (the computer buffs like to say **dialect**) of the BASIC language, and a ZX81 program will not work directly on a different machine, without translation. But now thanks to the Timex corporation. the Sinclair is available in the USA, and gaining popularity through its low cost.

The program given here is a development of my geostationary program, to give data for the modified polar mount (**see CATJ February 1982**) as well as the standard azimuth and elevation coordinates. It differs also from other satellite programs in offering data for only those satellite locations entered at the time, which are relevant to the location of interest. You don't need telling that an Atlantic Intelsat is out of view from Australia! It presents its results in two convenient tabulations, the first showing azimuth, elevation and range, and the second, for polar mount installations, showing the two mount alignment angles, and then a listing of Hour Angle for each satellite (column HA). This Hour Angle is the angle through which the antenna turns about the fixed polar axis, in scanning along the geostationary arc. It is given in a slightly different form to the astronomers' hour angle; here it represents motion away from the meridian, in an east or west direction as shown by the suffix E or W. The polar listing also shows elevation angle and slant range, for path calculations.

continued on page 27

continued from page 24

S.J. Birkill on Experimental Terminals

CATJ OFFICE 35.47 NORTH
97.53 WEST

SAT (W)	AZ	EL	RANGE
14	*****	****	*****
18.5	96.4	0.2	41654
21.5	98.2	2.5	41385
24.5	100.0	5.1	41117
27.5	101.9	7.5	40852
34.5	106.5	13.2	40247
53	120.5	27.8	38810
66	133.4	37.0	38014
70	138.1	39.5	37816
74	143.1	41.8	37641
79	150.0	44.3	37458
83	155.9	46.0	37342
87	162.2	47.3	37253
91	168.8	48.2	37192
95	175.6	48.7	37160
99	182.5	48.8	37156
104	191.1	48.2	37191
109	199.3	47.0	37271
114	207.0	45.2	37395
119	214.1	42.9	37561
123	219.4	40.7	37723
127.25	224.5	38.2	37921
131	228.7	35.7	38119
135	232.9	33.0	38351
139	236.7	30.1	38603
143	240.3	27.1	38875
-179	*****	****	*****

POLAR AXIS INCLINATION 36.13
DECLINATION OFFSET 5.05

SAT (W)	HA	EL	RANGE
14	*****	****	*****
18.5	86.1E	0.2	41654
21.5	83.0E	2.6	41385
24.5	80.0E	5.1	41117
27.5	76.9E	7.5	40852
34.5	69.6E	13.2	40247
53	49.9E	27.8	38810
66	35.6E	37.0	38014
70	31.2E	39.5	37816
74	26.7E	41.8	37641
79	21.1E	44.3	37458
83	16.5E	46.0	37342
87	12.0E	47.3	37255
91	7.5E	48.2	37192
95	2.9E	48.7	37160
99	1.7W	48.8	37156
104	7.4W	48.2	37191
109	13.1W	47.0	37271
114	18.7W	45.2	37395
119	24.4W	42.9	37561
123	28.9W	40.7	37723
127.25	33.6W	38.2	37921
131	37.8W	35.7	38119
135	42.2W	33.0	38351
139	45.5W	30.1	38603
143	50.9W	27.1	38875
-179	*****	****	*****

FIRST EXAMPLE, USA

STACKNEDGE LODGE 51.88 NORTH
2.50 WEST

SAT (W)	AZ	EL	RANGE
-63	109.7	6.2	40997
-60	112.3	7.9	40806
-53	118.4	12.0	40378
-35	135.7	21.2	39434
-10	164.3	29.5	38656
-5	170.5	30.2	38591
1	178.1	30.6	38556
11.5	191.4	30.0	38607
14	194.5	29.7	38641
18.5	200.0	28.8	38721
21.5	203.6	28.0	38788
24.5	207.2	27.2	38867
27.5	210.7	26.2	38956
34.5	218.5	23.6	39203
53	237.0	14.7	40091
66	248.6	7.4	40869
70	252.0	5.0	41127

POLAR AXIS INCLINATION 52.54
DECLINATION OFFSET 6.82

SAT (W)	HA	EL	RANGE
-63	70.5E	6.2	40997
-60	67.4E	7.9	40806
-53	60.1E	12.0	40378
-35	41.0E	21.2	39434
-10	13.7E	29.5	38656
-5	8.3E	30.2	38591
1	1.6E	30.6	38556
11.5	9.9W	30.0	38607
14	12.7W	29.7	38641
18.5	17.6W	28.8	38721
21.5	20.9W	28.0	38788
24.5	24.2W	27.2	38867
27.5	27.5W	26.2	38956
34.5	35.1W	23.6	39203
53	54.8W	14.7	40091
66	66.4W	7.4	40869
70	72.6W	5.0	41127

SECOND EXAMPLE, ENGLAND

```
1000 REM GEOSTATIONARY LOOK ANGL
ES PROGRAM "GEO-X"

1070 LET K=PI/180
1080 DIM A(40,4)
1090 PRINT AT 11,6;"ENTER STATIO
N NAME"
1100 INPUT A$
1110 CLS
1120 PRINT AT 1,3;"GEOGRAPHICAL
CO-ORDINATES"
1130 PRINT AT 2,3;"--------------
-------------"
1140 PRINT AT 10,0;"DECIMAL DEGR
EES?          ENTER 1"
1150 PRINT AT 12,0;"DEGREES AND
MINUTES?      ENTER 2"
1160 INPUT Z
1170 CLS
1180 IF Z=1 THEN GOTO 3000
1190 PRINT AT 11,0;"ENTER STATIO
N LATITUDE, DEGREES"
1200 INPUT FD
1210 CLS
1220 PRINT AT 11,0;"ENTER STATIO
N LATITUDE, MINUTES"
1230 INPUT FM
1240 CLS
1250 PRINT AT 11,13;"N OR S?"
1260 INPUT Z$
1270 CLS
1280 LET F=0.01*INT (100*(FD+FM/
60)+0.5)
1290 IF Z$="S" THEN LET F=-F
1300 PRINT AT 11,0;"ENTER STATIO
N LONGITUDE, DEGREES"
1310 INPUT LD
1320 CLS
1330 PRINT AT 11,0;"ENTER STATIO
N LONGITUDE, MINUTES"
1340 INPUT LM
1350 CLS
1360 PRINT AT 11,13;"E OR W?"
1370 INPUT Y$
1380 LET L=0.01*INT (100*(LD+LM/
60)+0.5)
1390 CLS
1400 IF Y$="E" THEN LET L=-L
1410 PRINT AT 2,5;"WHEN HEADINGS
 APPEAR:"
1420 PRINT AT 3,5;"--------------
--------"
1430 PRINT AT 9,3;"ENTER SATELLI
TE LONGITUDE"
1440 PRINT AT 11,7;"WEST OF GREE
NWICH"
1450 PRINT AT 13,3;"(ONE SATELLI
TE AT A TIME)"
1460 PRINT AT 19,0;"WHEN LISTING
 COMPLETE USE ""STOP"""
1470 PRINT AT 21,8;"THEN GOTO 80
00"
1480 PAUSE 300
1490 CLS
1500 LET X=L
1510 GOSUB 5000
1520 GOSUB 5100
1530 LET L$=X$
1540 LET M$=P$
1550 LET X=F
1560 GOSUB 5000
1570 GOSUB 5100
1580 LET F$=X$
1590 LET G$=P$
1600 IF F>=0 THEN GOTO 1630
1610 PRINT A$;TAB 20;F$;-F;G$;TA
B 27;"SOUTH"
1620 GOTO 1640
1630 PRINT A$;TAB 20;F$;F;G$;TAB
 27;"NORTH"
1640 IF L>=0 THEN GOTO 1670
1650 PRINT AT 1,20;L$;-L;M$;TAB
28;"EAST"
1660 GOTO 1680
1670 PRINT AT 1,20;L$;L;M$;TAB 2
8;"WEST"
1680 PRINT
1690 PRINT "SAT(W)";TAB 10;"AZ";
TAB 19;"EL";TAB 27;"RANGE"
1700 PRINT "------";TAB 10;"--";
TAB 19;"--";TAB 27;"-----"
1710 FOR N=1 TO 40
1720 INPUT S
1730 FAST
1740 IF ABS S<360 THEN GOTO 1760
1750 IF S>360 THEN LET S=S-360
1760 IF S<-360 THEN LET S=S+360
1770 GOTO 1740
1780 LET A(N,1)=S
1790 LET D=K*(S-L)
1800 IF D>PI THEN LET D=D-2*PI
1810 IF D<-PI THEN LET D=D+2*PI
1820 LET B=ACS (COS (F*K)*COS D)
1830 LET H=ATN ((COS B-0.151269)
/SIN B)
1840 LET C=ATN (TAN D/SIN (F*K))
+PI
1850 LET A=INT ((C*10/K)+0.5)/10
1860 LET E=INT ((H*10/K)+0.5)/10
1870 LET A(N,2)=E
1875 IF F<=0 THEN LET A=A+180
1880 IF A>=360 THEN LET A=A-360
1890 LET A=INT ((A*10)+0.5)/10
1900 LET R=35786*SQR (0.41999*(1
-COS B)+1)
1910 LET A(N,3)=R
1920 LET A(N,4)=A
1930 LET X=A
1940 GOSUB 4000
1950 IF E>=0 THEN PRINT T$;S$;S;
TAB 7;"--";TAB 9;C$;D$;A;B$;TAB
16;"--";G$;E;E$;TAB 24;"--";TAB
27;INT R
1960 IF E<0 THEN PRINT T$;S$;S;T
AB 7;"--";TAB 10;"*****";TAB 16;
"--";TAB 19;"*****";TAB 24;"--";T
AB 27;"*****"
1970 SLOW
1980 NEXT N
1990 GOTO 1710
5000 PRINT AT 10,5;"ENTER STATIO
N LATITUDE"
3010 PRINT AT 12,2;"(DECIMAL DEG
REES, NORTH +VE)"
3020 INPUT F
3030 CLS
3040 PRINT AT 10,4;"ENTER STATIO
N LONGITUDE"
3050 PRINT AT 12,2;"(DECIMAL DEG
REES, WEST +VE)"
3060 INPUT L
3070 CLS
3080 GOTO 1410
4230 GOSUB 5000
4240 GOSUB 5150
4243 LET D$=X$
4245 LET B$=Q$
4247 LET C$=W$
4250 LET X=E
4252 GOSUB 5000
4255 GOSUB 5150
4257 LET G$=X$
4260 LET E$=Q$
4264 LET F$=W$
4265 LET X=S
4270 GOSUB 5000
4275 LET S$=X$
4280 LET T$=W$
4290 RETURN
5010 LET X$="   "
```

PROGRAM LISTING- produced by the Sinclair ZX printer.

```
5020 IF ABS X>=10 THEN LET X$="
"
5030 IF ABS X>=100 THEN LET X$="
"
5040 LET W$=" "
5050 IF X<0 THEN LET W$="-"
5060 RETURN
5100 REM :2 DECIMAL PLACES
5110 LET P$=""
5120 IF 10*X=INT (10*X) AND X<>I
NT X THEN LET P$="0"
5130 IF X=INT X THEN LET P$=".00
"
5150 REM :1 DECIMAL PLACE
5160 LET Q$=""
5170 IF X-INT X=0 THEN LET Q$=".
0"
5200 RETURN
8000 PRINT "ONE MOMENT PLEASE...
"
8002 PAUSE 100
8003 CLS
8005 FAST
8010 LET U=ATN (SQR (1777802896-
(6378*COS (ABS F*K))**2)/6378/SI
N (ABS F*K))
8020 LET Q=INT ((100*(90-U/K))+0
.5)/100
8030 LET P=INT ((100*(U-ATN ((42
164-6378*COS (ABS F*K))/6378/SIN
 (ABS F*K)))/K)+0.5)/100
8032 LET I=P+ABS F
8035 LET X=I
8040 GOSUB 5000
8050 GOSUB 5100
8060 LET L$=X$
8070 LET M$=P$
8080 LET X=Q
8090 GOSUB 5000
8100 GOSUB 5100
8110 LET F$=X$
8120 LET G$=P$
8130 PRINT "POLAR AXIS INCLINATI
ON     ";L$;I;M$
8140 PRINT "DECLINATION OFFSET
     ";F$;Q;G$
8150 PRINT
8210 PRINT "SAT(W)";TAB 10;"HA";
TAB 19;"EL";TAB 27;"RANGE"
8220 PRINT "-------";TAB 10;"--";
TAB 19;"--";TAB 27;"------"
8230 FOR N=1 TO 40
8240 LET S=A(N,1)
8250 LET E=A(N,2)
8260 LET R=A(N,3)
8262 IF R=0 THEN SLOW
8263 IF R=0 THEN STOP
8265 LET A=A(N,4)
8267 IF F<0 THEN LET A=180-A
8270 LET G=ASN (SIN (E*K)*SIN (I
*K)+COS (E*K)*COS (I*K)*COS (A*K
))
8280 LET M=INT ((10*(ACS ((SIN (
E*K)-SIN (I*K)*SIN G)/COS (I*K)/
COS G))/K)+0.5)/10
8285 LET W=SGN SIN (A*K)
8290 LET A=M
8295 LET X=A
8300 GOSUB 4000
8304 IF W=1 THEN LET C$="E"
8305 IF W=-1 THEN LET C$="W"
8306 IF M=0 THEN LET C$=""
8310 IF E>=0 THEN PRINT T$;S$;S;
TAB 7;"--";TAB 9;;D$;A;B$;C$;TAB
 16;"--";G$;E;E$;TAB 24;"--";TAB
 27;INT R
8320 IF E<0 THEN PRINT T$;S$;S;T
AB 7;"--";TAB 10;"*****";TAB 16;
"--";TAB 19;"****";TAB 24;"--";T
AB 27;"*****"
8330 NEXT N
```

S.J. Birkill on Experimental Terminals

The Hour Angle computation represents a conversion from the geocentric co-ordinates of satellite longitude, and the horizon co-ordinates of aximuth and elevation, and is the most relevant quantity in a polar mount system. A shaft encoder disc attached to the polar axis bearing will read out Hour Angle, enabling accurate translation between rotation angle and satellite longitude for each location. Declination can also be computed for each satellite (quantity G radians within the program), but is useful only to confirm that the mount's declination offset gives orbital arc tracking within one twentieth of a degree.

All computed values are presented to an appropriate degree of accuracy — there's no point in giving look angles to six places of decimals when the satellite's location is known to be no better than 0.1 degree, and the antenna's 1 dB beamwidth is 0.6 degree. The program can accommodate 40 satellite locations — more than enough for any terminal to be interested in — and the ZX81's COPY function

continued

S.J.Birkill on Experimental Terminals

```
ALICE SPRINGS                    23.71  SOUTH
                                133.88   EAST

SAT(W)        AZ              EL          RANGE
------        --              --          -----
  -53     --  *****   --   ****   --   *****
  -60     --  276.6   --    6.1   --   41009
  -63     --  277.9   --    8.9   --   40708
  -74     --  283.1   --   19.1   --   39640
  -77     --  284.7   --   22.0   --   39362
  -81     --  286.9   --   25.7   --   39003
  -85     --  289.3   --   29.5   --   38660
  -90     --  292.7   --   34.1   --   38255
  -99     --  300.0   --   42.3   --   37509
 -108     --  309.7   --   49.9   --   37055
 -110     --  312.2   --   51.4   --   36989
 -135     --    2.8   --   52.2   --   36415
 -156     --   45.3   --   52.8   --   36909
 -174     --   64.5   --   37.8   --   37972
 -179     --   68.2   --   33.0   --   38353
  171     --   74.3   --   23.6   --   39203
  143     --  *****   --   ****   --   *****

POLAR AXIS INCLINATION           24.25
DECLINATION OFFSET                3.51

SAT(W)        HA              EL          RANGE
------        --              --          -----
  -53     --  *****   --   ****   --   *****
  -60     --  61.7W   --    6.1   --   41009
  -63     --  76.6W   --    8.9   --   40708
  -74     --  67.2W   --   19.1   --   39640
  -77     --  64.0W   --   22.0   --   39362
  -81     --  59.7W   --   25.7   --   39003
  -85     --  55.4W   --   29.5   --   38660
  -90     --  49.9W   --   34.1   --   38255
  -99     --  39.9W   --   42.3   --   37509
 -108     --  29.6W   --   49.9   --   37055
 -110     --  27.6W   --   51.4   --   36989
 -135     --   1.5E   --   52.2   --   36415
 -156     --  20.0E   --   52.8   --   36909
 -174     --  45.8E   --   37.8   --   37972
 -179     --  51.9E   --   33.0   --   38353
  171     --  62.1E   --   23.6   --   39203
  143     --  *****   --   ****   --   *****
```

THIRD EXAMPLE, AUSTRALIA

should be used to print out results when the TV screen is full (error report 5, COPY gives printout, CONT clears screen and continues). If listing is complete but screen not full, use STOP, then COPY. To proceed from AZ and EL to polar listing, GOTO 8000 after COPY. The program then recalls the satellite locations already entered and prepares the polar printout. By using COPY rather than LPRINT to obtain a permanent record, full control is exercised over the printout format.

The program listing shown here is in the form produced by the Sinclair ZX printer, and may be less clear than CATJ's usual text. This is necessary to ensure every comma, semi-colon and space is in the right place if you are to enter the program accurately. One typographical error can totally disable **(bug)** the program. I hope the CATJ art department will forgive me!

Also shown are three sample printouts, one for a location in the USA, one for England, and one for Australia. A series of stars or asterisks (*****) indicates a satellite below the terminal's horizon. □

LETTERS to the Editor

Ms. C. Rule, Managing Editor
CATA/CATJ
4209 N.W. 23rd St., Suite 106
Oklahoma City, OK 73107

Dear Ms. Rule,

I do not always read magazines when they arrive, therefore the article by K.A. Simons and the letter by C.W. Gently, I have not yet seen. However, the reply by Mr. K.A. Simons concerning the db indicates that he (and his assumption of) his audience do not understand the meaning of the decibel.

The decibel is (10x) the log of a ratio, any ratio, that represents power, and (20x) the log of a ratio that represents voltage.

Conceivably, if a relationship (formula or equation) exists that has an exponent other than 1 or 2, then the proportionary factor would be other than 10x or 20x ie 40 for a Qubic etc.

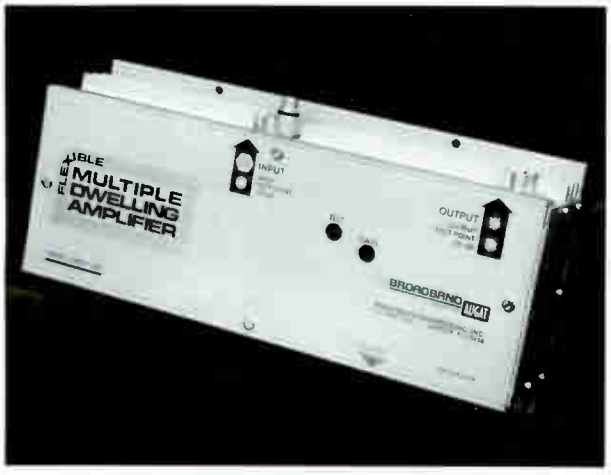
If you desire you can express any change as a ratio ie $\frac{\text{new}}{\text{old}}$ and compute the db change. A problem will only arise if you do not specify, by other letters or subscripts what you mean. This **is** where the problem arises. Some writers/publishers assume that when you read their "specialty" magazine or article you know in which system of units they will write.

Notational conventions are common the human race that inhabits this planet, and they **are** used. The "ins" understand and the "outs" complain. This however is common to the "ins" and the "outs" regardless of the subject.

That the "db" is jargon within the "ins" is an indication of lack of technical maturity. I expect to see this complaint in **Popular Electronics** only.

Paul Christie
Senior Engineer
IDR
Farmingdale, N.Y. □

Maximum Flexibility. High Performance. Low Cost.



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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.

We've designed the XMDA for one-way transmission only. This should meet the needs of most systems, and you don't end up paying for a two-way capability you may never use.

Rugged and dependable, the Broadband XMDA combines high performance with maximum flexibility at a low cost.

For additional information on specifications or pricing, call us toll-free at 800-327-6690, or write Broadband Engineering, Inc., P.O. Box 1247, Jupiter, Florida 33468. While you're at it, ask for our free catalog describing our full line of CATV products and services.

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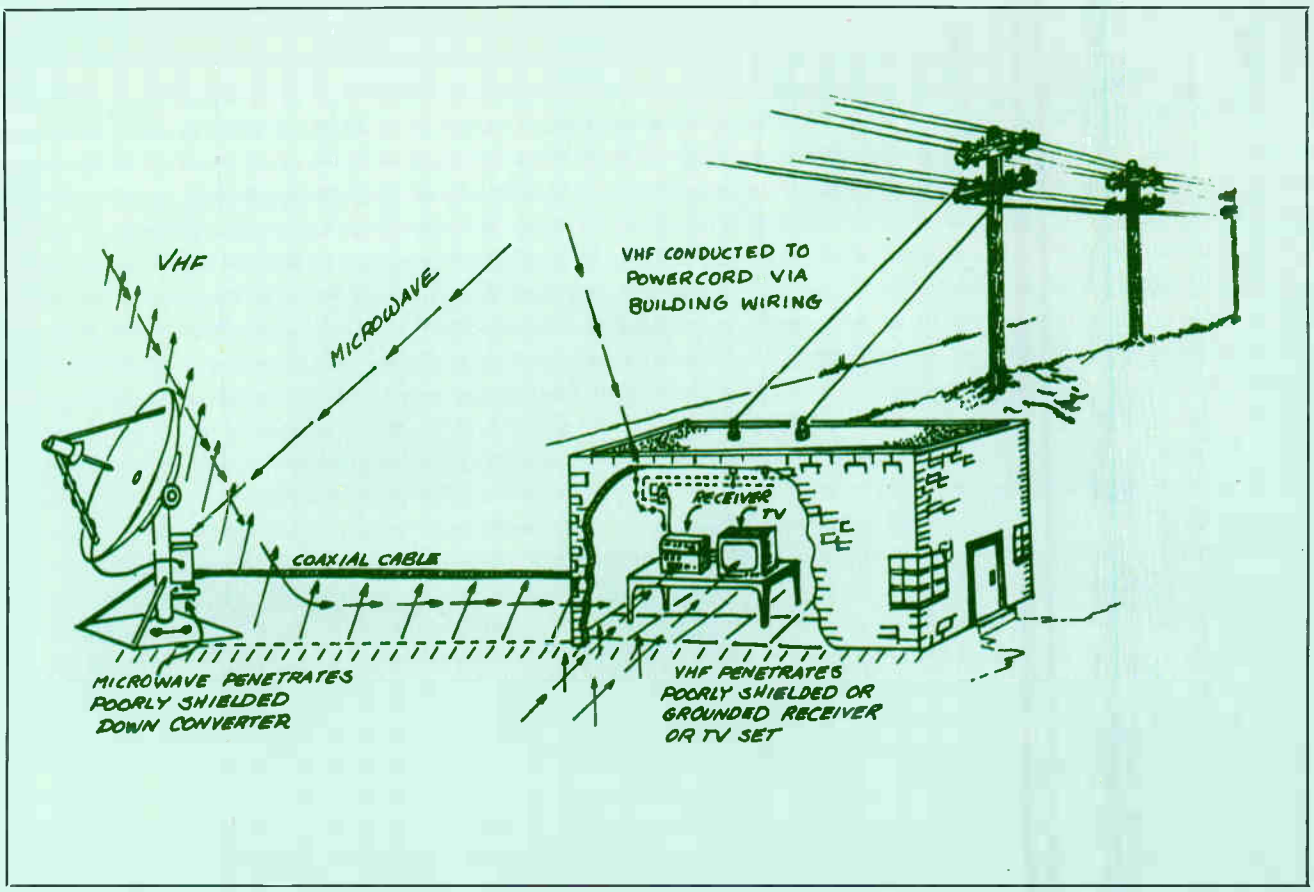


The Unified Approach

The TI avoidance-suppression approach consists of five logical steps; each of which will be discussed in detail in the installments to come:

1) TVRO Component Selection

After **basic** equipment choices are made, select the **make** with least TI susceptibility. For example, dishes with smallest side lobes.

2) Siting

Make a pre-installation TI survey and, within the property, locate the TVRO to take maximum advantage of existing shielding.

3) Defensive installation technique

Interconnecting, grounding and shielding the individual components to reduce TI probability, including non-antenna reception.

4) External "filtering"

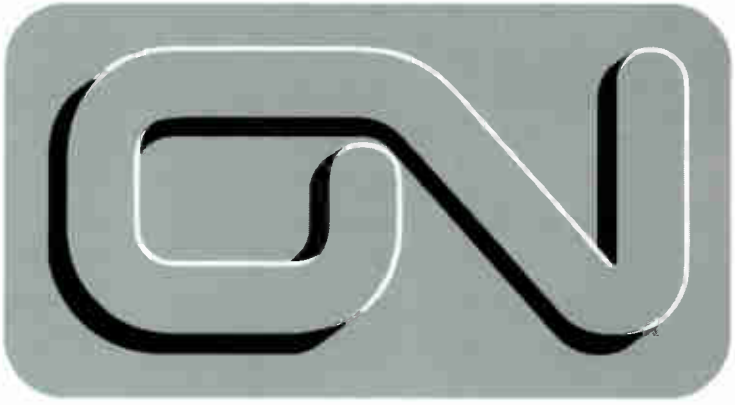
Augment natural shielding obstacles with artifical microwave barriers.

5) Suppression

Insertion of TI suppression filters into the microwave, IF or video sections of the TVRO system. This has been the subject of past installments. But we will continue with some new information developed in the field.

In the upcoming issues, we will take each of these five steps and explore thoroughly. If you have questions, or comments as we proceed, don't hesitate to contact me. □

There's only one



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ON TV provides exciting pay per view events with an experienced marketing, technical and creative staff and a track record of success.

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ON TV offers subscribers an optional tier of adult programming with 80% exclusive to the service.

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ON TV has two transponders (Comstar D-4: 4H and 6V) providing east and west coast feeds to ensure appropriate programming for all dayparts.

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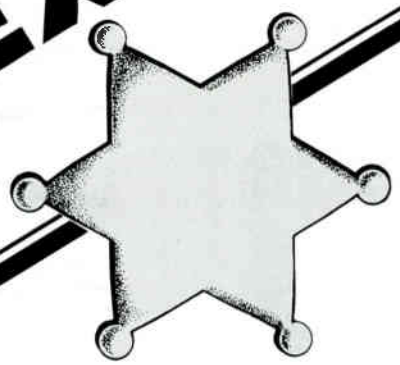
Only ON TV utilizes ORION to encode the signal and thus provide system addressability and security for the program service and pay per view events.

Call Affiliate Relations at 619-485-9880 for more information.

HIGH NOON IN TEXAS



All roads will be leading to San Antonio, Texas, February 2-4, 1983, for the 23rd Annual Convention and Trade Show for the Texas Cable TV Association, Inc., this year dubbed **"High Noon".** Another great show is in store for the attendees with a wonderful opportunity to inspect and view the latest in technology on the Exhibit Floor as over 185 exhibitors will be displaying their products February 2-4, 1983. The social events connected with the Texas Show are always delightful affairs, and this year will be no exception to that traditional Texas hospitality. But there will be plenty of business too, and below you can check the schedule for the themes of the business sessions. Hope to see you in Texas; it is always a grand affair!!

TOPICS FOR THURSDAY'S BUSINESS SESSIONS

9:15 AM - 10:15 AM
- Federal Legislative Update
- Staff Training: The Future of Service & Sales
- Great Convertor Shoot-Out

10:30 AM - 11:30 AM
- Thinking On Your Feet
- Re-Franchising - S.2172 - National League of Cities
- Will Two and Three Degree Satellite Spacing Affect Your Cable System?

1:30 PM - 2:30 PM
- R.F.I. - A Prerequisite To Expanded Services
- Program Guides: Marketing Tool For Revenue Source
- Facts On How Cable Is Changing Television

2:45 PM - 3:45 PM
- Ad Revenues - Ways To Generate
- State Legislation - What Can We Expect?
- Your Last Bullet - One Way Hardware/Two Way Service

PROGRAM AT A GLANCE

TUESDAY, FEBRUARY 1

8:00 AM	Exhibitor set-up begins
7:00 PM	Golf and Tennis Pairing Party
8:30 PM	Hilton Palacio del Rio La Corona Room- Cash Bar

WEDNESDAY, FEBRUARY 2

9:00 AM	Golf and Tennis Tournament
9:00 AM	Registration Opens
2:00 PM	Exhibit Hall Opens
6:00 PM	Cocktails
7:00 PM	Bar-B-Que, Dancing Lynn Anderson entertains

THURSDAY, FEBRUARY 3

8:00 AM	Continental Breakfast
9:00 AM	Remarks by Ted Turner Call to Order- J.E. Mankin, Jr. Mission Room
9:15 AM	BUSINESS SESSIONS
NOON	Exhibit Hall Closed LUNCHEON
1:30 PM	BUSINESS SESSIONS
2:00 PM	Exhibit Hall Opens
6:00 PM	President's Cocktail Reception
7:00 PM	Comida Mexicana Dinner B.J. Thomas entertains

FRIDAY, FEBRUARY 4

8:00 AM	Women In Cable Breakfast
9:00 AM	Exhibit Hall Opens
11:00 AM	Bloody Mary Hour
1:00 PM	Exhibits Close - Show Ends

□

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But sooner or later you'll want to take advantage of your Sweep Recovery System's more sophisticated capabilities.

For instance, you can add the Card Read/Writer and store traces for later review or comparison. Or use the Polaroid camera to make an immediate hard copy of the results.

The powerful Memory Expansion option lets you store seven traces internally, includes automatic correction for system tilt, and provides an averager to give you an instantaneous average of the amplitude trace.

You can also add an AC Adapter/heavy duty battery charger, a transmitter battery backup, notch filters, and a variety of cable equalizers and simulators.

For a detailed listing of all the options available with the Model 1855/65 system, contact Wavetek Indiana, Inc., 5808 Churchman, P.O. Box 190, Beech Grove, IN 46107. Phone Toll Free 800-428-4424. In Indiana (317) 787-3332. TWX 810-341-3226.

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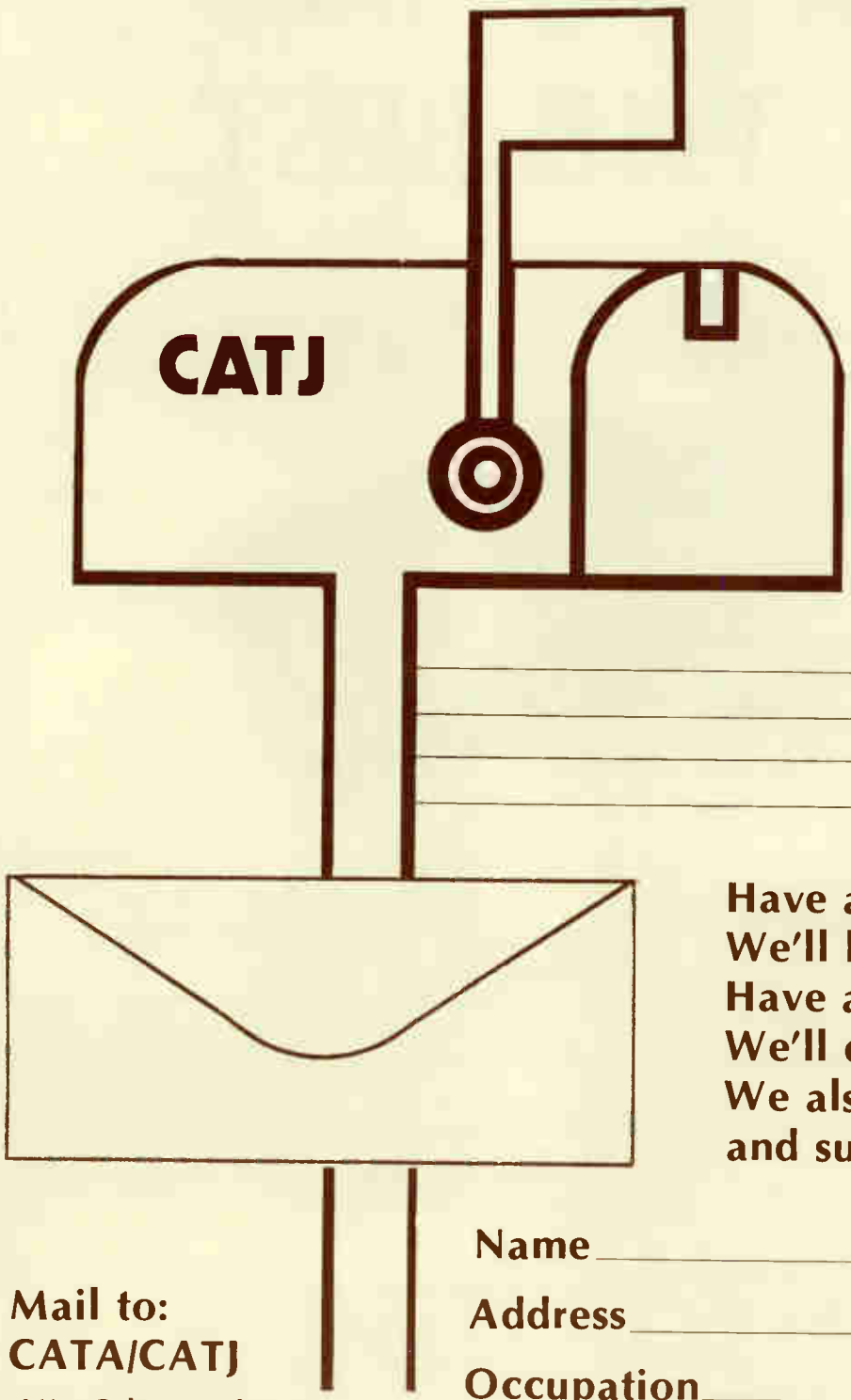

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Address _____

Occupation _____

Signature _____ **Date** _____

Mail to:
CATA/CATJ

Attn: Celeste Rule
4209 N.W. 23rd, Suite 106
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Washington Update

Steve Effros
Executive Director, CATA

As you might imagine, the telephone in the Washington CATA Office has not stopped ringing since the decision by the CRT was announced to substantially increase the rates for carriage of "extra" distant signals. Many operators have saved more than the amount of their yearly dues already in 1983 by calling the Washington Office for information about the CRT ruling rather than paying for high-priced answers from Washington attorneys. Of course we do not give out legal advice, we can only tell you the general interpretation of the rulings as they come out. There are many cases when the best advice that we give is to call your attorney — however there are many times when a simple question can be answered without having to have a time-clock start somewhere that will result in an additional legal fee later. That's part of the service CATA offers its members for their dues, and boy have they been taking advantage of it over the past few weeks! The line is busy so often that we are thinking of installing one of those automatic machines that the airlines use to let you "get in line" for the "next available agent" and listen to some music while you wait! Probably the best music to play would be a wedding march since a lot of operators are in the process of making new marriages with programmers now that the decision seems to be pretty universal that most operators will not pay the 3.75% increase for "extra distant signals imposed by the CRT. They are dropping the signals instead — a process that has been stretched out a little bit by the last-minute delay granted by Congress.

First let's review what has happened and what has been decided before going on to the most often asked questions. As you know from the last two issues of CATJ, the CRT has massively increased the rates for signals that could not have been carried prior to the FCC's elimination of the distant signal rules. That new rate, 3.75% for each additional DSE (Distant Signal Equivalent) was to have gone into effect in January, 1983. It did not.

Thanks to the tenacious effort of Ted Turner, with help from the rest of the cable industry once Ted got the ball rolling, Congress was convinced, literally at the last hour, to postpone the effective date of the increase for distant signals until March 15, 1983. We were shooting for July, but we only got till March. At least it gives us a little more time to figure this whole mess out, and possibly to go back to Congress for more relief. We won't go into the gory details of the trench fighting that went on to get that last-minute stay, however, it would be good to note for all of you that the issue at the end came down to a very few Congressmen. Every contact in every local community meant a great deal. For our part we want to thank all of you for sending the letters and telegrams that you did, and for responding to the telephone calls that went out at the last minute.

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There were several cases where the Washington CATA office, as part of a unitifed industry drive coordinated with the NCTA and with the Turner people, called some of our members at home to get them to make emergency, last-minute calls to certain members of Congress. Why we even got one operator to convince the Mayor of a large town in the district of a key Congressman to get on the phone on a Friday night to try to secure a vote. The whole thing was that close! So, if there is any lesson in all this, it is that you should **NEVER** underestimate the importance of **every** contact you make with your elected representative. Always remember that there are times when it really does come down to **ONE VOTE!**

Anyway, we got the delay of that part of the CRT ruling dealing with the 3.75% increase. The rest of the ruling, increasing the fees in the top 100 markets because of the FCC elimination of syndicated exclusivity went into effect as scheduled on Jan. 1.

So where are we now? Well, the new extra-distant-signal rates will go into effect for all such signals that are carried on March 15, 1983 unless something happens in the meantime to change that. Several things could hapen, but it is not terribly likely that any of them will. First, Congress could be convinced to extend the "stay" until the Courts rule on the legality of the increase. It would be logical for them to do that, but politically it is going to be a very difficult thing to get done. Needless to say, the MPAA and the Broadcasters are watching very closely to make sure that another stay does not get through Congress. To put it mildly, it would be one hell of a fight! That, of course, doesn't mean we won't try. But don't hold your breath, and prepare your system and subscribers for a **March 14 trigger date** just in case — that is if this decision applies to you, and if you have decided to take the "extra" signals off.

Another possibility is that the Court will rule on the legal case that has already been brought against the CRT decision. However that too is unlikely. The Court refused to grant a requested preliminary stay, and they refused to speed up the briefing process for the case. That means that there will be no "expedited" hearing of the case. We doubt that the Court will have even heard the whole case, let alone decided it by the time March 14 rolls around.

Notice that we are saying March 14 — not March 15. If you have decided to take off signals to avoid paying 3.75% of gross basic revenue for those signals you must take them off **BEFORE March 15! Thus, your deadline is midnight of March 14.**

The Copyright Office, which makes the decisions on **HOW** we pay copyright fees after the Copyright Royalty Tribunal (CRT) decides what we have to pay, has made some preliminary rulings to allow us to deal with the period from the end of December to March 14. To begin with, at the request of the NCTA, they ruled on a few key questions prior to the end of December that needed to be answered before any cable operator in his right mind would have left the signals in question on in January.

The Copyright Office said that even though they will retain their rule that once you carry a signal for even one day during a Copyright period, you must pay for that signal for the whole period, (this is known as the "No Pro-Ration" rule), you will only have to pay under the old, adjusted fee schedule, not the 3.75% so long as you take the signal off by March 14. Naturally, that was one of the questions that had the phones ringing the most in the last few days of December. After all, what good would the "stay" granted by Congress have been if the Copyright Office said that because you carried those signals for any portion of the pay period you had to pay at the higher rate for the full period anyway! They did not say that. But since they are sticking to the "No Pro-Ration" rule — one that CATA thinks is absurd and should be fought in Court, it still means that if you are carrying a signal that you will drop by March 14 to avoid the 3.75% levy, you will still be paying almost twice as much for it since you will only be carrying it for half the pay period while you will be forced to pay for the whole period!

There is nothing much you can do about that now if you carried the signal on January 1st. The Copyright Office says that carriage of the signal for even one day triggers the obligation to pay for the signal for the entire six months! How's that for the copyright owners ripping off the American public!

Another area of general confusion, and again, this is a ruling of the Copyright Office that has yet to be challenged in Court, and we wish to heck it was, is the area of "Tiers". The present rule is that even though you may have all your "extra" signals, or even all your distant signals on a "Tier", you still have to calculate all your copyright payments based on the gross basic revenue **IN ADDITION** to your tier revenue. You cannot pay just based on the tier revenue. Now we know that sounds ridiculous. Here is a situation where, say, an operator has **10,000 subscribers** but only **1000** take the tier that has the distant signals. Logic says we should only have to pay copyright for the number of people actually watching the copyrighted works. But no, the Copyright Office says you have to pay based on the entire revenue base of the system — **all 10,000!** Admittedly, there are a lot of operators who have refused to do so — who are only paying based on the number of people actually getting the programming in question. And some of those are only paying for the "tier" revenue while others pay based on the combined

basic and tier revenue but only for the number who take both. However, we must warn you that the Copyright Office says that is incorrect. Eventually there will be a Court test and that will get cleared up. But you should know that if you do not now follow the Copyright Office's interpretation, you could POTENTIALLY be liable for a lot of money, and possibly even the loss of your compulsory license. It would not appear to be a good bet simply to keep all those "extra" signals on a tier and then assume you will only have to pay for those folks who actually watch the programming.

Please, let's all remember that all of this confusion only applies to cable systems who file, or expect to have to file, based on the "long form" copyright fees. That is, those folks who have systems deriving $214,000 or more from basic revenue per half year. Also, as we pointed out last month, it does not apply, regardless of how much money the system makes, to those systems outside all television markets since those systems have never been subject to any FCC signal carriage restrictions and would be grandfathered for all signals carried if suddenly a broadcaster started operating in their area now.

That brings up another of the all-time favorite questions. What about grandfathering? Well, as far as we can tell, any signals you could legally carry, including pre-72 "grandfathered" signals, or any that you got waivers for between '72 and June of '81, can continue to be carried without incurring the 3.75% additional liability. Further, while there may be some dispute about this, it would not appear that the CRT has any authority to regulate **WHICH** signals you carry, just the **NUMBER** of signals you carry, thus the rules do not appear to be signal specific. Meaning that you may be able to switch signals around if you need to in order to create the most attractive package for your subscribers. If you are in a situation like that, it might be wise to contact your attorneys, or at least talk to the Washington Office to understand the implications of the entire thing.

That's about it. What seems to be happening is that lots of cable operators are dropping the "extra" distant signals and putting on cable-only programming instead. The main beneficiaries seem to be the USA Network, the Cable Health Network, MTV, and C-SPAN. As we have said in the past, we think it would be great if **EVERY** system carried **C-SPAN** (see article in this issue) — and it would definitely be a sort of rough justice for the Congressmen who voted in favor of this whole Copyright mess to now have to explain to the voters how they wound up on the channel insted of the programming that the folks were used to watching! That has already happened in at least one instance, and the Congressman's Office contacted

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the CATA Washington Office to see what they could do to get the signals back that the people wanted (as well as keep C-SPAN on another channel). We told them what ALL cable operators should tell their subscribers and the press if that issue comes up: Congressmen and Senators must come out **PUBLICLY** in support of a bill to get those "extra" signals back to the subscribers. It is, after all, the subscribers who are being hurt most by all of this, and Congress can very easily change the rules of the game to allow those signals back on the air. The only way that will be done is if we, as an industry, let our subscribers know that there is someone who can do something about all this — our elected representatives, and that they will have to actively work with us to get the signals back.

Now while we have been careful in all of this to make clear that most of these rule and fee changes only apply to the "bigger" systems, you should remember that there could be very bad results for all of us. If **ALL** of the major systems drop the distant "extra" signals, and the fees make it economically impossible for them ever to be carried in the major markets in the future, it could very well mean that one or more of the satellite transmitted signals will come off the bird, or at least cost the remainder of us one heck of a lot more to carry. Why? Because all of the carriers' (SSS, United, EMI) projections when they leased satellite transponder time were based on a larger subscriber base, assuming they would get into the major markets. If that is no longer true, then all of the cost projections will change — to our detriment. The bottom line here is that the **WHOLE** industry, whether these new rules directly affect you or not, has to fight against these new rulings.

How? Well, as we already said, we have to let our elected representatives know that we need some Congressional action to get this mess cleared up. That may take the form of putting a special message up on the screen if you have to take some signals off. We are looking at some wording for such a message, and may be able to help you out on it if you want the help in the near future (certainly before March 14!)

One last note, for those of you who are running up against city councils demanding that you keep signals on that you, for economic reasons have to take off (unless you get a rate pass-through). It is well established in law that the FCC has EXCLUSIVE authority over the carriage of broadcast signals. It really doesn't matter whether there is something in a franchise or not as to the specific signals you intended to carry, that portion of the franchise is, and has been preempted by the FCC. Now we are not recommending that you get into a screaming contest with the city, and especially

not in the cases where they can say they granted the franchise based on promises that they now find are unenforceable. Also, they may be able to hurt you if they have rate regulation. But it is just good for you to know that broadcast signal carriage regulation is the exclusive domain of the FCC — not the local authorities. If you have a problem like this, once again, it would be best to contact your attorney.

PRAISE THE LORD AND PASS THE AMMUNITION!

It comes as no surprise that there is a lot of competition these days to get a position on the cable dial in some communities. There still is, after all, a shortage of cable channels out there. And we are getting more and more programmers all the time. The battles are getting hotter all the time as some outfits even offer to pay to get on a channel. Another way to get on, or stay on a channel is to get subscribers to support the service and then get them to put pressure on the cable operator. One of the most blatant campaigns in that vein was recently brought to CATA's attention.

It happened in Holdenville, Oklahoma, to our good friend and strong CATA supporter Jeff Krumme. Certain subscribers in his community (apparently those who had previously donated to CBN and were therefore counted on as strong local supporters) got the following "CBN ALERTgram":

Dear Friend,

CBN has just learned that Teleview Cable, Inc. has discontinued televising the CBN Cable Network. This means that the "700 Club" and other CBN cable-originated programming will not be available in the Holdenville area.

We are disturbed by this decision which excludes your area from receiving CBN's unique 24-hour package of refreshing family entertainment and inspirational programming.

If you agree, we urge you, as a supporter of the entire CBN Ministry, to help bring CBN back to your area. Only if you show concern over the cancellation, and take action, will CBN Cable be able to supply this programming to the Holdenville Community.

For your convenience, we have enclosed two postcards, one addressed to Teleview Cable and one to us. Please write Teleview Cable and express your comments and concerns. Then let us know if you wrote to Teleview.

Remember, this matter is urgent!

Thank you for helping CBN continue its television ministry in the Holdenville area.

Appreciation and Regards,
The Management and Staff
of the CBN Cable Network

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Well, the letter was obviously an attempt to build pressure in the local community, and it was also clearly a form letter, which leads us to wonder how many other systems have been hit with this type of tactic. What we are relatively sure of is that very few elicited the response that Jeff sent back once he found out what was going on;

Dear Management and Staff

For some time we have been considering the message you distributed in Holdenville, Oklahoma. We had not, as a matter of fact "discontinued" televising the CBN Cable Network." However, the commercial manner in which you have tried to put an un-Christianlike gun to our head is causing a review of our policy. We hear more and more comment about the commercialization of religion, and so many people selling Christ for Money on television. We also notice that your document was unsigned so that no individual is identified. It does not seem that Jesus would approve of the things you are doing and we are now giving the matter our serious consideration.

How's that for fighting fire with fire! Maybe we should say brimstone with brimstone! In any case, we just thought we would pass that one on to the rest of you in case you needed some ideas for the future.

C-SPAN — IT SHOULD BE ON EVERY SYSTEM!

The Cable Satellite Public Affairs Network — **C-SPAN** — is probably one of the best investments any cable operator can make in the future. As you all should know, C-SPAN carries, among other things, the live proceedings of the House of Representatives. There are also national call-in shows and the airing of Congressional hearings. It is what public affairs television should be, and it is being done by the cable industry. We must take more advantage of it. There is nothing quite like letting a Congressman know that he is being watched on cable television by his own constitutents! What's just as important is letting the constituents know that they can now see what is going on in Congress, and that they can have an impact on it. Cable has the rare opportunity of being able to be a good citizen in its community as well as a good business. We can teach civics by using cable as the example — after all, if some of those subscribers would recognize their own power they could probably get all those distant signals back that they just lost! C-SPAN should be in every school in every cabled locality. It should be promoted as one of the true, unique benefits of cable television. Hopefully soon we will also be able to bring our subscribers live proceedings from the Senate as well. And again, in order to do that the subscribers are probably the strongest lobbying force we have. We must use that force. We must organize it, and one way to do that is to start carrying C-SPAN NOW! Yes, it costs some money — .03 cents per subscriber per month — but that is **money well spent.** Do it today — call C-SPAN at (202) 737-3220.

THE LAW SUITS — WHAT IF WE WIN?

By now you have all read of the many law suits that are now in the Courts all over the country regarding cable television and franchise authorities. Some of the important ones we have already reviewed in prior issues. In short order, they are the Tuscon case, where a losing bidder is suing the city to allow it to start building a system in competition with the winning bidder on the same terms and conditions as the winner got; the Ventura, Cal. case which argues that once a cable operator has been in the community for a period of time he gets certain rights, consistent with First Amendment arguments that should guarantee the continuation of the franchise — this case is couched mainly in antitrust terms, and even has an allegation that the Consultant to the city (CTIC) has run afoul of the anti-racketeering statutes because they are guilty of trying to "extort" promises from the existing cable operator by seeking new competitors in an RFP process; the Denver case — better known as the "Mountain States" case because it was brought by the Mountain States Legal Foundation, which challenges the right of the city to grant "exclusive" franchises, and also challenges much of the authority of the cities to regulate cable at all on the ground that most such regulations are a violation of the First Amendment.

Needless to say, there are others. But let's just look for a moment at the implications of these cases — what happens if they overturn the existing laws? To say the least, it would be chaotic. If the antitrust theories are correct, it would mean that a city, in essence, would have to design an ordinance and then let anyone who wanted to operate in the city under the ordinance. Now that could lead to some very tough ordinances, since that may be the only way the city could assure that it got what it wanted out of the system. That is, they would have to "gold plate" the system before the operators told them what was reasonable and what wasn't. The problem with that is that most operators would not build under such circumstances unless they already had money tied up in an existing system there. That means that this approach may have the most impact on existing franchises at renewal time rather than on new franchise fights. But then there is the Ventura-type case. If that one wins on its broadcast theories, it would mean that a cable operator can rest somewhat easy in that his renewal would be almost assured. In fact it may not be a renewal at all, but an absolute right to do business in the city. That sounds good for the existing operator, but not so good for the city. However what ap-

pears good on the surface may have some bad effects when you delve a little deeper. For instance, if **"we win"** that one, what about the tax implications on existing systems? If there is no real termination of the franchise, if it is indeed perpetual, then would cable operators still be allowed to amortize the value of the franchise? Millions of dollars of tax advantages may be lost in one bold stroke! Have the lawyers considered that little aspect of the case?

Finally there is the Mountain States case. Of course this one is not being brought by a cable operator, but by a public interest group. That means that unlike the others, which may very well get settled long before any dangerous legal precedents are set, there is little likelihood that Mountain States will settle. There is nothing to settle about! They are in this for ideological reasons — and while we may agree with some of their ideological positions — particularly that the cities have gone way too far in the regulation of the cable television industry, especially since we are, in some ways, First Amendment speakers, a total "win" in this case would throw everything into a cocked hat — as a matter of fact, the impact of the case is already being felt.

You see, the basis of the case is not only that a city may not require all the things that have now become "standard" in cable franchises, but also that the city cannot stop competitive cable systems from starting up. That would mean that, for instance, in the Denver situation, right after a cable operator has promised and started building a "gold plated" system another operator could come in and cream skim the system with a low-priced, stream-lined system. The result would be real trouble for the "gold-plated" folks since we all know that most subscribers would rather not pay for all the city-required "extras" if they have the chance. That's what most bankers and cable operators fear — hence, even though the case is nowhere near being argued in Court, some cable operators are already going back to the big cities and saying that the threat of low-priced competition is forcing them to re-think their promises. To date the city, in this case Denver, has not accepted the idea of allowing the winning bidder to start out by building a streamlined system, even with the promise that the "gold plate" will be added later if Mountain States loses the case.

But what if they win? It would seem to us that the result would be some very swift action on several fronts. First of all, as already noted, the big city systems would be in a real problem — especially those that had already been built with the "gold plating". Clearly the only reason a cable operator offers all those goodies is in order to get the franchise — presumably the **ONLY** franchise that that city will give out. There is no way he

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could get a return on that massive investment if that were not the case. And the city is more than willing to go along with that sort of thing because they want all those bells and whistles, and they know that the only way they will get them is if they make sure the operator has a clear shot at someday making a profit. Now as most readers of this newsletter know, we have long questioned whether, even with an exclusive franchise, the big urban systems will be able to pull out of the red. We think that too many promises have been made, and too much is riding on the presumption that new services will make up the difference on the profit and loss sheets. But leave that aside. If Mountain States wins, then there is nothing to prevent some other company from cream skimming — particularly with pay services. That would guarantee the demise of the gold plated system operator in our view. So there is a lot riding on this decision!

We think the first thing that would happen is both the cable industry and the cities would to go Capitol Hill to try to get the problem cleared up. By then, unfortunately, from a political point of view it may already be too late. The Hill is unlikely to consider giving power back to the cities that the Courts have taken away, presumably on Constitutional grounds! What's more, a significant segment of the cable industry, particularly those who see the opportunity to go in and cream-skim, would not be terribly interested in supporting such legislation.

The only other option for the city folks, who, under this scenario would have lost almost all of their powers to regulate cable television would be to go to the state legislatures. That spells trouble for all of us! As is well known, when states start looking at the cable television question, one of the first things they consider is taking state control! We suspect that would be the major trend this time around. This is especially true if the Court decision created some sort of protected status for cable television operators under the First Amendment when they are First Amendment speakers — that is, when we are originating our own programming. That could really cause a mess because the only way out for the state, consistent with the Constitutional problems, would appear to be calling cable a common carrier!

Well, as you can see, the implications of these law suits are massive, and we really have no good idea of where they might go if they are ever really decided by the Courts. One thing that can be said for sure; you can never tell what is going to happen in Court. It is always best to stay out of that forum if you can avoid it. But we are in it now, and we are going to have to prepare for the consequences.

With regard to the main case, the Mountain States case, we think the best move now would be

to see if we can reach some accommodation with the cities and get legislation through Congress before the real trouble starts rather than after the Courts force us to. Apparently the NCTA and the National League of Cities have reached the same conclusion since serious negotiations are now under way between the two. CATA is being kept informed of those negotiations; however we are not a part of them, preferring to keep our options open rather than get stuck in a "smoke filled room" solution as happened to the NCTA in the copyright negotiations last year. Obviously we will keep you informed about what is going on, and we expect to see some sort of legislation in Congress this year on the subject of franchising. This will be a new "S.2172" type bill, and there will be lots of yelling and screaming about it when it finally appears, no matter who drafts it. So you may as well be prepared!

YOU CAN'T TELL THE PLAYERS WITHOUT A SCORECARD

We keep using that headline to try to keep you up to date on our wonderful program suppliers who keep changing ownership from month to month! This will definitely not be the last time you see it! Maybe we ought to just start a "department" in the Washington Update to keep you abreast of the changes, and rumored changes! Anyway, as of right now, Home Box Office, while owned by Time, Inc. (which of course also owns ATC) has now entered into other business agreements for movies and production of movies with Columbia Pictures (owned by Coca-Cola) and CBS. The Movie Channel has now been split up between Warner-Amex, MCA-Universal, Paramount, and Warner Bros., and Showtime, presently owned by Viacom, is rumored to be talking with just about everyone about adding new owners — the strongest rumors at the moment still center on 20th Century Fox and ABC.

Did you get all that? Don't bother memorizing it. The bottom line on what is going on is that the movie companies, having failed in their "Premier" effort to get into competition in the pay movie business have now decided that if you can't beat 'em, you may as well join 'em!

JUST THOUGHT YOU'D LIKE TO KNOW

Every once in a while we come across some information that is just begging to be told to other people. This is one of those times. The American Society of Mechanical Engineers has figured that the United States could put a permanent space station in orbit for about $9 billion — that's the same amount that Americans spent on buying pizza in 1981! You can chew on that little gem until next issue! Hope you all had a good holiday season — now it's time to get back to work! □

OAK MiniCon 2 Addresses Small System Needs

The new MiniCon 2 controller from Oak Communications System features a high-performance M68000 microprocessor and automatic, continuous refreshing of decoder profiles. The controller works with MiniCon 2's IBM 5150 Personal Computer, or with a host business system through Oak's IAS software package.

The new MiniCon 2 — Oak Communications Systems' second-generation small addressable system — simplifies and streamlines addressability for small cable system operations, with more advanced software and state-of-the-art hardware. Like its predecessor, MiniCon 2 provides many control features found in much larger addressable systems, at a fraction of the cost.

A new controller and improved software have have increased MiniCon 2's subscriber capacity and control features, and have also upgraded headend hardware. Minicon 2's affordability and dependability mean impressive bottom line performance and a relatively short pay-back period.

MiniCon Development

MiniCon 2 is an excellent example of product improvement through computer software development, which is becoming more important in the cable industry. Advances in operating software triggered hardware enhancements, increasing system capabilities.

The original MiniCon system was introduced a little more than a year ago, and during that time the product has evolved quickly. Its six initial control functions have more than tripled; subscriber capacity has nearly doubled to 15,000 and in interface with most available business systems is now possible. A new minicomputer, the IBM 5150, and a new controller featuring the Motorola M68000 processor have also been added to the system.

MiniCon 2 gives small system operators the flexibility and control they need for maximum system performance.

Control Features

MiniCon 2 now boasts 20 control options, including operating reports for the first time. System control is "user-friendly" — entries and feedback are in plain English, and operating personnel are usually trained in one day or less.

At the time a customer's decoder is installed, the operator may allow the customer up to two days of free viewing of optional levels of service. This marketing tool (which originated as a system-requested enhancement) can help increase pay penetration, using a "warm puppy"

approach — once the pay service is in the home, the subscriber is reluctant to give it up.

Other unique control options include a series of special event functions, permitting the operator to add, modify, delete or purge pay-per-view programs. A special event schedule report is also available, which is helpful in planning mutli-PPV offerings and assuring an attractive special event mix.

Other reports now available from MiniCon 2 are decoder profile listings by customer or serial number, and inventory reports which track decoder status codes and the number of subscribers, and summary reports on service levels and special event usage.

Other Enhancements

Minicon 2 now accommodates up to 15,000 subscribers, and in the near future will be able to handle as many as 25,000.

The system's tiering capacity has increased to 32 levels, and each decoder in the system can be authorized for up to 32 special events during any period the operator chooses.

Oak's Interfaceable Addressing System (IAS) software is now available with MiniCon 2, meaning that small system operators can interface their decoder control system with their business system. MSOs with a number of small systems can network them, using a central billing computer and the Oak IAS software.

New Controller

The enhanced MiniCon 2 controller, with its high-performance Motorola M68000 processor, continually refreshes decoder profiles in its decoder file, after those profiles have been downloaded from the IBM 5150 host computer.

If the host computer is down for any reason, the front panel of the controller can be used to monitor decoder profiles previously received from the host computer. It can also perform other decoder control functions, such as modifying and adding decoder profiles, or reauthorizing decoders.

In fact, the new controller in the Minicon 2 system can be used as a "solo" computer, and acts as the slave in a communications link with a business system. Eight simple commands issued by the business system host computer provide addressable control for the system operator, using Oak's IAS software.

The controller's capacity is 8,000 to 27,000 subscribers and will be expanded in the future. The controller/IAS system provides a low-cost option for small systems using a business system which will accommodate addressability.

Oak's MiniCon 2 is the ideal way to start with or add addressability to a cable system.

The basic MiniCon 2 system, including either standalone or IAS software, the IBM 5150 personal computer, and the new controller lists for $22,965. The original MiniCon system is still available from Oak, too, and sells for $15,000, not including an optional printer ($750.00).

For more information on Oak's MiniCon systems, contact an Oak salesperson or call 815/459-5000. □

MiniCon 2 Delivers the Most Important Addressable Features

The second generation of MiniCon now includes 13 addressable functions. Considered the most important features, these activities provide the small system operator with unparalleled control.

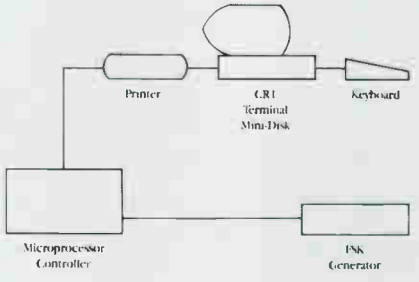
Each operating subscriber terminal has its own unique serial number and address. By computer command, you can identify the status of any operating terminal and change its status. Simply select an activity from the plain-English menu and enter the subscriber number. The menu covers the following categories:

1. Add a customer
2. Change the information for a customer
3. Delete a customer
4. Test by serial number
5. Test by customer number
6. Change the information for a serial number
7. Update the decoder file
8. Change time and date
9. Review and/or change system parameters
10. Immediate hit by customer number
11. Immediate hit by serial number
12. Contents of decoder file
13. Contents of decoder file by customer number

System Features and Specifications

Global output Rate: 7,500/min.
Word Length: 40 bits
Decoder Capacity: 10,000
Power Requirements: 105–125 VAC 47–63 Hz 350 W
Temperature Range: 50°–104°
Humidity Range: 20° to 90° RH without condensation

Remote Operating Capability
Z80 Microprocessor Utilizing IEEE 796 Multibus
Battery Backup Capability offered as an option
Printer
IBM 5150 personal computer
Note: Z80 – Trademark, Zilog
Multibus – Trademark, Intel



Showcase

ALPHA TECHNOLOGIES ANNOUNCES NEW PEDESTAL MOUNT

Alpha Technolgies of Bellingham, WA, standpower power systems manufacturer, has introduced a new pedestal mount enclosure to house its standby power supplies and associated batteries or general CATV equipment. The new enclosure offers significant improvements in the areas of structural strength and mounting simplicity. Due to an all new sturdy construction, vandals will have a difficult time tampering with this unit.

The enclosure is modular and is available in 2 and 3 shelf models, allowing the installation of two power supplies and/or two sets of batteries for increased standby time. Colors available are desert tan or lawn green. Paint is an extremely durable epoxy paint.

In order to save shipping charges and/or allow much smaller storage volume the unit may be ordered unassembled. On site assembly is very simple, requiring only a socket wrench, and takes approximately 15 minutes. Delivery is 4-6 weeks a.r.o.

For further details contact Alpha Technologies in Bellingham at (206) 671-7703 or your area representative.

WAVETEK ADDS MODEL 1880 SYSTEM ANALYZER

Wavetek Indiana, Inc. announces the addition of the **Model 1880 System Analyzer** to its line of CATV Test Equipment. Designed as a field-portable, microprocessor-controlled instrument, the Model 1880 allows rapid, pushbutton selection of system parameters such as Amplitude, Hum, FM Deviation, Composite Triple-beat, Cross-Modulation, and Carrier-To-Noise.

In addition, the Model 1880 features automatic one-button calibration, a built-in audio detector and speaker, and a unique split-screen image system which allows the operator to view two expanded portions of the spectrum simultaneously. Housed in a field-proven ruggedized case, the Model 1880 may be powered from 12 volts, from its own internal battery pack, or with the BC-3 Power Supply, from 100 volts AC.

The price of the Model 1880 is $4995. Delivery is approximately 120 days ARO. For more information, please contact Wavetek Indiana, Inc., 5808 Churchman, Beech Grove, IN 46107, or call toll free 1-800-428-4424.

COMM/SCOPE INTRODUCES WHOLLY NEW CONCEPT IN COAXIAL CABLES FOR CABLE TV

A totally new generation of high-performance coaxial cables for the cable television industry has been introduced by its developer and manufacturer, M/A-COM Comm/Scope, Inc., Catawba, NC.

The new products - first in a series of **QR** (for "Quantum Reach") coaxial cables — features greatly reduced attenuation and a new low-mass dielectric which gives it superior handling characteristics and far more flexibility than any solid-sheath coaxial cable on the market today. U.S. patents are pending.

In announcing the development, Frank M. Drendel, vice chairman of M/A-COM and board chairman of Comm/Scope said: "The QR Series represents a new era in the production of advanced-technology cable for the ever more demanding CATV operator. QR is the first coaxial cable to be completely re-engineered, from the inside out, for the 'System of Tomorrow'."

Other significant capabilities of the new cable are:

- — Vastly improved handling characteristics, demonstrated in four exacting bend and stress tests;
- — Virtual freedom from the danger of connector pull-out (core shrink-bank); QR maintains 98% of its core-to-outer conductor strength after extended thermal cycling;
- — Greater resistance to cable damage during construction and system installation;
- — A unique, optimum-thickness outer conductor tube, achieved by high-speed induction welding of aluminum strips, which reduce the weld zone area to fractional proportions;
- — Improved cable jacketing of new medium density polyethylene (MDPE), imparting environmental stress crack and abrasion resistance, tensile strength toughness, elongation, and coefficient of friction;
- — And extended jacket life, both in buried and in aerial applications.

More than two years in development, QR brings "quantum" innovations and cable improvements to the industry, with consequent economies in coaxial installation and maintenance.

The total re-engineering of the new cable was described by Brian Garrett, Vice President in charge of engineering at Comm/Scope:

"From the very first design drawing, the QR concept has been carried through the various steps in development, manufacturing, and component processing, with impressive advances in control, monitoring, materials and high-speed production."

M/A-COM is a major supplier of components, equipment and systems for commercial telecommunications and defense applications. Through its operating companies, M/A-COM is a leading supplier of digital information processing and transmission equipment for satellite communications, data communications, fiber optics, television broadcast and CATV. M/A-COM is also the producer of the broadest range of microwave components for manufacturers of equipment used in the defense and commercial telecommunications market. For more information, contact M/A-COM Comm/Scope at (800) 438-3331. □

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 Rockfeller 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)

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, replacement parts)

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
415—969-9400

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

CCS Hatifield/CATV Div.,
5707 W. Buckeye Rd.,
Phoenix, AZ 85063
201—272-3850
(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,
P.O. Box 1240
Plano, TX 75074
214—233-6631
(M9 Generators)

Century III Electronics, Inc.
3880 E. Eagle Drive,
Anaheim, CA 92807
630-3714
(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)

Associate Roster

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)

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 3949
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)

Gardiner 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)

* **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.,
134 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)

LRC 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.,
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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)

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D8—CATV test equipment	M8—CATV test equipment	S8—CATV engineering
D9—Other	M9—Other	S9—Other

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NCS Industries, Inc.
2255-E Wyandotte Rd.,
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1-800—523-2342
1-800—492-2032 (PA)
(D1, 2, S8, 9 repair service)

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

North Supply Company,
10951 Lakeview Ave.,
Lenexa, KS 66219
1-800—255-6458
1-800—332-1073 (Kansas)
(D1, 2, 3, 4, 5, 6, 7, 8)

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

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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)

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)

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 Tascherean Blvd.,
Longuevil,
Quebec, Canada J4K 2X8
514—651-3716
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Great Neck, NY 11021
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(D1, 2, 3, 5, 6, 7, 8, 9)

* **Texscan Corp.,**
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Indianapolis, IN 46219
1-800—528-4066
(M8 Bandpass Filters)

* **Theta-Com CATV,**
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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,
40 Oser Avenue,
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,
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2 - RMS Power King 60 volt power supply PS - 60 New in original sealed cartons. 800 - GRS 412 - CH-A-01 New .412 Gilbert fittings

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Mom & Pop operation has gotten to large. We have 8 small systems. Would like to sell 5 of them. Financing available to the right person. Contact Mike Steil, 515-887-2222, P.O. Box 408, West Bend, Ia. 50597.

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Use the Texas Instruments TI 99-4(A) computer as a character generator. 10 pages, 10 lines per page, 14 colors. Requires computer, cassette, and cassette cable. Minimemory module suggested. Program and instructions for $50.00. A character generator for under $500!

Write to: Cable TV Software, 66 Ponderosa Lane, Elizabeth, Colo. 80107.

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Excellent opportunity for system managers and technicians for our systems in Colorado, Texas, and Oklahoma. Need qualified personnel for these Southwestern locations; good working conditions and opportunity for the right people who want to work and stay actively involved in the cable business. These systems have good equipment to work with and offer excellent situations to grow in the cable business. If interested, send resume to the box number indicated below.

Box 71080
c/o CATJ
4209 N.W. 23rd
Suite 106
Okla. City, OK 73107

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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:

1.) Systems — paying regular monthly dues based on number of system subscribers.

2.) Associate Members — pay an annual fee.

3.) Individual Members — pay an annual fee.

NON MEMBERS may also use the Classified section at the rate of 50 cents per word with a minimum charge of $20.00. Add $2.00 for blind-box. Non-members should include full payment with the ad insertion.

Deadlines for all Classified Advertising is the 1st of the month for the following month's issue.

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EAGLE
COMTRONICS INC.

The American Eagle. Lasting symbol of strength and independence. Subject to attack . . . but always the standard of leadership, endurance and survival.

For over 5 years, Eagle Comtronics has maintained its strength, independence, and course through periods of growth, change and challenge.

We've grown from a four person operation to among the leading privately held companies in the CATV business employing over 600 people.

Why do Eagles endure? Ask us.

Or ask cable operators who have purchased over 10,000,000 of our traps. In 1977, Eagle introduced cost efficient security to the CATV industry with the first reliable, stable, anti-corrosive trap in the business.

Ask over 1,000 cable operators who are now using our 500 MHz tap. Eagle's tap led cable into the world of 440 + MHz capability and our tap continues to lead the industry with its unique mechanical features and the lowest insertion loss of any tap available in the market.

Ask 8 of the top 10 MSO's who are now using our programmable descrambler. Developed through engineering expertise and with a unique and practical approach to securing multi-tiered service, our programmable descrambler is the ticket for systems needing to expand service without depleting capital.

Ask about our new addressable descrambler. A plain and simple product that eliminates the concept that addressability is "too complex" or "too much too soon" for today's cable systems.

Ask our twenty-one member engineering team that is at the leading edge of cable technology. Eagle is investing over 60 man years in the research and development of products for your future. Projects in progress include interactive two way communications systems, communications data security, MDS, STV, Satellite DBS, and Direct Satellite Transmission.

It's the largest ongoing research and development effort in Eagle Comtronic's history. It's common sense telling us to pay as much attention to the wants and needs of our customers as we do to the quality of products we manufacture.

EAGLE
COMTRONICS INC.

EAGLE QUALITY PRODUCTS: Addressable Descramblers, Programmable Descramblers, Traps, Taps, Splitters, Home Terminals, Converters.

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IN CANADA: Deskin Sales • Montreal • Toronto • Vancouver 77D Steelcase Road West, Markham, Ontario L3R2M4 (416) 475-1412
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