

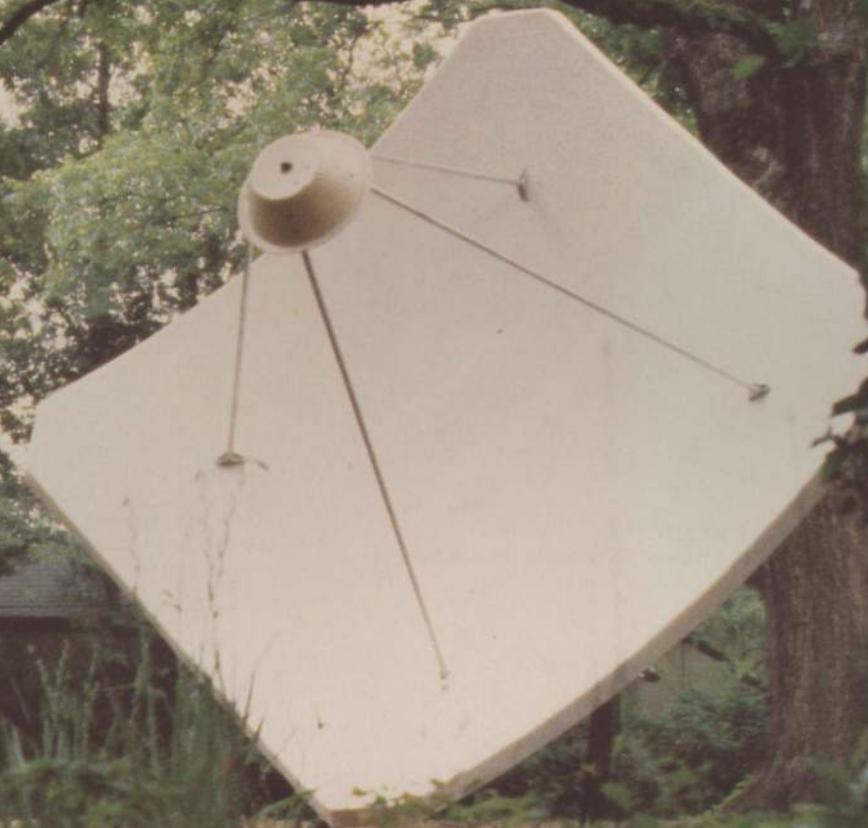
COOP'S  
SATELLITE  
DIGEST



DECEMBER 1981



# APOLLO X9



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## COOP'S COMMENT ON TECHNOLOGY

### DISAPPOINTING EQUIPMENT

One of the "services" we attempt to provide for readers is reviews of equipment performance. We have had a policy, since the inception of **CSD**, whereby any manufacturer of goods may send along a unit for test, and we oblige by checking it out and writing about it. We **also** have a policy wherein equipment which turns out badly does not get written about, since a really negative report certainly would not do the manufacturer any good. And there is always the chance that the particular unit we got was not representative of the regular production run units; so in the case of a unit that performs "badly", we try to get a replacement from the supplier to see what those chances are.

From the reader's viewpoint, knowing which equipment does perform well is nice, but knowing which equipment performs **not so good** is perhaps even more important. There are dozens, perhaps hundreds, of different antennas, LNAs, receivers and attachments now advertised in **CSD** and there is no practical way to police **each** of these to insure that readers are not buying a pig-in-a-poke, when they order from suppliers advertising here. When we receive complaint letters from readers, concerning some particular piece of equipment, we go to the manufacturer to try to work it out. In many cases merely acting as an intermediary straightens out the bad feelings, and everyone walks away satisfied. In other cases we detect hostility from the supplier, or in a few cases outright deceit, and we promptly cut off **CSD** advertising pages from such firms.

Recently there has been a flood of equipment arriving for check out. In one instance (AVCOM receiver), we went out on our own to acquire units and to expand upon the initial report

(see November '81, **CSD**). What I have growing down here in the islands is a rather substantial amount of equipment which either does not work at all, or works so poorly that I am concerned that there is a tremendous amount of "junk" on the marketplace.

There are several possible approaches to this dilemma. One possibility is to list that equipment which has been received, but which is not being reviewed due to "technical inadequacies". The practical result of that would probably be to cut off **all** equipment shipped our way for review; and we'd lose the opportunity to find out what does not work so good.

If there is a "pattern" to the arriving equipment, it is this. Much of that we find lacking is coming from **newer** firms in the field. Much, **but not all**. In trying to analyze what is happening here, I have come to several conclusions:

- 1) Older, established firms, are being pushed beyond the limits of their production capabilities. There are shortcuts being taken in quality control, or worse yet, equipment that should fail the QC phase is getting shipped by people who should know better.
- 2) New firms, anxious to make their mark in the marketplace, are rushing into production equipment that is not yet mature enough for production. This is an excellent way to die before you are born, since we have a small industry, and buyers trade "intelligence" on a regular basis.

There isn't much I can do, even in my position, to clean up **everyone's** act. But I can remind those who **will be** sending equipment to us, hoping for a favorable review, that you do yourself no good whatsoever to send along to me a piece of equipment that is either not mature, nor fully checked. **I can** remind all of the industry that good equipment is in woefully short supply, although equipment per se is not. That suggests to me that as a buyer, you should exercise **extra restraint** in ordering **and paying** for equipment which you have not evaluated in your own location. There is still plenty of room for mature growth in the industry, and many of the new firms in the industry **will** one day be giants. It's tough to start off as an unknown, and fight those already established, for a spot in the marketplace. But this is a young industry yet, and there is still plenty of room for good products designed by creative people and marketed by honest, straight forward sales people.

### OUR COVER -

Florence, Arizona state prison has their own satellite TVRO terminals. Not one, but two. Put together by the inmates, using their own funds and efforts and skills. It's an excellent training program leading to rehabilitation skills that suit the modern world. **See Page P-13.**

CSD  
TECHNOLOGY



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## TERMINAL OPERATOR JAILED

### WHITHER GOEST - SCRAMBLING?

If you follow the rapid growth and development of satellite use for video transmissions, you must come to the conclusion that even in the short space of one year, there have been substantial changes in the use of satellites.

There is a new paranoia amongst the new (and old) users of satellites over "transmission security". Much of this "fear" is being fanned by aggressive sellers of scrambling equipment; firms who want to convert **all** satellite feeds to "secure", or "scrambled" transmissions. Their enthusiasm can be understood if not appreciated. They are out to make a buck, out of people's fear of the unknown. The trade journals carry their advertisements. "**Who is Watching (Listening) to Your Transmissions??**" they ask. And then they proceed to tell the concerned reader how, for a mere three or four hundred thou, he can have secure transmissions.

The networks have **always** been paranoid about their programs, for probably the least-best reason of all. Network programs are to be "released" to the viewing "public" **only** through network affiliates. A satellite is not a network affiliate; it is a network transportation system. Even if the very same program is being viewed simultaneously by 50,000,000 homes, they have this "policy" which says it shall be secure. Until they release it through their "authorized affiliates".

1982 will be "the year" the networks discover and move with both feet into satellite feeds. They are already moving there, cautiously, trying to work out their agreements with AT&T, and trying to develop programs which will enhance their own control over their individual affiliates. It is a dangerous game, since getting the affiliates into the dish business will immediately plug the affiliates into a host of new (non-network) program choices. An affiliate given a choice, new choices, may often elect to dump the network show and carry something else, delivered via the bird.

NBC is now "testing" the AT&T approach to satellite program delivery. That handful of NBC programs, carried for years over on SATCOM F2, TR8, was moved from F2 to COMSTAR D3 (TR1/vertical) this past mid-October. There went the nightly Johnny Carson Show, the three hours of afternoon soap operas, and the occasional prime time show that somehow snuck onto the TR8 position. There went the best US signal received in the far eastern Caribbean.

October was also a month for other testing. It was during October that CBS and NBC experimented by switching audio and video on several "test feeds". There you saw it; **Little House on the Prairie** on TR1 of Westar 1 one evening. So you cranked up the audio, and "hey", what is this? The audio was **NBC Nightly News**. Was somebody asleep at the switch? Nope. Over on Westar 3 you found the reverse; **NBC Nightly News Video** and **Little House** audio. Very clever.

This was not a "new trick"; Intelsat has been playing this game for years. Intelsat frequently sends the program audio along on either another transponder (no sign of audio sub-

carriers with the video), or even on another bird. The Alaskan feeds on TR 23 of F2 play the same game for a part of each day; send the video from the lower 48 to Anchorage on TR23; send the audio up on an SCPC carrier on TR3 of the same bird.

**None of this will stop the really devoted private terminal viewer**, or the sincere "pirate" bent upon "stealing" the network feeds for whatever purpose he may have in mind. If it takes two dishes, and four receivers, to get the program audio and video together, so be it. Several people found the Leonard-Hernes fight video over on an ANIK bird back in September, and the audio was loud and clear on COMSTAR D2 (even though the video was OAK-scrambled on D2).

**HBO and others** have undoubtedly considered the simple switching of audio and video. But they, **unlike the networks**, cannot carry it that extra step and also switch **birds** at the same time. Why? The cable firms, **their "affiliates"**, are still basically one-dish users and until the cable industry grows into two or more dishes-per-system, the ability to send video on one bird and audio on another is not there. But, that would not stop them from stripping their program audio from the normal transponder and either swapping it with another HBO program audio on another HBO transponder (on the same bird), or, perhaps "bundling" all four or five of their audio services on a single transponder set aside for that and other (HBO) narrow band purposes. That's not a foolproof system of course; but it is far less expensive than "real" scrambling. What that would do is create a large, new market for multiple receivers at private terminals! HBO has quietly told affiliates it **will** "make the system secure" when the F3R bird is put into service. They have never said "how" they will do this. Stripping the audio away, or even sending the sync off to another transponder, would do this. **Until**, private terminals figured out that it took a second receiver to put everything back together again.

**There is a "war" going on here.** It is not unlike the intelligence/counter-intelligence operations one finds in real warfare. One side decides it is being "taken advantage of", and they take a step to correct that. The opposite side takes the corrective step as a challenge and develops a system to counteract the move.

Then there is the legal side of all of this. Of all of the private business interests that use the birds for program distribution, the professional fight promoters are perhaps the most concerned about the "integrity" of their program rights. The Leonard-Hernes fight, this past September, is the most recent example of what can (and did) happen when somebody without a good foundation in law, and an instinct for what you can do, where, can get themselves into a terrible jam.

**Regular readers** of the *Digest* will recall that South Florida's Bob Behar "pioneered" the outdoor, public showing of satellite delivered closed circuit fights over a year ago. Behar routinely attracted crowds to his Hialeah showroom as large as 4,000 people. He finally ran afoul **not** of the fight promoters, or federal authorities, but rather the local Hialeah police department who decided that his 4,000 person gatherings, "without a permit", were not a "safe idea". Behar wisely decided at about that time he had pushed that particular promotion idea for about all it was worth, and quietly discontinued the public displays.

Others however picked up on the concept. Amongst those, during the recent Leonard-Hernes battle, was a group in Houston, Texas that calls itself **Pirate Video**. An apt, but ill-chosen name, perhaps.

Pirate Video contracted with a representative of Mid America Video Corporation to set up a trailer mounted rig in a Houston parking lot. Pirate Video wanted to demonstrate how attractive owning a private earth station might be. Mid America's sales rep, Joe Champion, was simply following up on a customer request. Champion set up the trailer rig and was on hand to make sure the system worked properly. Pirate Video's Chris Walker, Beach Stone, Shayne Stone and John Reynolds were all on hand when the fight began, and the

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crowd assembled. Now this fight **was** scrambled. By the somewhat secure (until we publish the circuits for defeating it!) Oak system. Perhaps, Pirate Video didn't expect the fight to be scrambled. Joe Champion had no equipment to unscramble the video, and the audio of course was sent without scrambling. The crowd saw a jumble of video lines, but heard good audio. **The scrambling security was not broken.**

The promoters of the fight attempted to obtain an injunction **before** the fight, to stop the "display". They failed in a **federal** court, but finally got an injunction issued in a **state** court. The injunction from the state court was issued too late, however, and it could not be served until **after** the fight was over.

Joe Champion was served with a criminal complaint. **He was arrested**, handcuffed, taken into custody and "taken downtown" where he was fingerprinted; as were the Pirate Video personnel.

**Now this is serious stuff.** Mid America Video maintains that the system was bought by Pirate Video, and that their representative, Joe Champion, was on hand only to provide the customer with technical assistance with the terminal. Not clear at this point is who actually touched the receiver dial, and tuned in the scrambled signal. Also not clear is what violation may have **actually** occurred, since the "secure" (i.e. scrambled) signal was **not decoded**. Mid America Video is out beating the bushes trying to raise funds to pay for the legal defense of Joe Champion. SPACE is concerned that if the case ends up in court, a "precedent" may be established which might eventually spill over to the private (as opposed to public) in-home use of satellite transmissions.

**Section 605**, you may recall, prohibits the "interception" and "divulgence" of common carrier signals. Viewing in your home, you **may** be legally involved in the "interception", but as long as the display is "private", many attorneys feel you have not gone that second step; "divulgence". The "Houston Case", as it is becoming known, clearly had "divulgence" (it was a public "display"); **but did it have "interception"?** The secure part stayed secure (the video). The complaint read as follows:

"On or about the 16th day of September, 1981, in Houston, Texas, and within the jurisdiction of this court, the Defendants, Chris Walker, Beach Stone, Shayne Stone, Scott Reynolds and Joe Champion, did knowingly and willfully, and without authorization from Main Event Productions, Inc. Intercept a radio communication being transmitted by satellite, Comstar 2, channel 18, to wit the Sugar Ray Leonard and Thomas Hearnes World Welterweight Championship fight card, from Las Vegas, Nevada; and, the defendants did publish and cause to publish and divulge the contents, substance and meaning of that intercepted communication to Ronald Johnson and Gabrielle Chatum. This is a violation of Title 47, United States Code Section 605.501, Title U.S.C., Section 2."

SPACE worries that this is a "bad case". That is, a "bad case can establish a precedent which reaches far beyond its instant application". SPACE has decided not to act **directly** in this case, although General Counsel Rick Brown **is providing** some assistance **privately** to Joe Champion's attorney. **Mid America is not involved** in the controversy, officially, but seeks to assist Joe Champion, its representative. To that end a "Joe Champion Legal Fund" has been started.

It is no wonder that the fight promoters are nervous about this. Back a year or so ago, fights were routinely carried on satellite and there was no overt attempt to disguise their presence or content. Then the knowledge that fights could be tuned in, with the right equipment, spread and publicity (such as that appearing in the **Detroit Free Press** telling the story of several in Michigan who successfully found the fight on a Canadian satellite) was nationwide. You cannot blame them for taking steps to make their product more secure. First, they tried using reduced uplink power, hoping this would drive the private terminal signals down into the noise. But that effort failed when it became big business for people with trailer

mounted terminals to rent their facilities out, **legally**, for local theaters displaying the fights. A 4.5 meter on a trailer, or on the ground, requires the same satellite signal. Next, the fights were shifted to Canadian ANIK satellites; a move that denied access to some far southern viewers but not those further north. Ultimately, it was determined that hard scrambling was the only real answer. But there is so much money riding on the successful delivery of the fights to hundreds of locations, a back-up for the back up system is required. So trot out the Canadian ANIK connection, one more time, and split the audio and video feeds; ala Intelsat.

**Split audio feeds are simple to hide**, and difficult to find. A transponder can hold up to 16 sub-carrier transmitted audio channels, or if the audio signal can tolerate being confined to a low audio bandwidth (such as a voice commentary for a fight), the audio channel can be super-hidden along with 1200 or so others on a single transponder using SCPC of FDM-FM techniques. In none of these cases is there actual "scrambling" going on; simply some clever schemes to separate and hide the various parts of the signal.

**Another technique**, tried by RCA some years ago, was to take the sync portion of the video signal away from the video. This is another one of those "not difficult to do" tricks. Less the sync, the picture won't hold vertically or horizontally on a standard receiver. The picture will lock up when sync is "reinserted". In RCA's experiments, they took the sync and sent it along on an unused **aural subcarrier**. In this instance you needed a receiver to spare, or an extra sub-carrier detector, to receive the sync. Then you had to figure out how to "reinsert" the sync with the raw unsynced video. There is nothing that says the sync has to ride along on a subcarrier in the same transponder as the video, of course. It, too, could be sent on a separate transponder, or even a separate bird. This **particular** system, as applied by RCA, had many problems. For professional broadcast re-use, getting the sync proved to be an expensive problem to correct. For non-professional use,

#### RCA TECHNIQUE

VIDEO → ROUTE TO TRANSPONDER "A"  
 SYNC → ROUTE TO SUBCARRIER, TR "B"  
 AUDIO → ROUTE TO SUBCARRIER, TR "B"

innovative people such as Steve Birkill have been stripping the satellite sync and regenerating their own for many years. In other words, you don't have to have the original sync if you can create new sync on your own. With modern IC devices, it costs you about \$25 to do so.

Thousands of hours, millions of dollars are being spent on the security aspect of satellite transmission. More thousands of hours and more millions of dollars are yet to be spent; many of these in legal forums where those who feel they **must** have protection will pursue their positions in both court and before the respective legislative bodies in their districts.

The coming year, 1982, will be "the year" for rapid developments in the security arena. We'll enter 1983 wondering what ever happened to the "good old days" when the only thing that stopped you from viewing a satellite signal source was a decent antenna, LNA and receiver!

## TWO DEGREE SPACING?

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#### TIGHT GETS TIGHTER

The Federal Communications Commission has been presented with a "tight problem" by its staff. The Commission staff has been studying the perplexing problem of what modifications, if any, could be made to the present US 4 degree bird to bird spacing, in the geostationary/Clarke orbit belt. And now they have a formal recommendation to lay before the Commission. It is **two degrees** bird to bird.

Satellite Radio Branch head Ron Lepkowski, who figured strongly in the Commission's action to deregulate licensing of private terminals in 1979, suggests that there may be room for 40 or more C-band (4 GHz) and 40 or more K-band (12 GHz) birds under the new proposal. He adds that the exact number will depend upon where the US finally "draws the line" on the now expanding North American orbit belt. Recent FCC actions have pushed the orbit belt in both directions (beyond 70 degrees on the east and 140 degrees on the west), apparently in a move to claim orbit "rights" prior to the 1983 international conference on this matter.

**The present 4 degree spacing** has been called "wasteful" by many engineers who have conducted paper studies and computer modeling to show that 4 GHz birds, providing service to dishes as small as 3 meters (10 feet), could get along without major increases in ground-received inter-

ference from adjacent satellites. The staff recommendation for 2 degree spacing caught virtually everyone unprepared. The whole matter will now go out for public comment, and if the comments are not too disastrous, an eventual rule making proceeding.

**Instant reaction** to the 2 degree proposal was largely negative. Lepkowski, anticipating adverse reaction, suggested that the successful use of 2 degree spacing will depend upon much tighter control of satellites in their assigned positions and "exploitation of cross polarization isolation techniques."

**Most** of the reaction from the industry centered around the "cost to users" for implementing the tighter standards. Satellite operators were concerned that existing satellites, now in operation, or far enough along in planning not to be changed, would find it difficult if not impossible to conform with their existing uplink-receiving antennas. Commissioner James Quello, who appeared at the Washington SPTS Seminar this past April, asked "**Will existing small dish owners have to abandon their antennas and replace them?**"

The Commission, in considering the proposal, passed on it without objections, and suggested that the public comment version of the proposal should go out with a "strong recommendation for passage by the Commission". Lepkowski pointed out that the "slot squeeze" could be implemented by all existing **licensed** users without undue hardship or expense. Backyard, private TVRO terminals, are **not** licensed and the careful use of the word "licensed" seems to indicate that Lepkowski and staff had some serious doubts about whether smaller terminals could, indeed, continue to function with the tighter bird to bird spacings.

**Technical studies** published in **CSD** earlier this year indicated that for 3 degree bird to bird spacing, most of the well designed 3 meter dishes would not find the tighter spacing to be a problem with keeping sidelobe levels from adjacent satellites at manageable levels. However, the **2 degree** spacing is an entirely different proposition, and it is believed most of the existing 3 meter and perhaps some 4 meter dishes would find substantial increases in adjacent satellite interference under the final proposal.

**The US proposal** makes no allowance for the Canadian sub-allocation which presently has 5 degree bird to bird spacing. If the Canadians refuse to go along with tighter spacing, the nearest US satellite on both sides of the Canadian arc segment (roughly "protected" between 99 west and 119 west) will have to stay at 99 and 119 respectively. That will leave the Canadians "free" to continue to carve up their own segment as they see fit, using bird to bird spacings that suit their own national policy.

**Opposition** to the proposal is expected to be considerable. There are now an estimated 600 plus 3 meter size dishes in the cable industry, plus another 400 plus in or about to go in for radio networking. Very few of these terminals have a "license" in the eyes of the FCC, since getting a license for a 3 meter size terminal (i.e. meeting **all** FCC license criteria) is difficult at best, and impossible in many areas of the country. If the Commission chooses to ignore pleadings from unlicensed users (and that will include virtually all private terminals as well), then the brunt of the attack will have to come from the satellite operators themselves. When the bird to bird spacing is reduced (as proposed) to 2 degrees, the "flight operations" for day to day bird operations becomes much more complicated. Not only must the birds be kept "on station", better, but according to Lepkowski "much tighter controls on polarization integrity and boresight pointing will also be required".

**There is another problem** for the satellite operators; can they keep their **uplink signals** away from adjacent birds when the birds are as close as 2 degrees? Most ten meter and up, uplink antennas, can handle this fairly well; but not all can. The now frequent commercial use of "portable 4.5 meter" uplinks (Robert Wold, Southern Satellites, others), however, would not be able to control their uplink signals well enough

to insure that these uplink signals stayed out of the input-receivers on adjacent birds.

Several early-to-comment engineers feel the FCC is really after hassle-free 3 degree spacing approval, and the 2 degree spacing proposal is simply an example of asking for more than they really expect to get and then "settling" for 3 degree after all. We'll all see just how serious the FCC is over the next 12 months.

## IS THE FCC PLANNING A CRACK DOWN?

### WHY GET APPROVAL?

One of the classic avenues pursued by those special interest groups who might wish to slow down or stop the development of new technology is to run to the Federal Communications Commission for assistance. In years past, broadcasters have run to the FCC to request help in slowing



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down the development of cable television, and more recently, low power TV stations. Initially this is a lobbying effort; the big wheels of one industry descend upon the Commission asking attention for their points of view. If this effort fails, at high FCC levels, then the affected party begins the slow and often laborious course of working up from the middle (or bottom) of the FCC through "education" of staff members.

The latter approach is now underway at the Commission, and the target for this new "interest" is the small, but growing, private TVRO industry. The Commission is now taking a few early steps to establish their "territory" for possible future regulation of TVROs, and in the coming year we can expect to see much more activity in this area.

As a body, the FCC determined in the fall of 1979 that private TVRO terminals no longer required FCC sanction (i.e. licensing). It has taken nearly two years for the initial thrust of that "deregulation" to wear off, and for the now more and more concerned opponents of private terminals to find "weak spots" in our industry. We'll discuss here what these tender spots may be, and to point out how being tender may cause some of what we do, and what we do it with, to change in the year ahead.

Until this past summer, no firm had ever bothered to take any (private terminal) TVRO hardware to the FCC. It was the judgement of most in the industry, and even most at the FCC, that this particular type of receiver did not require any FCC sanction, since it fell outside of the many rules and regulations which govern the design and operation of standard TV receiver units. Most of the firms in our field are new at this business however, and while ignorance is seldom an excuse in court, few of the existing firms have the corporate muscle or background to even have a staff attorney on board. Thus there have been many areas which have been "overlooked" by the typically engineering-minded management of the private terminal manufacturing firms.

When The Heath Company (now a part of Zenith) decided the time was right for it to come onto the market with a private TVRO package, they went shopping for the right hardware. Ultimately, as has been reported in **CSD**, they settled on hardware largely manufactured by Scientific Atlanta. At the same time this was happening, well known TVRO manufacturer Microdyne was developing similar "mass appeal" marketing plans of their own. Both groups decided that there may be some reason to take all or parts of their terminals to the FCC for approval. We reported on this during the spring and summer here in **CSD**.

The fact is that if you have enough time to research and digest, carefully, FCC rules and regulations, you can find several existing bits of language which indeed **could be** interpreted to apply to TVRO receiving hardware. It is the possible interpretation of rules, to apply to a product which you have on the market, that concerns every far sighted manufacturer of electronic hardware. The FCC has the power to issue an interpretation of a rule already on the books. That **interpretation** can be challenged in court, if there is some question to its applicability to a specific situation, but in the interim between the interpretation and the court hearing, a business can literally die awaiting an outcome. Heath/Zenith and Microdyne wanted to take no chances, when they elected to take their new TVRO bits and pieces to the FCC for approval, before placing their new hardware on the market. Others would do well, if they have hardware of their own, to carefully consider what follows.

The Commission **has rules** which regulate:

- 1) A device that is capable of radiating a signal, which could under either proper or improper installation and use, cause interference to other electronic receiving systems.
- 2) A device that operates within the TV broadcast frequencies (54 to 88 MHz, 174 to 216 MHz and 470 to 890 MHz), and which is essentially a "low power" transmitter device intended for "interfacing to" a receiver; typically, a television receiver.

The first type of device, a regular radio receiver for example, or a regular television receiver, or a hand held portable receiver (etc.), comes under FCC jurisdiction because of something called "Part 15". If you closely inspect the back plate of virtually any receiver you may have around, there will be a statement on it which tells you "This device complies with Part 15 (Restricted Radiation) Rules and Regulations, at the time of Manufacture"; or something like that. The key phrase here is "restricted radiation".

Now you may wonder, if you come from a non-engineering background, how a receiver can "radiate" a signal. What is a transmitter (i.e. that which creates a signal that could be radiated) doing inside of a receiver? It turns out that almost any receiver in use today has at least one "transmitter" hidden inside. That "transmitter", or RF signal generator to be more precise, is the LO or local oscillator. You may recall that when we "step-down" the 3,700 to 4,200 MHz region satellite signals to our ultimate video and audio jacks on the receiver proper, that we have to go through something called "mixing". This is the technique where the incoming TVRO signals are "mixed together with" a locally generated signal; the LO. In this process we reduce the operating frequency of the TVRO signal to something we can handle; i.e. a "lower frequency".

A single conversion TVRO receiver has one LO (for one conversion), and that LO operates typically between 3,630 MHz and 4,130 MHz. None of this "falls" within the frequency region of concern to the FCC, previously listed. So far so good.

A double conversion receiver takes the TVRO signal from 3,700 - 4,200 MHz down to either (1) the 1,200 MHz region, or, (2) the 500 MHz region, or, (3) the 450 to 950 MHz region. This takes one LO, and the combinations possible are many. Generally speaking, the 1,200 MHz region intermediate frequencies are created with LOs operating well above the top of the UHF TV band. The same thing applies to receivers



## SATELLITE Video-Audio RF MODULATORS

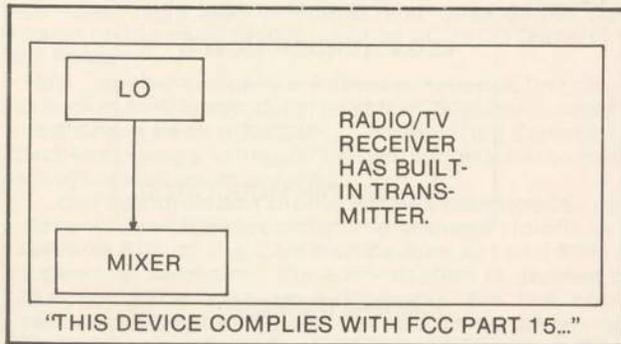
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operating with "high IFs" in the 500 or 450-950 MHz regions. But, a **double conversion** receiver converts a **second** time, typically down to 70 MHz. Now we have a second LO, operating in the 1130 MHz region (for 1,200 MHz high IF), or in the 400 to 600 MHz region (high IF near 500 MHz), or in the 320 to 1020 MHz region (for the broadbanded high IFs between 450 and 950 MHz). Clearly, there **are** situations here where there is an LO operating in or very close to that special group of frequencies which the FCC wants to protect under "restricted radiation"; Part 15.

Heath (using a Scientific-Atlanta receiver) asked for certification (**type approval**) of their receiver because they felt that perhaps the double conversion receiver might be construed to have potential "radiation problems", in the much protected TV band (actually from 30 to 890 MHz). Their approval is for Section 15.63, and it deals with limiting the amount of (LO) radiation from a device that has a local oscillator ("transmitter") that operates within the "restricted" and protected band of frequencies.

The bottom line here is that **any** receiver manufacturer, with one or more LOs, that happen to fall between 30 and 890 MHz, could be dragged into a situation with and before the FCC. **They could require** that your receiver be submitted for approval. Such an event will be made more likely by sloppy design practices, which allow inappropriate amounts of LO to find its way out of the receiver case and into the air. The Commission is not out looking for more work, but they have plenty of "helpers" out there who will bring violations of their rules to their attention.

The FCC's applicable rules here read as follows:

**"The field strength of any electromagnetic radiation from the cabinet, control circuitry and power leads of any receivers operating in the frequency range 30 to 890 MHz shall not exceed specified field strength limits at a distance of 100 feet or more from the receiver:**

Over 25 MHz, up to and including 70 MHz	<b>32 microvolts per meter</b>
Over 70 MHz, up to and including 130 MHz	<b>50 microvolts per meter</b>
130 to 174 MHz	<b>from 50 to 150 microvolts per meter (linear line)</b>
174 to 260 MHz	<b>150 microvolts per meter</b>
260 to 470 MHz	<b>150 to 500 microvolts per meter (linear line)</b>
470 to 1,000 MHz	<b>500 microvolts per meter</b>

Now the "microvolt per meter" measurement technique is unusual in application. The "per meter" applies to a "meter of antenna length", but a resonant pick-up antenna is assumed. This requires additional interpolation to adjust the pick-up antenna length against the "meter-length reference", and produces a new set of actual field strength level numbers. Further discussion of this is beyond the scope of this quick look at the problem, and receiver suppliers impacted are advised to request a copy of the FCC Part 15 rules for a fuller discussion.

Again, there is a bottom line. The FCC does not want a receiver interfering with another receiver. They have language in the rules to restrict or limit the amount of "incidental radiation" any receiving device may emit into the airwaves. A receiver that does not comply runs the risk of being shut down at the shipping door until the problem is corrected. One way to insure that you don't have this problem is to submit the receiver to the FCC's Laurel, Maryland Laboratory for approval.

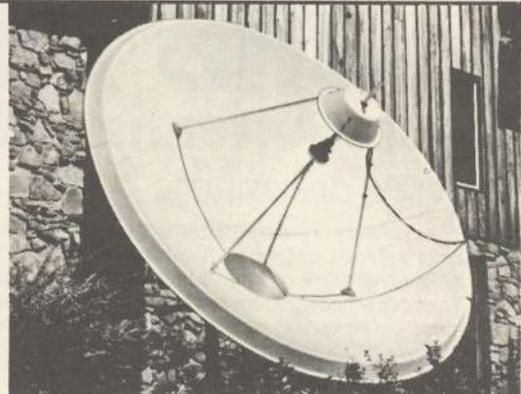
**Then there is the interfacing device.** This one is a little more complicated, and indeed, up in the air at the FCC. First, let's try to define what an interface device is, and why you already have one in your TVRO terminal. Probably.

The FCC concern is that we have a whole family of devices which are on sale in the public marketplace, which have the "potential" to cause harmful interference to receivers. Unlike the receivers covered under Part 15 "incidental radiation" rules, the concern here is with a device that does not pretend to be a receiver; it is clearly a "transmitter".

The FCC calls these "Class I TV Devices" and they are found in every VCR, most home computers, virtually every electronic game. In our business, we call them **modulators**. The FCC defines a Class I TV Device as a gadget with "restricted radiation that produces, on frequencies allocated for television broadcasting, a radio frequency carrier modulated by a video signal and which feeds the modulated radio frequency energy to the (interconnected) television receiver(s) by conduction".

The interpretation of this? Your TVRO receiver comes out at either RF (i.e. the modulator is built into the receiver), or at baseband video and audio. Outside of the TVRO receiver, you connect the baseband signals to the external, unattached and dis-associated modulator. Your modulator is a "**Class I TV Device**". Now, what does that really mean?

There are millions of Class I Devices around. The computer



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(home, office and high technology) machines have been particularly concerned about this particular bit of regulation. There are two ways to interface a computer output with a video screen; run the output to a special video **monitor**, or, run the output into a TV modulator which in turn connects to any **standard TV receiver**. Now a home, or low cost, computer manufacturer would much rather sell a TV **modulator** to the consumer (cost under \$10) than a special video monitor (cost over \$50, absolute minimum). So this group of firms has been fighting the FCC for some years now, to get the rules changed. The FCC has responded by drafting some proposed rules, but for right now, the old rules still hold. What are those rules?

1) When the modulator is a separate box, not a part of the TVRO receiver (in our case), it is clearly a Class I Device. Now under the present TV Interface Rules, you cannot (that's a **NOT**) get approval or certification for a stand alone modulator. **No way**. In short, a stand alone modulator (including those advertised here in **CSD**) are, in the eyes of the FCC, not legal. And there is no way, under the existing rules, to make them legal.

2) When the modulator is built into the unit (such as a VCR unit), the present Class I rules apply. The present applicable rule section is 15.419, but the manufacturer must submit the system to the FCC for approval.

This is what Microdyne did, and what Heath did. The Heath receiver consists of an outdoor downconverter/LNA (so-called LNC or Low Noise Converter), plus an indoor demodulator with a built in modulator. The Microdyne unit submitted to the FCC has everything at the antenna feed; **including** the modulator.

So if outboard TV modulators are illegal, why do so many people sell them? How do they get away with it? That's part of the "weakness" of the present TVRO system business. Most of us are buying, selling, and using a portion of a system which the FCC could, clearly, come down upon with no notice at all.

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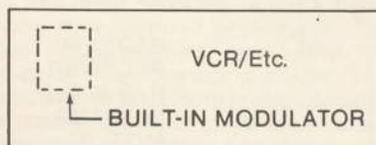
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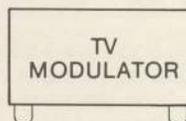
Box 36, Stearno, KY 42647

606-376-8781

### LEGAL (UNDER 15.419)



### ILLEGAL (PERIOD)



This fact is not being lost on those who fear the continued growth of our industry.

**There are two solutions ahead.** We said earlier that the FCC is itself planning to change the Class I Device Rules. In their modified version, the Commission may (that is a qualified "may") decide that stand alone modulators are TV Interface Devices. Some people feel that this is a good bet; others disagree since the Commission would in effect be turning loose millions of (very) low power TV transmitters, with virtually no way to control them, or their use. One opponent, of the possibility of approving stand alone units as TV Interface Devices, notes "The electronics world has created 1 and 2 watt linear, solid state amplifiers which could easily be driven to full power by a TV modulator. I can see this whole thing turning into an uncontrolled 'Citizens Band Television' network".

The proposed rules would classify TV Interface into a pair of categories. The one that holds hope for us here suggests "a device that produces a radio frequency carrier modulated by a video signal, from a video source and which feeds the modulated (carrier) to the antenna terminals of a conventional television receiver".

But, there is a fight ahead to get this approved. SPACE is considering entering some pleadings in the matter; all TVRO manufacturers should be aware of the implications both for the future, and for the present.

The Commission is uneasy about TVROs. They are getting flack, at both high and middle management levels, about the tremendous growth of this industry. They also have a very vocal proponent of the industry position in SPACE.

The Commission recognizes that, for the moment, they do not know enough about private TVROs to properly regulate them directly. Past Commissions, faced with this posture, have slowly worked their way into a regulatory stance by adopting seemingly harmless rules that nip away at the fringes of a new technology. Then when they have worked their way into the middle of the fray, the jump on the new technology with both feet. There is an on-going fear that this is what may be happening now, with seemingly "little issues" in the TVRO arena. Two can play that game.

If Heath/Zenith and Microdyne went to the FCC because they wanted their "rights", vis-a-vis restricted radiation and/or TV Interface Devices clarified, that is seemingly reason enough. But at least some in the Commission thought they saw more to the applications than those reasons.

Neither company would like to get caught marketing TVRO equipment if the roof should suddenly cave in on the industry, because the FCC adopted **serious** rules in this area. Both, **one can suspect**, hoped that by obtaining FCC approval for their respective **systems** under restricted radiation and inter-

face rules, might also "by Association" slide by the Commission on the much bigger question of "TVRO Ownership/Use Policy".

Now neither company is known to have had that ploy in the back of their minds, but at least the Commission decided it could have been a possibility. Therefore, the Commission attached language, to the grant of type approval for the Heath package, which reads as follows:

"...this authorization should not be understood to condone actions that promote or encourage violations of Section 605 of the Communications Act of 1934, as amended. Moreover, the authorization is granted on the condition that advertisements for the above referenced device are designed not to encourage violation of Section 605. Such advertising may result in a revocation of this grant."

The Commission even went so far as to "suggest" language which they would find suitable. If you build or sell TVRO terminals, read the following carefully.

"Use of this device may violate Section 605 of the Communications Act of 1934, as amended, through the unauthorized interception and divulgence of radio (television) communications, or, use of radio communications, or, use of radio communications for one's own benefit where there is no entitlement to its receipt."

Shades of cigarette package warnings!

In reporting to its membership, SPACE notes that the "wording" is "suggested", not mandatory. It may be included at the "discretion of..." the TVRO manufacturer. SPACE also notes that inclusion of this language "could be a significant safeguard against a suit (brought by) program suppliers..."

Perhaps better language, capturing the "spirit" of the FCC's "suggested" language, would read like this. It has the same legal meaning, and it makes the viewer/user of the terminal more aware that the ultimate imposition of viewing restraints rests with the user:

"This TVRO (system) (receiver, as a part of a complete system) has the ability to intercept transmissions not intended for you as a viewer/user. Such transmissions are protected Section 605.501, and Title 18 U.S.C., Section 2, of the Communications Act of 1934, as amended. The legal rights of individual home viewers has not been determined fully by the Federal Communications Commission, nor by a competent court of law. Protected, private transmissions, via satellite, may only be intercepted with the permission of the transmitting agent or agency, and any divulgence of such transmission to others, or use of such transmissions for private benefit is expressly prohibited by Section 605".

Yes, that is longer, but it has the value of at least putting the user on notice that terminal use, like an automobile speed limit, is enforced at the point of use. There is an old lobby saying profounded by a large group of US citizens; "Guns don't kill people; people kill people". TVRO terminals don't break the law; people do.

**EQUIPMENT TRADE**

I have been a subscriber to CSD for nearly two years. I still do not have my TVRO up and operating but I eventually will have one. I thought that perhaps in the CSD readership there might be someone interested in a trade. I have a Hewlett Packard "S" band signal generator, model 618B, which covers 3.8 to 7.6 GHz. It has CW, or FM modulation built in. I would like to trade it for a good quality TVRO antenna, or TVRO receiver.

Ellsworth O. Johnson  
E. M. Johnson Co.  
364 Coeur d'Alene Street  
Spokane, WN 99204

A good quality signal generator is a mighty useful piece

**TECHNICAL  
CORRESPONDENCE  
AND NOTES**

of test equipment for TVRO antennas, LNAs and the front end of receivers. Whether a 618B is worthy of an even swap for a "good quality" receiver or antenna remains to be seen.

**LIFE OF THE PARTY**

The SCDN receiver idea is a great concept, when it works.

Even though Tay Howard says in his new manual not to install the downconverter board outside, we did it and it works OK with 300 feet of RG-59/U coaxial cable between the converter and the rest of the receiver. I don't know what will happen when it gets down to -40° up here, so if somebody has a circuit to lock the VTO into a stable mode at low temperatures, I would appreciate having it.

For a low cost (\$200 US) low power 1 watt linear solid state amplifier, wideband across the whole VHF band, look into the

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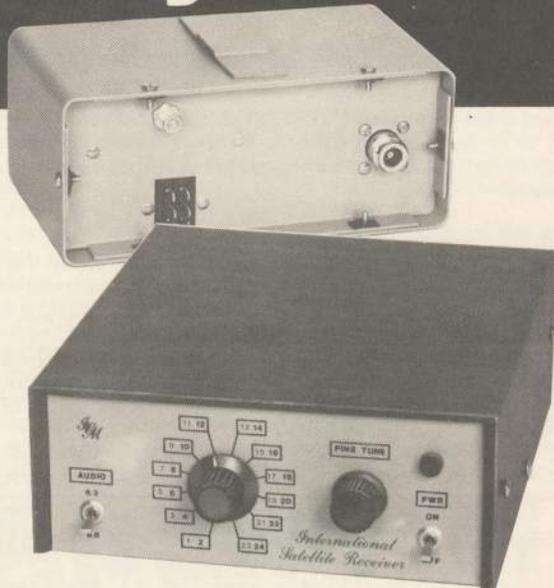
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Other features: Automatic frequency control, automatic gain control, standard video output, subcarrier output for future accessories, wideband phase lock loop demodulator, selectable video polarity, internal audio and video controls, provisions for an RF modulator, standard jack for optional remote control, built-in bandpass filter and D.C. block.

OPTIONS: REMOTE CONTROL UNIT \$109.45  
TUNABLE AUDIO UNIT \$189.95



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405/236-3741

new Mini-Circuits ZHL3A or the ZHL-1A. All you need is 24 volts DC at 600 mA and you have 1 watt of power ready to radiate. There is also a 2 watt version (\$495 US); the ZHL-1-2W. Speaking of low power, you wrote once that Oliver Swan was designing and selling 10 watt VHF translators for about \$450 each. What about printing some details on Oliver's plans so others can carry on where he left off?

M. Rejean Mathieu  
660. 13 ieme Ave.  
C. P. 1601, Senneterre  
Quebec JOY 2MO

Tay actually said he dislikes putting anything more outdoors (i.e. at the antenna) than is absolutely necessary since he has an intense hatred for climbing up ladders to work on stuff at the antenna feed during a driving rain. You know Murphy's Law; something will break at the least opportune time. The Mini-Circuit 1 and 2 watt broadband amplifiers also caught our eye. But gobbling up .6 amp at 24 volts turned us off for 1 watt output. The Anderson Scientific 10 watt output translator (also solid state; and a full translator, not just an amplifier) uses 1.0 amp at 12.6 volts. Now that is energy efficient! Oliver kept volumes of work notes in spiral bound notebooks, and three ring binders. What happened to those lifetime-of-notes we have never been able to learn. There was a nasty battle between some of those people Oliver left behind when he died, and the situation is not yet fully straightened out. A pity; the man died too soon, and left far too much work undone. The last time we saw Oliver was just a few months before he died. We spent several days with him, videotaping the details of his 12 through 20 foot sphericals. Oliver had to take a nap each afternoon, since his health was already failing. He, Mrs. Swan, and Coop drove six miles across the border into Mexico for dinner the last night Coop was there. Oliver never ate much, and when he did he stuck to vegetables and fresh foods. That night he ate a Mexican steak, something we had never seen him do before. He never told us how seriously ill he was, although he knew himself. He loved that steak, and kept exclaiming how good beef tasted to him. It was probably one of the worst steaks we had ever tasted in our life. To Oliver, it was a treat he could barely describe, and with words he was very capable. All the time he was eating, and savoring each bite, he lectured on his second favorite subject; "eating the right food to stay alive and healthy". At the time he ate that steak, he knew his days were numbered. He was quite a man.

#### MAN IN INDIA / NEEDS HELP

I happened to be going through Bob Cooper's book "Home Satellite TV Reception" which is very informative. In our country, television is just now becoming popular. There is a big debate whether to allow our nation's TV to expand to color; all present transmissions and receivers are black and white only. From your book, I am confused which satellites we might be able to receive here in India. It looks as if only the INTELSAT transmissions could be received here. Is there somebody who can help us sort this out?

S. R. Ranganathan  
114 A, Race Court  
Coimbatore - 641 018  
Tamil Nadu  
India

Anyone looking for a pen pal in India will find Mr. Ranganathan anxious to share in your knowledge of our technology.

#### MAN IN PHILIPPINES / NEEDS HELP

In one of our recent trips to the USA, we came across an article written by Bob Cooper entitled "Do It Yourself TV Broadcasting", appearing in the summer issue of Video

**Buyers Guide.** This concept of low power television stations, fed by satellite or videotape, is very interesting to us.

The Philippines use the American NTSC television system, and there are five private VHF television color networks. There is also one premium service, available in the capital (Manila) on cable, and now inter-linking to other nearby large population centers using microwave relay.

We live in an area some 350 miles from Manila, where there is no television reception. There are three towns here, with a combined population of 50,000 people. Would a ten watt VHF transmitter, with a suitable antenna, cover an area approximately 30 miles across?

Of greater importance, what television signals via satellite could we receive here in the Philippines?

A. M. Cervantes  
President  
Haka Concepts, Inc.  
23 Don C. Revilla St.  
Pasay City  
3129 Philippines

**We know there are many consultants in the low power TV business reading this, and each of you could lend this man a hand and probably build a client relationship out of the contact. Tell Mr. Cervantes "Coop Sent Me".**

#### NOT AN 85°?

In the October '81 issue of **CSD**, reference was made to difficulties encountered by Coop with a couple of DEXCEL LNAs. With all due respect, we decided to do some checking. We attempted to contact Bob Behar for serial number information since he was the seller of the units to Coop. Bob was out of town on one of his frequent trips, so his office told us they had been serial numbers #122 and #259.

Serial #122 is a 100 degree unit. It was shipped on September 22, 1980 and it was returned to us on July 1, 1981 for warranty repair work. We found nothing wrong with it except for chipped paint. This was supposed to be a "brand new 85° unit", according to Coop's report. A unit ten months old, and 100°, is not a "brand new 85° unit" in our book.

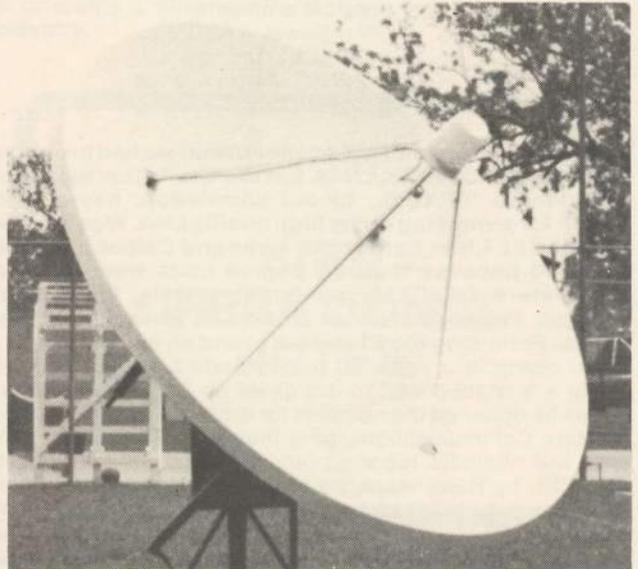
In checking, we find that serial number 259 is yet another 100° unit. It was shipped on December 12, 1980. This is supposed to be another one of Coop's units. We have not yet received it back for checkout however. It was, according to the report, on a SatFinder dish and we assume it was working. If it was on a SatFinder dish, why did it not work on the Hero dish written about?

It has been our experience that two DEXCEL units do not turn south at the same time. Upon reviewing Hero's warranty record, we find that only five units have been returned to us. Without divulging the number of units shipped to Hero initially, I can tell you that this is a very, very low rate of return. But it is consistent with DEXCEL's track record with other large volume customers.

A few pointers on connecting LNAs to systems are in order:

- 1) **Be sure** the flange mount surfaces of the LNA and the feed are clean and free of any debris and contaminants. All too often contaminants are present on these surfaces and the result is a noisy picture.
- 2) **Be sure** the LNA and the feed horn are tightened flush. There should be no voids (gaps) between them. Both the feed horn and the LNA contacting surfaces should be flat. If any bumps or ridges are present, you will have poor pictures.
- 3) **Shaded LNAs** perform much better than those exposed to direct sunlight. LNAs exposed directly to the sun will have a higher temperature than ambient, and this means a higher noise figure.
- 4) **Keep** the (operating) voltage on the low side of the recommended range. This will keep LNA heat lower, and remember that as a rule of thumb the noise temperature for the LNA will vary in a linear fashion by 0.012 dB per degree centigrade.

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It is unfortunate that Coop had the experience he did. But Dexcel cannot accept his comments about the units being "brand new", nor about them being 85° when they were 100°. Also, noise figures are basically measured on similar equipment by all LNA manufacturers. DEXCEL has several Ailtech Model 75 Precision Noise Figure Meter (test sets). We have had their factory recalibrate the noise sources, and Ailtech insists the calibration is correct. If Coop's pictures looked like they were coming through a 150° unit, he certainly should have looked at other possible problems.

Art Kawai  
DEXCEL, Inc.  
2285C Martin Avenue  
Santa Clara, CA 95050

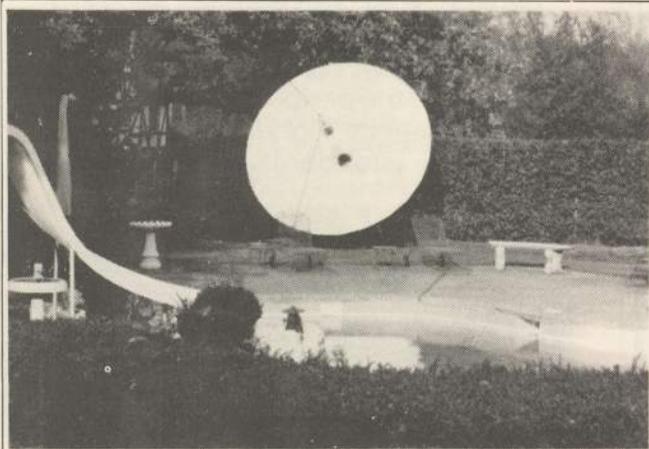
We can understand Art's concern that we had problems with a pair of DEXCELLNAs, but there is further data to be considered. DEXCEL, to our knowledge, has a reputation for producing a very high quality LNA. We switched to DEXCEL LNAs here in the Turks and Caicos in the fall of 1980 because their 85 degree units were superior performers. DEXCEL's numbering system, for product, assigns the code number DXA-3115 to their LNA products. Following the 5 is a dash (-) and an extra number. A 2, for example, is reported to designate a 100 degree unit while a 3 is supposed to designate an 85 degree unit. Art notes he obtained the numbers for the two units we returned, to Hero Communications, from the office there. We submit that the numbers reported (and the one unit returned to DEXCEL by Hero) were, somehow, not the two units we had down here. One had -3 designation, although we admit we had never recorded the serial numbers and could not recognize the precise units even if showed to us. Given that, Art checked on two units that we never had here, it is no wonder he was upset with our report.

The 100 degree unit, removed from the SatFinder dish, but not up to par on the Hero dish, points up the dangers in assuming anything. We had done "A" and "B" switching between a pair of -2 (100°) units, before selecting the unit finally placed on the SatFinder antenna here. The unit selected was the best of the two tested. Whether it worked as good as it could have, or should have, is another matter. When we did finally get back to the islands, with another 85 degree unit, the Hero dish played just fine. Nothing else had been changed in our absence and the time lapse from 100 degree off and 85 degree on was around 15 minutes. Bob Behar was on hand when we first fired up the dish, and he and I both agreed that the pictures were not up to par. We spent several hours cross connecting spare 7/8ths inch hard lines to eliminate the possibility of high line loss, or a bad connector, and even temporarily ran inside from the Hero dish on 7/8ths inch line normally in use on the 5 meter AFC antenna system. After cross checking everything, we were left with two possibilities; the LNA, or, the dish. In the end, replacing the LNA with another DEXCEL unit proved to be the solution. Oh yes, we have not lost our confidence factor in the DEXCEL product. When Bob Behar replaced our returned-to-him 100 degree unit, we stepped up (by paying more bucks) to another 85° unit. Finally, as to "old" versus "new", the units were new to us, and came out of DEXCEL factory-fresh shipping containers. Perhaps Bob Behar needs to "turn" his inventory more often!

#### TRISTAR FEEDS / AGAIN

It was with great interest that I read the recent letter to CSD published in the October issue, by M. L. Gustafson, which described an A/B/C test that he had done using our feed for a Spherical TVRO antenna.

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All Aluminum Construction  
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2036 Congressional Blvd  
St. Louis, Missouri 63141  
314-432-7666

Dealer Inquiries Welcome

Let me first state that I have no quarrel with Mr. Gustafson's results, although I question the use of a non-calibrated receiver signal strength meter in attempting to make those measurements; as he obviously had access to better test equipment (evidenced by his drawing number one). I would also like to point out that we are constantly re-evaluating and improving our full product line, making subtle design changes as we go along and gain experience.

The objective, in designing any feed, is to first look carefully at the characteristics of the reflector involved, in a number of different situations. This should include both high and low look angles, situations involving terrestrial interference, and in the case of a long-focus antenna (i.e. a Spherical), the range of focus points which are not necessarily on-axis with regard to the antenna reflector. The designer must then choose, based upon all available data, the illumination pattern required from the feed (i.e. optimum). Optimum, in this case, is defined as that condition which will satisfy the designer's own particular design and performance criteria.

These criteria are quite subjective and involve many tradeoffs between sidelobe performance, antenna noise temperature, aperture efficiency, performance of the antenna system off-axis, and a range of different f/Ds which are to be accommodated by the feed. Based upon these considerations, the designer then makes a choice of the radiation pattern which he wishes to achieve, in order to illuminate the reflector in such a way to accomplish his design goals. The actual part is then constructed, and changes made, until a radiation pattern as close as possible to the design is achieved.

This is the process by which all of our designs originate and grow. The pattern desired is chosen and a feed is constructed, to match that pattern, which has been arrived at considering all of the tradeoffs listed. Those tradeoffs ensure that the highest reading on a signal strength meter cannot possibly be achieved on the same antenna system for all different circumstances of f/D, look angle and angle-off-axis.

The only claim we make for our feeds, and the only claim which any manufacturer can honestly make, is that the radiation pattern of the horn matches the specifications. I feel the best design is that design which performs well under varying conditions, such as one encounters in the real world.

David J. Yanko  
President  
Tristar General, Inc.  
Cleveland, OH 44131

The Gustafson report mentioned compared the apparent feed efficiency of a Tristar Spherical feed, a Chaparral Spherical Feed, and a "standard" McCullough horn (Spherical) feed. Gustafson found the Chaparral a better performer by approximately 1 dB. We questioned that report ourselves since he also found the Tristar feed no better than the standard McCullough feed; and our tests of a Tristar last spring indicated it was superior to

the McCullough feed. Yanko is absolutely correct; a sweeping statement that any single-tested anything (antenna, feed, LNA, receiver) proves that it is better than (or worse than) other similar units is at best a foolish statement. Unless, it makes sound notation of the factors used in the testing process which could have effected the test results obtained. It seems the more equipment evaluation we do, the less sure we are of the results! That is probably a subtle reflection on our maturing as an industry.

## BIRD OPERATIONAL NOTES

**DECISION** by 9th Circuit Court of Appeals, that home use of VCRs recording copyrighted materials is illegal, caught VCR industry by surprise. For TVROs case may set some precedent, or signal areas of attack for those who would legislate or regulate in-home viewing by private terminals. Primary concern, at moment, is that Court specifically makes **manufacturers** of VCR hardware "liable" for assisting users in alleged illegal use. Court noted "(manufacturers) know that the (Betamax) will be used to reproduce copyrighted materials". Extension of "logic" would make TVRO hardware suppliers liable for violation of 605, for same "reason". Appeal of decision certain; for now, everyone is in holding position.

**SAVAC INTERNATIONAL** claims to have a "revolutionary new dish design capable of handling the newly proposed FCC 2 degree spacing for 4 GHz birds". Antenna has four "optically graded surfaces, a plastic-metal surface laminated to the parabolic elements and a metalized 'honeycomb superstructure'." Dish is just over ten feet in size, was used to demonstrate reception during recent teleconference. Firm is located in St. Petersburg, Florida (813/344-1634).

**WESTAR VI** will now be launched in last part of 1983.

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- (E) Single Channel Audio - \$15.00
- (F) AFC and Metering - \$15.00

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Because W-3 will only be three years old at that time, it is unlikely W-6 will replace W-3; rather will seek new orbit position.

**OLD Saturday Night (Live)** programs now being distributed W-3, TR7 by Robert Wold for terrestrial carriage by independent TV stations. Episodes are one hour long, now appearing WGN (TR3, F1) weekdays 11:30 PM eastern.

**LNA-LNC** manufacturer DEXCEL reportedly being purchased by California Microwave; firm that pioneered many types of low-cost radio receive only terminals.

**YET** another buy/sell arrangement involving an LNA supplier. AMPLICA has been purchased by COMSAT General Corp.; effective early January.

**MUCH FEARED** signal "piracy" bill finally spelled out. It's sponsor, Congressman Waxman of California, notes "(the) technology revolution that has brought to us an abundance of telecommunication type services also contains a threat to the continued existence of such services. Any electronics entrepreneur can sell black boxes, decoders, (earth terminals) and unless this trend is contained, the day may arrive when anyone can intercept subscription telecommunication...but there will be no programs left to steal!" Bill is primarily intended to do battle against sale of MDS/STV decoders but substantial provision against improper use of home TVROs is included. SPACE is battling for changes in bill's language.

**CHANNEL MASTER**, which started running with home TVRO ball last May, and then quietly dropped out of sight, re-opened marketing plans with massive NYC news conference. CM judges present TVRO population to be 15,000 home units, expects market to be 15,000 to 20,000 in 1982, and expects market to double each year through 1985. CM also said market will be \$5,000,000,000 by 1985. CM currently has around 150 distributors signed for product line, offers 10 an 12 foot antennas, LNA, cable, KLM manufactured receiver and LNAs (100 or 120) in \$6-\$7,600 (list) price region.

**WHEN SATCOM V** begins operations at 139 west, there will be as many as six TV channels for Alaskan Instructional TV System operating. FCC has approved 93 low-power TV (LPTV) station network for Alaska, to be tied together by SATCOM V and by six regional uplinks spread throughout state. Programming will seldom make you laugh; intended to be instructional, up to 18 hours daily, from pre-school through 12th grade.

**COMSAT** asking for permission to send US TV programs to Australia on **daily basis** with new INTELSAT uplink at Santa Paula, CA, and new receiving terminal at Moree, Australia.

**ABC's** new partnership cable programming, with Hearst, will debut in mid-March and be called DAYTIME. Service will run 1 PM to 5 PM (eastern) on F3R.

**PENTHOUSE's** PET television service, to be distributed via Westar 1 (TR3), getting a late start. Blaming program production delays, service originally scheduled to begin mid-October, slipped into November and may slip further. It

promises to be a "fresh" (new) service when it hits; will move to Westar V late in 1982.

**SORRY JOHN!** John Cornell, known to many of us, tried to put an LPTV station on the air at Southern Pines, NC. The FCC received Cornell's application this past March, but it was "frozen" with the rest. Undaunted, Cornell reportedly activated on channel 7 retransmitting The Movie Channel and ESPN, via his home TVRO, on October 15th. On October 23rd FCC field personnel shut him down, and levied a \$2,000 fine. Cornell thus becomes the first LPTV station to be operational, and, the first to be shut down by the FCC. Sorry John!

**RCA SATCOM IV** may be a real mess. Of 24 transponders, 2 are being set aside for occasional feeds. Nine transponders will be taken by firms who now hold similar slots on D1/D2. Seven more are in an RCA "auction-off" process. And that leaves 6 unaccounted for; RCA says they are thinking about how to use those remaining. Four of the 24 will be 8.5 watts per transponder; the balance 5.5 watts (up from nominal 5.0 watts on F1 and F2).

**MICRODYNE** offering "kit" to retrofit 4 GHz antenna/LNA/receiver systems for direct 12 GHz reception. Included is new feed for 12 GHz, LNC that has output at 4 GHz so existing LNA and receiver can be used as final part of dual band system. Not cheap; nearly \$10,000.

**LATEST SATCOM** blast off dates; 3R was to have gone **November 19th**, F4 now expected to leave pad **January 12th**. If mid-late November date worked, earliest F3R activity will be shortly after first of year. F4, meanwhile, may be April 1 before it becomes operational.

**ATT** dealt blow by FCC. Telco had always insisted that anyone using COMSAT birds must **also use** ATT up and downlinks. FCC found this practice discriminatory, has ordered ATT to make birds available to anyone who can pay the tariffs, regardless of who provides up and downlinks.

**TED TURNER** may have pulled off another coup. Turner's new CNN-2, due to start up January 1, has reached agreement with Warner-Amex to use WA transponder 15 on F1, and a similar transponder on F3R when the new bird is activated. That puts both CNN services on "primary cable bird", and gives Turner a big edge on upstart ABC-Westinghouse venture due to debut later in the Spring on Westar IV. Turner's 7 to 11 PM coverage will be in one hour news blocks, balance of day (EST) will be in 30 minute "blocks". Agreement with WA is for two years, which is an eternity in this business.

**Bonneville** Satellite Corp. will be using WESTAR TR5 on W1 for yet to be announced cable programming, shifting to TR1, W4 by mid-82. When Southern Pacific SPACENET bird launches 1984, Bonneville will use three full transponders there for yet-unannounced services.

**ITT** will preview all digital TV receivers/monitors late in 1982. Using "VLSI" technology, full receivers will have equivalent to 140,000 (plus) transistors with analog to digital and digital to analog conversions. Best part of procedure is

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that NTSC to PAL/SECAM conversion, **with in set**, is relatively simple offering prospect of true single-receiver with **all-standards worldwide** operation.

**DISNEY** may finally jump into cable programming by signing deal with Group W for partial programming responsibility for one of the ten video transponders Group W will use on Westar 4 and 5.

**NEC** America showing off a new digital video transmission system that compresses a pair of video signals into standard 0-4.5 MHz baseband-width; and automatically time-base corrects each output channel at receiver end. NEC calls system "DV-10", and claims it is first "two for one" video system developed which does **not result** in picture resolution loss. If it really works, firms such as HBO could double up two feeds on a single transponder, save big bucks in satellite transponder rentals and get "scrambling" in process. No word yet on cost of receive end decoder, from NEC, although one source puts it at over \$50,000 per location. If that is a correct price, cable won't be interested.

**ON January 1**, HTN will expand to a second service 12 hours per day; all G or PG rated, seven days per week. HTN continues to feed one feature per night on F1, TR21 but stopped service on W3, TR7.

**AFTER** announcement of ABC/Group W marriage for new competitive-to-CNN news service, to begin on Westar 4 this coming spring, ABC has done it again. This time "partner" will be Getty Oil, major owner of ESPN. The service will be a part of ESPN and they hope to find 12 events per year (one per month average) to "lift" out of ESPN, and offer only to those cable homes willing to pay "extra" for single event. ABC seen as hedging bet that many major sporting events in future will **leave** regular commercial networks and end up on "pay TV".

**ROUND ONE** Of legal fight between WGN and their common carrier, United Video, ends with UV winning. WGN wanted to use its own vertical interval to transmit text data to WGN owned cable systems. UV was already stripping out WGN vertical interval data, and planning to use interval for transmission of its own text service. WGN took UV to court...and lost. WGN will appeal.

**CBN**, transponder 8, F1, trying to move from religious to "secular" network status, has FCC blessing. CBN needed to get waiver of FCC rules limiting number of hours per week affiliates could carry programs, without whole operation being called a "network". FCC approved waiver and CBN now shooting for national network of its own, using TR8 on F1.

**ARGUMENTS** over whether 3 meter dishes will handle FCC's proposed 2 or 3 degree bird to bird spacing back in headlines again. National Cable Television Association now joins forces with RCA to provide hard engineering data which both claim shows that "quality reception with three meter (10 foot) dishes, if the FCC elects to space satellites 3 degrees apart, is impossible". FCC now studying both 2 and 3 degree spacing, is expected to approve one or the other before end

of 1982.

**WESTAR 3** will be the bird to carry new Rockefeller Center / RCA Entertainment service when it begins service early in 1982. This gives Westar 3 the following **cable line-up**:

**TR1** (probable) / RCA Entertainment Channel; **TR5** / Private Screenings; **TR6** / CBS Cable; **TR7** / Home Theater Network; **TR9** / Satellite Program Network; **TR11** / CNN-2; **TR12** / Eternal Word Television Network.

Additionally, transponders 2, 3 and 8 are in regular video use, 10 used by ABC for backup news feeds. With **WESTAR 4** and 5 planned for 1982 launches, and Group W taking first 5 and then 10 transponders on these two new (24 channel) birds, many are wondering if the balance of the cable programming now scheduled, for Westar 3, will move to one or both of these new Westar birds.

**FCC** is not exactly standing still while pot boils on question of who is liable, for what, when a private terminal tunes in a transmission for which it does not have viewing authority. FCC asking Congress for permission to increase forfeitures they can levy against rule violators (i.e. Section 605), from present \$2,000 limit to \$100,000 (!) limit. Language would also change, making it **possible** for Commission to levy fines against anyone who "causes, aides or abets violators". **Some interpret this to possibly include** the sale and installation of terminals, when the seller does not provide clear instruction to the buyer as to what the buyer can or cannot tune-in, without liability. **Dealers beware:** make sure your customers have printed instructions from you, outlining exactly which transponders, on which satellites, they can watch, without permission or charges.

**FAILURE.** Enterprise Radio, operated by several ESPN founders, a national satellite fed all-sports network has closed doors and returned pair of Westar 3 SCPC channels to Associated Press. They ran out of money.

**SECOND** 12 GHz SBS satellite went into operation without hitch. SBS now has new worry, with SBS-3 coming up fast. Do they have more transponder capacity than they can sell???

**INTELSAT** scheduled to move IV-A bird to 53 degrees west this month. This bird will provide potential interim "DBS" service to Mexico, using spotbeam as well as Mexico-to-Mexico links for new national satellite fed TV network being put together for Televisa Cadena (XEW-TV). Televisa now leasing, through Intelsat, transponder 3 on Westar 3. Some suggest this W-3 transponder may be dropped by XEW, after IV-A becomes operational; freeing up W-3 TR3 for use by **another US cable oriented** firm.

**FCC** took first step to free up delivery of US Domestic satellite signal programs to off-shore areas (such as Canada, Bermuda, et al). In approving use of domestic satellites for this purpose, Commission cited "efficient, low cost services" available on US DOMSATs as opposed to INTELSAT's big buck rates and marginal signal levels. **However**, applicants approved must now go to INTELSAT to request service and

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service and obtain formal denial from INTELSAT, or get statement that INTELSAT will not suffer economic losses by allowing applicant to use DOMSATs, before FCC approval becomes final for each applicant. FCC action welcome, but there is plenty of legal work and nail biting ahead for any programmer who thinks he will automatically be delivering to Mexico or elsewhere in the near future.

**INTELSAT** response to FCC decision to open up US DOMSATs for "transborder users" was to file "domestic tariff" at FCC requesting permission to serve general North American market. They hope to use newly moved IVA bird currently slated for Mexican use, at 53° west, and will charge around \$1.2 million per year for 24 hour per day transponder use.

**WORD** from Brasil is that BrasilSat, on again / off again, now plans 1985 launch of two birds with third as on-ground spare. These will be 4 GHz birds, with 34-36 dBw contours over Brasil and much of northern South America; in Portuguese language.

**NEC 24** channel receiver now available in limited quantity in US; priced around \$2,200. Contact NEC Broadcast at (312)640-3792. This is first, all Japanese, TVRO receiver product to be sold in USA.

**FIND THE NEEDLE?** Japanese thinking about designing 50 GHz up / 40 GHz down satellites with 60 watt output at 40 GHz. Because of extremely high cloud/rain losses, they admit downlink antennas would need to be 10 meters in size. That's rough equivalent of 40 meter dish at 4 GHz, and, can you imagine antenna aiming problems that would produce!

**CANADA'S TELESAT** reports ANIK-C bird has left Canadian test lab, is now at Hughes for additional checkout procedures. Bird scheduled to launch during last four months of 1982; will be 12 GHz service only.

**IF YOU** want permission to carry Moscow's Ghorizont transmissions, you can get it. Just write to Radio Moscow, P. O. Box 88, Moscow, USSR. They are now granting permission to "cable operators" to carry their television programs. Another quick-access route; contact Soviet Embassy in Washington, DC. Cable operators in Holland, now using Ghorizont signals, report they have been told Russians are **considering** offering "sub-titling in Dutch". That could get kind of messy if numerous cable firms, in different countries all speaking **different** languages, sought such "service". Unless sub-titling was done on discrete subcarriers, traditional "titling-over" could fill screen with multi-language translations!

**MUSIC TELEVISION** (MTV) service transponder 11 has been suffering periodic problems; it could be their uplink transmitter running down, or, worse yet it may be transponder 11 is having problems. RCA is long overdue to lose a transponder...or two, on F1.

**FCC** whittled number of DBS applications approved down to nine; throwing out 5 they said did not meet application criteria. The next phase of "study" will take us through early January.

**INN NEWS** feeds to indie stations now three per day, all fed initially on Westar 2, transponder 2.

**RECENT AWACS** rhubarb spilling over into proposed Arabsat deal, which is under contract to combined French

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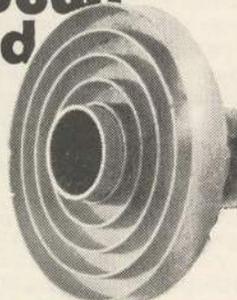
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Areospace and Hughes combine. Those who lost AWACS fight now contending Arabsat will place valuable military satellite communications directly into hands of unfriendly nations, including Libya. Approval of US Department of State being held up, pending full investigation.

**EIRP** for forthcoming (late 1984) Columbian twin-C band bird satellite system set at 35.6 dBw at boresight, 24 transponders, including several for television.

**SCIENTIFIC ATLANTA** now reportedly shipping 300 TVRO terminals in typical month; including CTAV, MATV and Zenith-Heathkit packages. They claim to be largest, but truth is that several **home terminal** suppliers are in same league. SA also about to announce 12 GHz terminals, using basic Zenith-Heathkit 4 GHz package with 12 GHz "front end". Price will be high, at first.

**MA BELL** now asking FCC for expedited permission to launch **another** 24 channel bird for television; claims it has hard orders for 5 video transponders on COMSTAR D3, cannot presently accommodate additional video users, and notes it has requests for service from an additional **60** full and part time channel users.

## REMEMBER -

The October, 1981 issue of **CSD** (page **T5**) contained a special terminal operator reporting form to be used by you in reporting your reception quality on **F3R** after RCA makes the shift from F1 to F3R. If you do not have a copy of this form, please write to **CSD** for a copy today. **CSD, P. O. Box G, Arcadia, Oklahoma 73007**. From the reports filed, a very detailed analysis of F3R operations will be in the first available **CSD**!

**COOP'S BASIC MANUAL** - This is the brand new STTI Manual that is devoted entirely to the fundamentals of designing and installing a top performing private satellite terminal. What you **MUST DO** to get peak performance, on every transponder, all of the time. The little things nobody ever tells you about. Stuff you need to know!

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**GIBSON SATELLITE NAVIGATION** - The first time you try to find a satellite you will wish you had this Manual. Author Steve Gibson boils down the complicated world of navigating your satellite dish through the skies to several easy to understand and follow "basic" steps. And if you want a computer interface to your dish tracking controls, that's here too!

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**COOP'S SATELLITE OPERATIONS** - Users tell us this is the most useful Manual they have in their libraries. The whole complete world of who transmits what, where and when, is uncovered for you. From Anchorage (Alaska) radio stations to NBC executive "intercom" lines, it's all here. With instructions for tuning in those many "hidden services" carried by satellite.

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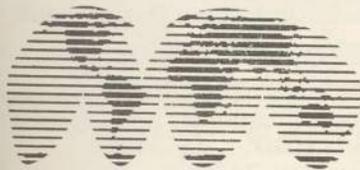
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- **VCR COMPATIBLE** - Video and audio levels allow use of your VCR as a modulator, providing immediate recording without cable changes when desired.
- **DESIGNED FOR RELIABILITY** - Careful cost/performance balance to insure continued quality reception.

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  - 120° LNA
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  - No Special Tools Needed
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U.P.S. Shipable anywhere in USA.



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Scan-tuned, multiple audio sub-carriers, local or remote control, superior threshold performance, full metering, double conversion of course. And available exclusively from Starview Systems. in stock for immediate delivery.

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## New Low Pricing

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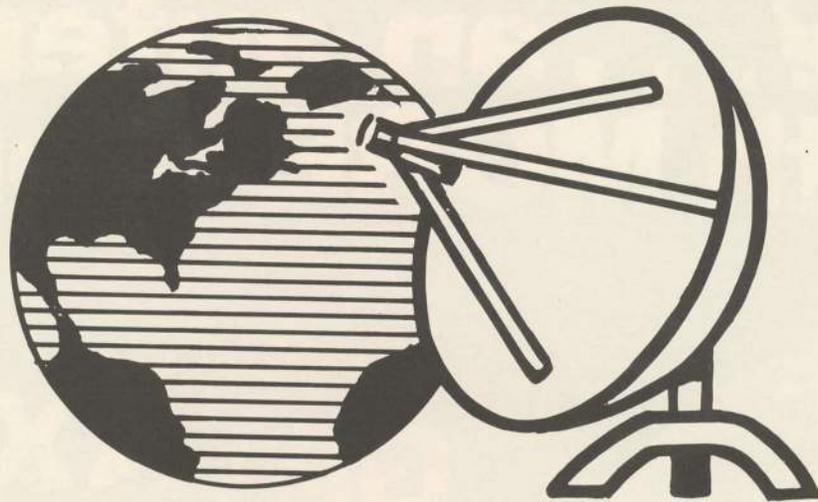
Get in on the ground floor as a TVRO dealer in your area! Starview Systems provides you with everything you need; professional instruction plus the finest mobile sales terminal on the road today. Included is a 10 foot Starview parabolic equipped with rotating feedhorn, Avantek 120 degree K LNA, top of the line Starview 24 channel tuneable receiver, 75' of coaxial and connection cables plus a trailer to get you to the demo site and operational in 30 minutes time. And the price? An unbelievably low **\$4800.00**



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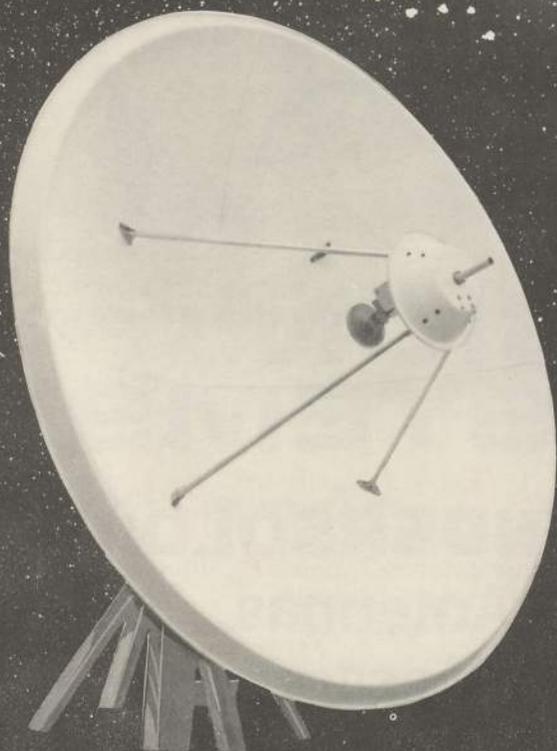
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SatFinder...the people who pioneered the first quality rotatable receiving satellite system...the system that rotates through all satellites, not just 20 channels...the system that eliminated gear and switch adjustment and the use of bulky motors and heavy wires...

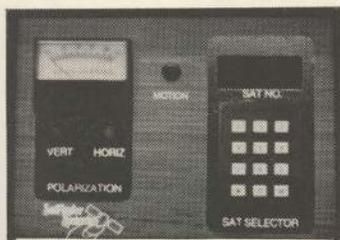


SS-3 HAND ROTATABLE ANTENNA PACKAGE NOW ONLY \$2895.00 WITH SATFINDER ELECTRONIC ROTATION PACKAGE \$3995.00

**COMPARE OUR 10' DISH TO ANY 13' DISH**

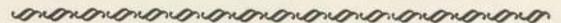
**SATFINDER...THE SYSTEM THAT PUT THE STARS AT YOUR FINGERTIPS WITH JUST THE TOUCH OF A BUTTON BRINGS YOU AN ANTENNA SYSTEM FOR UNDER \$3,000.00**

Our new 23,000 square feet manufacturing facility enables us to give you the SatFinder quality you have seen and read about at this incredible new price. Now you too can afford the system that has been called "the Cadillac of the industry".



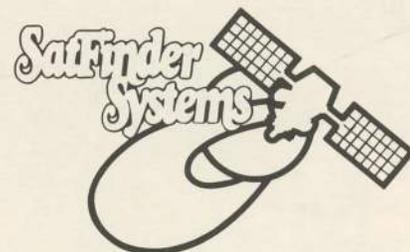
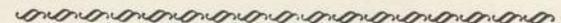
SatFinder command control allows you to instantly select any satellite you choose with just a touch and is easily programmed for future satellites.

**AVAILABLE IN:**  
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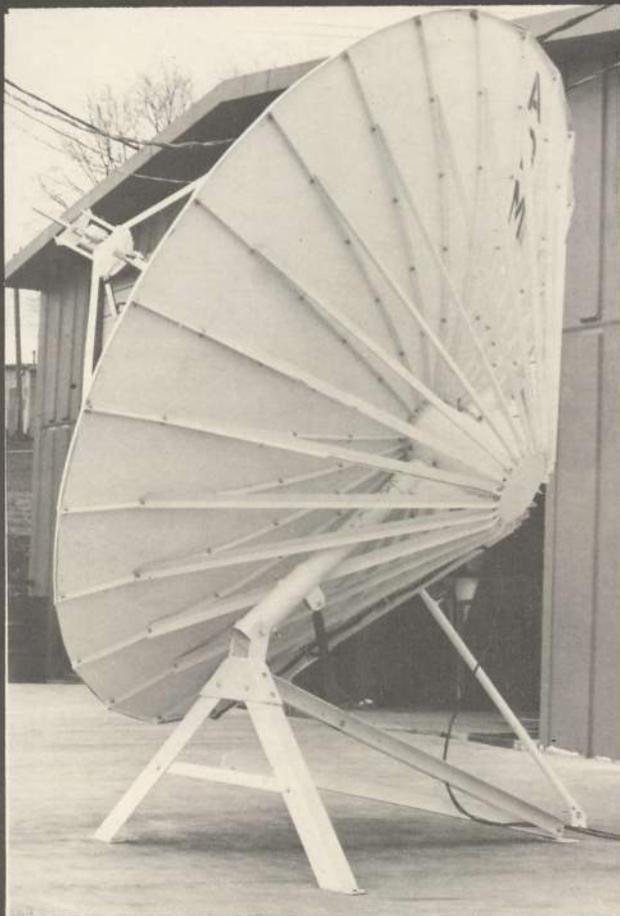


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You must be completely satisfied with the performance and ease of installation or your money back.



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# AVCOM QUALITY YOU CAN DEPEND ON

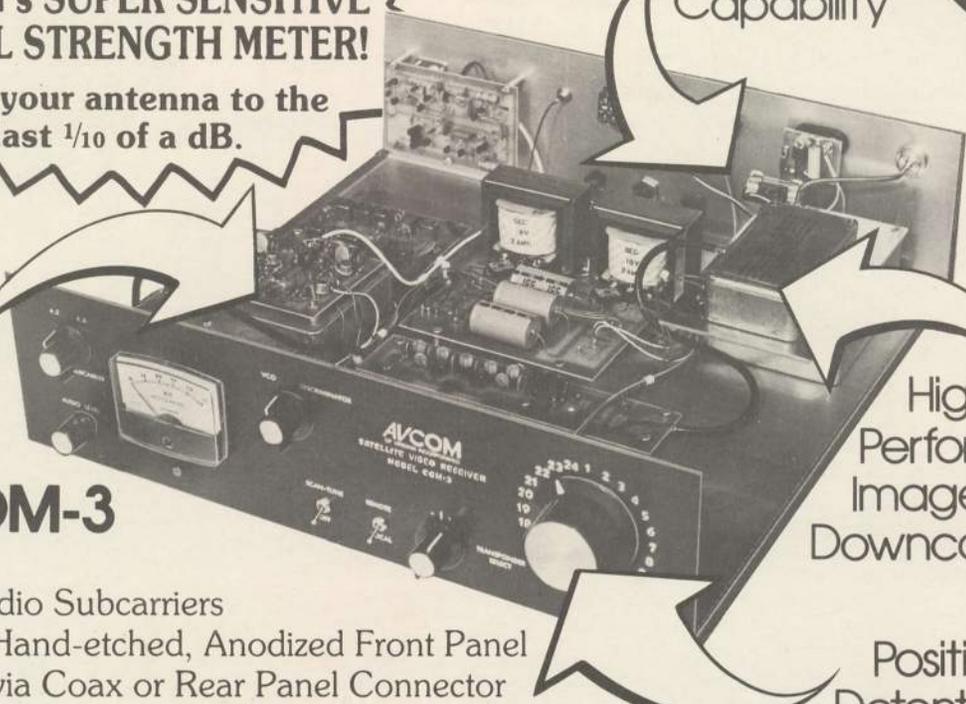
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- Up to Six Audio Subcarriers
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- LNA Power via Coax or Rear Panel Connector
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with jack for remote meter

### AVCOM

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- Quality Construction
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COM-3R complete with REMOTE CONTROL UNIT

Everything you need for your complete  
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# Wilson Microwave Systems



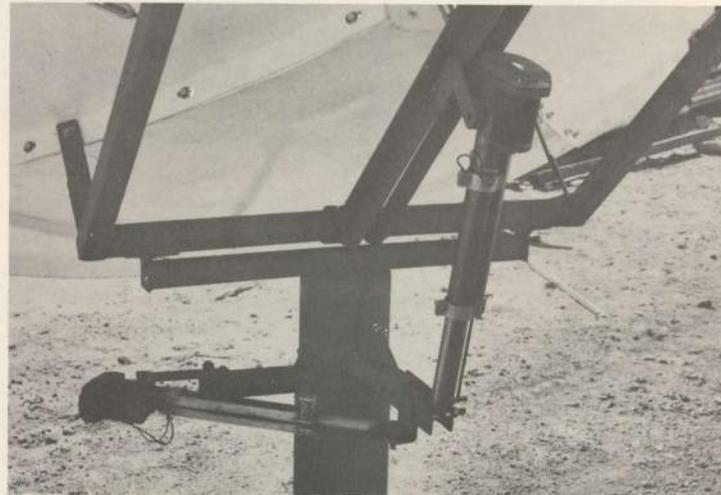
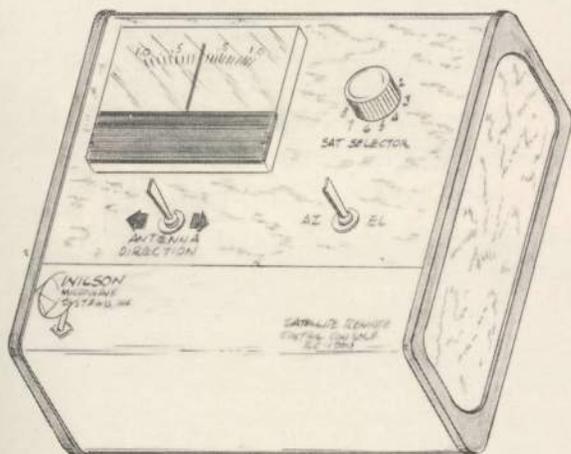
Wilson Microwave Systems uses the latest state of the art method of manufacturing the parabolic designed antenna. Resistance to distortion and instability is increased with the addition of a full screen mesh sealed within the 1/4" thick fiberglass.

Wilson's unique "Vari-Mount" provides the easiest installation and mounting method available today. The 4pc construction of the dish provides easier handling, less installation time, and greatly reduced shipping costs.

With the exclusive 4 point Williams' mount, you are assured a quicker installation and that the antenna will be more securely fastened to the Vari-Mount. The antenna struts aid in stabilizing the fiberglass for operational reception in winds of up to 50 - 60 MPH.

A ball bearing race allows easy turning of the antenna in changing to the different satellites. A scale is included on the base to assist in their location.

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Wilson can now supply you with a complete system for turnkey operation that includes everything that is required for installation. The package includes the fiberglass 11' antenna featured above, receiver, 120° LNA, modulator, and all cables required. Many options are available.

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A top quality satellite antenna unit. Manufactured in the center of the U.S.A. for low freight cost. Two piece fiberglass reflector, packed for easy handling.

- 10 foot diameter • Feed horn • Rotor • LNA mount
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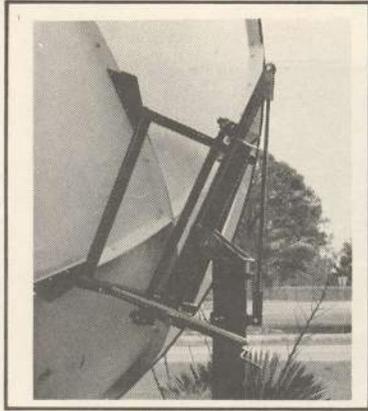
**SPACE ANTENNAS, INC.**

Suite 1036-38 127 West 10th Street Kansas City, MO 64105

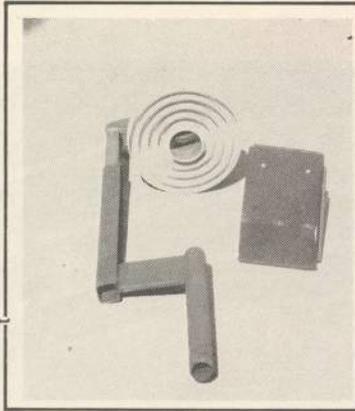
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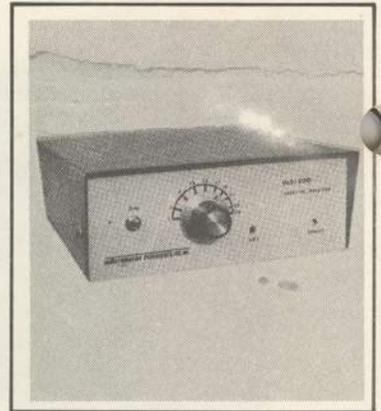
**POLAR MOUNT**



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**LNA MOUNT & ROTOR**



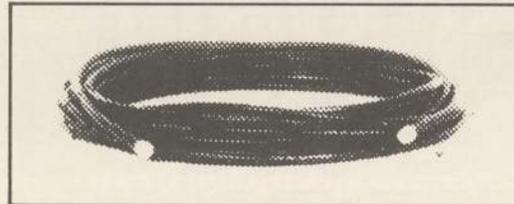
**GLR-500 RECEIVER**



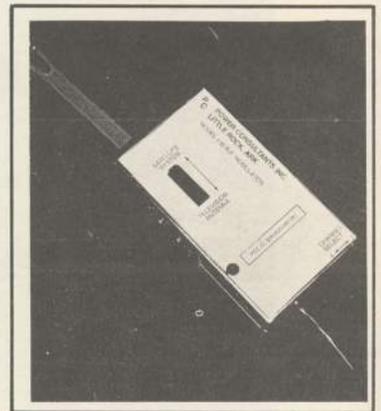
**10 FT. DISH**

**\$2895**

**10 LOT • F.O.B. LITTLE ROCK, AR**

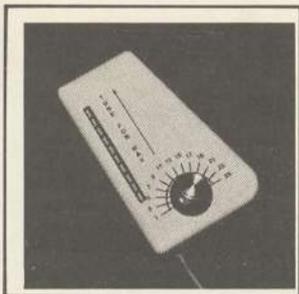


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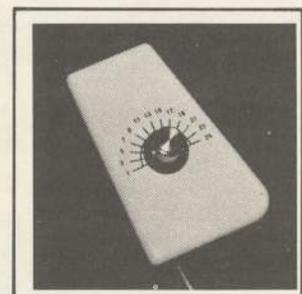
**Built-In LED Signal Strength Meter**

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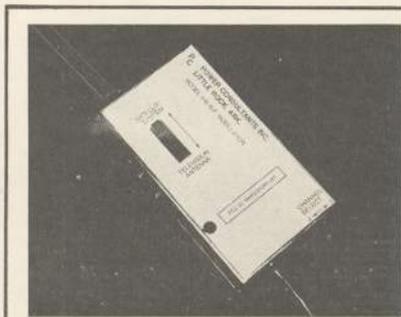
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**RPM-500 Replacement at One-HALF dealer cost.**



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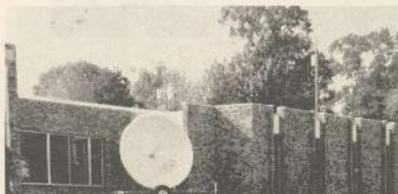
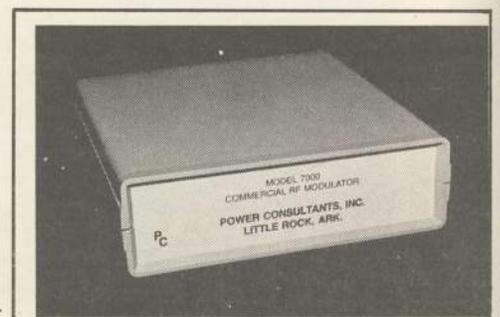
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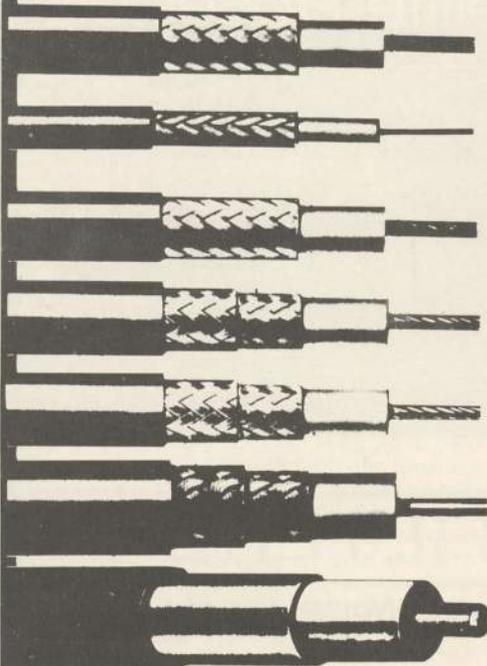
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	Nominal Loss Per 100 @		Unit Price	
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RG 214/U-S	19.0 DB	28.0 DB	1.45/ft.	1.37/ft.
RG 214/U-T	19.0 DB	28.0 DB	.66/ft.	.59/ft.
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- Matrix or Dematrix selection (model SSP 312 only)
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SPECIFICATIONS		TYP.
GAIN		50dB
CHANNEL SEPARATION		47dB
HARMONIC DISTORTION	Stereo	.06%
	Monaural	.08%
FREQUENCY RESPONSE	Multiplex	20Hz to 10kHz
	Matrix	20Hz to 20kHz
	Wide dev.	300kHz
BANDWIDTH	Narrow dev.	150kHz (SSP 312)
	TUNING RANGE	5.5MHz to 8.5MHz
DIMENSIONS	W/H/D	9" x 2 1/2" x 8 1/2"
	Weight	3 lbs.

**Arunta Engineering Co.**

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## EARTH STATION FILTERS

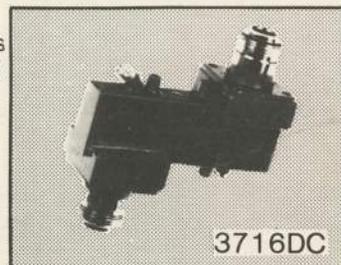
### To Eliminate Terrestrial Interference and Noise



3217LS

- Terrestrial Interference Trap 3217LS is connected after your down converter to 70 MHz IF.
- Eliminates picture sparklies and wipeouts due to microwave telephone signals on your transponder
- Connect 3217LS - 60 MHz and 3217LS - 80 MHz in series and forget the problem for **any** transponder channel.
- We can also supply traps for receivers of different IF frequencies.

- Improve picture clarity (better signal - to noise ratio) with Filter 3716DC which passes the full 3.7-4.2 GHz transponder band with less than 1.0 db loss and suppresses out of band noise. Has LNA power insertion terminal.
- Also suppresses the image band (1.8-2.3 GHz) at least 50 db.
- This small interdigital filter takes up only 2.5 cubic inches of equipment space, has type N input and output option N or SMA.



3716DC

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## COOP'S COMMENT ON PROGRAMMING

### FAIR RATE - REVISITED

In our October "Comment on Technology" we reviewed a suggested private home CNN "viewing fee" of \$75 per year. We noted that SPACE, through General Counsel Brown, termed the fee outrageous. In commenting on our overview of this situation, later in October, Brown wrote that our remarks "caught... (him) by surprise". Brown writes regularly within the pages of "INSIDE SPACE", a weekly newsletter circulated to high-dollar SPACE supporters.

Brown's primary concern appears to be his "surprise" that we would make a comment on this issue since we are on the board of directors for SPACE, and (as he notes) "We will not be able to negotiate as an industry if the Board of Directors does not collectively support **one point** of view".

Our October "Comment" said the \$75 per year fee is "probably...not a fair rate". But, we noted that this rate is not for one home; it is for any number of homes between 1 and 30. We further suggested that SPACE has an opportunity here to re-negotiate the fee in two separate ways: (1) Modify it so that it is a rate for "30 years for a single subscriber", or, (2) better yet, let SPACE "purchase" these \$75 "blocks" and then "resell" them through SPACE member dealers and distributors to 30 individual viewing homes for (we suggested) \$150 each. That's the same as \$5 per year per home, and in the process, SPACE generates funds (\$75 for SPACE per block "resold"), which it much needs.

**Brown spends a page** within "INSIDE SPACE" arguing for "solidarity" within the industry "during an incredibly sensitive stage of our growth". In effect he is really saying that his office and only his office should be given "the right" to comment on matters in negotiation, and before the industry.

Last summer I prepared, wrote and set into type a rather lengthy overview of SPACE's problems with obtaining adequate funding to operate. As a matter of courtesy I sent a copy of that report on to then-SPACE-President Taylor Howard, prior to publication. The report was critical of a nearly quarter of a million dollar budget Brown proposed to SPACE members, and his suggested approach to raising that amount of money. Howard pleaded that while he agreed totally with my overview, he felt a public discussion of SPACE funding problems with a proposed budget would not help him get SPACE's funding problems resolved. He asked that I not print the overview at **that point** in time, and I agreed in the interest of solidarity.

I may have set a dangerous precedent by backing off on that report since apparently Brown perceives that his office and only his office should have any "comments to make" about matters of interest to the industry. To back up his posture, he asks SPACE Directors to give him written agreement on his own position.

Now Brown and I go back a number of years. Between 1975 and 1978 we worked together; I as Executive Director, he as Washington Counsel, for a cable television trade association, I initiated (CATA; Community Antenna Television Association). I ran the office, created the meetings and wrote and published the association's journal "CATJ". Rick quarterbacked the CATA positions before Congress and the FCC. **We both learned** that if there is a weak Board of Directors and/or a busy President, **we** as staff members could create a day to day policy as we saw fit. We also learned how, through an association trade journal (CATJ), we could magnify, or shrink "issues of importance", and mold them to suit our needs.

This time around things are slightly different. **CSD** is not SPACE's trade journal, and while I serve on the Board I judge my **independent** position as publisher of **CSD** to be of far greater importance than my Board position. There have been, are, and will continue to be many-many instances where Brown created SPACE "positions" on issues will be contrary to my own position. I intend to retain my independent view because it serves the industry to have a "check and balance system" operating. I also have this thing for the First Amendment, and the right of the press to speak out when it perceives a need to do so.

I introduced the industry to Brown (and vice versa) at the 1980 Miami SPTS, because I knew and respected his brand of "hard ball". From that introduction, SPACE has formed. SPACE needs his brand of hard ball right now, and it serves our needs to have Rick Brown doing the **one thing** he does so effectively; lobbying for a position in Washington. The industry also needs healthy debate, constructive review of our own actions and a greater degree of intra-industry participation in the whole process. Let's try to keep this balance intact.

C  
S  
D

PROGRAMMING



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## CANADA MOVES TO FREE UP TERMINALS

### CANADIAN AUTHORITIES GIVE UP?

As those who have followed the saga of TVRO development in Canada, through the pages of **CSD**, know well...it has been a long and sometimes rocky road. Per capita, there are undoubtedly more private TVRO terminals in Canada than in any country on earth. In the far northern areas of Canada, TVRO terminals are the only link with the outside world, and the remainder of Canada.

And as readers are aware, most Canadian terminals either are fixed on F1 (a USA satellite), or, spend a great deal of their time resting on F1. The Canadian courts (see **CSD** for June, July 1981) have had their share of cases wherein both US and Canadian authorities have attempted to put the quash on "illegal trans-border viewing", by Canadians, of US satellite signals. HBO (et al) pursued a Canadian apartment complex into a British Columbia court this past spring, after the Canadian Mounties engaged in a bit of sleuthing that resulted in the shutting down of a complex terminal offering four US signals to more than 600 apartments. The Canadian court found the apartment complex **not guilty**.

The subject is complex, as we investigated in great detail last April here in **CSD**. A now ten year old "exchange of letters" between US and Canadian authorities has been proclaimed as "law" in this area. The background behind the exchange of letters suggests that US authorities badgered Canada into agreeing that Canada would not grant permission to US viewers to watch Canadian satellite signals, only after the US threatened to take away US launching facilities for Canadian satellites just as ANIK I was on the pad ready for blast off.

In Canada, the "spread" of US satellite signals has been happening on three fronts. First there was the community-shared terminal. The very first terminal in Canada, installed back in the summer of 1977, pumped WTBS into a cable television system in the Canadian Yukon. That episode lasted only three days before the authorities shut it down (**CSD**, June 1980). Since that time non-authorized (i.e. "illegal") Canadian terminals have "shared" F1 reception with whole communities in a variety of ways. Some estimate there are no fewer than 50 Canadian cable-type systems serving full (although usually small) communities, and no fewer than 200 (!) low power broadcasting stations doing the same thing. To that first "category" of "illegal" re-users of American F1 television product one must then add the recent development of Canadian apartment/motel/hotel systems. This group, **in particular**, has the US program suppliers exceedingly concerned. "Name brand" chains, such as Ramada Inns, are on an individual motel basis sticking in terminals and distributing premium US programs to clientele. Finally, there are the individual private terminals, now estimated to number between 3,000 and 5,000 depending upon your source of (mis)information.

The Canadian terrestrial television system is far more responsive to small pockets of people than the US has been. There are hundreds of low power TV relay/translator stations operated by the CBC and other Canadian broadcasters, spotted throughout the rural areas, to insure that these people-pockets have access to **at least** a single television channel. That "response" may be part of the Canadian problem. In the southern areas of Canada, cable television (bringing in US terrestrial signals) now reaches into nearly 55% of all homes. That's impressive. It impresses the rural and far northern Canadians in a negative way. They have a single channel (if any channel) of CBC television, while their cousins in the south have 20 or 30 channels of television including US network and independent service. The satellite, to them, makes it possible for them to have similar types of service and rural/northern Canadians have never been particularly impressed by rules and regulations and laws, adopted "in the south" or the "metropolitan regions", which "deny" them access to something the southern cousins have available.

There is, literally, a "Television Revolution" going on here. And into this fray has jumped the Provincial governments. The roots of this fray actually trace into two distinctly different segments of Canada. The rural and/or northern regions have their claims to "equal service". They are an independent people who feel their remoteness should not be a penalty in receiving wide access to communications. Then there are the southern cable system operators, a powerful political force, who have to date been denied legal access to either US satellite signals or to "pay/premium" television services. As successful as Canadian cable has been, it has not yet begun to offer any HBO-type of service; because the federal government has not yet approved a **national** pay TV policy.

The two groups, with different motivations, have come together in the limelight because of satellite services available over much of Canada from US satellites. The Canadian national government, or the Canadian Provincial agencies have to settle this.

**The provinces claim** they have the right to regulate all cable television. They stake this claim on their existing exclusive regulation of telephone services and systems, and make the notation that cable television is "just like telephone circuits" since both are "closed circuit". The federal government, meanwhile, claims that on the issue of pay television (i.e. premium) channels, **they** have authority. They back this up by noting that they and they alone regulate the carriage of **signals** by Canadian cable, and they add that any successful pay television system in Canada would have to be conditioned upon a nationwide system (i.e. a Canadian version of HBO). Everyone knows that the only economical way to have a national pay service is to use satellites. And yes, satellites **are regulated** by the **federal** government.

The regulatory agency, CRTC, suggests that not one but perhaps two "national pay services" should be authorized. There is a serious battle on-going as to how these services might be structured. Quebec wants them to have high French content. Federal Canadian authorities want them to have a high percentage of "Canadian" content; some suggest as much as 80% of what is shown on "pay TV" should be created in Canada, as an incentive to Canadian performing arts and theater. The more practical Canadian cable operators privately suggest that if 80% of the content is "made in Canada" the pay service will have a difficult time getting "off the ground" when viewers have an alternative; American premium service via satellite.

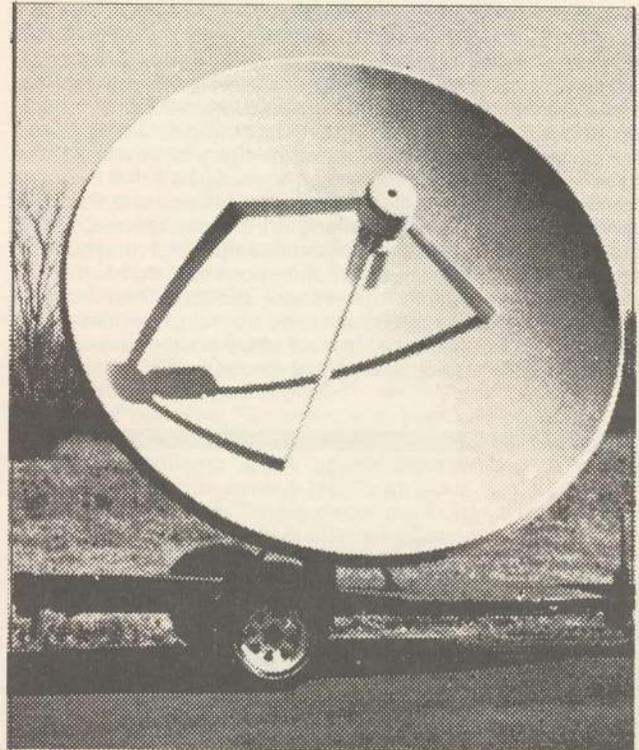
Which brings us back to the issue closest to our hearts; private and not-so-private terminals in Canada. Communications Minister Francis Fox has bounced back and forth on this one for more than a year. In October of 1980, he took to (inter)national television to proclaim that **any** (including those at private homes) TVRO terminals were illegal, **and would be shut down by Canadian authorities**. Rural and northern

Canadians dared him to try it. British Columbia's Pat McGeer proclaimed that Fox could start with a terminal he installed on the grounds of the BC Parliament. After losing the round in BC court with an apartment complex, Fox began to see the writing on the wall. At a September meeting of Provincial Communication Ministers, Fox did a turn around. He decided "...everyone should be allowed to buy and use earth stations to pick up satellite signals for **private** use...". Out of all of this has advanced yet another "new policy". It states:

- 1) Broadcasters, licensed by the CRTC, would be required to obtain a CRTC receiving license for receive only terminals;
- 2) Unlicensed "broadcasters" (i.e. TV operations located in logging camps and other remote areas) would not be required to obtain a TVRO license;
- 3) Individuals operating terminals for private use would not require a license, nor could they expect to receive government protection from terrestrial interference sources (i.e. the same type of approach adopted by the FCC in October of 1979).

It has been the plan of Communications Minister Francis Fox that a newly activated ANIK 1/2 system, transmitting four Canadian "super station" signals to northern and remote areas, would get the rural and northern viewers "off the American TV habit". Fox's plan is that if Canada has "suitable alternative viewing", to American satellite signals, on ANIK 1/2, then he can "force" the Canadian viewers to watch Canadian product. CANCOM is the company selected to bring this off, at a charge of \$4 per home served. CANCOM claims they have had "tremendous response" to the program, and report they will serve no fewer than 500 communities with this service, ultimately. This is a four-channel TV service, and it will be scrambled on ANIK 1/2 with the OAK system. On the ground, viewers with the "CANCOM connection" will connect to local (new) cable systems serving far northern communities, or, view the service via local rebroadcasting transmitters. Use of the OAK security system to scramble a service that grosses \$1 per-channel per-month per-location is possibly the greatest example of "security overkill" ever fielded in the history of satellites. But will this Canadian alternative wrench the Canadian community system viewers away from SATCOM F1? Most feel that CANCOM will have a measure of success, but far from total switchover. Many Canadian communities are installing a **second** dish for the CANCOM service, but they will continue to carry at least some American signals also. Fox, sitting in Ottawa where television is abundant, is still having his problems understanding that rural and northern Canadians don't appreciate his "Canada for America" swap. Many editorials in rural and northern newspapers point out that if Fox wants them to watch **only** Canadian television, he should see that southern Canadians **also watch** only Canadian television. In other words, they don't want the short end of the TV stick.

For some years, Fox and his predecessors have held up the infamous Canadian/US accord (see **CSD** for April 1981) as rationale for why Canadian viewers cannot "simply tune in" US satellite signals. That accord, in an exchange of letters but hardly with the force of real law, is now once again under review. Fox and others from Canada are meeting with their US counterparts to develop a more coherent "policy" for "legal use" of so-called "trans-border domestic satellite signals". On the US side of the border, there is intense program supplier interest in being able to expand their market into Canada; **legally**. Much of this hangs on the approval of trans-border service. Its approval will have to come on two fronts; the US FCC and the Canadian CRTC, followed up by an official "treaty" between the two countries on this point. There is a persistent rumor, coming from within the Canadian satellite operation Telesat, that suggests Canadian satellite operators have **already signed** tentative agreements with 12 US satellite program suppliers to allow distribution of their programs throughout Canada on an ANIK bird. The story suggests that these agreements, hinging on approval of



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trans-border negotiations, would go into effect in 1982.

If there is a continuing thread of movement in the Canadian satellite situation, it is this. Private terminals, unlicensed and serving individual homes or logging camps or small communities, have continued to grow without **serious** legal problems, in spite of the best and most fierce government pronouncements to the contrary. Their growth has been so dramatic and so widespread that their presence, contrary to existing law, is actually forcing the law to change, to recognize that they are indeed operating, that they will continue to operate, and that therefore they had best be accepted, and recognized by the Canadian authorities. It is a perfect example that rural people, deprived of an important communications tool, do not have to take what they are offered without protest. Their form of "protest" has been to go ahead and do it anyhow, law or no law. It is an example to keep in mind as US law makers attempt to wrestle with the same family of issues in 1982.

## THUMBNAIL LOOK AT COMSAT DBS

### THE PLAN

The front runner to build, launch and operate a 12 GHz DBS (direct broadcast satellite "system") is COMSTAR, through their subsidiary Satellite Television Company. Their plan, now before the FCC, will come under close scrutiny in the months ahead. STC has asked for permission to begin construction on their system prior to the Regional Administrative Radio Conference, scheduled for 1983, where nations of the western hemisphere will meet to decide which nation will be able to place DBS satellites at which geostationary/Clarke orbit locations. The STC plan calls for four separate satellites, each dedicated to service in a specific US time zone. The basic details of their proposal follow:

**Number of Channels:** Three per satellite.

**Use of Channels:** Channel "A", "Superstar" (major motion pictures, pop concerts, theater specials, family entertainment). Channel "B", "Spectrum" (children's programs, film classics, public affairs, performing arts and cultural attractions). Channel "C" "Viewer's Choice" (Sports, adult education, experimental television including high resolution, theater, lectures).

**Home Equipment Required:** 2.5 foot rooftop antenna, outdoor LNC and IF amplifier, indoor demodulator and addressable descrambler, built-in modulator (channel 3 or 4). **Note:** Large antennas will be practical for "edge-areas", along the fringes of coverage zones.

**Security:** Each receiving location will have an individual addressable code (bit). Each subscriber's bit message will be transmitted on a regular basis, activating the descrambler.

**Sequence:** There will be four operational satellites and two backup satellites when the system is "mature". The eastern time zone satellite will be the first launched and activated.

**Satellite Locations:** Satellites will be operational at 115° W

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**Transmission Parameters:** 72 MHz wide transponders (3 on each satellite) plus guard bands, telemetry channels. Transmission power 185 watts per channel.

**Fees:** Approximately \$25 per month for full three channel service, and equipment leased from STC. **Optional:** User may purchase own equipment and pay programming-only fee in \$14 to \$18 per month region.

**Field Implementation:** STC will contract with local firms, nationwide, to perform field installation and maintenance of receiving units. Special priority is planned for minority owned businesses in this field work and Small Business Administration/SBIC loans are proposed to help such firms get started to handle field installation and service work.

**Operation Hours:** Initial plan calls for 18 hours per day, per channel, with expansion to 24 hours per day after all four time zones are operational.

**Ground Facilities:** Broadcast and control center near Las Vegas, Nevada (chosen because of low annual rainfall thereby reducing uplink power requirements in 17 GHz uplink band) with backup facility at Santa Paula, California.

**Operational Dates:** Totally dependent upon initial approval from FCC, and survival of efforts in Congress and courts to halt system after expected FCC approval. Earliest practical operational date for first satellite (eastern time zone) early 1984. More probable date, late 1984 or early 1985 assuming no long, drawn out legal problems.

**Contacts:** Satellite Television Corporation, 1301 Pennsylvania Avenue N.W. (Suite 1201), Washington, D.C. 20004 (202/626-3600).

**SUBCARRIER  
DETECTION  
SYSTEMS**

**PICK A PAIR**

Recovering the audio subcarriers has not given the private terminal industry any particular problems since Taylor Howard explained his scheme for doing so in the original "Howard Terminal Manual", first released by STT in August of 1979. In that receiver, Taylor used a CA3065 IC as a demodulator (detector) and an LM380 IC for amplification purposes. Most of the receivers that have followed have pursued similar or identical formats.

Many of the early receivers offered, and a fair proportion of those offered today, stick to one or two audio subcarrier demodulators per receiver. The technique is to spot-tune-up a demodulator IC for a specific frequency (such as 6.8 or 6.2 MHz), and then the package detects the audio present in that subcarrier frequency range and delivers same to the output terminals on your receiver. A few of the newer receivers offer either a tuneable audio system (allowing the user to select any audio subcarrier between roughly 5.5 and 8.0 MHz), or the tuneable function in combination with one or more fixed-

tune positions. The arguments for being able to "tune" the subcarrier region are sound (pardon the pun). While 6.8 MHz has long been the so-called "standard" sub-carrier frequency for as long as there has been an RCA F1 bird, over on Westar birds you will find 6.2 MHz in use as a subcarrier as often as not.

Recently, however, a number of new formats have been developed to satisfy individual programming service needs. MTV (Music Television), operated by Warner Communications on F1 transponder 11, is a case in point; and the November ('81) CSD presented an excellent paper by satellite pioneer Steve Gibson on why the MTV system is both unique and enjoyable to "decode" in stereo. Even Quad Stereo! CBS Cable, now operational nightly on Westar 3 transponder 6, offers more conventional stereo by using a pair of subcarriers; 6.8 or 5.8, where the mixture of the two, by the receiving terminal, creates twin channels of audio. Other newer services, scheduled to become operational early in 1982, will also be employing multiple subcarriers for multiple channels of sound. It is still not practical or profitable to produce stereo sound for play through monaural television receivers, but by looping the two or more channels of audio out of a properly equipped satellite receiver, you can drive an external sound system to recapture and play the full multiple channels in your living room. Most television receivers, even the big ticket projection receivers, have notoriously bad sound systems, and as many of us have discovered through the years, even a modest home sound system can dramatically improve the basically tinny sound which one finds with standard TV receiver audio systems.

There are at least three products now on the market which have been designed to increase your enjoyment of satellite television sound, and if the original transmission happens to be in multiple channel stereo, well, so much the better. The first unit on the market (late in 1980) came from International Crystal Manufacturing Company. They call it the ICM

**Tunable Audio.** The more recent units on the market come from Arunta Engineering Co. and there is a pair of units here; the **SSP-310** and the **SSP-312**.

The ICM unit tunes from 5.5 to 8.5 MHz with single knob tuning. You connect an unfiltered video output from your TVRO receiver to the Tunable Audio unit input and from the rear panel jacks you have a selection of monaural output, or, (through a pair of jacks) stereo output. ICM tells you to obtain your TVRO receiver video output, to drive the Tunable Audio unit, **prior to any "filtering"**. That means that most TVRO video outputs have a low pass filter on the video output; a filter which actually chops out any frequencies above say 4.5 or 5.0 MHz. Since the subcarriers ride along, with the demodulated video, **above 5.5 MHz**, it would not do to try to drive this unit with "filtered video" since you will suffer a considerable loss of those subcarrier frequencies in the 5.5+ region. With some receivers on the market (ICM, for example) there is a "subcarrier output" jack on the rear of the receiver. This really means "plug into this jack and you will have the subcarrier region, unfiltered". Lacking this external jack, you have two choices:

- 1) **Go inside the receiver** and locate the spot where the output of the video demodulator feeds a video amplifier. Most video amplifiers have a built-in filtering network, so you want to "tap into" the demodulated video **before** it is amplified (and filtered), bringing it out to your tuneable audio recovery system through a simple extra jack added to the back of the receiver, or through a short length of miniature coaxial cable.
- 2) Or, you can trust that maybe (just, "perhaps") the filtered video coming out of your TVRO receiver is not all that filtered in the first place, and that between low filtering, and, good sensitivity on the part of the tunable audio unit, you can still recover good sound from the subcarriers anyhow.

**It is worth trying the latter**, before you engage in the

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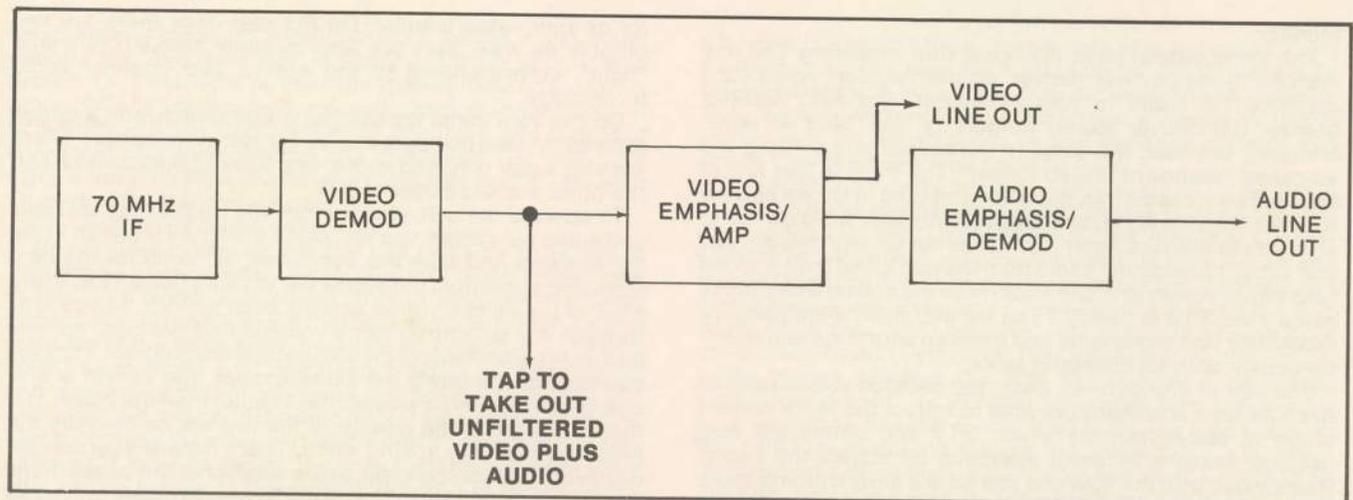
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former. Simply connect a video output from the TVRO receiver and run it into the jack marked subcarrier input on the ICM Tunable Audio unit. Connect a sound system to either the monaural or stereo outputs of the ICM box, and tune the knob. Pick a weak transponder with less than adequate audio, and simply do an A/B comparison. Is the sound noisier through the ICM? If it is, you'll have to go inside to tap off ahead of the video filtering. If it is not noisy (it may even be better than the receiver's own audio system!), you are in business. Now it may be that your TVRO receiver only has a single video output, and even though the Tunable Audio works great, being driven by that video output, you wonder how you can drive it **and** get video to drive your modulator/monitor from a **single** spigot.

**You have two options.** First of all, there are two inputs on the back of the Tunable Audio Unit. One is a common RCA jack, the other is a funny looking jack called "BNC". The BNC should not scare you away; most video stores now stock an adapter that is a BNC male / RCA female. Or, you could simply use a BNC type plug. Now what good will this do, since **both jacks** are labeled "input"? Well, although ICM does not tell you this in their literature, the two jacks are so wired that you can simply call them "loop-through" connections. That is, plug the video coming **from** the TVRO receiver in one (either one) and the line going **to** your modulator/monitor (video) to the other. In "looping through" the two jacks, the Tunable Audio machine gets all of the subcarrier signal it needs, and you still have plenty left over to drive your video modulator/

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The GBS 2000 provides all necessary signals for any of the following procedures:

- RF amplifier alignment
- Second IF and split receiver alignment.
- Energy dispersion processor (EDS) alignment.
- Video systems alignment.
- Audio subcarrier alignment.
- Signal to noise measurements.
- Oscilloscope synchronization.

The GBS 2000 features a master RF output at approximately -30 dBm for TVRO receiver compatibility. There is also a video modulation system for use with any of the standard video tape recorders or video disc players. Complete instructions for these applications are contained in the GBS 2000 user manual.

monitor.

The three output jacks may be a little confusing. The one marked monaural will deliver simple, regular, non-stereo (satellite TV) audio to your modulator. The pair, **marked stereo**, will deliver stereo outputs (a "left" and a "right" channel), provided the satellite transmission is utilizing the so-called "**standard stereo format**". The truth is that few of the new services do this, but when you tune in such a service with the Tunable Audio unit, a front panel light will glow red to alert you to this fact. Again, ICM does not tell you this, but you can extract monaural audio from **that** jack, and then you can take either stereo or mono audio from the stereo jacks, at the same time. This is handy if you want to drive a standard TV modulator (the mono jack) and a stereo sound system simultaneously, without changing jacks.

The pair of Arunta units, designed perhaps subsequent to the ICM unit, and therefore able to reflect the more current bing of stereo formats which MTV and others are now utilizing, takes a different approach all across the board. Remember, with the ICM unit you have a **single** tuning knob, to cover the full 5.5 to 8.5 MHz region. With the Arunta 310 or 312, you have a **pair** of tuning knobs; labeled, appropriately, "A" and "B". The concept here is that because many of the newer sound formats send their stereo by utilizing **two separate** subcarriers, you need to be able to independently tune in **both** subcarriers, if you are going to recover the **pair** (or quad) of channels available.

The 310 is the lesser expensive of the two units, and the one with the fewest features. It is the unit provided to **CSD** for evaluation, and while we would like the opportunity to look separately at the 312, we'll be able here only to touch on it. The 310 is sort of like having two of the ICM units in a single case. You have a pair of inputs marked video; and like the unintentional pair of inputs on the ICM unit, you "loop through" the video from the TVRO receiver; inserting the 310 between your satellite receiver and either your video modula-

tor or your video monitor. On the rear deck there are two outputs as well. They are appropriately marked "left" and "right", corresponding to the normal two channel audio technology.

On the front panel we have an on/off switch, and a switch marked "A" (one position) and "A + B" (second position). There are also a pair of tuning knobs; one marked Subcarrier A and the other marked Subcarrier B.

To operate the unit, after connecting up the loop through, and audio out cables, you first place the A / A+B switch in the "A" position, and tune the Subcarrier "A" knob for the best sounding audio from the subcarrier of your choice. Now in the case of tuning in a stereo service, such as MTV, as you tune through the subcarrier band you will find not one, but two separate audio feeds of the same apparent program. They will sound **approximately** the same, except. The except is that one of the two will be weaker (less audio) than the other. In the case of MTV, the weaker of the two will be near the 6.4 MHz mark on the tuning knob. That's where you set the Subcarrier "A" tuning knob; to the **weaker** of the two carriers. As Steve Gibson pointed out in the November **CSD**, MTV uses a system whereby one of their two channels is made up from the **difference between** the L and R channels; they call this L - R (as in minus) channel. And the other channel is made up from the L + R (as in plus) channels.

Having found the weaker (L - R) channel with Subcarrier "A" tuning, then you switch the front panel switch down to "A + B", and leaving the Subcarrier "A" knob set, you tune the Subcarrier "B" knob for the **louder** of the two. There will be a dramatic difference between the L - R and the L + R and you will have no difficulty telling when you have the two. If the knob calibration is reasonably close, you'll notice (with MTV) that the Subcarrier "B" tuning is resting lower in frequency than the Subcarrier "A" knob.

At this point you have glorious MTV stereo pouring out of the pair of output jacks on the rear panel. You can connect it,

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using jumper cords (RCA fittings) from a local audio store, directly into the auxiliary or tuner input on your stereo system. Or, if you have no immediate plans to listen in stereo, buy an RCA "Y" cord at the local audio store, plugging the twin RCA fittings at the "top" of the "Y" into the L and R output channels, and then feeding the combined L-R and L+R signals from the RCA plug on the bottom of the "Y" into your TV modulator audio input position.

OK - so how do these units work?

We reported briefly on the ICM unit last spring in **CSD**. At the time we were primarily concerned with being able to tune in the extra audio subcarriers then in place on the WGN transponder (3) on F1. Since that time, there has been a major reshuffle of the WGN sub format and we now have a sub with WFMT (fine music) on it, another sub with a fulltime country and western service (news once per hour), and a third sub with a fulltime middle of the road format (news once per hour). This is perhaps the most "fertile" ground for subcarrier tuning, although it is by no means the only such transponder available at the moment. The novelty (frankly) of tuning in the spring-of-'81 crop subcarrier services wore off quite quickly for us, and we packed up the ICM and set it on a shelf. Unless you are a devoted fan of "classical music", WFMT wears thin in a hurry. We move to the beat of steel drums down here in the Caribbean, and in two months of listening, I never heard a single steel drum on WFMT.

After the demonstration of the Arunta unit at SPTS Omaha, and with the recent addition of Music Television, I thought there may be a use for all of that extra audio after all. In the interim, the audio subs on WGN had changed and expanded as noted. So when the Arunta SP-310 arrived, we broke it out of the box and brought the ICM Tunable Audio off the shelf as well.

Both are now in regular service here. Running fulltime, every day; 24 hours per day. I won't tell you exactly how they

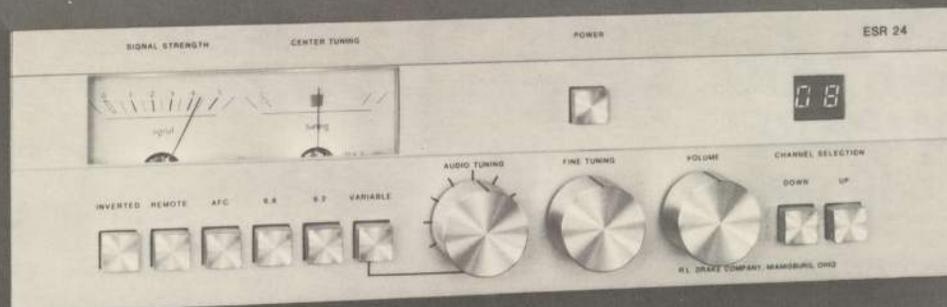
are used, but suffice to say that Susan, who is a country and western music fan, now has a place on her MATV system TV dial where she can have C and W music whenever she wishes. They have been running for more than a month as this is written, and my observations of how well they perform, and where they fall down may be of interest.

The ICM unit drifts; slightly, and you have to reset it a couple of times per day if you want to stay right on top of a service such as the C and W format stuff. It runs in a rather constant environment, with the temperature between 78 and 82 all of the time. That's no big deal; our control room stays in that range all year long. So do our islands. I thought the drift might be in the TVRO receiver, so I switched around on a couple of different receivers. That also gave me the opportunity to see whether the ICM had-to-have a dedicated "subcarrier output", or whether you could take the regular (one presumes filtered) output from a regular video jack on the TVRO receiver, and still get the same audio. You can. I tried this on a Washburn, a Sat-Tec, a couple of ICMs and an AVCOM. Same net results. The video output of the TVRO receiver (any we tried it with) will drive the ICM unit. The sound quality out of the ICM is very good; far better than the typical TV receiver audio system can properly display. You can test this yourself by running the audio into a good sound system.

The SP-310 unit does not drift, but tuning is borderline difficult; especially on a crowded subcarrier "band" such as one finds on transponder 3 of F1. The audio quality is as good, or better than, the ICM; but the comparison is subjective and close in either event.

What did surprise us was the ultimate sensitivity between the two units. In our tests, we found the ICM to have less noise on weak transponders than the SP-310 did; in either the one or two subcarrier modes. The difference is not significant, but it is plainly there.

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Either unit is a good buy and both will deliver a lot of pleasurable use to the user. We had the opportunity, on MTV, to compare the audio quality of the SP-310 against a \$1400 package sold to the cable industry for the same purpose. As we have discovered with basic "commercial" versus "private" TVRO receiver tests in the past, the SP-310 walked all over the \$1400 package for sensitivity. The commercial guys are so accustomed to designing equipment to work with big, fat signal levels that they simply do not pay much attention to what may happen with their equipment when the input signals are not so strong. So in addition to being horribly over priced, such CATV type commercial units suffer from a lack of sensitivity.

**Arunta Engineering** is found at Box 15082, Phoenix, AZ 85060; **ICM** is found at 10 N. Lee, Oklahoma City, Oklahoma 73102.

WHERE TO  
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WHEN

#### THE CHANGING SATELLITE FACE

If you have a motor driven dish, you may have noticed that along about the start of the third week of this last October, the NBC feeds which have been a mainstay of transponder 8, SATCOM F2, disappeared. These feeds were perhaps the longest straight run of the same-feeds at the same-spot in the sky, in the history of satellite communications.

On the day prior to their removal from F2, they popped up (along with some new ones) over on vertical transponder 1, on COMSTAR D3. There is a strong message here concerning what is gradually happening to the "pros" in this business; the television networks. One might reason that since NBC is a television network owned by RCA, and RCA owns the SATCOM family of birds, that if NBC wanted to utilize satellites for the transportation of programs, it would be done on a SATCOM bird. Yet, last spring, NBC negotiated an agreement with AT&T for fulltime use of a transponder (or two or more, ultimately) to transport all of the NBC programs via a COMSTAR bird. On the surface, this seems like a funny way to run NBC.

**AT&T has been in the network business as long as NBC.** To the exact second. When the first two-station network, between Schenectady, New York and New York City went into trial operation in 1940, for television, AT&T provided the link-up. When, in 1946, television between New York and Philadelphia became linked, it was AT&T that did it for NBC. When, in 1952, the first New York to San Francisco television program was transmitted, AT&T did it again.

AT&T has built the world's most modern, and perhaps flexible, **terrestrial** wideband communications network, largely because of the demands of the nation's television operators. Where television links needed to be established, Bell went ahead and put in repeater links that when operational **also provided** the capacity for hundreds or thousands of telephone calls, along the same paths. It was

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probably true in many cases neither television, nor telephones...**alone**...could have supported the **initial** cost of the terrestrial service. **Together**, both became possible. Bell's greatest period of growth has exactly paralleled the growth needs of the television industry.

AT&T wisely sees the shift coming, to satellite interconnection. It also sees itself saddled with an existing network of terrestrial systems which must be maintained, and modified, and updated on a regular basis. Without regular television networking along these spans, it sees a very rocky road ahead. It can cross subsidize the terrestrial networks, if the FCC will allow that, by moving the network inter-connections to satellite. But if it **loses** the network's TV business, the present low telephone rates are going to have to go through a considerable upward spiral. AT&T wants to protect itself in this situation, so it has leaned, in many ways, on the networks to get them to agree to use COMSTAR birds for their satellite networking. NBC and CBS have agreed to the AT&T plan; ABC will probably follow.

**Now this change** will do several things to the other satellites. One already finds many of the Sunday football games on D1/D2, and there are more and more network specials being shoved out on the same two birds. D3, it appears, will be **the home** for the "test program" now going on with NBC, and to be followed in the spring by the other networks, plus Robert Wold and another user or two. For terminals in the Caribbean, this is bad news indeed, since the NBC feeds on TR8, F2, were about the best US signals available in the area. Now they are gone. Robert Behar's trips into the Caribbean, to show off the Johnny Carson Show, were made none too soon. Today, a trip to the same locations would find no Carson Show available.

**We can expect more and more** of the "regular" network programs to show up on D3, exclusively, **over the next year**. And since AT&T is providing the service, it is not too much to expect that generally speaking the signal levels on the ground

will be "below par", since the typical AT&T dish is an 11 meter or larger. The uplink power used will be adjusted downward, to reflect the "size" of the AT&T (and other) receiving site dishes. No, you won't be watching many of these feeds with "small dishes". And that, frankly, is the way the network and AT&T people want it.

The initial "gosh, this is neat" era of satellites is rapidly drawing to a close. The next era will be one of solid, business like growth, with the usual business constraints taking precedence over the "neatness" of the technology. Once again there will be a period of change, and if your interests are effected, you'll have to be ready to make a few changes of your own.

### DECEMBER ODD-BIRD LISTING

Access to data on what to find, when, on F1 and many of the W3 transponders is widely publicized in publications such as SatGuide. However, data on what is likely to be found on some of the other unusual satellites is difficult to come by. For the expressed purpose of assisting you in identifying **which** satellite you may be pointing at, during the installation phase of a new or modified satellite antenna, **CSD** presents the following data based upon recent observations:

#### COMSTAR D3/87° West

NBC feeds of three one hour soap operas, some of the prime time evening schedule, Johnny Carson Show now seen on vertical transponder one here; audio 5.8 MHz. No other video noted recently.

#### COMSTAR D2/95° West

Feeds into the Caribbean (i.e. Puerto Rico) seen on either TR24 (weekend sporting events) or TR12 (weekday special events). Weekend football (Sundays) on TR2 and 4 (horizontal), and 9, 13, 21 (vertical). 5.8 MHz audio.

#### WESTAR 3/91° West

TR6 noted carrying some ABC programs on irregular basis.

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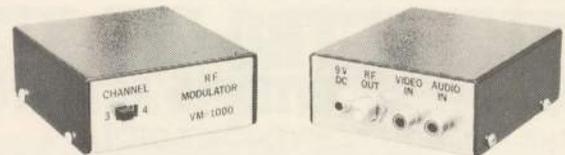
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On TR6, daytimes, feeds around 11 AM eastern of Army Health Services. Saturday morning at 10AM, TR7, feed of Solid Gold (no commercials) in segments. Saturday evening, same transponder, Canadian CTV news feeds. Transponder 10 used as backup for Westar 1, TR1 for ABC feeds when two simultaneous feeds are required.

**WESTAR 1/99° West**

ABC Good Morning America fed to west coast USA from 10 AM to 12 noon weekdays TR5. TR1 used evening Sundays to feed ABC, NBC, CBS (in sequence) weekend news 8 PM to 10 PM eastern; followed 10 PM by Sixty Minutes. Professional football noted Sundays TR1, 3, 5 and 6 or irregular basis.

**ANIK B/109° West**

Transponder 4 used to feed news, sporting events and pre-network release programs daily. News fed at 4:30 PM and 11 PM (eastern).

**CHANNEL CONVERSIONS**

COMSTAR and RCA Satcom satellites operate with **approximately** the same channel allocations for their 24 channel satellites. It is the practice of the industry to list transponders as they appear on each satellite and for this reason the 12 channel WESTAR and ANIK satellites can be confusing since the present generation of both employ a single polarization (horizontal only) with a net product of 12 (rather than 24) transponders.

To transfer ANIK or WESTAR listed transponder numbers to 24 channel receivers, use the following quick formula:

- 1) Take the Westar / Anik listed transponder, double, and subtract 1. For example, if the listed Westar transponder is 6, double it (12) and subtract 1 (11). Dial / channel / transponder 11 is the position where you will find the signal on a 24 channel receiver.
- 2) Westar / Anik transponders listed there will appear as follows on a 24 channel receiver:

Westar/ Anik Listed	Appears on 24 Channel Receiver At
1	1
2	3
3	5
4	7
5	9
6	11
7	13
8	15
9	17
10	19
11	21
12	23

When reporting observations, please clearly state whether you are reporting the dial position on a 24 channel receiver, or the actual Westar / Anik assigned transponders.

**SCRAMBLED BOXING**

In the enclosed article, published in the Detroit Free Press, it says that the promoters of the Hernes-Leonard fight sent the signal on three different satellites. What I would like to know is how all of this was done. Does a private terminal operator need special equipment to receive these scrambled transmissions? The same article talks about investigating signal pirates, and holds out the possibility of suing them. Could you explain to me what legal rights I have in a situation like this?

David Zsidi  
Saginaw, MI 48602

The Detroit Free Press article reports that Ed Tomaszewski, a private terminal operator in Michigan, found the fight without a blemish. And that Chuck Karem,

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**operating Video Alternatives in East Detroit, found the fight on a Canadian satellite - "much to the delight of about 75 fight fans who watched the fight at the store". Meanwhile, down in Houston, some fellows who tried a "Bob Behar Parking Lot Trick" were arrested by federal marshals for trying to bring in the same fight. There is a special report in this issue of CSD on this subject. Read it.**

**RL DRAKE RECEIVER**

I enjoyed the first SPTS, for me, in Omaha. We were very gratified by the wonderful reception for our new ESR24 TVRO receiver. RL Drake is interested in participating in your satellite enthusiast contest, and is offering one of our new single conversion ESR24 receivers. With your acknowledgement, I will see that you are sent one of the first production units off the line shortly after December first. This should give CSD an

opportunity to test and review the receiver before awarding it in the subsequent contest period.

Michael Brubaker  
Special Product Sales  
R. L. Drake Company  
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**Drake will also be announcing a double conversion receiver after the first of the year. The firm is well known in the communications world, having been building HF, VHF and UHF equipment for private and commercial use since shortly after World War Two.**

**LET THE FEDS BUST THIS ONE!**

Please find enclosed a photo of the first satellite receiving system inside of a prison. WE have our five meter terminal now fully operational, and have been working on a ten footer for future use. I have read over Coop's Manual several times and I keep coming up with the same question. I have checked the f/D on the dish but feel I am in real trouble. On our 10 foot dish the focal length is 67 inches while the depth of the dish is 25 inches. Each time I do the calculations, I get strange numbers. None of them are even close to the .3 to .6 f/D ratio which the manuals suggest is optimum. What am I doing wrong?

Paul D. H. LaBarre  
ASPC-TV  
Florence, AZ 85232

**Paul's problem is that he was assigning the wrong values to f and D. The f is the focal length of the dish. The D is the diameter of the dish; not the depth of the dish. If the dish is 10 feet in diameter and the depth is 25 inches, the formula starts by finding the focal length. You say it is 67 inches. But is it? The focal length is equal to the radius squared divided by 4 times the depth. The radius is half**

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the diameter, or 5 feet. Five squared is 25. The depth you measured is 25 inches, and four times 25 inches is 100 inches. Now we divide the 100 number by the 25 and we get a whole number; 4.0. This is obviously not correct since the answer (the focal length) is not 4 anything. So what did we do wrong? Two things, both commonly done. First we reversed the two numbers. The radius squared is the number we divide into, not by. Next we mixed units. In the first number (radius) we had five feet while in the second number (depth) we had inches. Both numbers must be of the same unit; inches makes good sense here. Doing it over, we have the radius (5 feet or 60 inches) squared; or 3600. And we have the depth (25 inches) times 4, or 100 inches. Now we divide the 3600 by 100 and we find the focal length should really be 36 inches; not the 67 you suggest. What is the f/D then? It is the focal length (36 inches) divided by the diameter (10 feet or 120 inches). That is 0.3, which according to conventional wisdom is just barely inside of the .3 to .6 region where you get the best gain performance plus the best pattern control with the feed and dish combination. We wonder what the federal marshals might have done if ASPC-TV decided to tune in the Hernes-Leonard fight? Everybody watching it was already "locked up"!

#### REFLECTIONS ON ANTENNA TESTS

In reviewing Coop's comments on the antenna tests at Omaha, I would like to make one correction. During these tests, we were able to test three of the spherical antennas. This included a 6 and 12 footer from Hayden McCullough, and a ten footer from Ghost Fighters. Both the ten and twelve footers demonstrated good performance, and were very close to the 55% efficiency line. We did not include the six footer on the performance chart (published) since the C+N/N measured at just 3.8 dB. Anyone wishing to carry the chart on out to six feet aperture, and plot this point, can certainly do so.

We were quite surprised at the "range" of antenna efficiencies encountered, however, and gratified to find in nearly every case where we could look at the quality of the pictures produced by the antennas, there was a very close correlation between "measurements" and picture "quality"

If there is sufficient interest in this type of test, at future SPTS events, there are several refinements we will undertake to improve the accuracy still further. The most important, perhaps, is to monitor the output power of the (test) transponder. This reference measurement should be made each time a candidate antenna is tested, so that any change in power output can be factored into the individual antenna results.

At first glance, one would not suspect the power output of the transponder to vary significantly in a short period of time (such as a day or two) since we are normally led to believe that the uplink operators push the signals into transponder saturation. However, in the (admittedly) limited amount of testing we have done, we have seen repeated variations of up to plus and minus one-half of a dB, even on the transponders one might suspect to have close, fulltime monitoring (such as transponder 24, on F1, uplinked by RCA at Vernon Valley). Actually, transponder 24 was quite well behaved during the Omaha testing procedure, and we were pleased with the repeatability of the reference measurements, during the testing periods.

Finally, we have been asked how much money it might cost to put together a test set such as we used to perform these tests in Omaha. The answer turns out to be around \$6,000, if everything is included and packaged in a neat carrying case. If one already owns some of the high-ticket items, such as the power meter, the cost can come down significantly. Anyone with an interest in putting together such a test set may contact the writer.

Jack Trollman  
Consulting Engineer



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There are three factors that can and do cause normally "solid" signals to vary. Jack mentions "saturation". This means that the signal transmitted to the satellite, by the uplink, is adjusted up to the point where any additional uplink power will not result in any additional downlink power, or signal level. The satellite transponder "saturates" (i.e. becomes "full") and any more signal simply is not translated into additional downlink signal. If the uplink operator monitors his operation carefully, he will keep his uplink signal "in saturation" all of the time. Sometimes they slip up, and the uplink signal drops below saturation, with a corresponding reduction in downlink power, or signal. Second, the birds wander or move both east and west, and north and south. The slight wanderings are easiest to spot at the edges of the coverage patterns; Alaska, or the Caribbean foreexample, since the antenna pattern "ridges" are sharper or more closely spaced here. Third, there is local weather between your receiving antenna and the sparseness of space beyond the atmosphere. If your antenna points through a heavy, dark water-laden cloud, you can count on some reduction in signal level. Even though the cloud may be only a few thousand feet thick, and that is a very small part of the 23,000 plus mile trip the bird signal makes to your dish, it can be the most "lossy" part of the path.

**A NEW GILLASPIE RECEIVER**

Thank you for the coverage in CSD on our 5000 series rack mount receiver and Ampli-Splitter. Our present 7500 series receiver is being phased out, and we have introduced a 7600 version. We expected to have at least 300 of these shipped

before the Anaheim SVS gathering. This new receiver has tunable audio, linearized tuning with accurate audio and video tuning indication. The down converter, which mounts outside, has been temperature stabilized to prevent temperature drift. An improved demodulator, originally created for the 5000 series professional receiver, has been included in the 7600 to prevent the video "tearing" that is common with many units.

Norman Gillaspie  
President

Norman is a perfect example of what somebody with an "idea" can do in this young industry. He appeared at the 1980 mid-summer San Jose SPTS, and spoke on the program about single conversion receiver techniques. It took him several months to make the transition from part time garage operation to a real business, but he has done it with a flair and professionalism that shows what can be done if a person is willing to devote himself totally to a project and an idea. Congratulations Norman for making it!

**INTERNATIONAL REFERENCES**

Would you please give some references for additional information on Intelsat and other international satellites operating in both the Atlantic and Pacific clusters? I need to know what programming is available on the various satellites, what their EIRPs are, what audio subcarriers are used, plus how one calculates the antenna, LNA, receiver requirements for various sites. Are there any private terminal operators with experience in picking up these birds? I have a collection of STT manuals, which are really excellent, but find this data missing.

John L. Foley, Jr.  
New England Satellite TV  
Worcester, MA 01609

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Dealer Inquiries Welcome

The most complete treatment of this subject in any single place we know of is "Coop's Satellite Operations Manual", which devotes about half of the manual to just the questions you ask. Basically, Intelsat satellites operate on three antenna formats. They use a Global pattern, which has an EIRP in the 17 to 22 dBw region (US and Canadian DOMSATs have 34-37 dBw in the center of their patterns); a Hemispheric pattern which may reach an EIRP of 26 dBw and a Spot Beam pattern which may reach 35 dBw. "May" is an important word here since many (indeed, most) of the Intelsat video transmissions use not a full transponder, but rather something called "half transponder working". That means they divide the 36 MHz transponder in half, and fill only half with a television signal. The effect on you is that you get 3 dB less signal this way. That can make a 26 dBw Hemi pattern really 23 dBw maximum. Then they "back off" their uplink

power to allow them to transmit other extra subcarriers in the same transponder. This can reduce the real EIRP by another dB or 2. Most Intelsat video transmissions, where the audio is transmitted on the same transponder as the video, use a 5.8 MHz subcarrier frequency. But that is not "sacred", and a tunable audio system is recommended. At the present time there are a number of African and Middle Eastern nations using Atlantic birds, half transponder format, to send television to outlying regions. Spain and Portugal do the same thing to reach the Canary and Azores Islands, respectively. Brasil uses an Intelsat bird to send Globo TV network programs to their terrestrial network. Argentina and Columbia will join Brasil this coming year. BUT - with the half transponder format, and backing off for audio, even though most of these are hemispheric patterns, their real world EIRP is in the 22-23 dBw region. That says a 10 to 11 meter dish and the best electronics for most users.

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Ben C. Francis  
P. O. Box 422  
Paradence, Bird Rock  
St. Kitts, West Indies

To those who envision spending a glorious ten days in the eastern Caribbean installing a satellite dish this winter (after making the sale to this gentlemen) this word of caution. The look angle to F1 is under 10 degrees and F2 is no longer carrying NBC programs. Good luck.

SATELLITE ANTENNAS

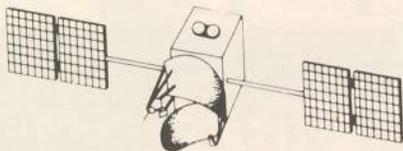
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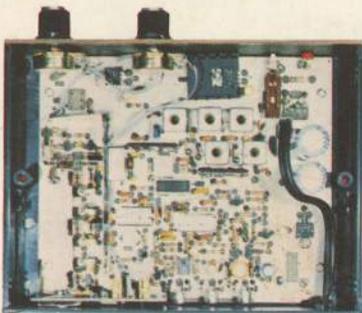
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Frequency range:	3.6-4.3 GHz tunable
Audio range:	5.2-7.6 MHz tunable
Threshold:	8db CNR
IF bandwidth:	30 MHz for full fidelity video
LNA power:	15 volts regulated for up to 2 LNAs
Outputs:	Standard one volt audio and video, compatible with VCRs, monitors and modulators
Optional:	BC-1 RF modulator kit, tunable channels 3-6 with sound



**Sat-tec Systems**

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