

**INSIDE THIS ISSUE**

Build It

**TWO STAGE NEC LNA**

Broaden Your Horizon

**MULTIPLE SPHERICALS**

Hardware Shortage

**RELIEF - WHEN?**

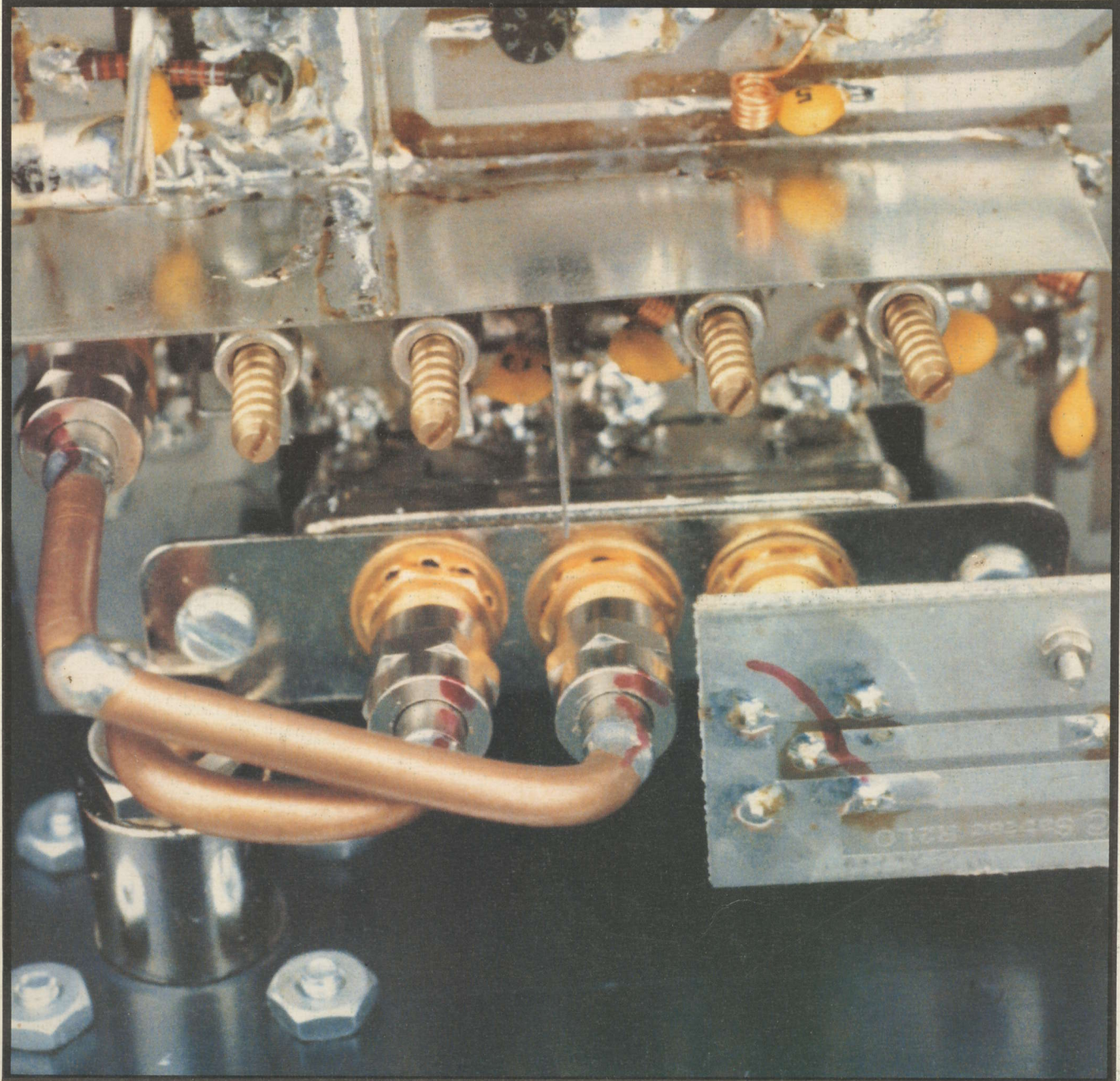
Marketing Tips

**TVRO SELLING TECHNIQUES**

**COOP'S  
SATELLITE  
DIGEST**



**OCTOBER 1980**





BEAUTY IS MORE THAN SKIN DEEP



**YOU HEAR** a lot of talk around these days about the so-called 'upper market' in home satellite terminals; those folks who live in \$200,000 plus homes who want home satellite TV but who have an aversion to an over-sized 'bird bath' sticking out of their superbly manicured rose garden. **STS of Missouri** recognized early in this game that not everyone was going to fall in love with the shiney white graceful lines of a typical satellite parabolic antenna. We knew that 54% of the people in this country are women and we also knew that 68% of this nation's wealth is held by women. That's why we created the most beautiful home satellite antenna on the market today.

**IF YOU** are a dealer in TVRO systems perhaps you should re-evaluate your own sales approach. YES - **you think** satellite dish antennas are beautiful. But perhaps your customer does not. Our dealers tell us that they can average 60 to 70% sales to demonstration ratios. That means for every ten times you set up a demonstration, between 6 and 7 terminals will sell. On the spot. We think a good part of this amazing success story is due to the fact that our antennas look as good to the woman of the family as the pictures look to the man of the family. REMEMBER - most people now buying terminals don't care about super-PLL recovery or LNA noise temperatures. They are concerned only with two things...what the installation looks like sitting in their \$200,000 yard...and...what the pictures look like on their TV set.

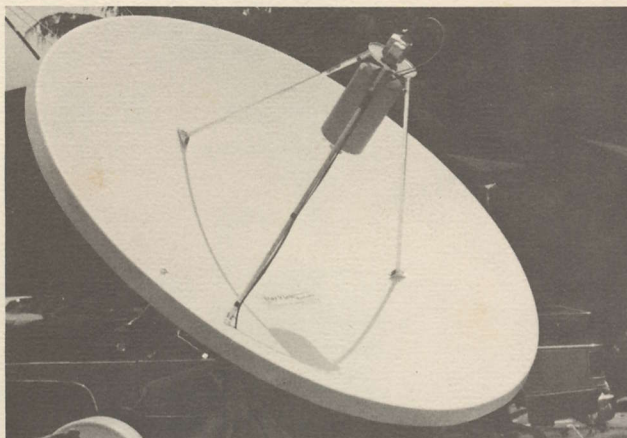
**NOT EVERYBODY WATCHING** home satellite TV is an engineer in love with our technology. A good sales presenter and presentation captures the flavor and imagination of the potential buyer's mind. **STS of Missouri** makes it possible for our dealers to sell high quality systems backed up by the industry's most professional staff of packaged hardware suppliers. If your present line of hardware is turning big-ticket customers off, come over to the 'Good Looking Professionals' in home satellite terminal systems. We are as near as our toll free telephone number.

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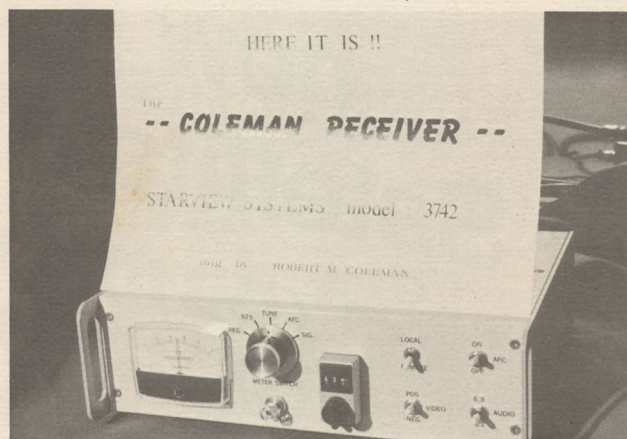


# Starview Systems Has ALL OF THE STARS COVERED!



## NEW!!! Everything At Dish!

Starview Systems has teamed up with Robert Coleman to introduce the ultimate low-cost complete system. Shown first at SPTS San Jose, the full TVRO receiver (including LNA portion) mounts at the dish! Our 10R system has a complete 10 foot dish antenna, plus a remotely tuned receiver that is housed at the dish feedpoint. Just bring down the low-cost RG-59/U to your TV receivers. Here is a **complete** system that delivers NTSC re-modulated satellite signals on VHF channels 3 or 4. The price? A real breakthrough at \$4650! Find out more today.



## NEW!!! Coleman 3742 Receiver!

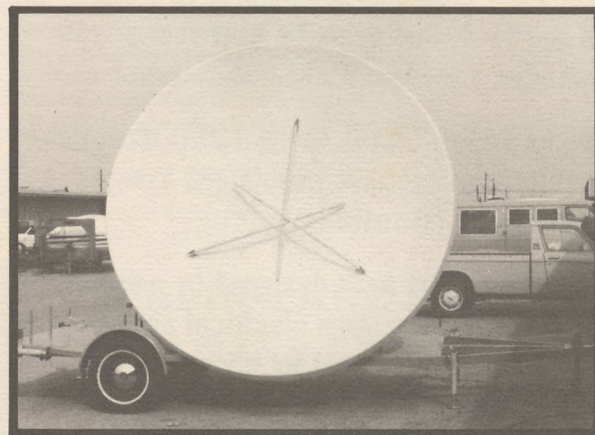
Scan-tuned, multiple audio sub-carriers, local or remote control, superior threshold performance, full metering, double conversion of course. And available exclusively from Starview Systems. Ask about early delivery today!

## LNA SUPER SALE - Continues!

**YOUR CHOICE** - 100 degree (!) K, 50 dB gain top of the line LNAs for just \$1095. OR - Avantek 120 degree K, 50 dB gain low noise amplifier with the new 'power block' DC coupling system that allows you to use your TVRO downline for powering! Instant delivery on this top grade LNA at the unbelievable price of \$795!

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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 Microdyne 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 \$7200!!!




# STARVIEW SYSTEMS

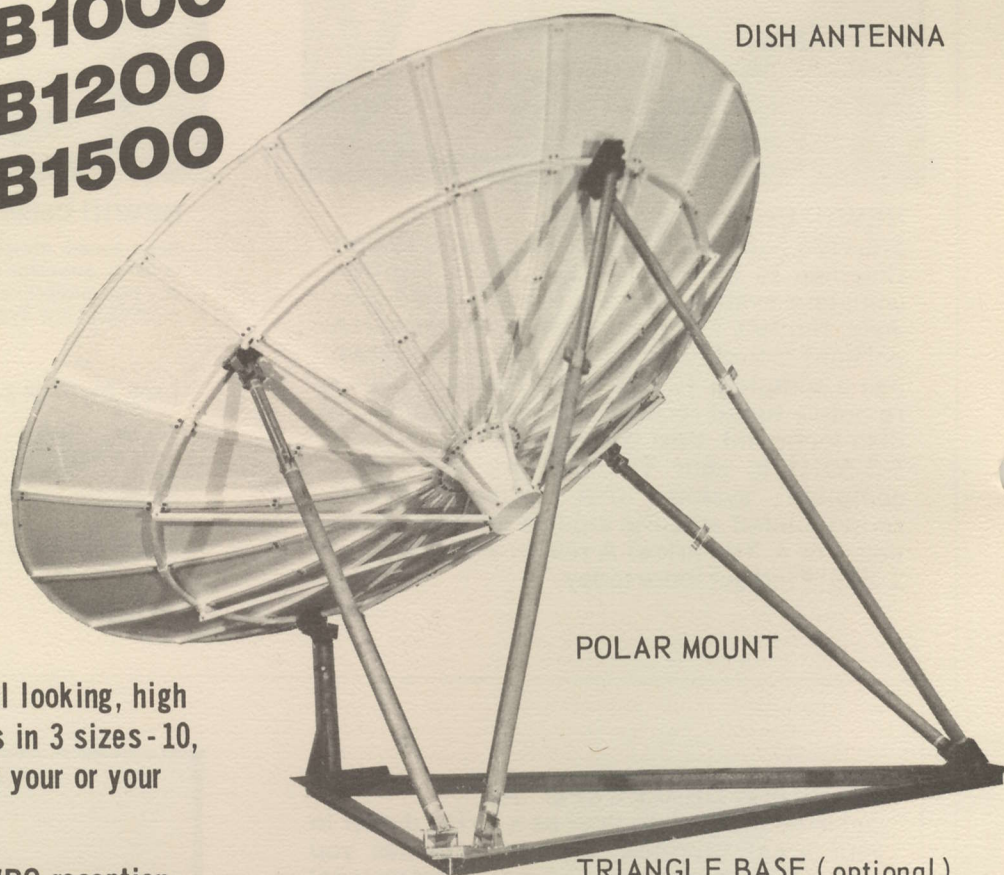
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# Lindsay...

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POLAR MOUNT

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LINDSAY provides professional looking, high efficiency metal petal antennas in 3 sizes - 10, 12 and 15 ft. and gains to meet your or your customer's needs.

Prices so low that it opens TVRO reception possibilities for more people and assures profitability for installers.

These antennas were designed by antenna engineers for maximum electrical performance, by structural engineers for endurance and ruggedness.

The polar mount allows easy and fast set-up and can be motorized.

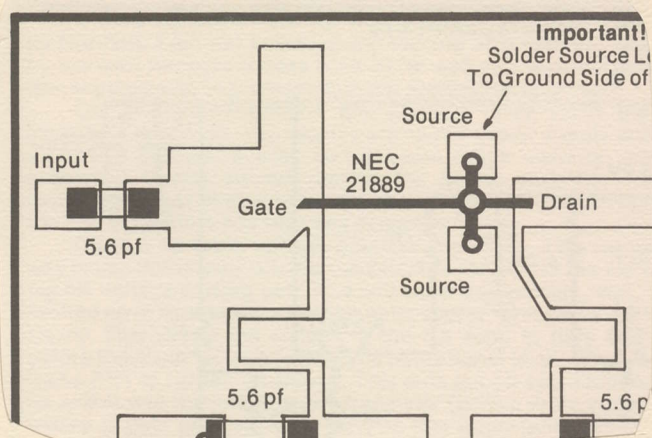
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### ON THE BEACH...

Several winters ago while fighting an Oklahoma blizzard as I was driving home from my Oklahoma City office at CATJ Magazine I made the off-hand remark to Susan on our VHF ham radio link that 'I don't see why anyone would choose to live in a part of the world where the winters are severe and the summers unbearable'. She retorted that since I could operate a typewriter almost anywhere in the world, she too wondered why we were still living in Oklahoma some ten years after we 'stopped to visit some friends' back in the late 60's. Several snow drifts and 90 minutes later when I stumbled into the house Susan, Tasha and Kevin had it all worked out. We were going to move.

**Lots of people have that dream.** But we were serious. First I had to arrange to dispose of my ownership interest in CATJ, the cable TV magazine I had founded back in 1974. It took awhile but by May of '79 that was done. Then there's the matter of where you move to. Susan and I had lived in the Caribbean for a year in the 60s and loved it. But many of the more desirable Caribbean spots had either become tourist traps with McDonalds and Burger Kings under every palm tree, or there was political instability. We had to think about schooling for 8 year old Tasha and 11 year old Kevin as well. We are great collectors of information and in short order we were receiving the local newspapers from a dozen or more islands scattered throughout the Pacific Ocean. We were about settled on Micronesia when a chance ham radio conversation with a chap down in the Turks and Caicos islands (between Miami and Puerto Rico) strung a responsive cord. Several trips there later we had made up our minds, purchased 250 feet of white sandy beach on one of the last great unspoiled beaches in the Caribbean and had building plans being drawn up.

**Then the low cost satellite TV explosion hit.** We were caught in a net, partly of our own making, and our mid-79 departure got put off. STT's various activities, including CSD and the seminars and all of the manuals simply could not be left in someone else's hands at that point in time. Now, 14 months or so later I am finally on the beach.

### AMPLIFIER PARTS LIST

- 1) NEC21883 GaAs-FET (approximately \$55 each) from California Eastern Labs (2 required).
- 2) Printed circuit board (available from author for \$25)\*.
- 3) 5.6 pF chip caps (7 required, available from author for \$.50 each)\*.
- 4) 1000 pF disc ceramic, 4 required
- 5) 4.7 volt 400 mW zener diode, 4 required
- 6) 1N4148 diode, 4 required
- 7) 10K pot, 2 required
- 8) 33 ohm, 1/4 watt, 5% resistor; 2 required

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The fellow I had learned some detail from, about the Turks and Caicos, is my partner in the construction of a chain of three mini-powered TV stations we are building here. Each of the TV transmission sites will also house a local FM broadcasting station transmitter. When Edmund Ewing and I get finished with the construction here in about a year some 3,000 English speaking people who grew up under British colonial rule will be watching their first television and listening to their English speaking local radio.

**Until December we are in a rented house.** Just three miles up the beach to the east two buildings are rising above the sand dunes; the smaller of the two (we call it 'The Annex') will have an apartment in it plus a TV production studio, publications office and one of the world's great amateur radio stations. Already a five meter AFC/Microdyne dish is rising above a pad adjacent to 'The Annex' and a seven meter will be operating by Christmas. Numerous smaller dishes are under construction and pads are being poured. We hope by next Easter that our general contractor, Sam Lightbourne, will have 'The Big House' finished so we can move out of the apartment in 'The Annex'. Both are less than 75 feet from the most magnificent deep blue caribbean waters we have ever seen.

**Our new TV station** for Providenciales is a big deal locally. While electricity has been available on the island for a decade or more it was only this summer that most people got it. 'Juice' over wires sure beats having to re-fill a Yamaha generator every five hours! By day Edmund and I build towers, erect antennas, run coax, put in AC wiring and try to keep up with Lightbourne's crew as 'The Annex' TV studio nears completion. By night, with my typewriter resting atop a row of huge wooden packing crates that left Oklahoma in mid-August I write magazine copy, answer letters and work on a couple of new manuals and a book. We all swim a lot, snorkel and eat fresh lobster and Grouper that abounds here.

**This is pioneer country.** Mail comes once per week. Telephones only work sometimes. And the nearest hardware store is 650 miles away. Every nut and bolt required has to be planned for and brought in from Miami. The chap we bought our land from, Dick Dupont (of 'the' Duponts), is behind a new 600 room resort several miles up-beach from us and that's the second biggest thing locally since the island has barely 600 people on it now. Edmund and I will see that this new resort has terrific TV.

Through several years of planning and re-planning I feel quite comfortable with the 'long-distance' running of STT's Oklahoma operations. Rick Schneringer has been on board now for several months and he'll see that your inquiries get answered and your problems resolved. I'm **not** happy with the present arrangement where **videotapes** have to be made by us in the islands and sent back to Rick for shipment to those who order but that will work out shortly.

So when you see the Cooper's in Houston this fall at SBQC we'll be easy to spot. We'll be the party of four brown and tan dressed casually in sandals and West Indies Video T-shirts with a far-away look in our eyes. We'll be glad to see you all in Houston but we'll be even more glad to leave you all and get back home again...on the beach.

## BIASING AND USING NEC GaAS-FET AMPS

Norman Gillaspie's report on building up your own two-stage GaAs-FET amplifier, appearing elsewhere in this issue of CSD, is a fine project. However my own experience with this circuit or ones close to it may give you additional



## NEC TWO STAGE

## GaAs-FET AMP

By this point in the evolution of the low cost satellite receive-only-terminal technology you should be well aware that the LNA (low noise amplifier) is not something you throw together and expect to work with reasonable efficiency. Many people have been concerned that even if you start out with a PC board layout for a 4 GHz GaAs-FET amplifier that has been 'lab proven' that you cannot simply take that board, plug in parts and expect the unit to work at optimum noise figure and gain. Past **CSD** articles (see Kenneth D. Rae, page T10 for May) have dealt with the tricky business of optimizing an LNA after the appropriate board and parts have been acquired.

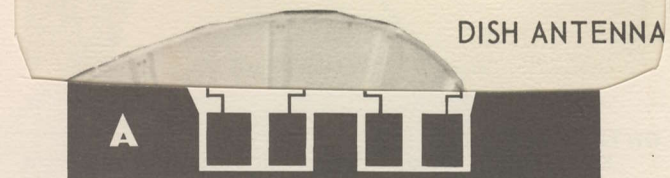
The truth of the matter is that you cannot get optimum performance (lowest noise figure and maximum gain) together; and further, you cannot expect to get either unless you are willing to do some 'tweaking' on the circuit board. The problem? We are dealing with two variables; exceedingly small or tight tolerances on the actual boards (affected by parts placement, lead lengths, the housing et al), and, variation from GaAs-FET device to GaAs-FET device substantial enough to insure that a circuit tweaked to optimization with one particular GaAs-FET is not likely to still be optimum when a seemingly identical GaAs-FET is installed as a replacement.

We are therefore at the point of making compromises if we insist on building our own GaAs-FET LNAs. By compromising we are simply accepting that lacking the necessary noise figure test set and sweep equipment test gear (such a package costs upwards of \$13,000 these days) we will have to settle for whatever noise figure and gain we can achieve by following proven designs worked out by somebody else who indeed has access to such exotic test gear.

This report details a two-stage GaAs-FET low noise amplifier constructed around the NEC 21883 devices; generally available in the \$50 to \$60 price range from several sources including California Eastern Labs. The original circuit layout for this amplifier was probably created by NEC in Japan. Subsequently the layout found its way to both this writer and to John Rohner of Rohner & Associates. Independently both Rohner and I made subtle but very similar modifications to the original NEC layout; a fact we both discovered while meeting for the first time at SPTS in San Jose!

These antennas were designed by antenna engineers for maximum electrical performance, by structural engineers for endurance and ruggedness.

# ides you w RO Antennas



### Design

One nice feature of this design is that the input and output VSWR is quite good; this allows you to use a waveguide to coax transition coupled with a waveguide horn to give a real world antenna feed without the use of a lossy isolator. Input matching has been restricted to the best compromise between input match for power transfer and optimum noise figure. Output matching to the input of the second stage GaAs-FET is the simplest way possible; using a short section of transmission line. The 5.6 pF coupling capacitors are chosen for their low coupling loss and DC blocking. The other capacitors provide for microwave and low frequency bypassing.

(Note: John Rohner suggests that the interstage capacitors should be standard chips, not the special 4 GHz types. He notes that if a 4 GHz rated chip capacitors are used the PC board layout must also change since the circuit layout shown has inductive compensation for the non-4 GHz chips. Rohner also notes that gate and drain decoupling capacitors are 1000 pF discs and they also are standard discs; not 4 GHz versions.)

The circuit board layout, provided by Rohner, must have a ground plane on the back. There should be 'reliefs' for the gate and drain voltage feeds and the recommended powering system is the Rohner created circuit included here.

The 4.7 volt zener diodes are strictly over voltage protection and the 1N4148's are 'idiot proofing' diodes to save your expensive GaAs-FETs!

The circuit shown from my own development work utilizes a pair of 10K pots which are used to set the GaAs-FET's gate voltage. I have found that if the following procedure is utilized you will have good performance:

- 1) Before applying drain voltage, set the 10K pots for maximum voltage on the gates.
- 2) Monitor the voltage drop across the 33 ohm resistor feeding the first GaAs-FET.

The polar mount allows easy and fast set-up and can be motorized.

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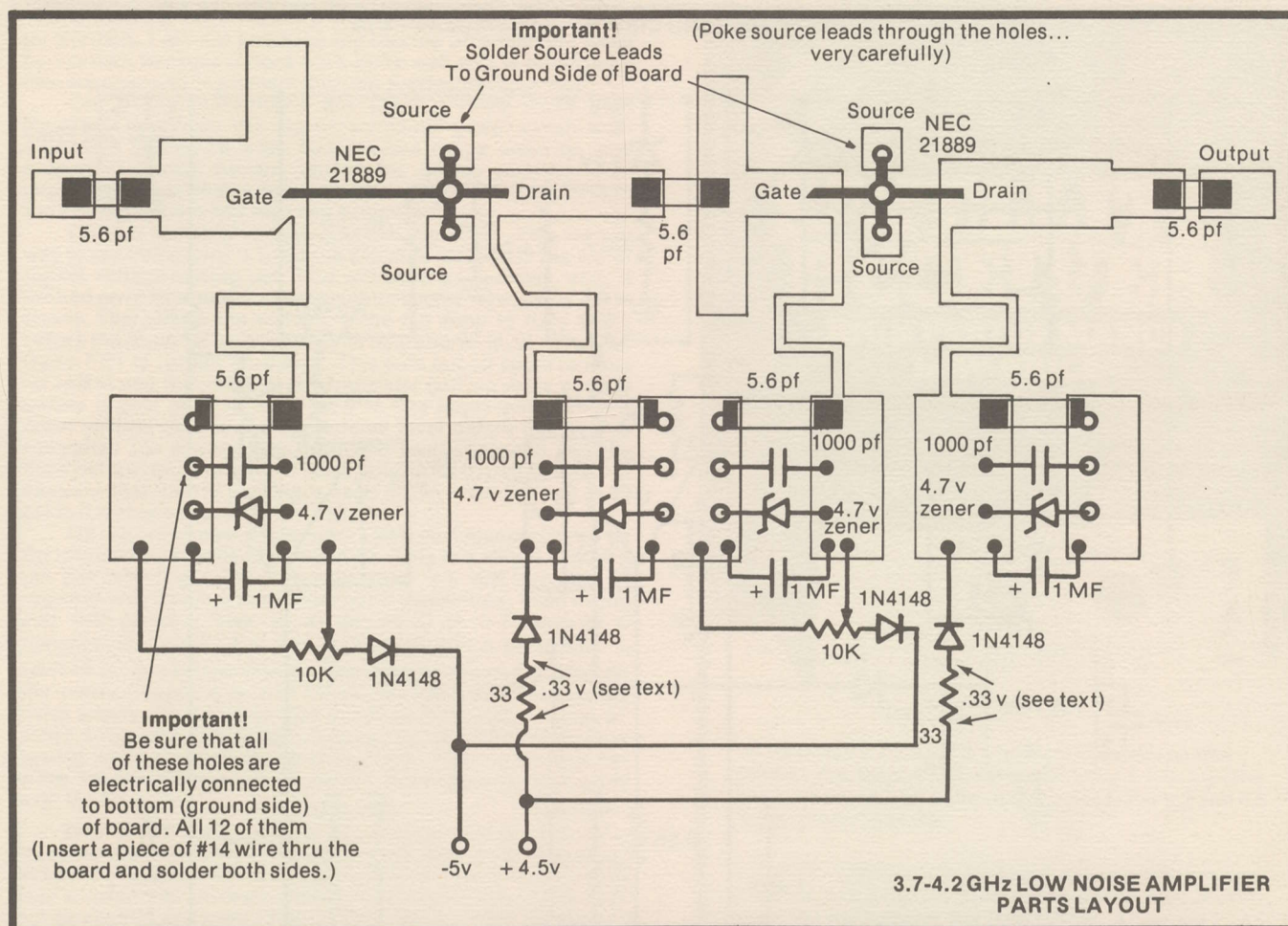
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picked through and soldered on both sides before attaching the associated components. SMA fittings should be used to couple into and out of the amplifier. Be very careful that there is good grounding of the SMA to the ground on the circuit board. The board must be mounted in an enclosure or made rigid by soldering a heavy gauge (#16 or larger) wire to the bottom side of the circuit board from the input to the output. Use two pieces to make it rigid and this will prevent the fragile chip capacitors (and the GaAs-FETs) from breaking if the circuit board is accidentally flexed.

#### Summary

Now a low cost GaAs-FET amplifier with good performance specifications is within reach of the home builder. The GaAs-FETs are available from California Eastern Laboratories, 3005 Democracy Way, Santa Clara, CA 95050.

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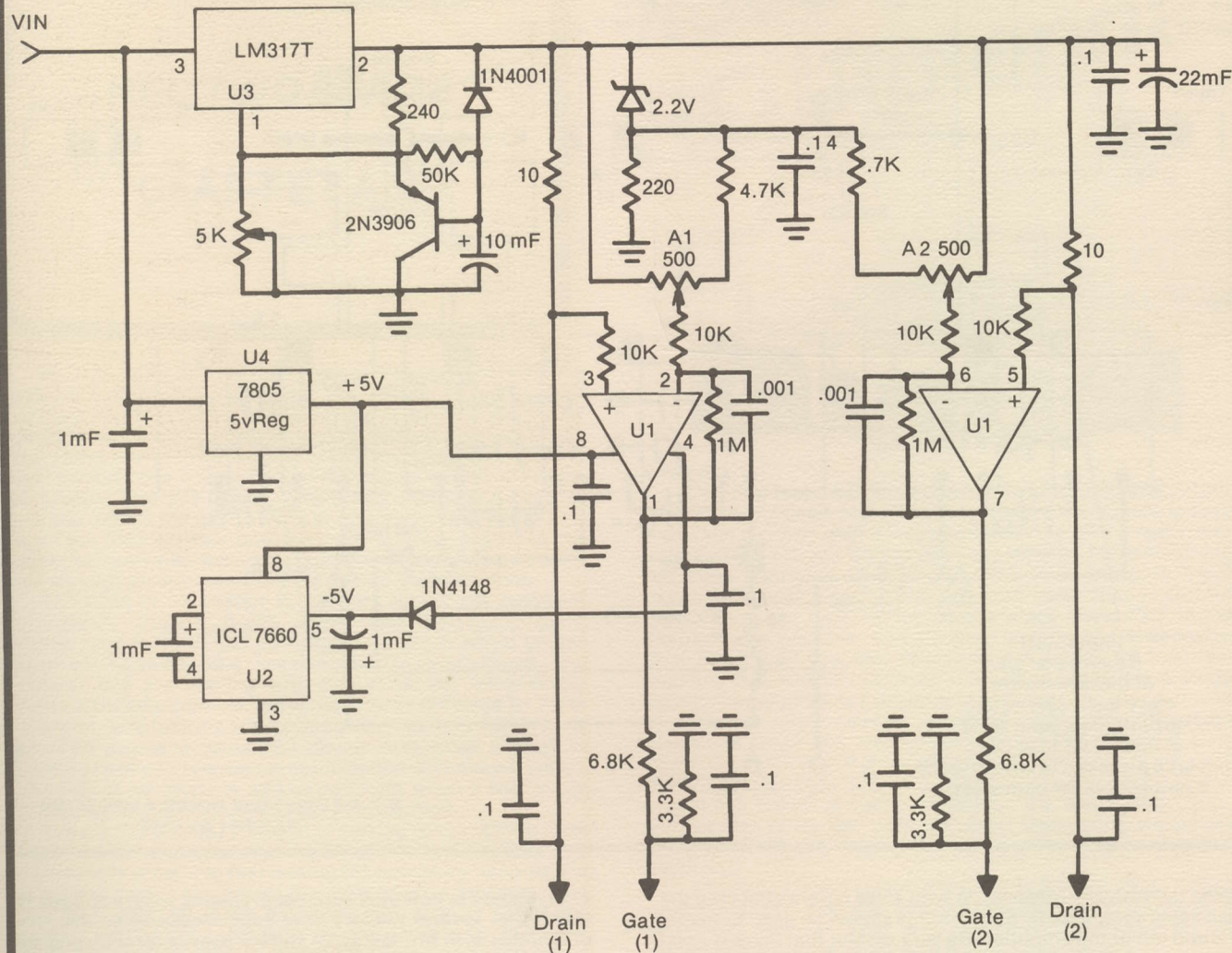
alert readers to potential supplier problems we are obliged to report that several readers have experienced some delivery difficulties with Mr. Gillaspie and his boards recently and we advise you to check with him prior to sending money. You might try calling at 415-854-0266.

## SOME COMMENTS ON BIASING AND USING NEC GaAs-FET AMPS

Norman Gillaspie's report on building up your own two-stage GaAs-FET amplifier, appearing elsewhere in this issue of CSD, is a fine project. However my own experience with this circuit or ones close to it may give you additional



### ROHNER'S BIASING CIRCUIT - 2 NE218 GaAS-FETS



U1 = MC1458N (Dual 741 type or amp) 8 PIN DIP  
U2 = ICL7660 Intersil Negative 5V Generator

background which you should consider before jumping into the project with both feet.

First these two caveats. The circuit and board shown will **not** work with bi-polar devices. Whether it will work with an HP device I leave to HP fans; although I truly doubt anything approaching optimized performance will result.

There is some history on this particular stripline circuit which may be useful to you. Very early this year I received a rough drawing of this layout from an NEC engineer in Japan with whom we had been working. The engineer had started to work on the circuit for the NEC 388 part to operate in the 3.7 to 4.2 GHz band. Before he finished this project however he was shifted to work on some 12 GHz receiver circuits and the NEC layout provided was never optimized nor tested extensively. It formed the basis for our own design efforts at Rohner & Associates for our own receiver front end. In our application we use a trio of the NE 218 devices in our LNA/downconverter.

Norman obtained his stripline configuration in about the same rough form from California Eastern Labs (the distributor of the devices here in the states) and developed his own version of the amplifier. The stripline has been very carefully and painstakingly optimized for the NE 218 part and this is why I caution others not to attempt to plug in other devices unless they are prepared and equipped to re-evaluate the optimization parameters.

**In LNA design** the most important design criteria, relative to good performance, is the stripline in which the transistor operates. The stripline determines the noise figure, interstage coupling and output coupling based upon that particular transistor's 'S' parameters. What is perfect for one version of the GaAs-FET may oscillate for some other part. Or it may push the gain down and the noise figure up, in which case you have 'operation' but not 'performance'. So I cannot recommend this stripline for **any** part other than the NE 218(89). And with the relatively low price tag (\$55) and the very attractive device noise figure (.8 dB or under 60 degrees Kelvin!) the whole package does make a very attractive LNA approach.

## Where I Differ...

The biasing circuit in use in our production versions of the

by  
**John Rohner**  
**Rohner & Associates**  
501 N. Elm  
W. Liberty, IO 52776



LNA differs markedly from the 'hobby' biasing approach taken by Norman. I am not knocking the biasing arrangement used by Norman because it does work quite well and is admittedly less expensive to implement than our production approach.

Our design parameters are perhaps more exact than Norman's approach. We require a unipolar power supply with a positive ground, a wide temperature range stability, and individual device current control for device stability. The circuit we use is shown here. There are some unique parts in the biasing system and they beg explanation.

U3 is a variable voltage positive regulator. The normal way to use this circuit is to tie the 240 ohm resistor to the top of the 5K voltage setting pot. This will work quite nicely, and, if hobbled up in this manner the regulator comes 'to voltage' quite slowly. This allows the voltage to the Op Amp to fully settle before the drain voltage reaches its operational level. Thus the GaAs-FET is turned on **slowly**. This cuts out all opportunities for spikes and it eliminates the transistor getting drain voltage before it gets gate voltage. Why is this important? Well, if drain voltage gets to the operational level before the gate is controlled the device may drop into oscillation and destroy itself before the gate control takes hold. And there goes \$55! It happens that the 317 part lends itself to a slow turn on and at 90 cents it is cheap protection.

U2 is a brand new (in January 1980) part manufactured by Bg Intersil and it sells for around \$3. This is a single CMOS 8 pin DIP which generates -5 volts from +5 volt supplies. It requires only a pair of additional parts (capacitors) to do its job and will perform over a -20 degree C to +70 degree C temperature range. You will note that I add a third part, a 1N4149 (or any silicon diode). This device operates only when the power supply is turned off as the 7660 (CMOS) relaxes quite slowly. This means that the high frequency oscillation slows down and at a certain frequency just before it quits a square wave appears at the output pin. The diode does not allow the square wave to get across and raise any difficulties with the Op Amp.

This circuit uses a pair of 741 type Op Amps as current comparators. The current is set by pots A1 and A2 and once set will hold the transistor device at the current set or established over wide temperature excursions. The importance of this may not be readily apparent. The GaAs-FETs get their best noise figure at a low current; 3 to 5 mA being typical. However they get their best voltage gain at a higher current; 10 mA (as Norman Gillaspie suggests) being typical. It is very important in designing an LNA system wherein the noise figure is established by the first or lead transistor that you set the operating parameters for that (first) stage for lowest noise temperature or noise contribution. **NOTE: Here I differ, from experience, with the '10 mA per stage' recommended by Norman.**

Additionally, if a GaAs-FET is going to be unstable it will try to oscillate and when it does this it will draw additional current. So if we can control the current we can also keep the stage from oscillating.

#### Set Up Procedures...

Once you have the circuit built-up the set up procedure for the biasing system **prior** to hooking up to the LNA board is as follows:

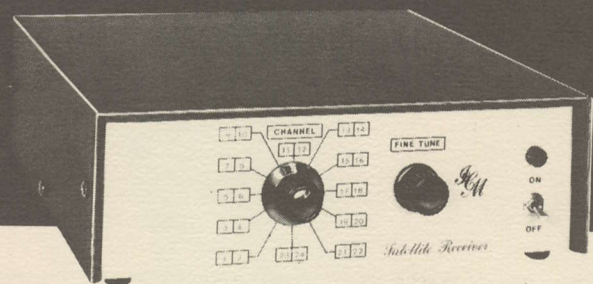
- 1] Turn on V-in (something less than +30 volts DC);
  - 2] Adjust the 5K pot on U3 for a drain voltage at the device recommended level (3 volts for NE 218);
  - 3] Set the 500 ohm pots (A1 and A2) to their mid position;
  - 4] Turn off V-in.
  - 5] Bleed pin 3 of 317 (U3) to ground and check for zero volts.
- Now connect the gate voltage points to the LNA.
- 6] Connect a milliamp meter between the drain 1 output and the drain 1 input on the LNA;
  - 7] Jumper drain 2 to the LNA temporarily;
  - 8] Apply V-in.
  - 9] Check U3 pin 2 for proper voltage;
  - 10] Set A1 for the proper operating current;
  - 11] Remove the power and bleed the drain voltage to ground;

Introducing

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## SATELLITE RECEIVER

HIGH PERFORMANCE  
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International's TV-4300 is a high performance satellite receiver that tunes all channels within the 3.7 — 4.2 GHz band. Standard dual audio output provided at 6.2 and 6.8 MHz. Others available.

The TV-4300 is a fully packaged and assembled receiver complete with a built-in LNA power supply, built-in AFC, tuner, control circuitry and power cable. All output levels compatible with video monitor and VTR input. Easy to use! Simple tuning!

**\$995.00**

#### Select These Options . . . .

- Remote tuning control . . . . . \$99.50
- Six frequency, crystal control, audio with stereo output. (Factory installed 6.2 and 6.8 MHz crystals supplied) . . . . . \$89.50
- Other audio frequency crystals . . . . . \$9.50 ea.
- Model TV-4300A . . . supplied with remote control and six frequency, crystal control, audio with stereo output . . . . . \$1,149.00



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- 12] Remove the milliamp meter and solder drain 1 output to the LNA board;
- 13] Place the milliamp meter in the drain 2 line;
- 14] Repeat steps 8, 9, 10 (use A2 rather than A1) and 11;
- 15] Remove milliamp meter and resolder the drain output to the LNA board.

Now find a housing and install the LNA and biasing boards inside. And check it once again. If you happen to have test gear to allow you to check noise figure adjust A1 for best noise figure performance and A2 for best gain. If you, like most of us, do not have such fancy test equipment install the LNA system in line with an operating TVRO receiver and set A1 and A2 for best looking picture. Now seal it up and leave it alone!

The typical settings for best performance for a two-stage system is 3 mA on the first NE 218 (optimum noise figure performance) and 10 mA on the second (and third) NE 218 (maximum available gain or MAG).

**These additional comments.** NEC is reputed to be the world's largest supplier of GaAs-FET devices for whatever that is worth. And I always recommend that when building up a GaAs-FET that you place the capacitors on the board **first** as this will help cut down on transient spikes caused by your working on the system as you are installing the transistors.

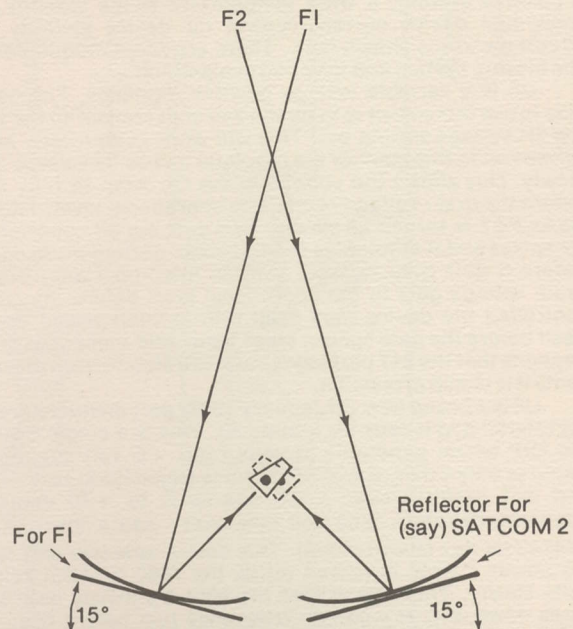
**CSD note:** John Rohner is seriously considering breaking his LNA portion of his new receiver system out of his receiver package and offering it as a stand-alone system for those who might be interested in an LNA in the 30 dB gain region at a reasonable price. Contact John directly if interested. We all appreciate Rohner's openness and willingness to share some of his hard-learned 'secrets'!

## MULTIPLE SPHERICAL ANTENNAS FOR SEEING THE 'WHOLE' ORBIT BELT

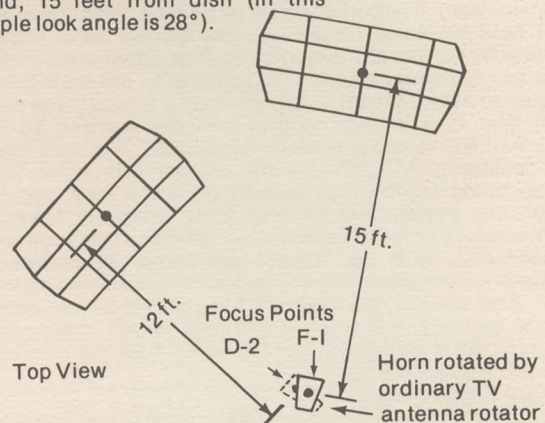
With the expansion of the 'active' satellite belt to an arc that starts on the west at 135 degrees and ends on the east at 87 degrees (SATCOM F1 to COMSTAR D3) those who like the low-cost, light-weight spherical antenna approach are put into a posture of having to select which **portion** of the belt they wish to look at successfully. While it is possible to see or receive signals from as much as 40 degrees of the belt with a spherical it turns out that good performance is more often limited to a window of about 30 degrees width. The full arc now that is active however extends over a 48 degree span of belt which will translate to varying (larger) azimuth windows for each receiving site. For a typical mid-USA location this amounts to changes in azimuth of from 234 degrees on the west to 162 degrees on the east or a **73 degree window**. A parabolic dish can be motor driven through the belt, at some considerable expense, or can be manually moved (at some inconvenience). A spherical moves with considerably more effort and expense.

One method to be able to select the full belt at most

Example for two satellites close to one another, such as F1 and F2. In example, birds are 17 degrees spaced in sky and 12 degrees in observer sky separated. Set tilt angle of antennas to get focal point at same height by accomodating elevation angles.



12 foot dish tilted 16° back from vertical gives focal point 7 feet off of ground, 15 feet from dish (in this example look angle is 28°).



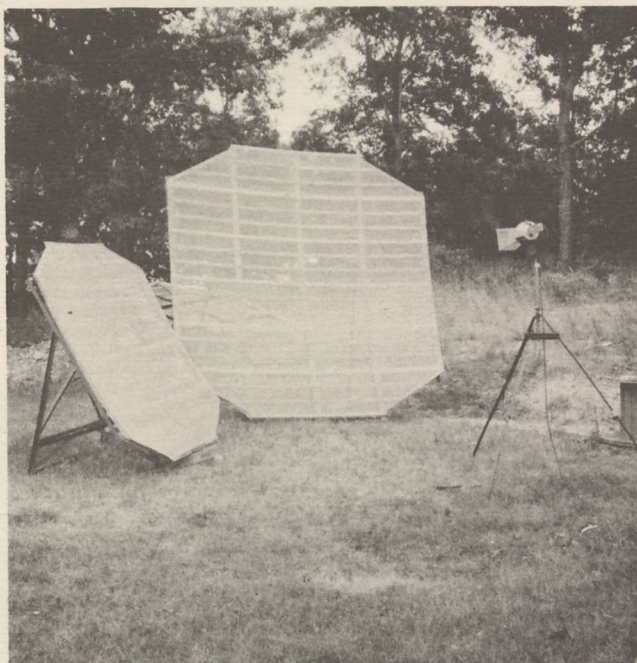
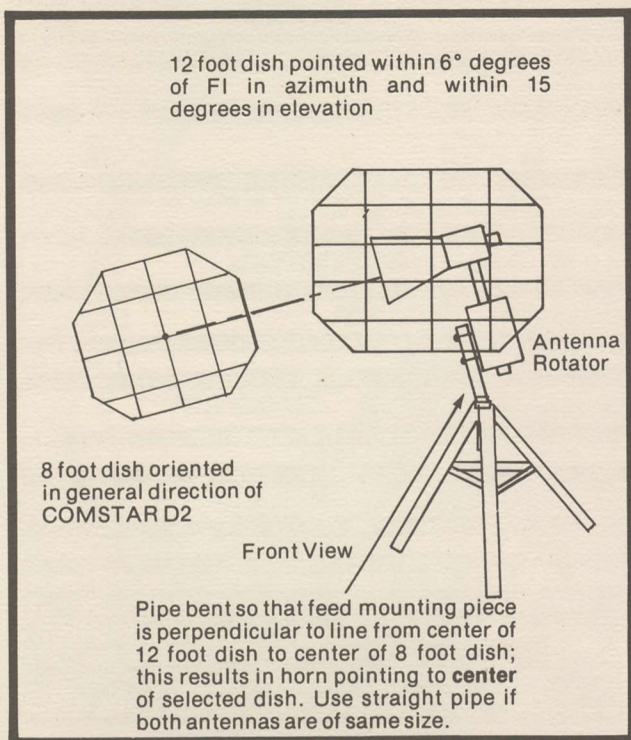
8 foot dish tilted back 31° from vertical results in a focal point for D2 7 feet off of ground, 12 feet from dish. In example look angle for D-2 is 49 degrees.

locations which seems cost effective and by observation does work very well is to design a receiving system that utilizes a **pair** of spherical reflectors. It is possible to arrange such a system so that a single feed horn (and feed mount) can be utilized and the feed focal point for both antennas is either exactly in the same location area for both antennas or only slightly different. Tests have indicated that you can arrange the system so that two primary satellites (such as F1 and D2) can indeed have their focal point at the exact same point and this means that an inexpensive TV antenna rotor can be installed on the feed and the receiver can then be switched

by  
Hayden McCullough  
Vidiark Electronics Development Co.  
P. O. Box 57  
Salem, Arkansas 72576

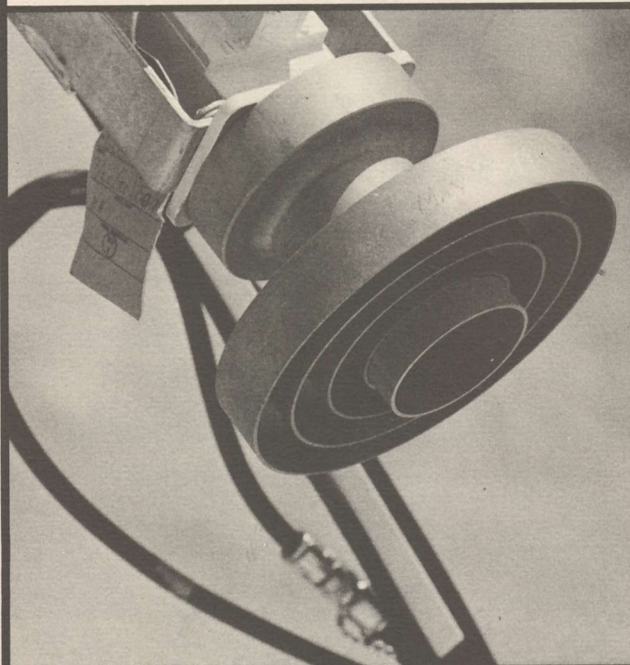


from say F1 to D2 by simply rotating the feed antenna remotely as you would rotate a simple TV antenna.



With my 12 foot antenna installed for F1 in this example a smaller 8 foot spherical was then installed for D2. The system will fall into place best for a pair of primary use widely spaced satellites and in theory a third reflector could also be added with geometric spacing so that a single feed antenna equipped with a common TV antenna rotor could indeed receive the signals from each of the three birds. Of course the option of moving the feed to pick off additional satellites from any of the multiple reflectors remains as does the ability to independently

## CARE About How You FEED Your TVRO Antenna!



**CARE AND FEEDING** of your TVRO Antenna is an oft overlooked reason why many small terminal systems have a bad case of the sparklies. The Chaparral Super Feed is the cure to this common ailment.

**THE SUPER FEED** gets the last fraction of a dB of gain out of your parabolic surface. It replaces horn and other non-precision feeds which because of 'illumination limitations' fail to achieve maximum 'dish gain' for your system. The increase in antenna gain with the Super Feed is well documented (for reference, see **CSD** review, July 1980) and may be as much as 1.5 dB! Super Feed bolts to your LNA (mates standard CP-229 flange) and is designed for optimized performance with dish f/D's in the .3 to .5 region.

**DELIVERY** is immediate from stock. Price is \$135 in single lots. Call or write for more information on the Tay Howard designed Super Feed!

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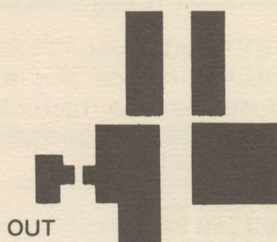
mount additional feeds (plus LNAs) for simultaneous reception from multiple birds. Assuming you already have a spherical antenna for the first bird (FI in my case) the additional cost will be in the neighborhood of \$450 (\$400 dealer cost for the 8 foot 8-Ball and the balance for a TV rotor).

On the other end of the equation it would appear that you could use this twin-reflector approach with a single focal point and single rotor controlled feed horn for satellites spaced as closely as 17 degrees apart (SATCOM FI to FII for example); closer than that requires the reflectors to be set virtually atop one another.

Since everything seems to have to have a name I am calling this a 'Segmented Torus Type' which easily abbreviates to the 'STT Antenna' (!).

## A REPLACEMENT OSCILLATOR FOR 8090

If you are upset by either the cost or delivery factor for the (Avantek) 8090 VTO device which is called for in the popular Tay Howard TVRO receiver, here is an alternate approach made possible by the recent appearance of 'plastic' microwave transistors. The end result is a VCO that can be assembled for under \$15. Theory suggests that a person could also replace the Avantek high LO as well with a similar circuit for about the same kind of money.



The device has been built as shown and it performs very well. However extensive testing has not been done and it is advisable to warn others that this is more of a curiosity circuit for other experimenters than a carefully checked out system ready for unskilled duplication. It is simply a starting point for others who may share a common problem with me in this area.

The NE02137 costs around \$2. With the 1-10 pF tuning capacitor (glass piston trimmer recommended) the tuning range will be around 500 to 1100 MHz. With the 1S2209 VVC specified the tuning range limitations of this part are 600 to 1200 MHz. The stripline layout can be done directly onto a glass type board. By selecting a properly TC variable capacitor the drift will be negligible over temperature. The 6.2 volt

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SMA PLUG FOR RG-174	\$6.57		

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AFC lock range: greater than 5 MHz  
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Video level out: std. 1 volt p-p  
Audio level out: 1 volt p-p  
Power requirements: 15VDC @ 200 ma  
Demodulator: NE564 PLL IC  
Tuning voltage out: 2 to 13.5 volts  
Tuning voltage in: 0 to 15 volts max.

### 70 MHz DEMODULATOR CARD

The Sat-tec D-1 demodulator is the last block in a TVRO system, it is where the 70 MHz IF signal is converted to video and audio. The D-1 contains a PLL demodulator, video processor (CCIR de-emphasis, 4 MHz low pass filtering and 30 Hz clamp), dual sound sub-carrier demod and AFC circuitry. The power requirement is small, 15VDC @ 200ma., signal input is -20dbm @ 70 MHz. AFC will enable the user to lock most any VTO L.O. with no problem whatsoever. Video and audio outputs are a standard 1 volt p-p suitable for driving any monitor, VTR, or modulator.

D-1 Demodulator Kit	\$99.95
D-1 Demodulator PC board only	\$49.95

Part Number	Description	Price Each
Avantek GPD-1002	1GHz, 12 db gain TO-8 can amplifier, 15VDC	\$45.00
Watkins-Johnson V802	2.5-3.7GHz VTO, lower noise than Avantek types	120.00
Watkins-Johnson V705	600-1000MHz VTO, lower noise than Avantek	120.00
Signetics NE564	PLL selected to operate at 70MHz	7.50
Van-L DBM-500	4GHz mixer, SMA connectors	85.00
Amperex ATF-417	1GHz, 25db gain hybrid amplifier, 20-24VDC	19.00
Motorola MWA-110	400MHz, 14db gain, -2.5dbm	9.00
Motorola MWA-120	400MHz, 14db gain, +8dbm	9.75
Motorola MWA-220	600MHz, 10db gain, +10.5dbm	12.40
Motorola MWA-230	600MHz, 10db gain, +18.5dbm	13.50
Motorola MWA-310	1GHz, 8db gain, +3.5dbm	12.40
Motorola MWA-320	1GHz, 8db gain, +11.5dbm	13.50
Motorola BFR-90	3GHz F <sub>1</sub> NPN transistor, 15db gain @ 1.2GHz	2.50
Motorola MRF-901	3GHz F <sub>1</sub> NPN like BFR-90 but 2 emitter leads	2.75
Regulators: 7800 Series	5V, 8V, 12V, 15V, 1A TO-220	1.50
Regulators: 7900 Series	-5V, -8V, -12V, -15V, 1A TO-220	1.75
IF Transformer	10.7MHz IF can be padded to 6.2 or 6.8MHz	1.25
Tuning capacitor	10pf multi-turn for filters, PLL, etc.	.95
Coin form + can set	Nice coin form set for filters, good to 120MHz	2.00

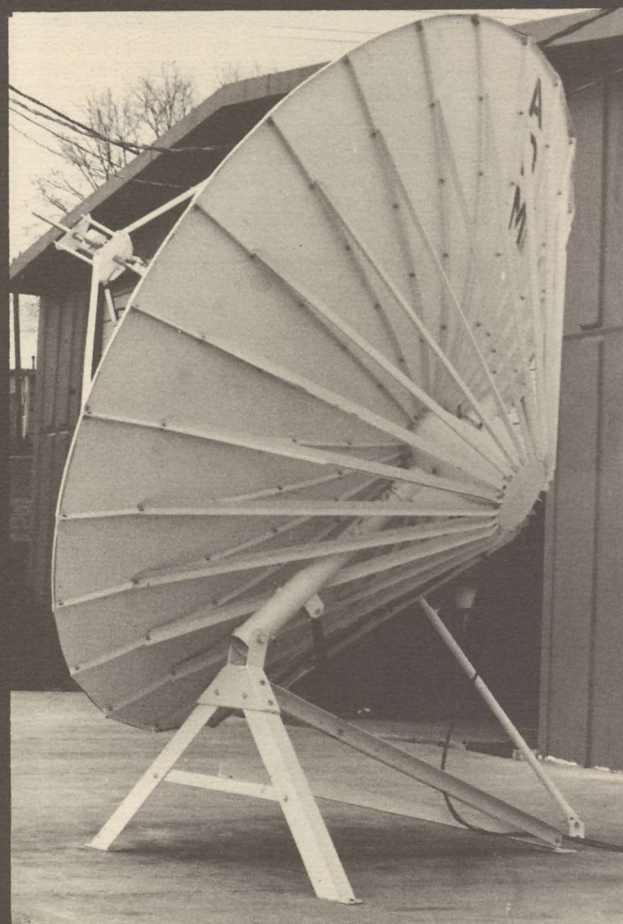
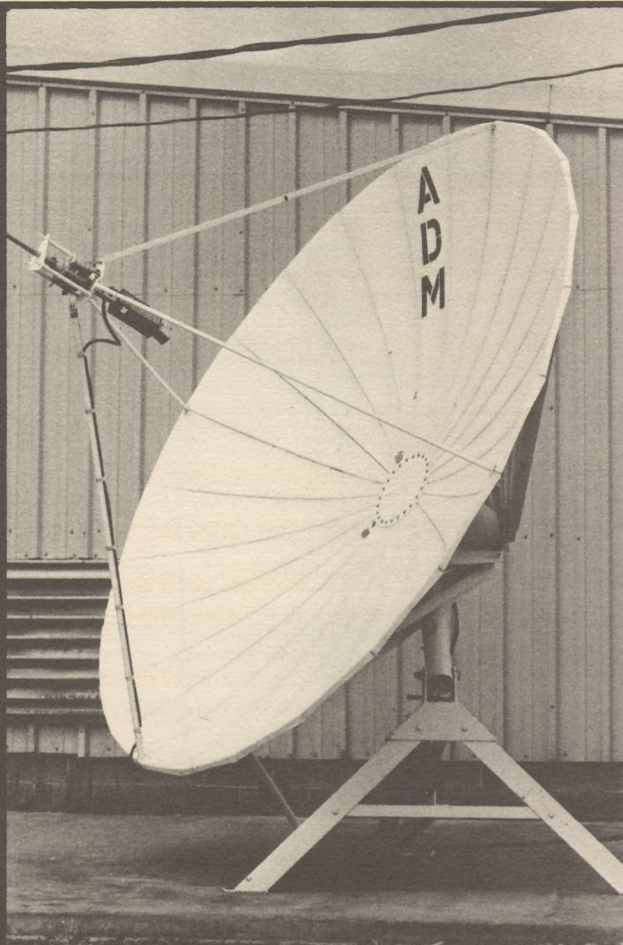


Sat-tec Systems; Box 10101  
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by  
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Rohner & Associates  
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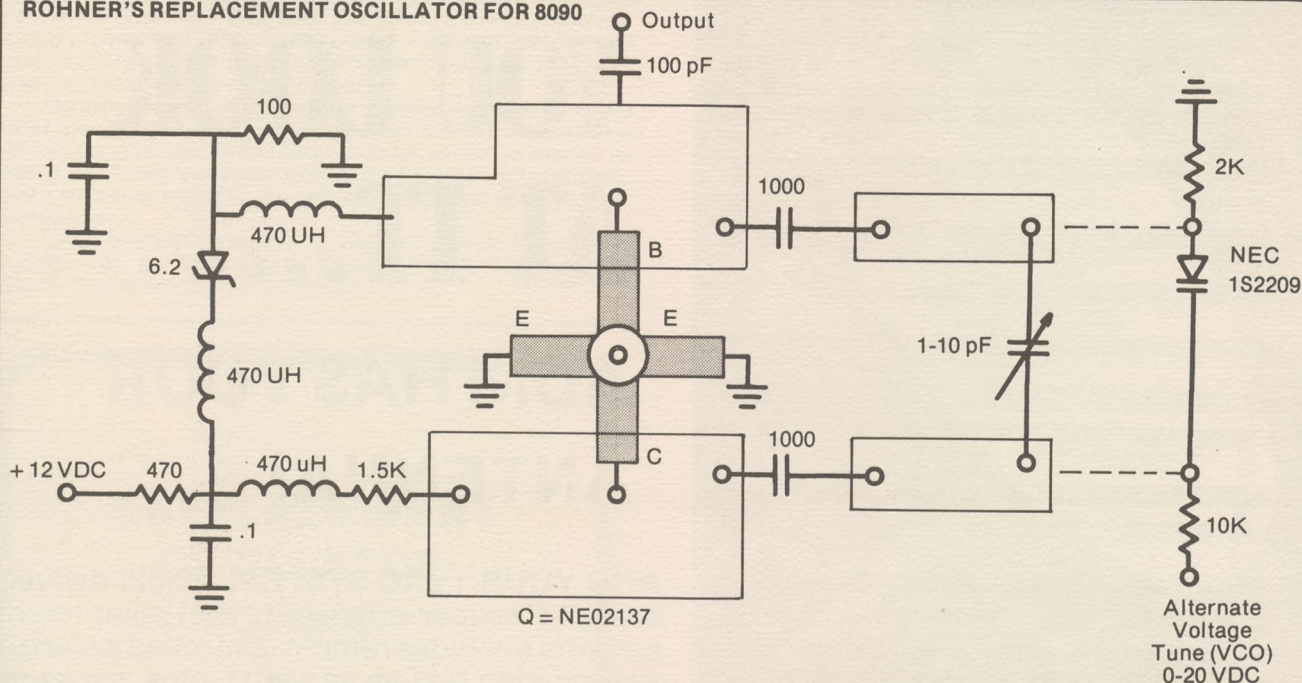
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Poplar Bluff, Mo. 63901  
(1-314-785-5988)





## ROHNER'S REPLACEMENT OSCILLATOR FOR 8090



zeners are available at Radio Shack.

One additional note for builders: **Mini-Circuits** (2625 East 14th Street, Brooklyn, N.Y. 11235; 212/769-0200) now has a model 5BL diode ring mixer covering DC to 1000 MHz. This device seems to require less LO drive than some other mixers available, can be used as the second mixer in the system (high IF to 70 MHz) and retails for under \$5.

The circuit board shown is not presently available through

any of the suppliers serving this industry; note that all parts except the VVC and chip caps go on the **back** of the board.

**Some additional observations:** The 1S2209 (NEC) can be replaced with an Alpha DKV 6510 hyper-abrupt diode and this will give a 4-40 pF tuning range for a 1 to 10 volt change. By replacing the NE 021 with an NEC 219 and the 1S 2209 with an Alpha DKV 6650C and some tweaking on the strip line you will have a VCO that should tune the 2-4 GHz range.

## TECHNICAL CORRESPONDENCE AND NOTES

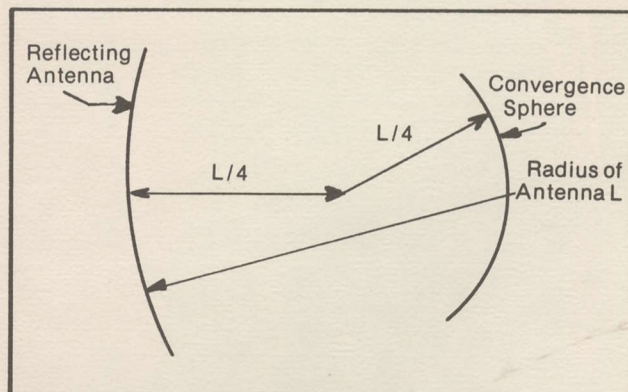
### EXPOSED SPHERE

The February issue of Radio Electronics contains one more of your articles dealing with the satellite television earth stations. On page 49 for February it mentions that:

'With the geometry, one moves the location of the focal - or feedpoint - antenna (left and right along a line parallel to the reflector surface) to switch from one satellite to another satellite'.

I think there is a mistake in this statement. I have done the calculation of the feedpoint and the surface of this feedpoint happens to be an inverted sphere of radius one fourth the radius of the reflecting antenna with a center at one fourth the distance to the antenna in the axis of the antenna. I am

enclosing a sketch of this sphere. As you can see it is very easy (and I am designing this system myself) to construct a mechanism to rotate a single receiving horn with an ordinary antenna rotor to receive several satellites with the same horn.



I am also enclosing a computer output of the points within the sphere. In this output the points correspond to satellites located the number of degrees left or right of the antenna access. The calculations of this table suppose that the antenna has a tilt angle to focus directly on the satellites in the north-south direction. As you might guess the calculations are approximate and are valid only for small incoming angles. At 20 degrees, for example, the diffusion around the convergence point starts increasing significantly.



descrete) audio bandwidth type channels to be common multiplexed onto a single sub-carrier. The CATV types are starting to get a little nervous about the number of 'extra' channels. The fear stems from the fact that with each sub-carrier added the available transponder power on the bird is further divided (power is maximum-fixed at 5 watts per transponder; that five watts 'spreads' amongst all of the carriers and sub-carriers). Each sub-carrier added nibbles away, perhaps as much as 0.3 to 0.5 dB, at the non-sub-carrier video signal EIRP level on the ground. Take a close look at 21's signal level sometime (with the receiver AGC dis-abled) and compare it to 17 or 9 or 5. All four share the same antenna pattern yet 21 is universally weaker on the ground. 21 also has a pair of operating sub-carriers.

#### WASHBURN DISASTER?

Page P9 of the August CSD refers to battery powering of the LNA and a trickle charger along with reference to GE MOV devices. Please run a construction article on such a system in a forthcoming issue.

The Washburn Kit is a disaster. I ordered it after the Miami SPTS and have not yet received all of the parts. With all of the errata, incorrect drawings, substituted parts and circuit changes, it will be difficult to know when one is really finished! You will do the group a great service by never mentioning it again.

Leland K. Glenn, MD  
Fort Myers, FL 33901

Anyone out there care to 'share' circuit/schematic for an LNA power supply that utilizes trickle charged Nicad cells with MOV devices scattered throughout to prevent power surges? One source for such a supply, commercial in the \$200 region, is ECA, P. O. Box 2029, Grove, OK 74344. Another is US Tower, P. O. Drawer S, Afton, OK 74331. YES - we agree up to now there have been mini-disasters following Washburn around. BUT - we disagree his receiver should be ignored. Clyde could have silently dropped out of sight but instead he faced the problem head on, appeared at San Jose to answer critics and has now managed to put together a backer who we feel sure will see that kits, parts and wired and tested units get into the marketplace quite quickly. We still feel this receiver properly assembled and aligned is the hands-down winner for sensitivity and we for one are very anxious to get our hands on one to see if we are right. When we do (we've been promised one this fall) you'll read all about it here.



SBOC Houston apparently will be stage for yet additional round of exciting new hardware plus many of the pre-production units unveiled at San Jose in July promise to be in a delivery mode by mid-November. John Ramsey plans introduction of high grade receiver with discriminator detector (in place of PLL). Unit is tuneable over full range, offers range of bells and whistles in \$1400 region. Also look for a new ICM

(International Crystal) receiver probably also featuring conventional discriminator or advanced PLL approach. Comm-Plus, the firm Nelson Ethier is associated with in Montreal, will have factory delivery of their San Jose prototype on hand priced in \$1900 (Canadian) region list but available to dealers in quantity in \$1300 region. Also look for some excitement in the LNA area with 120 degree units in \$800 retail range getting push from 100 degree units in \$1100 range and even 80 degree range units.

**NEW understanding** of problems relating to low-cost home receiver front end technology will shortly lead to major breakthroughs in receiver 'add-on' devices for sharply improving performance of receivers. 'Image noise' created in LNAs has been unseen culprit in apparent degraded performance of low dollar receivers; a new filter designed by Tay Howard will shortly be available from ICM and perhaps others to improve performance on even high dollar commercial units. Amplica brand LNAs are now being retrofitted with filter to correct problem created by broad LNA noise spectrum; another LNA with similar problems (when mated with broad input private receivers) is SCI brand. Solution to problem is so dramatic that special session at SBOC will address topic in detail so that dealers now experiencing noisy pictures will appreciate cause and cure.

**WIDEBAND FM** demodulator that can be retrofitted to virtually any TVRO receiver with improvement in picture quality will be another breakthrough surfacing at SBOC '80 Houston. Unit is being produced in 'single inline package' by California Micro-Electronics Technology Corporation and is described as 'trick detector'. The new device is seen as potentially being as revolutionary to low dollar discriminator performance for fraction of work. Initial cost to be in the \$50 region.

**TWO** ten meter SA dishes located in Fairbanks, Alaska area are available at about half the original price. Suitable for use in southeastern Alaska, ready for immediate pick up or delivery. Contact Rick Brown at 202-387-3100 for details.

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# SBOC'80

## HOUSTON

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### SATELLITE BUSINESS OPPORTUNITIES CONFERENCE

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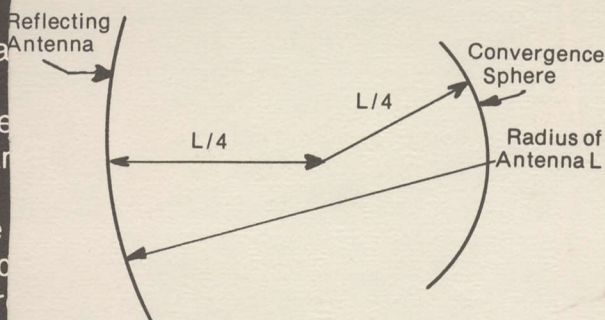
A very special kind of **Satellite Seminar for professionals** looking for the right answers to getting into the satellite TV business; profitably. So special that we call it a business opportunity conference. Which is exactly what it is...a gathering of people and firms who are looking for the best combination of marketing strategies, hardware packages and services to offer to the television viewing public. Only SBOC Houston doesn't stop there. Intensive three day session includes a hard look at **every aspect** of capitalizing on the tremendous potential in low-cost satellite systems. From uplink ownership and operation to programming packages via leased satellite transponders. Dozens of exhibits, dozens of hard hitting seminar sessions, more than 30 hours of special in-house television programming from past SPTS events. **PLUS** - the very latest in new technology from new super light weight antenna systems to complete terminals that have all of the electronics integrated into the dish antenna. If you believe there is money to be made in the low-cost satellite communications field, you need to be at SBOC '80 Houston!

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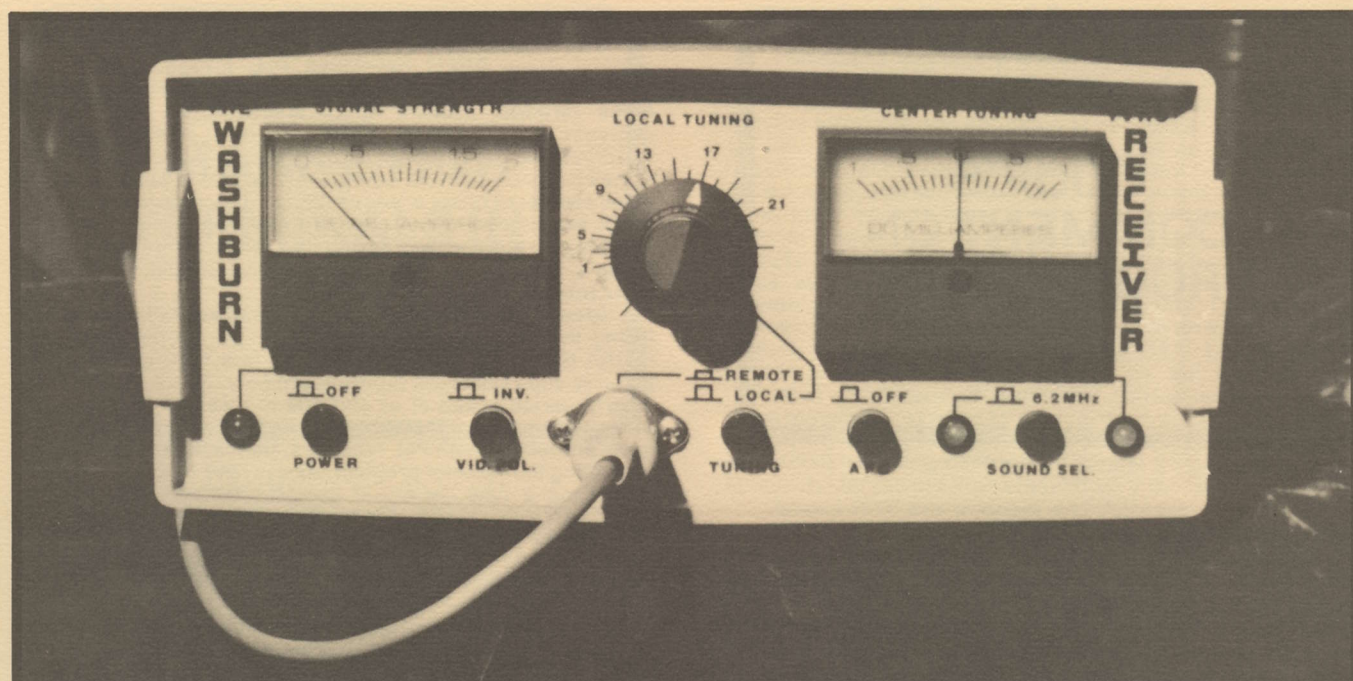
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## SBOC '80/HOUSTON





## THE <sup>TM</sup> WASHBURN TVRO RECEIVER

### EXCEPTIONAL PERFORMANCE

- **TRUE EXTENDED THRESHOLD** - 7 dB under full video modulation conditions, achieved through meticulous attention to removing limitations imposed by components.
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- **FULL REMOTE CONTROL** - 25 ft. (extendable) remote allows an untrained user to easily select transponders and control the volume of the High Fidelity Audio Output. Normal transponder selection automatically commands correct feed polarization through a closed-loop servo.
- **SELECTABLE SUBCARRIER PRIORITY** - With visible subcarrier indicators and two easily changed plug-in detectors (5.5 to 8.4 MHz available, U.S. or CCIR format). Usually eliminates the need to manually select subcarriers, while allowing manual control when desired.
- **FULL FUNCTION METERING** - With selectable manual tuning and AFC disable allows checks of system CNR without additional equipment. Continuous monitoring of Signal Strength (in linear dB) and AFC Correction (in MHz).
- **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.

**SUPERIOR VALUE** - A natural for this effort since they had been the first serious marketer of commercial terminals for the commercial folks; in particular, cable TV systems. SA at the time was clicking along with sales in the \$100 million per year range, growing like a weed, and according to detailed analysis within the cable industry selling around 65% of all of the cable TV satellite terminals being bought. SA was clearly number one in a field of perhaps ten suppliers.

In March of 1979 an SA chap named Dick Campbell got in touch with Coop and shared his thoughts on the development of a 'home terminal division' at SA. The new division would be called HOMESAT and Campbell was expected to head it up. Typical of SA approaches, HOMESAT would be a marketing operation drawing upon the manufacturing capabilities of the parent firm. At the same SA was producing 4.5 meter and larger dishes, a tuneable plus a fixed tuned (single channel) TVRO receiver, was about to introduce what for the cable industry was a low cost video modulator (\$700 region) and they

private terminals to use for transmission. Campbell made an assumption that later turned out to be false; he was confident he could work this out with HBO since SA was a major supplier to HBO of terminal hardware. At that time HBO was literally giving terminals away to cable systems if the cable systems would carry the HBO pay programming and SA had cut a fine, money saving deal with HBO to supply much of this equipment.

The first SA installation, in New Mexico, fit the mold created by Campbell; a very remote ranch family, isolated on a 360,000 acre spread. No television at all. Their 4.5 meter dish and twin satellite receivers put them in touch with farm and ranch news and Bozo the Clown from WGN. Subsequent publicity on the type of installation and type of viewers was lost however when the second, third and so on 'buyers' turned out to be a totally different type of user. One was a sports nut in South Carolina who wasted no time getting national publicity because he suddenly had access to as many as 50 baseball



## COOP'S COMMENT ON PROGRAMMING

### YET ANOTHER GROWTH PHASE

Just about one year ago H. Paul Shuch and I bantered about our separate prognostications as to how far and how fast satellite TV receiving hardware might go and in what length of time. I note with amusement in the December (1979) CSD a comment by Paul that he expected \$1,000 home receivers in the marketplace by mid-1980. If one considers June and July to be mid-1980, and one also attended SPTS San Jose over the July 4th weekend, one saw Paul's forecast come true. Not once but twice. The Sat-tec R2 and the ICM TV-4300 both at \$995.

In the same December Digest I read where I commented back to Paul "...while it may be true that engineers will be ready to produce \$1,000 end user price range receivers by this coming (sic) summer, we seriously doubt the balance of this new, fledgling industry will be ready to manufacture or market them...". Score one for me too.

Now here we are barely 45 days in advance in Houston's SBOC '80; a gathering some are already calling 'a high brow SPTS'. And we are hearing the usual rumors and rumblings about what new, exciting hardware will be available for the first time in Houston. Ah yes, there are several new receivers scheduled for first-time display at Houston. But surprise, they won't necessarily be cheaper. Rather, they will try to be better. Both International Crystal and Sat-tec seemed to have learned something with the introduction of under \$1,000 receivers. That something being that when you get the price down so far you are forced to make certain sacrifices in user performance or utility which many users are not willing to accept.

There is no question in my mind that given sufficient production quantities a high class, good performing satellite video receiver can be marketed for \$1,000 or even less. But the key here is 'sufficient production quantities'. Turning out 50 or 100 radios per month is far from enough to put into manufacturing the kind of automated, precision controls that top-performance satellite video receivers demand.

The receiver portion of this industry has been riding the original Steve Birkill developed PLL (phase locked loop) demodulator since Tay Howard designed the first complete home terminal system. Birkill's work with PLLs made everyone sit up and take notice because it offered excellent low-threshold performance. But it did so at a price; that being somewhat (varying from unit to unit) degraded picture quality when compared to say a 'conventional' discriminator detector. Clyde Washburn fine tuned that problem with his innovative Washburn receiver last spring but the true importance of Clyde's work was lost behind a smoke screen of delivery problems.

Meanwhile in the field new dealers were both cursing and loving the PLL inexpensive receivers. Loving the price, but fearful that buyers would reject the less than perfect color pictures such receivers typically produce. So we have a new growth period ahead of us and due to blossom at Houston's SBOC. Taking what they have learned about (small quantity) mass production with PLL receivers, both ICM and Sat-tec are re-visiting the detector problem. As you read this I am carefully evaluating a new variety of detector receiver from Sat-tec and expect a new ICM unit in for test any day.

Getting rid of the PLL is not the total answer to high quality pictures. Clyde Washburn has shown that properly handled, a PLL has no color video quality problems. In fact, it can work better than a conventional discriminator in the video quality area and also create threshold sensitivity which conventional discriminators find impossible. But getting this high performance out of a satellite video receiver costs money. It takes very careful selection of parts, and most important, it takes extremely careful alignment and patience.

That in fact is the primary reason high dollar receivers such as those from Microdyne or Microwave Associates often do work better than our industry's standard PLL units. That's also why Andy Hatfield's AVCOM receivers still cost twice as much as PLL units in this field; Andy has stuck with a conventional discriminator, careful (and expensive) selection of parts and lots of hand tweaking on each receiver before it leaves the factory.

PLL receivers will not go away. For many applications they are adequate. In Clyde Washburn's hands they are elegant. But for high-quality (smear-proof, tear-proof) color reception, the conventional discriminator would seem to be a logical place for this industry to be right now.

All of this will come to a head in Houston as these and other new receivers coupled with unbelievable LNA prices (under \$1,000 100 degree units???) and more consumer oriented, attractive and functional backyard antennas slug it out for honors for producing the 'best looking pictures' at the conference.

I for one am delighted to see this shift away from 'least expensive' to 'best looking'. That is, after all, what satellite TV does best; provide multiple channels of potentially 'studio perfect' television. The system can work so well it has always bothered me that we mess it up with too cheap receivers that were perhaps no more than a few hundred dollars removed from perfect pictures. Here's to Houston!



## PRIVATE MARKETING TERMINALS IN 1980

### CREATING EXCITEMENT

Selling satellite television is a very exciting endeavor. The mere concept of tuning in extraordinary television from 'space' captures the imagination and fancy of virtually every person exposed to it. The business is also filled with pitfalls and bottomless pits so deep that one careless trek can leave the neophyte dealer crippled for life and out of business before he ever gets started.

During Houston's SBOC '80 Bob Cooper is bringing out a new STT manual entitled "Coop's Satellite Business Opportunities Manual". Digging into files of successful and not so successful efforts to sell private (and low-grade commercial) terminals Coop is putting together a game plan to assist would be entrepreneurs in this new field in avoiding both the big pits and the little pitfalls which everywhere dot the countryside.

Perhaps the greatest danger in selling satellite TV hardware or systems is your own enthusiasm. Unless you have come into this industry gradually, from an allied field such as cable television where there is a deep appreciation for the sanctity of ownership rights of various types of television programming, the usual human response to satellite TV signals is that 'Hey - they are there, they are available for the taking'. Sadly that is not true. And if a dealer takes it upon himself to push home satellite terminals with a sales pitch that builds upon that premise, he is digging his own pits. And as many previous feature reports in CSD have detailed on a regular basis, we all must be extremely careful with not only **how** we represent the services available but what premises (as well as promises) we create to sell the hardware systems.

Most of the marketing efforts to date have been exploratory in nature. That is, people or firms have chosen a particular operating style to project as an image for their own particular selection of hardware. We'll look at some of these here. But not before the inevitable history lesson.

### THE FIRST...

The first serious, well funded, carefully researched effort to sell private terminals was fielded by Scientific Atlanta in the spring of 1979. SA was a natural for this effort since they had been the first serious marketer of commercial terminals for the commercial folks; in particular, cable TV systems. SA at the time was clicking along with sales in the \$100 million per year range, growing like a weed, and according to detailed analysis within the cable industry selling around 65% of all of the cable TV satellite terminals being bought. SA was clearly number one in a field of perhaps ten suppliers.

In March of 1979 an SA chap named Dick Campbell got in touch with Coop and shared his thoughts on the development of a 'home terminal division' at SA. The new division would be called HOMESAT and Campbell was expected to head it up. Typical of SA approaches, HOMESAT would be a marketing operation drawing upon the manufacturing capabilities of the parent firm. At the same SA was producing 4.5 meter and larger dishes, a tuneable plus a fixed tuned (single channel) TVRO receiver, was about to introduce what for the cable industry was a low cost video modulator (\$700 region) and they

were up to their multi-hundred-thousand investment dollars in creating their own LNA manufacturing capabilities.

**HOMESAT was carefully created** and conceived to **not do** just exactly what it ended up doing. How's that? Well, SA knew well that the whole concept of **individual** private home satellite terminals was not going to be popular with the cable TV folks. The cable firms, after all, had an 'exclusive' on re-sale or local distribution of programs sent out via satellite. SA surmised, correctly, that cable firms would not like to see some other market develop which might **share** this same satellite feed service. To combat this expected response SA's Campbell created a marketing program which used the cable firms as installing dealers and maintenance centers for satellite terminals. A cable firm in Boise City, Oklahoma (for example) became the 'franchisee' for SA in an area about 100 miles in diameter. Which pointed up SA's second market thrust; they were going to zero in on the **rural market**. Campbell commissioned a detailed marketing study which when completed revealed to him that some 60,000 plus ranches and farms existed in an 11 state area. All of the 'spreads' earmarked were large enough (in annual dollar sales volume) to 'qualify' for private (home) satellite TV terminals.

**Armed with this program** and these statistics, Campbell chose Coop's weekly satellite delivered TV program (then being created for the cable industry) to spring the new SA approach. Within days of the program's airing the SA entry into the home satellite terminal business was the latest gossip subject for the cable folks. And there were negative responses very quickly.



**DICK CAMPBELL [left]** with Coop on set of 'Satellite Magazine' TV program reveals his firm's plans to enter private terminal industry; April 1979.

The first significant response in the negative came from the program suppliers; HBO in particular. Home Box Office told SA "We don't think we will be able to authorize your private terminals to use our transmission". SA's Campbell made an assumption that later turned out to be false; he was confident he could work this out with HBO since SA was a major supplier to HBO of terminal hardware. At that time HBO was literally giving terminals away to cable systems if the cable systems would carry the HBO pay programming and SA had cut a fine, money saving deal with HBO to supply much of this equipment.

The first SA installation, in New Mexico, fit the mold created by Campbell; a very remote ranch family, isolated on a 360,000 acre spread. No television at all. Their 4.5 meter dish and twin satellite receivers put them in touch with farm and ranch news and Bozo the Clown from WGN. Subsequent publicity on the type of installation and type of viewers was lost however when the second, third and so on 'buyers' turned out to be a totally different type of user. One was a sports nut in South Carolina who wasted no time getting national publicity because he suddenly had access to as many as 50 baseball



games per week. Another was a TV addict in Ohio who found tuning in network news feeds far more fascinating than Bozo the Clown. And so it went and the pressures began to mount.

To stifle the negative responses coming from the cable folks and the networks and everyone else involved with bird transmissions, SA saw to it that their customers filed for and obtained full FCC licenses. To cover the matter of using various cable-intended program sources Campbell directed SA to take a full year's fees out of the sale price and forward same in check form to HBO, Showtime et al promptly upon installation.

Meanwhile cable giants put the screws to SA. A planned gigantic sales push, aimed at getting cable firms to become dealers or maintenance centers for SA home terminals was scheduled for the annual cable TV trade show; and then cancelled at the last minute because of cable industry negative feedback. At that trade show SA Chief Operating Officer Sid Topol sought out Coop to counsel him. "This can be the biggest thing that ever happened to either of us; but we have got to cool the publicity, back off and leave it alone for awhile while the cable industry gets used to the idea".

Well, the cable industry did not get used to the idea. In fact, by the time of the first SPTS ('79 held in Oklahoma City) SA's Campbell and his firm's display had adopted a backed off and almost silent attitude. HBO's refusal to accept SA checks for one-year-in-advance programming had come to a head and after his scheduled first day appearance at SPTS Campbell hopped a plane to New York for what turned out to be the final showdown meeting with HBO.

SA had a lot riding on the development of private terminals. There had been significant contacts between SA and firms such as Radio Shack. SA's Campbell was projecting thousands of small antenna terminals (3 to 4 meters in size) per month, with the SA built LNAs and SA built receivers to back it up, by the end of 1980. Quietly, off the record, he as even talking about a planned joint venture with a firm such as Radio Shack whereby they were targeting a 'Christmas 1981' introduction of a complete \$1,000 terminal (antenna, receiver, LNA...all manufactured by or for SA). One had to assume that the SA entry into LNA manufacture and the expansion of their small dish (3 meter) antenna facility was all tied to these type of projections by Campbell. "Our first sub-target is going to be a \$50 4 GHz to IF front end; by the first of 1981" Campbell said. "Our concept is that by marketing in sufficient quantity you can get the LNA gain required and the high frequency mixing down to a \$50 cost-to-us factor if the whole package is intergrated together".

Alas, support from a firm 'like Radio Shack' never came (if it was ever there at all) and the HBO monkey wrench became a bottomless pit that by early in the fall of 1979 had driven SA out of the direct home satellite terminal business. There are skeletons about and even some remnants of that marketing operation however. Foremost of these is a Denver, Colorado operation called WTCI; Western Telecommunications Incorporated. WTCI is one of those moderate size communications conglomerates that owns and operates a big string of cable TV firms along with one of the nation's largest, privately owned common carrier microwave firms. The microwave group supplies TV channels to cable firms in most of the states west of and inside of the Rockies.

WTCI and SA announced, just about one year ago, that WTCI was assuming the 'marketing role' for private (home) terminals formerly done by SA. Campbell left SA shortly after this announcement. WTCI offers today to ranchers and farmers and other people with around \$3,000 in cash to put up for installation and around \$150 per month to put into a programming and equipment leasing kitty a private home terminal. WTCI cut their own deal with HBO et al and they had the clout to make it stick.

Because WTCI operates a healthy and large string of cable TV systems, and because HBO depends upon firms such as WTCI to make its own business work, it was not too surprising to learn how WTCI and HBO worked out a problem which had stopped SA dead in a pit. Said WTCI "We take a portion of the \$150 per month fee and we pay each of the program suppliers viewed by the leasee's home TVRO system". How?

Well, WTCI simply 'counts' the home terminal viewer as

if he were really connected to a nearby (however far that might really be) WTCI cable TV system. If the Bozeman, Montana cable system had 2,500 HBO subscribers at the end of the HBO payment month and somewhere outside of Bozeman there were four private terminals also getting HBO through WTCI installed private terminals, the reported count for Bozeman simply became 2504.

WTCI also claimed to have solved the 'other' problem which SA could not solve; control over programming if the customer did not pay. "If a leasee refuses to pay for his terminal, we take it out. Nobody ever gets behind in payments to us and we never get behind in payments to HBO that way" notes WTCI.

The concept was clever but not novel. A speaker at the first SPTS proposed that everyone in attendance sign up to his 'Satellite TV Cable Service'. He suggested that he would



## Space Age television for your home via satellite.

Enjoy the quality of satellite color TV reception. Watch first-run movies, live nightclub entertainment, special children's programming, concerts, contemporary Christian broadcasts, news, family favorites... and sports:

- Major League Baseball
- NCAA Football and Basketball
- Professional Tennis, Golf, Hockey, Soccer, Basketball
- NFL Pro Football

All of this comes in as beautifully as if you were in a television studio.

For more information, call Dick Campbell at (404 449-2000), or write us.

## HOMESAT

A Scientific-Atlanta Subsidiary

Providing Exceptional TV Programming

3845 Pleasantdale Road, Atlanta, Georgia 30340, Telephone 404 449-2000

SA's HOMESAT division initially created advertising theme built around the attractiveness of the satellite programming service.

contract with HBO for the sum of all of the individual home terminal users he represented and everyone would be 'happy'. Unfortunately HBO said 'no dice'; they were not going to authorize any such 'cable company' to use their programs unless the operator had some foolproof way to 'shut off' viewers who refused to pay.

The same problem bothered SA's Campbell from the beginning. "What happens if, after the first year, your New Mexico rancher decides he doesn't want to pay HBO (or anyone else) for the second year's service" we asked him. "He would get cut off" was Campbell's response. We wondered how. On Coop's TV program Campbell squirmed in his seat and responded "We have proprietary ways". Short of building into each TVRO receiver a one-year self destruct fuse we didn't see how. Off camera he added "I wish you hadn't asked me that!". Clearly WTCI had found the only sensible answer that



would satisfy HBO; retain ownership of the terminal, and lease the terminal plus the service to the user.

The WTCI program has not exactly lived up to Campbell's projections. With the end of the first year approaching perhaps 75 such terminals will have been installed. Several non-'professional' dealers have done better with much less fanfare.

Perhaps the most distressing factor in all of this has been the unwillingness of the program suppliers to deal with non-cable terminals. It is a complex problem with no obvious easy answer.

HBO and Showtime maintain, in public and in private, that their own agreements with the movie suppliers have specific limitations written in which prohibit them from accepting contracts or providing service from or to non-cable (or more recently, non-motel/hotel) 'clients'. Such contract prohibitions may well exist but there is at least the presumption that more is involved. For example, 'The Movie Channel' has accepted private terminal viewers from the beginning; at a \$96 per year fee. Not many have signed up but while HBO and Showtime, through then-SA's Campbell, were telling delegates at SPTS '79 in Oklahoma that they would not allow private terminal viewers Warner's then-Al Parinello was speaking on the rostrum of SPTS telling the same delegates that Warner would accept private viewers. Since by in large Warner buys movies from the same suppliers as HBO and Showtime, one wondered how Warner could offer the service to private terminals while HBO and Showtime could not.

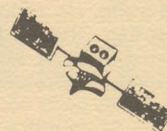
Perhaps the fact that HBO and Showtime were at that time aggressively selling their services to the cable market while Warner's service was primarily being utilized by Warner-owned cable systems had something to do with it. Warner was not fearful that cable operators would give them hell for the move but HBO and Showtime were. HBO in particular was extremely sensitive about its position in the market and as evidenced by the pressures they placed on SA was not going to create any situation which might endanger their leadership position as a pay programmer.

#### MEANWHILE...

Well, if big bucks and big corporate muscle couldn't pull off a viable marketing program for private, home terminals, what chance did a small firm with no bucks and no muscle have to make it work? Surprisingly perhaps, smaller firms had a much better chance of getting started and surviving simply because they were small. A few got off the ground peddling a half dozen or so terminals per month in the fall of 1979. They did so by identifying who their market was and then concentrating on that market.

Chuck Colby at Microwave General did more in this area than perhaps others. Starting with a ten foot terminal antenna, the usual assortment of LNAs and one each of the various receivers then available Colby decided to capitalize on his special knowledge of the California electronics industry. First came a major public demonstration of low-cost satellite TV terminal operation, conducted during the 1979 WESCON electronics show in San Francisco (see front cover, CSD for January 1980). Colby knew that in the hundreds of California based electronic firms there were many dozens of well heeled executives and stock holders who had the bucks to acquire a terminal. He also reasoned that with some knowledge of electronics such people would not be difficult to 'sell'; that they would grasp and appreciate the concept. Sales went well and Colby was a quick learner. One of the most important things he learned was that people in California don't like big dish antennas as focal points for their yards. Armed with this sales resistance he set out to design an antenna mount for antennas up to 16 feet in size which would have all of the desirable characteristics. Namely, exceedingly low profile, automated azimuth and elevation tracking and a digital display system handsomely mounted for wall hanging which would tell the user exactly where the dish was pointing at any time. He did one more thing; he went to 'outdoor-blend' colors for his dishes with tans and golds and subdued greens commonly employed. A sales presentation notebook fitted out with large, professionally created photos showing the antennas carefully set back into rose gardens, adjacent to hedges and wherever

### SELECT YOUR CATV SYSTEM Satellite Programming INTELLIGENTLY...



#### ...with SAT-Guide

Twenty channels of programming today on FI, soon 35 on FI and D2. Keeping up with what is 'up', when, is almost impossible. Until SAT-Guide.

ALL FI programs on all transponders are listed in this unique programming guide to satellites. INCLUDES daily program listings PLUS monthly summaries of movies, sports and specials. Only \$36 per year from:

**SAT-Guide**  
Division of Commtek

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Hailey, ID 83333

## 85 K / 50 dB GAIN Low Noise Amplifiers

**A MAJOR BREAKTHROUGH** in low noise amplifiers! AB Electronics pushes back the LNA 'noise barrier' by an important 35 degrees from standard 120 degree units and delivery is from stock!

**50 dB of gain** (minimum), **85 degrees K** (maximum) across the full 3.7 to 4.2 GHz range. A major brand LNA with credentials you have to see to believe. And at a price more than 50% below previous 85° units. **The ultimate LNA; priced at just \$1995!** Call for full details.

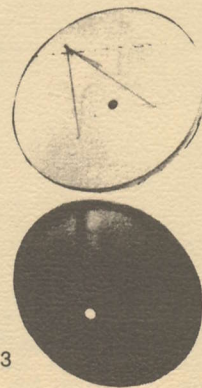
**AB Electronics**  
1782 W. 32nd Place • Hialeah, FL 33012

(305-887-3203)

*Now available at an  
affordable price...*

### PARABOLIC REFLECTOR ANTENNA

Big 10 ft. diameter fiberglass construction with 4 petals and center section. Bolts together easily in 45 minutes. Focal length 48.6, F/D Ratio .4, Gain 39db. Weight 185 lbs. Reflector only \$680.00. In lots of 10 \$585.00.



### MINI - CASAT

RT. 3, BOX 160 FULTON, MS 38843  
601 862-2132

else they have been installed goes a long ways to dispell potential buyer fears that they will end up with a 15 foot glaring white bird bath outside their living room window. **"Not everyone believes a satellite dish is a thing of beauty"** comments Colby.

Colby was one of the first TVRO dealers to outfit a trailer with a portable antenna. "I began with a ten foot on a trailer under the theory that while most of my California installations would not be 10 foot antennas the small dish could be an effective demonstrator of the service". Colby found that the ten footer became a demonstrator of the 'novelty of satellite reception'; not the potential 'quality' or 'diversity' of the service. "There is an important difference here" he notes. "You can attract a big crowd in a shopping center with a 'satellite TV - the novelty'. But you don't attract many buyers of high grade, high-dollar systems." He then graduated to a 16



foot trailer rig which simulates for potential buyers the **same reception** they would have with a permanent 16 foot installation. "It all has to do with properly **qualifying** your buying candidates".

Many early dealers fall into this trap. Shucks...there is no trick to attracting a **crowd** of people with a **free** show. And you may actually enjoy explaining what it is and how it works everytime somebody asks a question. At least for the first dozen or so times you do it. But then after a day or two of this you slowly realize that you must have talked with dozens or hundreds of people and yet you don't really have a single **solid** sales lead. "Everyone **wants** one...but I haven't **sold** any yet" is a common early pitfall. Colby believes the successful dealer doesn't limit his marketing to public displays and the development of sales leads from such displays. "It has been my success that you **pre-qualify** your market and build your own list of potential buyers. Approach them with the message having first determined that they are the type of people who fit the mold of likely prospects and that they **can afford** the system".

**Affording the system** is a key element in all of this. SA's Campbell did a rough form of qualifying when he engaged a market research firm to determine how many farms and ranches there were with sufficient annual gross income to allow them to afford such a terminal. Others, such as Colby, do the same thing on a smaller scale.

"Upbeat, alive people who are successful in business and who have as evidenced by their life styles surplus discretionary income to spend are the best prospects. If a family fits this general mold then you can zero in on people with special interests such as sports or movies or insatiable appetites for current events (news)".

**The trick** then is to combine both public displays, which creates an image for you and your firm, with a carefully researched list of key prospects. "Once the prospect list is started you begin to look for ways to get an introduction to people on that list".

Marching up to someone's door after you have done your own investigation and qualification and asking "Would you like to buy a **satellite TV terminal**?" is probably not very effective. Dealers with a track record in this area prefer to bring out the prospect's interest in specific areas such as sports and then gently slide into the unusual sports coverage available on satellite. From this point in the contact it is a short side trip to hauling a trailer mounted rig to the prospect's site for a day or two of actual demonstration.

#### AWESOME...

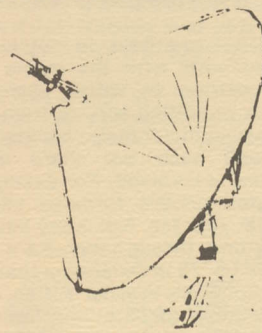
An appreciation of the basic difference between 'the novelty' of satellite TV and finding 'qualified' potential buyers is important. Much of the advertising created to date has perhaps over emphasizes the 'novelty' factor. "Up to 60 TV channels with your own earth station" headlines one advertisement prepared for insertion in national publications **TV GUIDE** and **PLAYBOY**. "Exciting New Viewing Worlds" headlines another advertisement with the sub-headof "Directly from space satellites to your own earth terminal". Still another reads "Television Programming Relayed by Satellite".

A full page layout prepared by SA said it with a certain eloquence. "Space Age Television for your home via satellite...". When SA abandoned the direct sale of home terminals Campbell had been exploring utilizing the same agency that creates the Coca Cola advertising themes. If 'Coke Adds Life'...what would satellite reception add!

**Overselling the product is very easy.** The service is awesome and mind boggling. It is easy to get caught up in the massiveness of the offering and in the process both overwhelm the prospect and create for yourself some potential legal problems. It is the latter which begs attention.

"Up to 13 pro games each Sunday" suggests one advertisement. Now you and I both know that the only way you can dial in 13 pro football games on a Sunday is to 'drop in on' the **network** feeds on **WESTAR**, **COMSTAR** and **SATCOM FII**. You and I also know that the networks and the FCC take a very dim view of such viewing since these are not relayed telecasts but rather they are private links between a program origination site and network control headquarters. Inserting into advertising this line openly taunts the FCC, the networks and

## Up to 60 TV channels with your own earth station.



With this 11' satellite receiving dish antenna totally assembled and installed by **Earth Stations**, you can receive from 40 to 60 television stations in your own home. You'll see the best of pay and commercial television...

- ★ Current uncut movies
- ★ Up to 13 pro games each Sunday
- ★ Sporting events not available on commercial TV
- ★ Live Las Vegas entertainment
- ★ Special children's and religious programming
- ★ And much, much more

It's a whole new world of entertainment.

**Call Johnny Jennings  
For Price Information**

801-150-0111

**Earth  
Stations**

P.O. Box  
Greenwood,



**PUSHING ON** number of TV channels available by satellite, this advertisement was prepared for a schedule in **TV GUIDE**.

perhaps worst of all, the professional football folks. It is a good way to end up in court.

Another brochure makes a similar slip. "Our home Earth Terminal Satellite System is what you need to give you a broad spectrum of the various shows transmitted via satellite. **Home Box Office**, **Showtime**...and an unlimited selection of sporting events are just a few examples...". Use of the **specific** programming service names, in particular **HBO** and **Showtime**, is a no-no. It would be far better and safer to highlight the 24 hour service offering of 'The Movie Channel' although naturally people on the street may not identify with that name as readily as with the near-generic term 'HBO'.



**COMPLICATED...**

Many of the early brochures and to some extent current brochures forget that the typical prime customer candidate is **not** interested in LNAs, receivers or antennas. They will be purchasing the final result only; the pictures and the sounds. And the only part of the system they will deal with on a regular basis is the control portion of the package. Colby believes this part should be handsome, well appointed, and easy to use. "It **only costs \$30 to \$50 more to put the control switches into a good looking walnut or other fine wood case**" notes Colby. "When you are dealing with a terminal that sells for upwards of \$10,000, it makes no sense to stick switches into a Bud box that offends the family's decorating values".

One Tulsa, Oklahoma dealer created his own design for an electronics system to readout the exact antenna location and is working on an even simpler system which will do away with digital displays of azimuth and elevation in favor of a simple symbol system. As the polar mounted antenna scans across the sky the display panel will light up with a satellite symbol as each bird location is reached. When the antenna is 'on the money' a separate portion of the display will flash 'WESTAR III' or whatever is the appropriate satellite on boresight. "We noticed early on that it was a mistake to tell people how low noise their amplifier would be, that their receiver was double conversion or their antenna had a special scalar loaded feed horn. We have even eliminated any technical language from our brochure since we believe this turns people off; they don't like complicated facts although they may be very awed and even impressed with the complicated system they are installing".

Holding back the technical details of the system is another way of holding up the system pricing. "The more detail you give the customer, the more apt he is to think he is rapidly becoming an expert. Pretty soon you have a know-it-all telling you your LNA is wrong or your feed needs to move to the left. I prefer to tell the customer to go away, after we decide exactly where the system is going, and not come back until we get it installed and operating" notes one Ohio dealer.

**TVRO SYSTEMS**

**SYSTEM I** - Prodelin 15' Antenna — Microwave Assoc. VR-4X Receiver, Two Avantek 4215 LNA's, Video Tape Recorder/Modulator, Cables.  
Dealer Cost ..... \$13,950.00

**SYSTEM II** - Prodelin 12' Antenna — remaining equipment same as System I.  
Dealer Cost ..... \$12,700.00

**SYSTEM III** - Prodelin 10' Antenna — remaining equipment same as System I.  
Dealer Cost ..... \$9,990.00

**SYSTEM IV** - Microwave Assoc. VR-3XT Receiver, Prodelin 10' Antenna, one Avantek 4215 LNA, Modulator, Cables.  
Dealer Cost ..... \$6,995.00

**SYSTEM V** - SAT-TEC R-1 Receiver, Prodelin 10' Antenna, one Avantek 4215 LNA, Modulator, Cables.  
Dealer Cost ..... \$4,995.00

Prices net and do not include freight or tax if applicable.  
— write or call for catalog —

**DELSTAR  
SYSTEMS**

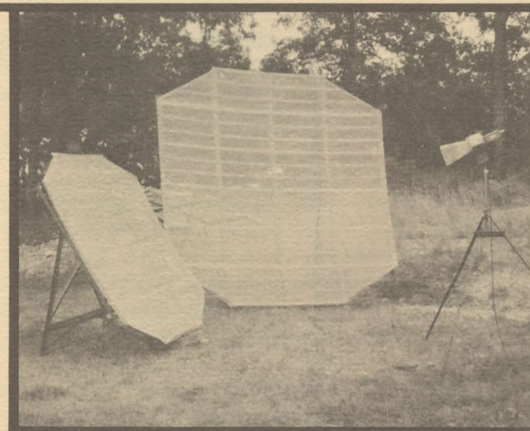
Distributors of Earth Satellite Systems/Equipment  
7800 Bissonnet, Suite 200 Houston Tx. 77074  
713/776-0542

**THE UNBEATABLE  
PAIR!**

**BY NOW** virtually everyone knows you have at least two good choices when selecting your satellite TV antenna. The parabolic dish, and, the Spherical. And most people now know that the Spherical offers advantages no parabolic can offer. Such as multiple-satellite visibility, far lower wind resistance (the winds blow through the surface), and not insignificantly lower cost.

**THE 8-BALL** is the leading antenna line in the Spherical field. Hundreds of 8-Ball antennas are now providing high quality reception from Canada's frozen north deep into Mexico and the Caribbean. Our popular 12 foot size is now joined by a new 8 foot 'demonstrator special' which extensive testing reveals will perform as well as or better than any 10 foot parabolic on the market today! PLUS - with an 8 foot trailer mounted you can demonstrate the length of the full satellite belt (over any 30 degree span) right at your customer's location by simply moving the feed antenna from bird to bird; leaving the Spherical reflector surface 'in place'. BOTH the 8 foot 8-Ball and the 12 foot 8-Ball are now available in the standard mesh and a new 'tough mesh' for extra rugged applications. Pricing remains \$750 for the standard 12', \$780 for the ruggedized version while the new 8 foot is priced at \$650 for the standard mesh and \$685 for the ruggedized version.

**SHOPPING FOR THE BEST LNA BUYS?** Check with 8-Ball **before** you order because we'll give you a price on brand-new factory sealed Avantek 120 degree (50 dB gain) LNAs with the DC power block that will knock your eyes out!





**POSITIVE...**

Perhaps the best brochure simply states the 'type' of programming services available, and awesome quantity of such programming ("Over 200 hours of movies per day!") and then selects several key sales points to soften the blow of the system pricing. One of the most effective techniques here is to compare the price of your terminal to some other regular family purchase. New car pricing offers many opportunities for 'A' and 'B' pricing comparisons. Swimming pools, popular purchases for people with that kind of money to spend, is another with the notation that unlike the typical pool the satellite TV terminal can be used by young and old alike 365 days a year regardless of weather!

**Shared terminals** is an appealing sales approach ("Neighbors may share if they agree to watch the same programs you have selected..." reads one brochure) but it must be handled carefully. The primary sales advantage to shared service is obvious; pricing can also be split between groups or families. But conditioning sharing on **everyone agreeing** to watch the **same programs** at the **same time** may be a mistake. Some dealers report they have clearly spelled out sharing options in their sales manuals. The first option they

offer calls for one antenna and LNA to be shared but each home has its own receiver. Using the new remote control packages (such as the ICM TV-4300) the receiver for each home can actually be located at the antenna site with inexpensive three wire remote control cables stretching hundreds or indeed thousands of feet going back to the terminal while a piece of RG-59 carries modulated RF back the opposite way to the homes. "We have found the best combination occurs when neighbors agree to share a common antenna/LNA system" notes one dealer. Another notes that his experience with shared terminals has been only 'so-so' and that two such installations eventually ended up with each home having separate antennas after a few months of 'shared service'.

**FINANCING...**

Getting financing on home terminals is difficult. **Charles Dascal**, Chairman of the Board of Miami's Continental National Bank tells us why.

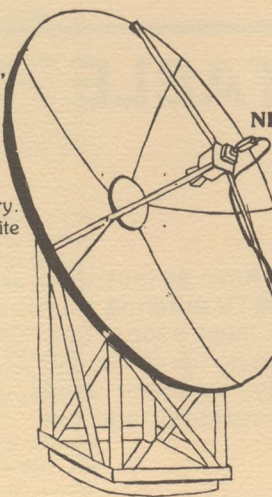
"I have my own private terminal and I love it. But I **would not loan money** on a terminal at this stage of the development". Why? "Terminal prices are much too fluid and technology is developing far too fast to look at a satellite terminal the way we look at new car loans for example. We

## TELEVISION PROGRAMMING RELAYED BY SATELLITE

### A COMPLETE SATELLITE STATION FOR YOUR HOME

**IF** poor reception or limited selections of local television stations limit your viewing, then satellite television is for you. Our home Earth Terminal Satellite System is what you need to give you the broad spectrum of the various shows transmitted via satellite. **HOME BOX OFFICE, SHOWTIME, NICKELODEON**, and an unlimited selection of **SPORTING EVENTS** are just a few examples of the programs that are available to you at home.

**AS A RECEIVING SYSTEM**, the Home Earth Terminal Satellite System gives you studio quality pictures in your home. A clear view of the southern sky, free from obstruction is all that is necessary. The dish must "see" the satellite 22,300 miles above the equator.

**NEIGHBORS MAY SHARE**

if they agree to watch the programs you have selected. This limited form of sharing requires little more than the cost of the cable. Additional equipment is necessary if they wish to select their own programs. The cost will be approximately 65% above the usual installation cost.

**CONDOMINIUMS, APARTMENTS, MOTELS, & RESORTS** will offer a special attraction when they own a system designed especially for them.

**NO LICENSE** is necessary: On March 23, 1979, the U.S. Department of Justice, in a filing before the FCC, took the position that "existing laws do not require FCC license to use a device that simply receives radio communications."

**SAFETY:** Microwave signals from satellites are all around us. This equipment is merely a receiving device. All outdoor electrical wiring is a low DC voltage drawing less than 10 watts.

**FINANCING CAN BE ARRANGED**

**COVERING THE BASES** - this brochure was prepared to highlight the options available to the terminal owner. Use of generic terms such as HBO and Showtime could lead to legal problems however.



have a long history of new car loans and we know precisely what a new car will be worth days, months and years after it is driven off the dealer floor. We have no such history on satellite terminals and with prices dropping so fast I could not loan money on a terminal using the terminal as collateral".

What Dascal is saying is that a \$10,000 terminal cannot be considered the same as a \$10,000 car. A twenty percent downpayment on a car is far more than adequate but a much larger downpayment would be required on a terminal simply because the bank doesn't want to have to dispose of a partially paid for terminal months after it is installed because the buyer found out he could buy an equivalent terminal some months later for half the price.

Microwave General's Chuck Colby saw this problem initially. "The people we sell to may not always have the spare cash round but they can use their other assets to round it up. To make sure that our terminals don't get caught in the downward spiral crunch of cheap terminals, we make them unique and different; from the antenna bases and subdued colors to the packaging of the control system." Colby's approach is not dissimilar to taking the high road with autos; you build in and sell customers on the **extra value of your particular system**. By keeping your system non-standard, you have another handle on keeping customers happy after the sale. "I anticipate my buyers will be aware of price drops and developments in this field" notes Colby "but I also know that the chances they will find the same features in an off-the-shelf package as we offer in our customized packages is very small".

#### SUMMARY...

Satellite marketing is growing up. Two distinct markets exists with many sub-markets. The direct sale market, represented by the CSD reader who is installing or building his **own** terminal, is a semi-technical market. It is largely mail-order and this is the segment of the market which has attracted most of the attention to date. It is also the market segment which has caused receiver prices to drop and hardware to simplify.

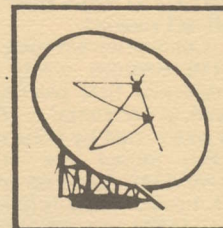
The other portion of the market has attracted less attention and may be developing more slowly. High or near-professional grade terminals, packaged by their sellers to reflect the desires of the buyers are being sold in local areas by competent, far-sighted dealers who recognize that you don't have to sell many \$10,000 and up terminals per month to have a nice business going. But the dangers in selling higher grade terminals are there; the danger that you will, as a seller oversell your product, or worse yet cheapen the product so that it loses its value too quickly. We all have a lot to learn.

## THE FALL '80 TRANSPONDER LINE-UPS

#### OPTIMISTIC 'NEW' SEASON

This fall's television actor's strike aside, most of America looks forward to the September/October period for the appearance of new television programs. This year new television 'services' join with programming for a piece of the viewer attention and interest. For this is the year and the season when the first **serious** users of COMSTAR D2 and

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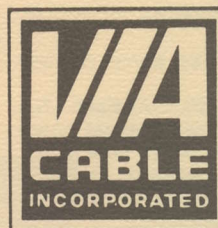


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WESTAR III begin their programming and marketing efforts to attract viewers.

Cable programming relay began on SATCOM FII (the one at 119 degrees west) in 1976. HBO occupied a single transponder first (vertical 17) and one year later HBO had moved to horizontal on FII, grown to a pair of transponders, and was joined by CBN on 8. By the end of 1976 WTCG (now WTBS) joined the HBO pioneering effort. PTL and SHOWTIME followed and the rush was on. In June of 1978 RCA moved the cable industry over to FI and the cable industry began to get nervous about the bird's capacity. In July of 1978 cable satellite pioneer Ed Taylor of Southern Satellite Systems forecast a total of more than 40 cable service transponders by 1980-81 and most people felt Ed was off by a factor of two or worse.

Give or take a day or two, as we enter 1981 it is likely there will be no fewer than 21 transponders assigned to cable on FI, another 11 assigned on COMSTAR D2 and no fewer than three assigned on WESTAR III. That's 35 cable service programming channels and it overlooks the shared use by groups such as BET/USA Network/C-SPAN of transponders such as 9 on FI. Clearly Taylor was on the money.

#### FI CHANGES

All of the cable activity is **centered on RCA FI**. Under present plans RCA will continue to dedicate FI to cable TV programming relay until their FIII-R (replacement) satellite is launched and made operational about a year from now. When FIII-R is operating, the present transponder renters on FI will be shifted in one grand move to FIII-R and because FIII-R will have 24 dedicated-to-cable channels an additional three transponders will become available for cable.

The use of COMSTAR D2 by cable's new breed of fall programmers is an interim measure; pending activation of FIII-R. After FIII-R becomes operational and it has assumed the present FI load (plus three new channels), the cable programmers then on D2 will be shifted from D2 over to FI. This then will give cable two birds, a total of 35 channels; at 132 degrees west (FIII-R) and 135 degrees west (FI).

**Transponder 1** - Presently in use by San Francisco/Oakland KTVU. The 'carrier' bringing this channel to the bird is Warner-Amex and they have announced that effective January 1, 1981 KTVU will be **yanked from the satellite**. Warner's Nickelodeon will move from 11 to 1 at that time.

**Transponder 2** - PTL is here and will stay.

**Transponder 3** - Presently in use by Chicago's WGN; carrier is United Video. No changes forecast.

**Transponder 4** - Broken.

**Transponder 5** - Presently in use by the 24 hour 'Movie Channel'. On January 1 the Movie Channel will **switch** to a split-time-zone feed and this will become their eastern/central feed channel.

**Transponder 6** - Presently in use by Atlanta's WTBS; carrier is Southern. No changes forecast.

**Transponder 7** - Presently in use by ESPN which went to 24 hour per day service, 365 days per year on September first.

**Transponder 8** - Presently in use by CBN and no changes forecast.

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**Transponder 9** - Presently shared by BET (Black Entertainment Network; Friday nights only from 11 PM to 2 AM eastern), C-SPAN (daytimes when Congress is in session and at various other times as special programs dictate) and USA Network (formerly Madison Square Gardens Events). USA Network has now become a 'wrap-around' service, with programming essentially **24 hours per day** (when BET and C-SPAN are **not** operating). Recent programming addition includes 'English Channel' (programs produced in England but **not** by BBC) Sunday and Tuesday 10 PM to 12 midnight (eastern).

**Transponder 10** - Presently in use by SHOWTIME (west coast feed) and no changes are likely.

**Transponder 11** - Presently in use by Nickelodeon which will **move** to TR 1 January 1st; will become western time zones feed for **The Movie Channel**.

**Transponder 12** - Presently in use by SHOWTIME (eastern time zones feed) and no changes are likely.

**Transponder 13** - Presently in use, when operational (transponder has a history of being erratic), by Trinity Broadcasting (KTBN). Trinity **also** now **dual-feeding** on COMSTAR D2 because of erratic nature of transponder on FI.

**Transponder 14** - Presently in use by Cable News Network which is guaranteed continued use of this channel (by court mediated decision) **only through** December 31st. In event RCA **does** move CNN off of this transponder after December 31st major shuffling of other assignments could result.

**Transponder 15** - Presently in use by RCA data (telco, etc.) traffic; no changes forecast.

**Transponder 16** - Presently in use in daytime by ACSN (vocational training); transponder is actually leased by SHOWTIME which acquired it for half-day use when old FANFARE service was taken over by SHOWTIME. Occasional 'sports' feeds of Video Sports Network, a new SE Regional 'ESPN', here two days per week.

**Transponder 17** - Presently in use by New York's WOR **however** this may be a short term thing. Actual leasee of transponder is SHOWTIME which it is rumored is planning a new 'basic' cable programming service. In event SHOWTIME decides **not to allow** WOR (carried by Eastern Microwave) to continue, early in 1981, WOR will be forced to move to COMSTAR D2.

**Transponder 18** - Presently leased by Reuters news service for transmission of digital news and financial data in daytime (weekdays) and sub-let from Reuters by SIN's GALAVISION in evenings. Galavision expanding schedule to longer days this fall, adding television serials purchased from Brazil and possibly live boxing.

**Transponder 19** - Presently in use by RCA data (telco, etc.) traffic; transponder rumored to be operating at low power levels due to powering problems, no changes forecast.

**Transponder 20** - Presently in use by HBO's relatively new CINEMAX service (18-20 hours per day); eastern time zones feed.

**Transponder 21** - Presently in use by SSS's Satellite Program Network (SPN) which also operates on WESTAR III with

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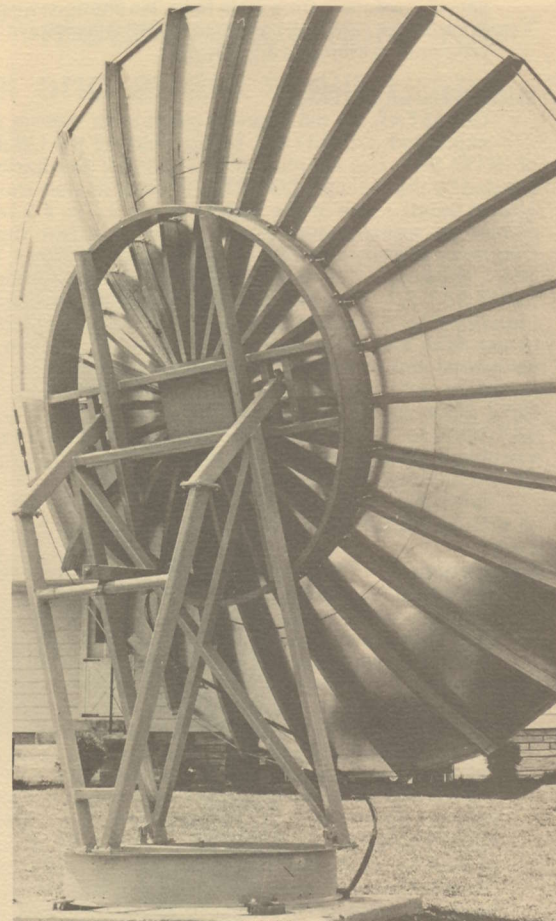
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SPN-II. Twenty four hour per day service includes Home Theater Network G and PG movies evenings 8 PM to 10 PM Monday-Saturday, EST.

**Transponder 22** - Presently in use by HBO's western time zone feed and no changes are forecast. During daytime Modern Satellite Network (MSN) feeds approximately five hours per day (12 noon to 5 PM eastern weekdays and 7 AM to 12 noon weekends) with new 'Western Classics' feature on Saturday mornings.

**Transponder 23** - Presently in use by HBO's new CINEMAX service; western time zone feed. No changes forecast.

**Transponder 24** - Presently in use by HBO's eastern time zone feed and no changes are forecast.

#### MEANWHILE ON D2...

COMSTAR D2 (95 degrees west) is an interim service as explained. COMSTAR, being a part of the US ownership of INTELSAT, has an unusual transponder numbering system created by the fact that COMSTAR places its non-transmission (guard band) space in the middle of the 3.7 to 4.2 band. This causes all transponders above 12 to be offset (upward) in frequency slightly (see CSD for June 1980, page P14; bottom of chart showing '1/2 transponder format assignments' for INTELSAT IV). This has caused some confusion in the cable industry where transponder numbers are typically thought of in the RCA SATCOM format (i.e. 24 total, 12 even channels horizontal and 12 odd numbered channels vertical). For most receivers, you can assume transponders 1-12 will fall in the same place on D2 (or other COMSTAR birds) as they do on SATCOM; for 13 and above the slight upward offset will not be a problem. CSD prefers to use the 'CATV numbering' system since it has been the most widely publicized.

With that 'warning' the D2 assignments follow; note that as with SATCOM odd numbers are vertical and horizontal are even.

**Transponder 6** - ESPN uses this transponder presently for 'backhaul' or feeding programming to their Bristol, Ct. facility where it may be taped for later showing or used live. Rumors suggest that the new Premiere service may use this transponder if it gets through the legal snafus.

**Transponder 7** - National Christian Network currently using this channel on an 'abbreviated' 24 hour format; similar to PTL/CBN/Trinity. However, on October 26th a new cable movie and cultural pair of services will sub-let space here. On Tuesday through Saturday **ESCAPADE** will program from 8 PM to 2 AM (eastern) with 'adult action/drama' movies. Same time, Sunday and Monday, **BRAVO!** will feature cultural events. Fee for either is \$2.40 per month or both for \$3.60 per month. There will be a major movie 'Sneak Preview' each 4th Monday and first three titles bought are **Being There**, **Cruising** and **Carny**.

**Transponder 8** - SIN (Spanish International Network) has this transponder leased; full use plans not determined.

**Transponder 11** - Rainbow Communications has this transponder leased; likely to be put into service around first of

year by new programming service.

**Transponder 13** - Currently in use by Trinity Broadcasting Network (KTBN) as a back up to their ailing feed on FI transponder 13.

**Transponder 15** - SHOWTIME has this transponder leased; if SHOWTIME does activate a new 'basic' cable service early in 1981, kicking WOR off of FI, **WOR is likely to land here.**

**Transponder 17** - HBO has been observed feeding their eastern time zone feeds of the regular HBO service here since early in September. This may be a test, or, it may be permanent. Higher D2 signal levels in Florida and southeast make this a serious development for small-dish terminals.

**Transponder 18** - Also leased by HBO which could do something with it at anytime.

**Transponder 19** - Leased by Satellite Communications Network by Las Vegas Entertainment Network (LVEN) and Cineamerica's 'over 45 years of age' channel (6 AM to 9 PM) making it a 24 hour per day service. LVEN is \$.30 per home per month, Cineamerica is no charge. LVEN producing full range of programs, some sports, built around attractions of Las Vegas.

**Transponder 22** - Leased by Warner-Amex which is talking about producing a 'full time' (which means at least 14-16 hours per day) 'pop music channel'. Warner is big in music/entertainment investments, could create service similar in concept to their Nickelodeon using radio disc jockey format for current pop music. Earliest likely formal announcement is December of this fall.

**Transponder 23** - Leased by Times-Mirror and United Video. Times Mirror rumored to be readying some type of programming for spring of 1981 debut.

ALSO On D2 you can anticipate seeing sports and news feeds largely intended for private (as in network) services, especially in the lower numbered channels (below 6, where CATV service begins). As detailed in CSD for December 1979, D2 is supposed to have a superior-to-FI signal in many edge-areas of the US and Florida test reports indicate this to be true there. However levels are not up substantially from FI in areas further southeast such as in the northern and central Caribbean.

#### MEANWHILE ON WESTAR III

Western Union has been playing catch up ball with the folks at RCA ever since RCA management decided to pursue the cable business and Western Union decided (at the time) that cable might not amount to much. WESTAR birds and their 12 channel capacity has hampered their ability to market and for the time being there is no shortage of occasional use customers for all of the three WESTAR birds. In fact Western Union announced in September that their advance bookings for occasional use time, especially in the 3 PM to 12 midnight period, for the full fall of 1980 and into the early winter of 1980 and 81 was so solid that they are virtually sold out.

The next WESTAR (IV) satellite, perhaps operating in late 1981 will be 24 channels however as will a recently announced WESTAR V bird. Both will probably replace; IV will replace I and V will replace II.

In the interim there has been some 'spillover' growth of cable onto WESTAR III. It is likely that this interim III cable growth will switch to WESTAR IV (which will replace WESTAR I) when the 24 channel bird becomes operational. Growth on WESTAR III is likely to be slow however simply because of the limited (12) channel capacity.

**WESTAR transponders** are numbered in the standard 12 channel format. All, like ANIK, are horizontally polarized. If you have a 24 channel receiver, the easiest way to adapt to the 12 channel assignments is to take the WESTAR numbering shown here and multiply by 2 (i.e. X 2) and then subtract 1. For example, WESTAR 3 transponder 5 will show up on your dial at  $5 \times 2 = 10$  minus  $1 = 9$ . All WESTAR transponders will have 'odd number dial spots' on your receiver but they are horizontal (it is not REALLY that confusing!).

**Transponder 1** - (also 1 on your 24 channel receiver) is dedicated to narrow band audio transmissions including some radio networking.

**Transponder 2** - Leased by Hughes Television Network which

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carries many individual sporting events (found on dial position 3).

**Transponder 3** - Used by Mexico City's **XEW-TV** as a feed for Mexican television stations now being equipped with ground receive terminals. All in Spanish, approximately 20 hours per day (found on dial position 5).

**Transponder 4** - Various narrow band including some radio networking (found on dial position 7).

**Transponder 5** - Often used to feed **CBS**, **NBC** news feeds and some occasional sports (found on dial position 9).

**Transponder 6** - Leased by **CBS**, this one will most likely be the home of the new **CBS Cable Service** when it begins in June of 1981. **CBS Cable** is to be a 12 to 14 hour per day service combining 'culture' and 'training' and some 'entertainment' programs; likely to be a free (no charge) service (found on dial position 11).

**Transponder 7** - Message traffic, not in use for video.

**Transponder 8** - Carries the **Spanish International Network (SIN)** network feed, largely originating in San Antonio or Los Angeles. Approximately 18 hours per day (found on dial position 15).

**Transponder 9** - Carries **SPN-II (Satellite Program Network)** which operates 24 hours per day. Programs are the same as **SPN-I** on transponder 21 on **F1** except they are shifted in time so they do not duplicate each other. Includes old movies, pop music, etc. (found on dial position 17).

**Transponder 10** - Largely in use by **ABC** network where you will find **ABC World News Tonight** at 6, 6:30 and 7 PM (repeated) weekdays and other **ABC** material at various hours (found on dial position 19).

**Transponder 11** - Leased and used by **Ted Turner's Cable News Network** to feed news stories from around the US back to Atlanta. News stories fed are occasional, usually unedited (i.e. raw form) and total time use may be as little as 15% of day with empty carrier usually there as a 'marker' (found on dial position 21).

**Transponder 12** - Occasional service including some news feeds and sporting events (found on dial position 23). On **WESTAR III**, it will be the non-assigned transponders (i.e. 2,5,10 and 12) which **ABC** is nearly 'sold out' of for the fall and early winter period.

#### AND...

In addition to these dedicated or assigned services there are still others planned for early starts and not yet firm on where they will be in the satellite belt. **Golden West Subscription Television (GWSTV)** is a **Gene Autry** venture bringing over the air pay TV to Omaha, Memphis, Oklahoma City, Chicago and Dallas this year and next. **GWSTV** has signed to use 73 hours per week (6 PM to 3 AM weekdays and 1 PM to 3 AM weekends typically) to transmit from an Oklahoma City uplink STV movies. The time block will be on **some WESTAR satellite** when it begins; possibly this fall. Whether the satellite uplink will be 'scrambled' or whether **GWSTV** will be content to scramble at each terrestrial transmission site (Omaha, etc.) is not known.

And one more cable service looking for a home is **Satori's 'Private Screenings'**; a midnight to 3 AM or so 'soft porn' service scheduled for Friday and Saturday nights featuring movies such as **Satin's Cheerleaders**, **Vixen** and **Nocturna**. Pricing will be \$1.29 per month including a 'colorful' program guide and each night will have two movies back to back (so to speak).

The Society for Private and Commercial Earth stations (**SPACE**) is in its formative stages. The goals of **SPACE** are to make private access to satellite signals a recognized, legal right, to ensure that program suppliers can receive just compensation, and to provide technical and legal information to our members and to the government. **SPACE**, in order to be effective, needs a broadly based individual and corporate membership and sufficient funds to be effective in Washington, D.C. If you are in the business or are a terminal owner you need **SPACE** to keep you informed, to reduce legal harassment, to make your desires and intent known, and to stay on the right side of the law.

I have just returned from Washington where

## TAYLOR HOWARD REPORTS ON S.P.A.C.E.

**SPACE** general counsel, **Richard Brown**, took me through the halls of Congress and arranged meetings with a number of people who have been central in formulating new laws governing all telecommunications in this country. There are several things our readers should know about the people involved. First, **Rick Brown** is sure footed, trusted, and very highly regarded in the Congress and in all of the agencies which we visited. He has a keen perception of both the large and small problems. His opinions are highly valued. Second, my experience in Washington, though greater in various funding and regulating agencies than in Congress, goes back 20 years, has been very positive and has given me an understanding of how the system works. Finally, the people we met are desperately trying to solve a broad set of communications problems, want to do the right thing, and need our help to do either one.

Before I state our problem, it would be well to realize that the U.S. government is faced not just with the wonders and grief that satellite technology has brought to our society, but to those brought upon us by the rapid electronic revolution in general. So while we are worried about a "large" problem to us, it is only a small part of the telecommunications legislation which will, among other things, determine our telephone bills, what earth-based TV is available, the growth of cable and interactive systems and everything else having to do with wired, wireless, guided and unguided communications.

It may well be that a few words tacked on to our missing from one of these bills may determine the entire future of the earth terminal industry. Further, the congress feels that this is such an important set of problems that they must be addressed by elected officials reflecting the will of the people, not by appointed personnel in the regulating agencies.

As president of **SPACE**, I have decided to focus our current effort on the space-to-earth segment, partly because that is the stated, major concern of our membership, and because it is one of the least understood areas. I strongly feel that if **SPACE** does its job properly, private terminals can emerge as a potent and well regarded part of the American telecommunications structure, a structure which will stand as an example to the rest of the world of the true strength of unfettered communications and free enterprise.

There are two levels to the problem; the international one where, by treaty, the 3.7 to 4.2 band is a point to point communications band, not a direct broadcast one, and the U.S. one where earth-based technology has "broken through" and made the band usable and economical to many more points than were ever envisioned by the planners of the last 10 to 20 years. As a matter of fact, there are "planners" who do not to this day believe that a 10 foot dish and 120 K amps with inexpensive receivers can produce perfect pictures -- we are regarded by them as liars!

Within the U.S. there is an even nastier problem: we are perceived as pirates and worse! We have been thrown into the same bucket as the non-franchised **MDS** receiver and **STV** decoder producers and owners. Sad to say, the differences and the true nature of the problem cannot be explained to a congressional staff or committee in a few minutes of testimony



-- it takes time and a lot of ground work. Explaining the satellite-to-earth problem alone takes time but to unravel it from the MDS-STV mess and the emotionally charged atmosphere surrounding them is nearly impossible.

We, SPACE, mainly Rick Brown, interacted with Congress in a way intended to be helpful during the last two months. Very broad pending legislation was amended to solve the MDS-STV problem in a way which would also have the effect of making criminals out of earth station manufacturers, dealers and owners! Once the problem was explained, the amendment was softened to eliminate earth stations from consideration but we were unsuccessful in getting affirmative rights which would guarantee satellite access. The net result at this writing is that the amendment and, for other reasons, perhaps the whole bill have been stopped for this session.

So what is the real problem? The real problem is that people who are receiving MDS signals with antennas bought from suppliers, those who receive scrambled TV using purchased decoders and those who receive from satellites with purchased equipment are not paying monthly access or copyright fees and are therefore regarded as thieves. Not just thieves in the eyes of the Motion Picture Association or Home Box Office to mention only two, but in the eyes of all three branches of our Federal Government!

It is now generally thought in Washington that what is needed is a "theft of service" bill making it illegal to decode, unscramble or otherwise recover transmissions which are intended to be available only for paying subscribers. SPACE has had some success in getting across the point that there are



to establish the right to receive satellite signals for anyone buying an earth station, a right predicated upon paying for the service. That sounds like a simple goal until you realize two things: we are not yet sufficiently known to be respectable, and private earth stations never appeared positively (or at all) in the planning of any supplier because the major markets are cable and MDS. Since we are now an important consideration (though still a relatively small market when compared to the present 17,000,000 cable subscribers) in communications planning, it is time to open discussions with the major suppliers to not only guarantee access, but to do it in a way that generates revenue and puts the legal question to bed once and for all.

It is clear to Rick Brown and to me that there will be legislation that affects the entire industry next year. If this year's legislation had gone through it would have killed or seriously wounded the private terminal business. SPACE has made itself known but now needs help.

We need individual members both for strength in numbers and for their ability to do an educational and lobbying job on their legislators and local news media. We need corporate members for the above and for the financial support they can give.

You, as an individual or a company, need SPACE so that you are well informed, so that you can best use your limited time most effectively and so that you can stay in business and/or out of jail.

Through our case and intent are clear and honest, the

threat of disastrous legislation is very real. I feel that SPACE can not only make our viewpoint known, but that we can make it prevail and be a positive force in the development of the world's first and finest free enterprise telecommunications system. We stand at the threshold of what a rapidly moving technology can do and it is our responsibility, not only to move that technology ahead, but to help with the understanding which will ensure that it is done in a socially responsible way.

by  
Taylor Howard  
President  
S.P.A.C.E.

#### NOTE:

Individuals and firms who have not yet joined S.P.A.C.E. may do so under the following schedule: \$25 per year for 'supporters' including private terminal owners; \$100 per year for dealers, distributors and manufacturers; \$500 per year for anyone who wishes direct representation on the S.P.A.C.E. Board of Directors. Send your check with a description of your classification to S.P.A.C.E. (Attention: Rick Brown), 1521 O Street NW, Washington, D.C. 20005 or call Rick Brown at 202-387-1856.

## BIRD OPERATIONAL NOTES

TWO scenarios seem left in analysis of RCA's loss of FIII satellite last December. With a \$77 million insurance covering \$48 million in launch and hardware costs and \$20 million in lost revenues the insurance consortiums covering the loss wanted to know everything they could about the disappearance before another one happened. The bird was lost during the firing of the apogee kick motor, designed to shift the orbit from an elliptical mode into the geostationary circular mode. The apogee kick motor was to have fired for 28 seconds. But 14.5 seconds into thrust all communications ceased. At the time of loss the only irregular data being received indicated the exhaust plume temperatures were too high. Based upon this indication, scientists have deduced two likely endings for FIII. Favorite among the two has the apogee kick motor starting and the exhaust cone breaking down allowing super-hot exhaust gases to sear and then melt the rear portion of the satellite. With the satellite melting all communications and control is lost. In the second postulation, the apogee motor fires but at the same time there is premature deployment of the satellite solar arrays. The drag from the arrays cause the bird and top thrust stage to spin out of control with radial structural damage quickly following. In the end, the result is the same; loss of a satellite. The launch of FIII-R still looks good for mid summer of 1981 with operation beginning about one year from now at 132 degrees west.

ONE of the fallout of the loss of FIII (and more recent loss of Ariane, May loss of NOAA-B bird, July loss of Air Force satellite and failure of Japanese experimental satellite power system) has been dramatic increase in cost of insuring birds. In past premiums have been in 10% range (of cost of bird plus launch). New round of premiums likely to be in 20% region with



expectations that additional loss in near term future might drive them up to 50% above that. Bottom line? These costs are passed on to transponder users in the form of higher monthly/annual fees.

**SHUTTLE** set backs continue with some now believing earliest launch will be spring of 1982 although NASA still contends spring of 1981 is possible.

**SEPTEMBER 30th** was to have been date when FCC spent full agenda discussing **satellite broadcasting**. Don't expect total approval yet but matter is being handled in expedited manner. ABC meanwhile has stepped up paper attacks on DBS spearheading effort NAB admits cannot stop DBS but **could** 'slow it down for several years'. COMSAT official called latest ABC attacks 'consistent with its historical opposition to any technological progress which promises more video diversity for viewing public'.

**ARIANE** launch scheduled for November has been set back until next February; results of study following loss of LO2 during this spring not due until this month.

**COURT** suit in which Oak Industries lost piracy lawsuit in Los Angeles has not dampened the spirits of OAK or ON TV (Los Angeles). Both claim error in Judge Lydick's ruling which said Communications Act does not cover interception of STV signals. Lawsuit attempted to stop sale of decoders in Los Angeles. Judge further ruled that Oak has no right to decoder monopoly.

**INAUGURATION** for Australian domestic satellite TV, via INTELSAT IV F8 on spot beam centered on Alice Springs, due to begin about time you read this. Service has been rumored for sometime; according to Peter Duddy in New Heribides tests of the service have been going on for some time with 29.5 dBw measured along Australia's eastern coast (indicating spot center may reach 31 to 32 dBw). Levels projected for other areas include 24 dBw in New Heribides, 29 dBw over most of populated Papua, New Guinea. Reports say it will be active 18 hours per day providing first time live TV to substantial region of Pacific.

Only 'regular' feeds on COMSTAR D3 apparently Sunday morning transmissions directed to Puerto Rico on transponder 24 (H) in 9 to 11 AM (eastern) time slot. Programming typically consists of program segments including some feeds originating in Europe.

**WESTAR III** continues to carry ABC Chicago news feeds in AM (for 'Good Morning America') and PM (for 'World News Tonight'); CBS news feeds in PM, many sporting events and SPN-II 24 hour per day transmissions. **WESTAR I** continues to carry between two and four PBS feeds during majority of day plus eastern time zone feed of NBC 'Today' program and western time zone feed of ABC 'Good Morning America' in addition to news feeds (late PM), sporting events, and western feed of ABC evening news.

**FCC** expected to approve early launch of COMSTAR D4 in December, some two months prior to planned February (81) launch date. Comsat General is concerned that with batteries on board D1 and D2 failing rapidly the spring eclipse season (which results in several weeks of reduced operations because of limited solar power) will cause massive problems with D1-3 configuration and traffic unless D4 is in position and operating. D4 is to be co-sited with D1 at 128 degrees west temporarily and then D1 will join D2 where the two birds will fly in unison sharing transponder loading.

**LATEST** Canadian rumor calls for Toronto station CFMT to be uplinked from ground station near Buffalo to become 'Canadian super station' available to US viewers via satellite. No indication of when, or how or on what bird this might happen.

**PREMIERE** service scheduled to inaugurate January 1st going ahead with aggressive marketing effort in spite of Department of Justice suit filed to stop service. Service promises more major movies, released earlier than via other pay movie distributors, but DOJ says group of four movie producers plus Getty Oil partnering the venture are stepping into civil antitrust areas. Cable industry reaction to DOJ suit was mixed with most bigger system operators adopting wait and see attitude.

**USE** of WESTAR III transponder for relay of Mexico's national TV network programming originating at XEW-TV (channel 2, Mexico City) has been operational for several months now. Service runs 20 or more hours per day on transponder 3. Scientific Atlanta recently received contract to provide 22 receive only terminals for primary stations in network.

**HBO**, long a user of RCA Vernon Valley, N.J. uplink facilities is building their own uplink in northern New Jersey. SHOWTIME continues to use RCA Vernon Valley facility including RCA tape playback studio facility there.

**HORSE** race betting via satellite is latest venture using bird; called Telehorse (!). Service uplinks races from near Chicago to Las Vegas casinos via WESTAR, using scrambled video system developed by Westinghouse.

**ARGUMENTS** regarding who is at fault and solution to providing adequate TV reception services to northern Canada (above 60° north line) continue; latest result of special study conducted by Canadian government committee. Report charges Telesat with setting transponder rates so high as to stifle development of Canadian programming services, not allowing Canadian telecasters to uplink to birds directly, and not coordinating with Canadian national CBC service. One conclusion drawn calls for development of high power broadcast satellites for northern Canada. An interim solution suggests tilting ANIK-C 12 GHz antennas for northern Canada but by doing so coverage to small antennas in southern Canada would be lost.

ing and regulating agencies than in Congress, goes back years, has been very positive and has given me an understanding of how the system works. Finally, the people we met are desperately trying to solve a broad set of communications problems, want to do the right thing, and need our help to do either one.

Before I state our problem, it would be well to realize that the U.S. government is faced not just with the wonders and grief that satellite technology has brought to our society, but to those brought upon us by the rapid electronic revolution in general. So while we are worried about a "large" problem to us, it is only a small part of the telecommunications legislation which will, among other things, determine our telephone bills, what earth-based TV is available, the growth of cable and interactive systems and everything else having to do with wired, wireless, guided and unguided communications.

It may well be that a few words tacked on to our missing one of these bills may determine the entire future of the earth terminal industry. Further, the congress feels that this is an important set of problems that they must address.

#### RIP-OFF IDENTITY

On page 6 of the August CSD (programming section) brief mention is made of a rip-off from Oregon called Cascade Electronics who sell junk under the guise of TVRO modules. I know of whom you speak, but it is not Cascade Electronics (a fine surplus dealer in Portland) but rather it is **Cascade Microwave** in Jefferson, Oregon. I too have been victimized by this firm; I sold two 10 foot dishes to them this past spring and still have not received full payment. For partial payment I received a 1200 MHz filter but in the design they had the filter so over-coupled that it could not be tuned up properly. Luckily I had access to test equipment that allowed me to re-design and de-couple the filter. Since I am now designing and installing earth terminals in and around Oregon I am concerned when this sort of thing turns up in my state. I wouldn't want it to start triggering people staying away from Oregon firms because of some vague recall that a firm in Oregon is a rip-off outfit.

Lynn Hurd  
NOVA Earth Stations  
Beaverton, OR 97007

Apparently Cascade Microwave is now a defunct name after publicity alerting people that the guy behind it was difficult to deal with. We are told the fellow's name, under whatever company name he may now land on, is Cliff Blackstone. Caveat Emptor - buyer beware!



# TEKNIMAT MOD. 692A



## Satellite TV Receiver

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THE LEADER IN LOW COST TVRO

## Introducing the R2 Satellite Receiver

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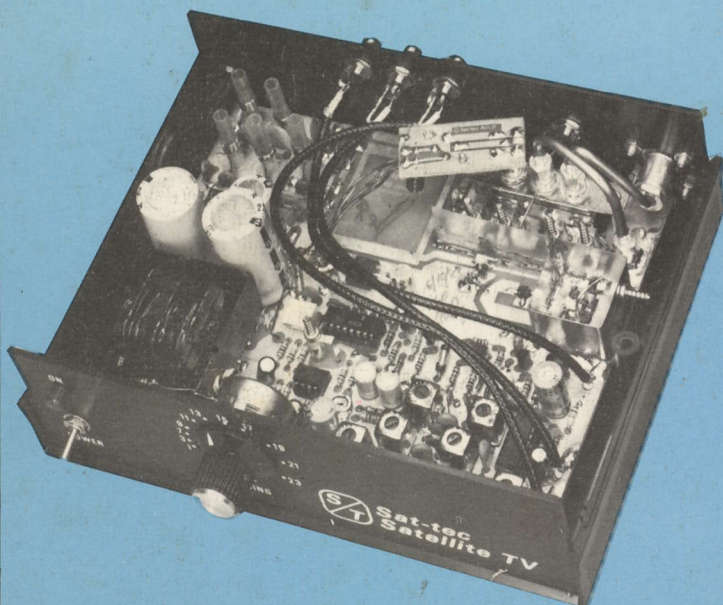


The Sat-tec R2 receiver is a versatile, consumer oriented unit designed for volume production. Easy operation and a clear, simple format makes the R2 idea for any application where non-technical users are involved. Fully frequency agile, the R2 may be used on 12 or 24 transponder birds, and since the tuning is continuous, foreign satellites such as Intelsat and Molniya can be received. A high performance AFC keeps the tuning accurate and sharp, fine tuning is not necessary. Standard one-volt P-P outputs for both audio subcarriers as well as video interface easily to any VTR or use the optional BC-1 modulator for direct TV set hook-up.

For a quality, low cost TVRO system, the Sat-tec R2 receiver can't be beat!

### SPECIFICATIONS

- Frequency Range:** 3.5 - 4.5 GHz  
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**Audio Subcarriers:** 6.2 and 6.8 MHz standard, others available.  
**LNA Power:** 15 volt at 150 Ma LNA Supply built-in.  
**Power Required:** 110 VAC at 15 watts 50/60 Hz, 220 volt available.  
**Size:** 8x6x3 inches, 3 lbs.  
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**Optional:** BC-1 RF Modulator Kit, tuneable channels 3-6 with sound....\$24.95.



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