



**COOP'S  
SATELLITE  
DIGEST**



**MARCH 1983**

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**TOP OF THE MONTH**

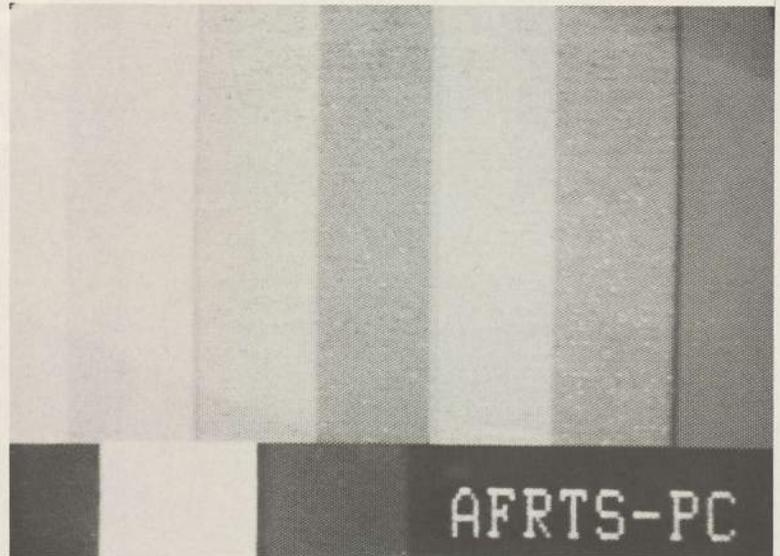
**THE FUTURE.** Change in the satellite world is now pretty much taken for granted. What we may not take for granted, or expect, is the magnitude of the change. There are several looks at what the future holds in store in this issue; including a 'the-future-is-now' piece explaining how the **Armed Forces Radio** (and) **Television Service** (AFRTS) is now sending 24 hour per day **American** television through satellite to Europe, Africa, South America, the Middle East and portions of Asia! If that doesn't open up terminal sales in those portions of the world this year, we will be very surprised.

**DURING** December we visited with one of the (we hesitate to say "the") pioneers in scrambled, premium television; **Ike Blonder** of **Blonder Tongue Labs**. Ike's vision has always been good. He has never been fearful of telling people what television **should** be like, or how it **should** function. We look at several of his views regarding the future of scrambled television in this issue.

**COOP'S COMMENTS** are lengthy this issue, covering a wide variety of subjects. Included is an inside look at the production of a U.S. national television report for **ENTERTAINMENT TONIGHT**, on the WIV pioneer satellite fed broadcast system in the Turks and Caicos. Can you imagine spending more than \$5,000 per minute of air time for a 'news' show? Read on.

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**OUR COVER** — The Honourable Norman Saunders, Chief Minister of The Turks and Caicos Islands (left) being interviewed by Scott Osborne of the U.S. television program **ENTERTAINMENT TONIGHT** for a piece scheduled to air during late February or early March. Cameraman Don Hunt (right) was part of the four person crew creating the report late in January on Providenciales. Twelve foot dish by Paracclipse; bright sunshine by the Creator.

**COOP'S  
 SATELLITE  
 DIGEST**



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## COOP'S SATELLITE COMMENT

- **WARNING: Shows Can Be Dangerous!**
- **ENTERTAINMENT Tonight**
- **MPAA WRITING U.S. FOREIGN POLICY**

### EXPEDITION to Sri Lanka

For several months I have been working on a project which really got started more than three years back. Shortly after **CSD** began publishing (October 1979) it occurred to me that we, as an industry, owed our very being to **Arthur C. Clarke**. True, Arthur did not build the first satellite. He only conceived the satellite system. Still, without his brilliant mind and his far-ahead-of-his-time thinking, no telling when satellites would have happened. Our first, inaugural, **CSD** issue carried a reprint of the famous **Wireless World** article penned by Clarke in 1945, explaining to everyone old enough to read how geostationary satellites might work. If you don't have a copy of this issue of **CSD**, it is available in the **CSD Anthology**, Volume One. Anyone who earns a living in this field should have that volume on their bookshelf.

I suggested, late in 1979, that the industry should repay Clarke by taking a TVRO to his home in Sri Lanka (for the old timers, that used to be called Ceylon). Nobody jumped up and volunteered in 1979. Perhaps the fact that Sri Lanka is almost exactly half way around the world from the mid-west had something to do with the reluctance to join in this gift to Clarke. More likely, the industry's pioneer manufacturers were simply too poor to afford such a trip, and the luxury of giving away a terminal to **anyone**. I allowed the idea to hibernate and set about getting the industry healthy.

This past fall I revised the idea with a few friends down for the Provo Retreat. There was instant **'Yes We Will!'** responses from all around. Then I went back to Arthur C. and outlined my plan. To say he was enthusiastic would be an understatement.

Clarke is currently up to his eyeballs in finalizing arrangements for the filming of **"2010: Space Odyssey II"**. A recent note from Clarke to me noted "(Steven) Spielberg due here tomorrow . . . **MGM and 20th Century-Fox still locked in combat** (over who will have rights to film story) . . . **hope to get latest gory details shortly**". That **2010** will be a blockbuster movie is not in contention. That Spielberg would do the story well is not in contention. That Clarke has to put up with alot of Hollywood type hype to get his book onto film is obvious.

**Here is how the Sri Lanka trip shapes up.** I had originally planned to have two TVRO installations hauled to Sri Lanka; one 20 footer, and, one 12 to 14 footer. The 20 footer will be installed on the flat, third story roof of the Electrical Engineering Building of the University of Sri Lanka (Moratuwa U). This one will be a gift to the **Arthur C. Clarke Third World Communications Centre**. The President of Sri Lanka will welcome the group, host us while in Sri Lanka (along with Clarke), and there will be massive publicity for the firm supplying this antenna.

The 12/14 footer will be installed at "Leslie's House", the Clarke residence on Barnes Place in Colombo. To clear the heavy vegetation, it will probably have to go on the roof or be mounted on a tall column running up the side of the house. This will not be the first TVRO for Clarke; he had a 15 footer during the Indian SITE tests back in the late 70's, but as early readers of **CSD** are aware, it blew into a crumpled mass in a typhoon late in 1979. This will be the first Intelsat capable installation for the father of satellites, and you can already imagine the advertisements that will follow as various suppliers donating equipment to Clarke and the University of Moratuwa tell the world that **their equipment** was selected for this project!

Now, so see that there is good publicity for those who will be donating their equipment and time to make this work, I have arranged for at least one (and perhaps two) U.S. television productions to go with us to produce special programs on the installations, and the bringing-to-Clarke his first satellite TV service. There are other talks going on with some European broadcasting groups, and we may end up with worldwide coverage before we get done.

Initially, I was concerned that we might have some difficulty rounding up the equipment, and talent, to make the installations. That is not proving to be a problem! In fact, we may need an 'Air Bus' to get everyone there. Arthur C. has arranged with the Government for the immediate clearance of customs and immigration authorities of the entire band of people and equipment. Being met as we come in by the President of Sri Lanka gives you some idea of the importance being attached to the project.

**All of this puts me in a delicate spot.** Initially I went to several people (firms) that I had carefully deduced had the right type of equipment, expertise and funding available to capitalize on such a 'show'. Then word got out what we were up to, and numerous **other people** (firms) started calling to 'volunteer' their equipment and talent. When people who have **no equipment to sell** started asking if they could 'go along' I knew we had a potential problem!

My own plans are to head out of San Francisco with Susan and Kevin bound for Tokyo. With the assistance of somebody we all know, in this industry, I am planning to put on three days of seminars in Japan to teach Japanese electronic businessmen and engineers what the **real 4 GHz world** is all about. It looks like we may have nearly 900 people attending this series of seminars and obviously if you are in the manufacturing business and wanted to meet with **all** of the leading Japanese hardware manufacturers, this would be an excellent opportunity to do so. I have an agreement with someone in the industry already covering my 'appearance' in Japan, so how others who are in competition with that 'sponsor' of me might work into this remains to be worked out.

**Then we'll head off for India** to stay overnight before jumping down to Sri Lanka. One of the U.S. television crews plans to do a story on the Indian Film Industry while in the area. I didn't realize that Indian film makers are the most prolific in the world, turning out hundreds of films per month.

Meanwhile, it is likely that at least some of those coming to install the two dish terminals will have arrived from the 'west', or New York, and be busy getting their panels and mounts and equipment laid out for the installations. We'll plan to spend five to seven days in Sri Lanka ourselves. Arthur C. has invited son Kevin to go diving with him. Clarke is building a private mini-motel-diving centre which will be ready by early fall and I don't need to tell the divers in the crowd what a thrill it would be to dive with Clarke and **Underwater Safaris**. Kevin and I will be hauling our own video gear to tape the whole 'expedition' and we have already arranged the 'rights' to that finished tape to be shown on US domestic satellite under the sponsorship of a well known US firm. So those of you who cannot go with us will have a detailed, we hope enlightening and fun, look at the whole affair along about Christmas time from the comfort of your own living rooms. I plan to talk extensively with Arthur C., on camera, while there to get his insights into where this revolution is taking us. You can count on seeing the same finished

program at some of the industry trade shows late this fall and early next year as well.

**Now the \$64 question.** How much room is there, to go?

I originally thought of this as a **small** expedition, perhaps involving no more than 10 people; including the personnel going to donate and set up the two dish installations. No way. We may end up with twice or three times that number.

There **are** certain economics in travel if the group reaches certain sizes and we all pretty much travel together. I am working on that. I'd like to keep this small enough so that the President of Sri Lanka doesn't get bruises on his hand from shaking everyone's hand as they climb off the flight from India. I'd also like to keep it small enough that Host Clarke does not feel he has been invaded by a band of slightly crazed 'Satellite Groupies'.

Still, I know how much people (firms) want to have **their** receivers, or LNAs or antennas installed in Sri Lanka. Fortunately the flat roof on the three story engineering building at Moratuwa U is quite large and it would hold more than a single dish. **It may look like a NASA test site when we finish!**

The spot I find myself in is deciding **which** firm gets to send equipment, and **which** people get to go. Since this is a once-in-a-lifetime opportunity, **never to be repeated**, and probably never to be topped in importance, I can understand why so many are captivated by the opportunity. **One of the possibilities** is that we 'move' the **Provo Retreat** scheduled for fall to **Sri Lanka** and turn the affair into a full blown double purpose gathering. I suspect we could talk Arthur C. into addressing the group on one or two occasions, and I can visualize all of the VCR decks grinding away as he talks about how this not only began, but where it may be headed. There is no greater visionary in the world today on this subject.

**I suspect many will try to corner me in Vegas to talk about this.** I welcome that since I still have an open mind about the expedition and am not yet numbed by the interest. I would suggest, however, that **even if** you do talk with me in Vegas that you **follow this up** with a detailed letter to **CSD** giving me your thoughts, suggestions, and what equipment (if any) you or your firm would like to see left behind in Sri Lanka.

The only potential fly I see in the ointment is the financial health of the industry. Right now there are plenty of 'advertising dollars' available in the larger firms to invest in such a project. If the industry stays healthy through fall, everything looks like a bed of roses. If we slip and falter, there will obviously have to be some adjustments.

**There is one scheduling problem** and that involves the November scheduled SPACE Show in Florida. It appears to me that we will want to leave a buffer of about ten days to two weeks immediately after the SPACE Show before heading off for the back side of the world. That would put us into the last week or so of November and early December. Clarke says that the seasonal (SW) Monsoons are all gone by then and "... **the weather and diving would be fine** ...".

I am very excited by all of this. Keeping it out of the 'three ring circus' category may prove to be difficult but I am going to try. I look forward to hearing from those who share the vision of an "**Expedition To Sri Lanka and Arthur C. Clarke**".

#### E.T. TWO (or One)

Those of you who wander through the orbit belt in mid afternoon (ET) have probably come across the satellite-syndicated program **Entertainment Tonight**. This is the original "E.T." since it got up and running before the movie of the same initials came out. ET runs on WESTAR IV around 3:30 PM and around 5:30 PM ET (**that's** eastern time!), usually on Wold's transponder 19. It also runs on 120 or so terrestrial TV stations, typically in the 5 to 8 PM time slot, often just ahead of the 8 PM (7 CT) start up of network programs. They tell me it has around 30,000,000 viewers a week, which is not bad.

Our November issue of **CSD**, reporting on the trials and tribulations of building, and operating, a 'national television network' down here in the Turks and Caicos, caught the attention of some of the folks at ET. Yes, we have subscribers spread throughout the broadcast trade. You'd be shocked if you knew some of the people who are reading this right this very moment (Hi Jack!).

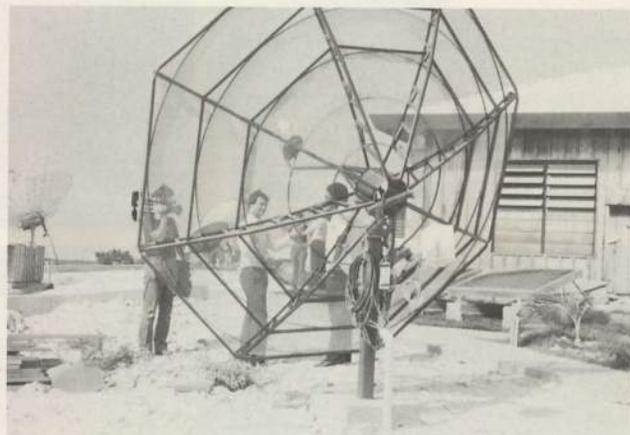
**ET contacted us in January.** They wanted to send a crew down here to Provo to do a story on our 'network.' I think the part about the

islander's unusual attitudes towards sex on television got them interested, first. My first inclination was to say no. **SatGuide's** David Wolford used to bug me about coming down here to do a story on us. I told him 'no thank you.' Just to put that into perspective, I said the same thing to a representative from **TIME**. I am not looking for publicity. We average a dozen 'strangers' or more a week during the winter just 'dropping in' without **any** overt publicity and I don't encourage people coming down to find out how we do things. I feel like we live in a zoo half the time as it is.

I casually mentioned ET's request to Susan. Normally she is far more against 'drop ins' than I since she still remembers the hordes who used to descend on our Arcadia (Oklahoma) home after every new magazine article or television network appearance. She also remembers the guy who hired a helicopter right after the fabled October of '78 **TV GUIDE** article, to fly a spiral around Oklahoma City while he searched for a dish antenna on the ground. He found us after three hours of looking, marked our location on the map, and then drove up to our door on a Sunday morning 'demanding' to see me. I don't blame her for wanting a little privacy.

To my shock she said "**Let's let them come down.**" Since I have almost total faith in her intuition, I reconsidered. She likes the show and felt that they might do the Turks and Caicos Islands some good. Heaven knows our little country has no budget to buy fancy commercials like Jamaica and the Bahamas do, so some editorial coverage that attracted people to the islands (as long as that was not also to our house!) might be good for 'our' country afterall. So I told the ET crew to "come on down."

My contact was Don Hunt of **Don Hunt Teleproduction**, out of Nashville. Don, it would turn out, owns his own TVRO. He would also turn out to be one of the most creative field production/camera people I have ever witnessed at work. Out of Hollywood would come Barry Simon and Scott Osborne. Scott does the hosting of pieces that he creates with Barry.



**HUNT, Osborne and Saunders** through the Paraclypse 12 foot dish during an interview session out of doors. **ET strikes again!**

We spent the first day shooting tape on top of our transmitter 'mountain,' and then they followed me (tape rolling) into visit with some of our commercial sponsors, and into the local supermarket where people stopped me to tell me what they liked and did not like about the previous night's television. Scott called that 'Instant Nielsens.' Barry especially liked it when 'Fast Eddie' (a local restaurant operator) cornered me and gave me a tongue lashing for showing a 'dirty movie' in mid-day. He caught me off guard since no 'dirty movies' had been scheduled. I did notice his TV was off when we walked in. I flipped it on and **there** it was; "**The Postman Always Rings Twice.**" Good grief! The local Provo power had apparently 'glitched,' and when it came back on the 'switcher' (this selects which program source goes to 'air') had flipped itself to a 'non-approved' program channel. **Ooops.** To make matters worse, the movie had come up when the national Minister of Education (a 'clean pro-

**CONTINUED/ page 58**

# Paraclipse

HIGH PERFORMANCE  
SATELLITE TELEVISION SYSTEM

## Study the Choices

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

## Design Criteria

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

## System Performance

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



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## Solid vs Mesh

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

## Modular Components

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

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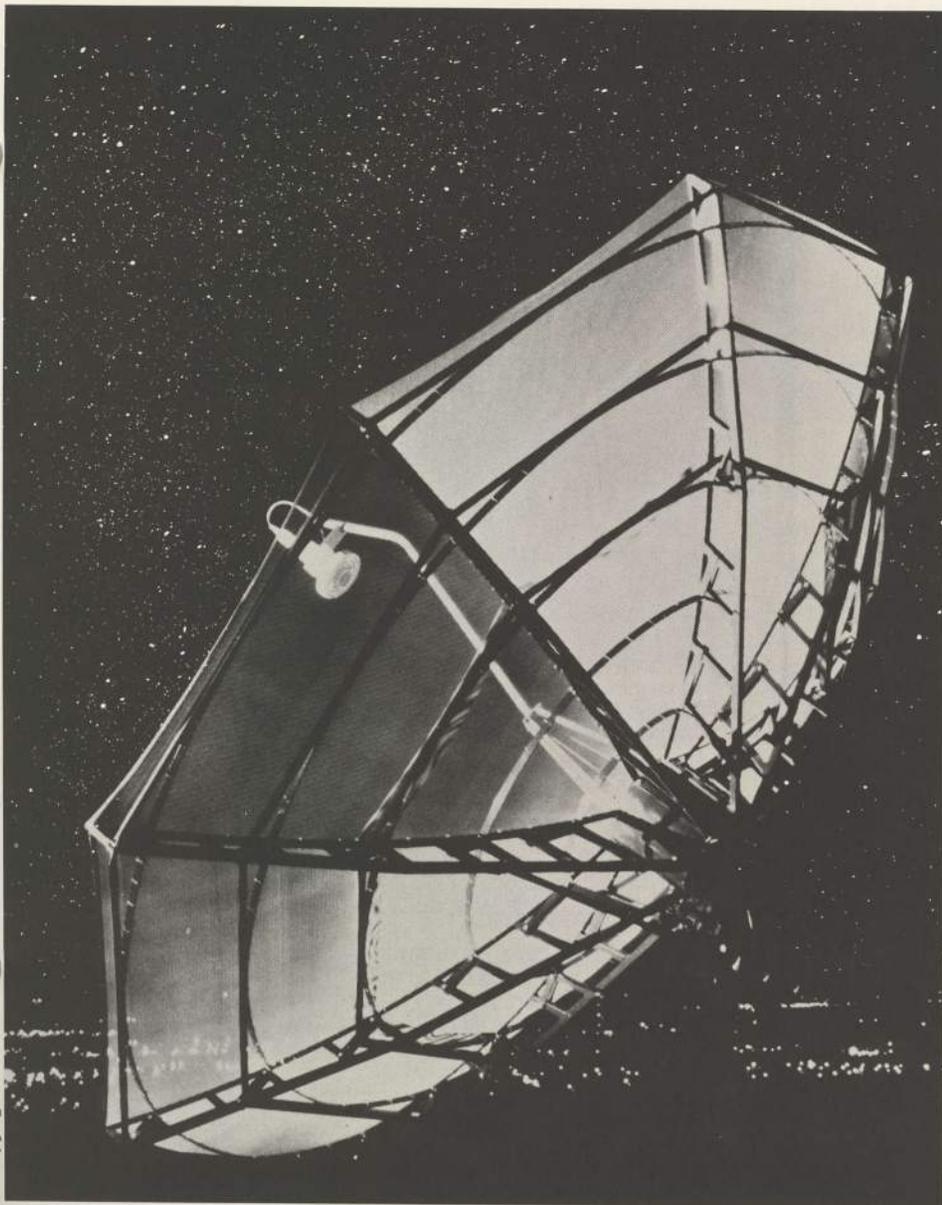
# Paradigm

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## Polar Mount

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## Production Capacity

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

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



## AFRTS BEGINS

### UP/UP and Away

On Christmas eve, in the western hemisphere, the (American) Armed Forces Radio (and) Television Service (**AFRTS**) became an international television network. The fall-out of this new inter-continental American based service may be considerable.

More than two years ago RCA signed a contract with the Department of Defense to plan an international television system to carry American television programming to distant points on the globe. This particular project was fueled by the American reaction to the change in government in Iran, and the subsequent hostage-taking by the Iranian government. You may recall that one of the concerns of American foreign policy at the time was the apparent inability of American forces to be ready for whatever might happen in the Indian Ocean area. Without Iran as a friendly country from which to base operations, there was a void to be filled. A small island group in the Indian Ocean, Diego de Garcia in particular, was chosen as a forward base for American rapid deployment forces. Today, uncounted thousands of Americans, military and civilian experts, are housed in this Indian Ocean enclave. Naturally they have television, for no American group travels and stays very long very far from American television. Unfortunately the television they have been forced to watch has been quite long in getting there. AFRTS, the Department of Defense, and RCA set out to correct that. The new 'international AFRTS' is the result and as a side result of all of this, 24 hour per day, live, American television is now visible throughout all of Europe, a good part of Asia bordering on Europe, virtually all of Africa, major portions of the Indian Ocean and through the Indian sub-continent. Now, American troops in the Indian Ocean can **wake up to Johnny Carson** and **go to bed to Jane Pauley**. Life may be turned around in the Indian Ocean, but it is 'live' life none the less, and AFRTS is making it happen.

The 24 hour per day AFRTS service is collected at the RCA Vernon Valley site in New Jersey. ABC, CBS and NBC programs, along with approximately 12 hours per day of CNN (each day differs



## INTERNATIONAL U.S. TELEVISION

and weekends favor network sports) make up the collective 24 hours AFRTS day. RCA collects CNN from F3R, ABC, CBS and NBC from either direct network microwave feeds out of New York City, or from other satellite feeds, and packages the entire service for uplink initially on F2 (119 west) on transponder 20. You can, within the North American reach of F2, see **that** service. This is simply an 'inexpensive' way to get the packaged service up to Andover, Maine where COM-SAT operates an Intelsat uplink. The service leaves Andover on (American) TR3 headed east to an Intelsat bird located at 1 degree west. No point in looking for this one unless you are in New England; the limits of visibility apply and it does not make it inland, even to Miami.

What it does cover is virtually all of South America, every part of Africa, every part of Europe, and as far east as Lake Balkhash in central Russia, south to the very tip of the Indian sub-continent. Those are, of course, at the **edges** of the visibility limits. One can presuppose that Moscow (look angle 9 degrees) has wasted no time getting a terminal in and operating!

The Intelsat bird at 1 west is apparently in a state of transition. What it will eventually be, a IV series A bird, and what it apparently is today (still believed to be an IV series bird) may ultimately have considerable impact on the performance of the system. If it is, as you read this, **an IV series bird**, it will have an elongated figure 8 curve to its flight formation, wandering as much as 2 to 3 degrees north and south of the equator as it attempts to maintain a geostationary location. At least one observer in New England (**John Drew**, Mystic, Ct.) found it 2 degrees north of the geo-stationary orbit position early in January. If the bird is continuing to fly in the figure 8 pattern (see **CSD** for November, 1982; report by S.J. Birkill on figure 8 birds), systems that attempt to access the bird **without** some way to adjust the dish north and south tracking (see article by John Drew, February 1983 **CSD**) will have to keep checking until they find the bird near to its equatorial crossing point.

On (American) transponder 3, this bird is carrying its audio on a 6.8 MHz sub-carrier which some sources report is grossly 'under deviated.' This is the same, if the reports prove accurate, to operating with a narrow band type of FM system. At least one other report, from a Middle Eastern terminal, notes finding the audio some five transponders **higher** on an SCPC carrier. The system **may** have been utilizing both methods of audio transmission when it first cranked up, but apparently it will settle in with the more or less standard 6.8 MHz audio sub-carrier format when all of the initial kinks are out of the system.

The Global transmission pattern will have a 22 dBw footprint at beam center, dropping to 19 dBw at the edges. However, the pattern is not equal in all directions and many locations may experience increased signal of from 1 to 2 dB above the projected levels. This translates to a good quality 6 meter dish in the favored boresight regions gradually dropping to a 7.5 meter (or slightly larger) dish in the fringes of the visibility limits. Not your typical backyard type terminal, but not an impossible situation either. Oh yes, right hand circular polarization will get you the full effect of the Global pattern. A linear feed will lose more than 2 dB of the signal present.



AFRTS WORLDWIDE Service is launched via Satcom F2 at 119 west, linked to Andover, Maine for re-uplinking to Intelsat at 1 west.

**MEANWHILE/ Planned For The Pacific**

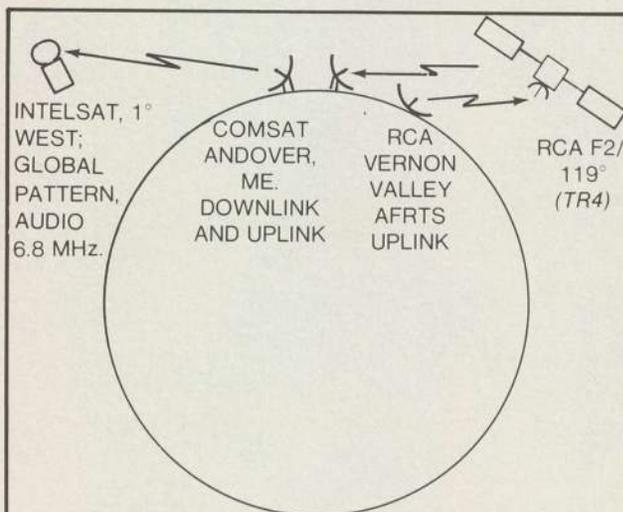
The expansion of the AFRTS service to a true international delivery format is actually just beginning. The 1 degree west location was chosen primarily because it is far enough east in the Atlantic cluster to allow some coverage into the Indian Ocean region. It is as far east as can be 'hit' or seen from the COMSAT/Intelsat uplink at Andover, Maine and of course a largely un-used Intelsat spot (and bird) was on station there. By shoving the bird as far east as can be seen from Andover, the service picks up the Indian Ocean region (and the target area of Diego de Garcia) with a **single hop** from North America. That is important to RCA, and AFRTS, since each hop 'costs money.' Intelsat does not donate their transponder space to anyone; the Department of Defense included.

The exact start-up date for the Indian Ocean service was of course timed to coincide with the Christmas season period. Steve Birkill in England, with his 8 foot dish, was among the first to spot it and report its presence. No major announcements of the service start-up were made, however.

Quite the opposite is apparently true for a Pacific Ocean expansion of the same AFRTS system. Based upon bid requests now circulating in the TVRO industry, AFRTS plans to begin service to widely scattered areas in the Pacific in August of this year. Present plans call for the same service now being beamed to 1 degree west to be beamed to one of two new IV-A series birds scheduled to take up service in the 180 west (or east) region over the Pacific. Birds previously in use by Intelsat over the Indian Ocean, IV-A (F6) and IV-A (F3), are slated to take up station over the Pacific. They are to be several degrees apart and replace the older IV series birds now in operation for the Pacific. The IV-A series birds coming to the Pacific, on a drift from the Indian Ocean prior locations, were replaced by new V series this past fall. One of the first locations scheduled to get a terminal, **for American forces use**, is located in the Philippines just outside of Manila. Dozens of others will follow.

The AFRTS service planned for the Pacific region is separate from the newly begun CNN/NBC service to Australia, also through the Pacific bird(s) (see CSD for February, 1983). Unlike the Australian service, which inter-twines a pair of video signals into a single transponder, thereby requiring highly complex equipment to separate the two signals into individual baseband 'channels,' the AFRTS signal will not be scrambled and will be available to any terminal with sufficient sensitivity.

With a bird located at 1 west for the first region served, and a second bird fed from the west coast to handle the vast Pacific region, the majority of the world will have access to AFRTS television. Possible link-up to an Indian Ocean region bird is under consideration, but given little chance for approval during the next few years. If you are interested in plotting which portions of the world would not be covered,



**PRESENT GENERATION AFRTS SERVICE USES INTER-CLUSTER LOCATION AT 1° WEST TO COVER EUROPE, AFRICA, INDIAN OCEAN ARMED FORCES SITES (SEE TEXT).**

if AFRTS stays with the 1 west and 180 west (east) birds only, drag out an atlas or globe and find the following regions (**not covered**):

- 1) Between 77 east and 93 east (with very low look angles on the edges);
- 2) Between 115 west and 72 west (with very low look angles on the edges).

The above 'lost' regions reflect the east/west borders at the equator, and north and south of the equator the lost regions 'pull in' closer to the bird location(s) resulting in pie-shaped lost coverage regions broader at the top (north pole) and south (south pole). A quick study of an atlas will reveal no significant land areas, with American forces known to be stationed, will miss coverage with the pair of birds operating.

**PROGRAMMING and Marketing**

The initial Atlantic Intelsat system is in a period of maturing. A sizeable portion of the broadcast day, for now, is from **Cable News Network (CNN)**. **NBC** currently provides the **TODAY** and (Johnny Carson) **TONIGHT** shows while all three networks provide major sporting event coverage. The concept with the network is to use the satellite feeds as a 'network feed' to local terrestrial AFRTS transmitters scattered around the globe. Entertainment programming suffers little when delayed via videotape; news and current events oriented programming, plus sports, suffers if delayed in transit, of course. This concept is not likely to change as the system expands. Entertainment programming will probably continue to reach distant points via tape delay.

When the Pacific zone IV-A bird is ready to start relaying programs, the Atlantic 1 west situation should have settled down to a bird that nominally maintains geo-stationary orbit position. This may have happened already, as you read this. The 1 west location has been a contingency spare location for Intelsat for many years, occupied by the very first Intelsat IV bird ever lifted into orbit. It has had large north and south excursions across the equator for years and as Steve Birkill reported (CSD for December, 1982), it had been considered a likely candidate for North America to Middle East/Indian Ocean relay for AFRTS for several months.

**NOW** — who can use this new Americanized service? There is already considerable joy in Europe. The long-sought US television service is now available, even if only on larger terminal dishes. Ted Turner has been looking for a way to get his first service into Europe and CNN is certainly a major part of the AFRTS mix. **Unfortunately**, for consideration by the new generation of European cable TV systems, this service might as well not even be there. Why?



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## CHAPARRAL

The AFRTS service is not capable of being licensed for use by any non-military installations. A cable system serving a town in England might be able to put a dish in for the service; but it would never get the necessary approvals to carry the signal. That does not address individual terminals accessing the service, nor does that address terminals installing the service for MATV applications in self-contained locations (such as resort hotels and the like). In each individual case, since AFRTS approval will not be forthcoming, use of the service 'legally' will depend upon the laws within the country in question, and the commitment to enforce those laws by the respective national authorities. 'Thinking' European satellite terminal sellers are aware of this, and while they don't like having their selling market 'restricted,' they recognize that in spite of the technology, there are certain things that simply cannot be done.

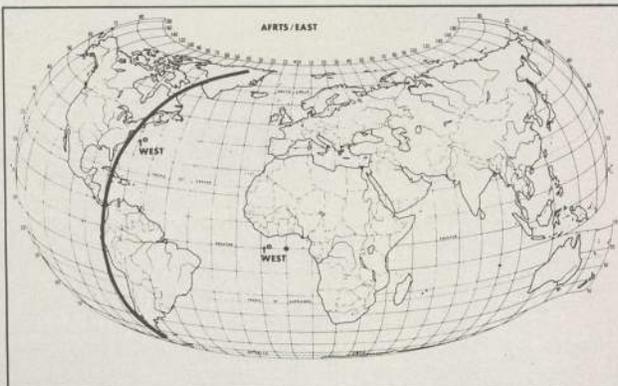
Readers may recall that in our November (1982) issue analysis of what it will take to get the private terminal industry to fly in Europe/Africa and the Middle East, we came to the conclusion that live, American style news would be a substantial 'sales tool.' For the near term, this suggests that the market for large-style non-commercial terminals sold on the basis of the availability of this service (plus up to several dozen others, of course; not from the USA) should number in the thousands of units. That's good news for those equipment packagers capable of playing in the six meter and up league. It may not rule out optimized smaller terminals for the same service.

One of the design tricks most system planners have ignored through the years is total system optimization for a single transponder. The concept that the 'sky is full,' and any terminal worth its salt must have full sensitivity capabilities over all 500 MHz of bandwidth has kept us from looking at alternate methods of achieving better pictures on perhaps a limited portion of that bandwidth.

Most of the system feeds give away sensitivity when they are forced to 'broad band' to cover all of the 500 MHz satellite bandwidth. Up to .7 dB additional carrier is, in theory, available when the system feed is optimized for a 'narrow segment' of the bandwidth. Similar narrowband improvements are available in the LNA area. LNA manufacturers spend considerable time insuring that their units have flat system response, with only very small variations across the full 500 MHz bandwidth (see CSD for February, 1983). An LNA designed, or tuned, on purpose, to give peaked response in say a bandwidth of 50 to 80 MHz (a transponder is 40 MHz wide) can achieve noise figures in the 65 degree region with careful tuning. That is another 1 + dB to be realized for an optimized system.

In theory, additional improvements in the system are possible if the receiver down converter is optimized for only a portion of the normal bandwidth. All told, it is possible (on paper anyhow) to achieve as much as 2.5 dB additional system carrier sensitivity in a narrow portion of the band with any system that was previously optimized for the full bandwidth. That is another way of saying that if a six meter terminal provided adequate reception for the full 500 MHz band, with an AFRTS optimized service, a terminal in the 14/16 foot region could do the same thing for a single transponder or two.

The wisdom of marketing an 'optimized' terminal is debatable, but it does reduce the overall antenna size required and may in some situations prove to be the only way that a terminal could be sold and installed in a distant, remote location. At least one manufacturer of a



TUE 18 JAN 83 1 OF 5

(TODAY'S SCHEDULE)

2330 ABC NEWS

2400 NBC NEWS

0030 CNN CONTINUES

0330 MACNEIL/LEHRER

0400 CNN SPORTS TONITE

0430 NBC TONIGHT SHOW

0530 ABC "VIEWPOINT"

PREEMPTS NIGHTLINE

JOHNNY CARSON Tonight Show, Today Show, ABC news and sports are primary network fare currently in schedule; in addition to CNN.

high performance 12 foot antenna is looking closely at an optimized system in the 14 foot region. The biggest danger in optimized systems is that the transponder assignments are not cast in concrete and where AFRTS may be today, somebody else may be tomorrow. Field retrofitting a sizeable number of terminals, from say transponder 3 to transponder 22, could be a formidable travel experience. That negative aside, there is interest in this approach nonetheless. And the dollar savings to the ultimate user could be in the 40 to 50% range; not insignificant.

#### WHERE To From Here?

As with the first US domestic transponder services, the AFRTS package is a first 'worldwide' American television service, and it has a considerable amount of 'growing up' to do. Because it is government funded and operated, overnight, sudden changes are unlikely. AFRTS is not in competition with anyone, and they will make changes slowly and as the funds become available.

Between the Pacific and Atlantic feeds, what this service does not do is give Ted Turner his desired worldwide reach for CNN; in spite of the ready, major-day-part availability of CNN virtually worldwide. The Pacific Ocean Turner service, targeted to Australia and Japan (see CSD for February 1983) is not usable even on big terminal systems in the region unless they are equipped with the highly complex Thompson/CSF decoding system that interleaves a pair of signals into a single transponder. The AFRTS Pacific service will give



AFRTS TREATS operation as 'network link' combining advisory notices to 'station managers' with program feeds.

Turner un "scrambled" coverage, but only for a part of the day (the balance being taken by US networks). Twenty four hour per day Turner is still elusive in the Pacific. And the same problems repeat with the Atlantic feed.

What it may do, on an 'unofficial basis,' is put sufficient of Turner's CNN into the air that it can be 'demonstrated' to prospective clients, and governments, in Europe, the Middle East and Africa. Given sufficient **live** exposure, it could **help Turner** get there on his own with a regular 24 hour per day Turner feed.

One of Turner's problems, to now, has been finding a suitable bird that could be uplinked from the states and still reach into Europe with useful signals. Intelsat has offered lower rates for certain types of (pre-emptible) service on its older birds. The IV-A bird seated at 1 west could well qualify, and while the cost of uplinking through Andover, Maine to that bird would not be insignificant, it **is a new option** open to the Turner organization. Nothing is static in this business and the prospects now appear brighter for a Turner created European cable feed.

## CONVERSATION

## WITH IKE BLONDER

### THE FUTURE Is Not Clear

Isaac S. Blonder is Chairman of the Board of Blonder-Tongue Laboratories, Inc. (One Jake Brown Road, Old Bridge, N.J. 08857). Blonder and partner Ben Tongue began building MATV products in a 'loft' shop north of New York City at the dawn of commercial television in the United States. From that humble beginning, 'B-T' products have encircled the world, bringing to millions and millions their first-time television.

Blonder's contributions to the growth of television number in the hundreds of individual developments, creations, patents and products. Ike has served on virtually every important industry and FCC sponsored committee since the dawn of television. But few realize that Mr. Blonder and Mr. Tongue are really the fathers of subscription television in the **real world** and with that distinction goes the further recognition that to be the fathers of subscription television (STV), they must also be the fathers of 'scrambling.'

Ike has a detached view of the present state of scrambling. His firm manufactures a scrambling system, and it is widely used by many of the larger STV broadcasters. He will admit that neither his scrambling system, nor those created by others, is 'engineer-proof.' He does like to point out that those broadcasters who have selected his 'BTVision' system have not been plagued by the mushrooming growth of underground hardware suppliers. He does not suggest that the 'BTVision' system cannot be defaced; only noting that for whatever reason others, such as the Oak system available in Los Angeles, has been forced to repeatedly go to court to prevent unauthorized manufacture, sale and distribution of 'descrambler' boxes.

In Ike's view, "**What one engineer can do to make a picture unintelligible, another can undo . . .**" and he notes the **real** security is found in making the cost of descrambling a signal so prohibitive that it is no longer cost effective for somebody to try to 'compete' with the authorized source of units.

The history of subscription television, and scrambling, is important. If you understand what efforts were mounted in years past, you will develop a better understanding of why today's techniques are employed. Not all of the history, however, is strictly electronic. STV has been a hotly debated, much argued technique from its first dawn. Hundreds of millions of dollars have been raised, invested . . . and lost, in getting STV to its present tenuous state.

Long before there was commercial television, there was an effort to create 'Pay TV'; an euphemism for subscription television. Way back in 1929, Eugene McDonald committed his firm (Zenith Radio

Corporation) to 'pay television.' One year later, in 1930, a fellow named Sol Sagall set up a firm to develop his viewer supported system; 'Scophony.' It would turn out that Scophony, in spite of its unlikely name, would be the first to demonstrate a system, opening up in a pair of theaters in London in 1938 using large screen projection television!

The war would shut down further development, and it was 1950 before subscription television got started again in the United States. That was the year Paramount Pictures engaged in some experiments utilizing the facilities of Los Angeles television station KTLA. They called the system 'International Telemeter' and the tests didn't prove very much.

But another test conducted in 1950 had different results. Scophony, re-named 'Skiatron Subscriber Vision' managed to put together on the air tests using New York City's WOR. The tests were repeated, and ran longer, using the facilities of Hartford, Ct. station WGTH, in December of 1954 and January of 1955. All told, more than 350 hours were broadcast, and movies were the program fare.

It was in 1951 that Zenith introduced 'Phonevision' in Chicago and it was in 1953 that International Telemeter took the tests out of the air and placed them on cable, using the facilities of the Palm Springs, Ca CATV system. In 1955, Blonder Tongue Labs, less than a decade young and heavily involved in the MATV and CATV hardware fields, began an R and D effort aimed at 'Pay TV.'

**The first**, major effort to make Pay TV work came in California in 1962. A firm with the unlikely name of STV Corp. installed cable TV plants in Los Angeles and San Francisco, using Bell Telephone facilities. The effort ultimately failed, but only after more than \$20,000,000 was spent. The California theater operators mounted an intensive anti-STV public campaign resulting in law suits and restraining orders and a long list of legal problems for the would be pay or subscription business. Years later, the courts would rule in favor of STV Corp but by then the money was gone and the damage was done. Had this effort not failed, the progress of subscription television would have been off and running more than a decade before HBO started it all in earnest with the September 1975 launch of their service via satellite.

**It should be noted** that while the efforts seemed to shift from over the air 'Pay TV' in the 50's to cable 'Pay TV' in the 60's, the rules were

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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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changing. Even if only for a temporary period of time. When the signal was 'in the air,' there had to be a 'security system' in operation, or there would be no way to fund the system's operation. When the signal was only being transported by cable, the 'security' was the integrity of the cable system, and if the cable operator did a reasonably good job of policing who connected to his system, and under what terms, there was little reason to worry about more complex schemes to protect the 'product.'

The tests in the 50's demonstrated some interest in over the air 'Pay TV.' The same tests attracted fierce opposition from a number of quarters; existing broadcast networks and large broadcast operators, in particular, saw over the air Pay TV as a direct threat to 'free TV.' The FCC first tackled the problem in 1955. They did not know whether they had the legal authority, under the Communications Act of 1934, to license broadcasters to engage in subscription television over the air. Twelve (!) years later, the FCC decided it **did have** the authority to grant STV licenses and they proposed a set of rules. That was 1967. Two years later, the United States Supreme Court ruled that the FCC did, indeed, have the proper authority to grant STV licenses. The Supreme Court got into the act because networks and broadcasters took the FCC to court.

The FCC compromised to get **any** rules adopted; effectively limiting STV to a handful of larger cities (markets), and then by some clever small print rules, just about eliminating VHF stations from playing with STV. The broadcasters got pretty much what they wanted; STV would become a UHF TV 'option' and the broadcasters were not too worried at the time about STV making much of a dent in the way they liked to do things.

However, it was not 1970 or even 1971 when the first over the air STV system got started. **It was 1977.** The first station to go on the air was conceived, designed, funded and built by Ike Blonder and some friends. Blonder, incensed that nobody was seemingly willing to even try the new technology, finally decided to put his own corporate position in some jeopardy and get STV 'on the air.' And so, channel 68 began broadcasting from a northern New Jersey suburb, attempting to sneak into the New York City market from the west. Ike's station pioneered STV, although years later it would be traded off to Wometco-Home Theater after losing far more money than Ike likes to think about.

### Techniques

While others were wrestling with the relatively simple problems of putting subscription television on cable, Blonder Tongue plunged into a series of development programs dealing with the more complex problems of over the air 'Pay TV.' The first products to be introduced came out in 1955. Many of the systems developed would look great in the laboratory but fail miserably in the field. Others would look great both places, but then fall under the FCC's ax as the broadcast rules governing technical standards changed. One system, that transmitted a pair of (black and white) signals on a single TV channel was dropped when the FCC firmed up color transmission standards; for example. Through all of this, money was spent and re-spent. Zenith's McDonald, for example, may have spent more than \$70,000,000 on getting over the air subscription TV developed and FCC approved, between the initial 1929 announcement and the 1970 FCC authorization of a subscription TV format. Zenith bowed out of the subscription field just as the FCC finally gave STV its stamp of approval. \$70,000,000; gone, but not forgotten.

The concept of (over the air) subscription television is based upon the transmission of intentionally scrambled television programming. The system works, as a financial investment, because the signal can only be descrambled at approved receiving sites equipped with the appropriate receiving decoder equipment. The success of the system obviously turns on the extent that the signal stays scrambled, the extent of the scrambling security, and the ability of the programming firm to continue to offer worthwhile programming which subscribers are willing to pay extra to receive.

Scrambling or encoding of the signal is accomplished using standard commercial television hardware in conjunction with a special STV 'encoder.' The entire encoding/decoding process occurs within the normal 6 MHz bandwidth of a standard television transmission; or the standard 40 MHz wide (36 nominal) bandwidth of a satellite transponder bandwidth. The encoding/decoding process should not

introduce degradation to the original picture quality. A basic system is shown here in block diagram form.

Most common scrambling techniques used in existing systems are a compromise between required levels of security and the cost of the hardware. Any system operator using an encoding/decoding system must be able to recover the cost of the hardware (both the encoding or station hardware, and the decoding or subscriber hardware) from his revenues. Decoder manufacturing costs, installation costs and maintenance costs are a major concern to any potential user of a scrambling system. Production volume, for the common element (the subscriber decoder), also enters the picture; big production volumes do indeed bring down individual decoder units costs. But not as substantially as you might suspect since certain portions of the decoders do not lend themselves to full assembly line, mass-production, techniques.

There are only so many, known, ways to scramble an analog (i.e. not digital) video program. All of the existing systems use one, or a combination, of the following:

- A) **Suppression or offset of picture synchronization pulses;** (The video signal consists of the actual picture information and special signals that direct the picture element data to 'line up' in a precise point on the screen, recreating on the picture tube the original picture. If the special/sync signals are reduced in strength, or re-arranged in the transmission process, the picture elements arrive at the picture tube with nothing to tell them **where** they should 'line up.' The result is a picture that drifts and floats and generally is disorganized.)
- B) **Inversion of the video signal;** (The video signal has an 'erect' and 'non-erect' status. Certain parts of the picture information 'points' in a specific direction. The encoder can turn the picture around, so that it appears to be backwards or 'inverted' in some form. It becomes the job of the decoder to re-invert the picture to its original 'direction of flow'.)
- C) **Superposition of video and another signal of a defined waveshape** (i.e. sinewave, triangle waveform, etc.); (By adding a 'foreign' element to the picture, it distorts. The foreign element can be a relatively simple, 'basic,' energy form which can be eliminated from the picture at the decoder, thereby establishing the original picture.)

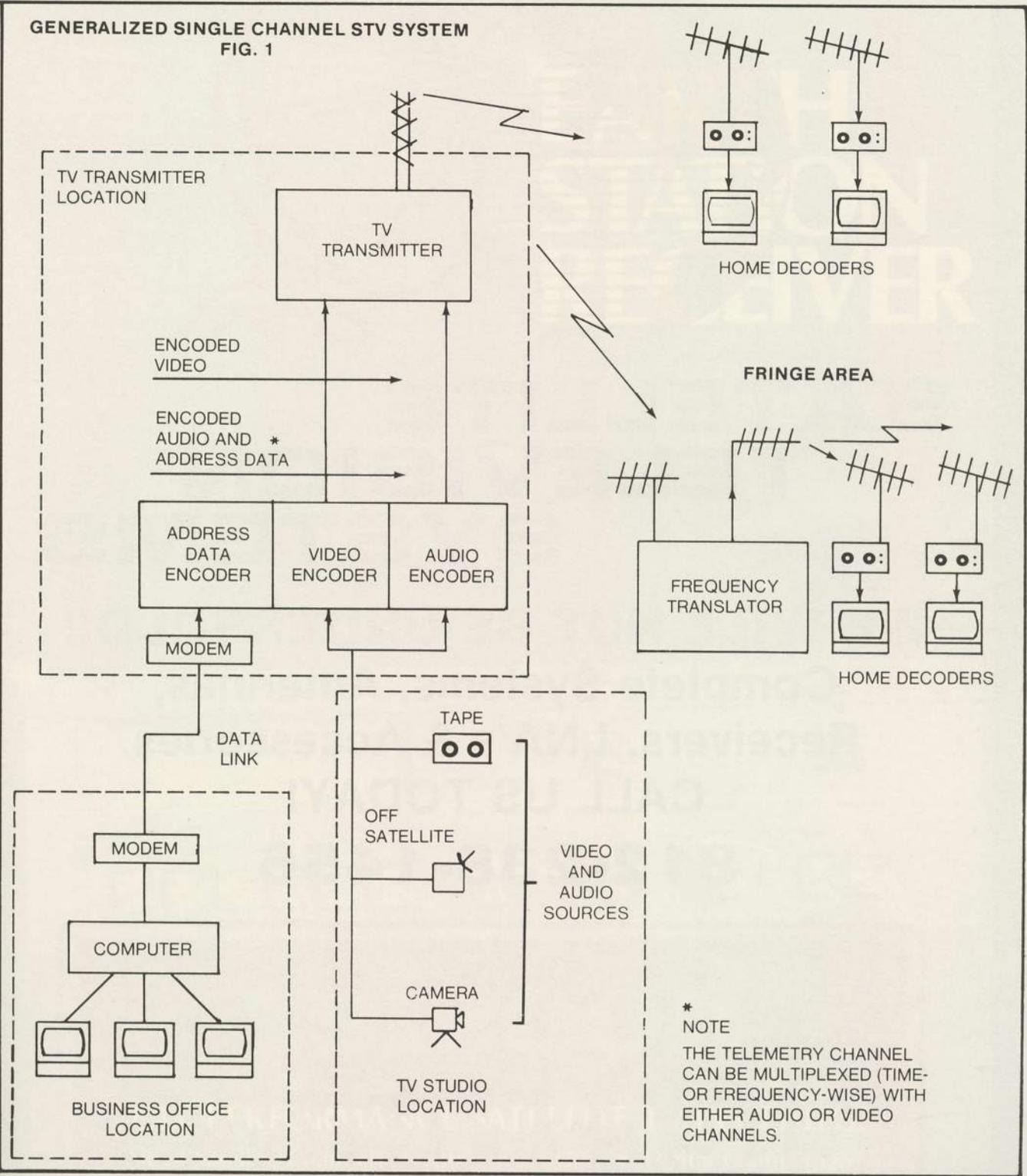
Of all of the various techniques possible, suppression of the sync signal(s) has become the most popular. Sync suppression is considered 'simple' by engineers and unfortunately it has also been found 'simple to defeat' by unauthorized receiving location tinkerers. It is attractive, nonetheless, because it is relatively low in cost to implement, and highly reliable in the field. To make up for the fact that the video may be 'soft scrambled' using this technique, some systems create an extra audio (sub) carrier to which they move the normal 'program audio.' The regular audio carrier is then modulated with what is called a 'barker channel'; it tells people who tune in the service that the picture is scrambled, and that they may call a certain (given) number to sign-up for the service. Often the extra audio (sub) carrier is placed **above** the 15 kHz point that cuts off the normal program audio carrier modulation, just out of 'ear reach' for the normal, home, TV set audio system.

To complicate matters for the would be provider of over the air subscription television, scrambling and its ability to withstand attempts to defeat it by unauthorized receiver locations is but the tip of the overall operations problem. A descrambler system initially contracted for by a subscribing viewer ends up in that subscriber's home. Even if an equipment deposit is collected, the equipment itself is no longer in the hands of the programmer. The viewer can, and will, often take the equipment to another location and once 'loose' the programmer has lost control of a revenue producing center.

**To make this less of a problem,** it was determined that each of the individual descrambler boxes would have to be capable of being 'addressed'; that is, turned on, and off, remotely and on command, from the transmission center. If the scrambling techniques were not enough of a design and operations problem, the addressing functions would change the name of the game.

Decoder boxes are controlled with telemetry data. Telemetry is

GENERALIZED SINGLE CHANNEL STV SYSTEM  
FIG. 1



simply a stream of electronic information, sent out along with the picture and sound, in coded form. Each authorized decoder location has an internal, unique, code inside. Each decoder authorized to receive the service has a code number assigned to it. The telemetry data is often transmitted on a continuous basis and it cycles through all of the 'code numbers' at some fairly frequent repetition rate (such as once per minute). Each time the decoder box receives the particular data code containing the **number** assigned to **that box**, the box is told

that it is alright for the decoder to continue to supply service to the viewer. If the box disappears, or is stolen, or if the user forgets to make his current payment, that individual code number is eliminated from the telemetry data transmitted. Failing to receive its own code number, the decoder box fails to produce pictures for the viewer.

As 'neat' as that sounds, unfortunately all that the addressing code

\* NOTE  
THE TELEMETRY CHANNEL CAN BE MULTIPLEXED (TIME-OR FREQUENCY-WISE) WITH EITHER AUDIO OR VIDEO CHANNELS.



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is really doing is telling some part of the decoder to turn on. For the decoder to receive the incoming codes, and in turn to know whether it should 'pass pictures' or not, obviously **some portion** of the decoder box must be running **all of the time**. It cannot turn off, completely, or it won't receive the telemetry data. That says that the telemetry data code operates some type of 'switch,' internally, within the decoder. The decoder box is on and running all of the time; the picture and sound are there alright. But an 'open switch' keeps that picture, and sound, from passing **all the way** through the box to the output connector that leads to the TV receiver. The 'switch' is not supposed to operate except when it receives the proper, coded, telemetry 'code' but clever technicians have found the switch in many of the units available. And they have figured out how to make the switch close on its own, without the code being received.

Undaunted, the STV programmers have determined that if they can transmit a stream of telemetry data codes to tell which decoders to turn on (and eliminate those, they hope, that do not receive 'their code'), they can also offer special programs to subscribers on a 'Pay Per View' (PPV) basis. That's when a blockbuster event, such as a world championship boxing match, comes along and normal programming is suspended and viewers are given the option of paying 'extra' just for that single event. Fees as high as \$20 have been asked, and paid, for major events on a 'PPV' basis. Those STV systems equipped with 'addressable decoders' can play in this game because they have the ability to turn on **just** those subscribers who have authorized the extra charge on their monthly bill. Those without addressing capability have to pass up PPV events since they have no way to determine which of their subscribers get the event; and which do not.

#### Transmission System

A standard commercial TV channel has a pair of carriers; one each visual and audio. The telemetry channel is often 'multiplexed' into one of these two carriers.

One commonly employed technique places the telemetry data into one of the non-dedicated video lines during the blanking interval portion of the picture transmission system. With 4 MHz of video data present, this lends itself to a high data rate (i.e. room for lots of telemetry information). However, this approach does have drawbacks. For example:

- 1) Sending digital (telemetry) data on the video carrier will usually require an additional video demodulator stage for the descrambling process (i.e. the first demodulator gets the video **with** scrambling while the second demodulator eliminates the scrambling).
- 2) Even with a 4 MHz bandwidth, by time multiplexing the telemetry with the video, there are some constraints placed on the system. There is no such thing as a 'free lunch'!
- 3) By adding the telemetry data to the video lines, during the vertical interval period, the 'blanking network' may have to be altered, and expanded, to allow proper video blanking at the end of each video line and while the telemetry data is being transmitted.
- 4) Video is AM (amplitude modulated) and unlike FM where high signal to noise ratios are possible, the AM (telemetry) data may not be usable unless the input signal from the antenna system is (exceptionally) clean. Thus there are problems with weaker signals, or those marred by 'multi-path' (i.e. ghosting).

So while it is possible to send the telemetry data 'multiplexed' **in-with** the video signal, it is not generally accepted as the best method of providing instructions and coding to the decoder units. Many of these problems are overcome by adding the coding and data signals to the FM (frequency modulated) **audio** signal. The audio signal is already FM (in preference to the noise-prone AM video signal), and it is possible to multiplex (as in add-to) the program audio the necessary additional signals, carrying them slightly higher in the (audio) spectrum as a part of the multiplexed-at-baseband audio input to the transmitter.

The proper selection of (audio) sub-carrier frequencies is important to system performance; especially in a 'nonlinear' channel environment. The telemetry data channel is dedicated to this function full-time, during both scrambled and non-scrambled transmissions. This increases the amount of data that may be 'throughput' during a 24

hour day.

#### Modulation Formats

If the transmission system is going to use some portion of the video field to transmit the command/telemetry data, there are several considerations.

- 1) **The video channel's wide bandwidth**, plus its lower linear and phase distortions, suggest a baseband type of data transmission using direct amplitude modulation of the visual carrier. Return-to-zero type signals (also known as 'self clocking') are preferred since by using such an approach the receiver requires no 'symbol time base.'
- 2) **Pulse modulation techniques**, which typically use short pulse widths of high peak power and relatively low duty cycles, are an effective way to combat the noise that is inherent in an amplitude modulated system.
- 3) **Pulse Width Modulation (PWM)** is particularly attractive as it can be used without regard to being in 'sync' with symbol spacing (provided the space in time between the codes is fixed). Ghosting problems, common in off-air TV service and dangerous to the transmission of data, can be lessened as a problem by using a high depth of modulation.

Practical systems, now in use or in active development, make use of bit rates between 0.5 and 1 Mbs. This allows from 15 to 50 bits **per active line** of video, dependent upon the binary signal configuration (type). This data rate, through field testing, has proven to be a relatively good trade off between equipment complexity plus noise and multipath immunity at the receiving end.

When the telemetry channel is combined with the composite **audio** baseband, FM sub-carrier modulation is typically used. FM-FSK is the most common format. The narrowband FSK technique, with a 5k bits per second rate, combined with a relatively simple PLL type demodulator, has proven to be quite immune to system noise. Binary PM (phase modulation) offers a better tolerance to noise but requires more complex (coherent) detection. This drives up the cost of the hardware and is not considered a good 'trade' for cost versus performance. A breakthrough in system costs would increase the use of binary PM however.

#### Data Coding/Addressing

The primary function of the telemetry channel is to address on a selective basis the authorized descrambler units. Each authorized descrambler has a unique code assigned to it and that code is 'built-in' the unit through either hard wiring of the decoder, or through a pre-programmable proprietary 'chip' device. This 'code' is therefore 'memo-rized' by the unit.

The address decoding unit receives the telemetry data channel and monitors that channel waiting for a command which corresponds to its pre-programmed 'code number.' Some systems also have an error correction scheme so that if there is noise or other interference with the telemetry reception channel, the unit does not function until it has received more than one 'correct' code transmission. The second (etc.) command code data received tells the unit that the first data received **was correct**, and having been told 'twice' to perform some function, the unit then proceeds to perform that function (such as turn on).

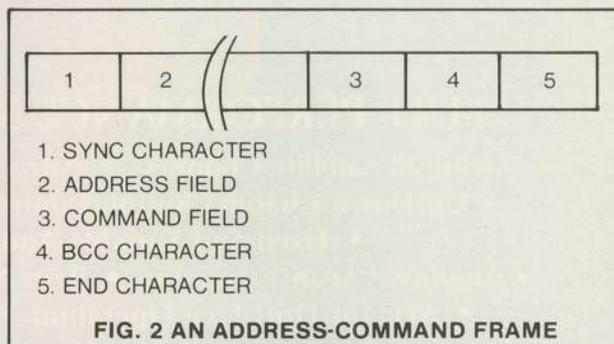


FIG. 2 AN ADDRESS-COMMAND FRAME

An example 'message frame' is shown here (figure two). The

unique (to each decoder) addressing information is found in field two. The address message is followed by a 'command field' which (when decoded and executed) sets that particular decoder into a required mode (i.e. on, off, etc.). The active message is preceded by a synchronization character (which acts as a 'timing element'), and is followed by an error-checking-block, and an 'end' character (telling the decoder the end of the message has been received). The number of data bits required in fields 2, 3 and 4 depends upon the particular system requirements and the 'size' of the decoder universe.

The operator or system designer has several options relating to the frequency of repetition for the message frame. It can be sent on a continuous basis, on a regular cyclic basis after a certain number of address transmissions, at a fixed-time interval, or on a 'request basis' as customers request status changes.

One of the problems associated with the decision on how often to transmit the message frame is the 'down status' that will occur when a decoder location has a momentary or extended power failure. Most decoder systems are not designed to retain their 'instructions' since the system depends upon 'memory refreshing' to keep units in the particular, authorized status. If there is a power failure at the receiving terminal location, the address instructions are lost. If the message frame is not transmitted on a continuous basis, the decoder will not re-activate until the next message frame is transmitted. However, continuous transmission of the message field increases the likelihood that there will be interference between the telemetry channel and either the audio or video signals being transmitted. There is no 'easy answer' to this problem.

#### The Overall System

As shown in the block diagram, the telemetry system begins with a 'host computer' which controls all of the operations from a central location. All of the command messages are stored and originate here on their way to the individual decoder locations. The host computer is connected to the address encoder with a data communications link. If the computer and the encoder share the same facility, this 'link' can simply be hard wiring between the two. More often, the encoder is installed at the broadcasting or uplink location while the host computer is some distance away. A radio or other communications link must be installed to interconnect the two systems. Each such 'sub-system' increases the system maintenance problems and adds to the probability that there will be erroneous telemetry data transmitted.

At the transmitter or uplink unit, the encoder receives the data instructions from the host computer and translates that data into a suitable modulation format for the actual transmitter. This data is then modulated into or by the transmitter and sent out as a portion of the total transmission.

At the receive location, the decoder not only unscrambles the incoming video/audio, but it also must respond to the telemetry channel and correctly interpret the instructions sent on the telemetry channel. Those instructions, in turn, dictate what the viewer sees and hears through his decoder/receiver system.

All in all, there is a considerable amount of hardware involved in the total system and very little tolerance to system error if the full system is to function as designed.

#### Decoder Design

The addressable decoder typically employs a crystal controlled 'front end' and a split-carrier type of audio recovery system. This allows the program audio to flow in one direction for amplification and 'display' in the system speaker, while the multiplexed telemetry audio is fed into the telemetry decoder section of the unit. By filtering out the address sub-carrier, and demodulating it with a PLL type of demodulator, the telemetry data is presented to an LSI address processor. The address processor is typically a 'proprietary' design chip device; an 'N-MOS' component in the language of the chip designers. It performs the address recognition function, checks for errors, decodes the command data, stores the command data and supervises the transfer of the command data to and from 'memory' to give instructions to the decoder's descrambling network.

#### However . . .

In spite of all of this technology, and concern for security, the STV and through-satellite scrambling systems have been plagued with varying amounts of illegal or black market descrambler activity. Ike



**IKE BLONDER** carries his love affair with optics to his only serious hobby; the collecting of unusual 'Stereo' or 'three dimension' still cameras. Here, in his office, he records the visit of Coop and others for his extensive 'Stereo Slide File' by preparing to snap our picture with one of his many stereo cameras.

Blonder is not certain all of the design considerations now being put into practice are equal to the creative talents of engineers in the field. He suggests a 'wish-list' of desirable points which the STV/satellite scrambling operator might like to see in a practical system. They include:

- 1) "The scramble system should be safe from commercially available equipment such as 'cable-ready' television receivers. A viewer should not be able to buy an off-the-shelf television receiver that is capable of decoding the audio or video 'scrambling' without modification."
- 2) "No simple (fine) detuning of the television receiver should be able to unscramble the decoded signals."
- 3) "The scrambling of the video should be sufficient to prevent more than an occasional glimpse of the subject matter."
- 4) "The restored signal (i.e. scrambling descrambled) should not have deteriorated the picture quality where that deterioration is obvious to the ordinary viewer."
- 5) "The means of addressing the individual decoders should be sufficiently flexible to allow the programmer to offer 'tiers' of programming and individual pay-per-event (view; PPV) programs at a minimum cost premium and with the highest degree of reliability."

In Ike's view, the industry has not done very well to date in controlling its own product.

"None of the presently operating systems are absolutely secure

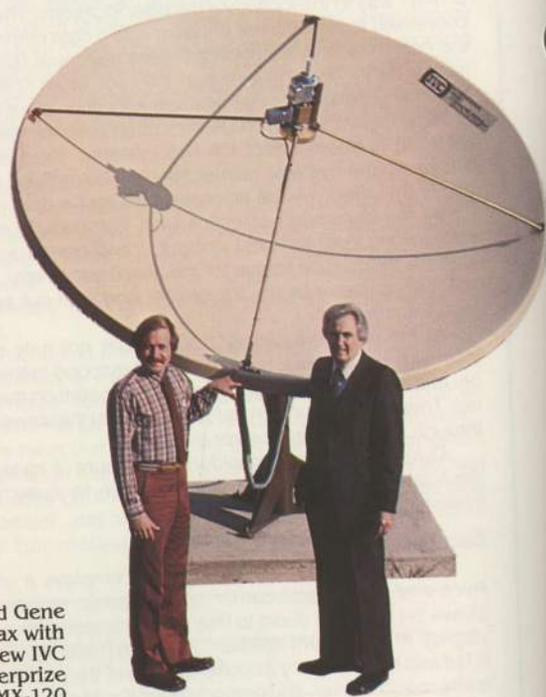
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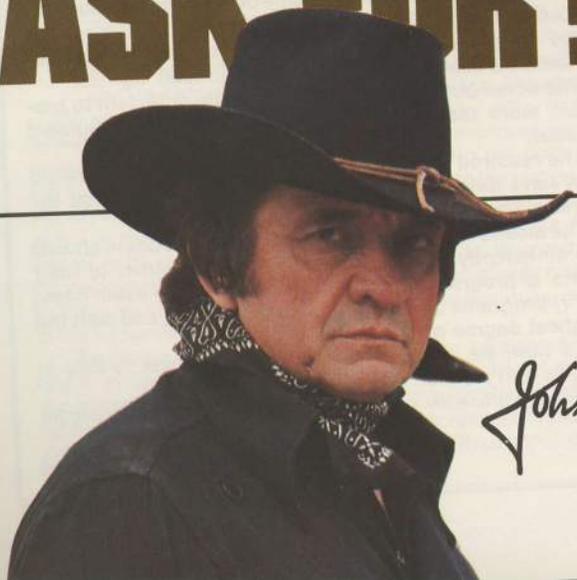
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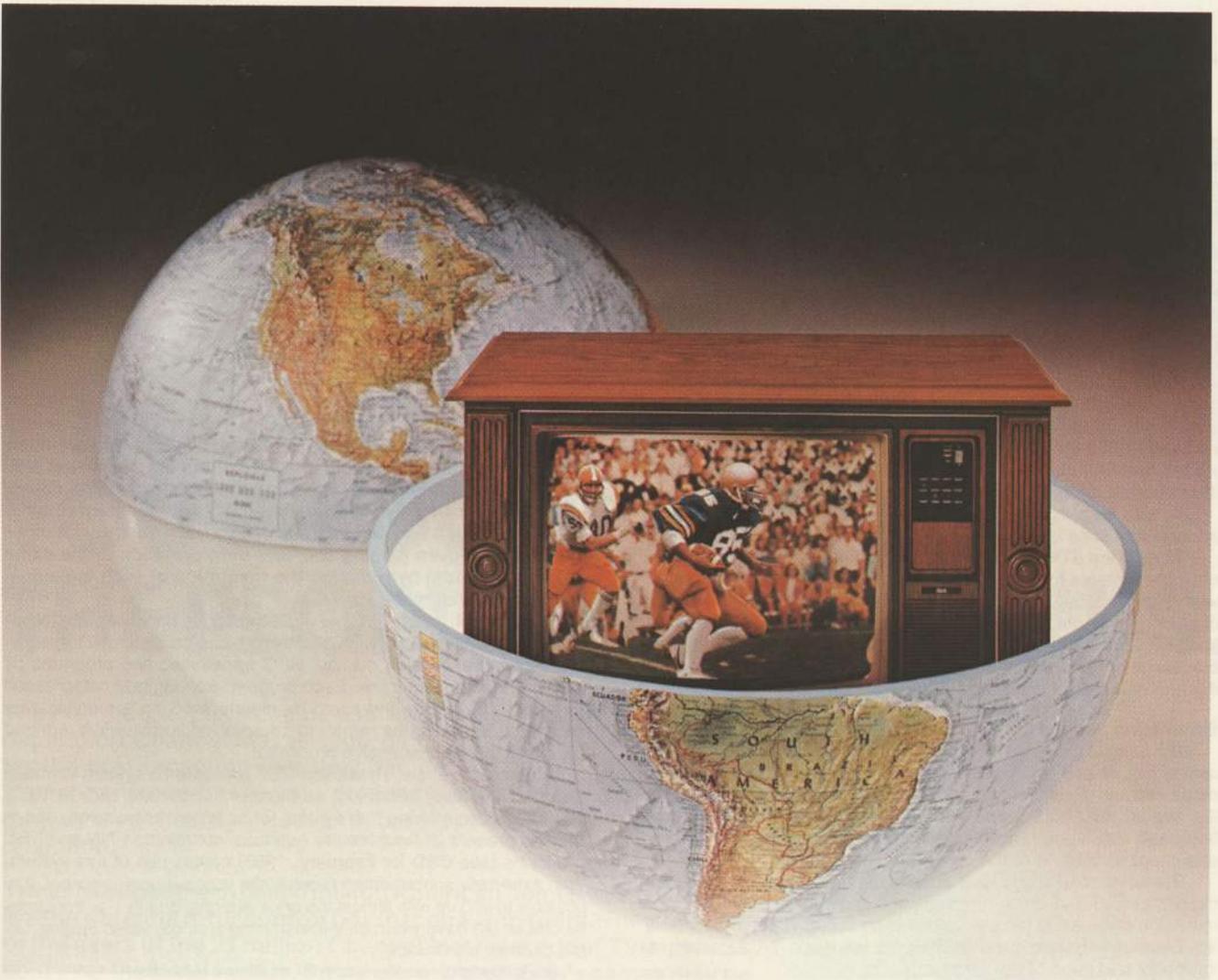


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against theft. Indeed, the larger Pay TV systems have been beset by pirates ranging from individual engineers to unlicensed, underground, manufacturing facilities (turning out thousands of units for black market sale).

"MDS (Multi-Point-Distribution-Systems) generally operate without any form of scrambling, relying upon their microwave frequency (2.15 GHz region) as a form of 'security' against theft. Some of the MDS systems actually have **more unauthorized viewers** watching, using black market obtained microwave downconverters, than they do paying, authorized viewers.

"As soon as the piracy became evident, the typical STV operator went to court. The courts usually provided legal relief making unauthorized reception of STV service illegal. However, in some areas of the world the courts may not be so understanding. The correct answer is to improve the technology so that there is, indeed, a theft proof system. Unfortunately, this type of security will also drive up the cost of the individual decoder terminals."

Ike also feels that the host-computer approach to controlling the address functions is a little understood cost factor.

"Most of the STV systems in the United States found out that their original estimates for computer control of the addressable decoders were exceeded by several orders of magnitude. Unless everything is operating 'just right,' the computer control system can be a disaster. Imagine what happens when the computer glitches and there are thousands or hundreds of thousands of receivers that suddenly lose the end of a block buster movie!"

#### Scrambling Secondary

Any definition of scrambling has to conclude that if the transmission of picture and sound leaving the transmitter **cannot** be properly recovered and displayed on a normal (unmodified) television receiver, the 'signal' **must be scrambled!** Most of the discussion to this point has dealt with scrambling for the expressed purpose of preventing unauthorized viewing of the signal(s).

The future road suggests that there may well be 'scrambled looking pictures' ahead which are displayed in dis-array on your normal television receiver for reasons **other than** security or addressability. Ike Blonder sees the 'next frontier' of television broadcasting as 'multiplex television.' Now, what is that?

**Multiplexing** is the use of a single carrier or transmission channel to carry two or more separate sets of information. In a sense, the standard TV transmission is 'multiplexed' since the video information and the audio information are each treated separately again through a major portion of the receiver proper. The two independent signals are 'multiplexed' or carried together as a convenience to the system operator.

The multiplexing that catches Ike's eye is different than this, however. It involves taking two completely different sets of television programming, each with its own associated program audio, and transmitting them within the bandwidth or spectrum space normally occupied by a **single** picture and its associated single audio channel.

In 1957, Blonder Tongue Labs patented a system called **Bi-Tran**. This system allowed for the transmission of one regular, 'free,' TV program, plus a second 'hidden' or 'secure' TV program on the same transmission system. A flaw in the system kept it from the marketplace; the 'persistence' factor in the television picture tube caused the second picture to 'bleed' through the first and that destroyed the system as a useful marketing tool. But, this was 1957; more than 25 years ago!

Blonder feels that too many of the engineers working with developing techniques to send two or more separate, unrelated, television pictures on the same 'channel width,' have not done their 'optics homework.' It all boils down to what the human eye sees, and will tolerate, before what it sees becomes objectionable. He relates:

**"The optimum viewing distance from a TV screen is 3 times the height of the picture. It requires 1100 lines of video (picture) information to match the visual acuity of human vision at that distance. The viewer, however, finds it more comfortable to be at a distance of at least 8 times the height of the screen with our present NTSC 525 line system. This greater distance tends to 'mask' the noise and scanning lines of our present transmission system.**

**"The room light level determines the optimum hue, (color)**

**saturation, and contrast for the viewer and these are usually exaggerated values compared to the original studio composition. Most viewers wish to set their own 'levels' and hue, regardless of what the studio set may appear like in real life."**

In looking at our present system, Ike sees both flaws and the opportunity for improvement:

**"The preferred aspect ratio for a scene is 2.5 to 1. The current aspect ratio of a TV screen is 4 to 3. I believe the resolution could easily drop to 200 lines with no viewer objection. The system we now have is limited to approximately 350 lines of real resolution and a higher resolution picture would only be required for a large screen display. Video 'flicker' causes long term viewer fatigue and it also limits the saturation of color demanded by the viewer. Flicker found on satellite receivers with insufficient clamping (or the 30 Hz dispersal energy), or on PAL transmissions, is an example of building in viewer fatigue, and unintentionally limiting the high saturation colors demanded by most viewers. And, it is a peculiarity of the human vision that we can trade (high grade resolution) for more channels, even placing two sets of information in the same channel-width by reducing the resolution of each individual program video service."**

At the April, 1982 National Association Of Broadcasters (NAB) trade show in Dallas, two high quality, high cost multiplex TV transmission schemes were on display. NEC transmitted two programs by **sharing** the horizontal line. Each program was digitally compressed to **half a line width** and could be clearly seen on a monitor after reception. Restoring the signals to a normal full-screen width required an expensive and extensive processor.

At the same show, Thompson-CSF presented a system for multiplexing alternating fields, just as Blonder Tongue did back in 1957. RCA has been offering that system for satellite transmission, and in fact the present 24 hour feed to Australia, combining CNN and NBC programs (see **CSD** for February, 1983) makes use of this system. With extremely sophisticated receive site processing equipment, it is possible to end up with almost the original signal quality (i.e. the same as one would have when only transmitting a single video program in the channel bandwidth).

Ike's thoughts on the future of multiplex television.

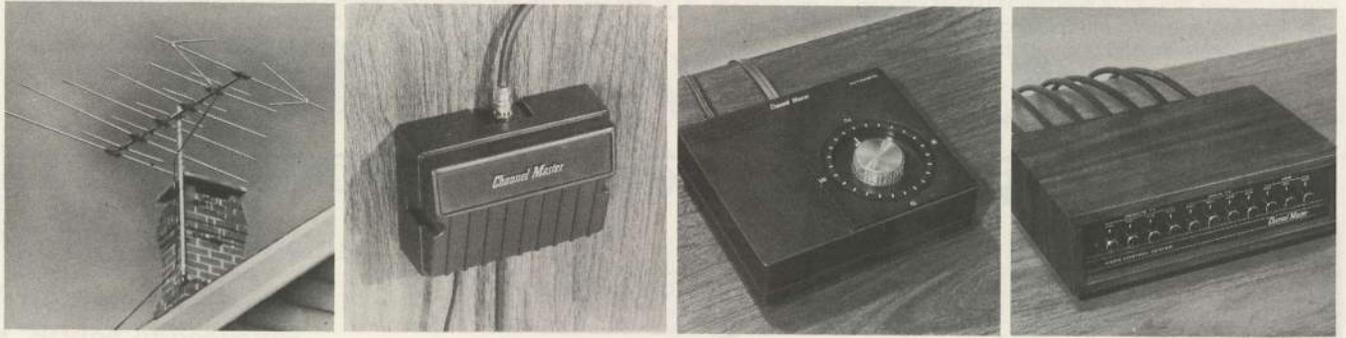
"It will only happen at the consumer level when the total cost of encoding and decoding devices to multiplex the additional program channels drops below the cost of separate transmission facilities. The breakthrough will probably be sparked by Pay TV, which for security reasons already has a decoding device at the receiver (\*). The entrepreneurs and inventors have a real incentive to travel this path, for the benefit of science, and for the TV viewer. The significance of multiplex television is not alone, however, in the lower cost and conservation of spectrum. Multiplexing would allow:

- Carriage of luminance and chroma on separate channels, erasing the errors associated with the present 'color multiplexing' system in use by NTSC transmission systems;
- The creation of three dimensional television displays;
- Wide screen television with aspect ratios as high as 3 to 1;
- The total elimination of scanning lines and flicker."

Progress for the sake of progress usually comes slowly, if at all. Progress to save money, **or to make more money**, usually happens faster. If multiplexing of two or more television signals into a single channel bandwidth is fueled because of a need to get more programs

\* — **SHOWTIME** recently announced its intention to 'scramble' its satellite fed network sometime in 1984. In the request for bids on building the hardware for the new scrambled system, **SHOWTIME** denoted that it intended to convert all video and audio signals to a 'digital format,' which in turn lends itself to the multiplexing (in a digital format) of two or more video (plus audio) program services into a single transponder. Indeed, **SHOWTIME** announced it would be prepared to offer up to six different program services per transponder with the new digitized service. Ike Blonder's forecast that multiplexing might be fueled by the development of Pay TV services wishing to get more 'dollar volume revenue' from their present transponder holdings could, indeed, be the turning point for multiplexed television as a future transmission system.

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into the limited amount of spectrum space available, it could happen with lightning speed. If multiplexing is paced by R and D budgets hoping to create the next, 'great plateau' of television technology, it could be a long time happening.

There is not, at the present time, a scarcity of 4 GHz transmission channels. One only has to observe the number of transponders **not in**

**use** (W5, W4, F4, et al) to note that there is plenty of room available. With new launches of Galaxy and others coming up in 1983 and 1984, the transponder reservoir will expand. At the present time, there does not seem to be a 'spectrum scarcity' motivation for multiplexing of signals; not on domestic circuits anyhow.

## CLEVER SCHEME

## TO SWEEP AUDIO DEMODS

by  
Roy Orvis  
Dryden, Ontario  
Canada

If you are required to work with audio in satellite receivers there may be occasions when it would be convenient to perform an I.F. sweep alignment, or at least look at the response curve of the audio sub-carrier detection system. Sweep generators that function in the 5.5 to 8.0 MHz region are, however, difficult to find and the occasional use required may not justify a large investment for a special instrument. You may already have on hand all that you need.

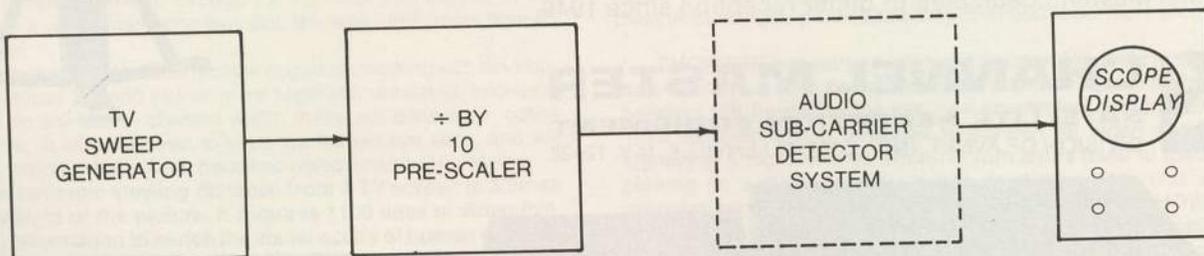
If you have in the shop a TV channel sweep generator and a divide by 10 pre-scaler which you probably use with your frequency counter, you are in business. Feed the output of the sweep generator, set to function in the appropriate section of the VHF range, into your pre-scaler and you will have a sweep output at 1/10th of the original sweep frequency. A sweep generator for TV channels 2 through 13, for example, will usually sweep in steps of continuously from 50 to 220 MHz. This translates to the 1/10th range of 5 to 22 MHz. The sweep bandwidth is also divided by 10 in the pre-scaler, so if you are sweeping say 50 to 60 MHz, your output will now be 5 to 6 (MHz).

Starting with a relatively low level from the sweep generator into the pre-scaler, there will be no visible output from the pre-scaler. As the output level from the sweep is increased, an irregular output will

appear on the display scope screen. It will look like a 'city skyline' with spikes rather than a smooth output curve. A further increase in output level will create the desired 'flat topped' output; i.e. a straight line display (assuming the device being tested is itself 'flat,' or, you are going directly from the pre-scaler to the detector and scope). I was surprised to find, with my particular pre-scaler, that when I reached the level where the output from the sweep became 'flat,' that the markers internally generated in my sweep were there as well (although, again, properly divided by 10). From that point, a slight increase in the drive from the sweep generator caused the markers to 'disappear' on the display. If possible, it would be better to use a low frequency signal source as a marker generator, following the pre-scaler.

The swept output from the pre-scaler consists of square waves. In most applications this will not matter since the tuned circuits you are checking, or tuning, will remove the harmonics. However, in certain applications a low-pass filter might have to be inserted ahead of the device being tested or measured.

Finally, this technique is not limited to divide by 10 pre-scalers, although they are commonly available. Other division ratios may be chosen with the appropriate divider IC devices.



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## REVIEWING BASICS

The primary factor used in specifying the performance of a microwave antenna is its directive gain; that is, the gain which the antenna exhibits in a specified direction (typically at 'boresight'). All gain is typically referenced against a no-gain test antenna 'standard.' In many fields, that standard is a 'dipole' antenna. In other fields, the gain is referenced to a 'modeling antenna' called an 'isotropic source.' You can build a dipole. You cannot build an 'isotropic source' because it is a mathematical 'model' possible only on paper or in a computer. Not all antenna specification sheets make the distinction between gain numbers; "41 dB gain" does not tell you whether the gain is 41 dB **greater than a dipole** (more correctly, dBd where the last d stands for the dipole reference), or, 41 dB **greater than an isotropic source** (more correctly, dBi where the i stands for the isotropic source). In our business, this failure to identify the reference model is important since a dipole antenna has 2.1 dBi; or, 2.1 more gain than an isotropic (modeling) reference source. To put that another way, suppose brand 'X' claims 41 dB gain for a 12 foot antenna while brand 'Y' claims 43 dB gain for their 12 foot antenna. Is brand Y better than brand X? Perhaps not. Perhaps brand X is referencing to a dipole while brand Y is referencing to an isotropic source. Both have (within 0.1 dB) the same gain!

Other antenna performance factors of concern include sidelobe levels, beam width, noise temperature, mechanical construction and so forth. For maximum theoretical gain, the parabolic should be 'illuminated' (as in 'fed') by a 'point source' which provides a uniform illumination across the full aperture (height and width) of the dish surface. This is expressed by the following formula:

$$G = \frac{4 \pi A}{\lambda^2} = \left( \frac{\pi D}{\lambda} \right)^2$$

Where:

A = APERTURE AREA

D = APERTURE DIAMETER

$\lambda$  = WAVELENGTH

IN THIS SITUATION, GAIN IS A FUNCTION OF FREQUENCY

For years researchers have attempted to design a feed which provides "perfect" illumination. In practice, some compromise must be made in the feed design to reduce the spillover and sidelobes. Spillover occurs when the feed antenna 'sees beyond the edge of the parabolic dish surface' and to the ground below and behind the dish.

## OF TVRO ANTENNA EFFICIENCY

by

W. Jensby

1460 Lewiston Drive

Sunnyvale, Ca. 94087

The ground is a source of noise and ideally the feed antenna will intercept or accept no ground noise since this noise reduces the system performance. Sidelobes are uncontrolled (or uncontrollable) 'spikes' or 'burrs' appearing in the feed antenna's 'field of view'; sort of like having 'hot spots' in your peripheral vision such that objects way off to the side of your eye 'bounce up strongly' to distract your straight ahead vision. In addition to spillover and sidelobes, the antenna in the real world is also subjected to gain losses that occur because of an imperfect parabolic reflector surface, optical blockage caused by the placement of the feed antenna in front of the center of the dish, and blockage caused by the support struts which anchor the feed antenna at the focal point of the dish. All of these factors 'play upon' the real world gain of a dish, and results in the real world gain generally being expressed by the following equation:

$$G = N \left( \frac{\pi D}{\lambda} \right)^2$$

Where N is the overall antenna efficiency, found as a product of the **entire** antenna, including antenna surface efficiency factors, the efficiency of the feed, the blockage created by the feed and struts and other items.

Until the advent of the space program in the 1960's, most microwave antennas were used for point to point terrestrial links and for radar systems. Typical diameters in use were 5 to 15 feet. Because of the conservative nature of such terrestrial link planners, **fade margins** of 20 dB were planned into the systems and many (Bell) systems insisted on 40 dB fade margins. If 'fade margin' is a new term to you, follow this. Every system link (one microwave tower to another microwave tower; a satellite to your dish antenna) has a precise and calculable amount of 'space loss'; that is, engineers can calculate exactly how much signal will be 'lost' along the way. They assume 'normal, clear weather, between the two points' when computing this loss and they compute normal equipment operating parameters. **Then they get conservative**, and add in **additional path loss** to account for turbulent weather, equipment degradation, and so on. This additional 'loss' they make up by designing the system to have **larger** transmitting and receiving antennas, **more** transmitter power, **more** sensitive receivers and so on. The net results is that they have a 'margin,' or a safety factor, built into every terrestrial microwave system. If something goes sour, the system still works since there is a safety or 'fade' margin built in to begin with.

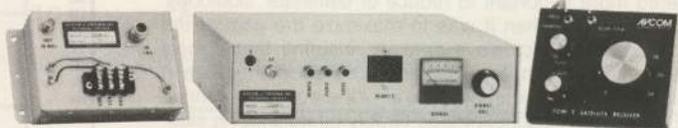
Your typical 11 to 13 foot home antenna may have a 0 dB to 3 dB 'margin' built in. You didn't plan it that way; it just happened. If there is a bad storm over the area where the dish is, and heavy, moisture

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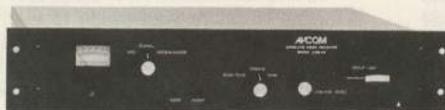


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### People Are Asking . . .

*LNA/Downconverter (LNC)*

vs.

*Separate LNA & Downconverter?*

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

laden clouds appear close to the ground between the dish and the satellite, the extra 'loss' as the satellite signal travels through the water laden clouds causes the signal to 'fade' and sparklies to appear. Briefly, to be sure, but their appearance signifies the 'thinness' of your 'margin.' That's the difference between **your** home terminal systems and the CATV systems across town; the CATV systems typically have no less than a 3 dB 'margin' or safety factor built-in, just for those few hours per year when the heavy clouds build up overhead.

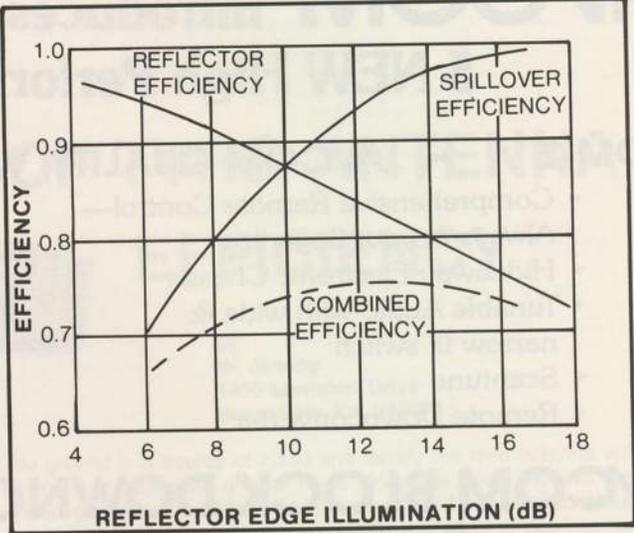
In that some era of terrestrial microwave network planning, it was often considered more important to reduce or eliminate 'sidelobes' from the antenna pattern than it was to maximize the gain of the antenna. In a terrestrial microwave network, insuring that signals coming into the antenna from the 'side' did not cause interference in the desired signal path was paramount. So all of the work on antennas and antenna feed systems concentrated largely on minimizing sidelobes and allowing gain to be a secondary consideration. This created a 'gain plateau' in antenna and feed designs that persisted for many years. An antenna system with 50 to 55% "efficiency" was considered to be acceptable. In fact, the 55% efficiency factor became so standard that virtually all of the antenna charts that system planners employed for designing terrestrial systems used 55% efficiency as a reference point. Even antenna system planner slide rules used 55% efficiency as a 'norm'!

As larger and larger antennas were designed for the Space Program, and 60 to 90 foot monster dishes began costing millions and millions of dollars, it became apparent that doubling the reflector surface area to add an additional 2.5 to 3 dB of 'gain' was getting very costly. So new time, and money, was directed at improving the efficiency of the overall antenna system. It was apparent that if the antenna **system** efficiency could be increased from 55% to say 75%, that was a far better trade than doubling the size of the reflector surface area.

Returning to the gain equation, it was found that the efficiency factor is made up by a number of factors, including the following:

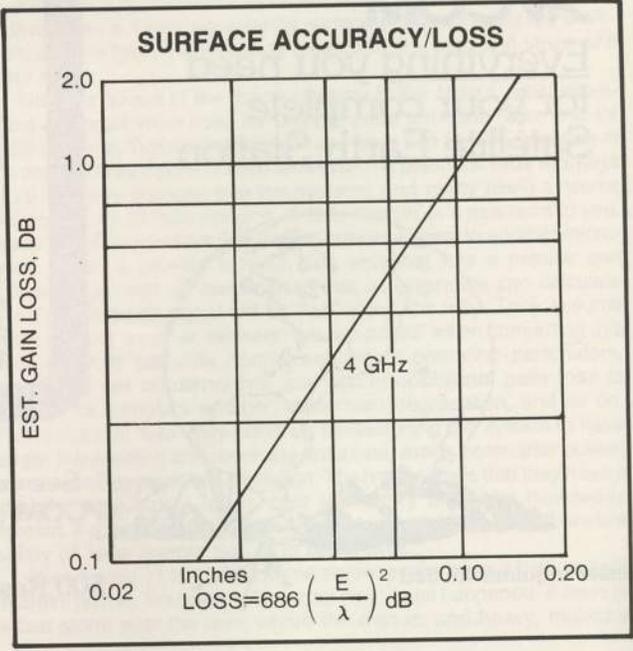
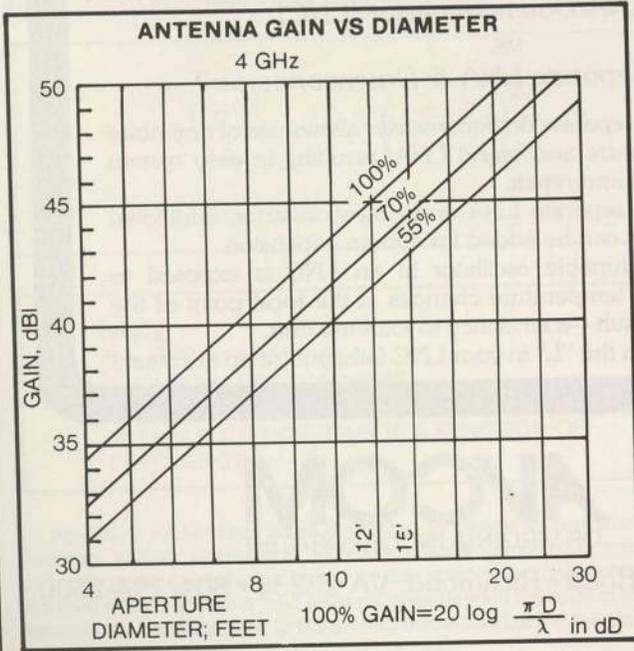
- N<sub>1</sub> = spillover efficiency
  - N<sub>2</sub> = illumination efficiency
  - N<sub>3</sub> = aperture blockage (by feed and support struts)
  - N<sub>4</sub> = ohmic losses, cross polarization, and other factors
  - N<sub>5</sub> = random surface errors in the dish reflector surface
- And, thus,  $N = N_1 N_2 N_3 N_4 N_5$

Since high surface accuracy had already been achieved it was apparent that the feed system was the most obvious area to attack for increased efficiency (gain), as it affects N<sub>1</sub>, N<sub>2</sub>, N<sub>3</sub> and N<sub>4</sub>. Millions of research dollars have been spent by a number of research groups on this issue and it is likely that in the past twenty years or so all of the



significant gains to be made have been isolated and improved upon. To find out what some of these test results have been, a search of technical literature was made to learn more about high-efficiency antenna systems. Computer studies have predicted total efficiencies approaching 80% (78% efficiency is often cited), and some very narrow bandwidth antennas have achieved this goal; typically using the Cassegrain sub-reflector type of feed system. The chart appearing here illustrates some of the results.

As seen, N<sub>1</sub> and N<sub>2</sub> are the prime areas where improvements were made. And these are mainly a function of the feed system design. Any additional losses will only reduce the overall efficiency of the antenna. Note that no portion of the antenna is 100% efficient, **in any design**. Each of the factors make some 'negative contribution' to the overall efficiency of the antenna. It is interesting to note that surface errors (N<sub>5</sub>) in the antenna designs tested were in the 95 to 96 percentile region. That is far better than I would expect to find with many of the mass produced metal and fiberglass antennas in the home TVRO field. I mention this since the dozens of antennas one sees at an industry seminar seldom impress me as being in the 95 to 96% efficiency class when graded for surface accuracy. Unlike the professionals tested in the tabular results shown here, we still have a long ways to go in our own industry! A table, here, suggests what happens



Efficiency Item	Standard Prime Focus	Scalar Feed	NEC Cassegrain	Rantec Cassegrain
(N <sub>1</sub> ) Spillover	83%	95%	95%	93%
(N <sub>2</sub> ) Illumination	77%	81%	96%	98%
(N <sub>3</sub> ) Blockage	97%	97%	93%	94%
(N <sub>4</sub> ) I <sup>2</sup> R (Ohmic) Losses	95%	95%	95%	96%
(N <sub>5</sub> ) Surface Errors	95%	95%	96%	96%
<b>Total Efficiency —</b>	56%	67%	77%	79%

COMPARISON OF ANTENNA EFFICIENCIES

when there are 'RMS Surface Errors' on the dish of between 0.02 and 0.2 inches. As you can see, 1/10th of an inch RMS error translates to nearly 1 dB of surface 'loss' due to surface 'mistakes.'

A common debated point in antenna design is the loss caused by the feed support struts (the blockage created by the feed itself being another consideration). It is worth noting that energy from the satellite, captured by the parabolic surface and in and through the feed support struts is then re-reflected in arbitrary and usually unpredictable directions. It does not end up in the feed as it should. The more struts supporting the feed, or the larger the struts, the more signal lost by this blockage and re-reflection. The magnitude of the loss is a function of the 'blocked aperture' versus the 'unblocked aperture.' If the feed struts occupy 7% of the surface of the dish, the additional loss in system efficiency works out to about 0.3 dB. A not insignificant loss. When the blockage of the feed itself and the blockage and re-reflection of the struts are combined, the total losses could approach 1 dB. The formula to calculate this is:

$$\text{Gain reduction} = 10 \log_{10} (1-B)$$

where **B** is the ratio of the aperture blockage to the total area of the

reflector surface.

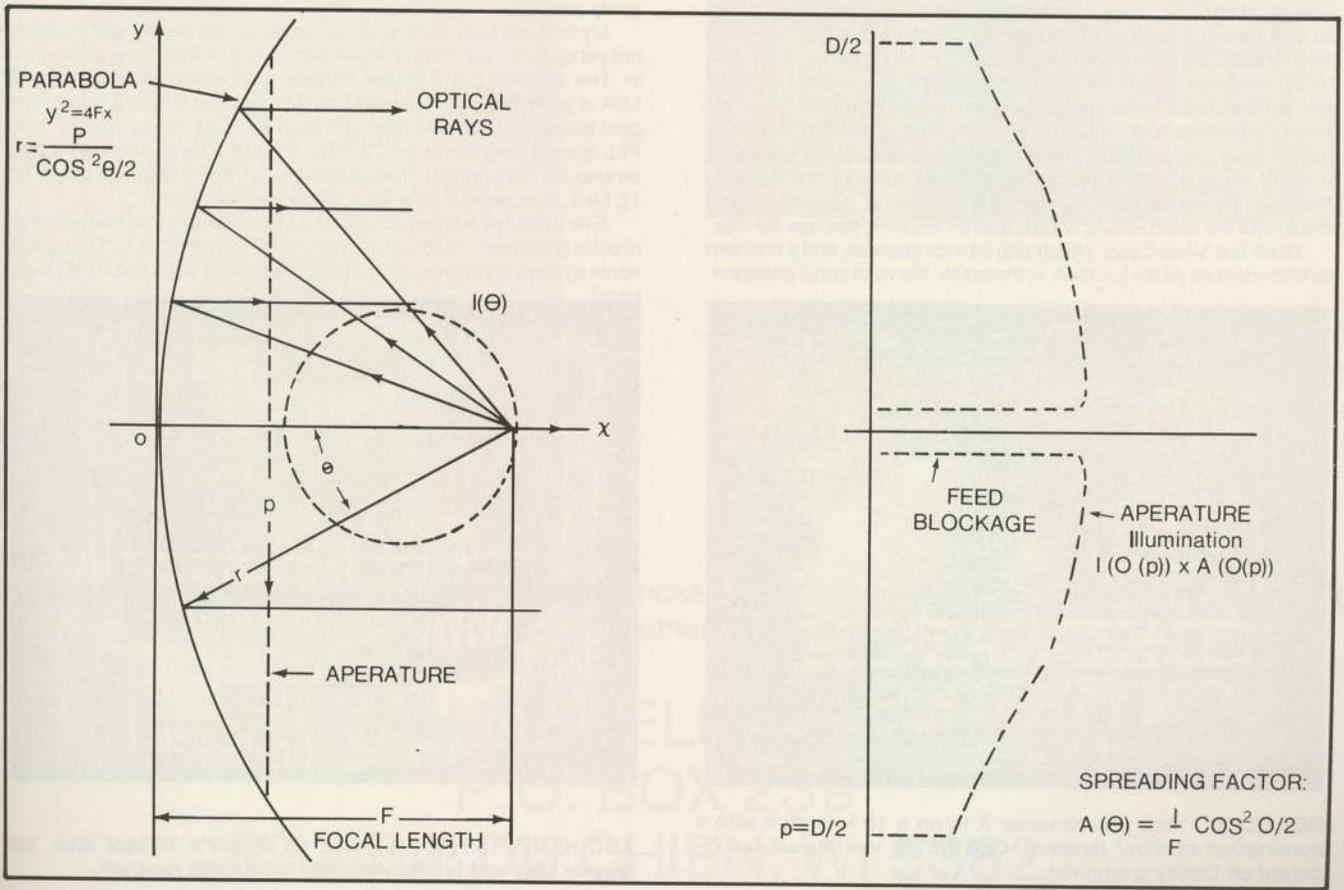
Dealers and others in this industry can only profit by understanding more about the various factors that influence antenna system performance. Many of the newer manufacturers and sellers of reflectors do not, themselves, have an adequate schooling in the basics of surface and collector (feed) design. There are many good 'ideas' out there but not all of the ideas will stand the test of careful analysis. Buying an antenna because it **looks good** can be a dangerous way of selecting your own products for local marketing. Understanding more about how products should be designed to work properly is a far safer course to follow.

**References:**

**Reflector Antennas**, edited by A.W. Love (1976); IEEE Press, New York

**Electromagnetic Horn Antennas**, edited by A.V. Love (1976); IEEE Press, New York

**High-Efficiency Microwave Reflector Antennas / A Review**, edited by P. Clarricoats and G. Poulton, Proceedings of the IEEE, Vol. 65, No. 10 (October 1967).



## PLAYING AROUND

## WITH A 3 METER TERMINAL IN AUSTRALIA

by  
Peter Duddy  
16 Tiffany Court  
Montrose 3765  
Australia

During the past six to eight months there have been some interesting changes in the Clarke Orbit Belt that serves Australia and the Pacific. I recognize that some of the intrepid American TVRO travelers, such as Bob Behar (see **CSD** for February, 1983), may give readers a fleeting glimpse of worldwide conditions in the belt, but my observations from a fixed location in Australia may have greater long term data that will assist others in planning terminals in this part of the world.

Some six months or so ago, our national broadcasting network, the ABC, was transmitting to the Australian Outback region using a pair of spot beam services from Intelsat at 174 east. Signal levels in my southern area of Australia were in the 23 dBw region, with a reported boresight intensity of 29 dBw in the region around Alice Springs, to the north. In November this service was moved to the reserve Intelsat IV bird located at 179 east. That seemed to be strange, at the time, since a December change-out from the IV bird to an IV-A series bird had been announced. What really happened is that the 179 east bird was also changed out from an IV series to an IV-A series. This was significant since it meant that we now had a pair of hemispheric (rather than spot) beams to work with. The change over from IV series to IV-A series is very important since we now have service from more recent vintage satellites (certainly not the signal levels of the new V series birds, but an improvement nonetheless!), and with the hemispheric nature of the antenna patterns, others throughout the south Pacific should also be enjoying this new service.

There is a 'West Coast' (Australia) service channel, and a northern service channel. At my location, in the south, the west coast transpon-

der is as much as 2 dB hotter, telling me that complaints which have been registered by some of the terminal operators in the west have found their mark, and Intelsat has authorized them to run with greater uplink powers and come closer to saturation for the transponder for the western portion of the continent. It is well known that Intelsat is very conscious of power use and they would prefer to run their transponders at about **half** power, where possible, to stretch the longest possible life out of the birds. Loud complaints do work, however!

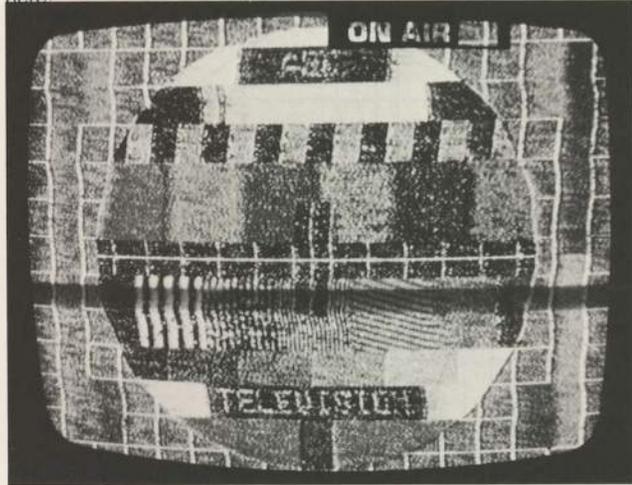
At the same time that the ABC moved to 179 west, we also saw the appearance of the CBS feed coming from Los Angeles to the eastern Australia 'Nine Network' (see **CSD** for February, 1983). The signal level is quite low here on my ten foot dish, as you might imagine, and this service is reported to be on a Global transponder (**Editor's Note:** The fact that it is seen north of the equator, in the Phillipines, would verify this.)

My terminal is modest even by American standards, and certainly not yet up to the par of the Intelsat designed terminals others have put in. The antenna is a **3 meter** Andrew spun aluminum reflector; the LNA is an Avantek 120 degree unit. My receiver is home brew, from past issues of **CSD** and manuals from STT; an image reject mixer, PLL demod and the usual 70 MHz IF strip. The receiver was built around full transponder characteristics so when I redesign the IF for 15 MHz bandwidth, I may gain a couple of dB there.

Even with this modest equipment, reasonably enjoyable reception in color is possible on at least the twin ABC service channels and with some system improvements I may be watching CBS and AFRTS yet here!



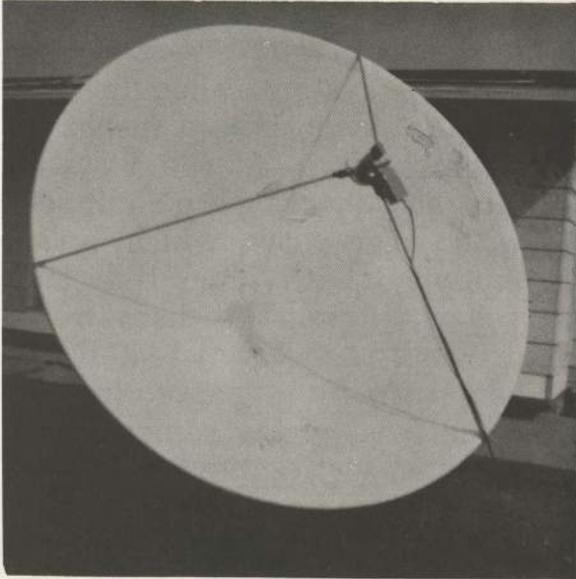
NOT GOOD / until you consider it is on a 10 foot dish with a non-Intelsat receiver terminal. CBS NEWS via Intelsat, as received on Duddy's terminal.



ABC HEMISPHERIC / received on Duddy's 10 foot dish, 120 degree LNA and full transponder bandwidth receiver.

# SPUN PARABOLIC ANTENNAS

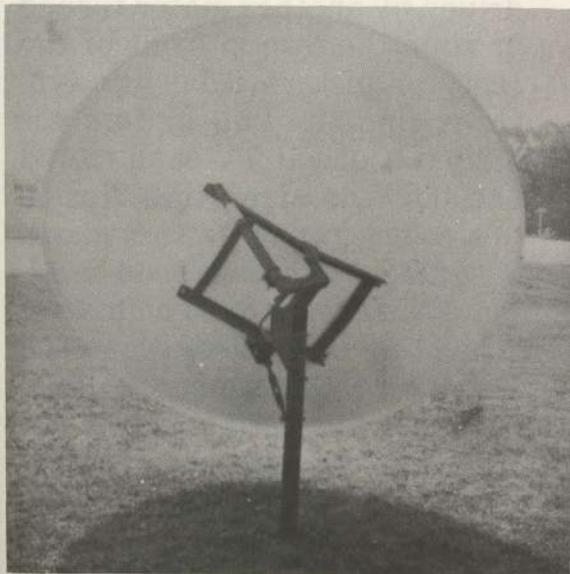
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## THE ROOTS OF TVRO (Part Seven)

For nearly a year the FCC would stage a side-show, main-show, and after-the-show show. Millions of dollars would be spent by CBS, RCA, and a few other late-comers as they built special sets, hand crafted color cameras and receivers, built special transmitters, and generally came in on-cue from the Commission. Up to that time, most of the color tests had been conducted in New York City. That was logical; both CBS and RCA headquartered there and both had their extensive production studios there (virtually *all* television programming originated in New York at that time; microwave inter-connection existed only between Boston and Washington, running through New York). However, to accommodate the FCC, CBS spent a large sum to convert Washington's WOIC (channel 9, now WTOP) to color, and RCA equipped both WNBW and an experimental UHF station they had operating in Washington for color.

The main arguments through the period October 1949 until a decision was reached in early fall of 1950 were these:

(1) The CBS system started out requiring a 12 MHz wide band (the equivalent to two TV channels), but converted to a 6 MHz

wide system when the CBS people saw that if they wanted to broadcast color on VHF, *this would be a requirement.*

- (2) The CBS system, called field sequential color, was a mechanical nightmare. At the TV studio, the cameras were equipped with large discs which were equipped with blue, red, and yellow filters. The discs were driven by a motor at 1440 RPM and as the filters passed (rapidly) in front of the camera pick up tube, for fractions of a second, the camera pick up tube saw only those colored objects which corresponded to the filter positioned in front of the camera lens at that instant. At the receiver, another color disc driven by another motor turned or spun the disc in front of the receiver picture tube. By synchronizing the two motors *exactly* (i.e. one at TV camera and one at TV receiver), the illusion of a colored image was created.
- (3) The CBS system was *not* capable of transmitting compatible color; that is, existing black and white receivers tuned to a CBS colorcast did *not* receive a picture in black and white (or color). They simply *received no picture at all.*
- (4) CBS told the Commission that while they were demonstrating color pictures on only receivers with 7, 10, and 12 inch picture tubes, that their technique would work just as well with the new larger 16 and 19 inch screens also. Some would question this, as we will see.

- (5) The public, should the CBS system be approved, would be faced with the following:
- (A) Buying a color receiver, which would receive CBS colorcasts *and* black and white telecasts;
  - (B) Converting his existing receiver to a color receiver (approximate cost several hundred dollars), to receive CBS colorcasts *or* standard black and white telecasts;
  - (C) Installing a less expensive converter so that when CBS colorcast, his receiver would produce the program *in black and white*, but *not* in color (approximate retail cost, \$75);
  - (D) Doing nothing, in which case when CBS colorcast, he could *not* watch the program.

In 1949 there were 3,600,000 television receivers in the hands of the public. By the end of 1950, when the Commission reached a decision on color, there would be 9,700,000 black and white only receivers in public places. By the end of 1951, when the Supreme Court had finally settled the dispute, there would 15,420,000 television receivers in the hands of the public.

CBS hit hard and long (and repeatedly) on the fact that its color had the *best looking pictures*. It harped on the 10 year program during which they had color, and Senator Johnson didn't help things with *his insistence* that color was here and ready, and the public wanted it.

The RCA compatible color had the following arguments going for it:

- (1) It was *all* electronic, and neither the TV studio nor the home receiver required large rotating color cellophane discs in front of the picture tube;
- (2) The *existing* receivers received the colorcasts in black and white, with about the same black and white clarity as regular black and white telecasts.

However, the RCA compatible color had failings at that time, and it was these failings which the Commission focused on:

- (1) The hues were unnatural, and required almost constant viewer juggling of the receiver controls (it later turned out that the majority of this aspect of the problem was being caused *at the studio*, and that, as studio techniques improved, the user-viewer got to sit in his chair more of the time and play home-technician less of the time);
- (2) The color smeared; that is, the colors tended to run. Bright colors, such as ruby red lips, tended to keep right on going past the lips into the face area beyond;
- (3) Color quality was unstable, it changed drastically from minute to minute.

Clearly, RCA had a good concept going, but it had *more than a few bugs* left to be worked out in 1949 and early 1950. Equally clearly, *CBS knew deep down* that RCA could and would solve these problems, so it pushed *extra hard* to get its system accepted as "the national standard" *before* RCA could work out the bugs. It was more than a matter of corporate pride; CBS had

patent rights on its system and anyone constructing a CBS-system color receiver would have to pay a patent royalty to CBS for their rights. A few bucks were involved. CBS kept the pressure up on the Commission, and Senator Johnson periodically reminded the Commission that *he was satisfied* with the quality of the CBS pictures and he wanted television now! (Perhaps because Colorado had no television, Senator Johnson was not worried about his constituents badgering *him* about his approval of a system which would antiquate their television receivers; *they had none at the time!*).

In the fall of 1949, at the urging of the Commission, RCA set up their owned and operated WNBW in Washington to start limited schedule color-casting. Six custom receivers were placed in "typical locations and used under typical home conditions".

During the fall of the 1949 hearings, *others appeared* on the scene for the color television standards prize. One hung in there until the end: Color Television, Incorporated of San Francisco (CTI). The CTI system was also all electronic; but their major contribution to the color squabble would be nearly one year later.

Late in 1949 the FCC announced the game plan and rules for color demonstrations before that body:

**"The demonstrations will include color television camera equipment, color television receivers, monochrome receivers, and converted monochrome receivers (i.e. converted to receive CBS color in black and white). The receivers to be demonstrated will include 4 receivers receiving color only in a 6 MHz wide band, 1 receiver for demonstration of 6 MHz color versus wider (12 MHz) color; one conventional black and white receiver converted for color reception and one black and**

**white receiver not converted.**

The demonstration will include slides, test patterns, dancing, singing, juggling, fashions, near and far shots, different types of lighting and backgrounds. In one demonstration the camera equipment will be located at a local (Washington) high school football field."

CBS, the company first slated for demonstration really put on a show. One Commissioner said, "This was the darndest three ring circus you ever saw. TV studio equipment was all over the hearing room. We had to thread our way to our seats through cables, lights, and jugglers rehearsing!"

The RCA demonstrations had a *little less* of P.T. Barnum to them. Set up in the studios of Washington's WNBW in the Wardman Park Hotel, they consisted of two color cameras for live (TV studio) presentations, a color film camera, and a color slide camera. Two color TV monitors in the studio, plus a special 16 inch receiver, were set up for the observers.

RCA put on an elaborate, tasteful program consisting of solo performances by network stars of that era, and a musical program staged with 19 musicians all brightly attired in colorful costumes.

After the two shows, the general attitude was that the RCA demonstration produced impressionable black and white (i.e. compatible) pictures, but that color pictures were flawed. RCA had *not* developed a single gun picture tube for the receiver at that time, and, to produce a 16 inch picture, RCA had to custom build a (large) cabinet that housed *3 separate black and white picture tubes*, arranged with dichroic type mirrors to focus the 3 separate red, blue, and yellow images on a single 16 inch screen.

The RCA tests lasted one full week,



and as the week wore on, the picture quality improved considerably. Unfortunately, FCC personnel were among the first to see the show. Senator Johnson came late (i.e. towards the end of the week), and after he saw the RCA demonstration he said:

**"I am impressed by the demonstration and I was surprised because of what I had been told to expect. I think the RCA method has some vital features."**

While the demonstrations attracted only RCA and CBS at that point, the testimony and evidence being taken simultaneously by the Commission was not limited to the two contenders. Many firms had a vital stake in the hearings. One of these was DuMont.

DuMont's contribution to the early television era (pre-war until the early 1950's) cannot be overestimated. DuMont originally owned and operated television stations in New York (WABD), Washington (WTTG), and Pittsburg (WDTV). These stations were among the first on the air in the nation, and DuMont was a major producer of television equipment of all types. DuMont also operated a television "network" in that era, competing

with NBC (RCA) and CBS for station affiliations and audience.

DuMont had no *direct* interest in color development, and Dr. DuMont, as we shall see, really *seriously questioned the importance of color* at that point. For its role in the color hearings, history must award to DuMont the title of *Devil's Advocate*. DuMont personnel submitted briefs and testimony, and for one fleeting, highly entertaining moment, put on a memorable demonstration for the FCC. The occasion was late in the fall in 1949. DuMont personnel, headed by Dr. Goldsmith, sat through the CBS demonstrations and apparently got madder by the day. As scientists and electronic engineers, *they saw through the technical mumbo-jumbo* which CBS was dishing onto the non-technical Commissioners. One thing really stuck in the craw of DuMont, and that was the CBS glib dismissal of big screen color TV utilizing the spinning wheel which was a part of the CBS system. Because the wheel was more than twice the diameter of the picture tube screen, large screen receivers became (physically) very large very soon.

To be continued

## INDUSTRY AT LARGE

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

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### STACK 'Em

I would appreciate some feedback on this idea. For years radio astronomers have 'stacked' parabolic antennas to achieve higher gain on their radio telescopes. Similarly, VHF and UHF antennas can be stacked in bays to achieve greater gain. Why not satellite TV???

Suppose, for example, you set-up four Paracclipse 12 foot anten-

nas with a 100 degree LNA on each antenna. Then you connected them together through exactly equal lengths of cable to keep phasing equal, to a mixer (I don't know whether a power divider in reverse would work as a mixer as a line splitter does at VHF/UHF).

Would stacking the four 12 foot antennas give us the same performance as a single 21 foot antenna? A 7 meter dish has approx-

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imately 715 square feet of area while the four 12 footers would have a total of 52 feet of surface area. Most of the 7 meter antennas are rated at 48 dB of gain and the Paraclypse is a conservative 41 dB. A rule of thumb for VHF/UHF is that if you increase the antenna size (with identical antenna 'bays') four times, you add 6 dB of additional gain. But in the case of VHF/UHF antennas, the stacking harness goes in **ahead** of the amplification so perhaps by putting the LNAs ahead of the mixing, we would expect a little more than 6 dB and actually meet or exceed the gain of a 7 meter dish (!).

The primary advantage I see for creating such a bizarre antenna farm would be the economics of the situation. Currently I can purchase four of the Paraclypse antennas for around \$3600 and four 100 degree Amplica LNAs for around \$1400. That totals \$5000. Behar wants approximately \$17,000 for his 7.5 meter dish and Hughes and SA are up (way up!) from there.

Jim Morrow  
StarTrack  
Cheyenne, WY. 82003

**Not bizarre but not new either. There are two large problems with 'stacking' parabolic dishes. Phasing, and, keeping line loses down so that you don't lose more in the coupling process than you gain with the stacking process. By placing the LNAs at the individual antennas, you'd probably beat the former problem. In fact, you could stand substantial line losses and mixing loss since it would be pure and simple voltage, and most systems have more signal voltage (as opposed to signal power) than they can use anyhow. The phasing problem may be tougher to resolve. The individual reflector surfaces need to be in-phase with one another. That says the reflectors need to be the same distance from the bird so the path length to each is very close to identical; down to say .3 of an inch or so. The Radio Astronomy folks use lots of tricks to make this happen, including using line stretchers to simulate variations in phase between two or more dishes. You could do the same thing with coaxial lines; starting off with 'exactly equal' line lengths (that could be a good trick when working to .3" tolerances with connectors involved) and then whacking on one of a quarter of an inch at a time and measuring all over again to see if the net summed signal from the two antennas went up, or down. There are commercial line stretchers available; trombone like mechanical devices that allow you to adjust line lengths. However, you'd have some difficulty powering your LNA through one of these and would probably have to figure out some way to insert LNA power at each antenna, separate and apart from the phasing network. We'd start with two identical antennas and make that play before trying to make four antennas play. Get the problems worked out with two, and then grow to four. You will be on untested ground but it is a very worthwhile project. Only one problem remains; how do you move, in unison, four antennas all at the same time so that they swing on a polar axis that maintains constant equal distance between each of the antennas and the satellite 'point' signal source? You may end up with a single bird antenna system, but as you note, if you can do for \$5,000 what somebody else wants \$17,000 for, you are headed in the right direction! Oh yes, when you get it flying, it is a dead cinch for the front cover of CSD!**

#### OPPORTUNITY Knocks

A few months ago you tossed out the idea of the Turks and Caicos possibly being ripe as a spot to build TVRO equipment. I would like to know if anything has come of your idea, and if yes, what companies might be involved. I am interested in working in this industry and the idea of being involved in a start-up operation in the islands is very appealing. I have a background in electronics manufacturing, training, and supervision.

Name withheld

**We've had several letters in this vein and since most of the fellows are presently employed in this field, we don't want to give any of their present employers the idea that their people may be getting ready to jump ship! Update on the key question. At the present time, no firm is close to cementing a deal with the Government of the Turks and Caicos to set up a manufacturing facility here. I'd say we are 18 months to two years away from something**

**happening in this area. Several firms are talking with the Government and I hammer on the head of Government officials at every opportunity. There is no reluctance on the part of government; just a matter of being a very small country with only a handful of decision makers, and far too much work and not enough time to do it. I'll keep pounding from here, and taking prospective manufacturing people by to see government leaders. Sooner or later it will pay off.**

#### SAME One

I would like to inquire as to whether Coop is the same Robert B. Cooper who authored an article appearing in the September 1971 edition of **Popular Electronics** describing the 'All American Sports Amplifier'? If yes, I would like to know if it is still possible to obtain a full sized foil pattern of the board layout for several of the models described.

T.L. Nicholson  
53 Amundsen Bay  
Winnipeg, MB  
Canada R3K 0V1

**Same guy. And no foil patterns are available. Left those behind in Oklahoma years ago. The 'All American Sports Amplifier' was a combination low noise VHF signal amplifier and an interdigital bandpass filter. The idea was that if you lived in say New York City, and the Jets games were blacked out, you could use one of these gadgets to pull out distant VHF transmissions on VHF channel 3 from either Hartford or Philadelphia to watch the games. A signal pre-amplifier wasn't enough; the strong (very strong) local signals on channels 2 and 4 would wipe out the pre-amp. The combination bandpass filter and pre-amp usually made it work.**

#### ANOTHER View

After returning from the excellent Provo Retreat I did some careful rethinking about what is happening to the international marketplace, and in particular, to the Caribbean, South America and Central American regions. I would like to share the enthusiasm for this region of the world becoming a large marketplace for US TVRO technology, but I am afraid I must come to an opposite conclusion. Let me share my reasoning with you.

There are severe economic problems throughout Latin America. Argentina recently devalued its peso by a factor of 10:1. Mexico, Guatemala, Honduras, Nicaragua, and Jamaica have enacted laws **specifically prohibiting** the export of US dollars, or using a phony dual exchange rate, whereby the money has a domestic, and, an international value, in order to encourage exports and discourage imports. This makes it necessary for people trying to buy US goods to engage in money shenanigans, usually through banks in the Cayman Islands.

There continues to be considerable political unrest, particularly in Central America, which seems to be progressing towards some large scale confrontation; possibly as serious as Cuba. And the US will be involved right up to our eagles, or at least be accused of being so involved.

We deal with large scale Central and South American buyers daily. And I notice a lot of nest feathering going on in Miami, Tampa, New Orleans and Caracas by citizens of Central America who are investing in items either in the USA, or considerably more portable than 20 foot dishes.

As a viable marketplace, this leaves the Caribbean and the tax shelter islands. I believe that this Caribbean market continues and that it will be assisted by the transportable dishes, including the ADM, HERO and Paraclypse types. But I don't think the entire Caribbean will amount to as much business as just one 'average' state within the continental 48. I fear that this region will be invaded by 'carpet baggers' with ten foot dishes who are used to installations in 37 dBw footprint regions. As we both know, there is a hell of a lot of difference between 37 dBw and 27 dBw! Certainly there are uses for these cheap dishes and cheap receivers, but these people and this equipment can only tarnish the concept of private, home terminals by attempting to unload their gear on unsuspecting people in the Caribbean.

Bill Miller  
Tampa, FL 33615

# TRACKER III™

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High Frontier, Phoenix, AZ 602-954-6008  
National Satellite, Latham, NY 1-800-833-4485  
Vicom-Norad, Orange, CA 714-532-1376

We agree on the danger of trooping into the Caribbean with marginal ten foot dishes and bargain priced receivers. No good can come of it and anyone who tries it and blows an installation had better be prepared to pay the consequences. Money laundering, on the other hand, through the Cayman banks, has become a way of life for people from dozens of countries. Central American business people have been salting their dough away in Miami, Tampa, New Orleans and Caracas for decades and whether we approve of the way they conduct themselves or not, given their (admitted) political instability factor, it may be the only common sense thing to do. We warned readers in Coops Comments for January that dealing in lesser-developed nations with terminals can be risky. But so is walking through Newark after dusk. . . . or Hoboken in broad daylight!

#### EUROPE in New England

After completing my article on tracking off boresight birds over the Atlantic (see CSD for February, 1983) I thought readers might like to see the quality of the results with my rather modest home system. The first photo is of the Symphonie feed from 11.5 west, when they have their western hemispheric beam activated for the normal late morning (ET) feed to French speaking areas in the Caribbean and North America. This is a 36 MHz wide IF and there are some sparklies. The sound is excellent. The bird was **three degrees north** of the equator at the time, requiring tracking of course.

The next photo is of ATC (Argentine Television Color) from 27.5 west. The signal is a lower level here in New England than Symphonie although others report it to be very good. That ought to tell you



SYMPHONIE in New England



ARGENTINA in New England

something about the Symphonie footprint level!

The third photo is of VV or Venezuela. It also has a fair amount of sparklie noise, even with a narrow IF switched into the receiver. I have noticed that it **was** quite abit stronger some weeks prior to this photo.

Finally, the fourth photo showing the results from Ghorizont at 14 west. No sparklies at all, and excellent audio. This (Cuban) feed was typical of the evening stuff, and I have noticed that on many of the Cuban feeds they don't seem to deviate as wide as the Russians do when they are controlling the uplink.

John Drew  
51 Canterbury Road  
Mystic, Ct. 06355



VENEZUELA in New England



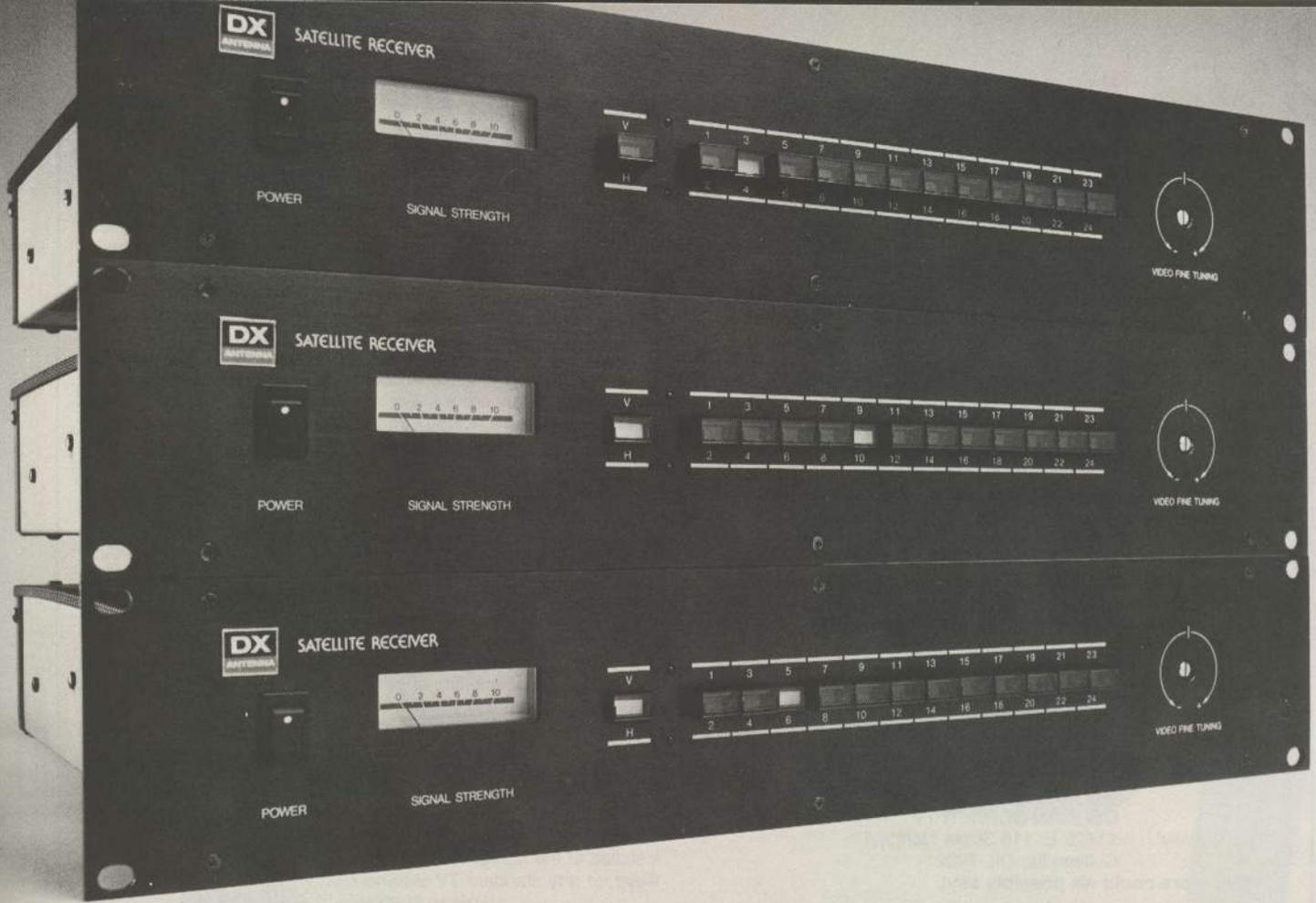
RUSSIA's Ghorizont in New England

John also included photos from Brasil, Peru and a suitable representation of other European and South American countries. He admits his five meter surface is bigger than many, but also adds that it has a 0.5" surface error or ripple and he feels that it may be more like a proper 12 to 13 footer. We agree with him, and encourage others who live in New England and along the eastern coast to see what is waiting for them east of F4/W1-2!

#### ANOTHER Telecom Story

We have been following with great interest the 'Saga of Telecom Industries' in the fall issue of CSD. We, too, have a story to tell which I hope will rebut the 'rebuttal' you published from Mr. Bertonis in your December issue.

At the Omaha SPACE show we purchased 2 receivers. They



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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.



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

performed poorly when we got them home. They were sent back immediately for repair and were supposedly re-aligned. When they came back, they still worked poorly and after a phone call to Mr. Bertonis, he reluctantly agreed to replace the down converter on one unit with the 'new' update. He wouldn't replace both units since (he said) 'the equipment has been used, and it has solder marks on it'. The fact is the equipment never made it out of our shop because we thoroughly test any new equipment before installing it for a customer. When the unit returned, it was actually worse than before.

We have been dealers in Satellite TV since November of 1980 and we certainly know how to hook up equipment properly without abusing it. After another call to Mr. Bertonis it became apparent we will have to take legal action, or kiss our \$1000 goodbye.

I definitely hope that SPACE will get involved soon in establishing quality standards for our industry. After all, these guys (from Telecom Industries) were guest speakers on the platform at the SPACE show. However, our loss was minimal compared to a distributor I talked with who has \$30,000 invested in these receivers which he has been forced to take back from dealers who had similar experiences.

In closing, I would be seriously interested if anyone out there would like to rent a booth with us at the forthcoming SPACE Vegas show to display Telecom equipment, and, to 'Enhance The Professionalism Of The Industry' as Mr. Bertonis so aptly wrote in CSD in December. 'We intend to continue to keep Telecom at the leading edge of this new and exciting industry' he concluded. My firm intends to do everything we can to 'push him over that edge' and out of this business, and back to selling Pre-Owned Desotos or wherever he and his firm truly belongs!

Larry Poyner/Mike Peace  
GERMAN CORNER TV  
11425 E. 116 Street North  
Collinsville, Ok. 74021

**What more could we possibly say!**

#### ROUGHING IT

I am enclosing a photo of my antenna next to my trailer in the campground where I am presently staying. The dish is a MICROSAT and it is looking at F3R in the photo. Note that I have mounted it to a picnic table to get sufficient room to walk around the 'lot'. Even being close to a big tree, I still have room to scan the full Clarke belt. An Avantek 110 degree LNA and a Gillespie 7600A receiver round out the system. I guess you would have to call this 'roughly it . . . smoothly!'.

L. Bruce Kinman  
Rt 1, Box 118-A  
Leonardtown, Md. 20650



Arthur C. Clarke would be proud of you.

#### DRAKE/Soft Video?

I read with great interest your article on receiver performance in the October '82 issue of CSD. I have been using and selling Drake ESR-24 receivers for some time.

Drake really seems to be doing what you suggest some are doing; having a too narrow IF (thereby losing some of the picture detail) and then throwing in ten cents worth of parts to 'cover up the blemishes'. I have been asking them what to do to improve their 'washed out picture'. I phone them, I write them, but to no avail. They answer all of my other questions, but specifically avoid responding to the key question about video quality, and how you improve it.

You once wrote that you will not write about poor equipment. I note that you have not chosen to write about the Drake equipment. Am I to deduce, since they are a major supplier, that you tested the Drake receiver and found it lacking? Perhaps you have a cure for their video quality? It is really time that somebody takes a hard look at the performance of receivers (and antennas) and writes about what they find.

On another subject, you have an advertiser called Circuit Electronics that sells an auto polarization switching circuit board for \$49.95. This is, I believe, a total rip-off since it is not (I judge) worth more than \$10. Drake, in their application note concerning automatic polarization control, needs only 3 components at a total cost of about 15 cents to do the same thing this advertiser charges \$49.95 for. And you need no components at all if the Chaparral Polarotor One is used!

Finally, I liked very much your article in the November issue concerning rebroadcasting of satellite signals using low cost equipment. I was hopeful that you would explain a method of eliminating the unwanted lower sideband with the PC Electronics TVX-1. You did explain how to get rid of the lower sideband with channels between 420 and 450 MHz, but this technique apparently will not work with VHF channels 2-13, or channels 14 and up. That involved use of a lower vestigial sideband filter from Spectrum International. Does this filter have to be installed at the output of the transmitter? Couldn't it be installed at the output of the modulator? Who manufactures these filters for any standard TV channel?

Rejean Mathieu  
Television par Satellites  
660-13e Ave., Senneterre  
Quebec JOY 2MO  
Canada

**First to defend Drake. No, they have never allowed us to test one of their ESR-24 receivers.** However, we do own one and in fact it is used daily for WIV to bring down a couple of network shows from Westar 4. The video does have a 'soft look', we admit, but if you inspect it on a waveform monitor with color bars coming through the receiver, there is no unusual sign of roll off. Drake does, apparently, choose to 'process' their video. How they process it is proprietary, apparently, and we can't fault them for keeping some secrets to themselves. I suspect if I really wanted to know how they process it, I'd open up the case and inspect the demodulator/filtering/video amp stages for signs of a tuned network that is not usually there. We don't find the color unpleasant, and in fact have had numerous viewers comment that our 7AM to 9AM program (taken through the Drake) is 'cleaner' than many of our other day-parts. We have noted that our Microtime Time Base Corrector does NOT like signals fed through the Drake, having a considerable problem with the color sub-carrier. That may be a clue, but it is not an indictment since the same TBC also does not like the video from two of our four AVCOM receivers. Circuit Electronics is not, in our view, ripping off anyone. They provide a viable product that, to the best of our knowledge, works (we have had no reader complaints). If you can do it cheaper, go into business. If we arbitrarily 'banned from advertising' every product which we felt was overpriced, we'd wipe out half the industry in one shot! That's not our business anyhow; that's up to the marketplace to decide. If a product is overpriced (which the Circuit Electronics piece may well not be), it won't sell. And that will be that. Finally, for lower sideband filters . . . Spectrum International now will make available filters for almost any UHF frequency for about \$30 premium. For VHF filters, try Microwave Filter Company in East Syracuse. Can you install the filter after the modulator? Yes, of course. Provided the modulator is separate from the amplifier. The TVX-1 has all in one container and it would be difficult (and expensive) to insert the filter into a lower level stage. Peace.

# Can We Help You?

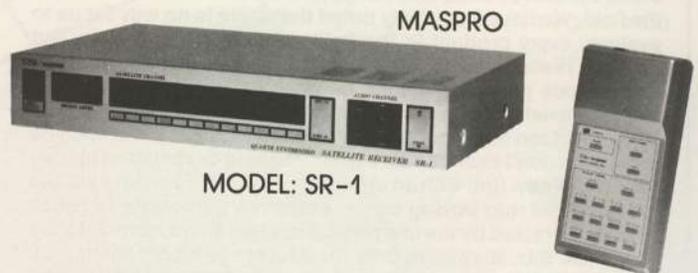
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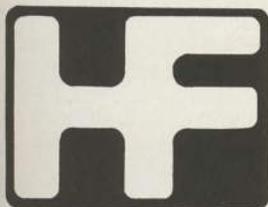
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**KEEP It Up**

A short note to say how much I enjoy Coop's writing and hope that he will keep up the good work. I really enjoy reading the reports on different receivers, antennas and LNAs. The information there has saved us alot of valuable time and money. I have had my own problems dealing with a number of distributors and have finally come to the conclusion, after a long first year of trying to get established, that it is far better to deal with the manufacturers **directly**, when you can. Knowing who you can deal with, and trust, is a bitter lesson. I recently tried two of the Washburn Earth Terminal receivers and must say they are the best I have ever seen. Please continue the product evaluations and 'notes' as it helps us sort out the good from the bad. Oh yes, we would like to attend the 1983 Provo Retreat; sorry we missed the first one!

Gold Star Satellite View  
Rt 1, Box 123  
Odem, Tx. 78370

**Our three Earth Terminal receivers just keep on grinding out high quality television, 24 hours per day. Clyde did his homework before he released this design and while he is up to his eye brows in a newer version (release date still not set) the present unit has stood the test of time, and competition, like no other product in the field. We have frequently noted that there is no way for us to evaluate every product in the field on a continuing basis. But between reader reports (which we always check out) and our own experiences plus intelligence network of faithful communicators, we usually get onto bad stuff before it has had an opportunity to infect too many people. Unfortunately, there will always be those who don't exercise care when sending or spending money to or with a new firm with an unproven product. Too many people get suckered into buying cheap, unproven equipment because they are attracted by the low price. If dealers throw caution to the winds like this, they have only themselves to blame when they get stuck with products that don't work and suppliers who refuse to return their money.**

**SIX Meter Accuracy**

I consider myself a close friend of you and your wonderful family. I have a great respect for your research and findings. So I find writing this letter very difficult to accomplish. But I feel if I don't, I will be betraying all the research and endeavors that our employees have put in during the past four years of developing our antenna and other products.

When I came across my copy of the 1983 January CSD, I briefly glanced through the pages, and decided to read the article on the Provo Satellite Retreat. I was greatly distraught when on page 42 in bold print was a statement claiming that a 12' Paraclype outperformed an older outdated Hero 20' foot model (even with a new surface). I don't doubt your findings, after all you have been in the industry a very long time and I would trust your findings long before anyone else's. But, I feel that all the facts concerning the older Hero 20 footer should be brought to light.

When I sent you the first Hero 20' model some two years ago, I pointed out that it was an early prototype. Also, when I sent you the new mesh for the antenna, I suggested to you that you should replace the antenna with one of our new models; the reason being that **even with** the new surface, the older 20 footer could never perform up to specs. Subsequently, all the antennas like it have been replaced with the newer model.

Reading further, I found on page 46 the comparison between ADM's 20 footer and the Hero 20 footer. You commented that there was a 1.00 to 1.50 dB difference in carrier to noise ratio. I discovered some facts of my own. I find that, without adequate instrument testing, arriving at this arbitrary figure is very difficult.

1) Andy Hatfield, in a recent conversation, told me that he never measured the Hero antenna so there was no real number I could obtain from him pertaining to the difference in performance of the antennas.

2) I do trust your eyes and those of Mr. Tom Humphries as a very good barometer of good and bad signals. But without the **side by side** testing with the **same** LNA and receiver on both antennas and without the use of a power meter, coming up with a **true** number is **very**

difficult.

3) After our telephone conversation, I simulated the identical production and assembly error that occurred with your antenna, and I came up with a difference of only .50 of a dB. The antenna you have, and three others like it, left our facilities before we found the error in production, and it has long ago been corrected.

4) Enclosed is a photocopy of the engineering data on our 20' antenna, done independently, by Professor Taylor Howard. It clearly states that our antenna has all the gain we claim. Also noted, by Mr. Howard, is that a dB difference between the two antennas would be hard to come up with.

5) The reason that I did not correct your antenna at the time of construction was that I wasn't present during the assembly procedure and upon arriving on your beautiful island, the antenna was already on the mount. That makes it virtually impossible to proof it properly as suggested in our assembly manual.

6) Remember also, that the very same antenna outperformed everything you had on the island at that particular time. That led me to believe that it was completely up to specs.

7) I will welcome side by side testing by an independent source, such as yourself, or the folks that did the testing in Omaha, and will provide you with an antenna for subsequent testing, because I too have seen a tremendous retreat in the quality of antenna production throughout the industry.

In closing, I hope you find the space to publish this letter. I feel it a duty to respond to your comments because of the earnest effort of our employees to maintain a high level of quality on all of our products. A small production and assembly error that has long been corrected should not cast any doubts on the quality and integrity of our products.

Robert Behar  
President  
Hero Communications  
Hialeah, Fl. 33012

**AND The Howard Support**

Mr. Robert Behar, President  
HERO COMMUNICATIONS  
1783 W. 32 Place  
Hialeah, Florida 33012

Dear Bob;

In response to your phone call of yesterday I have reviewed my data of last year and re-run several tests on the 6 meter Hero antenna installed here at my facility.

In the last year I have refined the measurement techniques and have had the chance to work on a number of different antennas while getting internal agreement between different ways of arriving at the desired answer.

As you will recall the answer given in my letter of 18 March 1982 was displeasing because I wanted to be the conservative engineer and say you had achieved the 55% figure of 45.6 dBi.

Now that the antenna has been in the air a year and has at least twice survived 70 plus mile per hour winds while my measurements have become more and more consistent I feel that I can reveal my true gain figure for the Hero 6 meter: Using the Polorotor feed I consistently measure (using comparative C/N with a known 10 footer and measured beamwidth of the Hero) an inferred gain of 46 dBi which translates to a 60% aperture efficiency.

This is very good for a lightweight petal structure and would be difficult to exceed without going to incredibly rigid framing usually found only in Intelsat B quality stations. For an antenna to be 1 dB better in performance would mean an aperture efficiency of nearly 75 percent for the same diameter — a figure probably unattainable in such a small antenna with a prime focus feed.

If there is a problem with your antennas it would be with the final assembly step where the last two ribs must be joined with a piece of aluminum which has to be cut to fit. The Hero I have was joined only after I had calculated the proper depth from the rim to the center plate and then measured the gap length necessary to achieve that depth. Also, no one walked on the ribs, jerked on pieces to make them fit, or lifted it in place with a backhoe.

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*Let's face it, all dishes pretty well look alike, have similar features, and often offer the same quality of reception. So what's the difference between other dishes and a Fullview dish? Quite simply, our price. And that really does make a difference when you consider that at Fullview Satellite Antenna Co. we are not only concerned with price, but also with quality and performance.*

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*And because of our low prices you will enjoy maximum profits. There's no question that with the Fullview dish—if you've seen one dish you haven't seen them all.*

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Antenna Co.**

\*In quantities of 10 or more.

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The bottom line of the above comments is that your antenna must be assembled properly to achieve optimum gain and I think that mine does just that. To get higher gain is hard for its requires petals which are parabolic in both planes. To get lower is easy, for all you have to do is screw up slightly in assembly.

While I do think that a solid dish with parabolic curves in both directions will, in general, outperform a petal mesh dish, the claim of a dB more gain is unrealistic — unrealistic unless:

1. The mesh dish was put together without adequate supervision and suffers a quarter to half dB penalty and:
2. The solid dish was assembled and tweaked for max to achieve optimum performance.

My general feeling after having assembled your dish, a Paraclypse, and a Janiel or two is that you are particularly vulnerable to assembly tolerance and screwup errors. For example it may well be that, in the comparison in question, the ADM was highly tuned but no better than the 6m Hero I have here while your antenna has been poorly assembled and is thus not fit for comparison.

I would urge you, in conclusion, to get control of the assembly process to make sure that the last step is a measurement of depth to force parabola to have its mathematical value. If this is done and the ribs are the right shape the focus will be in the exactly calculated place and the gain will be right.

H.T. Howard

For readers new to the game, HERO Communications manufactures a six meter antenna that is widely used throughout the world. It features horizon to horizon (down to about a 10 degree

look angle on both sides) chain type motor drive, mesh construction, heavy duty, aluminum, truss construction. We have two in the Turks and Caicos, having added the latest in July of '82. ADM manufactures a 20 foot all aluminum solid petal antenna. It is motor driven but only over approximately half of the Clarke Orbit belt. We now, also, have two of the ADM 20 footers in the Turks and Caicos. We wrote in January that based upon our tests, we found the gain of our initial ADM 20 footer, as installed under the supervision of ADM founder Jamie Gowen, greater than our best Hero 20 footer. We said by as much as 1.5 dB. Behar's rebuttal, here, is that it is not possible for the ADM to be as much as 1.5 dB better. He supports with the learned testimony of Taylor Howard, who consults for Hero. Behar offers to do a side by side test against an ADM, here. Using the same LNA, same receiver, same signals. That seems like a fair way to resolve the question, but we feel that both Behar and Gowen should be here when the tests are made, in addition to having Behar here when the Hero Six meter is assembled on site. As I write this, Jamie Gowen is asleep in the next room having put in an exhausting day assembling the second ADM 20 footer for us. It was a tough assignment; he broke more than once from marrying bolts and metal to trot 75 feet to the beach for a swim. That aside, we must note that we stand by our original observation; our best Hero antenna is not as good as our best ADM antenna. Can there be 1.5 dB discrepancies between equal antennas because people make small or large errors in assembly? We agree with Taylor Howard that there can be. Can the respective Presidents of ADM and Hero supervise or assemble their own 20 footers and come out dead-equal in a side-by-side test? I guess we will all see, soon!

## 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.

**PATMAR** Technologies now offering HTN (Home Theater Network) to hotels, motels, hospitals, nursing homes, condominiums, trailer parks and multiple home developers. Service is considered

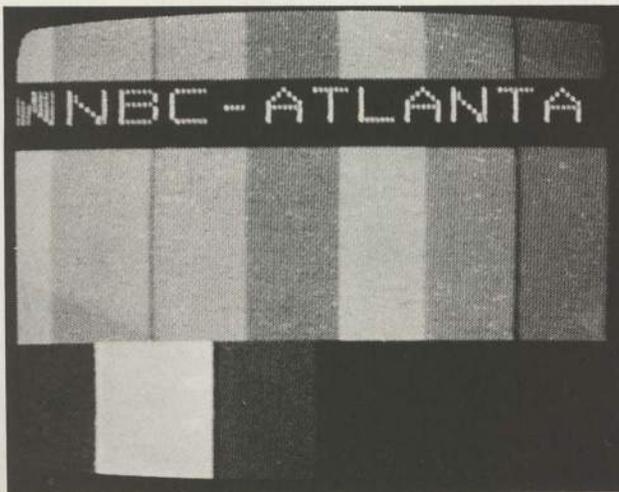
'Family (Premium) Channel', transmits 4 PM to 4AM daily, TR16, F3R. Cost to firms offering service is \$3.05 per unit per month plus \$.10 for the printed guide. Contact Patmar at 201-766-4408.

**SCIENTIFIC ATLANTA** in complicated exchange with British Plessey Electronics entering European DBS market. Plessey acquiring substantial percentage of SA outstanding shares, while jointly the pair are forming a new European subsidiary (Plessey Scientific-Atlanta, Ltd). SA's fortunes have not been good this past year, due to failures in home CATV converter field and other problems. The joint firm will also be very active in supplying cable TV hardware to the now exploding European cable market.

**U.S. CHAMBER** of Commerce Biznet service getting special push in 1983. So far the number of chambers using service has been a disappointment. Contract calls for S-A or M/A-Com gear to be installed, **but**, individual chambers have right to select **other** suppliers if equipment meets standards established for carrier to noise and signal to noise ratios. Excellent opportunity here to sell terminals of a semi-professional nature.

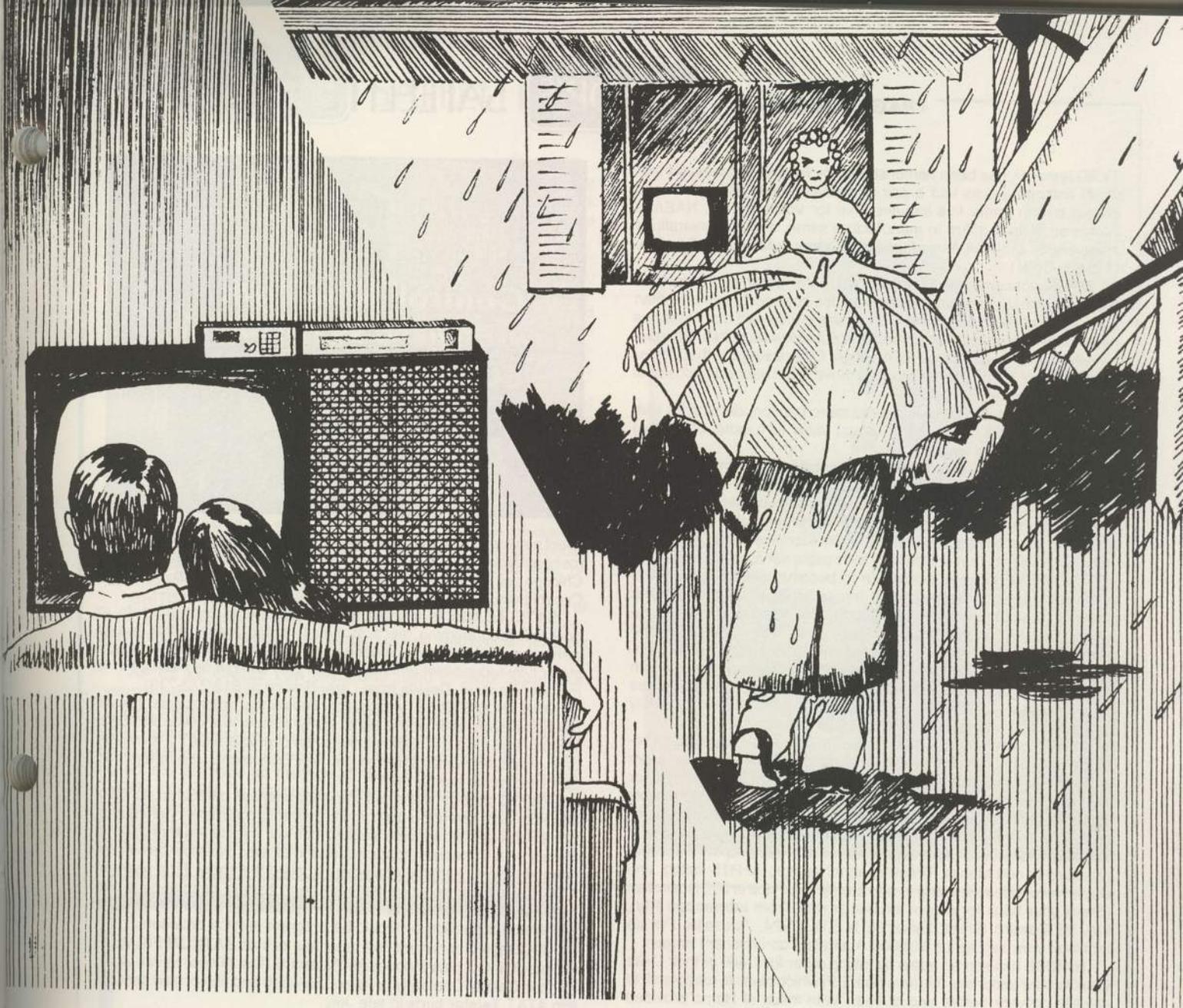
**FORD** and India exchanging blame for failure of INSAT-1-A bird last fall. Ford cites a complex series of failures, each small when taken by itself, for failure and criticizes Indian's manning control software of bird after it achieved Clarke orbit position. India says Ford was negligent in bird design. INSAT-1-B scheduled to launch on STS-8 of Space Shuttle.

**SUITCASE** earth station, similar in concept to transportable Luly



Wh  
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7107 So  
Midvale  
801-566



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



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

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408-295-1709

Satellite TV Specialists  
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Salt Lake City, Utah 84107  
800-292-3661

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Las Cruces, New Mexico 88001  
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Central Imperial Electric  
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807-468-9796

American Micro Supply  
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Cambridge, Ohio 43725  
614-439-7771

TVRO terminal, has been demonstrated by NASA. Unit uses six foot mesh antenna, packs into a pair of suitcases, and will set up and access bird in under five minutes time for voice link-up. NASA is interested in finding firm to manufacture same, and demonstrations are available at NASA Ames Research Center in Mountain View, Ca. (415/965-5091).

**SOME** concern that Russians will enter commercial satellite launch business. They recently announced contract to launch Indian birds starting 1986, and some US officials concerned that Russians might undercut established pricing and subsidize launches with government funds, in exchange for prestige. Others suggest that if Russians do enter 'game', it will be largely move to get hands on additional 'western currency'.

**RCA** is in process of selling three more transponders on F4 with 'as little as' \$1.5M down and 93 equal (easy to handle, of course) payments along the way.

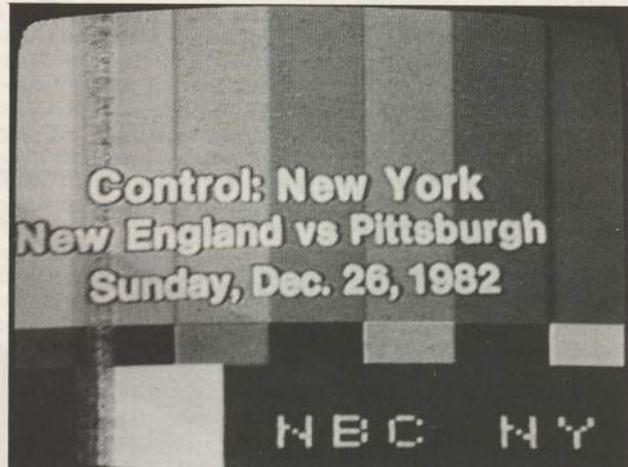
**NCTA** (National Cable Television Association) is planning aggressive attack on SMATV firms, concerned primarily that SMATV operators seem to be able to operate without getting complicated, expensive local city franchises or permits. NCTA is urging cable operators to purchase small dishes and install them in lucrative multiple dwelling areas to protect the turf until full city wide cable services are available.

**JAPANESE** industry would like to become regional provider of satellite services in Pacific. Recent announcements suggest Japan is planning series of satellites designed to provide low cost telecommunications to islands throughout Pacific; they would provide ground terminals as well. Intelsat, meanwhile, has announced plans to develop relatively low cost single voice channel terminals for use with future generation Pacific satellites; some transmit/receive packages costing as little as \$25,000 (!). Unique problems of Pacific, widely scattered, small pockets of people, lends itself to innovation.

**FIRST** Asian/Pacific edition 'Satellite TV Guide' has been produced. **SATELLITE NEWS** headlines it is for 'Owners and Operators of Earth Stations in the Asian Pacific Region' and carries listings for two separate ABC (Australian Broadcasting Corporation) channels currently delivered via Intelsat lease. News section talks of new installations in or going in for 3,000 room hotel in Bangkok, another in Singapore to extend Australian reach into Asia proper. Publisher promises to add Manila RPN 9 channel listings, AFRTS listing, and Cable News Network listing in future editions. Price is \$76 Australian (check your bank for proper exchange rate) from **Interscope Pty., Ltd.** 23 Edward Street, Sylvania, N.S.W. 2224, Australia. Private terminals now selling for \$10,000 Australian on continent proper.

**HARRIS** has scored again by taking order for 1,400 of their Delta Gain 3 meter terminals; this time from UPI which plans to totally shift to satellite delivery before end of year. With influx of Harris provided dishes, many state and regional radio networks (Texas, North Carolina, others) will also be shifting to Westar 4 coverage during 1983.

**FCC COMMISSIONER** Sharp has turned into a crystal ball gazer, speaking at recent broadcast conclave, and predicting that by 1990 the existing commercial networks won't be networks at all. Sharp sees



direct network connection to homes through satellites for all but larger metropolitan areas, predicts only cities such as Boston, New York and Chicago will continue to have terrestrial affiliates. Sharp is leaving Commission in mid-year.

**SATELLEASE** is training terminal operators to participate in downlink programming feeds at their Chicago facility. Firm boasts ownership of more than two dozen transportable, commercial grade, 5 meter fully redundant terminals which they can put on the road in 'a moment's notice'. Details from Larry Bracco at 312/272-7791.

**OAK INDUSTRIES** undergoing substantial management level re-organization after admitting to hefty losses in income in 1983, versus 1982. Like S-A, Oak felt the pinch of problem CATV converter units spending nearly \$16M to get new 56 channel converters into operating mode during 1983.

**ANIK C** start-up, the world's first commercial, dedicated, 12 GHz DBS-like bird, failed to attract more than mild interest of Canadians. Canadian cable firms were excited but last minute legal problems, threats from Canadian broadcasters and others, plus slow delivery of needed receive terminal equipment spoiled the show. First users of ANIK-C are those services that have been 'testing' on dual-band bird ANIK B for nearly two years. Most of what is happening with ANIK-C is jockeying for position by would be program service providers.

**UPCOMING** or current new launches include **SATCOM F6** (May), second **ANIK-C** plus Indonesian **Palapa B** (first of two) in late April, Hughes **Galaxy One** early in June (135 west) and first of new generation AT&T **Telstar** birds in late July.

**BLAIRSAT**, the firm that sent weekday transmission of TV commercials via satellite, typically on Westar 4, is all done. They lost more than \$7M in venture and have decided to call it quits.

**FRANCE** following earlier format is protesting plans of tiny Luxembourg to launch and operate commercial DBS bird. French say that Luxembourg DBS would "... cause a dilution of French television advertising market, and, bring to French viewers unwelcome cultural influences ...". Viva la France!

**BATTLES** to gain access to Intelsat records, considered public domain under Freedom of Information Act of 70's, continues. M/A COM and others want to see how Intelsat (Comsat) structures rates, arranges for feeds, and manages business since FCC is planning to open direct access to Intelsat birds to anyone with authorized earth terminal. Intelsat (Comsat) so far not cooperating. Court tests expected.

**FNN** has moved from WESTAR 4 to SATCOM F4 in controversial move that will probably include litigation before it is completed. Wold lost FNN as a customer, RCA gained FNN as user. Wold claims FNN didn't pay its bills, FNN says Wold owes it money from initial down payment made. FNN apparently has made deal with Rainbow Programming, operator of BRAVO service on TR 6 of F4 to use daypart of transponder. FNN plans to expand length of its broadcast day shortly.

**FIRST** US DBS operator, USTV, has announced it will commence service on ANIK-C bird on September first. USTV will program as many as six channels of programs, plans to charge \$750 for equipment plus \$100 installation fee, and monthly programming fee of \$15.



Many details remain to be sorted out.

**OAK ORION** system, the not-so-security system designed to scramble satellite signals, has been selected by the Catholic Network for their national service. Oak's problems in Canada, meanwhile, are not yet resolved.

**HBO-M/A-COM** deal for scramblers for HBO (and Cinemax) service leaves door open for other program suppliers. After HBO provides affiliates with first descrambler unit (one per HBO service taken; two if system also takes Cinemax), system may lease/rent second descrambler for around \$75 per month. Second unit will plug into mainframe holding basic control circuits and may be internally adjusted to allow decoding of unrelated-to-HBO pay service such as Spotlight.

**MEANWHILE**, cable industry is abuzz over latest proposed merger; between SHOWTIME and (Warner/Amex) THE MOVIE CHANNEL. Under new ownership pattern, several movie production firms would be included in package of owners. Too early to tell how it would all sort out in the marketplace. HBO screaming anti-trust to U.S. Department of Justice.

**S-A** has high hopes that its recent corporate acquisition of Canadian firm Digital Video Systems will result in new S-A product for encrypting video transmissions. DVS has been working on special, new, product line for digitalizing satellite video for some time, reportedly is close to solving problem.

**BRITISH VISNEWS** looking hard at creating 24 hour per day all news television service, ala CNN, for satellite distribution to European cable and SMATV systems. Projected start-up date is down road five years however.

**AP NEWS CABLE** now being distributed to cable systems on vertical blanking interval of WTBS, TR6, F3R.

**GOLDWATER** bill that gave SPACE and industry so many anxious moments during closing days of last session of Congress is back; as **S.66** That's the bad news. The good news is that, as introduced, the bill made **no** mention **at all** of 'signal piracy' nor private TVROs, nor SMATV. Unknown is whether attempts will be made to add new language to the bill while it is in hearings (scheduled for mid-February), or whether HBO et al will push for **separate** piece of legislation just for piracy concerns.



## EXPERIENCE IN

## THE CARIBBEAN PAYS OFF

This report begins in January, 1982, when my partner, Bill Heavener and his wife, Pat, were spending a well-earned vacation on the charming French-Dutch island of St. Martin in the Eastern Caribbean. One day they visited a time-sharing condominium development on the Dutch side of the island with the idea of buying a week or two in the sun. The eager sales person who showed them around and described the eventual plan for building 140 apartments (there were then 15 finished), mentioned that each apartment would be furnished with a 19" color TV set. Bill asked her what programming would be available since the nearest source of regular TV (albeit mostly in Spanish) was from Puerto Rico some 200 miles west and, at best, a very snowy almost unwatchable picture. The sales person responded that she had heard talk of installing one of those "dishes"; Bill's ears perked up and he sought out the developer who confirmed that he was, indeed, seeking proposals for the installation of a TVRO and master antenna system for the development. As my wife, Marina, and I were planning a trip to St. Martin a couple of weeks later, Bill promised that I would bring a proposal with me.

by Peter C. Sutro, President  
Patmar Technologies, Inc.  
6 Claremont Road  
Bernardsville, NJ 07924



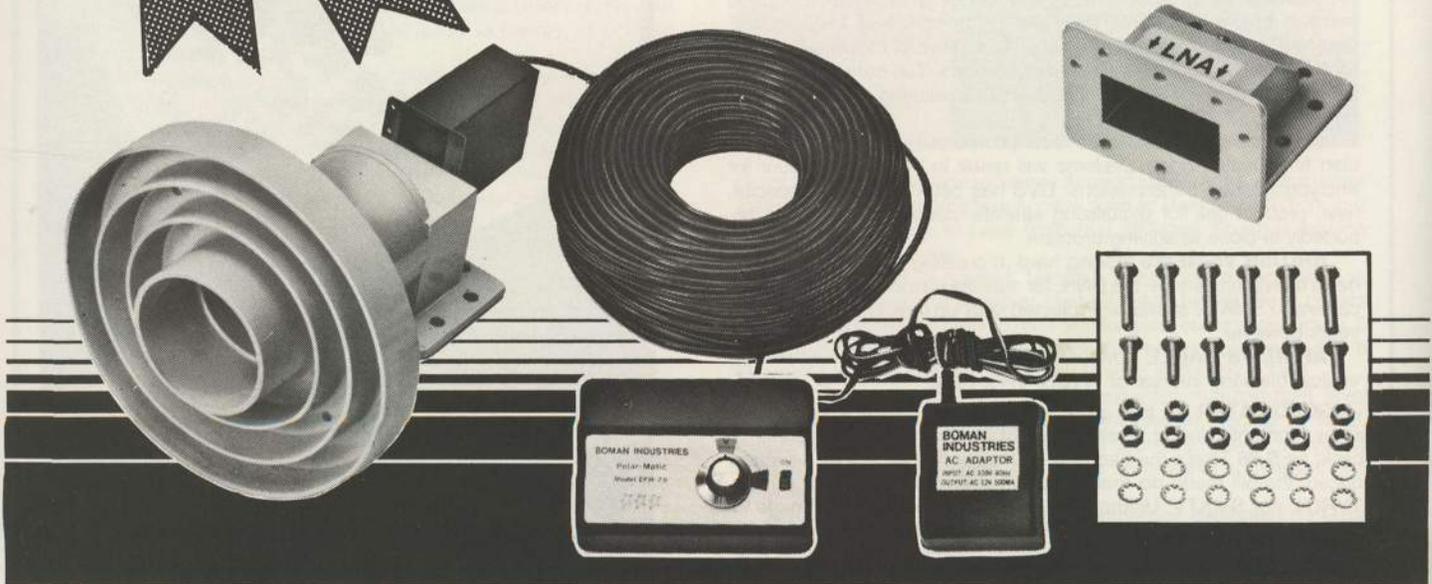
# "Polar-matic"<sup>T.M.</sup>

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## For the best picture-start with the best Electronic Feed Horn.

The new Boman Model EFH-75 **Polar-Matic** is designed to replace mechanical feed rotation devices in home earth stations. The selection of horizontally or vertically polarized signals is achieved by the Polar-Matic control unit rotating a precision probe inside the feed horn. No more waiting 10-15 seconds — now change polarity in less than one second.

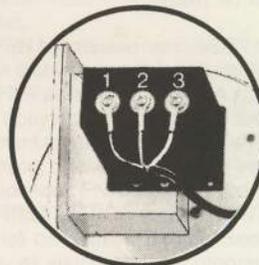
**INSTALLATION FEATURES:** 130 ft. of No. 3 conductor wire **TERMINALS** attached at each end - **NO MORE SPLICING** - Molded terminal posts on motor cover - Painted parts prevent corrosion - **ON-OFF** switch on control box for prolonged component life - Power-on light on control box - All necessary hardware included.

**CONTENTS:**

Polar-Matic Feed Horn	1	Hardware Packages	2
Angle Bracket	1	Double Stick Tape	1
Control Unit	1	Cable - 130 feet	1
Power Adapter	1		



PRECISION CONTROL WITH ON OFF SWITCH AND L.E.D. INCLUDES "NO SLIP" CONTACT TAPE.



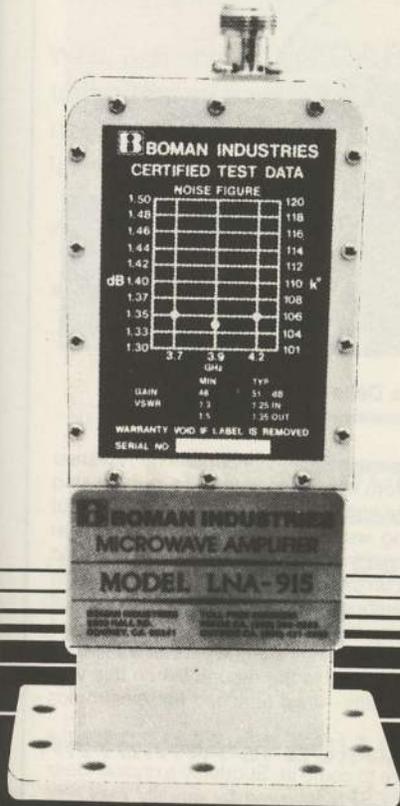
WEATHER PROOF TERMINAL STRIP TO INSURE YEAR AROUND CONNECTION. (NO MORE SPLICING)



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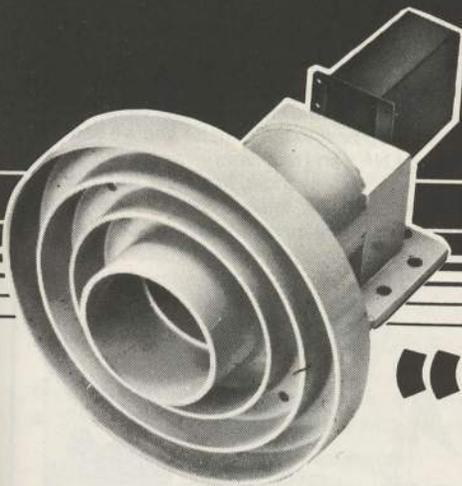
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TIGHTENING a bolt on St. Martin, Bill Heavener prepares to put Delta Gain into operation.

Upon his return we set about formulating our proposal. The biggest variable was the size of the antenna we would need. Patmar Technologies had been successful in installing 3 meter commercial systems in New York area hotels at a time (F1) when most manufacturers were recommending 13 to 15 foot antennas in that part of the US. From what we had read and even with the advent of F3R, the Eastern Caribbean was still a land of 7 to 11 meter antennas. We felt, however, that we wanted to try something smaller and proposed a 5 meter Prodelin antenna with 100° LNA's, and four Entertainer receivers. The MATV head end would consist of Blonder-Tongue modulators (AVMT's) and strip amps. Add to these a SOLA power regulator because the island's power is notably unstable, and we were ready to submit our proposal on February 16. It was accepted with enthusiasm, if a bit of skepticism, because it was about one quarter the cost of other proposals they had received. Two things bothered me — they wanted the system installed and operating by April 24, barely 9 weeks away; and, the information that a 7 meter antenna had just been installed on the island at the home of a local attorney who was an old acquaintance of mine. I went to see him and he complained that, at the cost of \$60,000.00 for a four channel system, his reception was not as good as he hoped it would be.

Nervous about our 5 meter proposal, I stopped in Florida on my way home from vacation and was assured by eminent and, I'm sure, well-meaning engineers, that a 5 meter in St. Martin (Lat 18N — Long 63W) would barely break color on the hot verticals of F3R, and get nothing on the other 18 transponders. Nonetheless, we decided to go ahead with our proposal and in a few weeks our Prodelin 5 meter left New Jersey bound for Miami, and thence from there by air to St. Martin



3 METERS ON CNN / Delta Gain video on Trinidad.



HIGH above Caribbean, Harris Delta Gain goes to work.

arriving the first week of April. Meantime the development had finished pouring the lid for the water cistern which consisted of a cement slab about 100 feet long, 20 feet wide and 6 inches thick. It was in an ideal spot for the installation, looking westward over the sparkling blue ocean and only 150 feet from the administration building which would house the headend. Bill arrived on the island on April 12th and began the arduous job (with plenty of enthusiastic, if unskilled, local labor) of erecting the antenna and running the cable for the MATV system. I arrived a few days later and found a very sunburned partner waiting for the crane which would lift the surface to the mount. When this was accomplished — after two false lifts — we attached the electronics and held our breaths.

Peaking the azimuth with a come-along and the elevation as best we could, we waited for a picture to come in. Suddenly a crystal-clear automobile race appeared on ESPN followed by equally excellent pictures on WGN, MTV, CNN Headline News, C-SPAN and one Cinemax. Perfectly acceptable, if not quite perfect, were the 5-watt verticals and the horizontals. After due celebration with the owners and builders who chided us with not proposing a smaller antenna, we returned home determined to follow that suggestion.

We returned to St. Martin in July after shipping three more antennas — Prodelin 3.7 meter and 3 meter and Harris 3 meter Delta Gain. In due course they were all set up next to the 5 meter and we began peaking, mixing and matching LNA's and receivers — we had brought a considerable spectrum with us. LNA's ranged from 120° to 75°, the receivers from Harris 6522 and 6528, DX, Intersat SR-20, Vidare and Entertainer. One after the other, the antennas performed acceptably, with the Harris Delta Gain almost the equal of the 5 meter. The 3.7



CLEARING local vegetation on Trinidad required building 'stand' on site.

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Well, just about! The **CABLESAT** broadband satellite system uses a **single antenna** to serve an **unlimited number of satellite receivers**. Apartments, condominiums, down the street, or across town, **CABLESAT** reduces the cost of satellite to about  $\frac{1}{3}$  that of other home systems, and to less than the cost of Canadian Cablevision/Pay-TV.

Anderson Scientific's ST99, with:

- A full line of CATV-grade active and passive components for both indoor and outdoor installations.
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**ST99 Receiver Dealer Price \$550 Canadian**

The people at **CABLESAT** have years of experience in the construction and operation of Canadian cable systems, and offer dealer training and field assistance for **CABLESAT** installations.

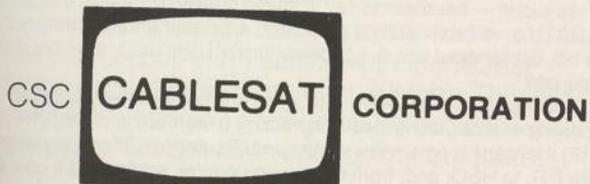
## ANTENNA SPECIAL

**CABLESAT's** own 8' Spun Aluminum and 9' Spun Steel parabolics offer everything you could want from an antenna:

- Spun antennas provide the best accuracy and highest possible gain. Our 8' antenna gives sparkle free reception throughout southwestern Canada.
- The single piece reflector drastically reduces installation time and eliminates assembly errors. You just can't go wrong.
- The 2 piece, pre-assembled polar mount goes together in minutes. Entire antenna installation takes 1.5 hours.

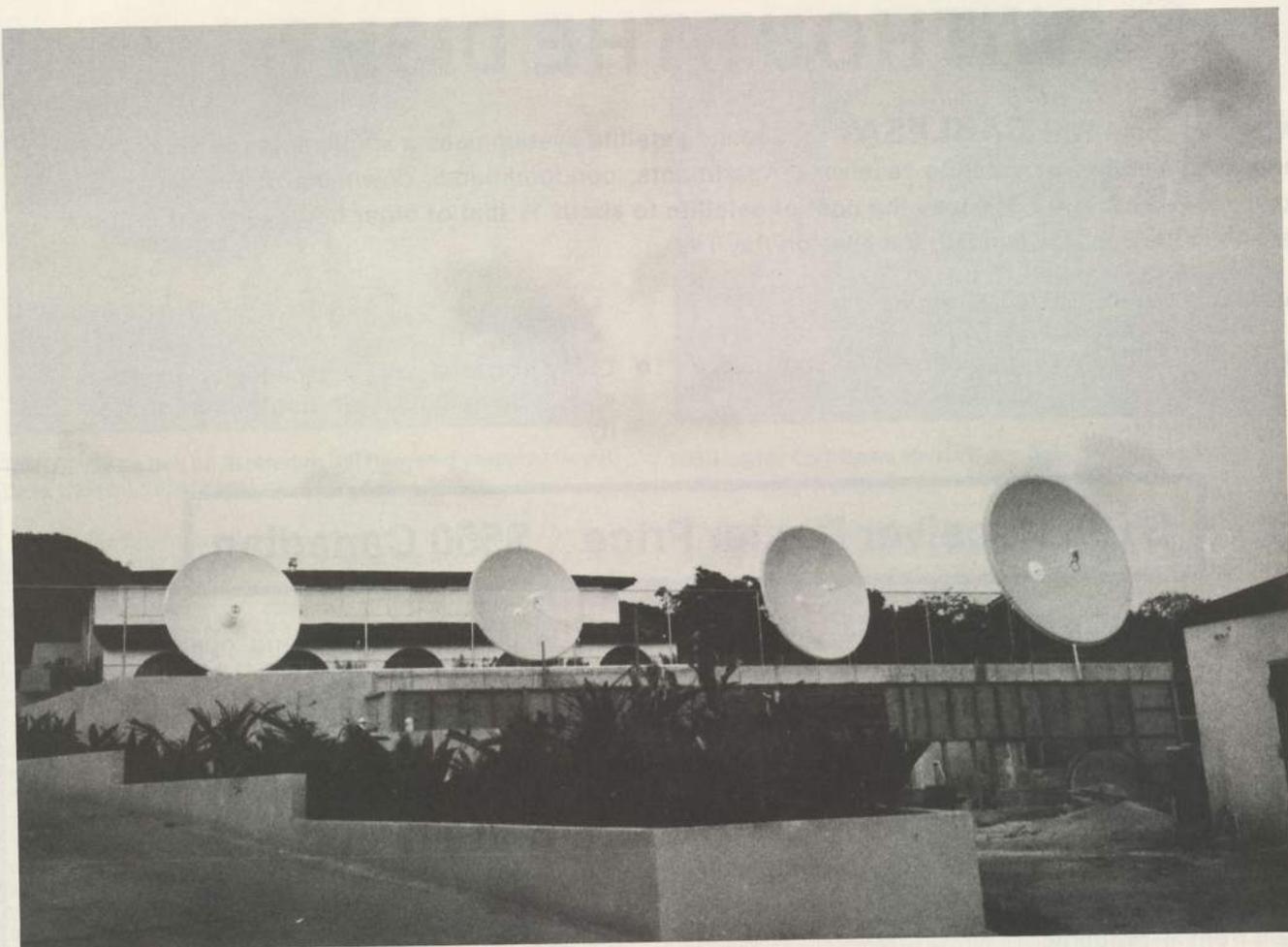
## Canadian Dealer Prices

- SA8 — 8' Spun Aluminum antenna with mount..... \$860
- SA9 — 9' Spun Steel antenna with mount..... \$895



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ST MARTIN ANTENNA TEST RANGE / from left to right Harris 3M Delta, Prodelin 3M, Prodelin 3.7M and Prodelin 5M. They all worked!

and the 3 meter Prodelin were deemed quite acceptable for home or commercial use especially in an area where no TV exists, and given the fact (as in the case of the Harris) that they could easily be driven through the arc to receive programming from 6 satellites (no Canadian birds) from F3R to F4.

The next day we installed the Prodelin 3.7 meter at the home of the attorney who owned the 7 meter dish, and who became our St. Martin partner, the 3 meter on a trailer, and the Harris at the home of an American industrialist who now watches about 40 impeccable channels on a 60 inch SONY projection TV, zipping through the arc

powered by a Vector 100 positioner.

Since that time we have installed 3 meter Prodelin systems in Curaçao, Aruba and — the acid test of all — a Harris 3 meter Delta Gain in Trinidad off the eastern coast of Venezuela, (Lat 10N — Long 61W)!!

It would appear that due to a better antenna design, newer satellites and better electronics, the day of the small TVRO antenna in the Caribbean and even on the north coast of South America and throughout Central America has arrived. The advantages are many: Smaller size antennas cost much less and are **air shippable** to remote locations at a fraction of the cost of their larger cousins. The wind resistance is reduced geometrically requiring much lighter mounts and foundations, and mesh dishes such as the Paraclype are particularly desirable. I do **not** mean to imply that small antennas are applicable to **all** situations — needless to say, if studio quality pictures are required for CATV or re-broadcasting purposes, a 3 meter antenna may not fit the bill, but for most home, condominium or hotel uses, they are quite adequate.

I do not intend to delve into the very complicated legalities of receiving or receiving and re-transmitting (whether via cable, VHF, or UHF) the many programs available on US satellites. They vary widely from PTL to HBO, and, from country to country, and must be considered on an individual basis. One must also carefully consider local attitudes toward reception of US satellite transmissions and the country's Intelsat agreements. Import duties on TVRO equipment can vary from zero (St. Martin) to 200% (Trinidad). Exchange control (your ability to get your money **out** of foreign countries) can also lead to some unpleasant surprises. Installation and service of TVRO systems is also much more costly, complicated and lengthy than anything you

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Sat-tek R5000 Receiver \$350  
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# It's raining cats and dogs, and the dish needs moving.

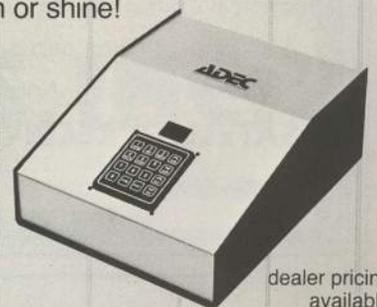
That could mean a soggy trek out to the backyard. But not if you equip your earth station with the ADEC microprocessor-controlled actuator system. This new actuator system lets you change dish positions easily and accurately, without ever setting foot outdoors!

The system's electronic control panel can be programmed for pinpoint targeting on all present and future domestic satellites—up to 50 positions in all! And it operates at a low 36-volt D.C. level. For installation, the ADEC actuator system comes complete with 175 feet of specially engineered direct burial cable. And waterproof quick-lock connectors eliminate the need for hand wiring.

With the ADEC actuator system, you'll switch satellites as quickly and easily as you now change channels. And best of all, you'll do it from a nice, dry living room . . . come rain or shine!

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may have experienced in the US. Almost **no** tools or hardware are available locally; including nuts, bolts, and washers, and if finally found, they cost a fortune! Offshore business should not be entered into lightly or without thorough investigation.

Since our modest successes we have received many inquiries from this area of the world and are willing and able to consult on equipment, shipping and installation. We are also starting to investigate the Western European market and would be glad to hear from interested parties in that part of the world. We feel that greater emphasis must be put on smaller and more accurate antennas in order to expand our market to foreign countries.

#### COOP CONTINUED/ from page 5

gramming advocate') had been sitting there in Fast Eddie's eating a meal. I understand he fell off his chair when the TV blinked, and came back on with a 'F . . . You.' I probably would have dropped my scrambled eggs myself. Needless to say I took immediate steps to see that did not happen again!

**With Barry Simon rubbing his hands with glee** because he had caught Fast Eddie chewing me out for 'dirty movies' while the TV camera was running, we headed back to the WIV studio to review the day's "rushes." Not bad. Very good in fact.

The next day we started out with Scott doing some intros to the piece. Those of you who have been here will possibly recognize our beach as Scott strolls towards the camera talking about how remote the islands are, and ends up by telling the audience that while there is no agriculture or industry here, "**Provo does have plenty of television.**" Just as Scott was finishing his walk-in open, our **Chief Minister Norman Saunders** showed up. I had arranged for Norman to fly over from Grand Turk to sit on camera with Scott to talk about the impact of television on the islands, and to talk about the growth of the islands. They did a great eight minutes or so, which I suspect will be telescoped to maybe 24 seconds when it hits the air. After the Chief Minister and Scott finished their session in the central courtyard of our house, we broke the set and did a quick piece in front of our Paraclype antenna. That's what you see on the front cover this month.

While I gave Chief Minister Saunders a ride back to the airport in the WIV blazer, and explained to him what had happened the day before at Fast Eddie's (I didn't want him unprepared for what I knew would be a strongly worded 'report' on what the Minister of Education witnessed!), the ET crew was shooting Scott's close, out west of the annex. As I drove up Susan came running over. "**Do you know what Scott is saying???**" she demanded. I obviously did not; they were 400 feet away and the wind was blowing.

"**Scott says you are a pirate . . . the last of the pirates!**" I gulped. I have been called almost everything one can imagine. I can stand most of it, even when it comes from somebody in Oklahoma. You have to simply consider the source, the mental ability of the source, and develop broad shoulders. If I was afraid of what people were going to say about me, I would have gotten a job selling shoes in Duluth. But Pirate???

I saw mild amber; not red, just mild amber. And trotted over to

where the ET crew was wrapping the fifth take on Scott's close. I said several things about the word pirate. None of them complimentary. And I ambled into a 120 second lecture about why that word was a very unfortunate choice of words in the particular quick silver point of time our industry was living in. Barry Simon listened and he and Scott **promised** they would not use that close, or that word. I **think** they understood why, but until I actually see the piece air I won't know if they are good to their word.

**It took me a couple of hours to cool off.** During which we set up and shot inside the WIV studio. They wanted to show the world how Susan runs the taping room switching, how Kevin and Tasha run one camera each and how I 'floor direct' a newscast. Our local newsman, Wendall Swann, did a dummy newscast for them. That ate up about two hours and if they use more than ten seconds of tape from that sequence I will be surprised. Oh yes, Susan does not run the switching in a real newscast. Kevin does, and usually Tom Humphries is there running the control room board and I am hopping around adjusting cameras, giving cues and otherwise making a fool of myself with my little headset. But for the ET show, it became a 'family enterprise.' That makes good TV; right!



**HUNT** was all over the place with his Sony camera, inserting his large frame into tight corners that hadn't been visited by humans in years. Here he attempts to intimidate Kevin with a 14 to 1 zoom and 2X expander. Kevin never flinched. Next stop . . . "That's Incredible!"

**I felt sorry for poor Wendall.** We do our newscasts with a certain island 'sloppiness,' in real life. The ET folks tried to give him a Max Robinson polish and after he had done the same 24 second news story seventeen times, and they shot him from every possible angle, I think he was ready to quit his TV job and sell Conch shells. I assured him that **we** would never get that fussy. He assured me that **if** that was how **they** did it in the 'big time,' we would never have to worry about

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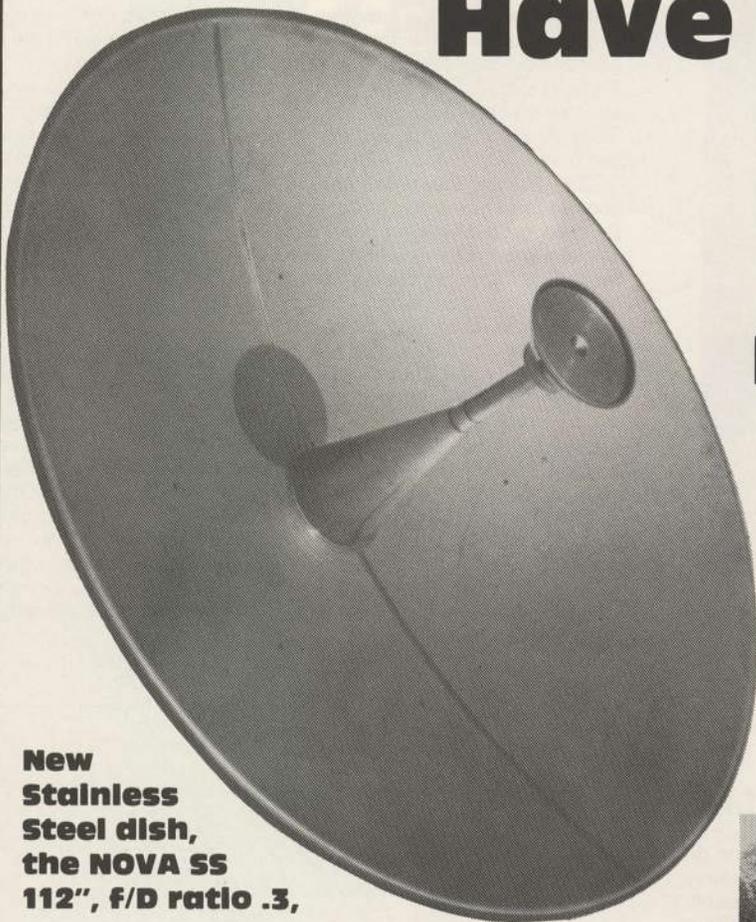
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CONTINUED/ page 60

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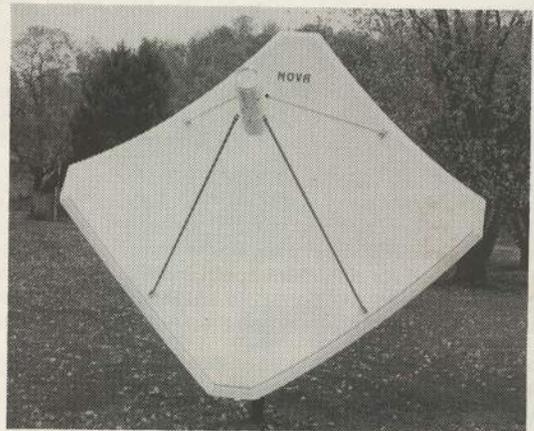
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SCOTT OSBORNE (right) adjusts microphone under collar of Turks and Caicos Chief Minister Norman Saunders (center) while Don Hunt readies the VCR (left).

him getting hired into a stateside job! Two hours to get ten seconds of air-usable tape was too much for him.

Then, since Scott had the opening, and the close, and Barry had all of his 'sex' and 'violence' stuff on tape, Scott and I sat down for the big interview. This should be the continuity thread for the piece, in whatever final air form it takes. Scott asked me how we started the station, how we selected programming, what people liked to watch, and how I managed to run this thing 24 hours a day, 365 days a year. If you think I look(ed) tired during the interview, you are (were) right. After two very long days, under some amount of pressure, we sat there and drank beer and did the interview. It was uncommonly hot, the 1800 watts of TV lights made it even hotter, and it was late in the day. I talked, even rambled, and we filled 30 minutes of 3/4 inch tape with my mutterings. None of it was brilliant. It was far too late in the day to be even reasonably bright. And I was still ticked off over the 'pirate' incident.

That evening they shot some tape of the control room, and Kevin showed them how a real pro runs an NCR (Network Control Room). Barry suggested Kevin's 13 year age, and his complete control of the whole network with no qualms, would be a good subject for "That's Incredible." Don Hunt had a concept of getting one of Ted Turner's shows interested in doing a story on us. I still remembered Scott's "pirate" close, and didn't say much.

Saturday morning Scott and Barry flew off to Miami to do another ET story about some guy that wanted to "gift wrap" an island with a huge four mile long ribbon. Don stayed on Provo to get some 'color shots' to help illustrate our piece. We were scheduled to hang new antennas on the recently installed 150 foot WIV transmission tower that day, so if you see (saw) Tom Humphries resplendent with beard bouncing around a tower site, you'll know where that originated. That evening Don shot some tape of typical WIV viewers watching (pro) football, and wrestling. Both Barry and Scott had a fascination with wrestling being our number one (as in most popular) show of the week, and they wanted to capture some shots of viewers 'going wild' when wrestling was on. A local bar had installed the first projection TV

CONTINUED/ page 62

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NCR (Network Control Room) operator Kevin Cooper readies for insertion of a commercial while Don Hunt (left) and Barry Simon (right) tape his busy hands.

set (in a public place) just the day before, and we all **expected** a good crowd to witness wrestling on the giant screen. The crowd turned out to be unusually light and the presence of the TV camera subdued their animation. Don shot a bunch of tape showing people getting-with the wrestling as long as he ran with his lights off; the minute he hit the lights they quieted down. Uncontrolled excitement, what they were looking for, disappeared with the lights coming on. Oh well, back to the drawing boards.

Before they left I 'dumped' the entire bunch of video they shot onto some of our tapes. It came to more than three hours worth. And it took two full days and parts of a third to get that much.

ET now has an annual production budget of more than \$30,000,000 per year. When you consider that they crank out five new half hours per week, 52 weeks per year, plus put together a weekend ETW (Entertainment This Week) composite program as well, it works out to nearly \$577,000 per week. Or, \$115,380 per half hour show. When they left, nobody would guess whether their efforts would result in say **one** three minute piece or perhaps a **couple** of three minute pieces. When you consider that they have an average of \$4807 per minute of air time to **spend** on getting their material ready to air and on the air, that says that a three minute piece can cost out at around \$14,422 on the average. Obviously not every minute they air costs them \$4807 (in-studio stuff, for example, costs far less and much of what they shoot 'on the street' is virtually free) so there are additional budget dollars available for 'special features.' I'd estimate, although I did not feel I had any business asking, that their sojourn down here probably will run them close to \$25,000 by the time they get the material ready to put on the air. In this case, Scott and Barry are closely associated with the show on a regular basis. You'll see Barry's name roll by on the credits most evenings. Scott does work for KNXT/CBS and others, spending most of his life jumping about the world looking fresh and bright. I think he lives out of a suitcase. Don Hunt 'free lances' out of Nashville, and provides his own equipment and himself for a fee. One of the locals asked Don to bid on putting

CONTINUED/ page 64

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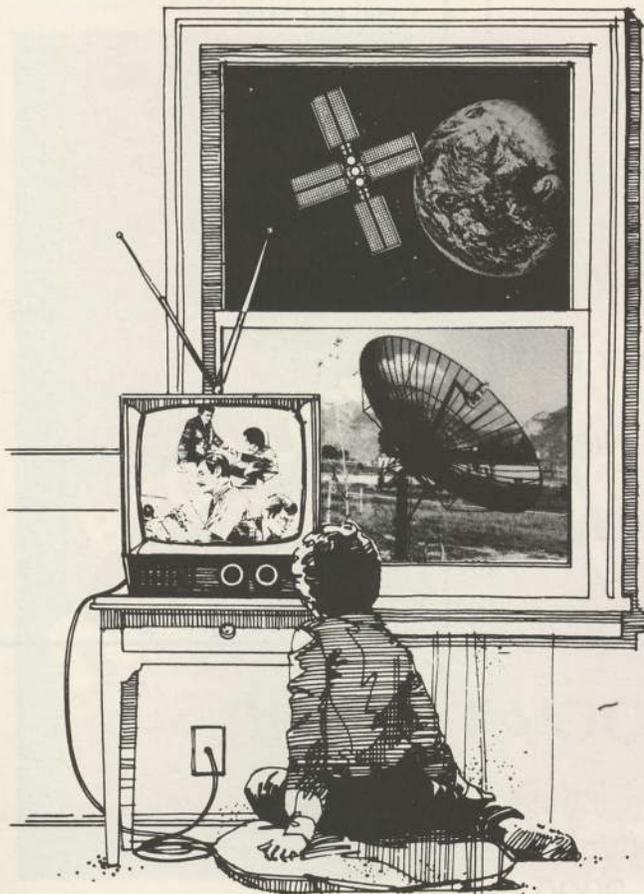
together a 10 to 15 minute promotional piece for a land development **down here**, and Don rattled off a list of charges that totaled about \$25,000 or so. Don is **not** high, in this business, and he certainly is very good (I highly recommend Don Hunt Teleproductions . . . 615/646-4622 . . . to anyone who thinks they need a professionally created videotape piece). Don's experience as a TVRO owner, plus he is a 'Ham' with an excellent understanding of what makes things work, makes him a natural to do documentary and production work within **our** industry.

At one point ET's concept was to 'hold' the Provo/WIV feature for air time in March. They wanted to promote it with **TV GUIDE** advertising to get the maximum ratings value out of the story. Barry and Scott were excited when they left that they get it 'on the air' as quickly as possible; so there is some chance that it will have been on the air even before you see this.

Looking back, I suppose it may have been a mistake to allow ET in here. I **do** agonize each time I see one of the slickly done Jamaica TV commercials, or the less slickly done Bahama pieces. Tourism throughout the Caribbean is way down this year and we need all of the help we can get. A country of 8,000 people just does not have the budget to compete in that commercial forum. But allowing ET in here, invading our family privacy and turning what we do and how we do it into some sort of sideshow for Hollywood producers, probably was not a 'wise trade' for that publicity for the islands.

**In addition to getting the islands some publicity**, I agreed to do this piece with ET after getting their assurance that they were not setting me up as a test-tube example of what happens when technology gets ahead of legislation and existing laws. I believed they were prepared to abide by that request until I happened to catch Scott's "pirate" close. Since that close was prepared ahead of his sitting down with me to do the 'meaty interview,' it was apparent they came here with the 'pirate angle' already in their minds. Regardless of how it actually runs (or ran) on the air, there is a lesson here for others.

Yes, satellite television needs publicity. It needs **good publicity**



that acquaints people with the positive benefits of terminal ownership. And a 'fair' report, done with journalistic integrity, **would have to** touch on the unresolved questions surrounding home terminal ownership, and point out that certain legal questions **do remain**.

But when a report pre-judges the issue, electing to pin us with the pirate label without benefit of judicial review or legislative review, it becomes apparent that there are pressures on the journalists which are filtering down from higher up positions in the broadcasting and entertainment world.

I should have recalled that Paramount owns ET, and that Paramount is heavily involved in the motion picture business. It may, in retrospect, be impossible to get a fair 'hearing' on the airwaves from **any** commercially funded broadcasting operation for what we do. All of which says that we must as an industry work doubly-hard to insure that SPACE has our support to keep pressuring the powers that be to accept us in the master framework of emerging technologies. We can't let our guard down, even for a moment.

## COMING APART . . . At The Seams

Since August of 1979, when Susan and I put together the first industry (SPTS) trade show, there has been a certain, 'cozy,' inside family running the major show events for the industry. Those coming into the industry in the last year or so may not be aware that this whole thing started when I authored an article for **TV GUIDE** in October of 1978, and as a result of that article describing our first, pioneering, home TVRO terminal to 22,000,000 **TV GUIDE** readers found the Cooper family on the **Cronkite CBS Evening News**; also in October of 1978.

**That drew 10,000 pieces of mail in a short period of time**; days. Most wanted to know how they, too, could have a home terminal. Unfortunately, there was no answer to that question in the fall of 1978. The least expensive cable terminals were in the \$20,000 range and all of the SA's, M/A COMs et al in the world were having difficulty supplying the 200 or so new terminals per month that the cable

CONTINUED/ page 66

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## COOP CONTINUED/ from page 64

industry needed. There was no excess production, for home use, at any price.

So I wrote a small Handbook that explained how the system worked, and described what a person had to do to get a home terminal. It was a gloomy picture that ended up with the recommendation that the person try to build their own, as I had done. Not a very good answer to an Orthodontist in Milwaukee who found his toaster a frightening appliance.

It was obvious to me that something had to be done, in a hurry. Here were 10,000 potential buyers of home terminals just waiting for somebody to point them at a capable equipment supplier. I dug back through my files and located the names of Taylor Howard, Robert Coleman, Oliver Swan, and H. Paul Shuch. I encouraged each to stop messing around with their garage created home terminal pieces and concentrate on getting equipment operational that could be put into (mass) production. That took eight months, but each came through.

To kick off the new industry, Susan and I put together the first 'Satellite Private Terminal Seminar,' for August of 1979. We rented a set of rooms at South Oklahoma City Junior College and expected maybe 100 people would show up. We headlined Shuch and Howard and Coleman and Swan and figured we'd be lucky if we didn't lose our shirts.

**More than 500 people showed up;** from as far away as Colombia (South America). Susan still carries bruises from people who pounded on her registration desk **demanding** that they be let in. **NBC** also showed up and Jack Perkins and Tom Snyder later put on the air a nice feature describing home terminals. The industry was off and running.

When the **TV GUIDE/CBS EVENING NEWS** et al sequence began, Susan, Kevin, Tasha and I had already determined that we would pack up my typewriter and move into the Caribbean. In fact, we made a final decision on the piece of property I now sit on, writing this, on Providenciales in June of 1979; two months prior to the first SPTS. That was a long discussed, carefully researched family decision.

After the first SPTS, it was obvious that we had an obligation to keep the SPTS sequence running. So we scheduled the second one at the Miami Bayfront Park Auditorium for February of 1980. It was even bigger than the first and the Merry Go Round was turning faster and faster. Our problem, the Cooper problem, was 'how do we get off????'. Provo was looking further and further away.

Susan took the bull by the horns, determined not to spend another winter in Oklahoma. Since she used to answer the STT (Satellite Telephone Technology) telephone in her kitchen in those days (I still have this vivid picture of her on roller skates with the telephone propped up on her shoulder, skating back and forth in the kitchen preparing lunch for the family, and our first employee . . . Gary Willhoite who now works for HERO Communications . . . while engrossed on the telephone with somebody in Tunisia or Schenectady who had just discovered satellite TV), she decided to find somebody to take over STT. She found several and one of those happened to be STT(I)'s present owner Rick Schneringer. Rick seemed like an unlikely candidate to me at the time. He was in the health food store business in Houston, and dabbled in land development in central Texas. He also didn't have much money to invest and we were not about to hand somebody the future of the home TVRO industry unless they had money invested in it. We were not looking for an **employee**; we needed somebody who would follow the format we had proven the industry needed and just continue with the game plan. There is an old saying that you don't screw around with something that is working. STT was working.

Rick Schneringer took all of the spring of 1980, all of the summer of 1980, and all of the fall of 1980 to try to get his own affairs in order. When Susan, the kids, and I packed our bags and 67 'must go by air-freight' boxes off to the Turks and Caicos in August of 1980, Rick was left alone in our Arcadia, Oklahoma home with our family poodle and a telephone. From then until May of 1981, Rick was our employee. They were not totally pleasant times but it worked well enough that no permanent damage was done. In that interim the industry got

CONTINUED/ page 68

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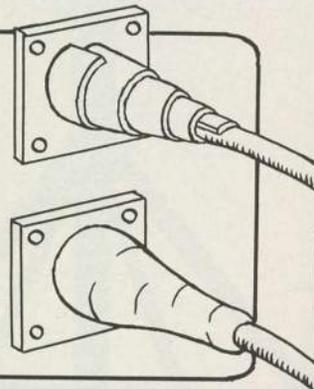
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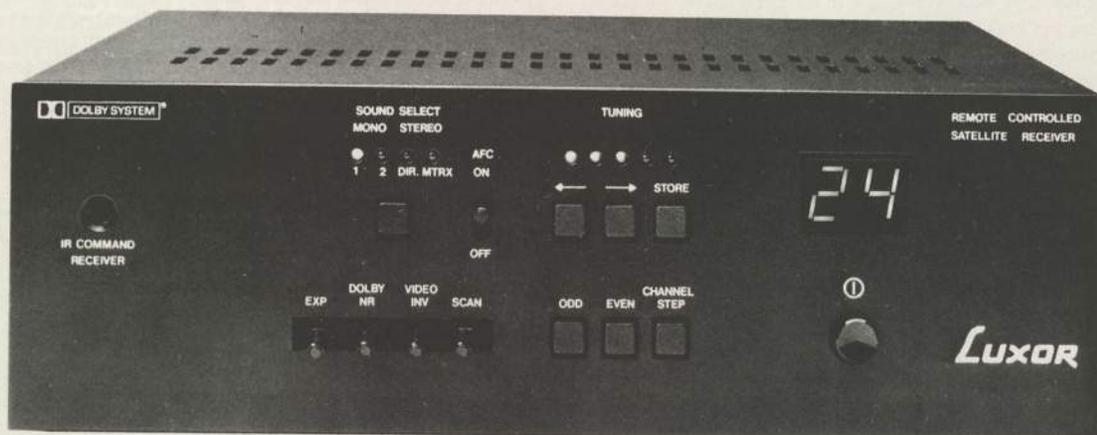
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## COOP CONTINUED/ from page 66

through our Houston SBIC, and the Washington (DC) show in the spring of 1981. Finally in May of 1981 Schneringer got all of his loose ends into one spot, and we sold him STT. He renamed it STTI (The I is for International) in a creative moment. Under the agreement Rick had the option of continuing to use me to create and run the seminars and trade shows, to create new STTI manuals, handbooks and so on. He exercised that option for the subsequent Omaha (summer of 81), Anaheim (fall of 81), Fort Worth (spring of 82) and Atlanta (fall of 82) shows. However, other than asking that I redo the badly outdated (Coop's) TVRO Home System Handbook in the fall of 1982, he went his own way creating new STTI manuals.

With CSD growing by leaps and bounds, with Europe opening up, and with our West Indies Video operation getting more complex by the week, I was grateful for not being asked to carry the full load that our contract could have required. But there were problems looming on the horizon. Substantial problems.

Rick's concept of a show was that it had to include big crowds of people. My concept of a show was that you limit it to people in the industry, or qualify those who felt they wanted to get in by not making it open to the general public. Since it was now Rick's show, his approach won out and by the time we got to Atlanta we had people paying \$5 at the gate to come into the show.

My concept was that you locate the best, most qualified speakers and you pay their way or whatever it took to get them in front of the group. To pay for this expertise, you charged enough so that attendees were each sharing the costs of these extra special people. Rick's concept was that you put out a sign up sheet and allow the manufacturers to put on sessions. Unfortunately, while this is not going to cost you anything for the speakers, you paid a far bigger price when a guy on the podium spent 45 minutes telling everyone why his antenna gear drive was the best around. Unmitigated sales pitches are not really all that educational.

My concept was that you only select a hotel site where you had

huge parking lots for antennas, where you had a working MATV system into which you could pump no less than one and hopefully two channels of instructional videotapes all about satellite TV (thereby allowing people to set up a recorder in their rooms and take home 20 to 60 hours of educational tapes as part of the show deal), and where you went in very carefully ahead of time and certify that there was no terrestrial interference. Rick's concept was that you do as little of the above as possible, since it cost big bucks, and having cut the admission price to as low as \$5, you no longer had the money available to do these things.

My concept was that there be a hard theme for each seminar. In Houston, for example, we concentrated on getting into the business. To go with that, everyone attending got a brand new (not previously released) 'manual' created just on that topic. In Washington (DC) we concentrated on the potential marriage between LPTV and satellites. The FCC killed that for a decade or more, but we were on target at the time and produced (SPACE's Rick Brown, and I) a fat manual that is still the best in that area available. The first all-Rick show was the Omaha 1981 show, and that was also the first show at which there were no new manuals released.

I have been criticized by some because I charged between \$125 and \$150 for a three day show. It took money to properly select a site, properly prepare up to 60 hours of custom produced videotape, haul several tons of videotape gear to a show, arrange for live taping of the seminars at the show so that people at the next seminar could share them, create and produce and hand out a brand new manual at every show, and round up top speakers who didn't have a sales pitch built into their sessions. If I was to start putting together shows all over again, I wouldn't change very much. I still think that intensive technology approach, surrounding attendees with sessions that taught, 60 or so hours of non-stop video tape programming that taught, and new manuals that re-enforced the teaching process, is the correct approach.

As Rick and I have drifted apart in show philosophy, and as he has

CONTINUED/ page 70

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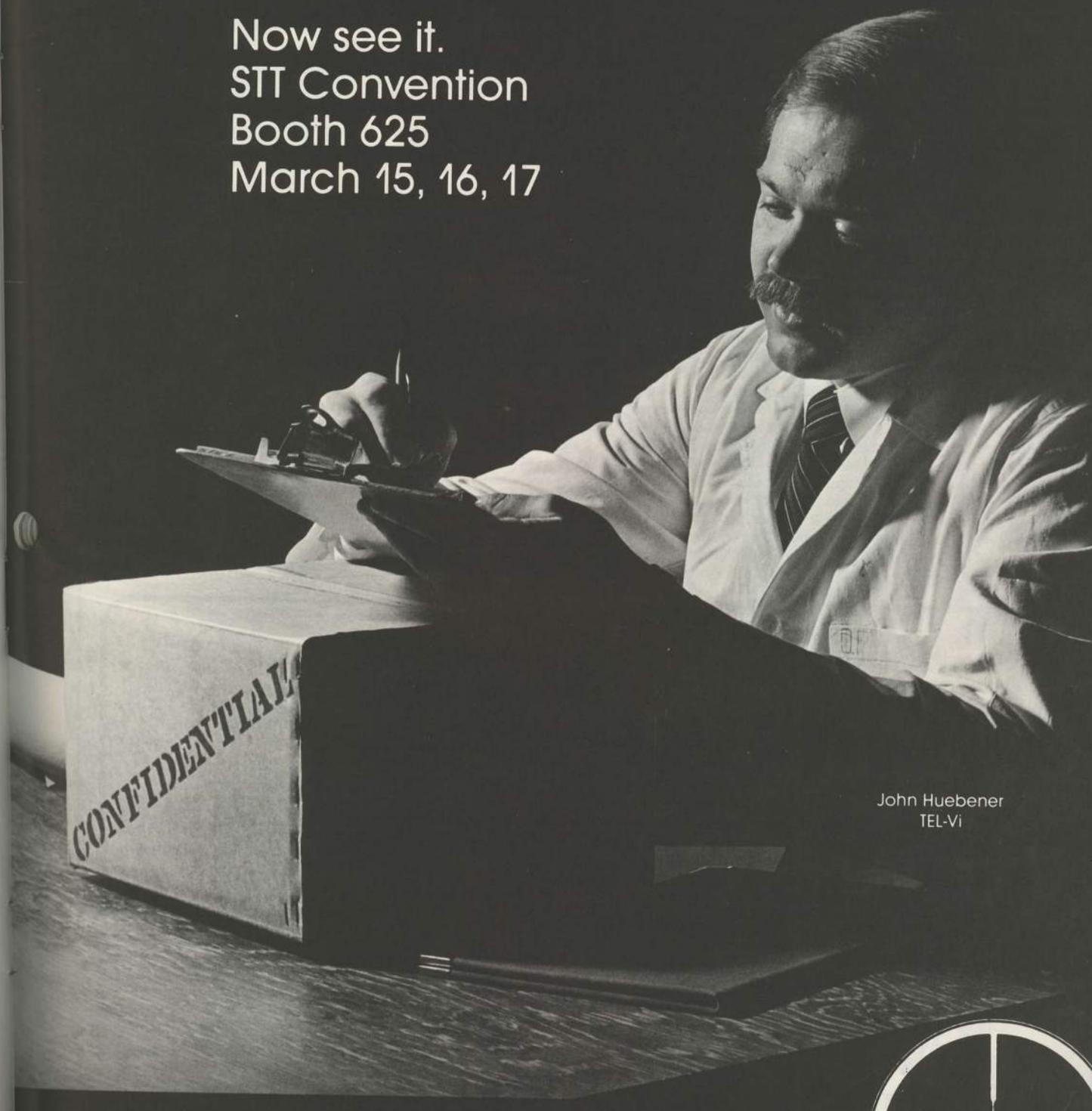
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## COOP CONTINUED/ from page 68

set out on his own to frame his own approach to manuals, there has been less and less of the 'Cooper Touch' on recent shows. I realized, after Atlanta, that my position had degenerated into being some type of 'attraction,' but the amount of **input** I was being allowed to shape the show was becoming virtually zero. I was being handed a list of speakers which Rick had arranged for, and asked to assemble them into a sequential listing. No more in-room videotapes, no more manuals, and very little opportunity to create a theme for the show and then get the **right** people to appear. Even videotaping of show sessions was gone; that had been done last way back in Anaheim, and all of the good material at subsequent shows had been said, and lost, after it bounced off of the meeting room walls. There was no way to go back and document the industry growth after Anaheim. Pity. Even when the sessions were highly sales-pitch oriented, they taught us something!

**So after nine consecutive shows**, I will have **no** relationship with the forthcoming Las Vegas show. Kevin and I will attend, for a day or day and a half, to function as the journalists we are. And I will attend the SPACE Board Meeting as a member of the board. Frankly, I will enjoy not being a 'sideshow freak,' being allowed to wander the aisles without being constantly fingered for questions, and to talk at length with people whom I feel have some innovative approach to products or marketing, for reporting here in **CSD**.

Most of all, now that I have no further contractual obligation with STTI, I will feel that I can be a better, yes . . . more 'honest,' journalist when it comes to reporting on the show itself. As long as my **name** was closely associated with the shows, it was difficult to maintain objectivity when reporting on show events. Thank gosh that it all passed and I can now write about a show as I see it through 'unfiltered' glasses.

I hesitate to pre-judge the Las Vegas show, but since I have been involved with cable TV and other electronic shows there, as an exhibitor and as a journalist, for more than a decade, I do have **some** observations. Las Vegas is a great city for people who have money to spend, and do not care which hole they throw it into. It is, or can be, a very expensive town to 'show' in. But all of that is common sense, or

'common knowledge.'

What new exhibitors to Vegas may not realize before they get there is that the labor union guys run the town. I won't comment on who runs the labor unions. It is not unusual to see union guys demanding that exhibitors set down tool boxes, or wrenches, or hook-up cables so that 'they' can do the work for you. Other than Chicago, it is the only town where a labor union guy can delay set-up of a booth because he decides that you won't unpack a box or move a table unless **he** does it for you. I would suggest that if you find yourself in a confrontation with a union labor guy, that you **not** attempt to muscle your way to a decision. Instead, drop everything and go find Schneringer. He's the show manager; **let him sort it out**. Getting into a beef with a union person in Vegas is not a nice way to start a show. Remember who runs the unions.

The next potential problem is the length of the antenna runs. Several of the industry suppliers attended the January CES gathering. Reports of 800 foot (plus) antenna runs came in. I'm very glad not many of us attempt to haul signals into the show area using 4 GHz (and 1/2 to 7/8 inch) hardline anymore! Find out **before** you go **exactly** how long your antenna run will be. Las Vegas may not be a good place to round up a big chunk of extra cable, in a hurry.

Las Vegas 'safety authorities' could be another problem. I remember a show a few years back where they **demand**ed that special wooden catwalks be built to get the cables from the antennas, inside, 'up' above ground. If my memory serves me correctly, the city 'official' enforcing the 'rule' suggested his brother-in-law, the builder/contractor, to build the special catwalks. At around \$5,000 for the exercise. I guess if that happens again Schneringer will pay for the catwalks. Regardless, if you find someone in authority 'suggesting' that you not run a cable in some area, listen carefully. If you disobey and forget you are in Vegas for a moment, he could shut the **entire** show down while the dispute is worked out.

If you figure you are going to 'slide' in next door, setting up some antennas and renting a suite at a hotel nearby to get around paying

CONTINUED/ page 72

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**COOP CONTINUED/ from page 70**

Schneringer his exhibit fee, think again. They don't like 'unauthorized sideshows' in Vegas and you might walk out and find your antenna in a tangled mess. Remember who runs the unions.

Like I said, I don't want to pre-judge Las Vegas as an industry showplace. But there are good, sound reasons why groups such as the cable operators and broadcasters try to avoid Las Vegas for 'serious shows.' I hope we don't live (or die) to regret this location for our industry show.

**WELL . . . Almost A Journalist**

In spite of my decision to be a simple journalist at the forthcoming Las Vegas Show, I have allowed one bit of commercialism to creep in. Last month I wrote that Avantek will be having a noise figure test set up in their booth in Vegas and suggested that everyone bring an LNA or two to find out how well the LNAs 'grade out' in competition. The same February issue carried an extensive piece of LNA development in the current state of perfection, and detailed the growth of a small LNA company, LOCOM of State College in Pennsylvania.

LOCOM's Kingsley Hastings and crew is scheduled to appear on center stage of the Vegas seminar the first morning, at 11 AM. Normally, Schneringer schedules a general introduction session at 10 AM (Tay Howard has done these in the past), or he looks for a headliner (WTBS President Wussler in Atlanta). Then the 11 AM session gets down to some representative, important topic that is burning everyone's mind. Hastings has convinced Schneringer that LNA noise figure measurement is that burning topic for Vegas, and he has grabbed the 11 AM spot.

Hastings is or can be persuasive. He is a good 'free market trader' and he found something to entice me to appear briefly on stage with them in the 11 AM session. What LOCOM intends to do at 11 Tuesday (15th) is go through the entire noise figure testing sequence showing everyone how the Hewlett Packard noise figure test set functions, how LNAs are measured, and what happens as LNAs are adjusted for optimized performance. Since I recently spent a whole bunch of pages

showing you the same thing in **CSD** (see February, '83) I could hardly argue against the importance of such knowledge.

I'd suggest that if you have anything to do with LNAs, at any level, this session should be on your 'must attend' list. I have no idea why Kingsley wants me on the stage for the opening of the session, so I've asked Kevin to keep the 'car running' at the side door just in case I have to make a quick get-away.

**RUST and Falling Apart**

About a year or so ago there were a number of new antennas entering the marketplace. There were also a bunch of new antenna mounted down converters, LNCs and so on showing up. They have now been through a winter. Some of them did not make it.

**CSD** intends to visit the subject of 'survival' in our April and May issues. I have been quietly gathering data from people in the field, regarding their bad experiences with various antennas and outdoor electronic gear, to create as complete a picture as possible for publication. I have a number of advertisers who will not like what is being prepared or will be prepared for print.

**For example**, there is a certain screen mesh antenna out there which refuses to hold up in any corrosive environment. I have been promised a photograph of this particular antenna, as installed in the southeast, showing complete disintegration of the screen mesh after **four months** of being exposed to the elements. There are some additional photos showing what happens to a popular feed system when the innards rust apart (in six months time or less).

My approach to this is that if we are rushing products into the field, and into customer hands, without confirming that they will hold up for reasonable periods of time before falling apart, we are planting the seeds of our own destruction each time we put in an installation. By pointing out in **CSD** what is happening, and hopefully discovering **why** it is happening and what might be done by the installers to slow down the deterioration rate, we will be enhancing our chances of surviving as an industry.

CONTINUED/ page 74

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**COOP CONTINUED/ from page 72**

This is a 'naked request' that readers who have experienced problems with equipment that is installed outdoors (we'll leave the fatality rate of indoor gear for a subsequent inspection) sit down and write to me detailing their problems. In effect, I am surveying the entire industry asking that readers share their bad news so that we can compile a composite look at the problems we are facing. The better the description you provide me of a problem, and the more thorough the documentation (i.e. photographs would be great!), the more likely we would be to use the material. If you are nervous about being identified as a source of 'bad-news-data,' simply include a line in your letter spelling out that CSD is welcome to use your report as long as we refrain from identifying you as a source. I respect that you may not want the hassle of a supplier if you squeal on him, even if I am foolish enough to print that data and risk losing that supplier's advertising support! I'll be looking for your letter.

**DEALER Survey**

Nobody has a corner on bright ideas and I always rush down to the Provo Flying Service office when I hear that Carol Graba has sent down a 'mail bag' from our Fort Lauderdale office. I like opening the mail and keeping up on what is going on.

A recent letter from Tom Harrington of Universal Electronics carried the suggestion that we could be performing a much needed service for the industry if we developed a CSD magazine survey form that asked dealers which equipment they liked, and why; which equipment they did not like, and why. Tom suggests that from an international survey, it would not take long for patterns to emerge. Equipment that is troublesome would stand out; firms that do not stand behind their products would be quickly recognized.

A superb idea and I am working on just such a two sided, tear out form, already. If you are planning to be in Las Vegas and you have some thoughts about just what type of information an international survey such as this should solicit, I'd like to hear from you while I am there. If you feel getting a few minutes of my time at a show is a pain in

the neck, drop me a line with your thoughts. All in confidence, of course.

**PRINTED Instructions**

Another favorite Harrington 'Soap Box' is the deplorable state of installation instructions, as supplied by most manufacturers, in this field today. Again, he is absolutely dead on. There are so few decent, adequate, complete 'manuals' in this industry that I can count them on one hand. And I, for the life of me, do not understand why people are so short sighted.

I have spoken with perhaps a dozen manufacturers about their manuals, or lack of manuals. The classic, really dumb, response I got from one was "Well, if they aren't smart enough to figure out how to put our antenna together from the photograph we supply, they aren't smart enough to be a dealer!". The photograph was a 3 by 5 Xerox® copy that barely told you that it was originally an antenna.

I think a lack of adequate manuals shows us laziness on the part of the manufacturer. Or a deliberate attempt to hide his technology. Neither is acceptable.

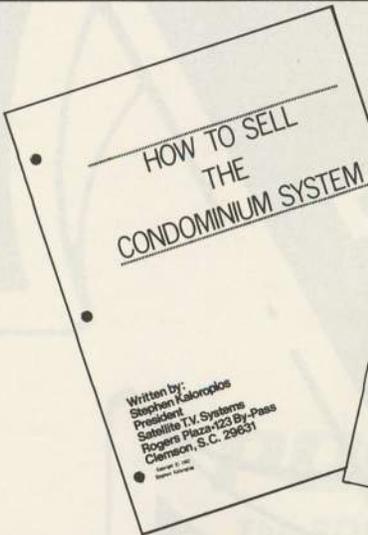
It has been my experience that when you call somebody in the manufacturing end on the telephone, you usually cannot get through to them. When you finally do get through, they explain that "I have been on the telephone with some clown in Bozeman who needed some help putting together his XXXXXXXX." That XXXXXXXX was this guy's product.

If I was in the manufacturing business, and I found myself, or my key people, spending an hour or more on the telephone a day explaining (and re-explaining and re-re-explaining) how to assemble or install what I built, it wouldn't take me long to figure out that this was very unproductive time for me! How can you explain how to seat the feed on a dish twenty times a week and not figure out that it would be better to put that information in the instruction sheets?

A common defense I hear from suppliers is that "We change the product so often, we would be writing new instruction manuals

CONTINUED/ page 76

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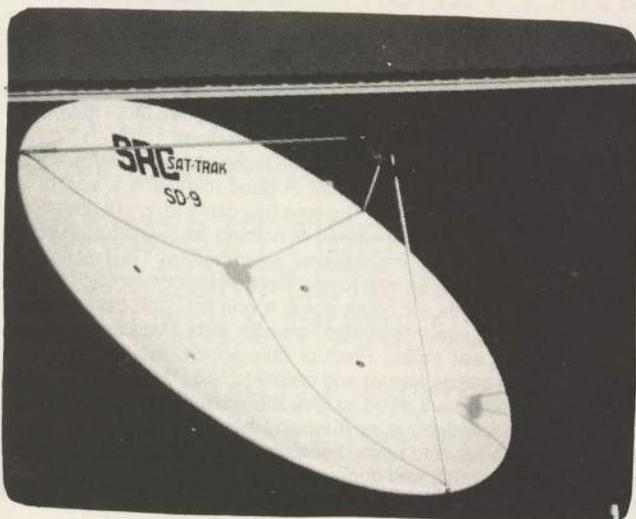
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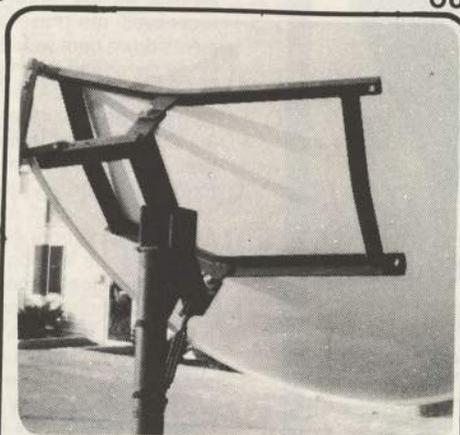
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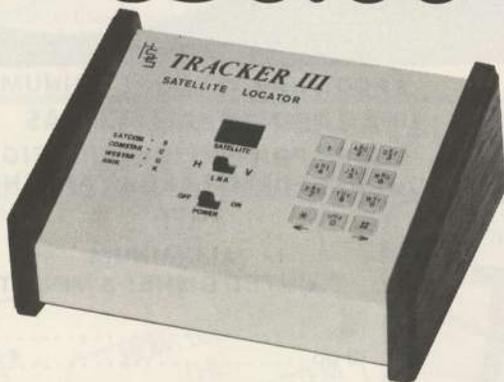
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COOP CONTINUED/ from page 74

every week." What about the poor guy out there who bought your product a month ago, finally figured it out, and now he buys another one and most of what he learned is of no value since you've changed the product on him? Good grief. An instruction manual can be done in sections; put each section of the installation on a separate sheet of paper. Don't 'bleed' base-assembly over onto the top of a third page and then launch into feed-assembly. That means you do, indeed, have to sit down and redo the entire manual each time you upgrade part of the product. Break it down into segments and then simply replace that one sheet (or two sheets) that cover the latest change. It is far easier on you that way, and you'd be surprised how much users would appreciate having the latest data to go with the latest modification.

I think that more of the dealers out there need to start urging manufacturers to clean up their manuals and instructions. It costs you money and time to get on the telephone to get help. If the manufacturers don't recognize how much time and money it is costing them to service dealers who can't find adequate instruction-manual help, the dealers themselves must be aware of the problem.

As an industry, we probably have the least adequate instructions of any segment of electronics today. A good manual is a sign of a mature company, and product. The time has come for more attention to be paid to the support material. If nothing else, manufacturers should recognize that 'first impressions' are important. The first time a dealer uses your product is vital to whether he ever comes back again for more. If he spends six hours doing a one hour job because he wasn't given adequate information to begin with, that can cost the manufacturer repeat sales. Product differences, real competitive advantages, are getting harder and harder to find. The manufacturer who makes a significant effort to give the dealer full information to work with will find dealers 'up' on them and their products. The dealers will come back, again and again, because they feel 'comfortable' with the product. A manual, well done, can spell the difference between success and failure for those selling in this field.

### LOOK Who's Writing US Foreign Policy!

Down here in the Caribbean there is considerable interest in the 1982 announced, Reagan government conceived, plan to help Caribbean (basin) countries develop better economic conditions, thereby warding off the threat of Communism. The idea is that if certain 'incentives' are presented to the nations in the Caribbean, governments down here would be more apt to become permanent friends of Uncle Sam than they would be to adopt policies which lean towards Cuba or Grenada.

There are several approaches to this. You may recall, from history, the 'Marshall Plan' that helped Europe recover after the second World War. From more recent history you know that US aid takes many forms; food, military hardware, technical assistance, programs such as the Peace Corps, and assistance in framing import treaties which allow products from other nations to enter the US marketplace.

During the waning days of the last Congress, HR 7397 ("The Caribbean Basin Economic Recovery Act") slid by the US House of Representatives virtually unnoticed. It did not get through the Senate, but 1983 is another year. Under the 'Act' approximately 30 'nations' and colonial areas in the Caribbean and Central America would be eligible to receive favorable import duty relations with the USA. In effect, 'duty free zones' could be established in these countries and goods manufactured or assembled in these zones could then enter the US without duty. This makes excellent sense since there are import duties of 20 to 30% on virtually everything brought into the USA, except where special treaties have been worked out between the US and the country of origin.

By allowing 'duty free manufacturing zones' to open, investors worldwide would be encouraged to open plants in say the Turks and Caicos or Costa Rica. The plants would use local labor to produce goods that would largely be exported to the USA under the import duty free plan. The plants would employ local people in the 30 or so countries, providing a boost to the local economy. The countries involved would develop export credits with the USA, which in turn

CONTINUED/ page 78



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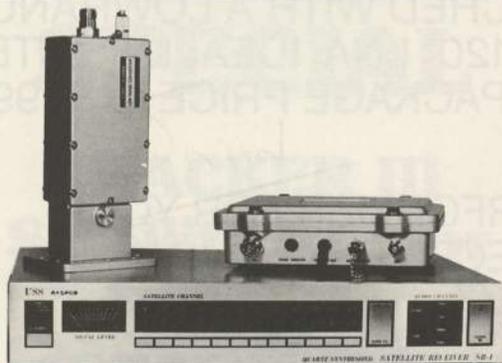
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## COOP CONTINUED/ from page 76

would be used to import back to the nations involved US manufactured goods. The trade cycle begun, the economic levels of all affected nations should rise.

Uncle Sam seldom, if ever, is benevolent without attaching strings to the programs offered to other nations. That's alright; if the Bahamas, for example, want to avail themselves of this duty free zone program, they should allow Uncle Sam's forces to work to control drug traffic through the Bahamas, for example, into the states. There's a trade here. The Bahamas gets use of the duty free zone status while the US gets increased cooperation from Bahamian authorities in curtailing drugs moving through the islands from South America.

Now, under HR 7397, the President of the United States was given wide latitude in designating which nations can benefit from this law. However, written into the 'Act' are certain specific areas where the President has no latitude. In other words, if certain things are happening in the candidate country, the President is precluded from designating that country as a beneficiary; no matter what.

What does that have to do with satellite television? I'm coming to that.

There are six areas where the President may **not declare** a country a beneficiary of the act unless there is a 'waiver.' For example, if a country is declared under Communist control, no benefits. If a country takes over the property of US citizens, without just compensation, no benefits. And so on. Except . . . except that there is a method built into the law that allows the President to declare such a country a beneficiary if ". . . **It will be in the national economic or security interests of the United States.**" That makes some sense; you can't wrestle a country away from Communism, for example, unless you can show them something better. The advantages of being declared a beneficiary under the 'Act' could be an important tool to convert a country away from Communism.

Now we get to the satellite part. As regular readers of CSD are well aware, there is a growing 'industry' in the Caribbean, Central and South America which involves the distribution of US television programming, and movies, on videotapes. These tapes have, in the past, usually been 'mastered' in New Orleans or Houston or Miami, and then flown to the foreign country in a flight bag. There they are copied (and copied and copied) so that ultimately thousands may hit the street. The people engaged in this practice do not pay a US copyright for the material being copied and distributed. Hollywood is not happy about that system. More recently, various countries in the area in question have allowed their national (**government owned or government controlled**) television stations and networks to install satellite receiving dishes and to tape for later broadcast (Haiti) or show live (Jamaica) US television programs; both network, and, those on HBO et al. The Caribbean Basic Act addresses this:

(A nation cannot be a beneficiary of the Act if) ". . . (it) **engages, through Government owned entities, in the broadcast of U.S. copyrighted material, including films or television material, without (the) express(ed) consent of the owners . . .**"

The explanation of this being included in the Caribbean Basin Act, prepared by the House of Representatives, goes like this:

"This provision is intended to ensure that the rights of U.S. copyright owners are protected against the increasingly frequent practice of foreign governments intercepting satellite transmissions, or, otherwise broadcasting copyrighted materials without the consent of the owners. This practice jeopardizes the substantial foreign revenues received by such copyright owners, and to the extent it is **practiced by foreign government broadcasting companies**, it (should) disqualify such (a) country from benefits of duty-free concessions."

And then the section on legislative history concludes with:

**"While international agreements may apply to this practice, they are apparently inadequate to remedy the problem . . ."**

There are six provisions which immediately disqualify a nation from participating in the benefits of the Act. The President may 'waive' five of these. One may not be waived. In other words, one and one alone is so written that not even the President can grant the country a waiver.

CONTINUED/ page 81

*The company that pioneered  
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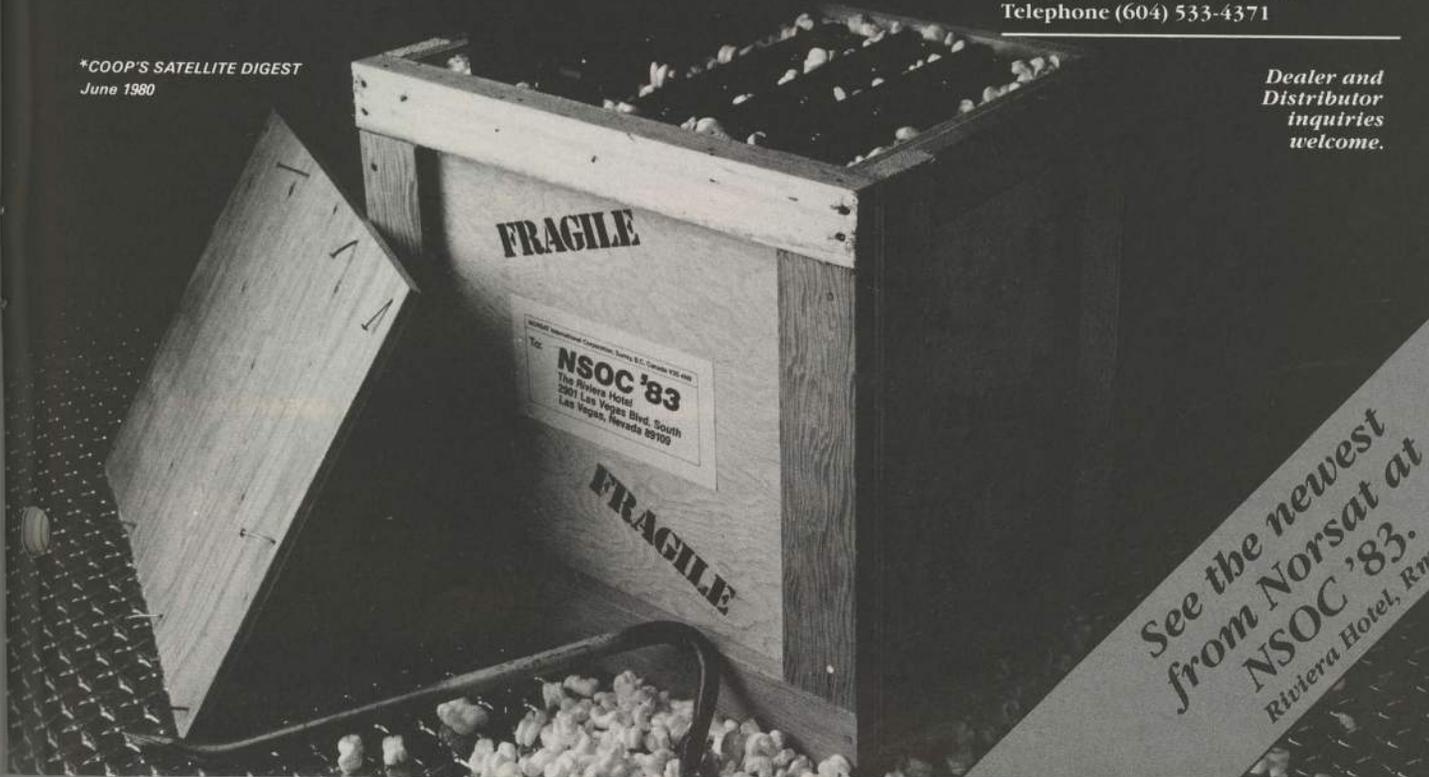
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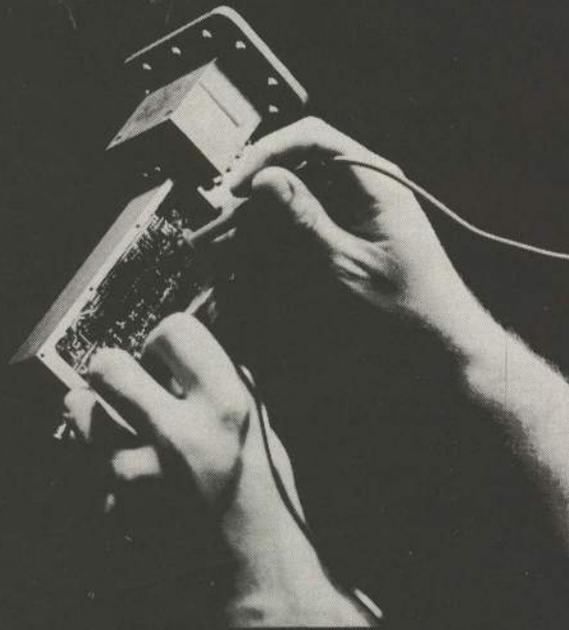
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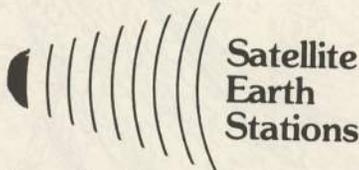
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**COOP CONTINUED/ from page 78**

No, being Communist is not the one the President may not waive. **You've got it.** If a country allows its **national television system** to use **any** US copyrighted materials without consent of the copyright owners, that nation cannot qualify for benefits under the Act, no matter what!

If you find it strange that the Motion Picture Association of America has a lobby that is so strong that it reaches all of the way into Congress, think about it some more. If you find it strange that a nation that 'borrows' the **CBS Evening News** is not a candidate for Caribbean Basin Act benefits, but a nation that throws Americans in jail, confiscates their land, and refuses to return criminals to the USA after they have fled to the nation in question . . . is still able to qualify, well, that's how powerful the MPAA lobby is!

Now, let us suppose that the new Congress repeats passage of this Act, and they also get the Act through the Senate. And the President signs it (this was **his** program, remember). And the Government of Jamaica finds themselves choosing between rebroadcasting the **CBS Evening News** and getting duty-free import concessions. We all know what Jamaica will do. So much for the **CBS Evening News**.

Now let's suppose that having won that victory, the MPAA looks around and spots 346 private terminals in Jamaica. All watching the **CBS Evening News**. And let's assume, just to make it worthwhile, that 100 of these are in hotels and other public places. That makes them 'semi-commercial' in nature.

So the MPAA goes to work to get the meaning of the law changed. They want the State Department to expand the restriction from 'Government owned and operated television station' to 'privately owned and operated satellite terminals.' If Jamaica caved in on **Government use** of the **CBS Evening News**, you can imagine how long they would debate shutting down privately owned terminals as well. About sixty seconds.

**President Reagan is making two fundamental mistakes here.** Number one, he is allowing his old ties to the motion picture industry to creep into his foreign policy process. That may be a good way to treat old friends but it makes for lousy foreign relations. Number two, somebody needs to point out to the President that allowing the free flow into Jamaica and Haiti of US programming is the best thing American foreign policy has going for it! A people who have not enough to eat, who are fed highly edited and restricted diets of television fare can only be enlightened by being exposed to American television. We don't have the best television in the world, but we do have a lot of it and virtually all of it is a promotion for the free enterprise system. People who aspire to a better life need role models and images to dream with. American television, good, bad or indifferent, provides an extremely effective role model for an aspiring people. A single **good hour** of American television can do more to encourage a poor people to struggle for a better life than millions of dollars in surplus foods. And best of all, it doesn't cost the American **taxpayer** one thin dime!

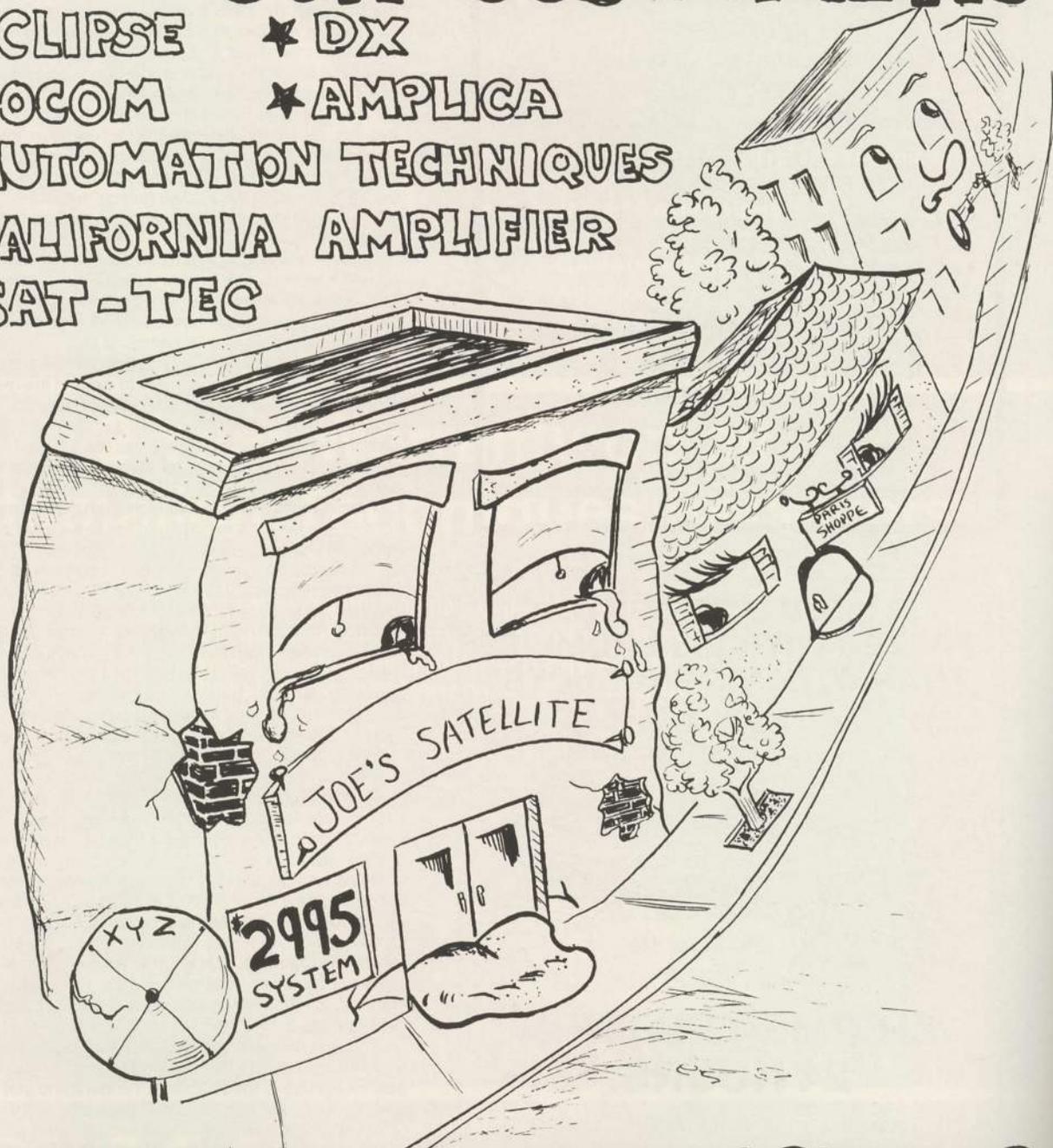
**NOW** — if the US Government is so concerned that Hollywood is not getting paid for its product in Jamaica, **they should simply pick up the copyright tab for the programs.** Set aside a few million a year at the VOA or CIA to pay Hollywood for the right to export American television to Jamaica, or Haiti, or wherever. Then step back and let the Haitian or Jamaican government 'steal' all they want to steal! That's a creative, common sense answer to making America look good in the Caribbean Basin.

We all know that it is unlikely that the MPAA would be interested in shutting down private terminals in Jamaica; all they want to do is to get paid for the use of the programs. I understand that one. But if this bill goes through, and the Jamaican government does quit showing the **CBS Evening News** (et al), those who can afford private terminals will continue to watch it while the **masses** of Jamaica, **the ones whose minds we so desperately need to reach** with 'the American message,' will lose their contact with America.

Somebody hasn't thought this one out very well. **We need** the widespread exposure of America in the Caribbean. **We need** to reach the **teeming millions** there with examples of America at work, and at

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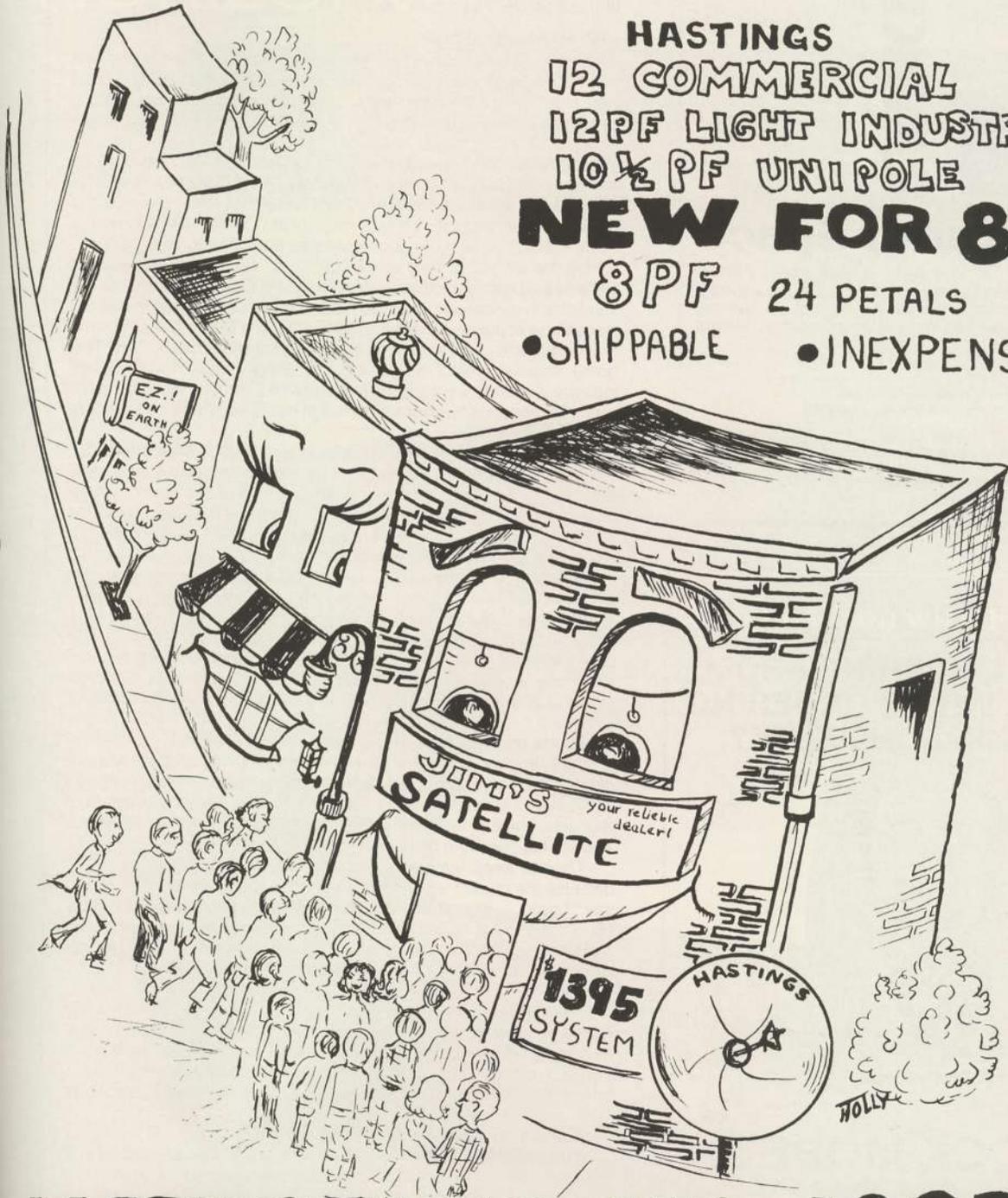
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COOP CONTINUED/ from page 81

play.

**Congress blew it in 1982.** The MPAA, not noted for its concern for humanity, never considered that it was far better for them to 'give' and be paid for it than to 'take' and lose the American exposure in the Caribbean. 1983 is another year; hopefully somebody will re-think this one out before it becomes law.

### HBO Marries M/A COM

I am beginning to lose the faith. I now wonder if there is any real meat in the scrambling scare. HBO, to me, is like the boy who cried wolf. I have heard them threaten to scramble so long that I am actually beginning to believe they don't know their scrambler from a defective LNA.

**The latest.** Well, the latest as of late in January. HBO has decided they are going to purchase their scrambler system from M/A Com. The same M/A Com that sells home TVRO receivers to many of us; the same M/A Com that sells LNAs to many of us. The same M/A Com that owns Prodelin, which of course supplies antennas to many of us.

Let me tell you a story about M/A Com. Years ago, way back in 1978 or so, I was an active consultant to M/A Com. That ought to put shudders in the present management who probably do not know how close I was at the time to then Chairman of The Board Dana Atchley. Someday, when I think the time is right, I'll tell you about the real 'first home terminal project' in this industry. Back before there was an industry and there were some people at M/A Com who believed there was a tremendous business potential in home terminals. I'll save that story, for now.

M/A Com is one of those brilliant companies that seems to be on the leading edge of everything. They have been going through a Pac-Man phase for the last four years or so, gobbling up every high technology company in sight. I was more than a little surprised that they didn't swallow up SA this past year when SA was struggling to stay afloat after their CATV converter debacle.

**M/A Com virtually invited two-sided selling.** You may wonder what that is. I'll tell you. First you get cozy with a new customer base; say the police of the nation. Then you design, for them, some nifty hand and vehicle mounted microwave speed radar systems. The police love the boxes; they can nab speeders and rake in the bucks and pretty soon every police department has to have a radar package or two or 200. M/A makes lots of bucks turning out the parts for these devices.

**That's the first side of the sale.**

Then you sit down and you design some nifty little microwave diodes that receive the police radar signals and you take these diodes and design a radar detection machine. Now you have a new series of products; one that feeds off of the first. You sell the police the radars. You sell the speeders and truckers the radar detectors. M/A gets rich.

Then to keep technology moving, when business slows down because the market is saturated, you go to the police again and you say "Look . . . everybody and his brother is buying radar detectors. Your radar is not as effective as it once was. So we have worked long and hard and we have developed a new radar. A new radar that all of those millions of radar detectors out there can't receive."

The police, older but no wiser, fall for it. They trade in their old radars or throw them in the scrap heap, and spend big bucks on brand new radars that work in a new frequency band. Now the millions of truckers and speeders out there with 10 GHz microwave detectors are defenseless because all of the new radar machines have moved to 24 GHz.

You are ahead of me. No fair skipping lines!

**Yup.** Then M/A announces a new series of microwave diodes that designers can use to build 24 GHz radar detectors! Now everyone out there with an old fashioned 10 GHz radar detector has to consider scrapping it and trading in for a new **two band** radar detector; one that works at 10 and 24 GHz, just to be doubly safe.

Business in microwave diodes booms. M/A Com gets rich. **Again.** Now there is nothing unethical about this type of creative marketing. Actually, it is downright clever. I knew that M/A (before they got the

CONTINUED/ page 88

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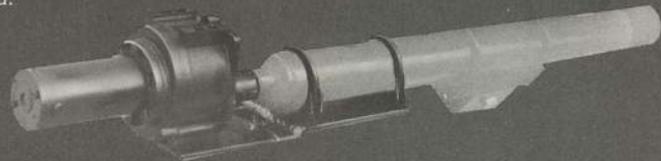
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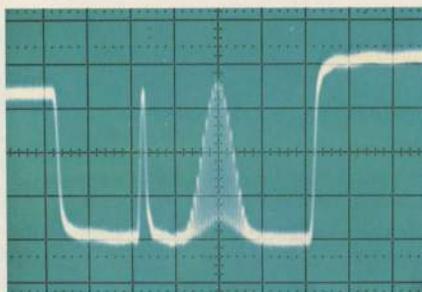
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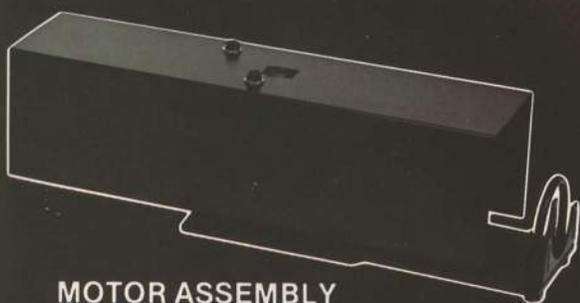
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**COOP CONTINUED/ from page 84**

Com) was 'clever' when I was actively consulting for them some years ago. I was deeply impressed, in fact.

And I could cite a number of similar examples for you, but since we all know about police radar, that ought to be enough for now. And it makes my point that two-sided selling is not new at M/A Com.

The fact that M/A Com is already selling home terminal systems on a large scale apparently didn't bother HBO when they elected to choose the M/A Com **Linkabit** video and audio encryption system. My sources inside of M/A Com (I still have a few) tell me that HBO bought something less than a totally perfected system, however. They are betting on what M/A Com **says** it can do, not necessarily what it **does** in lab proto-type now. I wish HBO well but I wouldn't be abit surprised to see Linkabit packages heading to cable systems coming out of **one door** and something with a slightly different name heading into the private market coming out of **another door** at about the same time. If you can do it with microwave diodes and police radar, why not do it with home TVRO terminals!

Actually, the truth is that I have just about lost all faith that anyone, **M/A Com or anyone else**, is going to produce and deliver and make work a **decent** scrambling system anytime soon. Even HBO's formal announcement cleverly indicated that while they would be starting **installation** of Linkabit decoders at HBO Mountain and Pacific time zone sites 'late in 1983,' they would not be putting the system into operation before 1984. They admitted to agreeing to spend \$2,000 per basic decoder and M/A Com tells us that the uplink encoder will cost \$500,000. That tells me the former cost them about \$100 in parts while the later probably cost less than \$10,000 in parts. **If that much.** I learned how to price things like this from some former top executives at M/A Com, and I still have notebooks filled with their formulae. Remember those days, Freddy?

My position remains unchanged. **Hurry up and scramble.** Do it right. Let us get this quick-silver period in our growth behind us. We have more important things to do; such as getting 10,000 terminals into the corner bars and pubs of America. All of this screwing around isn't going to make anybody any money. Except the creators of microwave diodes.

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When David McClaskey and Guy Davis were down on Provo during the November Retreat, we talked about a new receiver **Intersat** planned to unveil at the January CES gathering in Vegas. I listened intently as they explained the functions of the receiver. Everything (everything) would be microprocessor controlled.

Consider this. Your **typical** customer is not a videophile nut. Your **typical** customer is the same person RCA developed ColorTrak for; automatic color level and hue setting, because individual adjustment of flesh tones and color intensity was more than most people could handle. Your typical customer would like to have a simple, single button to push to change from one **program** to another **program**.

What complicates life in the home satellite world is that we have several, distinct, receiver adjustments likely when we change channels, and two antenna adjustments. The 'switching of channels' gets complicated when the polarization has to change, the receiver may have to change audio sub-carrier frequency, the dish has to move and so on. How do you accomplish all of this by pushing **one** entry on the receiver (remote) control panel?

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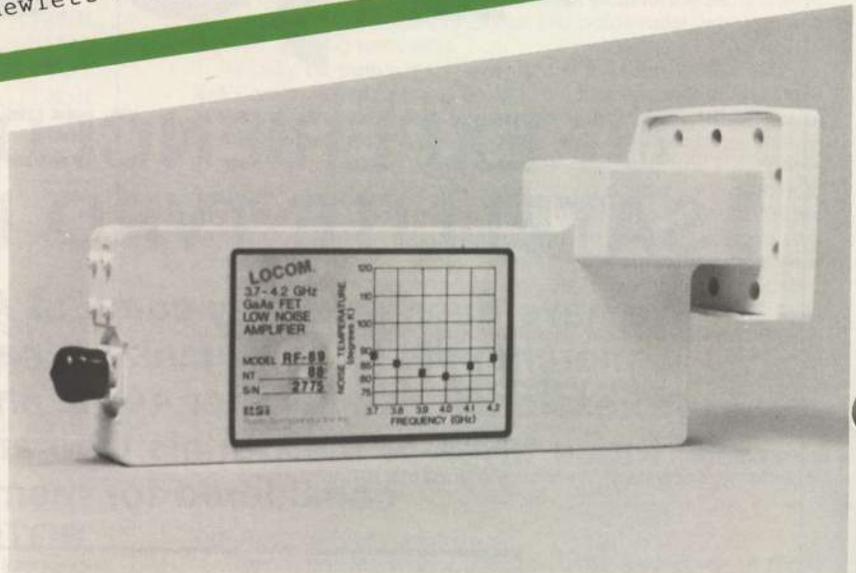
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The 8970A internal circuitry is so accurate and linear that instrumentation uncertainty is less than  $\pm 0.1$  dB. With the  $\pm 0.1$  dB ENR uncertainty of the 346B at most frequencies, and the uncertainties due to mismatch, total root-sum-square measurement uncertainties of less than  $\pm 0.25$  are easily attainable. --HEWLETT PACKARD, 1982

The fact that the HP 8970A automatically corrects for measurement errors, makes it much more accurate as a system, and much more repeatable from vendor to customer, than any other noise figure system in use.

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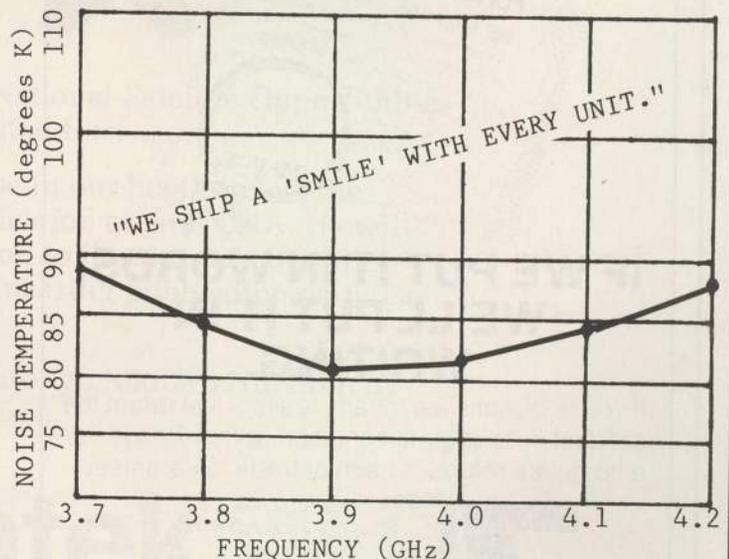
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-- FINAL TEST DATA PROVIDED. "WE SHIP A 'SMILE' WITH EVERY UNIT." The shape of the "Smile" on the Final Test Data chart below is typical of the performance of our LNAs. This Final Test Data is provided with every unit.

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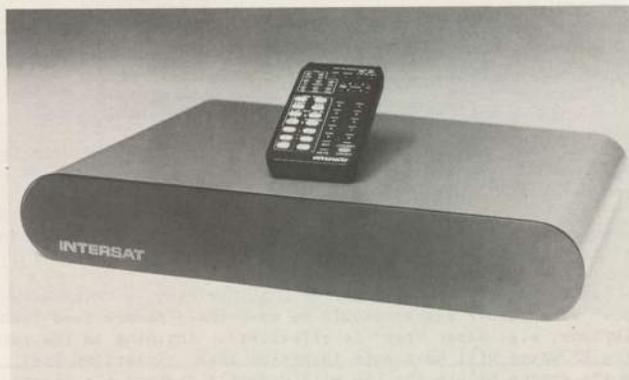
COOP CONTINUED/ from page 88

mitter.

You turn it on by entering a command on the remote. Then you punch in any one of up to sixteen different satellite designators. On your TV screen flashes a complete 'menu' of everything to be found on that particular satellite. A listing, as it were, of what program sources are available, satellite by satellite. Having decided on a particular **satellite**, and a particular **program** service, the user commands the receiver system to automatically find **that** satellite and **that** channel/transponder. The microprocessor does the rest. It moves the dish, adjusts the polar rotation system, scans and locates the channel you have selected, adjusts the audio to the (memorized) audio sub-carrier and bingo; you are watching the specific channel you requested.

If you leave the room and somebody else comes in and wonders what you are tuned to, they push a recall button on the remote control and the specific identity of the transponder on display pops up on the screen. An electronic roadmap; you never wonder where you are!

**There is more.** The system can be programmed so that without specific authority, the receiver will **not** tune in **some** channels. For example, suppose you are going out for the evening and you have visions of your 12 year old watching you back out of the driveway, and then heading for F4, TR7 at 8 PM. What the kid doesn't know is that **you told** the receiver **NOT** to display F4, TR7 while you were gone! And no matter what the kid does, unless he is into tearing apart hand held remote controls, he will have to do without 25 inch, full color, displays of Playboy 'Breast Washing Contests' that evening.



I've thought and thought about why I don't like this approach. I can only think of one problem that seems complex. What happens when the user mis-places, drops, or wipes out the hand held remote? Without it, there is no way to go to the box and do a manual override (as I understand it). If there was, the kid would be watching the Playboy channel everytime he had the chance! I suppose you could sell them a pair of controls; one for spare.

The receiver is slightly more than a regular receiver in other areas as well. It has a built-in stereo amplifier system, adequate (12 watts RMS per channel at .05% distortion) to drive typical home speakers. It has full matrix and discrete stereo receive capability. And tone controls. And the ability to lash two receivers (or more) to the same antenna.

**Pretty neat.** No, I have not **seen** one yet (as I write this) but Guy and David have promised me early loan of one of the first available units. They did show a display unit at the January CES gathering and you can expect to see all of the stops yanked out at the forthcoming March STTI Las Vegas show.

I am always pleased to salute innovative technology. And innovative marketing. Intersat seems to be getting both together in 1983 and I think we'll hear a great deal more from them as the year advances.

### THAT MISSING dB

In the January issue of **CSD** we reported on the November Provo Retreat, and included some antenna test results from a week or more of serious antenna testing. We happened to report that our favorite

CONTINUED/ page 96

# DOES YOUR LNA MEASURE UP WITH THIS MAN?



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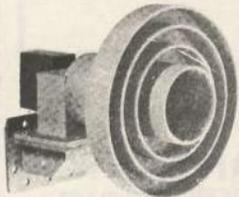
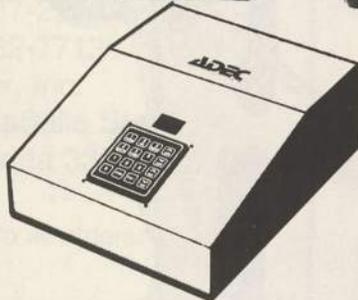
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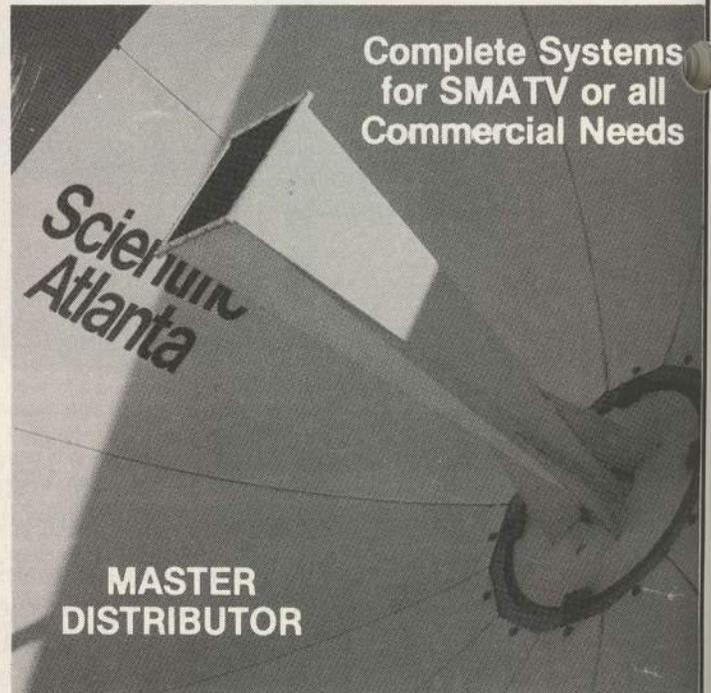
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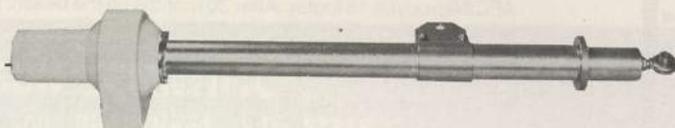
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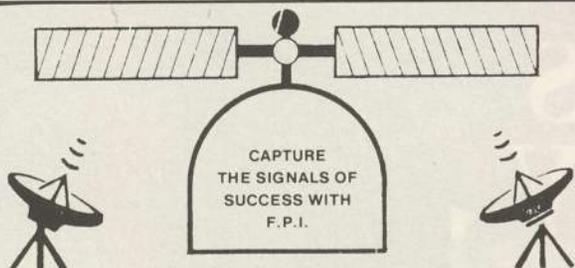
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COOP CONTINUED/ from page 92

antenna, the big Hero six meter horizon to horizon array, had been 'bested' by an ADM 20 footer; by a dB plus.

As you might expect, putting that into print did not make Bob Behar (HERO Communications) overly fond of me. With his antennas spread around the world, he is justifiably sensitive to reports that there are perhaps other antennas of the same aperture size which may have better performance. I'd like to talk about that.

I have delayed preparing a full blown editorial evaluation on the ADM 20 footer for several reasons. Those include (but are not limited to) the following:

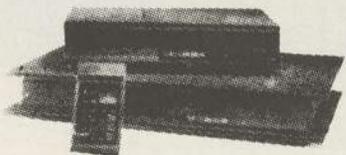
- 1) **My own crew** assembled and installed the HERO reference antenna. I think Val and Peter are very good. But they are not factory installers so they don't know every little nuance of the antenna.
- 2) Jamie Gowen, with Andy Hatfield close by, did most of the work on the ADM. Jamie **does know** every little thing about his antenna, and he had some 'field mods' he made as he went along. That told me that somebody else putting the ADM together might not get the same performance as Jamie will get.
- 3) Tom Humphries and I did what we consider very thorough testing between the two antennas. We swapped equipment and we feel very comfortable with the results as reported. But Bob Behar was not here when we did the tests and we feel we owe him the opportunity to be here when we compare the HERO 20 footer versus the ADM 20 footer.
- 4) The Hero Antenna has been in and operating for seven months as I write this. The performance today is everybit as good as the day we put it in. Actually, it is better now than originally, since we put a LOCOM 80 degree LNA on it, replacing another brand 85 degree unit. The ADM has been in about two months. The performance of the antenna **proper** remains the same as when it went in, but there are signs of possible (I said **possible!**) mechanical stresses on the antenna and if they continue, are verified, or get worse, that will have some impact on what we will eventually say about the antenna when we **do** write about it.

As I write this, late in January, I am expecting Jamie Gowen down to Provo for another visit. We have a second ADM 20 footer sitting in neat metal piles ready to put up. The new ADM, unlike the first one, will be physically very close to our reference HERO antenna. Based upon what Jamie, and we, learned while installing the first one, we expect to get better mechanical stability on the second one.

If mechanical stability is a strange phrase, let me define it for you. An antenna here is subjected to an almost constant wind. We don't have calm days. Trade winds blow 99.9% of the time. Gusts to 40 are very common. Not every day, but perhaps every other day. That places some severe stresses on antenna surfaces, mounts, bolts and what have you. This constant buffeting is to an antenna what the Baja 500 Road Race is to a car chassis. It shakes the antenna to death in a hurry and if there are weak points in the assembly, they become very obvious very quickly. Some people have wind tunnels. We have trade winds. It works out that trade winds are a bigger test since they are combined, in our case, with high moisture and salt laden spray. All of this boils down to 'mechanical stability' in our book, since I feel that an antenna should last years (performing like new) rather than months or weeks. When I see something that makes me nervous about the chances of that happening, I delay any detailed reports so that Mother Nature can do her thing. I'd rather wait and see if there is a problem, than rush into print with a report that is positive only to later discover that the antenna will not hold up in long term use.

**Just so** nobody assumes from this that the ADM is not holding up, let me clearly state that **so far** it is doing **very well**. The only 'perfect' antenna to stand the test of time here to date has been our \$12,000 AFC/Microdyne 16 footer. After 30 months on the beach, there are still no signs that its steel is rusting or that the bolts are frozen. The second best has been the no-longer produced SatFinder which took 15 months to start rusting. Others have rusted in weeks. But that's another topic for a report, which we'll look at in April.

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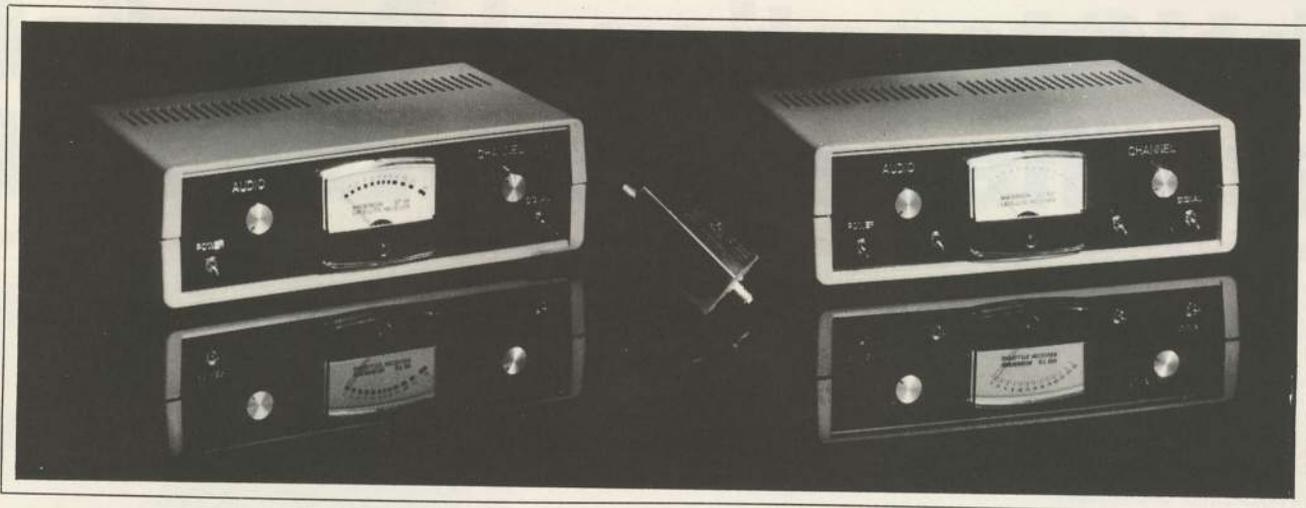
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CONTINUED/ page 100

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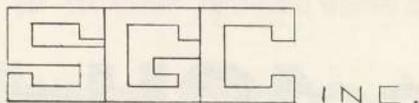
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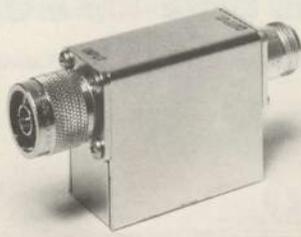
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### COOP CONTINUED/ from page 96

When I first found the 'gain advantage' for the ADM 20 footer, over the HERO 20 footer, I called Tay Howard to discuss it with him. Tay is Bob Behar's design consultant and I figured Tay would give me the skinny on Hero performance. He was puzzled why the ADM would be better and told me so. He suggested that we put it together 'wrong.' I should note that a small error, such as 1/8th inch, would be 'wrong-enough' to account for this ADM gain advantage. Neither Tay nor I resolved this on the telephone. I next called Bob Behar and told him the same thing. Bob suggested we may have put it together wrong. I agreed that was possible, and I raised the question that if we put it together wrong, with some experience in doing it, could not others also have similar problems? Bob reminded me at that point that Jamie had assembled his, on Provo, and Bob felt that was a distinct advantage in Jamie's favor. Neither Bob nor I resolved this on the telephone either and the matter sat until the January issue of CSD came out. When, as recounted, I heard from Bob again. Like I said, he was not overly fond of me at that point since some people put considerable faith in what I report and Bob said he had received three calls canceling orders for his antennas based upon what people read. I guess he was saying those three people had switched to ADM.

So I wanted you to know the background behind all of this, and to also know that when I feel comfortable with another round of testing with the second ADM, then we will write about it. I have invited Bob Behar to be here when we test again, and I will extend the same invitation to Jamie Gowen. We'll see how it all turns out.

### DEALERS Beware

There is a growing practice among those who come to industry shows to exhibit to play the dangerous pricing game. It would appear that many of those engaged in this practice are skirting on the very edge of legal liability, and may not realize that dealers are smarter than they apparently give them credit for being. Some examples in point.

At the recent CES show in Vegas (last January) there were a number of distributor types seemingly more concerned about matching the low-ball price down the aisle than worrying about whether they can, in truth, deliver equipment for the price hyped on their signs and literature.

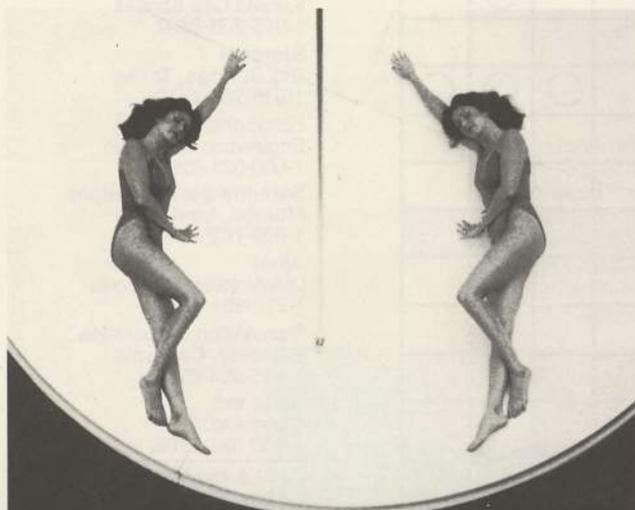
I understand the rationale that leads people to try to create new, lower, pricing levels. The object here is to get a complete terminal, installed, down to \$1.98 or so. Make it cheap enough to buy and everyone will have one. What a fellow loses in profit per piece he makes up in volume; right!

But when an exhibitor comes and promotes a complete package at a show such as CES for \$995 (two apparently did), one has to wonder just what it is you may be getting, as a dealer, for this rock bottom price. It is possible, to be sure, that someday the price may drop to that level from a recognized distributor. People will scream and yell when it happens but the proof will be that the firm advertising at that price is able to deliver at that price. Promptly, on time, with the exact equipment listed in the sales literature. And the equipment will work, and keep on working.

A dealer in San Bernardino, California advises me that of the two firms promoting \$995 dealer packages in Vegas at CES, neither one was apparently willing to accept orders at that price level. That's good since it is doubtful they could have delivered equipment that worked for that price. One firm touted a \$995 system and then attempted to switch dealers to a \$1260 package in the booth. Switch and bait is not new; retailers have been engaging in this shady practice for years. The \$1260 package, however, had an admitted 'six months shipping time'. In other words, they would take your order (50% payment in advance required) but they wouldn't even promise shipment for six months!

Another firm with the \$995 displayed had a \$1409 price if you bought less than six systems and they wanted 90 days to ship. Hummm.

The warning here should be obvious. We are all about to descend upon Las Vegas again. There will be hundreds (and hun-



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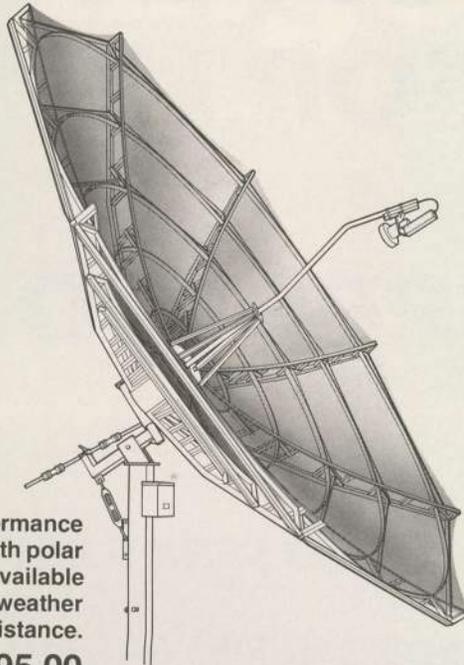
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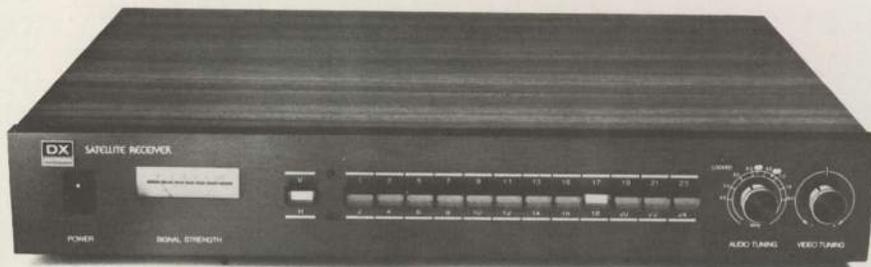
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COOP CONTINUED/ from page 100

dreds) of booths. Every booth will be vying for your attention. Even if you spent every day at Vegas making the booth rounds, it is doubtful you could spend sufficient time at each to get an intelligent handle on what is for sale and where the fine print is. If you go to Vegas to buy, you will end up towards the end of the show frustrated, anxious to 'buy something', and uncertain which way to go. That is precisely what the sharpies are counting on; that you will fall for their low ball pricing schemes and drop a 50% deposit with them. Hoping, obviously, that you don't realize that they want 3 or 6 months to ship to you (during which time they may well have left for Hong Kong!).

Remember, also, that 'no-name-brand' antennas often look nice but perform poorly. If you are not experienced enough to judge the quality of a dish, ask somebody with the experience to look at it with you. Some antennas are removed from their (fiberglass) molds before they have 'cured', because the manufacturer wants the mold for the next antenna. This 'green dish' will have bad problems; it will continue to 'cure' for days, even weeks, after coming out of the mold. If it is stored improperly, it can cure with a 'warp' or potato chip surface. We got one fiberglass antenna down here in the Turks and Caicos which was still curing when it arrived. It cured on the mount, and looks like a giant potato chip!

New, super-cheap receivers are another problem. Often the indoor part of the receiver is priced so low as to catch your attention. It may be hours or days before you realize that the downconverter (an essential part!) is 'extra' and the **combined price** of the indoor receiver portion, **and** the outdoor downconverter, is not such a good deal after all. Beware.

Don't allow your enthusiasm to do it cheap get out of hand in Vegas (or at any trade show). Cheap is alright if the performance is there, the delivery is timely, and the company stays in business long enough to back you up with warranty repairs. Cheap is not the first thing you should look for. Quality is. If you want to stay in this business, be very careful with your first purchases. Get your feet wet by sticking to proven products coming from established firms. Then, when you have the experience and financial ability to 'experiment', play all you want. If you follow this simple advice, **you** will be around to attend the **next** Vegas industry trade show.

### NO Hard Feelings

Last month I was, admittedly, a little rough on David Wolford and **SatGuide**. Just to show that my comments and thoughts were only predicated upon the issue at hand (accepting advertising from an obviously un reputable supplier), allow me to comment on the recent improvements in **SatGuide**.

I genuinely devour guides. Even those published in Europe for some of the services that end up on Intelsat birds. I probably spend as much time studying guides, to select the best balance of programming for the Turks and Caicos, as anyone alive. Until the February issue of **SatGuide**, my favorite for quite some time has been **Satellite Week**, published in California. I still like its timely format, and the more-apt-to-be-accurate listings although if there is a discrepancy between various listings in the many guides I receive, I almost always believe the standard **TV GUIDE** (which in the South Florida edition now lists a dozen or so of the satellite services).

But for ease of use, the February edition of **SatGuide** was a revelation. I have to commend Wolford and crew for getting the D3 and other oddball birds listed, and for putting it in a format which can be quickly diagnosed and all programming options considered. I suspect Wolford has been feeling the pressure from **Satellite Week**, and his addition of the D3 et al listings is his way of getting more competitive. Competition is good since it obviously forces us all to try to do a better job.

Not everything is yet found in **SatGuide** (Anik is still missing for example) but for ease of use it is the present hands-down winner. I still rely on **Satellite Week**, especially in the latter half of the month when late changes catch up with the long lead time at the monthly **SatGuide**. I was afraid they forgot the 'Guide' part of their name, and their reason for being in business there for awhile. I'm glad to see them making an effort to get back into the Guide business and we should all let Wolford know that we appreciate his redirecting his energies to producing the best Guide around.

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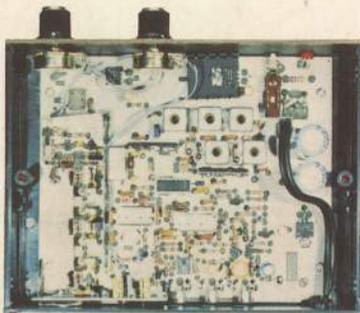
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