

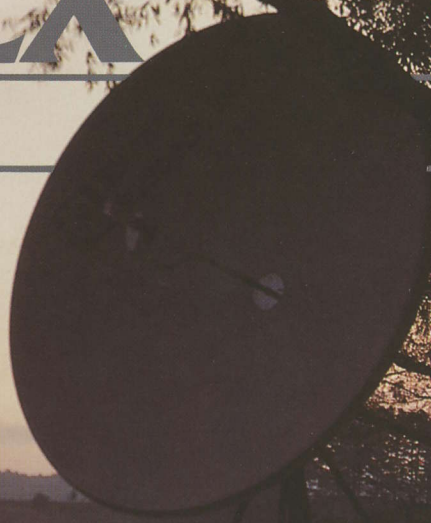
**COOP'S SATELLITE DIGEST** published monthly by West Indies Video, Ltd., a Turks & Caicos Corporation with corporate offices located at Grace B. Providenciales, Turks & Caicos Islands (West Indies). U.S. offices are maintained at Ft. Lauderdale, Florida. All mail including subscription advertising inquiries, reports and letters should be addressed to CSD, P.O. Box 100858, Ft. Lauderdale, FL 33310. CSD office hours in Ft. Lauderdale are Monday-Friday 9:00 AM to 4:00 PM. Telephone (305) 771-0505. CSD is mailed worldwide on or before the 1st of each month, first-class (airmail). Annual subscription rates are \$50 (US funds) for USA, Canada, Mexico; \$75 (US funds) elsewhere. Entire contents copyright 1983 by West Indies Video, Ltd. Robert B., Susan T., Kevin P., and Tasha A. Cooper.



# APOLLO<sup>TM</sup> ZX

## Satellite TV Systems

...You can't stay home  
without us.



Before you buy ANY satellite system,  
ask these important questions.

- 1** Does the system utilize an LNC or an old fashioned LNA?

The new Apollo LNC (low noise converter) eliminates the need for cumbersome 4 GHz cable and moisture-sensitive downconverters. Easier installation, greater reliability, and reduction of moisture problems all make good sense to National Microtech.



- 2** Does the receiver change polarity by instantaneous electronic switching or by mechanized movement that may fail due to ice or sand?

Microtech's new

Apolloriz...  
the pola...  
electron...  
moving...  
rotors...  
may be...  
and sa...  
at hom...  
any en...

- 3** Does the receiver allow you to move your outside antenna by remote control?

The Apollo Z-1 receiver (tuner) changes video, audio, polarity, and position of the antenna...all from one control console.

- 4** Is the antenna reflector impervious to rust and corrosion—or is it a wire mesh that may be here today and rusted out tomorrow.

The Apollo X-10, the best performer we have seen in a 3-meter dish, is made of thermo-compressed fiberglass—and Microtech guarantees a perfect match on all 8

panels. Corrosion & rust affecting wire mesh antennas are not factors in the performance or longevity of the X-10 reflector.

price of an Apollo...  
em is unbelievably...  
STARTING AT LESS...  
N \$3000 RETAIL.

Your dealer may have financing available. And, chances are, he can even install your system tomorrow.

NATIONAL MICROTECH SUPPLIES  
MORE SATELLITE TV SYSTEMS  
THAN ANY OTHER COMPANY IN  
THE WORLD.



We are proud of our company and products, and of the fantastic job our dealers and distributors across the country have done in selling and installing Apollo equipment. When you see our new line of Apollo systems, you will understand why few companies have experienced our phenomenal growth and success. Apollo TV... you can't stay home without us.

Dealerships and distributorships available in some areas.



**1-800-647-6144**

In Mississippi / 601-226-8432

Drawer E / Grenada, MS 38901



## TOP OF THE MONTH

**BETTER** ways of creating hardware. That's a major part of our editorial thrust this month. Freshly back from Las Vegas, many of us have seen the latest crop of antennas, LNAs and receivers. And we are confused with how product pricing can continue to drop, and drop show after show without some sacrifice in performance, or, reliability. We make a stab at exploring why the good products work, and why the bad ones don't, in this issue of CSD.

**ANTENNA** performance, in particular, is (or can be) confusing to evaluate. Perhaps there is a clue in the physical method used to put the antenna together. We look at that possibility in this issue.

**BLOCK** down conversion is becoming the 'in' thing for multiple receiver installations. Many dealers don't understand why it works, or why it is a better way to go. Using the DX receiver as a model, we explore the economics and advantages to block down conversion here this month also.

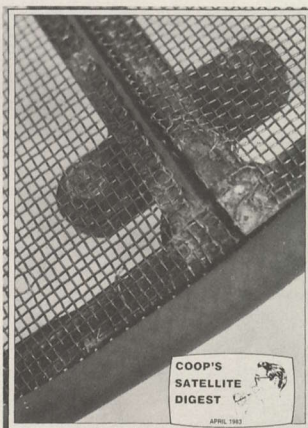
**COOP'S** Comments this month review the forthcoming European CAST '83 show and North American shows. His conclusions probably won't make show operators any more comfortable.

## APRIL 1983

COOP'S COMMENT .....	page 2
HARDWARE FAILURES (Part One) .....	page 8



HARRIS DELTA GAIN .....	page 24
PARACLIPSE 12 FOOTER .....	page 32
ADM 20 FOOTER .....	page 44
BLOCK DOWN CONVERSION TECHNIQUES .....	page 50
CORRESPONDENCE .....	page 62
BIRD OPERATIONAL NOTES .....	pages 30, 42, 48, 60



**OUR COVER** — A mesh antenna that didn't make it through the winter. Actually, in this case, it didn't make it through the fall and into the winter! Part one of a two-part look at hardware reliability begins this month. It is unfortunate that we have to spotlight things that don't work very well, very long, in this manner. But dealers are getting stuck with hardware that is not holding up, and we believe you deserve to know what to watch out for.

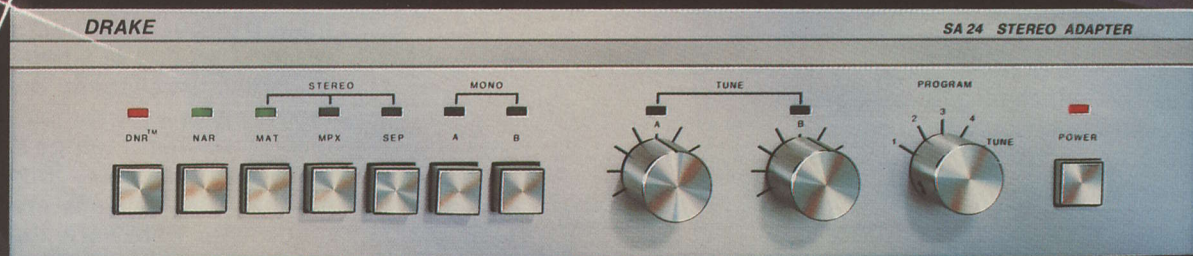
# COOP'S SATELLITE DIGEST



**COOP'S SATELLITE DIGEST** published monthly by West Indies Video, Ltd; a Turks & Caicos Corporation with corporate offices located at Grace Bay, Providenciales, Turks & Caicos Islands (West Indies). U.S. offices are maintained at Ft. Lauderdale, Florida. All mail including subscriptions, advertising inquiries, reports and letters should be addressed to CSD, P.O. Box 100858, Ft. Lauderdale, FL 33310. CSD office hours in Ft. Lauderdale are Monday-Friday 9:00 AM to 4:00 PM. Telephone (305) 771-0505. CSD is mailed worldwide on or before the 1st of each month, first-class (airmail). Annual subscription rates are \$50 (US funds) for USA, Canada, Mexico; \$75 (US funds) elsewhere. Entire contents copyright 1983 by West Indies Video, Ltd; Robert B., Susan T., Kevin P., and Tasha A. Cooper.



# STEREO ADAPTOR



## SA24 MULTI-MODE STEREO ADAPTOR

- Receives All Three Stereo Transmission Modes
  - Four Convenient Preset Program Formats
- Full Manual Tuning for Any Subcarrier Configuration
  - Selectable bandwidth • Mono Mode
  - Compatible with All Stereo Amplifiers
- DNR™ Noise Reduction System Reduces Hiss and Background Noise
- Attractive Styling Matches Drake ESR Series Earth Station Receivers

\*DNR™ is a registered trademark of National Semiconductor.

Write for Brochure or See Your Dealer



R.L. Drake Company  
540 Richard St., Miamisburg, Ohio 45342, U.S.A.  
Phone: (513) 866-2421  
Telex: 288-017

PIONEER MEMBER OF  
**SPACE**



# TUNE IN THE SATELLITES

The DRAKE ESS2250 is a *complete* satellite TV reception system—*everything* you need to bring satellite TV into your home for the ultimate in selective TV viewing pleasure. At the heart of the system is a precision-contoured, ten-foot antenna which anyone can easily assemble "on-site", using simple hand tools. Mounted in the shroud at the focal point of the antenna is a sophisticated array of electronic gear capable of capturing weak satellite signals with impressive results. And the sturdy polar-mount is designed for easy manual or motorized rotation (optional) over the entire satellite arc.



You exercise complete control over the entire system with the DRAKE ESR224 earth station receiver which features the latest in solid-state microwave technology to provide superb performance and reliability. The functional design and contemporary styling of the receiver (along with a full line of accessories) will complement and ensure compatibility with any audio/video entertainment center for years to come. This system can be simply attached to any TV set and detailed instructions make it easy for the homeowner or local dealer to install everything with confidence. The entire package is easily shipped via U.P.S. to any continental U.S.A. location.

The DRAKE ESS2250 is pre-engineered to provide sharp, interference-free reception to most continental U.S. locations.

Write for our free color brochure and name of your local dealer. Your Drake dealer can provide a demonstration and complete technical information.



PIONEER MEMBER OF  
**SPACE**

SIMULATED TV PICTURE

## ESS2250 SYSTEM

FULL PERFORMANCE SATELLITE TV RECEPTION



R.L. Drake Company  
540 Richard Street; Miamisburg, Ohio 45342  
Phone: (513) 866-2421 Telex: 288-017

You can be confident when you buy DRAKE... the first name in satellite TV systems.



## COOP'S SATELLITE COMMENT

- EUROPE SHOW Not For Satellites
- TOO MANY Shows?

### WILL NETWORKS ABANDON 4 GHz?

There has been considerable speculation over the past several years as to just when, and how, the three major US networks might make **fulltime use** of satellite technology. Recently NBC had taken some lead in the scenario by drafting a set of specifications which it is circulating to various hardware vendors seeking their input on 4 GHz versus 12 GHz.

There are several good, logical reasons why the networks might **not accept** 4 GHz as the most desirable satellite band to send programming to affiliates, and to bring programming back to the network control centers for processing and eventual redistribution. Two of these reasons highlight the 4 vs. 12 GHz controversy.

Terrestrial interference is a problem at 4 GHz. Bell terrestrial links tend to concentrate in big cities and hub terrestrial centers are usually located right in the heart of major downtown centers. Often there are such intense terrestrial signals on the ground that not even the most imaginative antenna shrouding/shielding and interference traps can clean up the picture. Not to broadcast specifications at any rate (what **you** might watch, and what a network affiliate might **accept** for re-broadcast are two different things). The best place to dump satellite signals is directly into the station control room. The control room is apt to be in a downtown environment even if the transmitter is some distance away.

Antenna size is another problem. And not because big size means big bucks, since we all know that stations have money to burn. The problem is more apt to be at the uplink end of the line where a special sports event or news event is originating. While some people have gotten by with 4.5 meter portable or transportable uplinks for video, there is much better quality to be had if the uplink is in the 6 meter and upclass (at 6 GHz). The networks feel, rightfully, that it would be far better to have small 3 meter (or even smaller) antennas on trailers that they could whip onto a news or sports event site and be 'on the air' in minutes rather than hours. You can do this at 14 GHz. You cannot do this at 6 GHz.

At the forthcoming NAB (National Association of Broadcasters) meeting coming up near the middle of this month, NBC is going to shock a few of the broadcast community by making a commitment to 12/14 GHz technology. It may not be irreversible, but it will be close to set in concrete. NBC has been testing a 12/14 GHz system, using the SBS bird family, for many months. Working with Harris, they have worked out enough of the bugs to be convinced that they would best be served with Ku band technology.

This decision, to use Ku band rather than C band, has been a difficult one. As much as they realize the wisdom of not being at 4 GHz, they also realize that as long as they make the decision to go with Ku band, they will be forced to await the availability of satellites (transponders) in that (newer) band. Right now, today, the right 'mix' of 12 GHz transponders, for NBC network use, is still several years away.

**Remember** that the networks want to maintain their basic distribution **with** the Bell folks. They are unlikely to ever consider changing that decision because they are very dependent upon Bell terrestrial circuits as well, and will continue to be even after the satellite move is made. Bell will not have sufficient 12 GHz transponder capacity to accommodate NBC (or any other network) before the waning months of 1985 and into 1986.

Bell/AT&T is scheduled to launch the first of their new, replacement **4 GHz** birds this July (TeleStar A). It will go into the same position now occupied by the pair of older COMSAT birds, D1 and D2, flying together at 95 west. The new Telestar bird is 24 channel, 8.5 watts per channel, with plenty of redundancy. Additional 24 channel (C band only) birds in this series will launch in May and June of 1984. Bell will probably replace D3 (87 west) with the May '84 flight and they hope to get a fourth orbit spot for the June of '84 launch (D4 operates at 127 west).

At the present time there are three regular (TR 1/NBC, 13/ABC and 17/CBS) and one irregular (8/ABC) channel of network service on D3. There are **some** affiliates presently using these feeds, but they are the exception, not the rule. ABC comes close to providing the majority of its network programming on TR13, while CBS and NBC use their D3 transponders for considerably less than a full network service schedule. None of the present use is even remotely related to the expansive use planned by NBC and the others by the middle of this decade. NBC will alone utilize more than 9 transponders, many of them fulltime. It is reasonable to assume CBS and ABC will end up with similar requirements. In fact, all three networks have already ordered on 4 GHz several transponders each; up to 8 in the case of ABC.

It is likely that with the launch and operation of TeleStar A at 95 west this summer, there will be an increase in use of satellite by all three networks. Whether that expanded use will come up at 95 west, or the present D3 position at 87 west is not known. Between that time, and the eventual operation of a 12 GHz system by NBC (and one must assume that CBS and ABC may well follow NBC to Ku band), there will be a **slow growth** of 'interim' network services at 4 GHz.

All of this says that while the networks are going to be using more and more satellite time in the years ahead, there is unlikely to be a single, dramatic, multi-channel expansion of their service **until** the middle of the decade; and then, if current planning matures, only at 12 GHz.

### TURNER AND CBS

Susan was watching a CBS special one evening late in February when she called me on our intercom. I had my head buried in the typewriter, as I often do at 10:30 at night. "**CBS just announced that Ted Turner is merging Turner Broadcasting with CBS**" she reported.

Turner is such a character that it is difficult to hang a single descriptive label on the man. "Bold" certainly fits. "Unpredictable" would also fit. Ted writes his own rules and plays every game to win. Every now and again when I feel bad about the plight of the world I drag out a 20 minute videotape I shot back in 1978 at a cable TV show. It is a hilarious unpurged good old fashioned stump thumping example of a king calling his troops to lay down their lives for the kingdom in the forthcoming battle.

Turner, in 1978, was a nasty, threatening guy to the **established** cable community. They were not yet ready for a 'wild man' telling them that their industry was going to bury traditional broadcasting. Turner had arranged to get his WTCG (now WTBS) on satellite in 1976. He was the first, and between the broadcasters who thought him crazy and the big time cable people who didn't understand his free wheeling



antics, he was not nearly as well received as he is now. It fell upon me to create an award for Turner, in recognition that his 'pioneering' efforts to get a good independent broadcast signal on satellite was a major milestone in the progress of the cable industry. At an annual cable show I used to run, we arranged to present Ted with the award and he in turn asked for a few minutes to tell everyone how thankful he was to (1) be alive, (2) be a part of a dynamic, growing industry, and (3) be sober. Not necessarily in that order.

**"We are all going to get rich . . . filthy rich . . . together"** he shouted from the pulpit. There was a murmur of approval in the crowd.

**"We are going to bury those networks . . . their days are numbered. Someday they will beg us to take over their old fashioned, antiquated systems"** he shouted again while raising his arm in victory.

For twenty minutes he carried on. When he finished, every man, woman and child in the crowd would have followed him into the gates of Hell, confident that they would all pass through unharmed. To wild applause he held his award high above his head (the first award from the cable industry; dozens would follow) and then headed for the bar where someone had thoughtfully arranged for his WTBS to be piped in from a satellite dish so he could bury himself in his Braves game for that night.



Last fall I wrote about Turner's plight in getting CNN or something like CNN into Europe, for cable system use there. In the same story, even the same paragraph, I talked about the possibility that CBS was attempting to package a special European feed channel of their own; to take CBS Network television; 'worldwide'. At the time I knew about the CBS and Turner negotiations. I very much wanted to tie the two together at that point, but decided that anything in print then might jeopardize Turner's negotiations. Like a good member of the Turner Army, I refrained from telling what I knew. Turner commands that kind of loyalty.

Nobody, not even I, would attempt to guess what a marriage between Turner and CBS will foster. CBS has the bucks and the size and the clout. Turner has the brashness and the flexibility.

**Only Ted Turner knows** whether this means Ted Turner is hanging up his gloves. He has, in recent months, been spending more and more time at his South Carolina retreat. I wouldn't blame him if he has decided to cash in his chips while the stakes are high and he is riding a winning streak. And, frankly I cannot see him being roped in by an old, conservative, Board of Directors dominated by CBS, very long. Ted will never knuckle under to anyone he thinks is wrong, or dumb, or slow to move. If he is not retiring from the ring, the marriage **may be** short lived. If he **is** retiring, the cable industry will never be the same again. They threw away the mold when Turner was cast.

For CBS, it is a marriage based upon their recognition that the technology of mass media is changing; rapidly. It is a recognition that while broadcast television may not die, totally, its vine is now withering and the size of the crop will go down year after year. Cable, and satellite delivery, may not totally replace terrestrial television, but it will chew up a big chunk of its revenues.

With ABC in bed with Westinghouse in the Satellite News Channel (SNC) operation, and ABC broadcast/network news beating CBS

frequently in the ratings, CBS can only profit from being part of CNN which easily dominates the cable news industry. Turner's WTBS is the closest thing to a 'fourth network' anyone has ever mounted (since the demise of the Dumont Network in 1953) and if WTBS is going to chew off chunks of viewers from CBS, ABC and NBC, it is better to be a part of that operation than stand outside watching your ratings tumble year after year.

As bold and assertive as Turner is on the US scene, he may be finding that his efforts to take CNN worldwide are not progressing at the pace he had set for himself. CBS can be very helpful here since they have the worldwide contacts, and tradition, which open doors that Turner would find closed to him.

**For now**, we can only stand back in the crowd and marvel at the job Ted Turner has done in creating a broadcasting corporation that ten years ago amounted to a poorly run UHF television station in the backwater of Atlanta, Georgia. Like Turner said to the cable group in 1978, **"We are all going to get rich . . . filthy rich . . . together"**.

#### \$699 CHEAP

When **John Ramsey** from **Sat Tec** was here on Provo for a visit in mid-February, we spent a considerable amount of time talking about just how inexpensive TVRO hardware might become. John's firm pioneered low cost TVRO receivers back at the San Jose SPTS in July of 1980, and by being one of the first two suppliers to break the then \$1,000 barrier for home TVRO receivers, John earned his spot in the TVRO history books.

The just completed Las Vegas STTI show (about which we will write in the May CSD) had a most interesting package of hardware available for what may have seemed like a ridiculous price; \$699 for the LNA, antenna, receiver to the dealer. John and I discussed just how low the ultra-low end pricing may really be falling in the balance of this year.

There has been a constant cost squeeze on all manufacturers of the three primary system components, i.e. LNAs, antennas and receivers. But for all three, combined, to drop to under \$700 at dealer cost level is something of a shocker.

It is no secret that offshore LNAs are now with us. So far they seem to be pretty fair 120 or 110 degree units and there are some around that are in the 100 degree class. Some of these are coming **into** the states in the just over \$100 region so you can see how they could be marketed as **part** of a system for less than a quarter of the \$699 price.

The economics of spinning dishes is fantastic. The labor factor drops to almost zero after the tooling is paid for and I know of at least one firm cranking out dishes just under 8 feet in size that claims to be able to pop a new dish off the mold every four minutes. That's tough to beat. There are some real bargains in French manufactured aluminum these days and by using non US or Canadian raw stock, it is possible to shave as much as 25% off of the cost of the material. Getting a spun dish, in aluminum, down to under \$125/\$150 cost seems realistic and the simplistic mount adds barely another \$25. Again, it fits the pricing structure. The people making fiberglass antennas are getting equally efficient, but in the long run it is doubtful they will be able to keep up with the metal spinners. We are definitely into the era of mass production efficiencies now, and it is showing up very rapidly.

I remember when the **parts** for a simple **receiver** cost upwards of \$800. I remember when some clever engineering dropped that cost for bare parts to under \$500. I am just a little bit amazed to see the cost of parts now dropping under \$75 for those who are clever enough to design around the traditional big buck components such as the \$40 VCOs. Getting a receiver out of the door for about \$250, in big quantities, is no big trick anymore and that's just the beginning of where that is headed.

A firm offering a \$699 package has to do its homework. But, after talking at length with John Ramsey and others who are on the leading edge of shaving costs, I have to agree that we aren't at the bottom yet. How much lower might it drop, in the next eight months? I would expect no additional big drops until we reach the November SPACE show in Florida. We are now entering the good selling season, and armed with new packages that can be retailed (installed) for as little as \$1499 or so, the demand should by all accounts exceed the supply for

COOP CONTINUES/ page 68



# THE ODD (BUT PERFECT) COUPLE FOR ALL SMATV APPLICATIONS FROM PATMAR TECHNOLOGIES

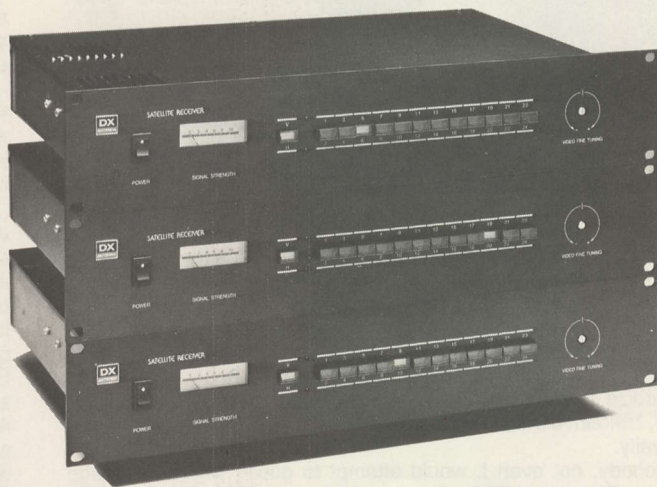


The Harris 3 meter Delta Gain Antenna combines the low weight and wind resistance desirable for SMATV installations with the high gain associated with much larger antennas. At the same time, its "deep dish" design with an f/d of 0.25 and modified Cassegrain monopod which shrouds the LNA's and feed assembly results in less terrestrial interference, low noise temperature and reduced side lobe interference. It also protects the LNA's from weather and theft.

It is available in both AZ/EL and Polar Mount configurations.

In cases where two or more satellites need to be accessed, multiple Harris antennas are cost effective compared to larger antennas with multi-beam feeds and will continue to work at tighter satellite spacings.

The DX Receiver and Block Downconverter is a commercial grade product with unique features for the SMATV industry. It enables the stacking of multiple receivers with the use of only one downconverter per polarity and the use of RG/59U coaxial cable instead of 1/2" heliax, making the cable run from the antenna to the satellite receiver and MATV head end much less cost and labor intensive. It also eliminates the need for ferrite isolators and expensive power dividers. The receiver returns to the original channel frequency in cases of power fluctuations or outages.



The output frequency of the block downconverter is 0.9 to 1.4 GHz and its working temperature is  $-30^{\circ}$  to  $+50^{\circ}$  Centigrade.

Patmar Technologies also offers a complete line of SMATV

products such as LOCOM LNA's and the SMATV and MATV products manufactured by Blonder-Tongue Laboratories including the ESM modulator for adjacent channel applications.

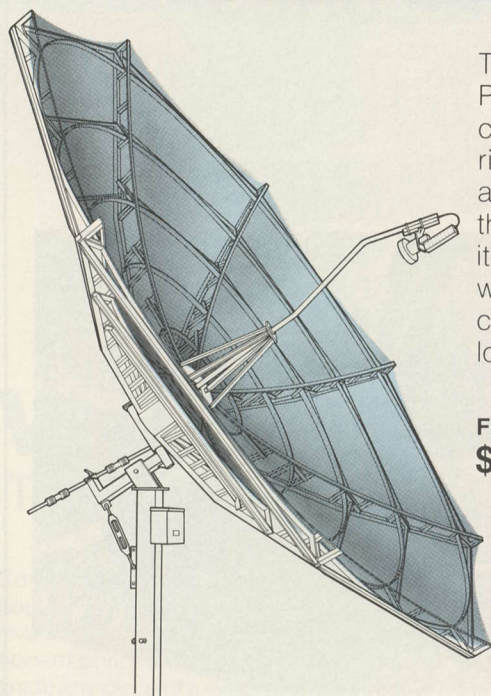
## PATMAR TECHNOLOGIES, INC.

Larry James, P.O. Box D, Claremore, Okla. 74017 (918) 342-1955  
For orders call: 1-800-331-8900

Peter Sutro or Bill Heavener, 6 Claremont Road, Bernardsville, N.J. 07924 (201) 766-4408



# THE ODD (BUT PERFECT) COUPLE FOR HOME TVRO INSTALLATIONS FROM PATMAR TECHNOLOGIES

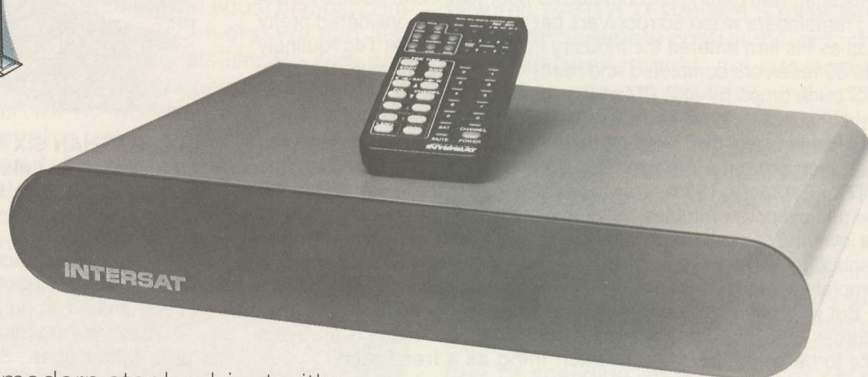


The Paraclipse 12-foot High Performance Antenna, constructed of sturdy aluminum ribs with heavy-duty expanded aluminum radar mesh reflector is the ideal home dish because of its ease of installation, light weight (280 pounds in one 18 cubic foot container), and good looks in either aluminum finish or

in baked-on powder coat available in a variety of colors as an optional extra. It comes complete with Polar mount which can be easily motorized and remote controlled.

**A complete, top quality, fully automated state-of-the-art satellite system for under \$2,500.00!**

Featured at  
**\$895.00**



The Intersat IQ-160 System (so named because of its brilliant performance) is a state-of-the-art satellite receiver with separate downconverter, modulator, stereo capability with 12 watts per channel direct to speakers and total infra-red remote control over antenna movement, channel selection, polarity and audio volume control. Its micro-processor has more memory capacity than most home computers. It is encased in a

modern steel cabinet with rounded ends. The face is of attractive etched smoked glass and is devoid of the customary knobs and dials.

Featured at  
**\$1,595.00**  
complete with 120° LOCOM LNA,  
24 volt actuator and pin-diode  
polarizer.

Patmar Technologies also offers many other products for the SMATV and home TVRO markets such as the Harris 3 meter Delta Gain Antenna, Prodelin 3 meter Antenna, DX Receiver and Block Downconverter and the complete line of SMATV and MATV products manufactured by Blonder-Tongue Laboratories.

## PATMAR TECHNOLOGIES, INC.

Larry James, P.O. Box D, Claremore, Okla. 74017 (918) 342-1955  
For orders call: 1-800-331-8900

Peter Sutro or Bill Heavener, 6 Claremont Road, Bernardsville, N.J. 07924 (201) 766-4408



## HARDWARE

## FAILURES

### HOW GOOD IS THE WARRANTY?

There have been a number of developments in the TVRO industry during the past year. But perhaps none has been as important as the acceptance of 'mass production techniques' for antennas, LNAs and receivers by the primary suppliers to the industry. With those new, automated or semi-automated techniques, have come new production efficiencies. A firm that perhaps turned out a couple of antennas per work day in 1980 was now suddenly able to pull a new antenna off the assembly line at 15 minute intervals. And there are some, using spinning techniques, who are suggesting that one new antenna every four minutes will be a 'standard of production efficiency' as early as the summer of 1983.

Receiver suppliers too have learned more about the techniques associated with getting product out the door fast. John Ramsey's Sat Tec remembers when 50 receivers per month was considered pretty good as his firm entered the industry in 1980. Now Sat Tec routinely gets 50 receivers completed and ready for shipment before the daily UPS truck drops by at 2 PM in the afternoon.

LNA suppliers have been hard pressed to keep up with the production efficiencies of their receiver or antenna building counterparts, but when they solve the problem of custom tweeking of each LNA (see CSD for February, 1983), they too will be right in there cranking out a new unit every few minutes. All of this has contributed in a major way to a lowering of equipment pricing, and has made it possible for major distributors to break the \$1,000, \$900, and even \$700 barrier in 'complete system packages' for the dealers in the industry.

But with any significant progress, there are those who warn that progress does not come without a penalty or two. There is always a price to be paid; **"there is no such thing as a free lunch."**

What we intend to do here, in a two part series, is look closely at the general changes in hardware trends, and then try to put those changes into perspective for the dealer. There are certainly some problems with some pieces of hardware. And the problems that concern us here are not necessarily those that jump out of the box 'bad,' but rather those that only come to the surface after a few weeks, or months, or service by the equipment. If the dealer is better informed about what problems might crop up, he is apt to be more careful in selecting his equipment.

There are several messages here:

- 1) If equipment is rushed from the drawing board to the field without adequate MTBF testing (i.e. an assessment of 'Mean Time Between Failures'), the distributor/dealer network, and the customers who end up with the stuff in their yard, become an important part of the testing sequence.

This is not all bad, provided the dealer gets the full backup of the distributor from whom he purchased the equipment, and the distributor in turn has the full backup of the manufacturer. But when a product gets into the field, operates for awhile, and then goes sour . . . and the manufacturer dis-avows any responsibility to make it right, then the guy in the field is up a creek with an expensive problem to fix. Not every dealer is in a position to replace a \$1500 antenna package, for example, and not go out of business in the process.

- 2) Not all outdoor-portion equipment is getting passed by experts



**IN LESS THAN SIX MONTHS** this motor mount decayed from its factory pristine finish to this ugly mess. The steel is thick enough the surface might hold together several years; provided you never had to move the assembly for repair or adjustments!

in 'galvanic action' before it is rushed into production. There are many metallic combinations, for example, which should not be 'mated' in an outdoor environment.

Antennas are particularly vulnerable to rusting, oxidation, and just plain falling apart. Some may last a year before the deterioration becomes obvious; others are lasting only weeks before there are signs of rust. Several extreme examples of rapid antenna system deterioration are shown in this issue. One, a classic and not very funny, involved losing the antenna azimuth control crank or handle because it rusted through in just a few months time (see page 64, this issue).

Basic chemistry teaches you that every metal has its own 'electrical value.' Copper, for example, is considered 'active' while steel is less active, electrically. When you place an aluminum bolt against a steel frame-piece, the two 'dis-similar metals' have different 'electrical potentials.' There is actually a 'voltage difference' between the aluminum and steel, even in clean, dry air. When moisture is added to the environment, that electrical 'imbalance' starts all sorts of chemical activity. Electrolysis, oxidation and a miniature 'battery' results. As the electrical potential, or difference, between the two becomes greater (due to improper material selection), more and more current 'flows' between the two. The greater the amount of current flowing, the more rapid the deterioration of the joint or surface to surface connection.

Many of the antenna assembly techniques involve a form of electrical bonding between a (screen) surface material and the framework. This bonding, initially under intense heat and some pressure, creates residual traces of new chemical elements. A screen-to-frame bond





# Videophile Satellite Television

The possibilities of component audio come to satellite video.

Component equipment has become popular in the audio field for a lot of reasons. One reason is that the component philosophy allows a purist to upgrade any piece of a system as technology advances without having to replace the entire system at once. This basic idea has ushered in an era of specialty firms dedicated to advancing the art of a single link in the chain. They succeed because all of their efforts are focused on one discipline, not thinly spread over an entire system. EARTH TERMINALS™ brings this philosophy to satellite television. We concentrate on the single most important, most difficult element—the microwave receiver. No other part of the system has such a dramatic effect on picture quality.

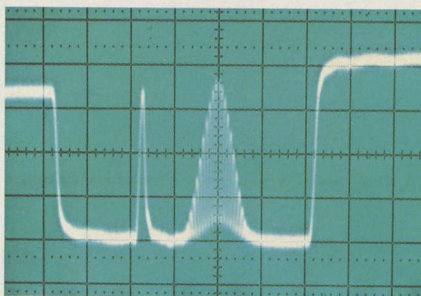
## Quality You Can See

An EARTH TERMINALS receiver provides cleaner pictures with less granularity. Truer colors that don't smear. Less sparkling snow on weak programs. Complete absence of herringbones and waves. Superimposed lettering that doesn't tear at the edges. In fact, you haven't seen video this exciting unless you've been in a television studio. If you own a quality video projector, you'll be even more impressed.

## Quality You Can Measure

Broadcast engineers are impressed with the accuracy of EARTH TERMINALS receivers too. Our VITS Sin<sup>2</sup> Pulse and video SNR test results are incom-

parable; actually the equal of most commercial grade receivers. We can also handle tough signals like Reuters data transmissions that give other receivers fits. It's no wonder then, that after exhaustive testing, some cable companies and television stations use EARTH TERMINALS receivers as their main source of satellite program material. They know value when they see it.



Unretouched Off-The-Air Sin<sup>2</sup> Pulse Test

## It's Easy To Live With

All this technical sophistication is really quite easy to get along with. Precise automatic fine tuning tunes every channel the same way every time. You don't have to be an expert to get perfect

pictures. EARTH TERMINALS receivers come with a remote control that selects channels individually, adjusts audio volume at your convenience, and automatically signals the rest of your system to supply the proper antenna polarization through an even/odd channel switch. And it fits in the palm of your hand.

## Tips On Value

There are plenty of satellite receivers that cost less than ours, but nearly all of them need bigger antennas and more exotic Low Noise Amplifiers for a picture free of sparkling snow. If you're on a budget, you can save money in other parts of the system by paying more for our receiver and come out even. You get high fidelity video in the bargain. If you're simply after the best picture money can buy, we can make it very affordable. Either way, give us a call or write us for the details.

EARTH TERMINALS  
Department 103  
One Microwave Plaza  
Cincinnati, Ohio 45242  
513-489-6200



**EARTH TERMINALS**



# WHEN YOU ARE THE A

## BUILD THE FIRST S



Hero System 25-H - 7.5 Meter  
Motorized Antenna

### ANTENNA SPECIFICATIONS:

<b>ELECTRICAL:</b>	<b>3 METER</b>	<b>4 METER</b>	<b>5 METER</b>	<b>6 METER</b>	<b>7.56 METER</b>
Operating Frequency	3.7 to 4.2 GHz	3.7 to 4.2 GHz	3.7 to 4.2 GHz	3.7 to 4.2 GHz	3.7 to 4.2 GHz
Antenna Gain at 4 GHz	40.4 db	42.8 db	44.5 db	46.5 db	48.4 db
Beam Width (-3 db)	1.75°	1.33°	1.°	.8°	.7°
First Side Lobe Exceeds FCC	32-25 Log 0	32.25 Log 0	32-25 Log 0	32-25 Log 0	32-25 Log 0
G/T at 20° Elevation (with 100°K LNA)	21.04 db	22.06 db	24.08 db	25.7 db	27.6 db
F/D Radio	0.30	.30	0.375	0.375	0.365



# E ACKNOWLEDGED LEADER IN BIG, WORLD-CLASS TVRO'S...

What do you do for an encore???

## T SMALL WORLD-CLASS TVRO ANTENNA!!!

**HERO COMMUNICATIONS** just took **BIG** out of world-class **TVRO** antennas. We have taken our four years of experience designing big, world-class antennas and established an entire new family of **small** world-class antennas. Using a totally new approach to antenna feed design, HERO is very proud to announce a 10 foot and a 13 foot in addition to our existing line of big antennas . . . **with 70% efficiency!!!!**

What this means to you, the dealer, is simply this. Now you can install a 10 foot system where only 13/14 foot system would previously play. Or, now you can install a 13 foot where only a 15/16 foot would previously perform. **This is no small accomplishment!!!**

This is such an important breakthrough that now, hard to serve areas such as the Caribbean can have superb performance on virtually all of the **U.S. DOMSAT** birds. As important as this may be to your fringe area installation business, there is more good news. The **PRICE**. Our 10 and 13 foot antenna with horizon to horizon motor drive and additional high quality features is priced less than any other low performance antenna of comparable size.

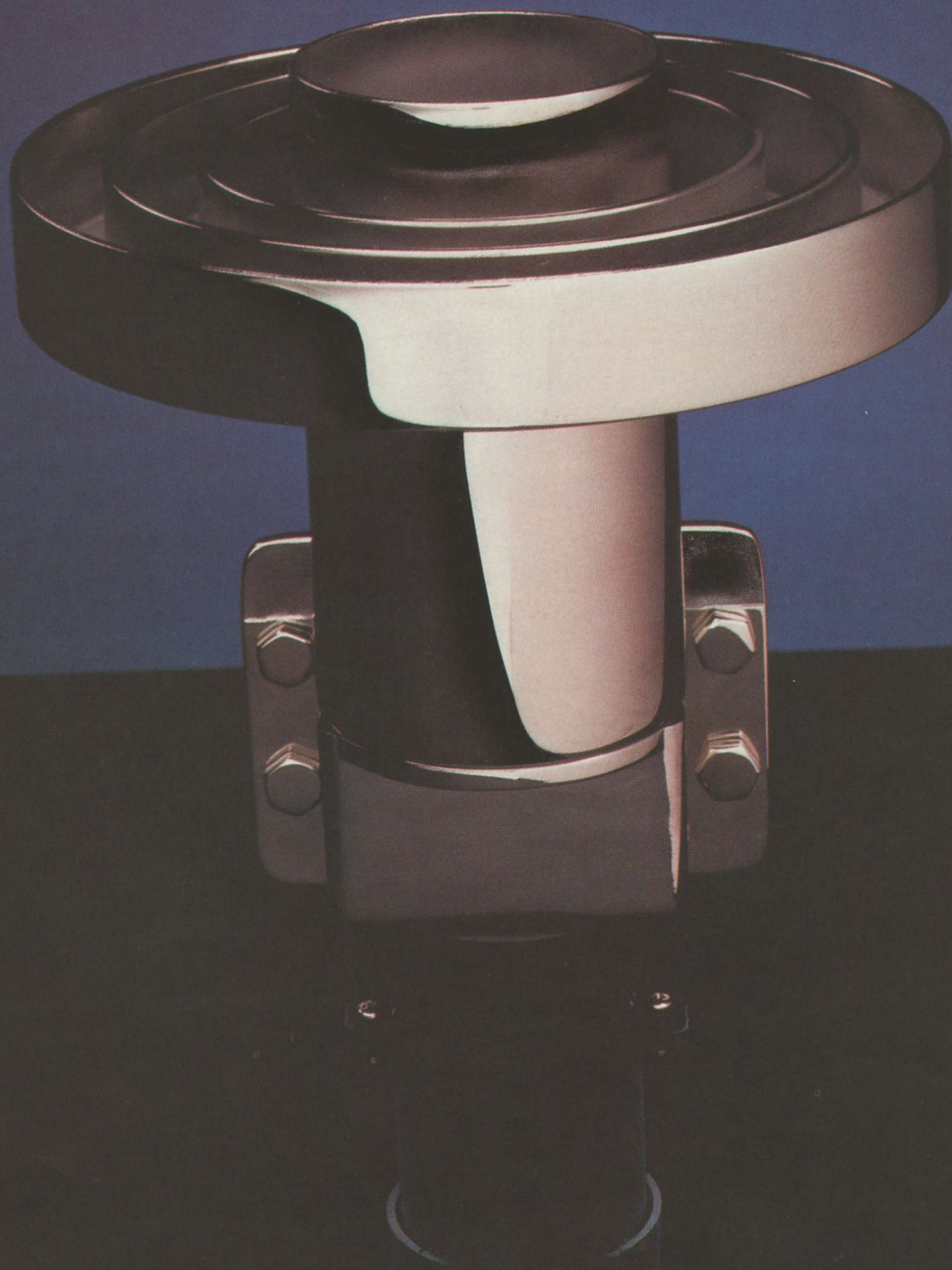
**Interested?** Of course, you are, because **Hero Communications** pioneered big world-class antennas and you know we have our act together. And now, Hero Communications pioneers **small** world-class antennas. Now, that's a hard act to follow!!!!



1783 West 32nd Place / Hialeah, Fla. 33012  
(305) 887-3203 / Telex 51-4712



# IF IT'S NOT CHAPARRAL, IT'S NOT A POLAROTOR.™



#### DISTRIBUTORS:

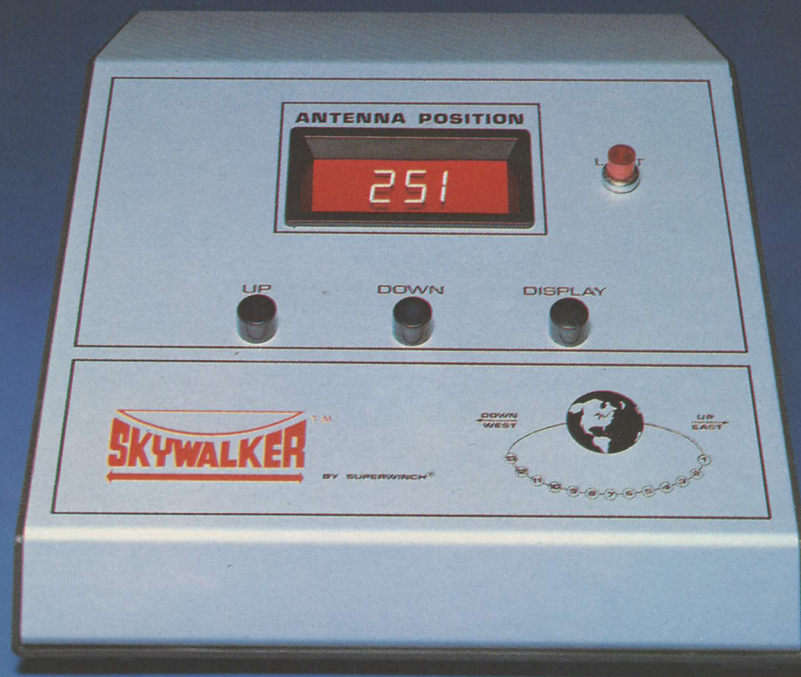
**Alabama**, Longs Electronics, 2700 Crestwood Blvd., Birmingham, AL 35210 (205) 956-6767; **Arizona**, High Frontier Corp., 2230 E. Indianschool Rd., Phoenix, AZ 85016 (602) 954-6008, (800) 382-0395; **California**, Transvision Corp., 2100 Redwood Hwy., Greenbrae, CA 94904 (415) 924-6963; **Colorado**, Echosphere Corp., 2250 S. Rantan, Englewood, CO 80110 (303) 797-3231; **Indiana**, Hoosier Electronics, 9 Meadows Center, Terra Haute, IN 47805 (812) 238-1456; **Kansas**, Allsat Service Corp., 7451 Switzer, Suite 107, Shawnee Mission, KS 66203 (913) 236-9692; **Louisiana**, Satellite Earth Stations, Hwy. 13 & Pine, Mamou, LA 70554 (318) 468-2203; **Mississippi**, Amsat, Hwy. 8 West, Grenada, MS 38901 (601) 227-1820; **Montana**, A.V. Electronics, 4301 North Star Blvd., Great Falls, MT 59401 (406) 761-3283; **New York**, National Satellite, Plaza #7, Latham, NY 12110 (800) 833-4485; **Satellite Video Services**, 63480 Vogt Rd., Bend, OR 97701 (503) 389-0996; **South Carolina**, Ohio, Sales Inc., 688 D. Alpha Dr., Cleveland, OH 44143 (800) 321-1188; **Oregon**, Wespercom, 63480 Vogt Rd., Bend, OR 97701 (503) 389-0996; **South Carolina**, Satellite TV of S.C., Rogers Plaza Hwy. 123, Clemson, SC 29631 (803) 654-5569; **Quarles Electronics**, 1616 Calhoun Rd., Greenwood, SC 29646 (803) 229-3638; **Texas**, Star Com, 1009 Greg St., Big Springs, TX 79720 (915) 263-0452; **Via Sat**, 5201 Bridge St., Ft. Worth, TX 76103 (817) 451-6601

See us at the National Satellite Opportunities Conference at Booth #630.  
Chaparral Communications, Inc., 2343 Bering Drive, San Jose, CA 95131

## CHAPARRAL



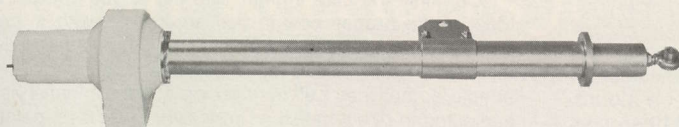
# It was only natural...



... that Superwinch, innovator in electric winch technology since 1968 and the manufacturer of more electric winches than anyone else in the world, should introduce Skywalker,™ an exciting new breakthrough in TVRO antenna actuator drive systems.

Superwinch standards always have been high ... in product design, product reliability and support, and in commitment to product availability. Their standards are reflected by the customer company they keep - Sears & Roebuck, J. C. Penney, Montgomery Ward, Western Auto, Canadian Tire, W. W. Grainger ... the list goes on. Over 525,000 products bearing our name are in service world-wide.

Superwinch offers this same high quality standard in the Skywalker remote TVRO dish control system.



by Superwinch

For further information, please fill out and mail coupon to:

Superwinch, Inc., Putnam, CT 06260  
USA or call (203) 928-7787.

Telex 643981 SWINCH PUTM

Please send me more information on your Skywalker™ system.

Name: \_\_\_\_\_

Street: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip Code: \_\_\_\_\_



## HARDWARE CONTINUED/ from page 8

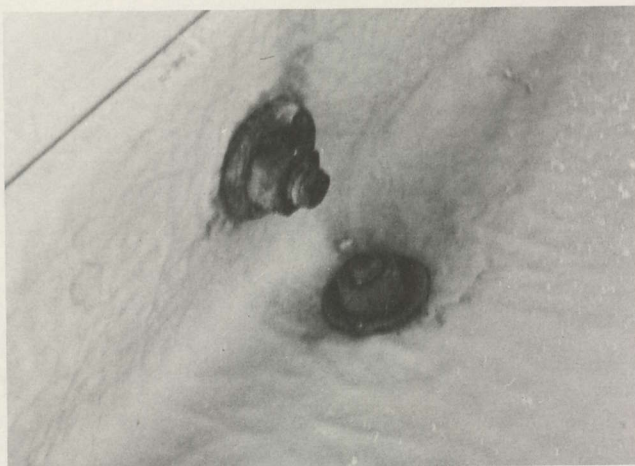
may have the two original metallic materials, plus several lesser 'materials' left behind as residues of the bonding process. They are apt to inter-react when exposed to the elements and cause an electro-chemical reaction that rapidly 'eats into' the antenna surface itself, at bonding points (see front cover, this issue).

- 3) As previously discussed in the June 1982 issue of **CSD**, a TVRO system that has any electronics out of doors (i.e. LNA, LNC, down converter) must somehow power that outdoor electronics. Some system designers elect to 'duplex' some or all of the required electrical voltage/current to the outdoor equipment in the RG-59 (etc.) cable that interconnects the outdoor electronics to the indoor electronics.

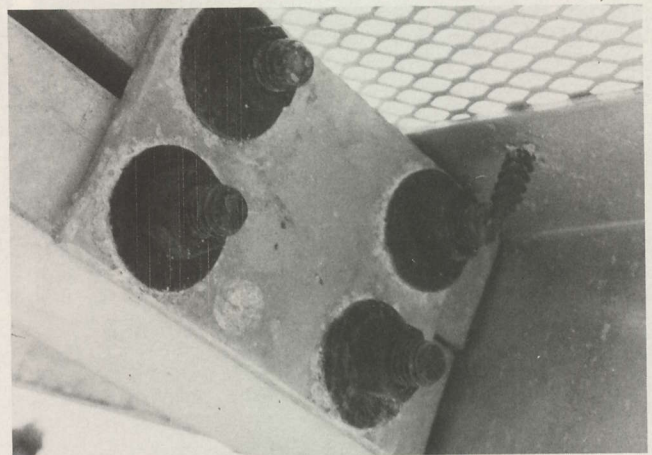
Whereas two dissimilar metal components will establish their own metal-to-metal voltage differences (i.e. become a miniature 'battery' at the joint) and create a current between the two metallic parts, outdoor equipment that demands electrical current from the indoor equipment is a 'planned for' electrolysis challenge. Extensive testing has revealed that when there is a voltage in the region of 12 volts DC (or greater), and a current in the region of .250 amp (250 mils) or greater, you have a sufficient amount of 'power' flowing in a circuit to cause electrolysis even though the entire circuit is in similar metals. The catalyst here is moisture, from the air or from direct leakage into the cable by a heavy rain or thick fog.

Some manufacturers strongly recommend that you not use cables such as RG-59/U for the transmission of outdoor equipment operating voltages; recognizing that the relatively small wire size of the 59, plus the often unsealed nature of 59 fittings, allows moisture to get inside and to combine with the relatively high resistance of the small 59 center conductor cable. The end result is a rapid deterioration of the performance of the outdoor equipment when oxidation or galvanic action builds up on the connector points causing a high resistance at this point and lowering the amount of operating voltage that 'gets through' to the outdoor equipment. The key here seems to be the **combination of voltage plus current**; a modest DC voltage (such as a tuning voltage for the VCO located outdoors) which has a small current associated with it seems safe. A larger current, even if at a slightly lower voltage, to power the LNA and perhaps other parts of the downconverter, is decidedly dangerous.

One solution is to use twin cables, or the 'Siamese' approach. One cable carries the RF signal (at IF) while the second carries the voltages. This insures that the RF portion is not subjected to connector surface to surface losses as resistance increases due to oxidation (i.e. there is no damaging current in that line to create short-term oxidation). This does not prevent the slow deterioration of operating voltage levels to the LNA and downconverter as the portion of the 'Siamese'



**FIBERGLASS ANTENNAS** are not immune to rust! Poor selection of hardware, used to hold the antenna together and on mount, results in rust. Even the reflective screen buried in the fiberglass is not immune to rust if it is a rust-able material, and there is an opening that allows moisture and air to get to it.



**POOR HARDWARE SELECTION** froze these antenna structure bolts solid in less than a year. Truss members are aluminum; hardware is non-plated steel.

cable carrying voltage slowly deteriorates at connector fittings.

Another solution is to use dedicated cables or wires for the LNA and downconverter powering. This requires a totally separate 'wire run' but it is the safest approach for long term system stability. At least with a dedicated cable run, the installer has the option of selecting cables that have conductor sizes large enough to insure that the resistance of the wire itself does not reduce the operating voltage to the LNA and downconverter to dangerously low levels.

In either case, the connections must be totally protected from moisture at all times. The most common practice is to use a product such as COAX SEAL to totally 'wrap' or cover every connection that is out of doors. COAX SEAL is a pliable, moldable substance that can be finger formed to tightly adhere to a connector or connection surface. Unlike self curing silicone substances available at hardware stores, the COAX SEAL does not harden after application which means you can go back months or years later and remove it to get the connection off if required.

- 4) Not all metallic surfaces 'weather' well. Any surface that carries microwave signal on the surface is of concern since changes in the surface itself could also change the efficiency of the part in the system.

The feedhorn, in particular, is of concern here. Let's begin by noting that there is very little expert opinion as to the ill effects of feedhorn surface weathering. In effect, nobody has to date critically studied what happens to the efficiency of a feed when the surface of the metal becomes coated, or pitted, due to weathering.

Some manufacturers of feeds ship a product that is bare metal (aluminum most often) while others coat the surface with an epoxy paint. Long term degradation, **if there is any**, due to weathering of an unpainted/unprotected surface, is unknown. Certainly a feed that has 'weathered' does not 'look' as pretty as one that is brand new, out of the box. But does the surface blemish affect the performance? Nobody seems to know, for sure.

Perhaps when we have studied this, carefully and for an extended period of time, we will find that the long term effects are measurable but not significant. We may also find that the surface areas of the feed which contribute the most to degraded performance are limited to the actual waveguide section that couples energy directly into the mouth of the LNA. As noted, there is insufficient evidence at this time to indicate at just what point surface blemishes on a feed contribute to reduced performance.

Certainly the LNA 'mouth' and the 'probe' therein is vulnerable. Most of the probes now in use are coated with a 'precious metal' surface. Such a coating is a form of insurance, against deterioration of the probe itself. Most probes sit far enough back, inside the feed structure, that they neither develop surface blemishes nor are they subjected to direct moisture from rain. They also 'point down' which



*Time to upgrade . . . ?*



*Satellite Receivers for All Your Needs*

**AVCOM<sup>®</sup>** 500 Research Road • Richmond, VA 23236 • 804-794-2500





## SYSTEM 7 OPENS IT UP.

### Lowrance helps open up the satellite market with an exciting new pair of satellite receivers.

The System 7<sup>XL</sup> is the new inexpensive Lowrance receiver with excellent performance and reliability. Features include detent tuning. Signal strength meter. Built-in modulator. 125 ft. of cable. Weatherproof downconverter. Fixed and variable audio. And more.

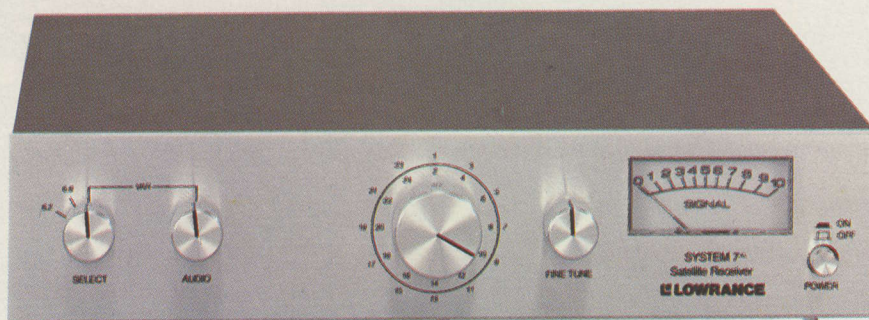
The System 7<sup>AR</sup> combines all the above, plus adds stereo decoding and a remote control as standard.

Lowrance also gives you the selling tools to keep the market open. With

dealer support that includes merchandising aids like color posters. Consumer TVRO question and answer brochures. Product brochures. Plus a video tape. All specifically designed to help you sell more earth stations.

When it comes to satellite receivers, demand the brand that helps increase sales . . . Lowrance.

**LOWRANCE ELECTRONICS, INC.**



Yes! I want to know more about the Lowrance System 7 Receiver. Send me more information today.

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_

State \_\_\_\_\_

Zip \_\_\_\_\_

**LOWRANCE**

LOWRANCE ELECTRONICS, INC.  
12000 E. Skelly Dr., Tulsa, Okla. 74128



## HARDWARE CONTINUED/ from page 14

prevents moisture from falling inside and collecting in the cavity that makes up the mouth of the LNA.

Some have asked if the 'probe' in the LNA mouth should be 'protected' with some type of sealant. The answer is a firm 'no'; under **no circumstances** insert anything **into the probe**, no matter how innocent the material may be! (Over the years there has been the odd story of spiders and other small creatures building webs or even nests inside of the mouth of an LNA; obviously such 'additions' to the system should be 'swept clear' as a matter of routine maintenance.)

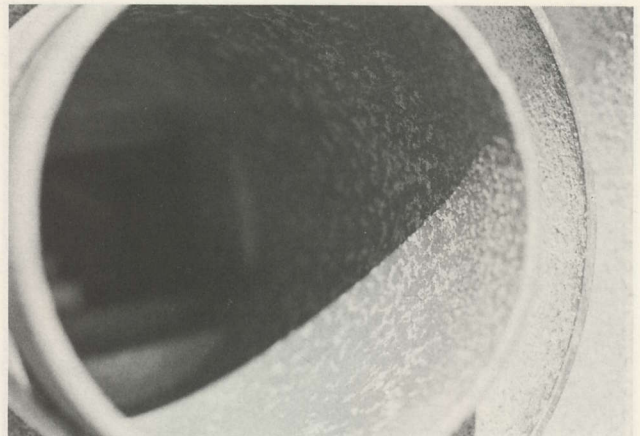
Where the LNA mates with the feed, you have a waveguide to waveguide flange. As many as ten bolt holes are provided for the installer to tightly mate the two together. Obviously, you don't want water leaking into the flange since there are often cavities within the feed where it can collect and 'sit.' How many bolts are sufficient? It would be less than 'pure' to suggest that all of the holes should not be filled with bolts. Experiments reveal that for electrical performance, with a brand new feed and a brand new LNA, just light surface to surface tension between the two makes the system perform adequately. However, neither surface stays 'new' very long and as they weather a tight (under pressure) contact is necessary. If you carefully select four holes, one on each of the four sides of the flange, so the tension between the two mating surfaces is equal, that is usually adequate. Then the entire mated flanges joint should be protected with COAX SEAL to insure that moisture is kept out.

5) Some attachments, optional with any system, are suspect. Polarization rotation systems, in particular the newest breed of such systems, are of concern.

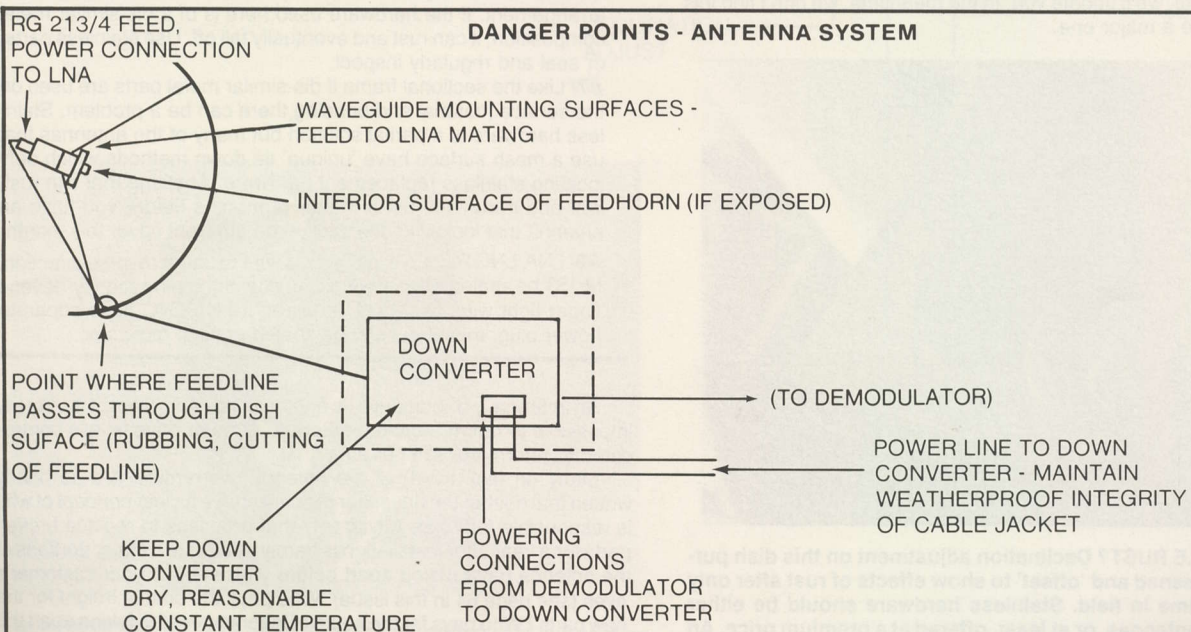
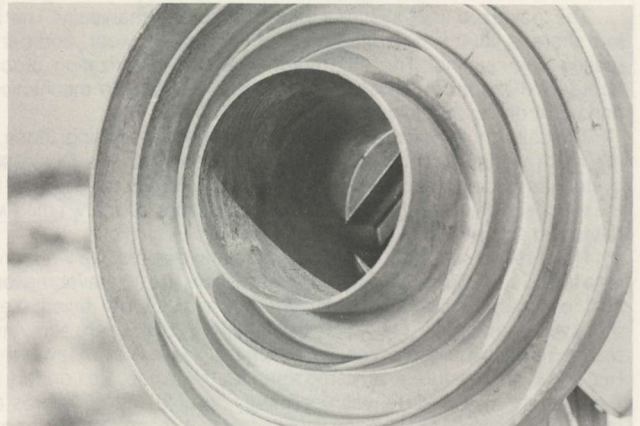
There was a 'rumor,' rampant during January of this past winter, which reported that a popular brand of polarization rotating system was 'coming apart' all across the country. Some of the currently available polarizer (that's a generic term here!) units rotate a small probe inside of the unit with a tiny DC operated motor. The probe moves around, within the feed, to electrically change the apparent polarization of the LNA probe. The LNA stays stationary.

Older, original, LNA polarization rotation schemes involved television antenna rotation motors which mechanically moved the LNA around an axis of rotation. The LNA probe was physically moved from one polarity to the opposite polarity by 'twisting' the entire LNA. This was a slow system and it required an often cumbersome-to-install mount that provided room for the antenna rotor motor.

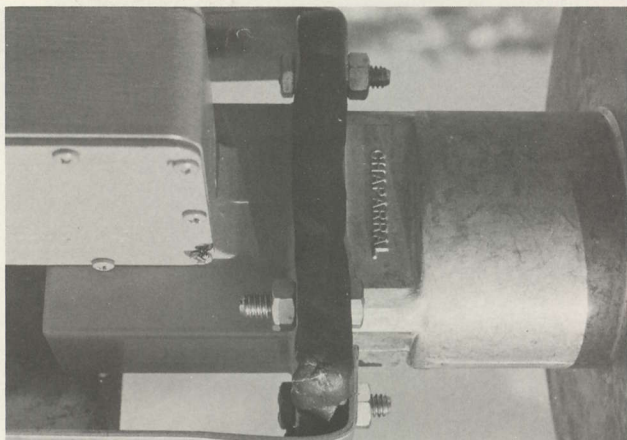
More modern approaches to the problem leave the LNA stationary, and either rotate a small probe in front of the LNA probe mechani-



**A PROBLEM?** The evidence is not yet in on how much loss of performance, if any, there may be when a feed has surface oxidation. This feed was in service for seven months when this photo was taken. Photo below shows brand new feed for comparison. Epoxy painted feed surfaces can prevent oxidation if the painting is properly applied.







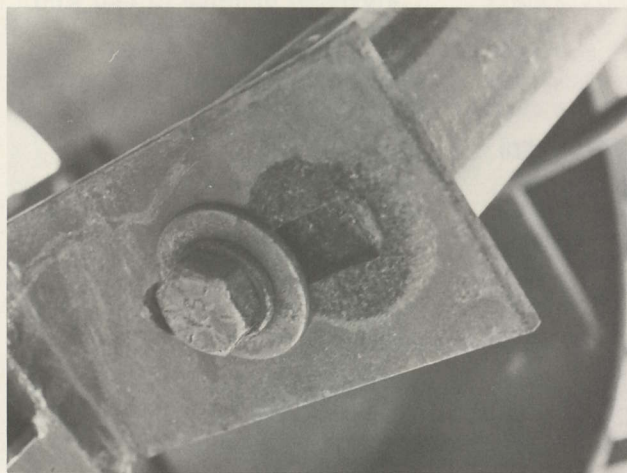
**SEAL UP THE FLANGE** between the feed horn and the LNA. COAX SEAL (black appearing material) wraps around the full flange to insure that moisture cannot leak through.

cally, or in the case of two units now available, 'charge' the waveguide section with a 'polarized field' that almost by magic rotates the signal itself as it enters the waveguide.

The 'polarized field' systems rotate nothing mechanically. Therefore there is little or no concern about mechanical wear, and parts rusting and quitting. The DC motor operated 'polarization probe' approach (Chaparral, BOMAN and others) does have mechanical parts that do move. How are they holding up?

The January rumor reported that tens of units were failing; those in the north were 'freezing up' when moisture got into the DC motor system, and froze solid. Those in more southern climes, according to the reports, were 'rusting out.' We heard the 'rumor' so many times we felt it **had to be true**.

However, in checking with distributors and dealers, we were only able to find a handful of verified instances where (for whatever reason) such mechanical probe rotation systems had actually failed. Yes, there were apparently a few (very few if our field checks are accurate) that froze-up in the north. Yes, there apparently were even fewer that had taken on moisture and rusted apart on the inside. So contrary to the January rumor, there was apparently no epidemic of failures as initially indicated by the rumors. If this analysis subsequently turns out to be inaccurate, we'll update you. In the meantime, we don't find this 'problem' to be a major one.



**JUST A LITTLE RUST?** Declination adjustment on this dish purposefully loosened and 'offset' to show effects of rust after only four weeks time in field. Stainless hardware should be either standard on antennas, or at least, offered at a premium price. An \$80 premium for stainless hardware is not a luxury in a corrosive environment; it is mandatory!

### JUST A LITTLE RUST . . .

When we have reported on mechanical equipment failure problems in the past, there have been reader letters suggesting that we dwell too much on 'minor problems' associated with rust and moisture. We think not.

There is considerable concern, justified in our view, as to **who is responsible** for equipment failures.

When a receiver or LNA quits, for whatever reason, within the warranty period, you can box it up and ship it back. If you did something dumb to the unit, it will get fixed although you may have to stand the cost of repairs. If the unit failed, within the warranty period, and the failure was not caused by you, it will get repaired and returned to you.

### ANTENNA DETERIORATION POINTS

**#1/** Where feedhorn mates with LNA microwave flange, seal with COAX SEAL. Consider selection of epoxy painted feed when antenna will be in corrosive environment. Some polarization rotation mechanisms did experience moisture problems this winter with water leaking in between the motor and the plastic motor support. Seal any joints in such mechanisms with COAX SEAL or RTV silicone.

**#2/** If dis-similar metals (hardware to structural members) are employed, there is very little installer can do to prevent rust except to opt for stainless hardware. Some have attempted to seal every bolt and nut with COAX SEAL or RTV silicone, but that is a long, arduous job with less than guaranteed results. Inspection of any joints will reveal a problem 'starting.'

**#3/** Hardware associated with tracking mechanism may not be manufactured by antenna supplier and may be of inferior grade metal. Coat all moving parts with heavy marine grease, seal any obviously dis-similar bolts and hardware with COAX SEAL or RTV silicone. And inspect on a regular basis for deterioration (see text)!

**#4/** Elevation set adjustment is normally a threaded rod which is once set and then forgotten (assuming it was done properly to begin with). The rod and all nuts and attachments should be coated with a good grade of marine grease after setting to insure that it will work, again, if needed.

**#5/** Bolts, where used to tie the base of the mount to the concrete or expanding-foam pad, are subject to the collection or puddling of water. Make sure this hardware is at least galvanized. Parts that are rusty when they go into the concrete, or that can start rusting once in concrete, **can** disintegrate **inside** of the concrete!

**#6/** Declination adjustment usually involves a set and forget bolt arrangement. If the hardware used here is of a dis-similar metal composition, it can rust and eventually fall off. Use stainless parts, or seal and regularly inspect.

**#7/** Like the sectional frame if dis-similar metal parts are used on the surface material and bonding, there can be a problem. Stainless hardware is a partial solution but many of the antennas that use a mesh surface have 'unique' tie down methods which defy locating stainless replacement hardware. Anything that can rust, **will** and it may be just a matter of months before you have an antenna that looks like the section on our front cover this month.

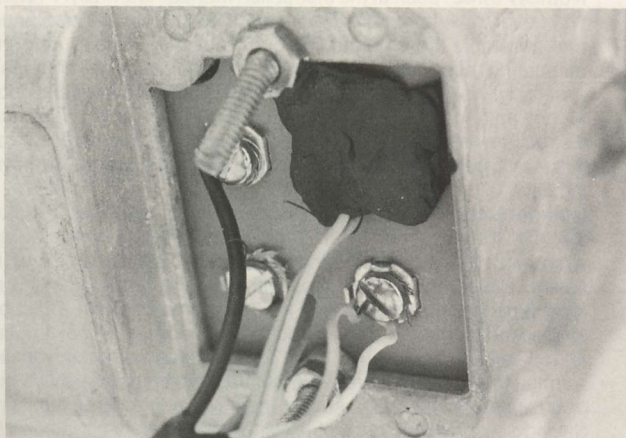
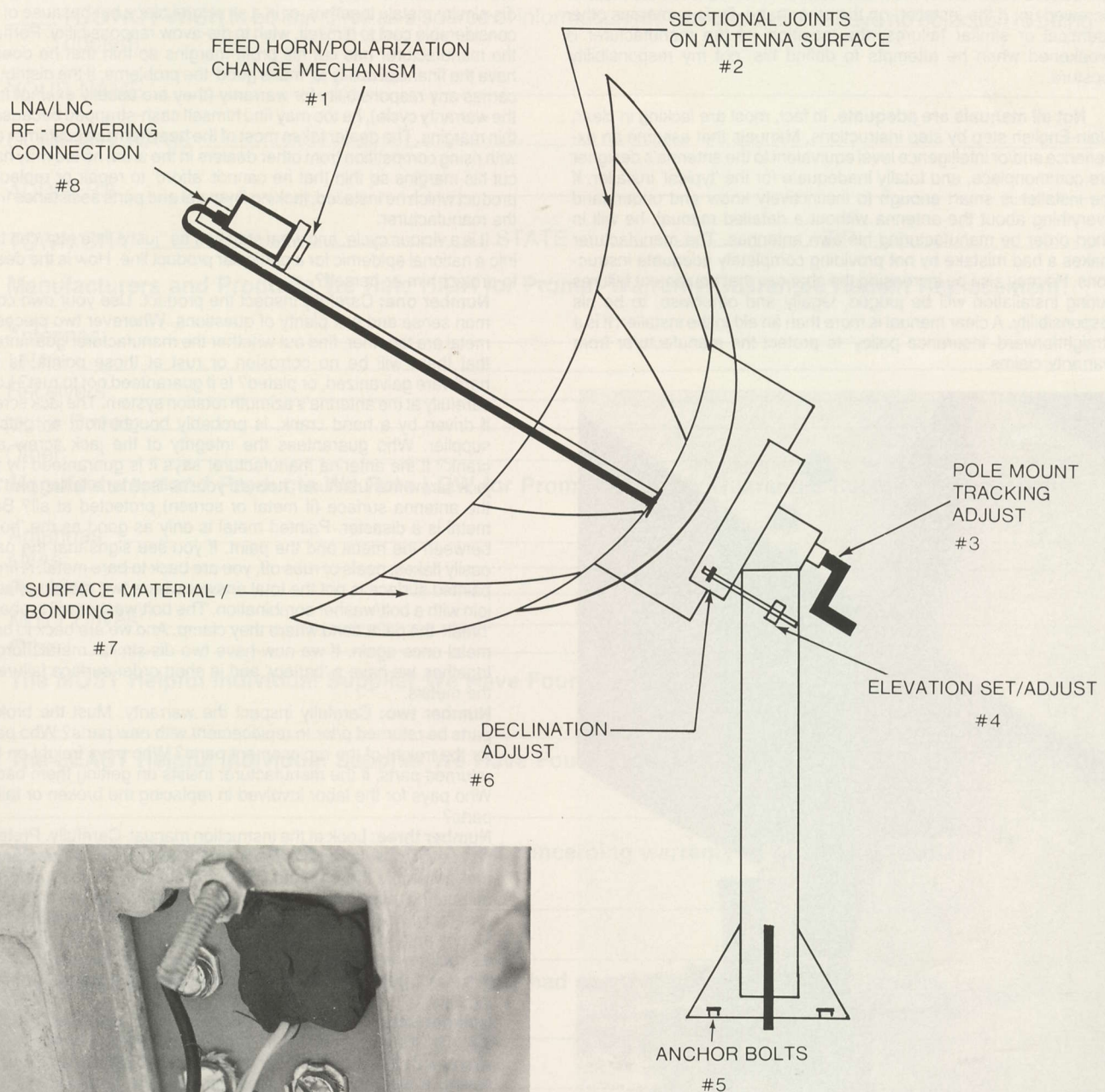
**#8/** LNA/LNC RF cable, carrying power to unit in reverse direction, **MUST** be sealed with COAX SEAL after tightening slightly-beyond finger tight with Channel-Lok pliers. If LNA/LNC have separate power plug, this also must be sealed against moisture.

An antenna, or motor drive, is another kind of problem. It is virtually impossible to return a broken antenna. A motor drive is less complicated to return, but still not easy.

Many (in fact, most) of the antenna 'warranties' are so poorly written that neither the buyer nor the seller have a clear concept of who is responsible for what. A warranty that promises to replace broken parts for a year after installation is hardly adequate if major portions of the antenna have rusted apart before your eyes or your customer's eyes (see page 64 in this issue). Who pays the cost of freight for the new parts? Who pays for the hours of labor involved in taking apart the antenna, replacing the broken or rusted parts, and returning the dish to the mount? Who is responsible for the mount proper? Might not the



ANTENNA DETERIORATION POINTS



BLACK GLOB of COAX SEAL over (rotor) equipment connection point is one way to insure that electrolysis does not get started.



manufacturer claim that the failure was caused by the installer not following, adequately, the installation instruction manual?

There is clearly a very nebulous region here which the industry has not properly addressed.

If the antenna fails because of some problem occurring at the time of installation, the manufacturer is naturally suspicious that the installer made a mistake. Installers have been known to take shortcuts and when manual instructions are not followed, the manufacturer may well have a legitimate beef with the way the product failed. If the failure is an isolated occurrence, the manufacturer firmly believes the installer screwed up. If the installer, on the other hand, finds numerous other identical or similar failures, the 'position' of the manufacturer is weakened when he attempts to defend his 'not my responsibility' posture.

**Not all manuals are adequate.** In fact, most are lacking in clear, plain-English step by step instructions. Manuals that assume an experience and/or intelligence level equivalent to the antenna's designer are commonplace, and totally inadequate for the 'typical' installer. If the installer is smart enough to instinctively know and understand everything about the antenna without a detailed manual, he will in short order be manufacturing his own antennas. The manufacturer makes a bad mistake by not providing completely adequate instructions. He may also be increasing the chances that equipment failures during installation will be judged, legally and otherwise, to be his responsibility. A clear manual is more than an aid to the installer; it is a straightforward 'insurance policy' to protect the manufacturer from warranty claims.



**TOO LITTLE/ too late?** This antenna mount, although galvanized, began rusting. The elevation adjustment rods were also rusting. Using a strong acid solution, the rust was removed by painting on the rust remover. Then the elevation rods were coated with a heavy marine grease. This should have been done initially, at the time of installation. You may never have to readjust the elevation rods (once set) but if they rust off, you'll still be in deep trouble!

**Just a little rust?** There is no such thing as 'just a little rust.' Not if you spot it within six months to a year from the time of installation. Our front cover photo shows a screen metal surface dish that had 'just a little rust' several weeks after installation. The photo was taken approximately five months after the antenna was installed. An isolated incident? Perhaps.

One of the unfortunate side effects of mass production is that hundreds, indeed thousands of antenna type products can be manufactured and into the field before a 'problem' is evident. At that point the manufacturer may realize he made a mistake, in mating two dissimilar metals together, or in a structural piece but because of the considerable cost to himself, wish to disavow responsibility. Perhaps the manufacturer has cut his profit margins so thin that he doesn't have the financial ability to 'make good' the problems. If the distributor carries any responsibility for warranty (they are usually exempt from the warranty cycle), he too may find himself cash-strapped because of thin margins. The dealer takes most of the heat from the customer and with rising competition from other dealers in the area, he too may have cut his margins so thin that he cannot 'afford' to repair or replace a product which he installed, lacking financial and parts assistance from the manufacturer.

It is a vicious cycle, and what starts off as "just a little rust" can turn into a national epidemic for a particular product line. How is the dealer to protect him or herself?

**Number one:** Carefully inspect the product. Use your own common sense and ask plenty of questions. Wherever two pieces of metal are together, find out whether the manufacturer guarantees that there will be no corrosion or rust at those points. Is the hardware galvanized, or plated? Is it guaranteed not to rust? Look carefully at the antenna's azimuth rotation system. The jack screw, if driven by a hand crank, is probably bought from an outside supplier. Who guarantees the integrity of the jack screw and crank? If the antenna manufacturer says it is guaranteed by the jack screw manufacturer, how do you 'collect' for a failing part? Is the antenna surface (if metal or screen) protected at all? Bare metal is a disaster. Painted metal is only as good as the 'bond' between the metal and the paint. If you see signs that the paint easily flakes, peels or rubs off, you are back to bare metal. A finely painted surface is not the total answer where two metal surfaces join with a bolt/washer combination. The bolt/washer will probably 'break' the paint bond where they clamp. And we are back to bare metal once again. If we now have two dissimilar metals forced together, we have a 'battery' and in short order surface failure of the metals.

**Number two:** Carefully inspect the warranty. Must the broken parts be returned prior to replacement with new parts? Who pays for the freight of the replacement parts? Who pays freight on the returned parts, if the manufacturer insists on getting them back? Who pays for the labor involved in replacing the broken or failed parts?

**Number three:** Look at the instruction manual. Carefully. Pretend you never saw the antenna before. Could you follow the manual and assemble the antenna without problems? If you judge the manual not adequate, talk with the supplier about the antenna's assembly. Will the supplier agree, in writing, that he will stand good for any antenna problems which are not covered in the assembly instructions in the manual? Perhaps if enough dealers insist on this, we'll get some decent antenna assembly manuals in the industry!

**Number four:** If the antenna is a new product, stand back and be the "Devil's Advocate." Ask yourself, honestly, "What can go wrong with this antenna?" And, "How can a person screw up in putting it together?" Yes, good performance is important. But, **long term good performance** is even more important. Don't be so quick to jump onto a new product just because it 'looks good' and is 'priced right.' "Too right pricing" may be an advanced warning to you that if there are problems, the company will be out of business or unable to satisfy their warranty claims later on. Saving \$50 'now' but being stuck with a \$500 repair bill later on is not good business.



**CSD INDUSTRY WARRANTY/GUARANTEE SURVEY**

**Instructions:** Please complete this side of the form, concerning your experience with warranties and guarantees, whether you **distribute or deal** in TVRO hardware. The reverse side of the form, dealing with product quality, is for **installing dealers only**. Note the very first line allows you to check off if you do NOT wish **CSD** to list you as a source of information. If you check this first line, your information will be held in confidence and while used in analysis of the industry trends, you will not be identified in our reports.

\_\_\_\_\_ **I DO NOT WISH** to be identified as a source of information (do **not check** if you have no objection to being quoted).

YOUR NAME \_\_\_\_\_

COMPANY NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

TOWN/CITY \_\_\_\_\_ STATE \_\_\_\_\_ ZIP \_\_\_\_\_

**Manufacturers and Products We Rate HIGH for Prompt Warranty/Guarantee Repair, Replacement:**

Antennas: \_\_\_\_\_

LNAs: \_\_\_\_\_

Receivers: \_\_\_\_\_

Motor Drives: \_\_\_\_\_

Other: \_\_\_\_\_

**Manufacturers and Products We Rate LOW for Prompt Warranty/Guarantee Repair, Replacement:**

Antennas: \_\_\_\_\_

LNAs: \_\_\_\_\_

Receivers: \_\_\_\_\_

Motor Drives: \_\_\_\_\_

Other: \_\_\_\_\_

**The MOST Helpful Individual Supplier We Have Found Is:****The LEAST Helpful Individual Supplier We Have Found Is:****The MOST HELPFUL experience we have had concerning warranty or guarantee (explain):****The MOST AGGRAVATING experience we have had concerning warranty or guarantee (explain):****Soapbox (relevant comments):**



## CSD INDUSTRY PRODUCT QUALITY SURVEY

**Instructions:** Please complete this side of the form concerning **your field experience** with equipment performance (warranty and guarantees **aside**) ONLY IF you are an installer of TVRO equipment (i.e. an installing dealer). Note the very first line allows you to check off if you do NOT wish CSD to list you as a source of information. If you check this first line, your information will be held in confidence and while used in analysis of the industry trends, you will not be identified in our reports.

\_\_\_\_\_ **I DO NOT WISH** to be identified as a source of information (do **not check** if you have no objection to being quoted).

YOUR NAME \_\_\_\_\_

COMPANY NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

TOWN/CITY \_\_\_\_\_ STATE \_\_\_\_\_ ZIP \_\_\_\_\_

### Products Which We Presently Feel Are TOP PERFORMERS:

Antennas: \_\_\_\_\_

LNAs: \_\_\_\_\_

Receivers: \_\_\_\_\_

Motor Drives: \_\_\_\_\_

Other: \_\_\_\_\_

### Products Which We Presently Feel Are POOR PERFORMERS:

Antennas: \_\_\_\_\_

LNAs: \_\_\_\_\_

Receivers: \_\_\_\_\_

Motor Drives: \_\_\_\_\_

Other: \_\_\_\_\_

### Which Firm/Product Has The BEST Instruction Manual,

### Which Firm/Product Has The WORST Instruction Manual,

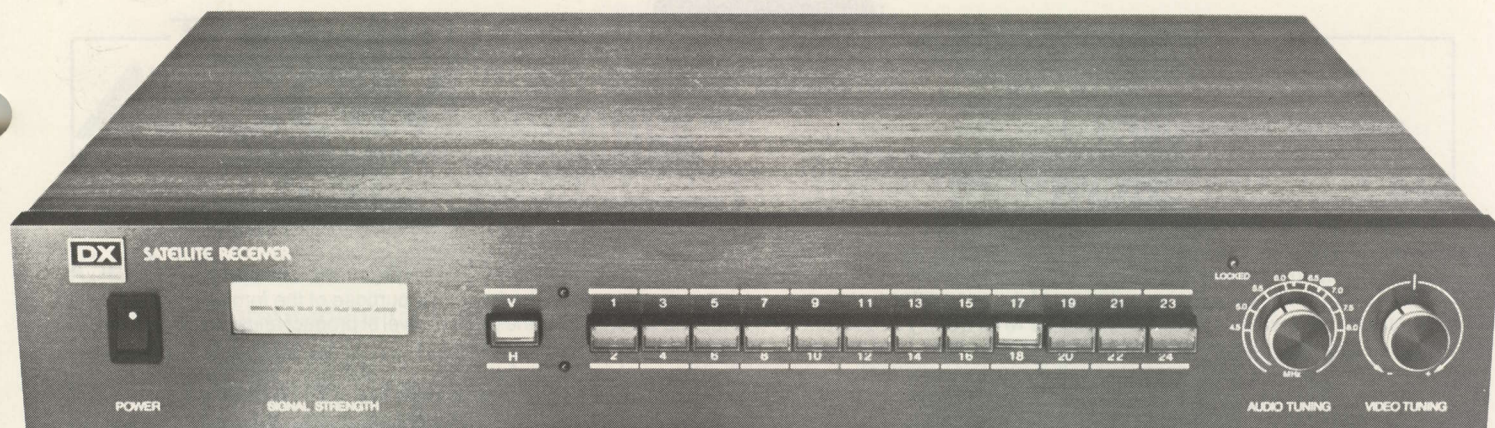
### Products We Will NOT Carry Because of Warranty/Guarantee Problems:

### What SINGLE Product Do You Feel The Industry MOST NEEDS?

### Soapbox (relevant comments):

Return this form before April 25th to: CSD FORUM, P.O. Box 100858, Fort Lauderdale, FL 33310





## Open New Doors in Multiple-Receiver Systems With the DX Receiver

Now DX Technology makes multiple-receiver mini-systems cost effective. The DSA 642 is a commercial quality satellite receiver that features dual, **block downconversion** through the DSA 541 down-converter. This makes possible interference-free reception in systems serving from 2 to 20 or more TV sets with one antenna. Furthermore with a coaxial switch it gives full 24-channel selection on each receiver.

The unit is housed in a handsome woodgrain-finish cabinet which measures approximately  $2\frac{1}{2}'' \times 17'' \times 12''$ . The large, easy to read signal strength meter, lockable audio tuning dial and video fine tuning dial give complete control and the "hi-tech" look blends attractively with the surrounding decor.

DX also provides line amplifiers, power dividers and other accessories compatible with the DSA 642 to complete the

system design.

DX, having pioneered the development of 12 GHz satellite reception, is one of the most respected names in satellite television reception systems in Japan and throughout the world. For more information, contact us today.

DX Marketing Group. C. Itoh & Co. (America) Inc., 270 Park Avenue, New York, NY 10017 (212) 953-5217. Manufactured by DX Antenna Co., Ltd., Kobe, Japan.





**Number five:** Protect yourself, as a dealer, at the consumer level. Insist on clear, plainly worded warranties from the manufacturer. When you complete a system, turn a copy of those warranties over to the consumer and explain that your warranty extends to the workmanship which **your firm** supplied; but, that the warranty for the products themselves are simply passed on, by you, from the original manufacturer. That will get you 'part way' out of the warranty loop if there should be problems. Make certain the customer understands what parts of the system (or what work) **you** guarantee, and which parts are guaranteed by the original equipment manufacturer. Some dealers even have this information in abbreviated form on the final 'customer acceptance form' which all dealers should have customers sign after an installation is completed. By signing their system acceptance form, the customer acknowledges by signature that they understand who is guaranteeing which parts of the system. That can save you a great deal of legal hassle later on.

**Number six:** Be totally familiar with your local and state 'retail protection codes.' If you have to engage a local attorney to prepare for you a list of what you can and cannot do to protect yourself from being totally responsible for the full performance of a system, do so. The \$200 legal fee will be far cheaper than running afoul of consumer protection regulations later on down the road. Incorporate

rate your own 'protection' into your 'system acceptance' form which the customer signs. That's your protection.

#### SURVEYING THE INDUSTRY

The entire area of product integrity and dealer satisfaction is largely uncharted. We don't, as an industry, really know how good (or how bad) the situation is. We intend to find out.

With this report is a two sided form. We ask that dealers and distributors complete the form. The purpose of the form is to learn as much as we can about the present level of product reliability, manufacturer integrity and responsibility.

We must have your identity with the form but there is a line provided where we will guarantee(!) that your material will be kept confidential and you will not be named in any subsequent written reports prepared for **CSD**. We intend to summarize all of the material, and to provide some analysis of general attitudes and trends of the major manufacturers, from the form-material returned. The better the response from dealers and distributors, the more accurate the analysis published. Since we will **all** profit from this knowledge, and it can save many of thousands of dollars to be pre-armed with this knowledge, we sincerely hope there is a 'high response rate' to the form.

Part two of this series will continue after there has been adequate time for the forms mentioned here to be returned, analyzed and prepared for print.

## HARRIS

## DELTA GAIN

#### BUILDING A BETTER Antenna

There has been plenty of talk of late concerning antenna performance and antenna system 'integrity.' Not all of that talk has been good.

Antennas are something of a mystery (see **CSD**, March 1983). They become even more mysterious when one attempts to increase their efficiency beyond the normal (and accepted) 55% efficiency factor. During the past 18 months, there **have been** improvements in antenna system efficiency. And when all of the various trade offs are considered, when you can get more gain out of an antenna of static size (i.e. by leaving the size alone, but improving the gain of the antenna), that may be a far better way of improving system performance than opting for a lower noise (and more expensive) LNA, or, by investing in a receiver which has better sensitivity but only at a trade off in cost.

There are two types of gain in a TVRO system. Neither comes easily, nor cheaply.

- 1) **Passive gain** . . . obtained without electricity, by the antenna reflector and feed. It is the gain of this portion of the system which you count upon to provide adequate signal to the electronic, or active part of the system.
- 2) **Active gain** . . . obtained with electricity. Both the LNA, and the receiver proper represent 'active gain.' LNA gain can be self defeating; i.e. you can use more gain/sensitivity to improve the picture **only as long as** the antenna passive portion is contributing more signal **than noise** to the receiver electronics. If the antenna/feed is picking up lots of noise, you soon reach a point where even a lower noise temperature LNA does not help the

performance of the system; the noise from the antenna literally 'drowns out' the low noise capability of the LNA.

Passive gain, done properly, is 'there forever.' Active gain is subject to your getting (and keeping) a good grade of LNA, a good grade of receiver. Active gain is subject to changes in electronic component values, as the units age. Passive gain is a secure gain. Active gain may be here today, and gone tomorrow.

This month **CSD** looks at three separate antennas, each of which clearly is a better-than-average antenna. Each achieves its superior performance because of the designer's attention to some detail in antenna design. None have been willing to compromise antenna performance for some cost cutting approach to save a few bucks in the manufacturing process.

#### HARRIS DELTA GAIN

Perhaps there has never been such a controversial antenna in the SMATV/TVRO field as the Harris Delta Gain 10 footer. It burst upon the scene just a year ago with an unusual amount of fanfare. Large, colorful brochures proclaimed that it was a world beater. There was an identifiable amount of product 'hype' associated with the introduction of the product and that hype shortly became ever 'bigger news' than the product itself. In fact, the sting of the hype outlasted the initial interest in the antenna proper, and perhaps with some justification, many of us dismissed the product because of the hype.

(The) Harris Corporation is one of the larger manufacturers of electronic hardware in the world. Their annual sales tops \$1,000,000,000 with ease. They have plants employing more than 25,000 people on four of the six inhabited continents. That fact alone

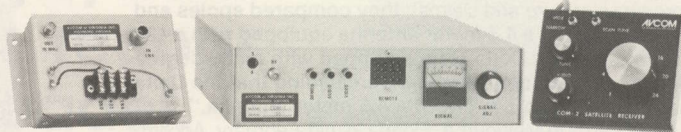


# AVCOM introduces

## 5 NEW High Performance Receivers!

### COM-2 • AVCOM QUALITY, VALUE AND VERSATILITY

- Comprehensive Remote Control—Always at your fingertips
- Hideaway Electronic Chassis
- Tunable Audio with wide & narrow IF switch
- Scantune
- Remote Downconverter



COM-2

## AVCOM BLOCK DOWNCONVERTER SYSTEM

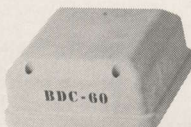
### For Cost-Effective Multi-Channel Installations

**COM-65**  
Semi-Agile Receiver  
with Unique  
Group Channel Selector



**COM-66**  
with Detented  
Channel Selector

**BDC-60**



- COMMERCIAL QUALITY
- DOUBLE CONVERSION
- HIGH STABILITY
- COMPATIBLE  
with SA's 6650 system
- FLEXIBLE DOWNCONVERTER—  
Use any degree & brand LNA
- Rack Mount, standard

# AVCOM

Everything you need  
for your complete  
Satellite Earth Station



Dealer Inquiries Invited

See your  
AVCOM dealer

# AVCOM

OF VIRGINIA INCORPORATED

500 Research Road • Richmond, VA 23236 • 804/794-2500

### People Are Asking . . .

LNA/Downconverter (LNC)

vs.

Separate LNA & Downconverter?

1. The separate downconverter allows use of any noise temperature and brand LNA, resulting in easy system upgrade and repair.
2. With separate LNA and downconverter, additional receivers can be added for system expansion.
3. The tunable oscillator in an LNC is exposed to extreme temperature changes at the focal point of the dish. Result—a tendency to extreme drift.
4. When the "L" in your LNC fails, you're up the creek!



suggests that there may be more to the 'Delta Gain' than pure hype. Had the initial claims of the Delta Gain antenna come from someone of lesser stature, it is doubtful more than a handful would have shown any interest at all.

Initial product announcement for the Delta Gain made certain claims which, in retrospect, many of today's Harris people associated with the product line wish had not been made. **John R. Todd**, Director of Product Engineering for the Satellite Communications Division makes the observation "There is one thing which I do regret (about the early product literature and claims); they compared apples and oranges. We compared a 4.5 meter antenna equipped with a 120 degree LNA against the Delta Gain equipped with an 80 degree LNA . . . and all of a sudden people were claiming that the Delta Gain 3 meter was the equivalent of a 4.5 meter antenna."

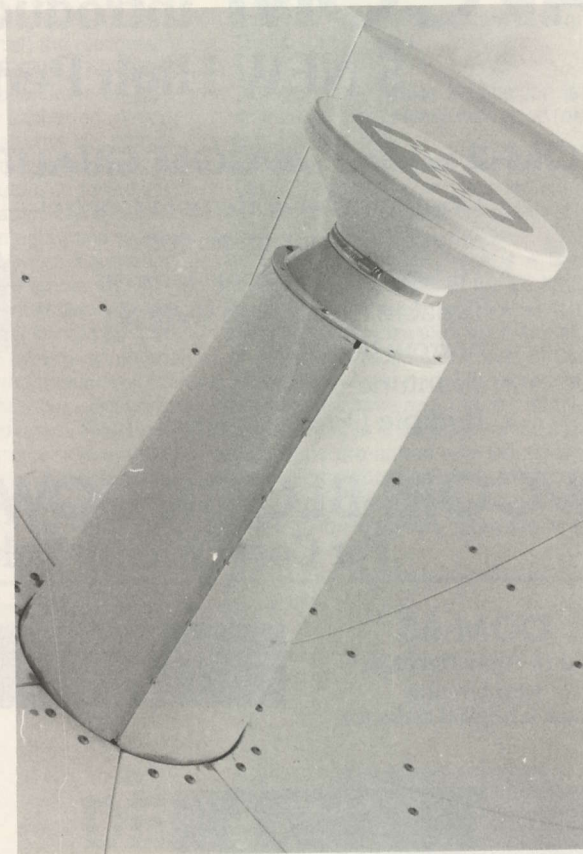
CSD visited Harris in Melbourne, Florida in mid-February. Accompanied by **Bill Heavener** of Patmar Technologies and **Tom Harrington** of Universal Electronics, we wanted to discuss the entire Delta Gain project since word was then leaking out that a new 4.5 meter as well as a 6.1 meter Delta Gain antenna were coming soon. Heavener has installed more than a few of the Delta Gains, at locations as remote as Trinidad in the southeastern Caribbean, and if there is a savvy Delta Gain user in the industry today, Heavener is that guy. Harrington hoped the Harris visit might allow us the opportunity to 'look inside' of some of their radio network fed-by-satellite hardware. Harris has recently contracted to deliver more than 1,000 of the 3 meter Delta Gain terminals to a major news wire service supplier, for feeds to their affiliate radio stations, and the hardware associated with the 'active' part of the installation fascinated him.

Back last fall, late in October to be precise, CSD also installed one of the Delta Gain 3 meter antennas on Providenciales. Since that time we have carefully weighed its performance against a number of antennas, using a variety of LNAs, and by the time of our visit we had formed some opinions about what we saw, and measured.

Harris suggests that the efficiency of their Delta Gain antenna is far more than the 'typical 55%' primarily because of their approach to the feed system, and some minor (but very important) shaping of the reflector proper. **Dr. Raj K. Chugh**, Associate Principal Engineer for the Satellite Communications Division, gets the credit for the innovation in the feed structure and the reshaping of the dish.

Todd explains:

"Dr. Chugh began modeling of the antenna more than 2 years ago. You begin with a concept of making changes in the antenna's feed system. This simply means that you sit down with a sophisticated computer and a concept and you tell the computer what you want the antenna to do. Then the computer, using a program created by Dr. Chugh, began to tell Dr. Chugh what the limitations were, and where he would have to change the antenna's design in order to achieve the efficiencies he wished to



**DELTA GAIN feed structure is sheltered from direct view by the housing that marries the sub-reflector to the container that both supports the sub-reflector and houses the LNA/LNC package.**

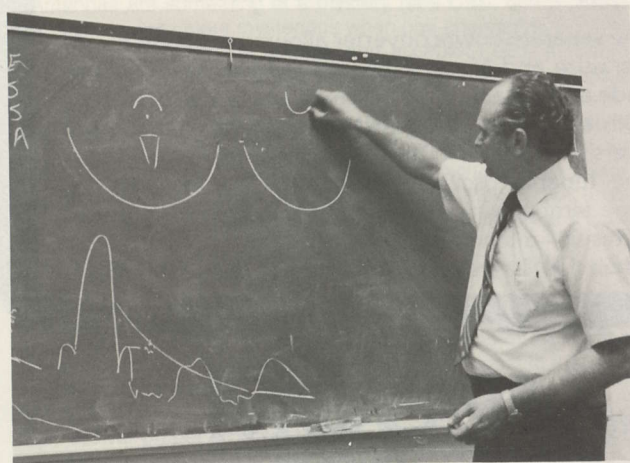
achieve. Six months after the computer modeling began, Dr. Chugh was making his first 'foam' models. It took another year to get the antenna into production."

Harris wanted an antenna that would exhibit reception efficiencies in the 70 percentile region. They also wanted an antenna that would function in a satellite to satellite 2 degree spacing environment, if the FCC adopted that spacing. Finally, they wanted an antenna that had more than the usual rejection of noise from sidelobes. And 12 GHz. Yes, the dish needed to have surface accuracies which would allow it to function at 12 GHz with high efficiency as well.

To control sidelobes (extraneous pickup by the antenna feed, from the ground surrounding the antenna, and from satellites parked as close as 2 degrees away in the sky), a standard cassegrain feed did not seem to be the answer. A properly designed **prime focus** feed antenna could deliver first sidelobe 'nulls' on the order of 25 dB below the main lobe, while a standard cassegrain feed was doing well to attenuate the first sidelobe by 15 dB or so. Yet the better gain (efficiency) was clearly on the side of the 'cassy' antenna. The trick was "how to modify the cassy feed to maintain the gain of the cassy but also pick up the pattern improvements of a good design prime focus antenna"! The 'game' got tougher when you moved the satellite to satellite spacings from 4 degrees to 2 degrees.

The **theoretical** antenna to do this had been known for sometime. It apparently first came to the surface in the 1950's when some microwave researchers at MIT (Massachusetts Institute of Technology) were looking for 'the perfect' microwave antenna. Unfortunately, they kept stumbling over a real world problem; "phase errors."

Phase errors are a no-no. They occur when signal captured and reflected by one portion of the reflector / sub-reflector combination arrive at the feed with some 'time differential' from signal captured and reflected by other portions of the dish. For all of the signal to arrive at



**HARRIS'S JOHN R. TODD, Director of Product Engineering for the Satellite Communications Division outlines the four principal types of parabolic feeds.**



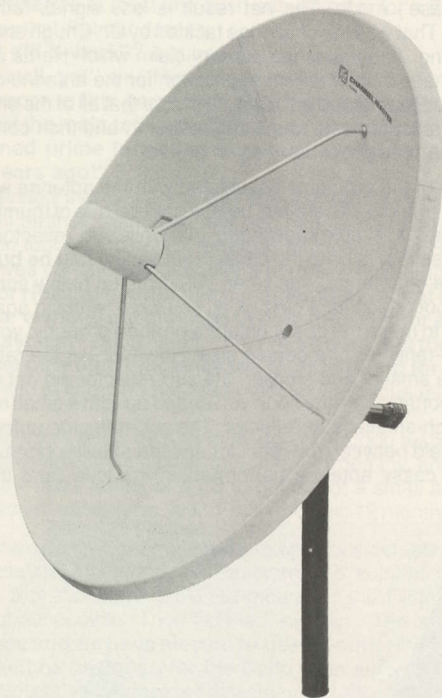
# \$2995

retail

**At last, the price barrier is broken on a quality system from a consumer recognized TV industry leader.**

Channel Master invites you to ride the leading edge—risk free! Our distributors are ready right now with in-stock equipment at a revolutionary new low price that brings the cost of satellite reception down to earth for thousands of new sales prospects. If you thought selling satellite was beyond your limits, take a look at these benefits Channel Master offers you!

- Fantastic New Low Price • Brand Name Recognition • State-of-the-Art Equipment • Local Distributor Inventory • No Initial Investment • Expert Technical Assistance • A Total System Warranty



The Channel Master Satellite Receiver provides the viewer with complete video and audio control with such advanced features as: • Automatic Polarity Switching • Signal Strength and Fine Tune Meters • Priority or Variable Audio Tuning • Built-In Switchable Modulator • Channel Scan • LED Digital Channel Display • Optional Remote Control

The optional SATSCAN™ remote dish control lets viewers re-aim their antenna at different "birds" automatically, with just a push of a button, from inside the home!

Add the Channel Master Satellite Stereo Processor and optional remote receiver control and you have a full feature system capable of satisfying even the most discriminating customers.

Donald Berg, Channel Master, Division of Avnet, Inc.,  
C483, Ellenville, New York 12428 (914) 647-5000

Tell me more about the CM Satellite Sales System

NAME \_\_\_\_\_

BUSINESS \_\_\_\_\_

ADDRESS \_\_\_\_\_

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

ZIP \_\_\_\_\_

PHONE ( ) \_\_\_\_\_  
Area Code

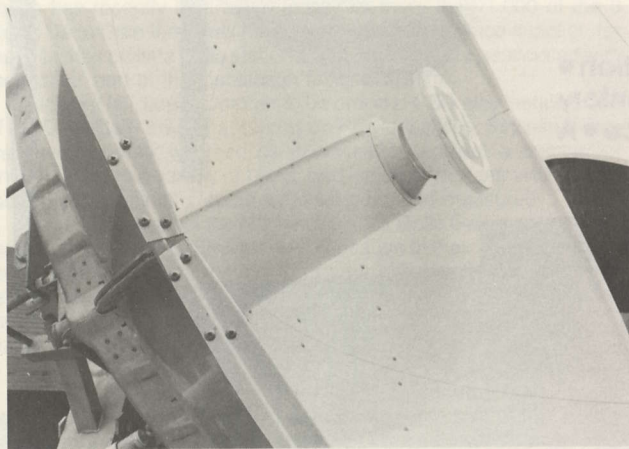
**SPACE**  
The Voice of the Satellite  
Earth Station Industry

**Channel Master®**  
Division of Avnet, Inc., Ellenville, New York 12428



the feed 'in phase' is important since only those signal parts that are 'in phase' will add up (to more signal). Those parts that may arrive 'out of phase' actually work against, or cancel some of that arriving in another ('in phase') mode. The net result is less signal, rather than more signal. That was the challenge tackled by Dr. Chugh and his computer modeling. And that is the primary claim which Harris and Dr. Chugh have made in their patent application for the antenna design. Simply said, Raj has figured out a way to insure that all of the energy captured by the reflector, sent to the sub-reflector, and then concentrated into the LNA feed probe, arrives 'in phase.'

One of the problems associated with the antenna was the size of the sub-reflector. There has been a general rule of thumb, based upon decades of available knowledge, that while sub-reflector fed antennas (i.e. those that fall into the cassegrain family) **can be built** for virtually any size of antenna, that when you dropped below something in the 13/14 foot region for 4 GHz work, you were 'working against yourself.' That is, to make the cassy antenna perform properly, you had to make the sub-reflector of a certain size. However, as the reflector surface became smaller and smaller, the sub-reflector did not reduce in size proportionately. Pretty soon you ended up with a small reflector, and a not-much-smaller sub-reflector. The sub-reflector, unfortunately, acts as a shield between the reflector and the satellite signal and what you gain in cassy antenna performance you lose (and then some) by



**DELTA GAIN** edging is part of the reflector surface 're-shaping' created by Raj's computer program to combine maximum gain, best pattern and minimum response to birds at 2 degree spacing.

blocking part of the satellite signal away from the reflector surface with the 'oversized' sub-reflector.

Dr. Chugh: "Our sub-reflector represents a 10% blockage of the dish surface. That is not inconsequential. However, had we followed standard and accepted cassegrain sub-reflector practices, the sub-reflector would be blocking 22% of the dish surface. That was clearly not acceptable."

How important is the 10% blockage? It is, afterall, equivalent to losing 10% of the dish surface area; and the center or hot ten percent at that.

One way to look at it is to suggest that when you have a 10 foot dish with ten percent blocked by the sub-reflector, you now have a 9 foot reflector to work with. Obviously a 9 foot surface is not going to work as well as a 10 foot surface. But, if you increase the efficiency of the feed, and also in the process reduce the amount of noise received by the antenna from undesired sidelobe pick-up, you actually could land out in front of a highly tuned 10 footer, by comparison. That was the goal of Dr. Chugh. He notes:

"There is a practical limit, with this approach, to making the sub-reflector any smaller than the equivalent to 8% blockage of the surface. In fact, between a sub-reflector tuned to work with this surface that blocks 10% of the surface, and a sub-reflector tuned to work with this surface but blocking only 8% of the surface, we have a cross over point. The currents appearing on

the edge of the sub-reflector become a problem. We had to control those currents if we wanted the antenna to perform properly."

The sub-reflector is not new to most in the industry. The Luly collapsible antenna has been utilizing such an approach since the July of 1980 SPTS show in San Jose, California. More recently, Chaparral has introduced a series of 'back fire' feeds, using a sub-reflector in place of the normal prime focus feed. The Delta Gain sub-reflector differs, however, in shape and contour from others we may be familiar with.

Harris is, understandably, reluctant to discuss just exactly where they have made changes to create a better feed system. They allude to having refined the shape of the reflector itself. A number of people have taken one of the Harris ten foot antenna sections and carefully plotted the parabolic curve against the surface before them. They typically will 'miss' where the refinements are. Dr. Chugh and John Todd know where they are; but they aren't talking.

It may be easier to visualize what is happening with the feed if you keep in mind that Dr. Chugh's feed is more than just a **little** unique. It has (see drawing) a protruded 'tip' in the center and a carefully computer modeled curve over the full surface. It does more than 'look into' an LNA cavity. It has become, as Dr. Chugh explains it, virtually a part of the LNA cavity.



**DR. RAJ K. CHUGH**, Associate Principal Engineer for Harris Satellite Communications Division explains the intricacies of edge currents on a sub-reflector member.

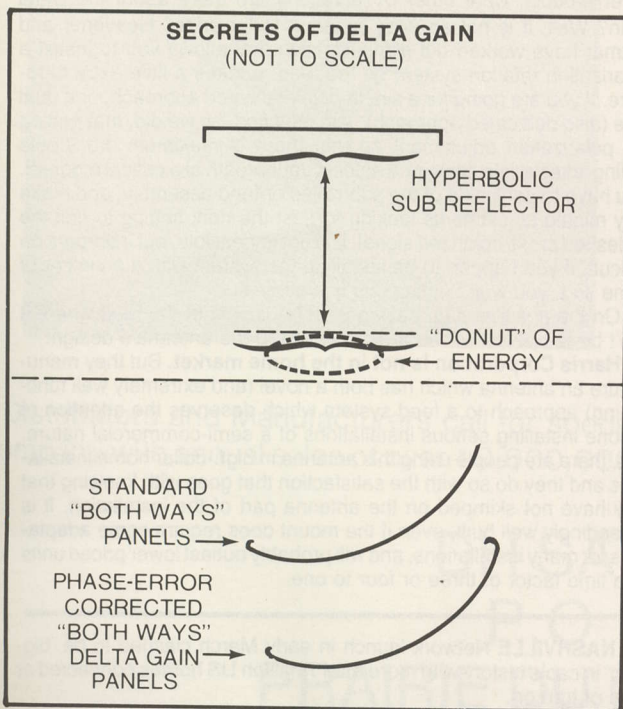
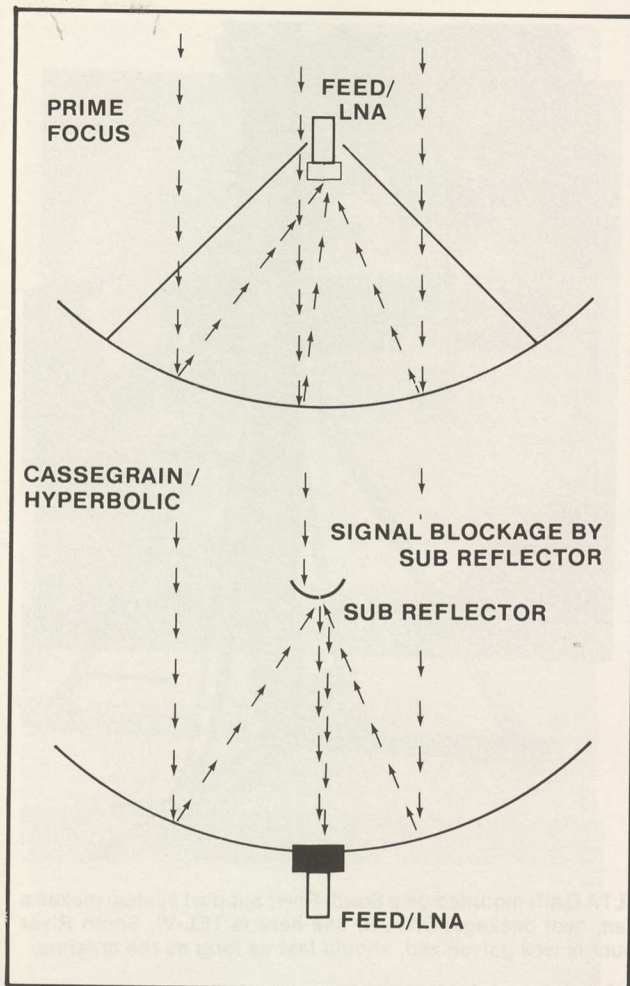
Equally important, for purposes of reducing the possible ill effects of the sidelobe energy from the ground below and behind the dish, is the slightly out-of-parabolic curve **edges** on the dish; **the very outer edges**. If you will stand back and look across the antenna, you can almost visualize a 'shroud' along the edges. A shroud is an interference combatting scheme created many years ago for prime focus antennas. An outer wall of metal is placed around the outer lip of the dish to act as a 'wall' against any terrestrial interference that might try leaking into the dish surface proper. It might be hard to equate the gentle lip around the outer panel sections to a 'shroud' but there is the unmistakable control of antenna 'noise temperature' with the dish (plus feed) nonetheless.

If the antenna is really better (we'll save 'than what' for a tad later), isn't Harris concerned about others copying their feat? John Todd smiles.

"Everybody does a fair amount of reverse engineering. Yes, we buy all of the products that we consider competitive, take them apart to see what makes them tick, and then put them back together and analyze the performance. Our Delta Gain is the first of this technology. Between our patent (pending), and our legal department, we intend to make it as tough as possible on those who might try to copy us."

Bill Heavener pointed out that since the Delta Gain got out of the 'hype stage' and into the field there has been a new interest on the part





of many SMATV/private TVRO antenna manufacturers to try the sub-reflector approach. He also noted that his firm has been approached to analyze at least one such sub-reflector for a Prodelin 10 foot antenna that Patmar carries.

"How well did it work?" inquired Todd.

"Not very well, yet" was Heavener's response.

"There is more to this game than sticking a sub-reflector out there in front of the main reflector. If that was all it took, we would have abandoned prime focus fed antennas in the 15 foot and down class years ago!"

Coop suggested that while some of the early trials may not be working as well as their manufacturers had hoped, he had recently witnessed a ten foot prototype at Hero Communications in Hialeah, Florida which was certainly a cut above a normal 10 footer in South Florida. "Taylor Howard has spent a considerable amount of time with Bob Behar working out changes in both the reflector and the sub-reflector system" Coop noted. "I'm not so sure that the Delta Gain will be the only high efficiency ten footer around for long." Dr. Chugh wanted to know whether the reflector was 'unusual' in any way.

"If it is, you can't tell it by just looking at it" Coop responded. Everyone agreed that competition in antennas was healthy, and that if there were a few more tenths of a dB to get out of a small antenna surface, they would probably be 'found' over the next 12 months or so.

The antenna's performance aside, there was considerable discussion on the merits of the antenna structure and support system. Heavener felt that the Harris provided mount for the Delta Gain 3 meter was not acceptable. Todd listened intently. "The mount is awkward to use and we have elected to use a South River mount which we asked be designed for the Delta Gain antenna." Up to this point Harris has virtually insisted that anyone buying their antenna also buy their mount. It 'comes as a package,' Todd explained, 'Would Harris either redesign the mount, or, allow distributors to buy the antenna (plus feed) alone?' Heavener wondered. "We'll consider that" Todd responded.

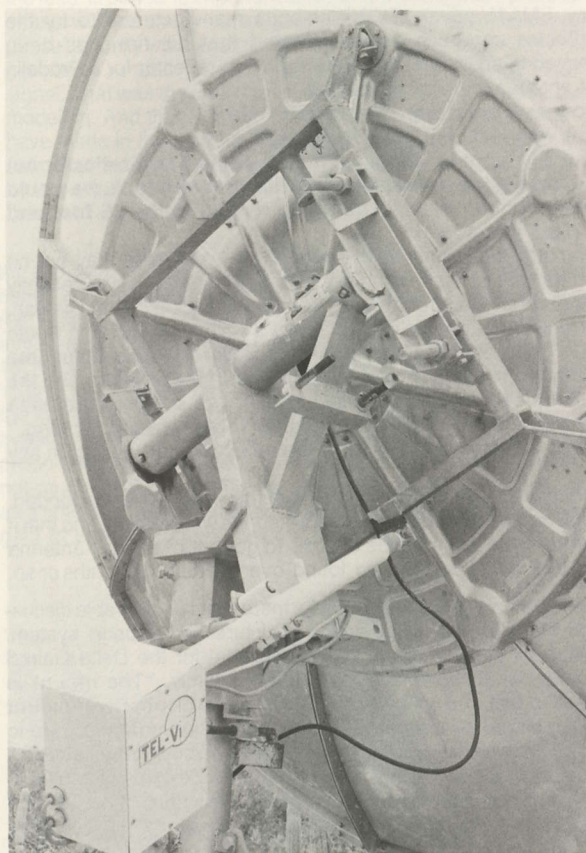
As we learned with our Delta Gain test installation in the fall, the Harris antenna goes together with greater precision, perhaps, than any other TVRO antenna we have ever assembled. Todd. "We started off with a production model accuracy of 16 thousands. Our routine production antennas are now accurate to 24 thousands." Heavener noted that you may have to use a center punch to get the screws in place. "It is certainly done to very close tolerances" he added. Todd amplified on the close surface accuracy. "Some of our very large (60 foot) Ku band antennas are assembled with a theodolite measurement tool and we strive for 21 to 22 thousands accuracy. Getting comparable accuracy, for a 4 GHz surface, is certainly one of the keys to our achieving high surface gain. Plus, it makes the antenna very usable at 12 GHz (Ku band) as well."

As you might guess, the Harris Delta Gain is not an inexpensive antenna. There will undoubtedly be those that attempt to copy the performance at a lower price. Todd again: "We are not trying to address the home market. We believe there is a substantial market right now for ARO (audio receive only) and SMATV antennas in the semi-professional class. I'm afraid that I would hear from Corporate headquarters in a hurry if they saw us drifting after the home marketplace. We were able to recently pass the 1,000 antenna point in units shipped. That allowed us to break even on the tooling for the project. Now we are working on recapturing the cost of R and D. This is an antenna that will be in the line for a long time to come; we see many, many new markets for it."

What type of new markets?

Well, there is a project currently being pushed by Comsat; the creation of some 'low cost' single channel telephone terminals for remote areas such as the Pacific Islands. This would most probably be a 12 GHz (down; 14 GHz up) system, although there is a push on at the present time to prove it at 4/6 GHz first. Harris is working on a 'wide band polarizer' which would allow a single Delta Gain dish to be used for 4 GHz single channel telephone receive and 6 GHz single channel telephone transmit. With new ten watt per carrier solid state, GaAs-FET 6 GHz transmitters now becoming available, the real world is suddenly aware that you could indeed plop down a ten foot antenna





**SIDELOBES** — meeting FCC requirements for 2 degree spacing was a design objective of the Delta Gain antenna series. Ahead, a 4.5 meter and a 6.1 meter version.

and a small container of electronics on a remote island and deliver instant inter-connect into the world's telephone network from virtually anyplace in the world. Harris intends, with the Delta Gain program, to be a part of that process.

Ahhh yes. But how well does the antenna perform in 4 GHz TVRO receive service?

Our first discussion of the Delta Gain, nearly one year ago, was primarily concerned with the 'equivalent to a 4.5 meter hype.' That is an issue now resolved. Todd 'regrets' the approach taken by a former company marketing type, and that is that.

**Is it as good as a 4.5 meter antenna? No.**

How about a 3.7 meter? Yes, it is. As good as a good quality 3.7 meter, at that.

**The Delta Gain is decidedly a 'quiet' antenna.** That means you can tell that it is not contributing much in the way of 'earth' or 'sidelobe' noise to the picture plus noise equation. That's good. We worked with it down to look angles in the 17 degree region (not as low as New England to F3R, but getting there) and were impressed. With some antennas, such as a straight ADM 11 footer, you can see the effects of earth or sidelobe noise as you get down below 20 degrees look angle. You can tell that birds of comparable footprint power don't "look as good" at low look angles as they do at higher look angles. This is not the case with the Harris Delta Gain 10 footer; and Bill Heavener who has installed the same antenna in the eastern Caribbean with look angles in the 10 degree region substantiates that observation.

How does it compare for gain? Very closely to a finely tuned 13 foot ADM. That is both a measurement statement, and, a subjective 'look at the picture' observation. In all honesty it is virtually impossible to tell the two apart when both are on the same bird at the same time, swapping electronics back and forth. So what is it not-as-good-as? In the same size class, it is going to average about 0.5 dB lower gain than say the Paraclype 12 footer, which we also look at here this month in



**DELTA GAIN** mounted on a South River support system makes a clean, neat package. Drive in use here is TEL-VI. South River mount is well galvanized, should last as long as the antenna.

the following report.

Other than the mount, which can be solved by purchasing a South River product, what other observations are there about the Delta Gain? Well, it is not an easy antenna to 'polarize.' Heavener and Patmar have worked out a modification that allows you to install a polarization rotation system on the feed. It takes a little extra hardware. If you are going for a single pole dedicated approach, or a dual pole (also dedicated approach), you may find, as we did, that getting the polarization adjustment so that there is maximum cross-pole nulling takes a little doing and holding your breath at a critical moment. You have to get inside of the sub-reflector/feed assembly, and make very minute adjustments looking for just the right setting to null the undesired cross polarized signal. It is not impossible, but it borders on difficult. If you happen to be installing the system with a polarizer of some sort, you won't notice this however.

On the positive side, having the LNA inside of the feed where it can't be tampered with is a nice benefit to the antenna's design.

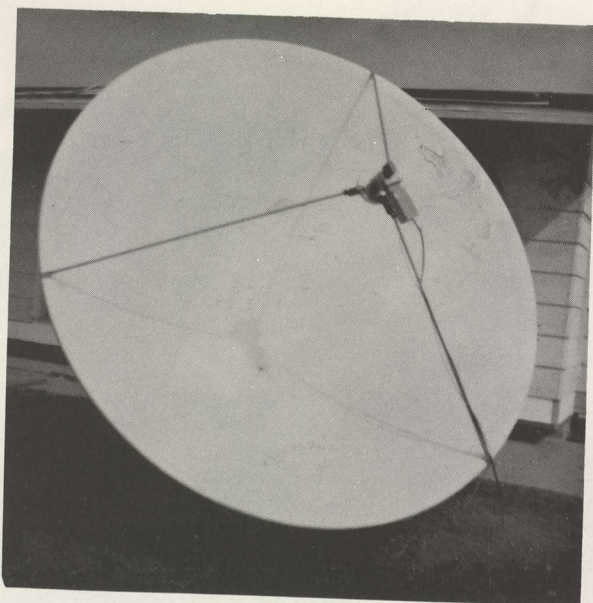
**Harris Corporation is not in the home market.** But they manufacture an antenna which has both a novel (and extremely well functioning) approach to a feed system which deserves the attention of anyone installing serious installations of a semi-commercial nature. Yes, there are people using this antenna in high-dollar home installations and they do so with the satisfaction that goes with knowing that they have not skimped on the antenna part of the installation. It is exceedingly well built, even if the mount does require some adaptations for many installations, and will probably outlast lower priced units by a time factor of three or four to one.

**NASHVILLE** Network launch in early March claimed to be 'big-gest' in cable history with more than 7 million US homes connected at time of turn on.

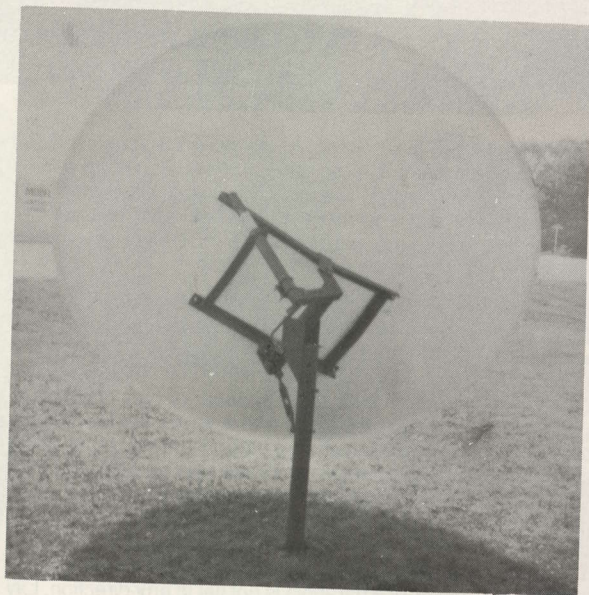


# SPUN PARABOLIC ANTENNAS

Because of the precision spin process our Parabolic Antennas are more accurate for more efficiency.

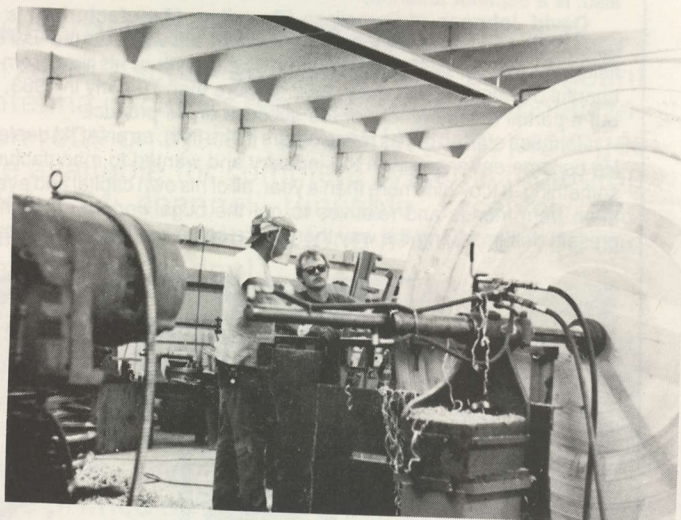


Well engineered Polar Mount



Manufactured in volume by the efficient Spin Process for more accuracy. 9' Antenna will out perform many 10' and 11' Antennas. Easy to haul, install and adjust. The efficiency of our Antenna allows a smaller antenna to work better. The smaller size is more acceptable in a home owners yard.

9' ALUMINUM  
9' STEEL  
8' ALUMINUM



The most respected names in commercial antennas are made by the Precision Spin Process. Our Antennas have been used commercially in cable systems and by a TV station for Rebroadcast.

Distributors and Manufacturers call for special prices. Our Company is a 17 year old Manufacturing Company with annual sales of over 10,000,000 in other products.

DH SATELLITE TV  
P.O. BOX 239  
PRAIRIE DU CHIEN, WI 53821  
PH (608) 326-6705



## PARACLIPSE

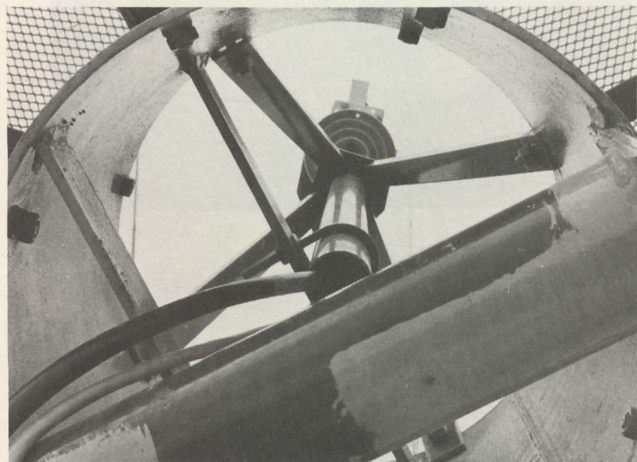
## 12 FOOTER

### PARACLIPSE 12 FOOTER

One has to only look at the Harris Delta Gain ten footer to recognize that it is not your average TVRO antenna. A quick glance at the Paracclipse 12 footer, however, reveals very little about the reason it, also, is a superior antenna.

**David Johnson** of Paracclipse (**Paradigm Manufacturing**) is a quiet, unassuming young man who worked his way into the TVRO field from the two-way radio industry. The growth of his firm, from a handful of employees in early 1982 to more than 70 early in 1983, is but a partial measurement of the success of his product.

Johnson started out as many others in the field; as an ADM dealer. He became entranced with the industry and wanted to manufacture something. It took him more than a year, all of his own capital and even more from friends and relatives to get the bugs worked out of his present design. Along the way there were some key people who had



enough faith in his product concept to put up some much needed investment capital at some critical points in time. Paradigm almost wasn't. But David stuck with it, and finally licked his design and production problems and now from the unlikely spot of Redding, California his firm turns out one of the best performing home TVRO antennas in the industry today.

To understand why the Paracclipse performs a cut above the average, you have to understand why many others do not. It has to do with maintaining a parabolic shape.

The fabled 'parabolic curve' is three dimensional. You can draw a circle on a flat surface, such as a sheet of paper or on a floor. It has height, and width (the two are the same with a circle). But that is not a parabolic. What separates a circle from a parabolic is the 'depth' of the product. That may be overly simplistic for the mathematicians in the crowd but even they'll have to admit that it is accurate, as far as it goes.

A parabolic antenna is a parabola. And a parabola . . . is:

**"... the curve formed by the edges of a plane cutting through a right circular cone at an angle parallel to one of its sides . . ."**

A 'section' or a 'piece' of a parabola is not flat in **any** direction. Lay a straight edge across it, and it will curve under the straight edge. Lay a straight edge lengthwise (long wise) across a section and the parabola will curve under it.

If you want to give antenna suppliers fits at the next industry trade show, walk around with a yardstick and lay it across panels or portions of panels on their antennas. Then stand back with your chin cupped in your hand studying the yardstick muttering 'Hummm.' Every now and again add a HUMMM for emphasis. Then pick up your yardstick and wander off, saying not a word.

In the trade, we talk about antennas being 'parabolic one-way' or, 'parabolic two-way.' That's like saying red is white because either the surface before you is parabolic **ALL** ways, **or**, it is not parabolic at all. Many antennas are, nonetheless, parabolic in only one direction; that's from the center of the dish to the edge of the dish. They are not





# ANYWAY YOU LOOK AT IT...

## ADM HAS YOUR ANTENNA!

**AND YOUR TVRO SYSTEM.** Rapid delivery on ADM's super-efficient 11 foot polar mount antenna (includes remote controlled polarization rotation system as well!), plus, packages are available for complete systems including LNA, 24 channel tuneable receiver and cabling. Why wait in a long line when you can get the best, today!

**A SUPER TVRO ANTENNA SYSTEM.** High quality panelized aluminum 11 foot dish and steel polar mount. Dish weighs approximately 200 pounds, mount 265 pounds. Precision designed, easy installation, zinc chromate base primed and heavy duty white top finish. The rotating feed is standard! Easily shipped and installed. Choice openings for dealers and distributors.

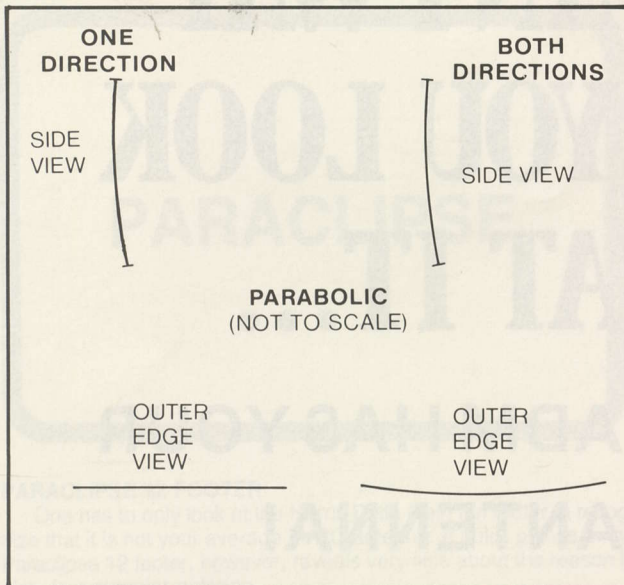


**Antenna  
Development &  
Manufacturing, Inc.**

P.O. Box 1178  
Poplar Bluff, Mo. 63901  
(1-314-785-5988)







parabolic around the dish, or across the dish at an angle.

There is a further definition for a parabola. It is:

**"... the locus of a point moving in a plane so that its distance from a fixed point (focus) and a fixed straight line (directrix) are equal ..."**

That says that if you are at the precise focal point of a parabola, you should be able to measure from that point to any other point on a circle drawn on the parabola's surface an equal distance from the center, and measure the same physical distance.

If a satellite receiving dish is assembled from any number of independent, parabolic in one direction only (and flat in the opposite direction) panels, there is no way for the dish surface to be parabolic. It can come close, but it cannot be a parabolic because the distance from the **edge** of a flat (short way across) panel or section is going to be further from the focal point than the center of a flat (short way across) panel or section.

Now, what is the penalty when a 'parabolic dish' is assembled from **a series of flat-in-one direction** and parabolic-in-the-other direction panels? The answer comes down to how much 'out of parabolic' the

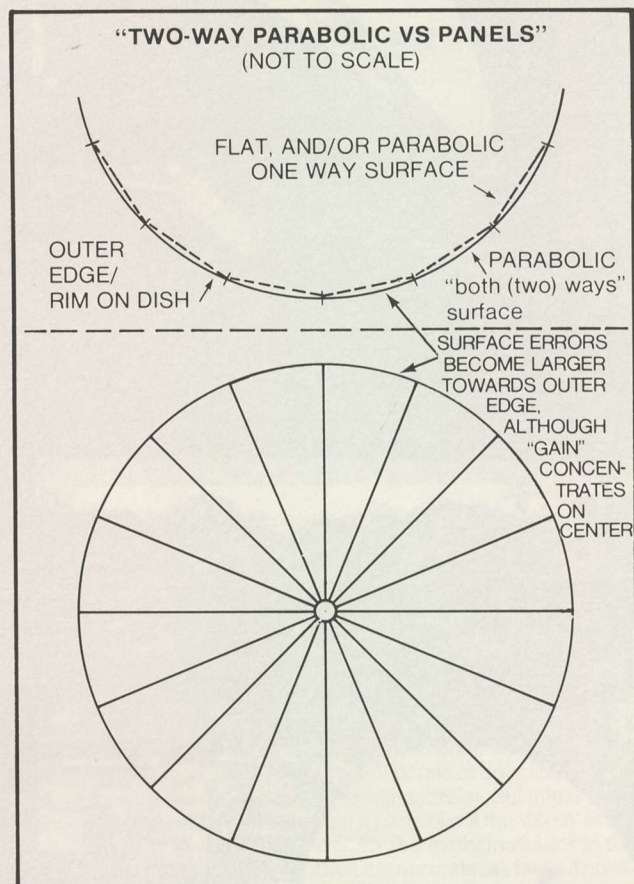
dish is, when the panels are used.

Since there are four 'quadrants' to our circle, we could attempt to make a 'dish' out of four flat sections, curving our piece of metal in only the long direction. It would function more like a 'horn' antenna than a parabolic antenna, but it would work. After a fashion. Four, then, is the smallest number of panels we can use to create a four sided or four quadrant 'dish.' It wouldn't work very well.

So we decide that if four won't function very well, we will have to go for a bigger number. How about 8? Or 16 or 32?

At some number we find that the deviation from a parabolic curve, or the distance from a parabola curve to the straight edge line drawn across the curve, is getting pretty small (**see diagram here**). In fact, it gets small enough at around 24 panel sections for a twenty foot dish that the performance of the dish, in theory, is but 0.5 to 0.7 dB **less than** a dish formed by some technique that has the dish surface curving as a parabola in 'both planes' at the same time.

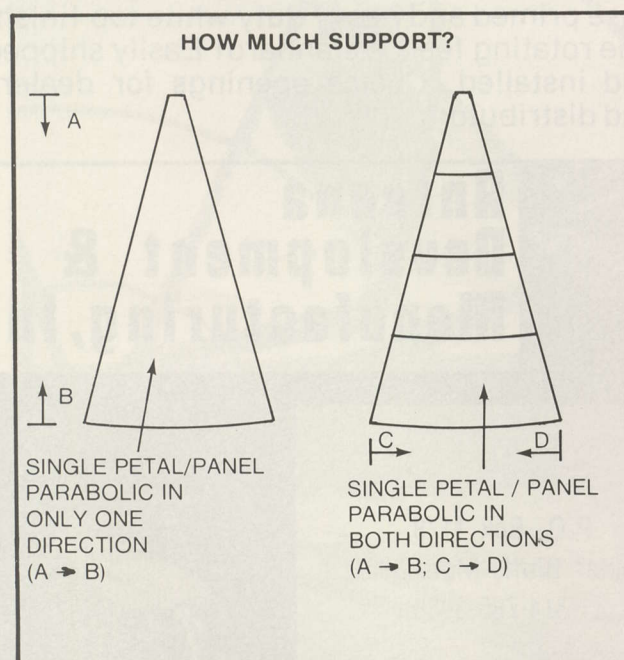
Hard, solid metal can be formed with a press or mold or forming jig



so that it 'curves' both ways at the same time. A petal for a solid metal dish can do anything, or almost anything, the designer wants. A dish created from pie shaped sections of mesh does not have that luxury. A pie shaped section of a dish is two-dimensional. It is designed to ship **flat** and it cannot be 'formed' so that it has a 'two-way-curve' in advance of shipping.

That forming can only take place in the field, as the expanded-extruded mesh section is placed on the dish support structure. How the support structure is designed, the number and location of the points where the mesh material attaches to the support structure, determines how closely the panel 'section' comes to falling on or within tolerable limits of the parabolic curve.

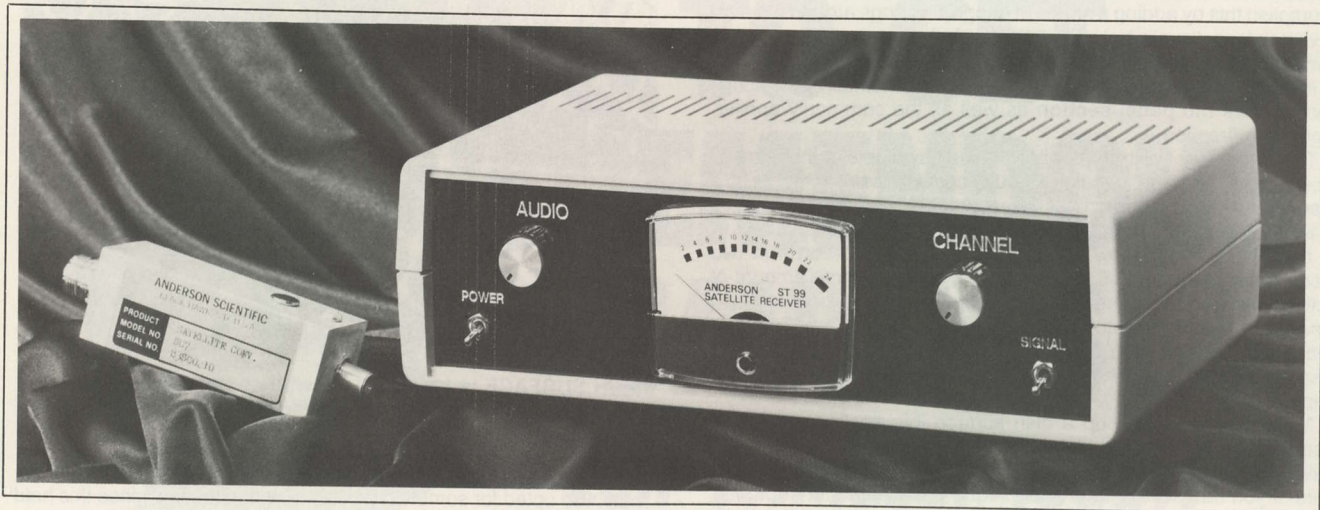
There is nothing terribly ingenious, or even outwardly clever about the Paraclipse antenna. What designer Johnson and crew have done





# ANDERSON SCIENTIFIC ANNOUNCES

## THE WORLD'S MOST VERSATILE SATELLITE RECEIVERS



Models SC7 Block Downconverter and ST99 Satellite Receiver

The Anderson ST99 and ST100 satellite receivers are the first receivers enabling truly low cost, simple, multiple television systems. Capabilities include:

**NEIGHBORHOOD COST-SHARING** Neighbors, or an entire neighborhood, can share a single antenna, LNA, and block downconverter. Each home has a receiver capable of independent channel selection.

**MULTIPLE TELEVISIONS** Several televisions within the same home can each be provided with receivers capable of independent satellite channel selection.

**MULTIPLE UNIT BUILDINGS** Each unit in a multiple unit building can be provided with a receiver capable of independent channel selection. Satellite signals are distributed throughout the building with conventional UHF MATV equipment.

**UNIQUE, BLOCK DOWNCONVERSION** All satellite channels are simultaneously downconverted to UHF frequencies. 12 or 24 channels can be provided simultaneously to multiple televisions.

#### MODEL ST99 FEATURES:

- Built-in Modulator
- Fixed and Tuneable Audio
- Dual Purpose Channel Select and Signal Strength Meter
- Wide Range AGC
- Built-in AFC
- Narrow or Wide IF Bandwidth
- Dual Conversion
- Cool, Long Life Circuitry
- DC Power Option

• DEALER PRICE: **\$350**

#### MODEL ST100 INCLUDES ALL ST99 FEATURES PLUS:

- Channel Scan
- AFC Deactivate
- Subcarrier Output
- Remote Meter Output

• DEALER PRICE: **\$450**

#### SC7 BLOCK DOWNCONVERTER

- Downconverts all satellite channels simultaneously to UHF

• DEALER PRICE: **\$ 190**

**ANDERSON SCIENTIFIC**

P.O. Box 800, Black Hawk, S.D. 57718

**605-787-4224**



## PARACLIPSE CONTINUED/ from page 34

is to not forget the basics. They have attempted to maintain the dish surface 'within the parabolic curve limits' as closely as possible. They accomplish this by adding a series of supporting rings around the dish at five points, or 'levels' between the inner hub center and the outside perimeter. These additional 'support rings' provide a place to attach the mesh surface, drawing it down in an effort to maintain a parabolic curve **across the panel section** as well as the commonly applied lengthwise direction.

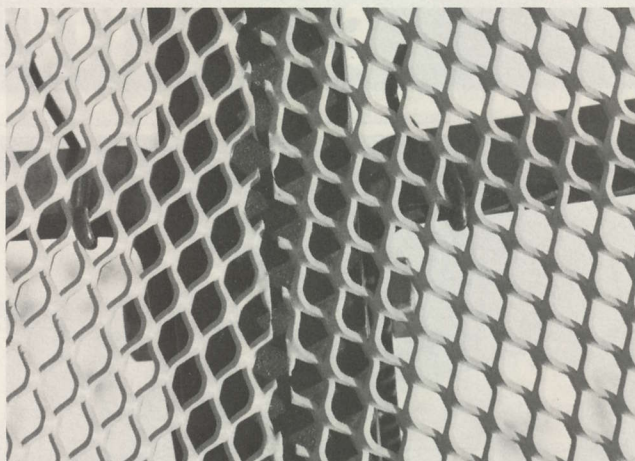
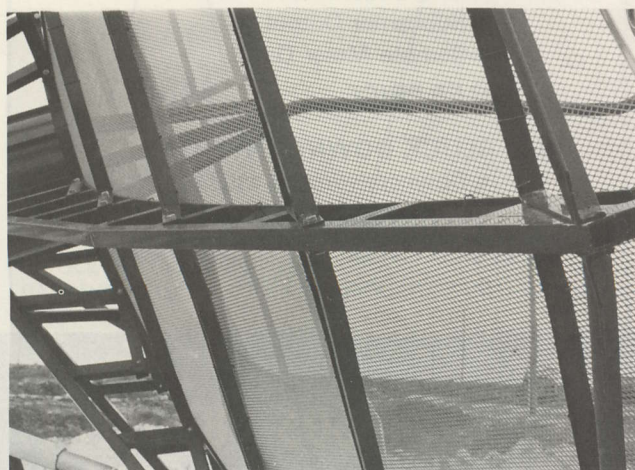
There are very few true parabolic dishes available in the marketplace today. Those that should, or could, come closest, in theory, are those that are 'spun' from metal. These usually smaller dishes have the ability, if spun correctly, to be as close to parabolic as manufacturing tolerances might allow. Any sectionalized dish, even if in two pieces rather than 8 or 16 or 24, is going to have some amount of section to section error. The gain of the dish, its ability to make a strong signal from the weak satellite microwave energy, always has and always will depend upon the surface integrity of the dish. Or, how close the **assembled** dish comes to matching the idealized parabola shape.

Manufacturers break up a dish surface into sections solely for ease of shipping, and once at its destination, ease of assembly. If you could build an antenna at the same location as you were going to use it, and if you had access to any technique you wanted for your dish, you'd spin it. Right on the site. To whatever size you wished. But that is **not** an option so every antenna designer starts by making compromises. **Make it in sections** so you can ship it. **Make it flat** rather than parabolic in both directions so you can pack it flat. **Make more sections** so you can reduce the amount of error (from the desired parabolic shape) when it is assembled. Make it in fewer sections so the guy in the field has less to put together. Compromises. The antenna is a series of compromises. The ones that work best are those that have the fewest compromises.

## ASSEMBLY

As reported in the January issue of **CSD**, the initial 12 foot Paracclipse antenna delivered exceptionally good pictures. Designer Johnson did or oversaw much of the assembly of the initial antenna since he was on Provo for the **Satellite Retreat**. It was nearly six weeks later that we had the opportunity to put one together on our own. There are, at this writing, five other Paracclipses operating in the Turks and Caicos and two more just coming off a boat. We think we have the hang of the antenna now.

You begin by assembling the super structure. Unfortunately, at this writing, we must judge the assembly manual as inadequate. Hopefully a more precise manual, carefully designed to lead the first time builder through the antenna assembly steps will be available soon. If you attempt your first Paracclipse without the benefit of a newly created manual, our advice to you is to unpack everything in neat piles, read the literature **available**, and then sit and **think about** how it is supposed to look as a finished antenna. Do this **before** you start picking up the first piece of hardware and support structure.



**MESH SURFACE** is held in place with epoxy coated wire clips (left and right of center going to rear and over circular support member).

The surface finish on the super structure is available in two formats. We opted for something called 'powder coating' since this held the promise that the metal would stay covered, longer, with a protective coating. Powder coating costs you more than the 'standard' finish, but unless you want an antenna that may rust and decay rapidly (it will depend upon your environment, of course), it is money well spent.

The superstructure goes together in about two man hours time. One person can do this part alone but it goes faster with a pair working on it. The only critical or careful step is the snugging of the five circular support rings that tie the individual spars or struts together, and insure that the dish is indeed close to a parabola in shape. We watched Johnson get down on his hands and knees and visually 'site' across the circular rings. He was checking to see that they were, indeed, aligned across the full dish. If you do this from two directions, 90 degrees apart, and everything looks aligned (with the dish sitting squarely on its back), it is now safe to proceed with the surfacing.

The mesh is attached with a clever (if not friendly) series of metallic hooks. The hooks have a bend at one end and from above the antenna you stick the hooked end up down via a hole in the mesh, and using a pair of heavy duty pliers you pull down on the hooked piece bending it firmly under a support member on the superstructure. You do this several hundred times. Each time you do it, you are firming the reflective surface against the near-parabolic surface at that point.

Thus without any bolts or metal screws or other 'modern' devices, you end up with the surface firmly attached to the superstructure.

**There is nothing remotely approaching fun** about that part of the assembly. After the first hundred clips or so you wonder if you will ever get done. We suspect people have been known to not use all of the clips, tiring of the work involved and towards the end spacing the hooks further and further apart. That's not a very bright thing to do (we know this happens; we inspected a Paracclipse installation in Florida recently and could tell, by the spacing **between** the hooks, where the person doing the work began, and ended!), since the surface integrity of the dish (and hence the performance) depends upon the surface laying down firmly against the superstructure **over the full surface**.

Over the course of the Paracclipse antennas installed in the Turks and Caicos, we found a variety of 'clip techniques' in use by Paradigm. In the 'worst case' we received a roll of wire and instructions to make our own clips(!). In the best case, the clips were preformed and coated with an epoxy finish which should protect the wire portion from rusting for quite some time. Installing the clips, by the way, really requires two people. One person stands on the surfaced side and pushes the straight end of the clip through the mesh while the unlucky member of the duo gets to be behind the dish and yank the straight edge portion up tight and 'crimp' it over the support member. We suggest a heavy duty pair of pliers, with a broad (1/2 inch or wider) nose since regular pliers tend to lose the grip of the clip leaving you grasping air, or your finger, with the pliers. One of our recommendations to Johnson is that he sit down and **design a tool** especially for installing his clips. We





# **(800) WAYS TO GET TREMENDOUS SAVINGS...**

***Call Tennasat Today!***

**Now save hundreds of dollars  
on name-brand  
satellite systems equipment:**

**LUXOR • TRANSTAR • CHAPARRAL  
AUTOMATION TECHNIQUES • SEVEY  
WILSON • JANEIL • VIDARE • LSI  
AMPLICA • CALIFORNIA AMPLIFIER  
AVANTEK • PARADIGM**

Tennasat Electronics offers you these industry-proven product lines plus fast, quality service . . . prepaid freight on *all* electronic packages . . . and same day shipping. When you use our (800) number, the phone call is free . . . and because of our volume buying power, you'll find quality equipment costs you next to nothing.

Take the line of profit. Because with Tennasat, saving money begins when you pick up the phone.

**TOLL FREE: 1 (800) 221-6275**

845 Springfield Highway  
Goodlettsville, TN 37072



**IN TENNESSEE:  
1 (800) 221-8161**



think the clips are a good idea but installing them can be a pain.

Once the mesh is surfaced, you direct your attention to the mounting of the dish. Paradigm has designed a mount that is simplicity itself. Into the ground you place a 3.5 inch (OD) piece of steel pipe (supplied). Depending upon the terrain, this involves about a wheelbarrow of concrete and a hole perhaps 30 inches deep by 12 inches in diameter. Hopefully you will use a level to insure the support pipe is straight up and down. Not getting it straight is about the only thing you can do wrong and not correct later.

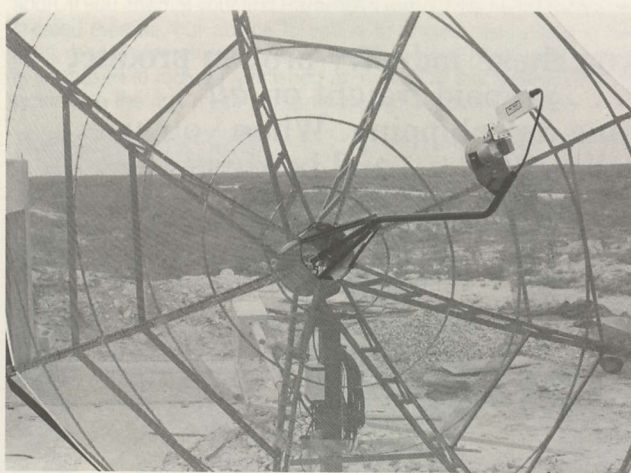
The antenna base is a welded steel square section that slides down over the 3.5 inch pipe. There are four 1/2 inch bolts that tighten up (on four sides) to secure the antenna base to the pipe. You leave it loose enough to make your north by south alignment adjustment and when you have the dish tracking, later, tighten everything down. We worried a little about the four 'set bolts' holding the dish snug in a heavy wind. Not long ago we had a sustained night of heavy winds with a peak recorded gust of 63 MPH. The antenna didn't twist on the mount so we feel better about that.

The declination offset adjustment is sufficiently broad to allow you to handle any offset required between approximately 18 degrees north and 60 (+) north. On special order you can fill in the blanks on both sides. Simply use a Sears leveling tool to adjust to your required latitude. The elevation is set with an oversized turnbuckle. We suggest that even if your antenna is 'powder coated' that you apply marine grease over the turnbuckle after getting the antenna set up. You may have to use it again, and it will work better if it is not all rusted up!

The feed mounts out of the center. We equipped our test unit with a LOCOM 90 degree LNA and a Chaparral I Polarotor. All of the cables come back down the feed's single support pipe to the rear. The square tubing vertical support provides a convenient way of mounting the down converter and Paradigm in fact provides a small housing that will hold many of the available down converters. The initial test installation was equipped with an Intersat SA-20 receiver and it had its own weather resistant housing for the down converter.

Because the entire antenna pivots on the round pipe you sank in concrete, getting the antenna to track is extremely simple. If you set your elevation according to the instructions, for your location, and have the electronics hooked up, you can simply loosen the four set-bolts and slowly swing the dish for a signal on a high bird, with the hand operated azimuth crank approximated for the right tracking angle towards the bird in question. Having found the first high bird, tighten up snugly (but not too tight, yet) the four set-bolts and crank down to the west. The birds should all fall in line right after the other.

It is such an easy mount to use that you may find yourself purposefully getting out of tracking just to have the experience of going back and re-adjusting it. It is far more fun than installing the clips, anyhow.



**VIRTUALLY OPAQUE** to the eye, the Paraclipse 12 footer combines circular support members with the more familiar 'struts' to create reasonably close surface accuracy following the parabolic curve 'both ways.'



**PROFILE** of Paraclipse 12 is clean. Square base support tubing mounts over 3.5 inch OD ground pipe that serves as quick and easy polar alignment system.

In addition to offering a 'powder coat' option (recommended in most instances), the only other option available to you is the motor drive. Without a motor drive, you have one of those innocuous hand cranks that lets you zip around the belt. That's fine for initial set-up but for true utility the dish should be motor driven from inside the home.

Paradigm, at this writing, offers their own motor drive. Thankfully, they are now in the process of changing the drive for a different version. Frankly, the drive we received with the initial dish left much to be desired. The worst problem it had was starting again, as in climbing back upward or higher, when the dish was either stowed or watching a bird at a low look angle. From our part of the Caribbean, F3R is less than 20 degrees up so we quickly discovered that the drive supplied at the time simply did not like a dead start from 20 degrees (or less). We quickly changed out the original drive for a TEL-VI which may have been a bit of overkill since most TEL VI units could move a house if required. At least the dish no longer 'stalls' at low look angles! Paradigm should be offering an improved drive by the time you read this; in case they are not, you have our recommendation for the TEL VI unit.

#### PERFORMANCE

What initially attracted all of the attention was the performance of the antenna. After five installations with the same antenna, and the opportunity to visit with others who have also now installed them following the Provo Retreat, we can report that they all work the same; very well.

As reported in the January CSD, the 12 foot Paraclipse is a better performing antenna than at least two of the antennas we had on site that are (were in the case of one; we took it down!) bigger by a substantial amount. The most impressive 'better-than' story relates, sadly, to a 5 meter AFC/Microdyne commercial dish which we have been using for WIV commercial reception for more than three years



# EXPAND YOUR ENTERTAINMENT HORIZONS!



**The FREEDOM X earth station receiver  
with distinct quality features includes:**

1. SIGNAL STRENGTH METER
2. CHANNEL SCAN
3. AUDIO TUNE 5.2 - 7.6
4. BUILT IN MODULATOR
5. OPTIONAL REMOTE CONTROL-video and audio from your arm chair or 2nd TV set.

6. I.E.D. DIGITAL CHANNEL READOUT
7. 24 CHANNEL DETENT SELECTOR
8. REMOTE DOWN CONVERTER IN DIE CAST ALUMINUM CASE WITH R.F. SEAL
10. OPTIONAL STEREO CAPABILITY
11. AUTOMATIC POLARITY SWITCHING CAPABILITY

## NOW AVAILABLE! Freedom Actuators

Designed and built to meet the demands of accurately aiming your satellite system. Design prohibits water from entering the barrell.

- \* No water freezing up your actuator.
- \* No water rusting the gear and screw.
- \* Thrust bearing.
- \* Gear welded, not pressed in.

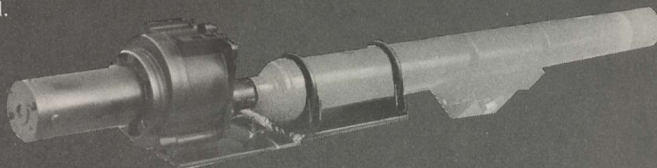
## Manage Your Dish Position with FREEDOM!



### A total retrofit system:

\*Simple installation\*programmable with the flip of a switch and the push of a button\*8-hour memory retention in case of power failure\*Dayton 90 v DC permanent magnet motor\*incorporates Hall effect design for maximum reliability\*solid state, digital readout, micro processor

FREEDOM to rotate your dish from the inside. FREEDOM from guessing that you are fine-tuned with the hand crank. . .FREEDOM to select over 45 pre-programmed stop locations by simply recalling the memory data by command through the keyboard.



**Complete system adaptable to almost all existing systems.** Includes programmable control, motor drive, bracket assembly and 100 feet of cable.

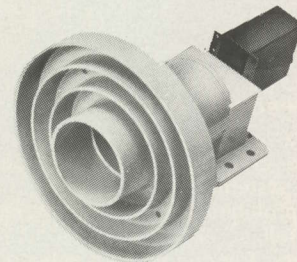
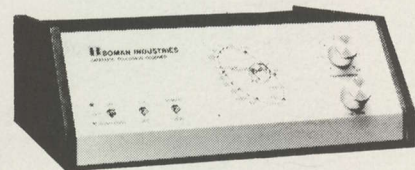
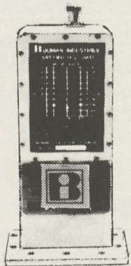
For more information call or write today,  
417-739-2291      FREEDOM      800-641-4444  
P.O. Box 908      Kimberling City, MO      65686



# MORE PROFIT.

## CHALLENGER I SYSTEM <sup>ONLY</sup> \$999<sup>50</sup>

6 UNIT  
PRICE



- ★ ALUMINUM 8' ANTENNA
- ★ AVANTEK LNA
- ★ BOMAN (TAYLOR HOWARD) RECEIVER
- ★ DUAL DOWN CONVERSION DOWN CONVERTER
- ★ POLAR MATIC II POLARIZER W/CONTROL
- ★ HEAVY DUTY POLAR MOUNT W/LNA TRIPOD

### OPTIONAL EQUIPMENT

- (1) RF310B MODULATOR \$59.50
- (2) CK975 CABLE \$56.50
- (3) 90 LNA (EXCHANGE) \$269.50

\* FOB FT. WAYNE IN.

EPOXY  
COATED  
DIECAST  
ALUMINUM



MWF 65

### UTRA SPEC HIGH GAIN MICROWAVE FEED

**\$999**  
ANY QUANTITY

**\$799**

500 SPREAD OVER  
6 MONTHS



**BOMAN INDUSTRIES**  
SATELLITE PRODUCTS DIVISION

9300 HALL RD., DOWNEY, CA 90241 (213) 869-4041

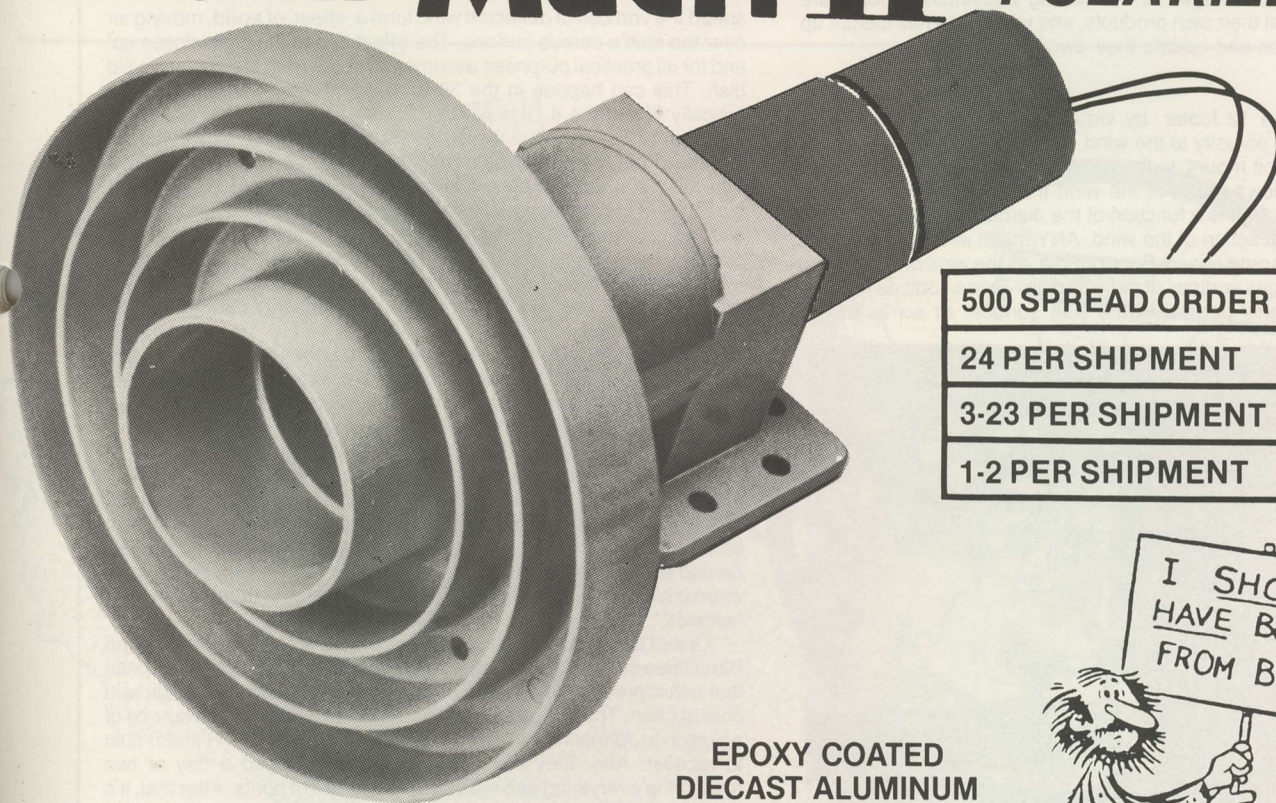


**BUYS** FROM **Boman** →

INTRODUCING THE ALL **NEW**

**"Polar-Matic**

**HIGH SPEED Mach II POLARIZER**



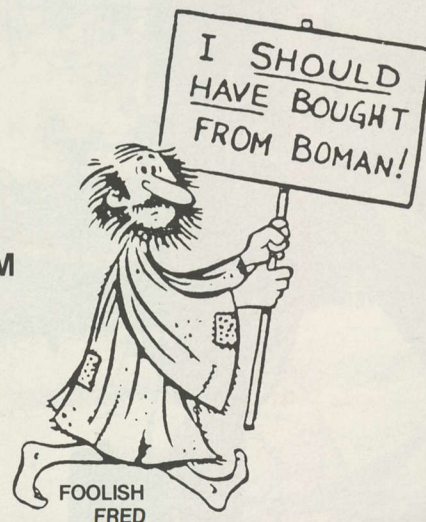
500 SPREAD ORDER	\$39 <sup>50</sup>
24 PER SHIPMENT	\$49 <sup>50</sup>
3-23 PER SHIPMENT	\$64 <sup>50</sup>
1-2 PER SHIPMENT	\$79 <sup>50</sup>

EPOXY COATED  
DIECAST ALUMINUM

(CONTROL INCLUDED)

**\$3950**

MASTER DIST. PRICE  
500 SPREAD OVER 6 MONTHS



TOLL FREE NUMBERS: INSIDE CA. (800) 352-2553 OUTSIDE CA. (800)421-2533



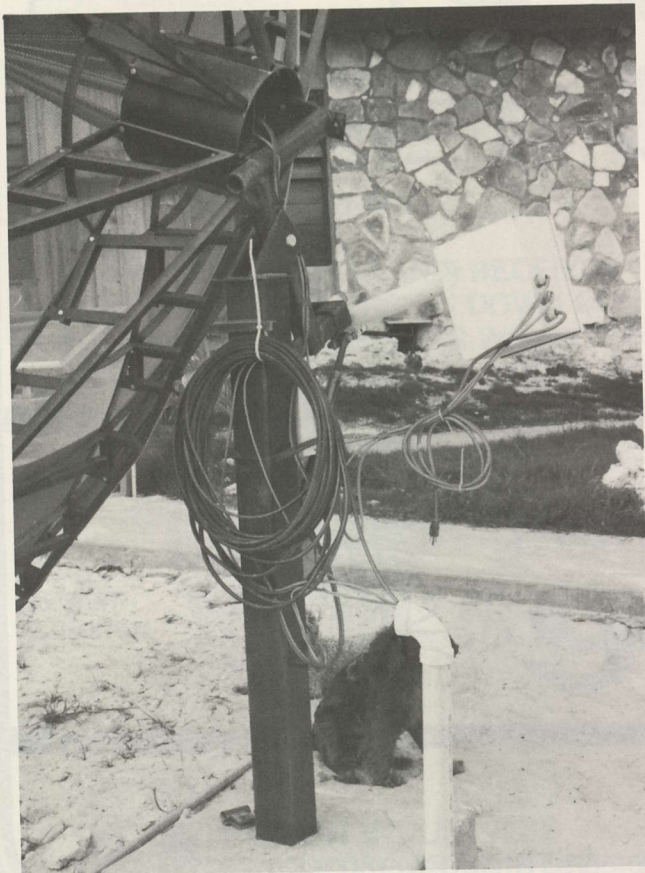
now. After firing up the Paracclipse, it took us about six seconds to realize the weak WTBS transponder was measurably better on the 12 foot Paracclipse than it was on the 16 foot AFC. After hours of tweeking on both, we came to the conclusion that swapping equipment back and forth and man handling the huge AFC antenna was not going to get us to the point where the Paracclipse performed within ten minutes of turn on.

People down here in the Turks and Caicos judge everything by the quality of WTBS (and a few of the other weak-set horizontal transponders). If you can sit down and **watch** WTBS, and not be **'bothered'** by the noise, "it is a good system." It took us three years and the most recently installed ADM 20 footer, plus some 90 degree LNAs, to get clean on **ALL** of the F3R (F1) transponders; so you can see that good signals don't just happen here.

Not many of you have an AFC/Microdyne 5 meter to compare to so you have no way of knowing whether that makes a Paracclipse good, or bad. Let's expand the comparison technique a bit. The Paracclipse produces better pictures than the ten foot Harris (by an average of 0.5 dB; not much, but there) and better than a 13 foot ADM (again, by just enough to be measurable). We should note that when Jamie Gowen was last down he described some modifications to his 13 foot series which he believes will bring it back as a 'better than' antenna. That's one of the side advantages to our testing equipment; people are forced to re-look at their own products, and when time has caught up with them, go back and update their own engineering.

#### MAINTENANCE

The Paracclipse 12 footer, by virtue of its screen mesh, has a certain amount of porosity to the wind. A solid dish catches all of the wind and 'works the mount' to the point of stressing the hardware. A mesh antenna allows **some** of the wind through. How much of the wind that gets through is a function of the diameter and shape of the 'holes,' and, the direction of the wind. ANY mesh antenna will 'close up' to the wind at **some** speed. For example, as the wind beats against the surface it creates vortices of deflected air. Those vortices jump off in directions roughly parallel to the dish surface. At some 'magic'



**TWO PEOPLE can lift the completed antenna but three is better. Five was certainly overkill!**

speed the vortices of deflected wind form a 'sheet' of **solid**, moving air over the dish's porous surface. The effect is that the dish 'closes up' and for all practical purposes assumes all of the wind loading of a solid dish. This can happen in the 30 to 40 MPH region with dishes we typically find in the 4 GHz world.

At 25 MPH sustained winds the Paracclipse surface stays virtually rock solid but the center pole mount for the LNA and feed gyrates. Typically, you **won't** notice this on your reception. At 30 MPH the gyrations of the center pod are greater and if you are watching closely, and the wind is gusting, you can detect slight changes in the picture quality on a marginal (i.e. not fully threshold quieting) signal. At 35 MPH you can detect the shifts in picture quality as a function of antenna movement. None of these are necessarily bad; just some careful observations.

It has been suggested to Paradigm that right after creating a high quality, step by step assembly manual, the next thing they should do is at least offer an optional stainless (steel) hardware kit. As discussed elsewhere in this issue, dissimilar metals can be a problem in **any** outdoor environment. Within 100 feet of the ocean, where the first of our Paracclipses sits, there are lots of corrosive elements at work. Even 'inland,' there are potential rust areas which could be avoided if the installer selected hardware that simply would not rust to begin with. In its favor, between the epoxy covered surfacing 'clips' and the powder coated surface on the mesh screen, we see few signs of surface (or structural member) deterioration even after several months of being 'seaside.'

One of the perhaps unfortunate, but predictable, side effects of the Paracclipse success has been a 'rash' of "Me-Too" copycat antennas that either precisely or almost exactly copy the antenna's design and construction. That is both a compliment to the design, and a source of agitation to Johnson. A 'knock-off' antenna has very little R and D cost to recover. After they buy a Paracclipse they spend a day or two measuring everything and making up a new set of prints. After that, it's time to sit by the telephone and take orders. The antenna knocks down for shipment (antenna, surface, mount; everything, complete) into a heavy duty cardboard container that is easily shipped via truck. It weighs just under 300 pounds and motor truck freight from Redding, California to southern Florida is under \$100.

In spite of its unusual profile, the Paracclipse antenna success story is really a study in how somebody who pays close attention to antenna basics can produce a clearly superior antenna product. There is a lot of fancy footwork in the antenna field these days. Much of what we see and hear is a product more of the marketing department than the engineering department. It is refreshing to know that there are still David Johnsons in this field and firms that believe the best marketing tool is a straightforward, good working product.

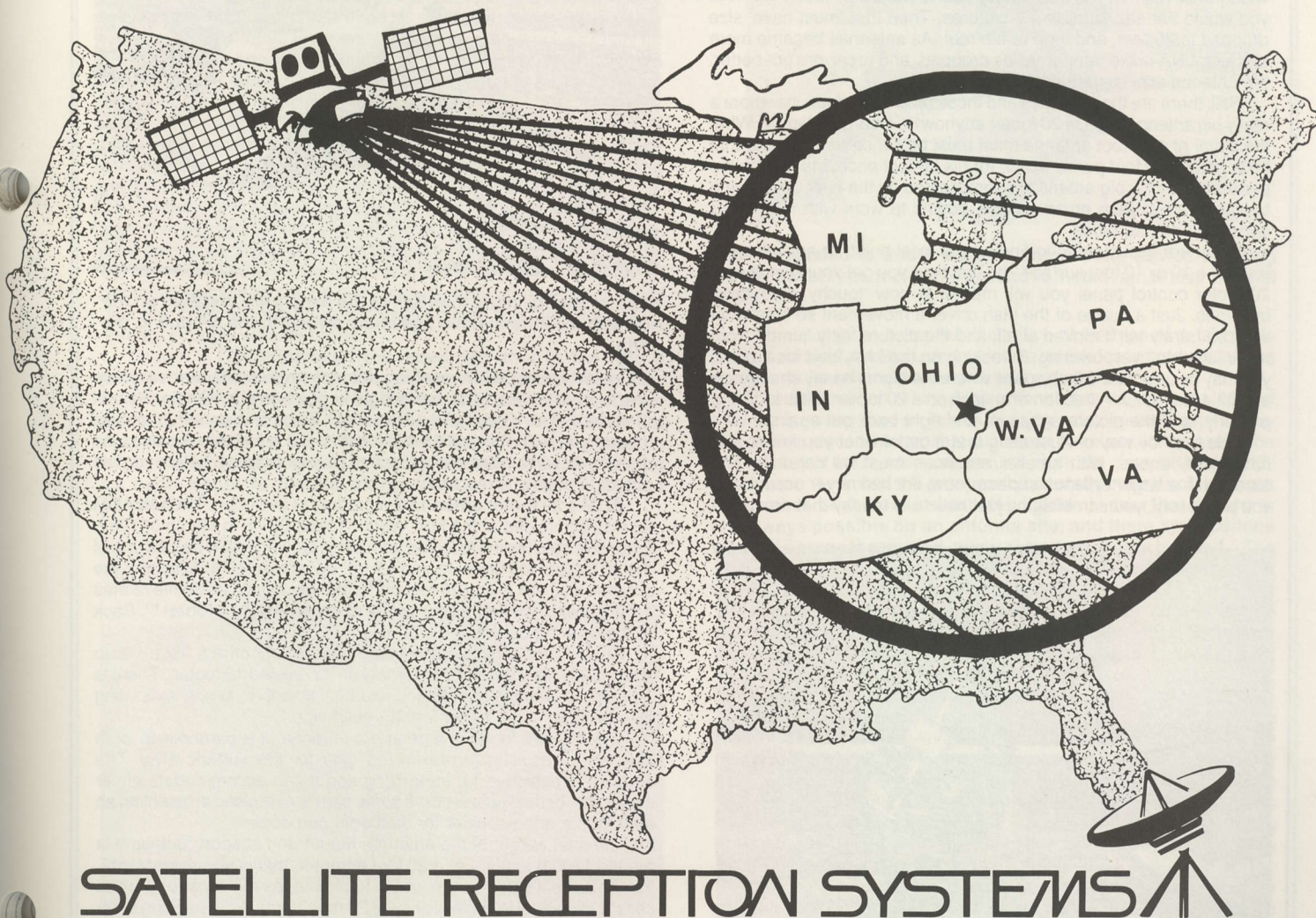
**ADD TO** those who say they will scramble, within 18 months; SPOTLIGHT, The Disney Channel.



# SRS DEALER PROGRAM

## features:

- Largest display of on-line systems in U.S.
- Toll free 800 numbers
- Open 6 days a week at 2 locations
- Low cost, 24-36 hour, on-site regional delivery
- Shipping anywhere in U.S. daily at 2 PM and 6 PM
- 5-year warrantied mounts
- 30-day infant mortality on electronics
- Large warehouse inventory — items in stock
- Installation, technical assistance, troubleshooting
- Site checks, mobile downlinks
- Full-service trucks
- Home and commercial systems
- Systems design and multiple hook-ups
- SRS catalogues supplied free to active dealers
- Co-operative advertising, i.e. *TV Guide*
- Advertising and sales support programs
- Advertising signs and products available
- "Birdseye" newsletter published 6X/year



## SATELLITE RECEPTION SYSTEMS

SPACE-AGE TECHNOLOGY AT DOWN-TO-EARTH PRICES

145 N. Columbus Rd.  
Athens, Ohio 45701  
(614) 594-2524

In Ohio: 1-800-592-1957  
For National Distribution: 1-800-592-1956  
Dealer inquiries welcome

2370 Morse Rd.  
Columbus, Ohio 43229  
(614) 471-6118



## ADM 20

## FOOTER

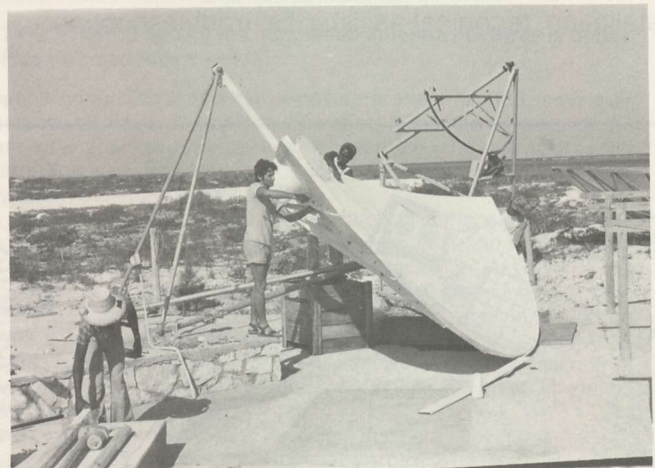
### ADM 20 FOOTER

Big antennas fascinate us all. Virtually anyone would give their eye teeth to have a fully agile 60 footer parked in the backyard with 20 degree Kelvin cooled LNAs on board. Fortunately for the industry, the beliefs of 1976/77 are long gone. Back then, in the dark ages, it was widely believed that you **absolutely had to have** a 30 foot antenna or you would not see satellite TV pictures. Then that 'must have' size dropped to 20 feet, and then to ten feet. As antennas became more efficient, LNA noise temperatures dropped, and receivers got better, the antenna size requirement modified.

Still, there are those locales and those receiving situations where a really big antenna (well, a 20 footer anyhow) is clearly called for. What the buyer of a 20 foot antenna must most be concerned about is that he is getting 20 foot performance for his 20 foot price. Measuring the performance of a big antenna is complicated by the ever decreasing tolerance for system errors as one begins to work with larger and larger antenna surfaces.

If you are accustomed to finding the focal point, or adjusting the dish for a 10 or 12 foot surface, the first time you get your hands on a 20 footer control panel you will marvel at how 'touchy' everything becomes. Just a nudge of the dish drive, a movement so small that you can barely tell it moved at all, and the picture fairly 'jumps' from noise laden to overpowering. Tweaking on the LNA/feed focal point, you may be used to 2-3 inch spans where the signal barely changes at all with a ten footer. A fraction of an inch on a 20 footer (if it is focusing properly) and the picture snaps in, and right back out again.

This is all by way of illustrating that most of what you know, and have experienced, with smaller antennas must be carefully 'fine tuned' with a larger antenna surface (now, if it had never occurred to you previously, you can imagine just how truly touchy that dream-of-



**HALF or slightly more than half of the panels are installed on the hub with the antenna/hub assembly swung to the ground to the north.**

60 footer would be!), everything has got to be more precise, more precision, and most of all, **more rigid** or you'll end up with twenty feet of surface and 12 feet of performance. Since it is doubtful you are investing in a 20 footer as a monument, it is advisable to pay close attention to what makes a big antenna play, or not play, before you run out and invest in a monster.

**ADM's 20 footer antenna** is a product of evolution. The first ADM 20 was introduced at the Fort Worth, Texas SPTS in March of 1982. Extensive field testing followed and Jamie Gowen finally hauled one of the 20 footers to Hawaii to verify what he suspected in Missouri; the antenna was **not** giving 20 foot performance. In fact, as Jamie relates it, **"In Hawaii, we had better pictures on an ADM 13 footer!"**. Back to the drawing boards.

Gowen and ADM were learning what many others have yet to learn; a 20 foot antenna is not simply an 'up-scaled 13 footer.' There is far more to being in the big antenna business than simply extending the parabolic curve a few feet on each side.

The ADM 20 footer is a petalized antenna. It is parabolic in 'both directions,' resulting in maximized gain for the surface area. The antenna is designed for motorizing and it can accommodate either single pole or dual pole feeds, if some care is exercised in selecting an appropriate ortho-coupler for dual-pole purposes.

The total weight of the antenna, mount and support hardware is around 1200 pounds. For a 20 foot antenna, that is surprisingly light. Yet the current versions are, as we found out, extremely strong. Total construction time is in the vicinity of 20 man hours, from packing crate to 'people.' You may spend a little longer tweaking on it, especially if it is your first 'big' antenna.

Gowen's approach to the 20 footer was that he wanted to have a complete antenna line, ultimately from 8/9 feet to perhaps 24 feet in



**ASSEMBLY begins with bolting together of mount, and installation of hub center section.**



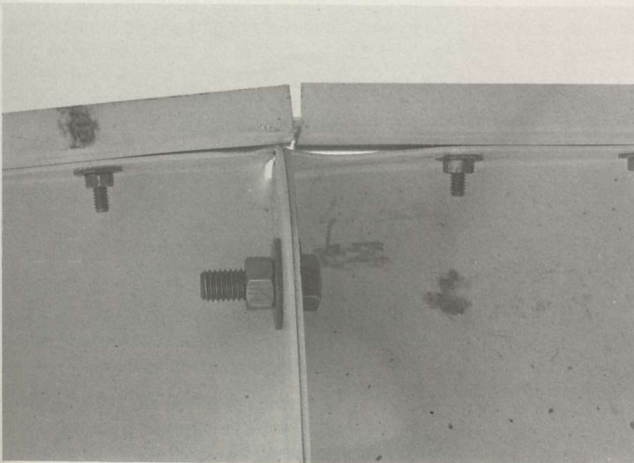
aperture. The 20 foot was brought out at about the same time as a lesser known 16 foot version. Jamie's attitude with the 20 footer was, until recently, that it was an unproven antenna. He was not comfortable charging buyers the full list price (from 40 to 60% of other 20 footers on the market) until he was **sure** the antenna was performing properly. In spite of his reluctance to sell the units, there are dozens now in service at TV broadcast stations in North America, and others spread from Africa and Europe to the Pacific.

Aware that **CSD** has a considerable familiarity with big antennas in our Caribbean test range, he arranged to send down a 20 foot antenna last fall. With Gowen's help, and the help of Andy Hatfield (see **CSD** for January, 1983) we had the first antenna operating in late October. Gowen worked with our two local antenna assembly experts on the first antenna, and he apparently made a number of mental notes on both the way the antenna went together, and performed because shortly after he returned to Missouri he sent down a number of mechanical arms and pieces which we were instructed to use in field-modifying the antenna's support system.

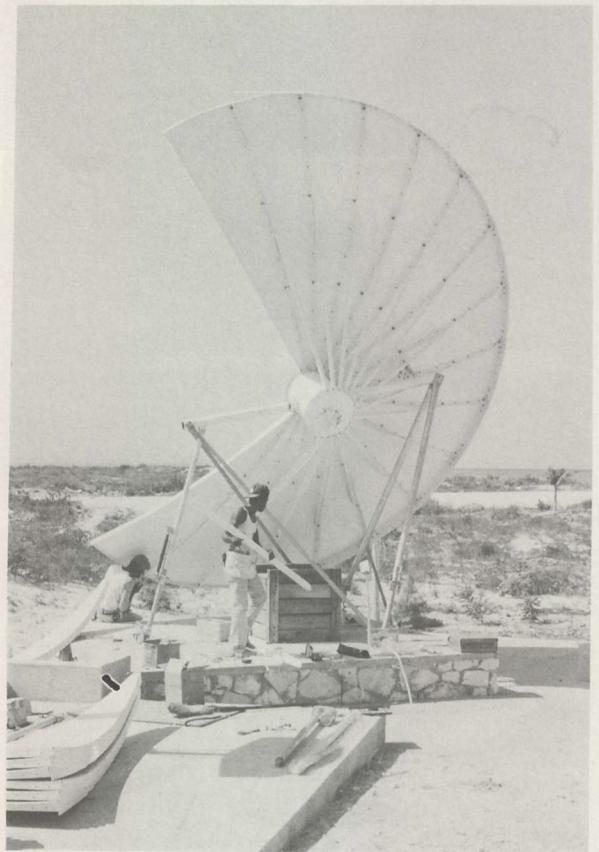
A second ADM 20 footer came down in early winter and in February Jamie came down again. At the end of the first semi-full day of work, the antenna was totally assembled and ready to install the feed mount support struts and fire up.

You start off with the 20 foot ADM antenna by setting up the mounting structure on heavy duty anchors already set in concrete. We used 3/4 inch all-thread rod sunk down in 14 inches of fresh concrete to tie the antenna to the pad at three locations. The pad had previously been in use for another large antenna and was more or less ready for the ADM when it arrived. Working mostly from the ground, or at most a few feet above ground, you assemble to the center hub section the first 50/60% of the reflector panel pieces. One of the changes Gowen made, after our first ADM antenna, was to modify the type and size of bolt used to connect one panel to another. Where previously 1/4 inch bolts had been used **all along** the seams, he had changed out a pair of the bolts for 1/2 inch diameter versions. This was done without enlarging the holes the bolts fit through. The original holes had been designed so that there was a small amount of 'play' for the 1/4 inch bolts. After field assembly of a number of the antennas, Jamie decided that the dish would be stronger, and more apt to conform to the desired parabolic shape if two of the bolt locations were upgraded to 1/2 inch diameter bolts and the holes left small enough that the bolts literally 'thread' through with a wrench.

Gowen. "This eliminated the possibility that in the field a person could be uniformly off to the side in all of the 7/16th inch holes with a 1/4 inch bolt, resulting in a compound type of error that after all panels were in place might cause the dish to be out of the true parabolic form. The 1/2 inch bolts force the panels to align, one to the next, and in this way the antenna is self-proofing as each panel is placed alongside the formerly installed panel(s)."



HALF INCH bolts are used between panel sections at two locations to 'force' alignment of panel to panel sections.



HUB IS rotated to south using a come-along device allowing workers to stay at or close to ground to install remainder of panel sections.

A small thing, perhaps, but illustrative of the type of detail which catches Jamie's attention, and which he translates to product change as soon as he returns from an in-field experience.

Once the first half or so of the antenna has panels installed, the antenna is swung over on its mount using a device such as a 'come-along.' This places the hub that still needs panel sections close to the ground so that the builders can resume work still close to the ground.

Gowen. "I wanted the antenna to be totally constructable from the ground, or at most a short step ladder. I know that a crane is not always possible on an antenna site, and there are locations where if a crane is required, many antennas cannot be used." The system works, and with a pair of workers there is no part of the assembly which two men cannot do unassisted.

Once the panels are in place, there is an outer 'binding ring' to cinch up. Jamie's wife Linda is crazy about horses, and it is **possible** that the concept for the outer 'cinch ring' may have come from Linda. It reminds horse enthusiasts of an old fashioned 'cinch strap.'

The ring consists of a series of flat metal plates, narrow but long. The plates wrap around the outer perimeter of the dish, bolting to one another and to the outer lip/edge of the panel sections as they circle the dish. You install the cinch ring pieces as you go along, and if you have assembled the antenna properly (it is almost impossible to do wrong although Jamie tells the story of one fellow in Puerto Rico who turned the center hub totally around . . . and still had satellite pictures!) the last cinch ring will align itself in an overlapping way with the holes and bolts on the first cinch ring.

The ring virtually forces the antenna to self align, making up for whatever error as may have crept in during assembly. There are no measurements to take, no proofing steps as such. Between the self aligning panel sections, and the self aligning cinch ring, the antenna **has** to go together **the right way** (oh yes, the fellow in Puerto Rico, who reversed the center hub, found the cinch ring plates did **not** align



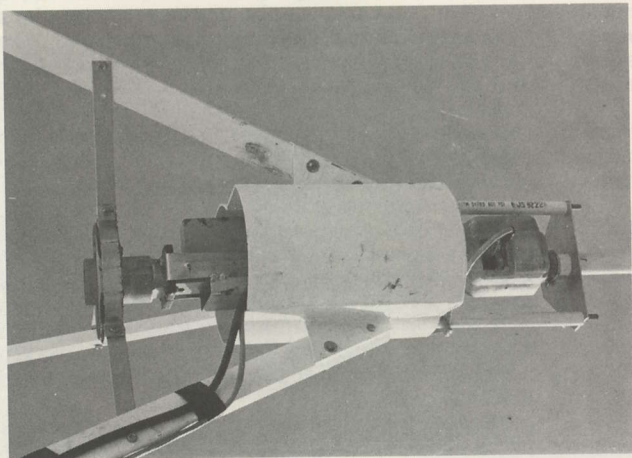


**CINCH STRAP** bands entire antenna together around outside perimeter. The last portion of the strap goes on tough (on purpose!) but holes align perfectly.

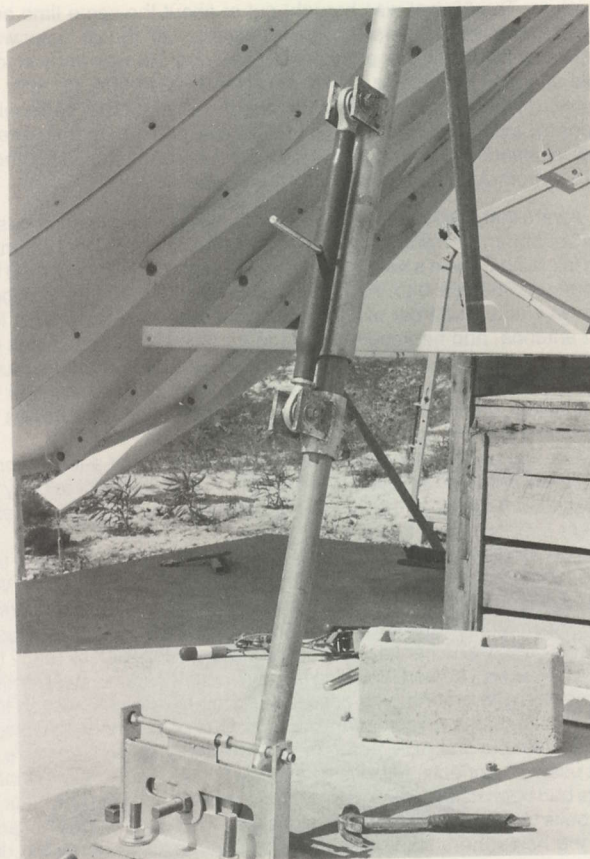
and rather than stop to figure out why, he got out his drill and made new alignment holes!).

The next step is the mounting of the three legged feed support and hanging the front end electronics. With everything in place, the fun of 'finding people' begins.

The mount is designed so that you first dial in your elevation setting (there is a combination of a front-nose hand-operated jack screw and some fine tweaking all thread adjustments on the two rear legs), and



**INNOVATIVE**, yet simple, method of insuring the feedhorn stays centered, regardless of look angle and stresses on dish, utilizes floating collar.



**ELEVATION** is set with front and rear support legs; jack screw fine tunes alignment. North/south alignment, if you missed being dead on, is done with footpad alignment brackets (bottom) on all three legs.

then do whatever correction as may be required on the north by south adjustment. The feet (three) are slotted with all thread adjustments for moving the antenna from left to right (or right to left), just in case you screwed up by a few degrees (perhaps as much as ten can be 'corrected') with your north and south polar alignment.

Like any polar mount antenna, you are advised to begin with a high look angle bird and fine tune the elevation (with an antenna this large, just because the inclinometer reads right does not mean you are dead on the money; the typical inclinometer has a  $\pm 1$  degree accuracy, and reading closer than 1 degree for fine tweaking has to be done with the receiver operating). While it is possible to move this antenna by hand, you would be foolish to try. On our second ADM 20 footer, we used a popular TRF programmable control and Duff-Norton drive which ADM has found satisfactory in hundreds of installations. We were not disappointed with either.

Unless you are very lucky (and you may not realize how lucky you were until too late!), you will spend three to five hours tweaking on a dish of this size making sure that the elevation, north by south pole setting, and LNA focusing adjustments are just right. A quarter of a turn on a jack screw, and you can lose 1 dB in carrier to noise. A quarter of an inch on the LNA focus, and you can lose a major part of a dB. **This is not an exercise for those who are in a hurry.** The real rewards come only after everything is adjusted for maximum performance and the system is playing to optimized condition.

Between the first ADM 20 on Provo and the second, Jamie Gowen also decided that he was not happy with the clamping arrangement that secures the dish surface and hub to the large pipe that supports the entire antenna at the appropriate declination-adjusted elevation angle. He brought with him a new type of clamp arrangement which we installed after peaking the antenna to optimized performance.



# COMPLETE EARTH STATION SYSTEMS

**Commercial or Residential**

## **New Products:**

E.T. fiberglass antenna/  
Automation Techniques 560/  
ADEC Programmed Positioner/  
Lowrance System 7A/SAT-  
TEC R 5000/Janeil/Houston  
Satellite Tracker I/Vector Jr./  
Microwave filter

## **Distributor of:**

ADM/ARUNTA/AUTOMATION  
TECHNIQUES/AVANTEK/AVCOM/  
CHAPARREL/DRAKE/E.T./COM-  
TECH/DEXCEL/LOWRANCE/LULY/  
EARTH TERMINALS/MICRODYNE/  
PILOT-VIEW/SAT-TEC/STANDARD/  
VECTOR/VIDARE/HOUSTON  
SATELLITE/JANEIL and more

## **NO COST ORDERING:**

To ensure the QUICKEST DELIVERY,  
use our TOLL-FREE NUMBER,  
SIX DAYS A WEEK / (800) 833-4485  
For prices or technical information call us  
at (518) 783-0088.



**NATIONAL SATELLITE  
COMMUNICATIONS**

Plaza 7 • Latham, New York 12110 • 518-783-0088





Some weeks later, having proven that it greatly increased the antenna's stability, he would send down a pair to add to the original 20 footer. During that period of time we had a storm through with wind gusts to 63 miles per hour. The new 20 footer never moved off the bird. The original 20 footer drifted by half a degree. That strongly suggested to us that the clamps were an improvement.

Another improvement Jamie created was a 'centering ring' for the LNA plus feed. We have never been overjoyed with the less-than-rigid support system which has been a part of the ADM 11 and 13 foot antenna package for years. The LNA/feed, if you are still using (for whatever reason) the Alliance antenna rotor package for polarization change, hangs out there slightly **under** supported. On low look angle birds, the feed can even 'droop,' down, towards the ground. We've created our own not very professional supports for the feed to hold it centered in the focal 'zone' but it took Jamie's metal shop to do it right. The solution is nifty; the scalar feed has a round, outer circumference. Jamie constructed a ring that is just slightly larger than the scalar feed's outside diameter. We smeared a liberal coating of marine grease on the outer edge of the scalar and the inner edge of the new support ring (which, as the photo shows, ties back to the three support struts) and mated the two. Now the feed stays centered, no matter what the look angle may be. Elegant, and neat.

### PERFORMANCE

The second ADM 20 footer works exactly like the first one. That's a good statement since there is always the possibility, with an antenna of this size, that you'll get 'lucky' with one and blow it on another. The second 20 footer has significant improvements in mechanical/structural integrity and we wasted no time modifying (by adding to) the first one to bring it up to the rigidity standards of the second. That's one thing about ADM; Gowen never stops improving the product.

With either antenna, we have completely clean signals on every one of the F3R transponders. With either 100 degree, or, 90 degree LNAs on board. The tough Reuters service on TR18 would, we judge, be in the 112 to 115 error judgment region. The hard to drag out vertical interval text services on TR6 are clean and error free. Only powered-down color bars on TR22 ever show a sign of sparklies; and they disappear when they power up and head into programming.

On some of the **really strong birds** down here, we are in the 52/53 dB signal to noise region. When COMSAT keeps their D3 bird close to the center of the 'box' (that bird is developing a figure 8 pattern, unfortunately) even the mid-USA boresighted transponders for the three networks are clean.

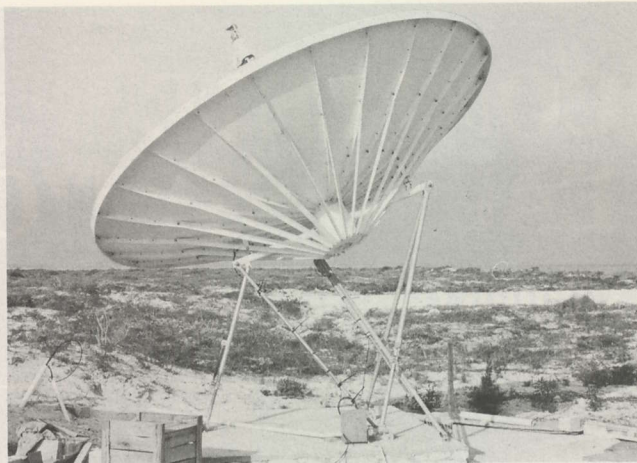
In short, these are good antennas that perform exceptionally well. They do so because Gowen and the crew at ADM have not been satisfied with the performance that might have gotten them by. I suspect there are further refinements ahead; I know for a fact that a new approach to driving the dish in a horizon to horizon format is being worked on (at the present time, with a typical Duff Norton heavy duty jack screw, you are limited to about half-horizon to horizon coverage).

The ADM 20 represents an exceptional value because of several

**POWER LEVEL** of many first generation 12 GHz birds, and certainly most of the second generation birds, may be radically lowered than initial 200 watts per channel promised. Original plans for 200 watts per transponder predicated on certain assumptions about 'achievable' LNA and receiver front end noise figures. Theory was that you had to put lots of power in sky to make up for relatively insensitive receiver systems, and to keep individual DBS dish sizes 'down'. Now that under 3 dB noise figures are common in 12 GHz lab model units and better noise figures, down to 1.5 dB, seem just ahead with new GaAs-FET technology, planners of 12 GHz birds are asking themselves why they should spend huge bucks to build limited channel capacity 200 watt per channel birds when they can drop powers to 100 watts, or lower, and shift more of the burden of clean signals to the rapidly improving state of receive terminal technology.

**DISNEY** will shift its launch date to April 18th, from April 11th, to avoid 'clashing' with televised coverage of Academy Awards on earlier date. Service will start off (Westar 5, TRs 10 east and 12 west) 18 hours per day.

**CANADA's** launch of pay TV, distributed via ANIK C2's 12 GHz



**COMPLETED ADM 20 foot antenna ready to go to work.**

factors:

- 1) It is priced substantially lower than other 'proven' antennas of its size (there are some other 20 footers around that may be as low, or even lower but to date they have avoided testing and analysis so you don't really know what you are getting, until too late);
- 2) The manufacturer operates with an 'open feed back loop,' constantly re-evaluating the design, performance and operation of the antenna. There is no resistance on Gowen's part to make a change or update prior units when better technology becomes apparent.
- 3) The antenna, with the latest adaptations, is exceptionally stout. We found it to be rock solid at winds to 63 MPH and when you use your weight to 'hang' on the lip, it does not move.
- 4) It delivers excellent performance.

### MAINTENANCE

If there is an area for improvement remaining, it would be in the long term ability of the antenna to withstand the environment. Some parts are painted, some are galvanized. Bolts are coated, although not stainless. The majority of the material in the dish and hub structure is aluminum, and while the paint coat is far better on the current run than it has been in the past, it is not up to Harris or S/A standards. Because virtually every part in the antenna is fabricated in the ADM shop, there are a number of 'raw edges' which get out the door without total protective covering. There are a half dozen or so steel parts which the user will quickly identify on his own as being rust prone. They should be protected, promptly, after installation.

transmissions also set many records. Some of the cable systems connected reported penetrating as many as 10% of their potential homes within first 30 days. Biggest problems to date? Getting sufficient hardware to fill all of the orders!

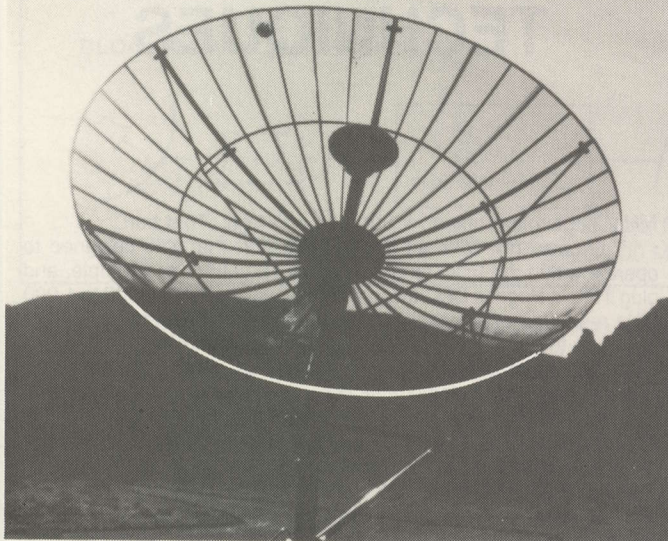
**WHILE DBS** advocated have argued that 12 GHz will be superior service in metropolitan areas because there will not be the same terrestrial interference problems that satellites have at 4 GHz (AT&T and others use 4 GHz for main trunking), the 12.2 to 12.7 GHz band is not exactly pristine. There are many licensees now using that band and FCC is proposing several alternatives as to 'where' to move the present occupants in plan to clear the spectrum for DBS use over next couple of years. Some will go to 12.7-13.25 GHz, some to 6.525-7.125 GHz, while others will land in 1.99-2.11 GHz or 17.7-19.7 GHz.

**NBC** is walking through procedure of drafting heavily documented specifications for 12 GHz linking of all network operations and affiliates but most of what is being processed for study has apparently already been decided. Network will announce 12 GHz plans in connection with demonstration using SBS satellite at this month's NAB conclave.



# A GREAT SMALL SYSTEM

## JANEIL REAR FEED 8 FT ANTENNA SYSTEM



### JANEIL REAR FEED 8 FT FEATURES:

- Advanced Chaparral rear feed design
- Solid single pole adjustable declination mount
- Strong .028 steel wire mesh reflector
- Lockable LNA downconverter mounting compartment for maximum security
- Chaparral Polarotor I for instantaneous polarity switching

We've never before recommended an 8 ft. system for use in low footprint areas but we're very impressed with the performance of this system. It just goes to prove that inexpensive does not necessarily mean cheap!

## LOWRANCE SYSTEM 7XL

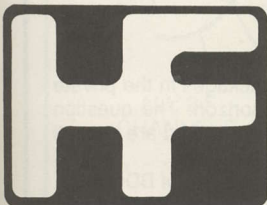


### LOWRANCE SYSTEM 7XL FEATURES:

- Proven high quality video/audio performance
- Detent tuning
- Tuning meter
- Completely weather-tight remote downconverter
- Built in channel  $\frac{3}{4}$  modulator
- RG59 and tuning voltage cable
- Superb Lowrance reliability

**THE PRICE... WELL THATS THE BEST PART, JUST GIVE US A CALL**

ARUNTA • CALIFORNIA AMPLIFIER • CHAPARRAL • DEXCEL • DRAKE • HOUSTON SATELLITE  
JANEIL • KLM • LOWRANCE • LUXOR • MICRO SCAN • USS/MASPRO  
PARACLIPSE • POWER CONSULTANTS • TRANSIFIER • TRIPLE CROWN



## High Frontier Distribution

2230 E. Indian School Road  
Phoenix, Arizona 85016  
(602) 954-6008  
(800) 382-0395

## High Frontier Distribution Northwest

976 Industry Drive  
Seattle, Washington 98188  
(206) 575-0660



## BLOCK DOWN

### PROVING OF A NEW TECHNOLOGY

The first TVRO systems, installed for cable firms in the USA, were single channel terminals. **The dish** was capable of collecting energy from up to 24 channels from a single satellite. **The LNA** was capable of passing all of the even (horizontal on SATCOM) or all of the odd (vertical on SATCOM) transponders. But down at the end of the line was a single receiver dedicated to a single channel/transponder 24 hours per day. It was not a very efficient system.

As more satellite program services became available, receiving system manufacturers introduced 'signal splitters'; devices which went on the indoor end of the large, 4 GHz transmission cable, and allowed two or three or four or eight separate receivers to look at a single channel; each. At least the dish, and the LNA, were being used for more than a single channel at a time!

When programming sources became available on both polarizations (SATCOM began only with video on the horizontal side), dual-pole feeds with twin LNAs (one for vertical, one for horizontal) became fashionable. Now the cable firm had one reflector, two LNAs, two large 4 GHz feedlines and some number of separate, dedicated-to-a-single-channel receivers tied to each of the two polarizations. Better, but still not very efficient.

Hughes was the first to commercially introduce mass produced receivers that took a different approach; although a small firm in Texas actually beat Hughes to the marketplace by about six months. The concept was this:

- 1) Rather than install a **complete** 4 GHz input / video and audio output receiver for each of the channels, why not mount an outdoor converter at the LNA and shift not a single TVRO channel down to IF at that point, but the full 500 MHz TVRO band down to a lower (intermediate) frequency (IF)? This meant that the system could be designed so that there was only one expensive, and complicated 4 GHz in / IF out piece (per polarization) in the system.
- 2) Now, with all of the TVRO channels in that polarization available as a 'frequency block', not at 3.7 to 4.2 GHz but rather at say 250 to 750 MHz, the far lower 'block IF' signals, all together, could be carried further, in less expensive cable, and individual receiver units could tune in that 250-750 MHz 'block' rather than the original 3.7 to 4.2 GHz region.

#### Why was this a good idea?

First of all, much of the expense in a cable grade TVRO receiver was in the 'front end'; that part that tuned the 3.7 to 4.2 GHz region, filtered it, amplified it, and then shifted that region to a lower (IF) range. If you could do this **just one time**, for up to 12 separate channels, there would be less expensive equipment to fail, and less cost to the user.

There followed a number of variations of the basic scheme. Each of the major big dollar TVRO receiver suppliers adopted a form of this technique, but unfortunately virtually none of them agreed on how to do it. The concept was universal; start off with 3.7 to 4.2 GHz input. But at that point they took different approaches. The IF, or the output of the Block Down Converter (BDC) varied from one manufacturer to another. Some elected 250 to 750 MHz. Another liked 500 to 1,000

## CONVERSION TECHNIQUES

MHz. Yet another opted for 900 to 1,400 MHz. That hurt.

You could **not take** an SA demodulator, that was designed to operate within the BDC range of 250 to 750 MHz, for example, and plug it into a Hughes BDC that produced an output in the 500 to 1,000 MHz region. In effect, they had each chosen a different part of the spectrum to use as their IF. And you had to have 'IF compatibility' if you were going to 'mix and match' various brands of BDCs and various brands of IF demodulators.

In spite of the fact that the various versions available did not allow the user to swap back and forth, the concept caught on. Early fears that the reliance on a single downconverter (BDC) might put the entire system out of service if that one unit failed proved groundless; BDCs, it would turn out, were among the more reliable pieces of hardware available.

There are other reasons why the BDC approach makes excellent sense for certain types of installations:

- 1) **Two or more receivers** . . . when you have two or more receivers sharing the same antenna, there are potential 'interaction' problems between the receivers. This is especially true when the receivers are 'single conversion' units and they are not equipped with an 'isolator' device. In fact, one receiver will 'talk to' the other receiver, causing interference and knocking the second one out of service on certain channels.

The BDC approach cures this, totally. Because of the relatively high IF (intermediate frequency) employed by the BDC approach, the receivers never 'talk to each other'. That's good.

- 2) **Improved system performance** . . . it is inherent in the presently available 'commercial' BDC packages that there is more care, better quality parts, and better engineering with the BDC unit, and the demodulators that go with that unit, than with virtually any of the single conversion receivers available. That is not a blanket indictment of single conversion receivers; it simply notes that most single conversion units do cut some corners to hold the prices down.

The BDC approach, and market, is largely the semi-professional or professional marketplace. For a 'private cable/SMATV' installation, where a receiver is apt to be dedicated to a single transponder all or most all of the time, the BDC demodulator can simply be designed to deliver a better, higher quality picture. When you are feeding 50 or 5,000 television receivers with a master antenna, that becomes an important consideration.

Now, what happens when the industry we all live in decides that the BDC approach is a good one? Isn't that contrary to our 'cheaper is better' and 'drive the price down philosophy'?

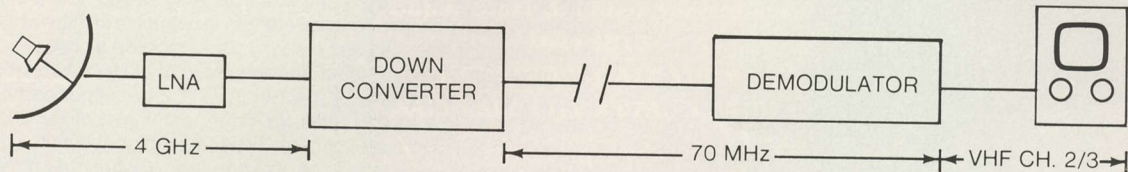
### THREE IN / More Coming

There are, presently, three 'established' packages in the private TVRO field. And several others are on the horizon. The question becomes, what do they do, when do you use them, and are they all chasing a very small, insignificant marketplace?

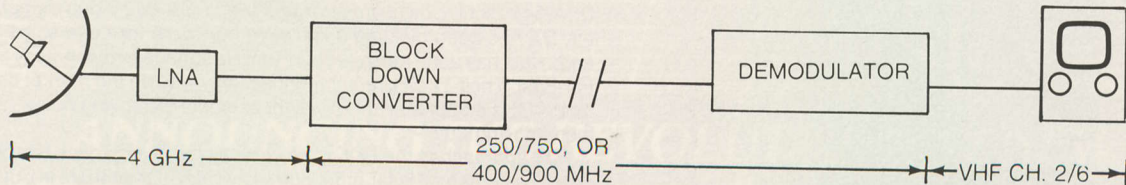
**First in was AVCOM** with their COM-66(T) series of BDC units. AVCOM is the most expensive of the three systems presently available, and it delivers excellent quality pictures. AVCOM suggests you



## CONVENTIONAL



## BLOCK DOWN CONVERSION



install the BDC at the antenna, in a housing they provide or in some type of weather (or at least moisture) proof housing. You connect your LNA to the BDC input, and power to operate the LNA can either be fed to the LNA through the same cable as brings the 3.7/4.2 GHz energy to the BDC, or alternately, via a separate powering line if your LNA requires a separate power plug. There are no user adjustments in the BDC and it fits in the palm of your hand. The BDC connects to the indoor demodulator(s) through a piece of RG-59, or some other suitable 75 ohm cable. Runs to 200 feet are recommended but longer runs could be used by proper selection of lower loss connecting cables. You also run a two wire powering line to the BDC, from the demodulator since AVCOM feels that it is bad engineering practice to haul the LNA operating voltage and current through RG-59.

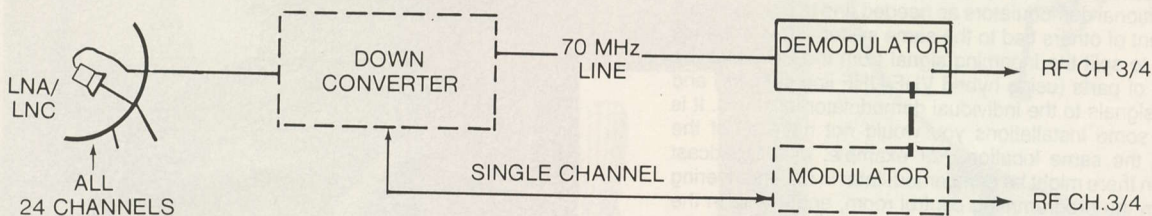
The COM-66(T) series is a double conversion package: the IF signal range fed indoors from the BDC-60 is in the region of 250 to 750 MHz. The demodulator, indoors, is rack mounting and has a 24 channel selector. It ends up with a standard 70 MHz IF which means

that standard terrestrial filters and other 70 MHz accessories can be adapted to the system.

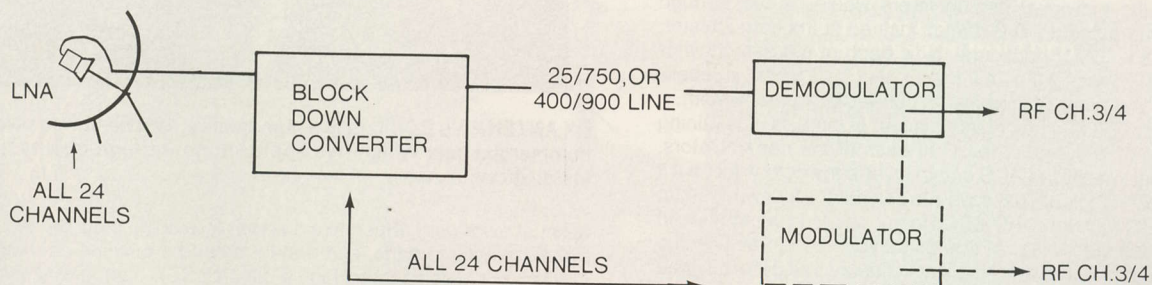
Since there is now power being handled in the RG-59 (or other) RF line connecting the BDC-60 to the 66(T) demodulators, you can feed virtually any number (up to 12) of the 66(T) demodulators with the same BDC. That means that if you really wanted to do 'it right', you would dedicate a separate 66(T) to each of the transponders on the chosen polarization (or 24, for each of the two polarizations) and then feed each to its own 'cable modulator'. The BDC drive comes in from the outdoor unit and is 'split' into parts utilizing standard, hybrid, CATV (VHF-UHF) signal splitters. You use a two-way hybrid to feed a pair of receivers, a four way hybrid to feed four receivers and so on. With a little pre-engineering, you can feed multiple demodulators with far greater utility, and better results, than trying to split 4 GHz into several parts using the far more expensive 4 GHz signal splitters.

The 66T series is not a home receiver. Yes, you **could** sell a 66 system for a home but it is not likely that people who are used to the

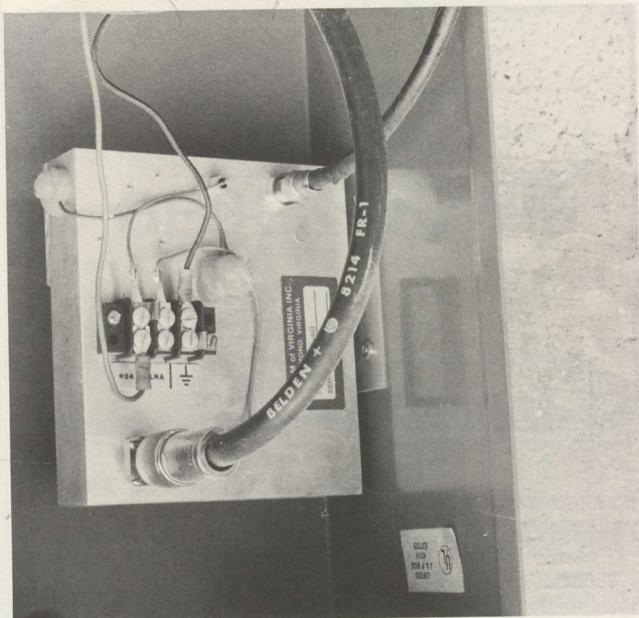
## CONVENTIONAL



## BLOCK DOWN CONVERSION







**AVCOM's BDC-60 is intended for picture-quality commercial installations; LNA powering can be cable fed or wire fed.**

convenience of single button tuning would want the engineer-oriented 66(T) series unit in their home. To date the marketplace for the 66(T) has been almost totally commercial; broadcast stations, SMATV installations, and cable. One of the 'clever' things that AVCOM did with this unit was to adopt the Scientific Atlanta IF range. That means, unlike other commercial packages, it is possible to install a BDC from either S/A or AVCOM, and then inter-mix the demodulators since both look at the 'same IF range.'

Like most AVCOM products, the 66(T) has plenty of user utility. For example, there is a signal level meter (adjustment pot is on the rear panel), tunable audio, wide and narrow audio filtering (switch selectable), a pair of video outputs and both an RCA jack and a terminal strip for output audio. For scrambled transmissions, the clamp may be disabled internally. IF and video gain are also user adjustable (set and forget at time of installation) internally.

The utility of such a system, for professional installations, is the ability to add additional demodulators as needed and to operate each totally independent of others tied to the same system. This depends upon being able to split the incoming signal from the BDC into the required number of parts (using hybrid VHF-UHF line splitters) and then routing the signals to the individual demodulator locations. It is possible that in some installations you would not have all of the demodulators at the same location. For example, in a broadcast station application there might be one demodulator in the engineering center, another in the programming control room, and a third in the management section. Each of the locations would have independent selection of the programs received. In a more elaborate installation, two LNAs (one on vertical, one on horizontal), and two BDCs (one on vertical, one on horizontal) would each process their respective polarizations. Then the individual demodulators would be fed through appropriate splitters and an 'A/B' switch located at the demodulator; 'A' for vertical, and 'B' for horizontal. Now **each** of the demodulator locations can select **any** of the 24 transponders from a bird, independent of each of the other demodulators connected to the system.

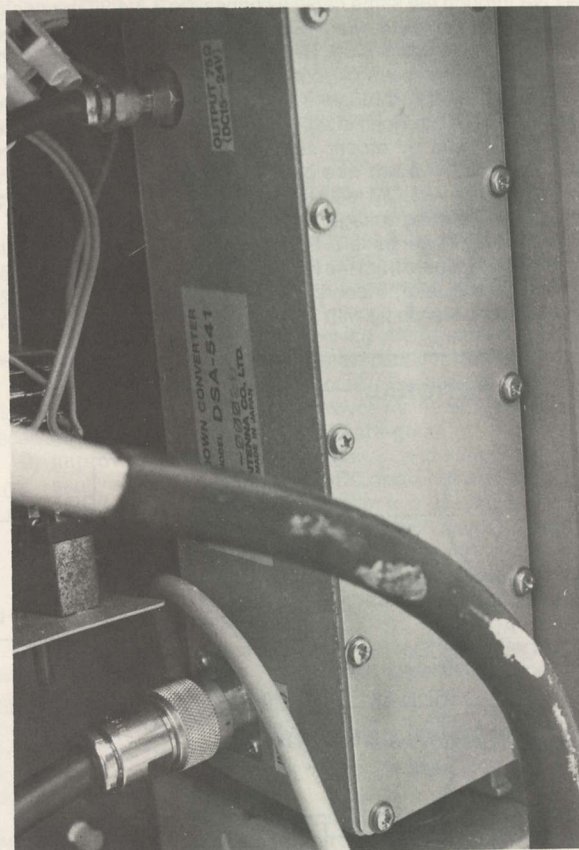
The problems you run into, doing this sort of thing, is maintaining the proper level of IF range 'energy' to each of the demodulators. AVCOM does not specify the BDC output level to the output line, but it is in the +10 dBmV region. That says you can drive a four way splitter at the end of a 100 foot run of RG-59/U (foam) and then go another 50 feet or so on each output leg. At that point, you need to amplify the 250-750 MHz region with a line 'amplifier' to insure that demodulators further away have a sufficient signal voltage level to function properly.

Designing all of the possible variations in BDC/IF distribution

systems is clearly beyond the scope of this initial look at BDC technology. There is this simple suggestion. You know you have a problem with line losses at the BDC output IF range when you notice that the higher satellite transponders are starting to get noise in them while the lower channels are crisp and clean. This is because all coaxial cable has more signal loss at higher frequencies than at lower frequencies. When you block convert 3.7 - 4.2 to .25 - .75, the upper part of the satellite band (4.1 to 4.2) ends up in the upper part of the BDC IF region (.65 to .75 in our example). Thus these higher satellite transponders will be the first to show signs of 'noise' when you have too much coaxial cable between the BDC and the demodulator. We'll come back to this topic shortly since it is a problem that is common, in varying degrees, to all BDC systems.

**Number two into the pool** has been the **DX Antenna Company** DSA-541 Block Downconverter and their DSA-642 video demodulator. **DX** has been building microwave hardware for quite some time and in fact has done much to push 12 GHz Japanese technology in the Far East. Their 12 GHz equipment actually was on the market before their 4 GHz equipment; an excellent example of 'moving down' rather than 'moving up'!

**DX** approaches the BDC system with typical Japanese thoroughness. Their manual is far more complete than many others in our field and actually teaches you how to wire together various equipment configurations for a variety of private and professional uses. Moreover, they back up their basic BDC and demodulator units with a line of



**DX ANTENNA's BDC unit is a high quality, well designed piece of commercial gear which has applications for high quality home installations as well.**

optional extra parts that make it easier to amplify the BDC IF range signal, split it into parts, and route it around a building or complex.

**DX** has chosen a rather high IF for their BDC output; .9 to 1.4 GHz (900 MHz to 1,400 MHz) to be precise. There are good engineering reasons for this, and perhaps a couple of clever marketing reasons.





*The Satellite Television  
Super Store & Video Specialists*

262•8813

5665 SOUTH STATE STREET  
SALT LAKE CITY • UTAH • 84107

## ANNOUNCING THE REVOLUTIONARY NEW COMPONENT SATELLITE ANTENNA SYSTEM



8' SPUN ALUMINUM



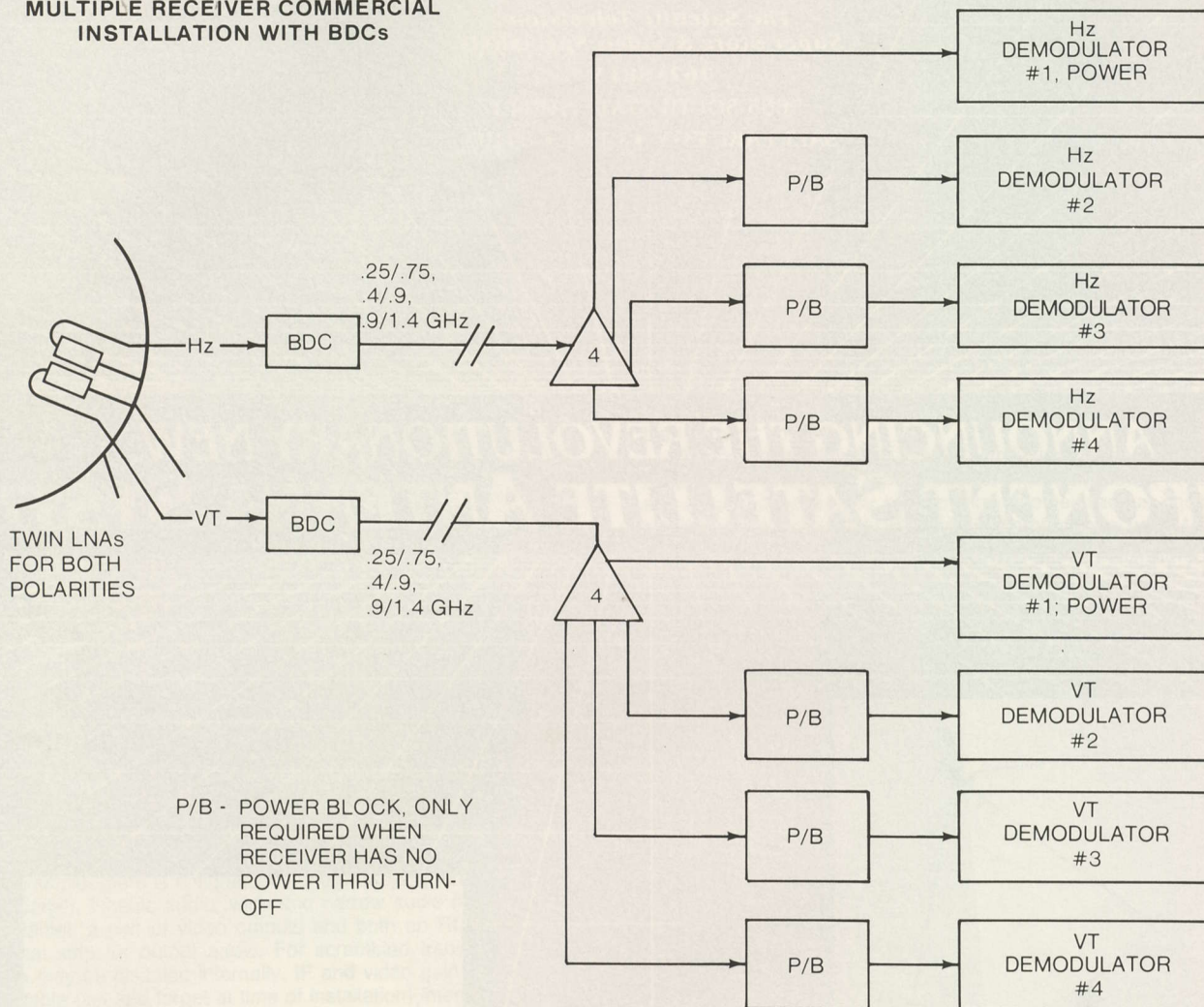
10' OR 13' MESH



10' PRODELIN  
COMPRESSION MOULDED



# MULTIPLE RECEIVER COMMERCIAL INSTALLATION WITH BDCs



Unfortunately, it makes life slightly more difficult for the installer. We'll see why.

Their BDC carries operating power (24 VDC nominal) to the system through the interconnecting coaxial cable that ties back to the demodulator. On the back of the 642 Video Demodulator unit is a choice; you can select 15 VDC or 24 VDC to send up the line to the BDC. You select the 15 VDC 'tap' when you are powering only the BDC, or the 24 volt tap when you wish to power an LNA on the 'other side of' the BDC. You will also select the 24 volt tap when you are installing line amps between the BDC and the demodulator; a point we'll look at shortly.

The 642 has push button selection of transponders with a master 'vertical' and 'horizontal' selection switch. Thus the 12 buttons cover all 24 transponders. The receiver has a 30 MHz wide IF (at the final or second 130 MHz IF range) and has been designed for optimized high definition performance in commercial grade installations. There is also a front panel 'fine tuning' control for the video, as well as an audio subcarrier tuning system that covers the range from 5 to 8 MHz. On the rear panel, you have the IF input connector (fed from the BDC), an input attenuator control, RF output (channel 3 or 4, switch selectable) from an internal modulator, a video output and an audio output; and, a composite output for the audio subcarrier region.

The choice of a .9 to 1.4 GHz IF range, out of the BDC, presents

the installer with the largest number of 'unknown factors'. This frequency range is outside of the normal UHF TV range (470 to 890 MHz) and there are, therefore, no readily available line amplifiers and parts available (including line splitters) so that you can, in the field, make up your own distribution networks for the BDC output signal. DX covers you here by offering their US-3S line amplifier (20 dB of gain at 1.4 GHz), and a series of 2, 4 and 8 way power dividers (i.e. splitters) that have been designed to function in the 'unusual' IF range chosen.

Cable loss, connecting the BDC to the demodulator, at .9/1.4 GHz, is not to be taken lightly. You can 'stretch' line lengths (with RG-59/U, the larger and lower loss RG-6/U or RG-11/U foam) at lower frequencies (such as 200 to 900 MHz) without running into trouble rapidly. When you start stretching at 1.4 GHz, in these basically low-frequency cables, you are apt to find the higher frequency end transponders (those nearest to 1.4 GHz in the IF scheme) progressively getting down into the noise as the transponder number gets higher. That is obviously something to consider when planning such an installation.

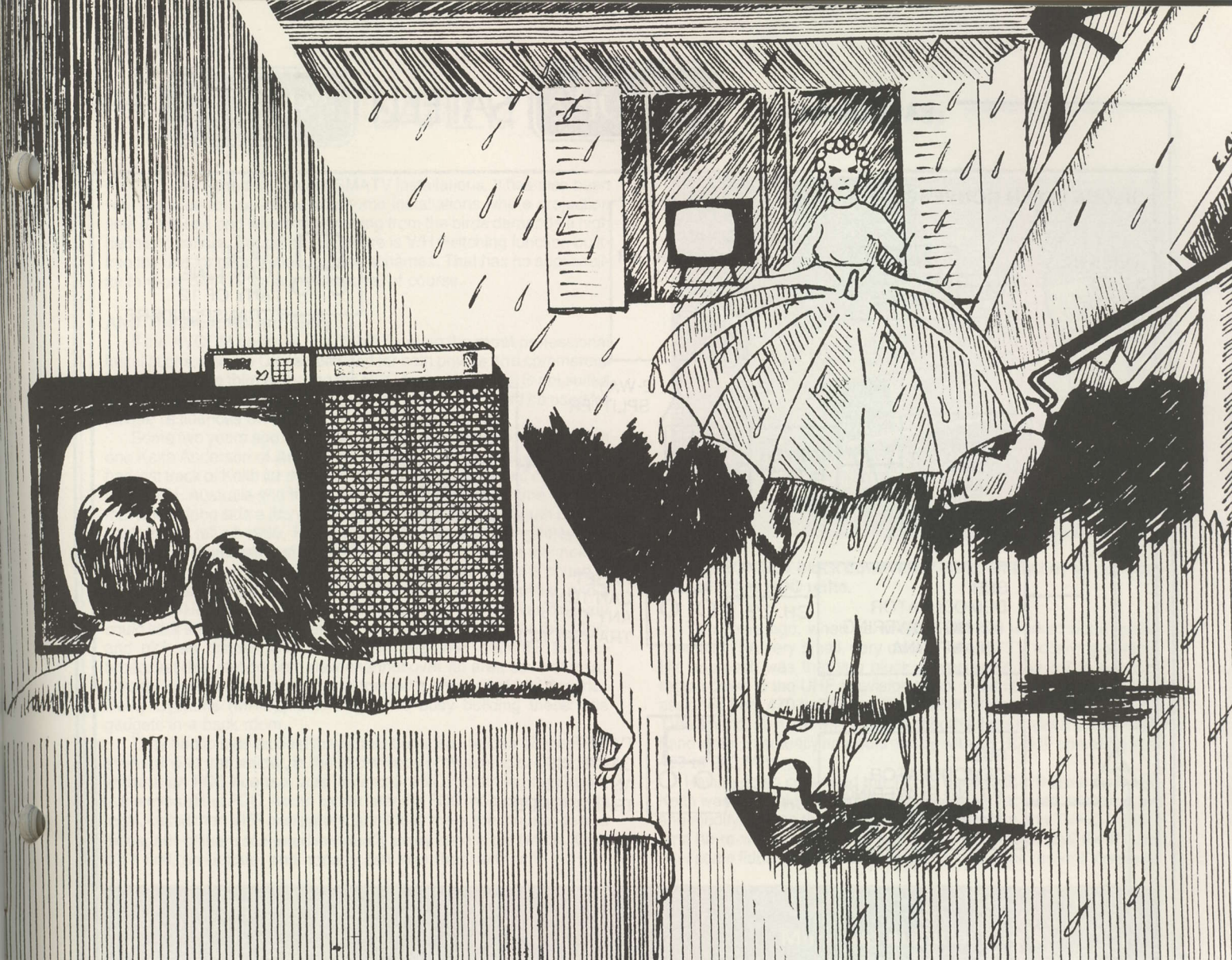
DX suggests that you limit yourself to 150 feet of RG-59/U (or 250 feet when using foam versions of the 59) when connecting a single BDC to a single receiver. If you were using any of their multiple outlet splitters/power dividers, your maximum line length would shorten up the additional loss-per-leg attributed to the splitter.

In our test installation, we first ran the 4 GHz signal inside in 7/8ths

WH  
na  
the  
Sta  
mo  
and  
Wi  
rea

Man  
Com  
3678  
Salt  
801-9

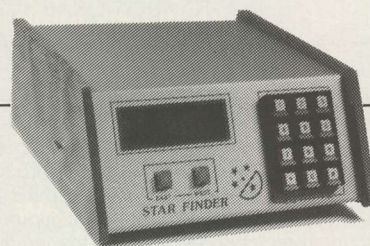




## Don't Be An Old Crank, Power Your Dish

When the forecast calls for rain, sleet, blizzards, tornadoes, hurricanes, or just downright rotten weather, there is no need for you to go out to move the dish. The Star-Finder will do it for you. With state-of-the-art remote control, the Star-Finder can pinpoint each satellite and at your command move your dish.

With large LED readout, the Star-Finder is easy to read, even from across the room. And if the Star-Finder



needs your assistance, it will tell you by reading out "HELP". So, why not get the finest in the industry.



**STAR-FINDER**

For Distributor Prices call: 801-974-5411

Manufactured by:

**Computer Video Systems**  
3678 West 2150 South  
Salt Lake City, Utah 84120  
801-974-5411

**Satellite TV Specialists**  
5665 So. State Street  
Salt Lake City, Utah 84107  
800-292-3661

**Pats A-1 Appliance**  
2225 East Lottman  
Las Cruces, New Mexico 88001  
505-526-2412

**American Micro Supply**  
500 South 9th Street  
Cambridge, Ohio 43725  
614-439-7771

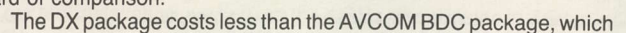
**Nortec**  
P.O. Box 328  
Kenora, Ontario, Canada  
P9N3X4  
807-548-5998

**Via Sat.**  
5201 Bridge Street  
Fort Worth, Texas 76013  
817-451-6601

**Total Vue Marketing**  
7844 Madison Ave. #167  
Fair Oaks, California 95628  
916-962-1177

The Star-Finder is exclusively at these U.S. and Canadian distributors...







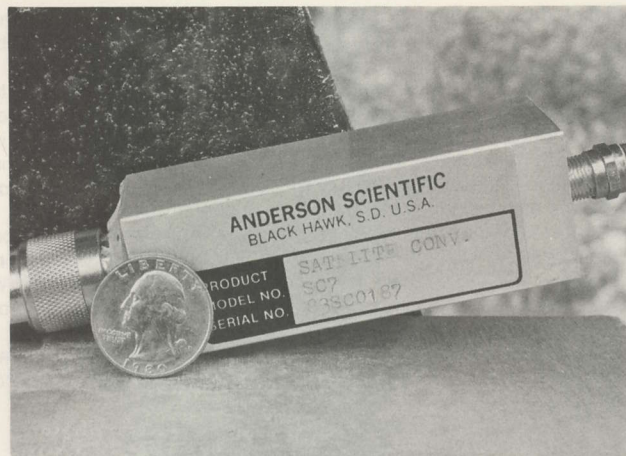
makes it well suited for private/SMATV installations. It has also been well received for top-of-the-line home installations where projection sets are in use and where videotaping from the birds demands a high definition picture. For home use, there is V/H switching function built into the unit for polarization rotation schemes. That has no applicability to most SMATV type installations, of course.

#### AND The Most Recent Entry

If the AVCOM package is suitable for even the **most** professional installations, and the DX can be used for both private **and** commercial installations, the third entry into the BDC technology pool is not suited to anything but private use. But, here is the kicker, it could be used for private residences on a commercial basis.

Some two years ago we received a letter and a flier in the mail from one Keith Anderson of **Anderson Scientific** in Black Hawk, SD. We had lost track of Keith for more than a decade, and it turned out he was in Canada. Australia and the Phillipines for much of that time. We first met Keith along side a tiny dirt landing strip in the hills of South Dakota back in the fall of 1960. He and a partner were building television 'repeaters'. Keith was a whiz with the then new solid state technology and he had figured out how to take a box about the size of a pound of butter and stuff into it a VHF television receiver, an IF amplifier, and a one watt VHF, solid state, TV transmitter. Keith's claim was that you could stick this small container on a chunk of pipe on top of a mountain and pick up distant VHF station, on one VHF channel, and re-broadcast that station on a new channel over an area several miles across. Keith and his partner had formed a firm called Mid America Relay Systems (MARS) and they were busy building these little gadgets in a back room.

They had to hide as best they could because the idea of operating even a 1 watt transmitter, in the backwoods of Wyoming or Colorado, **without an FCC license**, was tantamount to proclaiming revolution, in the eyes of the FCC. About a year later the FCC made such gadgets legal, called then VHF translators, and today there are thousands and thousands of them scattered in virtually every state in the Union. Keith did it first, solid state, and nobody can take **that** from him.



**ANDERSON SC7 block downverter is extremely tiny by comparison to other BDC units.**

Two years ago, when he wrote, Keith had worked out a similar 'revolution'. A very small, very cheap, satellite TV receiving system. His approach was that you block downconvert the 3.7 to 4.2 GHz region down to the UHF television band. It didn't quite fit (UHF TV is assigned from 470 to 890 and it takes 500 MHz to squeeze in the full TVRO band) so Keith was pushing at both edges to get a full 500 MHz bandwidth. Eventually he would end up with his BDC IF operating from 420 to 920 MHz.

Having down converted the TVRO band to that frequency range, Keith was then taking a small Japanese manufactured television **set** and modifying it so that it would tune-in, **directly**, the TVRO signals. First he re-worked the tuner, and then the detector and the IF, and after some fiddling and parts changes he had a converted TV receiver

#### More top manufacturers

Dexcel, Drake, Auto Tech, K.L.M., Luxor, Wilson Microwave, Chaparral, M.A.G., Cable Inc., Beach Craft, Tweaker, and more.

#### More dependability

Full manufacturers warranty depot.

#### More versatility

We have an exchange program

#### More value

We offer the lowest prices in Canada

#### More speedy delivery

We carry all items in stock

#### What more can you ask?

Contact us for more information



128 INDUSTRIAL PLACE  
PENTICTON, B.C. V2A 6X9  
(604) 493-7228 (604) 493-7229

**Canada's #1 Satellite Television Distributor**



that produced really quite decent color satellite TV. He re-worked the audio stage so that it would recover the standard TVRO audio sub-carriers as well.

Keith had no desire to manufacture the system, but he did want to see it get into production. He would be satisfied with a royalty arrangement. After some looking we found a company that was interested in producing the package. We'll stop the story there to avoid stepping on some tender toes. Suffice to say that this particular package is **not** what we are going to write about here. Not quite.

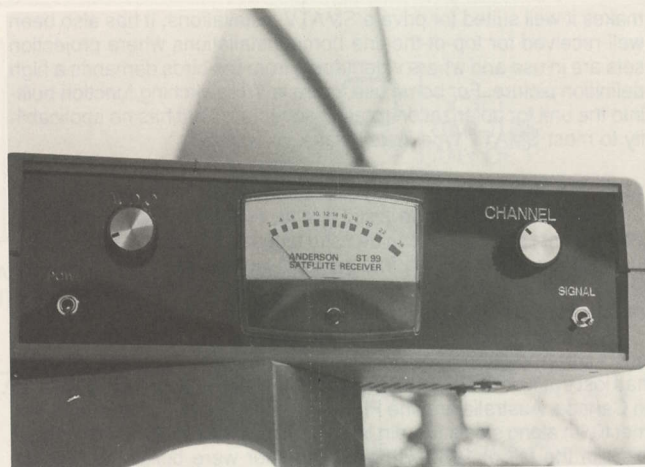
Late last fall, Anderson Scientific came out with their latest version of that basic technology. It consists of an **SC7 block downconverter**, and either an **ST99** or an **ST100 demodulator**. If you understand how block downconversion works, now, you have a pretty good grasp of the Anderson package.

There are two primary attractions with the Anderson package; price, and, versatility. The versatility is, in a sense, directly related to the price.

The concept from Keith Anderson is this:

- 1) One TVRO antenna can serve more than one home.
- 2) Each home can have totally independent selection of any transponder on that satellite, without affecting any of the other television receivers connected to that system.
- 3) You wire from the 'master antenna' to each of the homes with simple, low-cost cable; such as RG-59, RG-6, RG-11 or if you are really in the big time, some of the .412 or .500 or .750 solid aluminum jacketed 75 ohm CATV cable.
- 4) To make up for cable loss, you select readily available, off-the-shelf UHF MATV 'line amplifiers', which are commonly stocked at reasonable prices at thousands of locations nationwide.
- 5) To split off signal to feed an individual home, you select readily available, off-the-shelf UHF MATV splitters and signal tap-off devices; also commonly available.
- 6) **You do all of this cheaply.**

We saw this system **operating** in **May** of **1981**. We have seen later versions in the interim years and this past February Keith sent down the latest version for us to test. This is a report on that test.



FRONT PANEL STT99 demodulator.

The Anderson SC7 BDC is so small that you will at first figure they left it out of the shipping container. We show it here with a quarter, for size reference. It operates on a 12VDC supply sent to it via the RG-59/U coaxial cable that connects its output to the first demodulator in the system. For those who are into powering requirements, it uses 15 mA of current at 12VDC; not much. The SC7 also passes power to the LNA, and LOCOM or most Amplica or Avantek LNAs will operate properly at the 12 volts passed through. The SC7 looks like it **could** sit out of doors, but we **don't recommend** that you leave it totally outside without some form of protection (wrap it in COAX SEAL, cover it with Heat Shrink tubing, etc.).

There is a single screw-driver type adjustment on the SC7. This allows you to offset the downconverted channels one way or the other; it is also, we found, an installation procedure that you probably should

# AVM-100X

## AUDIO-VIDEO MODULATOR

### IN STOCK



- Crystal Controlled Master Oscillator
- +15 to +55 dBmV output
- Integral band-pass filtering
- Image and Harmonic Rejection: 55 dB minimum

- Any channel: Low, Mid, High Band, VHF
- Four Level Controls: Audio and Video Mod, Sound and Output

**Transifier, INC.**

A SUBSIDIARY OF PICO PRODUCTS, INC.  
415 Gator Drive, Lantana, Florida 33462  
(305) 588-7356



follow at least once when it is installed. We'll explore why later.

At the other end of the RG-59/U (or whatever cable you select; Anderson suggests that you can run up to 145 feet of standard 59, or up to 290 feet of standard RG-11/U) is the ST99 or ST100 demodulator. The ST99 is the bare bones model. It had two connection points on the rear; LNC (SC7) input line, and, TV out (internally modulated on user selectable TV channels 4, 5 or 6). That's it. Two F59 fittings and you are in business.

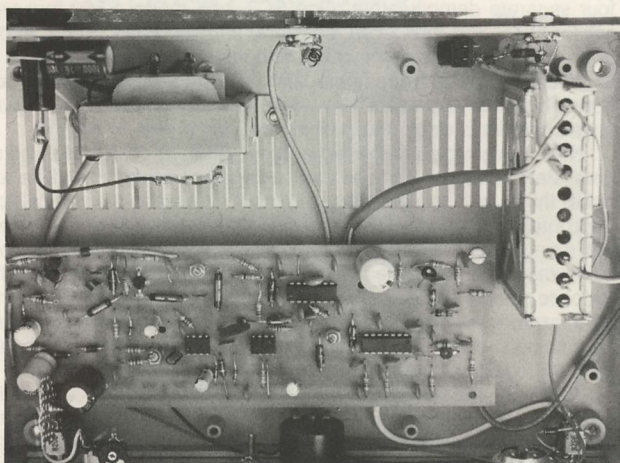
On the front panel you have an audio subcarrier tuning knob that covers the range from 5 to 8 MHz. Maximum counter clockwise is a 'click' position which is pre-set to 6.8 MHz (it could be pre-set anywhere in the 5 to 8 region). Then you have a switch that controls the front panel meter; in one position the meter reads signal strength for antenna peaking. In the opposite position the meter reads the transponder number. Connected to the latter function is a knob that turns and turns . . . you are changing channels as you tune the knob, and the meter tells you where you are tuned. There is also a power on/off switch, and a small screwdriver adjustment under the meter which you use to calibrate, if required, the meter when it is in the 'transponder readout' switch position.

That's it.

Now if you want to go for the fully equipped version, the ST100 adds to these functions an AFC switch (turns it off for tuning weak signals), a SCAN switch (rate is 1 pass per second), a subcarrier output jack for feeding an external audio subcarrier detector, and an external meter jack which you could use to remote control the signal level meter out at the dish.

As the photo of the interior of the demodulator is bound to reveal, Anderson is a not one to waste expensive parts. John Ramsey would appreciate Keith Anderson.

What we have here is the same driving force that caused Anderson in 1960 to reduce the television translator to a box the size of a one pound container of butter. What he has done will probably alarm some of the purists in the crowd. Frankly, the Japanese could learn a great deal from Keith.



INSIDE - Anderson ST99 block downconversion demodulator.

Which brings us to the price, before we go on with the description of the package.

Anderson publishes a 'Dealer Price List'. This assumes you tell Keith that you are a dealer, and that you purchase one each of the products. There are 21 products listed but we'll hit the important ones only:

- 1) SC7 Block Downconverter .....\$190
- 2) ST99 Satellite Receiver.....\$350
- 3) ST100 Satellite Receiver.....\$450

As a 'dealer' that means you can package an SC7 and an ST99 for \$540. Then you can add a two-way line splitter (model S556 at \$3) and another ST99 (\$350) and now you have (with some cable) two separate, independent, TVRO receive terminals for \$893. Carry it out to

Moldable PLASTIC



COAX-SEAL®

SEALS COAX FITTINGS  
FROM MOISTURE  
AND CORROSION!

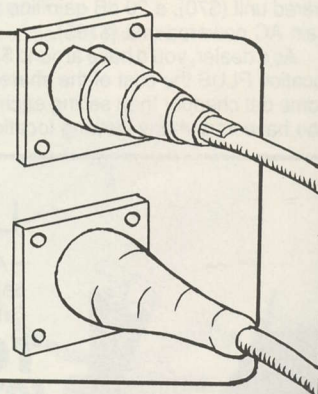
NEW! Only material that will adhere to poly vinyl or vinyl outer coax jackets!

- Only material that will adhere to poly vinyl or vinyl outer coax jackets.
- Forms and seals over odd shaped and difficult fittings.
- Non-contaminating and non-conductive.
- Wide ambient temperature range ( $-30^{\circ}\text{F}$  to  $+180^{\circ}\text{F}$ ).
- Stays flexible for years thus insuring moisture proof connections.
- Reuseable - allows you to quickly disconnect fittings and reseal them with the same material.
- A must for satellite TV - microwave work - wire antenna at solder joints - in the shack.

DEALER INQUIRIES  
WELCOME

Packaged in convenient  $\frac{1}{2}$ " x 60" roll. 2 rolls \$6.00 post paid.

COAX-SEAL . . . the new space age material that is quick and simple to apply. Remove backing from approximately 6" of plastic. Wrap outer covering toward fitting. After wrapping, knead to form a smooth surface and force out air. EFFECTIVE — FOOL PROOF — INEXPENSIVE.



UNIVERSAL ELECTRONICS, INC.  
1280 Aida Drive • Reynoldsburg, Ohio 43068

END YOUR LNA MOISTURE PROBLEMS / see CSD for JUNE 1982,  
and recommendations for using COAX-SEAL.



four separate demodulators (One SC7, one model S560 four way splitter at \$5, and four ST99 receivers) and you have \$1685. Add a dish and an LNA and some cable, and you can serve four homes or four locations in the same home, **each with independent selection over which transponders they want**, for less money than you would have spent for a single receiver system just a year or so ago.

Now let's get back to the technology. When Anderson showed us his system in May of 1981, he tried to impress us that if you did a few clever things with the feed you could park it between the vertical and horizontal polarizations and independently clip off all 24 transponders with a single downconverter and single LNA. It worked, after a fashion, but it was not comparable to watching a single transponder with the opposite polarity properly cross-pole attenuated. Keith still offers this as an **option**, but reading between the lines we think he may himself have come to the realization that for just a few dollars more you can get good quality on **both** polarizations.

The ST99 and the ST100 are available in both 'narrow' and 'wide' (video IF) bandwidth. The unit we tested is a wide unit, which means that if you park the LNA probe half way between vertical and horizontal, you get them both; **together**. With the optional 'narrow band' version, you park half way between and get both; **independently**. The last time we saw this work, we felt that the reduction in video detail, slight buzzing in the audio, and tearing when the screen had a superimposed set of letters or numbers was not a good trade off. We do want you to know it is available.

With the price of the individual demodulators down quite low, there is a better way to give your family, or your neighborhood or your condo total selection of all 24 of the F3R transponders.

- 1) Put in a decent quality dish.
- 2) Equip it with an orthomode (dual polarization) feed, such as that offered by Chaparral.
- 3) Hang **two** LNAs on it, one for each polarization.
- 4) Install a **pair** of SC7 downconverters, **one for each** polarization.
- 5) Run **two** separate pieces of RG-59/U or whatever cable as may be suitable for your planned distribution system to each receiver location.
- 6) Install a \$10 MATV "A/B" switch that allows the person at each ST99/ST100 location to select between a 'vertical' (such as 'A') and a horizontal ('B') cable feed.

If you stop and analyze such a system, each individual viewing location will have the cost of the ST unit plus the cost of the switch plus a pro-rata share of the antenna/SC7/LNA package. Each will also share the cost of the cable plant that ties everyone to the antenna, or to each other. Yes, you would wire this like a cable TV system is wired; go from the antenna to the **first** location, 'tap-off' some signal (Anderson has a line of tap-offs for \$5 or less each) for that location, and then go on to the next location. When you need an amplifier to make up for line losses or tap-off losses, Anderson offers a 10 dB gain line powered unit (\$70), a 20 dB gain line powered unit (\$100) and a 22 dB gain AC powered unit (\$135).

As a dealer, you'd have around \$500 average in each demodulator location PLUS the cost of the shared dish/SC7s/LNAs. It is bound to come out cheaper than selling each location their own private dish; if you have very many viewing locations.

We have operated our package for about one month. We started off sticking it on a 12 foot dish that was handy, and were surprised to see good (better than fair, but not excellent) quality pictures. Then we moved it to our Harris ten foot dish and did an A/B comparison on difficult F3R between the Anderson package and an AVCOM COM-2 receiver. The COM-2 won, but we would have been shocked had it not. But you can't share the service from a COM-2 (or **any** conventional receiver) except on a single channel at a time. With the ST99 you can.

On the negative side we found three things we did not like. We've communicated with Keith Anderson about each and feel that at least two of them can be resolved to our satisfaction.

- 1) **The instruction manual** tells you how to shift (using the tuning slug on the SC7) the output frequency of the BDC so that if you are losing **either** the high end (such as 23 on vertical or 24 on horizontal), **or**, the low end (such as 1 on vertical or 2 on horizontal), you can get them back. Unfortunately, the manual does not tell you what to do if you are losing **both** ends! We were and Anderson is working on this for us.

The worst possible solution to this problem would be that for whatever reason, you might lose a transponder or two at one end (we could bring it back so we had either the high end, or the low end back in but not both). I guess Nickelodeon and PTL might get 'tuned out' in the worst case scenario here.

- 2) **We found some hum** (like in AC line frequency 'buzzzz') in the audio. Not real bad, in fact it was not noticeable on all transponders; just on a few of them. We suspect a power supply filtering problem and believe this one is easily solved.
- 3) **We also found some 60 cycle AC** (the video equivalent to hum in the audio) in some of the video transponders. It was faint, in the worst case, gone in the best case. No, the video hum and the audio hum did not correlate. Again, we believe this one can be fixed.

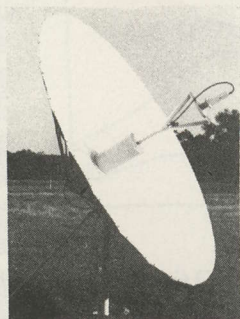
**A few words about the manual.** Anderson is exploring some new technology here. He is wise enough to realize that a person who is new to satellite TV also is new to distribution-by-cable TV technology. His manual is one of the most complete manuals we have seen in this industry in years. If you can read common English, you'll have no problems figuring out how to use the equipment and how to wire up your home, your block or your apartment building. If you happen to have even a smattering of MATV/SMATV/CATV background, know and understand what a distribution system using coaxial cable is, and how it works, you will feel right at home with Anderson's technology. If you don't, but know somebody who does, you've got it made.

**The danger we see with the system is**, however, many-fold. First of all, if Anderson's concept catches on, his wide open circuit board and his technology invites imitation. We feel Keith is entitled to make a fair profit for the several years of R and D that lead him to where he now is and while we won't suggest that the present receiver (and SC7 block downconverter) can't be built and sold for less money, we will note that if the same products were being produced in the Far East they would roll the SC7 off the assembly line for about \$10 cost each and the ST99 for well under \$50 each. We hope Keith has a great several months; it will take the Far East that long, at least, to tool up and start flooding us with their versions of the same technology!

#### BDC — Synopsis

If you have stayed with us this far, you are probably wondering when the inventive technology in the home TVRO field will ever end. Block downconversion, when we started, looked like a high priced technology for commercial and semi-commercial installations. That's the way the entire home TVRO field got started; we took what the big boys had developed for commercial installations, and we scaled it down, and forced the price down, into a realm that made sense for the home TVRO terminal enthusiasts. BDC, which offers certain unique features for high quality commercial installations, now also appears to offer certain unique, and downright cheap, features for the private home systems as well. When will it end? Probably never.

**ISRAEL** may be getting into Satellite business. A dual band (C and Ku band) bird is being studied with location near 12 east planned.



### Lowest Prices

HASTINGS 10½ Dish \$695  
Sat-tek R5000 Receiver \$350  
Gillaspie, KLM, Autotech

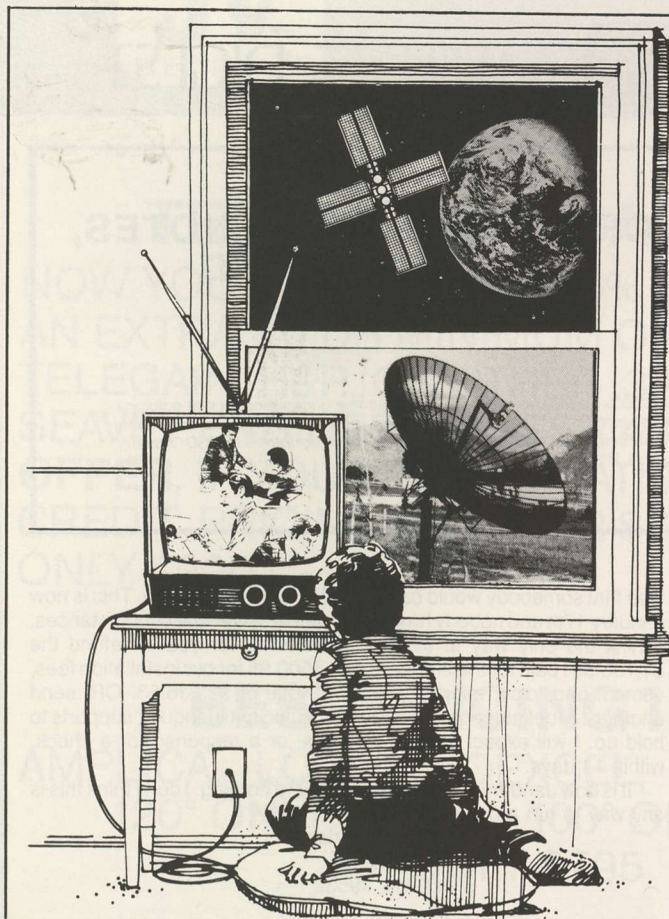
### TOTAL VIDEO SATELLITE SYSTEMS

P.O. Box 516  
Bainbridge, GA 31717

Georgia 912-246-6790  
Canada 416-826-8066

1-800-841-8506





## ON SAT-SCENE

### SEE AND HEAR THE SHAKERS, MOVERS AND DOERS OF SATELLITE TELEVISION

Bob Dushane • Janeil  
Bob Luly • Luly Telecommunications  
Yozo Satoda • Dexcel  
Bob Cooper • Coops Satellite Digest  
Bob Behar • HERO Communications  
Taylor Howard • Prof. Emeritus—Stanford  
Doug Denert • United Satellite Systems

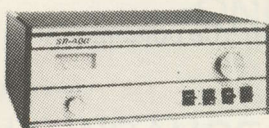
Broadcast Time  
Every Saturday on Satcom F3 • TR • 18  
2:00 p.m. EST 12:00 NOON MST  
1:00 p.m. CST 11:00 a.m. PST



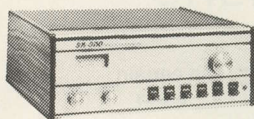
Executive Producer  
George Mitchell  
P.O. Box 327  
Sandy • Utah 84070  
801 • 561 • 0931

Program Sponsored by Satellite TV Specialists  
Coming Soon: "ORBIT ON THE AIR" ®  
The First Satellite TVRO Shopping Service

## NOW! FROM AN ESTABLISHED COMMUNICATIONS COMPANY HIGH QUALITY TVRO SYSTEMS and SATELLITE RECEIVERS



SR400 Receiver



SR500 Receiver  
With Modulator



SR600 Receiver  
With Modulator  
and Stereo

### THE QUALITY SHOWS

Our Six Foot System Plays Better Than Their  
Eight Foot System!  
Our Eight Foot System Plays Better Than Their  
Ten Foot System!  
Our Ten Foot System Plays Better . . . PERIOD

### THE THOROUGHNESS SHOWS

Six Foot System with SR 400 Receiver  
Eight Foot System with SR 500 Receiver  
Ten Foot System with SR 600 Receiver  
Thirteen Foot System with SR 1000 Receiver  
System Prices from \$2,000 Suggested Retail

### THE THOUGHTFULNESS SHOWS

All Systems include:

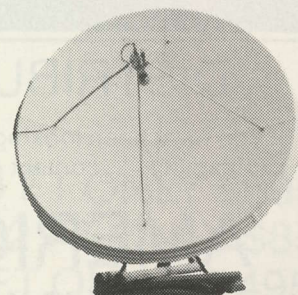
- Receiver
- Modulator
- 100° LNA
- Polar Rotor
- 100 Foot Cable
- Fibreglass Reflector
- Full Polar Mount

### THE DESIGN SHOWS

All Systems and Receivers are engineered for  
easy customer installation or *Profitable* dealer  
installation.

Handsome dealer margins — why not make  
money again?

Quality components throughout



A LIMITED NUMBER OF EXCLUSIVE DISTRIBUTOR TERRITORIES ARE AVAILABLE  
DEALER INQUIRIES INVITED



**SATELLITE RECEIVERS, Inc.**

4180 Elmhurst Dr. • Indianapolis, Indiana 46226 • Area 317+634-0611





## INDUSTRY AT LARGE

### CORRESPONDENCE, NOTES, REBUTTALS AND CHARGES . . .

CSD provides this industry Forum with the understanding that opinions, thoughts and "facts" published are from the writers, no liability for statements extends to the publishers. Address letters to CSD/Industry, P.O. Box 100858, Ft. Lauderdale, FL 33310.

#### FOLD UP ANTENNA

I don't know if CSD can help, but I have been having very poor luck getting any satisfaction from Janeil Corporation over an antenna which I purchased recently. The enclosed letter addressed to Mr. Dennis Dushane of Janeil explains:

"I purchased the Janeil 13' antenna on October 31, 1982 and received it on December 22, 1982 from JV Electronics, Inc. for the price of \$1,735.55; including shipping.

"During assembly, the triangular support on the lower side bent, causing the dish to fall over. Upon inspection, the chain reaction was for Petals D and E to be bent outward, then the hinge 5/8" bolt bent, and the rear arms on the back of petals D and E bent causing the dish to be out of round. Assembly instructions were followed closely, including a telephone call to your 'Jeff' at 801-776-0571 to verify the assembly instructions.

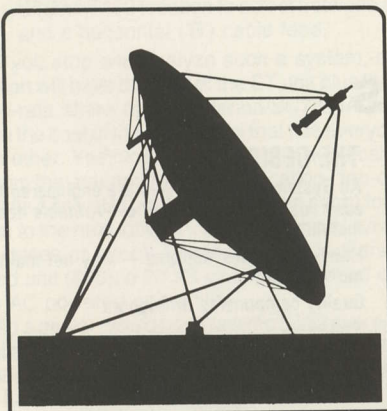
"The triangulation support is insufficient in strength to support the 13 foot dish. When I called you on January 3, 1983 you said another person would call me on January 4 at 10:30 with some help. When I didn't receive that call, I called back on January 12th and was prom-

ised that somebody would call me at 12 noon on that date. This is now January 17th and nobody has called me yet. Given the circumstances, I think the only way to settle this matter is for you to refund the \$1,735.55 I paid for the antenna, plus \$500.98 for our installation fees, cement pad, pipe, telephone calls; a total of \$2,236.53. OR, send another 13 foot antenna with proper or sufficient triangular supports to hold up. I will expect another antenna, or a response, or a check, within 14 days."

It is now January 24th, and I have heard nothing. I don't think this is any way to run a company!

Bernard S. Carlson  
Rt. 5, Box 242  
Biloxi, Ms. 39532

**If this was an isolated bit of flack about Janeil, we would never publish it on its own. However, as the front cover of CSD displays this month, there are other apparent problems with the product line. Follows a letter sent from Janeil to a well known distributor**



FINALLY!...

### QUALITY ANTENNA SYSTEMS AT AFFORDABLE PRICES\*

- 10' (3m) or 12.5' (3.8m) fiberglass antennas with true polar mount on triangular tripod base.
- 42+ db gain. • Optional remote tracking.
- 4 sections for easy shipping & installation.
- Total shipping weight less than 550 lbs.
- Complete electronics packages available.

DISTRIBUTORSHIPS STILL AVAILABLE in certain areas

\*If you have been looking for a distributorship for the "right" antenna system: quality/guarantee/price/profitability . . . contact us:

## AMERICAN ANTENNA INDUSTRIES



P.O. Box D • Tolleson, Arizona 85353  
(602) 233-2382





## WHOLESALE DISTRIBUTORS

41 CANAL STREET, BOX D208  
LANDING, NJ 07850 • TEL. 201-347-3206

### TECHNOLOGICAL BREAKTHROUGH

NOW YOU CAN ACHIEVE 80% FEED EFFICIENCY AND PICK UP AN EXTRA 1.0 DB MINIMUM ON YOUR VIDARE, PRODELIN, TELEGAIN, H&R, OR OTHER .3 f/D DISH WITH THE NEW SEAVEY ENGINEERING ESR 40 X FEED POLARIZER. **NO RISK OFFER**, IF YOU ARE NOT SATISFIED RETURN IT FOR **FULL CREDIT**. PRICING REGULAR \$300 INTRODUCTORY OFFER ONLY \$200

### BEST PRICING IN THE INDUSTRY

AMPLICA, LOCOM, DEXCEL, CALIFORNIA AMPLIFIER, LNA'S  
120° ONLY \$275    100° ONLY \$325    90° ONLY \$450  
80° ONLY \$795    70° ONLY \$995

### RECEIVER BUYS

PROLINE SERIES II    EARTH TERMINALS    DEXCEL DXP1100  
ONLY \$395    ONLY \$1095    ONLY \$899

ARUNTA SSP416  
ONLY \$775

LOWRANCE SYSTEM 7XL  
ONLY \$550

LOWRANCE SYSTEM 7AR  
ONLY \$699

AMPLICA RC10  
ONLY \$699

COOK-PRO  
ONLY \$799

### ANTENNA PRICING

VIDARE 10 FT NOW \$895  
VIDARE 13 FT NOW \$1295  
VIDARE 16 FT NOW \$2495  
JENSEN 8 FT ONLY \$595  
JENSEN 12 FT ONLY \$895

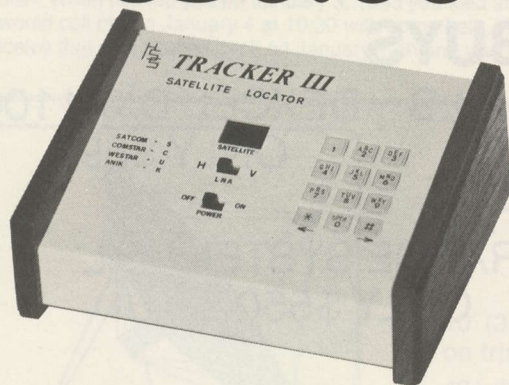
PARACLIPSE 9 FT ONLY \$695  
PARACLIPSE 12 FT ONLY \$850  
TELEGAIN 11 FT ONLY \$1495  
BEACH CRAFT MOTOR DRIVE  
NOW ONLY \$299

VISA AND MASTERCARD ACCEPTED!



# LAS VEGAS SHOW SPECIAL

**TRACKER III**  
**Satellite locator**  
**for only...**  
**\$650.00**



SEE US AT BOOTH 620

Distributors of Earth Satellite Equipment

## DELSTAR SYSTEMS

**(713)776-0542**

7800 Bissonnet, Suite 200, Houston, Tx. 77074

when he asked for a refund for defective antennas:

"Our warranty on all our documents expressly limits our liability to the working function for the product for one year. If you desire a replacement for any malfunctioning part such delivery will be made immediately upon request'.

And, follows, a letter from that well known distributor back to Janeil:

"Thank you for your response to my letter dated January 26, 1983. As the pictures (submitted) clearly show, damage to the antenna system is not limited to any one part of the antenna. Rust has affected all parts, even the bolts. The complete rusting away of portions of the mesh has destroyed the ability of acceptable reception of satellite signals.

"Do I understand your letter to require us to request replacement by listing **each part individually**?

"Also, are we expected to bear the expense of further freight charges, as a result of the failure of your equipment to withstand the elements, as promised by your advertisements and statements?

"As we receive inquiries regularly concerning the performance of your products, we are most interested in resolving this problem."

What the black and white reproductions of the original color photos do not perhaps show clearly is that everything that is not shiney-black is now rust-colored. Not by decorator design, either. The antenna in question, by the way, had only been installed five months when it fell apart. And it was installed in a rural/suburban neighborhood in a smog and salt free midwestern state region where the only damaging environment was some rain. We are certain Janeil will have a response which we look forward to publishing.



**MISSING?** The jack handle for antenna tracking. The small nub protruding from the center of the cylinder is where it was.



**DOWN THERE** on the ground. The Jack handle. Where it fell, after rusting through and falling off five months after installation.



# WINEGARD® INTRODUCES AFFORDABLE SATELLITE TV

WITH OUR NEW HOME SATELLITE TV SYSTEM  
FEATURING A TOP PERFORMING 8-FOOT  
DISH AND HIGH QUALITY RECEIVER



MODEL  
SC-5000  
PKG.

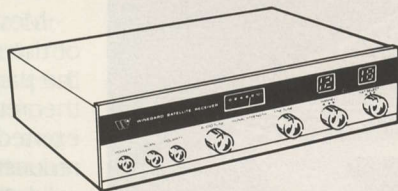


**WINEGARD®**

When you sell Winegard's Home Satellite TV System, you're not only selling a high quality package, you're also selling the kind of features your customers are looking for in satellite TV receiving equipment.

The Winegard Home Satellite TV System features an 8-foot spun-aluminum dish, a new state-of-the-art receiver that boasts a channel scan button for quick orientation, polarity reversal, signal strength meter, fine tune and audio tune controls, channel select with LED readout, a satellite select with LED readout for an optional satellite selector, and a built-in Polarotor™ that automatically changes to correct polarity for each channel.

## WINEGARD'S COMPLETE HOME SATELLITE SYSTEM INCLUDES:



Winegard's Home Satellite TV System includes 8' dish, receiver, 120° LNA, feed horn, down converter, Polarotor™, polar mount, hardware and 150-foot of cable. Optional items include a remote channel-select control and satellite selector for quick orientation from one satellite to another.

FOR MORE INFORMATION on Winegard's Home Satellite TV System, write Winegard Company, 3000 Kirkwood St., Burlington, IA 52601 or call (319) 753-0121.

## WANTED 2,500 EXPERIENCED HOME SATELLITE TVRO INSTALLERS

We have been asked by some of America's leading retail merchandisers to organize a nationwide network of professional installers for 4GHZ and 12GHz TVRO's. Only those firms or individuals who are experienced will be considered for membership.

WRITE NOW FOR DETAILS AND FREE APPLICATION.

(Enclose business card or letterhead.)

SATELLITE ANTENNA SPECIALISTS OF AMERICA P.O. BOX 1007 BURLINGTON, IA 52601





# Paraclipse

## HIGH PERFORMANCE SATELLITE TELEVISION SYSTEM

### Study the Choices

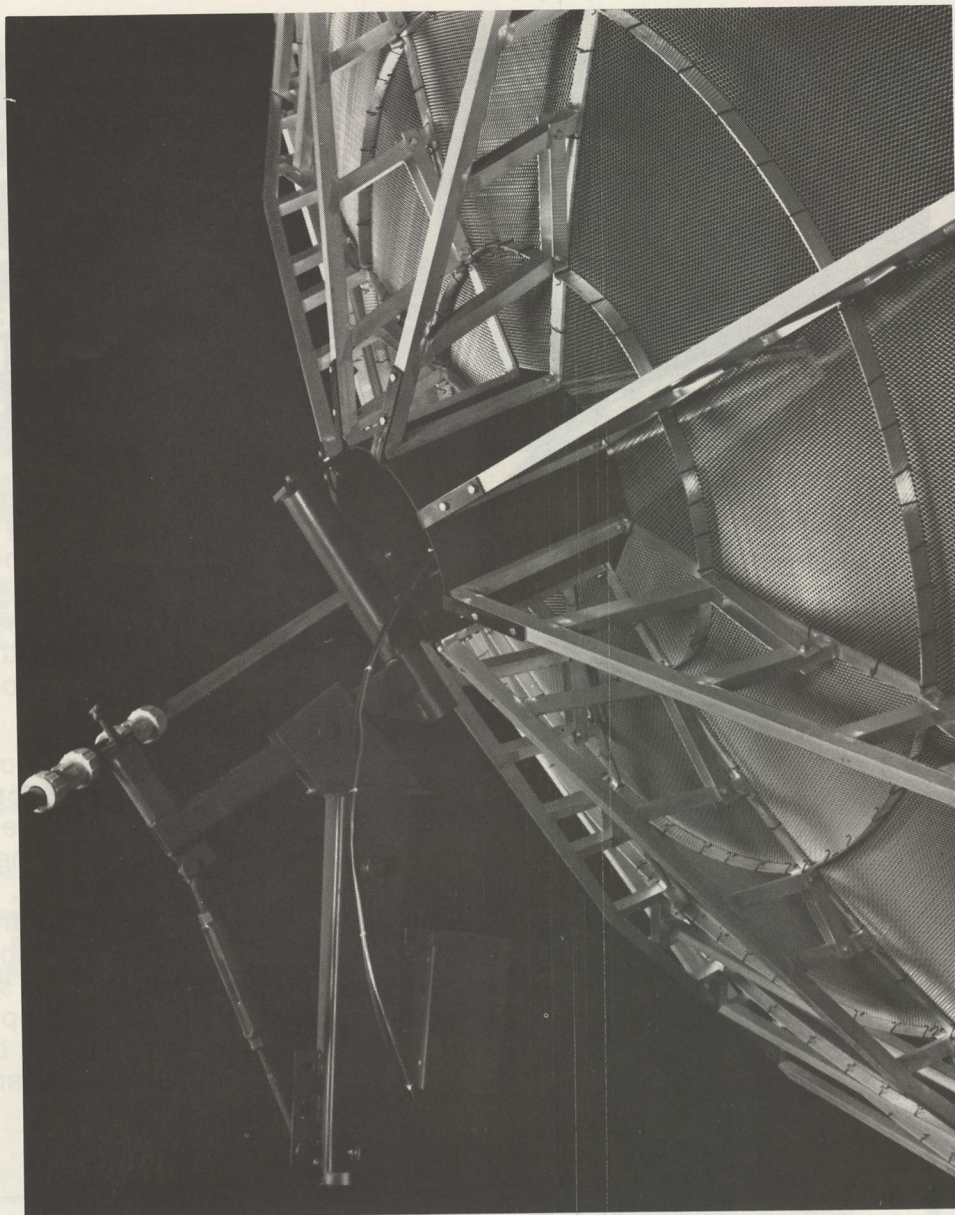
There are a lot of different ideas about the best way to build a home satellite television antenna system. Each deserves a portion of your attention, because it is only after you know something about the various solutions, will you be able to make an intelligent choice between them. Take a moment to examine the Paraclipse system; you'll find ours an intelligent design that makes no compromise in materials, craftsmanship or performance.

### Design Criteria

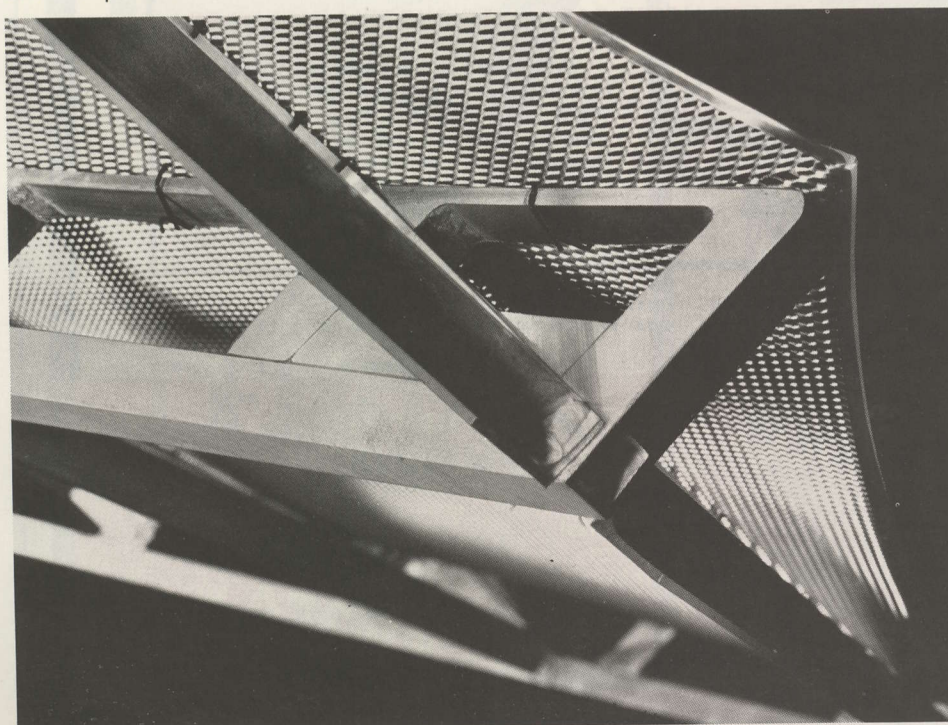
In designing the Paraclipse, we established a complete list of performance, manufacturing and marketability criteria for our antenna to fulfill. Every design decision we made reflects our efficient accommodation of these criteria. Paraclipse will stand up to your closest scrutiny in terms of construction, performance and choice of materials.

### System Performance

Maximum performance from any satellite antenna is achieved in direct proportion to the antenna's ability to maintain the symmetry of its parabolic shape. The more perfect the shape of the parabolic dish, the more uniform the signal received. A strong uniform parabolic shape translates to a strong uniform picture.



© Copyright 1983 Paraclipse Manufacturing



### Solid vs Mesh

Mesh configuration with alignment of the reflective surfaces to complement the parabolic shape achieves maximum theoretical capability, while pressures exerted by wind and weather are reduced by approximately 67% over solid dish systems. Paraclipse achieves symmetry and avoids distortion by virtue of design.

### Modular Components

Components from one Paraclipse antenna will fit any other Paraclipse antenna. Automated production techniques ensure precise fit, ease of assembly and interchangeability of parts. When crated, the entire antenna weighs 365 pounds. This portability is why you find Paraclipse systems performing in some very remote locations.

PIONEER MEMBER OF  
**SPACE**



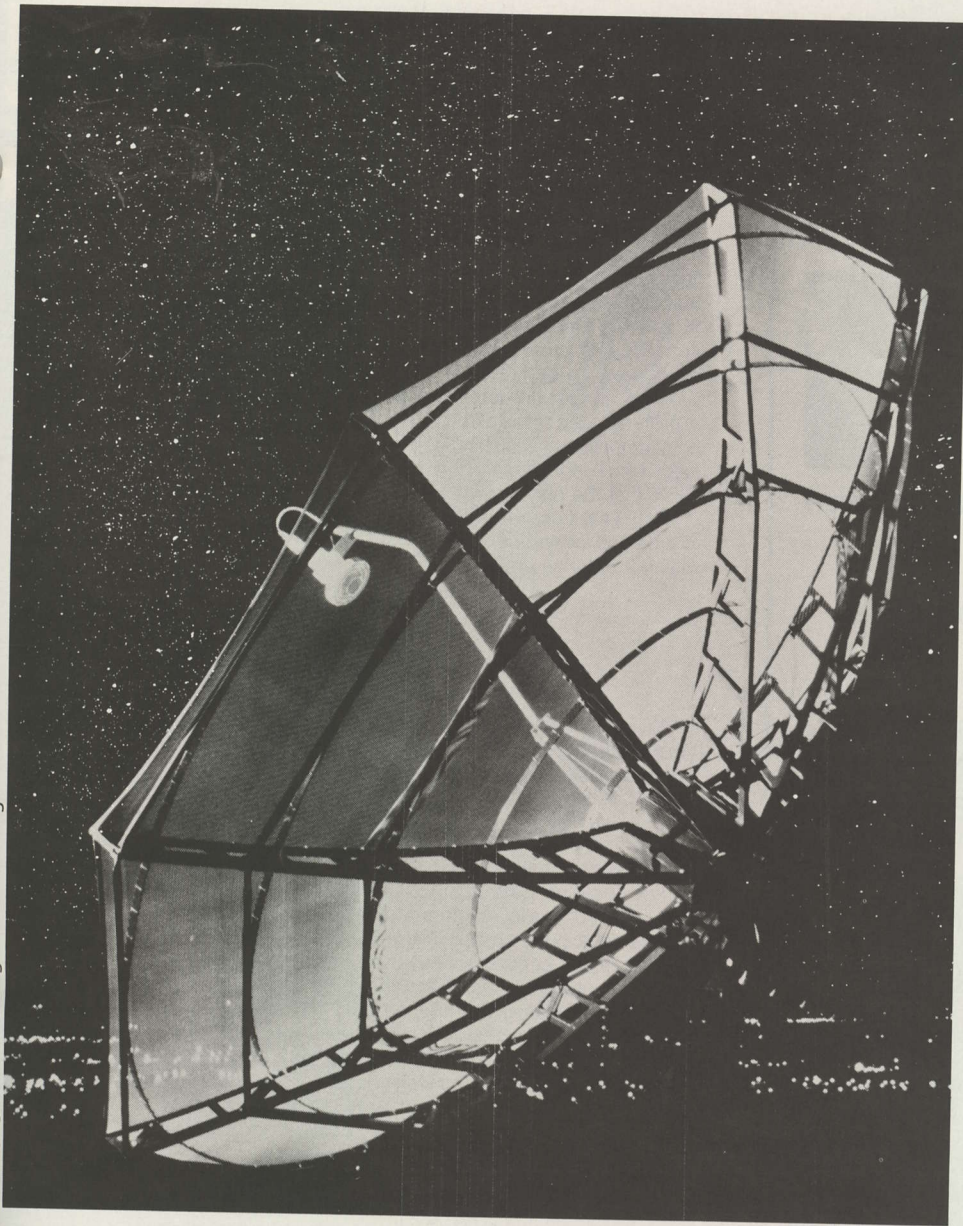
# Paracclipse

HIGH PERFORMANCE  
SATELLITE TELEVISION SYSTEM



**Paradigm Manufacturing, Inc.**  
6911 Eastside Road  
Redding, California 96001  
(916) 244-9300

© Copyright 1983 Paradigm Manufacturing



## Polar Mount

Strength, solidity and polar accuracy were the primary design criteria for the steel hub, polar mount and pedestal. Our own baked powder coat finish seals the mount against corrosion and makes it beautiful. Paracoat (a baked-on finish) is a beautiful and lasting option. Paracclipse, here today, here tomorrow.

## Production Capacity

If you appreciate the engineering, wait until you hear prices. Paracclipse is no back yard operation. We have the production capacity to manufacture, ship and service thousands of antennas a month. This gives us an unequalled edge in cost reduction, and it gives the buyer a good reason to be confident about the future.

Paracclipse, dollar for dollar, your money just can't buy more performance.





## Fabulous Fiberglass Dishes!

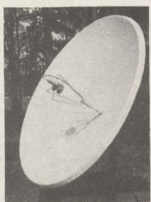
### FEATURING THE NEW ONE PIECE

6' DISH .....\$190

7½' DISH .....\$225

COMPLETE SYSTEMS COMPARATIVELY PRICED

*Opens Up New Sales Areas  
For Additional Profits*



### Features of the NEW 6' and 7½' Dish

- Guaranteed 2 Years
- Polar Mount
- Designed for either Rotor or Polarotor
- Beige in Color (Less Heat)
- Pad mount or single pole mount

Drake • Gillaspie Receivers • KLM  
Avantek • Amplica LNA's

Complete 10' - 12' and 16' Systems Available

Motorize your dish from a selection of six different motor drives

Complete systems shipped within 24 hours



**J & J SATELLITE TV SYSTEMS**

Route 1 Hwy. 34 • Sharpsburg, GA 30277 • 404-253-5921

CORRESPONDENCE CONTINUED/ from page 64

### DIVIDE AND CONQUER

I am very concerned with the editorial written by **SatGuide** publisher David Wolford appearing in the February 1983 issue. I believe that this editorial unnecessarily challenges two years of effective work by SPACE. Does the industry want a SPACE divided in its efforts to promote and protect the TVRO industry? A SPACE "divided and conquered" by one allied to the cable field? It is my opinion that Mr. Wolford's published words are self-serving and of questionable value in protecting the rights of the TVRO industry. He appears to be making an attempt to establish himself as resident guru of the TVRO field — a field of such innovation a guru is unneeded. As far as I am concerned, SPACE is the only way to go!

A SPACE from which members and TVRO industry leaders defect to a self-appointed pundit **could** very well fall prey to the wiles and witchery of those opposed to TVRO rights.

Patrick S. O'Dell

Publisher

SATELLITE TV WEEK

Fortuna, Ca. 95540

Wolford's February editorial took SPACE to task for not, in his view, properly responding to the threat by cities and towns to adopt ordinances that seek to restrict the installation (i.e. operation) of private TVRO antennas. The matter was discussed in CSD, as well, in the February Coop's Comments. Wolford suggested that SPACE was spending too much time fighting national battles and not giving sufficient support to dealers who were having local or state problems. He ended by suggesting that a new, second, trade association might be formed. Wolford had circulated a copy of his February editorial to members of the SPACE Board of Directors at the Las Vegas CES gathering. The Board spent some time discussing Wolford's charges and then sent several Board members to try to reason with David. He refused to reconsider publishing the editorial and was apparently not interested in talking directly with anyone at SPACE to learn what the trade association was REALLY doing to fight the restrictive ordinances. It was one of those classic "My mind is already made up . . . don't confuse me with facts" confrontations.

COOP CONTINUED/ from page 5

virtually all price levels of hardware. But between now and the November SPACE show, we are going to see even more intense pressure being applied to the hardware manufacturers. I wouldn't be too shocked, now that the mass production revolution is underway, to see dealer pricing in the \$499 region by this time next year. And that could translate to completely installed terminals for as low as \$999.

### EUROPE PROGRESS

Some months ago I reported on a quick tour I made in September of Europe, and suggested that with certain factors happening in Europe 1983 could well become 'the year' for home TVROs. Well, enough time has passed for those events to either happen or fail, and it is time to re-address just what is really happening in Europe these days. Oh yes, most of what follows will say 'Europe' but should be considered to include northern Africa and substantial parts of the Middle East as well.

I hold that the real ingredient required to get the industry off and running in Europe is a trade show that embodies all of the ingredients that we have come to expect from our own trade shows in North America. Back in October or so I saw just such a trade show occurring in Birmingham, England in September. The show (CAST '83) is shaping up to be a huge extravaganza. Unfortunately, it has become an almost totally cable related show. Even worse than that, for the home TVRO industry, is the face that the show will not have any teaching and training sessions of a practical nature. In other words, the poor guys attending the show, interested in starting up TVRO dealerships,

COOP CONTINUES/ page 73

**VHF • UHF**

*Tunable* **SATELLITE** *New Improved*

**VIDEO-AUDIO MODULATORS**

**Micro-Verter II series**

**EXCELLENT NATIONWIDE DEALER PROGRAM!**

- AVAILABLE CH. 2-13 plus LOW UHF.  
(Each unit tunable over 24 channels.)
- CRISP, HIGH FIDELITY COLOR
- NEW TEMPERATURE STABILIZED AUDIO SUBCARRIER CIRCUITRY.
- DUAL REGULATED POWER SUPPLY.
- ALSO IN PLUG-IN MODULE FORM  
(less power supply).

"Over 17 years of video modulator expertise"

SUG. LIST \$80.00 **ATV Research** Dial (402) 987-3771

13C - Broadway DAKOTA CITY, NE 68731



# PRECISION SATELLITE LOCATOR

*"The finest motor drive available"*



**\$399<sup>00</sup>**

- ★ GUARANTEED NEVER TO LOSE POSITION MEMORY
- ★ EXCITING NEW "STATE OF THE ART" COMPUTER TECHNOLOGY
- ★ BRIGHT FOUR DIGIT L.E.D. DISPLAY
- ★ FAST AND EASY INSTALLATION WILL RETROFIT MOST ANTENNAS (20 MIN. TYPICAL)  
(OPTIONAL SCREW JACK SHOWN)
- ★ POWERFUL AC-DC MOTOR

WRITE FOR BROCHURE OR CONTACT YOUR DEALER

701 COLLIER, HANNIBAL, MO 63401 • TEL. 314-221-4146 • CALL FOR DISTRIBUTOR PRICING



# "I was sick and tired of undependable earth station controllers."



Peter E. Kent  
President

## I'm an engineer, so I made one myself! I'll stand behind this one."

The best earth station controllers on the market are programmable, reliable, easy to operate and priced right. When I looked closely, I soon found several design flaws which could have been corrected before they were put on the shelves.

It annoys me to see a product on the market before it's thoroughly tested. As an engineer, I expect things to work and keep on working. After all, that's what engineering is all about.

My wife sometimes says I'm stingy. She's right, but I also understand that quality costs less in the long run. So, I keep an eye on every penny and I make sure that our products are the very best.

My engineers and I carefully designed and tested the Surveyor Eleven—a reliable, dependable, convenient and reasonably priced satellite locator.

Here are the features that make the Surveyor the best on the market today:

**1 2-Year Warranty** I know the Surveyor Eleven works, so I'll give you a two-year warranty on parts and labor. See what our competition offers.

**2 Reliability** No other controller uses a true closed loop servo system which gently starts and stops the motor. You get much longer life from your motor, gears and actuator.

The Surveyor Eleven prevents motor burnout by limiting maximum torque and by delaying reversing power.

**3 Safety** The Surveyor Eleven has UL Registered 90 VDC motor drive circuits.

The red LEDs tell you when your actuator has reached the adjustable maximum limits.

Both red LEDs light up if a control wire is disconnected, saving you the expense of a service call.

**4 Fail-Safe Memory** The Surveyor Eleven never loses its memory during a power outage. Just set it and forget it. You don't have to remember to change the back-up battery every year.

**5 Locks on Target** The Surveyor Eleven is immune to miscounting from stray noise pulses.

It's also so accurate (within 0.030 inches of dead center) that it doesn't need fine tuning.

Settings won't drift because our circuits compensate for line voltage fluctuations, temperature change, aging and noise pulses.

**6 Optional Remote Control** The optional remote control unit brings the convenience of the Surveyor Eleven right to your easy chair.

**7 Easy Operation** The Surveyor Eleven is simple to install, simple to program and simple to operate. One knob selects up to 12 satellites.

This earth station controller has something entirely new. All the same reliability features you have come to expect in the Surveyor Seven are now in the new Surveyor Eleven—plus three new features that put us further ahead of the pack:

**1 Skew Compensation** The Surveyor Eleven automatically and accurately compensates for skew and the backwards Westar satellites.

**2 Polarization** You can set the Surveyor Eleven to horizontal, vertical or receiver/remote polarization with the turn of a knob. No need for a separate box.

**3 Scan** Exclusive to the Surveyor Eleven is the Scan function. It allows you to search through all 24 channels for the one you want without switching from horizontal to vertical polarization.

---

**Kent Research Corporation**

---

We won't sell anything until it's just right.

## SURVEYOR ELEVEN™

Kent Research Corporation 1900 Burdett Avenue Troy, New York 12180 518/272-6870



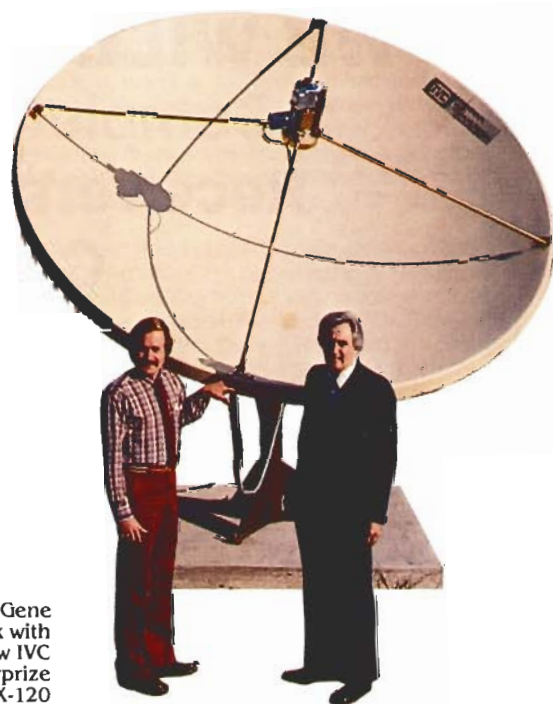
# "QUALITY PRODUCTS, RESPECTED DEALERS, A GROWING COMPANY... WHAT MORE COULD YOU ASK FOR?"

What does an internationally known entertainer do for entertainment? In the case of Johnny Cash, he watches television on his IVC home satellite entertainment system. Cash was so impressed with the quality of the system that he agreed to endorse the equipment.

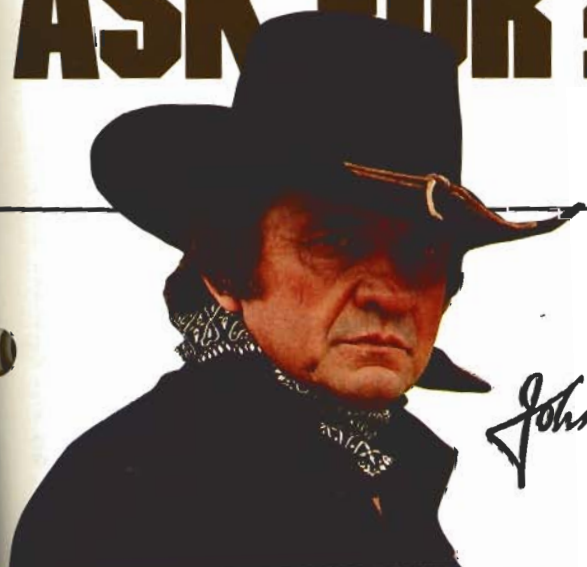
Cash's endorsement has helped IVC become one of the leading manufacturers in the home entertainment satellite industry. Dealers and distributors throughout the country have profited from the endorsement of a well-known entertainer such as Cash. With Johnny Cash's reputation backing the product, it's much easier for them to sell IVC's equipment.

With Johnny Cash's endorsement, distributors have the finest products on the market as well as the endorsement of someone whose reputation for honesty and integrity is above reproach.

IVC is constantly growing and expanding and there are profit opportunities available in some areas. For more information call (501) 771-2800 or toll free 1-800-643-5427.



Bob and Gene  
Mullenax with  
the new IVC  
Enterprise  
MX-120



*Johnny Cash*

International Video Communications, Inc.  
4005 Landski Drive  
North Little Rock, Arkansas 72118



Sustaining Member Of SPACE.





# **SATELLITE TELEVISION SYSTEMS**

**WE WILL NOT BE UNDERSOLD!!**

**Complete Systems, Antennas,  
Receivers, LNA's & Accessories**

**CALL US TODAY!**

**812-238-1456**

**hoosier  
electronics**

*"Nation's Largest Total Communications Distributor"*

**P.O. BOX 3300 • TERRE HAUTE, INDIANA 47803**



## PROMAR

offers the PARACLIPSE 12' screen dish with polar mount and Chaparral polarotor II feedhorn.

**\$895**

with Amplica RC-10 receiver/LNC combo

**\$1753**

800 - 237-2903

800 - 282-7713

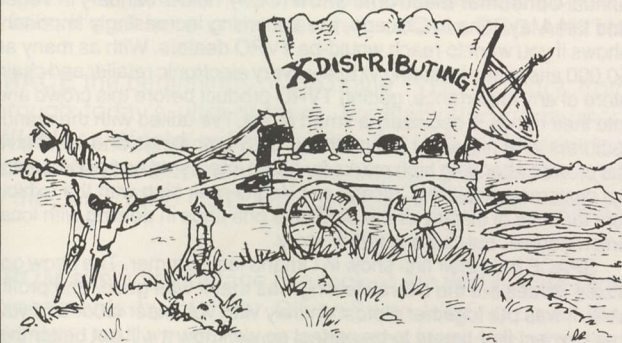
Promar, Inc.

4912 W. LaSalle St.

Tampa, Florida 33607

Inland Freight added to all orders.

**IS YOUR DISTRIBUTOR  
FASTER WITH HIS PROMISES  
THAN WITH HIS PRODUCTS?**



**SHIPMENT WITHIN  
24 HOURS.**

We have it in stock, not on order. So it goes from our hands to yours in record time.

**ECHOSPHERE  
CORP.**

2250 South Raritan Bldg. A  
Englewood, CO 80110  
(303) 935-1909

To order call: 1-800-521-9282.

COOP CONTINUED/ from page 68

will be left on their own to sort out the various competing claims of the equipment hucksters. They won't even know what an LNA is, or what antenna tracking means, and so on so it is doubtful that they will be able to approach sellers of equipment with sufficient background to make an intelligent buying decision.

**I have maintained from the outset** that in a new industry, such as this, that the 'secret success formula' for shows is that you bring in brand new dealers and you teach them the fundamentals of how the system works, and what to look out for when they are subjected to sales hype on the display floor. By forcing people to be smart enough to avoid being fed a line of crap, you also force the industry itself to mature rapidly. I feel this has done more to advance the way the industry has developed than any other single factor at play.

I made a strong pitch that the CAST '83 show follow our proven success formula. When I was in London in September, talking with Martin Ashenden about CAST '83, I had him convinced that you have to **teach** a brand new market **what** the market is all about **before** you can swamp the marketplace with confusing pieces of hardware and a brand new technology.

Then the cable approval by the UK government came along and all of the interest for CAST '83 shifted from a combo cable/satellite show to a cable show that will have the odd satellite equipment booth on hand. That's a fact, although the propaganda being circulated in Europe to bring people to the show still gives satellite TV an equal billing. Many people will attend CAST '83 hoping to find a satellite oriented show. Many will come away either confused or disappointed.

**I can't fault Ashenden for going where the bucks are.** Cable is certainly where the bucks are, right now, in Europe. I do fault him for not sticking to his agreement with me to put together a series of seminars that would teach European entrepreneurs what the satellite revolution is all about. I had planned to have people like Taylor Howard and Clyde Washburn and John Ramsey and Horton Townes up there on the podium 'teaching' the basics of hardware performance, and marketing. The confusion, and disarray in the satellite portion of the marketplace, that is certain to result when would-be home TVRO entrepreneurs are simply 'dumped' into a hall with hundreds of exhibits and no knowledge foundation to separate the wheat from the chaff, will set back the development of TVROs in Europe (etc.) by a year or more.

**I have a suspicion** what has happened here, above and beyond the obvious fascination with the quick buck coming in from the cable equipment hardware peddlers. Our home TVRO industry in the North American area is unique in the world. Frankly, we slipped one by the 'big boys'. I can still recall SA's Sid Topol grabbing me at a cable TV trade show in 1979 and strongly urging that I 'back off' the wholesale promotion of home TVROs. He suggested to me that if I kept up promoting home terminals, I would "ruin the marketplace". I guess he was right. Now we see \$699 dealer cost TERMINALS while SA is still charging more than \$699 for their LNAs! In SA's eyes, I'm a bad guy.

I suspect that people like SA got to the CAST '83 group and somehow pressured them into not allowing our traveling North American road show into CAST '83. Again, that's the way business works. If you were SA, and if you had dreams of creating a new market (with Plessey) for satellite terminals in Europe, you certainly would not want some group of guys like Washburn and Howard and Ramsey standing up there on the podium telling the people in the crowd about \$699 terminals! I guess I should have gotten an agreement worked out in writing before I tipped our hand back in the November CSD. Live and learn.

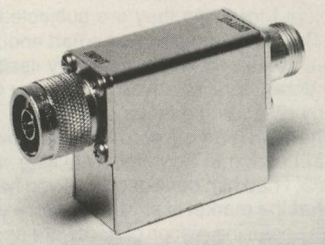
So it is worthwhile to head to Birmingham, England in mid-September? Well, you won't have any difficulty writing it off as a business expense because there certainly will be a show there alright. Is it a show that you as a manufacturer of TVRO hardware should seriously consider **exhibiting** at? **Absolutely not.** Not unless you've got so much money to waste that you don't care which hole you throw it into. And if you've got that kind of dough around, you'd be far better off sending it to SPACE to help out with the battles we are facing on this side of the Atlantic.

There are some answers to the problems presented by the change in 'character' of the CAST '83 show. But they won't bear fruit in 1983.



# SGC INC.

## ● HIGH RATIO ISOLATORS



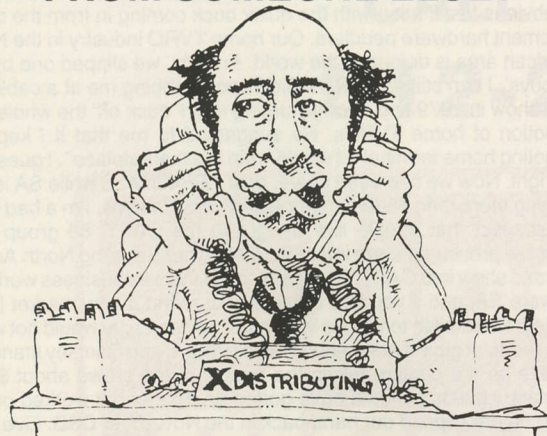
- FREQUENCY  
3.7 — 4.2 GHz
- ISOLATION  
Greater than 40 dB  
Greater than 50 dB  
Greater than 60 dB
- INSERTION LOSS  
Less than 0.9 dB

## ● BUY DIRECT FROM A MICRO-WAVE COMPONENTS MANUFACTURER AND SAVE.

### SATELLITE GROUND COMPONENTS, INC.

1236 Los Angeles Ave., Suite E  
Simi Valley, California 93065  
Phone — (805) 583-4818

## ARE YOU ORDERING FROM SOMEONE WHO'S ORDERING FROM SOMEONE ELSE?



## WE STOCK MORE...

Representing over 20 manufacturers. To give you a bigger selection and faster delivery.

**ECHOSPHERE  
CORP.**

2250 South Raritan Bldg. A  
Englewood CO 80110  
(303) 935-1909

To order call: 1-800-521-9282.

I'll share them with you in the months ahead.

### TOO MANY SHOWS?

More and more manufacturers are expressing concern to me that there are simply too many shows to attend. That's a problem alright and it is hardly unique to the home TVRO industry.

People hold shows because they can make money for the show operators. You take a show like Las Vegas; around 275 booths dragging in nearly \$200,000. Not peanuts. Then you add in the charge for people to attend and pretty quick you have a quarter of a mil sitting in the bank. If you use volunteer speakers and handle the hotel 'right' you can come out with about a 60% profit margin. Not bad for three days of intensive effort.

**Manufacturers** attend shows largely for two reasons; the new guys figure a show is the best place to load up on orders, and the old guys figure if they don't show up, some rumor monger will start a story circulating that they are no longer in business; or, their business is failing. That's a pretty absurd statement but this is a pretty small, and slightly absurd, industry still.

If you are a manufacturer, the cost of the show exhibit space (\$600 and up per booth) is but a small fraction of what the show **really** costs you. First there is transportation to the show. That varies for each exhibitor but for east coast manufacturers the recent Vegas show had to cost them around \$400 per person just to get there and back. Add to that the cost of staying at the show; typically five days if you are an exhibitor. Figure \$125 a guy a day by the time you feed him and cater to his vices. Then there is the cost of preparing special signs and the booth itself. One supplier told me **his booth** was costing him **\$15,000** just for Vegas. I shook my head in wonderment.

As bad as the direct costs are, the indirect costs can be even greater. Figure you are losing five working days, directly, for each guy that goes to the show. Sure, they are working but when you grab an engineer or secretary or whatever out of the company proper to handle show booth duties, you are leaving behind a stack of productive work that won't get done in their absence. I figure the typical employee going to a show like Vegas loses about two weeks of productive (as in 'goods shipped out the door') time. Throw in a week's worth of planning time for the booth and literature and special show selling strategies and you have three weeks shot minimum.

Now multiply that by three shows per year and you have 9 working weeks down the drain. Make that four shows per year and you have 12 weeks shot, per person, that works in the company. And so on.

With the industry becoming more and more consumer oriented, we find ourselves faced with some difficult show choices. The twice annual **Consumer Electronic Show (CES)**, held in January in Vegas and late May/June in Chicago, are becoming increasingly important shows if you want to reach would-be TVRO dealers. With as many as 50,000 attendees including virtually every electronic retailer and chain store of any importance, getting TVRO product before this crowd and into their hands is decidedly a smart move. I've talked with the manufacturers who regularly attend these CES gatherings and most give the crowds attending high marks for being interested and good potential customers. Neither Chicago nor Vegas rank high with the exhibitors for ease of display or the problems one finds in dealing with local union people, but that's another story.

SPACE held their first show in Omaha last summer. The show got mixed reviews but the overall feeling was that it was good, and profitable. It was put together almost entirely with volunteer labor and you can't expect first-timers to be perfect so we know it will get better this year. That's in November, in Orlando, Florida.

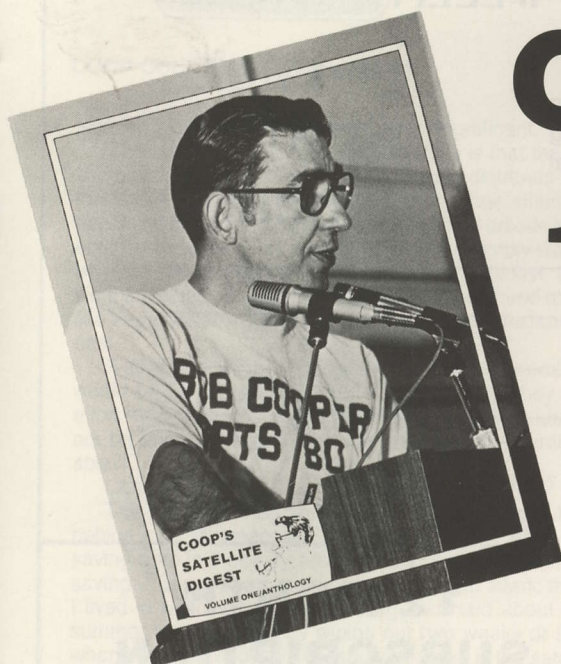
### And that's three shows.

STTI started the show circuit back in 1979 and with three shows per year it made good sense to follow the STTI show circuit. By moving them around the country, in the course of a year most people had the opportunity to attend.

### And that's six shows.

More recently, there have been shows announced by **Channel Guide** and various regional show entrepreneurs. If you add them all up for 1983 alone, it comes to six or seven perhaps 'important' shows for the year and an almost equal number of questionable shows. If you discount the questionables and assume all seven of the others are important, you end up with seven shows times three weeks 'lost time' per key employee associated with the show circuit. That comes to 21





# OVER 1000 Pages In The



## HOME SATELLITE TERMINAL TEXTBOOK

**EVERYTHING** you will ever need to know about the home satellite TVRO system. During the first two years of **CSD**, every topic from antenna measurements to LNA design was covered extensively. There are dozens of features on receiver design, LNA installation and selection procedures, dozens more on how the satellite system operates, and how it fails. It's all here in the new two-column **CSD ANTHOLOGY** now available for immediate shipment!

**TRACE** the beginnings of the home TVRO industry, from the first Taylor Howard and Robert Coleman receiver designs through today's ultra-modern, sophisticated consumer products. The complex text of the original Arthur C. Clarke 'Wireless World' article, written in 1945 (!) describing how geo-stationary satellites would be designed and function. Follow the development of programming permission battles, the start-up of SPACE, and see how one David Barker article in the June 1980 **CSD** changed for all time the mass production of TVRO receivers!

**FROM** sun noise outage to a look at the first private terminal receiver product ever offered for sale (1978!); from the first experiments by pioneer Oliver Swan leading up to the development of the Spherical antenna design, to the sleek, sophisticated motor driven spaceage terminals of today. Everything that ever happened in this young, dynamic industry worth reporting is covered in detail and depth in this 1,000 (plus) page 'Textbook'!

**Now you have the full first two years of CSD**, a textbook of the whole industry on your bookshelf. Year one (12 issues) is bound together with a 16 page foreword by 'Coop' in **CSD ANTHOLOGY/ONE**. Year two (the second 12 issues) is bound together as **CSD ANTHOLOGY/TWO**. Within the United States, either year for \$60 or both years for the combination price of \$100. Outside the USA, either year for \$75, or both years together for \$125 (US funds only). Put the industry's number one textbook, **CSD**, on your bookshelf today with this special collector's series of Anthologies.

**ONLY 1,000 SETS** of this two year dual-volume Anthology were printed. If you think finding back copies of the monthly **CSD** is a difficult chore, wait and see how hard it is to pry somebody loose from their **CSD ANTHOLOGY** after the present supply runs out! **To Order** your copy or copies, **turn page over and use order form there!**



SEND ME, free of charge, the latest STTI brochure describing TVRO receivers and antennas I can build; TVRO satellite aiming (navigation) systems and techniques; TVRO system operational programs.

**FREE  
STTI  
BROCHURE**

Name \_\_\_\_\_

COMPANY (if applicable) \_\_\_\_\_

ADDRESS \_\_\_\_\_

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

Send request to: STTI, P.O. Box G, Arcadia, Ok. 73007  
or call 405 396-2574

\_\_\_\_ **ENTER MY 12 MONTH SUBSCRIPTION TO CSD / \$50**  
in US funds enclosed (for USA, Canada, Mexico **only**)  
starting with the very next issue.

\_\_\_\_ **ENTER MY 12 MONTH SUBSCRIPTION TO CSD / \$75** in US  
funds enclosed (for readers **outside of** USA, Canada,  
Mexico) starting with the very next issue.

**12 MONTH  
SUBSCRIPTION  
SATELLITE DIGEST**

NAME \_\_\_\_\_

COMPANY (if applicable) \_\_\_\_\_

ADDRESS \_\_\_\_\_

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

SUBSCRIBE TO CSD AT: CSD, P. O. Box 100858, Fort Lauderdale, Florida 33310

\_\_\_\_ HERE IS MY ORDER for the full two-year **CSD Anthology**,  
24 complete issues bound in two volumes, more than  
1,000 pages strong; consisting of Volume One (Number  
One) through and including Volume Two (Number Twelve).  
My check for \$100 enclosed. (**Note:** Outside of USA,  
send \$125 US funds.)

\_\_\_\_ HERE IS MY ORDER for **just one Volume One** (October  
1979 through September 1980) of the **CSD Anthology**;  
including Coop's foreward. My check for \$60 enclosed.  
(**Note:** Outside of USA, send \$75 in US funds.)

\_\_\_\_ HERE IS MY ORDER for **just Volume Two** (October  
1980 through September 1981) of the **CSD Anthology**.  
My check for \$60 enclosed. (**Note:** Outside of USA, send  
\$75 in US funds.)

**24 ISSUE SET  
CSD ANTHOLOGY  
1979 / 1981 !**

NAME \_\_\_\_\_

COMPANY (if applicable) \_\_\_\_\_

ADDRESS \_\_\_\_\_

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

ORDER ANTHOLOGY FROM: CSD, P. O. Box 100858, Fort Lauderdale, FL 33310



## COOP CONTINUED/ from page 74

working weeks down the tubes. Not insignificant.

The talk I hear from manufacturers is that they are faced with some difficult decisions. Those that largely distribute through distributors are asking the distributors to handle their affairs at some of the upcoming shows. Those that mostly build for private labeling (i.e. their equipment seldom has its own name on it) simply want to cut back to perhaps two or three shows per year, at the most. Distributors who work the whole country are wondering if they need to travel to places like Vegas when their marketplace is primarily the northeast, or south-east.

If all seven of the 'important' shows were spaced out equally, life would be far-less complicated. Unfortunately, they are not and an effort by SPACE to coordinate the shows so individual shows would not be bumping into one another has failed miserably. How miserably?

Consider this.

The summer CES show in Chicago is in mid-June. Just days behind it, in Minneapolis/St. Paul, there is an STTI show. The only saving here is that they are reasonably close together. But is that a savings? Suppose most everyone decided to attend the CES show? If I lived in Minnesota, I'd think long and hard about interrupting my summer selling period by wiping out **two** weeks or so of the month when I could attend the CES show and take in the satellite **plus** video and audio marketplace.

If that isn't an example of questionable planning, the fall season is a dandy. The CES show is a good one, but it is not yet 'the' satellite show. The first SPACE Show in Omaha in 1982 was less than perfect (but hardly bad by any stretch of imagination), and, most important, it was 'the' industry trade association's TRADE SHOW. That alone is very, very important. This year, with plenty of advance notice, it comes up early in November in Orlando, Florida. Now move back about six weeks into mid-September and what do we find scheduled for Nashville, Tennessee? **Another STTI show!**

Nashville to Orlando is not that far. But the six weeks in between means that everyone coming home from Nashville has to just get back into gear again, and then turn around and head for Orlando. I suppose the exhibitors could pack their booths and have them hauled directly to Orlando. That will cost them four to five weeks of storage time in Orlando, and the possibility that the booths will be lost in the interim.

The manufacturers are telling me that **something must be done** to put this show business back into some type of sequence. I am afraid the loser here may be STTI since some of the solutions I hear being floated are going to cut into the STTI show circuit.

Way back at the fall of '81 Anaheim, California show STTI and SPACE sat down to try to work out a master plan for show scheduling. I thought there was the agreement that the SPACE show committee would work closely with STTI and others to prevent just this type of calendar and geographic 'bunching'. Apparently that was not the case.

What I hear manufacturers saying, with considerable conviction, is that SPACE should expand from one show per year to two shows per year. If that sounds like more problems than we now have, listen to their reasoning.

If SPACE conducted two shows per year, one in an eastern city and one in a western city, the country would be reasonably well covered. If the shows were spaced for spring (west) and fall (east), at about six month intervals, and the general time windows for both announced as a set format for years in advance, that would force **others** to plan **around** the SPACE shows. SPACE, conducting two shows per year, would end up getting just about everyone who is serious in this business as an exhibitor. With two shows, the income to the trade association would grow considerably and by having more dollars to work with to fund legal battles, ultimately the cost of per company membership could come down. In effect, revenue from the shows becomes a major contributor to the SPACE annual budget. There is plenty of precedent for allowing a trade show to carry the bulk of a trade association operating budget; the cable and broadcasting groups manage to raise 50% and more of their annual costs from their

COOP CONTINUES/ page 80

## Satellite Earth Stations Distributors Of

### ANTENNAS

KLM - 11 ft. Wire Mesh or SES Fiberglass Antenna  
Complete TVRO Systems

### RECEIVERS

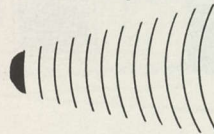
Luxor, KLM-IV, KLM-V  
Drake, Dexcel

Chaparral Polarotor LNA's by Dexcel

### ADEC Actuator

*"The Finest in Antenna Direction"*

- High Quality, Low Prices (call for quote)
- Trailer Mounts Ready to Roll
- Dealer Inquiries Invited



## Satellite Earth Stations

*"Distributing The Finest In Satellite Receiving Equipment"*

P.O. Box 160 - Mamou, LA 70554

La. Toll Free 1-800-252-3307 Out of State Toll Free 1-800-762-2110

**WHEN YOUR DISTRIBUTOR  
SAYS "COMPETITIVE PRICES"  
... DO YOU EVER WONDER  
WHAT THE PRICE IS  
COMPETING WITH?**



**SATELLITE RECEPTION  
AT DOWN-TO-EARTH  
PRICES.**

Our volume purchasing ensures lower prices for our customers. Even when they order in volumes of one.

**ECHOSPHERE  
CORP.**

2250 South Raritan Bldg. A  
Englewood, CO 80110  
(303) 935-1909

To order call: 1-800-521-9282.



# Here's a special value from Comtech!

## Our 650 Model Satellite Video Receiver for only \$995



Comtech has designed the 650 Receiver with the user in mind. Among its features are:

**A self contained LNA power supply**

**Remote control capability**, for channel selection from the comfort of your armchair.

**Digital channel select**, with an easy-to-read LED display.

**MGC/AGC switch, control and test point**, permitting you to align the antenna to insure optimum antenna positioning.

**D.C. Block**, for operation of a cable powered LNA, with external voltage for an LNA with a standard power cable.

**6.2/6.8 MHz PGM demod**, with optional demods that permit you to expand your capabilities.

If you want a top quality video receiver at this special low price, contact Jeannine Hillier at (602) 949-1155, or write to



**COMTECH  
Data Corporation**

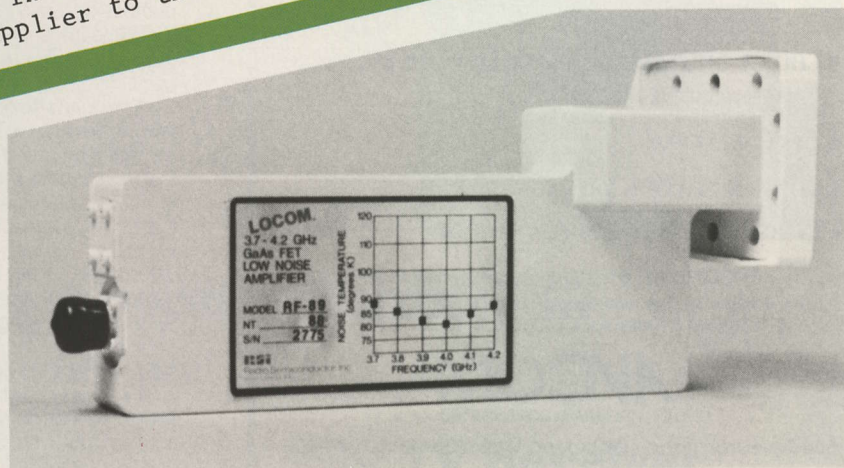
A SUBSIDIARY OF COMTECH TELECOMMUNICATIONS CORP.

350 North Hayden Road Scottsdale, Arizona 85257



# LOCOM<sup>®</sup> - RSI

LOW NOISE AMPLIFIERS manufactured by Radio Semiconductor, Inc. LOCOM LNAs are made by American workers in an American owned plant under EXCLUSIVE license from Locus, Inc., a major supplier to the Satellite Communications Industry.



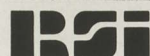
## COMMERCIAL GRADE RF-89s

### TWO (2) YEAR WARRANTY

75° NT, 80°, 85°, 90°, 100°; 52dB Typical Gain

## CONSUMER GRADE RF-44s

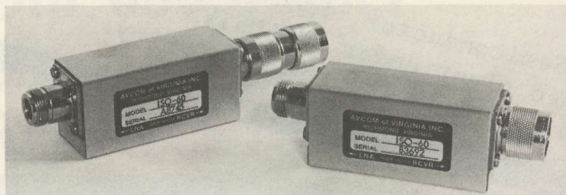
90° NT, 100°, 120°; 44dB Typical Gain



Radio Semiconductor, Inc.  
315 Benner Pike, State College, PA 16801 U.S.A.  
Tel: (814) 238-2133 / TWX 510-670-3640 RADIOSEMI  
(800) 233-3028 (Outside PA) FOR DEALER INFO ONLY



## FERRITE ISOLATORS

PROVEN **AVCOM** QUALITY—THOUSANDS IN USE

## \* CHOICE OF TWO CONNECTOR CONFIGURATIONS!

Female-Female with Barrel Adapter  
Female-Male

## \* 3.65 to 4.25 GHz

## \* THREE ISOLATION VALUES

Greater than 60 dB  
Greater than 50 dB  
Greater than 40 dB

## \* INSERTION LOSS LESS THAN 0.9 dB

AVCOM can also supply your needs for

- \* Receivers \* 2, 4, and 8 way Power Dividers \* Antennas
- \* Feedlines & Cable Assemblies \* D. C. Powerblocks

**AVCOM**  
OF VIRGINIA INCORPORATED

Dealer Inquiries Invited

500 Research Road • Richmond VA 23236 • 804-794-2500

One Source for Your Earth Stations Needs

COOP CONTINUED/ from page 77

trade shows.

Then you throw in the CES gatherings in winter (January) and summer (June) and for those who want to work both the in-industry, and the TV and audio dealer folks, you have a package of shows that should handle just about everyone. The CES shows will never appeal to many of the distributors, and the manufacturers who simply private label stuff, so that gives them an easy out to simply plan on two shows per year.

**Obviously this hurts STTI very badly.**

There is a certain amount of almost blind loyalty to the STTI shows, perhaps because I started them, and, the industry. But those days are gone and the character of the STTI shows has changed remarkably in the last year. There is a battle brewing here and I for one hate to see it coming.

**There has been** considerable sentiment for the STTI 'show position' within the SPACE board. While **some** of the SPACE board members have been asking for **two SPACE shows per year** for more than a year now, **the majority** has voted to keep it at one so that STTI is not cut totally out of the show circuit. When STTI jumped into Nashville just weeks ahead of the one (and only) annual SPACE show in Orlando this fall, I fear that STTI may have lost some key votes on the SPACE board. It's one thing to be loyal to our humble beginnings; it is quite something else to stand idly by while our present gets carved up by bad planning.

**MEANWHILE in Sri Lanka**

I was only modestly serious about the possibility that the annual Provo Retreat, held in the Turks and Caicos last November, might be 'moved' this fall to Sri Lanka when a number of us are planning to go and visit Arthur C. Clarke (see **CSD** for March, 1983). That was before literally dozens of people jumped me about what a great concept that would be. Most of those running me down in Vegas, or writing or calling before we got to Vegas, felt that the opportunity to travel to Sri Lanka, be a part of installing two or more TVRO terminals for Arthur C. Clarke, and spending nearly a week there sharing our past and plans for the future, used the phrase "an opportunity of a lifetime". Most of these who have already extracted my promise that they **can** go along probably would never have the opportunity to simply drop in and spend time with a man like Clarke. To be on hand when the true father of geo-stationary satellites sees his first home satellite signals will be an experience that few of us could duplicate on our own.

Most of us know that within six hours or so of starting work on a twenty footer, or three hours or so of starting work on a 12/14 footer, we'll have pictures. The big problem at that point will be to tear Arthur C. away from his monitor long enough while we are there for the rest of the week to get him to take us Scuba diving!

Here, after all, is the man who worked out in 1945 just how the geo-stationary-satellite system should work. Here is the man who's vivid imagination created dozens of great books including **2001** and **2010**. And now, some 38 years **after** he conceived geo-stationary (Clarke Orbit) satellites, those of us who go to Sri Lanka will be on hand to watch his face and his excitement as his hands turn the dials and push the buttons that places perhaps 20 to 30 channels of international satellite television into his home, and the national University. It will be a heck of a moment. I expect several tears may tumble down my cheek.

The fact that perhaps a couple of dozen of us (or more if it keeps growing!) will be there, with Clarke, for perhaps a week suggests strongly that we should take the opportunity to learn from this great man. We in turn can teach him, by inviting him to sit in on our round-table 'Retreat' sessions. I know how much world leaders look to him for advice and counsel, and if we are able to show him where all of **our** energy and enthusiasm for the future of Clarke Orbit satellites originates, I believe he will be in a better position to guide and counsel those who ask for his help in the future.

Our Carol Graba is busy negotiating with some of the tour groups, attempting to save us all some big bucks by arranging for some group tour rates. No, even with discounts, it will not be an **inexpensive** trip. But how can you put a price, or a value, on such an opportunity? One thing you can count on; the January 1984 front cover of **CSD** will be of Clarke as he first tunes in a satellite TV signal in Sri Lanka!

## WHAT HAS YOUR CURRENT DISTRIBUTOR GUARANTEED FOR YOU LATELY?



## IF WE PUT IT IN WORDS, WE'LL PUT IT IN WRITING.

If you're dissatisfied for any reason, just return the product in its original condition, within 7 days, for a complete refund in cash or trade. Guaranteed.

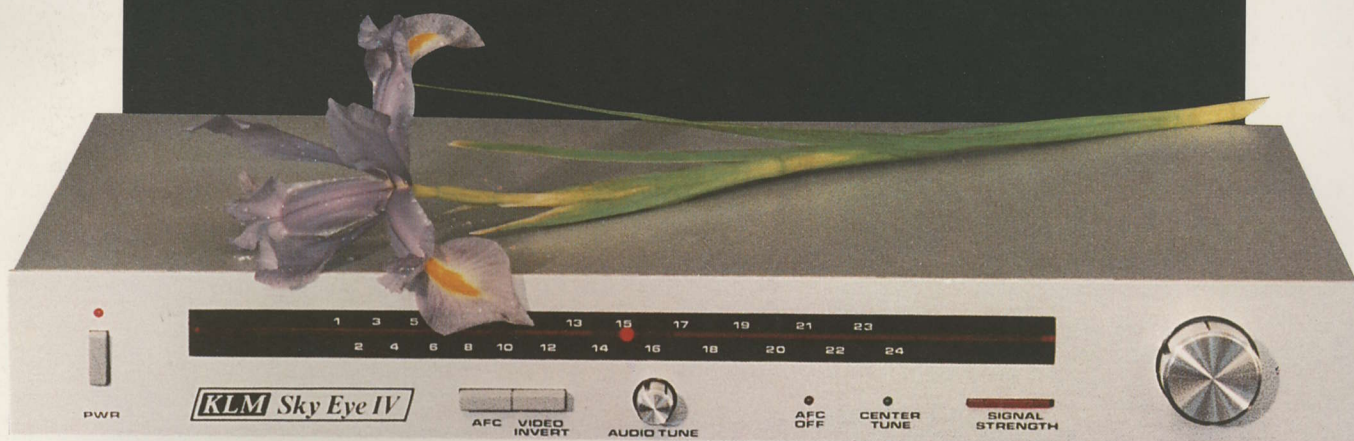
**ECHOSPHERE  
CORP.**

2250 South Raritan Bldg. A  
Englewood, CO 80110  
(303) 935-1909

To order call: 1-800-521-9282.



**You could spend more  
but you won't see a  
better picture . . .**



## **KLM's Sky Eye IV Satellite TV Receiver**

Superior design and engineering mean unsurpassed performance at a very reasonable price. Picture quality, electronics, ease of operation and installation compare with units costing much more. The **KLM Sky Eye IV** features slide-rule tuning, signal strength LED bar, "Center Tune" LED, AFC and video polarity control, fully tuneable audio (5.5-7.5 MHz), and remote downconverter. State-of-the-art single conversion/image reject circuitry, with SAW filter, produces sharp, clean, bright video that makes even big screen and projection TV look better than you've ever seen it before.

---

### **Complete UPS SHIPPABLE systems, too**

KLM's new high performance **X-11** antenna features slide-in screen panels and double-reinforced aluminum support ribs for high strength, low weight and windload. The matching **Polar-trak** mount delivers all the satellites, horizon to horizon. Motorized model with KLM's exclusive Tangential-Drive makes jackscrew designs obsolete. Switch satellites from inside the home with KLM's **Polar-trak** or **Memory-trak** remote consoles. X-11 antenna and Polar-trak mount can be assembled by two people in 2½ hours. Both are **shipped UPS!**

---

**MADE IN U.S.A./ONE YEAR WARRANTY.** KLM's receivers, antennas, and systems are built at its own manufacturing complex in Morgan Hill, California. KLM stands behind all its satellite TV components with a full 1 year warranty.

**KLM electronics, Inc.**  
P.O. Box 816,  
Morgan Hill, CA 95037  
(408) 779-7363

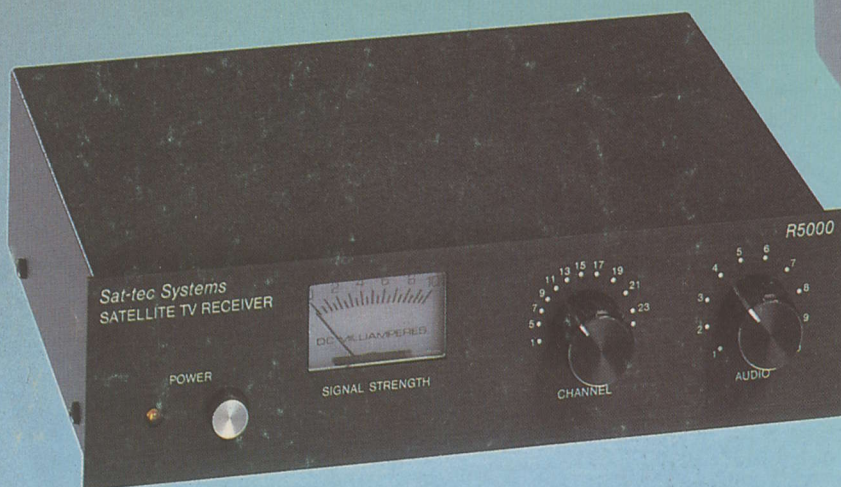




# Sat-tec . . . R-5000

*The Leader in Satellite TV*

*Contemporary styling,  
state-of-the-art performance,  
down to earth pricing*



Sat-tec's R-5000, a receiver designed for today's marketplace with tomorrow's features. Features customers demand, like; signal meter, contemporary styling, unexcelled picture quality, tunable audio, built-in modulator option, channel-lock AFC, baseband video output, rugged weatherproof downconverter, current limited "idiot-proof" hook-up, digital limiter/discriminator detector and reliable uni-chassis construction. Our years of accomplishments in the satellite TV industry has given us unique insight into reception techniques and customer demands. The R-5000 incorporates the latest technology as well as the subtle details that only experience can develop.

Extensive quality control checks such as our unique triple level board test, receiver burn-in as well as a final actual on-the-air check out assures reliability, for years to come.

The R-5000 — never has so much been experienced for so little. From Sat-tec, the name you've known first, since the beginning of Satellite TV.

Easy wiring is a Sat-tec exclusive, the down-converter can be up to 500 feet away from the receiver and only a pair of RG-59 cables are used — no troublesome multi-conductor wires or soldering! And, a real lifesaver are our current limited outputs, wrong hook-ups won't damage anything and there's not even a fuse to blow — it's the installer's dream!



**Sat-tec Sales Incorporated**

2575 Baird Rd., Penfield, NY 14526 • 716-586-3950