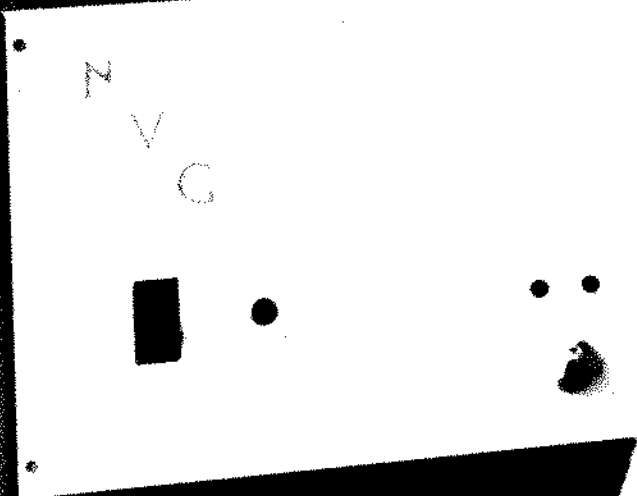
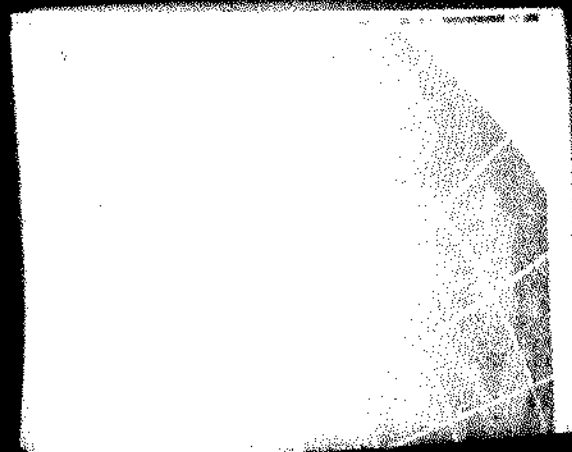


COOP'S SATELLITE DIGEST



SEPTEMBER 1983



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TOP OF THE MONTH

ANOTHER kind of pioneering effort and story this month from old-timer Jim Vines of Paraframe. Nobody is more alone than a far northern outpost where the sun only shines a few months a year. Page 8 here.

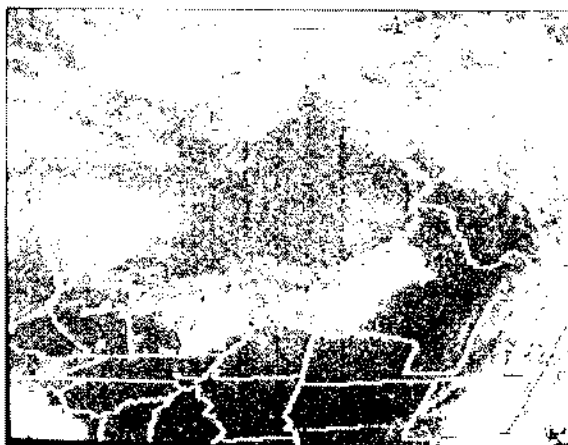
A FEW saw it coming; most did not. Is it TRUE that HBO/TIME will create a 4 GHz 'DBS' premium movie channel on one of the new 9 watt Galaxy bird transponders? Many think it is coming and we investigate what it means, and could mean, in some detail starting on page 16 here this month.

ON the other side of the fence, the possibility that our own industry has the resources to create and operate our own 'DBS' channel for home TVRO owners is creating quite a bit of controversy. And Coop looks at that this month.

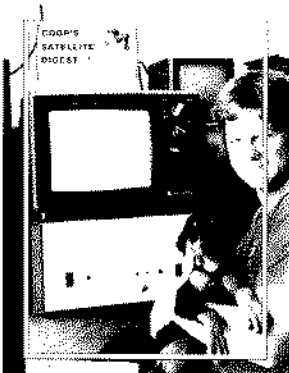
ALSO in 'COMMENTS' this month, some detailed discussion on why the forthcoming SPACE Orlando show will be far more of a show than has been staged in this industry in quite a few years. SPACE is on the line to prove it has what it takes to be in the show business, and Coop Comments also, this month.

SEPTEMBER 1983

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 SO THIS IS THE GREAT WHITE NORTH/Ay (J.K. Vines) page 6
 MICROSOFT-BASIC COMPUTER AIMING PROGRAM (Bill Miller) page 10
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UP TO DATE WEATHER AT 1691 MHz page 23
 NOISE CALCULATIONS/Revisited (John Ramsey) page 35
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ANOTHER KIND of video satellite. Kevin Cooper studies GOES weather satellite transmission from 1.691 GHz GOES/Central bird at WIV in Turks and Caicos. How you can expand your 'selling base' with commercial GOES installations is detailed starting on page 23 here this month. (Let's have no cracks about satellite TV going to 'the dogs'!)

**COOP'S
 SATELLITE
 DIGEST**



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COOP'S SATELLITE COMMENT

- 4 GHz DBS/ Too Good To Be True?
- REACTION to Operating Our Own Movie Channel
- ORLANDO/SPACE Will Be Different

THE Rush Is On

If the bubble of this past spring was not a false economic indicator, the season we are now entering will be two to three times as 'big' in sales as last year at this time. We all went into the Las Vegas show booked up. Equipment was already in short supply and the crunch of new orders originating at Vegas only added to the problems. Depending upon which supplier you talk with, either April or May were the peak shipping months through mid-summer. As we reported in **The Cooper/James Report** for August, some of that 'ballooning' was the direct result of a major supplier of receivers getting caught with his raw-parts inventories 'down.' When the supplier in question could not ship his normal quota of units, that caused many distributors and dealers to temporarily 'detour' to other suppliers for product. This in turn made the second-choice suppliers believe that the industry had suddenly doubled in size. Net result? A **false indicator** of growth.

Given the unreliable status of industry reporting systems, the tendency to 'hype' shipping numbers and the natural enthusiasm everyone has in this field for everything we are doing, truthful numbers are often impossible to find. Still, some advance knowledge of when to expect critical shortages is important to anyone handling equipment since intelligent planning can only result from proper input knowledge.

Keeping track of equipment availability will be a key part of every dealer/distributor activity over the next sixty days. If the fall 'TV Season' market is traditional, more equipment will be sold and installed between now and late November than has been sold and installed in the prior six months. This suggests that anyone who depends upon prompt delivery of equipment stay in close contact with all of your suppliers during September and October. **Know when** supplies are running short, **know when** replacement of inventory will be needed, and **know where** you have back-up supply sources in case your primary supplier finds it impossible to ship on a timely basis.

By December we will all be in a better position to go back and evaluate just how real the 1983 selling season was, and begin the planning process for 1984.

THE HBO 'Web'

Earlier this summer there was a flurry of journalistic activity in major metropolitan newspapers and news magazines concerning Home Box Office. Most of those pieces focused on HBO's perceived threat to the Hollywood film industry. The **New York Times Magazine**, for example, headlined **'Home Box Office Moves in On Hollywood.'** Others headlined **'HBO Takes on Hollywood.'** Each came to the conclusion that HBO was suddenly in a position to dominate virtually all of the Hollywood movie production because it had grown into a giant distribution system and by itself represented the single largest distributor of movie product in the world today. Hollywood, the movie production industry leaders at least, are clearly uptight that their 60 year domination of an industry is being challenged by an upstart 'kid' from the east.

HBO is often painted as the center of an empire that stretches out in many directions. The truth is, of course, that the center of the empire is TIME, Inc., the publishing company that happens to own HBO. TIME, Inc. business holdings are so varied as to be virtually impossible to 'chart.' They run the gamut from forest preserves to a third interest in the USA Network. The 'video portion' of TIME, Inc. holdings

includes HBO and Cinemax and the one third interest in USA Net plus full ownership of ATC/ American Television and Communications (Corp.). There are other lesser known pieces as well, such as Time-Life Home Video. Back in 1982, the last full reporting year available, TIME, Inc. had corporate profits for all of its operations of \$356,000,000. The video-group contributed \$166,000,000 of the profits or 46.6%. Yet the video-group revenues only amounted to 24% of total revenues. In effect, the video-group kept 19.21 cents out of every gross revenue dollar it took in, as profit. That, to say the least, is impressive in the world of big business.

All of this 'cash flow' creates a 'money-leverage' situation for TIME, Inc. They have dollars to spend to enlarge their empire and they have the tools to see that those dollars are spent in 'protected environments.'

When it became apparent this past summer that HBO was seriously considering creating a new type of premium pay service, on the new Galaxy One satellite, there were rumors and stories throughout all of the home TVRO industry. **"Was it true that HBO was going to offer home TVRO owners their very own movie service channel on G1?"** we were asked over and over again. It will, of course, be 'true' when it happens. And not a minute sooner. What **is true** is that the entire plan has top level attention at HBO and if all of the pieces can be made to fit, something like a '4 GHz DBS' service may well happen on G1. Down the road it might not be HBO that does it at all; it could well turn out to be a totally unrelated group, or a group that operates under the direction of our industry itself.

The concept that our own home-TVRO-universe is now large enough, or almost large enough, to support its own scrambled pay/premium delivery service is slowly sinking in. With shipments in new hardware this year attaining levels not even forecast one year ago, the number of home systems out there is nearing a count which makes us an attractive 'alternative-to-12-GHz-DBS' option.

We look at the rationale and reasons behind such a move in this issue of CSD but caution those who read key sentences and skip the details that this will happen when it happens. As Dana Atchley, III used to say to me . . . **"I guess we will believe it when it happens."**

ATTENDING CAST 83 In England

Early in September while some of you will be trying to decide whether Nashville was a good idea, or not, **Andy Hatfield** of AVCOM, **Jamie Gowen** of ADM and I (with our respective wives) will be winging our way across the Atlantic to travel to Birmingham, England to spend a few days looking over the **CAST '83 Show**. You may remember I had great hopes that this show would kick off the home and semi-commercial TVRO industry in Europe, back when it was announced last fall. I had met, at that time, with a chap named Martin Ashenden in London to discuss handling the seminar portion of the event. After a false start, the **CAST '83** group got off on a side detour with the likes of S/A and the other people who still think TVROs have to be gold plated to sell, so our Americanized approach to seminars didn't come off.

At about the same time the lid blew off the cable television industry in the UK and everyone but everyone was preoccupied trying to figure out how they could get a piece of the British cable pie. Not surprisingly, the direction of **CAST '83** changed from a **SATELLITES** and cable show to a **CABLE** and satellites show.

Since this is the first show in Europe that has the ability to turn into a primary vehicle for the display of TVRO products and the education of potential sellers and users of TVRO products in Europe, I decided I was going to attend just to make sure that I had a good understanding of what the European marketplace was really apt to amount to. I mentioned this to Andy Hatfield and Jamie Gowen and they wanted to go along. Since both are also going to Sri Lanka with us to visit Arthur C. Clarke this November, I guess we can consider the England trip a shake down cruise to see if the six of us can get along for a week or so.

There are some encouraging signs in Europe, in spite of the fact that CAST '83 is not going to be a big event for the satellite world. For example, there is something called MAC. Some of the clever people are trying to call it 'Big Mac' but McDonald's has nothing to do with it.

MAC is shorthand for **Multiplexed Analogue Component** and right away you know some engineer with a deprived childhood named it. MAC is a technique to transmit color video, and mono or stereo audio, to home satellite receivers; at 4 GHz, 12 GHz, 20 GHz or any GHz you wish to operate in. MAC was designed by the British IBA folks as a 'new television standard' which would, they hoped, have the ability to overcome all of those funny, old-fashioned nationalistic approaches to setting television standards. As you are aware, there are 405 and 525 and 625 and 819 line video standards all over Europe. There are methods of transmitting the video as FM and the audio as AM, and there are methods of transmitting the video as AM and the audio as FM. And on and on and on. There is PAL and there is SECAM. And there are variations of PAL (PAL-B, etc.) and variations of SECAM (French SECAM, Russian SECAM, etc.). In addition to not agreeing on how they will transmit the video and audio, in the terrestrial television world they also don't agree on what frequencies will be used, by whom, where. Designing a universal television set that will function in the UK, or France, or Italy, or Hungary is just about impossible. Well, not impossible; just very expensive and very cumbersome.

So the British IBA folks said "Let us be intelligent enough that we do not allow this to happen to us all over again with satellite services. Let us sit down and agree on a new universal system which will be somehow compatible with everyone's individual television transmission formats so that DBS, for Europe, will be truly universal in use."

MAC does some interesting things to the video, and audio. First they decided that if you insist on interleaving the color information in with the black and white information, you were just asking for trouble. So they broke the two components apart, and use the left hand 2/3rds of the normal line (or left hand 2/3rds of the screen) to transmit the basic detail information; i.e. the black and white. Then they have roughly 1/3rd of each line left over and they transmit the color information in that portion of the line(s). In effect, this is a form of something called 'Time Multiplex'; the black and white, and the color, are transmitted at separate points in time. There are numerous advantages to all of this:

- 1) **By separating the black and white from the color**, they have the ability to get a considerably higher-definition picture. Not HDTV (high definition television), quite, but close.
- 2) The signals, unlike HDTV, pretty much fit into a 'standard TV channel' which is another way of saying that you can have quasi-high-definition TV without having to use super wide (such as 50/80 MHz) satellite channels to get all of the information across.
- 3) Coming out of the (satellite) demodulator, you would have a plug with the three basic colors in it; and then you can use those three basic (baseband) color signals to drive any type of modulator you wish; SECAM, PAL or NTSC. That means that while a country with PAL may not want to switch over to some other format (such as SECAM), they can transmit **their satellite portion** via MAC and still have their own PAL standard TV sets. The same signal coming out of the demodulator would also drive an NTSC or SECAM modulator just as well, each in their own 'native' formats.

What MAC would do is establish a universal satellite transmission format, one that is 'opaque' to the individual originating or receiving point standards. MAC would be the transmission standard but PAL-B could go in at the uplink and you could take NTSC out at the downlink.

All of this is a pretty persuasive argument and the timing was fantastic.

Then there is the audio. Most of the high brow types seem convinced that the **ONLY** way to transmit satellite audio in the future is to make it digital. There is, frankly, a considerable amount of common sense to this although those of us using analog audio will probably be uncomfortable with something this new and 'devious' for several years. MAC would make all satellite audio digital and they can stack a considerable number of separate audio channels in there. The idea, in Europe, is that an uplink in the UK would be able to send out a half dozen companion audio channels, all digital, with the MAC video and the individual cable headends spread all over Europe would simply select the appropriate audio that matched their local language.

The MAC system was well timed; it came along as a practical solution to a real problem just when the nations of Europe were faced with either continuing their long term commitment to local 'standards' or accepting one of their local standards as an 'international standard.' MAC allowed them to start fresh with a system that really did make more sense than 'adopting' any of the 'local standards,' and almost everyone involved at least approached the proposal with an open mind. The French? Well, they said "no thank you" and went off on their own. Remember, the French don't want any other nation's DBS signals inside their country, and they will go to ridiculous lengths to keep their populace from being 'exposed' to non-French programming.

Here in North America, M/A COM has agreed to be a licensee of MAC and others have also jumped onto the bandwagon. This suggests, rightfully, that the British MAC system may ultimately be put into service on this side of the Atlantic as well. If it works better than what we now have (that wouldn't take much), we will all be better for it.

One of the things that I heard about MAC intrigues me a great deal. I am told that by separating the color signals from the black and white, they have created a system that does not have noise problems with saturated colors. That means, if it works this way, that if the satellite signal is weak and you have that annoying buzzing sound when they go to a bright red and yellow, while the solid red or yellow colors sit there and dance before your eyes with our existing transmission technique, that with MAC you won't have that problem. That sounds like a very worthwhile improvement to me and it might be closer to the ultimate threshold extender than anything we have seen to date.

Getting something like MAC adopted in Europe has not been easy. There are political rifts, social problems and that old bug-a-boo 'NIH' (not invented here). Fortunately, with the exception of France, most of the people involved in considering MAC seem to be engineers who have probably long ago tired of 'standards conversion problems.' You can carry national pride, for your own 'local standards,' just so far. And then it ceases to be 'fun.' Unless you are in France.

If MAC comes to North America, we will all have to start over. That is not a very pleasant thought and it may well be such a tremendous undertaking that it simply will not happen. Every receiver out there would at best require major surgery and more likely would be scrapped and replaced. That alone may keep us from enjoying a MAC type of system here, now or ever. The American 12 GHz DBS folks probably had a very narrow time window where they could have adopted MAC on their own. If they are willing to consider the advantages to being part of a worldwide market rather than a national market, it could well be that they would be better off even today to scrap their early plans for their own standards and go with a MAC type approach.

Certainly if MAC does take hold and the nations of Europe adopt it, we will see far less expensive and far less complicated worldwide TVRO receivers available. As the British IBA points out, everything unusual about the MAC approach can be reduced to a large chip so that the receivers would all be MAC equipped at a minimum cost. Some are even suggesting that MAC receivers would be less expensive than others in the future simply because the MAC standard eliminates many of the difficult and hard to adjust circuits one finds in a standard receiver.

Andy, Jamie and I will be looking into all of this while we are in Birmingham, England September 11th to 13th. And I'll have a report for you in our November issue.



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Sharp, clear pictures. That's what you expect from a sophisticated home satellite TV system. And that's what you get from Winegard!

The new SC-5000S motorized 8-foot package includes a sophisticated satellite video receiver for a dramatic difference in satellite TV reception. You get superb features like an audio tune control to adjust to any frequency in the 5.5 to 8.0MHz range; signal strength meter for precise antenna alignment; fine tune control to lock in the best picture on each channel; rapid scan control for locating satellites and positioning the antenna; channel select control with LED channel read-out; a polarity switch for satellites where polarization is reversed; a built-in satellite select knob with LED read-out moves the dish east or west. The receiver also features a built-in, selectable channel 3 or 4 modulator. A downconverter is included that mounts directly to the LNA at the feedhorn, eliminating line loss.

The sleek new receiver has rear panel connections for optional remote channel control; audio output for stereo processor and connections for Winegard's satellite selector. Each and every unit must pass our rigid quality control standards.

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Winegard's 8-foot dish is one you can handle anywhere! Easy to inventory, easy to transport, and best of all, simple to install! Weighs only 60 pounds and requires no more than four hours installation.

It covers the 3.7 - 4.2GHz band efficiently with 37.5dB gain. Wind survival is 90 mph. The feed is prime focus and enclosed in a weather-tight shroud along with a Polarotor™ automatic polarity unit, LNA and converter.

The 8-foot dish is heavy .090-gauge spun aluminum. A special weather-resistant, baked epoxy paint in parchment white provides long-life and attractive appearance.

For installation convenience, Winegard offers two types of rugged polar mounts — "pedestal" with a base that secures to a concrete pad or "post mount" that sinks into a cement base 18" in diameter and 4' deep. The Winegard 8-foot package is 100% complete, even includes 150' cable.

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Take a look at quality! Take a look at pricing! Take a look at the finest home satellite TV system in America! Take a look at Winegard! Designed for those who take their satellite TV seriously.

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TV AT

Coop's Note:

CSD is always pleased to hear from Jim Vines. History will record that Vines built the first 'home' TVRO antenna product, way back in 1978. He displayed it at the first SPTS in Oklahoma in 1979, and some old timers will remember that Jim has his own way of doing things. Vines operates from Alberta (Canada), having moved his firm there several years ago from Illinois. They build big, beefy, strong antennas up to 12 meters in size. And as this report notes, they get them into some very strange places!

COLDER Than . . .

Until a couple of years ago, working at a Canadian or Alaskan High Arctic oil exploration base camp meant watching old videotapes during after-hours recreation.

The trend in the Canadian 'oil patch' has been to install SMATV systems or at the very least provide satellite TV to one communal viewing room. Since the new Gulf Oil-BeauDril base camp at **Tuktoyaktuk, N.W.T.** represents the state of the art in Arctic drilling and dwelling technology, the owners decided that it should have "the best SMATV system in the oil patch."

Located on the shore of the Beaufort Sea, at 69.5 North and 133 west, Tuktoyaktuk is not a place to set your potted palm outside!

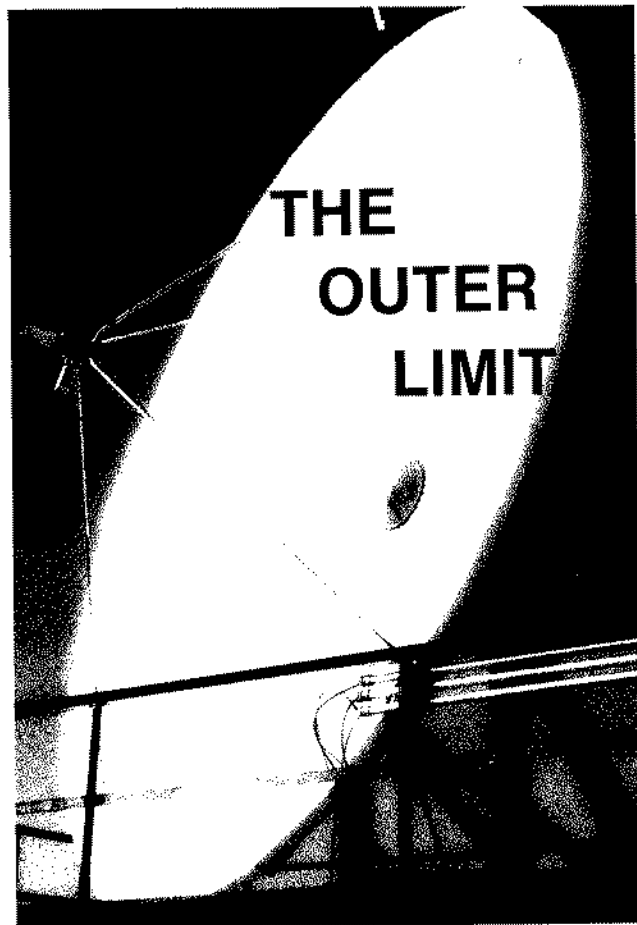
In early February, BeauDril solicited SMATV bids from their Calgary office. According to project engineer Rich Desaulniers "Although W.P. Teletronics did submit the lowest bid, we based our final decision on their track record as a leading Western Canada CATV contractor. We also agreed with W.P. Telecommunications that the Parafame antenna bid on the job was the best choice because it could and would be 'proofed on site,' in our presence, for parabolic conformity and because it had construction which seemed suited to the extreme temperature variations and prolonged use at low look angles, which are known to distort some parabolic antennas."

We received the hard order on March 4th and shipped on March 25th. Then on April 4th I joined WP's Cliff Paterson (who drafted the winning bid) and Greg Johnston, along with Desaulniers in flying to 'Tuk' by way of Yellowknife, Norman Wells, and Inuvik.

One could see the mighty MacKenzie River stretching and winding below on its journey to the Arctic Ocean. Seeing a major river flowing north was a little unnerving to a kid from Illinois! As we approached Norman Wells, the MacKenzie Mountains, seen across 80 miles of pitch black forest, appeared to 'float' on top of a temperature inversion.

From Yellowknife to Inuvik you get an excellent aerial view of what a population density of 'one person per 50 square miles' really looks like. It is a wondrous land of endless forests and uncounted lakes of all sizes. One can see the evidence of past glacial action because most of the lakes are oriented into a single direction. And one hundred miles

by
J.K. Vines
 Parafame Communications
 15606 - 116 Avenue
 Edmonton, Alberta
 Canada T5M 3S5



to the west are the MacKenzie and then the Richardson Mountains; marking the start of the Yukon.

The passengers on these Arctic flights are a mixture of oilfield personnel, and Inuit and other native people; plus a few territorial servants. As we exited our PWA '737' at Inuvik, I thanked our pilot for allowing us to ride in the cockpit and complimented him on the 'neat 180' he executed after taking off from Norman Wells; barely clearing a 3500 foot ridge known as the Franklin Mountains.

"Well — I'm glad somebody noticed!" he responded.

We donned Arctic survival gear and boarded a Twin Otter for the remaining 60 miles to 'Tuk.' Just north of town we cleared the tree line and entered a different world; all white! And on with the sunglasses. As we approached the Beaufort Sea a ground haze obliterated all of the ground detail. We were about to land in the worst 'whiteout' of the long winter, and it took our pilot three white-knuckle passes at the landing strip to make it down, with the plane yawing sideways all the way to the ground. The airport wind sock stuck out straight; warning us before we deplaned that there was a wind chill factor outside of -100F!

The Gulf base camp could be compared to an Arthur C. Clarke description of a Space Colony of the future. While outside the air temperature (without the wind chill) ran between -6 and -22F, it was quiet and warm inside.

The days were already 15 hours long. But, Sodium Vapor lights atop 50 foot poles illuminated the 'yard' continually lest anyone become lost during a sudden 'whiteout.' To prevent the buildings from heating up the Permafrost, the concrete floors are suspended 5 feet above the ground by timber pylons. Without this design 'trick' the Permafrost would melt and the entire colony would sink into the quagmire!

The whiteout that greeted us lasted three days. During this time Cliff and Greg assembled and proofed the 6 metre antenna, racked the five S.E.D. receivers and ran hundreds of feet of RG-59/U cable to the 90 wall outlets designated for SMATV service. On April 7th the



MOSTLY FAMILIAR site. Greg Johnston inspecting the TVRO product in Tuk.

wind died down enough for the antenna to be hauled outside with the assistance of a Caterpillar; and installed on its pylon support-suspended platform adjacent to the dormitory building.

We plugged everything in and while studying the 5 inch monitor Cliff jacked the big dish onto F3R. Bang. There it was, at a 12 degree look angle; perfect on all transponders except for 22 which had an overlay of 'black' sparklies on the NTSC color bars.

In the 10 PM twilight we quickly brought in the other birds, horizontal polarization only as that was the feed configuration. W5 has some sparklies on two of the transponders. W3 had sparklies on a single transponder. W3's look angle was just a tad over 6 degrees! ANIK B and D literally (well, almost literally) blew the phosphors off of the CRT.

By this point we were pointed dead into the (metal) utility building as we approached F4. Would we see F4 with the dish looking through the building, and, the look angle **under 5 degrees**? Yes — with sparklies — but all transponders (even PLAYBOY!) were watchable. Sighting through the rear of the dish we could see that fully 50% of the big dish was shielded from the bird by the utility building. That meant we had a 3 meter, not a six meter antenna on F4! If we could have moved that building, and gotten another 6 dB of antenna gain, well . . . F4 would have been totally clean also. And at under a 5 degree look angle no less!

BACKING Into Antenna Gain

All right — what might the 'real world gain' of a six meter antenna of this design be? I judged it to be 46.5 dBi. This judgement is based upon several factors, worth noting here.

The antenna uses 28 'semi-flat' panels. With absolutely flat panels in conjunction with our f/D of .375, the worst case discontinuity would be $\pm 0.25''$, occurring at the dish edges. However, errors of this magnitude occupy less than 1 percent of the total antenna surface



PARAFRAME at Tuk. Greg Johnston, Cliff Paterson and Rich Desaulniers.

error. Errors greater than $\pm 0.125''$ occupy approximately 29.3% of the total surface region. The remaining 70.7% of the reflector's area has a worst-case error of $\pm 0.125''$ and an 'average error' of $\pm 0.0625''$.

Averaged and weighted, the \pm peak-to-peak errors associated with 28 absolutely flat panels on a 6 meter reflector with an f/D of .375 amount to $\pm 0.125''$. And that renders an RMS (root mean squared) value of just over $\pm 0.040''$.

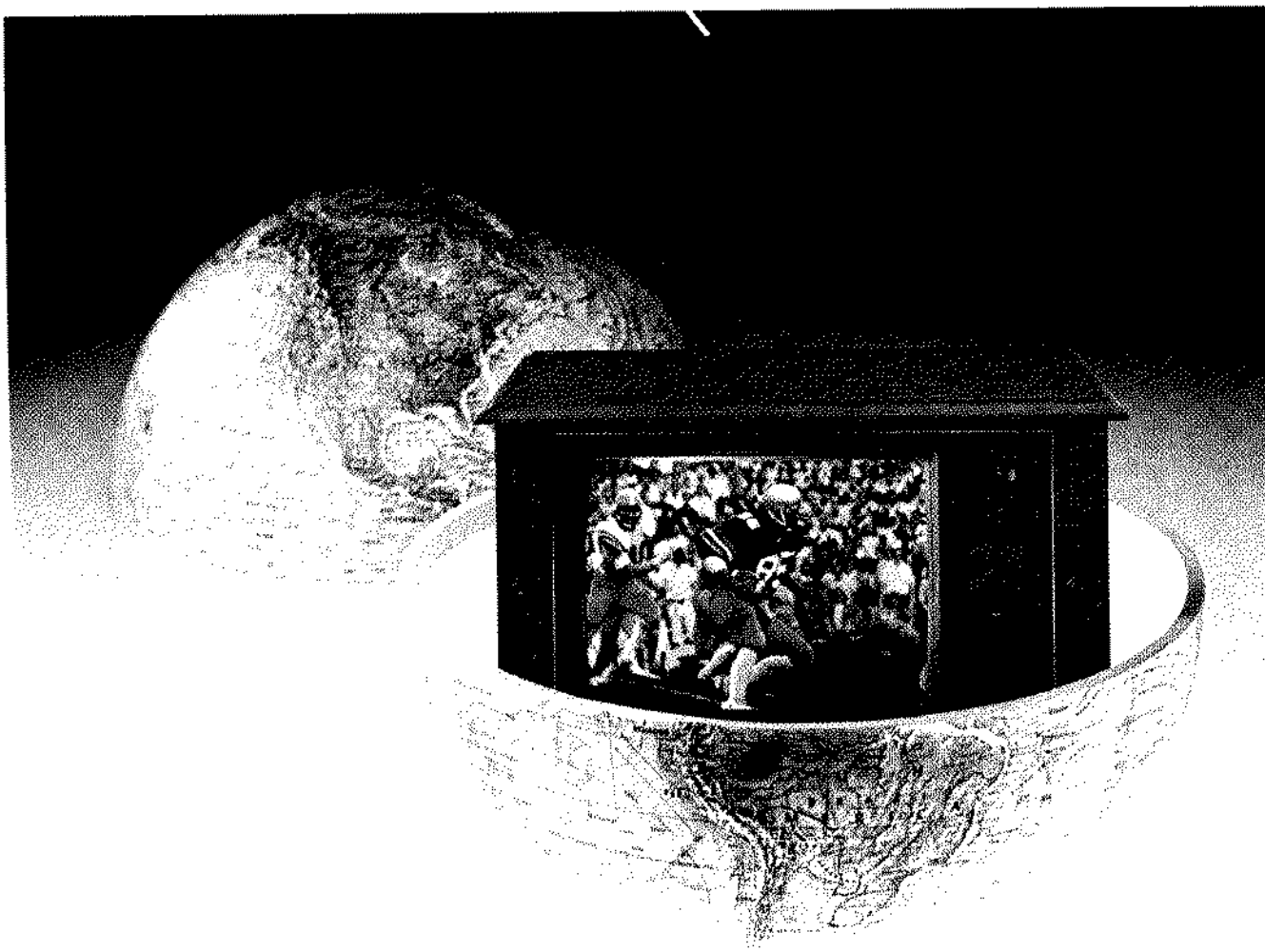
Being shaped slightly, our panels had a measured worst-case discontinuity of $\pm 0.20''$ for an RMS value of about $\pm 0.033''$. You can calculate the resulting gain penalty; it comes out to 0.1 dB reduction in gain for the semi-flat (less than totally parabolic) panel sections.

This is but the start, however, as other sources of error must be added to determine the final 'gain penalty.' Cross-sectional errors amount to about $\pm 0.10''$ RMS. Axial errors (inferred by careful edge sighting across the rim of the antenna) were undetectable even in the bright northern sunlight.

The added and summed errors were judged to be $\pm 0.050''$ RMS. The resulting gain penalty (relative to a theoretically perfect dish) would be 0.25 dB. Because the worst errors occur where feed illumination is down (i.e. in the outer surface regions) the penalty is actually slightly less than the calculated 0.25 dB.

The Seavey Engineering Associates dual feed, optimized for our f/D ratio, has a measured illumination efficiency of 77% with an edge taper of 16 dB. **Now** we can back into our 'gain' number:

- 1) Net illumination is 74% (allowing for blockage losses)
- 2) Gain based upon net illumination is 46.9 dBi
- 3) Subtract additional (ohmic) losses and we have 72% efficiency or 46.7 dBi
- 4) When surface errors are included (see previous discussion),



SYSTEM 7 OPENS IT UP.

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

The System 7^{XL} 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.

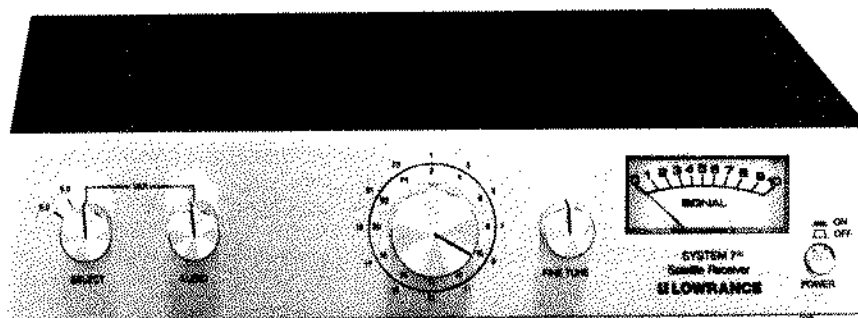
The System 7^{AR} combines all the above, plus adds stereo decoding and a remote control as standard.

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.

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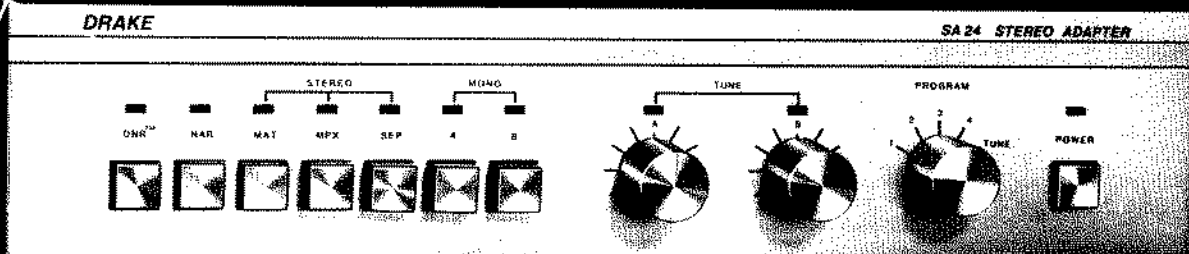
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 - Compatible with All Stereo Amplifiers
- DNR™ Noise Reduction System Reduces Hiss and Background Noise
- Attractive Styling Matches Drake ESR Series Earth Station Receivers

*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

INFLIGHT MEMBER
SPACE

OUTER LIMITS/ continued from page 7

we have a 'real world' number of 46.5 dBi.

What were the satellite's real-world EIRPs like at 'Tuk'? Given the antenna's gain (46.5 dBi), the 80 degree K LNA (which we'll call 70 degrees K because of the sub-zero operating environment), line attenuation (negligible), and the S.E.D. receiver threshold (8.5 dB) we can say that an EIRP of 25.6 dBw will create clean video with average 'FM deviation.' For bright red and yellow colors, approximately 28.0 dBw EIRP would be required.

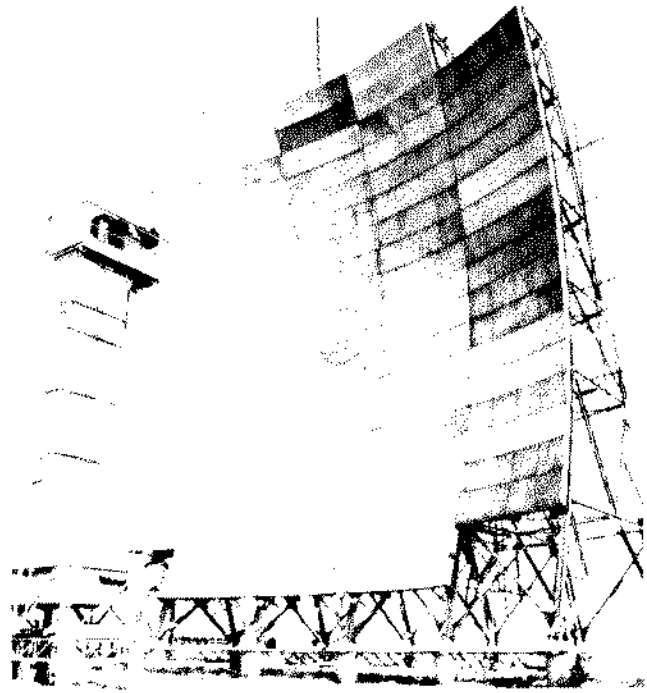
Add another 1.4 dBw to compensate for the increased path loss to this far northern location (plus the effects of the low look angles) at 'Tuk.' To equal a static threshold of 8.5 dB we really needed an EIRP of 26.7 dBw and to clean up the sparklies and distortion found on saturated colors (bright red and yellow) the requirement was approximately 29.5 dBw.

The weakest transponders on F3R were likely 27 dBw; and so the strongest must have been in the 31-33 dBw region. The 'even numbered' transponders on F4 (at less than 5 degree look angle) would appear to be in the 29-30 dBw region.

And W5, the weakest (observed) transponders were in the 26 dBw region. W3 has a very similar 'worst-case' EIRP.

On our fifth day we were treated to a full tour of Tuktoyaktuk. We saw the US 'DEW Line' antennas (see photo) peering out over the endless Arctic ice. We visited the Hudson Bay store to buy 'Tuk' T shirts (my favorite? "Tuktoyaktuk — Not the end of the earth, but you can see it from here!"). Then we were allowed to drive a couple of miles out of town onto the Beaufort Sea via the Dempster Highway winter route where last December a 'Pressure Ridge' explosively appeared under a thundering semi-trailer truck: separating tractor and trailer.

"Out here life's a game of chance" remarked our host. "Not the way we play it" retorted W.P.'s Cliff Paterson.



DEW LINE at Tuk. One of dozens of DEW line arrays stretched across northern Canada standing vigil over the North Pole route to Asia.

LET THE COMPUTER DO

TOWARDS Greater Accuracy

This program can be useful at several different levels. It can be used to do the original research for a new installation to discover which satellites are visible and what equipment is necessary to ensure good performance, and a printout can be enclosed with the quotation. A printout can be given to the installers to aid them in original adjustment and to spot problems. It can help a dealer remain competitive by showing the actual difference in carrier-to-noise ratio using various antennas and LNAs, perhaps allowing the use of a smaller dish, or more likely a less expensive LNA.

Rules for use are simple; just answer all prompts. The only tricky part is if either satellite or earth station is east of Greenwich, England,

by
Bill Miller
PROMAR
P.O. Box 22133
Tampa, Fl. 33622

THE HARD WORK

or if the earth station is south of the equator. In either case, enter the pertinent data as a negative (-) quantity, and the answer will be correct.

The program is written in **MICROSOFT BASIC** and was designed using an **OSBORNE 1** with an **OKIDATA 92** printer. It can be adapted to almost any form of BASIC, and the imbedded printer controls such as "CHR\$(28)" can be deleted or changed to suit the printer available, or all "LPRINT" statements can be deleted and the program run on a CRT only.

The data statements can be changed for different satellites, or more can be added. If the total number of satellites is changed, then the "read" statements must be changed to agree with the new number. For instance, if one satellite is added, then lines number 490 and 1110 must be changed to read "FOR I=1 TO 19."

A sample print-out and the program follows:

Sample Program Print

Satellite Aiming Co-Ordinates prepared by

PROMAR, INC
4912 West LaSalle Street
Tampa, Florida 33607

SUPPLIERS OF THE FINEST TVRO EQUIPMENT

This chart has been prepared for
 Bob Cooper

OF Providenciales, 22 Deg. North, 72.01 Deg. West With an antenna
 of 45 DB gain and 29 Deg noise temp and an LNA with 85 degrees
 noise temp., the Carrier to Noise ratio will be 10.1 DB.
 Polar mount angle is: 65.2 Degrees above the horizon

SAT	LOC	AZIMUTH	ELEV
SATCOM 5	139	261.2	12.5
SATCOM 1	135	259.3	16.4
SATCOM 3R	131	257.5	20.3
COMSTAR D4	127	255.5	24.2
WESTAR 5	123	253.4	28.2
SATCOM 2	119	251.3	32.1
ANIK AB	109	244.3	41.4
ANIK AD	104	240	46.2
WESTAR 4	99	234.5	50.4
COMSTAR 2	95	229.4	54.1
WESTAR 3	91	223.4	57.1
COMSTAR 3	87	216.4	60
SATCOM 4	83	208.2	62.2
WESTAR (1/2)	79	198.5	64
INTELSAT III	53	136	57.1
INTELSAT II	29	111	36
INTELSAT IV	18.5	104.5	25.5
G HORIZONTAL	14	102.3	21.3

```

10 PRINT CHR$(26)
20 INPUT "Display on printer [P] or CRT [C]";A$
30 INPUT "Enter Customer's name";N$
40 INPUT "Enter Customer's city";Q$
50 PRINT
60 PRINT "ALL NUMBERS OF POSITION ARE IN DEGREES,
MINUTES AND HUNDREDS OF MINUTES"
70 INPUT "Enter Site Lat. in Degrees North";AD:
REM if latitude is south of equator, enter number as negative
80 INPUT "Enter Site Long. in Degrees West";HD:
REM if longitude is east of Greenwich, enter number as negative
90 INPUT "Enter Antenna Gain in DB";DB
100 INPUT "Enter Antenna Noise Temperature";TE
110 INPUT "Enter LNA Noise Temperature";NT
120 INPUT "Enter EIRP from chart";EI
130 HD=HD+.01
140 K=6.61:PI=3.1415927#:R5=22766
150 DEF FN RAD(X)=X*PI/180
160 DEF FN DEG(X)=X*180/PI
170 DEF FN ACSN(X)=-ATN(X/SQR(-X*X+1))+PI/2
180 M=DB-10*(LOG(NT+TE)/LOG(10)):S=M+EI-42.6
190 IF A$="P" THEN GOSUB 610:
REM CALLS LOGO SUBROUTINE IF HARDCOPY IS SELECTED
200 W=AD:GOSUB 360
210 AD=DEC
220 W=HD:GOSUB 360
230 HD=DEC
240 GOSUB 930
250 GOSUB 950
260 IF A$="P" THEN GOSUB 890:
REM PRINT RESULTS OF POLAR MOUNT COMPUTATION
270 IF A$="P" THEN GOSUB 1100:
REM PRINT COLUMN HEADINGS ON PAPER
280 IF A$="C" THEN GOSUB 400
290 DATA SATCOM 5,139,SATCOM 1, 135,
SATCOM 3R,131,COMSTAR D4,127
300 DATA WESTAR 5,123,SATCOM 2,119,ANIK AB,109
310 DATA ANIK AD,104,WESTAR 4,99,COMSTAR 2,95
320 DATA WESTAR 3,91,COMSTAR 3,87,SATCOM 4,83
330 DATA WESTAR(1/2),79,INTELSAT III,53,
INTELSAT II,29,INTELSAT IV,18.5,G HORIZONTAL,14
    
```

```

340 END
350 END
360 DEC=W:W=INT(W):W1=DEC-W:W2=W1*.6666:DEC
=W2+W: REM DEGREES AND MINUTES TO DECIMAL
CONVERSION
370 RETURN
380 DEC=W:W=INT(W):W1=DEC-W:W2=W1*.6:DEC
=W2+W: REM DECIMAL TO DEGREES AND MINUTES
CONVERSION
390 RETURN
400 PRINT CHR$(26)
410 REM THIS ROUTINE IS FOR CRT READOUT OF
RESULTS WITHOUT HARDCOPY
420 PRINT "AT A LOCATION OF ";AD;" NORTH; ";HD;" WEST"
430 PRINT "WITH AN ANTENNA OF ";DB;" DB GAIN AND ";TE;"
" NOISE TEMP"
440 PRINT "AND AN LNA OF ";NT;" DEGREES NOISE TEMP.;"
450 PRINT, USING "##.##";S:PRINT
"DB WILL BE THE CARRIER TO NOISE RATIO"
460 PRINT "THE POLAR MOUNT ANGLE IS ";
Y;" DEGREES OVER THE HORIZON"
470 PRINT "BEARINGS AND ELEVATIONS TO
THE VARIOUS SATELLITES ARE:"
480 PRINT "SAT";" LOC";" AZIMUTH";" ELEV"
490 FOR I=1 TO 18
500 READ SN$,SL
510 GOSUB 950
520 CD=CD*10
530 CD=INT(CD)
540 CD=CD/10
550 Y=Y*10
560 Y=INT(Y)
570 Y=Y/10
580 PRINT SN$,SL,CD,Y
590 NEXT I
600 RETURN
610 LPRINT CHR$(27);"1"
620 REM LOGO SUBROUTINE AND RESULTS
OF FIELD STRENGTH COMPUTATION
630 LPRINT " "
640 LPRINT " *****"
650 LPRINT " *****"
660 LPRINT " *****"
670 LPRINT " *****"
680 LPRINT " *** *****"
690 LPRINT " **** "CHR$(28);CHR$(31);"PROMAR";
CHR$(30)" ***
700 LPRINT " *** *****"
710 LPRINT " *****"
720 LPRINT " *****"
730 LPRINT " *****"
740 LPRINT " *****"
750 LPRINT " ***"
760 LPRINT CHR$(27);"0" "Satellite Aiming
Co-ordinates prepared by"
770 LPRINT CHR$(30);CHR$(31)"PROMAR, INC"CHR$(30)
780 LPRINT CHR$(27);"1" "4912 West LaSalle Street"
790 LPRINT "Tampa, Florida 33607"
800 LPRINT "SUPPLIERS OF THE FINEST TVRO EQUIPMENT"
810 LPRINT CHR$(27);"0" "This chart has been prepared for"
820 LPRINT CHR$(28);CHR$(31);N$;CHR$(30)
830 LPRINT "OF ";Q$;" ";AD;" Deg. North, ";HD;" Deg. West"
840 S=S*10:S=INT(S):S=S/10
850 LPRINT "With an antenna of ";DB;" DB gain and ";TE;"
" Deg noise temp and"
860 LPRINT "an LNA with ";NT;" degrees noise temp.,
the Carrier to Noise"
870 LPRINT "ratio will be ";S;" DB"
880 RETURN
890 Y=Y*10:Y=INT(Y):Y=Y/10
900 LPRINT "Polar mount angle is ";Y;
    
```

Nobody Does It Better.

Owning a satellite television system opens up a whole new world of entertainment and educational opportunities for your family. Satellite television means more great Movies, Sports, Specials, Childrens Programs, News, Weather, Business, Education and Adult Programs than you can imagine. Examine a satellite TV program and you'll see what we mean.

The design of our new 2.8 meter model is based on the same proven engineering concepts as our original 3.8 meter antenna. We've refined the shape of the ribs and changed the hub to achieve greater structural integrity and less weight. Our welded Rib & Ring truss system shapes the expanded aluminum mesh into a true parabolic shape. Because wind resistance through the mesh is so much less than a solid dish, and the heat dissipation far greater, a Paracclipse system will remain true in the worst environments. Our ingenious polar mount allows you to change satellites in seconds, simply and accurately.

With the recently enacted 2° satellite spacing, our 2.1° beam width will give clear, sparkle-free reception, while less accurate antennas will become obsolete.

When you shop for a satellite television antenna, take a close look at the equipment and ask lots of questions. Keep in mind that the soonest you'll know the true cost of any system is after you've seen the end of it's service life. Try to separate the facts from the promises and go with a reputable manufacturer.

Only after you know something about the various solutions will you be able to make an intelligent choice about them.

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Paracclipse 2.8 meter

Your Picture Window to the World



The Paraclipse High Performance Satellite Television System will bring the world into your living room. Imagine the possibilities. Paraclipse gives you access to any television signal broadcast to North America via satellite. All the best channels will be yours to enjoy; Movies, Sports, News, Weather, Education, Music and Network programs.

The Paraclipse is available in custom colors. The welded aluminum-alloy frame is strong, lightweight and easy to handle. The parabolic dish is constructed of heavy-duty expanded aluminum radar mesh. The Paraclipse captures all the available signal while it greatly reduces wind and weather resistance. As powerful as it is beautiful, the Paraclipse is designed to give you years of trouble-free service.

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

COMPUTER/ continued from page 11

```

"Degrees above the horizon"
910 RETURN
920 REM:COMPUTE POLAR MOUNT ANGLE BY MAKING
    DUMMY SATELLITE SOUTH OF SITE LON.
930 SL=HG+.1
940 RETURN
950 W=FNRAD(SL):H=FNRAD(HD):A=FNRAD(AD)
960 L=(H-W)
970 D=FNACSN(COS(A)*COS(L))
980 C=FNACSN(-TAN(A)/TAN(D))
990 IF L=0 THEN C=2*PI-C
1000 CD=FNDEG(C)
1010 EL=ATN((COS(D)-(1/K))/SQR(1-COS(D)*COS(D)))
1020 Y=FNDEG(EL)
1030 RG=R5*SQR(1-(2/K)*COS(D)+(1/(K*K)))
1040 W=CD
1050 GOSUB 380

```

```

1060 CD=DEC
1070 W=Y:GOSUB 380
1080 Y=DEC
1090 RETURN
1100 LPRINT CHR$(27);"H";"SAT";" LOC";
    " AZIMUTH";" ELEV";CHR$(27);"I"
1110 FOR I=1 TO 18
1120 READ SN$,SL
1130 GOSUB 950
1140 CD=CD*10
1150 CD=INT(CD)
1160 CD=CD/10
1170 Y=Y*10
1180 Y=INT(Y)
1190 Y=Y/10
1200 LPRINT CHR$(27);"I"SN$,SL,CD,Y
1210 NEXT I
1220 RETURN

```

4 GHz DBS

ON GALAXY ONE?

MOVIES/Movies/movies

For more than 90 days now there has been an undercurrent of intrigue circulating in the home TVRO industry. The root of that intrigue is HBO/Home Box Office. We'll give you the basis of that intrigue and excitement right up front, and then investigate how all of this may affect the way you do business in 1984 and beyond.

The Hughes Galaxy One satellite, launched late in June and now positioned at 134 west, is a 24 channel bird with 9 watts of power per channel. Hughes has been building birds since the first birds were built (more than 20 years ago) and all through that time they have always been an 'OEM' for birds rather than an operator of birds. Galaxy One, to be followed by Galaxies Two and Three, are a major departure for Hughes: they **own** these satellites, and like RCA (who also builds birds) they will **operate** these birds. For fun. And profit. Lots of profit.

Hughes used the talents of a former White House aide, Clay T. Whitehead, to put Hughes into the satellite operations business. Using slickly created brochures and effective cable industry trade publication advertising, Whitehead went into the marketplace to sell channel space on Galaxy long before any serious work had begun to build Galaxy One. The Whitehead/Hughes approach was that the transponders would be 'sold,' rather than rented. Up to the announcement of this approach, nobody ever tried to 'sell' a transponder before. Hughes, Whitehead, and, Hughes' corporate attorneys figured out a clever way for would-be users to **own a part of a bird** each. They called it the 'condo' (condominium) approach. Ownership rights in the actual satellite (the housing, the powering system, the fuel, and the control circuits) would remain with Hughes. But the 'space' on board, those 24 little boxes that made up the communications heart of the satellite, would be purchased by the condo owners.

On the surface, the difference in price for ownership of a condo-transponder, and the rental fee that would be paid over say seven to eight years of expected bird life was not great. Some savings, to be

sure, but not astronomical. The buyer, however, had several things going for him.

- 1) If the bird held up for say ten years (many of the new ones will), he would get an extra two to three years of service 'free.' Not insignificant when the price per year is over a million dollars.
- 2) By purchasing rather than renting, there were 'tax advantages' to the buyer. He could 'depreciate' rather than 'expense' the cost of the transponder.
- 3) By **owning** rather than **renting**, the buyer was in a better position to get out of the deal, perhaps for a handsome profit, if he opted to sell off his transponder rights at a later date;
- 4) As an owner, the buyer could 'insure' his property more completely than he could as a tenant. That meant that there was a better chance of coming out 'whole' in the event of a transponder (or satellite) failure.

Naturally there was a fuss over this plan when Hughes announced it. People like RCA and Western Union and Robert Wold claimed 'foul' but they were probably mostly upset because Hughes had created a better way to get into the bird business than they had, and for the moment Hughes had a competitive advantage. There are those who might trace the failure of F4 to fill up to its capacity to the availability of space on Galaxy One. RCA, for one, was hurt twice by the Hughes plan. **First**, when Hughes got away with it, and gained FCC approval for 'condo sale' of transponders (but only after bitter wrangling at the FCC). **Second**, when Galaxy ended up with the coveted 134/5 west orbit spot after the FCC tossed all of the 4 GHz operator names into a hat and pulled out who would be able to operate from that position.

This is not about Hughes or Galaxy One. But understanding why there is a Galaxy One, and how it created a different and new type of thinking for American DOMSATs will become more important to you as you read what follows.

Nine watts of power. That's almost twice the power of the typical

RCA 5 watt transponder. It is a measurably greater amount of power (although an insignificant amount when received on the ground) than even the 'high power' F3R/F4 8.5 watt transponders (i.e. TRs 3, 7, 11, 15, 19 and 23 on F3R). As an industry we all know how significant the CONUS antenna pattern 8.5 watt transponders are to our business. Even a four foot dish in the central part of the USA makes viewable (if not perfect) pictures on **these** transponders.

ENTER HBO/Time Inc.

When Whitehead was chasing about the country looking for 18 possible buyers for the 24 Galaxy One transponders (Hughes holds six in 'reserve' as emergency replacements should any of the first 18 fail before the end of bird life), he elected to try to sell as many different groups as possible. He called Galaxy One many different names, but it usually came back to being 'Cable's Second Most Important Satellite' when all of the puffery was stripped away. By locating G1 right next door to F3R (cable's MOST important bird), he was even able to go to the back lot of Hughes and round up some antenna engineers who explained to him how an engineer could take the standard feed from a dish and replace it with an 'offset feed' that would look at two adjacent (in the sky) birds at the same time. That gave him a new marketing tool to work with. One dish, positioned halfway between F3R and G1, **with two feeds**. One for F3R, and, one for G1. Now the cable operators had a potential 48 channels out of a single dish rather than 24. Everything was coming up roses for Whitehead and it didn't take him very long to peddle off the 18 transponders he wished to sell.

Selling the transponders in advance was not critical to Hughes but it opened up an entire new method of financing. Some would later suggest that the same concept could be applied in other cable related but non-satellite areas. We'll see what that is all about.

By selling off 18 transponders at an average price in the \$10/11/12 million region, in advance of the bird even being constructed, Hughes had a nice new item on their financial statement. Eighteen transponders, pre-sold before 'construction' for a total of say \$198,000,000. They could bank that.

In fact, they could build the satellite and spend the profits from banking of those pre-build construction agreements. A modern 24 channel satellite, with launch costs, is about a \$70,000,000 item these days. No matter how much money you allocate for 'operating' the satellite (station keeping, full time flight control and monitoring) over say ten years, it is difficult not to at least double your money with a deal like that. And they had it all up front to use! Plus, in this case, they weren't doubling **dollar** bills. They were doubling **100 million** dollar bills. Uncle Sam doesn't print many of those anymore.

Amongst those who purchased transponder space on Galaxy One was Time, Inc.; they bought five of the transponders. And then just for good measure, a 'small' subsidiary of Time, Inc. named HBO bought a transponder of its own. That gave the corporate family six of the 18 available for sale; one third of the total.

Which brings us to the upfront statement you have been waiting for.

Time, Inc./HBO wants to get into the 4 GHz DBS business.

INTO YOUR Home And Mine

Since HBO began transmitting premium movie fare to the nation's cable systems in September of 1975, via satellite, there has been a strict, unbendable corporate policy at HBO. Their product would only be (re)sold to cable firms, or in limited cases, MDS and other 'protected distribution system' clients. Holiday Inns, for example, qualifies since the ultimate locations to be served by the movie service are 'accountable.'

HBO has shown absolutely no interest in selling their product to you or me, for view on our home TVRO systems. They have repeatedly refused to deal with SPACE or anyone like SPACE for viewing rights. They have done this because they could not control 'the gate' (i.e. insure where it was being seen, and by whom), and, because our 'numbers' have not been significant enough to bother trying to cultivate us as a 'market.' The growth of TVRO systems, operating at 4 GHz, has begun to change that stance and the Hughes Galaxy One bird plays a part in the turn-around thinking we are about to discuss.

For about ninety days now HBO has been in the marketplace talking with equipment suppliers. They began with Scientific Atlanta, an old 'friend' of theirs from the cable TV days. S/A, and HBO, have

subsequently been on the street talking quietly and discreetly with other more 'home terminal' oriented firms. In a few cases they have set out to find middlemen operators in places such as Dallas who would 'front' what we are about to discuss. The bottom line is that HBO is giving serious consideration to taking one of the TIME/HBO transponders, perhaps two of the TIME/HBO transponders, on 9 watt powerful G1 and turning it into a 4 GHz movie and special packaged 'DBS' service.

THE Concept

HBO started out in this business as an experiment at TIME, Inc. They hired a young Wall Street attorney named **Gerald M. Levin** and turned him loose creating a premium movie service. Operating out of New York City, they spit out five or six hours of premium movie fare per evening connecting up to cable systems in the New York/New Jersey/Pennsylvania region via terrestrial microwave. And they lost money for five years or so. That's when Levin took a gamble that ultimately turned HBO into perhaps the most powerful entertainment company the world has ever known. With just over \$6,000,000 in corporate money he agreed to lease satellite transponder space on the (then) new RCA F2 satellite. By using the satellite, HBO would be able to cover the entire nation with their programming. In loose partnership with such firms as Scientific Atlanta, they worked out the logistics of the ground receiving equipment systems and the TVRO industry was born.

From 1975 to 1980, HBO grew very rapidly. But their posture was always one of distributing movies brought to them for rental by the major movie production firms. HBO, in those days, was known as a 'tough negotiator' for movie rights and movie prices but nobody was more than slightly upset with the way things were going. That's when HBO decided that it could get a 'better deal' if it got involved in the production of movies. We'll come back to that.

By being a movie **renter**, HBO was subjected to the terms and conditions written into the contracts by the movie distributors/owners. If the movie folks wrote into the contract "This film shall not be shown in Hoboken on Thursday nights . . ." HBO was bound to see that it was not shown in Hoboken on Thursday nights. If they wrote into the agreement "This film will not be shown in Puerto Rico until after the movie theaters there have shown it . . .", then that is the way it had to be. The movie folks had many little special 'line items' in their contracts and the exclusion of showing the movies in private homes, even if those homes were reached by satellite, was included.

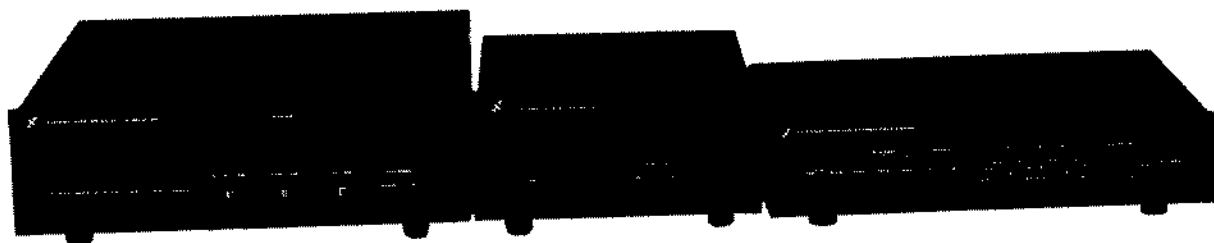
But HBO was also in the programming creation business on its own. There were the HBO 'Standing Room Only' series and sports series and comedy specials. HBO was finding, as early as 1978, that they could not support their habit (then 12 hours per day but headed for 24 hours per day) using movie products **alone**. The day was simply too long, and there were too many such days in a year, to load up the service with just movies.

HBO pays for movies on the basis of so much per HBO home per movie. They get some concessions for 'frequency' of showing. For example, they might get a movie deal that costs them 20 cents per home for the movie but they are limited to four showings in the first month of release and one or two showings six months later. Or they might spend 30 cents per home per movie but get more frequency of showings. No two deals are alike.

As HBO grew in size (**now more than** 12,000,000 homes, they claim), an interesting thing happened with the funding of movies. Back in the early 70's, an average movie could be shot and created for around \$5-6,000,000. Today, the same 'average' movie (nothing special about its stars or effects) costs at least \$12,000,000 to produce. At the same time, the movie people had been facing increased competition for leisure time pursuits and they have had to greatly increase their promotional and advertising budgets to get the movies into a profitable theatre release cycle. End result? It was now costing \$20,000,000 or so to launch a new movie although 40% of that was not in the movie itself; it was in promotion.

As the HBO numbers grew, it became apparent to HBO accountants that they had to be in a better spot if they pledged money for the creation of the movies **before** the movies were started. They had

Why is Channel Master very concerned ...about your reputation with your customers...about your ability to get service and replacement parts on satellite equipment for years to come? ...about the in-today and out-tomorrow philosophy of many suppliers in our young industry?



Because you are!

Because by now you know there is a lot more to a satellite earth station than a fancy-shaped dish. The final proof of any installation is in its performance and long-range reliability.

And performance is what the Channel Master Model 6128 satellite receiver is all about, with a threshold of less than 8 dB C/N, 20 dB image rejection, and a video dispersion removal rate of greater than 40 dB.

Its broadband discriminator provides crisp, clear video. High-gain AFC circuitry ensures drift-free reception.

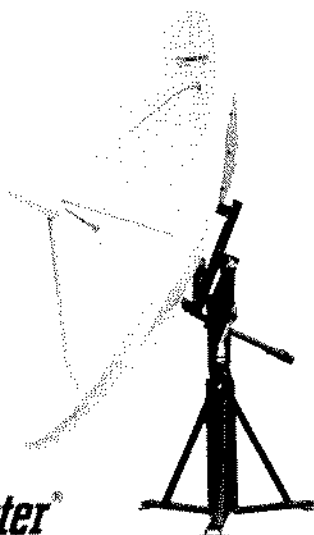
And your customers will have complete signal control with extra convenience features such as:

- Automatic Polarity Switching
- Signal Strength and Fine Tune Meters
- Priority or Variable Audio Tuning



Channel Master[®]

Div. of Avnet, Inc., Ellenville, N.Y. 12428



- Built-In Switchable Modulator
- Channel Scan
- LED Digital Channel Display
- Remote Control (optional)
- Stereo Processor (optional)



Add the Channel Master SATSCAN remote antenna controller and the satellite stereo processor and you have a maximum control system that is as easy to operate as the family TV.

Both the Channel Master Model 6128 Receiver and SATSCAN units are designed to provide your customers with state-of-the-art performance, reliability and control. Over 400 Channel Master distributor locations can provide you with convenient local assistance and support backed up by our 30-man field sales force.

Mail This Coupon Today!

Donald Berg, Channel Master Division of Avnet, Inc.,
C983, Ellenville, New York 12428 (914) 647-5000

I'm interested in selling Channel Master Satellite Equipment. Please send me more information.

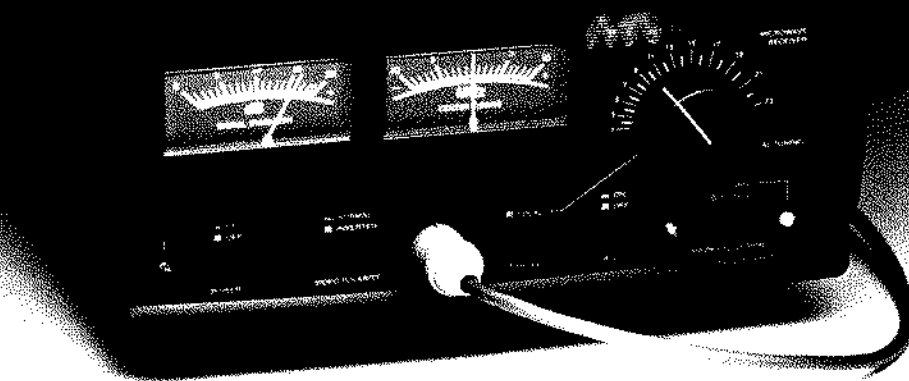
NAME _____

BUSINESS _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

PHONE (_____) _____
Area Code



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.

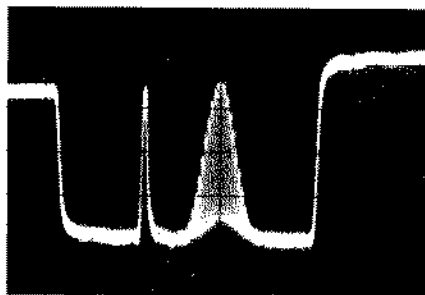
Quality You Can See

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 Sin² 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.



Unrelaxed Off-The-Air Sin² 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.

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EARTH TERMINALS

4 GHz DBS/ continued from page 15

several reasons, not all directly related to cost dollars, to want to do this:

- 1) **First of all**, while HBO has a comfortable 'lead' over the nearest competition (Showtime with 4,000,000 homes versus HBO's twelve million), there is always the fear that somebody might try to 'package' Showtime and number three The Movie Channel (2.5 million homes), and/or Spotlight into a single competitor. One way to make the HBO service 'stand out' is to give it a 'unique' look. In other words, somehow make sure that cable customers offered a choice of HBO or Showtime or The Movie Channel always find HBO programming 'more varied,' 'less duplicative' and otherwise . . . more competitive.

HBO found that if it went into the Hollywood production dens and offered to help fund the production of movies, that it could (for say a 25% equity participation) 'demand' that these movies ONLY be shown on HBO. In other words, they would be shown either exclusively on HBO, or in the worst case, FIRST on HBO and then perhaps months later on Showtime and the others. That, certainly, would help HBO's competitive posture in the cable marketplace.

- 2) **Second of all**, if they owned 'a piece of the action,' they could modify or even eliminate many of those funny exclusions the movie contracts presently contained ("No showing in Hoboken on Thursday nights," "No showing in Puerto Rico while in the theaters," etc.).

In a word, HBO could better 'control' the product if HBO owned part of the product. They could also make some extra money by seeing that the product was sold and re-sold, after its initial cable showing, in other market areas. Such as overseas, or to other premium service suppliers, or to the television networks (typically the next to last stop in the line with local station showing last in line).

So HBO got into the movie production business, in a relatively big:small way. They were pledging 25% of a \$12,000,000 film in return for the rights to the movie for HBO. It happened that they had grown big enough on their own that they could afford to do that for essentially the same dollars they were spending to rent the movies anyhow. How? Like this.

If HBO had 10,000,000 homes on the line, and a new movie was going to cost HBO 20 cents per home, HBO would be spending \$2,000,000 to 'rent' that film for showing to those homes. With that rental went limited showing rights (i.e. a specified number of showings), the probability that the same movie would be appearing on Showtime the same month or the next month, and a half dozen pages of special contract exclusions.

Now, HBO has 12,000,000 homes. The same movie, at 20 cents per home, now costs HBO \$2,400,000. On the other hand, for \$3,000,000 (25% equity interest) they could get the same movie on 'their terms' and with any success at all with later sales overseas, to firms such as Showtime (4,000,000 homes times 20 cents each is \$800,000 there alone), to the TV networks (typical charge to a network; \$1,000,000) and local TV stations . . . well, it just worked out that HBO was **now big enough** to pledge the same approximate amount they would pay as rentals, as equity ownership. And they came out far ahead.

HBO is now involved in a wide variety of movie pre-production deals. For example:

- 1) **TRI-STAR**. A venture with Columbia Pictures and CBS. Each of the partners have pledged \$66,000,000 to make movies and production has begun. Columbia will release the movies to the theaters (first), HBO will release the movies to the cable audience (second) and CBS will release the movies to the rest of the world (third and last). They hope to make 12 to 15 new movies per year.
- 2) **SILVER SCREEN PARTNERS**. For as little as \$5,000, you (anyone, actually) can invest in a movie making venture. E.F. Hutton is selling this one and they are raising a couple of hundred mil to make movies. The bottom line is interesting. Since the movies will be made 'on budget' (typically not over \$12,000,000), HBO is guaranteeing that anyone who puts in money will be guaranteed 'no loss.' **How?** Well, first the movie is made. Then it is released to theaters. If the movie does

poorly in the theaters, and does not make back its production costs, HBO guarantees that it will pay cable TV rights for that movie sufficient to make up the difference between the theater income gross and the costs. HBO can't lose. They plan to make 12 to 15 movies and **some** of them **will** make money in the theaters. Maybe they all will. When a movie makes it in the theater, HBO gets the movie rights for cable (exclusively, of course) for pennies or no bucks at all. If a movie bombs, HBO makes up the difference. Even a real stinker doesn't play to totally empty theaters. HBO is not risking very much here.

- 3) **ORION**. A new film production company built out of the ashes of Filmways. Again, HBO is pledging 25% of the cost of movie production for exclusive cable TV rights. They plan to produce (and are now started on) ten pictures per year.
- 4) **INDEPENDENTS**. If you keep track of the movie trade press announcements, there are between 25 and 30 major movies being created right now which have HBO money in them. Often the money is a piece of paper; a pledge that HBO will take the movie and show it on the network, when the movie is finished. That's a very good piece of paper since the independent film producer can borrow money against that \$2.5 mil or so pledge. Many of the independent movies are being shot for \$5-6,000,000 still, today, and the HBO pledge (against exclusive cable rights, of course) is good for nearly half of the basic negative costs (i.e. actual production costs).

If tying up someplace between 50 and 60 new movies over the next year (and each year thereafter if it all works) is not a shocker to you, it is raising **some eyebrows** elsewhere. The 'seven major' movie production houses, for one, are none too happy about all of this. With the exception of Columbia (which is in a deal with HBO), they are outside looking in. HBO has so many movies started or about to start that Hollywood has never been busier. That is drying up the availability of production personnel, and taking 'at risk' dollars which the movie firms are accustomed to raising for their own use out of the marketplace and into HBO's domain. Several of the major movie production firms are screaming that the Justice Department needs to investigate and stop HBO before HBO takes over the entire movie industry.

All of the old arguments are being trotted out. "**HBO is selecting which movies will be produced. They are deciding which talent will work, which scripts will be bought, when the movies will be released. It is a monopoly.**"

So far the Justice Department has not moved on HBO. Perhaps because HBO is all over the map, cutting new deals almost daily, they can't figure out where the head of the serpent is located.

Back in 1948 the movie people were in a similar cat-bird seat. They **selected** the scripts, **raised** the money, **selected** the talent, **produced** the movies, and then **distributed** the movies on a schedule they created to movie houses that **they** owned. Later on, maybe, the 'independent' movie theaters got a shot at the same movies.

That's when a much older Department of Justice moved in and ordered the movie producers to dispose of their owned and operated theaters. The reason? The whole product chain, from creation to sale, was controlled vertically by a single company. The movie people fought it then but finally had to give in. **Now they are saying** that HBO, using 12,000,000 of the nation's living rooms rather than 400/600 movie theaters, has done exactly the same thing. **They** have taken over control of the production from conception to final sale. HBO responds that is nonsense; the real 'theater' in this case is the cable TV company, and while TIME, Inc. does own the nation's largest cable TV company (ATC with nearly 2.5 million homes), that is but a fraction (less than 10%) of the total cable TV homes in the present universe.

The rifles are nonetheless loaded for HBO. When the audience measuring firm, **A.C. Nielsen**, conducted a national survey this past spring to determine who watches what, Nielsen came to the conclusion that HBO is seen (i.e. available) in 18.3 million US homes. That number is more than 50% larger than HBO's claimed 12,000,000 homes. Since HBO pays 20 cents (or whatever) per home per movie based upon its 'home count,' the movie people who still sell to HBO screamed loudly. They instantly accused HBO of 'creative bookkeeping' suggesting that HBO was '**deflating their true subscriber count**' to keep their bills with the movie firms 'down.' HBO and Nielsen went back and looked at the Nielsen numbers and Nielsen later issued

a statement that said in effect "we erred."

There is of course another possible answer to the inflated HBO count. HBO may well be right about having approximately 12,000,000 (paying) subscribers. They could **also** have another very large number of **non-paying** subscribers. Cable systems are, with few exceptions, not very tight with security. Some cable systems use \$6 (their cost) descramblers to unravel their HBO-secure transmissions. It doesn't take an electronics engineer to get around that one. Other cable systems stick HBO on 'mid-band' (those channels between 6 and 7), or on 'super-band' (those channels above 13). And they don't scramble them at all; counting on having to provide the subscriber with a 'converter' to receive the mid or super band channels. Modern, in-store, TV receivers tune **those** channels **directly**. And, converters are available in thousands of locations coast to coast. Even Radio Shack carries them. Still other cable firms install 'positive traps' at each subscriber 'tap location' when the subscriber is NOT taking a premium service, such as HBO. To get the service, the non-HBO-payer simply has to get at the positive trap on the pole in front of or behind his home and disconnect or bypass the positive trap.

To be sure there are more sophisticated scrambling systems around. But they are far from universal; yet. The cable industry has admitted to a 10 to 15% 'penetration rate' for illegal connections. That the rate could be 20% for **premium services** does not seem outlandish.

The Neilsen/HBO flack was quietly moved to the back burner. But it reminded the movie people that times **have** changed. Security, as once they knew it for theater distribution in their owned and operated theaters, is a thing of the past.

With millions stealing HBO service, and other premium services, HBO has other concerns. **DBS is one of those.** The 12 GHz DBS packages now being put together are, frankly, not all that attractive. Between limited channel capacity and the huge start-up costs, it takes some pretty big players willing to lose millions (hundreds of millions) of dollars initially. HBO has played this one close to the vest; never ruling out being a part of DBS, but also never giving anyone encouragement that they might be in the game. Long term, DBS could be a form of threat to HBO unless they are willing, through TIME, Inc. to move into the programming portion of the service directly. So far, the only players in the game are the firms willing to operate both the service **and** the field collection agency as well. HBO has left the field collection to their 'partners,' the cable systems of America. They are smart enough to realize that field collection is quite a can of worms to itself. And, when you add equipment problems (most of the DBS folks plan to provide the equipment, **and** its maintenance as well) to the field collection problems, it begins to look like a great way to lose your shirt if something goes awry.

TIME/HBO probably have several good reasons why they would like to see 12 GHz DBS not get a good send-off. They might even be happiest if 12 GHz did not make the grade at all. Profiting from what they have learned with cable distribution of premium programming, they know perhaps better than any other player that movies and entertainment specials are THE one premium programming fare that attracts people to metropolitan cable service. It is possible that the suburban and rural people would feel the same way.

Which leads to a scenario of thinking.

Suppose, just suppose, that you took a premium grade movie and entertainment channel and you put it up at C band (4 GHz). You handled it with a reasonable approach to scrambling, something adequate but not so fancy nor expensive that the scrambling technique ate up all of your profits. Now, what is the **REAL** difference between 12 GHz DBS, and, the 4 GHz service we know today?

Answer One: 12 GHz has smaller dishes. Well, it will in 1986/87 or so if and when the higher power 12 GHz DBS birds get operating. Right now, this fall, the dish sizes being planned for are typically 3 to 5 feet in size. There are even some 6 footers in there. And, hey . . . there are people using 6 foot dishes **at 4 GHz!**

Answer Two: 12 GHz has less expensive equipment. Let's see now. The equipment prices being quoted are based upon annual equipment 'yields' of 100,000 packages per year. Hummm. The 4 GHz equipment prices really are not that far apart. Now, if you extrapolated the 4 GHz prices for 25,000 per annum to the same 100,000 per annum being described for 12 GHz . . . hey, look at

this! The prices are virtually the same!!!

Answer Three: 12 GHz has several channels available per home. Four or five per bird. Nobody wants to have to throw in a children's channel, an art's channel, a family channel and a sports channel . . . just to lead the viewers into paying for the premium/movie channel. It makes good economic sense to go to the trouble of doing one truly saleable movie channel (remember — that's the one that pays the bills). But to have to put together three or four others just to make the customer feel comfortable with his \$19.95 or \$24.95 per month? That's a drag. Now, let's see about 4 GHz. If you provided the movie service channel and **ONLY** the movie service channel, and there on the same bird or just a bird away you had **FREE ACCESS** to several family channels (i.e. WGN, WTBS, CBN, et al), and a sports channel (i.e. ESPN), and a couple of news channels (CNN, CNN-2), and a whole bunch more that is **NOT** scrambled and will not be scrambled . . . you just used **somebody else's money** to fill the customer's screen with the kind of stuff the customer has been told he will have. It didn't cost **you** one thin dime.

Answer Four: The FCC has authorized DBS at 12 GHz. But they have not authorized it at 4 GHz. True, but. But? But the FCC has also had numerous chances to shut off the quasi-DBS at 4 GHz, over the past five years, and they have done nothing to shut it down. Assumption? By not acting to shut it down, they have actually been leaving it a clear field to develop. In effect, they have been sanctioning it all along. Plus, even the 11/12 GHz DBS allocations have gotten terribly mixed up. First there was the 12 GHz band allocated to DBS **and only DBS**. And the 11 GHz band was allocated to 'fixed satellite service'; something quite different than DBS. Then along comes the FCC in June declaring that DBS can operate in the 11 GHz band as well; for those 'early bird DBS folks' who want to get a head start. **Conclusion?** The clear cut lines separating services, and bands, have fallen at the FCC. Nobody would yell real loud if somebody came along and offered a DBS channel or two at 4 GHz.

FILLING The 4 GHz DBS Channel

Big time operators in Hollywood are saying it out loud. "**HBO, in six years or less, has taken over the movie industry. They have divided and conquered Hollywood by some very clever business maneuvers. In just a few years, HBO will dominate movie production worldwide.**"

Talk like that can go to a firm's head. HBO, this summer, announced a deal with a new group. The project? Develop an 'HBO Type Service Channel' for European cable distribution, via satellite. Their major partner is an English film company that has close ties to the English broadcasting business. The English will own 51% but there is little doubt that arrangement will last long. An American HBO-type executive is likely to head it up and the plan is to pop out of the satellite over Europe with an 18 hour per day service along about the first of February coming.

A 4 GHz DBS channel, operated on Galaxy One by TIME/HBO has one small problem. A small problem which HBO is rapidly correcting. Getting the film product for display there. They have a similar problem with a European 'HBO' service.

Remember that HBO spent the first 8 years of its life buying product; or more accurately, **renting** movies and specials. They had the rights to display the product only in certain ways, at certain times, to certain audiences. But then, gradually, they began to get involved in the ownership rights of the films and specials on their own. That eliminated those four or five back pages of the typical rental contracts where HBO was precluded from showing the films "On Thursdays In Hoboken . . ." or "In Puerto Rico while still in the theaters . . ." and so on. Gradually, slowly at first, much more rapidly now, they found themselves with a growing library of movie and special product which they could use anyway they wished, anytime they wished. They, in effect, have the full 'Satellite Rights' to the productions. No matter how the movies or specials are distributed by satellite.

This allowed them to begin hard planning for the day when they could warehouse sufficient premium product to program not only their

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BUILD THE FIRST SN



High Gain 75 H - 7.5
Quadrant Antenna

ANTENNA SPECIFICATIONS:

ELECTRICAL:	3 METER	4 METER	5 METER	6 METER	7.56 METER
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

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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!!!!

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4 GHz DBS/ continued from page 19

cable service channels, but also a European service cable channel or two, and, perhaps a DBS channel or two. And if DBS, why not at 4 GHz?

KILLING Two Birds/At Once

If the FCC was not going to put 4 GHz 'quasi-DBS' out of business, if Congress was not going to move on federal legislation to outlaw unauthorized viewing of 4 GHz 'private transmissions,' and, if hard scrambling for the CABLE feeds at 4 GHz was finally coming down the track, was this not the time to jump into their own 4 GHz service?

First they could trot out all of those Tom Jones/Tina Turner specials that played so well on the HBO cable channel back in the late 70's. The cable firms couldn't get too uptight over that one; after all, they got the product 'first' did they not? Then by adding a month or two or three to the release dates for the 25% (or more) HBO owned new movie productions, they could still stay clean with the cable guys and at the same time get into the DBS world at 4 GHz as well. With a 4 GHz terminal priced at \$995 plus installation, in 100,000 per annum quantities, **the market would grow like topsy.** Put up just one (ET and one more PT) premium service channel at first. Let the 4 GHz terminal operators pick and choose from the other 'free' stuff on F3R and G1 to convince themselves that a 4 GHz terminal was a good deal. Charge \$19.95 per month and include a system that made it impossible for the viewer to get the service unless he paid for it. Something like a piece of plastic he would receive in the mail each month, or pick up at his nearby Time:Life book stand, take home and insert into his 4 GHz terminal decoder. Let those 12 GHz DBS guys chew on that one for awhile!

Now if 100,000 people took this service for \$19.95 per month, and HBO cleared \$10.00 per month per 'subscriber' after all expenses of administration, they are now taking in a million a month. Against which they get to trot out the same films and specials they have already paid for quite some time ago. A very profitable return. Make that 100,000 a bigger number such as 1,000,000 private 4 GHz 'DBS terminals' and now you have some real money to 'play' with. You say a new movie costs \$6 to 12 million to create? Here we have a 1,000,000 subscriber based service at 4 GHz generating \$10,000,000 a month in cash flow. Boy, will that produce a bunch of new movies per year! And each new movie is of course a brand new 'cash-flow-machine' all to itself. Each new movie generates new cash flow, which in turn generates new movies. Which generate more new cash flow. It is as close to the magic money machine as anyone has ever come. And Hollywood is still wondering what hit them.

HOW The TVRO Industry Fits

As an industry we have been in an adversary position with HBO since day one. Very few go back to that first SPTS show in Oklahoma in August of 1979 when **Richard Campbell**, then in charge of the **Scientific Atlanta HOMESAT** division stood on the podium to explain how his company 'hoped' to work out a licensing arrangement with HBO to allow at least S/A home systems to have legal access to HBO (and other premium programs). Very few in the industry know that a large 350,000 acre ranch in New Mexico called 'The Bell Ranch' was the first location to get a four channel S/A HOMESAT system and that with it went at least 'tacit approval' for the Bell Ranch to watch HBO.

Even fewer will recall that one and a half days into the first three day SPTS, S/A's Campbell was hurriedly called away from SPTS to fly to New York to meet with HBO executives. **He thought** he was leaving for the final contract signing. He didn't realize until he got to New York that he was being summoned to be told to 'knock it off'; that 'No, HBO was not going to sell directly to home terminal systems.'

That failure led to the demise of both the S/A HOMESAT plan, and Campbell, at S/A.

HBO, perhaps wisely with the wisdom of hindsight, was not ready to commit to a 4 GHz direct sale program in 1979. There were NO numbers in 1979; just a handful of terminals and most of those were in the yards of Taylor Howard and Robert Coleman types. Guys who wanted to play with the equipment rather than watch the pictures. No, HBO would wait until 'the numbers were right.'

Well, the numbers just got right.

- 1) The home TVRO industry is swatting away at an annual rate of **160,000 to 240,000** per 12 month period.
- 2) The HBO 'film library' count has gone up and up and up. And, with all of those partnership and co-production deals HBO is involved in out Hollywood way, there will be plenty of HBO controlled movie product available in just a few short months.
- 3) The price of 4 GHz terminals has dropped and dropped so that just around the corner there are **\$995 retail** (plus installation) packages.
- 4) Finally, the Hughes **9 watt** transponders, while not super power yet, are at least in the right class to make the **6/7 foot** terminals play in a wide area of the USA.

Oh yes.

All of this is happening or has happened just at the time when the 12 GHz DBS folks are getting ready for their own 'launch' schedule. By the time HBO/TIME is ready to unveil their own 4 GHz 'DBS' plans the average person in the street will just be beginning to understand what DBS means. Want a marketing tip? How about calling the new 4 GHz service 'HBO-DBS'? Now THAT will confuse the public!

"Have you heard about DBS"?

"Oh, yes, we are going to sign up this week. Imagine four channels of new TV, from outer space"!

"Four channels? You must be signing up for that tiny dish stuff. I've decided to get one of those big six foot dishes for 'HBO-DBS.' I'll get 40 channels they tell me, and all for \$19.95 a month."

RIGHT NOW/Today

... a number of corporate execs in our tiny industry are burning the midnight oil and sharpening their pencils to figure out how they can cut the price on their products even lower. The challenge? To be a part of the 'HBO-DBS' "team" and get a nice, big 'bankable contract' to be a supplier for an exciting new service.

So what's so new about all of this? Really, not very much. It is more of a marketing innovation than a new product breakthrough. It will mean greatly increased visibility for our 4 GHz world and it will do more to bring in new customers than anything done to date.

There are other ramifications as well, of course. SPACE has been fighting a battle to get HBO (et al) to agree to provide (descrambled) service to individual TVRO owners. Now along comes HBO, seemingly on their own at their own pace offering a 4 GHz service channel just for private homes (and motels perhaps as well, but don't count on that!). Does that mean that SPACE can quit working on an anti-trust law suit? Does this mean that SPACE has won its battle with HBO, or, does it mean that HBO never got into the battle in the first place? They simply won the war by avoiding the skirmishes and being first to the finish line?

What about Showtime and the rest? Will they now reconsider in face of a new 'consumer service' from 'HBO-DBS'? Can they afford to play in the 'consumer area,' like HBO, when, unlike HBO, they **don't own** enough of the product they show to even put up a couple of hours per day of programming?

There are many more questions. And many more answers. Some are impossible to answer. Others will have to wait their turn in line. The bottom line through all of this is that HBO is in a unique position to offer a 4 GHz ('HBO') DBS which no other firm in the world is today able to offer. Perhaps some consortium of movie firms, left out of the big HBO deals in Hollywood, could put it together from their vast film libraries. Perhaps. But the movie folks to date have shown an amazing ability to always do the wrong thing at the wrong time as far as the satellite industry has been concerned.

Years ago, way back in 1978, there was a serious study funded by four of the top six movie production firms in Hollywood. They wanted to see if a movie-firm operated cable service channel might fly. They spent tens of thousands of dollars and then backed off, fearful of what it all might do to the shaky relations they then had with their theater distribution system. Then along came The Movie Channel, and they did the same thing on their own.

The rules of the satellite game ever change. The players change. But one thing remains constant through it all. There has never been a more effective, economical, way of taking money out of people's pockets. No, it is not a perfect system. Yes, it is the best distribution

system ever devised. And as the numbers get big (HBO admits to adding 2,000,000 plus new homes per year in 1982) and bigger, the dollars grow totally out of sight. That's why so many people keep trying

to figure out some creative new way to get their hand into the pie. The pie gets bigger and bigger and bigger every month and those who know where the forks and spoons are stored can't eat it fast enough.

ANOTHER KIND OF SATELLITE

...GOES WEATHER AT 1691 MHz

24 HOURS Per Day

Think hard; what is one of those rare things that interests virtually everyone? Yeh, sex is a good answer. So is the weather.

Weather. Those of us who have relatively unlimited access to 4 GHz birds have full use of the Weather Channel service on F3R's TR21. If you can wait your way through relatively obscure weather facts, sooner or later, each hour, you will get the diagnosis that you are after.

You may have wondered where the Weather Channel and others get all of that information. Computers are one answer of course, but obviously somebody or something has to be loading the computer with the observations; the raw data. Satellites is another answer; special weather-watching satellites which do nothing more exciting than 'take pictures' all day and all night of that portion of the earth which is below them.

If you tune through the satellites late in the afternoon hours, when the networks and news services are feeding their 'DEF' stuff (Direct Electronic Feeds) sooner or later in such mixed feeds you will be treated to either 'the moving weather', or, some static shots labeled '8AM', '2PM' and so on. Those are obviously satellite views of the earth, or a portion of the earth so that should tell you that someplace up there somebody is operating a satellite system that takes pictures of the earth and transmits those pictures down to earth for analysis and distribution.

Most of those brief glimpses you see, as well as the basic material from which the Weather Channel manages to drag out a fresh new hour, every hour, use as a 'foundation' the NOAA GOES satellites. NOAA are the folks who operate as a government agency to monitor all of the weather all of the time. Years ago they used to be known as 'The Weather Bureau'. That was before satellites came along.

There are presently three operating weather surveillance satellites serving the western hemisphere; plus one that serves Europe/Africa, and one more that serves Japan and the Far East. The U.S. version of this is called **GOES** while the European version is called **METEOSAT** and the Japanese version is called **GMS**. They all have certain things in common; for example, they all take a series of pictures one after the other every day, store those pictures and then send the pictures down to earth using a slow speed television-like system called 'facsimile'. Facsimile, or FAX as it is also known, is a system similar to that used by some of the press and wire services to transmit still photos from their headquarters to newspapers and television stations all around the world.

FAX works by breaking the original photo down into a long series of individual picture elements (pixels). A synchronizing signal is transmitted at appropriate intervals to tell the receiver when to start a new 'picture line' at the receiver. The entire picture is actually transmitted one line after another, from top to bottom of the screen. This takes up to a couple of minutes for a full picture frame (i.e. a full TV tube full) to



be transmitted. Since we are accustomed to seeing a TV picture that is capable of changing 30 complete times per second (and thereby give the illusion of motion), it should not surprise you to learn that the system we are talking about here is sometimes referred to as 'slow scan television'. The scan, or movement onto the screen of the picture making elements, is far slowed down from regular television.

There are several good reasons why a system like this is preferred for transmitting weather satellite pictures. First of all, the picture is 'shot' or 'taken' much like you or I would take a 'snap shot'. It is not a movie or moving picture; what the camera sees at the instant the 'shutter is clicked' is what goes into the satellite memory. Weather folks can look at a shot taken at 8:18 AM and another taken at 9:18 AM and quickly see what changes have taken place below in the cloud cover, wind direction, movement of storm cells and so on. This is how hurricanes and other violent storms are plotted for movement.

Since the pictures are not 'moving' this allows the system to be designed for maximum sensitivity. One way to do this is to convert the relatively wide bandwidth of a normal TV picture (the bandwidth is required for the transmission of the high speed information, which in turn is required because there are 30 complete sets of information per second, to give us the illusion of motion on the screen) to a very narrow bandwidth. And then slow the speed of the data way down, to fit the bandwidth chosen. This is where the 'slow scan' or FAX signal approach comes from. By making the bandwidth of the received signal very narrow, and slowing the data rate down to fit the bandwidth remaining, the design of the entire system can be considerably relaxed.

GOES/ continues page 26



Horton Townes—Chairman, Satellite America (Treasurer and Director of SPACE) Seated.

Dave Fedric—President, Satellite America (Satellite Digest 1981 Man of the Year)

Satellite America leads a new revolution in small dish antenna development. This major advancement has dramatically expanded our market by substantially reducing retail prices of quality satellite systems. Satellite America technology now makes it possible for small six- and seven-foot antennas to deliver quality video coast to coast.

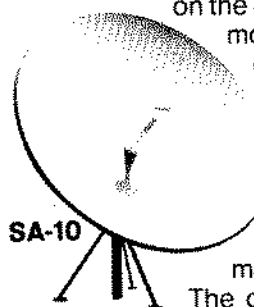
Because these pioneering developments by Satellite America have reduced equipment and installation costs, our distributors throughout the nation are enjoying tremendous increases in sales and profits.

Our SA-6, SA-7 and SA-10 antennas incorporate our new *DualReflect™* Feed which relocates the LNA *behind* the dish where heat and rain are no longer major factors in system performance. Although competitors may try to copy it, only Satellite America offers the true *DualReflect™* Feed.

Our SA-6 and SA-7 antennas

Join the Satellite America Revolution

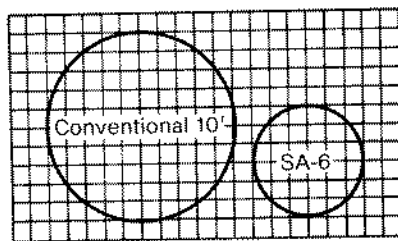
are of one-piece fiberglass construction with a special reflective surface that maximizes efficiency. Our SA-10 antenna is formed of eight thermo-compressed fiberglass panels that are perfectly matched for broadcast quality reception. The mounts on our SA-6, SA-7 and SA-10 offer similar improvements, making them the finest engineered and fabricated steel mounts available anywhere. For example, our new *PowerRing™* on the SA-7 and SA-10



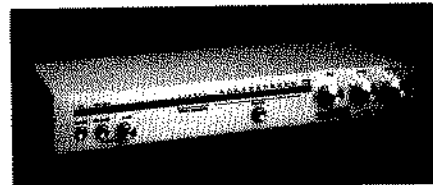
SA-10

mounts includes a declination adjustment for the most precise and stable polar mount movement on the market.

The dramatic size reduction of our six-foot antenna compared to a ten-foot model is clearly shown in the graph. You can see why wind loading is reduced to a manageable level for most applications and why consumer acceptance is so much better.



Our receiver technology is just as exciting. Our innovative new SA-1000 receiver is the first of a new generation of satellite receivers to come from Satellite America. LED tuning, push button controls, stereo



and "high-tech" styling are the ingredients making this the industry's finest value.

But products alone do not define our company. Our total concept of integrated marketing, advertising and logistical support sets Satellite America apart. In a few months, Satellite America has become one of the largest satellite system suppliers in the world. We believe we supply more satellite systems than anyone else in the U.S.A. and we know ours look the best.



Beyond that, our pricing is revolutionary, enabling you to realize even greater sales and profits. No one but Satellite America offers such low pricing for quantity buyers. And this translates into growth—unprecedented growth. That's why we ask you to join us. Be a part of this growth. Call today and secure a dealer or distributor relationship for the future. Satellite America will be there leading the way.

Sincerely,

David M. Fedric

Dave Fedric, President

Horton Townes

Horton Townes, Chairman

SATELLITE AMERICA
MARKETING, INC.
...entertaining new ideas

YOUR TVRO SYSTEM IS STATE OF THE ART.



What about your polarizer?

Only one polarizer offers you the reliability of digital solid state at low cost: M/A-COM Omni Spectra. With no moving parts to freeze up or meltdown – no motors, rotors or gears – the low loss M/A-COM Omni Spectra polarizer offers you top quality reception, whether you're in Anchorage or Anaheim.

Even in the harshest environments, this polarizer is completely phase and insertion loss stable. But that's just the beginning.

Because it's digital solid state, this polarizer never needs adjusting, after installation. It even features



Omni Pulse Decoder
Low cost receiver compatible adapter
Part # 4850-4004-00



an adjustable scalar feed to achieve maximum gain from every antenna. Satellite skew is automatically compensated for.

In-line design makes the M/A-COM Omni Spectra polarizer easy to install. And with low cost electronic adapters, it's completely receiver compatible.

Best of all is the backing of an industry leader: M/A-COM Omni Spectra. For the name of the authorized dealer near you, call (603) 424-4111 or write: 21 Continental Boulevard, Merrimack, NH 03054.

M/A-COM OMNI SPECTRA, INC.

GOES/ continued from page 23

For example, the present GOES/METEOSAT/GMS satellites operate at 1.691 or 1691 MHz. That's roughly 40% of the frequency of our C band transponder 24 to you can see that while we are still operating in the 'microwave region' we are at a far lower frequency than our standard TVRO. This does some interesting things for us.

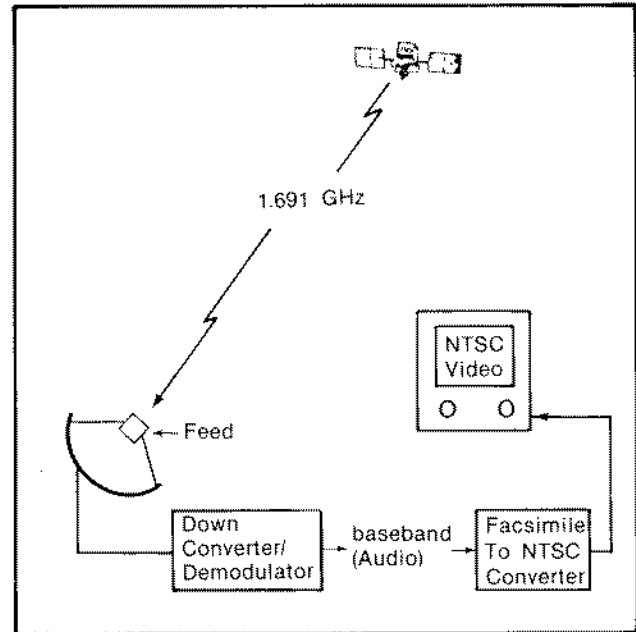
First of all, the 'weather satellite' terminal system has no LNA (*). The feed (more about that shortly) is connected directly to the down converter through perhaps a 10 to 15 foot chunk of RG-213 (or even RG-8) cable. Right away that sounds like an improvement!

Next, because of a combination of factors (relatively good satellite power, the very narrow bandwidth of the transmitted/received signal), you don't need a great big dish to recover the signals. The beams transmitted are essentially 'global' in pattern and other than low look angles, you will typically do very well with modest dishes in the 4 to 6 foot class. If you happen to have a good line on some 10 foot 4 GHz dishes, well, so much the better.

And next, because the down converter (it hangs outside with the dish) actually is a complete demodulator as well as a down converter, what you have coming out of that part of the system is basically an 'audio signal'. And that means that the only coaxial cable you need in the full system is that short piece between the feed of the antenna and the outdoor/antenna-mounted down converter.

This also brings up another interesting sidelight. Since what comes out of the down converter is an audio signal (i.e. something you can hear on a speaker), this suggests that you can locate the satellites with a speaker plugged into the down converter's appropriate spigot. Just listen for the unique tone/tone/tone sound of the FAX signal as you crank the dish along the Clarke orbit belt and you'll be dead on the bird without even looking at a monitor.

The audio signal exiting the down converter sounds like a musical jingle; the player seems 'stuck' on the same notes. Over, and over, and over. Those tones are signal sources to the major portion of the system; an indoor mounting memory and controller package. Remember that our picture is transmitted to us a line at a time. It starts at the upper left of the screen (with a 'header' or description of the picture to follow) and flows from left to right, top to bottom. If we were looking at this in real time, we'd only see a small part of a single line at a time. Long before the scan line device drove the picture image from top left to bottom right the first part in the upper section of the screen would have faded away from view. Years ago this problem was solved by using a special type of phosphor on the picture tube; one that had 'persistence'. That meant that as the picture tube was 'painted' by the electron beam, the phosphor on the screen held onto and remembered what the picture at that pixel looked like long enough for the full screen to be 'painted'. That, as you might guess, was not a very satisfactory system so when memory IC devices came along, it wasn't very difficult for engineers to build into the controller part of the system



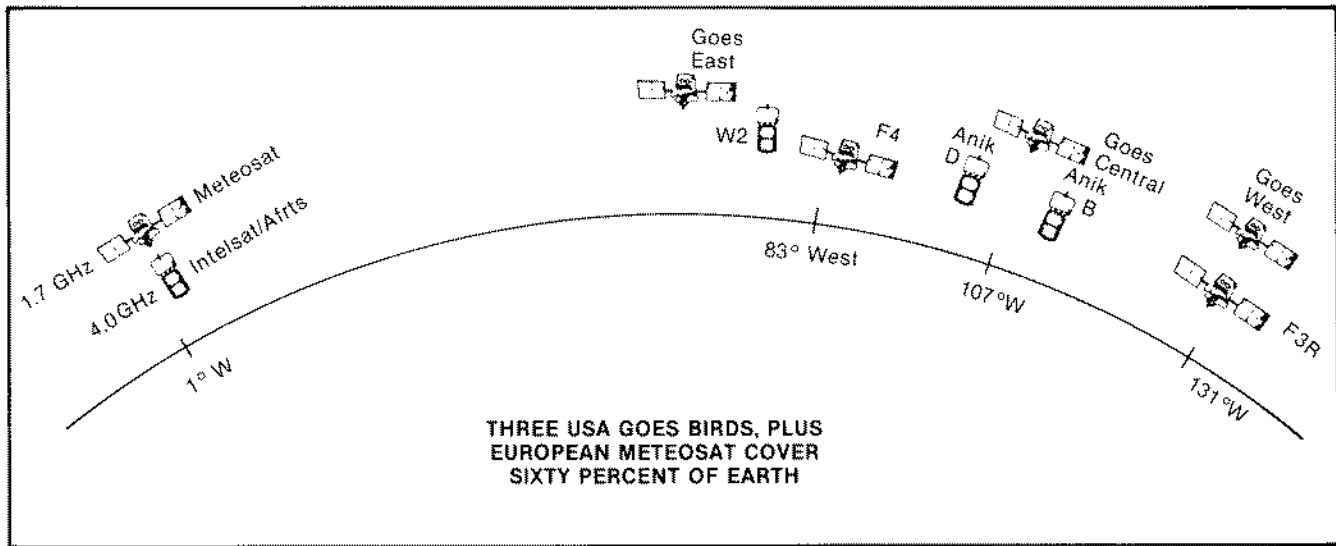
a series of ICs that accepted each part of a line, in sequence, and then held onto that information for as long as no new information came along to erase the data already in memory. With that kind of advance, you could store a picture forever if you wished, or operate with the monitor off for awhile, and when you turned it on, there would be a full screen display of the full picture in memory.

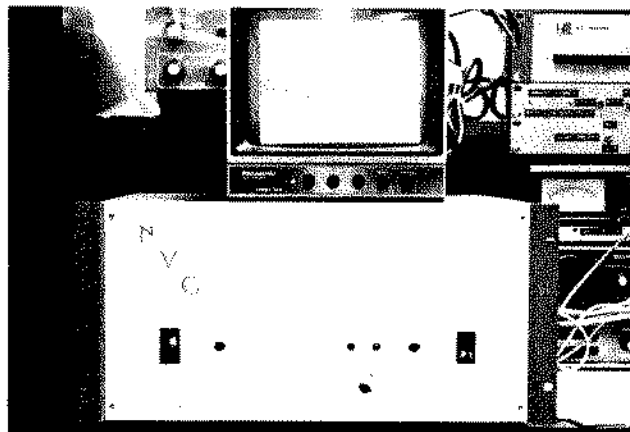
In effect, the memory is still 'loaded' a line at a time, but once fully loaded, it reads it back out to the display picture tube all in one lump sum.

THE GOES Birds

The US operated GOES birds rest above the equator in geostationary orbit. **GOES East** is a few degrees east of the Westar 2 location; **GOES Central** is between Anik D and B, while **GOES West** is located very close to F3R. Each of these three satellites has a regular daily transmission schedule. The birds are not used in the exact same manner; each has a function all of its own.

GOES East and GOES West are primarily 'observation birds'. They have a regular schedule they follow each day, aiming their cameras in either the daylight or nighttime (infrared) format at various parts of the globe they can see from their locations. GOES East, for example, can 'see' virtually into the western coast of Europe. down





LOCAL DISPLAY PACKAGE/ demodulator and video monitor goes indoors.

over the northwest tip of Africa, and clear south to beyond the Straits and the Falkland Islands. To the west, it sees beyond the coast of the USA. GOES West more than fills in what East misses, and extends the view over all of Australia, north to the Siberian coast line. GOES East and West send their data back to earth 'raw'; that is, the pictures you see are as seen by the satellite. They come down at a location on the coast of Virginia (Wallops Island) where NOAA maintains a full control center for the GOES program.

GOES Central has a dual purpose function; it makes its own head-on observations of North America (as well as South America), and it also acts as a 'repeater' in the sky for reworked photos received initially from GOES East and West. In addition to the transmission of East, West and its own Central photos, the GOES Central bird also transmits weather maps, upper air charts, and a dozen and one other weather related full screen views. Of the three birds, GOES Central is the most useful since the variety of information found there is the most complete.

The European METEOSAT bird at about the same 1 west location as the Intelsat bird that carries AFRTS television into Europe and Africa has an approach similar to the GOES Central bird. Throughout the scheduled day you have not only the raw views of the earth below, but you also have re-worked views as well.

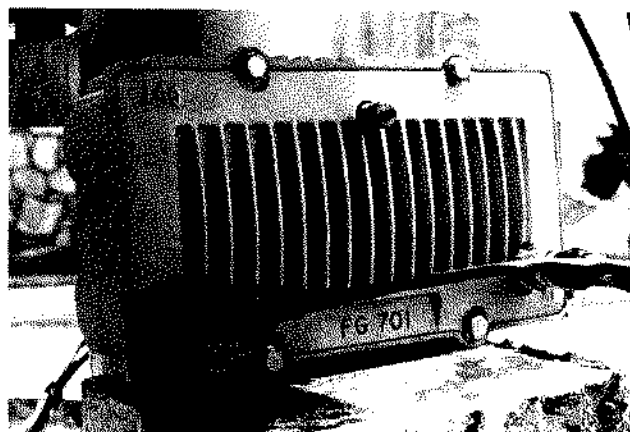
The object of the re-worked views is primarily one to improve the identification of the areas you see below. When GOES East, for example, takes a picture of a particular quadrant of the earth below, you have to be able to pick out some coast lines or major rivers or large lakes to determine what you are looking at. Anyone who has seen Skylab or Shuttle photos of the earth below can imagine what the GOES East and West raw pictures look like. Except . . . these pictures are from a height of 22,300 miles rather than from the relatively low earth orbits of the Shuttle (200 miles or so).

GOES Central, or METEOSAT (and one assumes Japan's GMS) make the views more useful by taking the raw data and placing an 'overlay' on top of the photos. The overlay tells you where the various longitude and latitude lines are on the earth scene below. In that way you can quickly pick out your area of interest even if everything around you is zonked in with cloud cover!

The weather maps, current and predicted, upper air charts, current and predicted, and ocean current charts (current and predicted) are just like you would expect to see in the morning newspaper, or in the control tower of the local airport. Only they are there, on your television screen, fast and accurate and in near real time.

No, there is no accompanying audio with these transmissions. It is

* — A ten foot dish will produce decent, very high quality, pictures in most regions without an LNA. However, for those who want to squeak by with smaller dishes (down to 2 feet or so in size), some type of 'pre-amplifier' will be required. Actually, you could do the same thing at 4 GHz as well; all it takes is a 45/50 foot dish in Kansas!



OUTDOOR DOWN CONVERTER/ Using CATV type (amplifier) housing, they cram the 1.691 GHz input down converter and the demodulator (RF to audio) portion of the system into this container which mounts as close to the feed as possible. RG-8, 213 or 214 cable connects the feed to the outdoor unit; a seven wire (in a single jacket) cable connects the down converter to the demodulator/ storage portion inside.

'silent TV' unless you want to listen to the 'tone'tone'tone' sound that signals the incoming signal is carrying data.

THE NVG Package

We first began thinking about usefulness of the GOES birds down here in the Turks and Caicos islands our first summer in the islands. That was 1981. We thought about it twice that summer; once when we had our first close brush with a hurricane, and again when we had our second close brush with a hurricane. Like most 'foul weather problems' we quickly forgot about the GOES service when the hurricane season went away.

Then in 1982 we saved up our pennies and went ahead and purchased that portion of the package we didn't already have on hand (i.e. we had a suitable dish or two laying around) from **Northern Video Graphics** (Suite 220-B, Business and Technology Center, 511 11th Avenue South, Minneapolis, Mn 55415; 612-338-6589). Their standard package is not exactly cheap as it costs \$9990 for a complete terminal. However, by the time you shave off the dish, mount and feed, you have effectively cut the package price in half. And there are many sources of the equipment, including some very nice build-it-yourself packages and kits, for far less than the NVG stuff. We chose the NVG gear because they have a sterling reputation for high quality equipment, and because we felt that if we were going to 'bank our lives' on the performance of the hardware down here in the islands, we didn't want it quitting just before a Hurricane hit. Suffice to say that perhaps one of the reasons why the 1.691 GHz gear seems so expensive to us is that their whole industry sells perhaps 200 terminals per month; about the level of TVRO systems back in 1977 or so. If, for whatever reason, the popularity of the hardware ever caught on, the terminal prices would tumble to present day TVRO terminal prices in a big hurry.

Now who out there is a likely candidate for a GOES weather package?

Farmers, spray pilots, airline types, maritime types . . . the woods are full of candidates. That's the good news. The bad news is that because NOAA is a government agency, and the GOES data is available to anyone 'free of charge', there are several dozen 'repackagers' of the GOES data out there selling against you. They deliver their versions of GOES (with whatever local or regional data they can dream up and sell) over landline (telephone) connections, using the same FAX audio tone approach we have coming at us from GOES direct. And these repackagers will typically be far cheaper with their equipment than you will be with a dedicated GOES terminal. Of course the repackagers ALSO charge a monthly 'service' or connection fee

GOES/ continues page 30

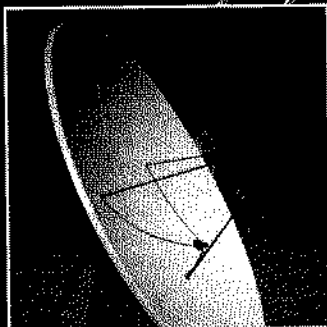
Track Through The New SR-1 System

Better By Design

For years, dealers have searched for quality satellite television reception in an attractive package that's EASY to sell and install. Now, United Satellite Systems has the answer. It's a second-to-none, totally integrated electronics package that even includes a remote-control unit that can be used in any room in the house.

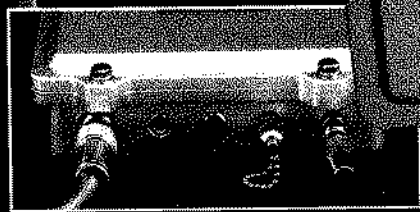
Track it through. See for yourself that USS has put it all together for superior quality earth-station viewing.

The USS Antenna is a commercial quality, prime-focus design parabolic reflector that was tested and proven superior at an independent microwave antenna test facility.



The USS LNC, using the latest GaAsFET technology, amplifies the signal, tunes the transponder, and down converts from 4 Ghz. to 1.2 Ghz.

The USS SR-1 System™ interconnects with a single coaxial cable. For easy installation, we have multiplexed onto one coax cable the IF signal, tuning voltage, and three-wire polarity control, eliminating all excess wires.

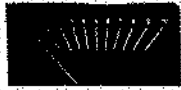


The USS Second Down Converter converts the signal from 1.2 Ghz. to 70 Mhz. It contains the power supply, polarity interface, pilot light and antenna "peaking" test point. It's in a rugged die-cast aluminum, weather-proof, O-ring sealed housing.

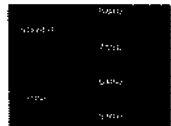
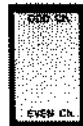
USS AASPRO

SATELLITE CHANNEL

AUDIO CHANNEL

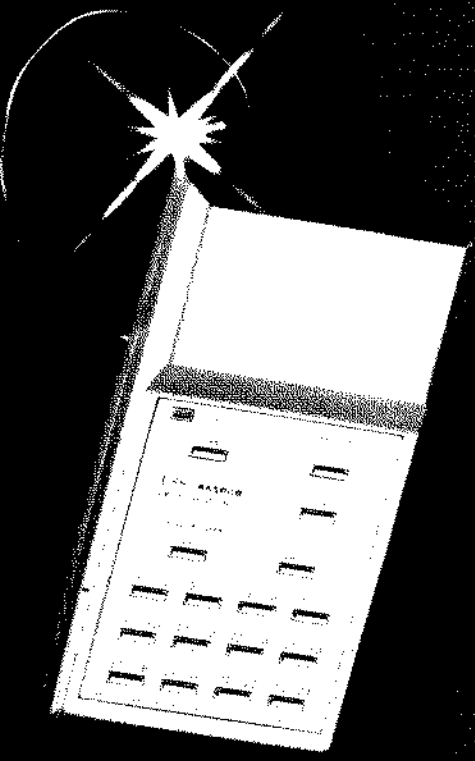
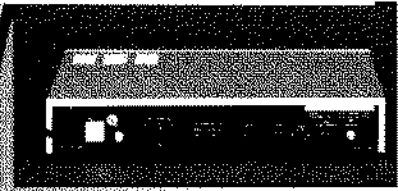


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...multiple polarity switching... simultaneous with a push... SAW filter tech... incorporated into... receiver and mod... digital modula... available on channels... through...



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UNITED SATELLITE SYSTEMS



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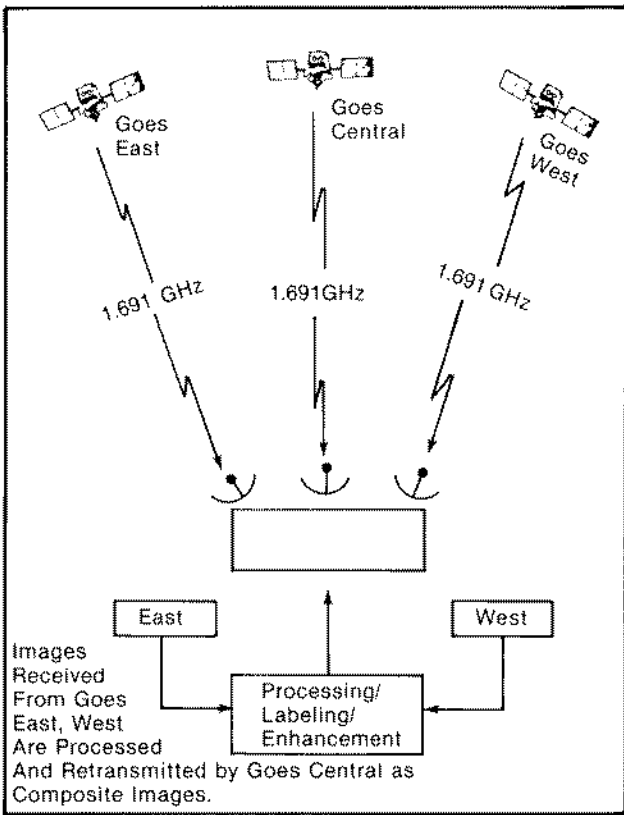
where the... 3205 E. 10th Lane... San Jose, Calif. CA 95128... 408-252-1711... 2600 West Park Drive, Inc... Oak, Calif. CA 94612... 415-871-2222

Master Distributor Eastern Canada... 990 Industries... 351 Steeles Road, West... Markham, Ontario L3R-3W1... (416) 477-0022... Johnson Enterprises... Courtenay, ND 58426... (701) 435-2321

GOES/ continued from page 27

as well since that is how they make their money; by selling a service, not selling hardware. And that should suggest a market within a market; firms that are paying big bucks for repackaged GOES data may be just as happy to have the original GOES data for a one-time purchase fee rather than the ongoing monthly service fee.

Those prospects aside, there are obviously those firms who exist outside the normal landline connection range of the repackagers. Those who live on islands, in the far north, anyplace where leased telephone lines cannot connect them to the nearest repackager of GOES are potential customers for GOES hardware. Just days after we had installed our GOES terminal at WIV, the local government airport control tower manager came by to see it work. It didn't take him long to realize how valuable it would be to have this data in the control tower; and we put in a TV link for the control tower and the Provo airport so that now they have direct access to the NOAA data via GOES. Since we have a couple of charter flights every day back and forth to southern Florida, now for the first time the tower and the pilots



know what to expect on the route ahead.

We found setting up the terminal absolutely duck soup. Anyone who has put in a 4 GHz terminal will feel right at home; it is child's play. Since we opted not to spend several hundred dollars for a special 'feed' antenna we were left to build one on our own. That turns out to be simple task. First you locate a two pound empty tin that used to house coffee (our's happened to be a Folgers brand can but others are just fine also!). Then you measure off in a couple of directions and drill a 1/2 or 3/4ths inch hole or two in the side of the can. That's where you will sweat-solder in a type N chassis mounting fitting. The fitting has its coax receptacle side 'out' and the 'pin' inside of the can. To the center pin you solder on a piece of brass rod, or, if you don't have a hobby store handy, you take some number 8 copper wire and straighten it out and solder it to the pin. This is your 'probe' for the feed. The coffee can is the actual feed. Just consider it a 'one-ring Chaparral' and you will be home free.

We put two separate N connectors and probes into the side of our can; one for the vertical signals and one for the horizontal. No, they don't transmit both from the same bird but there is a master plan that

ZOOM FEATURE/ full view

switches the polarization from one pole to the other with different birds.

Then we went out into the yard and spotted the first dish that wasn't in service at that moment, and which we could crank through the orbit belt with no pain. That happened to be a ten foot SatFinder dish which in its time had one of the best 4 GHz fiberglass surfaces in the industry. We took off the 4 GHz LNA and stuck the coffee can feed on in its place. Then we ran the 12 foot length of 213 from the coffee can feed probe/connector to the weathproof down converter which we stuck on a plate on the back of the dish.

Since what you get out the dish's down converter is an audio signal (remember that the down converter, outdoor mounted, is also a demodulator), we stuck a small speaker in the seven wire cable that was going to connect the demodulator to the controller/memory unit. That gave us a way to 'listen to' the satellites as we cranked the dish through the arc. Inside, at the end of the common multiple wire cable, we sat the controller/memory unit on a shelf with a monitor.

That's all there is to it; all that is left is to find the satellites.

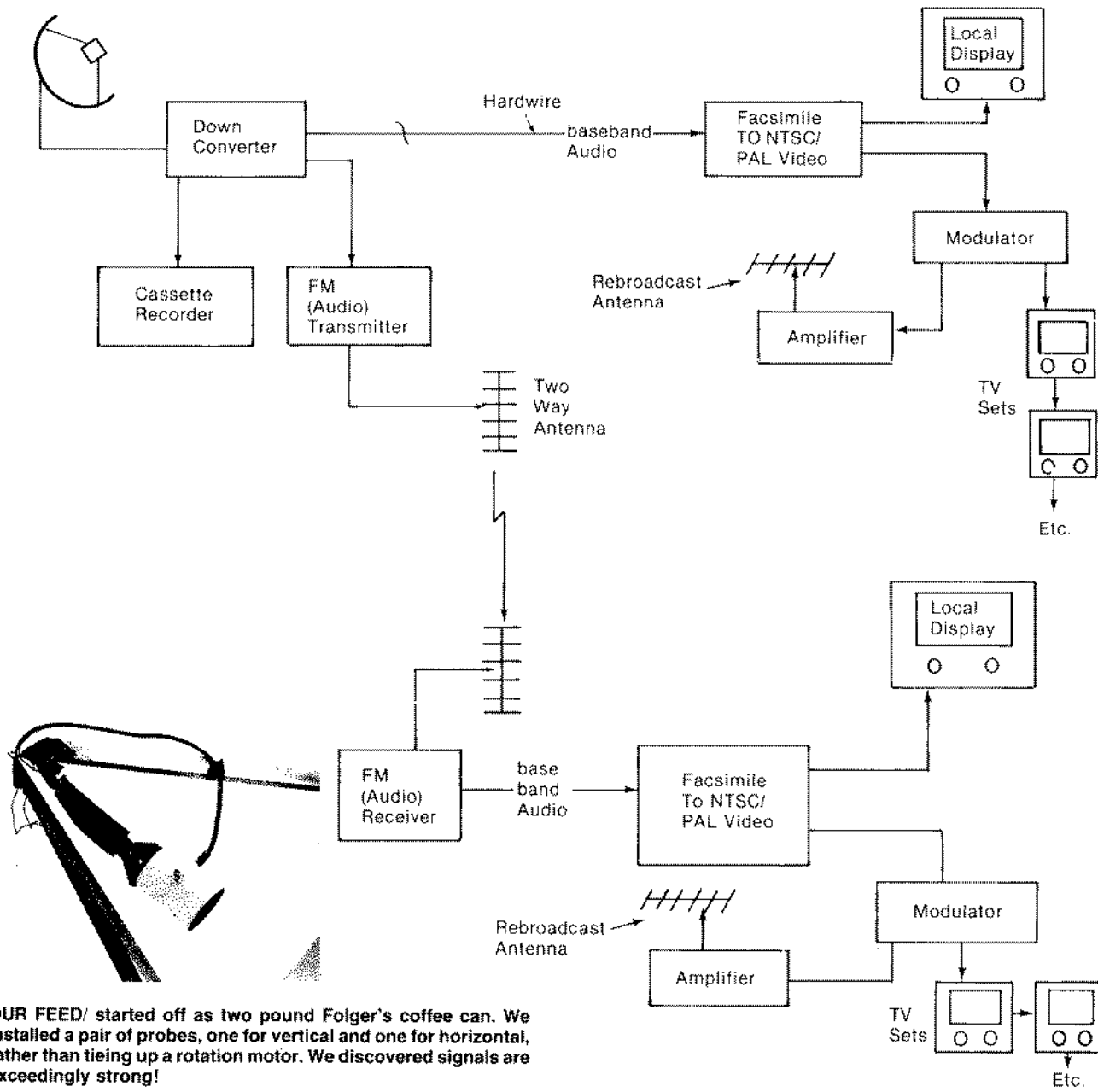
Since the dish was already tracking the belt, we simply cranked to the predetermined locations and listened. Nothing from GOES East. Humm. Then west to GOES Central. As we got within perhaps 5 degrees of the bird we started to hear the background noise in the speaker go quiet. As we got right up on the bird the noise in the speaker totally went away; full (FM type) quieting. We happened to crank up on Central while they were getting ready to send out their next scheduled picture. There was a burst of tone in the speaker followed by tone-jingle-bells. Rushing inside we found a picture start-

054 11044 0000-E 07 123.33 10



AND/ zoomed close up of portion of the full view.

HOW YOU CAN USE GOES/METEOSAT



OUR FEED/ started off as two pound Folger's coffee can. We installed a pair of probes, one for vertical and one for horizontal, rather than tying up a rotation motor. We discovered signals are exceedingly strong!

ing to fill the screen.

The NVG unit has a number of operational features which lend themselves to the professional weather observer-user. For example:

- 1) There is a 15 position thumbwheel switch on the front panel. You normally run in the number 3 position for GOES reception or number 9 for METEOSAT.
- 2) **Position number five**, after the memory is full and the screen displays the full view, can be dialed up and a button pushed and the whole picture turns upside down. This is useful since some of the images are reversed in display; those south of the equator may read south up and naturally you would like them south down. No problem; just 'flip' them with position five.
- 3) **Position number 13** is a favorite; it is the 'zoom' position. Dial up 13 and hit the button. Instantly you see just a portion (about 1/15th) of the full display. Now dial around the rest of the

thumbwheel positions and you will find similar zoom views of every other part of the full image. You can make just a small portion of the full view fill the entire screen. That's great for close study (but you still won't be able to see your 'dish' or you waving a flag!).

- 4) **Position number 12** is another favorite. It reverses the 'grey scale' so that white becomes black and vice versa. That's very useful in picking out particularly nasty storm centers since black stands out far better than the white clouds. The blacker the black, the taller (and nastier) the cloud and the moisture content.

Although we purchased the NVG system less their dish and feed, and saved quite a few dollars, they have enough options to satisfy

GOES/ continues page 34

FINALLY. OPTION M.



OPTION M

At last, you can offer your customers a satellite receiver system with all the most popular features, plus a modulator that allows direct connection to any TV set.

It's our R-10 Satellite Receiver with new Option M modulator, and it's made completely by one manufacturer. Amplica.

Here's the best news yet. The R-10 with Option M is one of the first modulator systems to be FCC certified in accord with the latest test regulations.

So you know you're getting an extremely reliable product from the most reputable manufacturer in the business.

You wouldn't expect anything less from Amplica.

Amplica, Inc.

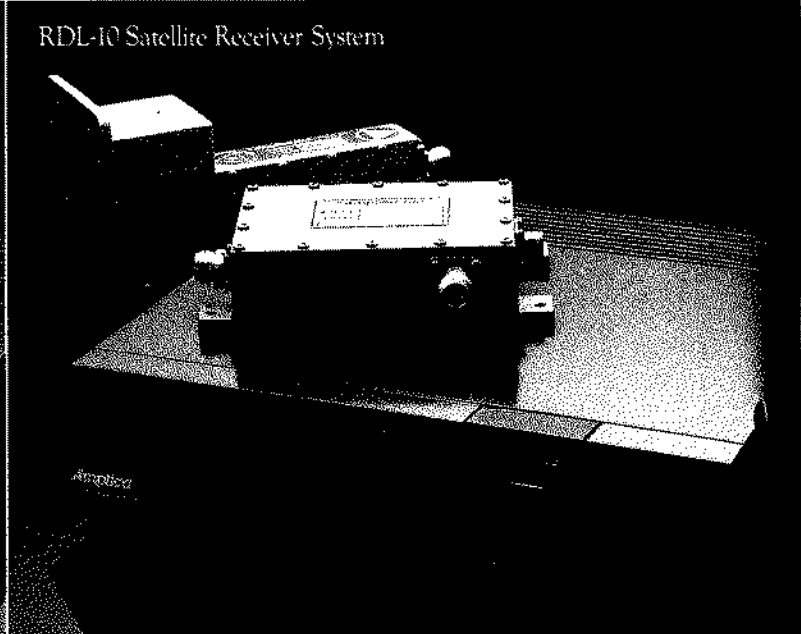
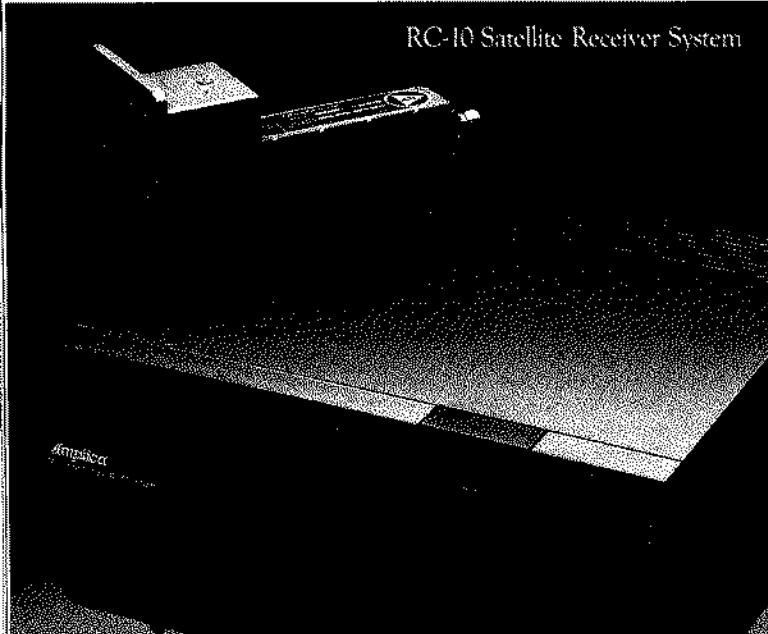
A COMSAT COMPANY

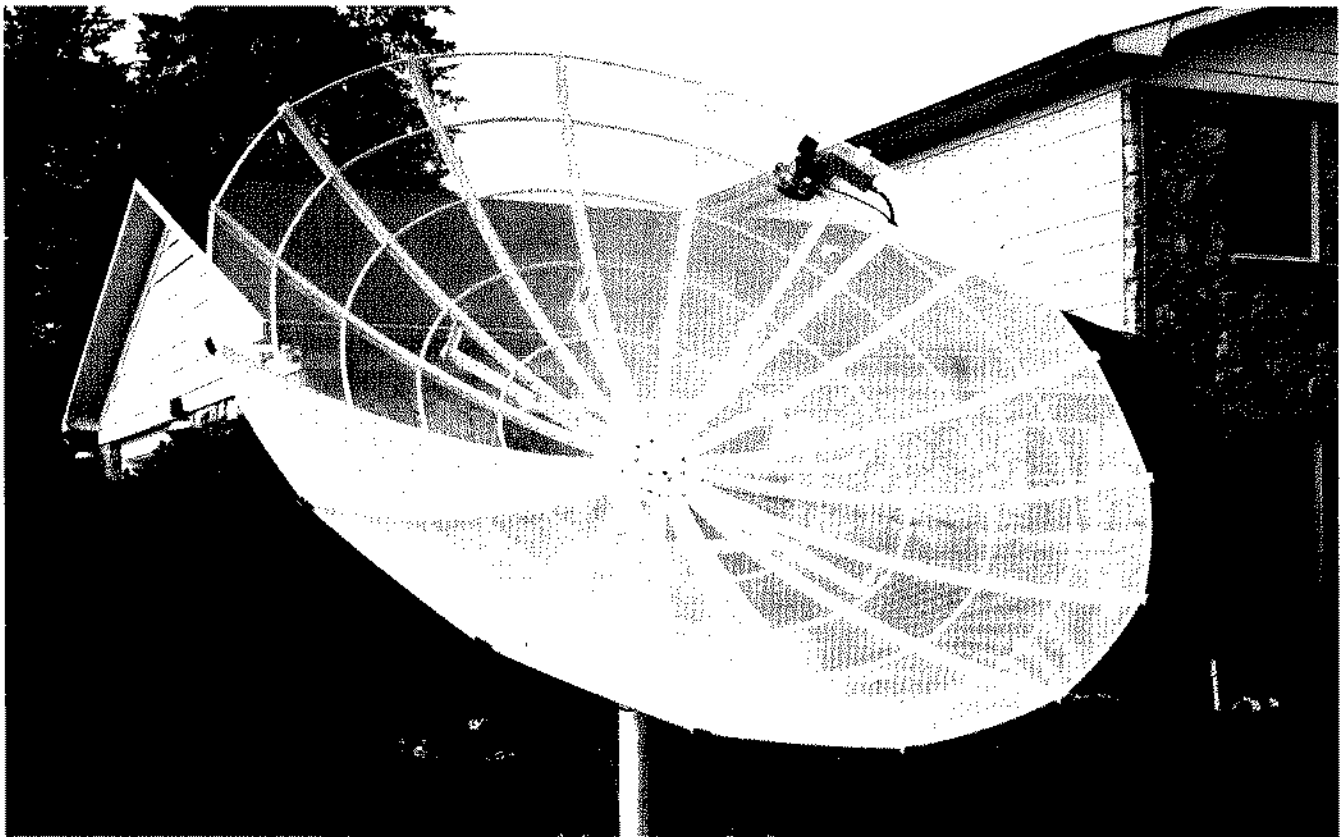
950 LAWRENCE DRIVE, NEWBURY PARK, CA 91320 (805) 499-2621 TWX 910-336-1291

Use of this equipment as part of a TVRO system may violate Section 603 of the Communications Act of 1934, which restricts the right to use licensed frequencies for space-to-earth radio communications. The user of such communications is responsible for compliance with all local, state and federal government laws and regulations. Additional restrictions may apply to the use of this equipment in certain areas.

RC-10 Satellite Receiver System

RDL-10 Satellite Receiver System





CONIFER MAKES IT EASY TO SELL THE COMPLETE PICTURE

Conifer's DE-2001 is a complete home satellite TV reception system featuring a totally integrated, performance matched selection of components designed for each other. Our exclusive 12-foot Micro-Grid antenna with 42.3dB tested gain has proven its superior performance capabilities throughout the continental United States, as well as Canada, Mexico and the Bahamas. Our contemporary-styled receiver has all of the most wanted features.

MODEL AN-1200 ANTENNA: Conifer's 12-foot antenna features the Micro-Grid "see through" expanded aluminum reflector surface especially suited for most discriminating environmental areas. Reduces overall weight by 66% over comparable 12-foot solid dishes. Cuts wind-load factor drastically resulting in a durable installation and more consistent quality satellite TV pictures.

Every Conifer antenna and mount is factory finished with a special "Polymer" coating which is electrostatically applied to protect against rust or corrosion caused by acids, alkalines, salts and other destructive chemicals. Aluminum Micro-Grid reflector surface is accurately prebonded at the factory to high strength aircraft grade aluminum alloy frame. . . eliminates hours of field assembly required by comparable mesh dishes. Your choice of black or white finish. Stainless steel hardware is also a

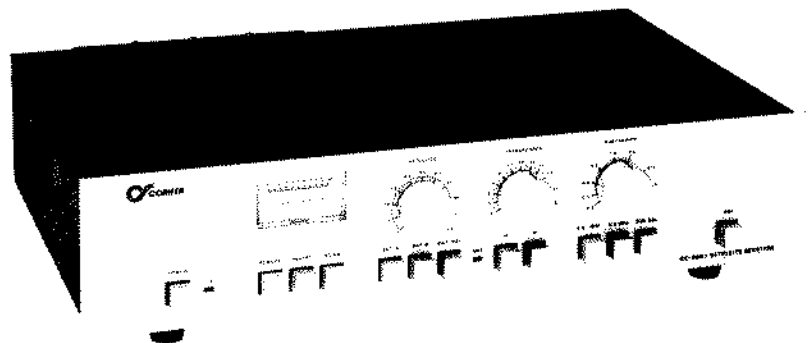
standard feature.

MODEL RC-2001 RECEIVER: The contemporary styled receiver fits with any decor. It features channel and audio tuning, LNA polarity control, inverted video, scan tune and Polarotor I™ control. A special feature is the front panel push-button control which allows for programming the positions of the consumer's two favorite satellites while allowing variable selection of the entire satellite spectrum.

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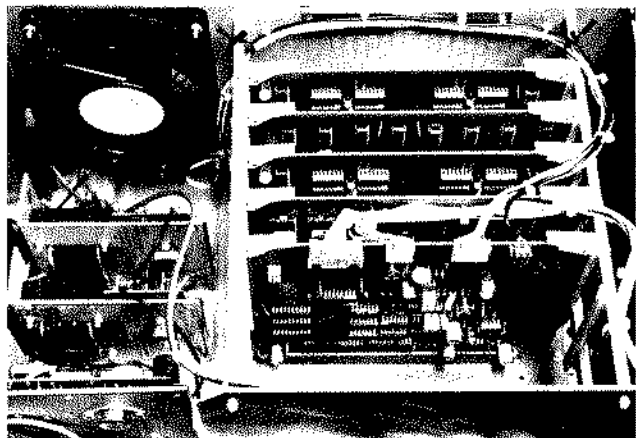
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GOES/ continued from page 31



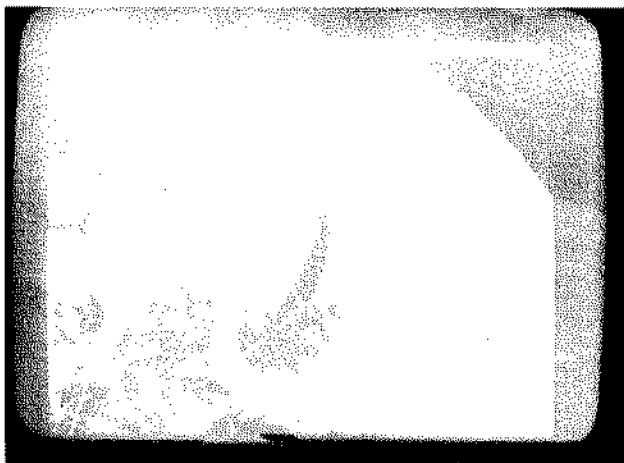
INSIDE the remodulator; they need plenty of 'memory' to retain the lines of video for static display, and hence the string of IC devices.

virtually anyone. You can store the data on a simple audio cassette tape and read it back into the controller/memory unit at will. You can equip the system with a highly accurate time clock, and knowing the daily schedule, just turn on the machine for that image or those images that interest you most. That saves you having to be around anytime except when the image of interest is being transmitted, or you can miss it all and catch it hours later since the machine will only memorize when the time clock is 'on' and that's when you set it to take the image you want.

You can have a hard copy print out of the charts or maps; they sell a hard copy matching (printer) for around \$1350. There are probably less expensive units around since it is a RS232/IEEE 48 control interface system. They also have a multiple picture storage unit (greater memory capacity) which allows you to receive and store (with the assistance of the time clock) 4, 8, 12 or 16 separate pictures and retrieve them at will.

Anyone who thinks they may have an interest in offering such systems should first invest \$8.95 for 'The New Weather Satellite Handbook' (from Wayne Green, Inc., 73 Publications, Peterborough, NH 03458). This is the best tutorial book on this type of system available, and it leads you into doing things yourself for far fewer dollars than you would spend for commercial equipment if that is what you like to do with your spare time.

It is difficult to fault a system that works when it comes out of the box, and assembles into a working package with so little pain or



IMAGES CAN BE REVERSED by front panel control to display intense thunderstorm activity (heavy black area).

mental anguish. Still, there are areas for improvement. Not in the equipment however; in several months of operation it has done everything it is supposed to do without a single glitch.

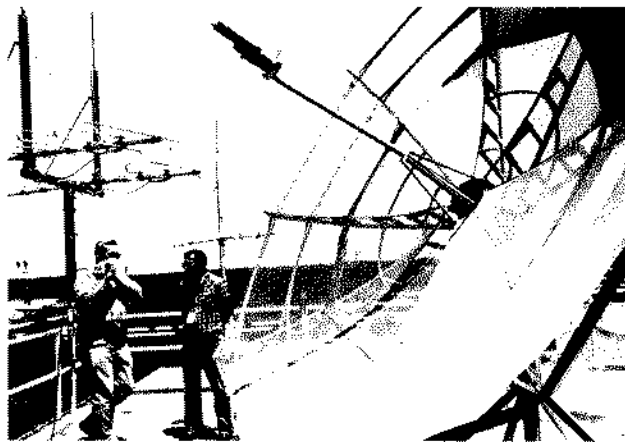
The instruction manual combines computer-ese with IC terminology. That's fine for the person experienced in this field but it leaves the first timer wondering just what they are trying to tell you. Fortunately the machine is very forgiving of set up errors and even if you can't get the picture right when you first turn it on, the sound of the 'jingle/jingle' tones in the speaker at least eliminates the concern that you don't have a working RF portion of the package. Since we spend so much time in the TVRO field worrying about whether we have acquired the satellite or not, this particular worry is easily handled.

The manual we received gives no instructions for setting up the antenna system. That's not because we didn't order the antenna either. Fortunately for anyone from the 4 GHz world; that part will be no problem. But, again, most users would have no experience in the

WEATHER For NASA

NASA, the folks who operate the Space Shuttle and other mandatory activities for our growing satellite world, recently decided they need to be plugged into the WEATHER CHANNEL service, from F3R, at the Cape in Florida. Unfortunately, they didn't have a willing, local cable company so they looked into purchasing a home TVRO type package which they could install.

David Johnson's **Paradigm Mfg. Co.** got the job and with a 12 foot Paracclipse and a suitable receiver and LNA package Paradigm Prexy Johnson himself went out on 'this installation'. One of the unusual problems encountered was terrestrial microwave. Not that finding 4 GHz microwave at the world's busiest spaceport is all that unusual; but in the process of finding it, Johnson mentioned that it sure would be helpful for shielding purposes if they could determine **which one** of the dozens of Bell telephone 4 GHz terrestrial links in the area was causing the problem.



No problem to NASA officials; a few minutes later, after a telephone call to Ma Bell, the Bell engineers began shutting down one 4 GHz terrestrial transmitter at a time, all over the Cape area, until they found the particular one getting into the TR21 reception from F3R. **Now that is cooperation!**

The next time they tell you on network TV that the Shuttle is in a holding pattern, waiting for the weather to clear, you can picture the NASA weather guys clustered around a television set watching the WEATHER CHANNEL. Paracclipse's Dave Johnson sees it this way; but then he has a bias now towards NASA!

satellite world and I can imagine some difficult days or weeks just trying to find the proper birds.

The manual also doesn't tell you anything about the operating schedules for the various birds; we missed the GOES East bird when we first turned the system on because we didn't know that they shut down for a few minutes every now and again to conserve battery power. Printed schedules are available, and at 1130 Z (GMT) each

day GOES Central runs off a full schedule for that day's activities. They even tell you when they are having uplink or other problems ('Please Standby') and that probably is a good idea as well.

If weather is important to people you know, and the long Weather Channel slots filled with sun tanning information and what have you is bothersome, you might consider a professional GOES/GMS/METEOSAT package from a firm such as Northern Video Graphics.

And if you are in an area of the world where transponder 21 on F3R doesn't make the grade anyhow, you are probably within reach of one of the five dedicated weather satellite birds. You won't find anything very entertaining here and they never interrupt for a commercial. But the information you **do receive** could well save a bunch of lives for folks who need to know when the REAL weather is about to take a turn for the worse.

SYSTEM NOISE

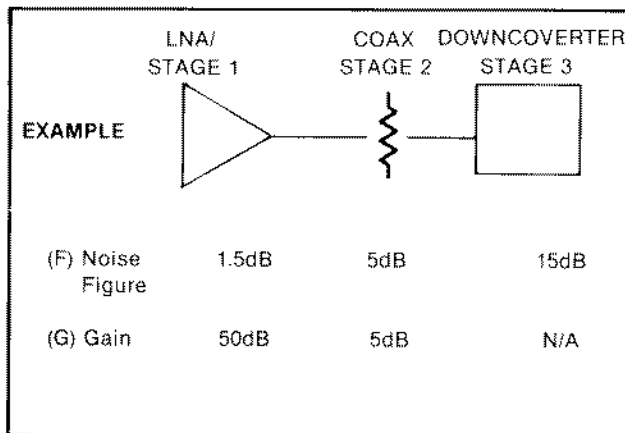
CALCULATIONS/ Revisited

by
John Ramsey
Sat-tec Sales, Inc.
2575 Baird Rd.
Penfield, NY 14526

The July issue of CSD carried a report on the May meeting of the ROBS group, and their work on evaluating TVRO receiver down converters for apparent noise figure. The same report also included some discussion of system electronic noise (antenna noise aside) and how the various portions of the system (LNA, coaxial cable, down converter, and demodulator) contribute to the overall noise of the system.

Predicting total system noise (and therefore creating the system CNR/ Carrier to Noise Ratio) is a relatively simple process and involves breaking the system down into a cascade of stages which have definable gains and noise figures. The individual stage/cascade segments are then summed using an equation known as "Friis' Formula". Basically, Friis' Formula states that the total system noise temperature is equal to the noise of the first stage (i.e. first LNA gain stages) plus a summation of the succeeding stages, divided by the preceding stage's gain. The formula and an example will make this clear.

Notice that the coaxial cable has both a gain **and** a noise figure specification! In this case of course the coaxial cable really has loss rather than gain so it amplifies (reduces) the signal by a negative amount (a minus number); equal to 5 dB. The cable is considered to be a passive device, similar to a signal attenuator, and for this purpose the 'noise figure' of the cable is equal to the loss of the cable; 5 dB. Friis' Formula uses linear terms and all of our data is in dB. From a suitable table of dB to linear conversions we will have linear numbers to work with, to suit the formula. Thus we will ultimately take the anti-log of dB values to return to the required linear terms. An example follows.



In this example we have placed a 1.50 dB noise figure LNA (120 degrees K) at the front of the system, and then we have followed that LNA with 10 feet of RG-8/U cable to connect to the down converter (the 5 dB of loss). Now what was the impact of that 10 foot section of RG-8 cable? The equation shows us that we now have a system (electronic) noise figure of 1.505 dB; not a significant degradation, in this case. Now let's see what might happen if we substitute a 30 dB gain LNA in place of the 50 dB gain unit, but retain our 15 dB noise

NOISE/ continues page 66

$$\begin{aligned}
 F_1 &= 1.5\text{dB} = 1.413 \\
 G_1 &= 50\text{dB} = 100,000 \\
 F_2 &= 5\text{dB} = 3.162 \\
 G_2 &= 5\text{dB} = .316 \\
 F_3 &= 15\text{dB} = 31.623
 \end{aligned}$$

$$F_T = F_1 + \frac{F_2 - 1}{G_1} + \frac{F_3 - 1}{(G_1)(G_2)}$$

$$F_T = 1.423 + \frac{3.162 - 1}{100,000} + \frac{31.623 - 1}{(100,000)(.316)} = 1.414$$

To convert back to dB, take 10 log F_T
 F_T dB = 10 log (1.414) = 1.505dB

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to 150 feet from your customer's antenna site.

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Since each component is interfaced into the system by quick connect and disconnect connectors, installing the RPS-4000 is a relatively quick and easy process. While the system may not be used with AZ/EL type antennas, it is compatible with most polar mount antennas, provided the antenna's polar shaft is suitable for mounting the

system's potentiometer. Most experienced earth station installers require less than 2 hours to install the RPS-4000.

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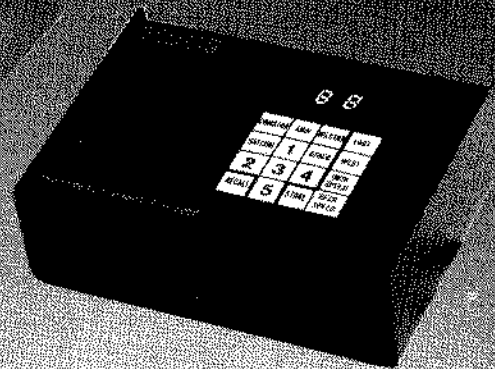
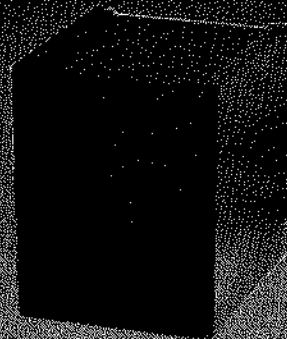
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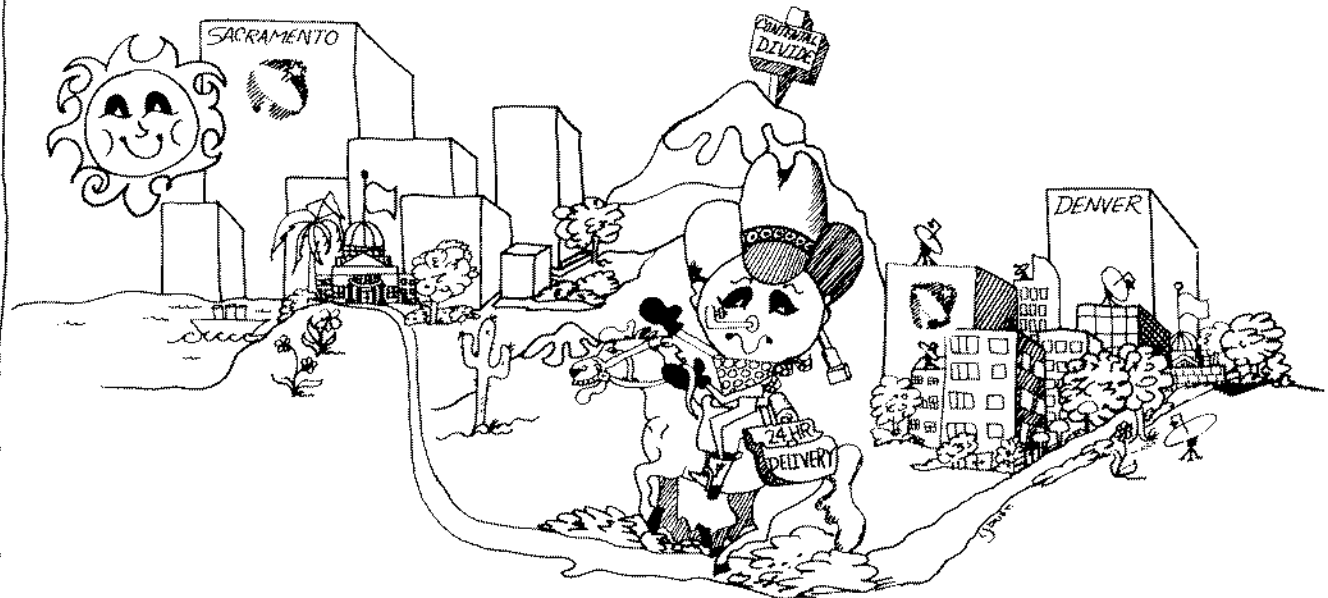
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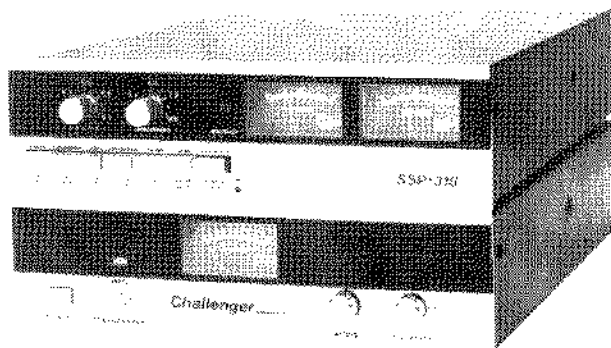
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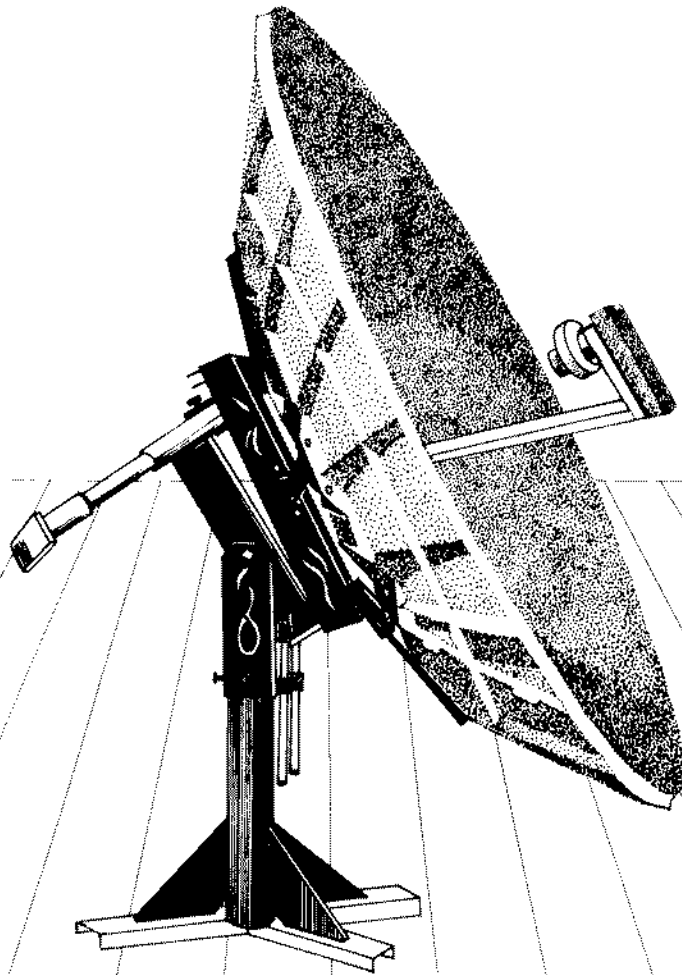
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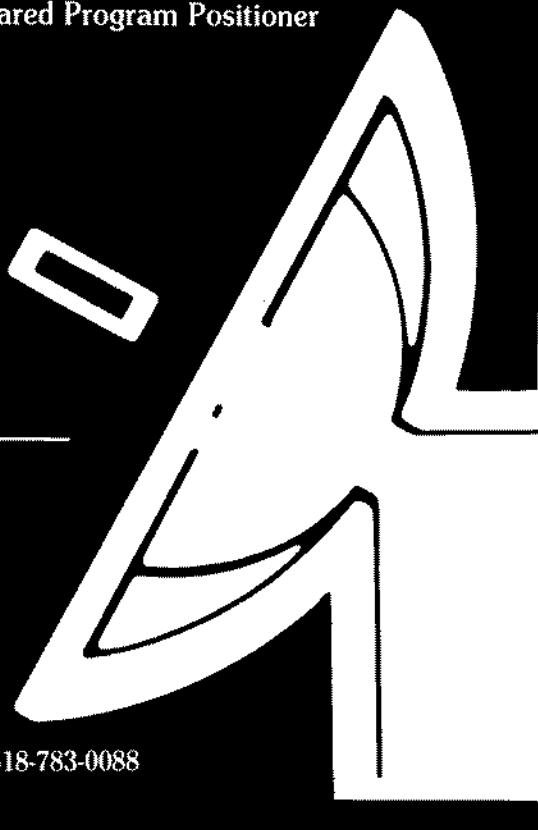
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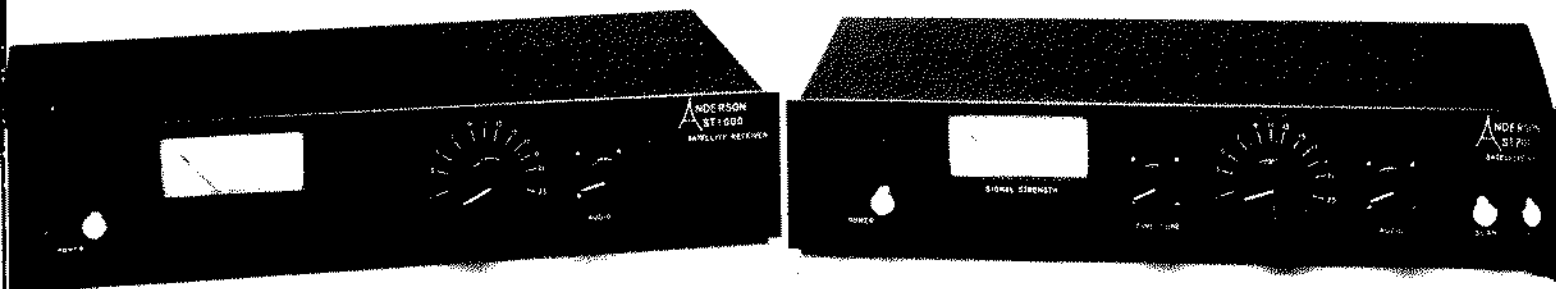


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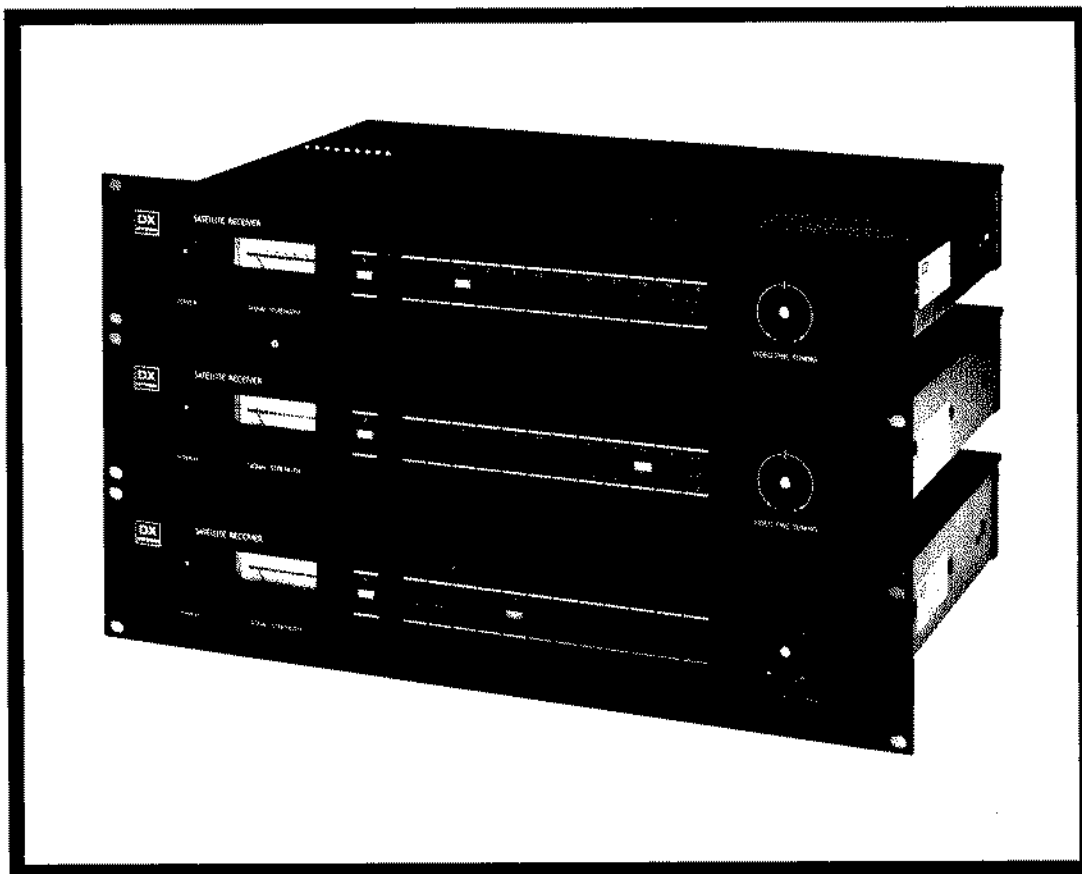
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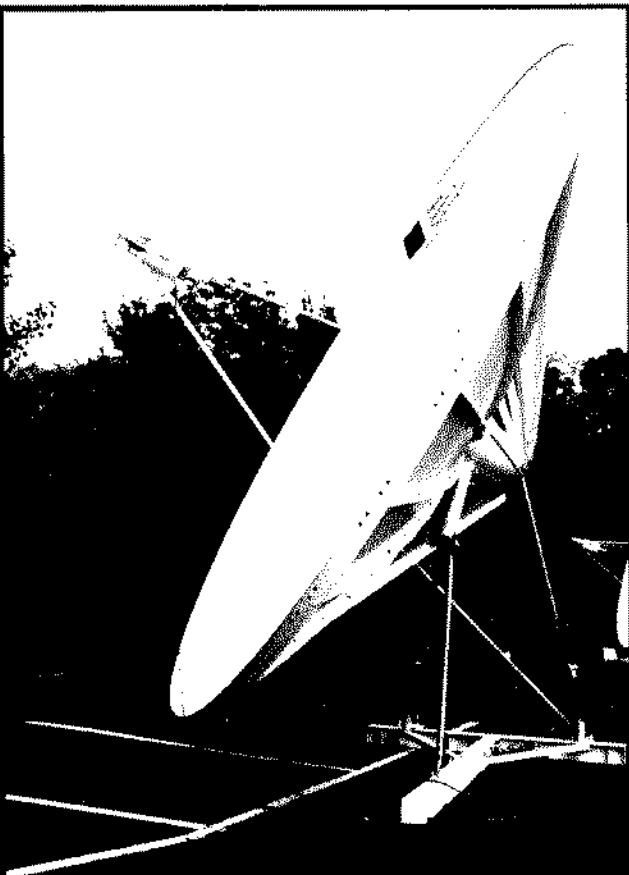
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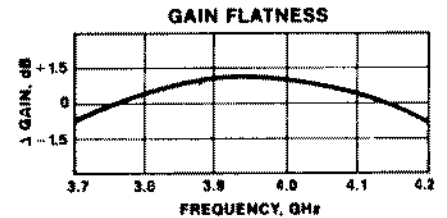
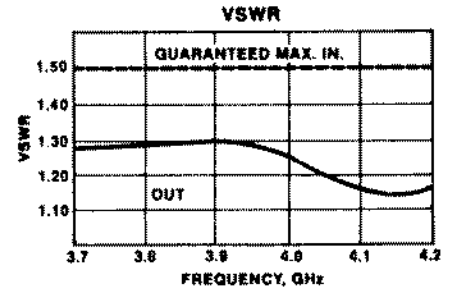
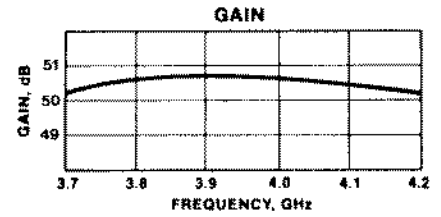
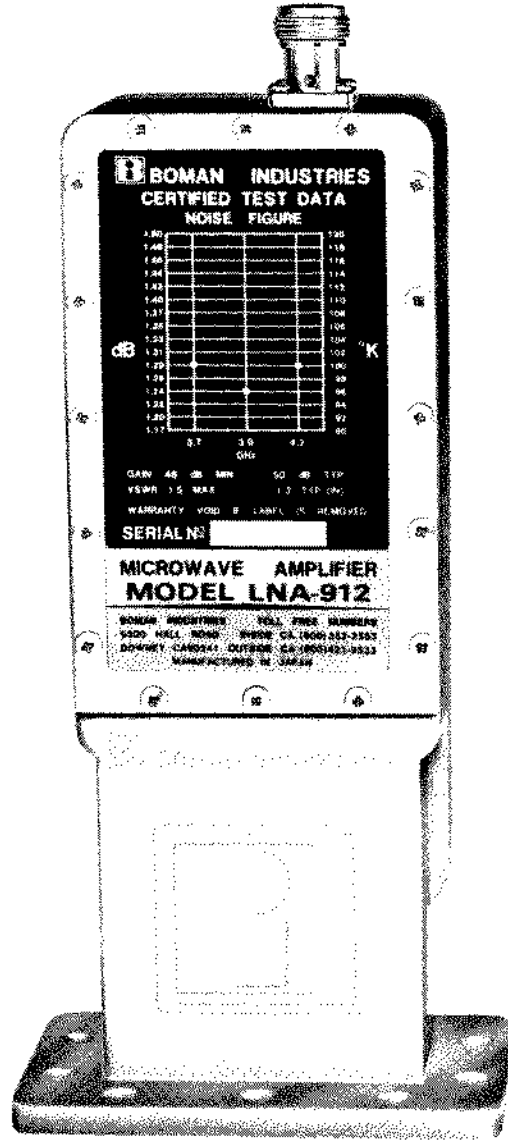
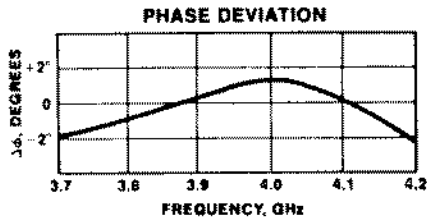
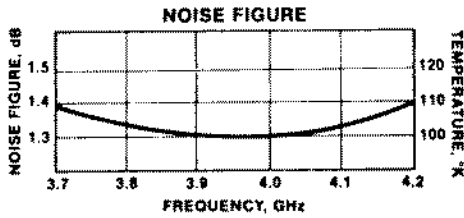
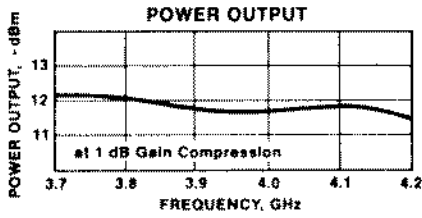
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Model LNA-912



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EASY INTERFACE:

Simple attachment to Drake, Automation Techniques, Wilson, etc. receivers permits instant polarity change *automatically* while making transponder selection. A simple cord plugs into the control and attaches to the rear of the receiver. No more soldering—no more schematics!

INSTANT POLARITY CHANGE:

Vertical-horizontal polarity is achieved instantaneously by simply pressing the selector button. This feature is operative when control is not being operated in Interface Mode.

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Permits fine tuning of polarity to viewer satisfaction.

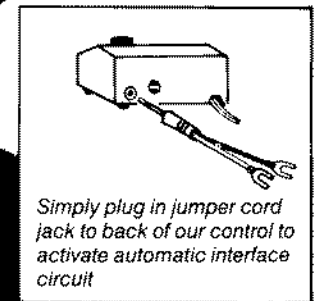
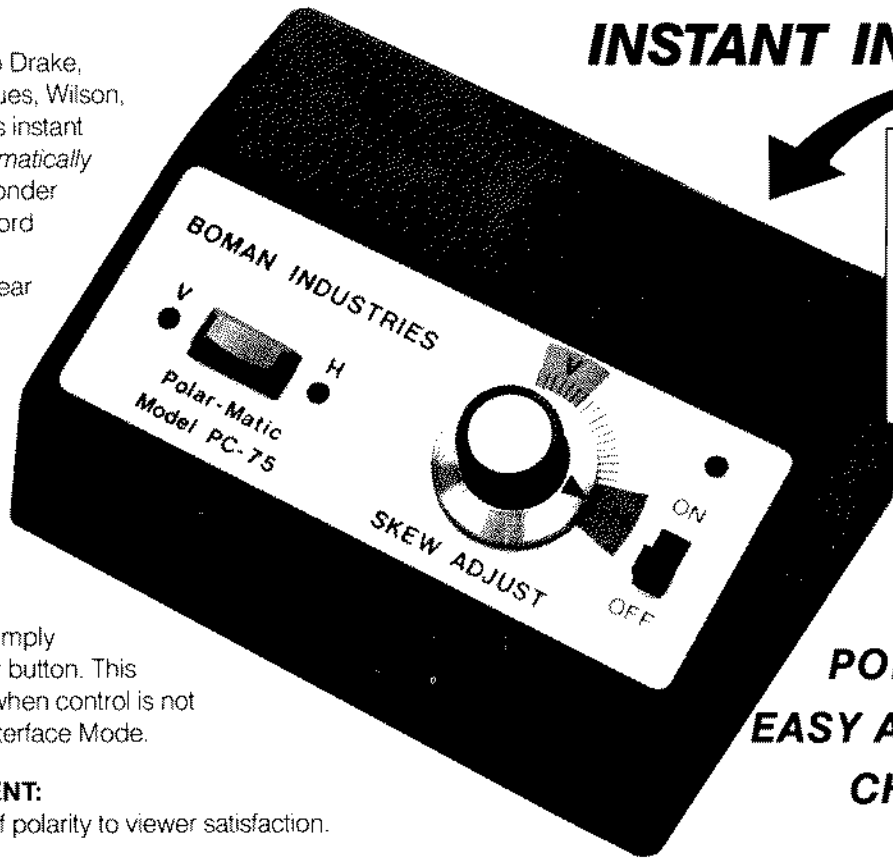
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Assures proper probe position to instantly achieve 90° rotation in the interface or manual selection modes. Now you can easily make this adjustment at the set—not at the antenna.

- Transformer inside control—not on wall cord
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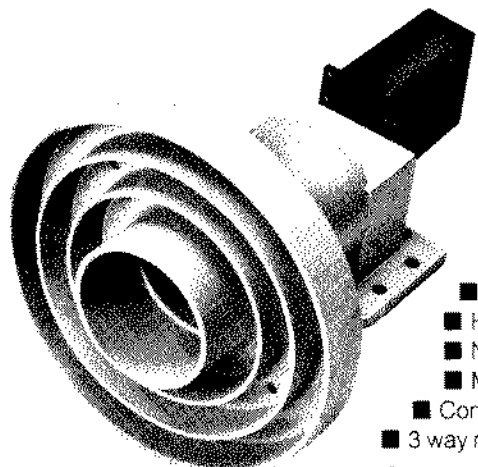
You will enjoy the easy installation, easy interface, appearance, and convenience of the Boman Model PC-75. Improve your profit picture while assuring increased customer satisfaction.

INSTANT INTERFACE



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- Servo motor operation for fast precise polarity selection
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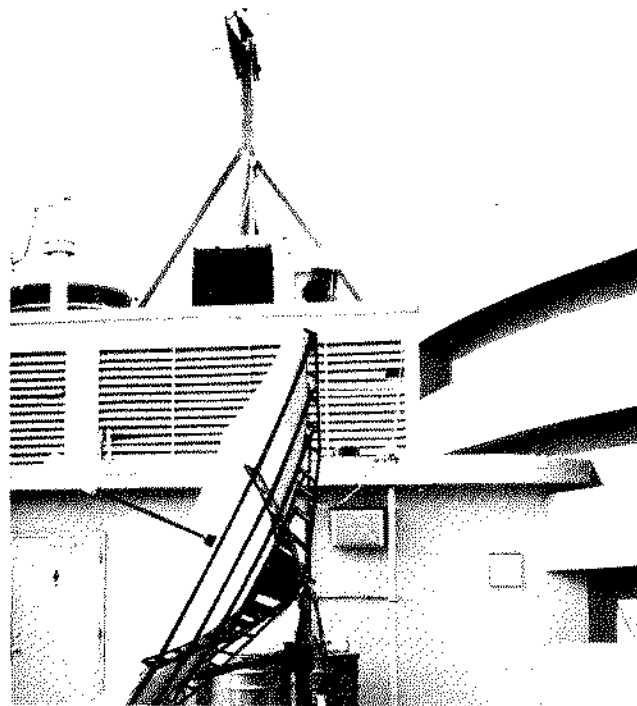
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WARPED PRETZEL

I recently had the chance to see, first hand, what a Tornado can do to a satellite antenna. I am sure you can figure out what type of antenna it was from the photo of the remains. I took my mobile 12 foot Paraclypse antenna to the site to restore service for the people, and using the same electronics, we found the Paraclypse produced better pictures. I cannot make an honest judgement of the original performance of the 20 footer, however, since we did not install it, nor did the factory that sold it.

Frank Abruzzo
President
Satellite Link, Inc.
303 SW 76th Terrace
Fort Lauderdale, FL 33068

Tornado may be a mis-nomer. Those of us who have lived in places like Oklahoma know that a tornado is devastating, but typically right down to the ground. The roof mounted antenna pictured obviously took a chunk of wind and we'd estimate the peaks had to be over 125 MPH. Wonder if they ever found the LNA and feed?



UNCERTAIN Degradation

I received the July issue of CSD and was pleased to see the article on the ECI-11 Footer. Thank you for the straight forward, honest

evaluation of our product.

By the time this letter is received, you should have our new production mount. Shipping it has been delayed by our tooling up for production for the full antenna system.

It puzzles me that you found a deterioration in the signal strength with the system. I am certain this can be attributed not to the feed as you surmised, but rather to the inadequate mount system we set up on Provo. I'm certain the South River mount now sent to you will solve the problem. We have never encountered signal degradation on any of our many installations we monitor. Nevertheless, if the problem persists, let me know and I will personally come down to rectify it!

Walter Grebis
President
Engineered Communications, Inc.

The ECI 11 footer was reviewed in the July CSD. We found a gradual but insistent degradation in signal level over the weeks that followed the installation. The new mount is now on Provo and after it is installed and the dish retracked, we'll let you know how it is performing. Grebis obviously liked the Island Princess hammock, and is itching for an excuse to return!

ANTENNA Claims

The roar from the people who are supposed to know what is happening in antenna design overwhelms the unsuspecting new dealer (or distributor); 10.5 dB, 40 dB, 50 dB. Mesh, metal, fiberglass — what antenna is best?

Let's begin with the term dB. A dB is a decibel — a power unit where one decibel represents a just detectable change in signal strength. A dB holds no significance unless it is **referenced** to a unit of power (such as 1 watt, or whatever).

For example, if you had 1 watt of power and you amplify that watt by 3 dB, you have just doubled your power; two watts. The same type of relationship occurs in antennas; you must **start with** some type of reference; i.e. gain over some known type of antenna.

There are several standard references that are commonly used in various antenna related fields; the so-called 'isotropic' (dipole), the (1/2 wave) dipole are commonly employed in many antenna forms. Thus, depending upon what is used as a reference, your final gain (relative to **that reference**) is determined.

Now let's do some comparisons. An antenna with a gain of 41.5 dB 'reference' an isotropic antenna will have approximately 39 dB of gain reference a standard (1/2 wave) dipole. Still confused? So are alot of people in the industry!

Questions that must be asked when analyzing dB ratings include 'what standard has been used for this antenna,' and 'are the gain numbers calculated, or, measured'? A calculated gain is a theoretical gain, not necessarily the actual gain. But in order to compare gain figures, you must know whether the gain is dBi (gain above an isotropic source) or dBd (gain above a dipole source). Without this knowledge (i.e. gain that is stated without a reference source), you cannot compare apples and apples!

When you are trying to make antenna test range or in-field antenna comparisons, it is very important to always use the very same electronics and cables and feeds (assuming all antennas are of the same I/D ratio). Ideally, the antennas would be mounted on the same 'test stand' and rather than spot measurements taken quickly, the

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measurements would be an average of levels measured over a reasonable period of time.

After you have compared antennas in the same location using the same cable and electronics, the next trick is to fairly judge the strength and stability of the antennas. Will the antenna hold its parabolic shape in changing weather? Such as from hot to cold, and back again. Will the antenna withstand snow and ice without changing shape? What is the antenna's capability to withstand winds? Does the shape of the dish 'distort' in moderate winds?

And then the cost of installation should be another important point to consider with shipping costs; does it take four men and a backhoe to install, or two men/two hours?

All of these factors are important in calculating your true installed-cost, and finally, your true installed 'profit'! In conclusion, the best way to select a parabolic antenna is by comparison, or, deal with a company that will guarantee you picture quality.

Don Berge
Continental Satellite Systems
11485 S.E. Highway 212
Clackamas, Or. 97015

Mostly true. Actually, much of this could be avoided and the dealer could be placed in a far better position of judging antenna 'quality' if all antenna manufacturers played by the same rules. Perhaps five of the top 30 antenna designs now being sold in the industry have ever been properly tested on an antenna 'test range' by professional antenna measurement equipment and personnel. Since there are many who continue to believe the fairy story that 6 and 8 foot dishes are good for America, and refuse to insist that the antennas they buy for installation-resale are 'proven' acceptable for weaker satellite signals plus closer satellite spacings, CSD is preparing to look at just what antenna test range measurement is all about, and what it proves to the ultimate buyer/user of parabolic antennas. Watch for the series to begin shortly.

HOFFMAN Again

As you may be figuring out, I do not always read CSD through and through when I first get it, and when I am extra busy I may skip an entire month before going back and picking up what I have missed. The subject of this letter is both flack and praise. I'm sure you get plenty of both but I wanted to add some praise on behalf of a group of people who never heard of Bob Cooper.

It was early December and we were on our way to Palo Alto (California) for Christmas holidays. The weather was terrible, even in Mexico it was raining so we decided to take the long way around and leave Mexico in Laredo. It is a couple of hundred miles further to El Paso this way, but the Mexican roads to the border are better and you are on US roads far faster this way. To get to El Paso you swing west through what is known as Big Bend Country. This is surely the most desolate area in the United States. From Del Rio to El Paso is 450 miles or so. Highway 90 passes through first one small town and then another but most of what you see along the way, in the form of civilization, are mere wide spots in the road. Because there are so few wide spots with people, I started to check them off on my 1983 Almanac. About half way along I found one that didn't compute; it was not on the map nor was it listed in the Almanac. What is this? A brand new town!

Well, what this 'town' had was plenty of satellite antennas. In fact, all along highway 90 there were satellite TV antennas at virtually every ranch house and in the small settlements the TVRO antennas looked like TV antennas in San Antonio; every home had one or two! Many have one antenna anchored on D3 (networks) and another anchored on F3. In one small town I counted 6 dual-antenna systems and 18 single antenna systems. The dual antenna systems were feeding miniature cable plants, a dozen or two homes hooked to the same antenna!

You may wonder why I am telling you this. I may be wondering why I am telling you this!

I first heard of satellite TV in late 1978. I had two names; H. Paul Shuch and H. Taylor Howard. This lead me to Bob Cooper and CATJ magazine. I became one of your pioneers when CSD came out and I've been there ever since. That was my one and only contribution to this wonderful industry; \$50 up front!

Now, I am a marketing man; a whole lifetime of selling and planning and whatever. I have watched Coop with great fascination as he gave birth to an entire industry. He mothered it, guided it, and helped it like it was the Queen Elizabeth 2 coming from the London docks down the river to the open sea.

And I am sure of two things. Without Coop out there keeping the industry on the more or less straight and narrow, the industry would not look like it does today. Without Coop, there would have been only one or two manufacturers in this field (like the video game field) that amounted to anything and even at that it would have been far longer before competition forced prices down and volume production up.

So on behalf of the people who live along highway 90, in towns that do not even have names, the forbidding land of the Big Bend Country of southwestern Texas, I say thank you Bob Cooper for what you did for them!

Bob Hoffman
'Someplace In Mexico'

Bob Hoffman's contribution to the industry is far greater than he lets on. After getting started with us in the summer of 1979, he carried the new technology back into central Mexico where today several dozen American families enjoy US television because Bob Hoffman was kind enough to share his terminal with them. The people of his 'unlisted' American ex-patriot community are grateful to you, as well, Roberto!

LNA Drive

How is the 4 GHz drive level of any particular receiver related to the performance when used with an LNA of less than the recommended minimum dB gain? How can the performance of a 95 degree LNA with 40 dB gain be compared to an LNA with a 120 degree noise temperature and gain of 53 dB? Are we actually spending more money for a lower noise figure and getting poorer results in the process? Is there a simple formula to show the trade-offs?

Jim Collins
LUNAvision
P.O. Box 1416
Bryson, NC 28713

We tried to set the record straight in our July issue and screwed it up badly (see ROBS report, July page 32). John Ramsey straightens it out this issue but the answer is not a (really) simple formula. We too have been concerned that some of the LNA folks are offering LNAs with gains as low as 28 dB (that's an amplification factor of 650 or so) or 30 dB (an amplification factor of 1000), whereas we learned some years ago that there was quite good reason for having 50 dB of gain (an amplification factor of 100,000). Yes, receivers and times have changed. But not that much! The LNA's gain has got to be adequate to insure that the low noise-figure created by the GaAs-FET stages in the LNA override the high noise figure of the down converter. As the ROBS tests (see CSD for July) told us, we are looking at down converter noise figures that average in the 13 to 18 dB region. Remember that a 120 degree LNA has a noise figure of 1.5 dB; far less than the 15 dB typical figure of down converters. When you stick any loss between the LNA output and the down converter input (a piece of cable . . . any cable . . . has loss), you reduce the amount of LNA gain available (the signal gain is lost in the interconnecting cable to the down converter) to 'override' the down converter noise figure. If you use the John Ramsey formulas in this issue, you will see that if your LNA has 30 dB of gain and you place the down converter exactly to the LNA using a double-N connector, you will have a small but measureable degradation of the system noise figure (assuming the double-N connector has about .5 dB of loss; none are loss-less). With a 30 dB gain LNA, any cable loss at all between the LNA and the down converter is a disaster. Now, if your down converter (by design, or by accident) has a noise figure of 18 dB or 21 dB (or as much as the 28 dB we measured on one unit in the ROBS tests), you can't hack it with a 30 dB gain LNA. It just won't compute. What about a 40 or 44 dB gain LNA? It all depends upon how much cable loss you allow between the down LNA and the input to the down converter. Here is one way to check. Stick the down converter, temporarily, right at the LNA output using a double-N fitting. That eliminates the cable loss and you can do a 'without cable' (double N) and 'with cable'



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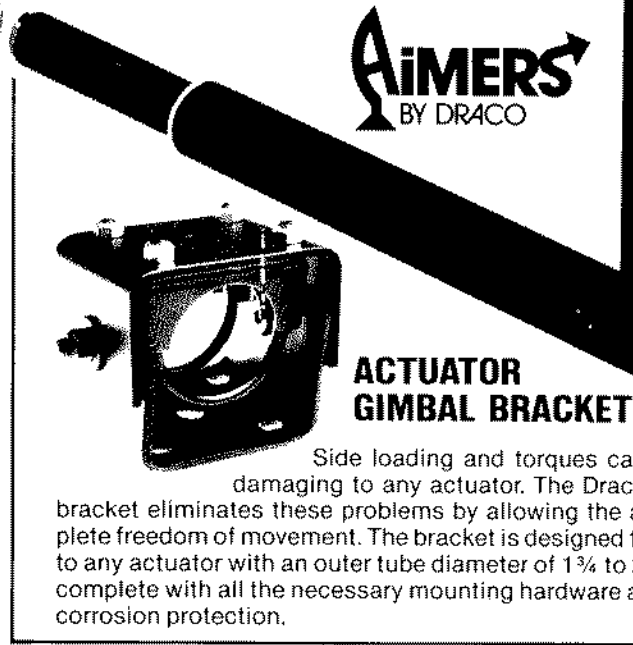
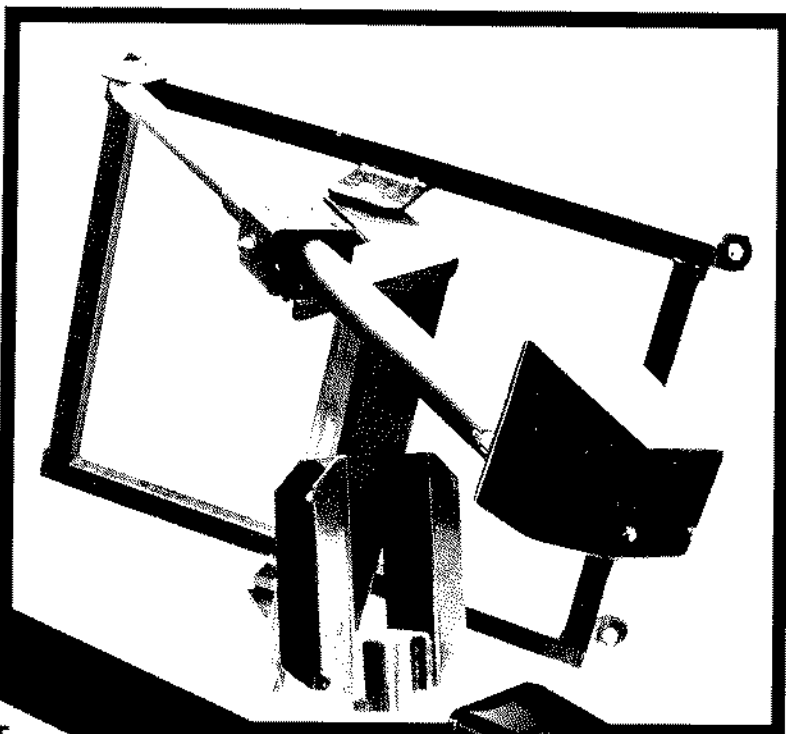
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Polorotor I type feed horns. Stores up to 64 satellite positions and full memory back-up has been installed to protect against loss of data during power outages. Built-in power supply makes the unit completely self-contained. Other features include, adult program lockout and one button realignment. Comes complete with digital controller, actuator, mounting bracket, cable and connectors.



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(normal length of cable in place) comparison. Some LNA suppliers will tell you that exhaustive testing reveals that a 44 dB gain LNA is OK for most installations. Those tests do not take into account that you may add an extra five or ten feet of 213/214 cable into your installation, increasing the loss they 'calculated' in their tests. Nor do such tests consider the possibility that you have purchased some poor quality 213/214 cable (214 is hard to get in poor quality since it is double shielded; RG-213 commonly sold to our industry, usually with N type connectors on it, is close to pure junk!) and your loss per ten feet may be several dB more than the cable they selected for their tests and computations. When in doubt, eliminate the cable altogether and do your own tests. And stay away from 30 dB gain LNAs unless you are dead certain that you (1) like to double-N connect the down converter to the LNA, and (2) know the down converter has a maximum noise figure no greater than 15 dB.

HEAT Those dBs!

I recently read an article describing a firm called Electronic Space Systems Corporation in Massachusetts that is working under some sort of developmental contract with China to develop a 8.8 meter thermal parabolic dish that will be used in the daytime with a Rankine cycle engine to track the sun and generate electricity from the sun, and at nighttime to track geo-stationary satellites for 'satellite TV service'. This seemed like a far-out idea until I investigated. It seems that Chinese are deadly serious and so is the US company. The Chinese are now completing a 5,000,000 square foot manufacturing facility to turn out thousands of these 24 foot reflector surfaces that stand nearly 29 feet high. The organic fed Rankine cycle engine will turn out 5 kW of electrical power when the sun shines; or even when it does not shine; it simply has to be daylight (clouds don't shut it down; just reduce the efficiency). The article suggests that with this system, you can collect and store solar energy in the daytime, turning it into electricity that is 'stored'. Then, it notes, "you can put this out in the middle of the Gobi Desert and plug yourself into the world (via satellites)". This is a very exciting concept, and while I am sure the costs must be high, the idea of combining satellite TV reception (or transmission) with solar power collection, generation and storage should have world-wide applications. Is there a less expensive way to do it?

M. ReJean Mathieu
660, 13 ieme Ave
Senneterre, Quebec
JOY 2M0 Canada

The TVRO (microwave) receiver is fed slightly off-of-center, not unlike the approach that uses one parabolic dish for multiple satellites by placing two or more feeds along the 'arc/curve' of the focal point. The sun, unfortunately, is not as forgiving and for the system to be maximum effective, the dish needs to track the sun. But is there a cheaper way to do it? Read on.

FREE TVRO

I am Monte Mahan, President of SUN TV of Greeley, Kansas and I have created a 'free satellite TV receiver'; or at least part of it is free.

I reworked my dish (see photo) and covered it with a mirror finish. Then I added a boiler and a sun tracking system which allows me to heat my domestic hot water and/or heat my house anytime the sun shines. Then I can watch satellite TV when the heater is not in use.

The photo shows my test model, a 9 foot (64 square foot solar heater) which, at the focal point, will melt a rod of 1/8th inch steel in 10 seconds time, or a similar diameter rod of aluminum in less than 5 seconds time!

Because my unit is prime focus, I have a rectangular boiler which covers my LNC when I am in the 'heat mode' and which automatically retracts while I am in the TV mode. I have contracted with a dish company to supply me with a 9 foot or a 12 foot petalized, .3 f/D polished, stainless steel dish which I will then retrofit with a subreflector and boiler. This allows me to place the electronics out of "harm's way" (i.e. the tremendous heat) and the subreflector is painted black to work with the boiler. I am currently working on the perfection of a triple threat unit using Freon in the boiler so I can produce heat, or cold air, and electricity.

My question is this. Do you think, since this could be primarily considered a solar heater, that local city Zoning Boards would classify

this as a solar device and not a TVRO device when people use them in a town? Do you think there are any other legal or marketing advantages such a product has?

Monte Mahan
RR 1, Box 68
Greeley, Kansas
66033

We hope you have the strongest rural route mailman in the USA, Monte. You are about to receive several hundred letters from every kind of person in the USA today! First, we suggest you unplug your telephone. Next, we suggest you NOT give out ANY information to ANY person until you get the best attorney in Kansas to protect you. Third, we suggest you take your test dish down and store it in the barn until this all blows over. Are there any marketing advantages to this? Good grief. Is the sun hot?

For openers, a solar water heating system is capable of substantial income tax savings. Present IRS rules allow you to subtract 40% of the cost of such a system from your taxes as a Federal Tax Credit. There are nearly 40 states that also allow you to deduct from your state income taxes a portion of the system's cost as a state tax credit. That's on top of the 'free hot water' you create.

If the TVRO function is 'hidden' by the retractable subreflector, our answer to your Zoning Board question is 'what TVRO?'. If I was going to buy one of your units (put us down for the FIRST production model; the Turks and Caicos Islands have the second highest percentage of useable sunlight in the world today; right behind the Gobi Desert!) and I had to describe it to the Zoning/Approval board, the fact that the dish also was capable of being used for satellite TV reception would never appear in my application. I could probably use my swimming pool to raise Piranha, too. But I doubt I'd list that as its function when I went before 'the board' for construction approval.

There are several dozen firms out there right now wondering what they are going to do with those six/seven/eight/nine foot antenna molds and patterns, when the satellites get weaker and are shoved closer together. You've just solved their problem and they'll beat a big path to your Greeley doorstep to try to talk you into becoming 'part of their team'. Since the typical American home uses around 1,000 gallons of 'hot' water per day, at an electrical cost averaging over \$2 per day (and often much higher), this makes selling the combo packages (hot water heaters plus TVRO service) a salesman's dream. First he points out that the money the customer saves in electricity (by using the sun to heat hot water) will virtually pay for the TVRO in a few years. Then he points out that the cost of electricity (or natural gas) to heat hot water will continue to go up, every year. To this he adds that 'old fashioned' rooftop hot water solar collectors are a nightmare to install and service (the latest Heath/kit system sells for \$2400 to \$3200) and require a plumbing degree to maintain, while the 'SolarBolic' system mounts down on the ground and installs in just a few hours time. All of this is before he gets to the 'free satellite TV' part.

Now let your imagination stretch. You say you can 'melt' a 1/8th inch steel rod in ten seconds? Imagine harnessing that heat on a construction site. You could form up all sorts of materials and modify all sorts of broken parts on site by simply using the transportable 8 or 9 foot 'SolarBolic' surface as a heat source and oven. 'Rotten water' could be vaporized, decontaminated and recollected in seconds; pure and ready to drink. Food could be 'flash fried' in a dry state and stored for long term use.

Even fiberglass dishes could be put into this service. How? We noticed some rolls of aluminized (metallic) material, up to six inches in width, for sale at a hardware store recently in Fort Lauderdale. Simply peel off the paper backing and using the adhesive backing on the aluminum, recover your fiberglass dish with the reflective aluminum; not 100% efficient, but far better than junking the 8 foot fiberglass antennas when the satellites drop in power and get moved closer together.

There's a real opportunity here for home experimentation. We hope those who are inspired will share their results with CSD, and those who think Monte is onto something will have the



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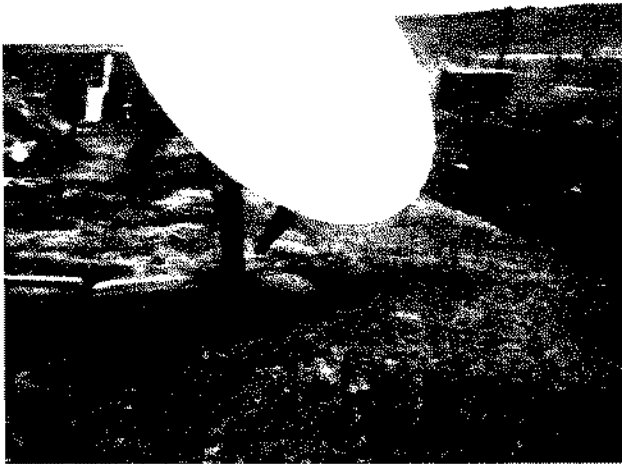
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courtesy to remember just because you can get his telephone number from information doesn't mean he has to talk with you!



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PRETTY Foxy

Realizing that CSD gets many letters concerning suppliers, I will make this brief. There is a mail order outfit in California that goes by the name of Foxy Lady. I should have been wary because of the name; but, they were good prices. To make a long story short, I bank-wired the money to them over 50 days ago and still no equipment. The owner, a Catherine somebody, refuses to talk with me on the telephone. The salesman, a Glenn Brown, also refuses to talk with me and now I have my doubts as to whether the secretary is giving my messages to the afore-mentioned individuals. We are instituting legal proceedings, but if you accept advertising from these people, not only will my opinion of CSD go down but you had better get your money first!

Lance Friedman
Applied Space Technology
6535 Seneca Street
Elma, NY 14059

Foxy Lady indeed! We have never carried any advertising for a firm such as this and must admit we had not heard of it previously. However, when we did some checking we discovered a California 'mail-order' business 'dba'. The last name of the lady President is Parker and you can perhaps learn of her present whereabouts and the status of her firm (it doesn't look good, to us) by calling 801-566-5603. You chaps have got to start being more careful when you find yourself being tempted with mail-order pricing that seems 'right'!

JV Satellite / Good Bye

I placed a telephone order to my Visa card, with JV Satellite in Landing, NJ. I talked with the firm prior to placing the order to confirm the prices which I saw advertised in CSD. Joe Valentino told me the prices were correct. I ordered a 9 foot Paracclipse antenna (\$595), a Beach Craft motor drive (\$299). That totaled \$894. When I received my VISA statement in July, I found that I had been charged \$1,300 by JV Satellite. At that point I had yet to receive ANY equipment. When I called Mr. Valentino, he stated that the \$1300 charge was a 'mistake' and that I was charged for a 'larger' antenna since the 9 foot Paracclipse was 'not available anymore'. He promised to send me a refund

for \$1001 and the Beach Craft motor drive. I have yet to receive the refund or the motor drive.

W.T. Todd
P.O. Box 4221
Wichita Falls, Tx. 76308

The saga of JV may not be over but as far as we are concerned, it is going to go in limbo. There is no JV Satellite advertisement in this issue. There will be no more JV Satellites ads in any issue of CSD until such time as those who hold 'I.O.U.s' from the former company, JV Electronics, are satisfied. We talked with the folks at Paradigm about why their 9 foot antenna was 'no longer available' (we thought that strange since we had just received one here in the Turks and Caicos) and we were told that JV had no authority to offer their antenna(s) for sale. In effect, according to Paradigm, JV was advertising something that Paradigm had never agreed to sell to JV. At best, that is sloppy for JV; at worst, it is bait and switch advertising. To take an order for a \$595 antenna and then 'upgrade' the customer to a \$1001 antenna without telling the customer, merely because you have the guy's Visa card number and can shove it through, borders on being deceitful. And that's being charitable.

GOOD GUYS/Bad Guys

In your June issue I read that ABC is presently using their news department as a 'tool' to shut down private, TVRO, terminals. I must agree with the people who suggest that the cable firms are stealing from the broadcasters and then reselling stolen product. Why hasn't the broadcast industry taken the cable industry to court for stealing WOR and WGN out of the air and then shipping these signals nationwide over satellite; where they are re-sold first to cable firms and then to cable viewers?

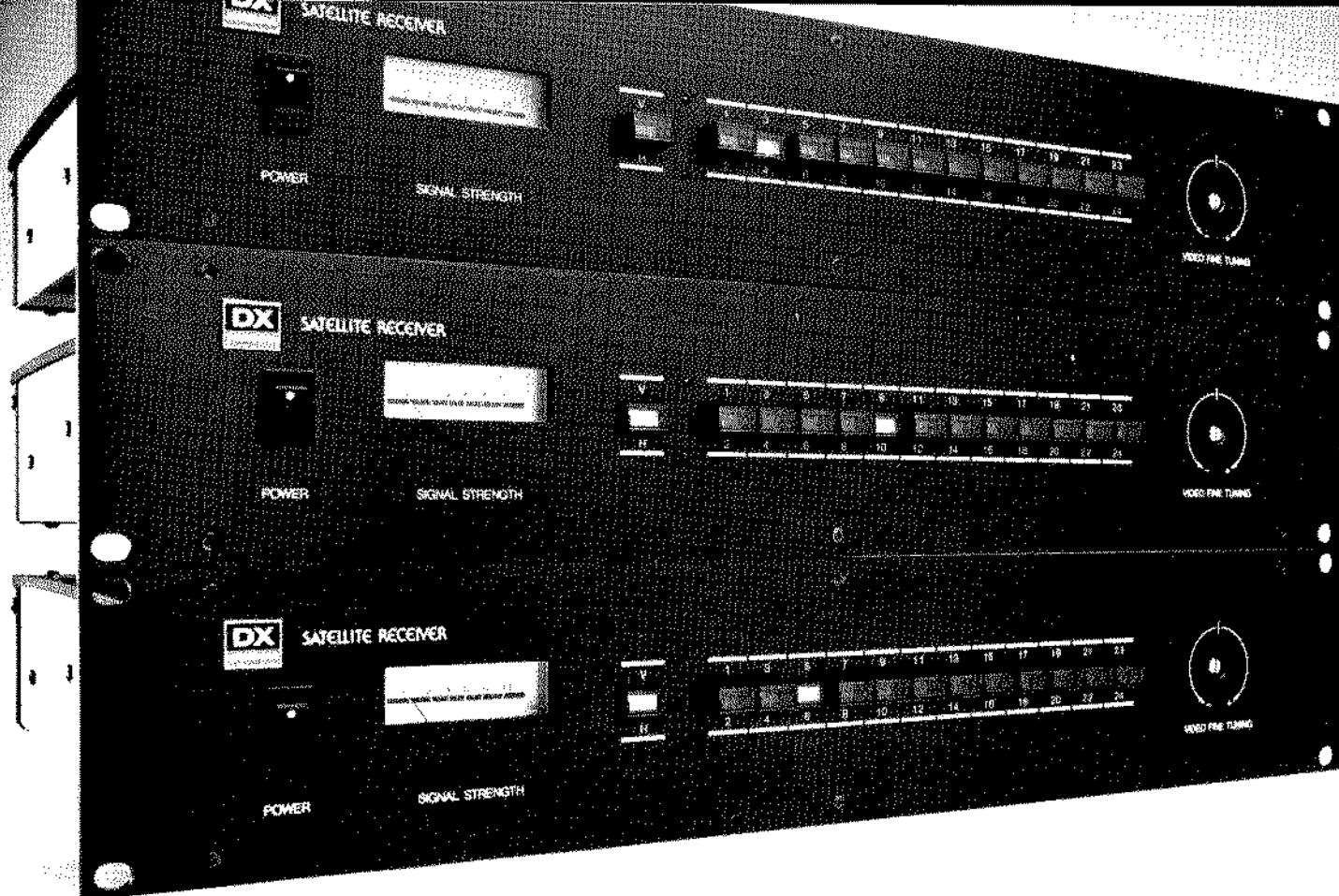
What bothers me about the dispute over 'piracy' and 'free air-waves' is that all of the attention seems of focus on the use of HBO or Showtime and other premium service channels. I don't hear anyone talking about private terminals watching C-SPAN, CNN, CNN-2, WTBS, WGN and WOR, for example. If the laws eventually require payment for HBO, what about these other 'non-premium' service signals?

There is a trend here for all broadcasting, television at any rate, to end up in some sort of 'pay mode'. I can see it now; \$2.00 a day for each channel you want, you order it when you want it or have the time to watch it, and nothing comes into your home unless you are willing to pay for it.

Perhaps DBS, with a \$500 package cost and \$25 per month, will not be such a bad deal afterall; locally HBO is \$11.95 a month, Showtime is \$10.95. Cinemax is \$10.95 and Disney is \$12.95. That's \$47 a month for just four channels!

L. Briones
Fremont, Ca.

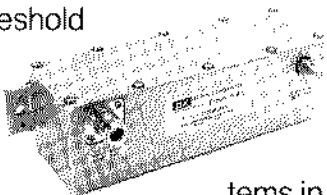
Cable systems do pay for 'distant' (satellite delivered) broadcast signals. The rate varies but may be as much as \$40-.60 a signal a month through the Copyright Tribunal collected funds. WTBS, WGN and WOR all 'collect' for their distant viewers. The firms that deliver these signals to the cable firms (i.e. the Common Carriers) do NOT pay however. It has been ruled that as Common Carriers they are exempt from the Copyright fees. The cable firms pay, and in many cases the cable firms pass those fees along to the cable subscribers, directly, as a sur-charge on their cable bills monthly. At the moment, the only firms actively pursuing scrambling of their signals (i.e. pay and watch, or, don't pay and don't watch) are the premium programming firms; HBO, Showtime, The Movie Channel, The Disney Channel to mention the majors. Others, such as CNN, Cable Health Network, WTBS and so on have absolutely nothing to gain from scrambling and rather significant viewers to lose if they do so. If a service is advertising supported, it wants to reach as many homes as possible and a potential additional audience of private terminal homes, growing at the rate of perhaps 20,000 per month, is not totally insignificant to them. The cable firms are heading for a \$50 charge per month average very quickly; they offer 'basic' cable (typically only local broadcast stations) for a token amount and then offer optional extra services (such as CNN, WTBS, WGN) on a 'second tier' of channels. For this they collect an additional \$3 to



DX Gives You Big System Quality at Small System Prices.

Now you can have top quality performance for a surprisingly reasonable price. The DSA-643 Satellite Receiver from DX features dual, **block downconversion**—unique for receivers in this price range. The DSA-643 uses a discriminator circuit for signal demodulation; a full 30 MHz bandwidth; and a unique threshold extension circuit. These features add up to a low threshold carrier to noise ratio, commercial quality reception and low cost installation in any system.

DX also provides the DSA-541 Block Downconverter. It features a highly stable ceramic resonator, with a fixed frequency of



2800 MHz. Stability is maintained at a remarkable ± 1 MHz over the entire -30° to $+50^{\circ}\text{C}$ temperature range. So you can install the downconverter out of doors, at the dish, without concern for frequency drift caused by temperature changes year after year.

The innovative DSA-643 Satellite Receiver and DSA-541 Block Downconverter are brought to you by DX, one of the most respected names in satellite television reception systems in Japan and around the world. DX also provides line amplifiers, power dividers, and other block downconversion-compatible accessories.



DX Communications, Inc., A Subsidiary of C. Itoh & Co. (America) Inc.,
116 Midland Ave., Portchester, N.Y. 10573 (914) 939-8880
Manufactured by DX Antenna Co., Kobe, Japan.

\$7 per month. At this point they are ready for the big buck items; the optional Playboy, HBO and so on services which average perhaps \$11 each per home. By the time the subscribers gets through basic plus 'second tier' they are usually spending \$15 to \$20 per month. Add a few premium service channels at \$11 average each and you get to that 'magic' \$50 a month figure in a hurry. Free TV? It was never free. And now, like everything else in an inflationary economy, it has gotten (optionally) very expensive.

HIGH On His Mount

We at South River (Metal Products Company) are grateful for the favorable references which have appeared from time to time in **Coop's Satellite Digest**, concerning our line of mounts. We have always attempted to produce superior products and so it is satisfying to be recognized by the industry's premier publication.

I must confess, however, to some dismay when I read the results of the Equipment Reliability Survey in the June **CSD**. Because the survey did not break out mounts as a separate category, distinct from antennas, we did not receive any mention; favorable or unfavorable. Yet the survey listed us among those manufacturers with the 'Worst' instruction manuals, something of a misrepresentation since at the time we had no instruction manual at all! Judging from the survey entitle, one might deduce that all we produce at South River are inferior instruction manuals.

The truth of the matter is somewhat more complicated. When we first began manufacturing products for TVRO, we treated them like any others in our product line. We were accustomed to dealing with professional installers who have little need for any but the most basic information. Moreover, we were used to taking a back seat to our antenna manufacturers since their product determines the use of our product. With the myriad of antenna types, actuator drives, and specialized mounting situations presented by our customers, we felt that a manual would need to be encyclopedic. We also felt it was unnecessary since the majority of our customers were local and discussed their requirements in person.

When we began to sell our mounts far-afield, we began to recognize that a simple assembly drawing would not be sufficient for most people. We told customers with questions to call us collect, and the calls began to multiply. In many cases the problems arose because the mount was being used with a faulty actuator or antenna, or because it was not properly installed. In some cases, customers didn't have even the basic understanding of the mechanics of a polar mount. We sat down and wrote a manual which eliminated the majority of those problems.

I hope this clears up any misconceptions you may have had about the prior lack of an instruction manual. I also urge **CSD** to include a separate category for antenna mounts in future surveys.

Roy Cohn
Vice President
South River Metal Products Co., Inc.
P.O. Box 394
Matawan, NJ 07747

Since you were motivated to produce a detailed manual to assist those customers you could not meet personally with, you will pardon some of our readers who bought your products and found no manual included. Accurately, South River did not have one of the worst manuals; they had no manual at all. To your credit, some of those who did have a manual rated even lower than your 'no-manual-manual! On the positive side, we have reviewed the massive (57 page) 'SR Series Heavy Duty Polar Mount' manual and can say to readers without fear of contradiction that this is the very best manual AND tutorial course in the mechanics of antenna mounts we have ever seen. For being complete, it rates an 'A' and we urge readers to write Roy Cohn for a copy for their own reference book shelf. Don't be cheap; stick in \$5 American to cover the cost of shipping it to you (it's worth far more than that to you, although South River does not 'sell' them per se) and then schedule a complete evening to read it through. You'll be far smarter for the time spent!

WHILE In The Neighborhood

I have been reading **CSD** for several months now. We are the

manufacturers of CATV/MATV components in India and we are now planning to manufacture TVROs in India, with the assistance of U.S. manufacturers. Now I have been reading in the past few issues that Coop and some others are coming to Sri Lanka this fall, via Madras. This is very exciting!

Will it be possible for Coop to let us know the details of the travel programme so that we might accompany him from Madras (India) down to Sri Lanka? Or, if you wish to visit anywhere in India, we would be very pleased to arrange this for you. I am also enclosing a copy of the technical specifications for INSAT 'B', which should be launched as you read this, and which will start functioning shortly thereafter.

Rajiv Mehrotra
SHYAM ELECTRONICS
F-114, Narain Vihar
New Delhi 110 028
India

The **CSD**/industry trip to see Arthur C. Clarke in Sri Lanka this coming November will indeed pass through India; both going to Sri Lanka and returning to London. We are also going to be in Tokyo, Hong Kong, and London. With us will be approximately 25 leaders of the North American TVRO industry plus some wives and a few children. Would we like Rajiv to accompany is to Sri Lanka? A charming idea! We will be able to use all of the help we can get installing a pair of twenty foot TVRO antennas plus a smaller 14 footer in the six days in Sri Lanka. If others want to join us in Tokyo and/or Hong Kong as we pass through, we'll make this a truly international visit to the father of all satellites. Regretfully, our stays in India are relatively brief except for a one day /overnight in Bombay. The INSAT 1B satellite package manual Rajiv included tells us that Indian manufacturers will ultimately need plenty of outside technical assistance in creating Indian 12 foot TVRO antennas plus electronics for their new service. We can see many opportunities for North American suppliers on the trip to make valuable contacts. Oh yes, we are now confirmed to visit two of the most creative Japanese 12 GHz hardware development centers while in Japan. What a neat experience!

LEGAL Status/Again

Home TVRO owners have the very same rights as anyone with a standard TV set and a TV antenna. It should be the FCC, as a federal commission, who is mandated to protect the public and to protect the rights of the citizens of these United States of America. It is the Federal Government that guarantees our citizens the Right of Free Speech. The only thing the FCC has a right to do is to act as a guardian of our airwaves to see to it that every citizen has the right to use them. In that way and only in that way will all citizens have access to the public airwaves at any time. The use of the airwaves must be kept open and available to every citizen at all times if our First Amendment Rights under the Constitution are not to be violated. Control of any one frequency or group of frequencies by any company or group of companies or individuals or industry is a violation of the U.S. Constitution.

Coop, ask SPACE to represent the individual citizens; you, me, any citizen of the United States. I think they may be on the wrong track when they try to represent an individual company or group of companies. The ultimate representation must be for any single citizen.

I've just started in this business after two and a half years of careful study and investigation. It gets the hackles on my back 'up' when I see big guys trying to step on little guys to make an industry grow. This is particularly irksome when a business is itself a creation of the citizens to help other citizens have a better life. And if I can be of any help in this fight to keep our airwaves clear and clean of special interests, let me know who to write and who to contact!

Bill Wepgyreski
Parchester Tetratics
Oakridge Road
Purdys, N.Y. 10578

Indirectly, we salute you since it has been our position from the very early days of SPACE that the people who should be funding SPACE, and running SPACE, are the people who have the most to lose if the 'big guys' gain control of satellite use. Who's that? The people who most benefit from the satellite

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A check in the amount of \$ _____ is enclosed. Make checks payable to SPACE

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services; those viewers out there all over North America. Unfortunately, SPACE got off as a trade association of equipment sellers and creators rather than of end users. This has forced SPACE to structure its interests towards the people who pay the bills.

SPACE represents everyone of course, but they are most responsive to the 30 or so OEMs and distributors who kick in the big bucks every month. Up until now, thank God, the desire of the OEMs and distributors to keep moving big amounts of equipment into the field has been parallel to the desires of the totally dis-organized users; the viewers. As long as we have the threat of other groups such as the premium program folks attacking all of us, we'll hang together. Maybe after that passes (and one day it, too, shall pass) the interests of those who presently support SPACE and the interests of those who use what SPACE's present supporters create may separate. Then, perhaps, there will be either a restructuring of SPACE, or, a totally user-oriented association.

OVER The Edge

With my USS 16 foot, polar mount dish, I get the best quality pictures by focusing the feed horn of the ortho mode coupler considerably below and to the west (left) of the center of the dish, looking at it as seen from the front. When I do this, I can see practically all of the (F3R) transponders without noise and the dish tracks perfectly across the belt. If I move the feed horn back to pointing directly at the center of the dish, where it should be to obtain the maximum gain, I end up with noise on several of the transponders on F3R, W5, W4, D3 and F4. This dish appears to be accurate, looking at it across the lip edges.

I changed the inclination up and down, with no positive results. Do you think I should lower the elevation and move the dish to the west, slightly, after re-boresighting the feedhorn to the center of the dish? What else could be wrong?

Werner Husemann
Apartado Postal 252
Col. Del Valle
Monterrey, N.L.
Mexico

Several possible causes here. (1) Be absolutely positive the dish is truly parabolic. Using two pairs of exactly opposite points on the dish (i.e. 12 noon and 6 o'clock, 3PM and 9 PM,) run two strings across the dish and pull them taut. They should cross ('X') exactly in the center of the dish. Now compare that 'crossover point' with where the 'apparent' center is located. If the two do not coincide, you could have a warped dish. (2) With an ortho-mode (dual polarization) coupler, you may have experienced some difficulty getting it mechanically mounted so that the true center of the dish directly aligns with the true center of the feed (horn) opening. If the feeds were offset, i.e. not in direct line with the two strings that cross in the center of the dish, you would have an effect such as you describe. In this case, you end up using only a portion of the dish because it is the only part that is the proper 'focal distance' from the mis-centered ortho-mode feed. (3) The dish could indeed be tracking 'high' on the belt in which case your apparent signal center on the dish would appear to be low. This could also shift the apparent center left of center (east on the dish) but you may have two problems here; the first is the feed not being properly centered and the second is compounding it by having the dish also tracking high. As you describe it, the dish is acting more like a 'spherical' than a parabolic. We suggest you 'string' the dish and verify the mechanical center. To be very precise, use four strings; at 12 to 6 o'clock; 2 to 8 o'clock, 3 to 9 o'clock, 4 to 10 o'clock. All four should cross at the same center point. Then reposition your feed to that exact center alignment and set the dish on your weakest bird (such as D3). Since it will be quite high in your sky, adjust the elevation only on D3. Now take the dish to F3R (lower in your sky) or Galaxy One and adjust only the north and south tracking. Go back and repeat on D3, and then F3R/G1 again. Keep this up until you can move back and forth and not gain any additional improvement. Having done this, compare the pictures and the signal level readings with what you started out with. If they are better, you have solved your problem. If they can't make the original levels, the dish is warped no matter

what the strings or eye-ball siting over the lip indicates!

A STAR Is Born

Your July issue of CSD is really beautiful! It could not be any better even if I would have shaved before you shot the photograph. It is all greatly appreciated and if I could possibly obtain a bundle of spare copies I would like to place some behind the Iron Curtain.

Your comment about my 'new name' was noted with interest. I am not going to complain about you giving me a new name as I believe it will result in substantial benefits if it is known that Coop was responsible for re-naming me!

Jan (Jon) Spisar
Spisar Engineering Ltd.
3732 Bayswater Cr.
Mississauga, Ontario
L4T 2G5 Canada

Jan/Jon Spisar appeared on the front cover of CSD/July with his latest 12 GHz 'goodies'. Having battled his way out of Eastern Europe with Molotov cocktails in each hand in the streets of a certain country then attempting to throw out some Moscow rulers, and landing in Canada in the 60's as a young electronics engineer, Jan has made many major contributions to television receiving systems in the world. After being responsible for a wide-wide range of TV products at Canada's Triple Crown Electronics, he went into semi-retirement so he could be with his family as they grew up, and to pursue his favorite leisure time activity; sailing. Satellites brought him back into the design lab and he is as fiercely independent in his design thinking as he was hurling Molotov cocktails at Russian tanks nearly 30 years ago. We have been chiding him about retaining his native first name 'Jan' for more than a decade and given the opportunity to re-name him in July, we decided it was time to drop the a for an o. When the extra copies of the July CSD arrive with his family in eastern Europe, they will probably wonder why he changed his name!

PROFESSIONALS

As an avid reader of CSD, I cannot help but notice just how many dealers seem to be dissatisfied with one or more of their suppliers. I am sure, from some of our own experience, that these gripes are justified. Just about anyone with a little capital can get into the marketing of TVRO products. The true professionals in the manufacturing end of this industry seem, sadly, to be few and far between. This letter is one of praise for a true professional man and his company.

TVRO receivers are available from stock from most of the major manufacturers and/or distributors. But, what happens when your installation requirements call for something that is out of the ordinary: a receiver for a particular application, for example? Recently one of our customers had such a request. It seems that the only source that is responsible to this type of request is Andy Hatfield's company, AVCOM of Virginia.

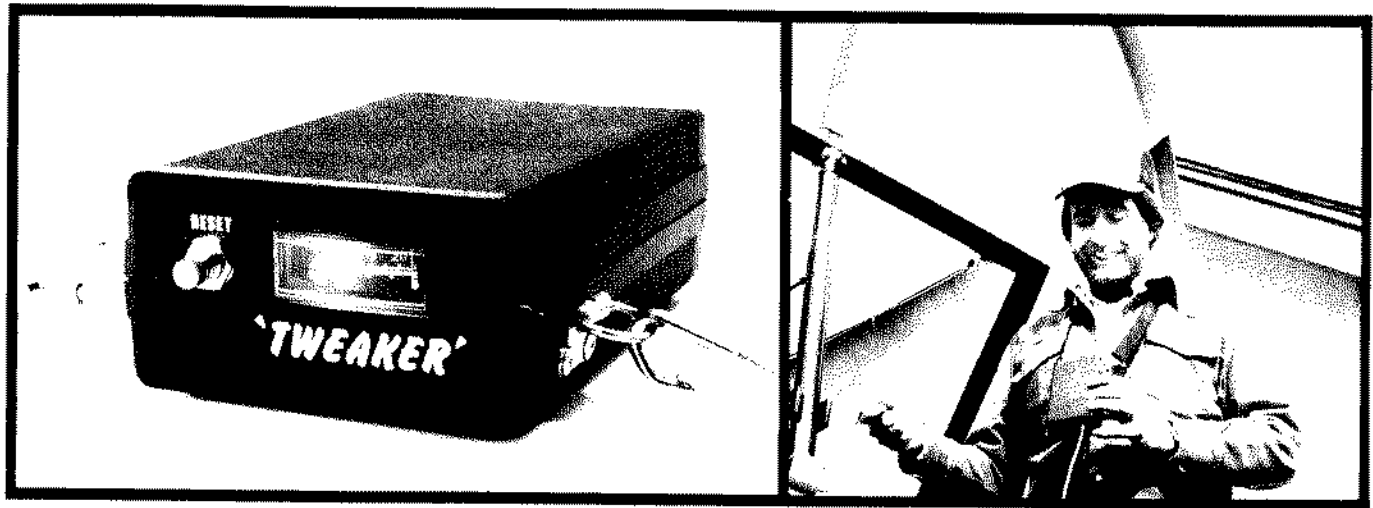
Yes, I know that much has already been written about Andy in CSD and that this good press is justified. But my example goes even beyond the ordinary request. I called AVCOM and within eight days a TVRO receiver, manufactured to meet our special needs, was delivered to our shop. I consider that to be outstanding in a time when products that are quoted as 'being in stock' often take weeks to be delivered. Remember, this was a new receiver design, just for us!

So in answer to those critics that complain about their suppliers, it might be that it is now time for you to recognize the established and proven leaders in our industry. Andy and his company are top notch, along with a few others. They provide reliable service, reliable engineering and reliable manufacturing. The industry needs dozens of firms like this to get us into a posture of being a professional industry. I commend people like Andy, Jim, John and Linda; people who place the needs of the customer on a high priority and who respond accordingly.

Stephen Glass
Heavens Above Satellite Systems
517 Park Avenue
Worcester, Ma. 01603

Andy's trip with Coop to London this month will take him out of the AVCOM shop for more than week. Now we'll see how well AVCOM runs without him there!

CUSTOMERS LIKE 'TWEAKER'[®]



So do distributors and dealers. Why? Because the Satlab *'TWEAKER'* * allows anyone to *precision tune* a satellite antenna. This includes adjustments to the focal length, feed mount, polarity, and parabola — all important in reducing sparkle. Customers especially appreciate the ability to quickly find the *maximum signal* from each satellite thus ending the guesswork associated with "best picture" or "least sparkle." Also, most customer service calls occur because the antenna is incorrectly positioned. With the *'TWEAKER'*, the customer fixes it himself!

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4005 Landski Drive
North Little Rock, Arkansas 72118
(800) 643-5427

Ross Electronics
900 Antelope Blvd
Red Bluff, California 96080
(916) 529-0200

Micro Linc Corporation
128 Industrial Place
Penticton, BC, Canada V2A 6X9
(604) 493-7228

Echosphere
2250 South Raritan, Bldg A
Englewood, Colorado 80110
(800) 521-9282

Kelgo Corporation
6395 McDonough Drive
Norcross, Georgia 30093
(404) 447-9450

Satellite Earth Stations
PO Box 160
Mamou, Louisiana 70554
(800) 782-2110

AV Electronics
4301 North Star Blvd
Great Falls, Montana 59401
(800) 548-9950

Nevada Satellite T.V.
PO Box #2
Las Vegas, Nevada 89125
(702) 452-5509

National Satellite Communications
Plaza 7
Latham, New York 12110
(800) 833-4485

Satco USA
834 Cookson Ave
New Philadelphia, Ohio 44663
(800) 362-8619

Wespercom
PO Box 7226
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* The *'TWEAKER'* is an electronic metering device that plugs into any receiver or downconverter operating at 70 mhz. Features include variable gain control, push button meter reset, and enough sensitivity to actually "see" satellite variability. Deluxe neck strap, manuals, and 10 feet of cable included.

BEING FIRST MAY BE GOOD...

BUT BEING THE BEST IS BETTER



*Gene Cernan, Commander of Apollo XVII,
who left man's last footprint on the moon.*

Intersat has the people with an attitude and determination to do the job better than anybody else.

I know what I'm talking about. In my line of work you have to be right on target. Nothing else will do.

The Russians launched the first earth satellite back in 1957. They called it Sputnik. It excited the world and jarred America into response. Sometimes an external influence can cause positive results.

It happened to us. America wasn't the first in space, but within a few years, no one could touch our Apollo moon program.

Remember the thrill when we heard, "The Eagle has landed?"

Man on the moon.

Once Neil Armstrong stood on the moon, things would never again be the same.

You could offer me anything in this world but if I had to give up my experiences in the Apollo moon program, I'd say, NO!

Since those days we have even broken through the external regions of the solar system.

What an age.

It's a wonderful feeling if you can write

"astronaut" on your resume —but it's not a skill that every company can use.

When you find a company that is dedicated to goals and standards that you hold dear—that's exciting!

Intersat is that kind of company. It's why I joined them. At Intersat, second-best won't do.

When satellite television became a big thing, everybody seemed to jump in fast. Dish antennas proliferated. All

sizes: Six feet, nine feet, ten feet. . . . Sort of like Sputnik.

At Intersat we were taking a closer look at all the possibilities. The people at Intersat reasoned that everything would depend upon the F.C.C.'s final decision regulating satellite spacing.

Intersat calculated that 2-degree satellite spacing would be the most likely decision.

That's what happened on April 27, 1983.

Intersat was right.

Intersat had designed the system and the precision-engineered Challenger XI dish antenna to meet this decision.

Other companies may need to completely replace earlier antennas. Expensive.

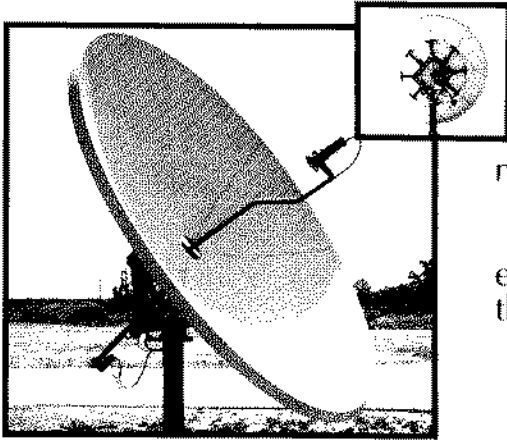
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BEAUTY AND THE BEST



*Challenger XI Antenna

So Intersat has developed the best satellite dish antenna — one that will deliver for you today and the future. That's only half the job.

They were also designing a receiver that would push everything else into yesterday. A micro-processor/receiver that has a bigger memory than most home computers. Intersat named it the IQ 160.

Great name . . . because it really is ingenious.

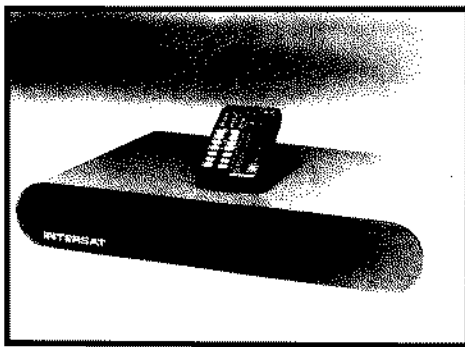
It does about everything including turning your dish antenna to the exact desired location by remote control. You won't have to go outside unless you want to.

It utilizes a video display that turns your TV screen into a satellite information center, yet its simple to use.

Everything is literally at your fingertips. You have a series of buttons on the remote control command module that do everything. You don't have to go outside. You'll never have to leave your chair. And it looks good, too.



*It's so easy.



*IQ 160 Receiver

Amazing . . . and I'm not that easy to amaze. If I've got you interested in Intersat, here's a list of some of Intersat's distributors. Stop by and see them. They got my attention. I'll bet they get yours.

— Gene Cernan

EXCLUSIVE AUTHORIZED INTERSAT DISTRIBUTORS

House of Artex
Huntington Beach,
CA 92649
714-963-8694

Interstellar Systems West
Lafayette, CO 80026
303-665-7499

Rhodes Satellite
Connection
Effingham, IL 62401
217-347-0461

Kings Antenna Service
Angola, IN 46703
219-665-7293

Satellite Home
Entertainment
Marion, IA 52303
319-193-0965

Tucker Communications
Kiowa, KS 67070
316-825-4239

Randolph, Hale, and
Meredith
Bowling Green, KY
42101

502-783-1460
Dockery Satellite
Warsaw, MO 65355
816-438-6192

Earth Satellite
Associates
St. Peters, MO 63376
314-278-2772

Burton Satellite
Big Fork, MT 59911
406-837-5290

Challenger Satellite
Systems of Nevada
Las Vegas, NV 89122
702-452-2263

Porter Satellite Systems
Newark, OH 43055
614-349-7715

Warren Supply
Sioux Falls, SD 57104
605-336-1830

Custom Video Services
Longview, TX 75601
214-758-4056

Rio Video Service
McAllen, TX 78503
512-682-5224

Sun Dance Satellite
Nibbley, UT 84321
915-466-7166

CNI Satellite
Systems, Inc.
Leesburg, VA 22075
703-777-6960

Intelsat East
Front Royal, VA 22630
703-636-1777

Central Supply
Williamstown, WV 26187
304-375-6054

National Electric
Regina, Saskatchewan,
S4L 1H1
306-569-2882

INTERSAT™

The Innovators in
Satellite Communications!
2 Hood Drive • St. Peters, MO 63376

TRANSPONDER WATCH

RECENT REPORTS OF ACTIVITY ON DOMESTIC / INTERNATIONAL SATELLITES

Send your reports to CSD Transponder Watch, P.O. Box 100858, Ft. Lauderdale, FL 33310. For late news, call (305) 771-0505

Galaxy One at 134 west testing indicates bird may have 'superior qualities' over a large part of North America and well into Caribbean. No reports yet from (northern) South America, but nine watt transponders are 'looking good'.

RCA went 'in house' to RCA Astro for contract to build trio of 24 channel, 40 watts per channel, 12 GHz birds. First launch September 1985 (birds K1 and K2). Antennas in 6 to 10 foot size envisioned and SMATV systems are considered major marketplace for services on birds.

TDRS (1) bird at 67 west has fully operational medium power 4 GHz channels on board, but they are not likely to be used by anyone for anything. However, NASA has decided to go ahead and modify TRDS-2 and 3 for higher power 'spot beam coverage' to Europe, from North America. US Information Agency would 'program' C band beam to Europe with launch dates in April and after, 1984.

SATCOM 1R was lost . . . and found again. Bird sits at 139 west, and had no problems **reported** until suddenly it 'rolled over' during routine operations in July. RCA had to transfer video and audio users to other satellites in hurry, and then tried to figure out what happened. After several weeks of testing, 1R was gingerly put back into service. 'Official' word from RCA was that no faults were found.

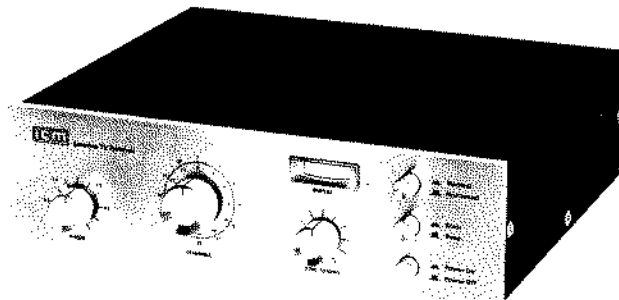
SATCOM 2R, meanwhile, was scheduled for August launch. It will function from 72 west with some video scheduled, eventually (1986) may move to 67 west to make room for F6.

BIGGEST 'winners' in recent RARC meetings had to be smaller nations in Caribbean; Jamaica, for example, about the size of Connecticut, ended up with same total number of DBS transponders as whole of eastern USA. See **Coop's Comments**, this month.

SPOTNET is latest attempt to use satellite 'off hours' to ship television commercials to individual stations. Blairnet had tried it previously, and failed. **GROUP W** (Westinghouse; largest single 'owner' of transponders in sky) will use midnight-5AM (eastern) time slot. Westar 5 transponders, daily except Friday and Saturday.

NASA busy trying to get President Reagan to 'endorse' start of funding for elaborate 'Space Station' system. Massive station, initially pegged at \$6/8 billion cost, would provide permanent home for personnel and elaborate powering and switching hub for future generation satellites.

WEATHER Channel future in some doubt; creator John Coleman



NEW INTERNATIONAL Crystal commercial grade receiver.

and backer Landmark Communications have been in and out of court battling over future of service. Coleman says service is 'on projection', although losing \$800,000 or so per month. Landmark says they never anticipated such losses. Coleman has option to buy out Landmark, for a few months, and if he finds new backer, things should even out. If he doesn't, Landmark takes over and some speculate they will sell off TR21 to somebody else to recapture some of their losses to date.

South Africa is latest nation to suggest it has an interest in creating and operating internal geo-stationary satellite system.

Ted Turner admits he has talked with some of the would-be 12 GHz DBS entrepreneurs about providing them with programming; ala WTBS, CNN or some new type of service. Turner says he sees no 'conflict' with cable interests who are presently fed with trio of Turner satellite services.

SARSAT, the joint US/Canadian/French/(Russian) satellite effort that pin points downed aircraft from their ELT or EPIRB on-board transmitters, is in trouble. System failed to reckon with the number of such transmitters that 'go off' on their own, or are 'tested' on flight deck, daily and satellite sensing of transmissions is now being swamped with 'false signals' that are coming from perfectly safe aircraft not in trouble. In the USA alone, there are nearly 200,000 such transmitters on board aircraft and every day a significant number 'sound off' for reasons other than an emergency.

BIRDVIEW Satellite Communications reported profitable fourth quarter (ending March 31); only firm in our industry traded over the counter, with no other product interests **but** home TVRO systems.

BATTLE over allowing privately owned 'international satellites' to operate (and compete with Intelsat), fueled by application of Orion group, now more complicated. A second applicant, International Satellite, Inc., has surfaced and whereas Orion says it would **limit itself** to 'private' traffic, ISI admits it would 'chase' Intelsat traffic as well.

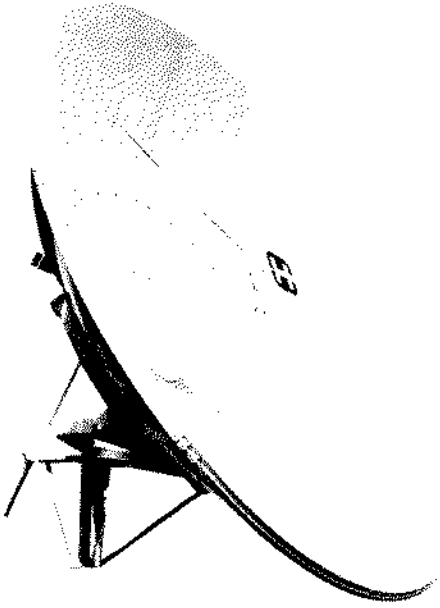
ECS-1, the new European cable TV bird, is scheduled for formal 'turn on' dedication October 11th. ECS-2 is scheduled for Ariane launch next May.

TELSTAR 301, first of the new generation of higher power (8.5 watt) AT&T satellites, went into orbit and should be starting testing for eventual home at 96 west as you read this. At present time this orbit location is occupied by older D1/D2 series birds, operating as 'coordinated pair'. Assigned location for TS1 is 76 west, and some confusion whether FCC would allow TS1 to locate at 76 west or 96 west initially. Question is not without significance since TS1 is scheduled to handle much of the new ABC and CBS network traffic on an interim basis. One possibility; TS1 will locate at 96 west, and what is left of D1/D2 combo will move to 76 west to hold the space for eventual TS series bird to be there. The next TS series launch in August of 1984.

ANOTHER group getting together to program a pay cable service channel in UK. Paramount, MGM and Universal film makers have formed United Cable Programmes, Ltd. They will need a transponder, of course, and say they see this as start of 'worldwide pay TV service'.

DOOMSAYER. Walter Morgan, President of Communications Center of Clarksburg has told satellite meeting group ". . . backyard TVROs will slowly disappear as 2 degree spacings become norm . . .". Morgan cited lack of reliable antenna firms in home TVRO field,

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

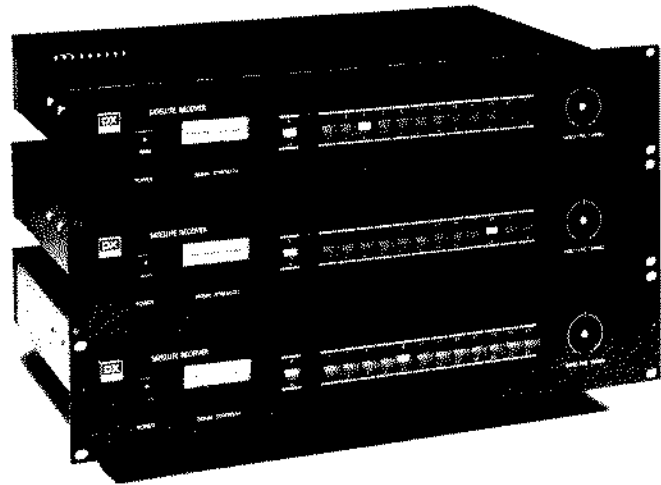


The Harris 3 meter Delta Gain Antenna combines the low weight and wind resistance desirable for SMATV installations with the high gain associated with much larger antennas. At the same time, its "deep dish" design with an f/d of 0.25 and modified Cassegrain monopod which shrouds the LNA's and feed assembly 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 $\frac{1}{2}$ " 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° 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.

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

noted "... there are (many) less-than-responsible antenna manufacturers (in home TVRO field)".

RCA has new tariff for non-cancellable transponder on F4. It will cost you \$150,000 per month for transponder for continuous use through December of 1988.

CABLE HEALTH Network and Hearst/ABC putting finishing touch on deal that will marry the daytime TR22 (Hearst) service and CHN into a single 24 hour per day service on TR17; F3R. CHN apparently has not obtained adequate advertising to be self sufficient.

JAPAN'S CS-2B, reserve, satellite went into orbit in August and

will be stationed at 136 east. CS-2A is already operational at 132 east.

LOCAL Program Network is latest effort to pool news and feature programs, WCCO, Minneapolis, is leader in system that uses Westar 4 for relay. Others include KING (Seattle), KSL (Salt Lake City), KRON (San Francisco), WAGA (Atlanta), WCVB (Boston), WBTV (Charlotte) and WDVM (Washington, DC).

SOUTH KOREA says they want domestic satellites also; in time for 1988 Olympics to be held in Seoul.

SCRATCH two more from F4, before you read this. SIN and Galavision should have moved to Hughes Galaxy 1 bird.

SYSTEM NOISE/ continued from page 35

figure down converter. Just to make it more interesting, we double the length of the RG-8 cable so that now we have 10 dB of cable loss (20 feet) between the output of the LNA and the input of the down converter.

$$\begin{aligned}
 F_1 &= 1.5\text{dB} = 1.413 \\
 G_1 &= 30\text{dB} = 1000 \\
 F_2 &= 10\text{dB} = 10 \\
 G_2 &= 10\text{dB} = 0.1 \\
 F_3 &= 15\text{dB} = 31.623
 \end{aligned}$$

$$F_T = 1.413 + \frac{10 - 1}{1000} + \frac{31.623 - 1}{(1000)(0.1)} = 1.728$$

OR

$$F_T (\text{dB}) = 10 \log (1.728) = 2.38\text{dB}$$

Editor's Note: The July CSD ROBS report included a numerical study of the relationships discussed here as contributed by Steve Koogler of R. L. Drake Company. On page 34, the diagram labeled 'Calculating Noise Figure Degradation Caused By Cable Attenuation', we had an error that should be corrected. Drop to the middle example for 'Worst Case Installation' and note that the gain/atten-

Now we have a significant change; the system (electronic) noise temperature had degraded from 1.5 dB to 2.38 dB. To put that into perspective, this is like changing the LNA out in front from a 120 degree unit to a 200 degree unit; not something you would do on purpose!

So there are good, sound reasons why there is a recommended set of system equipment for each installation. Reducing the LNA gain, to a number such as 30 dB, is safe only when the distance from the LNA output to the down converter input is very short. No loss, or less than 1 dB loss (such as through a double type N connector) is usually recommended. There is also a direct relationship between the down converter noise figure and the amount of low noise gain at the LNA. Higher noise figure down converters (such as some of those spotted in the ROBS tests, reported in July) are far less tolerant of cable loss between the LNA and the down converter, all other specifications equal. If you find yourself getting into noise problems when you are using the lower gain (40/44 dB) LNAs, it may well be that your problem is the length of line (and the amount of loss) you are sticking into the circuit between the LNA and the down converter input. The difference in cable loss at 4 GHz, using RG-8/U cable, is 5 dB when you jump from a ten foot length to a 20 foot length. The solution? Use lower loss 'jumper cables' or, higher gain LNAs. It is just that simple (*).

While CSD has published this data previously, here is a shortened version of the table that allows you to convert from noise figure in dB to noise temperature (Kelvin).

* — Or, alternately, get the down converter closer to the LNA output.

N _p (dB)	Noise Temp (°K)
0.9dB	70°K
1.0dB	75°K
1.2dB	90°K
1.5dB	120°K
1.8dB	150°K
2.5dB	220°K
3.0dB	290°K

(uation) chart flowing left to right under the diagram should read as follows:

Gain/Atten.	100.000	1/31.5	200
	(+ 50 dB)	(- 15 dB)	(+ 23 dB)

As noted by Koogler, this is a worst case example because (as John Ramsey points out here) the 4 GHz cable loss is 15 dB. By placing high (cable line) losses close to the 'front end' of the system, irreparable damage to the system noise figure results. Our thanks to Koogler and others for catching this drafting error.

COOP/ continued from page 3

PREVIEW/ CJR for September

'What is Troubling Dealers?', random national telephone survey results; plus, 'NASDA — What Happened?' ... a close look at where NASDA may have gone wrong. ALSO in CJR/September (out September 15) a national survey of LNA/antenna/receiver inventories and predictions for shortages ahead.

SPACE/ORLANDO/DIFFERENT

The forthcoming SPACE show at Orlando, Florida (in the Disney complex there) is beginning to look like it will be 'my kind of show.' One

COOP continues (again!)/ page 68

TAKE YOUR PICK!

BASIC

SYSTEMS

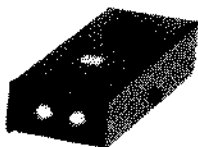
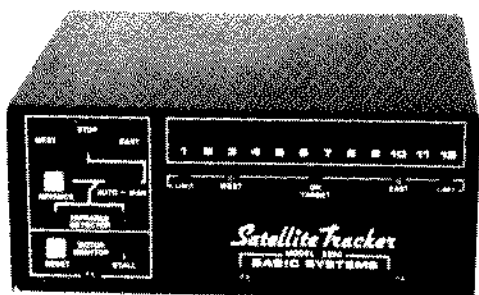
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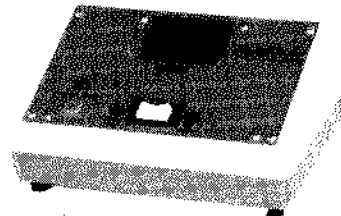
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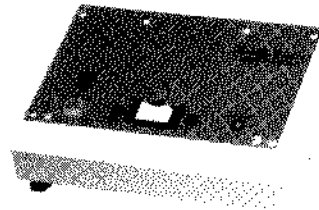
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MODEL 2000



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GEARMOTOR
CAPACITOR & CRIMP LUGS
MOTOR MOUNTING KIT

COOP/ continued from page 66

of the things we will be trying to do is to spend one full day conducting some good, old-fashioned, 'educational seminars' for the dealers out there who are at best confused by closer spacing, 40/44 dB gain LNAs, 6 foot dishes and motor drives that don't motor. Rick Brown of SPACE has been telling people that "Coop is coming out of retirement" to put on a one day special series of seminars for dealers. Nobody had bothered to tell me that I was in 'retirement'; I guess I slept through that announcement.

What I am doing is listening very closely to the hundred or so dealers who write us here at **CSD** each month to see where the present problems are. Then I will be taking those problems and building a series of seminar sessions around answering those specific problems. The folks asked to help out with this, on stage, will be knowledgeable, no-bull kind of people who have experienced the problems you are now experiencing, and who have found solutions to those problems. No product hype . . . no subliminal sales pitches. Just hard to find, accurate information designed to keep a dealer out of trouble.

Another aspect of Orlando that intrigues me is that very sizeable contingent of folks who are coming from throughout the Caribbean, central and South America, as well as Africa and Europe. There are several things happening this fall in the international arena; things which will directly affect the saleability and usefulness of home and commercial TVROs outside of the USA. RCA, for example, has asked the FCC for blanket permission to deliver some of the F3R programming services to the Caribbean. RCA hopes that rather than have to take every individual receiving site as an individual application before the FCC, they can get the Commission to agree that 'ESPN' (for example) can be 'blanket approved' for use anywhere outside the USA, within the Caribbean. That would certainly shorten the long lead time required to legally put ESPN into a housing development on Antigua, for example.

Another thing that is happening is a recognition that holding back the rapid spread of TVROs in the Caribbean, Central and South America is now impossible. And so, over the weekend of August 28-31, representatives from approximately 30 Caribbean and other nations met on the eastern Caribbean island of Grenada. Most of the representatives were the 'Ministers of Communication' for their respective national governments. The whole concept of that meeting was to address not the spread of 'illegal' TVROs in the area, but rather to find a common ground where these 30 nations or so could go back to the USA programmers who use the C band satellites and 'demand' (their word; not mine!) access to the C band signals: scrambled or not.

This one intrigues me. On one hand we have the Reagan administration trying to get their Caribbean Basin Act adopted by Congress; an Act that proclaims, among other things, that any nation in the area that permits the use of US C band satellite signals runs the risk of being 'cut off' from the benefits of the Act. On the other hand we have 30 nations meeting to tell Uncle Sam that 'no thank you; we ARE going to use American satellite signals and you WILL figure out ways for us to do so'!

Then there is the potent signal that is apparently going to be available over at least a major portion of this region from the new Galaxy One satellite; a signal which shows every sign of making American programming sources even more readily available in much of this region.

It is my suggestion that any **CSD** readers who live or who work in the area under discussion plan to make it to Orlando for the SPACE gathering. I've talked with SPACE President Bob Behar and SPACE's Rick Brown about setting aside a couple of hours on the morning of November 5th to allow all of us who have an 'international interest' to meet for some special, closed door sessions; at the SPACE gathering. I'd like to hear (a short note will be sufficient) from those readers who fall into this group and who plan to make it to Orlando for the SPACE confab the 4th-6th of November. If we can get a decent turn out, there are a couple of 'officials' in and close to government whom I would like to invite to meet with us in Orlando to discuss all of the many problems we face outside the USA. A November 5th session would be an excellent forum for all of this.

On top of all of this important stuff, SPACE has lined up a wide

range of speakers for Orlando; such as R.E. 'Ted' Turner of WTBS and Senator Barry Goldwater and so on. The combination of a great family-fun facility (Disney World), the central Florida location, several days of serious, important sessions, and some important people on hand tells me that the SPACE Orlando show will be a winner.

OUR OWN Movie Channel???

Revealing that some of the leaders in the industry were serious about starting an industry supported 'premium movie service channel' for home TVRO users sparked more than casual response from those who read it in the August **CSD**. The comments fell someplace between 'a crazy idea' to 'you haven't done your homework adequately.' And there were some (more than half, actually) who **actually felt** the concept was worth pursuing.

The first negative reaction I received came from SPACE. "If the concept has merit, it should be worked through SPACE" was an early message I heard. I reminded the caller that part of the reason there was such an effort underway was because not all of the OEMs and distributors in the industry support the SPACE lawsuit program. In short, there are OEMs and distributors who won't back a SPACE effort simply because it is a SPACE effort. That's pretty harsh, but that's the real world nonetheless.

The next negative response I heard was "nobody can make a premium service channel play for 24 hours a day with a hundred or two hundred thousand subscribers." Perhaps. Certainly there is evidence to support that theory. Warner keeps losing money, they say, with a couple of million subscribers to The Movie Channel. Yet we have SelecTV grinding away on Westar 5 with nowhere's close to a million subscribers. Perhaps, just maybe, you lose money when you spend too much money. Not when you don't take in enough money. I do know this. HBO collects around \$4.50 per month on the average from their cable system affiliates. That's \$450,000 for every 100,000 subscribers. They spend around \$2.00 to \$2.25 per month for the direct product; the movie and special 'rights,' per subscriber. That's \$225,000 per 100,000.

It costs in the neighborhood of \$150,000 per month to 'short-term rent' a transponder for 24 hours these days. And it costs an average of \$180 per hour to provide the uplink and ground support equipment. And that comes to \$130,000 or so per month. So we have transponder time (\$150,000) plus ground support time (\$130,000) plus the movie rights (\$225,000) on the direct cost side; for 100,000 'subscribers' it works out to \$505,000. Which suggests a break-even in the \$5.00 per home per month region for 100,000 subscribers. Where people like Warner get lopsided is in opening up Regional Sales Offices in every third state and staffing their offices with \$40,000 per year sales people who have large expense accounts to wine and dine the prospective cable operators. Or, in creating a headquarters staff of 60 people or so to manage the system.

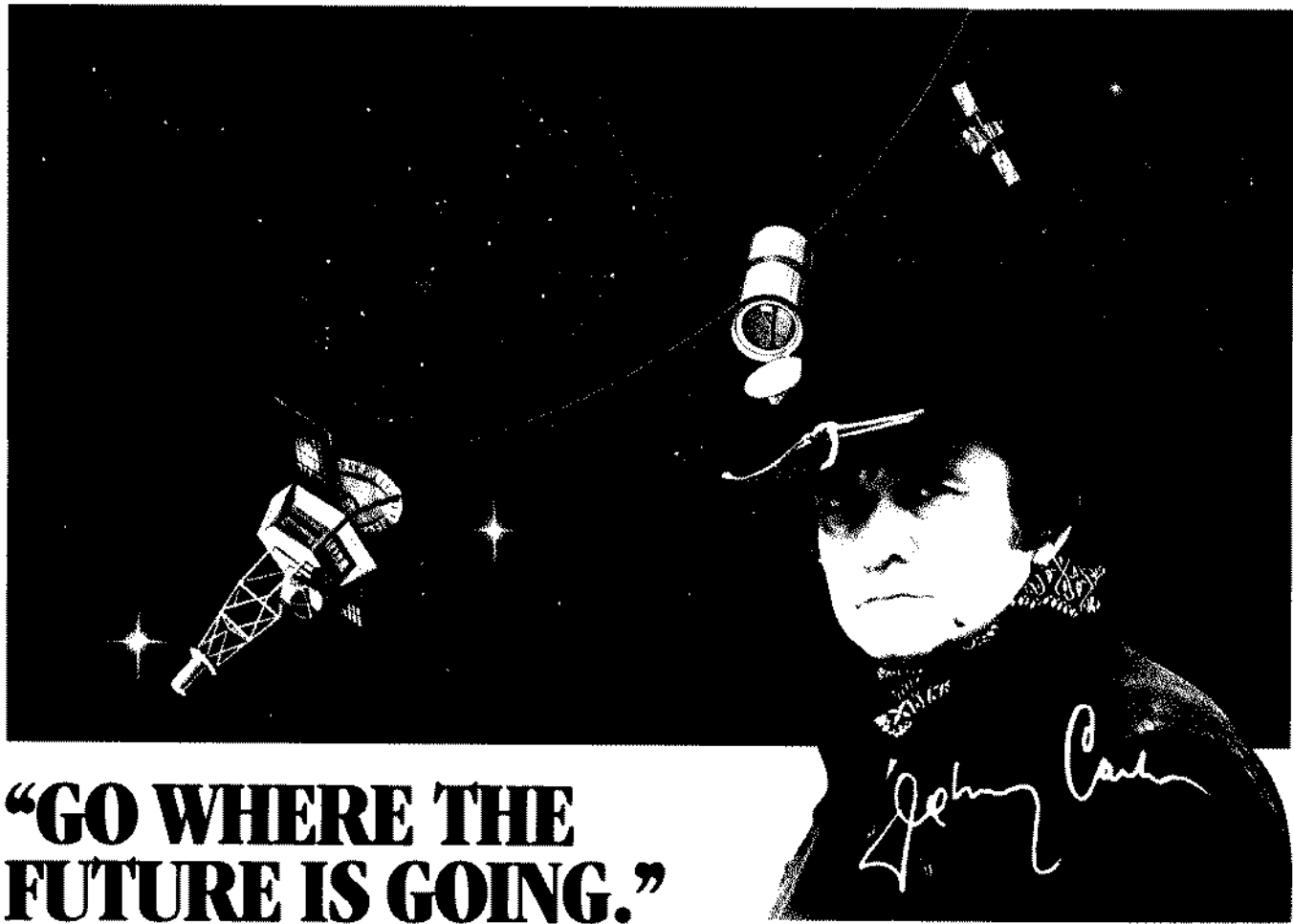
The concept I hear is that the system virtually runs itself; that it is **sold** by the TVRO dealers to their customers, and the dealer **collects** the first year's advance rentals when he sells the system. If we can't administer the service for \$1.00 per home (at the 100,000 home level), or \$100,000 per month, somebody has their hand in the till. It still looks like a \$5 to \$6 per month service charge to me.

Yes, you can spend far money on a service like this. You can also do it with the same frugal, common sense approach that most of our OEMs use to run their own businesses. I'd hate to see the concept struck down before it has a decent chance to try to get off the ground. At the very least, I think we owe it to ourselves to keep an open mind on the proposal until such time as we realize that we are just not in the right leagues yet to play the game.

SAT SCENE Sour?

I hate to see a good idea die on the vine for lack of support. This is what is happening with **Sat-Scene Magazine**; our weekly television visit (Westar 4, transponder 5, 4 PM eastern on Thursdays).

As most know, Sat Scene is the creation of one **George Mitchell**, a fellow with several dozen years of television broadcast management and production behind him. It comes out of Salt Lake City (created and uplinked there) and for your own information it costs about \$3,500 an



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What is ASTI?

Terrestrial interference (TI) is fast becoming a major economic consideration for the installers and operators of TVRO earth terminals. Thousands of dollars, even hundreds of thousands, may be at stake when the earth station is turned on — only to discover that TI is degrading or altogether preventing reception of desired satellite signals. At this point, conventional wisdom used to advise packing up and moving to another site. But now, with many of the available TI-clean sites already taken, and with the advent of a huge and still growing transcontinental microwave telephone relay system, finding another site can be impractical if not impossible. Consequently, most dollar-conscious installers and operators would rather stand and fight TI than switch to another site.

The purpose of this volume is to integrate two practices — avoidance and suppression — into a logical, unified approach that can be effectively applied in the planning and installation of any TVRO earth station system. Conscientious application of ASTI — the avoidance/suppression approach to eliminating TI at TVRO earth stations — will reduce the possibility that TI will be discovered at turn-on, enhance the probability that unavoidable TI can be eliminated, and increase the effective operating quality of the TVRO system.

The authors of this handbook, with years of experience as designers of RF and microwave filter networks, have had ample opportunity to test the ASTI approach—it works! Measured over a period of time, the costs involved in the ASTI approach have proved to be substantially lower than any alternative, especially in terms of dollars saved when the initial site was made operable. Furthermore, both cost and complexity of filtering to eliminate TI are lowered considerably when all essential aspects of the ASTI approach are conscientiously employed.

Contents Include:

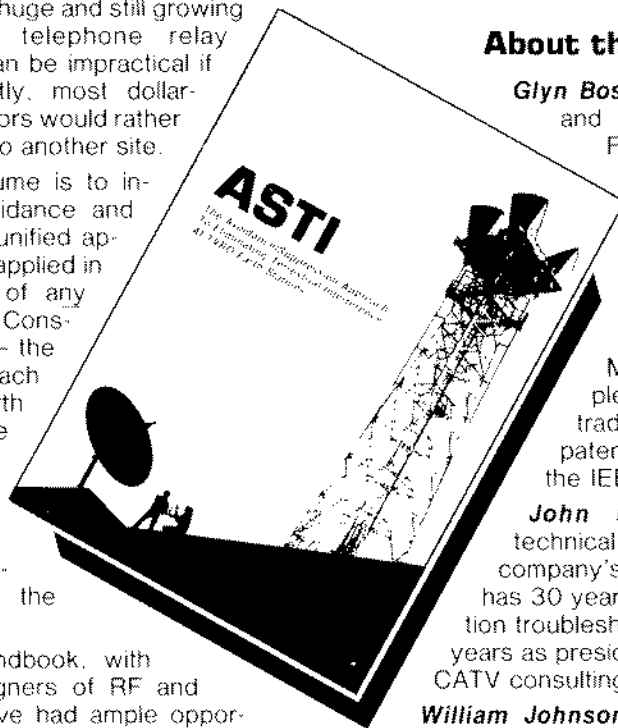
The TI Avoidance/Suppression Approach; Why Satellites; How Your Earth Terminal Works; TI Sources; TI Symptoms; Selecting the Antenna for Least TI; TI Susceptibility of Other TVRO Components; How to Select a Site; The Pre-Installation Site Survey; Defensive Installation; Use of Artificial Shielding; Filtering the TVRO; Filtering Special TVRO Systems; SMATV Techniques; Standard TVRO and Satellite Data; Formulas and Derivations...

About the Authors:

Glyn Bostick is the founder, president and chief engineer of Microwave Filter Company, Inc. He has been designing filters for the suppression of interference in cable TV systems, industrial and defense communications equipment, and satellite earth stations since 1967. Mr. Bostick has written a plethora of technical articles for trade publications, holds several patents and is a senior member of the IEEE.

John Fannetti is MFC's senior technical consultant and head of the company's new Field Service Division. He has 30 years of engineering and earth station troubleshooting experience, including 7 years as president of JDF Communications, a CATV consulting and TVRO installation firm.

William Johnson, chief engineer of research and development, is MFC's "voice" and travels around the country, upon request, to deliver ASTI-type lectures at various industry gatherings. In his technical capacity at MFC, Mr. Johnson is the design engineer in charge of special developmental projects. He earned his BSEE at Syracuse University and is currently engaged in graduate studies there.



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COOP/ continued from page 68

episode to put together. That's \$3,500 for 29 minutes of air time.

Mitchell is involved directly and indirectly with quite a crowd in Salt Lake. Some of these people are in the manufacturing business, some are in the distributor business, some are retailers. All are in the TVRO field. Some were also involved in the dealer trade association, NAS-DA, that was trying (until recently) to get off the ground. That would seem to offer several disciplines to Sat Scene, but perhaps all of that diversity is working against the program.

Mitchell, the professional broadcaster/producer, looked at Sat Scene as an opportunity to create something worthwhile for the industry; a weekly television program that told us all about what is happening in our field. I supported that because I did just exactly the same thing back in 1977 for two years; a weekly television program, via satellite, for the cable industry. I also supported it because television 'news' and 'features' is akin to print news and features and I happen to understand, and cherish, the strong and weak points of both. Back in March I volunteered my own time and support to Sat Scene because I felt that there was a better chance for the program staying on the air if there was a more diverse set of views appearing than simply the 'Salt Lake City Mafia'. Mitchell was obviously a pro; I could tell that by just watching. The others I was not so sure about.

Since I also have a bit of experience in television production, I could see where at around \$600-\$900 per commercial, Sat Scene was at best only going to break even. I knew George was never going to retire from the proceeds of this show, and I worried that he might not be able to continue if he didn't get some support from sponsors. From the beginning, the Salt Lake City 'gang' had attempted to use the show for their own purposes. That's not all bad; they were distributors of TVRO hardware and they probably agreed to help defray the costs in return for use of the airwaves. That's not a murky, under the table deal. Gillette doesn't help defray the costs of the World Series just because they like baseball.

But there are not very many distributors around who can stand to sock \$3500 a week into 'advertising', and to make matters worse as

long as the SLC group was heavy into producing Sat Scene, the program was not likely to attract any **other** distributors to the show. Even if the show got 'fantastic results' for the advertisers, the close identity with the SLC group simply turned off other would-be **distributor** advertisers.

That led to another phase of the program: OEMs who liked what George was doing with the program wanted to have their products on TV. And the Salt Lake City 'gang' tried to parley **that** into some distribution deals for themselves for the products the OEMs would push on Sat Scene. There's nothing murky about that either (every race car has a half dozen 'sponsor names' painted on the side and it's not because the sponsors like auto racing). But now we have a new confrontation; those OEMs who **might** have been favorably disposed to advertise on Sat Scene saw in the advertising program a side deal they might not want with the Salt Lake City distributor.

When I did around 15 interviews before the camera for Sat Scene at Can-Am '83, I knew that George was in 'summer re-runs'. That's an euphemism for not being able to fund new shows for awhile, and barely being able to come up with the direct transponder and uplink costs each week. With 15 fresh interviews to work with, and the excitement (well, mild interest) of Minneapolis to kick it off, I hoped that George could get a fresh start with all of the OEMs and all of the distributors during August.

Well, as you read this August is over and George is heading for Nashville, without me, to have another shot at getting the program into at least a breakeven status. I had opted not to attend nor support Nashville in any way, and found it convenient to attend another loser-conference in England at about the same time (if you are going to be disappointed, you might as well be disappointed in a nice place!). I am drawing your attention to this, in particular if you are a distributor or OEM, because I would like to urge those who can afford between \$600 and \$900 extra advertising dollar outlays per month (I'd suggest per week, but that's absurd in our industry right now), make it a point to give George Mitchell of Sat Scene an opportunity to explain what he has done to restructure the program and get it cracking in the right direction.

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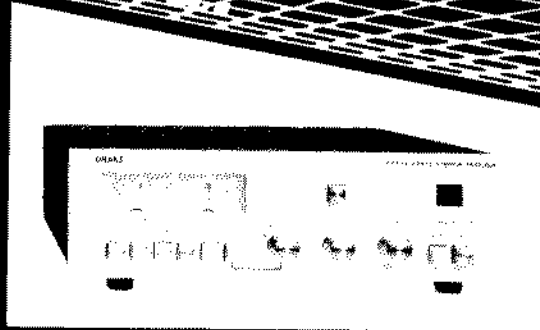
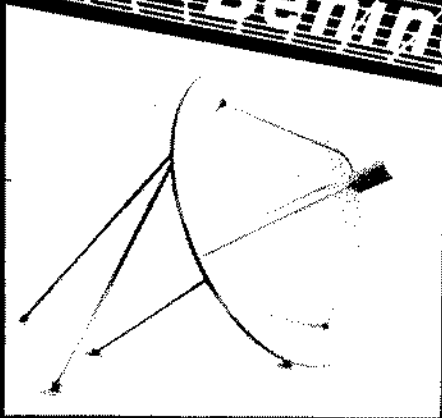
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COOP/ continued from page 72

The evolution of Sat Scene has been painful for George, but through it all he has turned out good video product and he has kept his journalistic integrity intact. I respect him for that and urge that those who are in a position to help keep this important vehicle on the air give it a shot. If you took just a fraction of the promotional budget you will be spending in Nashville and 'moved it' to Sat Scene, you'd be money and exposure ahead. **Think about it;** you don't need all of those shows anyhow!

NOW This One I Like!

Having suggested that others should answer their mail, let me preface what follows with the suggestion that those who get excited by it hold onto their letters for awhile. **I'll let you know when** the time is ripe to do more than salivate.

While I was in Minneapolis back in June I had a nice chat with an old friend from another Caribbean area country. He is doing pretty much what I do with local re-transmission of satellite signals and we share many common problems. Each time we meet, we also share common solutions to our problems.

We got off on the subject of transmitters. Those are the gadgets you plug video and audio into when you want to send the pictures and sound to somebody further away than your RG-59 will reach. We are both using the ten watt units from PC Electronics out in Arcadia, California and while neither of us has had real problems with the PC ten watters to date, neither of us is totally satisfied with the on-the-air performance of these \$700 jewels. Inexpensive they are; reliable they are. Superb quality video (and audio) they do not generate.

I have been working on several potential suppliers in this area, but was not getting very far very fast. My friend had been working on some of the same ones, and a few I had never heard about. We exchanged horror stories about sending money to firms that promised to build us the transmitters we needed, or about trying to marry a CATV 'Hyper-Band modulator' to a five or ten or twenty watt power amplifier. After filling our respective notebooks with exchanged data, we went our separate ways promising as always to stay in touch. I figured I'd see

Fernando again at Orlando but didn't expect to hear from him in the interim.

Well, just weeks after getting back from Minneapolis I got a note in the mail. He had found a well established builder of military video transmission hardware out in California; one of those small, but respected firms that bids on military contracts. They had quoted him on some 100% duty cycle, video rated, solid state power amplifiers. With power supplies, they were running like \$900 for a 50 watt output amplifier or \$3,050 for a 400 watt output power amplifier. Was I interested? I couldn't get off a letter fast enough!

Then after some more talking with the firm, since the power amplifier left you having to figure out how to marry a high quality modulator to the package to get the video and audio into the beast, they came back with another product already in their (military) line: a completely synthesized 10 watt output TV transmitter for \$2,000. Now that may not sound like a really great bargain (video and audio in; ten watts of peak video out) but there is a kicker in here; the word is synthesized. This particular unit, they tell me, can be frequency adjusted from say 50 to 300 MHz in 5 kHz steps. Want to change channels? Just dial up the new channel. Any channel, from 50 MHz to 300 MHz or so, or any odd ball channel in between channels, for \$2,000. Now that sounds like a fun machine!

Hold on. I said "**Don't write me yet . . .**" I'll let you know when the time is ripe to do more than salivate". Naturally I have ordered one of these 'gadgets'. So has Fernando. I have this great idea for 'scrambling'. First we program the synthesizer so that the transmitter jumps all over the band from 50 to 300 MHz in a random, but pre-programmed rate. Then you program the custom converters so that they are also going to 'jump' with you. You transmit for as long (or as short) a time you wish on say 55.25 MHz, and then you hop to 175.25 MHz for another spell, and then to 229.25 MHz for another spell and so on. You just keep moving around; once per minute, every third second, you name the rate you want to switch at. And rather than going into all of that ugly, nasty un-purpose scrambling technology where you set out on purpose to destroy the video **quality**, you leave the video in its pristine format and 'move'. They call this 'frequency hopping' in the

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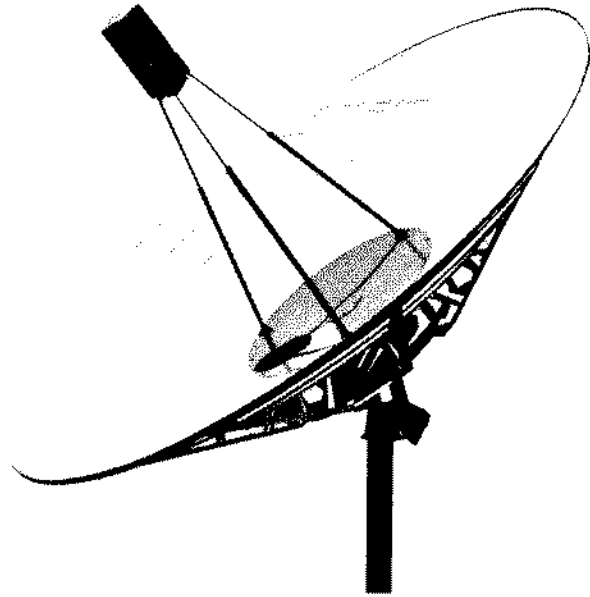
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military. I call it intriguing.

There are dangers in letting this kind of hardware loose however. A guy could set up a transmitter in his apartment in the states and broadcast on channel 6 one night and channel K the next night. He'd give them fits trying to figure out where he was or where he was going next! But you could do some really nifty remote work with one of these units; move into an area for a 'shoot' and see what channel is clear. Then set up and do your shoot with the remote cameras, and tear it down and move on.

It will be late fall before Fernando and I have our feet wet with these gadgets. If you want to discuss our progress (or lack of same; it could go either way of course), we'll see you in Orlando at the SPACE confab.

RECENT Visitors

Nobody with a level head would head 'south' in the middle of the summer; right? Like, when it is 102 in St. Louis, who would think of going into the Caribbean to escape the heat wave? Clearly not a level headed thought.

In spite of that logic, Intersat's Dave McClasky, Don McLaughlin and Guy Davis popped in to see us on Provo for three days late in July. The first thing they noticed when they got off the airplane was that it was twenty degrees cooler on Provo than it was in St. Louis. I know. That's not what they taught you in school. We have a difficult time convincing people that our year-around temperature varies about 5 degrees; that it is going to be within 5 degrees of the July 15th temperature on January 15th, for example. But that happens to be the way it is here.

The second thing the trio noticed was that we didn't head for the work-crammed schedule they had envisioned. After a stop at the Candy Cane for some fresh ice cream and a quick inspection tour of our latest over the air TV station facility (PIC-7, or Public Information Channel!) at Tower Plaza, we all headed for the beach. What a better way to cool off then hopping into the calm Caribbean summer sea. We stayed there for several hours waiting for Kevin to come by with his boat and take us snorkeling. Yes, we lead a rough life down here.

The Intersat crew had come down to spend a fast 48 hours giving me a cram course in the operation of their recently introduced IQ-160 package. We first announced that there would be an IQ-160 type package late last year. I have watched this package 'mature' from a concept to a complete terminal, now in reasonable production and shipping status, and wondered whether Intersat might have biten off more than they could comfortably digest.

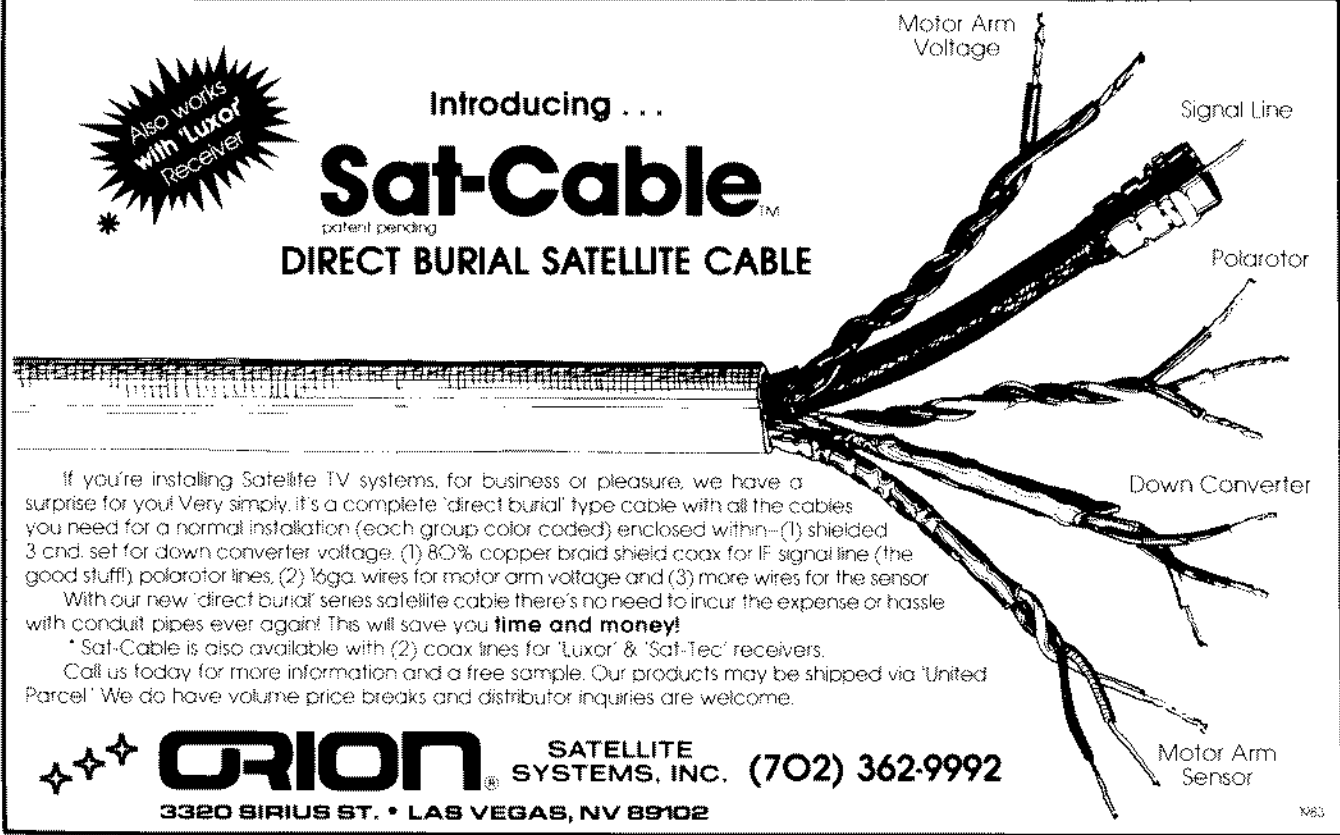
McClaskey and comrades (including Astronaut Gene Cernan who serves on the Board) had set out to push the 'state of the art' to its absolute limits. The scuttle-butt I have been hearing in the trade, from both close friends and not so close friends, was that the IQ-160 system was bombing in the real world; it was not working. McClaskey kept assuring me that it was working very well and evidently decided that I should have the opportunity to see for myself.

McClaskey, wisely, has not asked for any input from me on the system. I make it a point to confine most of my thoughts to what everyone reads at the same time, and long ago gave up the conflicts of being a 'consultant' and a publisher. I recall that the last real 'industry' type I consulted for was Channel Master, back in 1979 and 1980; but that's another story. What Dave did ask me to do was to reserve any judgement, private or public, until I have the opportunity to 'play with' the system.

I make it a practice to ask questions. Those who know me well often interpret my questions as a form of critique. Here's an example. "How hard would it be to interface the IQ-160 electronics to another dish; say the Paraclipse?". I asked that question of various people at Intersat, starting back at the Las Vegas show. Guy Davis knew where I was coming from, since Intersat had announced that the IQ-160 package was 'only going to be sold as a complete package'; (Challenger 11) antenna to receiver. In the back of my mind was the opinion that if the IQ-160 receiver worked even 50% as well as they said it should, that by forcing people to handle it only if they also handled the Challenger 11 antenna, LNAs and so on, Intersat was cutting themselves out of a considerable portion of the market. My 'fears' were not limited to Intersat; I saw others such as Conifer building their sales programs so completely around 'package sys-



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tems' that they might never profitably get out of that corporate-created box. Others, such as Drake and KLM, have attempted to **back into** antennas or complete systems from a strong position in the electronics. The results are seldom good. In my opinion, only Channel Master has really been successful with that approach to date and they have such tremendous strength in their marketing program that I believe CM could sell 4 foot dishes in Liberia if Syl Herlihy ever decided that was a good direction to go.

Intersat had sent down an 11 foot Challenger antenna system nearly two months prior to their own arrival. In May, at the Boca Grande ROBS meeting, McClaskey had given me serial number 001 of the IQ-160 to bring to the islands. Seemingly a moderately bright person, assisted by somebody like Tom Humphries, could make it fly. I never even tried, other than hooking up the 160 for some direct viewing tests.

I figured after a swim and some R and R, we'd get busy making the 11 foot Challenger antenna and the electronics fly. McClaskey had another idea. "**You know that SR-20 receiver in your bedroom?**" he asked. I did. We had installed it there, on our house-side 12 foot Paracclipse, back last fall during the Provo Satellite Retreat. "**Let's disconnect it and hook up the 160**" David suggested. "**Let's also disconnect the LNA, and the feed, and the Tei-Vi drive and change out everything but the Paracclipse for the IQ system**".

What was this? Somebody was actually suggesting that the IQ-160 might be retrofitted to a 'brand P' antenna! David Johnson would be doing hand flips in Redding.

"Look, I'd really like to put a Challenger 11 antenna here also, but that obviously does not excite you". He was right. The dish in question serves our bedroom; Susan's and my bedroom. The kids have to struggle along with their 12 channel cable TV system, fed from the WIV annex and its five dishes (D3, W5, F3R, Europe and a 'rover'). Susan and I of course have 12 'cable' channels in the bedroom as well (when I built the house I wired in an MATV system for the complex using good-old Channel Master distribution equipment); in fact, there are even outlets in the bathrooms, out at the beach in the Cabana and in the open-air courtyard where the **Entertainment Tonight** folks



RETROFITTING the drive to the Paracclipse dish to accommodate the IQ-160 drive system. McLaughlin is a hard worker.

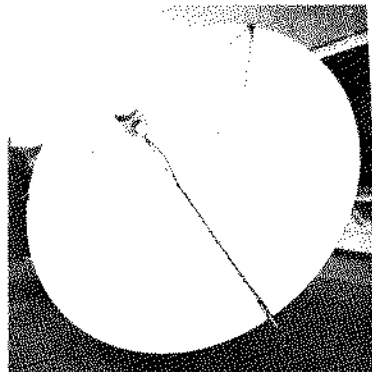
interviewed our Chief Minister, Norman Saunders. You are never more than 50 feet from a TV outlet anywhere in the complex. But the dish that serves only the bedroom . . . well, that is "Susan's dish" and when she can't find something on the normal 12 channels she likes, she goes fishing with **Satellite TV Week** and "her dish". I talked her into allowing me to stick it outside the bedroom window because it (being a Paracclipse) 'blends well' into the sandy dunes and Papaya trees growing in the area. We had reached a 'family agreement' two years ago that the property west of the driveway was 'mine'; I could stick up dishes and ham radio towers and what have you over there. But the driveway was the dividing line; anything on the 'east side' had better have roots and grow a few feet a year or it was in trouble! The Paracclipse 'snuck in' under a modification of the 'treaty'. I would have a

COOP/ continues page 78

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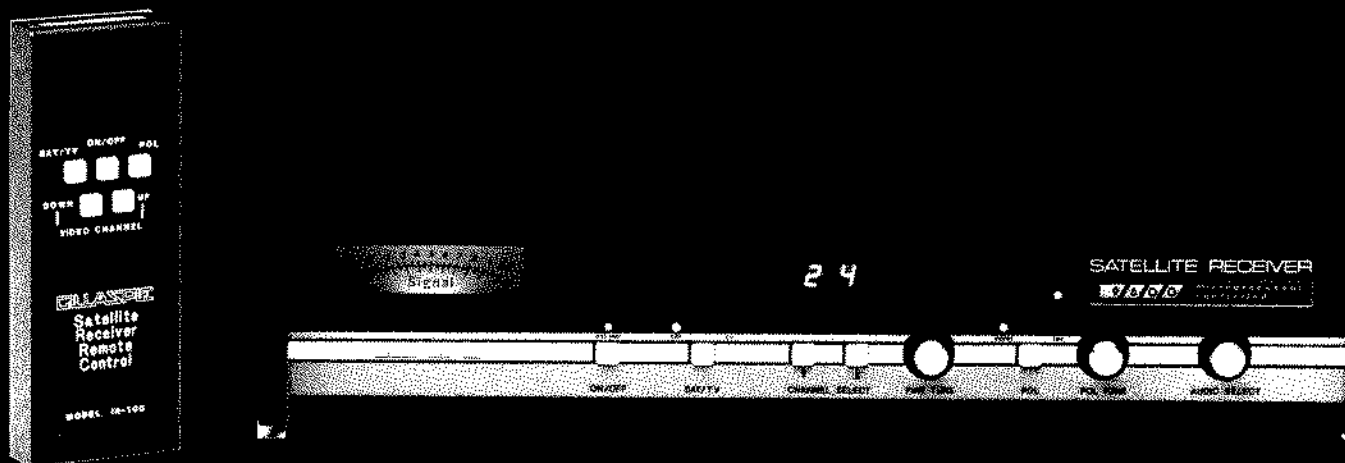
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COOP/ continued from page 76

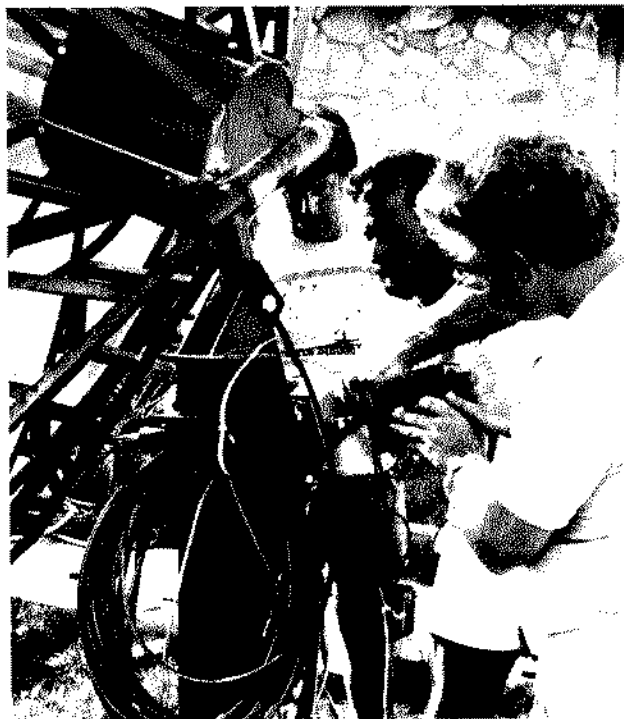
very difficult time modifying that treaty again to allow a solid dish of any size in the same area; even if we took the Paracclipse out and replaced it.

McClaskey, who knows and understands Susan well, understood that going in. So in a way, **David's desire** to get an IQ-160 'into my bedroom' (McClaskey is a pretty sneaky guy) and **Susan's 'rule'** that nothing but a Paracclipse (type) would be 'east of the driveway' kind of forced Intersat to review **their** policy of 'not authorizing nor encouraging or allowing' their IQ-160 system to be retro-fitted to another brand antenna.

So out of 48 hours on Provo, we spent the working portion of 24 full hours sawing and hacking and modifying and filing the IQ-160 drive system and the Paracclipse feed mount so they would accept the IQ-160 electronics. I didn't help matters any. Sometime back last winter I had hurriedly wired up an AC plug that carried through some 12-3 TW wire AC power out to the Paracclipse so the Tel-Vi drive could be plugged in. I didn't realize it at the time, but in getting the 12-3 wires inside my guys had to strip the wire out of the plastic jacket and they had ended up with two white wires and a single black wire. The normal procedure would have been to treat the two white wires as hot and the black as neutral (maybe not everywhere; but that's our 'code' here). I had screwed up and gotten a white and a black reversed and by dumb luck had the plug inserted into an outlet in the bedroom in such a way that nothing blew up.

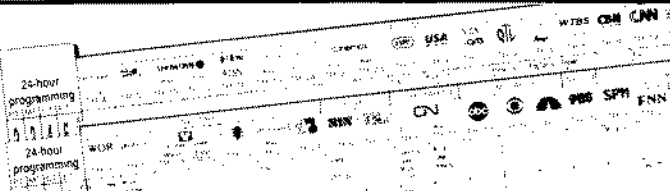
After a couple of hours of modifying the Paracclipse and the IQ-160 drive we hooked up the electronics to see how the pictures were. Bad AC hum bars in the picture. Don McLaughlin said they had run into that problem elsewhere and it was a ground loop. He suggested we put a three prong to two prong adapter on the AC cord and swap the plug in the wall outlet. I did that, and instantly shut down a circuit breaker. One side of AC went dead to ground. When that happened, we sent 110 volts AC (or something equally dangerous) into an LNA, a down converter, the Paracclipse antenna, my fingers and back into the IQ-160 receiver.

That cost us several hours of repair time; McLaughlin and



McClaskey on their knees in our bedroom ripping parts out of a spare 160 receiver and power supply to rebuild the broken one. I felt about six inches tall after it happened, and my fingers were numb for several days where one side of the AC line went into my body. Served me right. But Intersat deserved a better shake than that!

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ONCE A BEDROOM / now 'Intersat Southeast'. McLaughlin (left), McClaskey (center) rebuild an IQ-160 power supply.

What was going to be a two to three hour project ate up the only full day they were on Provo. When Susan came home from her full day

stint running the Candy Cane Ice Cream Shoppe, she found the four of us sprawled on her bed and McLaughlin giving me a designer level instruction course in programming the IQ-160 hand held remote. The screen was off the window where we snuck cables inside; empty cartons were littering the floor and parts of receivers were turning up in my underwear drawer two weeks later.

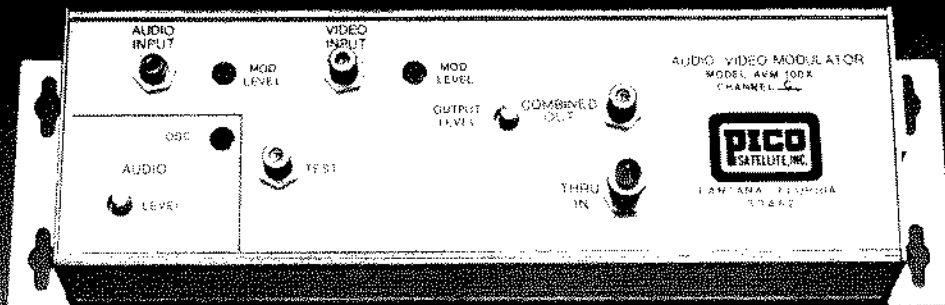
That evening Guy, Don, Dave and I joined son Kevin for a dinner at the Island Princess. Those who have been to Provo know the 'IP' well. We brought a fresh crab with us; McLaughlin and Davis had taken an hour off in mid-afternoon to get in a short Scuba dive and brought back a several pounder. We boiled it on the stove and then took it to the 'IP' and cracked it with a pair of Channel Locks while they were bringing us our dinner. I can still picture McClaskey in my mind methodically cracking every leg right to the very tip going after that last morsel of fresh crab. We could have eaten a dozen without batting an eye.

The next morning, the day they were scheduled out on the 2PM afternoon 'flight', we tackled the 11 foot Challenger up at Tower Plaza. Since I destroyed one of their 160 receiver power supplies and there were no 15 volt regulators to be found on the island, we decided we'd simply stick a 100 degree test LNA and the original SR-20 receiver back together for a test of the Challenger antenna. By the time we got done doing A/B/C (or actually, C/P/H) side by side testing, it was time for the trio to head back to the states on the H-18 Beech aircraft.

McClaskey did more than cleverly leave an IQ-160 operating in my bedroom. McLaughlin suggested they leave a pair of hand held remotes: one for Susan and one for me so we didn't have to fight over who got to change the channels (holding an IQ-160 remote in your hand gives you quite a feeling of power!). Now we have 'dueling wars' to see which one of us can override the other with our remotes. I usually lose, even though I am closer to the receiver by a couple of feet. I think I got the 'low power' version on my side of the bed! McClaskey also told Susan's partner, Sally Ward, at the Candy Cane that she was a 'ringer' for Linda Evans, the *Dynasty* television star. Thanks David; Sally goes around humming old movie themes now and her husband David says when you come back in January with your wife Susan,

COOP/ continues page 82

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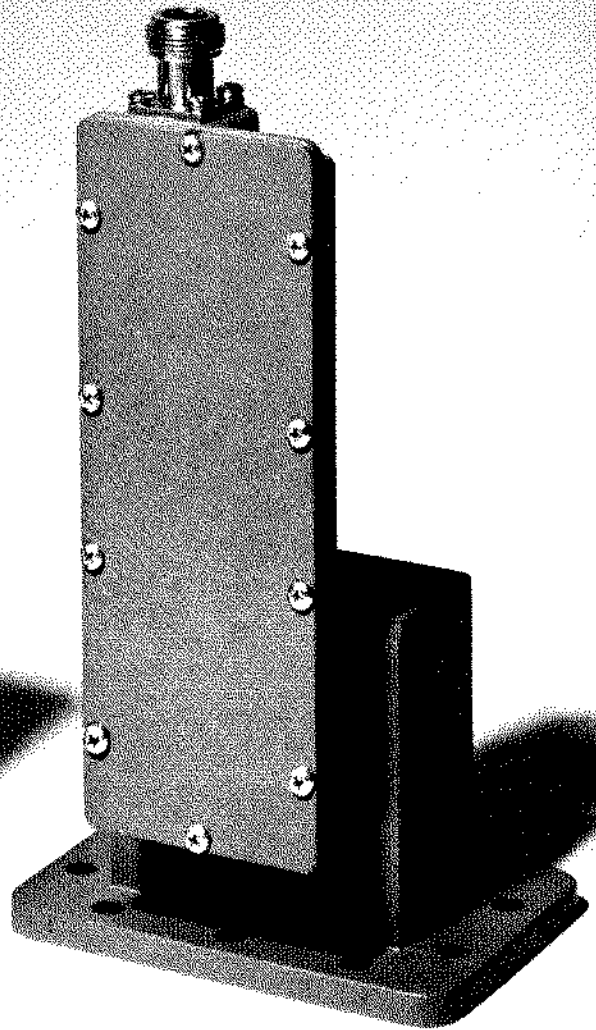
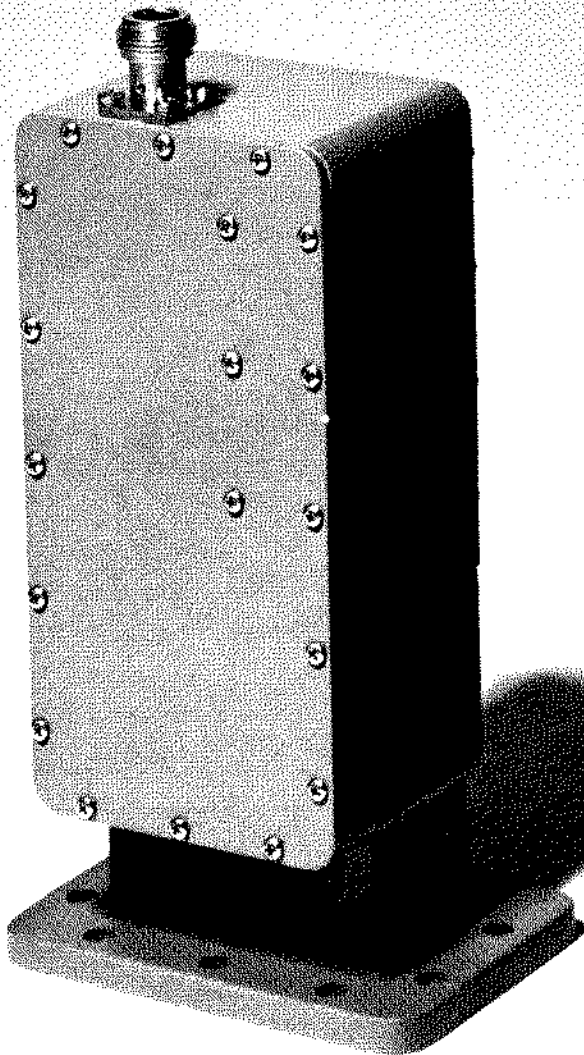
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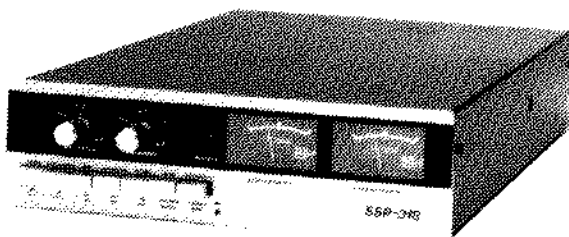
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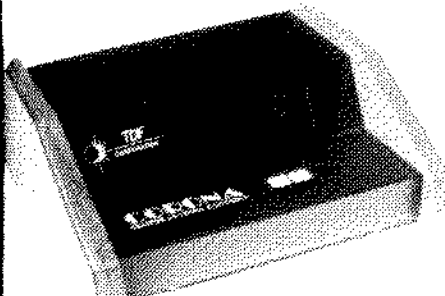
GILLASPIE 9600
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ARUNTA SSP-318
stereo processor



ARUNTA 416 INTERCEPTOR
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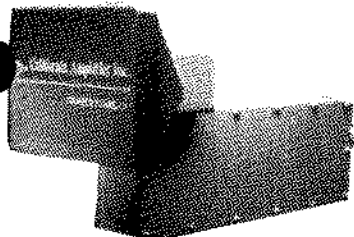
TDF CORONA
display controller



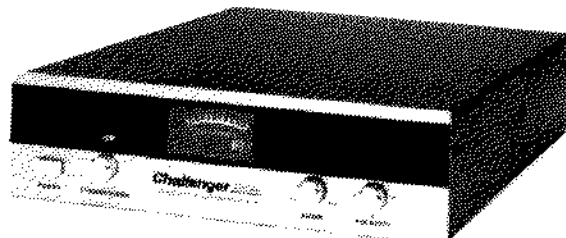
TDF ECLIPSE 1
programable controller



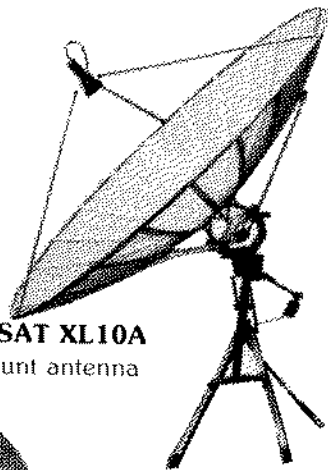
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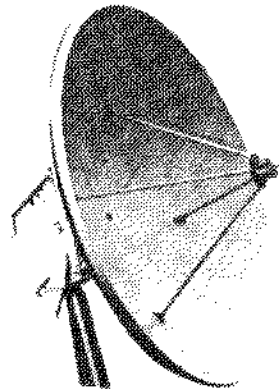
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COOP/ continued from page 79

you are in for a tremendous retaliatory effort!

I obviously enjoy visits like this, only wishing of course that people who come down for serious work such as this didn't have to 'engineer and run' with such great speed. Laying in the Caribbean talking shop sure beats sitting around a bar table in Nashville listening to Jim Rothbarth tell you how he is going to straighten out the industry.

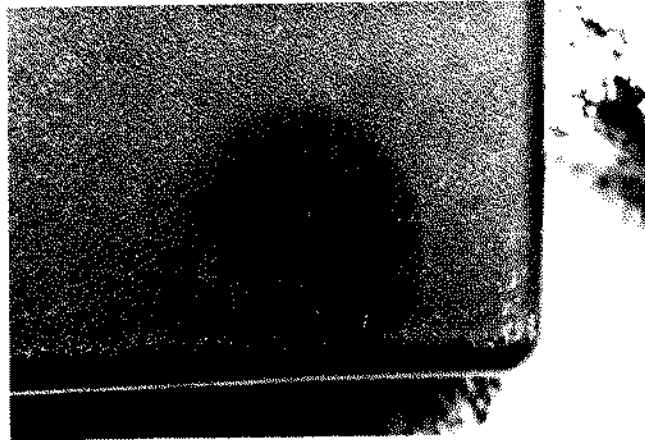
How does the IQ-160 work? **How** does the Challenger work? **Will** I ever get the window screen back on the bedroom window? **Will** Sally Ward ever stop humming movie themes? Tune in next month when we review the 160 system here in CSD.

MELT Down

Before the Intersat trio and I started to tear into the operational bedroom system here on Provo, I wanted them to see the pictures on the existing receiver/LNA/antenna package before we started replacing parts. We walked into the room, and I flipped on the equipment. We let the TVRO receiver and LNA run full time down here. It helps to keep the moist air outside if you don't cycle the outdoor (or indoor, in our case!) equipment on and off; cool to hot. The dish had been parked on D3 to I slipped through NBC/ABC/CBS on the vertical side and then swung the Polarotor to horizontal. Nothing happened. I tried again since it had been acting intermittent for a few weeks, and I had not gotten around to checking it out. Still nothing. So I excused myself and ran to the Annex to grab another power supply and controller since that is usually the problem with these things. When I returned, I had been gone maybe three minutes and I unplugged the small AC to DC supply and started to unhook the leads to wire in a new supply and control.

Ouch!

The control was so hot (remember, it is plastic) that I could barely hold it in my hand. "Look at this" I remarked to McClaskey. He grabbed it and let go. "Melt down" he observed. I turned it over and sure enough the plastic case on the bottom was starting to melt. A substantial portion of the case was a 'glob' and I'd guess that if five minutes of running 'jammed' had caused that much heating and



MELT DOWN? Outside of Polarotor case shows sign of turning portion of plastic into liquid form; next stop the 'wicker' dresser!

melting, another five minutes and we would have had a fire.

One of the voltage regulators in the device was shunting current through the heat sink, and the heat sink had gotten so hot that in addition to dis-coloring it was melting the plastic case. Since the Polarotor had been sitting, where it always does, on a 'wicker' (as in 'straw') dresser and I figure the ignition point of straw has got to be dangerously low, had this happened in another form, I might have lost the dresser, and the bedroom, and the house.

UL. Underwriter's Labs. They are the people who go around certifying that various electrical things (such as clock radios, toasters, et al) are 'safe' to use. They are concerned with electrical shock, and, fire hazards related to mal-functioning electrical gadgets. The Polarotor bears no indication that it is UL approved. **In fact**, not very many of the things we sell or consume within our industry have UL

In any application, insist on an Odom Antenna... It's

SOME DISH



Let's face it. We are in a high technology industry. And nothing spoils high technology like low quality.

Odom Antennas has manufactured quality fiberglass antennas for years and has established themselves as a leader in the industry.

Odom antennas feature the unique zinc flake spray reflective surface and each individual manufacturing process is inspected for quality control.

Odom offers a wide variety of residential and commercial antennas, ranging from the 6 1/2-foot dish all the way up to the 20-footer.

(Dealer and distributor inquiries invited.)



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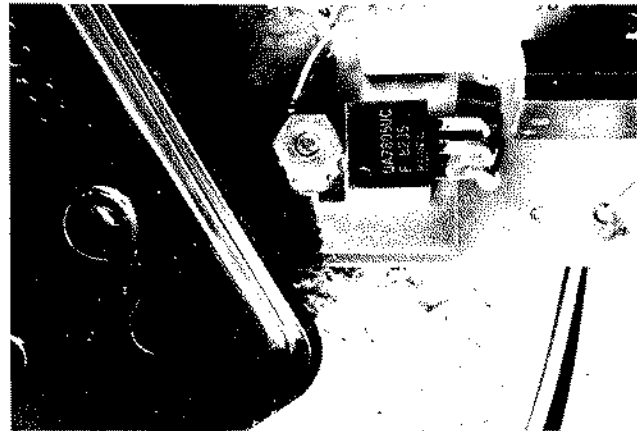
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BUNCH OF HEAT. The heat sink took the total output from the 1 amp supply and 'dumped it' into the case. The supply is not fuse protected and it could do considerable damage before frying internally.

approval. I was talking with a receiver manufacturer a month ago who told me his product, which he wanted UL approved, was held up by UL for 90 days getting approval. I can see **why** many of our products might not go for UL approval. I can also see, having been personally frightened by a mal-functioning piece of gear, the other side of the coin as well.

I know, because they have told me, that many of the brighter manufacturers carry product liability insurance. One antenna manufacturer said he was carrying \$10,000,000 and was increasing that. I'd like to point out that many of the TVRO customers are relatively wealthy folks. I saw some photos a proud installer was showing around in Minneapolis; he just finished installing a 12 foot system on a

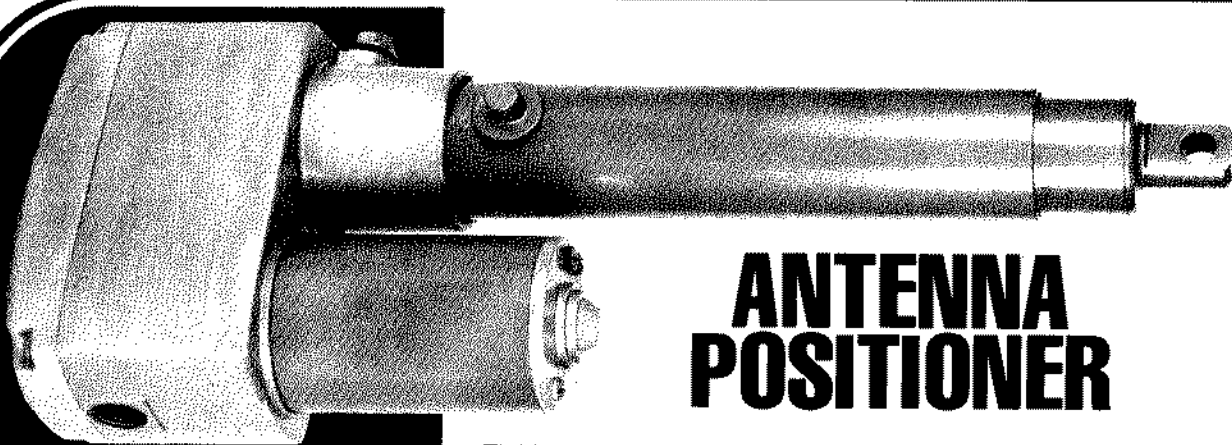


\$22,000,000 'estate'. Multiple receivers, signal splits, isolators; the whole nine yards. I'd hate to be in the shoes of Chaparral if a Polarotor 'jammed' and that \$22,000,000 estate burned down.

I'd like to see a show of hands, first from dealers. How many of you carry 'liability insurance'? Hummm. I'd judge that most of you **didn't** raise your hands. Now the OEMs. How many carry adequate liability insurance? Humm. You say you aren't sure what is 'adequate' and what is inadequate?

That is a very complicated area. State laws (i.e. setting how much dollar liability can be charged against a supplier of equipment or services) vary widely. What may be sufficient insurance for Missouri can be 90% too low in California. State courts and state laws have differing views on how much of an assessment should be made. If you carry \$10,000,000 in product/services liability, and the law says that there is no 'limit' on the liability that can be assessed if your product or

COOP/ continues page 86



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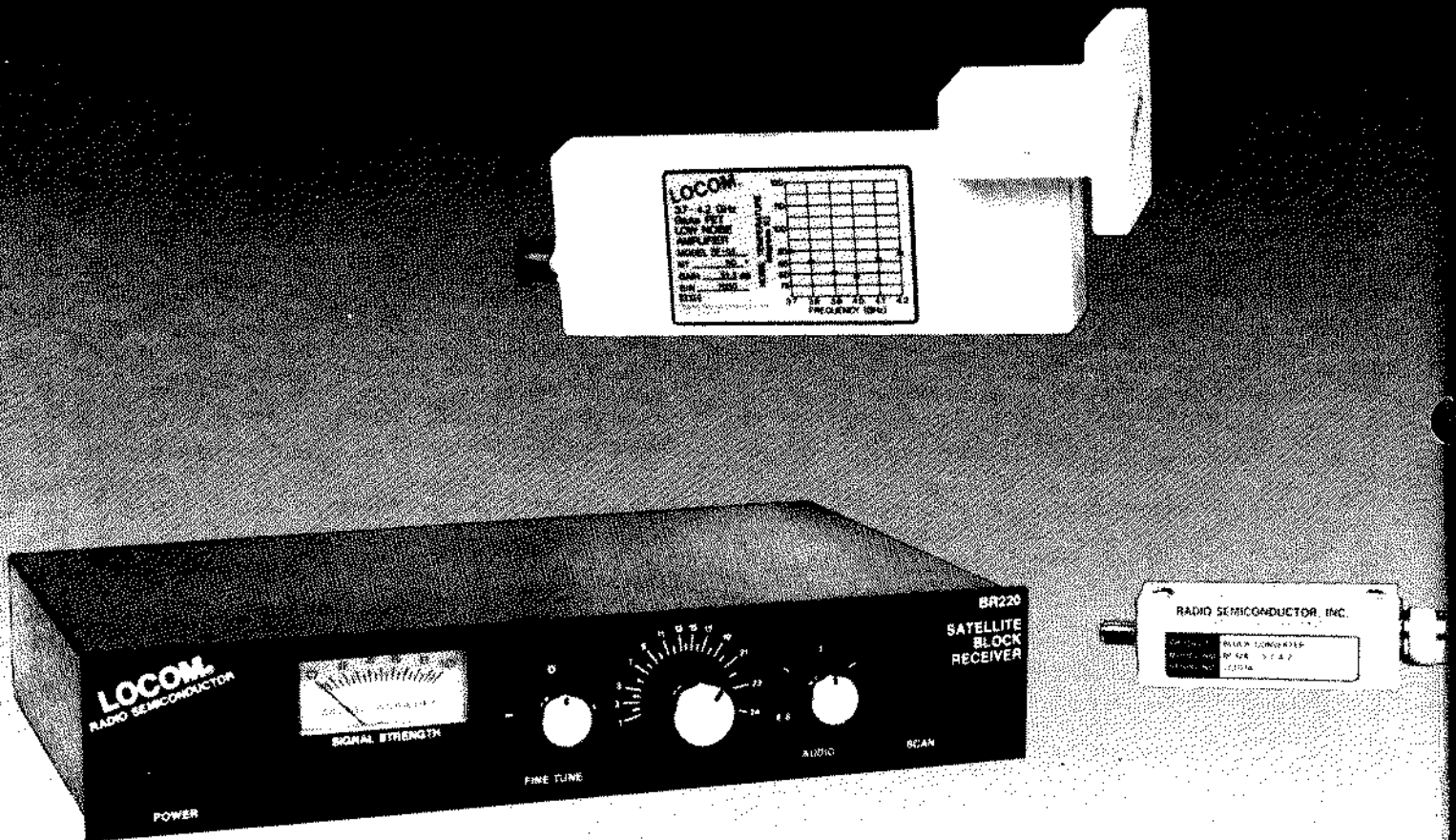
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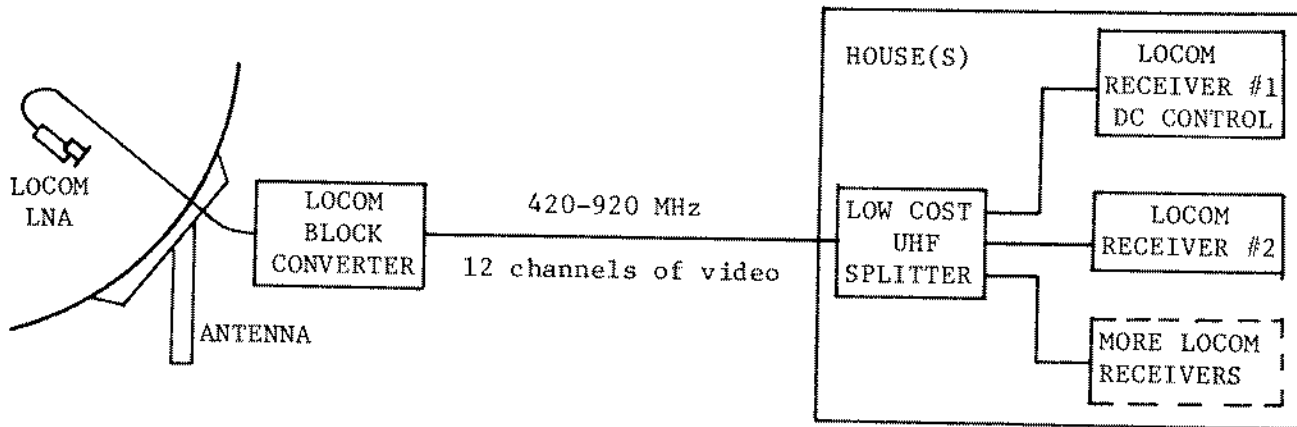


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NEIGHBORHOOD SYSTEM — 2 to 24 houses fed 12-24 channels from one antenna.

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LOCOM block converters differ from conventional converters in that they simultaneously convert all satellite channels to UHF frequency (420-920). Block converters offer the advantage of making it possible to run *multiple TV receivers* with independent channel selection off one block converter. This allows additional dwellings to be added for just the cost of a receiver and cabling, and yet retain independent channel selection. This can be done in a small system by using UHF splitters.

In applying Locom block conversion in a large multiple unit system, a trunk line approach can be used. A single polarity system can deliver 12 channels to each dwelling. Dual polarization, with 24 channels, can be accomplished by one of two methods:

(1) Use two LNAs, two block converters and two cables — one for vertical and one for horizontal. An A-B switch is used at the receiver to tap into vertical or horizontal.

(2) A larger antenna can be used, permitting *both* vertical and horizontal channels from only one LNA, block converter and cable. The LNA is placed halfway between the vertical and horizontal positions. The receiver bandwidth is reduced to 20 MHz in this method.

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COOP/ continued from page 83

service is proven defective, you could be bankrupted by a single decision from a judge. In the very best case, if you appeal to a higher court a decision that you think unjust, you (your company) will pay the **costs of appeal.** And lawyers are not known for being reasonable with their fees. I'd hate to have to carry a pending liability suit around on my 'books' for a couple of years while the attorneys fought it out courtroom to courtroom.

As is often the case, I have a suggestion. If you are not sure what selling in all 50 states means to your liability coverage problems, and if your insurance agent seems more interested in 'getting' your 'home owner's policy' than he does with making sure you are adequately covered for liability in Massachusetts, I suggest you call **Bill Young** in Maryland at **301-997-0300.** Young is the insurance fellow we talked about last month (he appeared on the front cover of **CSD** with Larry James and Guy Davis) in our study of end-user insurance for TVRO terminals. You probably like your own insurance man; but at the moment he can't hold a candle to Young, the insurance man, on the subject of TVRO systems. If you are a TVRO dealer, I would urge that you make very sure you have adequate insurance before you go out on one more job. Suppose **you** mis-wired a 110 VAC outlet for an outdoor motor drive system and your customer's 8 year old daughter got electrocuted because **you** switched wires on the plug line? Could you stand a \$5,000,000 law suit? **Think about it.** What we do every-day is not accident proof. We can hurt, kill, or maim with our hardware. We can burn down a customer's house. Being improperly covered can be a disaster in dollars, human suffering, and your own future.

FOUR Foot AGAIN

I can't recall whether it was P.T. Barnum or W.C. Fields that uttered those immortal words "**There is a sucker born every minute**". In either event, there are those who hope this is true and they keep cranking out the grand looking four color literature making all sorts of rash promises for the home TVRO market.

Now comes a company that claims they are producing 1,000 **four foot** dishes per day, using some sort of **'miracle, new, plastic'** process and using a "secret parabolic design". If these guys work Saturdays and Sundays, they are flooding somebody's market with 30,000 new 'miracle pieces of plastic' per month.

They claim they have a secret. They don't use metal screen or mesh or foil. They also don't use metal. They also claim their dish surface is accurate to ".005 thousandths of an inch". Let's see now005 is 5 parts of one thousand. So ".005 thousandths . . ." would be 5 parts of one million. Surely that is a typographical error. Or perhaps it just tells us the people perfecting this miracle don't understand math any better than they do 4 GHz reception.

The same release tells us that they "started producing 1,000 foot dishes per day on the 16th of April". By the 1st of September they would have produced more than 100,000 of those little buggers. Strange that nobody has seen them make a dent in our market yet. I guess we have all been underestimating how well the market is doing if a guy can drop in 100,000 dishes and not even be noticed!

There is a line in their copy I like even better. It reads:

"Haven't you been waiting for a smaller dish? Don't wait any longer, now everyone can have satellite T.V."

I wonder if saTTeLite TV is anything like saTeLLite TV?

Probably not. That's probably why they have gotten into our market without being noticed. They obviously are not in OUR market; they are selling saTTeLite T.V. antennas rather than saTeLLite T.V. antennas. We are grateful to them however . . . they have alerted us to a brand new field; saTTeLite T.V.. Now, can anyone tell me what that is? Maybe they need a magazine in that field.

One thing I did notice; the people in the saTTeLite T.V. field have a problem similar to ours. There's a line that reads:

"(Our **SECRET**) parabolic design provides wide band width without interferences (sic) of 4" and 2" satellite spacing".

The saTTeLite T.V. band must be far higher in frequency than our 4 GHz band if they can get 'wide band width without interference(s)' at 2 degree spacing. But they tell us in their literature "Now you can have 50 channels of satellite T.V. on a four foot dish (not D.B.S.)". Well, if it's **not D.B.S.**, and it's not 4 GHz saTeLLite TV, there is obviously some other band out there with 50 channels of TV on it.

This might be a really good deal. They tell us 'See magical, sparkle (sic) free picture on a four foot satellite dish. No special electronics needed'. I guess that means I can hook up my Zenith TV set to their 'secret design, magical dish' and I'll have 50 channels of non D.B.S. TV in my home. A heck of a deal. Like their punch line suggests
 "Just what everyone has been waiting for!"

THE Challenge

Those of you who read everything that even spells satellite correctly probably saw the two page advertisement appearing on pages 14 and 15 of **Multi-Channel News** back for June 27th. There a less than well known manufacturer of TVRO antennas issued a challenge. They said 'that any manufacturer of a five meter antenna who felt they could beat the three primary specification claims of the company issuing the challenge's 4.5 meter antenna was invited to bring their antenna to a Florida test site for a 'shoot out'.

Doug Dehnert's USS took the challenge. Dehnert wrote the firm in question on June 29th noting "**After about 20 seconds of careful consideration, I have decided to happily accept your challenge under your conditions**".

The company issuing the challenge really stuck their foot into it. They advertised their specifications (43.6 dBi gain at mid band using a single feedhorn, sidelobe performance that exceeds FCC 2 degree spacing requirements (first sidelobe - 20 dB) and cross pole isolation greater than 30 dB) and then offered to "pay all normal expenses for travel, lodging and meals incurred during (the) trip to participate in this challenge".

I suspect Dehnert could get a free trip to Florida out of this deal. I also suspect that several others in our field who manufacture some fine 5 meter antennas could also get a free trip out of the challenge.

Advertising. In any new field there is always as much hype as there is substance in the promotional efforts. There has been the classic Harris-disaster with their 3 meter antenna (remind me to tell you the story about the guys knocking off the Harris antenna, one day soon), and a number of others where somebody who didn't understand their own product, or perhaps worse yet, the competitive products, opens-mouth and inserts-foot. Maybe they figure the competition won't notice. **Maybe** they figure the competition fabricated claims for their products, **also**, and wouldn't dare rise to the baited challenge. Maybe lots of things.

My interest in this is not to pick on the firm issuing the challenge. They are a good firm in **many fields** but antennas just may not be their strong point. I was asked to test one of their antennas down here in the Turks and Caicos last spring; I tactfully suggested that they should save their money and antenna.

During the coming months we'll be looking at antenna claims, and more important, how REAL WORLD antenna claims get created, here in **CSD**. And if this particular challenge should happen to come off (Dehnert reports a less than speedy, enthusiastic response to his rising-to-the-challenge bait!), I've been invited by USS's Dehnert to travel in his party to witness the tests. I hope the guys who issued the challenge have an **antenna test range**; this could be very embarrassing to them if they don't!

DBS and 12 GHz

RARC 83. That stands for 'Regional Administrative Radio Conference'. The 'region' in this case is the western hemisphere; North, and South America. RARC was held in Geneva (Switzerland) during June and July and now after all of the shouting and squabbling the decisions are in. The nations of the western hemisphere have more or less 'agreed' on how the geo-stationary Clarke orbit belt will be utilized for 12 GHz Direct Broadcast Satellites.

The battles were legendary. Cuba led a group of have-not nations which wanted every nation to be accorded an equal number of spots or channels in the sky; Bermuda, for example, would get essentially the same number as the USA. Sure.

Then there were the claims by those nation's over which the Equator passes. They 'claim' that the orbit belt is inside of their territory and to use it, the satellite operators should pay a lease or rental fee. Right.

Then there were the power level ('flux') density debates. The US

COOP/ continues page 90

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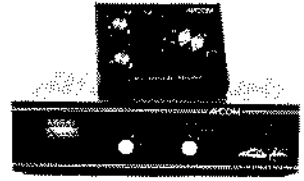
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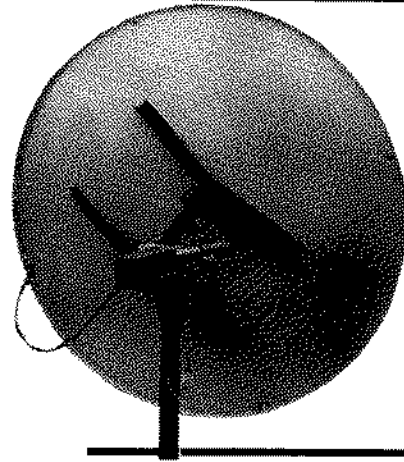
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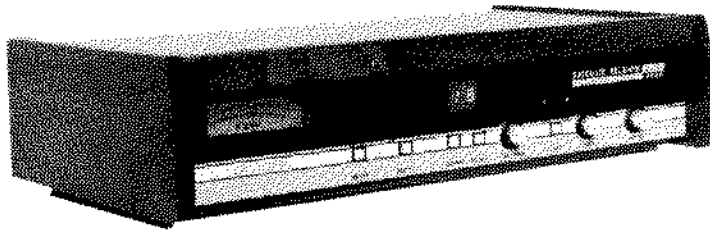
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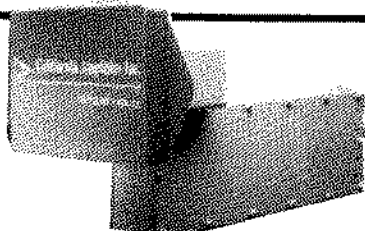
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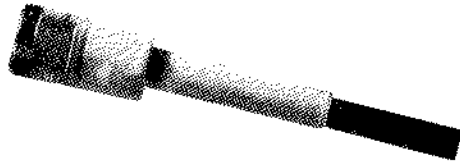


GILLASPIE 9600

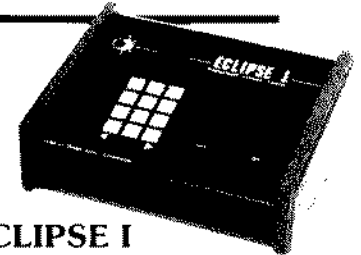
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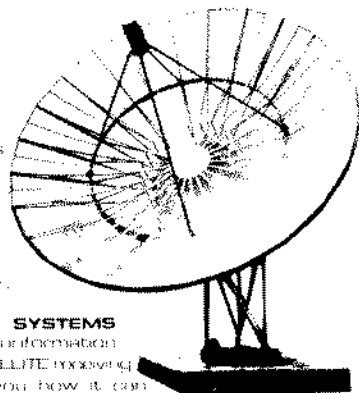
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OMNI SATELLITE SYSTEMS

COOP/ continued from page 87

wanted the 12 GHz satellites to be powerful enough that really small dishes might ultimately be possible; say down to 2 feet or so. Not everyone agreed; Canada, for example, wanted less powerful satellites since its concept of DBS is that rather than serving each individual home with its own antenna, DBS would serve individual community master antennas. This is a crucial decision since the power on board the satellites will ultimately determine not only dish size on the ground, but also satellite to satellite spacing in the belt. More powerful satellites, smaller dishes; and, more satellite to satellite spacing required. The US was in a crunch here; they wanted lots of space in the sky, and, they also wanted big, powerful satellites.

DBS ASSIGNMENTS/ 12 GHz

West	User
31	Falklands
42	Grenada
55	Argentina
57	Falklands
61.5	USA (*)
64	Brasil
69	Mexico
70.5	Canada (*)
71.5	Uruguay
72.5	Canada (*)
74	Brasil
78	Mexico
81	Brasil
82	Canada
83.5	Haiti/Dominican Republic
84.5	Trinidad/Surinam/Guyana
86	Peru
89	Cuba
91	Canada
92.5	Caribbean Basin
94	Argentina
95	Ecuador
96	Bermuda
99	Paraguay
101	USA
102	Brasil
103	Colombia
104	Venezuela
106	Chile
110	USA
115	Andean (**)
119	USA
127	Mexico
129	Canada
136	Mexico
138	Canada
148	USA
157	USA
166	USA (***)
175	USA (***)

* — Problems with solar eclipse
 ** — Concostium of Bolivia, Ecuador, Peru and Venezuela
 *** — Alaska and Hawaii beams

TVRO Terrestrial Interference NOTCH FILTERS

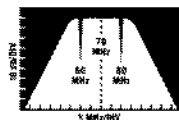


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The Drake models NF60 and NF80 are designed to trap out transcontinental telephone microwave transmissions, which create carriers ± 10 MHz from the center of a satellite transponder channel, falling in the 3.7-4.2 GHz earth station band. These notch filters connect in series with the 70 MHz IF cable of any TVRO receiver. They may be installed singularly or together depending on requirements. DC continuity is preserved for receivers requiring tuning voltage through the IF cable to the down-converter.

SPECIFICATIONS		
Model Number	Model	Description
2660	NF60	60 MHz notch filter/70 MHz IF
2680	NF80	80 MHz notch filter/70 MHz IF

Notch depth: 45 db MIN
 3 db bandwidth: ± 1.5 MHz of center frequency
 impedance: 75 ohms IN/OUT
 Size: 4.2" x 2.25" x 2.4"
 Weight: 12 ounces



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Well, it all sorted out. Some of the results were predictable. Others were less predictable. The US (and Canada), for example, ended up with some 'end-of-belt' locations where there will be solar shut down problems. A couple of times per year the satellites will go dark because of the solar/earth eclipse phenomenon.

It is important to realize that the 12 GHz DBS assignments have absolutely nothing to do with the 'other' 12 GHz assignments; that SBS and other birds, carrying television or data or whatever will function in an entirely different 'world' from DBS. There will ultimately be at least two and perhaps three separate 11/12 GHz (downlink frequency band) types of satellites up there. This is particularly confusing right now when some of the early DBS entrants will be tempor-

arily renting 11 or 12 GHz downlink space from the present (or soon to be operational) 11/12 GHz non-DBS birds. They are doing this to get a 'head start' in selling DBS, before any special high power DBS birds are ready to launch and operate.

All of the DBS talk you hear today (the HBO proposed Galaxy One service included) is not really DBS as RARC addressed DBS. It is a 'squatter DBS', temporary rights won at the FCC to (mis) use regular 12 GHz communication type satellites for DBS purposes. That's where the early use of ANIK-C and SBS-4 come into play. These are not DBS birds, and they do not have either the power nor the restricted number of channels which the 'real thing' will have in 1986 or so.

When you are asked to explain the new early-entry DBS, it is best that you be able to explain that what people hear being discussed is not DBS as there may one day ultimately be a DBS. The early stuff requires bigger antennas, on the ground, to make up for the lower power (and less restricted boresights) of the non-DBS 11/12 GHz birds being employed as a temporary measure.

When you invest in an 11/12 GHz 'test terminal', as I suggested in this spot last month in CSD, you are actually investing in a package which will be useful long-term for the reception of transmissions more akin to what we find on 4 GHz today (a mixture of broadcast/network, cable, premium, sport-feeds, etc.) than what we will ultimately find on the 'real' DBS service.

And 1985 or 1986 remains a long ways off for all of us. Between now and then, virtually anything can happen to the 'real DBS' and there are those serious students of the industry who contend that there will never be a profitable DBS service in the USA anyhow; that although many will try, virtually all will fail in the process.

Where DBS might make it is in the unserved regions of the western hemisphere. There is already serious planning, for example, for a Caribbean Broadcast Union service which would be 'shared' by perhaps a dozen nations. With each nation putting in a government 'subsidy' such a plan might ultimately 'fly'. But it will be well into the 1990s before any of this happens, either.

In the interim, the name of the game is still 4 GHz and it will remain that way for at least the balance of the lifetime of the existing 4 GHz US domestic birds. 12 GHz is here . . . but it will be a long time before it grows up and amounts to much vis a vis 4 GHz services.

CJR/ Off and Running

The first issue of (the) **Cooper/James Report (CJR)** went into the mails on schedule on the 15th of August. I was not pleased with the first issue, but then I am seldom pleased with any issue of CSD either, and we've had four years now to get it down 'pat'. CJR is our new mid-month dealer/distributor oriented newsletter. There are 12 issues per year and because it cleverly fits into the middle of the month, that means you are never more than two weeks away from 'fresh news' of our industry.

I call CJR a 'newsletter' but it is probably far more sophisticated than most newsletters. It has only 16 pages, and five of those are set aside for advertising. That's all there will be for advertising; we don't want it growing into a CSD advertising to editorial ratio!

One of the nifty things about CJR is that we 'close' it up for late news and material on the 10th or 11th of the month, and the mailing service has it into the mails on the 15th. Since we use plenty of four color pages, that's a pretty nifty trick. Our Carol Graba makes all of this possible by being the 'mother hen' who sees that the last bits and pieces go into the proper spot and the printer gets busy with his task at 8AM on the 12th of the month.

The first page of CJR is an industry 'STATS' (short for statistics) report. Larry James surveys a number of dealers and distributors, confidentially, each month around the 10th of the month. He finds out the lowest selling prices for LNAs, the highest; what equipment is in short supply this month, what is expected to be in short supply next month. All of this boils down to a fact filled front page that tells you at a glance just how the industry is doing; that week. We think giving the dealers this sort of information, in the middle of each month, is going to make the dealers better equipped to plan their own buying and stocking patterns. If CJR does nothing else but help the dealer save money on his purchasing, and keep him from overstocking on merchandise

COOP/ continues page 94

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RG-59/U (FOIL & BRAID)		49/M'
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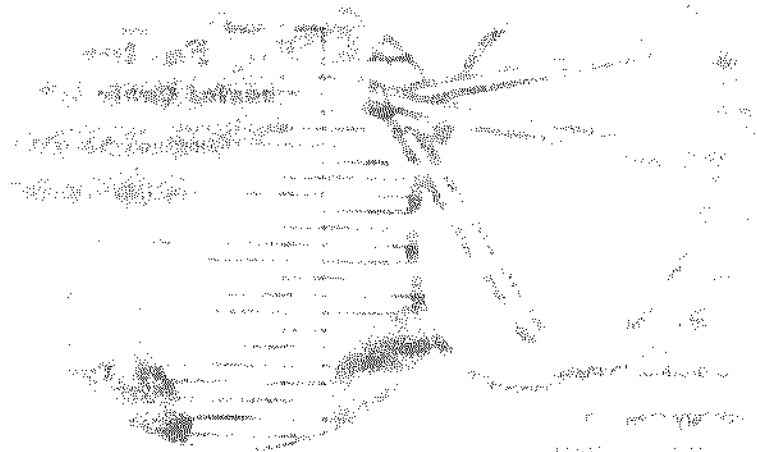
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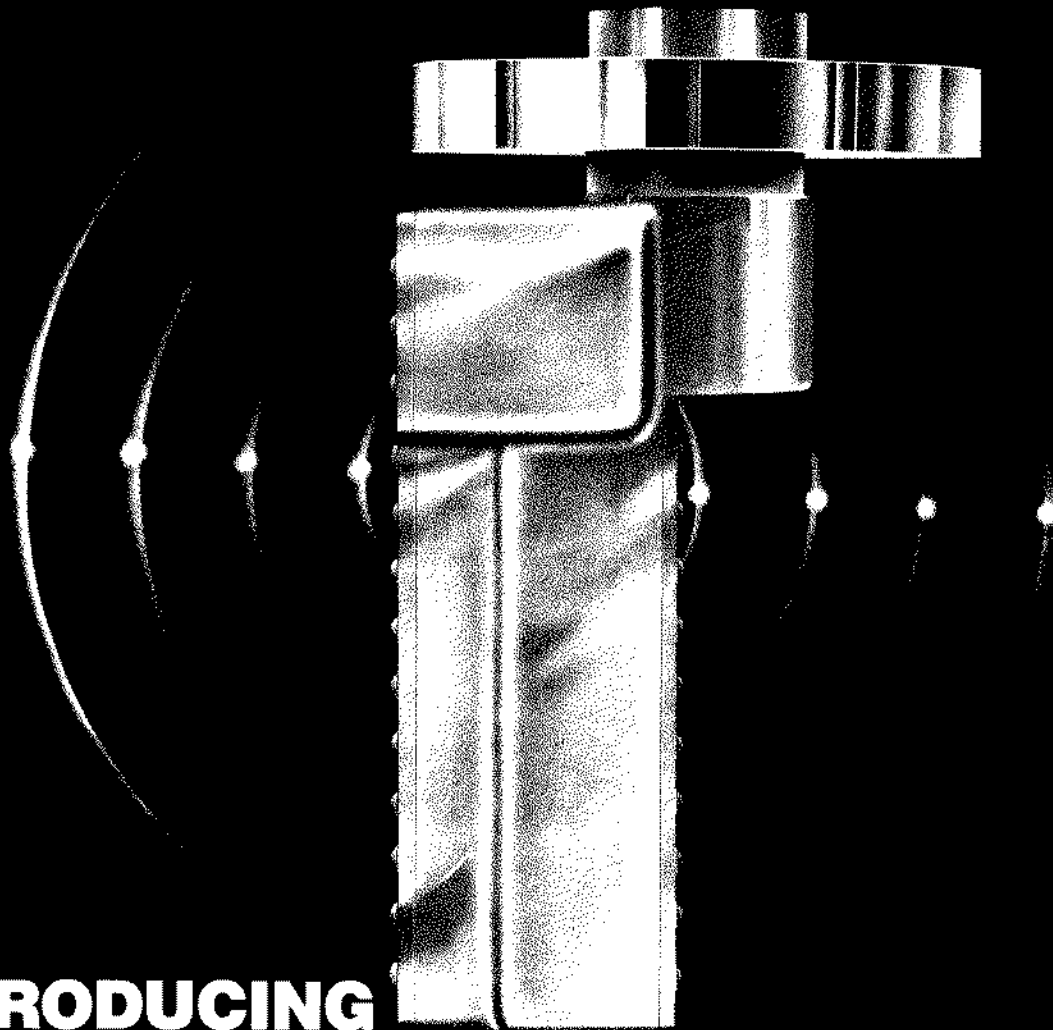
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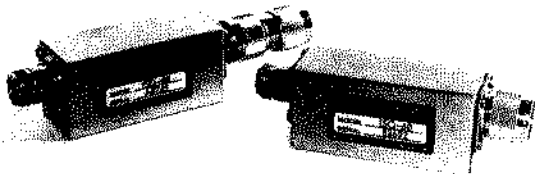
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COOP/ continued from page 91

that will be amply available in the coming month, it will have done quite a service.

The first (August) issue also contained an 'INSIDER Report' that intrigued me. Lots of people talk to me, off the record, about all manner of things. They know they can use me as a sounding board, that my responses will be straight forward and honest, and that I will keep their confidence. I appreciate that since having this type of information gives me a tremendous edge on where industry trends and patterns are developing. In our August INSIDER report I slightly betrayed one of those confidences: I left out all of the names of the parties involved. This particular 'INSIDER' segment talks about the 'attitude' that one, prominent industry supplier has towards the present 4 GHz market and the forthcoming 12 GHz market. **They view** the 4 GHz market as a 'learning curve' and they actually don't panic **if they lose \$20,000,000** or so stumbling around the 4 GHz arena. They figure that is a good way to be one up on the 12 GHz competition when it finally comes. We'll continue this type of 'INSIDER' reporting in **CJR** as long as people will still talk with me about their operations!

CJR. It will get better and we hope that it will have a sound, positive influence on the industry. The dealers deserve to have every possible working tool at their disposal and **CJR** is our contribution to that effort.

AND SO NASDA

The North American Satellite Dealer Association (NASDA) probably never had a real chance of success. Slacked against them from the beginning were a number of tough opponents. Some will say 'SPACE killed NASDA' and others will say 'NASDA killed NASDA'. The truth is not close to either of these statements.

The concept of dealers being a part of a national association, to share their problems and to work together for a better dealer-world, is a good one. Yes, SPACE did not like the idea of any group within our many groups getting started, and yes there was something less than open support for NASDA from SPACE.

I met for several hours with the creators of NASDA in Minneapolis. I had been asked to serve on a 'board of advisors' to NASDA, along with others such as Bob Luly, Taylor Howard and so on. I had agreed primarily because George Mitchell had asked me and when George looked me in the eye and told me NASDA was going to be good for the dealers, I accepted. I have considerable trust in George and respect for his intuition. I know that I **took** some 'heat' for agreeing to be on the NASDA advisory board; I suspect Taylor Howard did also. Tay and I also serve as elected members of the SPACE board and there were at least a few in the SPACE hierarchy that felt our agreeing to 'advise' NASDA was tantamount to sharing secrets with an enemy force. That's pure hogwash of course. I think Tay and I are both mature enough to realize when we are being 'used', and when there is the opportunity for something to be 'good' for all of the industry. Since serving the NASDA group as advisors earned neither Tay nor I any money (not even expenses), it had to be a labor of love for the industry.

As I sat and listened to the NASDA game plan, I did begin to see several weaknesses in the leadership. They had their 'sales shoes' on and were trying to sell me on their enthusiasm. They had a great deal of enthusiasm. In my mind I thought I saw a group of well meaning, probably honest people sitting around a table one day making a list on a yellow legal pad.

"**Over on this side let's make a list of all of the problems facing the dealer today**" I suspected it began. That probably took them a day or more to complete since dealers are faced with every problem on earth except hiding their Swiss bank accounts. Bad breath, LNAs that quit, dishonest product representation, banks that won't finance TVROs; the list would have to be several pages long.

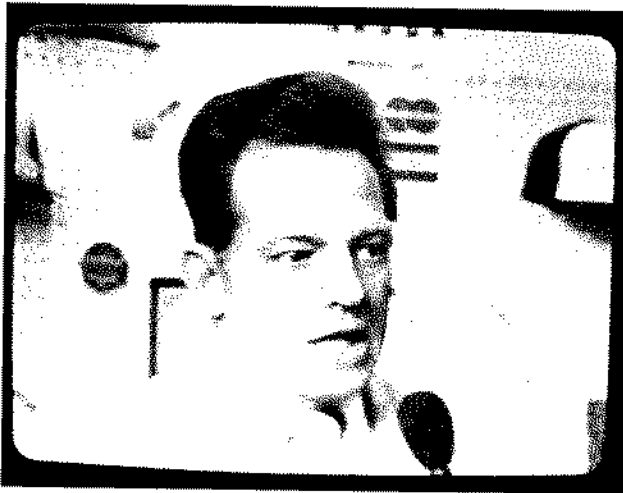
When they tired of making a list of the ills, I had this vision of the same people breaking for a meal and then coming back and starting over. "**Now let's make a new list, to go along side the old list. The new list will be what NASDA is going to do to solve all of the dealer problems on the first list.**" Since they were undoubtedly tired from the first list exercise, the 'solutions' became one liners.

Problem: The public doesn't know what a TVRO is.

Solution: Hold 24 coast to coast consumer level TVRO shows a year, renting facilities large enough to handle 250,000 attendees in three days.

Problem: Dealers can't sell terminals to people who don't have \$3,000 ready-cash.

Solution: Get them a financing package.



NASDA'S CARL REYNOLDS/ he tried.

All of this sounds great. It is a little bit like writing the Declaration of Independence and the Bill of Rights **before lunch** and then coming back and finishing up with the Constitution **after lunch**. You just can't properly assess the magnitude of what you are tackling when you are trying to change all of the world **on one yellow legal pad!**

After my two hour meeting with the folks from NASDA, I suggested to a friend that if they really tried to do **all** of those things, and in particular the consumer shows (scheduled to start this month), I'd be surprised if they got through the first show. One does not create and pull off a show for 100,000 people with just a few weeks planning time. Not when you have never done such a thing before.

All of this probably suggests to you that NASDA did itself in, as many believe, because NASDA was trying to do too much too soon. I submit that this had something to do with their short life time, but that is not the full problem here.

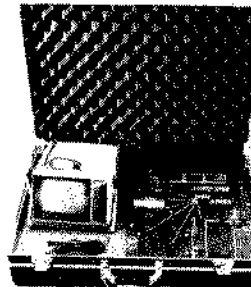
The real problem was the people who were involved. Each I met with seemed to have their own concept of what NASDA was, or more important, was supposed to be. No wonder, since the 'NASDA Manifesto' read like the U.S. Declaration of Independence! Any single item in the 'Manifesto' would have kept a professional staff of full-time administrators busy 50 hours a week for years. And trying to do ALL of those things ALL at the SAME time was a sure sign of premature demise.

I don't think the need for a professional dealer association is any less real because NASDA has folded. Quite the contrary. I think the attempt to make a national dealer association come together may have helped focus on where the real needs are. I am not persuaded that because SPACE has a dealer class membership, and accords a few seats on the SPACE Board of Directors to 'dealers', that there is any less need for a strong, properly focused and well run national dealer trade association. SPACE is often criticized for not taking care of the dealer problems, or the zoning problems, or the pricing problems, or the equipment spec problems. I think SPACE is wise to concentrate its limited funds, limited time and limited resources on those problems that affect **all** of us at one level or another. To ask SPACE to solve **every** problem everyone of us has is clearly not realistic.

If the dealers feel they need better dialogue between one another, then there is a need for a trade association that focuses just on that aspect of the dealer's world. To ask that a dealer association get involved in financing packages, insurance packages, warranty plans, group health insurance, consumer shows, video tapes, publications and what have you is to ask for the impossible. If the concept is good, the dealers will support it. If the concept is bad, no amount of hype and overly ambitious planning can make it fly.

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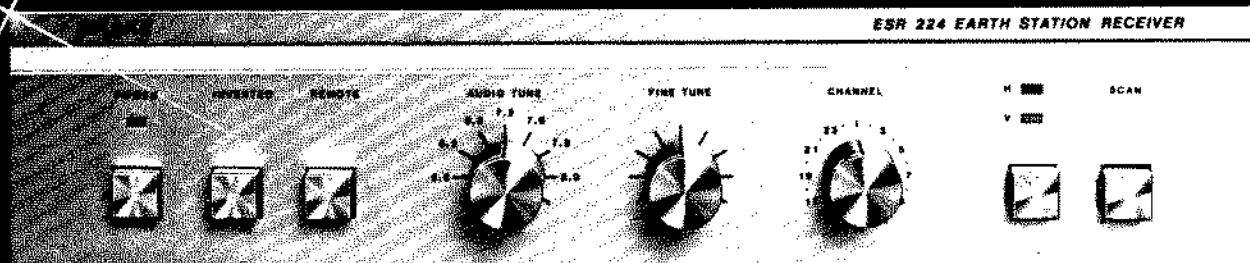
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