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OF THE
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on the outside...

CATJ salutes the
TEXAS CABLE ASSOCIATION
convention



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Ben V. Willie,
President of CATA

LOOKING AT THE FUTURE

For the past several months this page has been filled with the information we all needed to understand what was going on in the newest round of the battle over copyright. That battle is far from over. A bill, H.R. 3560 is now wending its way through the maze of the House of Representatives and the Community Antenna Television Association is working very hard to defeat the bill. It would not only force syndicated exclusivity on the cable industry, it would also write the "must carry" rules into law. This is totally unacceptable to us as operators or to our subscribers. The details of what we are doing about it can be found elsewhere in this issue. We urge all operators to join us in that fight, and we would hope that in one way or another even those operators who are not members of CATA, but who agree with our position (and we know there are a lot of operators in that category) would support the fight — both with your lobbying assistance and your financial help. We cannot support the interests of the entire industry if the industry does not support us!

But enough of that for this month. Because of the timing of the battle going on on Capitol Hill I missed my chance to include my views in the January issue of CATJ regarding our view of the future. After all, every other magazine and newspaper as well as all the radio and television commentators got their chance around the new year, and I want to take a shot at it too, even if it is a month late!

The next few years are going to be very important years for the cable television industry. The key question, as I see it, is whether we will be able to maintain our identity in a rapidly changing world of technology. We have already seen the significant danger to cable operators posed by the confusion in the public mind between cable television and broadband communications. We have seen the largest trade association of cable operators suddenly become an association dominated by broadband communications entrepreneurs. Of course, some of those companies also operate cable television systems — but as renewal time rolls around in the older, smaller franchise areas owned by these corporate giants I predict that they will have a great deal of trouble explaining to the city councils why it is infeasible for them to install the same broadband system that is being touted in the large cities in the smaller ones as well. I suspect that some of the larger operators will be selling off their smaller holdings because they realize that that problem will be facing them.

Unfortunately, their problem is our problem too. The publicity and confusion that now surrounds the cable industry envelops us all. Renewals will be a major challenge. The situation can be significantly helped by a concerted campaign starting now to explain to the American public that there is a major difference between cable television and broadband communications. The Community Antenna Television Association is planning to make that effort. Clearly it is an effort that must be undertaken by the cable operators and their association, since it is not necessarily in the best interests of the broadband companies to let Wall Street know that for the most part their industry is still on paper, not on the poles!

Speaking of poles, I suspect that a lot of our problems with basic pole rental rates will finally be cleared up in the next few years. Not that there still won't be fights, and, of course we are going to have to maintain the pressure to assure that the federal pole attachment rules administered by the FCC stay in effect. However we will probably get a very important new ally in the pole rental dispute relatively soon; AT&T! Why? Well, Ma Bell finally has some folks assigned to taking a closer look at their relationship with other industries, cable being one. And one of the things they noticed was that Bell, itself, rents about three times more pole space (usually from power companies) than it supplies to the cable industry! So it is in their interest too to make sure those rental rates are reasonable.

It is also interesting to speculate about when the Bell System (or Baby Bell) will get into the "cable" business. Now here again we get into major problems defining what is really going on. Bell most certainly wants to get into the data transmission and manipulation business. That is an integral part of the broadband communications business. So Bell will be competing most definitely with the broadband folks. But will they be competing with the traditional "cable" operators? That is doubtful. Bell, from what can be determined now, has no real interest in being a "programmer" of cable television systems. It does potentially have an interest in providing channels to others, but not to program those channels themselves. So will Bell be a competitor of "cable" operators? Not really. At the most they will be a supplier of channels to someone who decides they want to compete with the existing cable operator in a given community. And it would not be surprising at all if that new competitor turned out to be another "cable operator"! However that is all down the road a piece, when Bell

gets the technical capacity to transmit addressable video signals. Make no mistake about it, they will have that capacity! But it is not a current threat. But they will certainly be competitors of broadband operators, and that will happen sooner, rather than later. That is why the broadband association is so actively fighting AT&T at every move. It is understandable, and a wise course for them to take.

Finally, since we have looked at what the outside competition may look like, what about the internal problems? I would suggest that we will have more competitive challenges from within than from without. As the available new franchises diminish there will be more and more competition for the renewal franchises, and there will also be an increasing number of overbuilds. The cable television industry and the broadband industry will have to be very careful to assure that both the public and the regulators, state and federal as well as local officials understand what we are really all about. What our differences are as well as our similarities. And also what the distinction is between the technical capabilities of the industry (either broadband or cable), and the practical economic reality. It will be especially important for us to keep the distinction between broadband and cable in mind when the time comes in the foreseeable future that the regulators start on the inevitable road of investigating possible limitations on the size of multiple system operators of the make-up of the corporations involved in the industry. Vertical and horizontal integration questions are likely

to arise as well as the more traditional ownership issues involving other media. CATA has always had a very straightforward approach to these questions. We favor free marketplace competition. We oppose government intervention. The only time it is appropriate for the government to intervene is when the free marketplace is warped for one reason or another. Examples would be the artificial marketplace caused by giving the broadcasters spectrum space for free while the cable operator has to pay for this transmission medium, or giving rural telephone companies low interest government loans to compete with cable operators. Those are instances where the marketplace has been destroyed, hence some other controls are necessary. Where that is not the case the government should not interfere. All of these issues, however, will be coming up in the immediate future, and we all need to start focusing on them now.

In sum, we have a lot to look forward to, and we have a lot of work to do to assure our continued growth and prosperity. Our subscribers are already being provided with a wealth of programming that was unthinkable just a few years ago, and while there will certainly be some "shakeout" of the software suppliers in the next few years it is clear that the diversity that cable television offers the public will continue to grow. We are providing a service that no one else on the horizon can. It is our job to continue on that path. There is lots of work for all of us, and CATA will be there to work with all of you.

Our best to all of you as we plunge into this New Year!

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PART III: CABLE SYSTEMS VALUES

Basic Tax Considerations: A cursory View

By J. Patrick Michaels, Jr.
Communications Equity Associates
Tampa, Florida

Following the basic premises of the previous article in this series, which examined some of the basis investment criteria utilized by buyers, it is important to note that each opportunity has unique and distinct characteristics and must be examined with that fact in mind. A reliance on comparative generalizations can often be misleading, resulting in imprudent investment decisions. It is also axiomatic that each potential transaction has its own indigenous tax consequences for both buyer and seller. The complexities are enhanced by tax considerations which are unique to the cable television industry and, until recently, the lack of standardized accounting procedures. With the constantly changing tax regulations, all but the most elementary transactions require professional analysis. It is advisable to seek counsel from tax advisors familiar with cable TV transactions as a supplement to local counsel and accountants. This is particularly crucial where there may be additional complexities from estate considerations. While legal and accounting fees can be substantial for these highly specialized experts, the potential adverse tax consequences which may result from poor planning can be much greater.

"... first consideration is one of structure."

Although all transactions have inherent tax consequences for both buyer and seller, generally, active buyers have sophisticated expertise available, as they are usually concerned with more than one transaction. Since all buyers seek to maximize tax benefits, failure on the part of the seller to have professional assistance, which is often the case with family-owned enterprises, can significantly reduce the net benefits. Unfortunately, since it is extremely rare to seek an advance ruling from the IRS, adverse consequences generally do not become apparent until well after closing.

It is beyond the scope of this article to discuss in detail anything but the most elementary considerations, which are illustrative of some of the tax problems which might be encountered in basic transactions. The first consideration is one of structure.

The ownership configuration of most systems involves the following: an independent corporation, a closely held or family held corporation, a Subchapter S corporation, a subsidiary corporation, a sole proprietorship, a limited partnership, a joint venture and occasionally, a general partnership. Each form of ownership has its own particular tax considerations. The most common and of greatest interest to the independent operator are the closely held corporation, Subchapter S corporation, and sole proprietorship.

In the case of a sole proprietorship, the tax consequences are borne directly by the taxpayers owning the assets. Since many small operators have all of their business holdings in a sole proprietorship, the sale of a system's assets impacts all of their other business interests.

This type of structure can have significant advantages on an ongoing basis for a family owned business, personal liability risks aside; however, it may not be the best vehicle to utilize in a sale.

For example, since most of the assets of a cable system are classified by the Internal Revenue Service for tax purposes as personal property (Section 1245 classifications), on a sale of assets transaction, there is usually 100% recapture of depreciation at ordinary income rates. These rates are not subject to "earned income" limitations and could go as high as 70% for tax years ending before December 31, 1981. After January 1, 1982, the maximum income tax rate will be reduced to 50%. However, most sole proprietors in the cable business do not have taxable incomes in excess of the bracket, therefore, it is no more onerous to sell assets out of a sole proprietorship than a corporation, and sometimes, more beneficial.

In this currently intense seller's market, it may be more advantageous to consider incorporation and a subsequent sale of the stock; thus avoiding the depreciation recapture. However, many buyers will not pay as high a price for stock, since they assume more risks of the business and potentially suffer some income tax detriment. The IRS regulations would preclude incorporation solely for tax reasons, and therefore, it is advisable to plan well ahead. Incorporation supported by good business reasons should precede any sale and not be connected with the sale activity of any preconceived plan to dispose of the stock.

"... may be more advantageous to consider incorporation and a subsequent sale of the stock..."

The elementary question of tax recapture is most critical, regardless of the ownership structure and generally concerns both depreciation and investment tax credit ("ITC"). ITC is generally subject to staged recapture over a seven year period from the date the equipment was placed in service with 100% recapture on the first three years, 66-2/3% on the second two years, 33-1/3% on the last two years and no recapture if the equipment is retained in excess of seven years. The Economic Recovery Act of 1981 has changed the ITC recapture provisions for equipment placed in service after January 1, 1981. The percentage of the investment tax credit originally claimed must be recaptured as shown for property not held at least:

continued

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	1 Year	2 Years	3 Years	4 Years	5 Years
3 year property (6% ITC)	100%	66%	33%	-0-	-0-
All other property (10% ITC)	100	80	60	40	20

Currently, most cable equipment benefits the purchaser to the extent of allowing a ten percent of purchase price ITC. If the equipment acquired is used property, there is an overall limitation of \$10,000 on the total amount of credit claimed, which is less than if it were new equipment. The limitation on used property investment tax credit is increased to \$12,500 for taxable years beginning in 1981 through 1984, and to \$15,000 for taxable years thereafter.

In structures such as Subchapter S corporations, sole proprietorship, partnerships, etc., where an individual has taken advantage of the ITC, it is generally recapturable to the seller, whether assets or stock are sold. In the case of a regular corporation, where assets are sold, any ITC which has not been used by the selling company that is not recaptured in the transaction (subject to a fifteen year carry-forward), may be utilized, along with tax loss carry-forwards, to reduce any income derived from recapture depreciation.

Since sellers are always attempting to minimize taxes to be paid on a sale, and the buyer is generally concerned with minimizing future tax burdens on the business, it is necessary to further examine some of the additional concerns involved in the consideration of selling assets versus stock.

There are several major advantages to a buyer in acquiring assets. First, from a legal point of view, it is considerably less risky from the point of view of any unrecorded or contingent liabilities. Warranties are only as good as the financial capability of the warrantor. Secondly, and most importantly from a tax point of view, it is generally possible, through several appraisal methods, to revalue the assets on a favorable basis, increasing the income tax basis of the assets for purposes of future depreciation. Additionally, the buyer of the assets may be entitled to a one-time ten percent investment tax credit on the purchase of certain used equipment up to a maximum of \$100,000 of purchase price (\$10,000 credit). The limitation increases to \$12,500 in 1981 through 1984 and \$15,000 in 1985 and thereafter.

"... sale of stock has many other advantages to a seller ..."

Generally, the sale of stock of a corporation results in no recapture of depreciation or investment credit to the seller (except in certain instances involving Subchapter S corporations where special rules apply). Also, the sale of stock has many other advantages to a seller such as:

(1) Minimizes potential double taxation problems, which can result in asset transactions where there has been improper liquidation planning. However, a seller of assets can, by proper planning, avoid a double tax on liquidation.

(2) In many cases, particularly involving older franchises, no municipal approvals are required for a stock sale, whereas a sale of assets almost always involves municipal approval of assignment.

(3) Generally, avoids the necessity of obtaining transfers for leases, contracts, easements, pole agreements, etc. as a condition of sale.

Unfortunately, from a buyer's point of view, it creates a number of problems:

(1) Higher effective price since if the buyer liquidates in order to step up the basis of the assets, the buyer pays the taxes associated with depreciation, and ITC recapture. If a liquidation is not elected by the acquiring corporation, the effective price is still higher because of the lower depreciable basis, unless the buyer has substantial losses available on a consolidated basis.

(2) Strong warranties and/or an escrow account are needed to protect against unrecorded and contingent liabilities. This can be a serious problem, since there is no "title insurance" for personal property.

"... from a buyer's point of view, it creates a number of problems."

(3) Unless the corporation is liquidated or merged, there could be substantial allocations required for goodwill. In the case of an asset sale, it may be possible to allocate a portion of the excess purchase price above book value to the franchise which, according to some recent court cases (although there have been conflicting decisions), may be written off over the life of the franchise. Somewhat more risky is an allocation to the subscription lists.

(4) Many of the older, mature properties are in a taxable mode and unless other shelter is available from external sources or through expansion, the cash flow available for debt service may be 55% to 60% of the reported amount.

(5) It is often more expensive to pay the after tax cost of stock purchase than it is for asset purchase, particularly if individuals are the purchasers.

An additional consideration for a seller who is contemplating a sale of shares is the possibility of a tax-free exchange of stock with a public company. As long as certain rules are followed, this mechanism allows for a deferral of capital gains taxes and an avoidance of recapture

"... possibility of a tax-free exchange of stock with a public company."

problems. Capital gains taxes must be paid when the shares are sold. If the transaction involves some cash, referred to as "boot," then capital gains or ordinary income tax is due immediately on that portion, depending on the character of the source of the "boot." In order to

cont. on page 20

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Recognized as an invaluable reference

The 63-page book covers TV stations in the United States, Canada, and Mexico with the station directory pages covering such details as call letters, network affiliation or programming format, station locations, effective radiated power, and antenna height. The channel maps pinpoint station location and indicate call letters, network, offset frequency and local time zone. Another channel map section covers Central American TV stations operating on channels 2-6.

A new feature in the WTFDA TV STATION GUIDE is the inclu-

source, the guide is arranged by channel and features maps opposite complementary directory pages. It also features special sections covering TV satellite transponder frequencies and program source data, private microwave TV frequencies, and a directory of receiving

equipment supplier.

Designed primarily for long distance TV reception enthusiasts (TV-DXers), this second edition is expected to provide needed material for communications professionals, and become as popular a tool as their first edition.

sion of television satellite transponder information. Channel-by-channel listings detail operating frequency, polarization, programming originator and subcarrier services for three major US satellites. Information is also featured on Canadian and Russian satellites.

CATJ is offering these guides, available immediately, for \$10.00 per copy (\$12.00 for Canadian orders in U.S. currency) and will be sent first class mail upon receipt of your order.

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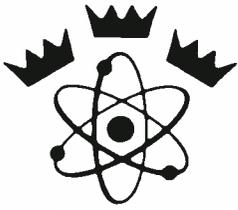
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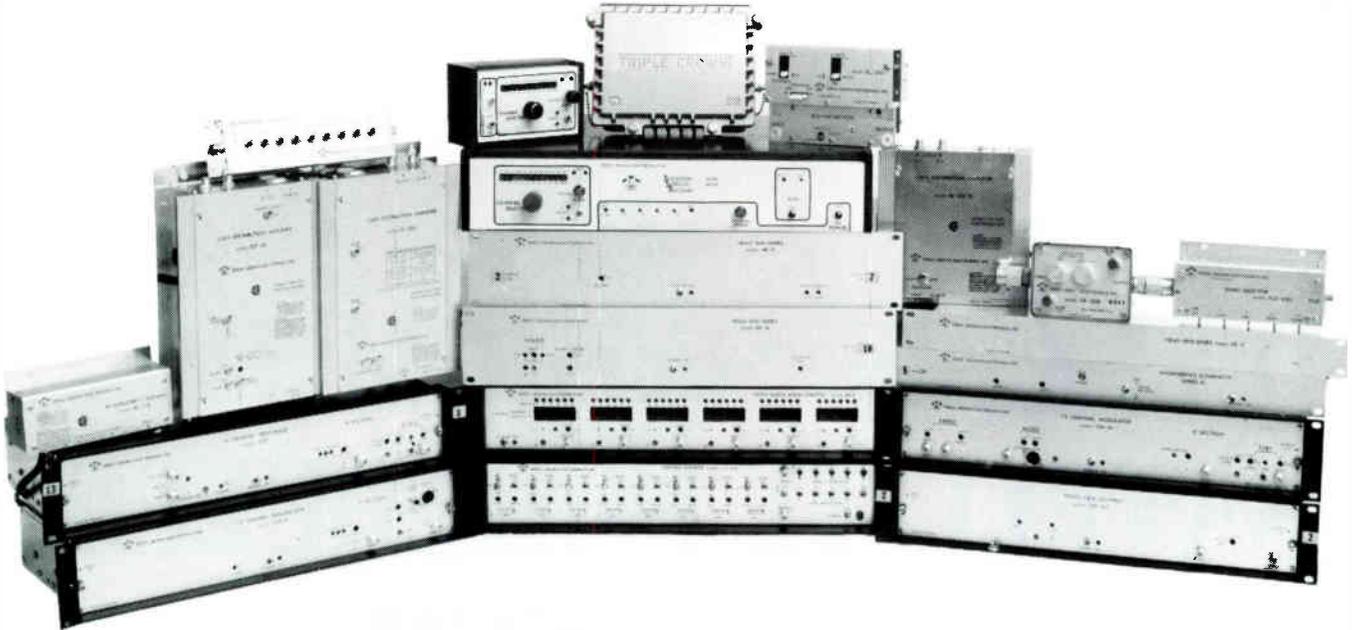
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RCA'S SATCOM IV SATELLITE SCHEDULED FOR LAUNCH FROM SPACE CENTER

RCA's Satcom IV communications satellite, scheduled for launching mid-January from Launch Complex 17 at the KENNEDY SPACE CENTER, will provide another satellite dedicated to cable TV programming, capacity of more than 1,000 hours a day.

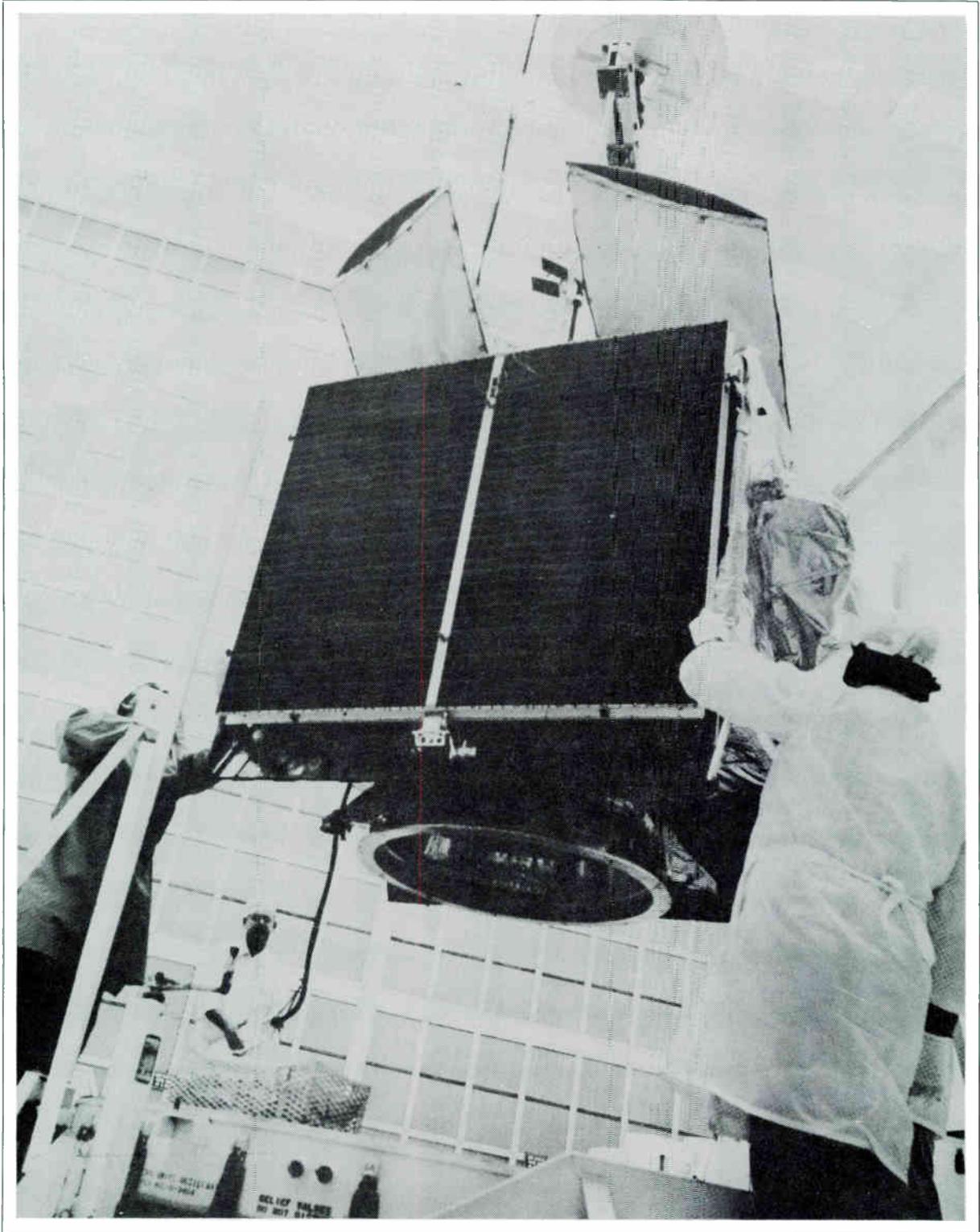
Developed and built by RCA Astro-Electronics of Princeton, N.J., for RCA American Communications, also of Princeton, the spacecraft will be placed in a geosynchronous orbit at an altitude of about 22,300 miles. Each of the spacecraft's 24 channels is capable

of carrying an FM/color television transmission.

The 2,385-pound satellite will go aloft on a Delta 3910/PAM-D launch vehicle and will be placed in an 83 degree west longitude orbital position over the equator. The first RCA Satcom was launched in 1975, a second in 1976, and a third on November 19, 1981. The communications network provides a wide range of communications services for government and commercial customers in the U.S., and with the addition of SATCOM IV, the RCA series satellites carries more

continued

The first ride taken by RCA Satcom IV at Cape Kennedy, Fla., was a crane lift out of its shipping container. In early 1982, the communications satellite will go into orbit from Launch Complex 17. Built by RCA Astro-Electronics, Princeton, N.J., the satellite is owned and will be operated by RCA American Communications, also of Princeton.



hours of nationwide television distribution than any other carrier in the world.

GENERAL DESCRIPTION

The RCA Domestic Communications Satellite (RCA Satcom IV) is a 24-channel spacecraft to provide commercial communications to Alaska and the contiguous 48 states. Each channel carries 1,000 voice grade circuits, one FM/color TV transmission, or 64 million bits per second of computer data.

With solar panels deployed, the satellite spans 37 feet. The spacecraft main body measures 64" x 47" x 44".

The three-axis stabilized spacecraft is equipped with the power, attitude control, thermal control, propulsion, structure and command, ranging and telemetry necessary to support mission operations from booster separation through ten years in geosynchronous orbit.

Spacecraft life, with continuous full power, is designed to be ten years.

LAUNCH SEQUENCE

The RCA Satcom IV spacecraft will be launched from launch complex 17A at the Eastern Test Range, Florida, by a three-stage Delta 3910-PAM launch vehicle. The first stage is a modified McDonnell Douglas Thor booster using nine, strap-on, solid-fuel rocket motors.

The booster uses liquid oxygen and liquid hydrocarbon propellants. The strap-on motors will be jettisoned approximately a minute and a half into flight.

The second stage is powered by a liquid-fuel pressure-fed engine that is gimbal-mounted to provide pitch and yaw control through second-stage burn.

A second stage engine cut-off (SECO-1) will occur at nine minutes from liftoff when the launch vehicle has achieved altitude of 105 miles. Another second stage cut-off (SECO-2) will take place fifteen minutes later.

The third stage is a solid-propellant motor secured in a spin table mounted to the second stage. At 25 minutes into the flight, the ignition of eight solid-propellant rockets will result in the spin-up of the third stage assembly. The third stage motor will then be fired sending the vehicle into elliptical orbit.

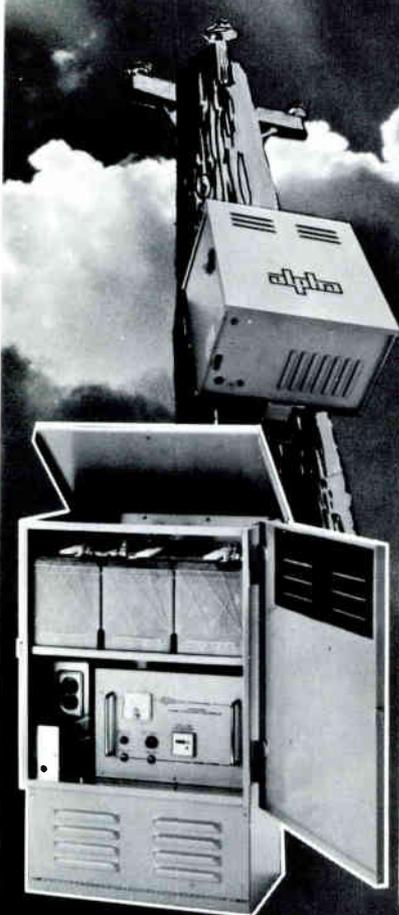
The spacecraft will then separate from the third stage at 120 miles altitude and 28 minutes into the flight. After approximately three days, the apogee kick motor will transfer RCA Satcom IV from its inclined elliptical orbit to a synchronous equatorial orbit 22,300 miles above the equator.

COMMUNICATIONS PAYLOAD

The RCA Satcom IV communications capability is provided

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--	---	--	---

by 24 powered TWTA (Traveling Wave Tube Amplifier) channels and four redundant TWTA channels. RCA Satcom IV's four redundant TWTA channels can be switched to replace any of the 24 active TWTA channels if any become unusable over the life of the spacecraft.

The 24-channel communications satellite payload consists of a fixed, four-reflector antenna assembly with six offset feedhorns, lightweight transponders, high efficiency TWTAs, and low density microwave filters. Rigid mounting of the antennas maintains alignment and eliminates risks associated with deployment. The RCA-developed, graphite-fiber, epoxy-composite material for waveguide sections, and antenna sections achieves ultra-light weight while retaining standard electrical designs for critical elements.

Frequency and polarization interleaving of the separate channels is employed with the transponder and four antennas to achieve 24 channels, each having a 36-MHz usable bandwidth within the 500-MHz allocation. The dielectric antenna reflectors employ orthogonal conducting grids such that the embedded wires provide cross-polarization isolation which doubles the channel capacity by permitting frequency spectrum reuse within the permissible bandwidth.

The four-reflector antenna assembly will provide general coverage of the lower 48 states and Alaska. The narrowband command and telemetry channels use the edges of the allocated 500-MHz band on both the 6-GHz uplink and 4-GHz downlink.

STRUCTURE

The spacecraft mainbody, measuring 64" x 47" x 44", mounts all electronic boxes, batteries, propulsion, and attitude control on three, honeycomb construction structural pallets. All

transponder components are mounted on a south pallet (that side of the spacecraft oriented parallel to the orbit plane pointing south in the operational mode), and all the housekeeping equipment on the opposite north pallet.

A third earth-facing pallet provides a mounting surface for four communication antenna reflectors with their separate composite feed assembly, two command/telemetry antennas, and earth sensors for attitude sensing.

The two sides between the equipment pallets and earth-facing pallet provide shear stiffness for the mainbody structure. Integrated with these assemblies are four spherical propellant tanks. The 1180-pound kick motor is housed in the center column of the spacecraft through the sixth side of the mainbody. A conical adapter attaches the motor to the cylindrical column and also provides transition support from the launch vehicle interface to the baseplate structure.

continued on page 16



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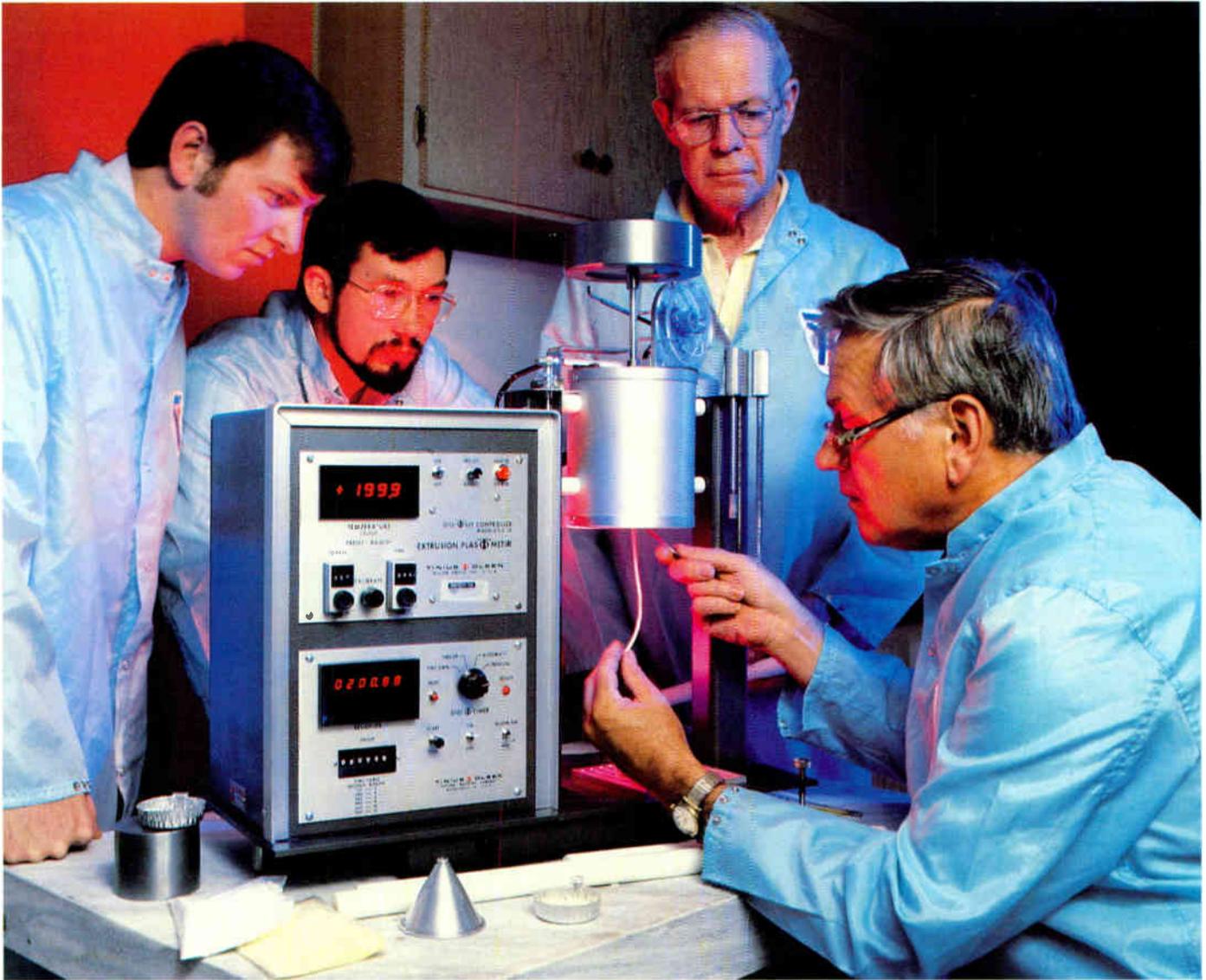
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cont. from page 13

ATTITUDE CONTROL

The attitude control subsystem employs a sealed, high-speed (4,000 rpm) momentum wheel with a separate earth sensor and closed-loop magnetic roll control. The RCA-designed STABILITE® attitude control system provides three-axis control by virtue of the gyroscopic rigidity of the wheel and its servo-controlled exchange of angular momentum with the spacecraft mainbody.

The inertial stability permits attitude determination by a single roll/pitch earth-horizon sensor without the complexity of a yaw gyro or star sensor. Continuous control of the pitch axis alignment to the orbit normal is achieved by magnetic torquing with no expendables or moving parts.

The system maintains orientation during normal orbital operation, orbit adjust, and the acquisition and injection maneuvers. The

pointing capability during normal operation is ± 0.18 degree about roll, ± 0.30 degree about yaw, and ± 0.12 degree about pitch.

The spacecraft has 12 hydrazine thrusters in a closed-loop system for North/South and East/West station-keeping. During a period of approximately 21 minutes every 3 weeks, this loop with its rate gyro will be energized to modulate the North/South stationkeeping thrusters and compensate for residual thruster misalignment or mismatch to maintain attitude control.

THERMAL CONTROL SUBSYSTEM

A Thermal Control Subsystem provides control of heat absorption and rejection to maintain all components of the spacecraft within safe operation temperatures, which range from 10 to 30 degrees Celsius.

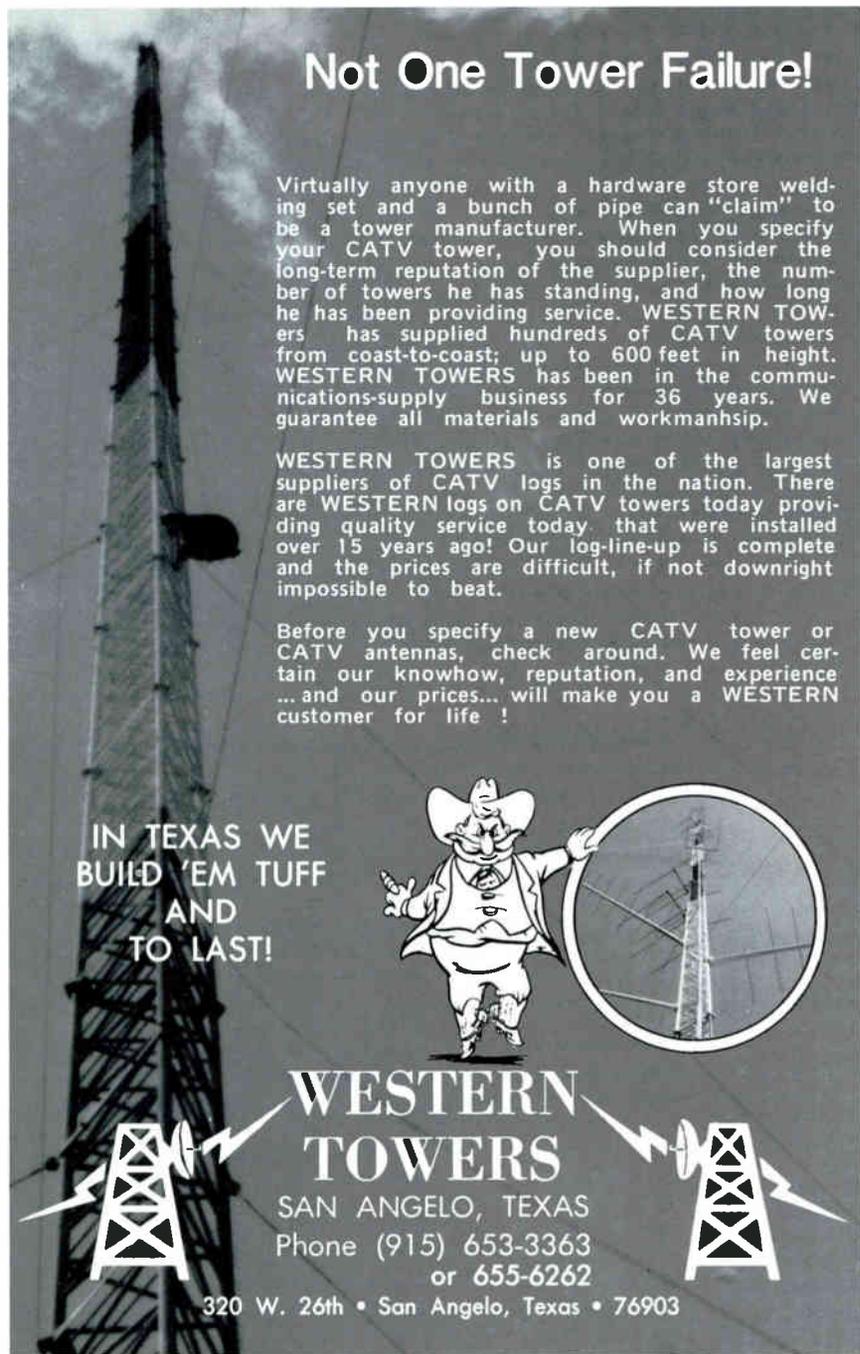
Space-type mirrors and thermal blanketing insulation are employed to provide passive heat control.

Layers of aluminized insulating material offer high resistance to radiant heat flow. The highly reflective mirrors maximize heat rejection and minimize heat absorption.

Under changing conditions of season and array life degradation in orbit, the battery temperature is maintained between 0 and +15 degrees Celsius for maximum battery life.

POWER SUBSYSTEM

The Power Subsystem consists of two bi-folded solar array panels and three nickel-cadmium batteries. The subsystem delivers a maximum output of 985 watts of power at a regulated 35 volts at beginning of life, and 700 watts after ten years. During the two eclipse periods that are experienced each year, power will be supplied by the batteries. Sun-oriented solar arrays and a direct array-to-load connection maximize the efficiency and minimize the weight of the electrical power generation, storage and regulations subsystem.



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With the spacecraft mainbody always aligned vertically, a single-axis clock-controlled drive shaft maintains the array toward the sun. Solar cells, which convert the sun's energy into electrical power, cover an area of 90 square feet.

Input converters in each subsystem convert the 24.5 to 35.3 volt power bus to their specific requirements at constant power and efficiency. These converters, including one in each of 24 Traveling Wave Tube Amplifiers, are designed to preclude a major single-point failure mode.

PROPULSION SUBSYSTEM

An on-board propulsion subsystem is designed to maintain the spacecraft on station throughout its ten year life.

The RCA Satcom IV carries 338 pounds of hydrazine monopropellant in four tanks for in-orbit use. Upon command from the ground, selected thrusters can be fired to provide spin-axis control of the transfer orbit, as well as velocity control in synchronous orbit. The hydrazine reacts with a catalyst to provide the energy thrust from the twelve reaction engine assemblies.

The passive surface-tension propellant feed ensures operation with no risk of bladder deterioration. Two independent, cross-connected half-systems are designed to maintain control, even in the event of failure of any thruster, valve or tank.

Maintenance of the station longitude and equatorial orbit inclination to 0.1 degree requires about 21 minutes of thrusting once every 3 weeks.

An apogee kick-motor uses a solid-propellant fuel to provide the 6,000 pound transfer orbit thrust capability. A dual-squib igniter is designed to ensure reliable in-orbit firing.

COMMAND, RANGING AND TELEMETRY SUBSYSTEM

The functions of command, reception, decoding and distribution,

along with automatic and manual telemetry and transponding range tones are handled by the command, ranging and telemetry subsystem.

Command signals are modulated on a 6.424-GHz carrier and received by one of the spacecraft's two omni antennas. Each of the two command receivers produces three isolated outputs containing the Frequency Shift Key (FSK) command tones. Two outputs from each receiver are sent to the dual command logic demodulator for

further processing and conversion to a digital bit stream.

Logic level commands are distributed to the spacecraft from the demodulator. Other commands, such as thruster driver, relay closure and pyrotechnic firing, are generated in the central logic processor. The processor has the capability to implement 160 redundant commands.

During attitude maneuvers, the processor provides an interface bet-

continued

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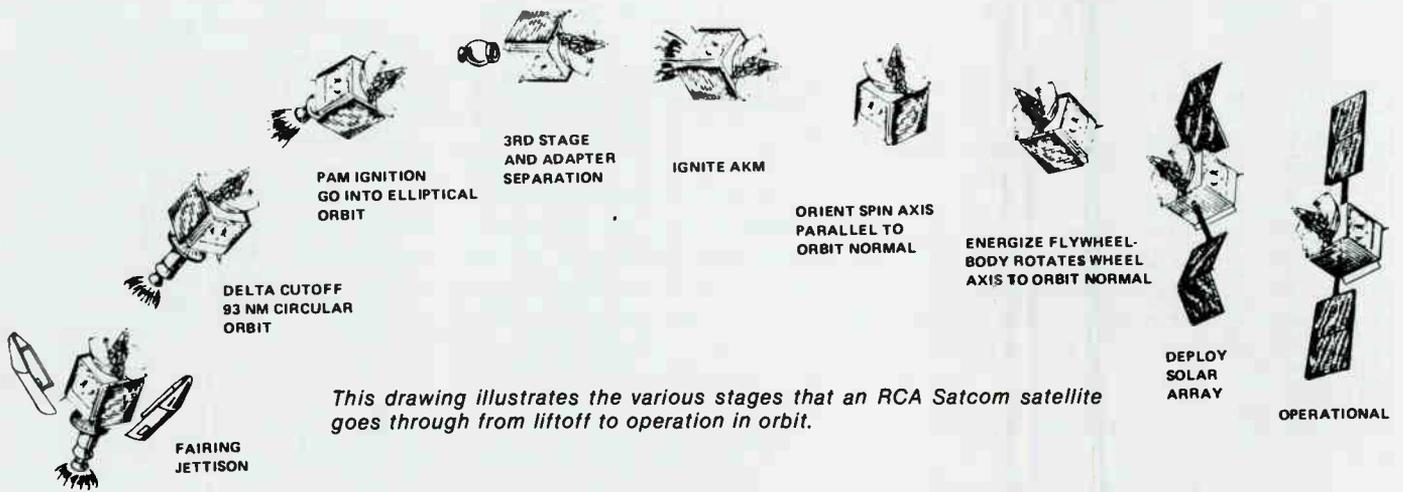
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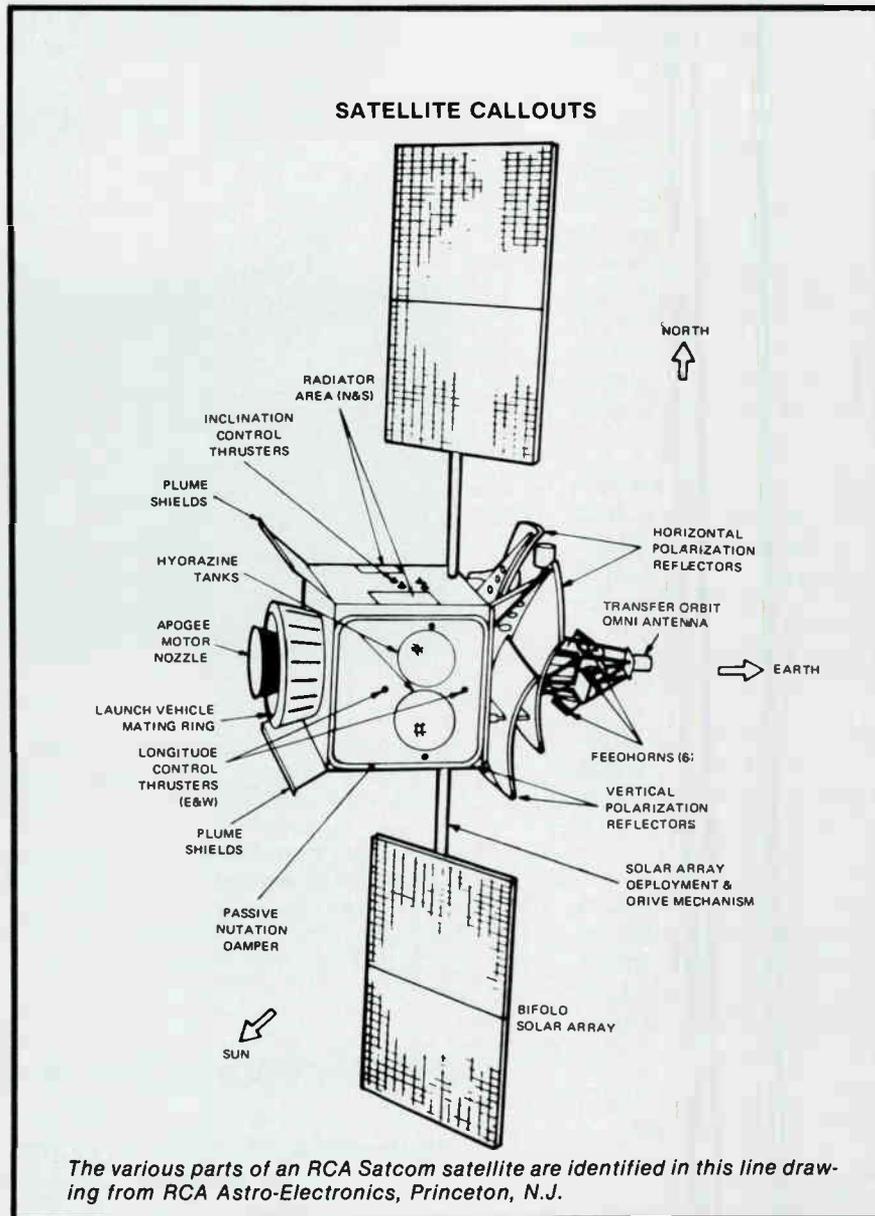
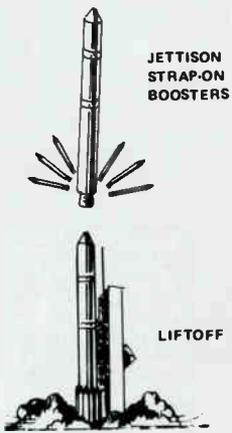
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LAUNCH SEQUENCE FOR A COMMUNICATIONS SATELLITE



This drawing illustrates the various stages that an RCA Satcom satellite goes through from liftoff to operation in orbit.



The various parts of an RCA Satcom satellite are identified in this line drawing from RCA Astro-Electronics, Princeton, N.J.

cont. from page 17

ween the thruster firing commands and the actual operation of the thrusters.

The ranging function involves the use of the two command receivers and two beacon transmitters.

The PCM telemetry function is performed by the redundant telemetry module. This unit samples each of 128 analog telemetry points at 64 frames per second.

The sampling is controlled by counters within the module. The telemetry points are available for storing housekeeping data, sync and spacecraft identification. PCM and analog single-channel dwell capabilities are also available on command for diagnostic purposes.

The two beacon transmitters with carrier frequencies of 3701 and 4199-MHz can each operate at two selectable output power levels. The high-power output level is used continuously during launch and transfer orbit operations and prior to earth orientation in synchronous orbit. The low-output power level is used during geosynchronous mission operations.

Additional satellite services will be carried over SATCOM IV, which will become operational in April 1982 following its January launch; a satellite service dedicated to Alaska service, which is scheduled for launch in October 1982; and a replacement for SATCOM I, scheduled for launch in March 1983. RCA has also requested authority from the FCC to launch a replacement for SATCOM II in August 1983.

RCA SATCOM DOMESTIC COMMUNICATIONS SATELLITE (RCA SATCOM IV)

MISSION OBJECTIVE:	Provide commercial communications to Alaska and the contiguous 48 states
LAUNCH INFORMATION:	
LAUNCH SITE	Air Force Eastern Test Range Cape Canaveral, Florida
LAUNCH VEHICLE	Three-state Delta 3910-PAM, with nine Castor, solid-propellant, strap-on motors
ORBITAL ELEMENTS:	
CIRCULAR	Geosynchronous, 22,300 miles above the equator
LOCATION	83° W. Longitude
PERIOD	24 Hours
INCLINATION	Equatorial, zero
SPACECRAFT INFORMATION:	
LENGTH OR SPAN	37 feet with solar panels extended
MAIN BODY MEASUREMENTS	64" x 47" x 44"
WEIGHT	2,385 pounds
STABILIZATION SUBSYSTEM:	Three-axis stabilized, earth oriented
SPACECRAFT DESIGN LIFE:	Ten years

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* Tandy Corporation

cont. on page 22

cont. from page 8

qualify for a tax-free merger, at least controlling interest must be merged for shares.

There are many complex rules and regulations which apply to this type of transaction, and it is very difficult to generalize; however, at the risk of oversimplification, one other basic consideration should be enumerated. Securities laws, in addition to tax laws, complicate the process. It is usually required for the seller to give to the buyer an investment letter which stipulates that the seller is receiving the shares for investment purposes and not for immediate resale. The seller usually must hold the stock for two years before he can dispose of it. The shares of stock given will usually be "lettered stock," which bears a restrictive legend stipulating that the shares are not registered for resale and must be held for a fixed period of time. Under this arrangement, the seller must be prepared to accept an aligned investment and accept the risks attendant thereto.

Another favored method of deferring, and in some cases, reducing capital gains taxes, is the sale of stock or assets on an installment basis.

Essentially, an installment sale involves a down payment of some percentage of the selling price and the balance due over at least two taxable years. This is a most intriguing possibility since the reduction of the maximum capital gains tax to 20%.

If the capital gain is significant to an individual in a tax year, then careful planning must be done to avoid or minimize any alternative minimum tax.

Another consideration in the sale of a cable business is the taxable effect of any consulting agreements, management contracts and/or non-compete agreements. Obviously, most consulting and management contracts are taxable at ordinary earned income rates. The non-compete agreement, which is far more common in broadcast sales, is an item which is taxable at unearned ordinary income rates. As the maximum personal income tax rate is being reduced to 50% in 1982, this is no longer the major consideration it used to be. When a portion of the purchase proceeds is allocated to the non-compete agreement, the tax rate will usually be significantly higher to the seller than taking the entire purchase price as capital gains. However, the buyer obtains an income tax deduction for payments for these agreements.

"... Another favored method of deferring ... sale of stock or assets on an installment basis."

Although it is not common practice in cable television mergers and acquisitions to set forth allocations in the purchase agreement, in actual fact, it is very beneficial to do so for both buyer and seller. In fact, it is critical for the buyer of assets to have an independent appraisal in hand prior to closing in order to protect their position with regard to the allocation in the event of an IRS audit.

The allocation to assets directory impinges upon the amount of depreciation recapture due on sale or liquidation. Hence, a seller would like the assets to be valued as

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close to book value as possible to avoid depreciation recapture. The buyer quite naturally wishes to step up the depreciable basis. Essentially, it is actually a function of the selling price. However, in any transaction, the IRS will look for a fair market value of the assets to base the allocation of the purchase price.

If the buyer insists on a maximum valuation of the assets, a seller will incur 100% of the depreciation taken. This can be offset by tax loss carried forward an unused ITC; however, in the case of most mature properties, this is usually not the case.

Buyers that utilize a corporate vehicle as the purchaser, wherein the corporation has substantial losses and/or ITC which may expire unused, have a substantial advantage in acquiring mature properties, since they may be able to agree to a depreciated value allocation to the assets or conversely may acquire shares of the seller's corporation and liquidate with minimal tax consequences.

Limited partnership, Subchapter S corporations and joint ventures incur far more complex regulations and require very sophisticated tax counsel to ascertain all of the tax consequences involved. Due to the extremely technical nature of these types of ownership vehicles, they are well beyond the scope of this article.

Finally, as pointed out in previous articles in this series, the previous absence of standardized accounting practices necessitates close examination of the financial statements of the selling entity. The recent release by the Financial Ac-

counting Standards Board of the Statement of Position, number 79-2, for cable reporting standards is an effort to overcome this problem. However, it has not had wide use by local and regional accounting firms. Consequently, financial statements must be carefully scrutinized. This is crucial in the acquisition of the stock of a corporation, since it is not possible to alter accounting procedures, except for good business reasons. It is also advisable to examine the tax returns of the seller for the previous five years. Since some practices vary with IRS districts, it is important to be aware of any audit results if the selling entity has incurred any IRS audits. It would also be useful, where possible, to attempt to ascertain if any tax cases are pending in federal court in that particular district, or if the IRS has taken any unusual positions with regard to cable TV companies.

"Limited partnerships, Subchapter S corporations and joint ventures . . ."

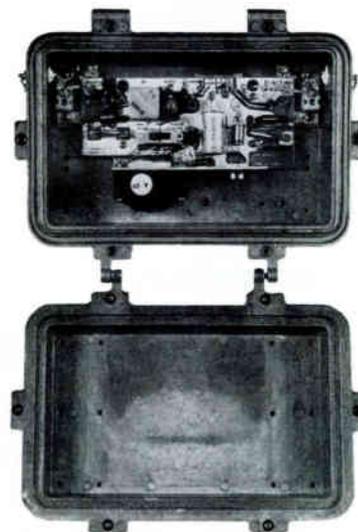
It is important for the reader to remember that the information contained in this article is intended only to point out some of the more common and basic tax considerations involved in cable television acquisitions. In closing, it is imperative that both buyer and seller rely only on professional advice from qualified accounting firms and tax counsel, preferably with some knowledge of the cable industry. The real dollar costs which might result from failure to do so can be substantial. □

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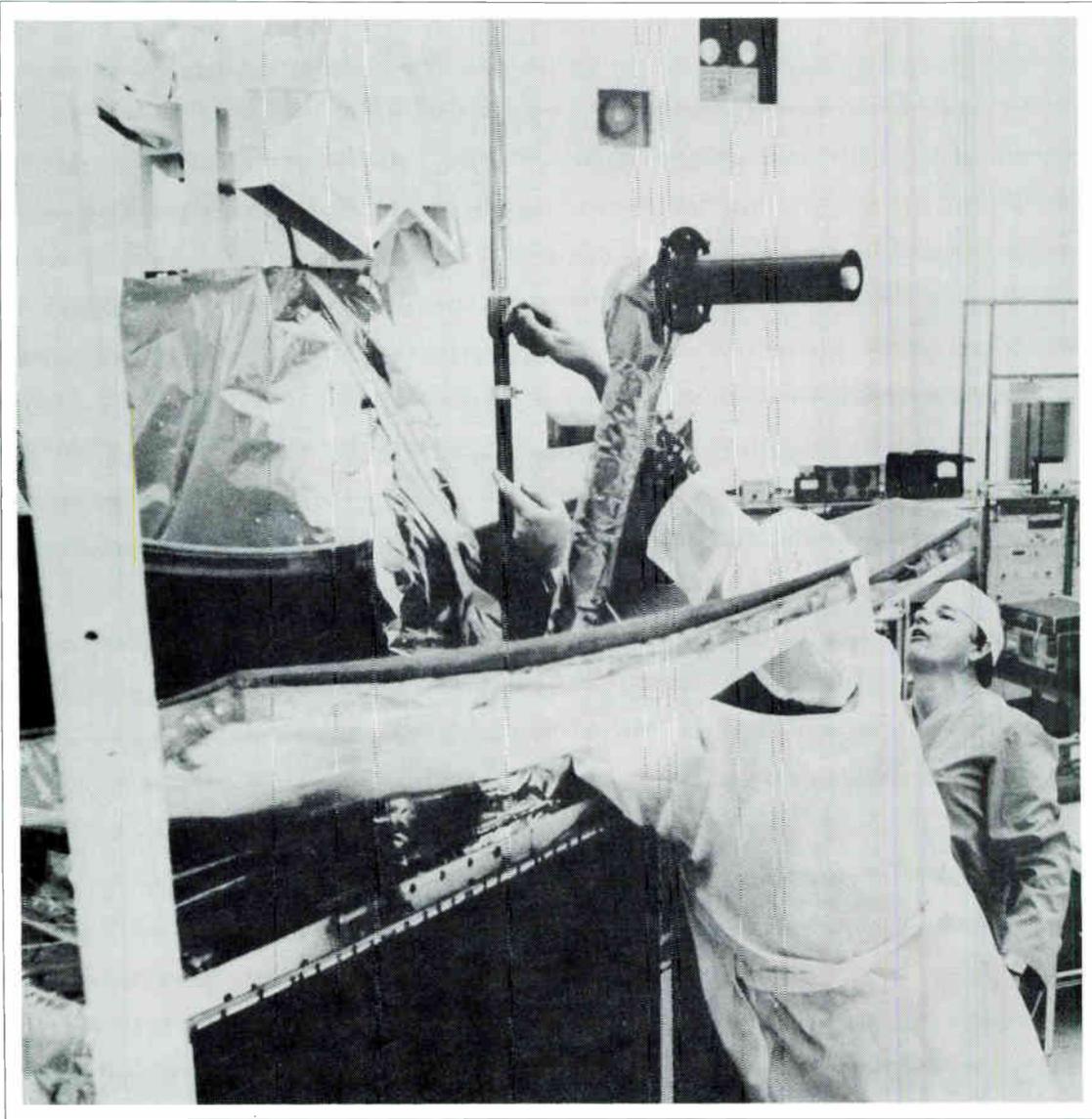
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cont. from page 19

RCA Satcom IV is checked at Kennedy Space Center, Fla., following shipment from RCA Astro-Electronics, Princeton, N.J. Launch from Complex 17 is scheduled for early 1982. Owned and operated by RCA American Communications, also of Princeton, the satellite will provide communications for all 50 states. □

SATCOM III R How Does It Look?

A lot of people have been asking how reception is from SATCOM III R as compared to SATCOM I. At this time we have no definite data for comparison purposes. Visually, from mid-Florida, the consensus is that SATCOM III R Transponder Bank 1 (Transponders 3,7,11,15,19, and

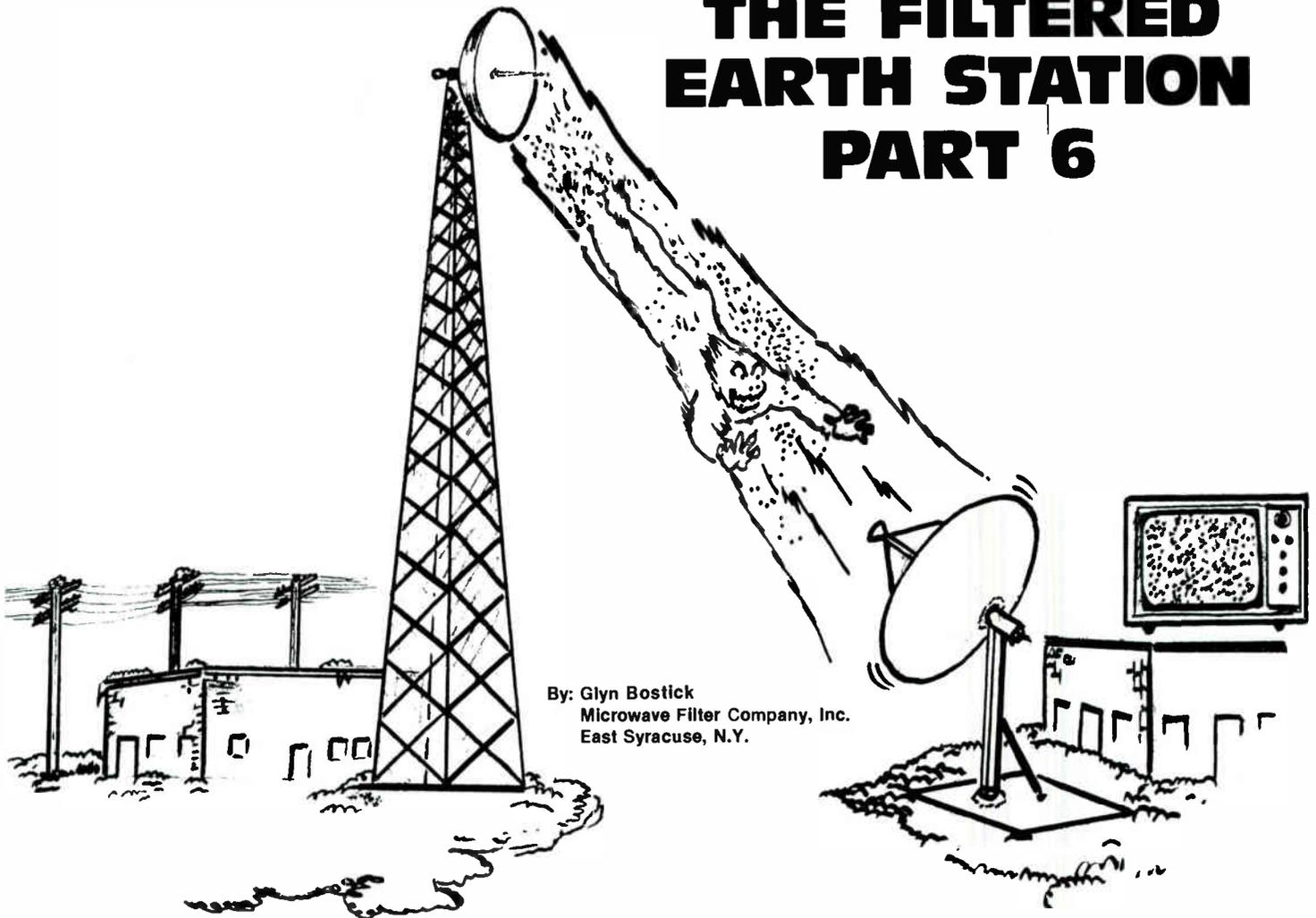
23) is hot and producing as good or better quality signals than SATCOM I. Transponder Banks 2 & 3 appear fair — probably as good as SATCOM I — but, there are some doubts about the quality of signals from Transponder Bank 4 (Transponders 2,4,10,14,18, and 22). The pictures from these

transponders seem to be slightly weaker in this area than they were from SATCOM I.

We hope to have completed actual measurement comparisons of the signals within the next two to three weeks and we will provide the results in the CATA-CABLE and CATJ Magazine. □

The "Abominable Snowman" Comes to

THE FILTERED EARTH STATION PART 6



By: Glyn Bostick
Microwave Filter Company, Inc.
East Syracuse, N.Y.

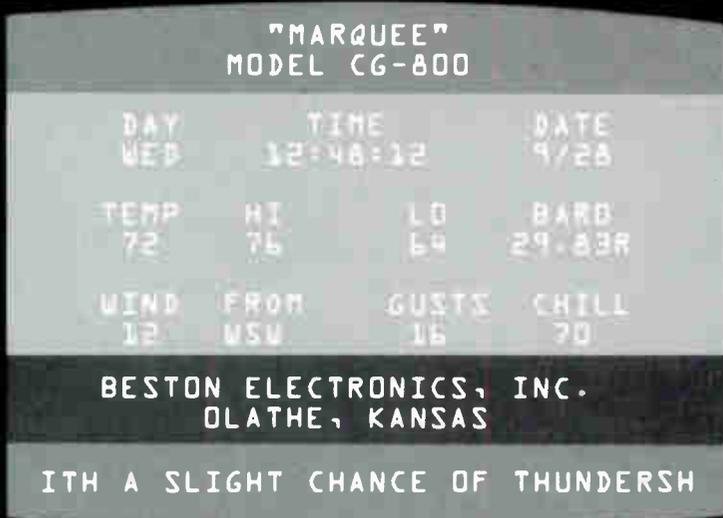
"MA-BELL" REVIEWED

We previously described the microwave telephone carriers (hereafter "**Ma-Bells**", or **MB**, for short) that **can** appear at 25 places in the earth station band: midway between adjacent transponders (23 places) plus another 10 MHz below transponder #1 and a final one 10 MHz above transponder #24. A microwave feed can carry up to 6 of these carriers, spaced 80 MHz (minimum) apart. These signals are vertically polarized. We will see them at 60 MHz or 80 MHz, at the 70 MHz IF band and, if our problem is only "sparklies" on the odd number channels, 60/80 MHz IF traps will **usually** eliminate them.

NOW COMES "SNOWMAN"

Note that we say IF traps **usually** eliminate "Ma-Bell". They'll work if the offending signal strength merely **deteriorates** quality: we can see the picture but we have "sparklies". Even when they are quite heavy, traps sometimes work. But when MBs are strong enough to wipe out ("snow", "blank", "kaput") the adjacent channels, the mixer is being disabled (de-sensitized), and **nothing** intelligible gets down-converted. Remember that the job of the IF trap is to separate the **spurious** from the **desired** in-

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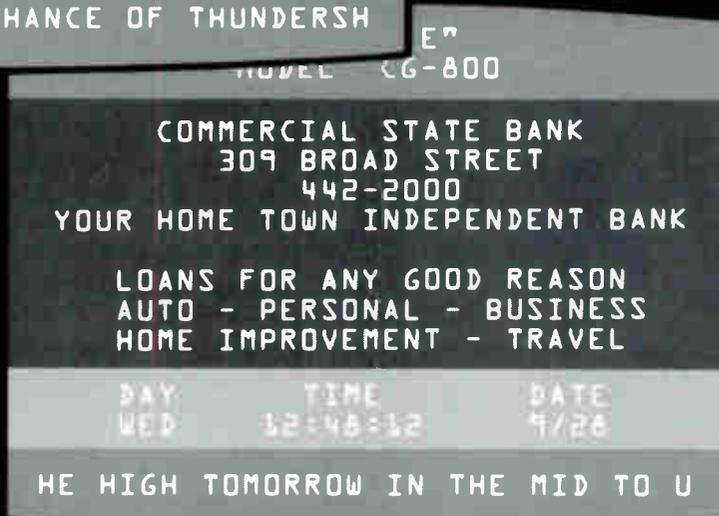
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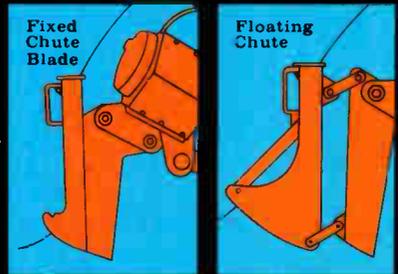


from 12 to 24 inches, and allows you to build to maximum power as soil conditions become more difficult. You'll hold your traction while you're doing it: greater weight — up to 4,250 pounds — and better weight distribution keeps the 350SX working when others slip or stall.

The 350SX is loaded with innovative features that make it a standout in its class... features that give you outstanding plow performance, more maneuverability, and greater operator efficiency.

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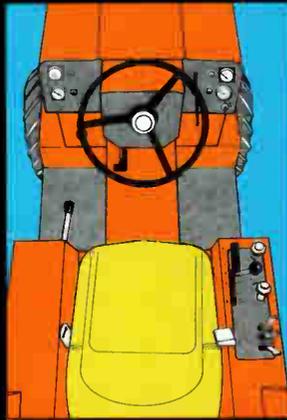
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and control is increased by standard 4-wheel-steer: you can steer front and rear wheels independently, to work more effectively on slopes. Dual-lift cylinders provide the force required to vary depths in even the most difficult



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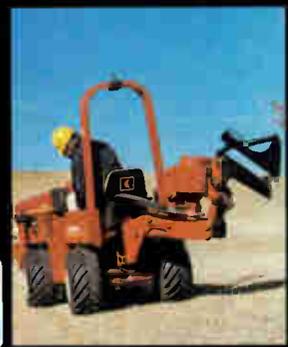
And the 350SX is "human engineered" for its operator. He sits in a rider module, facing the front. There's no body overhang, no awkward movements to reach the controls. They are grouped on the right rear fender in easy reach.

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December 7, 1981

Managing Editor
CATJ
4209 N.W. 23rd Street
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To the Editor:

Something has to be said in reference to Glyn Bostick's article, dealing with satellite noise filtering, published in the November 1981 issue of CATJ. Mr. Bostick's central thesis is that outside satellite "C" band (3.7 to 4.2 GHz) transmissions, such as 2.1 GHz and 6.5 GHz Common Carrier traffic, 3.4 GHz Amateur Radio transmissions, and 4.6 GHz Armed Forces communications inject noise into the satellite pictures. As a remedy, he strongly recommends the application of bandpass filters.

It is not clear from this paper, what he means by "noise". Is he referring to wide-band, random (white) noise? Or is he referring to harmonics and spurious beats, which, as in-channel or adjacent channel interference product sparklies on the pictures? Anyhow, he strongly recommends the application of microwave bandpass filters. Perhaps, on the same principal as we have seen a few years ago head-ends, loaded with bandpass filters before and after the signal processors.

Let's face it, microwave transmitters, particularly those operated by the Common Carriers, or the Military, are well equipped with low-pass filters. They are not supposed to inject harmonics into other bands, in violation of the FCC Rules and Regulations. And especially: How would a 6.5 GHz transmitter inject a harmonic into the 4 GHz band?

Then, returning to the basics, and assuming that somehow these services still radiate some spurious wide-band noise, reaching down and up into the 3.7 to 4.2 GHz frequency range, what would be the purpose of a filter after the LNA? (See the figure on the bottom of Page 22). The Carrier/Noise ratio of the TVRO stations is determined at the input of the LNA. The application of a bandpass filter in front of the LNA would simply reduce the C/N ratio by its insertion loss, which is highly counter-productive. A bandpass filter after the LNA has no effect on noise, and has no meaningful purpose against interference, which should be prevented at the source of origin.

Yes, Virginia, there are powerful wide-band radio sources, injecting 20 to 30°K or even 100°K noise into the "C" satellite band. Such as the sun, (remember those afternoon SATCOM 1 outages in the spring and fall, lasting 6 to 8 minutes?), stellar and galactical radio noise sources, and the familiar thermal radiation of the earth. However, no bandpass filter, not even a MICROWAVE BPF would reduce the sun-outage, or eliminate terrestrial

thermal noise. Only a higher directivity, lower side-lobe radiation pattern antenna could provide any improvement.

Before the next installment is published, could we expect more filtering on the article itself?

Sincerely,

Steven I. Biro
BIRO ENGINEERING
Princeton, N.J.

P.S.: Observe in the "Happy" filtered earth station picture the absence of the LNA in the "Bucking Dish" leg. A very unhappy situation. The configuration, as shown, will not achieve interference cancellation.

Letter To The Editor

Dear Editor:

GADZOOKS! I've finally done it: gored a sacred bull!

To me, and the approximately 30 installers per week who ask my help in salvaging badly sited earth stations, "NOISE" is any signal we don't want. We really don't care whether it's white, green or purple: if it bothers us, it's "NOISE".

I am ashamed for my faulty nomencla-

ture, though. I've fallen into the EARTHLY vernacular of those hands-on people for whom I write. Strangely enough, they read the articles and know exactly what I mean by "NOISE". And they're not even consultants!

My clients and I don't design receivers so we don't care a fig about noise figure. We've got our hands full just salvaging a lookable picture out of the wipe-out ("NOISE", I call it).

Nevertheless, twist & turn as I will, I can't escape it. By the textbook Steve is correct. I should have avoided the dread term S/N (Signal to Noise) ratio. Instead, I should have used the term C/I (desired carrier to interfering signal) ratio. As penance, I'm going up to our HAPPY EARTH STATION and frown for thirty minutes. Then, in my next article, I'm going to explain my fall from grace to a numbed disbelieving readership.

Now here's where Steve cuts me to the quick. He thinks that I think a 6.5 GHz carrier can throw a harmonic down into the 3.7-4.2 GHz band.

After a prefatory salaam to Steve's sacred FCC rules, I must tell the truth: analyzers don't lie. I've helped remove the third harmonic of identified FAA radars even though they are "not supposed" to emit them. (It's not nice).

But my rage knows no bounds at his suggestion that I would place a (Ugh!) filter in front of an LNA! It's impossible to do so on most earth stations anyway. But I would if I could, in some cases, to protect the little creatures from over load — by strong out-of-band signals.

And I was livid (with "white noise") to hear him state: "A bandpass filter after the LNA has no effect on noise, AND HAS NO MEANINGFUL PURPOSE AGAINST INTERFERENCE, WHICH SHOULD BE PREVENTED AT THE SOURCE".

But then I cooled down. He was right. Everyone should avoid emitting signals harmful to others. What could make more sense.

I realized where my duty lay. Nevertheless it's not easy. Last month, at my behest, over 30 dealer-installers plugged in MICROWAVE BANDPASS FILTERS and saw a picture for the first time — ever. But after seeing my error, I've just written them a memo telling them to remove the "UNMEANINGFUL" bandpass filters and go chop down those 2.1 & 6.5 GHz transmitting towers that wipe them out. But, of course, I don't put it in those words. I call it "preventing at the source".

Perhaps we need yet another kind of filter — to attenuate spurious journalistic emissions.

Yours in Sackcloth,

GLYN BOSTICK

cont. from page 24

telligence. If no intelligence gets through, the traps can perform no useful function.

Strong MB can be identified by periodic wipe-out. Since MB frequencies are spaced 80 MHz (min.), we lose channels selectively spaced throughout the earth station band. Of course the MB feed may have only one, two, — up to six frequencies, and we'll see a corresponding number of wipe-outs.

This situation is totally different from the wipe-out we get from strong out-of-band signals, where all or most channels are wiped out or given heavy visual interference. In that case we can get rid of the problem with a selective bandpass filter which passes the entire earth station band and attenuates out-of-band signals.

WHAT'S HAPPENING WITH STRONG "MA-BELL"?

A simplified explanation is shown in **Figure 1**. The down-converter (mixer) is designed to accept signals in the "normal operating range" — those expected from "the bird" as presented to the down converter after amplification by the LNA. In this range, the mixed output (IF) is reasonably proportional to RF input. If a nearby Ma-Bell is sufficiently strong, its RF signal "biases" the mixer into the "saturation" range, where the RF/IF curve has very little slope. We sometimes call this condition "overload".

The addition of RF satellite signals to this large threshold signal then results in very little IF output. The new IF signal is only slightly above the new threshold level so it is difficult or impossible to see it. We have "wipe-out".

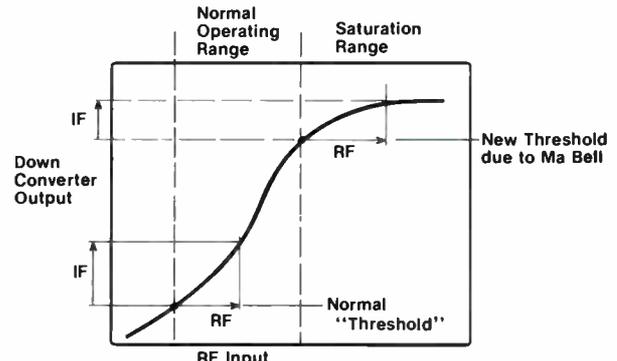


Figure 1

Downconverter saturation and reduced IF output due to strong in-band signal.

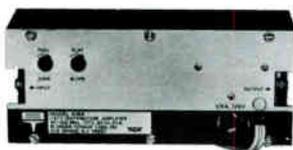
WHAT'S THE CURE?

We must prevent MB from reaching the down-converter and over-loading it. Easier said than done. See **Figure 2**. Ma Bell, an FM signal, is 10 MHz off transponder center frequency. Its FM deviation may be 3-5 MHz, depending on its momentary traffic

continued

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load. To suppress Ma-Bell, then we need a microwave trap whose 3 dB bandwidth is **at least 5 MHz** to cover the widest MB deviation. Such a trap would remove some transponder bandwidth from both adjacent channels and reduce picture quality somewhat. If we opt for a narrower microwave trap (say 3 MHz bandwidth), picture quality is better, but we may need to use the 60/80 MHz IF traps also: the microwave trap will "unload" the mixer, returning it

WHAT KIND OF MICROWAVE TRAPS?

We need a trap with a high **operating Q** (= 4,000 MHz/5 MHz = 800). In order to have a deep notch

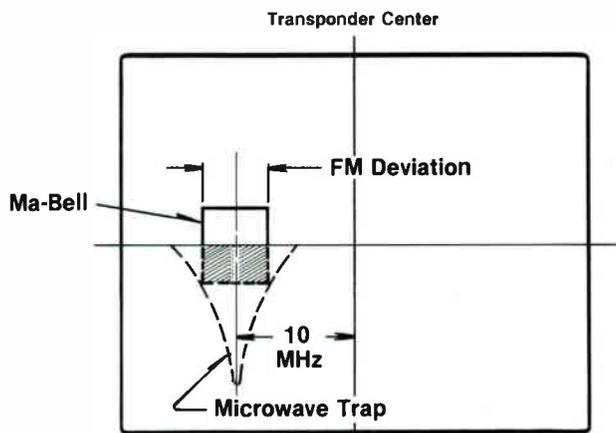


Figure 2

Nearest Odd Transponder

to near normal function, but the extremes of MB deviation may "break through the trap" producing "sparklies".

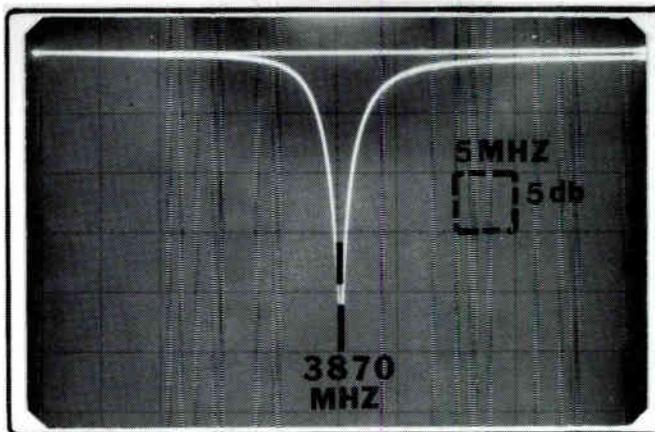


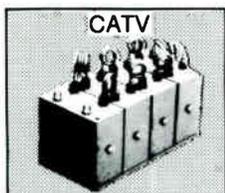
Fig. 3 (a) Response of typical microwave "notch". This one removes an "MB" midway between transponders 8 & 9.

(say > 20 dB), we must employ a microwave cavity with a very high **unloaded Q** (very low internal losses). The only **economical** microwave structure that meets these requirements is a **waveguide trap**.

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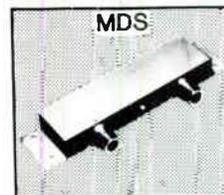
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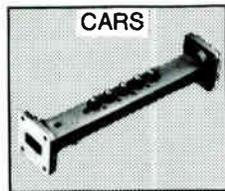
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Figure 3 is a trap designed in WR229 waveguide to utilize its very high loaded Q. Built-in coaxial transitions permit insertion in the coax cable (with N connectors) to connect between the LNA and down-converter. The trap shown has two notches — one for each of two MBs: 3870 MHz and 3950 MHz.

CAN WE STANDARDIZE?

Recall that Ma-Bell can occupy 25 frequencies within the earth station band:

Between Transponders	23
10 MHz Below Transponder # 1	1
10 MHz Above Transponder #24	1
	<hr/>
	25

Does this mean we must have 25 microwave notch designs? Each microwave frequency is a new design ball game: a different set of dimensions is required for each trap. This means 25 separate products, a very expensive stocking problem for a supplier of microwave traps (if you can find one).

Remember that the maximum number of Ma-Bells per feed is six, and that their minimum separation is 80 MHz.

A waveguide notch can be made tunable by several different means. A convenient one, a tuning slug mounted at the middle of the waveguide "stub", is shown in **Figure 3**.

A High-Q microwave trap (in WR229 waveguide) will preserve approximately constant band-width and notch depth when tuned $\pm 1\%$ of center frequency, about ± 40 MHz, in this case. So, a single notch can "patrol" an 80 MHz segment of the earth station band. The total Ma-Bell range is 3710 MHz (10 MHz below transponder 1) to 4190 MHz (10 MHz above transponder 24), or 480 MHz. Therefore, we only need $480/80 = 6$ separate notch designs to be able to tune one of them to Ma Bell. The following microwave trap specifications are offered as "purchase specs" for users. They are also recommended to potential trap manufacturers who are welcome to adopt them for the purpose of getting started on "standard" designs. **Purchase Specs For Microwave Traps To remove Microwave Telephone Carriers From Earth Stations.**

3 dB Bandwidth: 3-4 MHz
Notch Dept: 25 dB Minimum

Standard Notch #	Center Frequency (MHz)	Tunable (MHz)
1	3750	3710-3790
2	3830	3790-3870
3	3910	3870-3950
4	3990	3950-4030
5	4070	4030-4110
6	4150	4110-4190

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"MA-BELL" DOES NOT ALWAYS COOPERATE

Unlike "sparklies" situations where we use the 60/80 MHz IF Traps, we cannot design a **microwave** trap for a strong MB unless we know the **exact** MB frequency.

Most earth station operators with whom I've worked report courteous cooperation from MB person-

I have no magic solution to this impasse, except to note that the higher the rank in the telephone company, the more likely you will get cooperation. So aim at the **regional engineer** if you have no luck with the equipment operator.

If all else fails, a careful reading of your wipe-outs may permit deducing the MB frequencies. Where

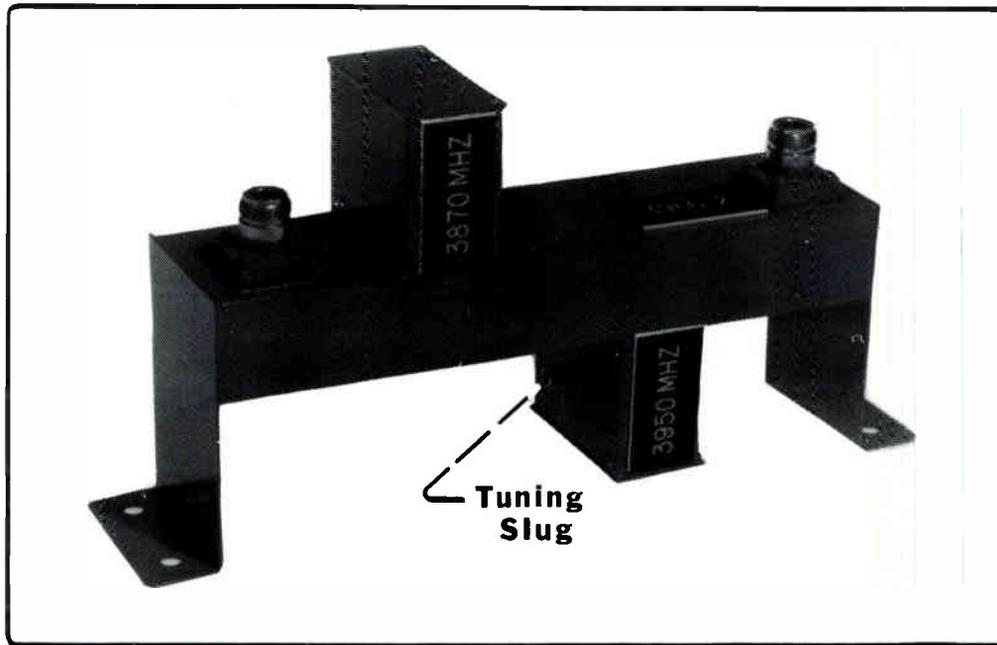


Fig.3 (b) Typical microwave notch filter. This one has two notches corresponding to two MB's.

nel, in some cases extending to furnishing a computerized read-out of the MB frequency, strength and line of sight.

But a disturbing number of MB personnel are ultra secretive and downright rude. Strange behavior indeed, for persons using the public spectrum.

you are using two LNAs (vertical and horizontal), wipe-outs may occur in adjacent **pairs**: a **vertical** channel plus the higher or lower horizontal. In this case, the MB frequency is **midway** between the center frequencies of the pair wiped-out. Where only one LNA is involved, the wipe outs will be the ver-

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tical channels. So you will be able to spot the MB frequency plus/minus 10 MHz: you know on which channel MB is located, but don't know whether its on the lower or upper edge. This information is usually good enough to design a trap since plus/minus 10 MHz tunability is very feasible. Nothing exact transponders wiped out and keeping in mind the 80 MHz (minimum) MB spacing rule,

that "noise" is any signal not desired by the earth station operator.

Nevertheless, I admit my transgression from the textbook and should have used C/I (desired **C**arrier to **I**nterfering carrier ratio). As a condition of my parole, I've promised to do so in the future.

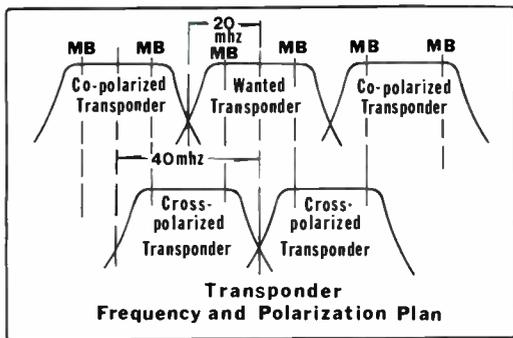
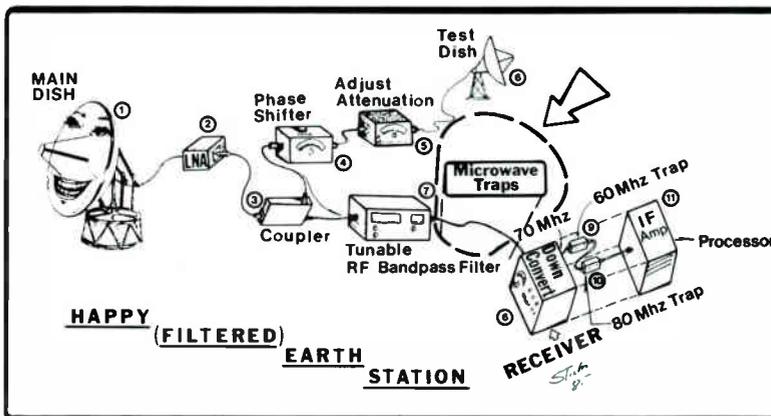


FIGURE 4

Satellite transponder frequency layout, showing permissible microwave telephone carriers ("Ma Bell" = MB)



may permit you to deduce exact frequency in some cases.

HUMBLE PIE TIME

Elsewhere in this issue a consultant slaps my wrist for loose use of the term S/N (Signal to Noise ratio).

I can't believe I've misled anyone closely following the articles since their context makes it clear

NEXT TIME

In the next part, we hope to continue the pursuit of the "Abominable Snow Man" with some case histories from projects now in progress. If data is not available in time, then we'll consider solutions for our last major terrestrial, the **Accidental Interference Carrier**: harmonics, illegals, etc. □

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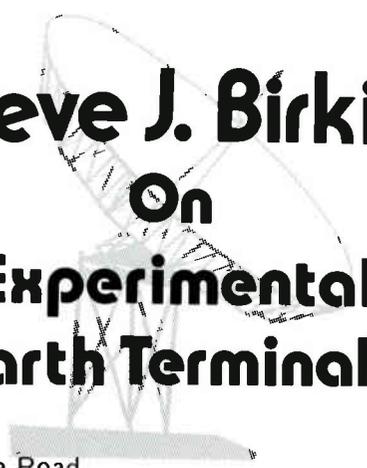
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Steve J. Birkill

On

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The Modified Polar Mount

Astronomers were the first to use the polar mount. They generally call it an equatorial mount — the two terms are interchangeable. It was realised a long time ago that, if you need to keep a telescope sighted on a celestial body despite the rotation of the earth, it's a lot easier if the telescope can move around just a single axis. Since most stars appear to travel in curved arcs across the sky, an azimuth/elevation mount is not too satisfactory. But by mounting the telescope so that it can turn about an axis parallel to that of the earth, the telescope is seen to track perfectly the movement of those stars lying in the equatorial plane. A clock motor driving this rotational axis allows the telescope exactly to counteract the earth's

rotation and remain fixed upon a distant star, from its rising in the east to its setting in the west. This 'hour angle' axis permits tracking in the celestial co-ordinate of Right Ascension.

The other direction in the sky, to north or south of the equator, is termed Declination. So to see the whole sky, a declination bearing is carried upon the polar axis. But since the earth's rotation does not affect an object's declination, this movement does not need to be motorised.

Our industry inherited the polar mount from the large (Intelsat etc) terminals, the design of which was based upon radio telescope antennas, on true polar mounts (though not all radio telescopes,

or indeed large terminals, use this form of mount). In the large terminal, continuous automatic tracking was required in both directions, so it was of little concern that the polar axis motion did not track perfectly along the geosynchronous orbit. The reason for this was the relative closeness to the earth of the orbit. The stars are so far away that to all intents and purposes the telescope's polar axis was the earth's axis. But the Clarke orbit, at only 22,300 miles up, is near enough for the terminal's displacement from the earth's axis to make quite a difference. Several degrees in face, at our latitudes.

It didn't matter too much in the 1975-77 period, when the CATV

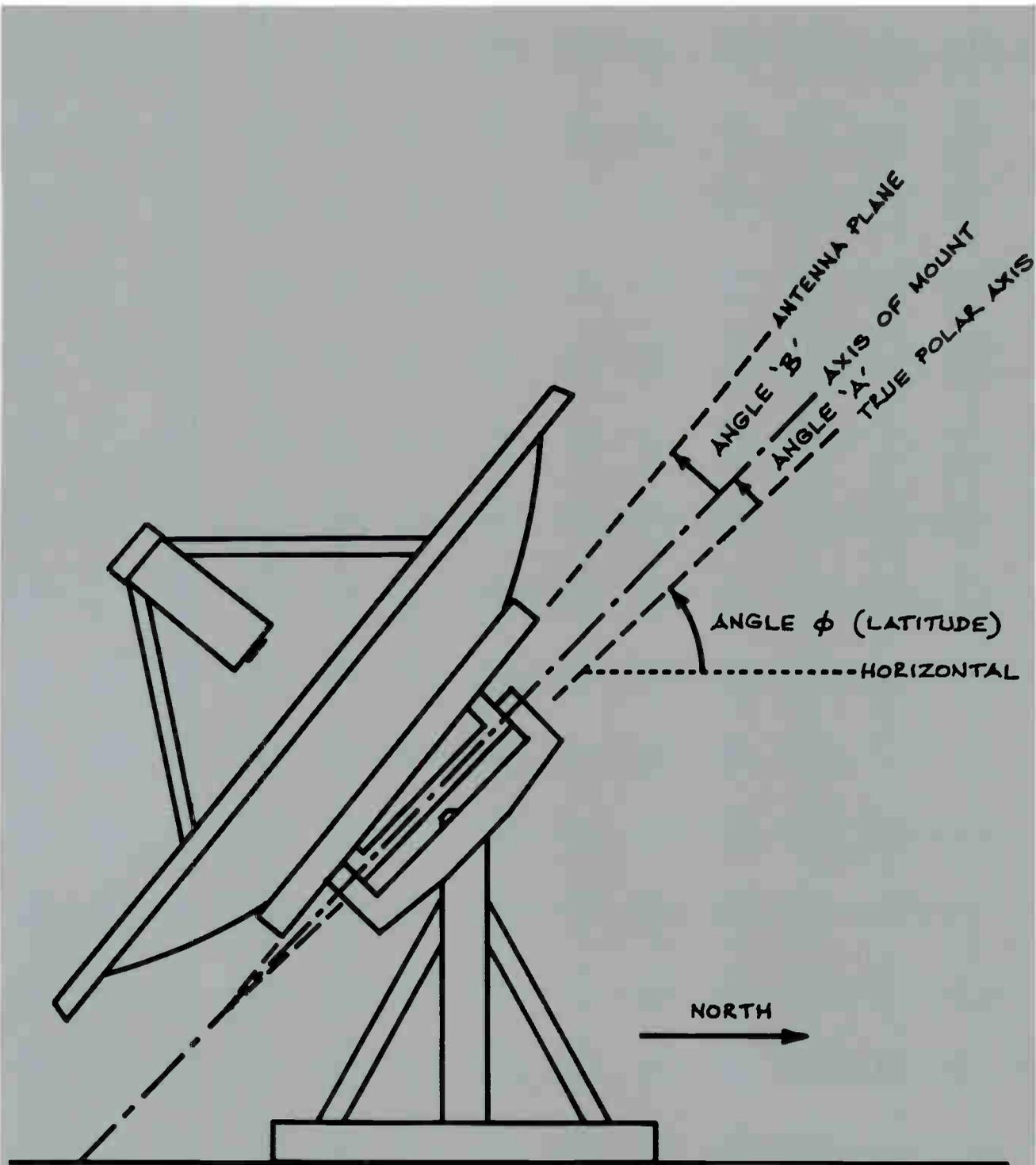


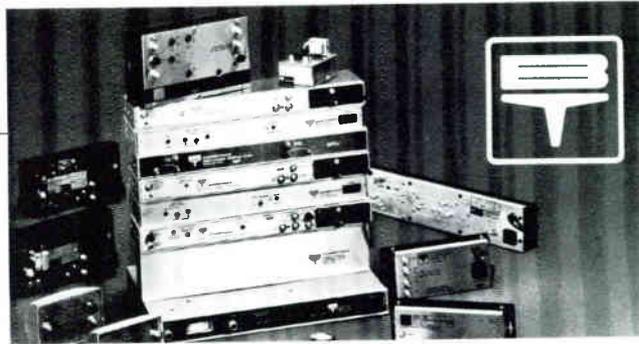
FIG. 1

ANTENNA ON MODIFIED POLAR MOUNT, SHOWING INCORPORATION OF ANGLES A AND B INTO THE STRUCTURE.

designers went back to their drawing boards, realised there would be more bird moves in their future, and worked out the figures for that great compromise, the **modified polar mount**.

It looks much like a classical polar mount, but two offset angles are built in. With either angle alone, the antenna can align precisely on the orbit at two points at most. With both angles incorporated, three point alignment can be achieved, and the points can be chosen to minimise the peak pointing error, either over the entire visible orbit, or over a selected portion of arc, such as the domestic belt. These optimisations involve the derivation of the general case of the look angle equations, plus differential calculus, which is unnecessary complication for our needs. Sufficient to say that the simplified three-point analysis presented here yields a pointing error of less than 0.05 degrees, horizon to horizon, for any latitude. Compare this with the 0.1 degree station-keeping 'box' of a domestic satellite, and the 0.8 degree H-plane 3 dB beam-width of even a 6-meter antenna. You will realise the error is quite insignificant in TVRO terms.

Figure 1 represents a polar mounted antenna with the modification angles built in. The chain-dotted line indicates the axis of rotation of the mount, and passes through the 'polar' bearings. A true polar mount would fix this axis parallel to the earth's, by arranging its tilt to be equal to the latitude of the location. The modified mount makes this tilt a little more, by the amount of angle 'A' which we shall derive. So the foundation is placed so that the rotation axis lies in a true north-south plan (i.e. the meridian) and the tilt of the axis is then adjusted to be equal to $(\phi + A)$ where ϕ is the geographical latitude of the terminal's location. Having fixed the direction of the modified polar axis, it must stay fixed. The extra declination ad-



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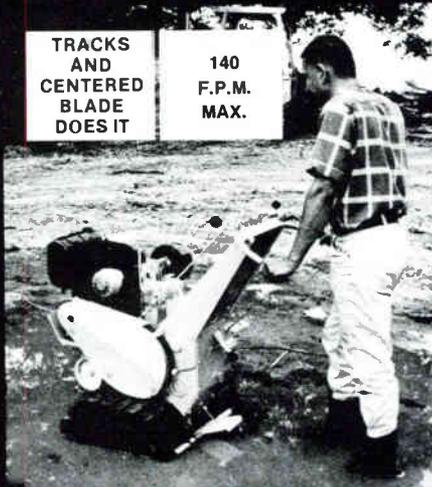
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FIG.3

VIEW IN MERIDIAN PLANE OF TERMINAL AND 'DUE SOUTH' SATELLITE SHOWING MODIFICATION ANGLES A & B.

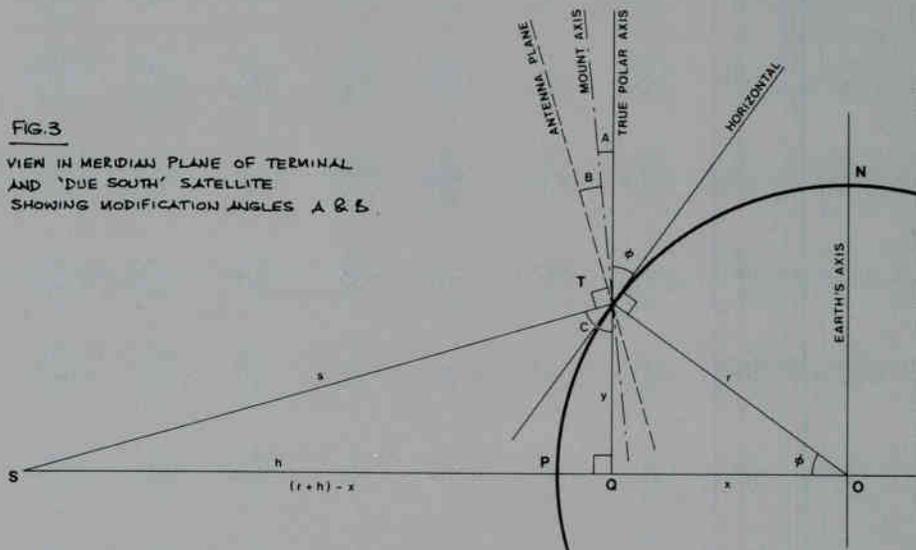
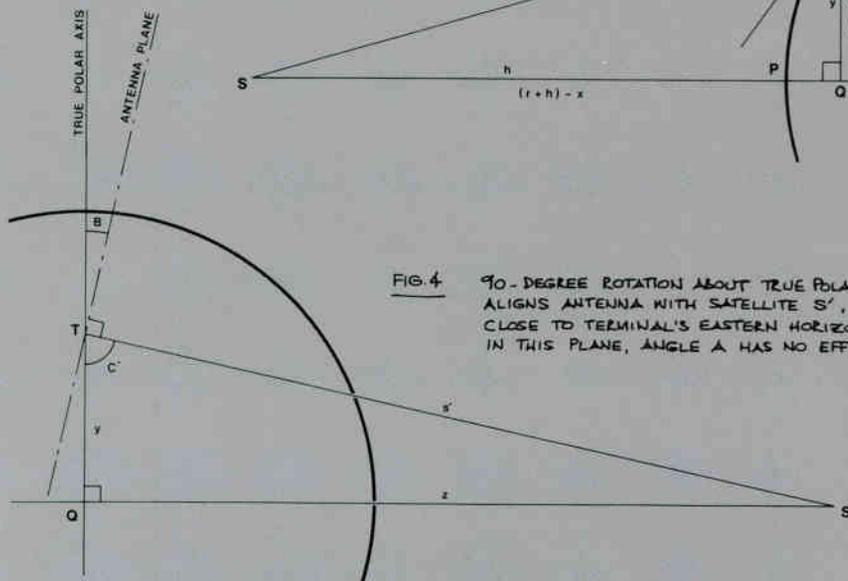


FIG.4

90-DEGREE ROTATION ABOUT TRUE POLAR AXIS ALIGNS ANTENNA WITH SATELLITE S', CLOSE TO TERMINAL'S EASTERN HORIZON. IN THIS PLANE, ANGLE A HAS NO EFFECT.



justment, angle B, is then applied. Now to permit this, there must be adjustment provided at the rear of the dish, where it is fixed to the 'polar' bearings. If your antenna doesn't have this adjustment it is not designed for modified polar mount installation. Looking at **Figure 1** you may think a change in the inclination of the rotation axis will achieve the same result, but not so. The diagram shows the antenna looking south, towards the nearest and highest satellite. But take it to west or east and you'll see that the effect on look angle of "A" diminishes, leaving angle 'B' to do all the work by the time you reach the horizon. In fact this condition obtains at a point just below the western and eastern horizons, as shown in **Figure 2**.

This special case can be used to simplify considerably the math associated with the modified polar mount. We define satellite locations S' and S'' as the two additional points (that is additional to S, the satellite on our meridian) where tracking will be perfect. At these locations, the antenna plane has rotated just 90 degrees either way from its 'due south' position, and it is parallel to the meridian plane. It is clear that satellites S' and S'' will not in fact be seen, as they are by definition just below the terminal's horizon. But if we set tracking correct here, it will be within 0.05 degrees over the visible orbital arc.

If we define phi as latitude, lambda as difference in longitude between S and S', r as earth's

radius, h as height of satellite orbit from equator, s as slant range to satellite, then by some simple trigonometry we can arrive at values for A and B which satisfy our requirements. (r and h are constants).

Figure 3 shows the terminal's meridian plane. Here

$$x = r \cos \phi$$

$$\text{and } y = r \sin \phi$$

$$SQ = (r + h) - x$$

In triangle SQT,

$$\tan C = \frac{(r + h) - x}{y}$$

$$= \frac{(r + h) - r \cos \phi}{r \sin \phi}$$

Summing the angles to the left of the true polar axis, around T,
 $A + B + C = 90^\circ$

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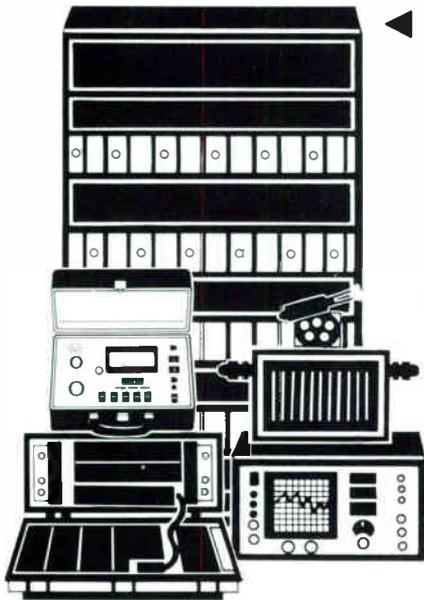


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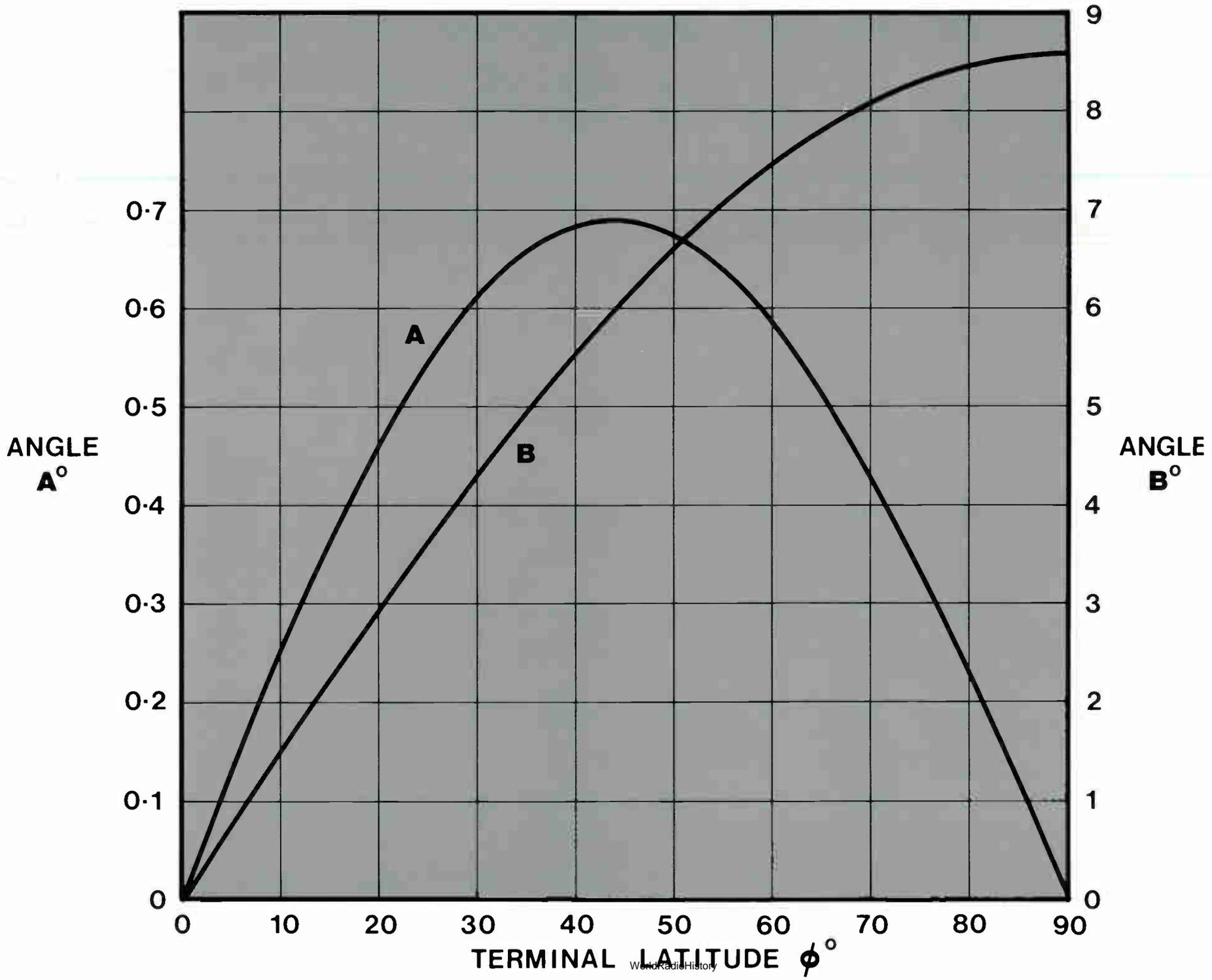


FIG. 5 VALUES OF ANGLES A AND B PLOTTED AGAINST TERMINAL'S LATITUDE, ACCORDING TO THIS ANALYSIS.

Turning now to **Figure 4**, the plane at 90 degrees through the true polar axis, it can be seen that angle A does not appear in this plane, angle B being the total declination required to look at the satellite at the S' location. So we have a new angle C', which by definition is (90 - B).

But in triangle S'QT, $\tan C' = \frac{z}{y}$

From **Figure 2**, triangle S'QO, $z^2 + x^2 = (r + h)^2$

$$\text{Therefore } B = 90 - \tan^{-1} \frac{\sqrt{(r + h)^2 - x^2}}{r \sin \phi}$$

$$= 90 - \tan^{-1} \frac{\sqrt{(r + h)^2 - r^2 \cos^2 \phi}}{r \sin \phi}$$

$$\text{And } A = 90 - (B + C)$$

$$= 90 - \tan^{-1} \frac{(r + h) - r \cos \phi}{r \sin \phi} - B$$

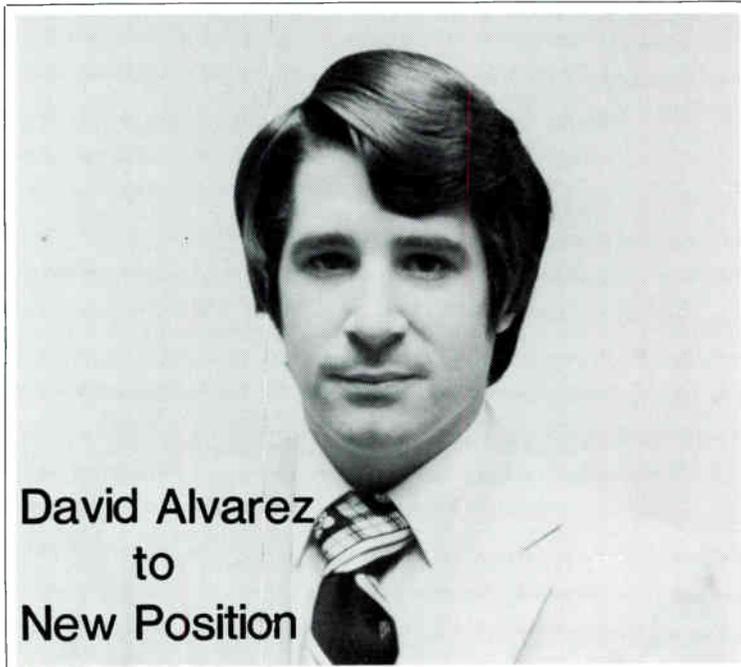
$$= \tan^{-1} \frac{\sqrt{(r + h)^2 - r^2 \cos^2 \phi}}{r \sin \phi}$$

$$- \tan^{-1} \frac{(r + h) - r \cos \phi}{r \sin \phi}$$

Steve J. Birkill

Plotting the values of A and B so derived, against latitude, gives the curves of **Figure 5**. The values given by the approximation are within a fraction of a degree of those given by more rigorous computation, and yield a mount which tracks within one-twentieth of a degree, horizon to horizon. The largest errors will be in the real-world measurement of the angles concerned. Alignment of your north-south line is all-important. A compass is useless, except for the initial survey. Sighting on local landmarks with reference to an ordnance survey map is an accurate method, if done with care. The Pole Star is

approximately one degree from true north, depending on time and season, and should be consulted with caution and accurately leveled instruments. A solar or stellar transit is the most accurate method, but you must know your longitude and be able to calculate true solar or sidereal time, respectively. Your latitude must be known again to a similar order of accuracy, not for its effect on A and B so much as for its incorporation, as 0, into the axis inclination. The survey map will show your latitude to a few seconds of arc, though one minute accuracy is readily achieved by reference to a world atlas, interpolating as necessary with a local map or road atlas. When you've obtained all the figures and applied them to your mount, the fun comes when you spin the antenna across the sky and see it perfectly sighted on every bird, horizon to horizon, without any of those fiddly declination adjustments at the extremes of the arc. □



Departing from our policy of not featuring personality stories, once more a significant promotion must be noted by CATA and CATJ. We are proud to recognize

the promotion of one of the cable industry's bright young people, David Alvarez, to the position of Director of Marketing for Microdyne Corporation.

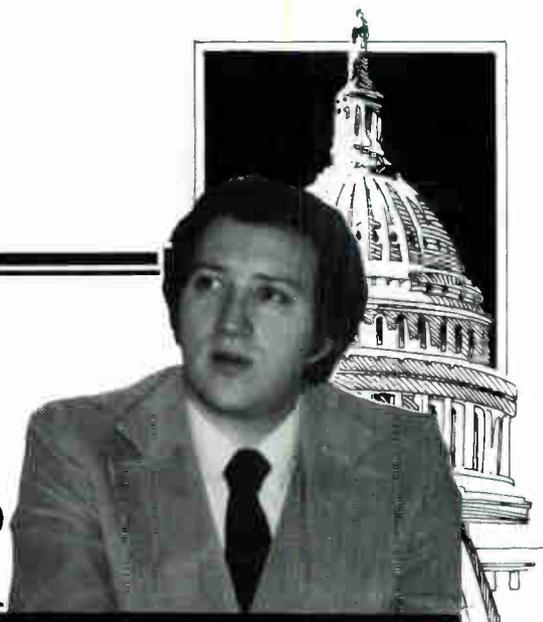
Having worked with David since CATA's and CATJ's early days, we can attest to the ability and expertise of this young man. David has been an untiring worker in the technical set-ups at CATA's CCOS meetings since the very first one at Wagoner, Oklahoma, suffering the unbearable 100+ degree heat there and at Fountainhead the subsequent years.

To David, we have always been able to turn for assistance and counsel on technical matters; he has graced the magazine with his writings; he is acknowledged by all in the industry as a knowledgeable and dedicated worker; he will continue to flourish in his new assignment, coordinating all marketing activities for **Microdyne's** satellite television products.

CATA and CATJ congratulates **Microdyne** on this outstanding promotion of David Alvarez and wishes both David and the company continued success and progress under this new leadership. □

Steve Effros
Executive Director, CATA

Washington update



SUPREME COURT DEALS WITH TWO CABLE CASES IN ONE WEEK!

When it rains, it pours! In early January the Supreme Court announced that it had decided not to take up the appeal of the National Association of Broadcasters and the Sports Leagues challenging the Appeals Court decision in the "Malrite" case. That means that we have finally won a complete victory on the issue of importation of distant signals and syndicated exclusivity, at least so far as the FCC is concerned. You will remember that the case was originally brought by the NAB and company to stop the FCC decision eliminating those two sets of rules. They lost at the appeals court level and went to the Supreme Court. The Supreme Court has now decided to let the Appeals Court decision stand. So were it not for the "son of compromise", the entire issue of syndicated exclusivity would now be dead. As we all know, that is not the case.

In a potentially far more important case, the Supreme Court decided that home rule cities are subject to the antitrust laws. Now it happens that the decision came about in a cable-related case, therefore there has been a great deal of publicity about it, and how it will affect franchising. The truth is, it probably won't have a major impact on franchising unless the folks who represent cities panic!

Here is what happened. The City of Boulder, Colorado tried to stop the franchisee, TCI, from extending its lines inside the city. They preferred to go out for new bids and maybe even split up the city. TCI had purchased an old, incomplete system in Boulder and wanted to expand it. TCI was told to stop building. They took the City to Court. The City was accused of violations of the antitrust laws and defended itself by saying that the government is not subject to the antitrust laws. THAT is the portion of the suit that went to the Supreme Court. The question before the Court was very narrow; are home rule cities subject to the antitrust laws? The Court had already decided that non home rule cities were. In the decision that just came down they said that home rule cities are subject to the law also. The only immunity to the application of the antitrust laws are actions by the federal government and the states. The

Court said that since the home rule city in this case, Boulder, was not acting specifically under mandate of the State to deal with cable television franchises it was not protected as the State would have been.

Now what does all this mean? Well, to begin with the fact that the city is subject to the antitrust laws, as decided by this case does not mean that the city violated the antitrust laws. That question has yet to be considered by the lower court. They first wanted to find out if the laws even applied. They have now found out that they do. The case now goes back to the lower court.

While we could paint a wild picture at this point of all the potential implications of this suit if in fact the city is now found to have violated the antitrust laws, it does not do anyone any good to do so. All that it really means at this point is that a home rule city cannot knowingly collude with one bidder for a franchise to prevent another competitor from getting into the marketplace. It **DOES NOT** mean that the city must give franchises to anyone who asks for one! There are some city attorneys who might look at it that way, so the one thing that is sure is that we will see more litigation because of the decision. The other thing that is likely is that some States will enact specific cable television laws, either taking jurisdiction at the State level or specifically granting jurisdiction at the local level to get around this decision. **NOTE TO ALL STATE ASSOCIATIONS!!!!** You will have to be on a sharp lookout for bills submitted in reaction to this decision. There are sure to be some folks who over react! Let's all try to explain the facts in the case and calm this thing down rather than get everyone excited about a legal prospect that has not happened.

IS "MA" ABOUT TO RING THE CABLE "BELL"?

Unless you have been totally out of touch with what has been happening in the world in the last few weeks (and if that is the case, we envy you), you know by now that the Justice Department (read the Reagan Administration) and AT&T have reached a settlement of their mammoth antitrust case. The settlement results in a new "Ma Bell" she

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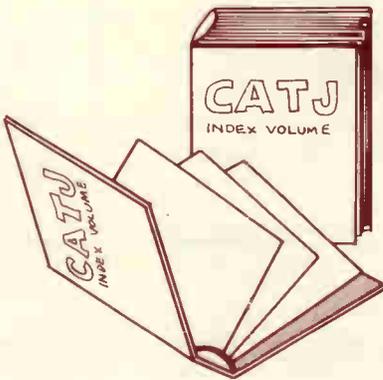
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- STEVE BIRKILL ARTICLES and
- WASHINGTON UPDATE

Separated by subject matter, this addition is designed to fit into the tabbed sections of the INDEXED VOLUME, a compilation of the major articles since the inception of CATJ (May 1974 through 1979). Completing this library, the 1980 CATJ Supplement is still available.

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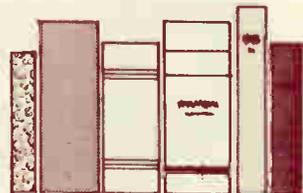
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is leaner, having had to give up all the local operating companies, but meaner since she not only has absolutely immense resources (she has to sell off billions of dollars worth of assets) and is now free to enter just about any competitive that she wants. Cable is not out of the question.

It used to be a standard line that when asked, Charlie Brown, who heads AT&T would say they are not at all interested in getting into the cable business. When he was asked that question again at the press conference dealing with the settlement he simply said "no comment". Well, that is a very loud and clear comment if you ask us!

Assuming that the settlement is accepted by the Court, AT&T will have to get rid of the local companies within 18 months. Then it will be free to enter the competitive marketplace. Now it is clear that cable television is not really the major target for Bell. They are interested in enhanced communications services for their long distance facilities, and they are also vitally interested in data processing and transmission.

this one "fall between the cracks" while all these other things are going on. Write those cards and letters!

As we get more details on how AT&T intends to proceed, as friend or foe, we will pass them along to you. In some areas it appears that they may be moving toward friendship. An AT&T liason has been established between that company and the cable representatives. CATA spent some time with him just before the settlement was announced. One interesting thing we learned was that AT&T leases more poles from the power companies around the country than cable systems lease from AT&T! And that's by a 3 to 1 margin! So it now appears that it is in their best interests too to work for lower pole rental rates. An example of that came just this month as all Texas operators were advised that their association had managed to reach an overall pole agreement with Southwestern Bell which drops rates from \$3.00 to \$1.90! Congratulations to Bill Arnold and the Texas Association!

H.R. 3560 — "SON OF COMPROMISE" — WE'RE AGAINST IT — HERE'S HOW TO SAY SO!

CABLE OPERATORS: If you are a little unsure of what a letter to your Congressmen concerning H.R. 3560 should contain and would like a little help, contact CATJ and we will be happy to forward a sample letter, complete with some suggestions, to you. This is an important fight, and we need your contacts. Contact us today for your sample letter kit!

That last part could be a serious blow to major cable operators who are now building gold-plated big city broadband communications systems on the presumption that they will be getting some of the costs back by providing enhanced data services. Bell is going to be in there too. Of course that could also be seen as a major opportunity. After all, AT&T will not have to work through the phone companies in the local areas any more, it could make an alliance with the cable industry. Cable is far better for data transmission anyway. So this could actually be a major break for the cable industry so long as one other thing doesn't happen — so long as Bell does not build its own systems! According to the settlement it would appear that they are not stopped from doing that. They could become a direct competitor with cable operators for the remaining cities. On the other hand, if the Boulder decision, outlined above, finally comes out in its strongest form, they could overbuild anywhere they wanted to! All of that, however, assumes that Congress will not step into this mess. We are betting that they will. Tim Wirth has already announced that he will hold hearings on the subject. — so this one is not over by a long shot. It does bring up one thing, though, the Communications Subcommittee is going to get VERY busy, what with the AT&T stuff, the Boulder-city franchising problems (hopefully the Senate will be coming out with a bill soon on that subject, including a ban on municipal ownership which CATA is working for) and finally the "must carry" aspects of the copyright bill. It is very important that you let Cong. Wirth and his subcommittee members know how important you think the subject of the "must carry" rules is! We can't let

We promise that we will not spend this entire issue discussing the topic of Copyright. However, as you all know, it is of primary and vital interest to all of us right now. As we spelled out in the last issue of the CATAcable, the Community Antenna Television Association and many other cable television operators are against the adoption of the proposed bill. The bill has two primary sections. One deals with the reimposition of the syndicated exclusivity rules on cable television systems, and the other imposes, by law, the "must carry" rules on cable television systems and subscribers.

Now we have gone into great depth on both of these issues in the past two copies of the CATAcable. If you need extra copies of either of those issues, just contact the Washington office and we will see that you get them. They are particularly helpful as background material when you talk to your Senator or Congressman. It is not that they would necessarily read the whole thing, but as long as one of their staff can read and understand the background of this whole thing then we definitely have a "leg up" when it comes to ask for the Representative's vote! After all, when people actually know the facts behind the whole mess they tend to agree with our position in any event!

Clearly, however, giving your Representative these long explanations does not help him or her to initially understand the issue. So what do you say? Lots of members have been calling the Washington office asking if we have some type of form letter that can be used to explain

the position of local operators. The answer, up until now, has been no. There are several reasons for this. First, it is not a good idea to use form letters. They have much less impact on Congress than when a constituent writes in his or her own words what is concerning them. Second, the form letters lose the benefit of personalization. That is, we can easily say, for instance, that we are very much against the "must carry" rules, and that they disserve the public because they force us in some cases to carry duplicating network signals when we could, instead be carrying programming that the public, our subscribers, their constituents really want to see.

It is much more effective in a letter to Congress, however, to point out the specific situation in your community. It cannot help but impress a Congressman when an operator, and hopefully some of the subscribers in his or her district write to say that they resent Congress telling them that they have to watch 3 channels (or 4, 5, 6 or whatever) of the same programming when the operator would love to provide to the public the diversity of programming that cable could provide BUT FOR Congress requiring the "must carry" rules! That personalization makes all the difference. The bill would do all the things we have outlined: reinstitute the syndicated exclusivity rules that had been eliminated as unnecessary by the FCC, and extend those rules to all markets, not just the top 100 — provide an exemption for any system of 3000 subscribers or less, freeze the current copyright fee structure the way it is, give the Copyright Royalty Tribunal a faster fee increase schedule to deal with inflation (it was five years, under the bill it would be every three years), and, of course, write the "must carry" rules into law.

H.R. 3560 was adopted by a 4 to 3 vote in the Copyright Subcommittee in December. It now goes to the full Judiciary Committee. There is likely to be a knock-down drag-out fight there as many different parties try to amend the bill. The key test will be proposed amendments by Cong. Sawyer, Butler and Frank that would substitute a bill eliminating the compulsory license for the one that has been adopted. They tried that in the subcommittee and failed. Another key test will be an amendment to be submitted by Rep. Railsback. He is trying to give the sports folks something in this "compromise" too. His idea would be to give professional sports teams some sort of exclusivity for the same sport in their market. That is, if there was a pro baseball game being played in your market (and this could be a 35 or 50 mile radius around the sports complex) then that team could demand that the cable operator black out all games of the same sport being imported at the same time!

Needless to say CATA, and the NCTA for that matter, are very much against any of these amendments. There are likely to be others as well. There is some indication that the National Association of Broadcasters is going to make an effort to change the "must carry" rules when they get to the full committee. They have already submitted proposed changes to the subcommittee, but those proposals have not been made public. Unfortunately, since there are some "perfecting amendments" to the bill that we do support, it is not the case that we can simply say we are against all amendments to the bill in the full committee consideration of it. It is far better to avoid confusing the issue by maintaining the position that we totally oppose the bill itself, and so do our subscribers.

After the bill goes through the Judiciary Committee it must then go to the Communications Subcommittee headed by Tim Wirth. This is so because a portion of the bill, the "must carry" rules, are considered a communications issue, not a copyright issue, and therefore the Wirth subcommittee has jurisdiction. So we still have a lot of Congressmen to educate on these issues! Not only do we need to make sure the relevant committees know our position, we have to make sure our local representatives are plugged into the process to — they, after all, will cast the key votes if this thing ever gets to the Floor. So that is the position we are in right now. There is a long way to go before this proposed "compromise" becomes a law. Of course if it does get through the House, then we have the Senate to deal with too — and that would all happen right in the middle of an election year! Who said we didn't have a chance to beat this thing?

Our initial strategy for now is pretty clear. We want to make sure both the members of the full Judiciary Committee as well as the members of the Wirth Subcommittee and the full Commerce Committee are aware of the difficulties we see in H.R. 3560. We want to focus particularly on the "must carry" rules. That doesn't mean that we are happy with the syndicated exclusivity portion of the law, it is simply that the "must carry" stuff is a lot easier to explain to a Congressman, and it is going to be easier to get that part of the legislation knocked out, thereby killing the entire bill. There are very few people who, when they fully understand the "must carry" rules, are willing to say they are a good idea! They are an out and out giveaway to the broadcasters, and a blatant power-play on the part of the networks, particularly when the networks try to convince anyone that it is in the public interest for us to be required to watch three or four channels of the same programming! □



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SHOWCASE!

ELECTRONIC NEWSPAPER EXPERIMENT CONTINUES INTO 1982

Eleven newspaper members of the Associated Press will continue their videotex experiment with CompuServe, Inc., through mid-1982.

The experiment to determine the market for home information retrieval and the newspapers' role began July 1, 1980. It was originally planned to conclude this month.

The extension of the experiment allows for continued research into what information is sought by consumers; implementation of electronic classifieds, scheduled for early 1982; and the placement of terminals in 100 homes across the United States.

The project makes available a daily electronic edition through the joint effort of the newspaper, Associated Press and the Columbus, Ohio computing firm through its CompuServe Information Service.

The 11 newspapers participating are: The Columbus (Ohio) Dispatch; The Washington Post; Los Angeles Times; The New York Times; St. Louis (Mo.) Post-Dispatch; The Minneapolis Star & Tribune; The Atlanta Journal and Constitution; The Norfolk (Va.) Virginian-Pilot and Ledger-Star; San Francisco Chronicle; San Francisco Examiner; and Middlesex News in Framingham (Mass.).

The results of the test are being shared with the 1300 daily newspapers and 3500 radio and television stations that own the AP, a not-for-profit news cooperative.

Each newspaper contributes news and computing expertise to produce an electronic edition, delivering its data to the CompuServe computers. Programs at CompuServe format each edition for access by the home consumer.

Customers with a personal computer equipped to receive signals via telephone may read any newspapers' edition by placing a telephone call in more than 260 cities nationwide. Outside those cities, toll charges would apply.

The local phone call is answered by a local computer, part of CompuServe's nationwide telecommunications network. The local computer establishes communication with the main Columbus computer, which contains the database and responds to inquiries from the home users.

The news flows to the home at 300 words per minute. Home users pay \$5.00 an hour for the service, billed in one-minute increments during evenings and all day on weekends and holidays.

In addition to news, the CompuServe Information Service also offers current and historical financial information, enter-

tainment, electronic mail, home banking, and personal computing services.

In the final phase of the experiment, three areas are emphasized:

— Continued study by RMH Research, Inc., a research consultant, to pinpoint subjects that present and future subscribers seek from a videotex system and to measure market potential.

— The implementation of the first nationwide electronic classified advertising database provided by newspapers and

— The installation of computer terminals in 100 homes across the United States for a five-month period to test the reaction by a cross-section of those interested in the concepts of electronic delivery and information to the home. Some consumers in this test-segment will pay for the service.

The project will provide the experimenters information on marketing the service, promotion, design of the database, and sources of advertising revenue.

The Associated Press is the world's oldest and largest news gathering agency, based in New York. CompuServe is an established national remote computing services company owned by H & R Block, Inc. For more information, contact Richard A. Baker, (614) 457-8600 at CompuServe or Henry Heilbrunn at the Associated Press (212) 621-1515.

CABLEBUS COMMITS TO WIRELESS ALARMS

At the opening of the Western Cable TV show in Anaheim the first week of December, **CableBus Systems Corporation** announced a major commitment to the wireless home alarm market and the carry home concept of an alarm system. As part of this commitment to be a major leader in this market, CableBus was co-spaced with Linear Corporation, the world's largest manufacturer of wireless alarm products and garage door opening controls.

On display were the major residential components for wireless alarms, including receivers, window and door transmitters, and wireless medical buttons. In addition, by special arrangement, CableBus is offering for sale a compatible wireless motion detector manufactured by Colorado Electro-Optics, and the Chloride-Pyrotector wireless photoelectric smoke detector. Working samples of all these products were on display at the CableBus booth at the Western show — connected through an operating MICRO-1 Urban CableAlarm™ Monitoring Center.

Cliff Schrock, founder of CableBus said, "We feel that wireless alarms and the 'carry home' concept of alarm system sales and installation is the key to mass

residential alarms. Coupled with CATV as the communications medium, wireless will allow much higher penetrations than have been experienced to date in the alarm industry.

CableBus also displayed artist renderings of two proposed TV set-top alarm systems that might be offered by CATV operators to the homeowner. The units are intended to be connected to an existing CATV drop at the TV set and operate as a self-contained Alarm, Panic, Intrusion, and Fire protection system.

"A typical scenario in the future", says Pat Robison, CableBus Public Relations Director, "is that the salesman would carry in the alarm system for the demonstration and actually install it in place on top of the TV or other appropriate locations. He (or she) would then mount the smoke detector, door transmitter, and hand the homeowner the personal emergency transmitter. If the homeowner chose to buy, the system would be left in place and service would start immediately."

As part of the show activities, CableBus did a survey of customer preference as to the final configurations of some of the wireless packages. "We intend to get some input from the cable operators before we begin production of these new set-top systems", says Cliff Schrock. "Everyone is asking for wireless systems, and we hope our prototypes and demonstrations allow the cable and security operators to help us offer a complete product family."

Also on display in Anaheim was the complete alarm product line and accessories from CableBus, including the popular MICRO-2 low-cost CableAlarm™ system and the home alarm terminals.



LEFT: Colorado Electro-Optics I.R. Motion Detector

CENTER: Linear Receivers & Window, Door, & Panic Transmitters

RIGHT: Chloride-Pyrotector Smoke Detector
FRONT: CableBus ACT-1 CableAlarm™ Terminal

CableBus Systems Corporation distributes the complete product line of compatible wireless residential alarm products.

For more information on CableBus products, contact CableBus Systems Corporation at 7869 S.W. Nimbus Avenue, Beaverton, Oregon, 97005, (503) 643-3329.

**WAVETEK ANNOUNCES
ECONOMICAL MICROWAVE SWEEP
GENERATOR MODEL 1084**

Wavetek Indiana, for many years a world-wide leader in the manufacture of sweep generators, now announces a new generation of economical, easy-to-use, digital display generators. Wavetek has incorporated a number of innovations into this compact-sized unit.



The Model 1084 has three operating modes: CW, Δ F and Full Sweep. Frequency in the CW mode is set by a ten-turn potentiometer and displayed with a resolution of 1 MHz on a 3½ digit display. In the Δ F mode, center frequency is selected by the ten-turn potentiometer; the sweep width range of 500 kHz to 1000 MHz is controlled by a 100 MHz/Step selector and a 100 MHz vernier. The Model 1084 features 1% display linearity.

In the Full Sweep mode, the start frequency is 3.5 GHz and the stop frequency is 4.5 GHz. The ten-turn potentiometer and 3½ digit frequency display operate as a variable marker. The marker products a bright spot on the display by momentarily delaying the sweep ramp for approximately 2 msec. Accuracy is \pm 10 MHz. External marker input is standard.

A front panel switch controls the birdy by-pass marker system and provides selection of harmonic markers a 1, 10, and 100 MHz. Differences in marker amplitudes make identification of markers easy.

The Model 1084 has an output power range of +13 to -60 dBm. This unit also features a dB/Step attenuator and an 11 dB vernier for continuous adjustment of output. Output level is displayed on a 3 digit readout with a 0.1 dB resolution. The price of the Model 1084 is \$2795 (Domestic U.S.) with delivery 90 days A.R.O.

For more information, contact Wavetek at 5808 Churchman, P.O. Box 190, Beech Grove, Indiana 46107; telephone (317) 787-3332.

**C-COR CATALOG
NOW AVAILABLE**

C-COR Electronics, Inc., has announced that the Company's November 1, 1981 product catalog is now available.

The catalog, which covers C-COR's complete line of cable television electronic distribution equipment, also carries information and specifications on a number of products and services not features in the previous catalog. Stuart L. Dance, Vice President-Sales & Marketing, states, "This new catalog is much more comprehensive than our previous catalog, including such products as 5-400 MHz bandwidth systems with specifications for third generation hybrids, the expanded line of mid-split amplifiers, the new off-premise, addressable SCAT™ System and System Design services."

For further information and a copy of the new catalog, contact the C-COR Sales Department in State College, PA, at 814-238-2461.

C-COR designs and manufactures broadband amplifiers and other electronic equipment, including passive devices and special amplifiers with laboratory, industrial and military applications. The company, one of the earliest in the manufacture of cable television equipment, also designs the coaxial communications/distribution systems that use their distribution equipment. While C-COR serves primarily the cable television industry, it also applies its equipment and engineering expertise to data transmission and coaxial telephone system markets.

A new total system concept, SCAT™, an acronym for Security, Conversion of up to 58 channels, Addressability with 22 Tiers delivers only one channel at a time to the subscriber's TV set controlled by the system's central office. It is in field trial for six months in Daniels & Associates' Greeley, CO, cable television system.

For further information contact: Sally O. Thiel, Promotions, 60 Decibel Road, State College, PA 16801 (814) 238-2461.

**SCIENTIFIC-ATLANTA JOINS FORCES
WITH MICROSAT FOR DISTRIBUTION OF
CABLE-TV EQUIPMENT IN CANADA**

Scientific-Atlanta, Inc., a leading manufacturer of cable television equipment in the United States, has signed a distributor agreement with MicroSat Communications, Ltd., a Toronto-based stocking distributor. Scientific-Atlanta will provide MicroSat with coaxial cable, industrial satellite products and headend electronics which will support MicroSat's

commitment to offer a complete line of high-technology cable television products to the Canadian market. The Atlanta-based manufacturer and MicroSat will offer their combined strengths in sales and service from their Vancouver, Toronto and Montreal locations.

For additional information contact: John A. Fazackerley, General Manager, Scientific-Atlanta (Canada) Ltd., 416/677-6555.

**SADELCO INTRODUCES THE NEW
719D INSTALLERS SLM**

Sadelco's new Model 719D is designed for the professional installer.

The 719D incorporates many new Sadelco design innovations and is housed in a new low-profile, impact resistant case. The 719D is a lightweight (7 lbs.), portable, low-cost unit, ideal for contractors and antenna installers.



The meter reads directly in dBmV to indicate signal levels and provides continuous coverage from 54-216 MHz VHF-TV Band, FM Band, CATV Mid-Band, and 470-812 MHz for the UHF-TV Band. An optional low-frequency adaptor is available which extends the range of the meter to include the frequencies from 4.5-45 MHz.

For additional information please contact: Sadelco, Inc., 75 West Forest Avenue, Englewood, N.J. 07631, 201-569-3323.

**HUGHES OFFERS
ANTENNA REORIENTATION
INSTRUCTIONS**

Detailed technical information concerning reorientation of the 3.7-, 4.5-, 5.0- and 6.0-meter antennas for Hughes Aircraft Company's receive-only satellite video terminals to receive signals from the new RCA SATCOM IIIIR communications satellite is now available from Hughes' Microwave Communications pro-

showcase!

ducts.

A simplified reorientation procedure, in step-by-step form, has been prepared for users of the Hughes TVRO system antennas in order to insure expedient change-over.

Copies of the newly-prepared information may be obtained by contacting Hughes Microwave Communications Products, P.O. Box 2999, Torrance, California, 90509, attention: product support; or by phoning (213) 517-6233.

TELEDAC OFFERING A NEW CHARACTER GENERATOR

The Teledac T-1016 character generator provides all essential features required by most message display applications. Some of these features until now were found only in more expensive message display systems.

While in the editing mode an extra line of information appears at the bottom of the screen. This line, called the editing line, provides the page number, its display time in seconds and any editing command code the operator is actually performing. The entire page content may be automatically centered simply by pressing the "Centering" key. The page transfer command is a convenient and time saving way to duplicate the same content in many pages. The color background is easily composed for every page by performing the color command and pressing the selected color key for each line on the screen. Up to 3 lines above the page are available for a header or fixed message display. These lines are easily accessed by the keyboard and can be changed by the operator at any time. This is a lot more convenient than having to change a chip every time a new header is required.



PHOTO CHARACTER GENERATOR T-1016

In the automatic display mode, pages times for zero second will not appear but will be kept in memory for future use. All other pages will appear for their individual display time (1-98 sec.), thus allowing the precision clock which may be displayed if desired. This feature combined with the

optional temperature display (°C/°F) and a (6) six hour stand-by power supply,



PHOTO SCREEN T-1016

operator to select a display time proportional to the page content. In the manual display mode each page stays on the screen until the operator presses the "Next Page" key. A combination of both modes is also possible.

In order to highlight a very important message an "Express-Message" is provided. When enabled, this feature allows to circulate the content of any one page on the second line of the screen. The information pauses on the screen, and is periodically whipped from left to right, one line at the time.

The T-1016 comes standard with a high make this unit very attractive for the small and medium size Cable Television Operator.

REPRESENTED BY:
WESTEC COMMUNICATIONS INC.
& MICROSAT s/e INC.

Scottsdale, AZ Monterey, CA Marietta, GA
(602) 948-4484 (408) 646-0727 (404) 971-1021

Associate Members of CATA may use this Showcase section of CATJ twice per year, for new product or services information.

Each release is allocated approximately 1/8th page.

TRAINING SCHEDULE

MAGANAVOX MOBILE TRAINING CENTER 1982 SCHEDULE

Location	Dates
Los Angeles, CA	1/20-22, 1982
	1/25-27, 1982
	1/28-30, 1982
Denver, CO	4/14-16, 1982
	4/19-21, 1982
	4/22-24, 1982
Syracuse, NY	8/04-06, 1982
	8/09-11, 1982
Atlanta, GA	10/13-15, 1982
	10/18-20, 1982
Dallas, TX	10/21-23, 1982
	3/10-12, 1982
Detroit, MI	3/15-17, 1982
	3/18-20, 1982
	5/12-14, 1982
Boston, MA	5/17-19, 1982
	5/20-22, 1982
	9/15-17, 1982
St. Louis, MO	9/20-22, 1982
	9/23-25, 1982
	11/10-12, 1982
	11/15-17, 1982
	11/18-20, 1982

SCIENTIFIC-ATLANTA Product Training Seminars

Scientific-Atlanta will be presenting three-day product training seminars according to the following schedule. Discussion by Scientific-Atlanta engineering personnel will be directed toward theory of operation and maintenance of headend, distribution, and earth station equipment.

DATE: February 22, 23, 24

LOCATION: Seattle, Washington

DATE: February 24, 25, 26

LOCATION: Los Angeles, California

DATE: March 16, 17, 18

LOCATION: Kansas City, Missouri

For additional information contact: Joan Smith, Promotions Coordinator, Communications Products Group, (404) 925-5509.

TRAINING SCHEDULE

Associate Roster

Alpha Technologies, 1305 Fraser St. D-G, Bellingham, WA 98225 (M9, Standby Power Supplies) 206—671-7703
AMCOM, Inc., Bldg. E, Suite 200, 5775 Peachtree-Dunwoody Rd., N.E., Atlanta, GA 30342 (S9, Brokering & Consulting) 404—256-0228
Anixter-Pruzan, Inc., P.O. Box 88758, Tukwila Branch, Seattle, WA 98188 (D1) 206—251-6760
The Associated Press, 50 Rockefeller Plaza, New York, NY 10020 (S9 Automated News SVC) 212—262-4014
B E I (Beston Electronics, Inc.), P.O. Box 937, Olathe, KS 66061 (M9 Character Generators) 913—764-1900
Belden Corp., Electronics Division, P.O. Box 1980, Richmond, IN 47374 (M3) 317—966-6661
Broadband Engineering, Inc., P.O. Box 1247, Jupiter, FL 33458 (D9, replacement parts) 1-800-327-6690
Broadcast Equipment Leasing, 7 Wood Street, Pittsburgh, PA 15222 (S3), 412—765-0690
Budco, Inc., 4910 East Admiral Place, Tulsa, OK 74115, (D9, Security & Identification Devices), 800-331-2246
CATEL-Division of United Scientific Corp., 1400-D Stierling Rd., Mountain View, CA 94043, 415—969-9400
C-COR Electronics, Inc., 60 Decibel Rd., State College, PA 16801 (M1, M4, M5, S1, S2, S8) 814—238-2461
CBS Cable, 1211 Avenue of the Americas, 2nd Floor, New York, NY 10019 (S4) 212—975-1766
CCS Hatfield/CATV Div., 5707 W. Buckeye Rd., Phoenix, AZ 85063 (M3) 201—272-3850
CRC Electronics, Inc., 2669 Killhau St., Honolulu, HI 96819 (M9 Videotape & Headend Automation Equipment) 808—836-0811
CWY Electronics, 405 N. Earl Ave., Lafayette, IN 74904 (M9, D1) 317—447-4617
CableBus Systems Corporation, 7869 S.W. Nimbus Avenue, Beaverton, OR 97005, (M1) 503—543-3329
Cable TV Supply Company, 5933 Bowcroft Street, Los Angeles, CA 90016 (D1, D2, D3, D4, D5, D6, D7, D8, M5, M6) 213—204-4440
Century III Electronics, Inc., 3880 E. Eagle Drive, Anaheim, CA 92807 (M1, M3, M4, M5, M7, M8, S1, S2, S8) 630-3714
Capscan, Inc., P.O. Box 36, Adelphia, NJ 07710, (M1, M3, M4, M5)
Channel Master, Div. of Avnet, Inc., Ellenville, NY 12428 (M2, 3, 4, 5, 6, 7) 914—647-5000
Collins Commercial Telecommunications, MP-402-101, Dallas, TX 75207 (M9, Microwave) 214—690-5954
Comm/Scope Company, Rt. 1, Box 199A, Catawba, NC 28609 (M3) 704—241-3142
Communications Equity Associates, 651 Lincoln Center, 5401 W. Kennedy Blvd., Tampa FL 33609 (S3) 813—877-8844
Communications Supply/Communications Construction, Inc., 319 J Westtown Rd., P.O. Box 1538, West Chester, PA 19380, (D1, 3, 4, 5, 6, 7, 8, 9, S1, 2, 8, 9) 800—345-8286
Computer Video Systems, Inc., 3678 W. 2105 S. Unit 2, Salt Lake City, UT 84120 (M9) 801—974-5380
ComSearch Inc., 7633 Leesburg Pike, Falls Creek, VA 22043 (S8, S9, Earth station placement frequency coordination) 703—356-9470
ComSonics, Inc., P.O. Box 1106, Harrisonburg, VA 22801 (M8, M9, S8, S9) 703—434-5965
DF Countryman Co., 1821 University Ave., St. Paul, MN 55104 (D1, S1, S8) 612—645-9153
Davco, Inc., P.O. Box 861, Batesville, AR 72501 (D1, S1, S2, S8) 501—793-3816
Ditch Witch, P.O. Box 66, Perry, OK 73077, (M9), 405—336-4402
The Drop Shop Ltd., Inc., Box 284, Roselle, NJ 07203 (M9, Plastics, D5, 6, 7) 201—241-9300
Durnell Engineering Inc., Hwy 4 So. Emmetsburg, IA 50536 (M9) 712—852-2611
Eagle Com-Tronics, Inc., 4562 Waterhouse Rd., Clay, NY 13041 (M9 Pay TV Delivery Systems & Products) 313—622-3402 and 800-448-7474
Eales Comm & Antenna Serv., 2904 N.W. 23rd, Oklahoma City, OK 73107 (D1, 2, 3, 4, 5, 6, 7, S1, 2, S7, 8) 405—946-3788
Eastern Microwave, Inc., 3 Northern Concourse, P.O. Box 4872, Syracuse, NY 13221 (S4) 315—455-5955
Electroline TV Equipment, Inc., 8750-8th Ave., St. Michel, Montreal, Canada H1Z 2W4 (M4, 5, 7, 9, D7, 9) 514—725-2471
Electron Consulting Associates, Box 2029, Grove, OK 74344, (M2, D1, S1, 8) 918—786-5349
Entertainment and Sports Programming Network, 319 Cooke St., Plainville, CN 06062 (S9) 203—747-6847
Ferguson Communications Corp., P.O. Drawer 1599, Henderson, TX 75652 (S1, 2, 7, 8, 9) 214—854-2405
Franey & Parr of Texas, Inc., (Formerly Doherty & Co.), One Turtle Creek Village, Suite 524, Dallas, TX (S9, Insurance) 214—528-4820
GTE Products Corp., Sylvania CATV Trans. Systems, 10841 Pellicano Dr., El Paso, TX 79935 (D7, M4, M5, M6, S4, S8) 800—351-2345
Gardiner Communications Corp., 1980 S. Post Oak Rd., Suite 2040, Houston, TX 77056 (M9 TVRO Packages, S1, S2, S8) 713—961-7348
General Cable Corp., 1 Woodbridge Center, P.O. Box 700 Woodbridge, NJ 07095 (M3) 201—636-5500
Gilbert Engineering Co., P.O. Box 23189, Phoenix, AZ 85063 (M7) 1-800-528-5567, TWX 910-951-1380
Harris Corporation-Satellite Communications Division, P.O. Box 1700, Melbourne, FL 32901 (M2, M9, S2) 305—724-3401
Heller-Oak Communications Finance Corp., 105 W. Adams St., Chicago, IL 60603 (S3) 312—621-7661
Hoarty & Raines Assoc., Inc., 8637 O'Neal Rd., Raleigh, NC 27612 (S7, S9 Consultants) 919—781-1734
Home Box Office, Inc. 7839 Churchill Way—Suite 133, Box 63, Dallas, TX 75251 (S4) 214—387-8557
Hughes Microwave Communications Products, 3060 W. Lomita Blvd., Torrance, CA 90505 (M9) 213—517-6233
Jerry Conn Associates, Inc., P.O. Box 444, Chambersburg, PA 17201 (D3, D4, D5, D6, D7, D8) 717—263-8258
KMP Computer Services, Inc., 555 Totavi, Los Alamos, NM 87544, (S4, 5) 505—662-5545
Karnath Corporation, 2001 Westridge, Plano, TX 75075 (S1, 2, 8, 9) 214—422-7981 or 7055
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 (D1, D8, S2, S8) 906—774-1755
LRC Electronics, Inc., 901 South Ave., Horseheads, NY 14845 (M7) 607—739-3844
Larson Electronics, 311 S. Locust St., Denton, TX 76201 (M9 Standby Power) 817—387-0002

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

Lemco Tool Corporation, Box 330A, Cogan Station, PA 17728 (M6, 9 Tools) 717—494-0620
Lester Kamin & Company, 2020 North Loop West, Suite 111, Houston, TX 77018 (S9 Brokers, Consultants) 713—957-0310
Lindsay Specialty Products, Ltd., 50 Mary Street West, Lindsay, Ontario, Canada, K9V 4S7 (M1, 2, 4, 5, 7, 9) 705—324-2196
Magnavox CATV Division, 100 Fairgrounds Drive, Manlius, NY 13104 (D4, 5, 7, M4, 5, 6, 7, S3, 8) 315—682-9105
McCullough Satellite Systems, P.O. Box 57, Salem, AR 72576 (M2, 9, D3, 4, 6, 7) 501—895-3167
Microdyne Corporation, 471 Oak Road, Ocala, FL 32672 (M9 Satellite TV Receivers) 904—687-4633
Microwave Associates Communications Co., 777 S. Central Expwy., Suite 1G, Richardson, TX 75080 (M9 Microwave Radio Systems) 214—234-3522
Microwave Filter Co., 6743 Kinne St., Box 103, E. Syracuse, NY 10357 (M5 Bandpass Filters) 315—437-4529
Midwest Corp., CATV, Divn., P.O. Box 226, Clarksburg, W. VA. 26301 (D1, 2, 3, 4, 5, 6, 7, 8) 304—624-5459
Miralite Corp., 1012 Brioso, Suite 201, Costa Mesa, CA 92627 (M2) 714—851-9000
Modern Cable Programs, 5000 Park St. N., St. Petersburg, FL 33709 (S4)
National Com-Service, Inc., 2255-E Wyandotte Rd., Willow Grove, PA 19090 (D1, 2, S8, 9 repair service) 215—657-4690
National Screen Service Corp., 1600 Broadway, New York, NY 10019 (M9) 212—246-5700
North Supply Company, 10951 Lakeview Ave., Lenexa, KS 66219 (D1, 2, 3, 4, 5, 6, 7, 8) 913—888-9800
Oak Industries Inc/CATV Div., Crystal Lake, IL 60014 (M1, M9 Converters, S3) 815—459-5000
Power and Telephone Supply Company, Inc., 530 Interchange Drive N.W., Atlanta, GA 30336 (D1) 404—691-6813
Prodelin, Inc., 1350 Duane Avenue, Santa Clara, CA 95050 (M2, M3, M7, S2) 408—244-4720
Pyramid Industries, Inc., P.O. Box 23169, Phoenix, AZ 85063 (M7, 8) 602—269-6431
Q-BIT Corporation, P.O. Box 2208, Melbourne, FL 32901 (M4) 305—727-1838
RMS CATV Division, 50 Antin Place, Bronx, NY 10462 (M4, M5, M6, M7, M9), 212-892-1000
Reuters, 1212 Avenue of the Americas, 16th Floor, New York, NY 10036 (D9) 212—730-2715
Rockwell International, Collins Transmission Systems Division, M.S. 402-101, Dallas, TX 75207 (M9, Microwave/Satellite) 214—996-5954
S.A.L. Communications, Inc., P.O. Box 794, Melville, NY 11747 (D1) 516—694-7110
Sadelco, Inc., 75 West Forest Ave., Englewood, NJ 07631 (M8) 201—569-3323
Scientific Atlanta Inc., 3845 Pleasantdale Rd., Atlanta, GA 30340 (M1, M2, M4, M8, S1, S2, S3, S8) 404—449-2000
Shafer Associates, Inc., 9501 Briar Glen Way, Gaithersburg, MD 20760 (S9, consultant) 301—869-4477
Showtime Entertainment Inc., 1633 Broadway, NY 10019 (S4) 212—708-1600
Southern Satellite Systems, Inc., P.O. Box 45684, Tulsa, OK 74145 (S9) 918—481-0881
Station Business Systems, 600 West Putnam, Greenwich, CT 06830 (S4, 5, 9) 203—622-2400
T.E.S.T., Inc., 16130 Stagg St., Van Nuys, CA 91409 (M9 Encoders & Decoders) 213—989-4535
TV Guide, Radnor, PA 19088 (D9) 215—293-8500
TeleCom Systems, Inc., P.O. Box 5214, Charlotte, NC (S1, 2, 7, 8, 9) 704—332-6064
Tele-Wire Supply Corp., 122 Cutter Mill Rd., Great Neck, NY 11021 (D1, 2, 3, 5, 6, 7, 8, 9) 516—829-8484
Texscan Corp. 2446 N. Shadeland Ave., Indianapolis, IN 46219 (M8 Bandpass Filters) 317—357-8781
Theta-Com CATV, Division of Texscan Corporation, 2960 Grand Avenue, Phoenix, AZ 85061 (M1, M4, M5, M7, M8) 602—252-5021
Times Wire & Cable Co., 358 Hall Avenue, Wallingford, CT 06492 (M3) 203—265-2361
Tocom, Inc., P.O. Box 47066, Dallas, TX 75247 (M1, M4, M5, Converters) 214—438-7691
Tomco Communications, Inc., 1145 Tasmin Dr., Sunnyvale, CA 94086 (M4, M5, M9)
Toner Cable Equipment, Inc., 969 Horsham Rd., Horsham, PA 19044 (D2, D3, D4, D5, D6, D7) 800—523-5947, In Penna. 800—492-2512
Triple Crown Electronics Inc., 42 Racine Rd., Rexdale, Ontario, Canada, M9W 2Z3 (M4, M8) 416—743-1481
Turner Communications Corp. (WTBS-TV) 1050 Techwood Dr., Atlanta, GA 30318 404—898-8500
USA Network, 208 Harristown Rd., Glen Rock, NJ (S4) 201—445-8550
United Press International, 220 East 42nd St., New York, NY 10017 (S9 Automated News Svc.) 212—682-0400
United States Tower & Fab Co., P.O. Box 1438, Miami, OK 74354 (M2, M9) 918—257-4257
United Video, Inc., 5200 S. Harvard, Suite 4-D, Tulsa, OK 74135 (S9) 918—749-8811
VU-TV, Inc., 4201 N. 16th St. #250, Phoenix, AZ 85016 (S4) 602—277-8888
Van Ladder, Inc., P.O. Box 1557, Spencer, IA 51301 (M9, Automated Ladder Equipment) 712—262-5810
Video Data Systems, 40 Oser Avenue, Hauppauge, NY 11787 (M9) 516—231-4400
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, (S4) 212—944-4250
Wavetek Indiana, 66 N. First Ave., Beech Grove, IN 46107 (M8) 317—783-3221
Weatherscan, Loop 132, Throckmorton Hwy., Olney, TX 76374 (D9, Sony Equip. Dist., M9 Weather Channel Displays) 817—564-5688
Western Communication Service, Box 347, San Angelo, TX 76901 (M2, Towers) 915—655-6262/653-3363
Winegard Company, 3000 Kirkwood Street, Burlington, IA 52601 (M1, M2, M3, M4, M5, M7) 319—753-0121

Note: Associates listed in bold are Charter Members.

classycats

Classy-Cat advertising is offered as a service by CATA for its membership. ANY member of CATA may advertise in the Classy-Cat 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 Classy-Cat 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 Classy-Cats is the 1st of the month for the following month's issue. Address all Classy-Cat material to: CATJ, Suite 106, 4209 N.W. 23rd, Oklahoma City, Okla. 73107.

"MICROWAVE TECHNICIAN"

United Video, a nationwide distributor of television signals is seeking a qualified person to maintain terrestrial video microwave system in N.W. Illinois. Duties include troubleshooting, FCC conformance and customer relations. Excellent salary, company vehicle, medical and dental plans, profit sharing and other benefits. Must have 2nd class FCC license and microwave experience. Video or cable TV experience helpful. Other openings occasionally in Central U.S. Send resume to: Tim Airhart, Director of Field Operations, United Video, Inc., 5200 South Harvard, Suite 215, Tulsa, OK 74135.

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CATJ
Box 1482
4209 N.W. 23rd
Suite 106
Okla. City, Okla. 73107

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

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ADD UNLIMITED PAY CHANNELS TO YOUR SYSTEM WITHOUT LOSING YOUR INVESTMENT IN CONVERTERS.

Now, That's The Ticket!



If you're like most cable systems, you've spent almost \$225,000 on converters. Don't throw away that investment! With Eagle's Descrambler, you can add 15 tiers of service and unlimited channels to your system using your present converter.

Write Your Own Ticket!

Whether you're adding one pay channel, 15 pay channels, or 15 tiers of service with 120 channels, Eagle's Descrambler can handle it all. Select only what you need. In the future, channels can be added to the headend scrambler with our simple plug-in module. The headend unit integrates with all manufacturer's modulators and processors and is compatible with all Standard/HRC/ICC configurations.

The Best Show In Town

Eagle's Descrambler is compatible with all single channel output converters and is factory tuned for channel 2, 3, or 4. The descrambler

has no information on the audio making it ideal for AML transmission.

Private Audiences Only

There are no subscriber controls with Eagle's Descrambler and our unique sync suppression scrambling insures maximum security. In addition, we've developed a tamperproof identification matrix to eliminate concerns about theft of service.

Future Attraction

Addressability? It's coming. Eagle's Descrambler will be ready for addressability when you are . . . and the descrambler will be perfectly compatible with our addressable unit. Across the board, we're working to protect your investments.

Add pay channels . . . maximize your converter investment . . . prepare for addressability . . . Eagle's 15 Tier Descrambler. Now, That's The Ticket!



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