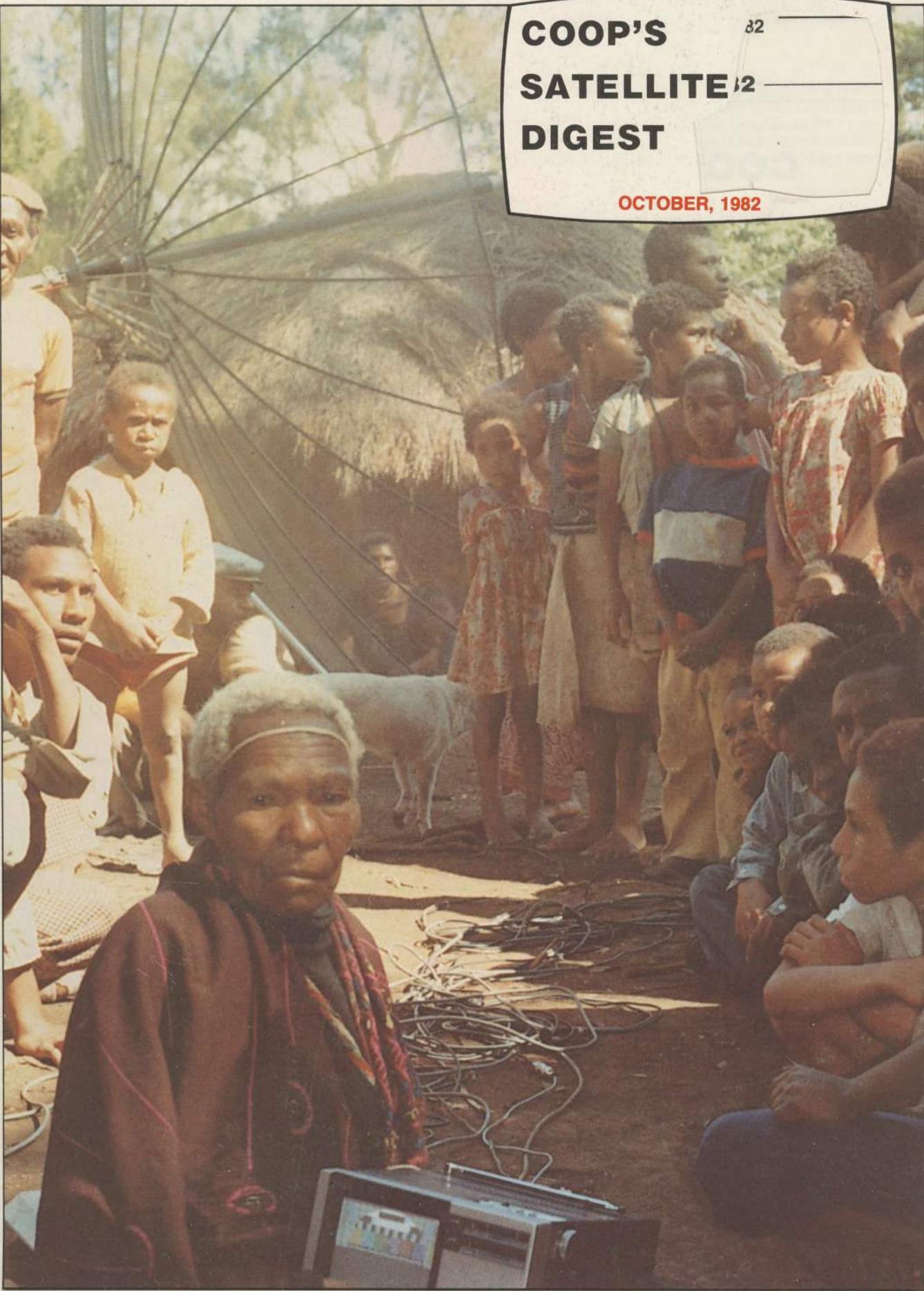


**COOP'S
SATELLITE¹²
DIGEST**

82

OCTOBER, 1982



We'll pay to find out.



Apollo X-10



Apollo X-9



Apollo R-1 Tuner



If your company buys or sells satellite receiving equipment and it's not Apollo™, we'd like to know the reason why.

National Microtech supplies more satellite TV antenna systems than anyone in the world—we've got to have some good reasons why! In fact, you're looking at some of the world's best satellite TV equipment on this page.

Our Apollo Z-1 uses an LNC instead of an old-fashioned LNA, changes the polarity electronically, and aims the antenna by remote control. The Apollo Z-1 is fast becoming the leading selling satellite receiver in the world.

The Microdesign receiver has a wireless remote control with memory for channel, polarity, and antenna aiming interface.

The new Apollo X-10 antenna is made of precision injected fiberglass panels that are guaranteed to match perfectly. The performance of the Apollo X-10 at 4 and 12 GHz is the best of the 3 meter dishes we've seen in the industry.

Our equipment makes good sense, and our prices are world class. We'll gladly pay for your call to find out the reasons why you're not using National Microtech's equipment...and we'll promise you some good reasons why you should. Call today **TOLL FREE**.



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TOP OF THE MONTH

PRODUCT marketing gets an unusual amount of attention in this issue. All of the wonders of electronics aside, how you **sell** the equipment will ultimately have more to say about your success in this field than anything Tay Howard or Clyde Washburn create in their labs.

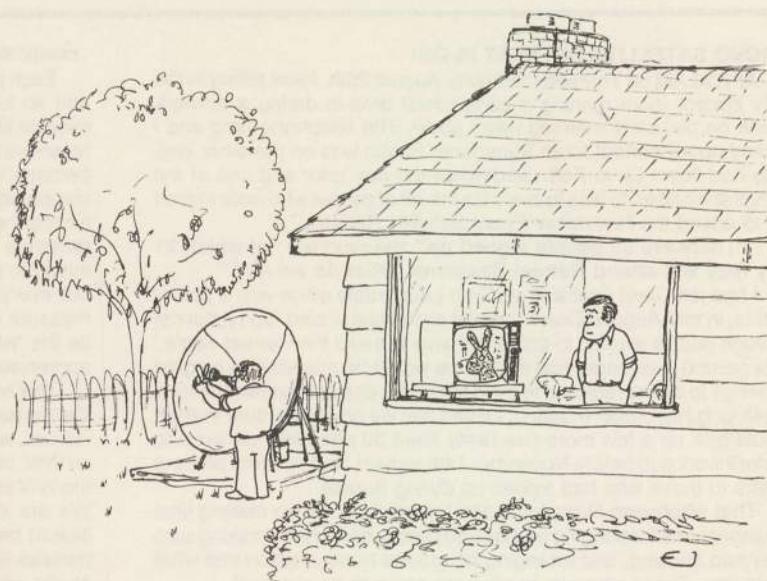
MARKETING of equipment, dealing with customers and not getting yourself in hot water with various laws and regulations, is tough. The **lack of** clearly defined regulations has made it possible for this industry to grow; but at the same time without regulations to guide us, it is easy to step over some imaginary legal boundary and run afoul of the property rights of others.

The Atlanta STTI gathering, late this month in Atlanta, Georgia, will concentrate on this muddle and attempt to find some answers for the TVRO dealer. We are doing the same thing here, directly in a piece detailing a Patmar Technologies program that allows you to legally sell 'The Movie Channel' into motels and hotels. And indirectly through an interview with the controversial head of Boman Industries.

In our **Boman interview** we believe we see the first substantial indication that a seed propogated in Japan is now growing within the industry; a seed that may well spell a battle between American ingenuity and Japanese production efficiencies. America has had a corner on home TVRO technology for the three year history of the industry. From this point forward, we will have to fight and fight hard to maintain that lead!

OCTOBER 1982

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OUR COVER — Deep in the jungles of Papua New Guinea a Luly transportable mesh antenna and associated battery operated electronics brings the first television communications with the outside world to a native village. See Coop's Comment, this issue.

**COOP'S
SATELLITE
DIGEST**



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COOP'S SATELLITE COMMENT

- SHOW ME BONANZA . . . or
- VIDEO QUALITY / MEETS THE EYE
- LEMONS FOR SALE

PROVO SATELLITE RETREAT IS ON!

At 7:30 AM on Thursday morning, August 26th, I was sitting in the WIV control room running a commercial drop-in during a network break on our early morning news show. The telephone rang and I picked up my control room Superfone. Susan was on the other end. She had flown up to Fort Lauderdale the day prior and one of the things she had to do was to evaluate the list of people who were signed up to attend the November Provo Satellite Retreat.

"There are 35 people signed up" she reported "of which 21 say they will attend Retreat Sessions. What do we do?"

I had left Carol Graba at our Fort Lauderdale office with a pair of letters, in mid-August. One was short and sweet; it said 'Sorry, but not enough people wanted to come to Provo to make the Retreat viable.' The second was longer and it gave the would-be attendees a long list of things to do in preparing to fly to the Turks and Caicos Islands for a week long November meeting. I voted that we go ahead, sure that we would pick up a few more (we really need 30 attending sessions to make it work out) before November 14th arrived. And so Carol sent out letters to those who had signed up during August.

That afternoon Humphries and I went about Provo making final arrangements for bringing perhaps 50 people down here, making sure they had housing, and arranging for ground transportation and what have you. Those who are coming are going to have a ball!

We'll fly 15 people at a time out of Fort Lauderdale Sunday November 14th. They will leave in six hour offset shifts starting at 8AM. **Most** will fly in a new Beech 99 craft and make the trip in just over two hours. Tom Humphries will be on the ground in Fort Lauderdale directing the lift off, scheduling who goes when, and making sure everyone is comfortable. Tom will be arriving in Fort Lauderdale the Friday prior (the 12th) and staying at a Holiday Inn close by to the Executive Airport we fly out of. He is a travel-wise user of the Fort Lauderdale to Provo route now, and that will help take the edge off the new experience for the many attendees who have never been into the Caribbean previously.

On Provo it will be a busy, fascinating week. Our Chief Minister (equivalent to the Prime Minister in the UK or President in the states), the **Honorable Norman Saunders**, will be with us for dinner on the 15th and I believe (or expect) he will be announcing a new Turks and Caicos Government development 'policy' regarding establishing small electronic manufacturing facilities here. The Turks and Caicos have a very low labor rate, an excellent labor pool, and Government is anxious to prove that they want to encourage people to establish facilities here. I'll stop there for fear of letting the cat out of the bag, but will note that anyone coming who is looking for an opportunity to build satellite equipment in 'paradise,' using low cost labor and without any taxes to cut into profits, will find this discussion very exciting!

Monday will be a light day. We want everyone to be comfortable and rested. In the morning we'll start hauling small groups across the sands and beach to the WIV facility about one mile from the host hotel, the Island Princess. There attendees will have the opportunity to see in a quick overview how we have turned satellite technology into a national television system.

During the course of the week we will investigate where the industry is headed, learn about some non-video satellite systems which we feel may ultimately be as big a market as video, and test

equipment.

Each participant is invited to bring with them their favorite receiver, and an LNA if they choose. Using the WIV antenna farm, we will allocate time each day to do both subjective and hard measurement of receivers and LNAs. This will be the first opportunity in the industry for perhaps three or four dozen different receivers to be side by side compared, using a variety of strong and weak satellite signals. We are turning the WIV television studio into a testing facility, and we'll line up receivers and march through a series of tests with each. We **don't** intend to publish the information in **CSD**, not in great detail anyhow, but everyone attending will know exactly how **all** of the receivers measure up. More important than that some may not measure up will be the 'why' they do not. Everyone attending will leave with a new appreciation for receivers, and what they do (or do not do).

This may well be the largest-ever 'group' to come to the Turks and Caicos Islands, all at once. In addition to having our Chief Minister talk with us, we will be televising his welcoming address to the group live on WIV, nationwide. We'll run the mile from the Island Princess back to the WIV studio using one of our new \$500 remote TV transmitter units. We are delighted with their performance (we now have three on island) because we can go out as far as 15 miles and in about ten minutes time be pumping live color video and audio back to the main studio, where we then patch it into the live on-air service, or tape it for later use. One of our units runs off of either 12VDC or 110 VAC which means anywhere you can carry a unit about the size of **War and Peace** you have a remote TV transmission site. Yes, we'll tell those attending all about this gear.

Those bringing family members with them will probably have the same problem that Ed Grotzky of Arunta Engineering had back in August. Ed and Pam brought their four kids down and in the week they were here only saw the kids, briefly, at dinnertime. The four youngsters were taken sailing and boating and fishing and snorkeling and picnicking, and so on, by the Cooper kids. Where else in the world would you entrust your four children to a 13 year old who piles them all into his 15 foot run-about and then disappears over the horizon heading to some distant island where nobody lives and where cannons from pirate ships are laying about the beach? The folks at the Island Princess have worked up a fantastic selection of island things to do for the week your family is here. I like Ed Grotzky's comment the day before he left. "**I have done fifteen years of fishing in 3 days.**" Ed snagged everything from Tuna to Mackerel and Grouper, and he found out all about sharks! He'll be glad to share his thoughts on Provo with you at (602) 956-7042.

The closer we get to the November 14-20 period, the more excited I become about the concept of holding a small, informal 'retreat' down here in the Caribbean. Anyone who has late thoughts on attending should check with Carol Graba at **CSD**'s Fort Lauderdale office (305/771-0505) to see if there are any vacancies. Failing that, make your plans now to attend the 1983 Retreat!

MEANWHILE in PAPUA, NEW GUINEA

One of the more enlightening people I met for the first time at the August SPACE show in Omaha was a young man named Lindsay Jorgensen. Lindsay and friend John Morgan (P.O. Box 424, Goroka, Papua New Guinea) have been hauling a Luly portable umbrella

antenna throughout the outback regions of New Guinea for more than a year now. We are indebted to Lindsay for this month's front cover photo and those that follow.

Lindsay is akin to those 1880'ish US pioneers who rode horseback in the American frontier spreading the Gospel. Only Lindsay, and John, are spreading the electronic message of civilization. New Guinea is largely still in the same primitive state of development which it was 500 years ago. Natives there have never seen a vehicle, believe airplanes are the work of the devil (they may have flown with Ed Hegner to Provo!), and the only white skin they have seen is the medicine man who paints himself with a white, chalky substance for dance rituals. You probably think I exaggerate. I don't. Lindsay told me about going into one native village where he was apparently the first white person to visit. Through an interpreter he learned that the strange-but-familiar bone a native straight out of the bush was chomping on was part of a human arm. Seems the native hunter was collecting his 'reward' for participating in a raiding party on a nearby village the night before. Lindsay decided not to eat with those guys, afterall.



SO THIS GUY says to me "Show me Bonanza or I'll eat your arm . . ."

Having established that Lindsay and John are probably the first 'television missionaries' to visit many of the outback regions of Papua New Guinea, you may be wondering how anyone could profit from such a business venture. Chances are that New Guinea natives who still eat their neighbors are not going to have gold coins stashed away under their mattresses, to buy an earth terminal. Chances are also good that if they really wanted what you had to sell, and you refused to leave it for them or they didn't like the 'terms' offered, you'd end up being the first television missionary to be skewered on your own feed horn.

Fortunately, Lindsay and John are still new enough at all of this that they have not tired of simply 'showing off' satellite TV reception. And they relate that there is intense commercial interest by the Australians and Europeans who have come to New Guinea, to settle, to have their first 'live' television service. Like many of the 'outback' areas of the South Pacific, television until now has been either a 'skip' thing or a business populated by people who run videotapes around on the island hopping airplanes. Television, per se, is not new to the 'civilized' homesteads. **Live television is.** And Lindsay and John are trying to develop a marketplace for home TVRO products there. Someday soon they may tire of tromping into native villages and setting up their umbrella antenna in front of the Chief's hut. But for now, that is part of the fun they are having.

We have had reports through the years of just what television a person can see down that way; down being a relative term for those of us who live north of the equator. With the assistance of Lindsay, let me summarize again in one place what you can see in a Papua New Guinea native village with a 12 foot Luly antenna, a Sat-Tec R2B or an ICM 4400 and a 120 degree LNA.

- 1) **Palapa A-1.** This is the Indonesian 'primary' bird, established by the Indonesians nearly 7 years ago now to provide a sky-

link for their tens of thousands of islands. This is a 12 channel Hughes type (spinner) bird, very similar to the older Westar 1, 2 and 3 birds. On this bird is **Indonesian TV-1** from Jakarta. From Goroka, the look angle is 19.5 degrees and the reception is 'good.' This is a PAL format signal and the entertainment value is low since it is a state-run service.

- 2) **Palapa A-2.** RTM-1 is a Malaysian national service in PAL color. They are presently running in a half transponder format with the audio multiplexed someplace. Lindsay knows where it is, but lacks the equipment to tune it in. The color is 'good,' but there are sparklies. **Channel 7 Bangkok** (Thailand) is the second video service found on A-2. This one is also in PAL, reception is good with light sparklies, and the audio is on a standard subcarrier. See below. Then the one that will interest US bred folks; **channel 9 Manila.** This one, like Bangkok channel 7, is full transponder and it transmits in NTSC 525 lines. The programming is split between Filipino and English and the audio is standard sound subcarrier. Reception is good with light sparklies.



"HOW DO ALL OF THOSE funny, little white people get into that tiny box?"

Before moving on to the last bird, it is interesting to note that the Bangkok transmission was previously sending their audio out on a multiplexed circuit. Then one day Lindsay found himself in Bangkok and he stopped to talk with them. While there he complained or noted that he was not able to get their audio on his Sat-Tec or ICM receivers because it was not on a subcarrier. The chap he was telling this to walked over to the transmitter and flipped a switch. "**Now you have audio**" he said. And sure enough, they left the switch on and now Lindsay has audio on a standard subcarrier! Try that with RCA.

- 3) **Intelsat 4 (F8).** The Australian Broadcasting Commission uses a pair of half transponders to send up the eastern (Sydney) and western (Perth) services; essentially the same, but time delayed for the western feed. The levels are low enough over Papua New Guinea that reception is very marginal on a 12 foot Luly antenna (Intelsat people will scoff at there being ANY reception on a 12 foot terminal; but then they have never been to Steve Birkill's 8 foot terminal in Sheffield, England). However, under the present schedule a switchover to a 4A bird (F1) will take place close to the end of 1982 and then, according to Intelsat predictions, the levels in his area should come up to those he now finds on Palapa.

So now you know. Given a circular polarized feed (for Intelsat), a good, sensitive switchable half and full transponder receiver and a lower noise LNA, a chap with a 12 to 15 foot antenna could do right well in New Guinea.

Just for those who might be tempted to book a winter trip into the South Pacific with a Luly Umbrella under their arm, and a suitcase of electronics, be advised. Lindsay was in Omaha with his arm in a cast. I was tempted to ask him if somebody tried to eat him for lunch but

INDUSTRY PROFILE

PATMAR TECHNOLOGIES Larry W. James

MOVING UP in SMATV

Satellite Master Antenna Television (systems) are perhaps inappropriately named. There is at least a pair of efforts afoot to change the 'name' of the service. Perhaps the service could use a name change; it hasn't done all that well with the present name!

The concept of connecting a 'master antenna' system to a satellite antenna is certainly not complicated. That's what the big boys do with 'community antenna' television systems. The primary difference between master antenna systems, and community antenna systems, is the areas they serve. Community antennas, by their name, serve entire communities. Master antennas, although not so clear by their name, serve one building or a complex of buildings under 'common or joint ownership.' Typically, a master antenna serves a motel, hotel, apartment building, condominium complex, trailer park or some other area where the city or country streets do not intervene. That's one of the clear definitions which separates a community antenna system from a master antenna system; where the cable connecting the various parts of the system must cross over, under, through, **public rights of way**, and where crossing over, under or through such public rights of way require a city or county 'franchise' or license or permit, the system is usually deemed a 'community' system rather than a 'master' system.

Everyone 'knows' that people who own and operate cable or community TV systems have to haul their receipts to the bank in dump trucks. Cable TV, not without just cause, has been called 'the great money printing press of the 80's.' To be fair, not all cable system operators rake in the dough but enough do that the business has attracted a considerable number of monied investors. It figures, then, that if there is a way to get a slice of this pie, a fellow should pursue the opportunity.

Any building you can wire with coaxial cable, connecting up individual rooms or living quarters, and control which living quarter gets which programs, offers an opportunity for an enterprising person to move into the cable big leagues. An apartment building with 200 outlets, bringing in \$15 per month per outlet, is not too shabby a gross income; especially if you are in a position to keep your costs down and spread your initial capital (equipment plus installation) investment out over three to five year payback periods.

However, you cannot **own** all of the cable systems installed in buildings such as this. You may well find that the building owner already owns the system, and that he is unwilling to give up his 'rights' to the system; whether he charges for the service or not. And that moves us a step closer to selling the equipment to SMATV systems, but not participating in the gross income.

One of the fastest growing areas of commercial use of satellite signals, by commercial establishments, is the motel and hotel industry. Motels and hotels feel a certain competitive obligation to supply some reasonable choice of television to patrons who rent their accommodations. And until the advent of satellite TV, most motels and hotels were reasonably satisfied to offer patrons the local off-air television signals through a wired (cabled) television system. Another group of motels and hotels started out offering 'optional' in-room movies a few years back, charging for first run (or almost first run) movies which were distributed into the rooms via the same cable as was carrying the regular TV programs, but transmitted on a non-standard TV channel

that required a 'converter' box to make the movie play in the room. While this approach is still found in some motel and hotel units, a more popular approach is to create an interconnection between the motel or hotel, and, one of the premium movie services such as HBO or Showtime or The Movie Channel. If there is a cable service passing by the motel or hotel, one of the easiest ways to plug in the premium service channel is to plug into the cable; for **all** of its services (rare), or, for just the premium service channel. Yet another approach to getting premium movies into the motel or hotel is to use MDS (Multiple point Distribution Service); a local microwave carrier designed to carry a single channel of 'secure' programming from a central transmitter to subscribers.

Most recently, premium movie services have been piped into motels and hotels directly from the satellite system which we all know and love. HBO has a deal with Holiday Inns, for example, and most of the company owned HI units now have HBO delivered to them via either direct satellite feed, local cable or a local MDS. Other hotel chains, regional and national, have gone a similar route with good results. The word has spread and the motel / hotel operators are now pretty universal in their belief that they must have a premium movie service in patron lodging rooms if they are to remain competitive. It is the direct delivery of premium service movies, to motel and hotel rooms, which interests us here.

YOU Can't Do That!

One of the primary battles fought by SPACE (to date, with no real results) has been the attempt to get one or more of the 'desirable' premium service (movie and specials) suppliers to agree to allow private and (S)MATV systems to pay for and enjoy their service(s). There was a brief 'window' when The Home Theater Network accepted a handful of 'affiliates' and another brief period when Showtime announced they would accept such affiliates; but in actual fact apparently never did. There was also a period of time where some (S)MATV systems operating in areas not built by cable nor franchised to cable were also able to extract affiliation agreements from Warner's (The) Movie Channel.

Through all of this, would be (S)MATV operators have been frustrated by an unwillingness to 'deal' with non cable or non-MDS firms, at virtually any level. That is the popular myth at any rate. And that is the myth which we are going to explore here since the truth is far more encouraging than the myth.

The truth is that at least one premium service company, The Movie Channel, has been licensing certain types of multiple receiver establishments for direct view of their satellite delivered premium programming. There are several 'catches' of course.

The premium service firms largely want nothing to do with any private residence, any cable system which is not serving a full community, and any low power TV rebroadcast station. They owe their loyalty, they believe, to the cable television industry and their product is therefore available only to such firms. This attitude extends far beyond the premium (movie, specials) firms; it includes others of lesser grade entertainment, such as ESPN, The Cable Health Network and even The Weather Channel.

In spite of this negative attitude, there has been a large 'loop hole'

which some of the more progressive and sophisticated SMATV folks have been driving through for several years. One of the firms that has turned that loop hole into a money making, highly successful venture is **Patmar Technologies, Inc.** (formerly First Cine-Tel Metroplex) of Bernardsville, N.J. (*). Patmar is a Delaware corporation that has been involved in the design, installation, operation and servicing of MDS, MATV, CATV and TVRO installations for the better part of eight years. The firm concentrates its activities in the New York City region, but is now branching out on a national scale. Presently Patmar divides the time and energies of its 25 full time employees between the maintenance of 26 hotel / motel premium service systems, a 1,000 outlet CATV system on Governor's Island in the New York Harbour, and a 15,000 unit apartment complex (CO-OP City; the largest in the world) in New York City. To make all of this work, Patmar's Peter Sutro has carefully nurtured a long-standing, professional business relationship with HBO, and Warner-Amex's The Movie Channel.

In the early days, before satellites, Patmar brought HBO service into their facilities using the MDS transmission facilities carrying HBO. Patmar found the motel / hotel or other facilities that wanted the service, contracted to provide the equipment and then acted as an intermediary with the premium service firm (HBO) to get the service into the facility. With the appearance of HBO and others on satellite, PATMAR extended its base of operations outside the immediate New York City region served by MDS, and went to the satellite to make The Movie Channel available; under contract.

What Patmar has been able to do, which many others have not been able to do, is to develop a working relationship with a premium service supplier; a working relationship that guarantees Patmar access to a premium service when and if they locate a client that wants a premium service.

The Patmar agreement with The Movie Channel is unfortunately, for the moment, only good for locations where people do not reside permanently. That is, motels and hotels qualify; **apartments and condos do not**. However Peter Sutro sees this changing as the industry matures, and as some of the paranoia which premium service suppliers now display towards (S)MATV operators subsides.

The present Patmar list of TVRO served installations (The Movie Channel in most cases; other non-premium satellite delivered services in addition to the Movie Channel in others) includes Sheraton Plaza Inns, Hilton Inns, Ramada Inns, Howard Johnson Inns and a host of other lesser known, local or regional motels and hotels. As of early August, these locations were concentrated in New Jersey, New York and Connecticut. But now Patmar has gone into a national program, and that is the basis for this report.

One of the most frequently stated 'excuses' from the premium service suppliers, why they choose **not** to deal with (S)MATV firms, is that they cannot be sure of controlling the quality of the service offered, nor can they be sure that they will be paid. In the early days of cable distribution of premium services, HBO had similar fears with the cable firms. In fact, HBO reserved the right to cancel a (cable) affiliate's contract if HBO engineering found the quality of HBO service on the cable system was not up to HBO standards, and, the cable firm was unwilling, or unable, to fix it.

Patmar believes they have a handle on both of these problems; they have a long series of successful, good quality systems in and operating, and they have developed an engineering expertise which has become their 'textbook' for each new installation. This 'textbook' they are willing to share with others. And that is one of the cornerstones of becoming part of the Patmar 'team' of national firms offering legal premium service to motels and hotels.

The Movie Channel has recognized Patmar as an 'affiliate,' much like all of the premium service firms 'recognize' discreet cable systems under common ownership as part of a 'master' affiliation agreement. Because Patmar is an affiliate of The Movie Channel, those firms that



PATMAR's JAMES — "We have legal access to premium programming . . ."

become part of the national Patmar program will also be covered by a master 'affiliation agreement.' And that is the second key ingredient in their national program.

Heading The Team

To expand their premium service satellite terminal installation program beyond the northeastern states, Peter Sutro has enrolled the assistance of a veteran of the home TVRO field; **Larry W. James** of Broken Arrow, Oklahoma (**). James is Vice President of National Motel / Hotel Sales, and on his shoulders falls the chore of putting together a team of professional sales, service and installation firms.

James and Sutro have broken the United States down into marketing regions; their format follows the popular telephone company area code divisions. An affiliated firm will be responsible for marketing, sales and installation in an area code region; or more, if they can convince Patmar that they have the strength to handle more than that. The entire program is based upon creating a national budget for the promotion of the new national service, with each affiliate of Patmar paying into a central kitty a pro-rata share of the annual budget. An area such as Colorado, for example, has 2% of the national market and the Colorado affiliate in the program would therefore carry 2% of the annual program costs.

James elaborates;

"Sublicensees (firms affiliated with Patmar) **will install TVRO systems in qualified motels and hotels, and service the installations.** The revenue derived from the installation and sale of the equipment goes totally to the sublicensee / affiliate. The monthly programming revenues received from the motel / hotel will be divided between the sublicensee / affiliate and Patmar."

CSD: What is it that Patmar is doing for a sublicensee / affiliate that such a firm cannot do for itself?

James: "A number of things. Because of our close working relationship with The Movie Channel, and because there are similar affiliation agreements pending with other premium and non premium service programmers, we have legal access to programming. Anyone that has tried to sell a stand alone TVRO system to a motel or hotel has learned that it is almost impossible for some firm that is not known and respected by the premium service firms to obtain an affiliation contract. That puts the TVRO sales firm in a tough spot; they can't sell the hardware because they cannot get the software. Sadly, a few have gone ahead with the installations anyhow, and that has hurt the image of the entire industry."

CSD: The software is certainly important. All of the glamour of the hardware aside, that's what you are really selling. But isn't it possible that others will also end up with affiliation agreements as well, on their own?

James: "To be sure. Which brings us to another advantage to working with Patmar. We were really quite satisfied to be dealing with motels and hotels in the area of the north-

* Patmar Technologies, Inc., 6 Claremont Rd., Bernardsville, NJ 07924 (Peter Sutro; 201/766-4408).

**Larry W. James, VP of National Motel / Hotel Sales, Patmar Technologies, Inc., 429 W. Miami, Broken Arrow, Ok. 74012 (918/451-0183).

east where we were headquartered. But then we began to run into some sizeable packages; 50 or 100 motels or hotels at a clip. Some of these are regional chains, others are well known chain outfits that operate clusters of motels and hotels in various geographic areas. They liked what we were doing, but they wanted to know that we could service the systems in Washington state or Texas with local service people. That told us we needed to broaden our operation. The best way for us to do this, to be able to handle these large, national chain contracts, is to have affiliates working with us. So we bring to the package the promise of many sales, made by Patmar, at a national level with the work then being done by the sublicensee."

CSD: Sublicensee is a strange term. I think I understand it, but . . .
 James: "We are not too happy with it either but that is the way our affiliation agreements with programmers read. It simply means that a firm affiliated with us, on a national basis, is licensed by us to work against our master license or contract with a programming firm; such as The Movie Channel."

CSD: The Movie Channel can perhaps be characterized as the weak sister of the big three; HBO is number one, Showtime is number two. The Movie Channel has a great deal to offer, their movies and only movies schedule should fit into motel and hotel rooms better than some of the serial stuff one finds on Showtime and HBO.

James: "We think it is an excellent choice for motels and hotels. Their scheduling does fit transient population perhaps better than the others. You have to keep in mind that The Movie Channel is owned by Warner Brothers which is not exactly a lightweight outfit. They may be running third with the cable folks, but we feel that ultimately they will become the most popular and best known premium service for motels and hotels."

CSD: Aren't you taking some chances asking firms that you know very little about to become a part of your operation? The Patmar name will be on the line with The Movie Channel, and elsewhere, and if an affiliate of yours goes off and does something dumb, won't that come back to haunt you?

James: "That was one of the drawbacks about going 'national' in this way. We could have done it on our own, opening our own outlets in key market centers. We considered that. But it would have taken far more time to get where we feel we have to be within the next twelve months or so. This is one of those concepts that is going to be a success. If we don't do it, moving against our own excellent track record and our good working relationship with key premium service suppliers, somebody else was bound to do it. Once a TVRO terminal gets installed in a motel or hotel, that system is going to be awfully hard to

dis-lodge. This may be a once-in-a-lifetime sale. They will stick in place as long as the service is good."

CSD: That brings us to the obvious. Selling TVRO terminals is a terribly seasonal business, at the home level. One of your divisions sells home terminals so you know that first hand. This may not be so seasonal.

James: "Most of the installations end up on the roof of a building. Very few motels and hotels are situated with spare ground on the south or southwest side of the building, and a good look angle at F3R. We have learned a lot about putting 11 or 13 foot terminal antennas on roofs, and we'll share that with our affiliates. This type of work can be done in the wintertime, and the interfacing of the TVRO system to the existing MATV system can also be done in the wintertime. We have had, on occasion, to set an antenna on a roof and hold it in place with sandbags until the snow melted, and then go back and make it permanent in the spring. This sounds sloppy, but in practice it works very well if you engineer the sand bagging as carefully as you would a permanent installation. We have found that business may actually peak in the winter months in the motel and hotel field since these businesses continue very busy that time of the year. We think it provides an excellent 'fill' for the slower months."

CSD: There is one more point that you glossed over earlier. The affiliate or sublicensee shares in the monthly service revenue from the motel or hotel. Let's talk about that.

James: "I think it is everyone's dream in this business to be able to have a regular income coming in, month after month after month, for an installation. The cable boys have made their billions this way, and the programmers get their operating cash and profits this way. Until now the TVRO seller has been in a 'wham-bang-thank you mam' type of sales business. There is virtually no 'after sale market' except for step up equipment. But if you put in a few thousand motel / hotel rooms each year, and every month those rooms, under contract with The Movie Channel or whomever, send in a check for their room count times the agreed to dollar amount per room, per month, then you too become part of that revenue stream. The check goes to the licensee, Patmar, and Patmar sends back a share of that check to the sublicensee. Remember that there are three firms directly sharing that revenue; the premium service supplier, your firm, and Patmar. Everyone likes getting those checks and it wouldn't take very long for the amount of those checks to work into a quite sizeable monthly annuity."

CSD: Let's talk about the type of experience a firm must have to be part of this. I can envision Patmar receiving several hundred phone calls from well meaning people the week after CSD comes out. Let's try to pre-screen some of those right now.

James: "Well, I don't want to turn anyone off in advance but there are some ground rules. We started talking about this in Omaha, quietly; although you did have me on your morning television program and we probably signed up 20 or so affiliates as a result of that exposure. First of all, this is no get rich, high boot scheme. I want people to recognize that Patmar has been in this business for some 8 years, and that we have had to work very hard to handle the prejudices which many of the premium service firms have against MATV people. They are biased, and perhaps rightfully so, because so many of the people who claim to be MATV people are unstable or not good business people. I'm not condemning MATV as a lot, just explaining that if you say you have MATV experience you usually have to prove yourself in advance of getting an affiliation. We are not about to jeopardize the relationships we have built up. Having said that, we would prefer to see firms who have practical hotel and motel cable wiring experience. Usually the cable system is installed, but it remains for the installer of the TVRO to



PATMAR's JAMES — "...The Movie Channel is an excellent choice for motels and hotels"

add a modulator or two, balance the system for the new levels, and make sure the system can handle the extra signals. There are occasions where the installer has to put in a fresh, new coaxial cable master system. That's where our distributorship with Blonder Tongue, for example, can help. We can get system layouts prepared, based upon the experience of our own engineers and the combined experience of Blonder Tongue or others we work with. We also want the affiliated firm to have an appreciation, which says experience, of or with commercial installations. Although the affiliate firm making the installation will be responsible for the ongoing proper operation of the system, handling service calls and so on, we want to be assured that they are not taking short cuts that will hurt. It will be us, and through us The Movie Channel, which will get the complaints if the service is degraded. We don't need that and we won't affiliate with a firm that has no experience.

"That is not to say that we won't provide training and back up engineering, and our own experienced people. We will. But we can't school every affiliate from the ground up. This program needs to hit the ground, running, because we have hundreds of installations waiting to go in.

"We'll handle each inquiry on a one on one basis. But we will be selective, because we view this as a lifetime commitment. We want, and can afford, to be affiliated with the 'right firm' the first time around, in each area."

CSD: What is 'dangerous' about this? There must be more negatives here than meet the eye. What should a person watch out for?

James: "The affiliate selects the equipment he wishes to use. He designs the system, installs it, collects the money and keeps all of the money. He gets a share of the monthly revenue for the premium or other services. We are there if he needs us, and if he doesn't need us, we don't force equipment or engineering at him. We send him pre-sold system sales for chains of motels and hotels. He brings us sales he makes, in the form of new motels and hotels that want to carry The Movie Channel or some other



PATMAR's JAMES — "We can't school every affiliate from the ground up. We are looking for experienced people."

service we can sublicense him to offer. The only money he pays out is for a cooperative, national, marketing program. Every affiliate shares the cost of that, and it is done on an annual basis against a carefully worked out national budget. The money placed into the pot by the affiliate is added to the funds coming in from other affiliates, and then we go out and sell national chains and regional chains on the service using that money to make the marketing program work. I don't see the dangers"

CSD: Well, this will appear in print on the first of October, and by the time many of those reading this arrive in Atlanta at the STTI show at the end of the month, if there are dangers, they will have them all worked out to tell you about! You'll be there?

James: "I hope that before we leave Atlanta, we will have completely filled in the territorial areas which have not been pre-subscribed for by that time. Yes, we will be in Atlanta"

COOP ON BASICS THE TVRO RECEIVER

\$8,000 and UP

The first mass public exposure to the joys of home satellite television appeared in **TV GUIDE** Magazine late in October of 1978. Coop had written the article early in the summer of 1978, and after it bounced from editorial desk to editorial desk it was finally scheduled into print. **CBS News** picked up the story and dispatched a team to do a visit with Coop at his rural Oklahoma home. On October 31st, 1978 Walter Cronkite did one of his famous lead ins and the rest was history.

The Cooper telephone was already unlisted. But enterprising people managed to track him down through **CATJ Magazine**, which he

owned and published at the time. Others mentioned in Coop's article were less fortunate. Taylor Howard was mentioned and his phone was still ringing off the hook months later. Interest in home receiver systems was very high.

Only, **nobody had such a gadget!** Taylor had a system he had patched together from surplus parts and some Stanford engineering ingenuity. Cooper's system had been pieced together with the assistance of kind **CATJ** advertisers and some dumb luck. LNAs cost upwards of \$2500 in that era for a 'decent' 150 degree unit. The antennas . . . well, Prodelin manufactured a ten foot 'terrestrial' dish with a mount designed to hang the antenna on the side of a piece of four inch pipe. With a special order you could get a 'button hook' feed for 4 GHz, but the package set you back nearly \$6,000. And the receivers? They started close to \$8,000 and went up. Way up. One of the most popular and sensitive receivers of that era, a Microdyne unit that sold for near the \$8,000 price tag, offered an extra audio demodulator (6.8 was standard) for a mere \$450. To change the audio from 6.8 to 6.2 you had to take out more than a dozen small sheet metal screws, lift the screen top off the receiver, unhook a gold plated (literally!) RF connector and unplug a powering and audio out plug. Then you lifted the 6.8 audio demodulator (which, by comparison, was about twice the size of today's separate down converter units) out of the receiver and replace it with the optional 6.2 unit. If that seems like a very tedious way of changing audio subcarriers, you should have been involved with moving an antenna (20 footers were standard) from bird to bird in those days!

And all of that was but four years ago right now.

The Start

There were four people in the world working on bringing receiver technology and pricing down to earth late in 1978. Taylor Howard was

trying to grow out of his first surplus microwave conversion scheme to what would one year later become the now famous 'Howard Terminal Receiver.' He was making progress, but he wasn't telling many people how to do it. He wasn't ready to share it, just then. There were too many loose ends.

In England, pioneer Steve Birkill was building his own receivers. It was during 1978 that Steve developed the PLL demodulator, a subject we will return to shortly. Birkill was handicapped, he thought, because the only dish he could scrounge in the UK was an 8 foot Andrew terrestrial microwave reflector, and he had no signals but the old style Intelsat IV birds to work with. Can you imagine chasing 17-20 dBW footprints with an 8 foot dish and a 180 degree LNA? Birkill was doing it, and because he had so little signal to work with, he could see every fraction of a dB in system improvement. Perhaps, ultimately, that would be to everyone's benefit. Maybe we would later be glad that Steve did not have 'fat' signals to play with!

In Travelers Rest, SC a ham named Robert Coleman was tinkering with some surplus electronics; the infamous 'TD Bell Microwave' gear which he was picking up at ham radio swap meets. It would be 1979 before Coleman made the system fly well enough to attract national attention, however.

Finally, in Oklahoma, there was a chap named Steve Richey who hung around with Coop a great deal. Richey actually had a private terminal receiver operating, and he had built perhaps a half dozen under contract for a Canadian pioneer seller of private terminals. Richey was the 'head' of the class, and there were many people watching what he was doing. Among those was Royden Freeland of International Crystal Manufacturing Company, of Oklahoma City. Royden would later become a receiver manufacturer.

The Richey / Rod Wheeler receiver came on the market at an announced price of under \$3,000. That bothered the people selling the \$8,000 and up hardware. At a cable trade show in mid '78 Richey was forced to take his "cheap" TVRO receiver out of his booth and hide it from the cable folks; they were so angry that he came out with a receiver that might be sold to private individuals that they were downright threatening. Richey spent the rest of the cable show hiding under his display table or in the men's room!

The first receivers offered to the cable industry, in 1975 and 76, were designed not for cable nor even for domestic use; they were straight out of the design books for Intelsat. A few modifications had been made to accommodate the differing modulation (full transponder) formats, and the single fixed audio (6.8) that was quickly the 'standard' for cable feeds. But the price remained way up there. The position of the early receiver suppliers to cable (Scientific Atlanta, TerraComm, Microdyne) was not indefensible. Every receiver then, and now, had a special device in it called a VCO. The VCO is the oscillator that allows the receiver to convert in a mixer stage the incoming 4 GHz TVRO signal down to a lower frequency range. In 1978, the VCO was a very special temperature compensated circuit that was stuck into a brass, machined cavity. It was not stable, by nature, so special compensating and tracking circuits had to be designed to insure that it did not wander around, causing the received TVRO signal to wander around with it. Oh yes. The VCOs in mid 1978 came from one of two specialty microwave manufacturers. They cost upwards of \$800 each (!) and by the time you got sufficient additional circuits tacked on to them to keep the receiver from drifting around from channel to channel, you had nearly \$1,000 in parts cost invested!

The VCO problem was the first big hang-up to be tackled. There were no Avantek off-the-shelf VCOs in those days, at any price. Taylor Howard and Steve Birkill were working in similar directions; both felt that a low cost transistor oscillator could be made to function for 'home use' since the receiver was going to be tuned and re-tuned from channel to channel with some frequency, and if the receiver did 'drift' it was not going to be a user problem.

Steve Richey went another way. He talked yet a third microwave specialty house into releasing a less stable (by Intelsat-standards, not stable enough) VCO, but he was paying \$300 each for them at the time. He shaved a bunch of dollars off the receiver, but he still had more invested in the VCO than modern receiver manufacturers have in the entire receiver package!

By early in 1979 another name was added to the pioneer receiver design roster and with the name came some new VCO talents. H. Paul

Shuch owned a small custom microwave engineering firm in San Jose, California. Shuch was also a teacher at a college in California. He had previously made his mark as a designer and builder of GEOS (1.6 GHz) weather satellite hardware. Shuch looked at what was being done and decided that he could offer 'microwave modules' with which talented people could assemble a home TVRO. Shuch had the honor of being the first into the marketplace to offer hardware with which somebody with reasonable talents could put together and see TVRO pictures.

The trails of Shuch and Taylor Howard crossed many times in 1979. Both would ultimately appear, and teach, at the first SPTS; held in Oklahoma City in the summer of 1979. Howard and Shuch technology largely became inseparable since the two lived and worked adjacent to the California 'Silicon Valley' region where much of America's microwave technology originated. Both had access to the latest in microwave parts (in those days, each announcement from Avantek or Hewlett Packard or Dexcel of a new transistor sent everyone running for their soldering irons and Teflon circuit board!), and both had friends within the commercial microwave industry to provide sounding boards.

Shuch's contributions were many. At the very least, his informative and highly tuned lectures at the first and second SPTS events inspired dozens who would later become TVRO equipment designers as well. Shuch worked out a VCO package (actually a pair of packages) which made it possible to get from 4 GHz down to a lower IF range at far lower cost than the commercial VCOs, with only a minimum amount of drift. Shuch was the design engineer for the first series of receivers from International Crystal, and in fact the first ICM TVRO receivers were really Shuch 'modules' packaged into an ICM case.

While Shuch was an inspiring teacher and a decent circuit innovator, he was often a difficult person to warm up to. If he didn't like you, what you said, or how you said it, he wasted no words letting you know. And, if he didn't believe some aspect of the technology warranted his attention, he simply glossed over it. Video demodulators, video filtering and video amplification were not favorite Shuch areas of interest so while his microwave technology was state of the art, he really left the total receiver undone by 'shucking' responsibility for completing the design of the full receiver. Ultimately, Shuch would retire from an active part in the industry because he felt that those who followed him were taking engineering shortcuts which he did not approve of. Shuch, much like today's Clyde Washburn, was something of an engineering purist.

If the VCO was an early cost problem, the demodulator was an early performance problem. At the first SPTS show, there were two designed-for-private receivers on hand. One came from ICM, basically a Shuch design with some Royden Freeland created demodulator and video circuits. The other came from Andy Hatfield who used the first SPTS to announce his AVCOM receiver. There were few similarities in the two approaches. Andy took great pains to hide or disguise what he was doing to produce TVRO pictures; Shuch told everyone who would listen exactly what he was doing. Side by side comparisons were meaningless; the pictures looked pretty much the same. But what surprised the commercial receiver suppliers on hand was that the Shuch design and the Hatfield design receivers had pictures almost as good as the expensive, and larger, SA and Microdyne units there.

Where the Shuch/ICM unit fell down was in the video processing. Shuch's lack of interest in video circuitry allowed Royden Freeland to follow the footsteps left ahead of him by Taylor Howard and Steve Birkill. It was in the summer of 1978 that Birkill had brought to the United States his design for a phase locked loop demodulator. The circuit for that PLL demod was published by Coop in **CATJ Magazine** in the fall of 1978. Taylor Howard remembers that the circuit shown didn't work very well. Taylor also remembers that early in 1979, another Coop project of that era, low cost 10 GHz point to point microwave, nurtured a reader contribution to **CATJ**. This circuit refined the original Birkill PLL, and less some of the drafting errors that crept into the Birkill report published by **CATJ**, Tay remembers that when he saw that circuit in print, he knew he had the answer to the TVRO demodulator. Howard would later describe this PLL demod to the world at the first SPTS, and in his STT Home Terminal Manual



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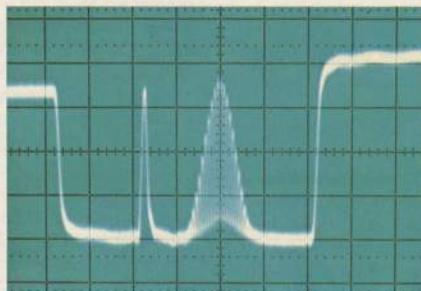
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released in mid 1979.

Like the VCO problem, which boiled down to creating a system that didn't require so many dollars for parts, the PLL demodulator was a cost effective improvement. These were the two big problems. And they were licked. All that followed were the refinements, as we shall see.

What Is A Receiver?

TVRO signals are transmitted at a microwave frequency. Each transponder or channel is a specific frequency, reached by national or international accord. Microwave frequencies are very short wavelengths; about the length of your thumb, at 4 GHz. Everytime you change the frequency (as in going from one transponder to another), you also change (slightly) the length of the wavelength. In our 3.7 to 4.2 GHz (a GHz is a Gig-a-hertz, which is electronic shorthard for 1,000 megahertz) band the lower frequencies (3.7 GHz) have longer wavelengths than our higher frequencies (4.2 GHz). The TVRO band is 0.5 GHz wide, or 500 Megahertz wide. It can accomodate 12 TV signals at once on one polarization (such as horizontal) and 12 more at the opposite polarization (vertical). The two polarizations share the same frequency band, but not the same precise frequencies. The 3.7 to 4.2 GHz band is wider than (i.e. it has more room than) the total UHF TV band from channel 14 to 83. The 3.7 to 4.2 GHz band is as wide as 469 'AM' radio bands (.535 to 1.6 MHz). As you can see, there is a great deal of 'potentially useful spectrum' on a single satellite. There is sufficient 'spectrum space' in the 500 MHz wide TVRO band to accomodate 49,714 **separate** AM radio stations, each with its own private frequency. If both polarizations now used for television were dedicated to the transmission of standard 'AM band' radio signals, one satellite could accomodate nearly 100,000 separate, distinct, AM radio stations. The United States today has fewer than 10,000 radio broadcasters in operation. A satellite is clearly an awesome 'machine'.

The satellite receiver can 'tap' into this vast national or international resource. It does so with an awesome level of technology, but a simplistic approach to engineering which developed more than 30 years ago.

A satellite receiver is actually nothing more than a terrestrial microwave service video receiver. The first such receivers, operating in the present 3.7 to 4.2 GHz band, were created by Bell Labs in the late 1940's. Bell recognized before most, including government that awarded the frequencies to Bell for such use, that the microwave spectrum was going to be the 'super highway of communications'. The present 3.7 to 4.2 band of frequencies was the first terrestrial microwave band of consequence awarded to Bell and like firms for the transmission of telephone calls, and later, video. The national terrestrial television networks developed by using this band, via Bell, to feed network TV programs from city to city. Bell had a great deal at risk when it designed the first 3.7 to 4.2 GHz receivers and it did an excellent job of satisfying that risk.

The Bell receiver technology preceded the later first use of this same spectrum by satellites. Whereas when Bell moved into this microwave range in the late 40's and early 50's, the spectrum was totally unused, the situation was different in the early 60's when satellite systems were first developed. By the 60's, Bell's success with electronic super highways had taught others that the microwave region was a valuable resource. After some hassles, the first satellites were awarded a "co-use-right" for the same 3.7 to 4.2 GHz region, with the provision that satellite systems of the 60's and after could never cause interference to the pre-existing terrestrial microwave systems. In those days nobody envisioned the rapid growth of satellite **systems** and even RCA and Western Union were not forecasting domestic satellites. So Bell and others using this frequency band for domestic links saw little to fear in allowing this sharing. Afterall, there were but **three** satellite receiving stations planned **for the entire United States!** And each would be in a 'sheltered' area where they could communicate with Intelsat birds to be located over the Atlantic, and Pacific oceans.

Here was the first seed of conflict for the late 70's and 80's. Bell asked for and received FCC approval for a plan which would (Bell felt) insure that satellite signals would not somehow wander into terrestrial receiving equipment sites, and cause interference. This was accomplished two ways:

- 1) All satellite signals would be 'offset' in frequency, channel for channel with terrestrial service, so that interference would fall 'off to the side' rather than squarely 'on top of' terrestrial carriers.
- 2) And, the satellite signals would be 'dithered' in frequency. That is, they would be moved up and down their channel width at a precise (30 hertz) rate, thereby spreading the satellite transmission energy out so that it never stayed in one place long enough to cause constant interference.

Bell was concerned only that satellite signals not interfere with terrestrial services. It apparently did not occur to Bell that there might be such a proliferation of satellite receiving sites, or that the FCC might ultimately allow such sites to be installed without FCC licensing (i.e. control), and that the sheer weight of the receiving sites would ultimately prove to be a bigger problem to Bell than the satellite transmissions themselves.

It turned out, as pioneer Robert Coleman (and before him, Taylor Howard) would prove, that a surplus (as in 'out of service', discarded) Bell TD-2 family microwave receiver intended for terrestrial service could, indeed, receive satellite television pictures. There was a period, from 1978 through the middle of 1979, where knowledge of this fact spread and pretty soon the few hundred TD-2 receivers discarded (as in retired) by Bell annually (in favor of new versions) were gobbled up by 'experimenters'. Prior to this discovery, and the polarization of this technique by Coleman, TD2 units were being sold for \$10 to \$25. When the satellite capability became known, and Coleman (through STT) published a manual describing modifications and adaptations to the basic TD-2 unit, prices skyrocketed rapidly. Pretty soon the whole concept of 'doing it cheaply' disappeared as TD2 prices went out of sight. This was all happening at about the same time that Paul Shuch began to crank out a reasonable quantity of his TVRO receiver 'modules', and Taylor Howard was releasing his now famous manual that told you how to build a relatively inexpensive (\$800 in those days) full receiver, from scratch.

One of the early lessons learned with the TD2 was the fact that terrestrial microwave equipment was not designed for reception of 'weak' signals. One of the things which Bell insists upon is something called 'margin'. That's extra signal level, built into a circuit between points 'A' and 'B'. Bell insisted that all terrestrial circuits have a margin of 40 dB or greater. Those were the engineering rules. So the TD2 was designed to function in the presence of very strong (by satellite standards) signals. The popular theory of the day was that you had to put around 45 to 55 dB of LNA signal gain in front of the TD2 to make it play back satellite pictures at all. Coleman, like others, believed this initially and he became the first private individual to design and make play the elusive GaAs-FET low noise amplifiers. Coleman also was perhaps the first to discover that a plain old TD2, fresh out of a Bell equipment rack, could in fact make pictures of a sort (weak, but recognizable) on a ten foot dish **without** an LNA! Some press reports misquoting Robert Coleman soon after he discovered this led to a brief period of euphoria in the hobbyist field; "**You don't need an LNA!**"

The truth was, of course, you did and still do. And somehow people were beginning to concentrate on the **total** electronic system, which included gain at the antenna (LNA), gain in the receiver and . . . more gain in the receiver. All of which brings us to the early wars between Shuch and Howard.

Where To Put The Gain

If the 1978 era receivers suffered from anything, other than high price, it was excessive gain. You have to realize that there was a fear, almost paranoia, regarding sending 4 GHz signals through coaxial cable. The first installations for cable used large 1 inch Heliax ® cable. At prices approaching \$5 a foot, connectors close to \$100 each, and the almost impossible task of making it go where you wanted it to go (cable this large has a mind of its own), there was nothing 'good' about the transmission line situation.

Andy Hatfield of AVCOM was probably the first person to really sit down and analyze the cable loss problem. Cable engineers told you that you could stand up to perhaps 5 or 6 dB of cable loss between the LNA and the receiver. In the large 3/4 and 1 inch cables (a few brave people had dropped down to 3/4" cable), that amounted to as much as



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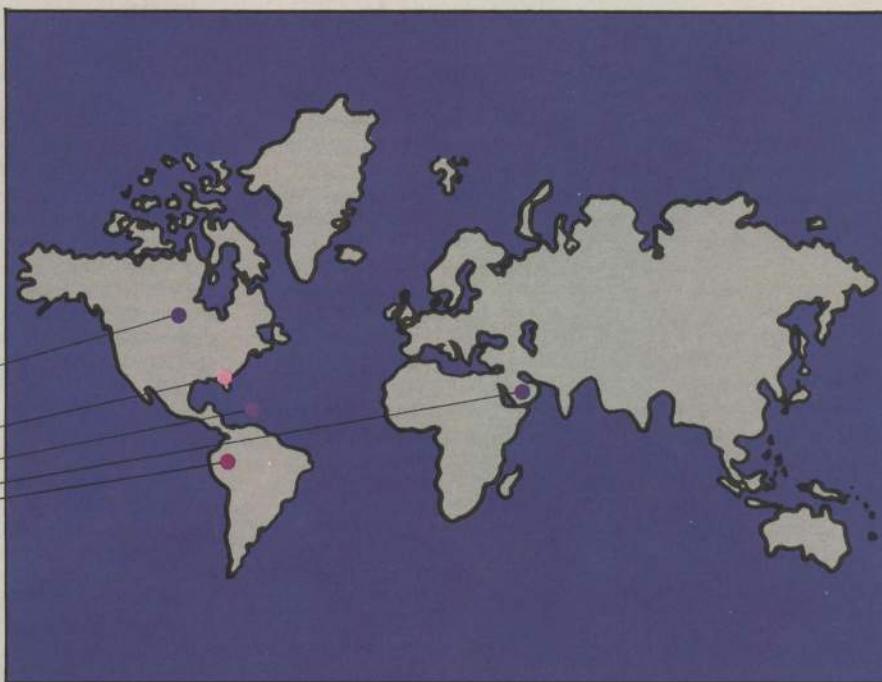
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200 feet of cable. Hatfield looked carefully at the cable grade receivers and decided that they, like Bell, had built in a huge margin. The margin was so great, Andy reasoned, that you could shave big dollars out of the receiver and the installation by simply dropping the margin. He couldn't see where the margin was buying you anything.

This thought process precipitated a hard look at where the system gain should go. Paul Shuch came into the field with his own theory of receiver system gain. He preached that the LNA should have 30 dB of gain, that the high IF of the receiver should have 30 dB of gain, and the low IF of the receiver should have about the same amount of gain. Paul called his approach 'balanced gain'. It happened to fit his own design experience since the high IF was in the 1200 MHz region with the first Shuch modular receivers (and later the first ICM units), and Paul had learned how to create 30 dB 'gain blocks' in the 1200-1600 MHz region with his weather satellite receiving systems. Shuch was persistent with his technique and he talked then-new-to LNAs Dexcel into producing a **30 dB gain LNA** for his receiver packages.

Hatfield, meanwhile, saw LNA gain as relatively inexpensive (he felt the customized 30 dB gain Dexcel LNA was at odds with everyone else's 50 dB gain versions, and thought it dangerous to design a receiver around a single source, single model LNA). His approach was to continue using the higher gain, standard LNAs but to design the receiver gain so that it could handle use of lower cost coaxial cable. To

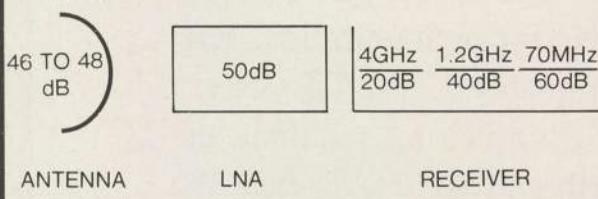
Andy, getting rid of multi-buck per foot hardline was a positive step. At the opposite viewpoint, Shuch wanted less gain in the system (the system included the LNA gain), but by trimming it to his "30/30/30" formula, installers were back to using hardline since the system as installed could only stand 5 to 6 dB of system loss between the 30 dB gain LNA and the input to the receiver proper.

Taylor Howard's early designs took a middle ground. Taylor felt that there would ultimately be two portions of the receiver where 'gain would be cheap'. One, he forecast way ahead of the actual fact, would be in the LNA. He could not see why the receiver manufacturer should spend valuable resources and money putting system gain into the receiver proper as long as the 50 dB gain LNA was going to probably be standard for many years to come. He also couldn't see putting a lot of gain into the high IF section when that was gain that required several times as many dollars per dB of gain than did the gain at the lower IF. So Howard concentrated on accepting the LNA high voltage gain as part of the system design, and moving the bulk of the receiver gain down to the ultimate IF at 70 MHz. There, gain was cheap because the amplifier devices existed from television receiver production.

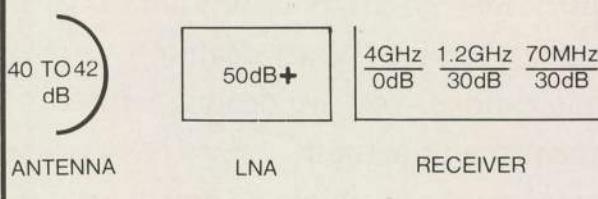
As the field would finally mature into established designer philosophies, it would be the middle ground between the Hatfield approach and the Howard approach that would prevail. All of this was before the industry discovered single conversion receivers.

THE CHANGE IN GAIN

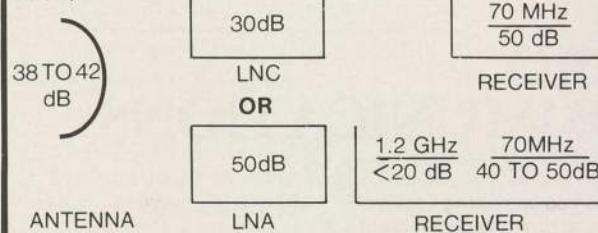
1976/78



1979/80



1980/82



How Many Conversions?

It was not until the San Jose (July 1980) SPTS that anyone thought you could really produce a quality TVRO signal with a single conversion receiver. Back in the June 1980 CSD, Arizona builder David Barker had described an image rejection single conversion unit which he was offering to builders in small quantities. In that same issue, Norman Gillaspie described his own single conversion receiver system. Between the two, the Barker approach quickly proved superior and within months even Gillaspie was building receivers "ala Barker".

Single conversion? What is it, and why did it take the industry by storm?

The TVRO signal lands on your antenna in the 3.7 to 4.2 GHz region. That is, as we now know, microwave. We also know that a microwave signal will withstand very little mis-use, or loss, or it simply evaporates. The trick is to receive the signal in the 3.7 to 4.2 GHz region, and then as quickly as possible transfer the 500 MHz wide band to a much lower frequency where circuits are not so tricky and it costs far less to amplify and process signals. A receiver does this with a stage called, appropriately, a conversion (or mixer) stage.

Back in 1978 and 1979, if you wanted to get from 3.7/4.2 GHz down to a lower frequency such as 70 MHz, you had to do it in two steps. First you converted from 3.7/4.2 GHz to a frequency in the 1200 MHz region, and having done this, then you re-converted the signal from 1200 MHz down to 70 MHz. Each conversion stage costs money.

Each conversion stage has an input frequency filter through which the incoming signal flows, a mixer device, a VCO (signal oscillator that makes the mixer work), some output frequency filtering and probably some gain at the output frequency end. In a double conversion receiver, there are two sets of these parts. Some people felt that was redundant.

Robert Coleman, as early as May of 1979, was demonstrating to Coop his own single conversion modification for the TD2 unit. It worked but the system suffered from something called images. In any single conversion scheme, the signal oscillator (VCO) that you manipulate to provide signal to the mixer is so close in frequency to the TVRO signal frequency being received, that it falls 'in band' for a good part of the tuning range from 3.7 to 4.2 GHz. This means that the VCO signal runs up and down the TVRO band as you tune the receiver from channel to channel. It always lags or precedes the actual transponder you are tuning in, by the frequency of the IF. If the IF is 70 MHz and you are tuning in a signal at 3800 MHz, then the VCO will be just below (3800 - 70) or just above (3800 + 70) the tuned-in carrier. The VCO tends to be far stronger in the receiver front end than the TVRO signal, and this strong 'in band' signal causes some problems with the receiver proper. With the particular (not image-canceling type) mixer Robert Coleman was employing in 1979, his experimental single conversion receiving kept running into and 'tripping over' these VCO created

signals, and images of these signals as he tuned about the band. Coleman was about 15 months ahead of everyone else, and since he had plenty of other projects to occupy his time, he never pursued this receiver approach to a final solution.

David Barker did. Barker discovered that a popular mixer configuration, developed for other forms of microwave systems, could be adapted to TVRO work. That was the birth of the 'image reject' or 'image canceling' double balanced mixer system. With it, it was now possible to get the 3.7/4.2 GHz frequency range signals all the way down to 70 MHz in one stage, or jump. The concept quickly divided the TVRO designer ranks. Some, like Taylor Howard, to this day do not believe in single conversion. Others, like Andy Hatfield, rejected it at first but later decided it was a viable and cost effective way to get TVRO pictures on the screen.

The subject of receiver 'LO radiation' has been dealt with extensively in past issues of **CSD**. For those who are new to the ranks, here is what it boils down to:

- 1) Any VCO/LO in a receiver is a possible source of interference. It is, in truth, a signal generator; a low power transmitter.
- 2) Unless great care (and added expense) is put into the receiver design, some of the VCO/LO signal will get 'out of' the receiver. It may 'leak' out of the container/box, or it may travel towards the LNA (i.e. the antenna), or the balance of the receiver. Or both.
- 3) Once the VCO/LO signal gets 'away' it can cause interference with other receivers.

It is particularly difficult, and expensive, to control the VCO/LO signal that is 'in band' or nearly 'in band'. With any single conversion receiver we find in the **home** TVRO marketplace these days, the VCO/LO operates 70 MHz removed from the actual signal being received. If the receiver is operating all by itself, the presence of the VCO/LO signal is undetected. Thanks to the image canceling mixer design, the VCO signal is not going to cause any problems with the receiver it is installed into. But, if there are two or more receivers operating off the same antenna system, or in the same vicinity, it is **possible** for one receiver to cause interference to another. That is the crux of the single conversion 'problem'.

Interference between single conversion receivers first popped up at the Houston SBOC show in the fall of 1980. Actually, the interference was between all receivers; single or double conversion. It affected any receiver in the place, although it originated in the single conversion units. It was there that the industry realized there was a problem, and manufacturers began to look for ways to cure that problem. Once again discovering a cure was not needed; the cure was

known. Bringing the cost of the cure down to an affordable level was the challenge. Andy Hatfield's solution was to install a device known as a Ferrite Isolator in the TVRO antenna line, so the VCO/LO signal did not travel 'backwards' towards the LNA, and other receivers in the area. It worked, but for other less well engineered receivers, it was not the total answer. It has been the nature of VCO/LO radiation that it can leak through cracks in down converter equipment housings, travel along the powering cords, flow down the 70 MHz IF small coaxial line as well as travel 'backwards' through the input downline. A Ferrite isolator might solve the problem for a receiver that had been well engineered to prevent 'signal leakage', but it would only reduce (not eliminate) the interference with receivers that had the VCO/LO signal leaking out of the container in other ways.

All of this aside, what Barker really did was make it possible for really inexpensive receivers to appear in the marketplace. He sold his design rights and his ongoing technical assistance to KLM; then just entering the field. The first production line single conversion receivers were several hundred dollars less expensive, at the dealer level, than the best priced double conversion units of that time. That large dollar reduction had an immediate impact on the way TVRO systems were priced. And it led the way to the modern two piece packaged receivers.

How Many Pieces?

Two piece receivers have actually been with us from the very first. Only in 1979 technology they were not very reliable in the two piece format and only the brave terminal operator opted for placing some of his electronics outside.

The same Paul Shuch operated one of his systems with the down converter (from 3.7/4.2 GHz to his high 1200 MHz IF) outside. He did this because he was hearing legitimate complaints from people who couldn't keep their 4 GHz feedline looses under the 5 to 6 dB Paul recommended. Remember, he was for balanced gain, including a 30 dB gain LNA. And rather than 'recommend' to people that they graduate to a higher gain LNA when they had long runs to make, Paul suggested they take his first down converter module and stick it outside. A few did and from that experience most concluded that placing **any** microwave electronics outside was probably not a very good idea.

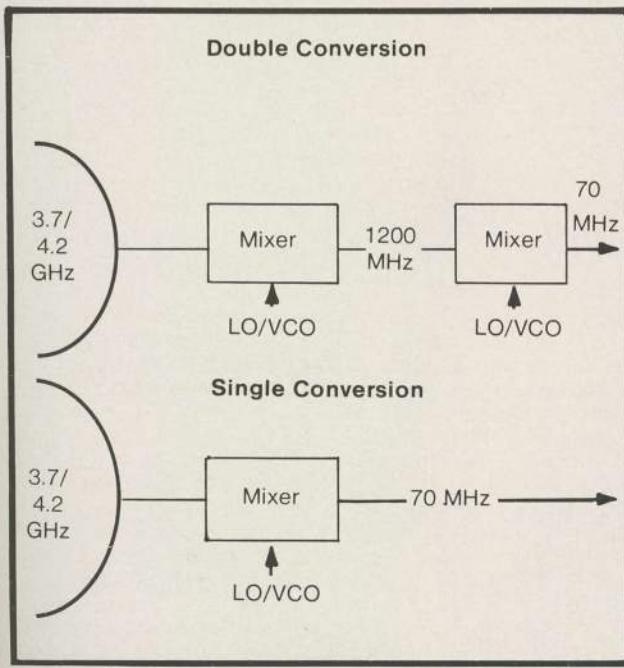
Robert Coleman also ran a remote receiver for some time. Robert placed virtually the entire receiver at the dish and he ran control lines inside. He eventually went so far as to ship only the remodulated channel 3 signal inside on coax, doing everything else at the antenna. But he was quick to point out that a person had to do some careful engineering of his equipment housing if he went this way.

Just as Andy Hatfield had been 'bothered' by long (or even short) runs of expensive solid coaxial cable, the designers as a group were bothered by pumping 4 GHz signals around for any distances. Even with the discovery that relatively inexpensive coaxial cables would hold up for runs to 125 feet or so (as long as 50 dB gain LNAs were used), the desire to get the signal down to 70 MHz, right at the antenna, was universal. But it didn't happen overnight, largely because the outdoor environment presented new problems to the receiver designers. Moisture was one problem; temperature was another. Keep in mind that until the home TVRO industry came along and started 'playing' with 4 GHz receiving systems, the microwave field as a body refused to accept that you could do anything with microwave equipment unless you boxed up the circuits in expensive brass machined 'cavity' boxes. It was considered lunacy to believe that you could snap microwave circuits on ordinary circuit board and get the circuits to perform. It was also lunacy to try to take one of these 'open circuit boards' and stick it into a galvanized sheet metal housing, and then mount it outside in the weather!

KLM was one of the first to prove that you could do it. This turned out to be one of those 'old wives tales'. You could do things like this with microwave circuits and not suffer any severe penalties.

Getting the downconversion stage, from 4 GHz to the standard 70 MHz IF, out at the antenna was a considerable leap forward. By eliminating the 4 GHz line between the LNA and the down converter, you could further reduce the total gain requirements of the total system. In fact, it was now beginning to look as if Paul Shuch may have had something back in 1979 when he was preaching 'balanced gain' and reduced LNA gain!

Once the receiver manufacturers began switching over to two



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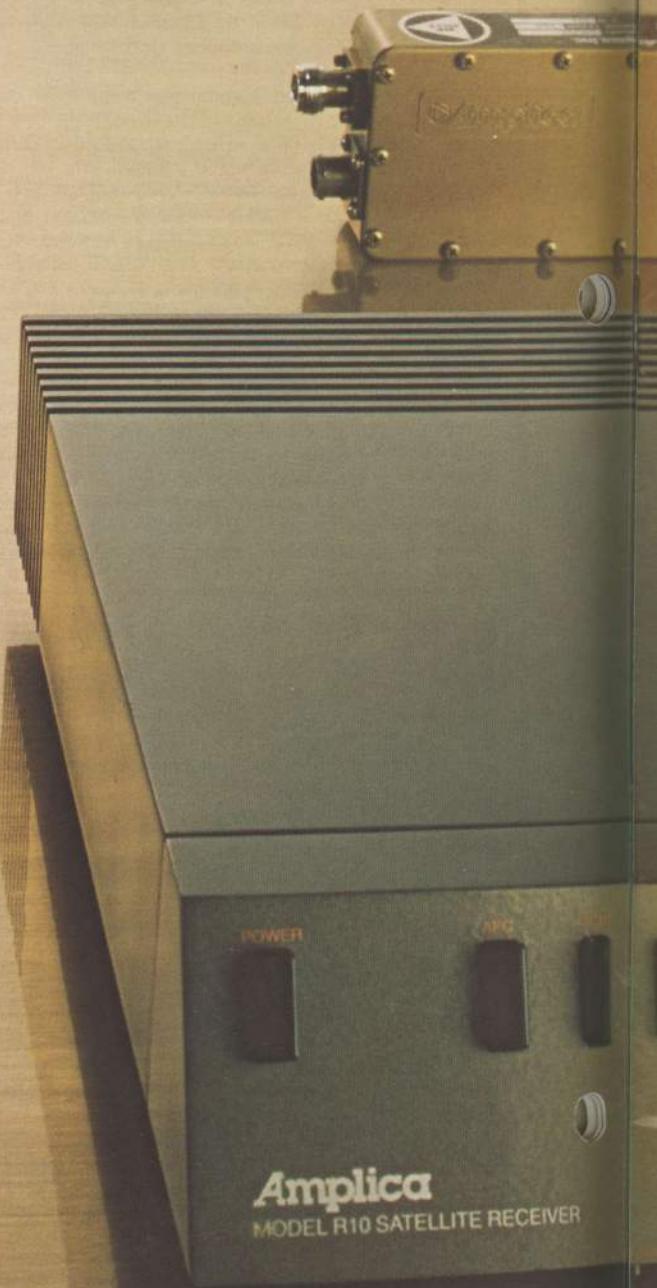
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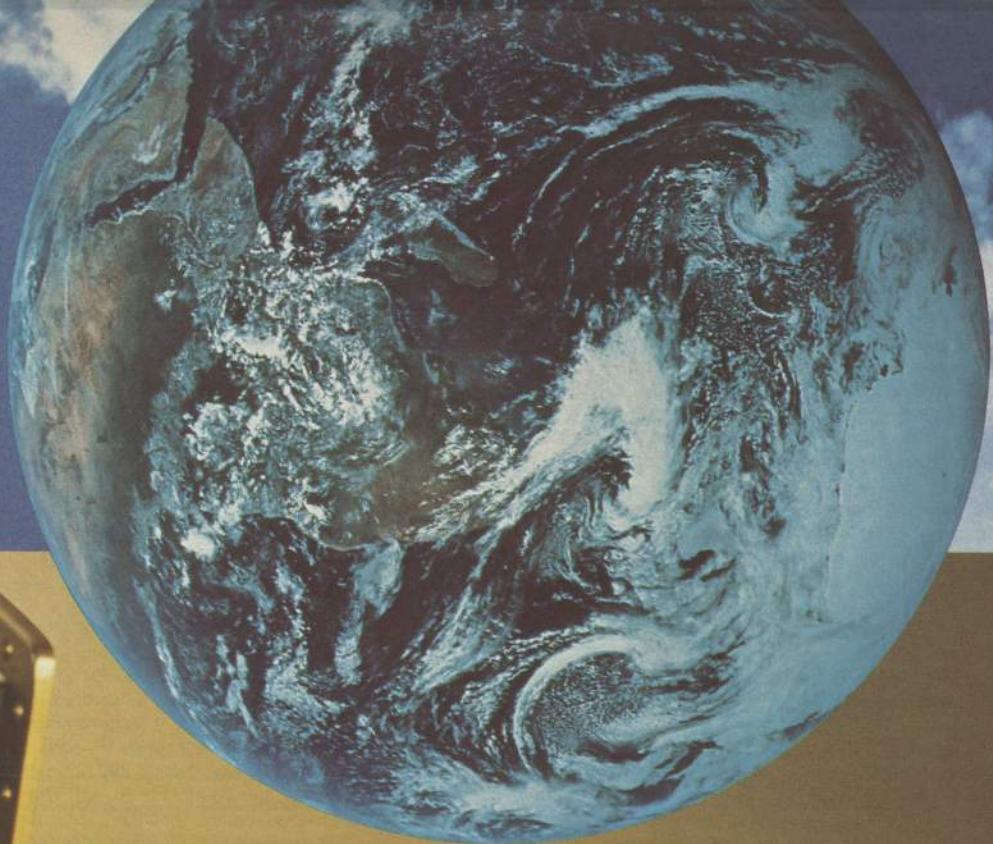
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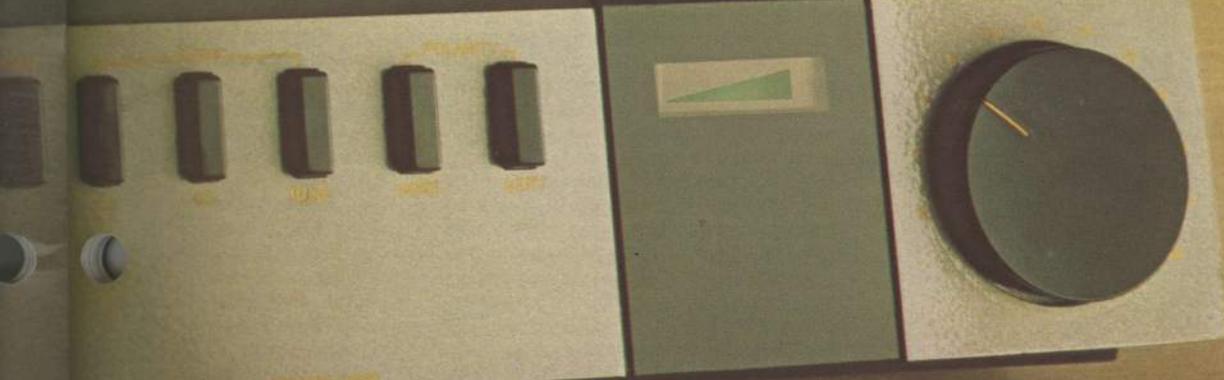


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piece units, the LNA suppliers began to take notice of the trend. First of all, if the down converting was going right at the antenna, that obviously indicated that 50 dB of LNA gain was no longer a rigid requirement. Remember that some of that gain was a 'reserve' for insuring that the 4 GHz signals could make the long cable trip from the LNA to the receiver. But what really caught their eye was that the downconverters being placed outdoors were the **only part** of the standard TVRO home receiver package that had 'microwave circuits' and microwave technology. "Why not" they wondered "build a package that included the LNA gain stages plus the downconversion stage?". And so the LNC was born.

Tracing the first single-packaged LNC is difficult. Robert Coleman built a couple of units that did this in the summer and fall of 1979. He was probably the first to do so, although he abandoned the project long before it was a 'mature' technology. Some of his efforts he wrote about but most he kept to himself or shared one on one with other innovators. The first commercial packages to appear on the market probably were introduced by Dexcel; at the spring of 1981 SPTS show in Washington, DC. The Dexcel units made a big splash but Dexcel was unable to begin delivery of this package (largely coming from their Japanese parent) until very late in the summer of 1981. What Dexcel did do, ultimately, is agree to make their LNC portion of the package available either as an antenna mounted segment, or as a separately packaged down converter, to other receiver manufacturers. This started people thinking about the wisdom of building full 4 GHz to baseband video TVRO receivers, versus stepping back and allowing the LNA people to supply LNC units. To many would be receiver suppliers, there is something very attractive about starting off at 70 MHz and allowing someone with expertise to worry about getting the 4 GHz signal amplified and down to 70 MHz. That is why, today, you see a number of new receivers loaded up with 70 MHz options such as wireless remote control, automatic scanning for video and audio, and a host of other features. But, mated with an LNC package which comes from another supplier.

While the two piece system has followed hard on the heels of very rapid progress with single conversion receivers, its use has not been

limited to single conversion receivers. Inspite of the manufacturing efficiencies attendant to single conversion receivers, there remains a small but dedicated group of suppliers who continue to design and sell double conversion receivers. And they, too, have seen the wisdom of doing away with the bulky, hard to work with and expensive 4 GHz cables. Here however the receiver designer has two options.

- 1) He can convert from the 4 GHz band down to his first, high IF (still in the 900 to 1200 MHz region) at the antenna, and then come into the receiver in smaller coaxial cable, or,
- 2) He can do both conversions in his outside 'piece,' dropping first to his high IF, then to his lower (70 MHz) IF, at the antenna, sending the final IF on inside in the lower priced and smaller coaxial cable.

Design philosophies are about split. Packing a pair of conversions into a single outdoor container, keeping the container small and weather tight, is still tricky. But sending the higher IF of 900 to 1200 MHz back down a piece of small coax is self limiting. You can transmit 70 MHz IF signals through RG-59 cable for relatively long distances (to 1,000 feet with care) but the 900 to 1200 MHz IFs begin to suffer high amounts of cable loss after a hundred feet or so. At least one of the newer receivers works out a compromise; it uses one LNC box to get the signals to a 1200 MHz range IF, adds a second box that drops the signal to 70 MHz, and then finally brings along the third and last box to demodulate the 70 MHz IF signal. The first two can be tucked out of the way where convenient; the third is the 'on display' container which the customer sees near his television receiver.

Where To From Here?

What we have discovered through the relatively short three year period of industry growth is that it has taken certain key 'breakthroughs' to move the industry into a new receiver design direction. The image reject mixer of Barker was one of those breakthroughs. The development of the LNC was another.

As important as those developments were, however, the big news in receiver design has been the constant re-evaluation of existing engineering in small, obscure areas. The 'how much gain' and 'where to put the gain' questions have undergone constant evaluation and re-evaluation. Each new mix of packaging has redirected the gain philosophies. And through all of this the cost of building a modern, TVRO receiver has continued to come down. A fellow had to spend around \$700 in raw parts to put together a Howard Terminal receiver back in 1980. Today comparable performance receivers have just over \$100 in parts in them at the OEM (original equipment manufacturer) level.

Reducing the parts count, finding parts that do two or three things at once, has been a constant battle of receiver designers. And it is not just the raw cost of parts that is at stake; it is also the labor required to purchase, handle, store, inventory, mount, solder and test those parts. Eliminate a 10 cent part and you may also eliminate 10 to 15 cents in labor. Plus, each part that you eliminate is one less part to go bad on you. That affects user satisfaction and the cost of operating a warranty repair service. None of these improvements are dramatic breakthroughs, but taken as a sum total of the whole package, they become far more important than any single breakthrough.

That kind of 'make it simple' engineering goes on constantly. It will continue for several years to come. It will accelerate with the entry into the field of large Japanese manufacturers where parts elimination is a special art.

The next breakthrough has been on the horizon for some time. It is likely to come in the area of video processing and it will probably reach our industry as fall out from the home VCR field.

As a group, our engineers are not well versed in the special expertise that comes from working with 'raw video' daily. We have finally learned how to properly filter and amplify video and for many that was a hard lesson since the majority of our engineers were much better suited to microwave or VHF work than video work. But knowing how to filter and amplify video is not knowing how to make dirty video clean up, or how to squeeze the last fraction of color enhancement out of a noisy signal. The people who do know and understand this are largely in Japan, and it may well be that when we begin to see original (as opposed to re-vitalized American) TVRO receiver designs coming to us from Japan, we will also see some pretty innovative stuff in the video processing area. If you doubt the truthfulness of this forecast,

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Ahead, the cost factor trend for TVRO receivers is rapidly approaching a point where basic receivers will level off at the distributor and dealer pricing level. There is only so much you can engineer

out of costs, and for costs to drop further there will have to be large scale economies based upon **very large** production volumes. Taking \$100 in costs out of a \$300 (OEM cost) receiver is one thing. Taking **another \$100 out** of a mature receiver design that now costs \$200 is quite something else.

INDUSTRY PROFILE

One year ago at the Anaheim STTI trade show, Boman Industries first entered the home TVRO field. They did so with an antenna, an LNA and a receiver package. Boman came to the home TVRO industry from a several decade history of distributing auto stereo and associated products.

The auto stereo field, like many 'mature industries', is exceedingly competitive. True innovations are few and far between since most of the raw engineering was done, and perfected, more than ten years ago.

The home TVRO industry, on the other hand, is still in the throes of engineering innovation and exciting new product breakthroughs. Boman is the first to enter the home TVRO field, with an aggressive national sales program, directly from a field where innovation largely depends upon marketing expertise rather than engineering expertise.

Boman has ruffled a few feathers and their long period of experience in dealing with off-shore (primarily Japanese) manufacturers of hardware has several of the US based suppliers 'up tight'. Boman products may well be the wave of the future in the home TVRO field. Boman's aggressive selling practices could signal the start of new, refined marketing skills in the home TVRO field.

To judge the near term effects of Boman in the industry, we'll talk with Boman President Bob Maniaci.

CSD: A swirl of controversy surrounds Boman's entry into the marketplace. How do you feel about this?

Maniaci: "I suppose the controversy extends right back to our philosophy of the industry. I personally, in October (1981) went out to buy a system for my home. I called on two of my friends to go along with me to look at this system that I had seen advertised in Newport Beach. One of my friends was a microwave engineer. While we were there I asked the seller to remove the cover from the receiver and the down converter. We looked inside of it for awhile and then my engineering friend said 'Damn it, this whole system could be built for \$1,000.' He meant the mount, the dish, the electronics . . . the whole thing. I didn't buy the system but decided to think about it. The next week during a regular meeting of the Board of Boman Industries there was a lull in the meeting and I jokingly told them of my experience with the home TVRO system. Our financial man asked how much the system sold for, and I related it was \$7,000. He then pointed out that there was a considerable mark-up between the estimated \$1,000 cost and the \$7,000 user selling price, and he suggested that we get into the hardware business. So we budgeted an amount to hire a consultant plus

BOMAN INDUSTRIES

Robert Maniaci

a study team from UCLA to look into the market for us.

"The UCLA study came back to us with the summary that at that point in time there was no real market or industry here; and they suggested that a market would emerge but only if there was a concentrated engineering and marketing effort to bring the price down for the ultimate consumer. They felt the real near term market was in rural America. They suggested a target price of \$2495, with a 'deluxe' system at \$2995. So that became our foundation and those were our goals."

CSD: You first displayed at Anaheim in November of 1981. There was obviously a very short turn around time for you between making a decision to enter the market, and displaying at Anaheim. You advertised LNAs and antennas and receivers in the \$400 region at Anaheim, but you didn't have any product to deliver. At the time I was outraged by your actions although subsequently I saw why you did it and what you were trying to accomplish. Wasn't Anaheim pushing just a little, for you?

Maniaci: "A lot of people had a lot of concern. Our staff was not skilled in this new technology nor the field. All of the products on display were proto-types and we told show attendees that we would not be delivering until February. We met that target shipping date, by the way. In looking back, I can see how the criticism arose but I am not in any way, shape or form ashamed of our product planning or marketing philosophy. Actually, I am very pleased with the reaction of our customers and I especially like one comment I heard when a Boman dealer told us that we were responsible for stopping the 'skyway robbery'."

CSD: It is my belief that while you did not start the current LNA price war, your massive advertising and aggressive sales efforts have sustained the LNA pricing wars. Many of your competitors scream that you are price cutting and ruining a market. How do you respond to this?

Maniaci: "I am not ruining a market, I am making or building a larger market. What I am doing is exposing the rip-offs in the marketplace. At our hospitality suite in Omaha a Boman customer raised his glass in a toast and offered that when he opens the top on a receiver and sees \$50 to \$60 in parts inside, and then is faced with a \$900 user price tag, he knows he



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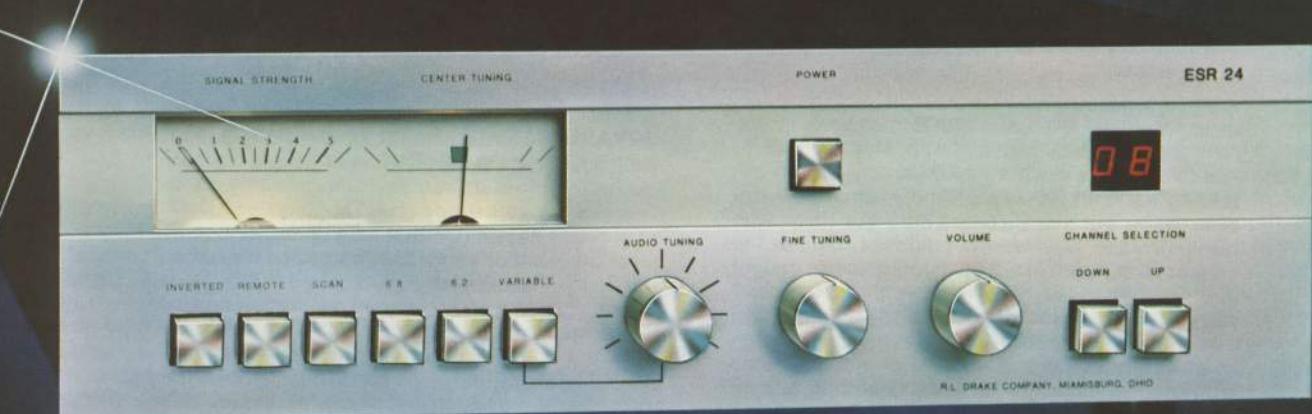
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CSD: Let's accept that you have found ways to trim margins, that you do sell equipment for less money. Let's also assume for discussion that you sell comparable performance, not just cheaper equipment. When you trim the margins, when you have less 'profit' to work with, won't that ultimately show up as reduced ability to take care of a dealer who may have problems?

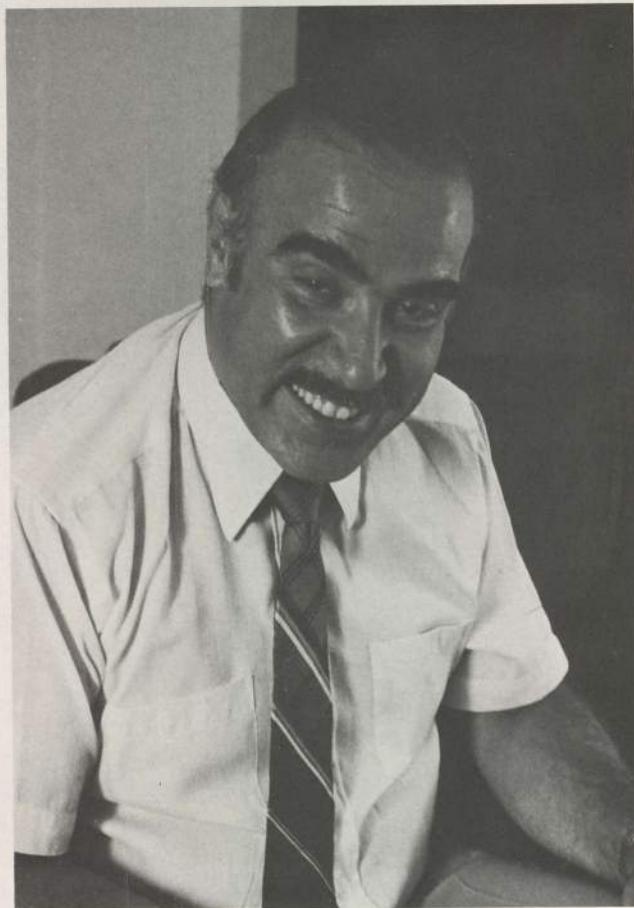
Maniaci: "Let me relate something that happened in Omaha. In the middle of the exhibit day, on the first day, a fellow appeared at the front door of the exhibit hall with two satellite receivers. He put them down out by the door and hung a sign on them. The sign said that the receivers were lousy, that he had paid cash in front for them, that they did not perform as advertised, and the company that sold them to him refused to take them back and return his money. I talked with this fellow and he was desperate! They had perhaps a couple thousand dollars of his working cash and he needed it back. He could not sell the receivers because the pictures were bad. The company that he bought them from was exhibiting inside. I would never allow something like that to get out of hand. First of all, all Boman customers are on open account. They have to pass our credit department to get there, and for awhile we were only approving about 2 out of 10 who applied. But with a 30 day open account, a dealer always has the ability, or the option, to simply tell the supplier, Boman or someone else, 'Hey, this is junk, it does not work, and I am returning it for credit.' I think that is important. It is always a dangerous situation when you buy something new, something you have had no practical experience with, for full cash prepayment. That is part of the growing up the industry is experiencing."

CSD: Are you suggesting that perhaps some of the equipment sellers are also upset with Boman because you have a selling policy that they do or may not have?

Maniaci: "I'd like to repeat what I said earlier. We are not ruining the market; we are simply ruining the rip-offs. There are some competitors out there who don't like the way we do business. I think the answer is simple. How would you react if I caught you, in public, with your hand in the cookie jar? Charging a customer a large amount of money and then having somebody else, a large corporation such as Boman, come along and offer the same equivalent product for far less, is getting caught with your hand in the cookie jar. They have reacted with every diversionary tactic they can think of, including starting ugly rumors about Boman in the industry."

CSD: Some of the older, or perhaps I should say old line innovators in this industry, cry that Boman copies their products and offers them at lower prices than they almost before they can get their products into the marketplace. Is this a valid observation?

Maniaci: "Wow. That's beautiful. I didn't think we were that good! Let's start at the mount and the antenna. Our two mounts were totally designed at our factory. Our first fiberglass dishes were definitely 'splashed' off of somebody else's dish. In fact, after we got better acquainted with the industry we discovered that our 'splash' was the third or fourth 'splash.' And after about 35 or so pieces delivered from those first designs, we learned how miserable a hand laminated reflector really is! So we tied up with Prodelin, in February of this year. So now virtually all of the dishes we sell are Prodelin dishes and nobody ever accused Prodelin of copying



BOMAN'S MANIACI . . . "We are not ruining the market; we are simply ruining the rip-offs."

somebody else. The feedhorns? Definitely, we duplicated one that was doing well on the market. The receivers? Our first receivers came from KLM and another design that had originated with Taylor Howard. Our second generation receivers from Japan are now in stock. Our third generation receivers are definitely of our own design and they are slated for the end of the fourth quarter, after the Atlanta show. So I don't understand where the charge of copying comes in."

CSD: I think it relates to the feedhorn system.

Maniaci: "Let's touch on that. The Polarmatic or motorized feed which we are now offering at \$49.50 with the control, under the show special offered in Omaha, has been advertised in CSD at \$99.50. But at Omaha we offered a 'get-acquainted' special of \$49.50. Now let me tell you how I came upon that particular feed. A fellow who is at Simul-Sat in Florida had that feed on display at a cable show in San Antonio, Texas this past February. He claims he developed and designed that feed. And we went ahead after bringing this fellow back to our plant, and put that feed into production. Now somebody else claims that they designed and developed that feed."

CSD: For the moment let's skip over who did or did not originate a motorized polar rotation system. I suspect that may become, or have become before this ends up in the October issue of CSD, a matter of litigation. I don't want to prejudice anyone's claims in this area by extracting quotes from a possible litigant which may come back to

COOP'S SATELLITE DIGEST

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haunt them. However, there was a problem in the August issue of CSD where you advertise your Polarmatic product. Chaparral Communications claims to me that the photograph that appears in your advertisement is a total lifting of their own product photo, from one of their pieces of literature. Do you want to address that?

Maniaci: "In Omaha I told you that I felt that in my absence and in the rush to get your CSD advertisement prepared, a temporary artist may have simply taken a short cut and made a mistake in selecting photos. After Omaha I researched that further, and unfortunately I don't have a good answer. We have two proto-types of this product in our office. I have found that we had photos in the files of our own proto-types; between our advertisements, our show special sheets and our full catalog. We used both photos. If you will look carefully at our three separate printing offerings, we have our own photos inter-mixed. And now what I felt might have been a photo of a Chaparral product could turn out to be one of our own proto-type units."

CSD: Chaparral was very angry at the Omaha show, over this incident. Has any more come of that?

Maniaci: "No, not as of this date. I went up to Bob Taggart and Taylor Howard at the Omaha show and struck up small talk conversation. That's when they hit me with both barrels! I would like to say this. I think it is wrong that if a part costs \$4 to make that it is sold to the dealers for about \$50. I think it is totally wrong. The scalar feed costs about \$4 to make. Let me explain that. Our standard feedhorn, which includes epoxy painting, all of the bolts and nuts and washers and even the carton box, costs us \$4.50. That's totally delivered to us. And I think it is wrong when that product costs 12 times as much or more to the dealer. I think this is overcharging. Now, the motorized version does cost more to make. The casting costs \$7 because there are three parts involved. And the electronics costs about another \$20 to \$21. So there is about a \$28 cost to us for the product, the bolts and nuts, the carton box; delivered. When we sell it, at maximum distributor discount, at \$49.50, we have about a 40% gross margin there and that is a hell of a lot. I think any greater profit is catching somebody with their hand in the cookie jar. Oh yes, these costs include amortizing the mold(s) over 10,000 pieces. It really gets back to the old story that whenever there is an unusually large gross margin profit in a product, it attracts competition."

CSD: Last January there was apparently an unauthorized announcement from a Boman person regarding a purported deal being put together with Sears and Roebuck. You subsequently explained to me that the entire incident was a mistake and there was no such deal underway with Sears. Still, I know that Boman is extremely interested in aligning itself with a major, national, retailer. Can you update me on where this program may be today?

Maniaci: "We feel like we would like to see this business really grow into a substantial industry. And we feel that it is very important that we have product being sold by the major retailers of America. They can offer the industry two things. Number one, they have existing customers who have credit approved and they have the mechanism to handle credit sales. And secondly, they will bring creditability to the product. When the product reaches that level of the market, then we think we will have a real industry on our hands. The major problem the industry now has is that so many of the dealers, and many of the distributors, have a very tough time 'floating' the

business. So many of the suppliers today demand cash in advance, or COD terms. And that is a drag on the industry. I mentioned that about 2 out of 10 of those who apply to Boman for credit qualify. I'd like to qualify that; ultimately the number who get approved, under some modified terms, may reach 50%. But the rest simply cannot be approved, often because they are so new in the business that they have no established credit history, and no banking connections to speak out on their behalf. We feel that the way this industry will finally get on its feet is through a strong base of highly competent dealers who will offer sales, and installation. We are building that network right now. And secondly, we must attract that first major retailer, who will offer creditability and a way of extending credit to the customer."

CSD:

The recent September issue of CSD carried a full page advertisement by Boman urging TVRO dealers and installers to align themselves with Boman. You are apparently putting together a cohesive network of installing dealers. Is this related to a major effort with some national retailer?

Maniaci: "Yes, it is. The only way a major retailer can enjoy the position of having troublefree sales of this product is to have a close relationship with top quality local dealers and installers, and secondly, handle a one year service contract for the product. When you buy a new RCA TV, you can buy a service contract for a 90 day or 12 month period. And since these systems occasionally require some minor adjustments, we are trying to support all retailers with a network of top notch, highly ethical local firms. We are paying the installer an installation fee, and we are paying them for a one year service contract."

CSD:

How are you going to actually qualify these dealers and installers? What is the procedure you use to determine whether you want a firm doing your installations and representing you in the field?

Maniaci: "The first criteria is financial stability. If they qualify for open account with us, they are already past the first hurdle whether they know it or not. At the same time, the activity on their open account tells us something about their sales volume, which in turn tells something about the size of their operation, how aggressive they are, and so on. Then if they are buying from us, we have a customer history of their competence. A fellow who calls us frequently for help with problems builds a file history with us. We can look at that file and quickly tell whether a fellow is capable of learning and profiting from his mistakes. Then we have been dispatching our own field men to help out or drop in on a customer installation. It is amazing what you learn in this way and it is amazing how often the installing dealer will take a shortcut and do something which will later come back to haunt him with service problems. And that material also helps us evaluate a prospective affiliated dealer."

CSD:

If there is a major retail outlet selling Boman in an area, will that preclude others in the same area from handling Boman products as dealers?

Maniaci: "Definitely not. First of all, we would never sell to a major retailer at a lower price than we would sell to the dealer. That's the first step. Secondly, a dealer may well handle other products which the major retailer would not handle. As an example, we don't presently offer a motorized dish drive unit because we are not yet convinced that there is a unit in the market which meets our criteria. But many of our outlets do handle these units, because they are satisfied with the products offered and they want to



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step the customer up to a more elaborate system. So it is a program that works at both levels and both ends. The installing dealer offers a specialty shop system and installation work under contract for the major retailer. The retailer offers a single package, or two packages, and credit financing. They can co-exist very nicely in an area. Our model for this is our car or auto stereo division where we have more than 250 dealers handling the product. They provide installation and service as well as sale. They work with retailers who offer only the sale, from within house."

CSD: So therefore if it develops that you do end up with a major, national retailer, this will not replace the local dealer handling Boman TVRO products?

Maniaci: "Correct. And we will see that the dealers have an ample margin of profit plus we see this as a total 'support the dealer program' from the beginning."

CSD: Are you looking at this plan on a territorial basis?

Maniaci: "Unfortunately it has not been that easy. For us to have a distributor, the distributor must purchase a minimum of 24 systems per month. That works out to about \$50,000 per 30 day period. If you offer him a payment plan that goes out to sixty days, the distributor must have a credit line of \$100,000. A lot of distributors just don't have that kind of credit ability. We have had to work with some to create a credit line draw situation; they have a line of credit which they draw against, and they draw and then pay and then draw some more. The real problem here is the distributor's growth pattern. He can be so successful that he outraces his credit line in a short time. A distributor with an acceptable \$100,000 line of credit gets good at what he is doing and he needs not 24 systems per month but 36 or 48. That means he needs more credit and where \$100,000 was carrying him for 60 days initially, now it may only handle 30 days of his needs. Now part of this problem is the turn over time for the products. If systems are tied up in the shipping stream for 10 to 20 days, that works to the disadvantage of the distributor. That ties up his credit line while the goods are in transit, but he doesn't have the goods to turn. Our solution here is to establish at least five national shipping locations. If we can get the product closer to the distributors, we can speed up the cash flow for the distributors. We think regional distribution warehouses will be a big help."

CSD: You entered the market by using work which others had engineered; in effect you were a super or national distributor. That got you started without having to stand still and wait for product to be developed from scratch. Now that you have almost a year in the marketplace, you have begun to bring out your own products. How will Boman designed products differ, in concept or pricing, from those that you have been selling to date?

Maniaci: "It has been an evolutionary process. We got started as you say by using other product designs and that allowed us to enter the marketplace more quickly. Now that we have had the luxury of spending a year selling products others designed, we can graduate to products which are original Boman from the cabinet upwards. Let me just note that with the products to be shown for the first time at the Atlanta show the end of October, those who feel we copy rather than create will get a real surprise!"

CSD: What about other distributors who service the entire country? Can they continue to grow and be competitive, in your view, without proprietary product of their own? Won't they, too, be required to re-enter the marketplace with their own equipment?

Maniaci: "I feel there is a definite demand for the quality

distributor. What I see happening is that some of the manufacturers are falling by the wayside. Those manufacturers who offer product without warranty backup, or those who refuse to honor warranty promises are the ones that are in real trouble. My suggestion to distributors is that there is a great market potential out there but a distributor can only survive by keeping his own financial house in order, and by being careful how he accepts a dealer. Financial planning has not had enough attention to date and in the coming year the firms that survive will be the firms who have professional financial planning and execution. That will separate success from failure more than any particular product mix or any particular approach to product design. If I have learned one thing in the years I have been running businesses, it is that growth can cause a company to go broke faster than any other factor. It is not that they are losing money but rather that they grow so fast that they outgrow their capital base. This causes them to get stretched out and when they are dealing with manufacturers who have similar problems with limited capital, they find themselves suddenly squeezed for product or operating capital. It can be an overnight disaster. A distributor, to succeed, has to be intelligent enough to align himself with a seasoned supplier or suppliers, and he has to spend most of his time monitoring the flow of product and cash, not just product alone."

CSD: On the subject of antennas, while you have negotiated an agreement with Prodelin and are pleased with the product and the firm, it appears to me that while you are continuing to bring your cost down on the electronics, the LNA, the receiver, and the balance of the system that

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attributes to the antenna goes up. The antenna part of the system, ultimately, has got to give you a lot of sleepless nights. How do you get it in line with the rest of the system?

Maniaci: "Actually just the opposite is probably true. The antenna is the area of greatest comfort. Why? Well, number one, they have done a hell of a good deal for us financially at Prodeline. We have looked at what it would cost to duplicate the extremely high quality of the Prodeline dish and I find that if we wanted to do it ourselves, we couldn't save 5% per piece. Could we save money by taking the antenna offshore? No way and I wouldn't even try it!"

CSD: I constantly hear people talking about the ongoing push to squeeze antenna size down. They seem to be saying that if somebody could package a terminal system in a smaller physical size, the industry would suddenly find itself in the mass market. I am even told that while price is important, that the physical size of the terminal is even more important. Some have a goal of a 6 foot antenna, others say the antenna has to be shrunk to 4 foot before everything busts wide open. Do you think there is a magic antenna size plateau that will turn the industry into a 100,000 per month business?

Maniaci: "Our thinking has not gone that far. Where we are right now is that we would like to develop a stamped reflector in the 8 foot size region. We now know and understand that there is a substantial region of this country, say the central 2/3rds or so of the United States, where a really optimized reflector and feed

with good electronics, would produce quality pictures. There were some 8 foot antennas, perhaps not totally optimized, in Omaha that were looking pretty good."

CSD: Engineers keep telling us that an antenna in the 8 foot size is marginal or below acceptable service levels for many areas of the country. Yet talk persists that if a really small antenna, such as the 4 foot Bob Luly antenna that produced viewable pictures in Fort Worth this past spring, could be offered as a part of a package, and if it produced quality pictures on at least a dozen transponders, and watchable pictures on additional transponders, that this would be enough to crack the marketplace wide open. I call this an entry level market, where the pictures are below totally acceptable quality, but the price is trimmed back also. Do you think there is such a thing as an entry level market?

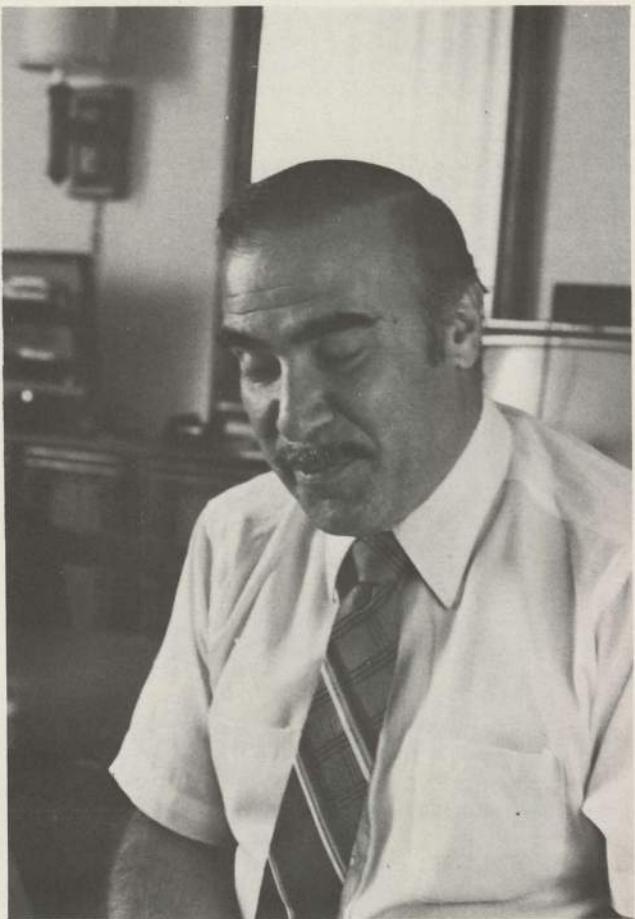
Maniaci: "If somebody could package a system like that and offer the system for say \$1995 installed, there would be an immediate market explosion. If somebody comes along with a product like that, and he needs some financing, send him to me!"

CSD: Isn't the crux of the question really determining just how much satellite TV a person must have, to spend money for a system? I believe that a finely tuned 6 or 7 foot terminal today could squeeze by on the hotter F3R and some of the W4 and F4 transponders, at least in the central USA, but would the customer be happy enough with say a dozen quality transponders that he would overlook the 4 dozen that are not so hot? How would the customer react when he was offered fewer channels, for less money and with a smaller antenna? Would he still feel a \$1995 or slightly lower installed price tag was justified, or would he pass on the system sitting tight until a higher quality terminal came along at the same price?

Maniaci: "Stated that way, it might not be viable after all. I think that perhaps you do need to be able to play the numbers game, offering 50 or 60 channels of reception, to be successful in the marketplace. I know that our customer service department receives an awful lot of telephone calls from end users who want to know why this transponder or that transponder is not as good as WGN or ESPN. If you reduced the high quality count to a dozen, as you suggest, and brought the price and dish size down at the same time, I'm not so sure it would be acceptable in the marketplace. Actually, I have not seen the buyer resistance to antenna size to be nearly as great as the buyer resistance to price. Sure, the wife may initially say 'Oh, not that big thing in my yard' but usually after she sees it operate she changes her mind. Our emphasis is going to be first on price, and secondly on size."

CSD: Talk to me about SPACE. You attended the SPACE Board meeting in Omaha, as a Pioneer member and supporter. What were your impressions of the Board, and General Counsel Rick Brown?

Maniaci: "Well, first of all I want to note that this industry is very fortunate that somebody had the foresight to get SPACE started several years ago. All too often in business, and technology, a group of people come along with a better idea and it shakes up the establishment. Then the established business people react and the new guys get buried or swallowed up because they haven't taken the time to organize into a defensive force. This industry is very fortunate that it had SPACE ready to defend it when the industry suddenly got large enough to attract the interest of the established systems. I don't know the history here, but somebody had the foresight to see these battles coming. I relate all of this to CB.



BOMAN'S MANIACI . . . "There is a definite demand for the quality distributor."

We were one of the firms that got caught by surprise when the FCC ruled that only 40 channel CB sets could be sold after a certain date. We lost \$6,000,000 in one afternoon and we were simply not prepared for what the FCC had in mind. That taught me a lesson about having a strong, watchdog industry trade association in place and watching all of the various regulatory agencies and Congress full time. It is a terrible feeling to read in the morning paper that you are out of business. We must be prepared. You must have a voice, and a set of ears, in Washington. The evening I attended the Board meeting, I felt that the focus of the meeting tended to wander from time to time. I suspect that the Board members don't really focus on SPACE activities and problems on a daily basis, that at the Board meetings they have to play both catch-up for knowledge and try to reach decisions in a limited time frame. Perhaps one of the things that SPACE needs most right now is more time being spent by members of the board, and others with experience and knowledge to contribute, to the ongoing problems facing the industry. I'm not so sure you can hold three or four cram courses in SPACE problems each year and deal effectively with the problems that are with us every day of the year."

CSD: I seem to recall you were concerned at the board meeting when it was noted that at one of the meetings last spring they could not put together a quorum.

Maniaci: "Yes, that bothered me a great deal. I can see where somebody can slip up and have scheduling conflicts where meeting attendance is simply impossible. But for less than a quorum to appear, thereby making the meeting virtually worthless, is not good. I think that every member of the board should have a designated alternate from either within the same company or from someplace else and if there are conflicts of schedule that cannot be resolved, then the alternate attends. I would like to think that there will be no more board meetings without a quorum. The other thing that concerns me is that the SPACE Washington staff have the budget they need to represent us. I don't know enough about Rick Brown or Fred Finn to pass judgment on the quality of job they are doing for us, but I do know that regardless of who represents us, they must have a reasonable budget to the job done. I know that there are always going to be internal haggles over the budget, that it will never be as large as the Washington staff would like. I also know that if we run them too trim and lean, that we remove some of the incentive for them to perform at maximum efficiency at all times and ultimately that is going to hurt us as an industry. If I was on the board I would certainly try to create new avenues for revenue for the association."

CSD: Last question. Last January at CES in Las Vegas, a spokesman for your firm said Boman was shooting for a goal of 10,000 home terminal systems sold and shipped during the first 12 months. You began shipping this past February. Where are you against that prediction?

Maniaci: "We are six months or half way into that period, and we are about 40% of the way against the 10,000 terminals. Will we make our expected or projected goal? Most certainly."

Actually, that was not the last question. We went off the record for a period and found ourselves discussing the emerging Japanese position in the North American 4 GHz marketplace. Boman's experience in dealing with Japanese industry probably exceeds that of all other US TVRO suppliers combined. The Boman auto stereo line of products is and has been a Japanese product line almost from the beginning. In those many years of close association with the Japanese firms, Boman has picked up a lot of experience which others will have to learn

the 'hard' way. We went back on record to discuss where Boman expects to see Japanese inroads in the American/Canadian 4 GHz marketplace, and where the dangers are for American manufacturers and suppliers.

CSD: How do you see the relationship between Japanese industry and this market?

Maniaci: "What we are going to see, and what none of us are going to enjoy seeing, is the high level of interest currently being generated in the orient. For example, there is such a strong demand for knowledge right now that if you or I put your Coop's Digest on newsstands in Tokyo, I bet 10,000 copies would be sold the first month! This is an exciting, new industry and the Japanese are really into 'future' technology. At the moment there is virtually no knowledge about this field in Japan. And there is one thing about the oriental; until he knows exactly what he is doing, he does not pull the trigger. Now we are starting to bring products of our own design back from Japan. Our own experience is typical. We went to the vendors who have been building auto stereo products for us for years. We told them how many pieces we wanted and what we were willing to pay for that product. They told us they would do it but frankly admitted they did not expect to make a profit initially. I told them not to worry about making a profit initially, that we would work it out as we always have. That's all it took; boom, they were in the business."

CSD: But you had an edge that others here may not have. You had an existing relationship with a Japanese supplier, and you went to him. I am more concerned about them coming here and figuring out what we are doing, on their own, and then going back to Japan to design and produce product.

Maniaci: "That is the frightening part, and that is now start-

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ing to happen. We are getting a sudden influx of visitors from Japan; people carrying notebooks and cameras. There is now a high level of curiosity about what is happening over here and it is the nature of the Japanese to take on a client at a loss of profit basis, but at a gain of knowhow. And they will go to a fellow like an AVCOM or any good receiver manufacturer and lure them into the web and build the product overseas. And then six to twelve months later he will see his designs coming back into the United States under one or more new brand names!"

CSD: That's a ploy for the smaller to medium sized Japanese firms; true?

Maniaci: "Not totally. The companies that have been soliciting me include some big names. Firms such as Panasonic showed up at the winter CES show. There must have been 30 engineers, each loaded with a notebook, camera and many had cassette recorders. You would be polite to them, finally run them out of the booth, and then they would come back in droves for more information. The Sharp Corporation has visited me; Sony would like to get into it. Hitachi made a formal, written request to work with us. Those are the people I don't mind. The ones that bother me are the smaller Japanese firms that are say below the top-100 level in Japan. These are the people who manufacture sewing machines in 1980, video tape recorders in '81 and '82 and then bang, they are in the home TVRO terminal business in 1983! And then in '84, they will be into dish washers. They will step in, and then step out, and they will be the ones that will hurt."

CSD: Isn't that exactly what happened with CB? There were idle production plants in Japan and firms like this jumped on the CB bandwagon, cranked out product while the market was good, and then bailed out when it was flooded with product and the field collapsed?

Maniaci: "Precisely. They will crank out a dozen or more different face plate versions of the same product, at less than good quality and that will hurt the industry."

CSD: You are suggesting that we will begin to see many private label brand receivers, and possibly LNAs, coming here possibly offered by distributors as 'their own' radio, when in truth the receivers may well end up being the same radio with a different front panel?

Maniaci: "Many of the Japanese I have talked with feel that TVROs will be the next boom. Most of the Japanese audio manufacturers are showing large deficits right now. What has happened is that in the American market people are not buying higher priced

home stereo systems. They are buying video games and video recorders and portable stereo sets. This means alot of these factories have idle production space and idle engineering time. They would like to move this space, and time, into designing and building home satellite receiving systems. To use the word we use in-house, they are hungry right now. And they will admit it!"

CSD: We have a unique approach to satellite receivers in North America. We have created a 4 GHz DBS' industry here but with the possible exception of a small portion of Malaysia, served by Palapa birds (Indonesia), there is no other place in the world where 4 GHz video receivers are used by consumers. Not right now anyhow. This has led us to believe that the Japanese will not get involved in 4 GHz hardware, in the mass quantities that get their real interest, but rather they will jump directly to 12 GHz where the real worldwide DBS systems will function in the latter half of this decade. Are you saying that you don't share this view, that you think the Japanese will move into the 4 GHz marketplace?

Maniaci: "Yes, I am. The receivers that you will see from them will be designed to work at either, or both, bands. Basically, the 70 MHz receiver can do both as I understand it. They tell me that the way they will approach us is with a 4 GHz front end, or LNC, dropping the signal to 70 MHz for a basic both-band demodulator. They will design the 4 GHz gear from the start as a part of a 12 GHz package where a second LNC, working at 12 GHz, will drop the signal to the previously created 4 GHz system front end. Some of the hardware has already been shown to us. NEC/Alcoa, for example, is going to be a formidable firm in this field. I have been shown their developmental proto-type and they have a 1986 period target price point of \$375 for a complete 12 GHz terminal. The bottom line through all of this is that the dealer and the distributor is going to have to keep his options open, and run a lean and mean ship. The changes will continue to come at us with blinding speed and those that survive are going to have to keep their reflexes quick and their options open."

The industry will in November be 'one year AB'; or, one year after Boman. Some will suggest that the Boman entry into the field has been good for the industry while others with strong personal feelings will carry the opposite view. Boman has survived the first year, and they show every inclination to be around for all of the second year. Their impact on the industry has been substantial during year one and while their market position is likely to increase in 1983, it is unlikely anything they will do in 1983 will have as much impact on the industry growth as 'simply being here' had in the first year of their participation in home satellite terminals.

ABOUT THIS SERIES—

Starting with the August 1982 issue of CSD, we began a series which is re-printing a long-out-of-print analysis of the early development of television broadcasting in the United States. This series, originally researched and published by Bob Cooper in the pages of CATJ magazine, established 'the record' for a Congress and FCC which was, in 1975, planning to increase the regulation of cable television (vis-a-vis television broadcasters). The original series is said to have had some measure of success in getting the FCC to relook at CATV regulation, the end result of which turned out to be far less rather than far more regulation for cable. We are consuming valuable CSD page space with this series for one reason; those new to the TVRO industry cannot grasp the significance of today's events without some tutoring in the early history of FCC handling of television broadcasting in this country.

THE ROOTS OF TVRO (Part 3)

Late in the summer of 1949, while

Bridgeport's RCA sponsored UHF was starting to pile up practical UHF operating data and the FCC had a momentary slow down in allocation matters (although color was going full steam!), the Television Broadcasters Association (TBA) petitioned the Commission to release for application television allocations in 11 markets in the west. Relying on the 1946 allocations table, which they apparently still thought was going to fly, the television broadcasters asked the Commission to allow stations to make applications for channels in Amarillo (5 channels were open), Denver (1 channel), El Paso (2 channels), Sacramento (3 channels), Salt Lake City (1 channel), Corpus Christi (3 channels), San Diego (2 channels), San Francisco (1 channel), Seattle (1 channel), Stockton, California (2 channels), and Tacoma (1 channel). TBA said these channels met the co-channel and adjacent channel requirements, and by authorizing their release "early", many people would be able to enjoy television while the freeze ground on. Their arguments were reasoned, logical, and politically expedient at the time. This would be the first television for Amarillo, Denver, El Paso, Sacramento, Corpus Christi; the balance already had at least one channel operating. It was, however, flawed reasoning because it was based upon the 1945-46 allocations table. Still, *the Commission could have taken much of the heat off* that was building on themselves had they at least granted token relief for Amarillo, Denver (which was the largest city in Senator Johnson's state and the largest trade area in the nation without television when the freeze froze), El Paso, Sacramento, and Corpus

Christi. But the Commission, busily engaged in surveying forests, was not counting trees at the time, and the motion died.

After the Commission announced it was going to open up the UHF channels, and Bridgeport tests started under RCA's guidance, the FCC had little to say about the allocation portion of the freeze for nearly one year.

FCC Commissioner Frieda Hennock did come out in mid 1949 and express her views about the building public pressure to release *some channels some place* for public use:

"I am keenly aware of the intense interest in the progress of television shared by members of the public generally, and especially the families contemplating purchase of a television set, and by manufacturers and by station licensees. But I am aware also of the many problems that exist as to the future status of black and white and color TV, both

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(now WBBM-2)

WCBS-2 New York, July '41

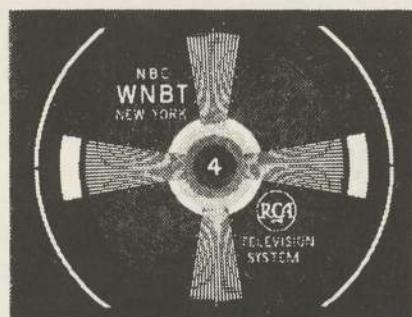
in the present and the proposed (UHF) bands, and in the multitude of other questions which must be solved to insure the finest development of this great new art for as many people as possible. I feel strongly that these questions must be carefully deliberated and thoughtfully answered by the orderly process of rule making proceedings. We are now in the midst of such proceedings, in which all interested parties are being offered a full opportunity to participate, present their views, and offer technical information. I feel that we must patiently continue to move forward in this orderly manner."

As the color hearings ground on, many members of the industry grew impatient with the snail pace progress of the Commission. Commissioner Robert F. Jones was the leading spokesman for *holding up allocations* until color was settled, and he often

spoke out against statements that filtered to his desk from industry spokesmen. Dr. Allen B. DuMont found Commissioner Jones' attacks hard to stomach:

"I would like to assure the Commissioner that television broadcasters and manufacturers alike (who were opposing the continuation of color hearings and the freeze continuation) will reap tremendous benefits from a really good color television transmission system. If there were such a system in existence, every industry spokesman would be camped on the Commission's doorstep urging and pleading for the immediate adoption of standards."

But the Commission was not moving. It showed *no interest* in providing even temporary relief on a spot location by spot location basis. When all of the rational arguments failed the pro-



WNBT-4 New York, July '41

WENR-7 Chicago, Oct. '43
(now WLS-7)WABD-5 New York, May '44
(now WNEW-5)



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ponents of some pretty far out systems began to make their pitches to the Commission.

One of these was Westinghouse. Now Westinghouse had been experimenting, with the permission of the Commission, with a program they called *StratoVision*. *StratoVision* involved the use of converted B-29 gun ships equipped with sensitive television receiving equipment and medium power VHF and/or UHF transmitting equipment. By flying a figure 8 pattern at 25,000 feet above ground, the receiving equipment picked up regular TV broadcasts from one or more stations within a 250 mile radius, and then through the on-board transmitter(s) rebroadcast the received signals outward on a new VHF or UHF channel. Westinghouse calculated that 14 such airplanes, flying figure 8 patterns in precise locations across the country, would be capable of relaying television programs *from coast to coast*, and in the process provide *StratoVision* to *ground* television reception for approximately 75% of the people in the United States. Extensive testing of the program was done during the freeze era, and Westinghouse gathered up reams of data to support its contention that *StratoVision* had a place in the FCC allocations scheme of things.

When Westinghouse tried some gentle pressure on the Commission to authorize *StratoVision* on a regular basis, during the freeze, they were sharply rebuked by the Commission with the terse reply that "*The first obligation of this Commission is to provide television to the metropolitan centers of this country which today have no such services; then the rural areas will be considered.*" The Westinghouse plan was primarily promoted on the basis of its

providing television service to rural areas which were unserved at that time.

Then there was polycasting, the brainchild of Raymond E. Wilmotte and Paul A. De Mars, consulting engineers practicing in Washington, D.C. Polycasting is best explained in this way:

"Rather than try to cover a metropolitan or trade area with a single high power, tall tower transmitter, the projected coverage area would be covered by a number of low power transmitters. An area with a ten mile radius could be covered by a 200 foot tower and a 200 foot antenna with a gain of 20. All transmitters serving a trade area (i.e. each polycasting transmitter) would operate on the same frequency; the individual transmitters would be 'netted' together to stay exactly on the same frequency to reduce objectional interference between one another."

With the polycasting concept, the high cost of one super power transmitter (the pair was thinking in terms of 6,000,000 watt UHF stations) would be greater than the equivalent 10 or 15 lower power polycast stations which would serve the same coverage region. Polycasting earned enough interest to continue to be talked about several years later, but it never was a serious contender for Commission attention.

Finally, in mid 1951, after the Commission had reached a decision on color (see separate report here), Chairman Coy resighted on the allocations problem. Speaking before the Rocky Mountain Radio Council (early day version of today's powerful Rocky Mountain Broadcasters Association) Coy told the broadcasters:

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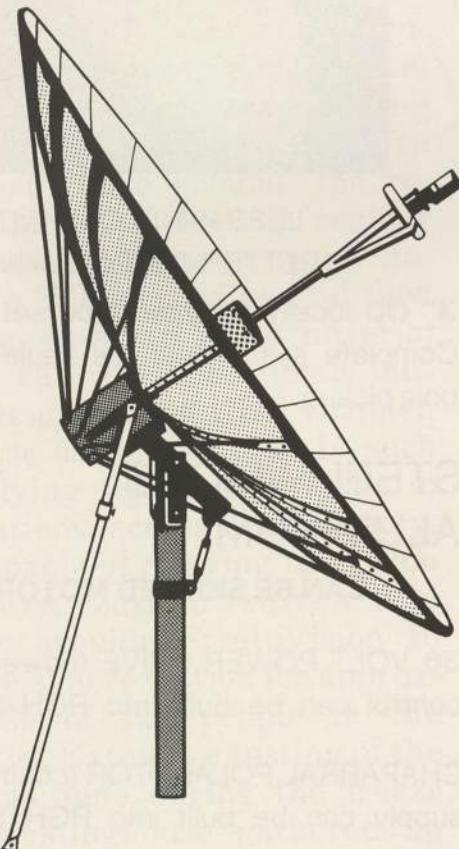
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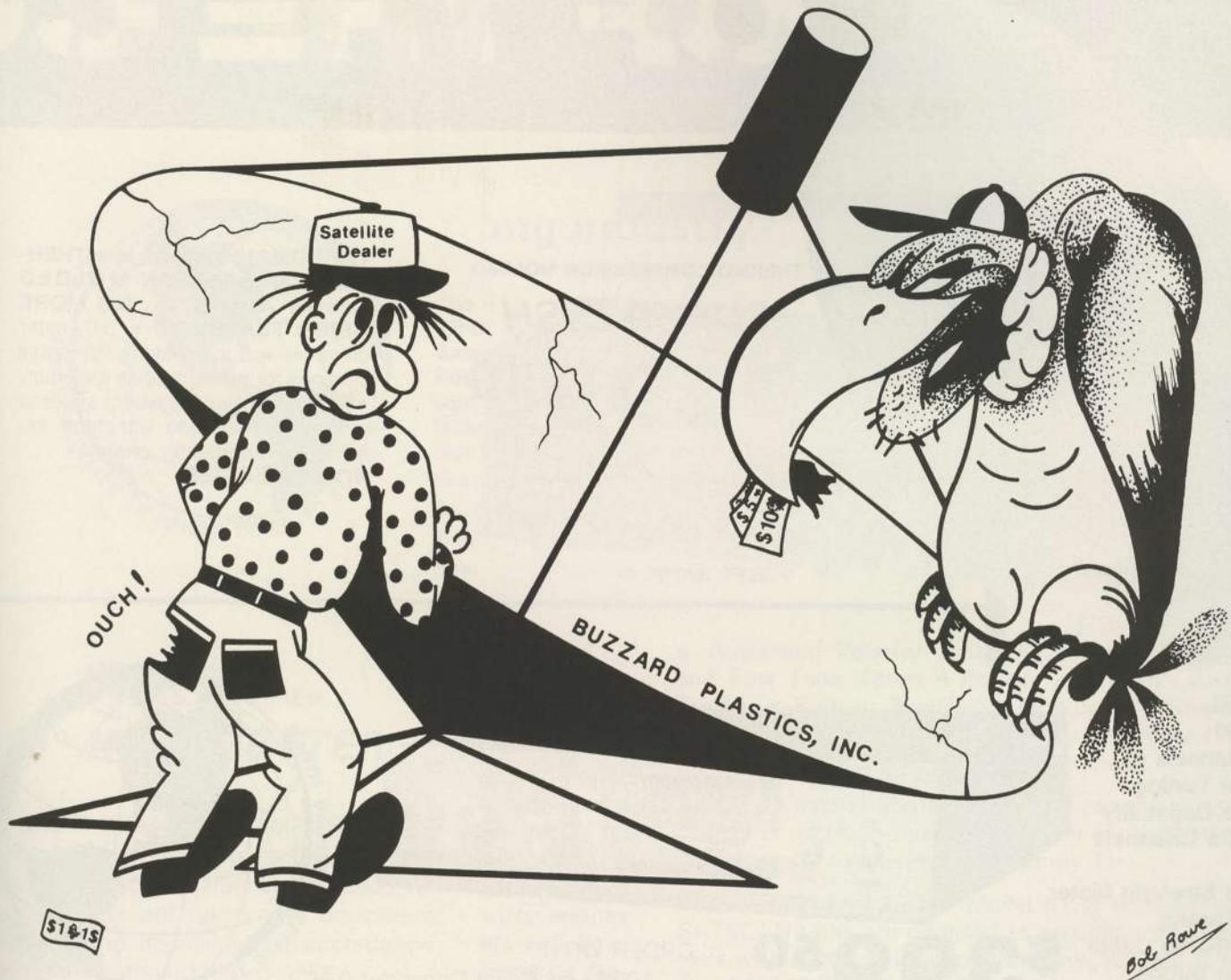
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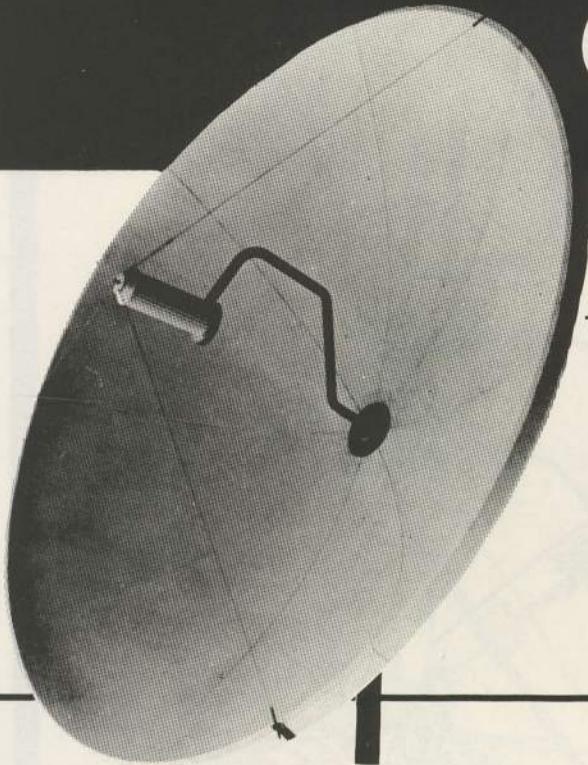
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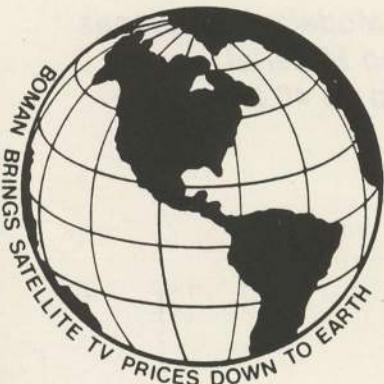
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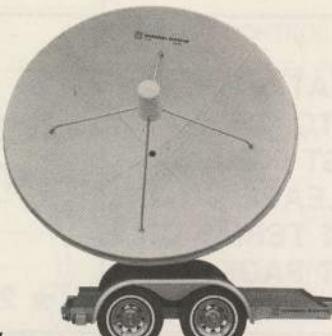
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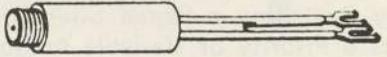
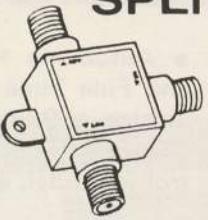
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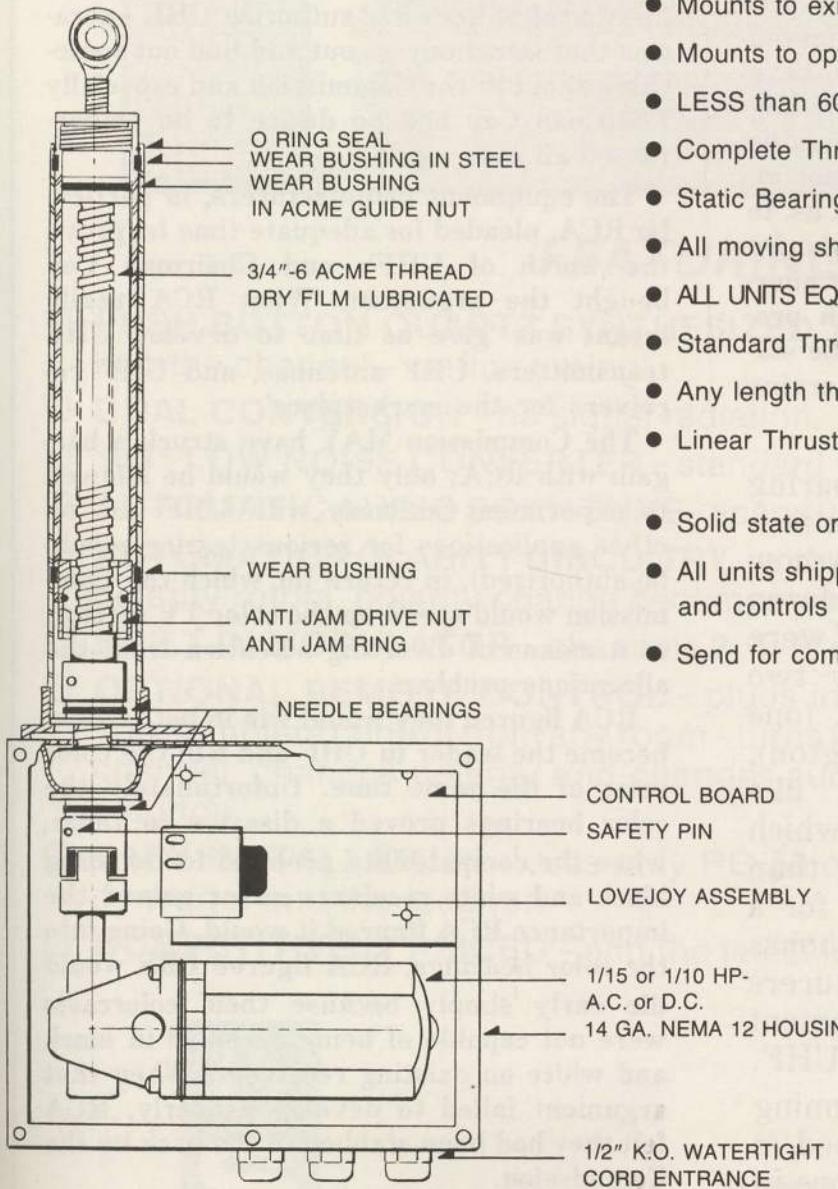
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CONTINUED / from page 32

Principally because of a lack of basic information. That information must come in large part from radio (and television) manufacturers. It should be produced as the result of a consistent year-round program of research. For example, we are now proposing to quintuple the number of television channels by moving into UHF. Here is a problem involving the expenditure of millions of dollars by the public and the (broadcast) industry. This part of the spectrum is relatively unexplored for television purposes. And yet, in all America, there were only a half dozen experimental UHF TV stations broadcasting programs last year and they were on the air for limited periods. Another half dozen licensees have carried on propagation studies and other limited research. A billion dollar industry is no place for operation by guess. We cannot afford, and the public will not long permit us, to plan our radio system on a crisis basis. By allocating a reasonable amount of your energy and your money to such research programs, you will be helping to assure the stability of your industry and you will be serving the public interest."

Clearly, in 1951, Coy was preparing the ground work to keep his Commission from being blamed for the by now long, drawn out freeze. The half dozen experimental stations he spoke of were probably fewer than that. Only two stations, both operated by RCA (one in Bridgeport and one in Washington), were operating on anything like schedules. Others, many of which broadcast nothing more exciting than test patterns, stayed on the air for a few months, and then only a few hours per day, as various manufacturers worked out bugs in their equipment they were then developing for UHF.

There was a popular theory running loose in that era, and it was echoed in subtle terms on numerous occasions in public by Dr. Allen DuMont. Dr.

DuMont didn't say it quite this way, but others did:

"It had become apparent, as early as late 1948, or shortly after the freeze was put into effect, that the 12 VHF channels would not provide adequate 'room' for television service for all of the nation. Anyone with a map of the United States and a compass (see Diagram 3 here) could draw his own coverage rings of the full number of VHF channels available, even under the 1945-46 close-spaced separations, and come to that conclusion. UHF was a possible solution, but no one knew anything about UHF. The Commission insisted that before it authorize UHF operation that somebody go out and find out something about it; the Commission and especially Chairman Coy had no desire to be embarrassed all over again .

The equipment manufacturers, in particular RCA, pleaded for adequate time to 'prove the worth of UHF'; and Chairman Coy bought the argument. What RCA really meant was 'give us time to develop UHF transmitters, UHF antennas, and UHF receivers for the marketplace'.

The Commission MAY have struck a bargain with RCA; only they would be allowed to experiment seriously with UHF (i.e. no other applications for serious testing would be authorized), in return for which the Commission would speed up the color TV matter, as a means of diverting attention from the allocations problem.

RCA figured they would win in both cases; become the leader in UHF and win the color prize at the same time. Unfortunately the color hearings proved a disaster to them, when the compatibility problem for existing black and white receivers never gained the importance RCA figured it would. Going into the color hearings, RCA figured CBS would die early simply because their colorcasts were not capable of being received in black and white on existing receivers. When that argument failed to develop properly, RCA felt they had been stabbed in the back by the Commission.

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LETTER FROM A CONGRESSMAN

Recently a very hotly debated bill introduced by Colorado Congressman Tim Wirth died in the House Energy and Commerce Committee. That bill, HR5158, was designed to create an entirely new 'ball game' for cable and telephone systems. The ripples from the bill possibly would have been still coming ashore twenty years from now.

The bill died because Wirth withdrew it from consideration during the bill's 'mark-up' phase. That is where final amendments and questions are considered, and a bill gets its final polish before heading for the floor of the House.

Death of the bill is largely given to **Congressman Tom Corcoran** of the 15th District in Illinois. Corcoran nit-picked the bill during mark-up and finally Wirth and other supporters withdrew the bill for this session.

Congressman Corcoran is new to most telecommunication matters, but he is apparently no novice in the field. Still before Congress is the Waxman Bill which would create huge monetary fines for use or mis-use of private TVRO systems. Recently industry person **James A. Renwick** of Ottawa, Illinois met with Congressman Corcoran, and discussed the pending HR4727 (Waxman bill). Following that discussion, Corcoran put his thoughts concerning this bill into a letter to Renwick. We share that letter with you here so that you will have additional material to work with when discussing HR4727 with your own Congressman.

Dear Jim:

Good to see you in the parade in Ottawa on Friendship Day. Information from the Society of Private and Commercial Earth Stations, provided at my request by its lawyer, Fred Finn, has recently been received, and since our discussion of congressional activity that may affect dish owners I have obtained a copy of the transcript of the only hearing held since 1980 on the major relevant bill and an authoritative review of that proposal. After reviewing this material, I assure you that I view that measure as an overreaction to the problem and will oppose legislation which does not fairly and carefully treat users of satellite receiving dishes.

Clearly, unauthorized descrambling of signals, usually transmitted on normal television channels through "subscription television" services, should be illegal. Those using decoders without paying for the service can be easily identified as in violation of the law simply because they possess them; SPACE rightly notes that most other methods of protecting signals would require invasions of privacy to determine whether signals were being "pirated." While scrambling signals involves a cost at the transmission and receiving ends and may cause a reduction in audio or visual reception quality, it is the simplest means of signal protection. I am concerned, though, that entertainment programming may be denied to rural and other persons who are willing to pay for it because transmitters of scrambled programming refuse to authorize decoding to all who properly request to do so.

Scrambling may be less advantageous to program transmitters if there exists a system of royalties paid by dish owners. The invasion of privacy consideration would be diminished under such a system since those having paid their fee would not be suspect of pirating signals. This royalty could be paid at the point of first sale, as SPACE

recommends, or annually (the latter would more accurately reflect the value of signals but would likely fail to encompass all dish owners).

The protection of signals by modifying the copyright laws would again subject dish users to potential invasions of privacy to determine unauthorized use. Similarly, the blanket authorization of reception of signals by transmitters without payment would entail privacy invasions to be enforced, and it would not protect users by requiring that signals may be received upon payment.

This latter aspect of the issue relates to the freedom of access to ideas, embodied in the First Amendment. Congress could, as the author of the report from the Congressional Research Service (a study arm of the Library of Congress) noted, provide "that senders of such programming over the airwaves must authorize the public to receive such signals upon payment of a reasonable fee." Imposing that requirement on transmitters could place a burden of proof on transmitters to show they offered their service should legal action be taken, or it could be a condition for being licensed to transmit the sort of programming that dishes can intercept. While I am concerned that the property rights of transmitters could be unduly infringed by injudicious legislation in this respect, it seems possible that an equitable requirement of permitting reception upon compensation can be developed, and that would be of great benefit to those who cannot otherwise access the new broadcasting services.

The subject of the November 17, 1981, hearing by the Subcommittee on Telecommunications, Consumer Protection and Finance (of the House Energy and Commerce Committee, on which I serve) was a bill sponsored by Congressman Henry Waxman (D-Los Angeles), H.R. 4727 (97th Congress). It would increase the penalties for violations of Section 605 of the 1934 Communications Act, which prohibits the reception and use of certain non-broadcast transmissions. It is debatable whether Section 605 protects entertainment programming of the kind provided by the new technologies. Is reception of entertainment programs "use"? Though H.R. 4727 does not address this question, congressional consideration of the legislation could give lawyers for transmitters "legislative history" that they could use in prosecuting dish owners, because the discussion of penalties would entail what "use" means. This approach is thus a back-door means of changing the scope of Section 605, and I will oppose such indirect changes in our laws. It may be of interest to you, Jim, that Section 605 does not provide protection to subscription television providers since that is a broadcast service.

So, H.R. 4727 is, in my view, a poorly-crafted solution to whatever legitimate concerns the transmitters have about unauthorized reception by dish users, and it does not address the interests of dish owners in obtaining the variety of programs available only through use of parabolic receivers. I assure you, Jim, that I will use my position as a member of the Energy and Commerce Committee, through which any legislation in this area normally must pass for review, to ensure that legislation affecting dish owners is the least onerous on dish users within the bounds of equity.

Just before you and I talked about this for the first time, Jim, I became involved, as you may know, in telecommunications legislation to reform our telephone and related laws. After spending more than 50 hours studying the controversial, 130-page bill that was before our Committee, I took a very active role in exposing the little-

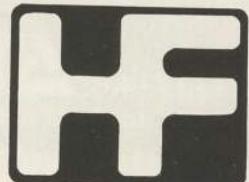
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known and ill-advised provisions that I felt deserved attention. After many days of playing a leading part in demanding that the bill be scrutinized by the Committee, its sponsor withdrew it. That experience in communications policymaking has elevated greatly my familiarity of that field of federal law and has given me some prominence in the eyes of those inside and outside of Congress on it. As well, I probably will serve on the Telecommunications Subcommittee in the next Congress, which begins in 1983, should I be serving in Congress then. Thus, the dual assets of having developed some respect in communications policy and most likely serving as a senior member of the basic communications panel of the House should help me defend the interests of dish owners and vendors.

It does not seem that Congress will soon act on matters affecting dish users, Jim, but I trust that you will feel more confident having my response. I look forward to working with you and SPACE in this regard, and please let me know should you wish to discuss this or any other matter of mutual interest at any time.

Sincerely,
Tom Corcoran
Representative in Congress

Early W5 Levels

I took the following relative readings on WESTAR 5 shortly after it assumed operation. Readings are on my 10' dish, ESR-24 receiver and an Amplica 120 LNA.

Transponder	Signal Level
1	11.3/.8
3	10.7
7	10.5
11	10.0

For comparison, here in central Kansas, my hotter transponders on F3R are 3 (11.0), 7 (10.7) and 11 (10.3). Hope it helps.

Dick Shogren
Home Cable, Inc.
Salina, Kansas 67401

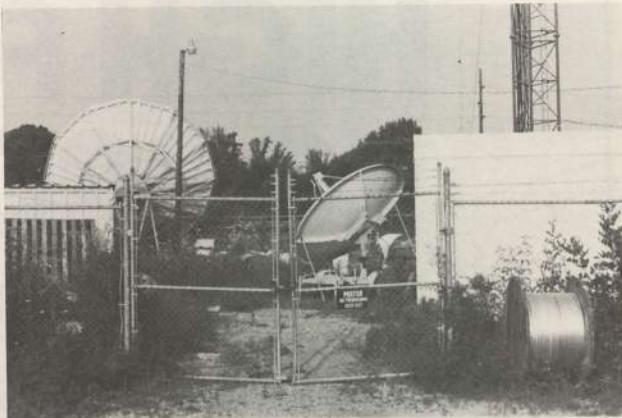
For your part of the country, W5 should be hotter than that but only by a little bit (reference F3R). One thing we did notice in your readings, provided, for all 24 of the F3R transponders is that you have a dramatic, almost straight-line reduction in signal level (relative), indicated on your ESR-24 meter, from the low end (TRs 1, 2, 3) to the high end (TRs 22, 23, 24). This tells us that if you are noticing differences in reception quality with your terminal (i.e. the higher numbered transponders are indeed poorer pictures), that your 'system' has a low end peak / high end roll off. The first place we'd look would be the feed. Next item under suspicion is the LNA (gain not flat across the full band). Finally, perhaps the receiver itself is peaked on the low end. It is possible to have gradually lower meter readings across the band (high or low end) without having reduced picture quality that corresponds to the meter readings; that merely means your metering circuit is non-linear. However, in that particular receiver, it sounds more like a system problem than a metering problem. Check it out!

BTCO Gets Help

Just to show that a Big Time Cable Operator and a TVRO dealer can co-exist together, here is a picture of our trailer 3 meter rig which we recently rented to Comcast Corp. of Paducah to handle the WOR transition. They were installing, late in July, an SA 5 meter antenna for WOR et al over on W5, and they needed a dish to fill in until that new dish was installed. We rented them a dish, an LNA and hardline to run into their building where they hooked up to their regular WOR receiver. In the background is their 7 meter F3R antenna. We have a good relationship with the local cable company because we are not only into TVROs, but we also do all phases of electronics including sound, video, MATV and so on. We are not a threat since most of our TVRO business is outside of the cable service area.

George H. Cumbee
Rowton TV and Sound Corp.
Paducah, Ky. 42001

Boy, we missed that one! You are right, George; there are



ample opportunities, with services moving about the birds as they do, for independent dealers to rent out a rig (on or off a trailer) to local cable firms to help them get by until their new, permanent installation is ready. In that respect (now that our mind has shifted into gear!) here are some more possibilities: If Don King is going to pipe a fight or other event around the country, tell your cable firms you can provide them with a rental dish for F4 (most don't have F4 antennas), or whatever other 'odd' bird as King may be up on. Many cable systems won't play with King because they don't want to invest in another dish. You can help them out, for a fee! Next, if the Canadian / USA bridge finally does get built this coming winter, there will be ample stuff on ANIK which cable firms will want to sample. Offer to rent them a dish for a week or a month so they can evaluate the ANIK programs. If you live in an area where the local ABC affiliate has to pay big bucks to get the ABC services carried to his studio on terrestrial microwave, offer to set up a 'test' system for him on D3 (TR13). I know of a couple of ABC affiliates that spend \$200 to \$400 per day to get their ABC feeds. With about 70% of the schedule now on D3, TR13, they would be delighted to see how they can save big bucks. A month's rental of a dish should convince them. Watch for those trickling-out Low Power TV grants. If one gets approved in your area, offer to help them get on the air in a hurry by putting in a rental dish for them until they get their own. Lastly, find out if any of your local TV stations are planning to add any of the Wold programs this fall (Entertainment Tonight, Merv, etc.). They could be hung up waiting for delivery on their big monster antenna. You could rent them a smaller one to get them going sooner. Remember, they can sell hundreds to thousands of bucks in local spots into a show like that, daily, and they are losing bucks every day they have to wait for installation of their big dishes!

FINDING BARKER

A company mentioned in one of your earliest issues is of interest to me. Could you help us contact David Barker of GHz Engineering?

Ernest A. Bach
74920 Borrego Drive
Palm Desert, Ca. 92260

Barker, who writes for CSD on a frequent basis, can be contacted through the good offices of KLM (see advertisement, inside back cover, this issue of CSD).

RUSH / PLEASE / TODAY!

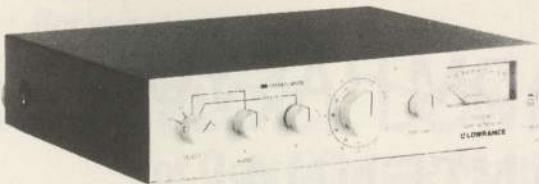
In your August 1982 issue of CSD, page 50, you talk about a ten watt transmitter available for VHF or UHF which sells for \$500. Who is the manufacturer?

M. Rejean Mathieu
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C.P. 1601, Senneterre
Quebec JOY 2MO
Canada

Try Tom O'Hara at PC Electronics. 2522 Paxson Lane, Arca-

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LOWRANCE Remote Control. Arm chair control for your Lowrance System 7 can be obtained with an optional remote control unit, which has detent tuning and separate fine tune.

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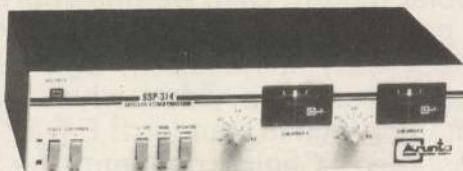
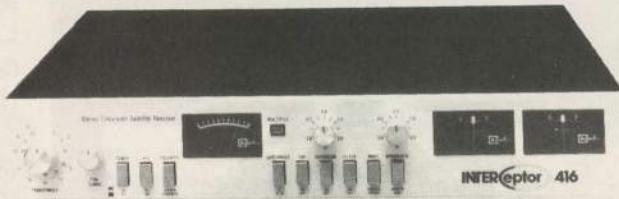
ARUNTA ENGINEERING The Interceptor 416 Stereo Television Satellite Receiver comes with features like detent channel tuning, LNA polarity switch, A.F.C., matrix/discrete stereo, dynamic noise reduction and Canadian filtering. Beautifully designed and easy to operate.

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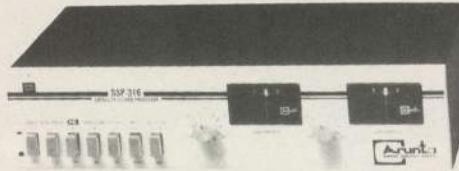
LOWRANCE The System 7 Receiver has every important feature you've ever looked for in a satellite receiver; attractive styling, detent tuning, matrix stereo, signal strength indication, A.F.C., video invert, built-in modulator, weatherproof downconverter, optional remote control, and optional rack mount. Lowrance has made improvements in each feature then put them all together in one system. Finally, they've added the kind of quality control that means genuine reliability.

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SSP-314 \$375



SSP-316 \$495

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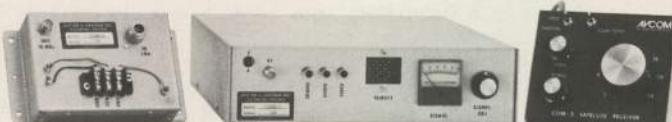
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4. When the "L" in your LNC fails, you're up the creek!

dia, California 91006. PC offers VHF channels on high band plus some of the lower UHF TV channels with ten watts peak pedestal power output. They have various options including DC powering (13.8), rack mounting, one or two channel (switching) transmitters and some 'special' frequencies as well. They won't sell to state-side people who intend to use their products within FCC license jurisdiction regions UNLESS the buyer is an amateur radio operator and orders the gear in the 420-450 MHz 'ham' band. They also manufacture tuneable down converters that output on VHF channels 2-4, for the 420-450 MHz band. We have two units running full time, and have had only minor problems. The price is certainly right!

FAR OUT

If there is an area where somebody needs to be doing some good, basic hardware design work, it is with a complete 'TV System Control Integrator.' Come on now; a guy shells out \$15K for 'The Best,' but winds up miserable because he is not a jet airplane pilot or a recording engineer! All of those buttons and dials scare him to death. These guys are 65 years old and they just wanna watch TV!

I read with interest the concept of televising directly back from a Mt. Everest expedition, in CSD, and may end up in the middle of a US network deal. But I have already found that the Canadians involved cannot grasp the significance of 'live' versus even a five minute delay. It seems the government of Nepal is not fond of flying up live to Intelsat from the Katmandu Hilton. Censorship? Editing? Who knows! But the difference to me is astounding. There is no US network interest at all if it is not live off the mountain. I really had a laugh when some guys here in NYC picked up the story from CSD and tried to sell it to one of the network SPORTS departments. I think these are the same guys that 'program' Max Robinson!

Finally, to share some of my experiences with trying to sell NBC

and CBS on using some of the Ghorizont stuff. We have been demonstrating direct Ghorizont reception right here in the canyons of NYC for more than a year. NBC was hilarious. VP of news furrows his brow (he knows something is being offered here . . . squeams out 'how many program / minutes a year do you think we could count on this for??'); he wants me to tell him how they should use live Russian TV in news department! Oh well, this was NBC, number four of the top three networks, which for a year now has been living off of the kudos of its great programming innovation of last year; the football game without announcers which went down in the history books as the great NBC 'Deaf and Dumb' football game!

At CBS the meeting was more enlightened. CBS actually met 'heavily' over it. In the end, they decided that the facility (including the press barrage and prestige) would have jeopardized the effectiveness of their Moscow correspondent(s). An intelligent consideration. So, in the end, they got their Miami man to get access to Ghorizont through Bob Behar's facility, and they saw fit to forego the PR aspect.

Ken Schaffer

The Ken Schaffer Group

330 West 42nd Street

New York, NY 10036

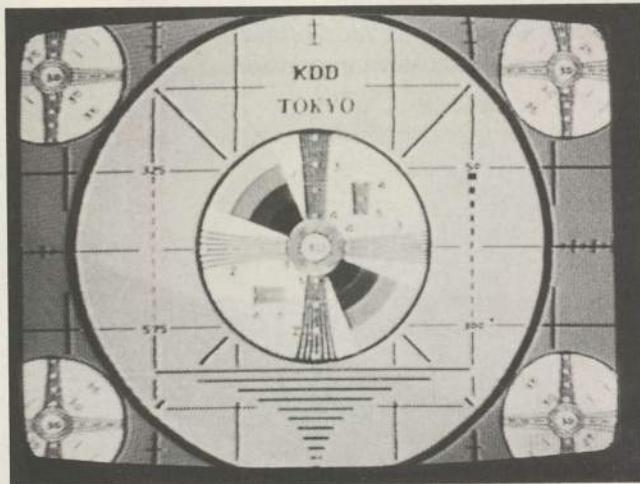
Kenny asked me to make his entire multi page letter 'off the record.' Couldn't do it Kenny; too much good stuff in there. KS is one of our industry's truly unique talents, having come up through the 'ranks' as number one publicist for Alice Cooper, Jimi Hendrix, an inventor who among other things created the audio deck time compression machine that allows radio stations to compress 67 second commercials into 60 seconds, and on and on and on. Someday some smart TVRO seminar / show person will engage Kenny to do about 60 minutes of his hilarious one man "How I Saved The World" routine. See you in Atlanta, Kenny.

TRANSPONDER WATCH

RECENT REPORTS OF ACTIVITY ON DOMESTIC / INTERNATIONAL SATELLITES

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

SIZE of the pot will determine how soon, and which, premium service suppliers start to adopt more friendly attitude with SMATV



folks. If size of 'legal' SMATV industry is under 100,000, don't expect much from Showtime, HBO et al. But when the number of subscribers out there that COULD sign up through a single, organized SMATV effort reach substantial size, then and only then will the big time operators 'come around.'

AFTER the initial rush to file for DBS satellite service, the two most significant firms with prior satellite operations experience now say they will 'wait and see.' Western Union, RCA both indicate now that while they consider their applications important, they expect to adopt slow course before rushing into construction of 12 GHz birds. Western Union says it will wait until it sees some hard orders for 12 GHz service before it rushes to expand satellite base. RCA, meanwhile, indicates that it may well wait until after 1983 Regional Administrative Radio Conference, to be held to determine which nations will receive 12 GHz allocation spots above the equator.

HARDWARE for 12 GHz is starting to be announced. At August SPACE convention Japan's DX-Antenna Company displayed 12 GHz terminal system, claims to have produced 1,000 units so far. M/A COM, meanwhile, has announced 3 meter antenna, a pair of LNC units, and package of four receivers for under \$10,000.

FIRST 12 GHz satellite construction permits have been issued. Comsat received first 'CP' and RCA will build pair of Comsat birds.

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1 Volt P/P ± 3 dB

Level

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18 Volt DC-LNA Nom.



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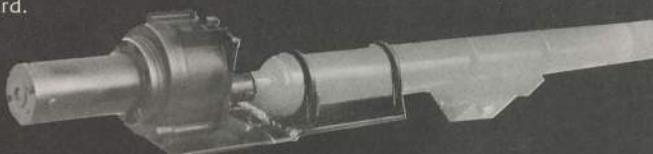
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System will eventually consist of four operational birds in orbit. Only Comsat appears to have both engineering and funding put together. Many other applicants have good intentions but lack finalized funding to place orders for 12 GHz birds. It will all take time, and best estimates still point to 1985 (late) for first operational US 12 GHz bird.

CANADA's ANIK C flight scheduled for July 1983 will apparently be first 12 GHz bird operating with regular DBS service. Best present estimates suggest October 1983 start up for up to 10 channels on Anik C by United Satellite Television.

FCC action to open up Intelsat birds for DBS service, meanwhile, adds additional element to picture. FCC wants to allow users of Intelsat to access the bird directly, without forcing them to go through Comsat. Commission also appears in favor of allowing direct-users to own and operate terminals; something Comsat does not allow at present time. Present V series birds have limited 12 GHz abilities, could be configured (by ground control) to deliver some 'spotbeam' 12 GHz service in limited areas, but only by cutting back on some other services.

REAL interest in SMATV may take place with the launching of 12 GHz DBS service(s). Virtually all of the early entrants planning 12 GHz DBS say they want to serve multiple dwellings with master antennas. Prospect for new, greatly enlarged MATV industry served largely by DBS birds looms on the horizon. Primary problem at this point in time is the apparent lack of diversified programming services planned for DBS; a subject CSD will visit in the December issue.

PBS programming on WESTAR 4 has been cut back and may be cut back further. Educational folks have cut a deal with satellite uplink packager Bonneville Satellite Corporation (BSC on satellite color bar ID) to take over some use of transponder 23. PBS cut backs in funding, real and forecast, have educational network scurrying about looking for ways to stay afloat. Reagan administration is basically in favor of suspending, in time, all federal funding for PBS.

TWO BIRD parabolic is being pushed by Hughes Communications. You take a standard dish of 15 foot size or larger and retrofit a special Hughes feed. The feed looks not at the center of the dish, but rather slightly left and right of center with two separate scalar type

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4. HOLMES KTTV

EDT 19:12:06

mechanisms. The result is each of two birds, separated by up to 4 degrees in space, ends up with use of a part of the dish surface. Greater bird to bird spacing results in antenna system efficiency losses which are intolerable. 'Loss' of system with two birds spaced at 4 degrees is in vicinity of 0.5 to 1.0 dB over same dish with a single feed, bore-sighted on the single bird. Hughes has special reason for announcing the feed system; they will launch Hughes Galaxy Bird to 135 west mid '83, and it will replace F1. New Galaxy bird will become large supplier of new cable TV programming and Hughes hopes cable system operators will retrofit existing dishes with their feed so cable firms can and will have access to both F3R (131) and Galaxy 1 (135).

IF WTBS weak signal level is bothering you, hold on. Common Carrier SSS has announced it is packaging five new 'Music In The Air' audio services which will be added to WTBS in sub-carrier format. Services will be packaged by John Doremus, best known for his 'In

Throw away that jack handle and get THE KIT

THE SPACE-VU II

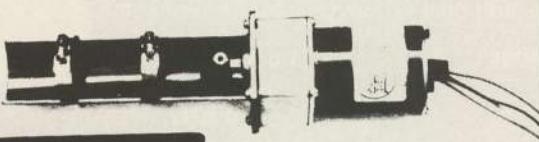
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Lowrance has made subtle improvements on each feature, then put them all together in one system. We've added the kind of production and quality control that mean genuine reliability. Each receiver must pass more than 50 quality checks, and is "burnt in" (run under normal operating conditions) for several days. The result? System 7 is the satellite receiver that you've been waiting for.

Like other Lowrance products, System 7 is backed by a full one-

year warranty. When Lowrance Electronics produces a product, we seek and demand excellence. In engineering, production, quality control, marketing, distribution, warranty and service. That's why we've remained the leader in other electronics markets for over 25 years, and that's why we're so farsighted when it comes to satellite receivers.

For more information on System 7 or details on distribution and co-op ad programs, clip the attached coupon and mail.

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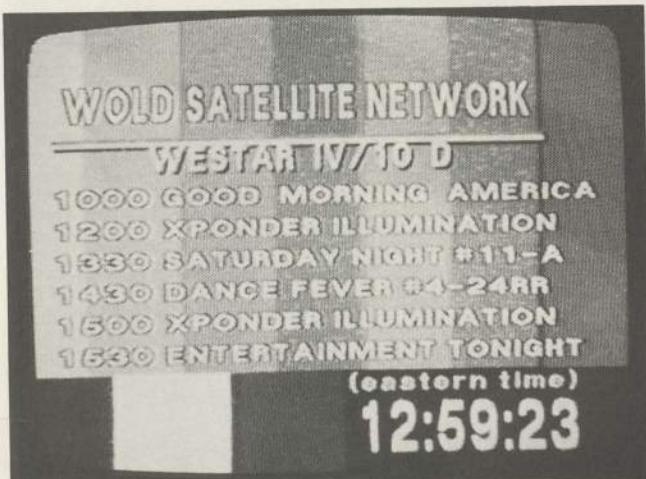
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SYSTEM 7





'Flight' taped music system packages on major commercial airlines. Initial five services will consist of (1) country and western, (2) Broadway/Hollywood show tunes, (3) big band sounds, (4) comedy and (5) hits from the 50's and 60's. Each additional sub-carrier can cause the video carrier to drop by from 0.5 to 0.75 dB at your location. If five sounds like too much to you, SSS would like to eventually have as many as 40 (!) separate audio service channels available.

CARIBBEAN legal service coming. United Video (common carrier for WGN) has asked FCC for permission to serve several points in Caribbean, legally, via F3R while SSS has asked FCC for permission to serve terminal in Dominican Republic with WTBS service. FCC approved concept of international use of US domestic satellites last November, requires applicants to first obtain permission in country where service will be used, then bring that permission plus tentative agreement with US common carrier to Commission for approval.

These are first to get that far in paperwork snarl.

IN CASE you missed it, satellite operators are now approved for outright sale of transponders under specified circumstances, and subject to FCC periodic review. Arguments have been floating in satellite industry for several years, since Hughes first announced it would 'sell' rather than lease/rent transponders. Commission approval paves way for WU, RCA, Hughes and others to raise virtually all of the cash they need 'in front' to design, build and launch new satellites into service.

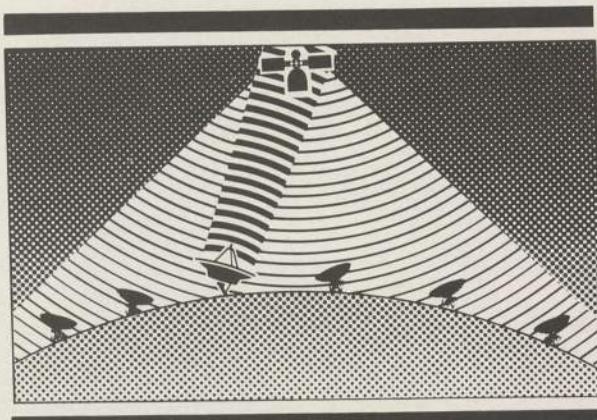
OAK continues to push their Orion encryption system. Company recently forecast that by end of 1982, "70% of the expected 40,000 earth terminals in use in North America will be in private hands". Oak has no better handle on how many private terminals there may, or may not be, than anyone else at this point. Their 28,000 estimate (.70 x 40,000) is probably low.

ANOTHER would-be-policy maker addressing security of satellite signals forecasts "pirating of satellite signals will cost cable companies more than \$100,000,000 by end of 1982". Writing in a security publication, author wants 'national policy makers' (i.e. Congress) to address issue. Hundred million dollar (per annum) number is absurd since at \$100 per terminal (program rights fees) this would require 999,880 operating private terminals in place!

NATIONWIDE press conferences are now possible, using services of new PressNet service. Company charges \$32,500 for uplink from one of ten US cities, provides downlinks at 9 other sites, and two-way audio inter-connect so that subject can be questioned from locations spread coast to coast.

COAST TO COAST radio paging service is being put together using National Public Radio (NPR) receive-only sites. Westar bird will provide national coverage, allowing individual pager-users to be 'reached' in any of 200 'market areas' nationwide. Local paging firms will handle terrestrial end.

RKO General Radio has joined ABC, CBS and NBC radio networks on Satcom F1. RKO has 150 affiliates nationwide and S/A is supplying their 3 meter terminals. Ultimate home of radio nets through RCA not nailed down since F1 spot at 135 west will become Galaxy 1



SCHEDULE

Westar IV	TR 12	Oct. 21	5 - 5:30 EDT**
Westar IV	TR 3	Nov. 4	5 - 5:30 EST**
Westar IV	TR 3	Nov. 18	5 - 5:30 EST**
Westar IV	TR 3	Dec. 2	5 - 5:30 EST**
Westar IV	TR 3	Dec. 16	5 - 5:30 EST**
Westar IV	TR 3	Dec. 30	5 - 5:30 EST**

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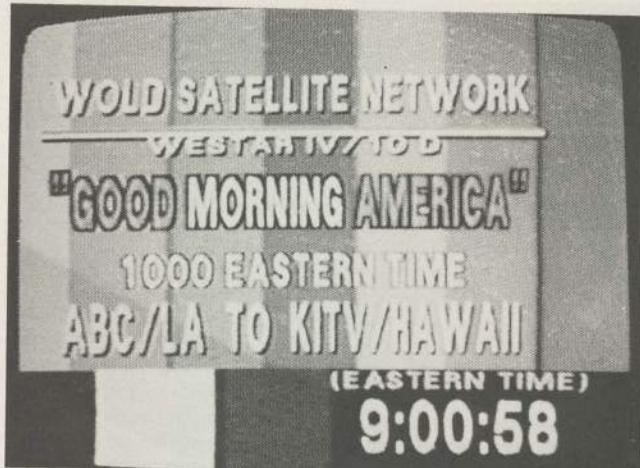
SBS attempt to lease out some of its spare 12 GHz transponders for interim DBS, or whatever, has apparently failed. Originally SBS offered six transponders for use; one has been taken by GTE Satellite. Three of these have now been withdrawn from the market, leading to speculation that they may be on a reserved status for some unnamed customer.

UNISPACE '82 meeting in Austria drew dozens of technical and political papers for consideration. One report of interest; it is forecast that for next twenty years there will be continued expansion of geostationary/Clarke orbit belt. Saturation of belt, on worldwide basis, at 4, 12 and 20 GHz is not anticipated prior to the year 2004 or so. Of the 126 satellites launched since 1963, 76% have been for communications.

SelecTV planning to expand network from 6/8 hours per day to 24 hours per day on transponder 18, Westar 4, before end of fall. Service is largely for STV stations nationwide, but also serves some MDS, CATV and SMATV firms. SelecTV has had some problems in past, continues to uplink from Gene Autry owned Oklahoma City uplink connected with STV operator there. Programming on SelecTV generally gets high ratings, schedule in even short day format has featured 50 or more movies per month plus late night (midnight eastern) 'hard R' package for adult viewing.

SIN may have legal problems with FCC and others, notably Justice Department. Network uses transponders on W4, programs largely to Spanish language television stations nationwide plus handful of cable firms. Charges include that SIN controls group of terrestrial TV stations in US and that SIN is majority owned by powerful Mexican Televisa broadcast group. FCC rules preclude FCC licensed broadcast stations from foreign ownership or control, require elaborate disclosures even for minority ownership.

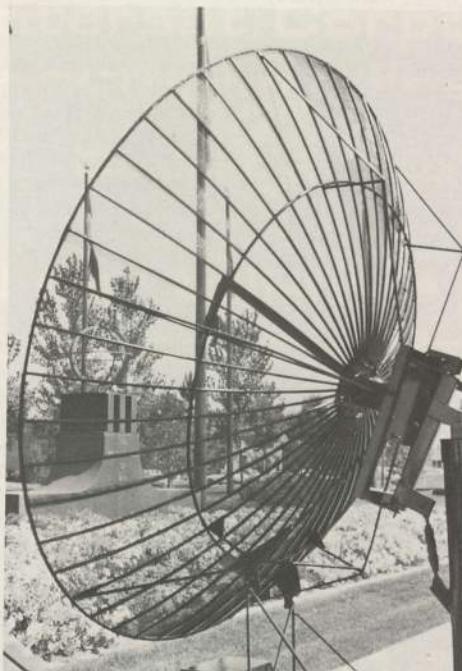
ALCOA/NEC joint entry into 12 GHz DBS market is gaining speed and interest. Dishes will be stamped aluminum (what else!) from 0.6 to 2 meters in size and elliptical in shape rather than parabolic. The 0.6 meter dish, 12 GHz LNC and receiver demod has a target price, in quantity, of \$350 while the larger 2 meter system has a target price of



\$500. Descrambler and installation is extra; probably in \$100 range. First out will be the 2 meter size packages, aimed at the interim medium power DBS birds (20-50 watt) and the projected delivery dates are slightly ahead of the mid '83 target for the first DBS test service on ANIK C. Oh yes, England's Steve Birkill was scheduled in the US in mid-September, as a guest of Alcoa/NEC.

A PAIR of 13 meter earth terminals, for both uplink and downlink purposes, will be installed by GTE International Systems in rural Colombia. Terminals will provide telephone, telex and video services including US television to Americans living at the El Cerrejón coal mining project operated by Esso Inter-America and the Colombian government.

ANIK D may surprise some people. The new 24 channel Canadian bird should be operating on station at 104.5 west as you read this with 11.5 watts per channel. That works out to 3.45 dB more per channel



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than older style Westar and Anik and Satcom birds and about 0.5 dB hotter than the ANIK B bird; if all are fully saturated. D is expected to take all of the traffic over from ANIK B (CBS North, TR11; CBC French, TR15; CBC English, TR19 plus network feeds on TR7), and, from the duo flights of ANIK 2 and 3 (BCTV, TR1; CHCH, TR7; TCTV, TR15; CBC French, TR23). This is a dual polarity bird (Canada's first). Bird launched successfully in August. Prime contractor, Canadian firm Spar Aerospace, has forecast that inspite of higher power, ANIK D will not have expansive coverage found with present ANIK birds. We'll see.

SPACE has been asked to provide a 'loaner terminal' to allow National Public Radio to conduct a year long experiment using the uplink facilities of United Video, through WGN sub-carrier. The terminal would receive the NPR SCA channel uplinked from Washington via Westar, at the WGN uplink site near Frankfort, Illinois. United would then convert the special 65 hour per week programming, intended for people who cannot read well enough to handle newspapers and magazines, to a WGN sub-carrier for re-transmission to around 20 'test' cable sites. Service will consist of specialized news for the handicapped, covering items from national newspapers, magazines and news letters.

SHOWTIME has sold 'again'. This time, 50% owner Viacom has bought out 50% owner Group W (Westinghouse). Back in 1978, Viacom sold 50% to TelePromper for about \$10,500,000. TelePromper later became part of Group W Cable operations, and Showtime 50% came with deal. Several unofficial reasons given for sale, including Group W's displeasure with Showtime management's decision to run 'hard R' material. Group W was not managing Showtime, Viacom was. Group W is backing the new Disney and Nashville channels, due up within the next six months and they may have decided Emmanuel wouldn't go well on the same 'billboard' with Mickey Mouse and Dolly Parton.

GROWTH of OTS-2 test service of a couple of hours of English TV programming per night continues. Latest to add service, ten units of RGA Cable in Switzerland. They acquired Ku band units from Califor-

nia's Orrox firm.

RECENT OBSERVATIONS

Regularly scheduled satellite service listings are found in **Channel Guide**, **Satellite Week** and **SatGuide**. Satellite use patterns, for non-scheduled services, found here are for the purpose of assisting new satellite installers and installations in pinpointing likely sources for unknown reception. Non-scheduled services change transponders and birds on short notice, or no notice at all, and thus must be re-visited each month.

Comstar D3/87 West — ABC continues to feed network programming for CT and ET areas 6AM to 10AM (ET), 11AM to 4:30PM (ET), 6PM to 11PM, 11:30PM to past 1AM, TR13. CBS expanding use of TR17 for similar feeds.

Westar W3/91 West — CNN Rome and other European feeds, inward bound, noted TR5 (1PM ET). CBS sports noted TR5 weekends, as well as TR11. Good Morning America feeds recently TR21. San Francisco uplinks recently TR23.

Westar W4/99 West — Bird slowly becoming video work horse for Westar system with heavy weekend use for football and baseball sporting events. ET zone Today Show noted many mornings TR11 (7-9AM), preceded by 'Early Today' 6AM. Seattle uplink baseball noted TR5. CBS late night programming noted TR11 some days. CBS Hollywood feeds noted TR9. Houston baseball noted TR2. ITNA west coast regional news exchange noted 7PM weekdays, TR11. ABC football noted TR9, 11 Saturdays. ABC World News Tonight noted TRs 2 (double hop), 9 and 20 some days 6:30PM, but on 20, only, reliably. SIN evening news package noted TR9 6PM (ET). CBS 60 Minutes noted TR11 10PM Sundays.

ANIK D/104.5 West — New horizontal and vertical (dual pole) operation scheduled here prior to your receipt of this issue of **CSD**. Virtually all present video service on ANIK B (109 west) and ANIK 2/3 (dual birds) at 114 west scheduled to move here with activation of new generation satellite. Peak transponder power is 11.5 watts resulting in substantial improvement from ANIK 2/3 service levels, slight increase from ANIK B levels.

CONTINUED / from page 3

refrained since we were in mixed company. Lindsay, and John whom I have not yet met, are obviously strong, young men who can take rigors of undeveloped areas without flinching. The obvious desire not to have your arm eaten, aside, it should be evident to others who might be tempted to leave the comparative peace and solitude of an American sub-division to trapse around the South Pacific that this would be no "Cook's Tour." I'd hate to receive a post card from a reader printed in block letters that read "Just to let you know that I am now learning to print with my left arm, having lost my right arm last week while demonstrating satellite TV in Malaysia . . ."

SMATV NUMBERS

There is a real tug of war going on between recent advocates of direct satellite reception and re-distribution of program services, via master antenna systems, and programmers. With the apparent willingness of at least **The Movie Channel** to deal with hotel and motel systems through SMATV operators (see report, this issue of **CSD**), the gauntlet may finally be on the ground to other premium service programmers such as HBO, Showtime and Spotlight. It all boils down to 'numbers.'

All premium service programmers have a common interest; making money. To make money, they have to get their service into the hands of paying viewers. And they have to do this in an economic manner. To date, serving 1 or 10 or 100 outlets per TVRO installation has not been worth the headaches that are associated with keeping track of who is out there. But the development of one or two SMATV trade groups is going to change all of that.

Premium service programmers have no desire to pass up willing, paying, customers. But they have learned to deal 'in bulk' through their cable affiliates, and they will have to see a similar format for SMATV before they will openly court SMATV connections. That's where the newly emerging trade associations come in.

It is a number game. There is some 'magic number' which will attract the positive interest of HBO and Showtime. That number could

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be 50,000 subscribers, 250,000 subscribers or 500,000 subscribers. Or anywhere in between. When the day arrives when one single man can sit down with affiliation chiefs at HBO or Showtime and 'offer' a single batch of subscribers, large enough to attract the premium programmers, the race will finally be over. And that brings us back to the newly emerging SMATV trade groups.

The National Satellite Cable Association seems to recognize this fact. SPACE, new in the SMATV biz, may not have grasped it yet. NSCA is working diligently on getting more and more existing SMATV operators to affiliate or join with it. Each new operator brings new outlets served into the fold. And the numbers continue to build. One suspects there are ongoing, perhaps quiet, contacts going on between NSCA and the premium programming folks. When the 'critical mass' is broached, the dike will break and the impasse will be over.

But only for those SMATV operators who are able to deal with the premium service folks through some master affiliation contract. That says that if you are in SMATV, or planning to get into SMATV, it would be wise to immediately join up with either or both of the SMATV groups. The dues are small, but the rewards ahead are large. An 'army' is being recruited. The larger the 'army' of SMATV-connected viewers, the more difficult it is going to be for HBO, Showtime and Spotlight to ignore the marketplace.

This analysis, of course, overlooks the very real problems which the present premium service folks have in dealing with any TV distribution system that does not represent itself to be a cable television system. That's the other side of the coin. Cable TV has made the present premium service suppliers the successes they are. It wields a very large stick and that stick is constantly poised at the neck of the premium supplier folks. The threat is that if premium folks start to serve SMATV folks (which cable folks feel is akin to serving the devil!), the cable family will rise up in arms against the premium service folks. Four years ago that would have been unthinkable; dropping HBO would have been a disaster. But now there are strong, competitive juices flowing between the premium folks and one of them will make the move first to SMATV service. But, again, only when and if there are significant 'bulk' numbers available to them. So

the 'cable political problem' will eventually turn out to be a non-problem. And once one of the premium folks makes the jump, most of the rest will follow. It all boils down to numbers. Subscriber numbers, and, monthly revenue numbers.

Bottom line? Stay on top of the development of the SMATV trade groups. Get involved, join them, and pay your dues. This investment will come back to you many times over in the years ahead.

AMUSING REACTION

On page 40 of CSD for August there appeared a brief, seven line report that said that Don King's Satellite Entertainment Network was interested in getting in touch with downlink affiliates who would be in a position to wheel up to a location and provide per-event feeds for a fee. We all know King is the impresario of boxing these days, and most everything he touches turns to golden cash. Naturally most people would like a chunk of that gold.

Our report gave King's office telephone number and sure enough a 'few' people read that report and called that number. Apparently, King's office was not ready for what happened. They tell me that more than 200 calls came in from the CSD seven line mention!

The first call we received was from a young lady who was very uptight about the report. She represented King, and she wanted to know where we got the story and who authorized us to publish it. Carol Graba, running our office, had no knowledge of the background on this one so the call waited until I was in Fort Lauderdale. That was several days after the first call to CSD, and in the interim, King's office called CSD several more times. Each call was increasingly hostile; I suspect the direct result of the increasing number of calls they were getting daily.

When I returned the call, I was told that 'unless you clear stories with us, you have no right to publish reports on King's activities.' I did a quick education job on freedom of the press and the young lady asked me to hold on. She ran to get a VP of King's group and he started all over on me. His first point was that King never wanted individual downlink affiliates, only cable affiliates. I begged his pardon but I had heard King say, on the pre-fight feed, that he

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wanted everyone who could make his programming available to be a part of his team. The VP chap then said he could pull his videotape and review what King said, and I said 'OK, so will I.' There was a pregnant silence on the other end, and then he said "OK, that's two strikes against you. First of all you admit you watched the event without our authorization, and now you admit you taped it!!!".

I laughed and said I didn't need his authorization to watch it or tape it. He immediately came unglued. After he had vented on me I patiently explained that my point of interception was outside of the United States, in a country which does not have any communication type treaties with the United States, and in a country that has not ratified the Belgium Satellite Copyright Accord of 1975. He didn't understand.

"Look, in Sacramento, California they have a local traffic law that says you cannot turn right on a red light. But in Stockton, California, turning right on red is OK; they have no such law. If I am in Stockton and I turn right on red, have I broken the law in Sacramento?"

Now he understood. In his earlier ventings he was threatening to haul me into court for illegally watching their transmission and illegally taping it. I knew he was probably mostly upset because they had recorded more than 200 telephone calls from people they did not understand, and his threats were a direct reaction to that frustration more than any concern he had about me watching a King fight somewhere.

Regardless of what King did say in the pre-fight hype, Don King Enterprises now says that they are not yet ready to accept individual downlink operators for their fights. I think that is poor planning on their part. Here they had a golden opportunity to build one heck of a card file on many (if not most) of the people in the downlink business, and they blew it. Someday they will wish they had those names and addresses. I'll accommodate them. But it will cost them a full page ad in CSD to make that announcement!

THE LEMON PROBLEM

There was an unfortunate incident at the Omaha SPACE show. It involved a dealer who claims he had tried to get satisfaction from a

manufacturer of TVRO receivers, but failing that satisfaction he decided to take matters into his own hands. It happened this way.

The dealer (Jerry Brandt of La Grange Satellite TV Systems, La Grange, Mo.) had purchased a pair of TeleCom Industries receivers at the Omaha show in the summer of 1981. The dealer says he could not get decent pictures on the receivers so when he attended the STTI show in Fort Worth in March he went back to the TeleCom booth and asked for help. They told him to return the units to the plant and they would be 'upgraded free.' He sent them back.

When they were returned to him, he also received an invoice for \$100 with the notation that one of the two receivers was damaged. Jerry Brandt was bothered by the 'damage claim' since the receivers had never been used; only taken out of the original factory cartons for testing on his bench. It was when he found them to be poor performers that he had contacted the factory for help, and received the 'return them for a free upgrading' commitment. He offered to pay half of the charge and they accepted.

Then three weeks prior to the Omaha show, Jerry Brandt sold one of the two receivers. This was the first time he had re-opened the boxes, and he found that the receiver which he had paid to be fixed was still not operating. He opened the other box and tried out that receiver. The pictures were, he relates, "filled with sparkles" and he ended up placing a Drake receiver in the system. He then decided to take the two receivers back to Omaha, almost a year from the time when this episode began.

As Jerry relates what happened next, TeleCom refused to refund his money, or repair the units. On a system operating in the TeleCom booth, the unit played 'poorly,' according to Brandt. He says he was told "tough luck."

What followed is the incident I mentioned. Brandt took the two units to the front of the Omaha exhibit area, by the front door. There he hand lettered a sign which offered the two units for sale. Brandt relates:

"When I left their booth, I told them that I was going to sell the receivers since I wouldn't get them to work properly. They quipped to me 'That is what you are supposed to do with them!'.

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So I went out into the hallway and set the receivers down with a sign on them. The sign said 'Two Pieces of Crap for Sale / Best Offer.' I wanted to use another word for crap, but being a nice person, I decided not to do that."

What followed Brandt's setting up shop in the hallway didn't surprise him.

"The fellows from TeleCom got all upset. I was threatened not only by them, but also by SPACE members who were putting on the show. This bothered me since I felt SPACE should be representing everyone, not just those (such as TeleCom) who paid the most."

Brandt goes on to tell me that he is 'tired of being used as a guinea pig' by manufacturing companies. He tells us he has a pair of dishes from a well known firm that he could not sell because of manufacturing defects. He also has, he says, three other receivers which he calls 'state of the art junk.' He figures he has \$6,000 or so invested in 'junk' and he is mad. He doesn't intend to take this anymore.

Jerry suggests a TVRO receiver 'shoot out'; similar to the antenna tests which have been put on in the past year. He figures that we go into a show, spot some typical type of dish installation, and then allow anyone who wants to bring a receiver by to plop it down for some quick comparison testing. He is really asking for somebody at (the) (a) show to sanction such an event and oversee the testing.

It was my intention to have just such a receiver comparison testing program at the November Provo Retreat. I would provide the signals through any of several dishes and anyone who wanted to A/B/C (etc.) receiver comparisons would be welcome to hang receiver equipment on the end of my feedline. We'd do monitor side by side comparison tests, and measure video signal to noise ratio with some test equipment.

There is no reason why such a session should not be put together at any show. All it takes is a dish supplier willing to lend you a feed off his dish, and some minor coordination to get people to bring their receivers by. If I were doing it, I would start off with a known, high quality receiver which I would leave on the dish full time on one side of a 4 GHz 'split'; and then use that as a standard against which all other

receivers tested would be compared. Anyone that wants to put together that type of informal, ad-hoc comparison period at the forthcoming Atlanta STTI show later this month will certainly have my support. However, lacking a controlled environment, I would caution all who might be part of this that quickie direct comparisons are often not conclusive so don't expect to 'grade' the whole industry in this manner. In fact, CSD will not publish the results since we know such a testing program would lack sufficient 'control factors' to make the results iron clad and universally applicable.

Testing of receivers aside, how do you handle a 'lemon'? Jerry Brandt did what others in different fields of endeavor have done previously. I remember a Ford Torino parked at some considerable expense on a trailer in front of the Oklahoma City Regional Office for Ford Motor Company for several months straight, some years ago. The display was attractive, even if the Torino had been repainted to resemble the world's largest 'lemon.' The trailer it was parked on cost more than the Torino and the fellow who parked it, as a protest against Ford, probably spent \$500 in professional signs detailing his plight. Ford didn't budge; the trailer sat there for at least two months, day in and day out, and the fellow had to hire somebody to keep feeding dimes into the Oklahoma City parking meters so it could stay there. I felt sorry for him.

I feel sorry for Jerry Brandt. And everyone else who has been stuck with equipment that doesn't work, or cannot work well enough to justify resale. But I think the real problem here is buyer awareness. And manufacturer willingness to guarantee performance.

Jerry apparently left the two TeleCom units in their boxes for months after he took delivery. **Mistake number one.** Always open up every box and test every unit within a few days of its arrival. Waiting weeks or months won't help your case when you go back to the supplier. Then after he sent them back for repair, he waited another long period of time before opening the boxes to re-discover he still had a problem. I won't repeat my suggestion again.

TeleCom, since they are getting it here, has never impressed me very much. They sent me back to Provo from Washington, DC with one of their receiver packages in the spring of 1981. They sent only the

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demodulator (although they said the unit was complete); I had to figure out my own down converter. The pictures with a down converter I provided were dismal. I told them this at the next show. Then at the Fort Worth show, they packed me up with another package; this one included a down converter. Humphries and I tried it out one day and after five minutes of messing with it dropped it into a huge pile of similar gear. It just did not produce useful pictures down here in the fringe area region. I relayed to them that they would be better off if I didn't write a review on it.

In their defense, I have spoken with dealers who tell me their units provide good value and good pictures. Jerry Brandt's experience is apparently far from a universal problem for TeleCom so I cannot lump them into the Rohner class based upon what I have been able to learn. Still, there is at least one lesson here for all of us.

If you look at the data sheets which receiver manufacturers supply, there is often no mention of receiver performance. What the data sheet should tell you is that if you have a certain CNR (carrier to noise ratio), they guarantee that you will have a certain SNR (video signal to noise ratio). For example, an 11 dB CNR ought to produce at least a 48 dB SNR. It should not be difficult for a receiver manufacturer to warrant such numbers. If they don't know, or cannot tell you what this basic performance criteria will be, then you have your first indication that you are dealing with a firm that lacks some of their engineering marbles.

More important, if they tell you that a certain CNR will produce a certain SNR, then you have two things going for you:

- 1) You have something which you can use to compare the performance of one receiver to any other receiver on the market, and,
- 2) You have something which can be measured, even in the field, and by that measurement you can quickly tell whether you have gotten a 'lemon' or not.

In effect, you have something in the 'hard number family' to base your complaint on. Simply stating "this receiver has too many sparklies" is not a defensible position. The manufacturer knows that, and he'll eat you up.

I don't know what it will take to get ALL of the receiver manufacturers to universally adopt this simple measurement approach, and to get that information onto data sheets (and into advertisements). But I do know that if dealers and distributors start demanding this sort of 'hard numbers' BEFORE they buy product, that will do more to get the manufacturers to adopt this practice than anything else that might happen.

Now before Clyde Washburn or somebody else of that family jumps on me for this suggestion, let me also note that there is more to the picture quality game than CNR and the SNR it produces. IF bandwidth, the use of pseudo-threshold extension, whether we are measuring color bars (i.e. a fully modulated transponder) or a view of an ocean scene (a lightly modulated transponder) all enter into the measurement scheme. I think we could probably write sufficient guidelines so that everyone would play it straight, but for now the first step is to simply get receiver suppliers to be willing to warrant, in writing, just what their receiver will do. A CNR versus SNR comparison, for say color bars, would be a fantastic first step.

Now, let us suppose that inspite of tremendous pressure from dealers many of the manufacturers still refuse to put this data into their data sheets and advertising. Then what? Well, then we sit down and plan a carefully controlled measuring session at a future trade show. We bring in some professional people with the very best test equipment and we turn them loose measuring each and every receiver which any dealer attending the show brings by. And then we publish the results.

I hate to see it happen that way. I would much rather see the manufacturers agree to provide this data, without any hanky-panky, on their own. But I have to side with the dealers on this one. I don't like seeing Jerry Brandt and the thousands of other dealers stuck with equipment which performs badly. The industry is growing up and it is time we started acting like grown ups. I'll be happy to talk with you about this in Atlanta, so come prepared with your facts. Emotionalism we don't need. We have had enough of that already.

P.S. Oh yes. TeleCom would certainly make me feel better about them if they would settle their differences with Jerry Brandt!

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RECEIVER Performance

Wandering about the aisleways of a trade show, such as the recent SPACE exposition in Omaha, one overhears frequent remarks about receiver performance and picture quality. Clearly some people are not sure what it is they should be looking for, on the picture tube, from receivers on display.

"The best" receiver does not exist. There is no single, 'best' receiver for all situations. What works best for me, in the 'fringe service area' we have here in the Caribbean, may not be the 'best' receiver package for you in St. Louis. There are several reasons why this is true.

The two most important factors affecting receiver performance are received signal levels from the satellite, and, the transmission parameters of the transmitted signal. As a group we tend to concentrate on the received signal levels and largely overlook the transmission parameter variations.

Every receiver has something called a 'threshold.' This is the point where the received signal strength (or level) from the satellite, plus the receiver sensitivity, inter-act to produce a picture that is largely free of noise; or sparkles. You can measure the threshold of a receiver, given suitable test equipment. If you don't have an electronics background, think of the threshold as a wall in front of you. Any signals sufficiently strong to 'stand up' tall over the top of the wall will be seen by you. Those that are the same height as the 'wall' will be barely visible along the top of the wall. Those that are 'too short,' not strong enough, will be hidden from view by the wall.

Only the 'wall' is more of a picket fence. Even when the signal is shorter than the fence, you can see parts of it through the gaps between the fence boards. You can move yourself around to get a better look through the openings between the 'pickets,' but no matter what you do a full view of the signal behind the fence is impossible since some of your view is blocked by the picket boards. A clear view is possible only when you somehow increase the height of the signals (their strength) to above the top of the fence, or, reduce the height of the fence.

You increase the height of the signals by making them stronger.

This usually means making the receive antenna larger. You reduce the height of the fence by reducing the threshold of the receiver.

Most people do not have a very good eye for judging received picture quality. This only comes from years of experience, and knowing what to look for. The television picture is an amazing display; it literally wants you to know what is good, or bad, with it. All of the clues are there for you to see and what remains is for you to be smart enough, or experienced enough, to interpret what you see.

For most of us, the threshold is a fixed number. The height of the fence is established by the receiver design and although we can 'play' with that number by varying the noise figure (a threshold of its own) of the LNA, for the most part we operate with LNA noise temperatures in such a narrow, limited 'range' that we are not going to make a substantial change in the system threshold no matter what we do with the LNA.

Threshold is directly related to satellite signal strength levels. A higher threshold simply means that we must also have a higher satellite signal level if we are going to see acceptable pictures. A lower threshold means we can still get acceptable signal levels even when the satellite signals are weaker.

Threshold is typically not related to the actual video technical parameters. That is, noise aside, the finite measurements one can perform on a video signal (video level, sync waveform, color burst level, video bandwidth, and so on) to determine the overall 'quality' of the video has very little to do with threshold. Threshold is established or determined by the way the front end of the receiver (the 4GHz section) is put together and tuned. Video quality, on the other hand, depends upon the care and expertise the designer and builder puts into the 70 MHz IF and the demodulator and the video amplifier portions of the receiver.

A receiver with a higher threshold may be inadequate for use in a weak signal area, but it may also have such superb engineering in the 70 MHz IF, video demodulator and video amplifier that the video quality of its pictures will be far better than the video quality of a receiver that exhibits superior sensitivity.

Many system installers select a receiver on the basis of its sensitivity, ignoring video quality as a separate, not always related, para-

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meter. Listening to aisle talk in Omaha, it became clear to me that many people mistakenly believe that if a receiver has good sensitivity, that is **all** that matters. The receiver sensitivity/threshold problem is made more difficult to comprehend or judge, separate from video quality, when there is a constant tug of war going on within the industry to use smaller, and smaller, TVRO antennas. Since system sensitivity depends upon a combination of receiver threshold performance, LNA noise figure and antenna performance (size being a sub part of antenna performance), the push has been on making the antennas smaller and constantly expecting more out of the receiver. This has resulted in many receiver suppliers spending their design time on improving receiver threshold while spending very little time on the back end of the receiver where video 'quality' is established.

We noted in the opening paragraph that there is no such thing as a 'best' receiver for every application. The best, most sensitive (lowest threshold) receivers are today not necessarily the same receivers that offer the best, highest quality video performance. And the reverse is even more true; i.e. those that offer best video quality are certainly not those with the best low-threshold performance.

Shortly after the Omaha SPACE show I found **Ed Grotzky** of **Arunta Engineering** (Phoenix) and **David Barker** of **KLM/GHz Engineering** on Provo with me. Ed brought with him a pair of Arunta's latest receivers: The Interceptor 416. One had a 36 MHz IF bandwidth and another had a 28 MHz IF bandwidth. David Barker had a new KLM SkyEye 4 receiver.

Both receivers have a relatively new 'gadget' in them. It is called a 'Saw Filter.' Now a saw filter is a section or part that is designed into the receiver at the IF; 70 MHz. The IF is the portion of the receiver where a major part of the receiver's gain is established. This is also where the receiver designer designs in the filter circuits which allows the receiver to tune in a single TV transponder at a time, ignoring (or 'filtering' out) those that are nearby. We have carried several articles recently describing receiver filter technology, and there have been some arguments between engineers as to just how you go about designing a 70 MHz IF 'filter' to get the best performance out of the receiver.



ARUNTA'S GROTSKY wiring up one Interceptor receiver package behind a stack of WIV AVCOM receivers.

One of the rules of receiver design is that you can improve the picture's video signal to noise ratio (the relationship between received signal and receiver created noise) by making the IF 'sharper,' or more narrow. That tells you to make the 70 MHz IF as 'narrow' as possible. Unfortunately, there is a counter rule that must be considered as well. If you make the IF bandwidth (determined by the bandwidth of the filter) too narrow, you miss some of the picture 'intelligence' or information being transmitted. You can check a similar situation by switching your satellite receiver audio between 'narrow' and 'wide' (if your receiver is so equipped). When a man is talking the voice sounds natural in both positions. But when you have a woman with a higher pitched voice, or music, being transmitted, the sound is 'tinny' in the narrow position, but 'full' in the wide position. In the narrow position you lose all of the higher audio frequencies.

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The same thing happens with a picture. If the picture goes through an IF that is too narrow, some of the picture information gets left behind. It never makes it to the screen. You can see this in an **extreme case** by noting that the color is 'washed out'; or even totally missing. The color information, in a sense, is much like the high portions of audio; they travel to your picture tube along the 'edges' of the receiver's IF bandwidth and are apt to be lost when the receiver IF bandwidth narrows up so much that they can't make it past the last few receiver stages to the picture tube.

However, while most everyone can detect the loss of color or a reduction in color, not as many apparently know how to look at a picture and see a loss in picture 'detail.' Picture detail can also be called crispness. It is that difficult to pin down parameter that separates a 'studio/network monitor' quality picture from a 'home reception/rabbit ear antenna' quality picture. An extremely narrow IF bandwidth will pass a picture that you can watch, but the picture will have a 'smeared' or washed out appearance. **You can smear a picture on purpose** by making the IF bandwidth too narrow, or you can use about ten cents worth of parts in the video amplifier to do the same thing. Some of today's satellite receivers smear the picture on purpose. Why would somebody do that? Well, if you 'smear it' the smear causes the **sharp** black and white sparklies to 'blend' into the background. You are trading off a loss of picture crispness and detail for an apparent reduction in sparklies. It is a cheap ten cent fix to a problem which the receiver designer should have tackled in the front end where the sparkle level is established, by the threshold performance of the receiver.

Listening to people wandering about the Omaha aisleways it was amusing and even upsetting to listen to reactions to different pictures. You can spot a neophyte very quickly; they immediately tag a smeared, **no sparkle** picture as 'good,' and a crisp picture with some sparklies as 'not so good.'

Long before the most recent interest in receiver video quality surfaced, Clyde Washburn of Earth Terminals was preaching wide bandwidth IF's and high video quality. One of the mainstays of Earth Terminal advertising for some months now has been a waveform monitor photograph displaying something called VITS Sin² Pulse. I'm sure Clyde includes this color display in Earth Terminal advertising because he wants that one person in 100 in the industry who knows what VITS Sin² Pulse measurement is to be aware that the video coming out of an Earth Terminal receiver is of wide band quality.

Way back in the beginning of this we noted that there are two factors affecting receiver performance; the signal level of the satellite, and the transmission parameters of the signal being transmitted.

The FCC (and other national and international regulatory bodies) largely ignore the enforcement of 'recommended' transmission parameters. To be sure, they do suggest transmission characteristics to the providers of satellite transmission services, but nobody at the Commission is really sure they have the legal right to insist on strict adherence to these parameters. Furthermore, they know for a fact that they do not have the money nor the manpower to monitor satellite transmissions for adherence to their suggested parameters. So we end up with no-two-alike transmissions.

One of the most annoying differences one finds is the bandwidth of the transmitted video. In the rules, transmissions are to be limited to a 36 MHz uplink bandwidth. That means that 99.9% or so of the information transmitted by the uplink station shall be confined to, or kept within, a band that is 36 MHz wide. The FCC has this 'rule' because they don't want SPOTLIGHT on TR4 transmitting such a wide signal that some of their transmission leaks into the adjacent channels used by PTL (TR2) and WTBS (TR6). But there is a big difference between specifying how 'wide' a signal can be, and how narrow it can be.

specifying how wide a signal can be, and how narrow it can be. Most uplink transmitters adjust their bandwidth with an up-front modulation / deviation control. Virtually anyone with access to the uplink station can twist on that knob and the bandwidth of the transmission will change accordingly. There is a meter on the front of the transmitter which corresponds to that control, and it is a simple matter to look at the meter and read out the bandwidth being used as you twist on the knob.

Way back when TVRO receivers were being first offered to cable firms, somebody figured out that if you narrow up the IF of the receiver just a little (from the recommended 36 MHz bandwidth that cor-

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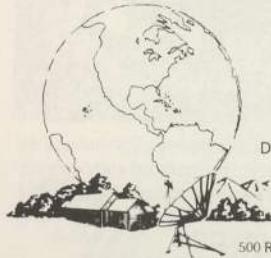
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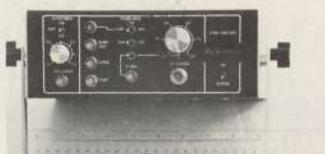
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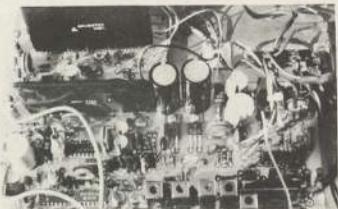
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ponds to the maximum bandwidth a transmitter is supposed to occupy), the receiver's performance could be improved. That began the 'if a little narrower is good' then 'a little more narrow is better' race that typified the CAVT TVRO field in the years 1977, 78 and 79. After reducing receiver IF bandwidths to as low as 22 MHz, most of the cable receivers ended up in the 30 MHz wide IF region where they are found today. Like most things in life, they had to go 'too far' before they realized they had passed the point of optimized performance, and come back a ways.

Through all of this the hapless uplink operators wondered just how wide **they** should set their own transmitters. In the middle of the night during February of 1978 PTL ran a series of tests with several of the receiver manufacturers. The receiver people stacked up their receivers with varying amounts of bandwidth; from 36 down to 20 MHz. Then PTL cranked up and down, with a color bar pattern modulating their transmitter, on the bandwidth. Several of the 'name' receiver manufacturers sat in their respective labs and evaluated the real world performance of each receiver with varying amounts of transmission bandwidth. No two engineers participating could agree on the results obtained and PTL went back to a nominal 36 MHz uplink bandwidth, and the receiver engineers went back to playing with receiver bandwidths again.

Today, in the home field, there are two schools of engineering thought; make the receiver IF bandwidth as narrow as you can without sacrificing video quality. Or, design for maximum video fidelity and toss the sparkle elimination problem squarely back in the hands of the installer.

The guys that are selling reduced bandwidth receivers accept the fact that the typical installer is going to try to squeeze by with the smallest antenna he can install, and still have performance which the customer will buy. The guys espousing maximum video bandwidth are telling the installer 'you may have to go to a larger antenna to get rid of the sparkles, but when you do this you will have a picture with definition that will knock your eyes out!'

The fact is that given present known technology, you cannot have high definition, superb detail video with a wide bandwidth unless you have more signal to the receiver to make up for the wider bandwidth. And you only get that crisp, high detail picture when you make full use of **all** of the transmitted bandwidth.

Yes, the transmitted bandwidth varies from transponder to transponder. For many years HBO (and then Showtime) were the perfectionists in this field, taking great care to transmit a full 36 MHz wide signal all of the time. You can spot those that use less than a full 36 MHz bandwidth by tuning through the channels with a receiver that is known to be less than 36 MHz wide (an AVCOM, for example) and carefully watching the signal level meter and the picture tube. If the picture looks unusually good, but the signal level meter reads lower than other nearby transponders, chances are you have landed on a transponder that does not use the full bandwidth. The meter reads lower than you think it should (based upon picture quality) because not all of the transponder is being used. The picture looks unusually good because the bandwidth of the transmitted signal 'fits' into the narrowed-up bandwidth of your narrower-than-36 receiver.

When Barker and Grotzky were here, we did some comparative testing between the 28 MHz wide and the 36 MHz wide Arunta receivers, and the new SkyEye 4. All three receivers use the new saw filters in the IF. The advantage of the saw filter is it has almost perfect filtering characteristics. You can design it to be as wide, or narrow as you wish, and there is no tuning of the filters. They snap or plug into the receiver and 'bingo' the receiver has the bandwidth of the filter. Most or all other filters have three or more adjustments which the alignment technician has to tweek on to get right. This means that with traditional IF systems, no two receiver IF's are totally alike since the technician doing the alignment has multiple adjustments to make and he never makes them in exactly the same way twice. Saw filters are widely used in some TV receivers, high dollar CATV processors and modulators. The recent price drop for saw filters (to under \$10 each in quantity) made them affordable for TVRO receivers.

You can tell when a signal occupies more 'space' than the IF affords to it; the edges of a color bar pattern tend to smear between colors. And letters supered over moving or static video have 'soft'

rather than 'sharp' edges. In effect, the picture has low definition.

The Arunta Interceptor with the 36 MHz wide IF had outstanding color transition (edge) definition. This was easily the best looking video I had ever seen here in the Turks and Caicos Islands. There is a qualification to that; none of our signals are strong enough that we could eliminate the last of the salt and pepper (sparklies). We came close on some of the F4 signals, but not quite, there. The 28 MHz wide IF took care of the sparklies, and the video was still good. But you could see the reduced bandwidth when you compared the two receivers side by side on identical monitors.

The KLM SkyEye 4 also did an excellent job. In fact, it had fewer sparklies than either of the Arunta receivers, with only slightly less color-edge definition than the 28 MHz Arunta. Of the three receivers compared, it had the best consumer level picture and it came nearest to matching the sensitivity of the AVCOM / Washburn receivers we use daily here.

The TVRO receiver marketplace is in a bit of a turmoil right now, and the intelligent dealer will do well to pay more attention to knowing and understanding the difference between a receiver that produces sparkle free but degraded video, and a receiver that produces high definition video picture (although it may require a larger antenna or better LNA to eliminate the last of the sparklies). Many, probably most, of your customers will be pleased with the former quality. Some, a few perhaps, will opt for the extremely high definition only possible with a carefully designed, full-transponder-width receiver. Any customer who wants to watch his satellite video on a large screen, projection television receiver will appreciate the difference between a 'narrowed-IF / optimized' receiver designed for sparkle elimination, and a receiver designed to display the full range of the wideband FM video being transmitted. But the customer will only have the opportunity to enjoy that added advantage if the dealer knows it is available, and points out the 'optional' benefits available with a step-up receiver system.

BOMAN In The Buff

There is an interview piece in this issue which I approached with considerable trepidation. I titled the piece 'The TVRO Industry / One Year After Boman.'

Boman is presently one of our largest advertisers. In almost any magazine in the world today, that would signal some special consideration for Boman, from the publisher. Those who know me at all know that I am not influenced by advertising; or a lack thereof. In fact, in our past August issue I reported on a problem which a TVRO dealer alleged he had had with Boman advertising, in CSD. I came down hard on Boman for what I perceived to be slippery advertising practices.

Boman's point man is Bob Maniaci; corporate President. He reports to someone named Boman. Maniaci admits in the interview appearing in this issue that Boman has made some mistakes. One of the mistakes they did **not make**, Bob feels, is entering the TVRO selling world. He is about as 'high' or positive on this industry as anyone can be.

Boman has riled many of the old line innovators in the field. They have freely (as Maniaci admits) copied products. In particular, their automatic polarization control system raised a real stink in Omaha at the SPACE show because it was priced approximately \$90 (at distributor quantity) **lower than** the Polarotor from Chaparral. I have never seen Taylor Howard as mad as I saw him in Omaha. Bob Taggart was not mad; he was livid. Both complained to me that not only had Boman lifted their product design, but Boman also lifted a photograph of the Chaparral Polarotor to use in Boman literature describing their version of this product. I'll let Chaparral and Boman sort that one out, in or out of court as my be appropriate. Maniaci explains how the mis-use of the photo may have occurred, if indeed it did, in the interview. But that is all smoke. The real bottom line in this issue is, as Maniaci explains in the interview, the question of fair profit. Maniaci claims Boman can produce a standard scalar type feed (the kind Chaparral sells) for under \$5 each; including the shipping carton. He also claims Boman can make the fancier automated version for around \$28 each; which Boman now sells to distributors for as low as \$49.50. Bob Maniaci believes Boman is getting a bad rap from industry suppliers whom they compete with because (as Maniaci states) "they have been caught with their hand in the cookie jar."



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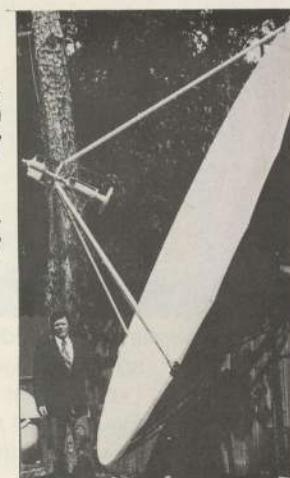
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I wanted the Boman interview to explore Boman's reflections on the growth of the industry, and the growth of Boman, during the six months they have been shipping into the industry. Boman first appeared at the Anaheim SBOC show last November. They did not begin shipping until this past February. Each month the latest Boman advertisement sends shivers up and down the back of competitors. I could probably pick up an extra thou a month if I cared (or dared) to reveal Boman's "next month advertised pricing" in advance, to their competitors. Even having a two week lead on the appearance of Boman's latest price cuts would give some of their competitors time to adjust. I'm not that hungry, or unethical, or stupid to engage in such a practice. In fact, now I make it a practice to have someone cover up the prices in Boman's ad before I review it for content. I really don't want to know what they are until the magazine is off the presses. It is much easier to deal with my industry friends in that interim two weeks between paste up, and mailing, if I can say "Hey, I don't know what the prices are!".

Boman is shaking things up. The industry will survive, and Boman may well become a dominant leader in this field. Those who stand off to the side urinating on Boman are doing nothing creative except perhaps emptying their bladders. Boman is not, I suggest, just another bunch of guys promising to shake up an industry. They are a bunch of guys who are yanking and tearing at the young, not yet well established roots of this industry. They intend to see that their own roots go down deeply enough that the next plateau of entrants into the industry don't do the same thing to them that they are doing to those who preceded Boman into the field. I think we'll all remember Boman for many years to come, regardless of what happens in the next 12 months.

A fair amount of my discussion with Bob Maniaci was 'off the record'; because he shared with me details of their next two product development levels. The first level will be on display, with plenty of fanfare, in Atlanta late this month at the STTI show. But that is getting ahead of the story, and into the interview proper. If you want to start off your month wondering how you may be coping with your particular segment of the business in 1983, turn now to page 19 here and see what makes Bob Maniaci and Boman 'run.'

SEE THE FUTURE and Gag

I really detest people who stand before some type of forum and bore you with their prognostications of how the future will be. I guess I have trouble with forecasting the future because I am too busy living and coping with the present. I do admit a weakness for the past, especially when I believe I see some instruction there for what may happen again in the future.

I therefore take with a grain of salt somebody telling me that by 2000 (or whenever) "every home in America will have a small dish on it, pointed to the great data bank in the sky." Good grief; every home does not have a radio, or television, or a telephone, or running water!

But I do like to steer Taylor Howard into a conversation about his perception of the future world, with dozens of in-view operating satellites, because he has that unique background of being both a scientist and an educator. I especially like Taylor's pointed comment that everything we are doing today, all of the battles we are involved in today, and the insurmountable problems we face today won't amount to a hill of beans (or a line in a history book) twenty years from now.

Taylor is dead right.

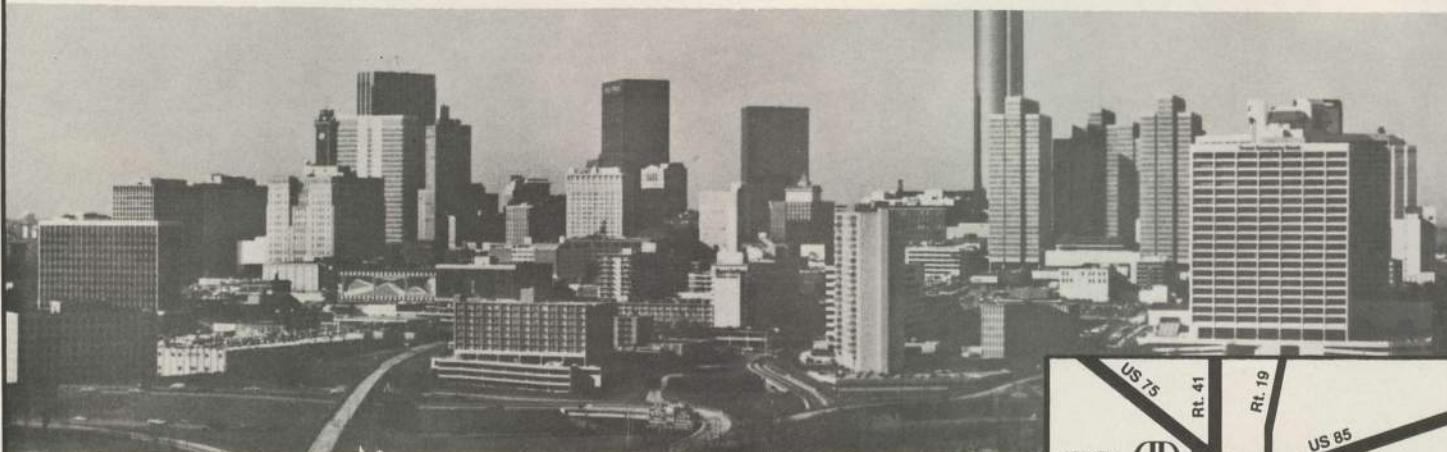
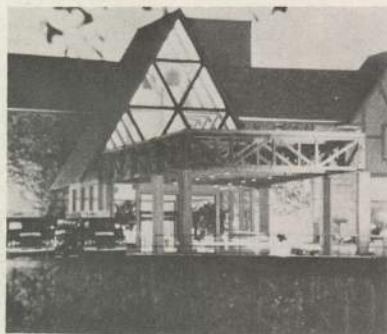
His point is that regardless of how universal satellite to home delivery (or two-way satellite to home / home to satellite) services may become, the world as we now know it will be radically altered by the revolution we are all now experiencing. None of us can say with anything more than imagined accuracy just how our world will be changed. All of us can say that it will be changed; substantially.

The only uncertainty remaining is the degree of change, or alteration, that satellites will ultimately contribute to the generations that follow us.

I calculate that I may be around another 31 years or so; provided I am not the victim of one of the frequent Fort Lauderdale to Provo (or reverse) D/H-18 plane flights that I ride at least monthly. Just when I think 31 years is quite a spell, I recall exactly what I was doing, and what the stage of television broadcasting was 31 years back. It was

ANNOUNCING . . .

the TVRO Event of 1982



THE SATELLITE INTERNATIONAL BUSINESS CONFERENCE

Atlanta, Georgia — October 29, 30 and 31

BY POPULAR DEMAND from both registrants and exhibitors, the Ninth Satellite Television Technology Seminar / Trade Show will be held at the Dunfey-Atlanta Hotel in **Atlanta**, Georgia, on October 29, 30 and 31, 1982.

JUST AS YOU SAW at the STT Trade Show in Fort Worth in March, the **Atlanta** event (abbreviated to "SIBCO") will once again bring to one meeting place all of the leading TVRO manufacturers, distributors and dealers plus hundreds of earnest, eager businessmen wanting to enter this vital, growing business. You will see 100-plus exhibits of all the latest TVRO equipment, 60-plus satellite antennas of every description.

IN ADDITION, there will be three days of hard-hitting private terminal training for newcomers to this field. Once again, TVRO industry leader and Coop's Satellite Digest publisher, **Bob Cooper, Jr.**, will be master-of-ceremonies and director of seminar training. Lecture attendees will again receive the STT "Gold Seal" Certificate of Educational Achievement for attending these sessions.

FOR FULL INFORMATION On exhibiting or attending this outstanding STT satellite system event, contact Rick Schneringer at STT, P. O. Box G, Arcadia, OK 73007. Telephone 1-800-654-9276. (in Oklahoma, call 405/396-2574)



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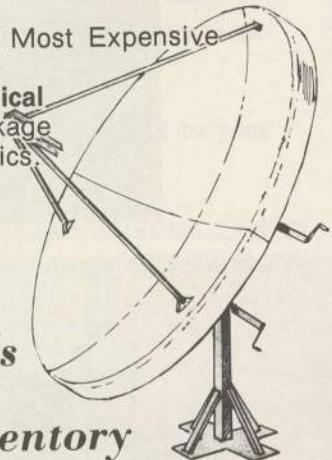
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just 31 years ago now that AT&T connected the west coast of America to the east coast, with **terrestrial** microwave relay. It was just 31 years ago now that San Francisco and Los Angeles got 'plugged into' the east coast (largely New York City based) 'television grid.' That **connection** probably was every bit as important to the development of America, in the years that followed, as was the driving of the Golden Spike on the first railroad, to connect the two coasts almost precisely 100 years earlier. Both acts set into motion the next level of 'homogenizing' America.

If none of this makes any sense to you, you probably also cannot appreciate the impact worldwide satellite interconnection may have in the next 30 years. Or sooner, since we seem to be living in a speeded up world these days.

So it probably is not important to worry about how, **precisely**, the world will change because satellites exist and affect us all. That will all sort itself out, a piece at a time, as the years unfold. But it is important to recognize that the roots of change are happening right now, at a furious pace. You are a part of one of the great evolutionary revolutions in the history of mankind. Know that, and respect the part you are playing in that revolution. The impact of what we are doing, each in our own small way, may ultimately even change the dietary habits of Papua New Guinea 'out back' natives. When they discover how big their world really is, through a village community satellite terminal, they will possibly stop eating their neighbor's arms. Of course it could go the other way just as easily.

Perhaps with inter-continental satellite hook ups some yet to be born cable-satellite channel will strive to beat out the 200 competitive channels available by staging the 'First Annual Papua New Guinea Arm Eating Contest.' If it catches on, major world networks, also yet to be born, will battle to acquire worldvision rights. Meat tenderizer firms will stand in line to buy up the 60 second spots at world dollar prices. The residual product rights would be huge; plastic model arms, T shirts portraying the winning 'mouth,' and the losing arm... the list is endless. And you have seen the future, and possibly gagged. Welcome to the 21st century!

THE CASE of 100 Degree LNAs

Along about the middle of August, or after the SPACE show in Omaha, a strange thing began to happen in the LNA marketplace. Numerous distributors found themselves selling more 100 degree LNAs than 120s. Now if the distributors reporting this were serving dealers in New England or off-shore, this might make **some** sense. But no, the distributors who found this happening were distributors who sell nationally, and there was a sudden increase in demand for 100s by users even in places like Oklahoma and Kansas (where, as one distributor quipped "A pie plate and a piece of chewing gum works!").

This has caused (up to press time) something of a shortage for 100 degree units, and some are now forecasting that the day of the 120 unit being 'standard' may be gone forever. Perhaps the reason for all of this is the narrowing of the price margin between a 100 and a 120. You can compare the current difference by looking at any of several ads in this issue. I'll tell you this; one way to narrow the margin between 120s and 100s even further is to **keep on buying** the 100s in preference to 120s!

At least that is the way it **should** work.

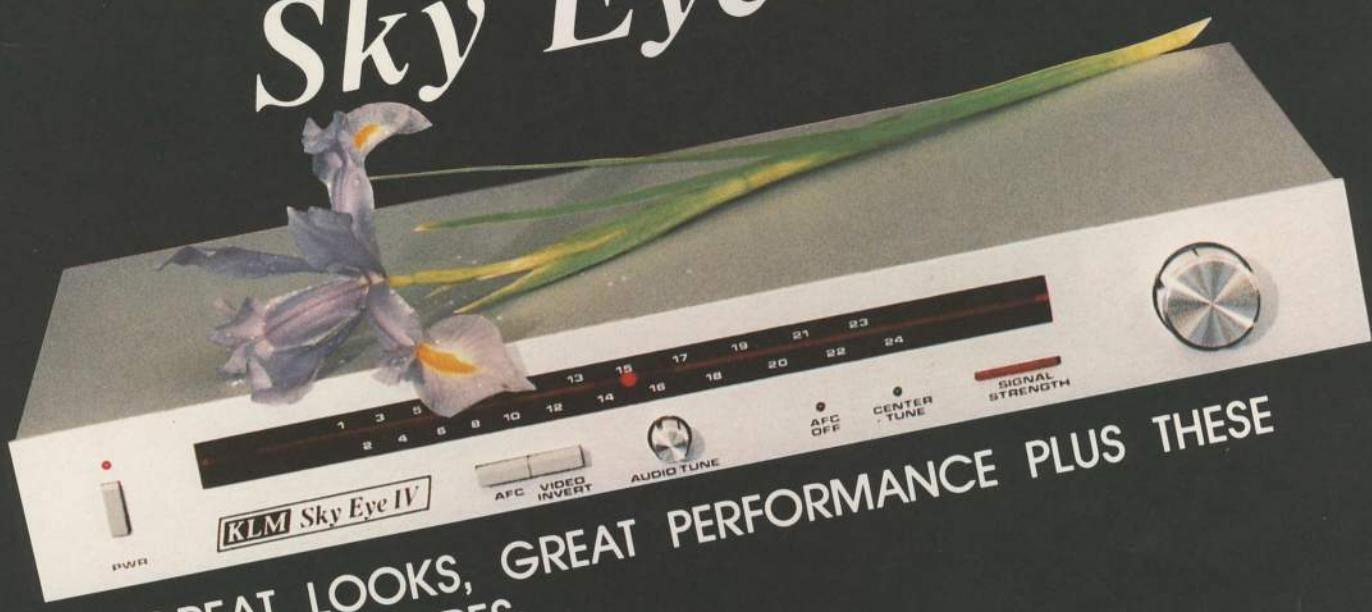
You can always tell when there is a high yield of 100 degree units, out of proportion to the 120s. You start **receiving** 100s when your **order** 120s. That also tells you that the sale on 120s is going pretty good and the supplies are running short.

There is something a little strange about a field where three 'boxes' roll down the production line to a final test station, and one of them checks out at 120, one at 100 and one at 90. After they are tested and stamped and put into boxes, they all go out the door at **different** prices. Yet they have the **same** parts in them, the **same** alignment time, and the **same costs**. It is like Chevrolet waiting until they started the engine at the end of the production line before they stamped "Impala," "Malibu" or "Corvette" on the nameplate! You can imagine how long the American public would put up with that nonsense.

So keep on buying those 100s and pretty soon the manufacturers will have warehouses filled with 120s. It will be interesting to see if they decide to recycle them as "Biscaynes" (remember the Biscayne???) or simply come back with a huge price cut on 'old style 120's' for us.

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For superior value as well as lowest system cost, the choice is but one—the R2B! See your dealer today or write to us direct.

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IF bandwidth:	30 MHz for full fidelity video
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