COOP'S SATELLITE DIGEST

NOVEMBER 1982

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TOP OF THE MONTH

REFINING our technology. That's a good portion of this issue of **CSD,** which is being prepared prior to the STTI meeting being held late in October in Atlanta.

The art of taking satellite delivered signals and 'sharing them' with two or more homes, is a big topic these days. We'll be looking at the 'sharing' technology, as it relates to **private** homes, in an early issue. In this issue, we dwell on the science and black art of taking one or more satellite signals out of the sky, and 'sharing' them with a community.

For many readers, located in the USA and Canada, this will have no direct, **'local,'** application. However, our mail of late has come from dozens of North American folks who are working 'deals' in far away places. What you can't use, as technology, at home you may well be able to use in Tim-Buk-Tou!

JUST when we thought audio systems were 'mature' we find out that there are transmission techniques in use on Intelsat (and we suspect, before long, some South American domestic) birds which don't fit our 'tunable' audio systems. We look at that problem in this issue as well.

IF you are reading this prior to Atlanta, congratulate your mail person. If it arrived after you left, well, we did our part and tried to get it out early!

NOVEMBER 1982

COOP'S SATELLITE DIGEST

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COOP'S SATELLITE COMMENT

- IMMORAL TELEVISION
- PUBLISH WHAT I SAY . . . not what I said!
- DIRECTORY FINALE

RETRANSMITTING VIDEO

A couple of years ago, immediately after the Coopers moved bag, baggage and dishes to the Turks and Caicos Islands, I began a **CSD** series detailing the trials and tribulations of bringing first-time television to a previously unserved region of the world. Apparently this subject wore thin with many (I hesitate to say most) readers in fairly short order so I retired our living memoirs to a back burner and shut my mouth about making a system like this play. I think I have been quiet long enough for one stretch, so this month we are re-visiting the subject. We have really learned a great deal, and since what we are doing daily is still not being done very many places, I think the subject is important enough to visit every couple of years or so.

We have made some bad mistakes. In a moment when I let my guard down, at the Anaheim STTI show last November, someone in the audience asked me how much money we had spent bringing first time television to the Turks and Caicos islands. I whipped out an off the cuff number which had six numbers left of the decimal, and somebody else asked me how in the world I could stand up there and tell people it could be done for $7500 when it was obvious that we had spent far more.

A good question. The answer is that somebody, us in this case, has made every mistake you or anyone else is likely to make, before you. And had we known prior to starting what we now know, we would have been able to do it for about 5% of what we actually did spend.

I want the material appearing in the regular feature section here to be as accurate and non-emotional as possible. Unfortunately it is difficult to write about this subject, which I and the family have lived day in and day out for over two years now, without some emotion. So I am going to try to vent my emotions in this spot in **CSD** and thereby allow me to write with fewer emotions in the feature report.

This is a funny, little country. There are no more than 8,000 people in the entire country; a medium sized county seat in Iowa would dwarf us. Way back when, or before there was a recorded history in the Turks and Caicos, these islands were occupied by an obscure 'Indian' tribe that must have been forced here by an ill wind. Some modern historians have recently claimed that Christopher Columbus first spied North America (continental) land about ten miles from where I write this. There is considerable evidence to back that up, other claims for the Bahamas and Hispaniola not withstanding. I do know that many serious students of such things believe the Pinta, one of Chris's three ships, lies in about 40 feet of water 15 miles from me. They have hauled up canons and planks and ballast from the site and the hauler-uppers have made the **Today Show** and **Time Magazine** with their claim.

Columbus or no Columbus, the Turks and Caicos were a haven for Caribbean pirates in the 17th and 18th centuries. Every now and again somebody stumbles across a 300 year old coin on our beaches, and local legends abound describing buried pirate treasures. None of this explains how until 1968 or so there were no white folks on **our** island, and no more than 600 or so non-whites.

The Turks and Caicos have belonged, or been under the wing of, Jamaica, the Bahamas, and Bermuda in recent centuries. The Bermudian folks did the most **for** these islands, or **to** them. They came here in the early and mid 1800's and developed a local 'salt industry.' You do this, or did then, by opening up some levees so that sea water could flow into low lying marsh areas. Then when the marsh areas fill up with sea water, you close up the levee and wait for the abundant sun to evaporate out the water. That leaves the salt behind, which people then proceed to 'rake up' into piles and eventually transport to the world's salt markets. This was a labor intensive industry, and the white Bermudian folks found ample local black labor. Which, since no North American Indians were black, raises the question of how and when the local natives arrived here.

There are two stories that bear repeating here. One suggests that during the 1700's and 1800's, when slave trading ships were plying the routes between Africa and North America, they made a regular route up the Caribbean slave expressway. That took them right past this set of islands. And this set of islands were, largely, empty of anyone. We are **told** that ship captains knew, as they passed this 'expressway exit,' that they were finally nearing their destination. And this was their last chance to 'weed out' the sick, the old and the infirmed. The story is that those who did not measure up were tossed **over board** as they passed by the Turks and Caicos. If the story is true, a few of them apparently had sufficient strength left to swim ashore and start all over.

The second story, or theory, tells us that during the American civil war, a number (not a large number, but certainly a few dozen) southern US planters, aware that their life style was crumbling about them, packed up their families and belongings **and some of their slaves,** and headed for unchartered waters. They came here, we are told, and tried to re-establish cotton plantations. They should have checked with the USDA before they left Savannah. Most of these islands receive no more than 30 inches of rainfall per year, and some years the annual take is far lower. The islands have a coral base, which means that natural, humus soil, is very scarce. What soil as there is has a very alkaline base and cotton is not a top notch performer in soil

ONE OF THE 'virgin' things we have done is to turn a sandy, coral beachfront location into a small oasis. Papaya, citrus and Avocado trees have been begun and are under the watchful eye (and watering hose) **of Susan Cooper.**

that is as alkaline as ours is.

There is still considerable wild cotton growing here and there. It has apparently been propagating itself for a century or more. I doubt that the yield ever came within 10% of what the southern plantation owners experienced in Georgia, or wherever, and privately I suspect that there may have been no more than a handful of such ventures. Still, it does help explain how black Africans **may have** ended up here.

Out of the trade loop, except for salt, the Turks and Caicos were largely ignored by the world until the 1960's. Then the US needed a down-range missile and satellite tracking station and one was built on the capitol island of Grand Turk. It is still there, but now it is owned and run by RCA and since low elevation manned flights are passeé, the scope of the installation has changed considerably.

The Mercury program brought short lived attention to the islands, and at about the same time the UK was shucking itself of responsibility (and the expense) for many of its overseas posts. The T and C was one of those posts. The Bahamas and Jamaica became independent, and Bermuda had long before discovered how to take care of itself. That left the Turks and Caicos as a last outpost of UK interest. The UK saw absolutely no strategic value here, no local economy developing which could help the dwindling world value of the pound, and looked for a graceful way to get out from under the $11M or so per year (US) which it was costing them to administer this place. This sent them in the direction of developing a local government system by which natives here elect an 11 man legislature. The legislature makes the laws, and runs the bureaucracy. The UK still provides a token bit of manpower (a figurehead Governor, direct management of the police and a few others including a roving court system). What the UK did **not do** was to create any way for the people here to support themselves.

The island of Providenciales, where the Coopers live, is the western most populated island in the Turks and Caicos. We are some 70 miles west of Grand Turk, the capitol, and about 650 miles E/SE (a 120 degree heading) from Miami. Provo was to the Turks and Caicos what Alaska was to the USA; there, not forgotten, but seldom visited or tended to. That left a void which two types of entrepreneurs slowly moved in to fill.

The first guys in here came ashore with a converted World War Two landing craft. They pulled up on a beach a couple of miles from where WIV now sits, lowered the front of the landing craft on the white sand, and drove a 1968 version of the D8 Caterpillar off onto the sand. Waving bottles of rum and trinkets for the natives, this first-ever motor driven land vehicle cut in-land from the beach and headed for a low, semi-flat area to carve out a landing strip. Within a few weeks the first rickety aircraft landed on Provo bringing in the first canned goods, battery operated radios, hand tools and liquor the natives had ever seen. Life would never be quite the same again. And that was but 14 years ago.

These same first guys then proceeded to talk the government into allowing them to swap government owned land for the construction of an infastructure here. That means government gave up 'Crown Land' in exchange for this group building roads, putting in a power plant, building docks and otherwise creating 'civilization.' To do all of this, they hired local labor, paid the labor with US currency money and immediately changed the way people lived. Up to that time, they fished and had gardens and took to the open sea to trade goods with Haiti and the Dominican Republic. Few of them went to school (there were none here, although Grand Turk had two) and most young men who reached 20 or so left Providenciales for the Bahamas or the states to work.

Having 'acquired' large tracts of very desirable land for their services, the American landing party then proceeded to do two things. **First** they opened stores so that the local natives had a place to spend the money they were being paid. That is called working both sides of the street. You pay a man $1.00 an hour to shovel dirt, and then you build a store to sell him canned milk and corn for $2.00 a can. The guy works so hard for his dollar per hour that he can't fish or garden anymore, so he goes to **your** store to buy **your** canned milk and corn. That takes most of what you paid him, so he has become a modern day slave of a different sort.

While the first-here were engaging in this activity, they were also bounding about the US selling or trying to sell their newly created beachfront and hillside properties. The prices were far lower than the Bahamas, but then they should have been since it was almost impossible to get here after you bought your property. In time a couple of dozen Americans and Canadians did buy property and build homes here. Those homes were so dramatically different than the local native homes that it quickly became apparent to the natives that canned corn and canned milk was not the best thing that might someday happen to them.

So much for the first group to move in here. The second group made the first group look like pikers. Because there was virtually no way to get here on a routine basis, and because the islands were strategically placed for 'exchanging goods' before a final three or four hour dash to South Florida, the drug folks discovered Provo and the neighboring islands. And they brought an entirely new culture here. They would leave Colombia loaded with tons of Marijuana or a few hundred pounds of Cocaine or who knows what, and show up on one of our dirt strips about dusk. Here they would meet up with several smaller planes, and they would 'barter' for fresh fuel. Their cargos would be split up into smaller final-leg shipments, and off the smaller planes would go barely skimming over the wavetops heading for unmarked and unmanned strips in South Florida. There was, in the early 70's, an 'Army' of them. To get fuel for their planes, they first simply pulled up on the local strips and bought gas. The small British security force soon got word of this and a game of cat and mouse, and bribery, set in. The British could not be bribed. The natives usually could. And that is not to fault the natives; they didn't have any reason to even understand what the stuff being transported was, and they certainly did not initially know what it did to people. All they knew was that for $5000 they had to work two hours hauling 50 gallon drums of fuel to a small, deserted dirt strip. **That would buy alot of canned corn and canned milk.**

It took about five years for this to finally play itself out and today, with the cooperation of the US Drug Enforcement Agency, we have fewer drug problems than most US towns; including county seats in Iowa. Yes, every now and again, some idiot pulls up at the local airport gas pump with a load of Marijuana and asks for a fill up. But now all planes are inspected, and when they find a plane with even a twig of the stuff, the plane is confiscated and the people on board hauled up to jail. The government as recently as three years ago was confiscating a half dozen planes a year that way, and then selling the planes at auction. Our favorite air charter pilot, Ed Hegner, bought two such planes at a government auction and still uses them for flights to the states and around this part of the Caribbean.

So by the time we moved here, all of the land and narcotic action was past (although recent) history. We came in the 'third wave.' Those are people who have come here to open drug stores and dry cleaning shops and hardware stores and photo supply businesses.

In the 14 years since the first guys hauled themselves on shore with a D8 and began cutting a road through the brush and sand, until now, this whole island has changed rather dramatically. People who never heard a radio, saw a newspaper, wore store bought clothing or drank canned milk now shop in super markets, drive fancy cars, send

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LETTER FROM ARTHUR C. CLARKE ('2010: Odyssey II')

ARTHUR C. CLARKE. The man who conceived the geostationary satellite system. In his now famous **Wireless World** magazine article appearing in 1945, Clarke created the technical foundation for today's satellite television explosion. **CSD** reprinted that famous **Wireless World** article in its inaugural issue; October 1979. Appearing on the front cover of that same issue was Arthur Clarke. We hear from Clarke every now and again, and as a devoted reader of **CSD** he has kept up with the expansion of our industry from that first issue of CSD.

Recently Clarke was presented with the Marconi Award, the most prestigious award in the electronics world. He traveled from his home in Sri Lanka to Holland to participate in the awards ceremony, and then traveled on through Europe to Russia where he was the guest of many of the legendary Russian Cosmonauts. Because of his stature in the scientific world, Clarke was accorded a detailed tour of Russian space facilities and even allowed to capture on film many of the sights.

The latest Arthur C. Clarke book is entitled **'2010: Space Odyssey II.'** It is currently being serialized in abbreviated form in **PLAYBOY,** and the full publication is due out shortly. Clarke is scheduled to appear on the US **'TODAY SHOW'** program on or about November 15th to talk of his adventures with space technology, and his new book.

Here, for Coop and **CSD** readers, Arthur C. Clarke has 'serialized' his receipt of the Marconi Award as well as his subsequent journey into the often hidden world of Russian space activity.

REPORT ON HAGUE-MOSCOW-LENINGRAD TRIP

After flying KLM to Amsterdam June 8/9, I was met by my hosts from Philips and taken to the Hotel des Indes in the Hague — which apart from its canals reminded me of Kensington. Here I was greeted by Mrs. Gioia **Marconi** Braga (Marconi's daughter, and instigator of the Award) and her husband George, as well as Dr. Walter Orr Roberts, current secretary of the Fellowship.

On the 10th, after several press conferences, there was lunch at the Italian Embassy (present H.E. and wife, the British and Sri Lankan Ambassadors, the Bragas, and my host Dr. Pannenborg, Vice-Chairman of Philips). Then we paid a visit to the Frans Hals Museum, followed by a reception at the British Embassy, arranged to finish early so I could get a good night's sleep . . .

The Award ceremony took place on the 11th in the splendid Hall of the Knights. Philips had arranged a display of radio equipment dating back to Marconi and culminating in a large model of the latest communication satellite. They had installed a dish in the courtyard to received TV from a European satellite, and the well-known broadcaster Raymond Baxter greeted us from the Goonhilly Downs Earth Station, reminding us that Marconi conducted his famous Atlantic transmission not far from here (also that I was born a little way up the coast, at Minehead . . .).

There was a welcoming party (the Burgomaster of the Hague, the Chief of Cabinet, Mr Mili, Secretary General, International Telecommunications Union, Dr. Pannenborg) to meet H.R.H. Prince Claus, who presented me with the truly beautiful trophy; in my speech of thanks I made special mention of the French proposal for an International Monitoring Satellite for the preservation of peace **(UN Document A/AC 206/14 of 6 August 1981).** I hoped that Sri Lanka would support this project at the forthcoming UNISPACE 82 Conference in Vienna, where I would be one of the country's delegates and would also be delivering one of the four public lectures. I also added that I proposed to apply the $35,000 grant towards the Developing World Communications Centre which the government hopes to establish at the University of Moratuwa.

Then my old friend Professor Yash Pal (director of the historic Indian satellite instructional project, SITE, for which he won the Marconi Award in 1980, and now Secretary-General of UNISPACE 82) gave an address. One interesting idea he put forward was the suggestion that low-altitude (e.g. 2 hour period) satellites could provide cheap telex and similar services to equatorial countries, which need them even more urgently than the voice and TV provided at much greater expense by stationary comsats. When he complained that no-one took him seriously, I rallied to his support (even though 'Palsats' move in what **he** calls 'anti-Clarke orbits').

The day concluded with a lavish dinner at the Hotel des Indes; somewhat to my embarrassment, Philips had put up large notices saying MR. CLARKE KINDLY REQUESTS YOU TO REFRAIN FROM SMOKING, which were received with widespread but not unanimous approval. The main address was given by ITU Secretary Mr. Mili, who stressed the importance of the upcoming World Communication Year, 1983.

The following day (Saturday, 12 June) we all relaxed on a bus trip to the "Floriade," a superb display of trees, shrubs and flowers of every conceivable type, which takes place every ten years. And on Sunday, Simon Welfare and John Fairley (principal perpetrators of "Arthur C. Clarke's Mysterious World") arrived on an arm-twisting expedition from Yorkshire TV, whose results — if any — only time will reveal . . .

All this, hectic and enjoyable though it was, was a mere prelude to my USSR trip. After saying goodbye to the Bragas and my kind hosts in the Hague, I arrived at Moscow on the evening of the 14th, to be met by Counsellor Casie Chetty of the Sri Lanka Embassy and my friend and publisher Vasili Zaharchenko, Editor of **Tehnika Molodeji** magazine, Bitov, translator of my last two books, and my excellent guide and interpreter (**she** called herself 'slave-driver'), Svetlana Prokhorova. When I tactlessly announced that I'd lunched with the **other** Svetlana in New York some years ago, she replied cheerfully, "Oh, I'm named after her." Oleg had run into trouble translating **Rendezvous with Rama.** "What," he asked plaintively, "is a **blivet**? I can't find it in any dictionary." I explained it was the same as a gubbins.

Though it was now late evening there was still plenty of light (something I couldn't grow accustomed to after two decades near the Equator), so we made a quick trip to Red Square for the usual photos at Lenin's tomb. Then to the huge Ukrania Hotel, where I slept well and woke up to the good news that the Falklands war was over. (Throughout the trip, my trusty Sony ICF 7600 — always referred to as my 'spy radio' — was invaluable. Despite the amazing — shall we say? — electronic pollution occupying the Soviet ionosphere, I was usually able to get the BBC's English service, though sometimes it wasn't easy . . .).

June 15 was one of the most memorable days of my life. First, Vasili took me to the really stunning display of spacecraft at the **Moscow Space Park,** with the huge Vostok launcher mounted outside. Then, with Svetlana and our official photographer, we set off for Zvezdny Gorodok ("Stellar Village") about fifty kilometres from Moscow. Feeling that my camera was an embarrassment, I handed it over before we entered — only to be given it back just as soon as we were inside, so I was able to shoot everything I wanted . . .

I'd been disappointed to hear that my favorite cosmonaut, General Alexei Leonov (Apollo-Soyuz commander, and the first man to do a spacewalk) would be at Baikonur for the upcoming Soviet-French mission. So I was delighted when I saw him waiting, with TV

by
ARTHUR C. CLARKE
Colombo
Sri Lanka

camera crew, at the entrance to the administrative building. We greeted each other with bear-hugs and he introduced me to two other cosmonauts I'd met before — Vitaliy Sevastyanov and Valery Lyakov, whom I'd recently taken for a spin in my Hovercraft.

Alexei then took me to his Commanding Officer, General Beregovoy (Soyez 3 pilot), who gave me an interesting but somewhat unexpected lecture, illustrated by rapid sketches, on the deplorable things Man's doing to his environment. (Translating this put quite a strain on Svetlana, who claimed that she not only didn't know any science — she didn't like what she **did** know. Towards the end of the trip, however, she admitted that several of the scientists she'd met seemed quite human.)

Then Alexei led me to his office, and I handed over the various gifts I'd brought — tea, a teak and silver elephant, a set of BIS 'space ties,' UNDERWATER SAFARI tee-shirts. I also gave the Centre a copy of James Oberg's analysis of the Russian Space programme, **Red Star in Orbit,** which was soon being rapidly perused. In return, Alexei gave me the handsome new volume of paintings he has done with his fellow artist Andrei Sokolov, **Life Among Stars** (unfortunately I had no time to meet Sokolov, but talked to him briefly over the telephone).

Next we went to the Centre's cinema, where I was shown a deeply moving film "Our Yuri," which I was assured had never been screened elsewhere. It recorded every stage of Gagarin's training as well as his family life; from time to time young Alexei Leonov appeared on the screen, with other cosmonauts (some famous, some dropped from the programme, some dead . . .) and I wondered what memories it evoked in the much-decorated 48-year-old General sitting beside me.

Then, followed by the TV cameras, we visited the Soyuz-Salyut trainers (just vacated by the crew now waiting at Baikonur) and crawled inside for a series of on-the-spot interviews. Since the spacecraft were designed for weightless operation, it wasn't easy to negotiate some of the narrower sections. I was also inserted, with great hilarity, into an EVA suit and then filmed grinning inanely through the visor.

We then left the building and proceeded to the Gagarin memorial a few hundred metres away, where Cosmonaut Sevastyanov demonstrated that he was a very professional TV interviewer. We had almost finished, and Alexei was asking some pointed questions about **Odyssey Two** (we first met at the 1968 premiere of **2001** in Vienna) when the skies opened and we had to run for it.

The next stop was Gagarin's own office, exactly as he had left it, with the clock recording the time of his death. "I heard the crash," Alexei told me somberly. He added that the cause had never been conclusively determined; and gave me a memento I shall value as much as the inscribed copy of the autobiography Gagarin himself presented me in 1961 — a fragment of the jet trainer in which he was killed. Alexei also gave me another rarity — the handsome medal struck to commemorate the 20th anniversary of Gagarin's flight.

The last stop was at Alexei's own apartment, where his wife (another Svetlana!) had prepared a meal for us. I also met his engaging little parrot Lolita, who normally perches on his shoulder but occasionally orbits the room uttering shrill cries. And here, between

CORRESPONDENT CLARKE at Space Park, Moscow.

toasts, I revealed that most of the action in **2010: Odyssey Two** takes place aboard the spaceship **Cosmonaut Alexei Leonov.** This obviously delighted Alexei, and now most of the Soviet Union has heard, **via** TV, his ebullient reaction: "Then it must be a good ship!" (It is.)

I then took a deep breath, and asked **my** Svetlana to translate the next bit very carefully. It was my hope and belief, I said, that **Odyssey Two** — in which seven Russians and three Americans start off as acquaintances and end up as friends (or better) would help to improve understanding between the US and the USSR. But genuine understanding must be based on honesty, and I would be less than frank if I failed to warn him that there were some aspects of the book that would not be well received in the Soviet Union. In particular, the plasma propulsion system for **Leonov** was being invented right now, by Russia's most famous scientist, whose moving appeals for peace I greatly admired. He has plenty of time on his hands, being exiled in Gorky . . .

Alexei gave a wry smile, and we parted affectionately. Then we all drove back to Moscow for dinner at Counsellor Chetty's — and the midnight sleeper to Leningrad, where Vasili and I were ambushed in a bleary condition by TV cameras around 7 a.m., immediately as we stepped on to the platform. Among those waiting for us I was delighted to meet Yuri Artsutanov, inventor of the 'space elevator' (theme of **The Fountains of Paradise** — my very last book, as I'd been claiming ever since 1977). He seems a shy, modest person and I hope all the publicity (the cameras invaded his apartment when I was there) hasn't upset his life.

The two days in Leningrad (I now understand why it is called "The Venice of the North") passed incredibly swiftly. Highlights were: TV interview in the Gas Dynamics Laboratory museum, which has an historic display of USSR rocket engine development; showing my Sri Lanka colour slides to the local Writers' Union; a surprising chance meeting with an Oak Ridge nuclear physicist in the hotel restaurant; Czar Peter's little country estate, about the size of Versailles, with its famous gilded statues and fountains (inevitably referred to by my colleagues as "The Fountains of Paradise"); my excellent and cultured Intourist lady guide; broad daylight at 10 p.m.; and of course the Hermitage . . .

We spent only an hour there, which is probably about right for a first exposure to its two million plus exhibits. As I staggered out, reeling with culture shock, I coined a new passive verb, gleefully adopted by my entourage: **to be hermitaged!**

In Leningrad there occurred one of those trivial little incidents that do so much to determine a visitor's impressions of a new country. Wherever we went, people were always staring at our official limousine, doubtless wondering what big-wig was riding inside. I found this rather oppressive, so was delighted when a policeman stopped the car and bawled out the poor driver for no apparent reason. ("He's bored and wants something to do," explained my hosts. "Anyway, it proves we're a democracy." I gladly conceded their point — at **this** level, anyway.)

On the second day, there was time for a full hour's recording in the Leningrad TV studio, later broadcast nationwide, and then Vasili and I were once more on the midnight sleeper back to Moscow, for the final round of official visits.

Friday June 18 saw two important conferences — the first at INTERSPUTNIK with Director-General Yuri Krupin and his staff, the second with Deputy-Minister Zubarev and staff at the Ministry of Posts and Telecommunications. At each I carefully explained my somewhat anomalous position as a British citizen unofficially assisting Sri Lanka on a private visit arranged by my Russian publisher. I hope it made sense to them; it didn't always to me.

With both Comrades Krupin and Zubarev I left the prospectus for the Sri Lanka Communications Centre and asked for their support. I also mentioned my hope of seeing a serious discussion at UNISPACE of the French 'control satellite' proposal. As I expected, no great enthusiasm was evinced, and someone remarked cynically that perhaps the French wanted to sell the hardware. Unfortunately I didn't think of the right retort: "So what?"

That evening there was a meeting with about twenty science-fiction writers and editors at the Writers' Union; it was end-of-term and everyone was leaving for the summer holidays, so the place was in a festive mood. After I'd explained some of the problems they might have sanitizing **Odyssey Two,** we went to dinner and I managed to handle all the toasts with the one glass of wine which is my operational limit.

On the 19th, to my pleasure and surprise, the Director of the Institute of Space Research, Academician Sagdeyev, brought his top scientists in on a Saturday morning for a two-hour conference. I was particularly interested to meet N.S. Kardashev, author of some of the most fascinating speculations about super-civilizations, and said that I was sorry I'd not been able to make contact with the other best-known astronomer in this field, I.S. Shklovsky (co-author with Carl Sagan of the classic **Intelligent Life in the Universe**). However, I was solemnly informed that putting Nik and Loseph in the same room might result in a matter-antimatter explosion that could destroy Moscow.

Once again I plugged the Sri Lanka Communications Centre and the International Monitoring Satellite, adding that since both the US **and** the USSR seemed opposed to it, I thought it was probably a good idea. My reference to 'the gentleman in Gorky's' role in **Odyssey Two** also produced some wry smiles.

I was able to pass on a recent report from one of the Jet Propulsion Laboratory teams of inexplicably powerful radio emissions from a point source in Saturn's D-ring. This led to expressions of regret that JPL had now been forced to accept Defense Department contracts to continue its operations. I said I shared that regret — but it was only fair to point out that the Soviet Union's military space effort was **many times** that of the United States. (I've just looked up the figures — **ten** times that of the US in payload weight, or 300 tons per annum, of which at least 75% is purely military.) Perhaps it was just as well that I did not know — as some of my audience undoubtedly did — that at the very moment the USSR was engaged in an unprecedented salvo of missile tests — one SS20, one submarine launch, several ICBMs — **and** a satellite-killer . . .

Then I made a quick shopping trip with Svetlana, because my name would be mud if I didn't bring back **some** presents. I never had time to visit any foreign-exchange stores, for the ordinary shops seemed perfectly adequate, with surprisingly low prices.

The final item on Saturday was a meeting with Nina Kubatieva, who'd flown in from Novosibirsk to present me with her university thesis **The Science Fiction Novels of Arthur C. Clarke** (I wish I could read it; any publisher interested in a translation?). Earlier, I'd also had the pleasure of meeting Larisa Mihaylova, another long-time correspondent, who gave me **her** candidate thesis on British and American Science Fiction.

Sunday 20 June was my last day, and Vasili and Svetlana took me to the apartment of Academician Sergei Kapitza, famous son of Rutherford's **protege,** the legendary Peter Kapitza. Here we did a one hour TV recording for the twice-monthly series Professor Kapitza has been running for many years; except for the fact that he covers a much wider range of subjects, it would not be unfair to call him the Soviet Union's answer to Patrick Moore and Carl Sagan (indeed, he is planning a collaboration with Carl). I was particularly interested to learn that he held the country's #2 SCUBA license, and we reminisced about spots we'd both dived at along the Great Barrier Reef.

Incidentally, Academician Kapitza was the only Russian I met with no trace of accent; he could pass anywhere as a university-educated Englishman. But then, as he pointed out, he was born in Cambridge — so many Englishmen would consider that he certainly **does** have quite an accent . . .

When we got back to the hotel I was too exhausted to do anything but go to bed, and was drowsing off when there was a vigorous knocking on the door. Deciding that it was either a reporter, or the bearer of yet another autographed book to add to the two-metre high pile I'd already acquired (and would have to get the Sri Lankan embassy to ship back) I ignored it. Ditto a phone call, a few minutes later. Now I'm sorry, as someone was trying to tell me that one of my four or five TV programmes was on the air; still, I'm not sure I could have stayed awake.

My last evening in Moscow was spent checking my "Afterword" for a book of space-art that Vasili is editing; then I watched one of the finalists in the current Tschaikovsky competition while Svetlana (who disapproved of my 'pour-in-and-stir-well' technique) packed my bags. She also gave me a little poem she'd translated, whose sentiments I

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was now beginning to understand: —

You can't grasp Russia with your mind;
Accepted notions here will lead astray.
Its heart is of a certain kind;
Belief in Russia is the only way.

(Tyutchev)

With a twinkle in her eye, she also paid me her ultimate compliment: "You're not a bit like an Englishman."

Around midnight, we were just preparing to leave for the airport to catch the (ugh!) 0.300 Aeroflot flight to Sir Lanka when there was a delightful surprise — a call from Alexei Leonov, on his way to the launch site, bidding me 'bon voyage.' I said I hoped to see him some day in Sri Lanka, and sent my good wishes for the forthcoming mission (as I write this, I've just heard that the docking has been successful).

Svetlana, Vasili and Counsellor Chetty got me swiftly through the formalities at the magnificent (and at that ghastly hour almost empty) Sheremetyevo-2 airport. As before, Aeroflot was right on time; I was impressed by the good-natured way in which the stewardesses tolerated inflight baggage (dolls, knapsacks . . .) sometimes equal in volume to the people carrying it. I was lucky enough to get three seats abreast, and though it wasn't as comfortable as the Moscow-Leningrad sleeper I arrived in Colombo in pretty good shape . . . to confront approximately 200 pieces of mail, including the galleys of **Odyssey Two** — with an editorial request that all corrections be phoned to New York within 48 hours.

Life was back to normal, and it was hard to believe that the whole thing hadn't been a dream . . .

RECOVERING FUNNY AUDIO

180 kHz at 4 GHz

Most of the popular, often utlized video transponders transmit their audio to receive locations by 'marrying' the audio to the video signal as a sub-carrier. Let's see how this works.

Our standard satellite television format sends signals into space in the 6 GHz region; the uplink. Inside the satellite these incoming signals are 'mixed' to a new set of frequencies, in the 4 GHz region, amplified, and re-transmitted back to earth through a downlink transmit antenna.

The original video signal is a baseband signal, occupying a frequency range between 0 MHz and perhaps 4 MHz. This is the sort of type of signal which you could view by connecting it to a video 'monitor.' A monitor differs from a video receiver in that a receiver tunes in the initial frequency as a **radio frequency** (RF) **carrier,** while a monitor tunes in the **information** being carried **by** the radio frequency carrier. It can do this at two points in the chain from uplink to you; **before** the original video signal is 'married to' a radio frequency carrier, or, at the opposite end of the chain, **after** the radio frequency carrier has been received at the downlink, and the original video information extracted from the radio frequency carrier.

A standard television receiver combines the features of a radio frequency carrier receiver, **and,** a monitor. The radio frequency portion takes the signal out of the air and amplifies the signal, converting the radio frequency carrier to a lower frequency so that the modulation or video information can then be detected or extracted from the radio frequency carrier. You can convert, or change the frequency, just about as often as you wish, and the modulation or original base band information will stay right with the radio frequency carrier.

In the satellite television format, the transmission mode is FM or frequency modulation. This means that the radio frequency carrier is married to the video information by varying the frequency of the radio frequency carrier. In terrestrial television formats, the video is normally transmitted in an AM or amplitude modulation format. That means the amplitude or strength of portions of the signal (a sideband) are varied by the content of the modulation information (i.e. video).

A frequency modulated signal uses up more 'spectrum' or 'space' to transmit the same picture information than an amplitude modulated signal. However, for high quality transmission systems, FM has many advantages which offsets the wasteful use of spectrum.

Our satellite video and our satellite audio are all transmitted by FM. The video signal occupies approximately 50% of the width of a normal 36/40 MHz wide transponder. This leaves the remaining 50% or so of the transponder width to stick in one or more audio channels associated (or not associated) with the video being transmitted.

To more fully appreciate what is being done with the audio, it is imperative that we study the make-up of a baseband format. This would be the same format at either the uplink, before the baseband (raw video and raw audio) is married to the radio frequency carrier, or, at the downlink, after the receiver has received the 4 GHz downlink signal, converted that signal to a lower IF (such as 70 MHz), and finally demodulated or extracted the video and audio signal(s) from the radio frequency carrier.

There is a handy rule of thumb which can be used to study the way a baseband signal ends up modulating a radio-frequency carrier in the services of interest to us. Satellite engineers consider 36 MHz of a 40 MHz wide transponder useful. They look upon the remaining 4 MHz as a pair of two MHz wide 'guard bands,' at opposite ends of the 40 MHz wide transponder 'channel.' Guard bands are avoided to insure that there is not interference between transponders which are adjacent, in frequency or the spectrum, to one another. Now remember that with FM, it is the frequency which the baseband signal is modulating. That means, for ease of understanding **if not literally,** that it is the frequency of the radio frequency carrier which is shifted or moved about by the presence of the video (and audio) information. If our baseband video information occupies 4 MHz (0 to 4 MHz is the same as being 4 MHz 'wide'), and we have 36 MHz to modulate, in theory we could force the 4 MHz wide video to deviate or 'swing' the radio frequency carrier over a 36 MHz wide region. The ratio between 36 and 4 is '9.' However, we have other considerations to be concerned with, including leaving enough room to send along an audio carrier (or more than one audio carrier). Space in that 36 MHz wide channel must be 'saved' for the audio.

To save spectrum, it was determined that approximately 20 to 22 MHz of the 36 MHz wide channel would be adequate for video; and the balance would be reserved for the transmission of audio and other data. It was also determined that the most economical use of the original baseband spectrum would be in a region from 0 MHz to approximately 8 MHz. All of this worked out so that the center 20/22 MHz of a 36 MHz wide channel would be reserved for the video, while the outside edges of the transponder, another 14 to 16 MHz of transponder space, would be left for audio. It makes a little more sense if we diagram it, and if we do **not take** the previous explanation **too literally!**

The modulation process is akin to a multiplication process. We have a baseband spectrum from 0 to 8 MHz, and we have a final transponder width of 36 MHz. We have to make the 8 MHz baseband spectrum 'fill' the 36 MHz wide spectrum so we end up increasing the width of each part of the original 8 MHz wide spectrum by approximately 4.5 times. And to keep the video and audio separate, at both ends, we artibrarily assign a segment of the 0 to 8 MHz wide baseband spectrum to audio. We already know that the video is approximately 4 MHz wide, so that means that the audio will end up being above the 4 MHz width-point of the video.

Just as a full transponder requires a guard band between trans-

Videophile Satellite Television

The possibilities of component audio come to satellite video.

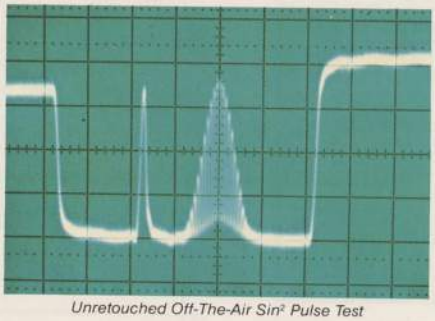
Component equipment has become popular in the audio field for a lot of reasons. One reason is that the component philosophy allows a purist to upgrade any piece of a system as technology advances without having to replace the entire system at once. This basic idea has ushered in an era of specialty firms dedicated to advancing the art of a single link in the chain. They succeed because all of their efforts are focused on one discipline, not thinly spread over an entire system. EARTH TERMINALS™ brings this philosophy to satellite television. We concentrate on the single most important, most difficult element—the microwave receiver. No other part of the system has such a dramatic effect on picture quality.

Quality You Can See

An EARTH TERMINALS receiver provides cleaner pictures with less granularity. Truer colors that don't smear. Less sparkling snow on weak programs. Complete absence of herringbones and waves. Superimposed lettering that doesn't tear at the edges. In fact, you haven't seen video this exciting unless you've been in a television studio. If you own a quality video projector, you'll be even more impressed.

Quality You Can Measure

Broadcast engineers are impressed with the accuracy of EARTH TERMINALS receivers too. Our VITS Sin² Pulse and video SNR test results are incomparable; actually the equal of most commercial grade receivers. We can also handle tough signals like Reuters data transmissions that give other receivers fits. It's no wonder then, that after exhaustive testing, some cable companies and television stations use EARTH TERMINALS receivers as their main source of satellite program material. They know value when they see it.



Unretouched Off-The-Air Sin² Pulse Test

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All this technical sophistication is really quite easy to get along with. Precise automatic fine tuning tunes every channel the same way every time. You don't have to be an expert to get perfect pictures. EARTH TERMINALS receivers come with a remote control that selects channels individually, adjusts audio volume at your convenience, and automatically signals the rest of your system to supply the proper antenna polarization through an even/odd channel switch. And it fits in the palm of your hand.

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There are plenty of satellite receivers that cost less than ours, but nearly all of them need bigger antennas and more exotic Low Noise Amplifiers for a picture free of sparkling snow. If you're on a budget, you can save money in other parts of the system by paying more for our receiver and come out even. You get high fidelity video in the bargain. If you're simply after the best picture money can buy, we can make it very affordable. Either way, give us a call or write us for the details.

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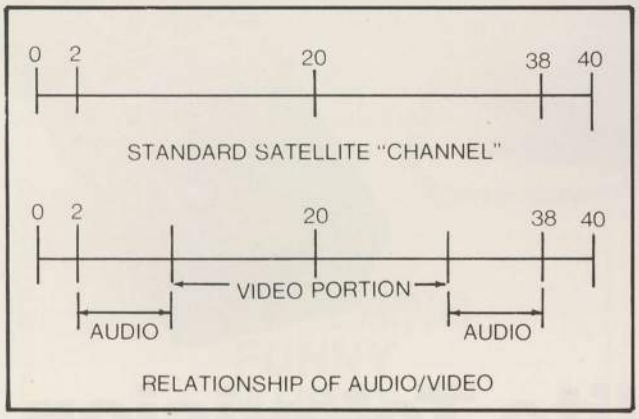
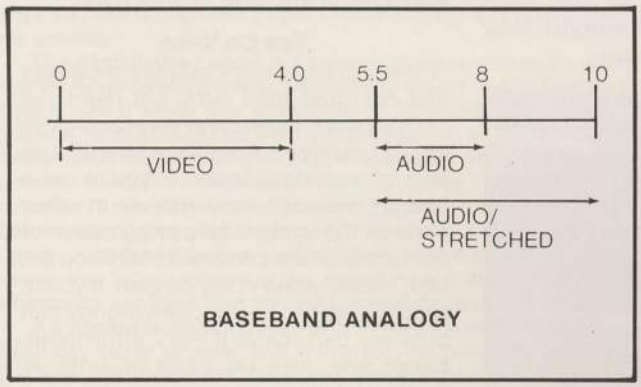
ponders, so too does a baseband 'transition' between the video information and the audio information. In this case our 'guard band' extends from approximately **4 MHz to approximately 5.5** MHz. That is designed to insure that video information does not 'crawl up' into the audio portion of the signal, and that the audio does not crawl 'down' into the video. Of the two 'crawls' it is the video going up which presents the biggest engineering challenge since the video signal is 'wideband' by nature, while the audio signal is (relatively speaking) quite narrow band.



The audio signal has to have a carrier of its own to ride along on, or it would wander about. Designers take the baseband frequency spectrum from 0 to 8 MHz and assign specific audio carrier frequencies to audio carriers. Because these audio carriers are secondary to the main video carrier, they are called 'sub' carriers. Common sub-carrier frequencies are 5.8, 6.2, 6.8, and 7.4 MHz. You will note that these audio sub-carrier frequencies are spaced apart by at least .4 MHz and can be as much as .6 MHz apart. Again, there has to be adequate separation or space **between the audio sub-carriers** to keep them from interfering with one another, and to make it possible for the receiver at the downlink to separately and individually tune in the different audio 'sub' carriers.



One of the happy characteristics of an FM transmission system is that it is possible to send a sub-carrier along with the video carrier for a very small additional 'price.' The entire system is designed to carry the primary or main carrier. Once everything is in place, from the uplink transmitter to the satellite, to the downlink receiver system, the audio sub-carriers can be added for very little additional money. This is the primary reason why you see firms that use satellite to sell video services, such as United Video's carriage of WGN in Chicago, adding more and more audio sub-carrier services. They have the **full** system in place, and they are paying for it with the transmission of video. **Now** they can add audio sub-carrier services for a tiny fraction of the original cost, serving perhaps not very many users per audio sub-carrier in the process. But because the BIG price has already been paid for the transmission of the video, the audio becomes a very economical 'add-on' service.

There is a price for adding audio of course, even if it appears to be small. There is additional equipment, and, **there is a penalty paid** by the primary or main video carrier. How does that work?

Every satellite transponder has a full rated transmitting power. For example, on F3R, WGN on transponder 3 has a maximum output power of 8.5 watts. That 8.5 watts is available to relay from space back to earth the WGN video carrier, and, the WGN audio carrier (6.8 MHz). Now, what happens if United Video adds additional sub-carriers, at say 5.8 and 6.2 MHz? **Each** of these additional carriers will consume **some** of the available 8.5 watts of power. It turns out that each sub-carrier uses between 0.5 and 0.75 dB of transmission power available. Or to put it another way, if **your** actual footprint from WGN was 34 dBw, with **one** audio sub-carrier present (the program audio channel), when they added two additional (and non video program related) audio sub-carriers, your footprint signal level would **decrease** by 2 times .5/.75 or from 1 to 1.5 dB. That is not an insignificant reduction in power since it comes close to being the difference in antenna gain between a 10 foot and a 13 foot antenna!

And when you combine a weaker-than-average footprint (i.e. WTBS) and add, as Southern Satellite System is now **planning** to do, several sub-carriers to handle five or more separate audio services, the reduction in available footprint power, to your antenna, can become quite significant indeed.

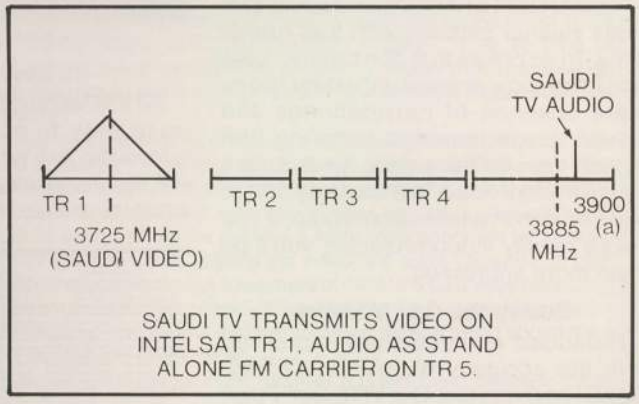
So while it is small, as measured in terms of dB, there is a price paid when additional (audio) sub-carriers are added to the basic video plus one sub-carrier format of most video program services. If you have a TVRO receiver which affords you the luxury of tuning for audio (or data) sub-carriers, you can build your own relationship 'chart' between those transponders that are strong, and those that appear somewhat weaker, as that observation relates to the presence of **more than** a single (audio) sub-carrier.

Staying Locked Up

One of the big advantages to the audio sub-carrier system is that the audio carrier is locked to, or referenced to the presence of a video carrier. If your receiver is properly tuned in for the video carrier, the audio will come along on the receiver baseband at the proper 5.8, 6.2, 6.8 (etc.) spot 'on the dial.' Your receiver has either an automatic frequency control (that keeps it locked on the video carrier), or a manual control which you keep 'peaked.' **The 'video lock' insures an audio lock as well.**

A standard receiver must keep the video portion of the signal within a 30 MHz wide, or so, 'passband' at the incoming 4 GHz frequency. As a ratio, that's keeping 'one part in 133' for stability and with modern down conversion oscillators (the oscillator is where the drift occurs), that is not a tough assignment. But, not all of the audio carriers of interest on satellite these days are transmitted in that format. And that is where the problems really begin!

Take, for example, that transmission of a TV program (or other) audio channel sent separate from the video, on a transponder removed from the video. This is a particularly popular system with many of the Middle Eastern countries utilizing Intelsat for relay of internal video programming. It has also become popular, recently, with several of the new users of Intelsat from South America (Colombia, Peru). Take Saudi Arabia, as an example (see diagram). The video is trans-



mitted as a full transponder (TR1) from 21.5 degrees west. The antenna system is an eastern hemispheric, which means the service is not seen west of the bird.

Saudi Video is centered on 3725 MHz (3.725 GHz) and the audio is five transponders higher, near the very top end of transponder 5; roughly 3900 MHz. How, with conventional home system equipment can you recover that audio?

Yes, if you want video and audio at the same time (simultaneously), you will need a **pair** of receivers. One for the video, and one for the audio. Then what? "Simply put the audio receiver on transponder 5, and tune in the audio with a tuneable audio system." No, that will not work.

Remember that a baseband tuning audio system functions because the audio is sent along with the video, as a sub-carrier to the video. In the Saudi case (and others) there is no video present. Without video, there are no sub-carriers.

So if Saudi is transmitting audio **without** a sub-carrier, how are they getting the audio on transponder five? By using a technique known as single carrier FM. It turns out that the Saudi's wanted their video to be as strong, and as close to perfection as is possible, with the satellite link. They had two transponders leased on Intelsat, and decided that if they took the audio **away from** the video transponder they could gain back both some extra 'power,' plus the use of a full 36 MHz for video-only. Transponder 5 **(reads 9-10 on a US receiver dial)** has not only their television program audio, but also a large quantity of Saudi telephone and data traffic transmitting in an SCPC format.

That still does not tell us how to get it back.

Demodulating the audio FM signal is a secondary problem to holding it in one place long enough to be able to tune it in and demodulate it! To explain; the automatic frequency control (AFC) in a standard TVRO receiver has to keep the receiver local oscillator within 2 to 4 MHz. The video carrier is the reference the AFC locks on, typically, and **as long as** there is a video carrier present, the AFC has **something to reference to.** Lacking that, the local oscillator in the receiver (it provides the signal to the mixer, which in turn down converts the 4 GHz signal to ultimately 70 MHz [IF]) has nothing to reference with. In the Intelsat installations, a 'pilot' or control carrier is transmitted **near** the middle of the transponder (or half transponder) as a reference signal. The receiver has a special detector that locks onto that reference carrier, and holds it within stability requirements so that the balance of the narrow audio carriers end up where they should be in the IF system.

This is a very expensive system requiring phase-locked synthesized oscillators for each of the in-use audio channels. Drift, then, or keeping the 4 GHz signal inside the 'passband' of the demodulator, is the number one problem involved. We'll come back to the Saudi system shortly.

A number of countries, such as Niger, Oman, Zaire, Morocco and Algeria use a system for video transmission called 'enhanced half transponder.' **See illustration.** Each of these users places the video in the lower half of the transponder, and the audio is sent in the upper half of the transponder. The audio may also be joined in the upper half by other 'domestic' audio channels, or communication channels.

Now it is possible, in either a single or double conversion system, for the receiver LO to be so placed that it can be 'below' or 'above' the signal being converted. For what follows, the receiver LO in a single conversion receiver must be **below** the signal being converted (called 'right way up' in the trade). For a double conversion system, the LOs (there are two) must **both** be below, **or,** both be above the signal being converted. 'Erect' is the term given to right-side up conversion and 'inverted' is the term applied to reversed LOs.

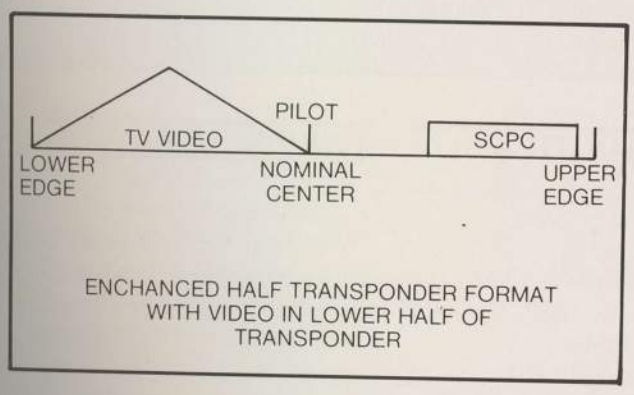
Now if you are tuning in any of the 'lower half / half-transponder format' services which transmit the video at the bottom of the transponder and the audio at the top, you tune your half transponder format receiver so that the half transponder wide video signal is centered on 70 MHz. That's the normal tuning procedure. Now, if the video is centered at 70 MHz, and the video is really half way down the lower half of the transponder, the upper half of the transponder, which contains the audio carrier, will now be up there between 88 and 100 MHz. And that suggests a method of copying the audio since the transmission format is FM, and standard FM broadcast receivers tune from just below 88 MHz to 108 MHz.

To tap into this signal range, you have to be mindful that in a half transponder format receiver (such as the AVCOM or ICM) the IF bandwidth is on the order of 15 to 20 MHz; or about half the normal bandwidth. If the IF system is properly designed, that will allow signals within the IF strip from approximately 62.5 (60) MHz up to 77.5 (80 MHz) to pass through to the video detector. Those 'way up there' **at 88 MHz and above** will be 'clipped' or severely attenuated by the IF filter. Yet you have to get your FM tuner / receiver connected into the 'loop' if you are going to tune in these audio FM carriers.

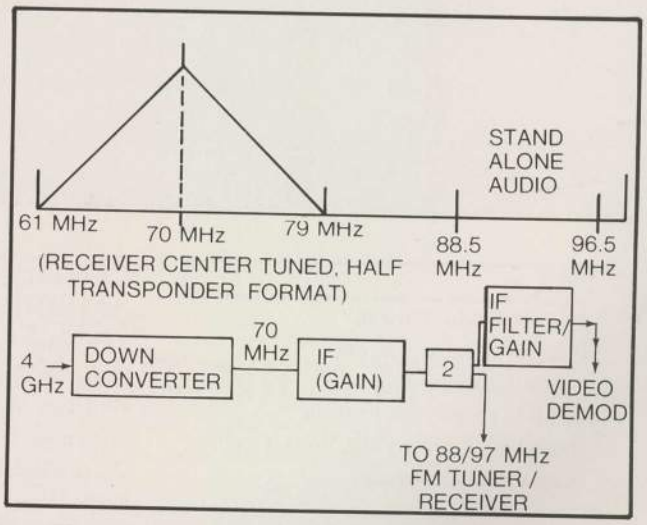
One technique employed with a measure of success is to look carefully at the 70 MHz IF amplifier 'string.' The filter may fall at the input, in the middle, or at the output. Each design has merits. Most often, however, the filter will end up **in the middle** of the 70 MHz string. This suggests that if you go into the IF board with a tap-off point inside of the IF, **but ahead of the bandpass filter,** you can derive sufficient signal to drive out through a short piece of coaxial cable to the outboard 88-108 MHz tuning receiver / tuner. Some have found that there is sufficient signal at the input to the IF, ahead of the IF amplifier / filter string and by merely adding a back matched or hybrid two-way signal splitter here (common 75 ohm CATV device), you can drive the IF out of one port and the outboard FM tuner / receiver through the opposite port. The danger here is that you may have a marginal amount of signal coming from the down converter to the IF, and a 3.5 to 4 dB reduction (caused by adding the signal splitter **ahead of** the IF) may reduce the quality of the video picture. It is worth a quick try, however, with two piece receivers **as long as you check** to be sure the IF line is **not** carrying a tuning or operating voltage for the remote down converter. You don't want to try adding a signal splitter in the line where there is tuning or operating voltage present!

Now, having made the connection, how does it work?

The half transponder signal is centered on the 70 MHz IF by the fine tuning control on the receiver. The receiver AFC references to that signal, and holds it in place to perhaps a couple of MHz if the AFC is



ENCHANCED HALF TRANSPONDER FORMAT WITH VIDEO IN LOWER HALF OF TRANSPONDER



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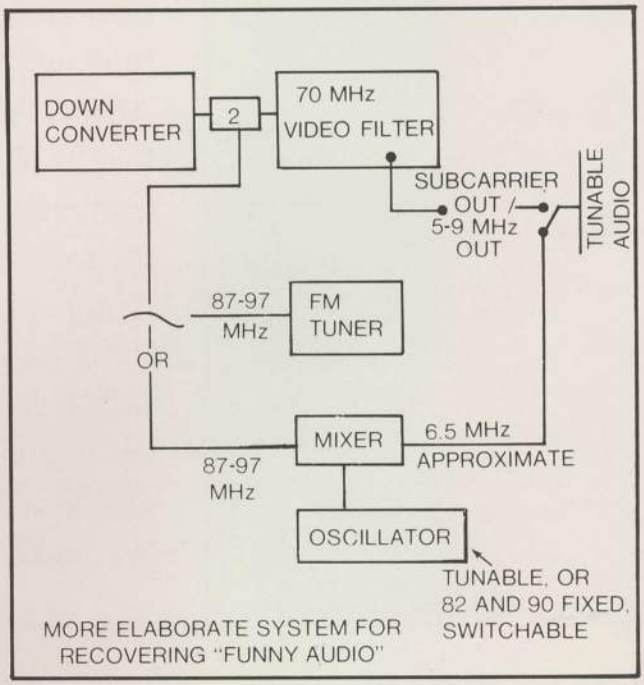
good. **But there will be drift.** The 4 GHz range oscillator is simply not stable enough under varying heat and operating conditions to be absolutely stable.

This instability will not be noticed on the video since the 'wideband' FM TV signal is fairly tolerant of such changes. But, when you have spotted Algerian audio at say 95 MHz, and have it tuned in, when the LO moves 2 MHz, the Algerian audio will also move (on your FM tuner / receiver) by 2 MHz. Such a system would possibly not be a suitable method of extracting the strange stand-alone FM audio carriers for a commercial installation, but it does give other terminal users at least access to these otherwise unavailable services. There are other, hypothetical, ways to accomplish the same thing but they involve engineering hardware which does not, apparently, exist at the moment. We'll return to this, also, shortly.

Now that we understand that there are some services which separate the video and audio, and the audio arrives at the downlink site via a method other than sub-carrier, what about the unusual technique employed by Saudi Arabia? Well, it turns out that where countries have leases on two or more transponders (or parts of two or more transponders), they may well opt to do this. The recent Colombian video addition to Intelsat apparently is transmitting their audio on a transponder 14 away from their video!

One solution is to use two separate receivers, with a splitter from the LNA output feeding the main receiver. One receiver, in the case of Saudi, would tune in the video on US equivalent TR1 while the second would tune in the audio on the US equivalent of TR9. If the TR9's receiver is one of the half transponder receivers, by setting the receiver fine tuning so that the **lower** half of the transponder is centered at 70 MHz, then you will be able to use the previously described FM tuner / receiver ploy to tune in the audio within the FM band. (In the case of Saudi, you will also find some radio program channels transmitted in the **same** 'upper half' **of the transponder,** but they will obviously not match the video, and for video-audio reception can be bypassed.)



MORE ELABORATE SYSTEM FOR RECOVERING "FUNNY AUDIO"

As noted, the receivers depend upon the presence of a video carrier to lock the AFC **to something.** Without any video on the lower half of the Intelsat TR5, the receiver is going to try to **find** something to lock to. There **are** carriers on the low end of that transponder (although not video), and the AFC **may** try to latch to one or more of them. When that happens, your carefully tuned in Saudi audio is going to move away from the spot on your FM dial where you had tuned it in!

The Next Step

There are several techniques being investigated to 'clean up' the

quick and perhaps dirty approach of tapping into the 70 MHz IF with an FM tuner / receiver. For those who may have some talents in such areas, these proposals are offered:

1) **Convert the audio** directly to a 10.7 MHz IF. Virtually all of the FM tuners / receivers utilize a 10.7 MHz IF, and one way to take advantage of their selectivity and still get the package stuffed into a modified TVRO receiver would be to build a tunable VCO which tuned either 76-86 MHz (or 98-108 MHz; **this** would keep the VCO **out** of the range normally covered by the TVRO receiver IF), and 'mix' the audio carriers directly into a 10.7 MHz IF. This leaves the control that tunes the VCO as a 'tuning control' and allows the user to tune, directly at the 70 MHz IF, the strange stand-alone FM carriers.
2) **Convert the audio** directly to the 6.8 MHz position on a fixed tuned TVRO receiver. The approach here is the same as with the 10.7 MHz IF, except that the VCO will now tune 80-90 (or **preferably** 94-104) with the mix product being at 6.8 MHz. This means the audio system already built into the TVRO receiver will become a part of the system, and user will simply 'insert' the additional VCO / mixer into the line when he wishes to employ 'direct SCPC tuning' for stand alone, wideband FM carriers.
3) **Convert** the 87-97 MHz region down to 3 to 13 MHz, and modify the tuning range of existing TVRO receiver audio demodulators to tune this range.
4) **Leave** the existing 5 to 9 MHz (nominal) TVRO sub-carrier tuning range alone, but install a fixed oscillator at 90 MHz for most of the popular stand alone wideband FM signals, or with an optional 82 MHz stand alone oscillator for the Algerian approach to audio. At these frequencies, a relatively simple transistor oscillator and double-balanced (or MOSFET) mixer will handle the chore.

Virtually any of these systems will still suffer from audio stand alone carrier drift, however; a function of the 'hold-capability' of the video AFC system. One solution to this problem, untried to be sure, would be to add a stiff (audio) AFC to the loop to try to hold the wandering audio carrier within the tuned spot on the dial.

The Challenge

As you can see, there are challenges here for equipment designers to develop additional variations to the now almost standard tunable audio sub-carrier detection systems which most receivers offer. The rapid development of satellite systems for national use, using the Intelsat system worldwide, is leading to unique and perhaps novel techniques for the transmission of audio.

REBROADCASTING SATELLITE SERVICES

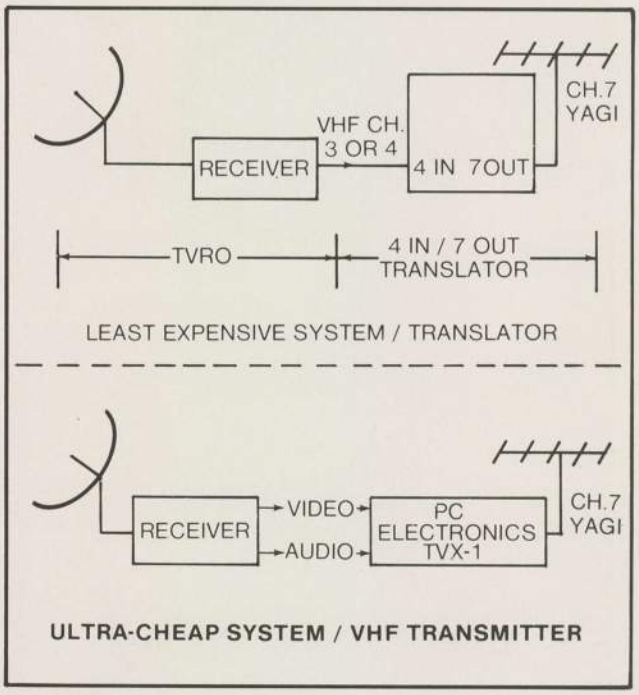
TECHNOLOGY A-GO-GO

Having established (see **"Coop's Comment,"** this issue) that television does have a social impact on an area of the world where communications has been scarce, at best, prior to the introduction of satellite fed service, the first real problem any budding entrepreneur faces is deciding just what type of system he or she will offer to the waiting masses. Unfortunately, there has been in the past several years a number of separate 'delivery technologies' fighting for your attention, and each has certain advantages, and disadvantages, to offer. Let's briefly look at each.

VHF Rebroadcast: When it comes to doing it cheaply, there is no less expensive method of redistributing satellite services to an area than VHF rebroadcast. In all forms of signal redistribution, you must look not only at the cost of your equipment, but at the cost of the equipment which the viewers must acquire to use the service. A standard, VHF television receiver, is just about the least expensive delivery-receipt-vehicle available in the world today.

Legal ramifications aside, a VHF retransmit system can consist of a standard TVRO terminal with VHF output on channel 3 or 4, a VHF 'translator' box that accepts channel 3 or 4 as the input and with that input creates a new VHF output (typically on high band, or channels 7 through 13), and a set of transmitting antennas to send the new signal into the air. We can all figure out what the terminal costs; the VHF translator (ten watts output nominally) and a set of transmitting antennas can be purchased for around $2,000. Sources for equipment follow at the end of this report.

If you can get by on a few selected VHF channels (i.e. channels 4, 5 or 6, or 7, 8), you can do it for even less money. **PC Electronics** has a full duty cycle ten watt VHF transmitter, which you feed with baseband video and audio, for around $700 on any of these channels. A set of transmitting antennas would with transmission lines and connectors come to another $200. That means that the price of a TVRO, **and $900,** you could be retransmitting the reception from satellites over an area 7 to 10 miles out in all directions from the transmitter location.



With 'cheap' comes a few problems of course.

VHF translators merely repeat into the air whatever it is you may be feeding into them from the satellite receiver / modulator. If you are using on on-board (or external) VHF modulator to derive your channel 3 or 4 initial output, that modulator **may not** adequately deal with the lower sideband signal which all commercial transmitters eliminate. The standard US (NTSC) television signal consists of an FM (frequency modulated) audio carrier, and, an AM (amplitude modulated) visual carrier. It is a characteristic of an AM carrier that it will have two complete, identical sets of 'modulation' present. They are called, appropriately, the lower sideband and the upper sideband. Since the TV receiver only requires the modulation information from **one** of these sidebands to recreate a television picture, and since having two

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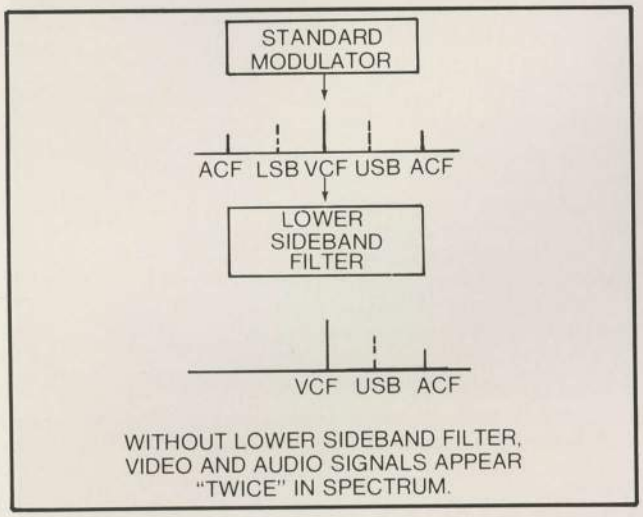
sidebands requires almost twice as much spectrum / channel space as a single sideband requires, commercial (i.e. FCC licensed) transmitters install a 'lower vestigal sideband filter' device to chop out or eliminate the lower sideband before it is transmitted.

Some modulators have such filters; **many do not.**



If you use a modulator that does not filter out the lower sideband, you end up actually transmitting the same picture data twice; on two, slightly different, frequencies. As you might suspect, this is wasteful to you, and, it can cause some problems with the standard television set which was designed to receive and process only a single sideband. We'll look into this further shortly.

UHF Rebroadcast: In theory, the only difference between rebroadcasting at UHF, and, rebroadcasting at VHF is the choice of a transmission frequency. There is more involved, however.

UHF is higher frequency than VHF, and whereas relatively 'sloppy' cable / connector / antenna practices may not kill you at VHF, they will do you great harm at UHF. To be an operator at a UHF frequency, you need to have some background in transmission techniques since UHF is far less forgiving of dumb transmission / reception techniques than VHF. UHF, however, provides a measure of control of who sees and does not see the transmission.

UHF translators (VHF channel input, UHF channel output) are available at relatively low prices if you stick to UHF channels 14 through 18 or so. These channels, like the VHF channels, allow the equipment builder to use 'Motorola Building Blocks' which create the nominal ten watt signal for a relatively low cost.

Standard UHF channels (i.e. 14 through 83) can be received on standard UHF television sets. The channel 14 through 83 assignment so familiar in North America is not worldwide (as, too, channels 2-13 is also not worldwide) and television sets sold in Africa, for example, may have an entirely different set of UHF channels than those sold in the North American region.

Anyone contemplating retransmission on any 'standard' frequency should first ascertain what standard channels will be available on television receivers available, or to be made available, in that region of the world.

Microwave Rebroadcast: There are two microwave region rebroadcast transmission / reception systems generally available. The primary advantage to microwave is that no standard television receiver, anyplace, will pick up a microwave transmission. A converter between the receiving antenna, and the television receiver is required to 'down convert' the microwave transmission service to a channel which the TV receiver can tune in.

Most microwave TV transmission in North America, for public consumption, operates in the 'MDS' band. There are a pair of channels here, in the region of 2150 MHz (2.15 GHz). Most operators here do not bother to scramble the transmissions since the frequency itself is a form of 'security'; the proliferation of retail level MDS receiving systems aside. A ten watt MDS transmitter **package** from a commercial source will cost you upwards of $25,000. The down converters and antennas, in quantity, will set you back around $60 each. It is traditional for the system operator to own and supply the down converters and antenna systems.

A far lesser known service, useful **outside** the United States and Canada, uses a unit made available by PC Electronics. This unit operates in the 1250 MHz region, and it provides under ten watts of power for around $1000 (complete package). This system still requires a custom down converter (cost around $80 each) and a custom antenna (cost around $60).

Cable Retransmission: There are two reasons why you would consider using cable transmission techniques rather than rebroadcasting through the air. The first is security. If you keep all of the signal bottled up inside of a piece of coaxial cable, the only way someone is going to 'view' or use the service is to be plugged in. That places control of who watches back in your hands. The second reason why you would use coaxial cable is multiple channel capacity. Once you have the cable in place, there is not much involved to add a second or third (etc) channel to the original channel. That increases your product sales potential, and gives you new freedom to work with multiple channel inputs.

The disadvantage to cable transmission is the cost per foot of cable plant, and the lack of return in areas where you have to transport the signal from village to village, and nobody lives in between.

If you use alternate channels (i.e. 2, 4, 6, 7, 9, 11 and 13) you can put together a seven channel 'headend' with relatively inexpensive modulators. Remember that the modulator is really a low power transmitter, and it 'launches' signals into a piece of cable rather than into a transmitting antenna. **Cable grade** modulators cost upwards of $700 each and some of the best quality units can be stacked on immediately adjacent channels (i.e. 2, 3, 4, 5, 6 etc.) without any concern that the lower sideband from channel 3 will interfere with the reception from channel 2. That means that you can carry at least 12 channels on standard VHF channels (dial positions 2 through 13) if you have that many quality satellite services available and the market to justify that type of service.

Recently **Transifier, Inc.** (see list at end of report) has announced a 'cable grade' modulator with high signal output level and the ability (they claim, we have not tested the unit at this writing) to operate on immediately adjacent channels. For $360, or under half of what many cable grade modulators go for, this would be a significant cost reduction for those putting in cable plant headends.

Cable economics boils down to housing density for cable plant miles. First you determine how much the satellite receiving site (including modulators) will cost. Then you lay out the cable plant on paper to determine how many miles of cable will be required to pass by the homes you wish to serve. With a 12 channel system, it is possible in most areas to still install a cable system plant for around $5,000 per cable mile. If the plant is 5 miles in length, you are looking at a 'ballpark' figure of $25,000 for the cable plant itself. To that **add** your cost of the TVRO and modulators, and you have a total estimate of the system.

Knowing what the system will cost, you then estimate the number of homes that will subscribe to the service, and the monthly fee each will pay. It will take you so many months of revenue to pay off the initial system cost. A period of time **under** three years is considered excellent; under five years is considered good to average.

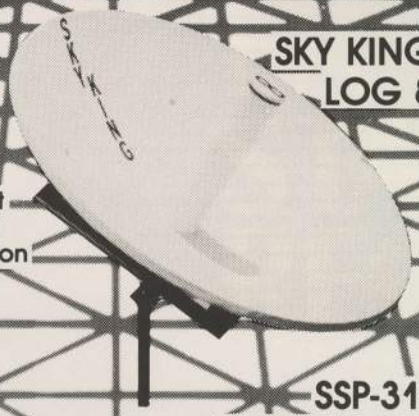
These, then, are the practical systems now available to the entrepreneur. Now, before we look at the technology and problems associated with each, let's address the security problem.

HOW SECURE?

Not all systems wish to be 'secure.' A secure system is simply one where the provider of the service determines who views the service, and who does not. There are many situations where the system operator wishes to have widespread acceptance and use of the service, and 'selective viewing' never enters for consideration.

One of the systems commonly found in Mexico, where US satellite signals are taken down for retransmission, is VHF rebroadcast with **community ownership** of the system. In this situation, a community pools the money required to buy and install the system, and the service operates in a non secure mode. Local people run the system, and through public donations or fund raising events the ongoing upkeep costs are covered. The position of the equipment supplier,

If Image is the Question, Arunta is the Answer.



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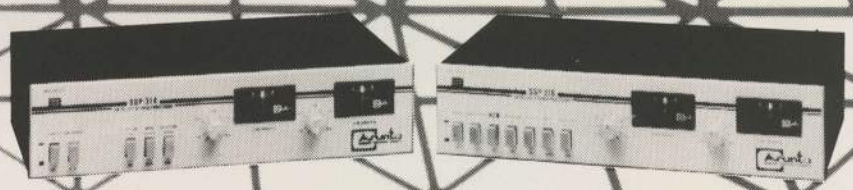

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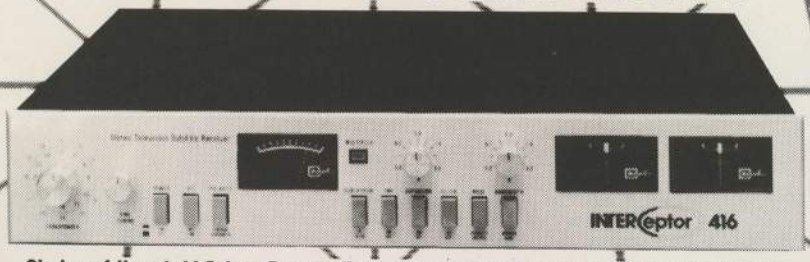

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here, is simply that of providing the hardware, making the system play, getting paid, and going away. The only caveat worth mentioning is to be certain that you can and will be paid, since a foreigner installing equipment in a strange land has virtually no constitutional guarantees, and can only lose in court if there are hassles.

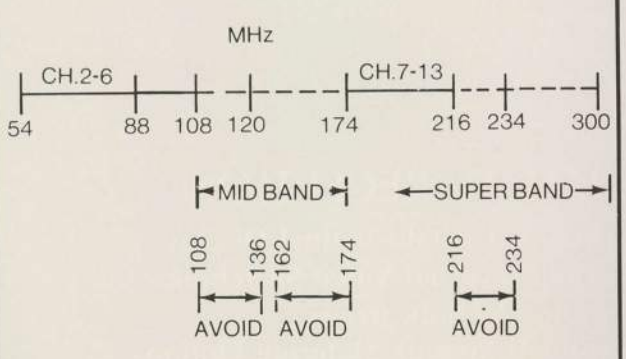
Perhaps the most common form of security is to shift the operating frequency of the transmitter(s) away from those TV channels found on standard television receivers. There are several options here:

1) Use the so-called 'mid Band' region between 108 and 174 MHz. Standard VHF television covers 54 to 88 MHz (channels 2 through 6) and 174 to 216 MHz (channels 7 through 13). The FM broadcast band occupies 88 to 108 MHz; in North America. There is room between 108 and 174 for 11 TV channels, each the standard 6 MHz wide. Cable TV systems use most of these 'Mid Band' channels, and that means that you have ready availability at reasonable prices of 'Mid Band' modulators ($700 up typically) and 'Mid Band' converters (as low as $20).

Mid-band modulators will get you a signal strong enough to launch into cable, but **not** strong enough to tie to an antenna. To get the power up to a level where an antenna will carry it to viewers will require an amplifier. **Lunar Industries** and a few others offer these units for about $1200 each. Typical Mid Band cable converters transfer the Mid Band channels to either a single low band VHF receiver channel (such as 2, 3 or 4), or, to the UHF television band where as a 'block' the 8 or 9 or 10 or 11 Mid Band channels can be tuned in someplace between channels 14 and 83.

Mid Band is not used in North America for television broadcasting (although in Asia, parts of it are so used) because there are important aeronautical two-way radio channels (108 to 136 MHz), amateur (144 to 148 MHz) and public safety (police, fire, and private business) services (150 to 174 MHz) operating there. If you attempted to operate a television transmitter in a 6 MHz segment within Mid Band where local or regional two-way radio services of any type were already operating, both sides would experience interference. You would cause them interference, and, they would cause your viewers interference. In particular, the 108 to 136 MHz aeronautical region is to be avoided since planes in flight cross over virtually all of the world from time to time and an airplane at 35,000 feet can intercept a ten watt TV transmission operating on an aeronautical channel several hundred miles away.

The upper portion of Mid Band (150 to 174 MHz) is used in some Central and South American regions for TV distribution. One danger is getting too close to VHF channel 7, which is assigned 174 to 180 MHz. If you elected to operate on the channel immediately below 7 (168 to 174) or even the next one down (162 to 168 MHz), it is possible, even probable, that many of the TV sets could be 'fine tuned' in the field to pick up your 'secure' transmission without your descrambler / converter unit. Taking this, and aeronautical interference possibilities into consideration, the most practical Mid Band channels to use therefore



SPECTRUM USE POSSIBILITIES IN REMOTE AREAS

become **150 to 156** and **156 to 162** MHz. Of the two, the lower channel is recommended in coastal areas since marine VHF radio operates worldwide in the 156 to 162 MHz region.

The primary advantage to Mid Band signal transimission is:

1) It is only slightly more expensive than standard VHF channel operation at the transmitter, and, the receiving converters are quite inexpensive.
2) With some careful engineering, in some areas you can operate on two channels (138 to 144, and, 150 to 156) thereby offering two separate program services. A single subscriber Mid Band converter will receive both channels, thereby reducing the cost-per-channel at the subscriber for the receiving equipment required.

There is this warning. Be very sure what local users of VHF two-way radio are doing, and where, with their own communication systems before tooling up for any specific Mid Band channel of operation. You don't want to begin broadcasting television in a 6 MHz band which you later discover is being used by the local police department!

The next 'band' used seriously for 'security reasons' is called 'Super Band' by the TV people. Super band is loosely defined as starting at 216 MHz (the top or upper end of standard channel 13) and extending variously to 300 or 350 or even 400 MHz. Since most of the hardware likely to be used for transmitting, and receiving, will come from the cable television hardware suppliers, we have to go along with what is already there and available.

Super Band concepts are the same as those for Mid Band; only the frequency range is different. You start with a cable TV grade modulator on a specific Super Band channel, and feed it with baseband video and audio. That gives you sufficient power to 'launch' into cable, but hardly enough to connect to a transmitting antenna. And that places you back in the amplifier search business. In addition to Lunar Industries, **Continental Electronics** in Hialeah, Florida manufactures amplifiers for this range.

Receiving system converters are available for slightly more dollars than the Mid Band converters, covering at least the lower portion of Super Band. These cable TV products are being stretched higher and higher in receiving / operating frequency all of the time as the cable folks expand the channel capacity of their systems.

For Mid Band reception, many of the log periodic type home TV antennas will provide adequate antenna power for home subscribers. Such antennas often are designed to function with at least **some** gain over the full bandwidth from 54 to 216 MHz, and that includes the Mid Band channels. Unfortunately the same is not true of the Super Band channels, which fall above and therefore outside the bracketed range covered by normal, mass produced home antennas. Therefore locating a suitable source of receiving antennas for Super Band home reception can be a problem. One source is Lunar Industries.

There are caveats concerning use of specific channels within the Super Band region. Neither Mid Band nor Super Band are allocated to television broadcasting, anyplace. They have become 'TV channel allocations' only because of the development of cable television services which require more than the standard 12 VHF channels to carry their programming. Equipment is available in these two bands **for cable;** it can be used, and is used, for through the air TV broadcasting. But such use is always subject to interference from, and interference to, two-way radio systems operating there.

Super Band channels immediately above VHF channel 13 (210-216 MHz) are not desirable for the same reason channels immediately below channel 7 (Mid Band) are taboo; clever people can fine-tune their television receivers 'above' 13 to reach these channels. This just about eliminates 216-222 and 222-228 MHz. It **was** felt that 228 to 234 was the first secure channel, but then when an over the air system was installed in Belize (Central America) using this channel, a local TV technician found a particular brand and model of TV set that could be re-tuned there. So much for security!

To get 'security,' so that people cannot fine tune to the signal, requires that you move several channels away from the nearest TV channel that standard TV sets will tune. Some of the more popular channels for this use are 234 to 240 MHz and 240 to 246 MHz. The 'interference' problem, from two-way communications, can be quite complex in this region. Whereas the FCC in the USA directly allocates frequencies in the Mid Band region (108 to 174 MHz) and therefore

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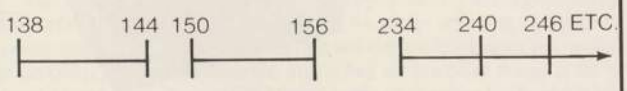
records are kept, and public, of the allocations, this is not true with the 225-400 MHz spectrum. Officially, the whole block is largely reserved for 'military' communications. The actual allocation process, determining by assignment who uses which frequency here for what, is not done by the FCC. It is done by a military equivalent of the FCC called 'IRAC' and that agency is about as public as the CIA. There are no records, no reference data to go by. All that is known is that these frequencies are largely used by (military) aircraft and ground forces.

That makes it difficult to determine, in advance, which frequencies to avoid. Close to the US border, Mexican operators using Super Band have had more than a handful of 'incidents' where their TV transmissions have been alleged to cause interference. Very few if any such incidents have been reported **other than** along the Mexican / US border.



BEST-SHOT POSSIBILITES FOR MID AND SUPER BAND

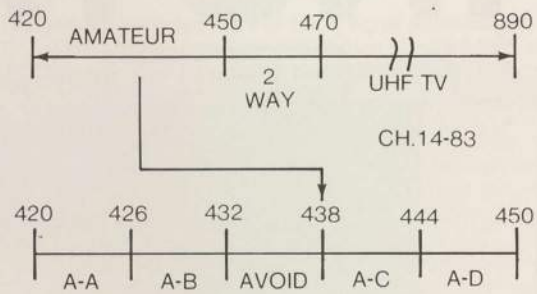
Some of the uses of Super Band are astounding. For example, there is a 70 mile link operating between two Mexican **mountain tops** which carries three channels of US television between a pair of Mexican cable systems. The transmitter power is but ten watts, but by building large (yagi) antenna arrays, they are able to cover such distances (line of sight) with excellent results. One of the beauties of Super Band is that we are at the top of the so-called VHF band, and just getting into the UHF band. Antennas, per channel, are physically small, allowing huge 'banks' of antennas to be built to extend the coverage of such distances.

The next band up is UHF. UHF television is allocated to channels 14 through 83, or 470 to 890 MHz. Virtually all television receivers in use have a built-in tuner covering this group of channels. Obviously there is no security operating here, even in areas where there is no television, since it would not take long for local residents to figure out how to get the service directly.

Using the same 'close to but not adjacent to' ploy used for Mid Band and Super Band is possible only on the 'low end' of UHF TV. The frequency allocation of interest, where equipment of a reasonable price level, is available, is 420 to 450 MHz. Inside of North America, this is an Amateur Radio allocation, shared with various radio navigation radar systems. The amateurs or 'Hams' have sub-allocated the band by more or less mutual accord and there are the following 'TV channels' in use:

1) 420 to 426 MHz
2) 426 to 432 MHz
3) 438 to 444 MHz
4) 444 to 450 MHz

A number of firms manufacture bits and pieces of gear for Ham or Amateur television. Only one offers a complete 'plug-it-in' and 'turn-it-on' transmitter package; PC Electronics. Their standard unit is a ten watt transmitter. The unit has no frills, but it is well designed and in tests we have conducted in the Turks and Caicos they have proven to be reliable units if properly cared for. The TC-1 is a complete transmitter with a built-in down converter. **Standard** transmit channel is 439.25 MHz (video) although others as noted above are available on special order. The audio is set the NTSC-standard 4.500 MHz above the audio, making it totally compatible with American TV receivers. There is a video gain (modulation level) control, and an audio gain (modulation) control. The audio input is designed for a microphone but will handle (with an external matching transformer) 8 ohm or 600 ohm line inputs such as you find with normal TVRO receivers. The **TC-1** is

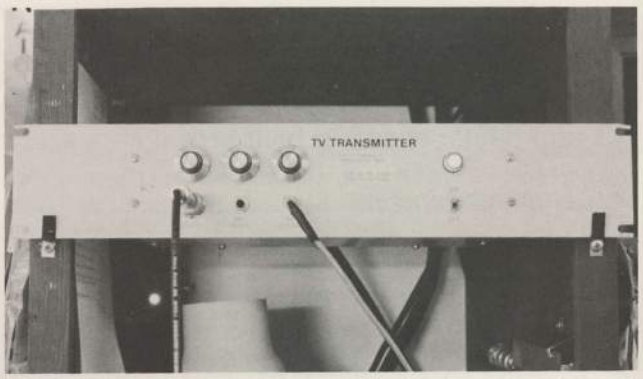


LOW UHF REGION CHANNELS IN-USE

designed for two-way television communication; there is a transmit, and receive switch on the front panel and in the receive mode a built-in quite decent down converter receives in the 420 to 450 MHz band (tuned with a front panel control) and delivers through an F connector output on VHF channels 2, or 3, or 4.

We opted for switchable 117VAC and 12VDC operation for our test unit, and for switchable two channel transmit. We ordered on 421.25 and 439.25 for local studio to transmitter link operation. We have used the unit for doing remote broadcasts with the whole package running off of 12 volt battery current. Standard configuration price is $399 (that's hard to beat!) and the options are $30 each. We'll come back to the operational problems, shortly.

Recognizing that some users of this equipment might want a few more frills, PC Electronics also offers a rack mounting verison dubbed the TVX-1. The same unit is available for VHF channels 7 and 8, UHF channels 14 through 20 as well as the previously listed 420-450 MHz channels. What this unit does is give you a **pair** of audio inputs, one of which is designed for line levels (the second is microphone), plus a detected video modulator output to drive a video monitor, and more careful design of the audio and video baseband circuits. A low band (channels 4, 5 and 6, anyhow) **should** be available shortly. The 420 to 450 band, plus UHF channels 13 through 20, will cost you $600 for the 10 watt transmitter while the VHF channels are $750 each.



PC ELECTRONICS TVX-1 is a rack mounted transmitter available on VHF channels 7, 8 plus a host of UHF range frequencies.

Now, what does the quality look like with these units?

The paramount problem is that this is a double sideband unit. Remember that lower sideband energy is normally 'chopped out' in a commercial transmitter. We initially tried a unit that had the lower sideband present. What happens is that many TV set detectors cannot handle the presence of the lower sideband, and the TV set IF and

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detector get very 'confused' by the extra energy present. This manifests itself as 'sync buzz'; there is a low to moderate level, in the audio, of television sync signals. The better TV sets, those with decent IF selectivity, can handle the lower sideband since the energy is filtered in the TV set and never gets to the detector at sufficient level to cause problems. But less expensive receivers buzz and hiss at you. Clearly, if you are trying to sell a retransmitted product, that is no way to go.

There is an answer and it will cost you an extra $131.50. The gadget is called the PSF438 ATV **Interdigital Vestigial Sideband Filter.** Not something you wander about repeating out loud, or you will be locked up! This is a filter which takes out the lower sideband. Apparently, however, this filter is only directly available for the 438-444 MHz channel (visual carrier on 439.25, audio on 443.75 MHz). So if you opt to operate someplace else, you will either have to go into a special (custom) order for a filter, or figure out another solution on your own.

With the filter in place, between the output of the transmitter and the antenna, life gets far better in a hurry. There will still be a few, really cheap, receivers which retain a low level of sync buzz, but for most the picture quality is very decent. Far better than you have reason to expect for a total transmitter cost of under $1,000 (with filter and transmitting antennas), anyhow.

If you are electing to transmit (**outside of** the US and Canada, where this is a Ham band available **only for** licensed amateurs) in the 420 to 450 band, your next concern is how people will receive you, when you want them to do so. Since you are far enough below channel 14 (470-476 MHz) that TV sets cannot be 'fine tuned' down to find you, the viewer will need a receiving down converter from you. PC Electronics offers their transmitter users several different versions of a down converter.

The TVC-2 is a down converter less the case. It has good specifications (1.7 dB noise figure, double balanced mixer) and requires casing plus a power supply capable of delivering between 12 and 18 VDC at 20 mA. Price is under $50 in 50 lot quantities.

The TVC-4 is the same unit in a case, with a power supply. The input is a type BNC fitting and the output to connect to the TV set is an F connector. Price is $76 in 50 lot quantities.

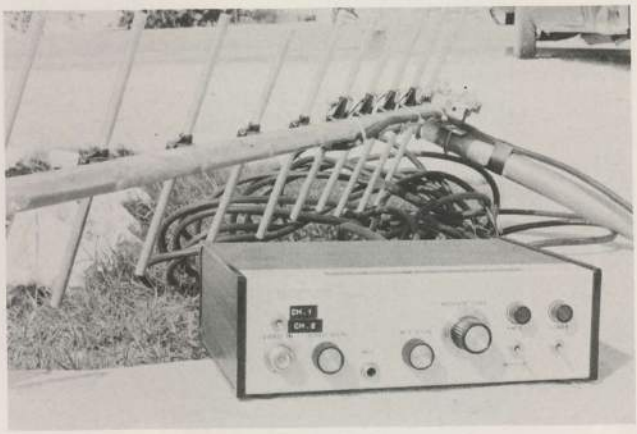
The TVC-4L is an ultra low noise version with a noise figure under 1 dB. Price is $89 in 50 lot quantities.

The next problem is the antenna. Now several users of this system have batched channels (420-426, 438-444) so the viewer can have either of two channels, or 'tiered channel' service. One Mexican operator offers channel 'A' at $40 per month, and that is his 420-426 MHz channel. He then offers channel 'B' for $20 per month when taken **along with** channel 'A,' or $40 as a stand alone. Using the PC Electronics down converters, he has taken off the continuous tuning knob and replaced that with a two position switch. In the channel 'A' position he has a pot pre-set for channel 'A,' and in the channel 'B,' a second pot set to channel 'B.' This involves the receiving antenna since you want to have a broadband antenna that will cover the full band.

Since this is an amateur band, there are several amateur band antenna products available. TVRO industry supplier **KLM** has a six element broadband antenna and **Cushcraft** has a five element yagi. The KLM has proven itself for broadband coverage, the Cushcraft is an unknown quantity.

Several people using the single 439.25 (438-444 MHz) channel report they have had satisfactory results by using consumer UHF antennas that are **broadband** in design. A UHF 'Bow Tie' antenna system, for example, fed through an outdoor matching transformer so that 75 ohm coaxial cable can be used, reportedly works well within 5 to 6 miles of the transmitting antenna.

It is fair to forecast that between the down converter and the antenna, a person will have around $130 tied up in receiving equipment per installation. **That can be a problem** unless your monthly service rate is quite high. One solution to this problem is to charge an equipment deposit fee, of at least $100. That puts the customer **on notice** that they are responsible for the safe return of the hardware, and it also helps the operator to fund the cost of the receiving equipment. Most system operators charge for service for a full year in advance; plus equipment deposit.



PC ELECTRONICS TC-1 is a combination transmitter and down converter. With optional 12 VDC connection, unit becomes stand alone field transmission system to which a camera, antenna, and a microphone can be added for remote transmissions back to a studio or transmission site.

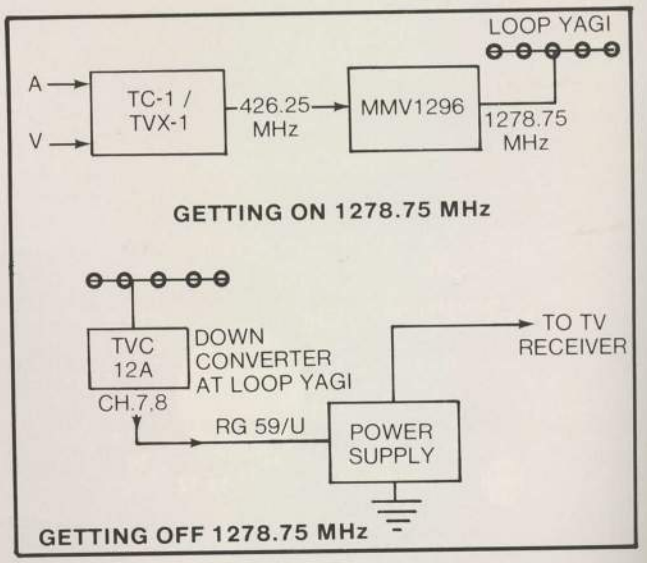
KLM 14 element antenna makes excellent fringe area installation for 420-450 MHz band channels.

THE NEXT BAND UP

Once you get out of the 420-450 band, the next band that can be described as 'secure' from the inadvertent or purposeful tuning-in by non-authorized viewers is the 1215-1300 MHz band. This is another Amateur or 'Ham' band, and that is why there is equipment available. It is also why you **cannot** use this band for this purpose inside the United States or Canada.

PC Electronics is once again the most diversified source for this equipment, and you start off with the TC-1 or TVX-1 operating on 426.25 MHz. Then you feed this into a model MMV1296 'varactor tripler'; a device that multiplies the 426.25 transmitter frequency by 3. That puts you operating on 1278.75 MHz with your video and 4.500 up with your audio. You go to all of this trouble, in case you need a reminder, because you don't want people finding you. The result is that about 6 watts of the original 10 watt 426.25 MHz signal ends up at 1278.75 MHz.

The transmitting and receiving antennas are something called 'loop yagis'; strange looking 7 foot long antennas that have 'loops of wire' (circular) for elements rather than the normal straight elements. Transmission line losses up here are very high, even when you are



PC ELECTRONICS 420-450 MHz down converter has front panel tuning control to tune through 30 MHz wide 'band.' Removing front panel control, substituting switched-in pre-set pots allows system operator to offer 'tiered' service.

using ½" or larger coaxial cable. So most people attempt to get the run between the transmitter and the antenna as short as possible, and use as large cable as possible. On the receiving end, the best bet is to mount the down converter right on the antenna. The TVC-12A is designed to do this but you have to build up your own power supply to feed converter operating power up the feedline. What comes down the feedline, similar to the TVRO receiver with an antenna mounted down converter, is the received TV signal at an IF of TV channel 7 or 8.

Starting with the TC-1 or TVX-1 package and adding to it to create a 1278.75 MHz transmitting system, you will spend an additional $113.45 for the tripler and around $65 each for the transmitting (or receiving) loop yagis. The antenna mounted down converter goes for $89 each in small quantities.

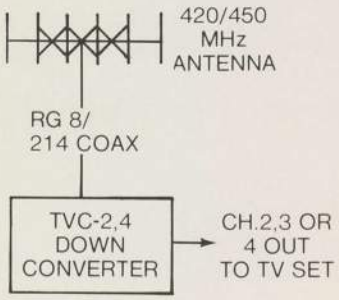
There are two more things that you can do with the 1215-1300 MHz packages. They make a good 'link' transmission system to couple two points up to 15 miles apart (but line of sight) together. And for private transmission, they can offer an 'extra' service to customers who may wish an 'adult' level service.

OPERATING PARAMETERS.

VHF translators are difficult to harm. Most systems use 75 ohm direct feed yagi antennas, such as the Jerrold 'J' series. These antennas feed with 75 ohm RG-59 cable, use F connectors for the connections, and at power levels of 10 watts and under you can use CATV grade outdoor two of four way splitters to lash two or four transmitting antennas together for additional antenna gain, or directional transmission patterns. We connect our translator / transmitter outputs to the antennas with 75 ohm .412 or .500 aluminum jacketed cable up to the input to our antenna signal splitter, and then use a good grade of 98% copper shield RG-59/U for the lines that connect the output of the splitter to the individual antenna bays.

Most translators and straight transmitters (the difference is that you feed a **translator** with an RF modulator, such as channel 7 input for a channel 4 output; a transmitter has an in-board modulator) use Motorola power amplifier devices. Motorola **says** they are capable of operating without blowing even when the coaxial line is open, or shorted. All of the units we are familiar with have large heat dissipating fins on the chassis to keep the power packs cool. Where practical, we install additional cooling using small fans to blow air across the outboard fins. Next to moisture, heat is the biggest enemy you will have.

If your TVRO receiving site and your VHF transmitting site are co-located, there is a good reason **not** to use a transmitter with an on-board modulator. Baseband video and audio, connected from the TVRO receiver to the transmitter, has a way of being susceptible to the transmitter power. Even ten watts of power, launched into an antenna 50 or 100 feet distant, can find its way back into the TVRO receiver video lines. For example, the TVRO receiver will have a 70 MHz IF. If you are transmitting on VHF channels 3, 4 or 5, your transmitter power will be **inside of** the TVRO receiver IF passband. That's an excellent



RECEIVE CONFIGURATION FOR A-A THRU A-D

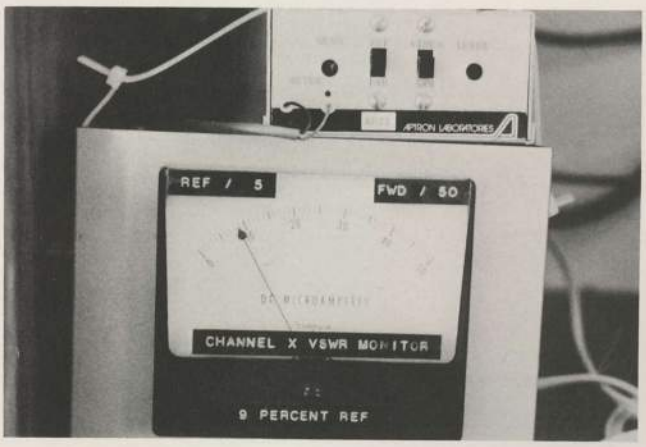
way to degrade your TVRO signal.

Even a small amount of RF 'feedback,' direct from your VHF transmitter back to your baseband input to the transmitter, or TVRO receiver, can cause the transmitted signal to lose the natural high quality, satellite crispness that you fought so hard to get in the first place. The best solution to this is to modulate at a channel removed from the actual transmitter frequency, and allow the translator to convert the modulator frequency to the final transmitter frequency.

UHF transmitters are especially susceptible to this problem. The shorter the wavelength becomes, the more difficult it is to keep the little waves from crawling down into the baseband and satellite equipment. Because the PC Electronics units all modulate **directly at** the transmitter, you have to be very careful to insure that the transmitting antennas are accepting power, and that you don't have a bunch of transmitted signal 'hanging around' the operating room.

PC offers $20 option, the DM-1 detector, with which you can monitor the actual power going to the antenna, and, any power which the antenna refuses to accept because of an antenna or transmission line problem. If you elect the PC UHF units, don't neglect this option. With a small 50 microamp meter and a switch, leads brought out from the DM-1 (it installs in the coaxial line right after the transmitter) allow you to calibrate the output power, and measure the 'reflected power' which the antenna system does not wish to accept.

Monitoring or measuring your signal **at the transmitter site** is very-very difficult. Even at the ten watt level, there is so much signal floating all around that you cannot simply turn on a receiver and tune yourself in. The signal gets into the receiver / down converter a dozen different ways and this causes hum, ghosts, ringing and a whole family of problems. That is the primary reason why the TVX-1 unit provides a detected output signal from the output of the transmitter amplifier; to



FORWARD / REFLECTED power monitoring system samples output of transmitter on 'transmission line' to determine whether antenna system will take 'the power' and provide a reasonable 'load' to the transmitter.

Amplica's new RC-10: Altogether, the world of TVRO never looked so good.

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That makes Amplica's new RC-10 a sure favorite with TVRO buyers since this Satellite Video Receiver System is easy to install and provides unmatched performance and reliability.

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- **Push-button audio subcarrier selection**
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allow you to actually 'see' what your transmitted signal looks like.

Unless you can do this, you have no accurate way to set up your video modulation control. Too little gain on the control, and your pictures are 'washed out.' Too much gain, and the whites buzz and hiss and get 'saturated,' or super white. A direct receiver cannot help you here because it gets so much signal, from so many sources, that it looks 'lousy' even when your transmitted pictures are perfect.

If setting the video is a problem, setting the audio is potentially an even worse problem. You can detect and monitor on a video monitor the outgoing video. You can measure the outgoing power and reflected power with a simple 50 microamp meter. But the audio almost has to be tuned in on a television receiver. And since the quality of the audio is largely determined by the video sync levels and the quality of the video, there is no reasonable way to monitor your outgoing audio from a location close in to the transmitter.

We have found that the best technique is to go some distance away, back behind the direction the transmitting antennas are pointing, and permanently mount at ground level or **even** below ground (!) a small coaxial cable fed receiving antenna for the operating channel. Run the feedline back to the control point buried a few inches underground, and take it directly to a receiver. Make sure the coaxial cable feedline between the off-air monitoring antenna and the receiver is heavily shielded, quality line since you don't want any signal picked up by the line proper.

Going to all of this effort may seem foolish, but if you are in a position to make adjustments to the transmitter video and audio levels, you **must** have some accurate way of determining when you have those adjustments properly set. To make certain the only signal your 'monitor receiver' sees is the signal coming from your transmitting antennas, you have to take extra precautions to control 'stray pickup' from other signal sources in the area; such as the transmitter box itself.

Satellite Signal Source Variations.

All of the preceding assumes that you will plug a single satellite signal source into a transmitter and having once set everything up, leave well enough alone.

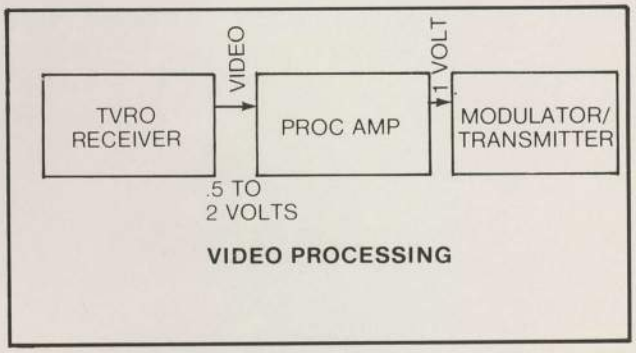
You may have two or more satellite sources, whether you use a single receiver and change channels with it on occasion, or have multiple receivers and 'switch' between them as a source for the video and audio to modulate the transmitter. The bottom line first; for all practical purposes, **no two** satellite **signals are alike.**

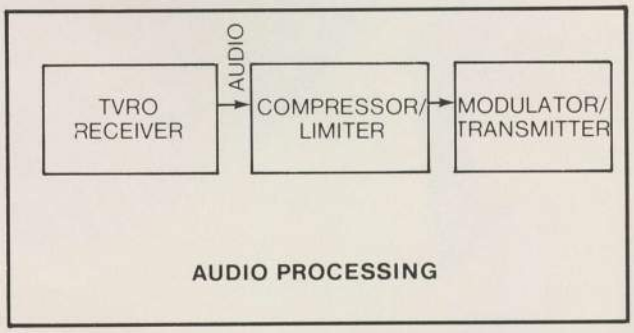
Any modulator or TV transmitter is sensitive to changes in video level, and audio level. A TVRO receiver that produces a 0.7 volt peak to peak video baseband signal is not the same as a TVRO receiver that produces a 1.0 volt peak to peak level. Not to the modulator, anyhow. The modulator depends upon a certain level of peak to peak level to properly modulate the transmitter. Too much video and the picture turns saturated. Too little, and it washes out. If life was simple, you could take the top off of each receiver and adjust the peak to peak levels to the same point using a test instrument such as a waveform monitor. Unfortunately, this will only hold for the particular satellite signals you initially adjust for. Simply changing satellite signal sources is a guarantee that what was 1 volt peak to peak on one service can well be .7 volts peak to peak on another. Most receivers attempt to control this variation automatically, but sometimes the changes are so great that their control range is exceeded.

A home type modulator has a pretty decent 'leveling' circuit built into it; often far better and far more able to cope with sudden changes than the commercial modulators. The commercial folks figure **you are going to control** the levels going into the modulator, and they don't include circuits to handle **wide** level changes.

A more practical, but expensive answer to this problem is to install a video processing amplifier (Proc Amp). A Proc Amp acts like a 'limiter,' cutting down suddenly high video levels, or a 'booster,' raising up levels that suddenly drop low. Installed in the line between the TVRO receiver and the modulator, it assures you that most of the variations will be automatically compensated for.

The difference in audio levels is also a problem. People may not like sudden changes in video, but at least their senses are not injured. A dramatic increase in audio level can raise them out of their chairs! The solution is an audio limiter that keeps tabs on the levels going through it, automatically attenuating any that rise above control-set





limits. This is about a $400 box. For several times that amount, an audio system that raises low levels and attenuates strong levels to a pre-set level is available. As you can see, life can get considerably more complex, and expensive, the minute you deviate from the simple TVRO receiver / transmitter lash up!

Dressing Up The Service.

As long as you are simply 'repeating' through a terrestrial transmitter the signal or program service of a single source, the entire system can run pretty much unattended. Solid state equipment, kept at a reasonable temperature (i.e. not allowed to 'bake') and dry will run for years without much attention, if it gets through the initial 30 day bake-in period, and you have 'clean' power to the equipment. We'll talk about power problems shortly.

But suppose you want to make the service look a little more like something that identifies it to you, your company or your area? How do you do that?

Obviously you need the ability to 'pull away' from the satellite feed, on cue, and insert your own local video and / or audio. Now life starts to get complicated, and expensive.

The simplest form of local video is a small camera. The simplest way of switching from the satellite feed to the camera is to install a video switcher that allows you to select which source you wish fed to the transmitter. Simple home video product switching systems will work but the on-air look will not be very good since each time you switch from one source to another, you are switching the reference sync signal which the viewer television set is tuned to. Not only will the two reference sync signals differ (causing the TV receiver to jump or jitter), but there will be a split second during the switch when there will be **no sync signal** present at all. And that will drive the TV sets crazy!

The next step up is a vertical interval switcher. These start at around $1000 and go up. They combine switching of audio and video (virtually all home type switchers deal only with video, and that leaves you with trying to figure out how to switch the audio at the same point in time) and electronically delay the switching, after you push the button, until the next 'vertical interval' comes along. That is a part of the TV waveform where you can switch without causing a jitter in the picture.

Being able to do a 'clean switch' is nice, and since a vertical interval switcher also allows you to **simultaneously switch the audio** as well, you have a package which reduces the opportunity for operator error. Most vertical interval switchers have between 6 and 12 'inputs' and that means you can plug in several different video and audio sources into the same switcher and then select which of them will be connected to the transmitter with the front panel buttons. A

The Immaculate Reception– now available for your existing system.

The Avantek Simulchannel™ Receiver system is now available with integral downconverter to save you space and dollars.

With Avantek's new downconverter, in the AR1000 Simulchannel™ Receiving System, you can share one downconverter with up to five receivers, all in a single mainframe. You've saved space over self-contained receivers, and *reduced per-channel cost* at the same time.

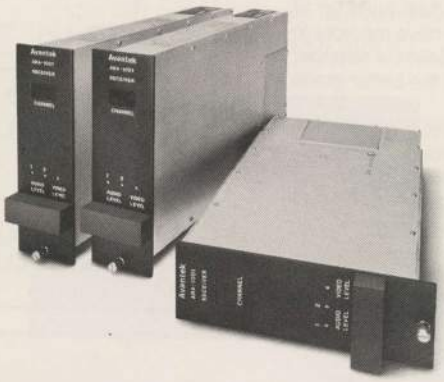
This system is fully compatible with your current equipment that has LNAs installed on the dish. It's based on our proven AR1000 video receiver, but instead of putting the downconverter at the dish, as we would in a new installation, we've made it a plug-in to fit the rack-mounted mainframe. The downconverter occupies the first slot, leaving room for five additional receivers.

The mainframe includes touch-pad tuning control that allows each receiver to be easily set to any of 24 transponder channels. And since each receiver is a plug-in unit, they can be added as needed.

We invite you to compare cost and quality of adding channels any other way. And if the specifications confuse you, just take a look at the picture. Then you'll know how much you're getting for your money.

New Optional Feature

If your receivers are located remotely, another Avantek innovation will be of interest. We've added "refresh memory" to our tuning control so that if the power is lost, the receiver memories won't forget what channel they're tuned to. It holds the information until power is restored—up to 24 hours—so there is no necessity to reset channel allocations.



In all, these are just some examples of Avantek's continuing engineering program that builds customer benefits around sound product ideas. Avantek is a complete supplier of products for the CATV Industry providing state-of-the-art electronics for quality satellite TVRO and test equipment to maintain a quality system.

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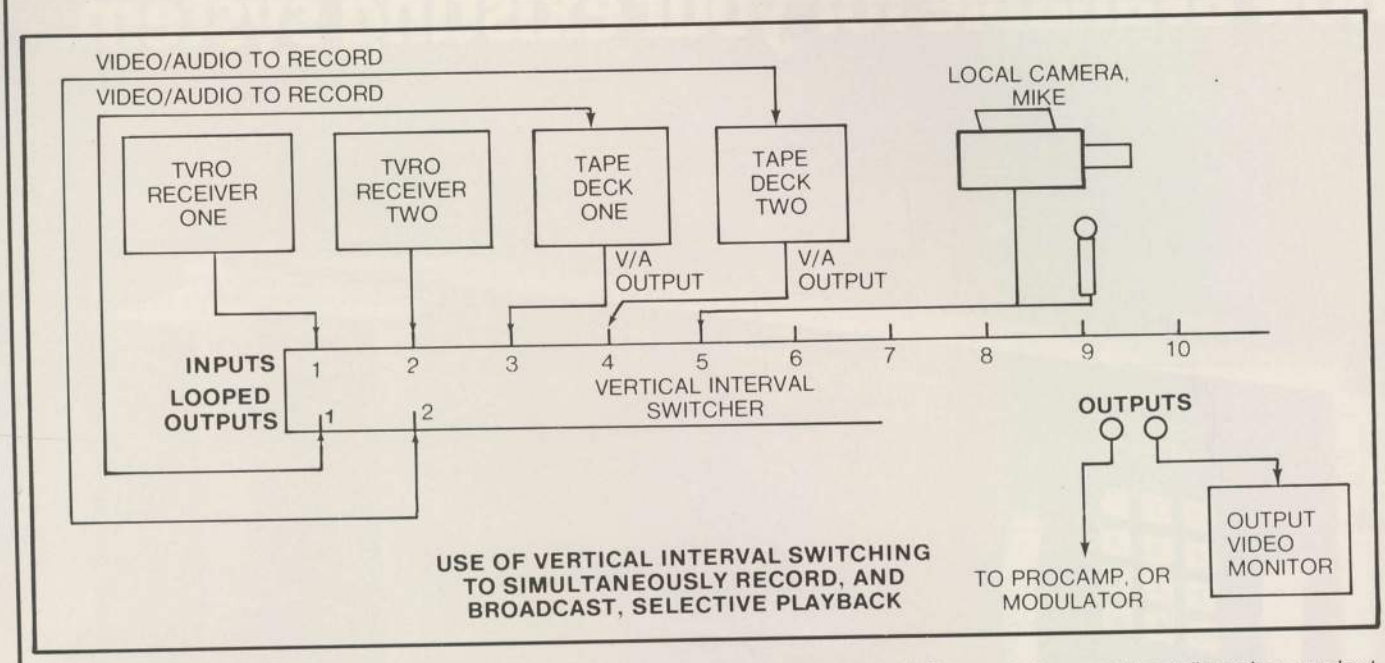


USE OF VERTICAL INTERVAL SWITCHING TO SIMULTANEOUSLY RECORD, AND BROADCAST, SELECTIVE PLAYBACK

couple of TVRO receivers, a camera, and even a tape deck or two can be connected giving you a greater versatility in what you transmit.

If you have a pair of satellite receivers, you can connect them up so that each feeds a separate input on the switcher. The switcher has a 'loop through' connection system, which means that you can feed into it, extract enough signal to connect to the transmitter, and then go on through the loop-out connector to another piece of equipment. If you also had two tape decks, you could go from satellite receiver to switcher, loop out of the switcher and into the record spigot on one of the tape decks. Now you can record on that recorder, whether you are selecting that particular TVRO receiver for transmitting source at that point **or not.** Then you take the output from **that** recorder and feed it to **another** switcher input position. Do the same with the other TVRO receiver and tape deck.

The result here is that you can switch-connect TVRO receiver #1 to the transmitter, and simultaneously record that program on tape deck one. Then you can **also** be taping TVRO receiver #2 on tape deck #2. At the appropriate time, you push the play button on tape deck 1 or 2, select the appropriate input that connects the output of the tape deck to the transmitter through the switcher, and transmit the previously taped program. This gives you a push-button time shift system and the ability to re-structure the transmission day to suit your own idea of what and when your audience should have access to various satellite delivered programs.

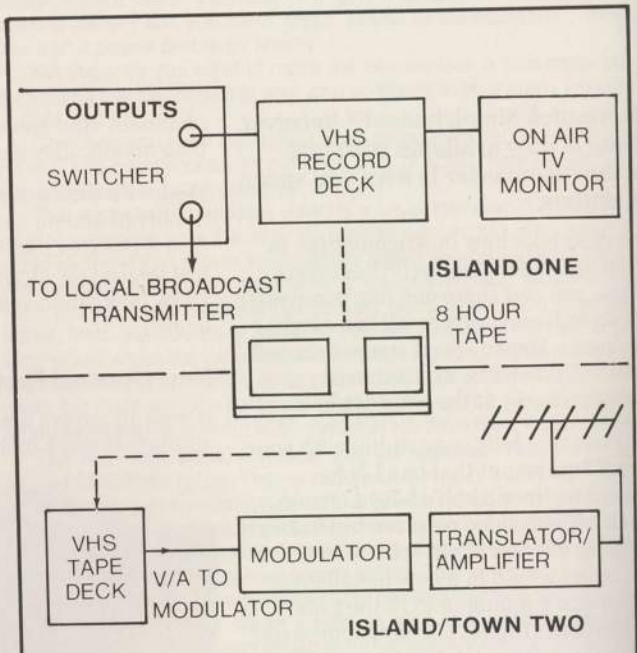
Recently the VHS format folks have come out with 8 hour tapes. The beauty of an 8 hour tape is that three of them make a full 24 hour broadcast day for fulltime operation. If you stick to the higher quality 8 hour tapes (i.e. Fuji T-160 Fine Grain Beridox; TDK Super Avilyn T-160) **and** use a bulk tape eraser between **each use** of the tapes, they will hold up for dozens of uses without signs of drop out or wear and tear. That means do not depend upon the erase head in the typical VHS machine to erase the previously recorded material, and provide a 'clean tape' for the next recording. There is a residual build up of previously recorded signals on a tape (a tape has to have memory to function and some of that memory lingers), and it takes a stronger head than the built-in erase head to eliminate it from the better grade tapes.

One of the interesting things being done on some of the Caribbean is for one central satellite terminal to act as a control center for the satellite signal reception and processing. During the course of the broadcast day on that island, one, two or three 8 hour tapes are made of the local broadcast service. These tapes then become the **next** broadcast day for **another** island, reachable by air transport. The tapes are sent to the next island where a VHS tape deck, and a VHF translator and a set of antennas provide virtually unattended coverage. This is one effective way to **increase** the audience base, and get into areas which are not large enough to support their own full satellite terminal. At most the programming is one day old, and access to even day old news and sporting events to an area where there is no TV is a real treat!

POWERING

Remote areas seldom have reliable power available. Power to run your equipment is a very real, **persistent** problem.

Islands and remote communities often rely on diesel generators for AC power. Diesel generators run in such locations are seldom well maintained, and you have both wide voltage variations, and, wide



USE OF 8 HOUR VHS TAPE FOR "SATELLITE STATION" FACILITY

MWA Replacement Amplifiers As Near As Your Phone

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Generic Type MWA	Avantek Model GPD	Frequency Response, MHz	Gain, dB (−55 to +85°C)	Typical Noise Figure, dB	Typical Power Output, dBm
−110	−110	0.1—400	13	3.5	−2
−120	−120	0.1—400	13	5.5	+8
−130	−130	0.1—400	12	7.0	+17
−310	−310	0.1—1000	7	6.0	−2
NONE	−311	0.1—1000	12	5.5	−2
−320	−320	0.1—1000	7	6.5	+8
NONE	−321	0.1—1000	12	6.0	+8
−330	−330	0.1—1000	6	7.0	+16
NONE	−331	0.1—1000	10	7.0	+16
NONE	−410	0.1—1300	10	6.0	−2
NONE	−420	0.1—1300	10	6.5	+8
NONE	−430	0.1—1300	8	7.0	+15

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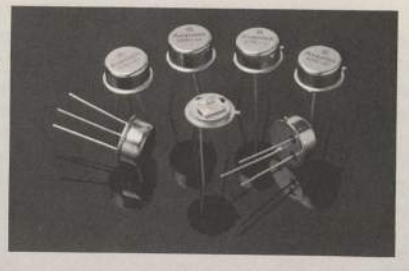

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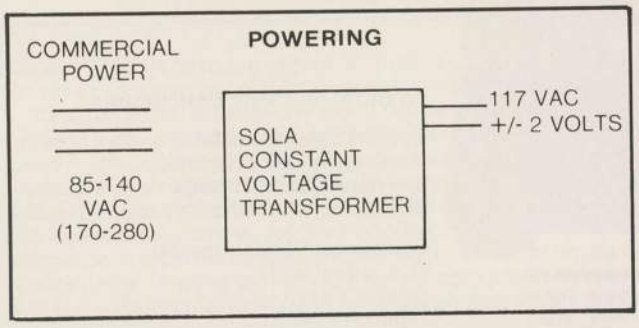
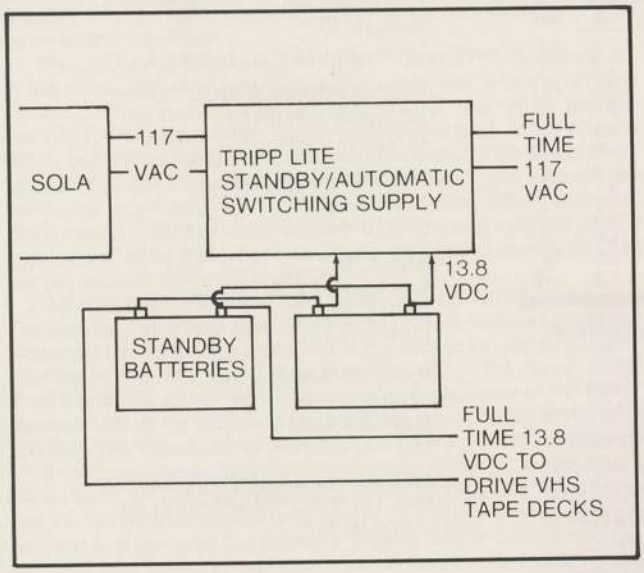
hertz-per-second cycle variation. Each is a disaster.

Increases or drops in voltage cause electronic equipment designed to operate within a reasonable 'window' (such as 100 to 125 volts AC) to sputter, and quit. Losing an LNA or a tape deck or a TVRO receiver is never fun; but when you are hundreds or thousands of miles from the nearest spares depot, it can be very unnerving.

Often the best answer is to get yourself totally free of the local power service, if in fact it is known to be unstable. With modern, solid state equipment, this is now far less costly than it was even a few years back.

Over and under voltage conditions are the first problem. **Too much voltage** (i.e. above a nominal 125 VAC) will cause voltage regulators and power supply components to 'snap.' Too little voltage changes the operating characteristics of equipment and can cause motors (in tape decks) to draw excessive current, and burn out. There is a window where most equipment will operate safely and typically that is between 100 VAC and 125 VAC. A good quality voltage regulator that provides a relatively constant output for varying input voltages from the local power mains is the answer. One such family of devices is the SOLA (brand name) Constant Voltage Regulator(s); or, Mini/Micro Computer Regulator. These devices can be wired to have a primary connection of 115 **or** 230 VAC, and the output side is 117 VAC ± a couple of volts. Everything in your station then plugs into the output side. They are available in various wattage sizes from a few hundred up to many thousands of watts.





If a combination of high / low voltage, **plus** frequently interrupted power service is your problem, you need to add, after the Sola device a TrippLite Standby Power Supply. This unit has a built-in automatic change over so that if commercial power fails, you are switched to a bank of batteries which provide 12 volts to the Standby Supply. When commercial power quits, there is a very fast automatic switch to backup AC created by an inverter built into the TrippLite Unit. You install as many 12 volt batteries as you need to carry you over for the longest power outage you are apt to experience. The 12 volt batteries are automatically charged when commercial power is on by the Standby Power Supply unit.

Of all of the equipment put into use in the Turks and Caicos, only VCR tape decks have a bad problem with varying AC line current rates. Most tape decks use the commercial AC frequency (i.e. nominally 60 hertz) to derive a 'clock frequency' for motor drives and other important tape deck functions. If the 60 hertz is **really** 59 or 61 hertz, your tape decks function poorly. It is possible to install equipment which will generate your own sine-wave (not square wave) AC, at 60 hertz (± 0.5 hertz) but the expense is very high. Topaz manufactures equipment to do this, but a 1,000 watt unit costs nearly $2500 and that is just part of your problem. You need nearly 80 amps of **continuous** 12 volts to provide input voltage to the unit for 1,000 watt AC output!

A better answer, if you are planning to operate tape decks in conjunction with a station in a remote area, is to use 12 (13.8) volt battery operated decks, and run the decks from a trickle-charged 12 volt system full time. In that way, the VCR decks generate their own motor and reference drive signals **from the 12 volt source** and this bypasses the decks falsely locking onto a wandering 60 hertz source. Panasonic and others offer 12 volt operated decks (usually capable of AC **or** DC powering). Simply throw away the AC cord and design the system to be 12 volt operated full time.

Powering problems in remote areas summarize this way:

1) **Voltage too high:** Power supply components, regulators quit, shutting you down.
2) **Voltage too low:** Powering transformers overheat, regulators may quit, receiver VCO's may wander and LNAs may lose gain and / or noise figure, or shut down.
3) **Switching transients** (occurs when primary power source switches from one generator unit to another): Power supply components quit, TVRO receivers not adequately regulated may 'pop' transistors and VCOs.
4) **Voltage shuts down / comes back on:** TVRO receivers may come back on **another channel,** or between channels. Transmitters (such as PC Electronics units) may pop primary fuse, shutting them down. 'Switcher' units may unlock and when power returns there is no video / audio fed through switcher **until** somebody re-enters a switching command.
5) **Wandering 60 hertz frequency:** VCR tape drives notice it first causing tape tracking errors that cannot be manually corrected. Large frequency excursions may also cause video picture flicker and / or AC ("60 hertz") bar to drift through video because input reference from satellite now widely differs from local reference AC frequency.

All of this says that adequate pre-planning is required. Stateside users are 'spoiled' because traditionally they can plug in and operate virtually anyplace. Few other areas of the world have such dependable, precise, local electrical power systems!

PITFALLS OF SCRAMBLING

If moving the frequency of the rebroadcast transmitter away from a standard television channel is not adequate, nor a complete answer, for your planned system, that leaves you in the business of devising a 'scrambler' system. Such a system requires special equipment which you install so that the transmitted waveform is distorted or otherwise 'messed up,' **on purpose,** when the signal leaves your station. This requires subscribers to have a proper 'descrambler' unit at each receiving location so that the purposefully introduced distortion can be removed for quality viewing.

As all students of scrambling technology and satellite transmission are aware, the art of economical, foolproof scrambling is not perfect. Cable systems routinely scramble many or most of their premium service channels, and cable industry studies suggest that there may be upwards of 1,000,000 non-paying viewers of so-called scrambled premium service channels.

Because the only volume-available, and economically priced, scrambler systems in the market are those designed primarily for cable system use, we cannot expect any more security for **our** own over the air transmissions than cable has for **their** cable secure transmissions. This simply means that sooner or later, somebody **is** going to figure out **how** you are scrambling, and build or buy on their own a descrambler. From that point forward, you have your own

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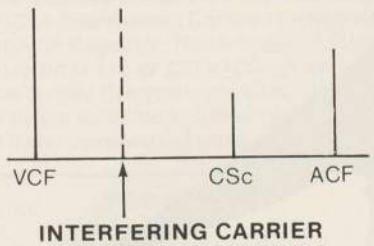
'security' problem.

For our purposes here, there are only two techniques which cost 'little enough' that they can be seriously considered for use in **remote** areas.

1) **Introduction of an interfering carrier:** The transmitted video waveform is sensitive to other signals which fall within the portion of the 6 MHz channel width that normally carries the picture information. There are a couple of spots within the video portion of the signal where, if you introduce another carrier signal, the picture disrupts. That is the premise of a system first pioneered by TEST and later expanded by Eagle Comtronics.

If the output of the modulator is taken through a box which generates one or more carriers and those carriers are mixed with or added to the normal modulated TV signal, at the appropriate levels, the final transmitted signal will contain the necessary video information **and** the interfering carrier signal(s). The box that accomplishes this is called a 'Scrambler' and it goes at the station.

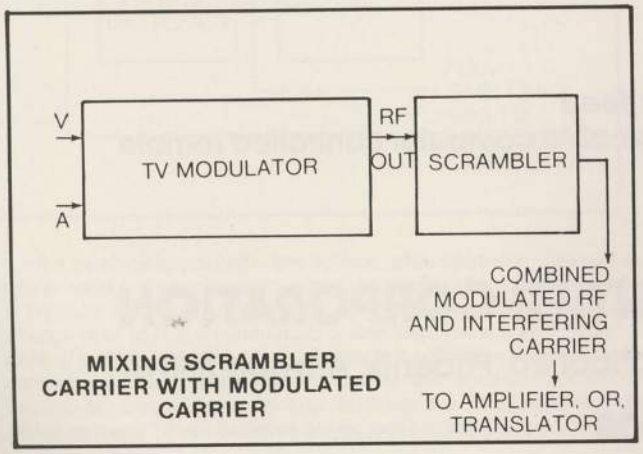


INTERFERING CARRIER INTRODUCED 2+ MHz ABOVE VIDEO CARRIER FREQUENCY

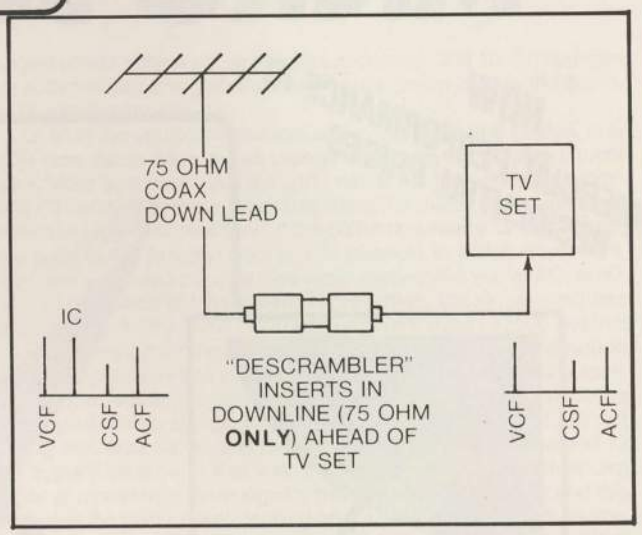
To restore the picture to an interference free state at the individual authorized receiving locations, you must somehow figure out a way to eliminate the interfering carrier(s) introduced at the transmitter site. TEST and Eagle accomplish this by installing in the coaxial cable feed line leading from the receive antenna to the receiver a very high 'Q' (i.e. highly selective) signal trap. It operates on the VHF channel that you operate on, and zero's in on that particular frequency where the interfering carrier(s) is located. It 'sucks out' or eliminates the frequency that has the interfering carrier, but leaves the balance of the TV signal ostensibly alone.

The advantages to this system are economics (the scrambler piece costs under $900; the individual home-installed descramblers under $10) and ease of operation. There are no user field adjustments, and the descrambler piece requires no electricity to operate; it is entirely passive. We'll look at the disadvantages shortly.

1) **Messing Up The Video:** The TEST / Eagle system leaves the original video intact, and introduces scrambling by generating another 'carrier signal' that rides along with the normal transmission. Other, more sophisticated forms of scrambling attack the video **at baseband,** or before the signal is modulated.



MIXING SCRAMBLER CARRIER WITH MODULATED CARRIER

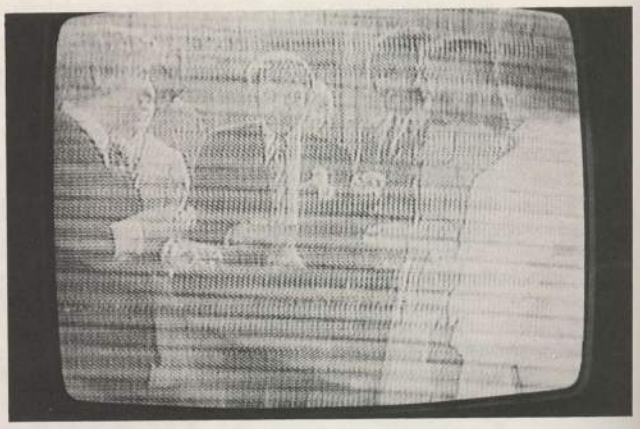


There are so many things a clever engineer can do to screw up the video that the possibilities are about as many as the number of engineers working independently on the project. The idea is to make the video so distorted, or unattractive, that people will pay you money to unscramble it.

However, anytime **you** start to do 'bad things' to the baseband video, you are messing with the parameters which **other engineers** have fought hard to keep pure and distortion free. There is some give and take involved; the more you do to the video to mess it up, the better the chance that you won't get all of the distortion out of all of the receive locations all of the time.

And, whereas the interfering carrier is removed with a 'passive' or non-powered descrambler device, as soon as you scramble by doing something 'actively' to the baseband video, you must have an 'active' descrambler at the receive location.

There are a number of firms offering cable hardware for this function; RMS, Hamlin, Eagle and Zenith are among those in this marketplace. The basic scrambler goes for upwards of $1800 while the descramblers may average $70 each in relatively small quantities. The descramblers typically function with an input of either VHF channel 3, or 4 since they are designed to **follow** a CATV converter box that brings all VHF, Mid Band and Super Band channels to a channel 3 or 4 output.



THE LOOK OF SCRAMBLING when the scrambling carrier is run at the same power level as the modulator, ahead of translator / amplifier. Audio is also 'messed up' by warbling 'bird like' sound. Level of interference diminishes when interfering carrier level is turned down to accommodate a translator that cannot handle extra carrier power.

Get the whole picture

It's all here - just what you've been looking for!

Satellite TV Week

5:30 P.M.
6:30M 7:30C 8:30E 9:30A

01 [D3] – Facts of Life Natalie's story of an Eastland girl having an abortion comes back to haunt her.

01 [F3] – Mobil Showcase 'Hedda Gabler.' Susan Clark stars in Henrik Ibsen's drama of a woman racked in inner conflict.

02 [F3] – Jim Bakker

04 [F3] – MOVIE: 'Body Heat' The love affair of a lawyer and a married woman unfolds into a crime of passion. William Hurt, Kathleen Turner, Richard Crenna. 1981.

05 [F3] – MOVIE: 'Zorro the Gay Blade' Zorro and his effeminate brother are portrayed in this comic spoof of the legend. George Hamilton, Lauren Hutton, Brenda Vacarro. 1981. Rated PG.

06 [W4] – Mis Huespedes Comedia musical sobre una casa de huespedes y las situaciones comicas que envuelven sus huespedes. Maria Victoria.

07 [W5] – Mixed Bag 'New Wave' surveys the effect of the New Wave movement on American life.

07 [F4] – Erotica Awards Special The Erotic Awards featuring highli

10 [W5] – Showtime at the Apollo

11 [F2] – Gubernatorial Debate-Democratic

15 [W4] - World Specials "The Killing of Sadat"

17 [W4] - Previn and the Pittsburgh "Perlman: Cool and Classic" turns the spotlight on violinist Itzhak Perlman, Andre Previn (piano), Shelly Manne (drummer), Red Mitchell (bassist) and Jim Hall (guitarist), as they jazz it up at Pittsburgh's Heinz Hall for the Performing Arts, with original music by Previn. The show is a candid close-up on the making of a jazz record and this unlikely group demonstrates what happens when great musicians get together to make music and have fun.

19 [F4] – MOVIE: 'Halloween II' A demented killer returns to terrorize his hometown. Jamie Lee Curtis, Donald Pleasance. 1981.

21 [W4] - The Case of Dashiell Hammett"

22 [W4] – New Antiques

24 [F3] – MOVIE: 'First Monday in October' The first woman U.S. Supreme Court Justice engages in battle-of-the-sexes with another

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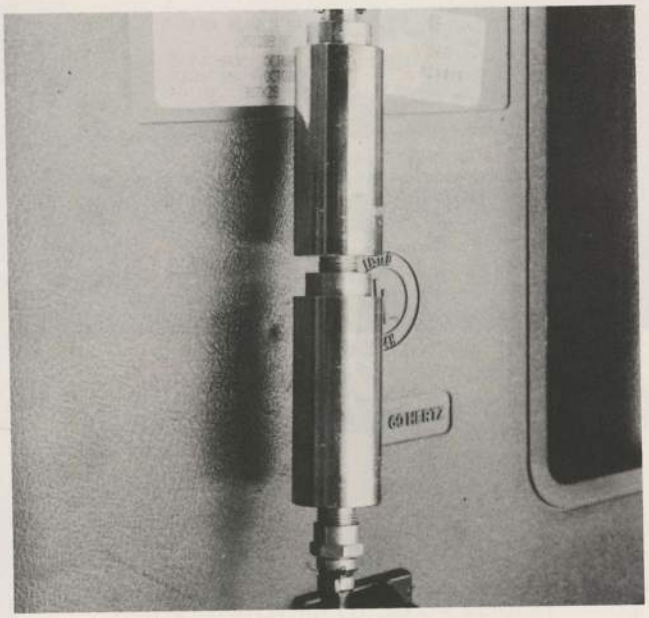


EAGLE descrambler is passive, highly selective, tuned trap. It inserts in transmission line just ahead of receiver and 'sucks out' unwanted interfering carrier.

The advantages to this system are the higher degree of security possible with baseband scrambling, and, the fact that most of the descramblers are designed to work with a cable 'tiered' system. That means, simply, that there are several scrambling codes built in or available for the transmit end. Inside the **descrambler,** you have a wire or two to change, or, a control to adjust to make the descrambler function with the same code as you have elected for the transmitter. This in turn means that you can **vary** the scrambling code as a function of time of day, providing a service that is coded in a certain way for between say 7 AM and 10 PM, and then switching codes at 10 PM for a 'late night service.' You might, as some do, charge a flat fee for the day and early evening service, and an **optional** second fee for the late night / all night service.

Another advantage to this is that **if** you start all of your subscribers with the same effective date (say January 1), you can select one code for a full year of service. By pro-rating later subscribers to end with the end of that calendar year, you can then go in on the first day of the following year and change the code. That is one way to insure that everyone comes back with a renewal since you will also change the individual descrambler code at the same time for those who have paid for a renewal. And that brings us to the disadvantages for the **passive** system.

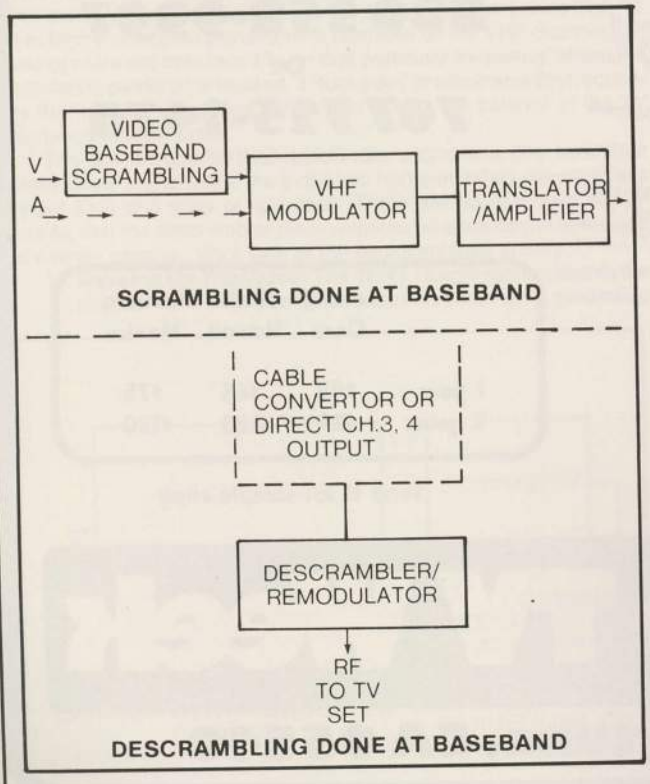
To be properly effective, the interfering carrier generated by the TEST / Eagle scrambler must be run into the air at the same 'level' or strength as the main TV carrier. When you loop the output of the TV modulator through the scrambler, and effectively mix the TV carrier (modulated) with the scrambler generated interfering signal(s), you have a way to adjust both to the same level. Failure to do this, so that the scrambler signal ends up being **weaker than** the picture carrier for example, will reduce the effectiveness of the scrambling carrier.

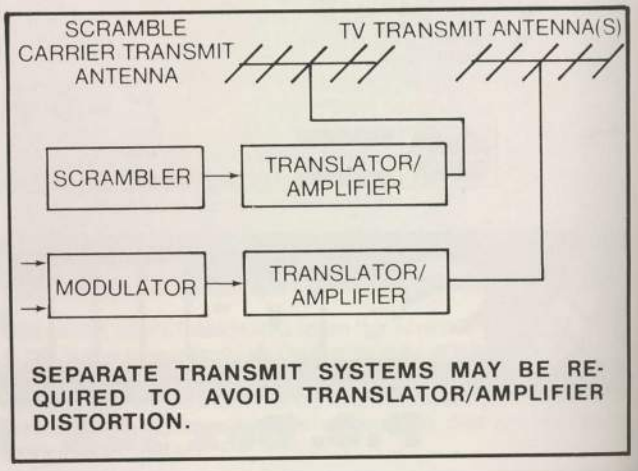
By the same token, if you run the scrambling carrier too high, or strong, you will have so much of it with the TV carrier that the passive traps will not eliminate **all** of the interfering carrier. This will leave diagonal lines moving across the screen for the home viewer who has paid, although it also makes viewing even more miserable for those who have not paid.

Some careful day to day attention is required to keep the system in balance. But there is a larger problem. Not all VHF translator packages can handle the additional carrier passing through them. If you modulate on say channel 7, and do your actual transmitting on channel 4, you have a channel 7 input and channel 4 output translator. Your scrambler is operating on channel 7 because you are mixing the scrambler signal with the modulator signal ahead of the input to the translator.

The Anderson Scientific translator, for example, simply **cannot handle** the extra interfering carrier, when it is operated at the same (as recommended) level as the modulator generated TV carrier. In fact, you have to back off or turn down the scrambler interfering carrier by a full 10 dB to keep from driving the translator into a distortion mode (which **really** messes up the picture!). So you are darned if you do, and darned if you don't! Run the scrambler at the proper level, and **everyone** has bad pictures. Run the scrambler at a reduced level, and those people with many designs of black and white receivers don't even know (or can hardly tell) that you have the scrambler turned on!

The normal solution to this would be to turn down the translator, so that it runs at some reduced output power. This is a common practice when you have exceeded the 'input ratings' to an amplifier (and the extra carrier does this), and the 'gain' of the system must be reduced to allow the extra carrier to pass without causing the amplifier stages in the translator to distort. Unfortunately, there are several points in many translators where gain is achieved and **each** must be individually 'turned down' to insure that distortion does not creep into the





system.

A more universal solution to the problem is to treat the scrambling carrier separately, and not attempt to transmit it through the TV translator at all. With this approach, you take the scrambler carrier output and feed it into its own 'translator' or amplifier. This bypasses the TV translator box and affords you the opportunity to run the two transmitter levels up and down independently of one another. You then have the option of combining the two signals with a directional coupler and using the same transmitting antennas for both, **or,** hanging two separate sets of transmitting antennas; one for the normal TV transmission and one for the scrambler transmitter.

RETRANSMITTING MARGINAL SIGNALS

Each time a set of base band signals (audio plus video) are passed through another chain of transmision and reception, the quality of the signal suffers. This is one of the reasons why commercial broadcasters virtually insist upon having 54 dB signal to noise ratios for their regular (satellite and microwave delivered) feeds; they know that long before the signals reach a viewing home, the quality will be far lower.

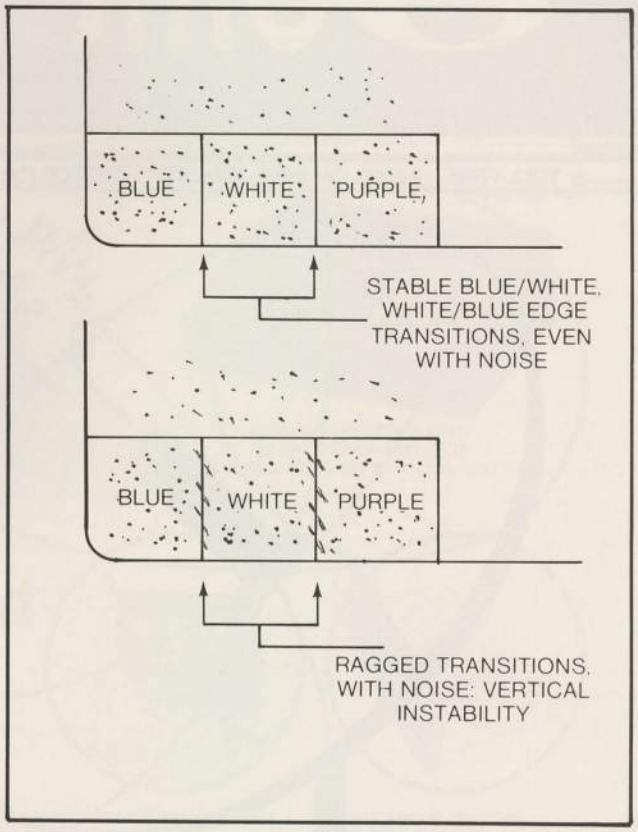
In the satellite business, a signal received on a standard full transponder format receiver is typically right on the edge of sparklies when the video signal to noise ratio is 48 to 49 dB. Some receivers claim better than this but such claims seldom hold up with hard measurement.

That says that if you look at a monitor at the TVRO site and see **absolutely no sparklies at all,** even under saturated red and blue and yellow conditions, you are likely to be 49 dB SNR or better. As a general rule, you should attempt retransmission of no pictures that do not measure up to at least this level of service. Unfortunately, that is not always practical.

One of the more common problems, even with signals that appear to be in the 48 / 49 dB SNR region or better, is a loss of color on the retransmitted signal. The color looks great on the off-bird monitor / receiver, but when you look at it on the retransmission frequency, it is gone! The problem here is that the color sub-carrier level on the original inward bound satellite transmission is low; sufficiently low that by the time you have passed it through another link in the chain, it is gone or lost. This is actually happening in the retransmission **modulator** (although in rare circumstances it could happen in the amplifier / translator in the system) and the only quick answer if you have one or more program sources where this condition persists is to invest in a reasonably good quality video processing amplifier. A unit such as the Versa Count VPA-3000 gives you the necessary controls to recreate a color 'burst' signal and set the level so that you have color back again. But it is not an inexpensive fix; around $2500.

Another common problem with border-line signals is tearing of vertical edges; where there is a sharp transition from one scene to another. **You can notice the same thing on a color bar pattern** by focusing on the lower left portion where there is a white and a blue square. If there is noise (sparklies) in the picture, but the line separating the white and the blue is rock solid and not waivering, you have no problems in using that signal. It won't be noise free, but it won't sit there and shake and jitter on you either. If, on the other hand, the transition line from blue to white or the next one from white to purple is coming apart, shaking left and right, this problem will get worse (**much** worse) when the signal is retransmitted. The solution here is expensive, and it may make more sense to look at using a larger satellite antenna to get the signal up enough in level so that the noise goes away and the picture loses the shakes. The fix is called a 'time base corrector' and its purpose is to look at anything in the picture that is not stable (i.e. the timing reference is disturbed by noise) and replace that unstable portion with a new line or video. Time base correctors are normally used for videotape production work, and any that work well enough for satellite system use start at around $9500 **and go up.** There are a number cf them, priced substantially higher than this, that do absolutely nothing to improve an unstable TVRO signal, so before you agree to purchase **any** time base corrector **for satellite video correction,** make certain the seller understands that you will be using it with 48 dB SNR **and below** satellite video signals, and obtain a guarantee that if it does **not** correct your problems, you have the right to return the unit!

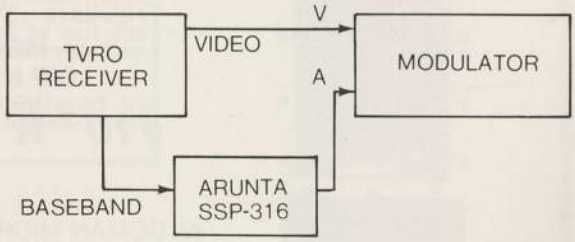
Another video problem, which manifests itself as an audio 'disturbance' on viewer receivers, is the effect that occurs when the received



program supers letters and other character generated text over the video scene. If you have ever been watching a close-to-threshold signal (some sparklies), and you heard the audio buzz and hiss at you when they switched to a 'super,' you know the problem. The evening newscasts from ABC / CBS / NBC are an excellent trial proving ground since they use some of the most elaborate graphics on a daily basis, in television production today. When the newscaster is moved to the side of the screen and they bring in an insert video source to his right or left, such as a map of Lebanon, and then begin identifying points on that map with supered names, the audio may well get so noisy that you can barely hear the announcer.

Video production techniques tax the delicate balance between the normal color sub-carrier and the audio sub-carrier(s) to the very limit. These bright, less than full screen color displays, are 'hot' and they have very sharp transitions from color to color. How or why it happens aside, is there a solution to it?

The best solution is to get the signal up out of the noise. It takes



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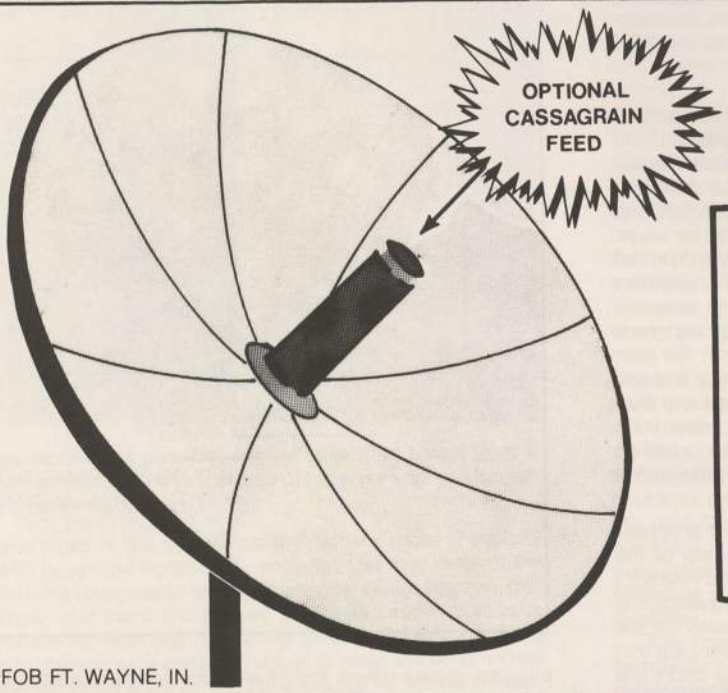

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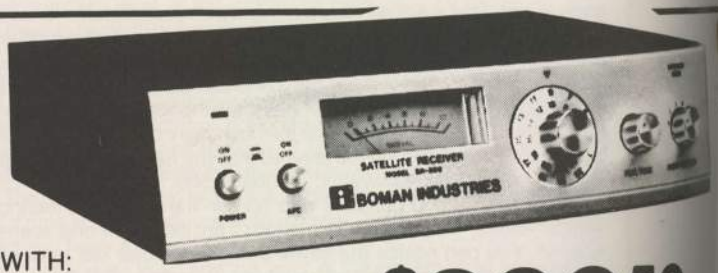

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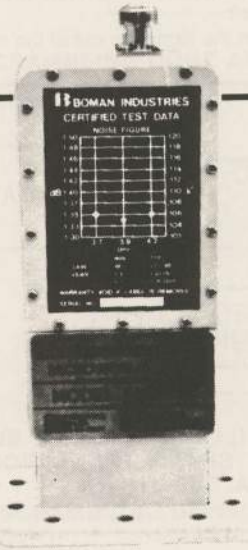

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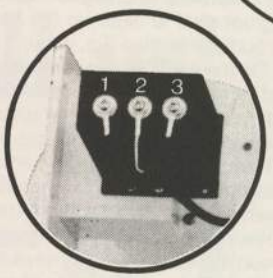

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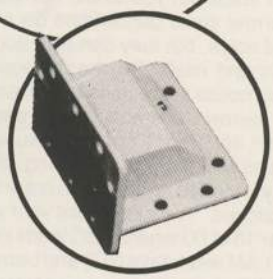

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about 50 dB SNR to eliminate the buzzing in most situations and that is a bunch of additional 'margin' in the TVRO antenna system. It is possible to minimize the effect by utilizing a separate audio processor (one outboard from the TVRO receiver) like the **Arunta SSP-316,** but total elimination is unlikely.

Finally, marginal TVRO signals often include less-than-full quieting of the audio sub-carrier. For some reason, people are less apt to complain about slight picture degradations than they are with noise in the audio. The latest generation of TVRO receivers often offer 'narrow' and 'wideband' audio recovery systems. What they are doing here is 'sharpening up' the audio passband with an audio filter. It is inherent in any system that if you can narrow the bandwidth of an amplifier or processor, you **will reduce** the amount of background noise. Noise, of **this** type, is evenly distributed through the spectrum and the **less spectrum** you pass, the **less noise** you have to contend with.

If 'narrow' **always** sounded better, there would be little reason to leave in a 'wideband' position. Unfortunately, when you switch to a narrow audio passband, you reduce the 'range' or 'width' of the audio present. That means that very high audio frequencies and very low audio frequencies are 'chopped out,' or lost in the narrow band process. A narrow band audio processor may be fine for the typical human voice but you would not find it ideal for listening to music.

Narrow audio bandwidths do a great deal to clear up the background noise, but they can also add audio distortion (i.e. making the audio sound 'muddy') in the process. On the AVCOM line of receivers, you can notice some units which tend to make female voices 'crackle' in the narrow band position (on **early** AVCOM narrow band units; a problem apparently corrected subsequently). This is also true with others as well. So you are trading off here; less or no noise for perhaps slightly distorted audio which crackles on audio sounds that are fairly high pitched. You can check your own system by tuning onto transponder 13 of D3 where ABC feeds network programming. Between 10 and 11 AM weekdays (ET) and between 4:30 PM and 6 PM weekdays (ET) ABC transmits a test signal that includes a sliding scale of audio tones. Place your receiver first in a wide band (or normal) position and listen to the audio as the tones increase in frequency. Then switch to narrow band and listen again. If you have twice as many tones, audible, in the wide band mode as the narrow band mode, you will be observing the effect of audio frequency limiting in the narrow band mode.

A solution? Well, external audio processing systems are available, through audio specialty shops. The best package to tackle the problem may be an **audio equalizer** system. This gives you a dozen or so controls allowing you to set up your own audio passband processing network, selectively filtering low and / or high portions of the audio spectrum to suit your ear. For around $250 you can equalize the satellite audio with one of these packages, filtering out the high frequency hiss **and** the low frequency rumble that is attached to a less-than-threshold TVRO signal. That's the good news. The bad news is that each time you change transponder, you will probably have to go through the set up exercise all over again, and you may even have to do it when the program changes since the original audio recording characteristics change from master to master. It gives you another set of controls to work with, and for the perfectionist, it is the desirable approach to cleaning up the audio.

SATELLITE REBROADCAST / Sources for equipment mentioned here.

Anderson Scientific / P.O. Box 800, Black Hawk, SD 57718
ARUNTA Engineering / P.O. Box 15082, Phoenix, Az. 85060
Cushcraft / P.O. Box 4680, Manchester, NH 03108
Eagle Comtronics P.O. Box 2457, Syracuse, NY 13220
Hamlin / from Anixter Communications, 4711 Golf Road, Skokie, Il. 60076
Jerrold / 2200 Byberry Rd., Hatboro, Pa. 19040
KLM Electronics, Inc. / P.O. Box 816, Morgan Hill, Ca. 95037
Lunar Industries / 2785 Kurtz St., Suite 10, San Diego, Ca. 92110
PC Electronics / 2522 Paxson Ln., Arcadia, Ca. 91006
RMS / 50 Antin Place, Bronx, NY 10462
Transifier, Inc. / 808 East Coast Ave., Lantana, Fl. 33462
Zenith / (CATV Sales), 1000 Milwaukee Avenue, Glenview, Il. 60025

SUMMARY

Rebroadcasting satellite received video and audio is not complicated, but it is a never ending game of chasing small problems, correcting them, and then standing back to search for the next level of small problems.

The only time it is simple is when you elect to use a single, full time satellite program source, and the signal received is in the 49 dB SNR region and up. Any switching at all, or any near, or at, or below threshold signals will multiply your day to day problems by several orders of magnitude. And the cost of doing it properly will increase dramatically as well.

ROOTS OF TVRO (Part Four)

The Commission possibly planned to do RCA in anyhow *before* the color hearings began. Some have ventured the opinion that Chairman Coy felt that if RCA won the UHF prize, "it would only be fair" if CBS won the color prize—sort of an *"equal spoils for equal folks"* approach.

Still others suggest that the overwhelming Commission interest in the period in color was due *almost entirely*

to the fact that the Commission had come to the realization that VHF would *not* provide adequate television service to all of the nation, and that it *might* be several years before UHF was technically ready. So *the color issue became a diversion* for the senators and congressmen and governors pressuring the White House and the Commission in that period.

Pressure began to mount none the less. Former Senator Clarence D. Dill, who in 1934 authored the Communications Act of 1934, took pen in hand as "Citizen Dill" to write Chairman Coy:

"Nearly three years is too long to delay action on at least enough applications to serve regions without television. Surely the Commission could process some for use of frequencies to certain sections of the country. It is not necessary to provide for all small towns immediately. It is highly unjust not to provide for at least one station for thickly populated areas.

I respectfully suggest that the Commission do something about these situations by making exceptions to the freeze order at once. If I were in the Senate, I would address that body and introduce a resolution that would bring the members of the FCC before the Senate Committee on Interstate Commerce for the purpose of impressing your staff with the injustice of the orders of the Commission by the continuation of this freeze order."

So the Commission began what was to be a new kind of regulation, one manipulated by the raising of flags. Apparently the Commission felt that anything it did *would be* controversial, so it set out to find out which of its plans would create the *least pressure* for the Commission.

One by one the plans were marched out, and each was "raised on the flag pole". After a decent interval of flag flying and "enemy sniper attacks", each flag was pulled down and the bullet holes counted. In the end the flag (plan) with the lowest number of holes in it would be the winner.

An early 1951 plan created channels 2-13 and 14-65. During hearings, the inter-mixing of channels in the VHF range and those in the UHF range drew lots of industry comments. Of the inter-mixture, which was even before the fact a very controversial matter, the Commission said:

"It is reasonable to assume that the economic problems which will be faced by the new broadcasters who occupy the new channels (14-65) will be considerable. However, the same problems were faced by the existing VHF telecasters when they began operation prior to the distribution of television receivers in their areas. If the entire UHF band should be allocated for regular telecasting, all receivers will have to be built to receive both VHF and UHF bands. If the inter-mixture is avoided, there may be receiver design and distribution confusion, and it would become necessary to limit many areas to only one or two VHF channels, even though UHF assignments were available, and additional (UHF) stations could be financially supported."

So the die was cast for intermixing of VHF and UHF. By allowing inter-mixing the Commission was faced with wholesale revamping of the allocations table along the lines suggested by DuMont (recall that the DuMont allocation plan found 4 VHF channels for each of 140 large trade areas).

At the same time there was an at-

This series appears in **CSD** from a pair of issues of **CATJ**, The Community Antenna Television Journal, published in 1975. In this Coop created **CATJ** series, the early history of television broadcasting in the United States was traced to provide a 'record for Congress' of FCC actions and inactions which led, ultimately, to the television network broadcasting system that grew in America between 1946 and 1975. Through this continuing series, **CSD** readers are given the opportunity to better understand the foundation for today's explosive satellite industry growth.

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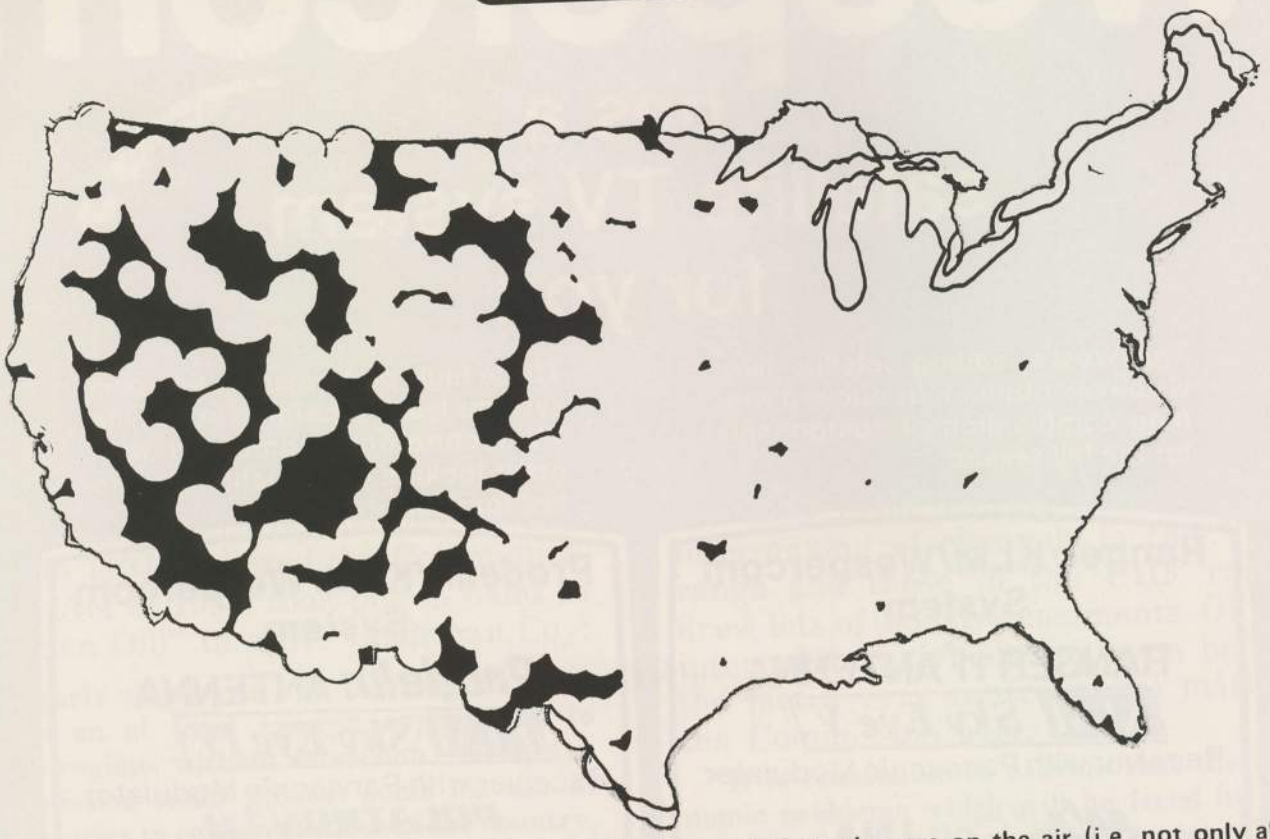

WITH VHF AND UHF CHANNELS—even if ALL allocated channels were on the air (i.e. not only allocated, but active), there are still substantial regions of the U.S. (black areas) without television signal contour coverage.

tack on the FCC's basic "block assignment plan". The Federal Communications Bar Association (FCBA) questioned the Commission's "right" to set up block assignments (i.e. start out with an allocations table which assigned VHF channels by pre-designation to certain areas) on a geographical basis. The FCBA opted for an allocations program similar to that in effect in the AM broadcast band where new station applications were allowed *"when the applicant could demonstrate that his new station would provide new service to underserved areas, without providing interference in the primary coverage areas of existing stations"*.

The ramifications of the proposal were many. As presented to the FCC, it was mostly conceptual. The FCBA spelled out few details how it would implement the program of non-block assignments if approved by the Commission. Basically, though, it would work like this:

"The country would start with the then operating 107 television stations. New applications for new channels would apply for any channel they wished, and it would be up to these applicants to prove that the facility they were requesting would provide new service to an area, and would not interfere in the process with existing service."

It certainly would be a *flexible* plan! But the Commission ruled, "The FCC *does have* the authority to classify stations, prescribe the nature of service to be rendered by each class of station, determine the location of classes of stations or individual stations, and establish areas or zones to be served by each station." They quoted sections of the 1934 Communications Act in their

ruling, and further quoted testimony offered in the formulation of the Radio Acts of 1927 and 1934, by Ex-Senators White and Dill. White had said:

"One of the most difficult problems we had to deal with was whether there should be any preferences written into law with respect to any particular character of service. At the time we were working on the legislation the agricultural land grant colleges, for example, were very insistent that they should have privileged status. There were others just waiting for our decision in this area so they could claim prior rights. We were forced to write the authority for the Radio Commission in very general terms, leaving a large amount of discretionary powers in the hands of the Commission. It was hopeless to try to work it out in legislation."

At least one commissioner disagreed with his fellow Commissioners on this ruling. Commissioner Jones pointed out that the (then under discussion) 82 channels of spectrum space did *not* meet any of the five Commission priorities substantially. The five priorities were to: (1) *Provide at least one television service to all parts of the United States;* (2) *Provide each community with at least one television broadcast station;* (3) *Provide a choice of at least two television stations to all parts of the United States;* (4) *Provide each community with at least two television stations;* (5) Assign any channels which remain, after the first four priorities, to the various communities based upon the size of the population of each community which might receive more than two channels, the geographic location of the community, and the number of television channels of service available to each such community from other television stations located in other communities.

Jones said, of the so-called "inflexible assignment program":

"It is clear that an inflexible geographical assignment plan does not meet the criteria which the Commission asserted as a basis for it, and it is therefore illegal."

Legal, or illegal, it was never seriously contended thereafter.

Late in the summer of 1951 the FCC undertook to provide some measure of relief (it said) for the TV-less areas. It allowed some of the existing VHF stations (i.e. the original 107 then on the air) to *increase their transmitting powers*. This had the effect of extending their service areas, and it also had the effect of making more permanent their audience coverage regions *before* the new VHF (and UHF) stations would come on the air. The power increase program was met with mixed reactions; the stations getting the grants were delighted to be able to increase their service areas. Those who felt this would make it more difficult for the new (UHF) stations to make the grade were *less* enthusiastic. These were, however, the first changes of *any type* permitted in operating facilities, by the FCC, since the freeze began on September 30, 1948.

Another flag run up by the Commission came in late 1951 when FCC Chairman Coy visited the RCA Bridgeport UHF experiment. After inspecting the transmitting facilities and visiting several viewing locations, Coy said:

"I am so sold on UHF that personnally I would like to see all television service moved to UHF."

They never found enough pieces to *that* flag to haul it back down!

SERIES CONTINUES / December

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INDUSTRY AT LARGE

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TVRO In Costa Rica

I live in a residential area approximately ten miles north of San Jose, Costa Rica. There will be about 50 homes here when the area is fully developed. Can anyone tell me what size dish I need, what type of LNA, and what type of receiver to receive US domsat video and audio? We would like to connect all of the homes in the area to the system, use dual LNAs and splitters so that each home could have simultaneous access to both polarizations. Who can help us engineer this system?

Ray Bigler
P.O. Box 223
Heredia, Costa Rica
Central America

With the activation of Westar 4 and Satcom F3R, there should be no fewer than 10 and as many as 25 high quality signals available on a 20 foot dish, 100 degree LNA system; spread over both of the birds. But this can be a tricky installation for those who have never ventured into weak signal areas previously, where system performance must be optimized at every turn.

Taylor (or Ty) In Australia

You may be interested in reading a recent article published in Australia by **'Broadcast Engineering News'.** It seems that Tay Howard, the pioneer of TVROs in North America, and the first President of SPACE, has been lured by the almighty dollar of the pay-TV operators. One point of humor I find with the article is the initials of the new company; I wonder! I may be getting to the states late this year and would like the opportunity to visit with fellow TVRO enthusiasts. I hope to have photos of the Intelsat IVF4 service to Australia shortly and will send them along.

Peter Duddy
16 Tiffany Court
Montrose, Victoria
3765 Australia

Peter pioneered TVROs in the Pacific, first establishing a system in the New Hebrides back in '80 or so. The article Peter sends along reports that Taylor is one of six corporate directors for a firm known as Television Australia Satellite Systems **(TASS). The firm will first bicyle videotapes to outback Australian communities, and then plans to lease 4 GHz space on Intelsat to send programming directly to these communities for about $20 per month. TASS seems to be positioning itself for the eventual development of pay program distribution, via Ku band satellites, in Australia, hoping perhaps for a shot at the** interim **C or 4 GHz band market while Ku band systems are being launched. In the six member board we notice that the article credits Tay with being** "the inventor of the Telesat direct satellite reception system". **They plan to transmit 42 hours per week, in the 5PM to 11PM time slot. Those who would like to swap satellite stories with Peter Duddy while he is visiting North America this fall should write him directly.**

Wold?

Just who is this Robert Wold that you write about; a 5% fellow who snips around the edges of an industry? Why is he involved in so many things?

Billy Crickman
6440 East Raymond Street
Indianapolis, In. 46203

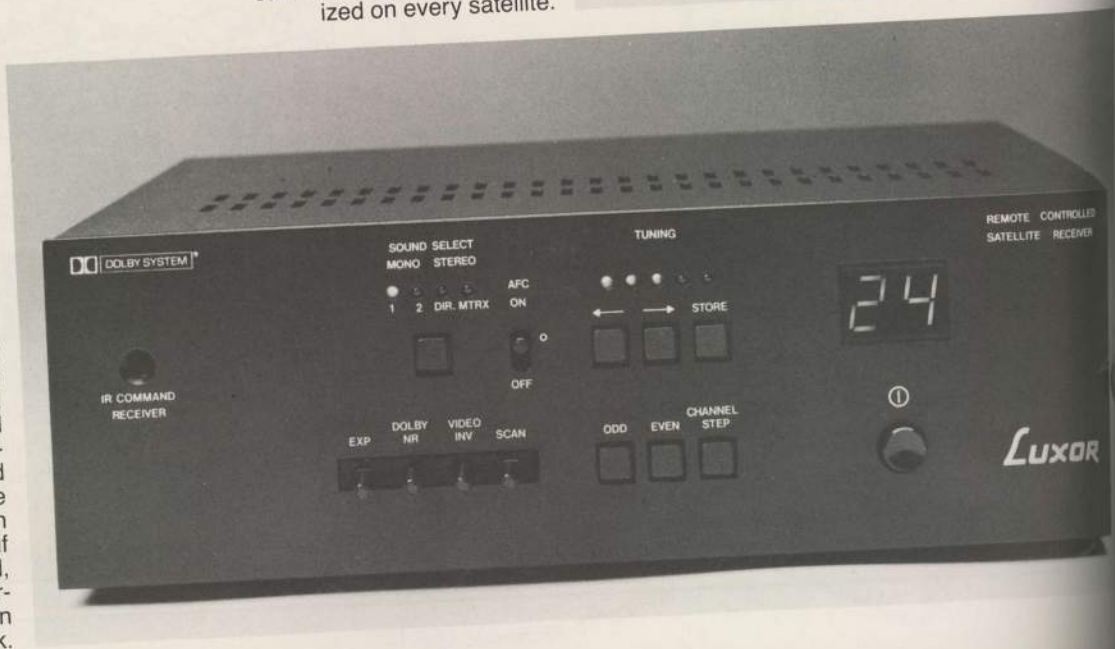
Robert Wold is no edge fellow. Wold was the first **with the vision to recognize that satellite communications might someday be a solid business enterprise. He began by going to Western Union (and subsequently RCA) and leasing whole time blocks from them. Having commited himself to pay for the time, he then set out to re-sell small chunks of the blocks he purchased to individual TV stations, teleconference groups and others. He packaged both the satellite 'time' (i.e. transponder space) and a novel system of uplinks and downlinks, to offer to broadcasters and others a complete package of satellite service. He did this when nobody else was willing to gamble money in the business. Subsequently, he has been the primary mover in getting syndicated programs such as 'Solid Gold', 'Saturday Night Live', 'Entertainment Tonight' and more than a dozen others onto**

CONTINUED / page 54

PRESENTING The Luxor 190 9530

The exceptional Swedish satellite receiver . . . with

Hand-held remote control transmitter allows direct access to all 24 transponder channels. Vertical and horizontal polarization selected automatically; polarization can be fine-tuned and optimized on every satellite.



Mono 1, mono 2, stereo direct and stereo matrix modes can be programmed to any transponder channel. Memory feature stores fine-tuning of all 24 channels; 8 additional channel memories included for satellites with non-standard frequencies. Dolby and 2:1 audio expander. Alternate channel step function replaces IR-transmitter if necessary. Low threshold, outstanding video performance. Modern Scandinavian design, in black.

STS

high-performance 4GHz infra-red remote control.

Only the Luxor offers all the features you want — at a lower list price than other satellite receivers!

Standard Features

as of Sept., 1982

Receiver	LUXOR	ESR 24 DRAKE	LOWRANCE SYSTEM 7	APOLLO Z 1	AMPLICA R 10	AUTO TECHNIQUES GLR-550	AVCOM COM 3	WASHBURN	GILLASPIE 7600 A
Video Section									
Defeatable AFC	●				○			○	
No Fine-Tune Necessary	●			○	○			○	
Automatic Polarization With Chaparral Polarotor	●			○	○				
Video Invert	●	○	○	○	○		○	○	
Two Scan Speeds	●								
LED Channel Display	●	○							
Audio Section									
Four Programmable And Tuneable Audio Systems	●								
Mono 1, Mono 2, Direct Stereo, Matrix Stereo	●					○			
Dynamic Expansion	●								
Dolby Noise Reduction	●								
Infra-Red Remote Control									
Direct Access Any Transponder With Chaparral Polarotor	●								
Automatic Polarization (Polarotor)	●								
Select Any Preprogrammed Audio System	●								
All Audio Systems Infra-Red Tuneable	●								
Fine Tune Polarization (For Satellite Skew)	●								
Down Converter									
Dual Conversion	●			LNC	LNC			○	
Total Features	16	2	1	3	4	1	1	4	0

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Great Falls, Montana
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Englewood, Colorado
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satellite distribution. One TV station at a time, he has talked them into installing dishes for the receipt of satellite delivered programming. When the history of satellite TV is written, Wold **will deserve a chapter of his own. Without his efforts, the whole of the industry may have been another year or two 'happening'.**

Rohner Not All Bad

I've been a subscriber to **CSD** since issue number one. I recently built John Rohner's 70 MHz Amp/Filter and the 1357 discriminator strip, as well as his variable audio demodulator and MTV type stereo decoder. I placed several small orders with Advanced Communications Engineering in West Liberty, Ia. for PC boards, ICs, and a few other items. I received prompt, excellent service. Everything works fine, especially the 70 MHz Amp/Filter and the 1357 discriminator strip. The 1357 works far better than the (older) 564 demod and divide by two circuits I have been using in the past couple of years. The 1357 works so well that I may not build the (newer) Rohner Digital Demodulator he is planning. But then again, I probably will, since that is where the fun is; in building, and trying, new circuits.

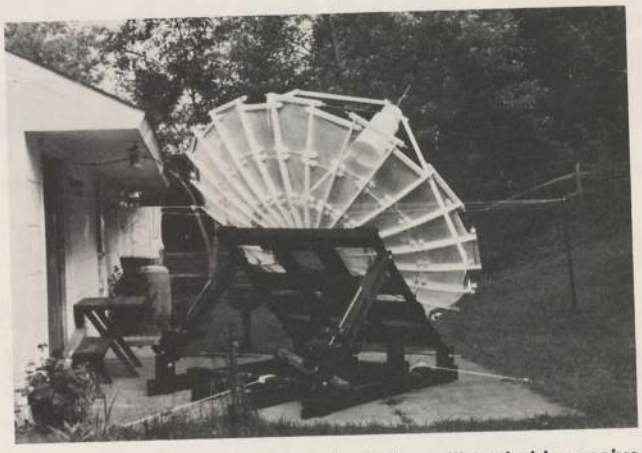
Tommy Middleton
P.O.Box 45
Hawthorne, Fl. 32640

John had so much creative genius to give. Pity.

DID IT HIMSELF

I am one of those 'brave souls' who designed and built his own dish. The ten footer is constructed entirely from materials commonly found in the local hardware store; plywood, standard dimension lumber, threaded rod, nuts, bolts, washers, screen, paint and so on. The dish is extraordinarily strong for its weight. I jumped up and down on it, turned upside down, on my garage floor with undetectable deflection. It has supported itself without injury; notice (in the photos) the 'customized' shroud. I was going to build an LNA and feed antenna but prices have dropped so much, I purchased both. The system is up and running with the Howard-Coleman receiver and works just fine even though I have some tree blockage on F4. I enjoy the technical articles in **CSD** and hope that you will continue them. I would like to see some technical articles on delay line discriminators and image phasing mixers.

G. Barry Guard
8703 Granite Lane
Laurel, Md. 20708



Congratulations on a fine project! You will probably receive letters from several dozen people who want to know exactly how you did it. Why not share it will all **of them, and others, by preparing us a 'how to do it' article for** CSD? **Remember, we have a contest going wherein articles of that type will be reader-judged early in 1983 and some lucky author will find himself as our guest** (with a friend) **down here on Provo for a week in 1983.**

Trinidad 16′ Spherical

We have just returned from the Island of Trinidad where we installed a 16′ Spherical antenna. With it, we received 12 channels of which 4 or 5 were viable. We plan to return later this year to install some 20′ parabolic antennas. We got Satcom F3R. Should we see anything else? What about Intelsat? ODOM/ADM and HERO all manufacture 20 foot dishes. AVCOM has a special receiver for fringe areas. What about it? We want to present an affordable and quality product.

Michael Magnuson
InterPole
Box 1322
Winter Park, Co. 80482

We can't see anyone using a Spherical in the Caribbean. Why? Because when you leave the US coastline and head south and east, you suddenly have access to an entire sky filled with satellites. 20 or more different satellites is not unusual.**But, they are spread from horizon to horizon and a Spherical simply cannot be used over such a wide range of azimuths. Plus, a spherical used where the look angles are high requires a feed that is typically way out of reach; also way up in the air. The biggest problem in weak signal areas is having the ability to** carefully **and easily** optimize **the dish alignment, and the system feed. That means you have to be able to move the dish in very small increments** (1/32nd of an inch or less), **smoothly, and be able to return to the same spot again and again. You have to have access to the feed to very** carefully **peak it for optimum illumination of the dish, and be able to get up there and change out the LNA to carefully measure LNA to LNA differences. Any system that cannot be run smoothly, with stable mechanical rigidity, is a waste of time in this part of the world. Judge each of the antennas available using this criteria, and you'll be OK. As for the AVCOM special receivers, there is a switchable half and full transponder format AVCOM with operator tweeking controls on the demodulator circuit. We have been using one for a couple of months now and will have a report in the next issue of** CSD.

New In The Game

I'm new in the satellite field and am not yet sure it's a viable

TRACKER III

SATELLITE LOCATOR

A TOUCH ABOVE THE REST

Why settle for just any satellite tracking system when the Tracker III could put the world at the tip of your fingers.

State-of-the-art features and convenience. These are our biggest assets. From the comfort of your very own easy chair, you can set and reset your Tracker III system to zero in on any of the present or future satellites in the U.S. domestic satellites belt with pinpoint accuracy. Our Memory Store enables you to preprogram your system for instantaneous repositioning at the punch of a button. The LED digital display shows you exactly which satellite you are positioned on, not just a meaningless position number. Also, Tracker III provides programmable horizontal and vertical polarization for satellite position for use with Polarotor or Alliance Rotatable Feed systems. This allows the programmer to compensate for "skew" across the arc. Best of all, the Tracker III can be continually updated when more features become available, thereby eliminating any possibility of the unit ever becoming obsolete.

Adaptable to most dishes including ADM.

HOUSTON SATELLITE SYSTEMS INC.

For more information on how to obtain your own Tracker III system, contact us today at
8000 Harwin, Suite 397
Houston, Texas 77036, 713-784-8953.

Available from the following distributors:
Delstar, Houston, TX 713-776-0542
Echosphere, Englewood, CO 1-800-521-9282
High Frontier, Phoenix, AZ 602-954-6008

business here in Southern Florida where even 12′ dishes don't do a sparklie free job on all transponders. Economic viability not withstanding, it is turning into a fascinating experience . . . my first reversion to the horrors of retail selling in nearly three decades. Fortunately, the research work we do for others, and our posture as export reps, for TV broadcast gear (we represent Acrodyne translators, for example) pays the freight while we test the waters.

Will Connelly
U.S. Technology Export Corp.
P.O.Box 21518
Fort Lauderdale, Fl. 33335

Inspite of the best efforts of RCA and Western Union, a 12 footer is just not quite adequate for all **transponders on** all **birds in South Florida. However, the same 12 footer works very well on** many **of the vertical F3R transponders as well as** many **of the W4 and W5 transponders far further east; down into the middle of the Caribbean.**

INTRODUCTION MADE

I would like to introduce the 'Mico Linc Corporation.' Our company is located in the beautiful Okanagan Valley in British Columbia, some 250 miles north of Spokane. We are dedicated to the distribution of good quality TVRO equipment, at fair prices. We offer a complete line of products including TeleCom, Drake, DEXCEL, USS, Wilson and the new Loc Linc antenna, a square parabolic. If any Canadians out there would like additional information, please contact us.

Orin Beebe, President
Micro Linc Corporation
128 Industrial Place
Penticon, BC
V2A 6X9 Canada

Happy to introduce you to the industry. With all of the TVRO activity in Canada, it has been somewhat amazing to us that there are virtually no Canadian firms advertising in CSD **and very little is known of the marketing growth of TVRO systems in Canada. Perhaps there is a Canadian out there who would like to make it a practice to** contribute **timely reports to** CSD **monthly so that we could do a better job of keeping Canadian readers** (there are hundreds and hundreds of Canadian subscribers) **advised of their own progress and problems.**

WILL IT CATCH WATER?

Enclosed is a picture of my first TVRO antenna system dish; thanks to the help I found and continue to find in **CSD,** it works great!

Donald B. Crow, DDS
130 Cabrillo Avenue, Suite A
San Clemente, Ca. 92672

With that dish pointed in the right direction, you could probably listen in to Richard Nixon's next **set of memoirs being dictated!**

HELLO JERRY MILLER

On page 50 of **CSD** for June 1982 there was a note from a Mr. Jerry Miller regarding spherical antennas. Unfortunately, Mr. Miller did not supply his address and I would like to contact him. Can you help?

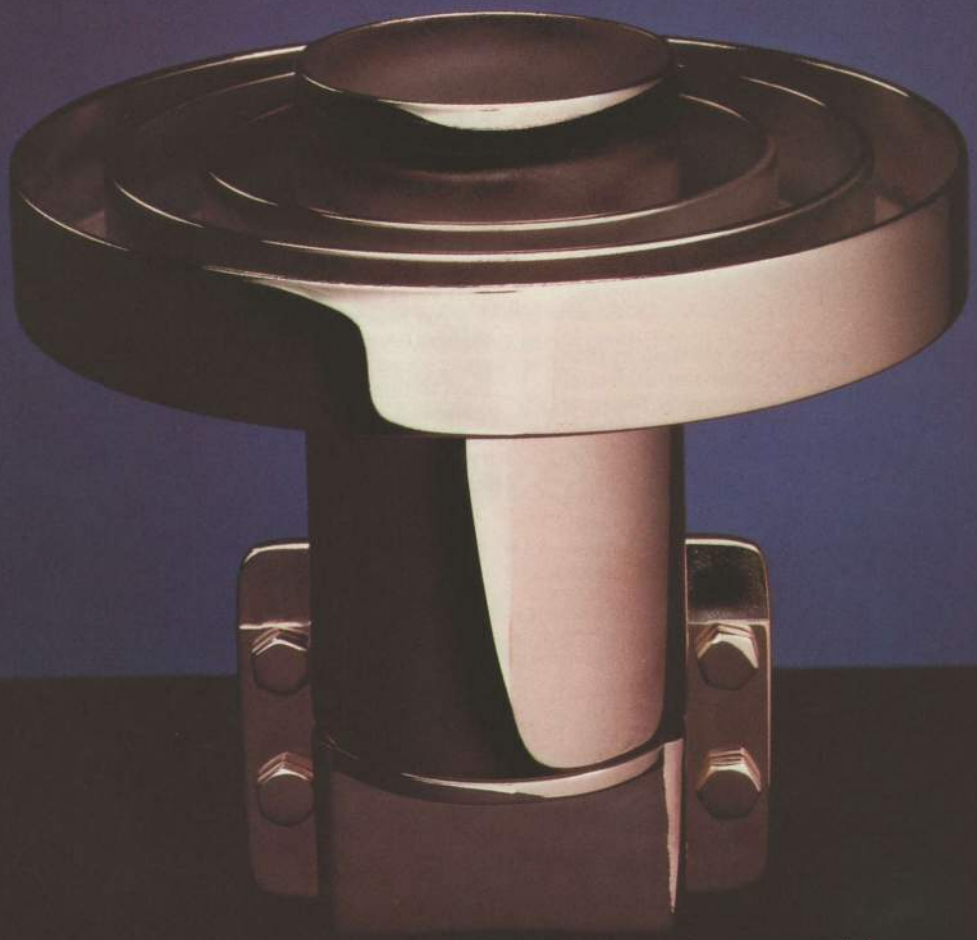
Milan Bryska
P.O. Box 112
Charleville, Q. 4470
Australia

OK Jerry Miller, next time send your address! And please write Mr. Bryska directly in Australia. He wants to be your pen pal.

A REALLY BIG SHEEW

I am writing to extend my appreciation to the staff of SPACE, and in particular Robyn Nietert, for the support which they have given to all of us in the past year in spreading the truth about the satellite world. Recently my firm was interviewed by a newspaperman regarding the TVRO business. As a Dealer Member of SPACE, I asked for and received tremendous support from Robyn regarding some of the legal subtleties of satellite communications. SPACE has convinced Congress that our membership is eager to work towards equitable communication regulations. Without SPACE, the satellite communications industry would not be as well off as we are today. Let's keep supporting this vital voice in Washington!

OUR POLAROTOR GOT THE BEST OF OUR SUPER FEED.



Nothing succeeds like success. We had the best feedhorn on the market. The Super Feed.™ But we couldn't leave well enough alone. So we developed the Polarotor™.

It's everything you'd expect from the Super Feed. And then some. Like top performance for a clear, sharp picture. With an improved carrier to noise ratio. And more signal picked up from the dish. There's tuning speed and accuracy. Because a probe inside the circular waveguide, rotated by a small servo to any position over 180°, will accurately change positions within 1°: and a flip of the switch changes antenna polarity in less than half a second.

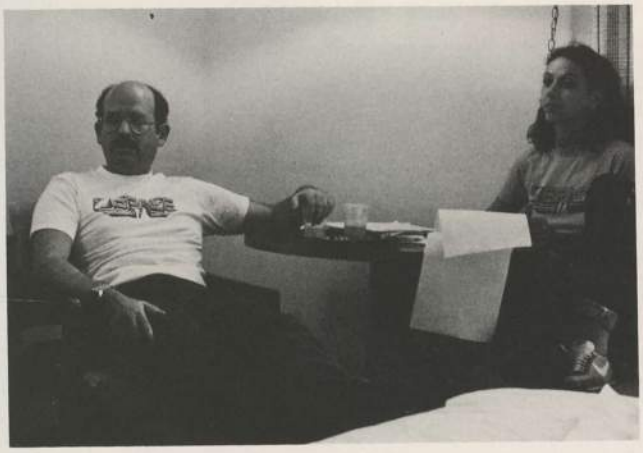
The Polarotor's™ even better than any electronic polarization unit you'll find. For performance. Or price. It costs about half as much.

Polarotor™. From Chaparral. The newest way to get the best of us.

CHAPARRAL

Chaparral Communications, Inc., 103 Bonaventure Drive, San Jose, California (408) 262-2536.

Peter C. Foley, President
Potomac Satellite Systems, Inc.
1021 S. Barton St., Suite 128
Arlington, Va. 22204



We remember Robyn (well) **when she was clerking in Rick Brown's office. She worked hard and attended law school at night to earn her degree, and she is one very sharp lady. Sharp as a tack. In the photo here, VP Brown** (he's the one with the **thinner** head of hair, on the left) **and Robyn are listening intently to SPACE Convention Chairman Bob Behar** (out of camera range, to left) **make a point about exhibitor problems, the day before the SPACE Omaha show opened this past August. Robyn is the only lady attorney we know who could,** and would, **invite** three men **into her bedroom at a hotel to discuss the threat of a Japanese equipment invasion. Stick to it Robyn, they love you!**

AW SHUCKS

Thank you for your part in inviting me to speak at the SPACE Convention in Omaha. I especially enjoyed having lunch with the group. Although my visit was brief, I felt I gained so much by visiting the exhibits and meeting with so many fine people. Thank you again for this opportunity — I look forward to further associations.

Larry Pressler
United States Senator
United States Senate
Washington, DC 20510

Senator Pressler spent a portion of his address at the SPACE Convention appealing for someone (anyone!) **to come to his town and put in a small CATV system. With around 500 people living there, the big boys have pased the town by so far. Here's an opportunity for somebody to get started in a manageable way, in a home town of a US Senator. Who knows how much good that might one day do!**

MODIFIED FOR JAMAICA

The modified polar mount described by Ronald Waltner in the April and June (1981) issues of **CSD** has worked accurately for my 7 metre parabolic dish which I recently completed. The dish tracks accurately from F3 in the southwest to one of the Intelsat birds at about 20 degrees west location. I have not, however, been able to access the Russian Ghorizont bird at 14 west, although you have written that it is pretty strong on the Turks and Caicos Islands. Your **Coop's Operations Manual** suggests using circular polarizaton to receive their RHC transmission, but surely on a linear feed I should be able to receive something; or not? I am using a Dexcel 100 degree LNA and their DXR 1100 receiver and have obtained the enclosed list of signal levels for the primary satellites we watch here.

Hugh R. Brand (6Y5HB)
28 York Castle Avenue
Kingston 6, Jamaica

Hugh's readings show that the following are the highest and lowest as noted: F3, strongest is WGN (TR3) and weakest is CNN (TR14). **On Westar 5,** strongest is WOR (TR3) and weakest is transponder 21. **On Westar 4,** strongest is SIN (TR16) and weakest is PBS schedule 2 (TR17). **On F4,** strongest is the test pattern (TR3) and the weakest is HBO (TR18). **Using the Dexcel meter as a relative level indicator, the strongest signal in his sky comes from TR3 on F4 followed closely by WGN on F3. He finds W4 levels slightly** lower than **W5. That surprises us and suggests, Hugh, that you may not be tracking properly in the** middle **of the belt. Universally, W4 is hotter than W5** (far down into South America, especially on the super hot even-numbered / vertical transponders). **Hugh did not mention reception from ANIK 2 / 3 or Anik B. If TR 7, 11 and 15 are close to** (slighly down, or even to, or slightly above) **sparklies on your 7 meter dish, you have** full **seven meter** performance. **If the signals are down from threshold by 3 or more dB, you are losing some signal someplace.**

Your problem with Ghorizont is strange. The 14 west bird flies in a figure 8, and it is closest to being exactly over the equator around 6 PM to 10 PM at night, at the 14 west location. It may be down 6-8 dB in the worst case (noon to 2 PM and 12 hours later), **but is visible with an almost sparklie-free picture at the optimum time on even a ten foot dish** (up most of the eastern US seaboard as well). **Try again.**

INTERESTED?

Are you interested in 'DBS Gossip,' such as the pending battle between US and Japanese technology, for this worldwide service?

Dennis Mitchel
Alpha Industries
20 Sylvan Road
Woburn, Ma. 01801

Gossip, no. Well reasoned projections based upon facts, yes. **If we published all of the gossip we heard, but could not substantiate, we'd be 200 pages thick a month! We'd also like a good, light-in-math, treatment of GaAs-FET devices, from the viewpoint of someone who** knows **some of the tricks of** optimizing **LNA stages using these little jewels. Anyone at Alpha listening?**

ANNOUNCING...

THE FIRST EDITION OF THE BOOK
THE TVRO INDUSTRY HAS BEEN DEMANDING:

STT'S
INTERNATIONAL SATELLITE TELEVISION RECEPTION GUIDEBOOK

By STEPHEN J. BIRKILL
(World-Renowned Satellite Expert and Former Chief Engineer For The British Broadcasting Company)

It's here — the complete guidebook to setting up a TVRO terminal almost anywhere in the world!

Whether your requirement is to specify or manufacture receiver hardware for the export market, to make use of overseas transmissions at home or to start a TVRO industry in your own country (on any continent), you will find in this book the information you need. You will be given the full-time, regular and many occasional TV transmissions carried on the world's communications satellites, outside of the North American 4 GHz domestic systems which are well documented elsewhere. European and South American reception possibilities are discussed thoroughly. EIRP levels are given throughout the book, enabling antenna size requirements to be established for all locations.

In this International Guidebook, the newest and most ambitious of STT's educational manuals, there will be much information that has not appeared in any other publication and is simply not available through regular channels. By its very nature, it is of considerable commercial value to those exporting TVRO equipment.

— Ready for Shipment —

THE NEW GUSTAFSON SPHERICAL ANTENNA MANUAL

We are extremely proud to announce the publication of a new STTI manual on spherical antennas, written for us by Mike L. Gustafson, one of the outstanding TVRO engineers in the world today.

Despite the wide range of satellite antennas on the market today, STTI still receives orders by the dozens for a thorough, clear-cut manual that will enable the average guy to build a low-cost, efficient sperical antenna.

Let Mike explain this new manual: "The concept behind this new spherical antenna was that it had to be easy to build, not require any mathematics and not cost an arm and a leg. Oh yes, I forgot, it had to work great as well!

I feel I have met my design goals; it can be built with no special tools, without touching pen to paper, and it costs less than $300. Oh yes, it turns in sparkle-free pictures on F3 here on the West Coast."

The Gustafson Spherical Antenna Manual is ready for shipment.

ORDER FORM

I WOULD LIKE TO ORDER THE NEW INTERNATIONAL SATELLITE TELEVISION RECEPTION GUIDEBOOK AT U.S. $40 (U.S., CANADA, MEXICO) OR U.S. $45 (OTHER COUNTRIES).

I WOULD LIKE TO ORDER THE NEW GUSTAFSON SPHERICAN ANTENNA MANUAL! (U.S. $30 IN U.S., CANADA, MEXICO, OR U.S. $35 ELSEWHERE).

SHIP TO:

NAME _____

COMPANY (if applicable) _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

Credit Card Information: MasterCard, Visa or American Express

_____ # _____ Exp.Date _____

MAIL ORDER TO: STTI, P. O. Box G, Arcadia, OK 73007 Telephone Queries: 1-800-654-9276, 405-396-2574 or 405-396-2336.

TRINIDAD / NEEDS HELP

We would like to obtain the names and addresses of any source of information that deals with equipment and quality of reception for this area of the Caribbean. We would also like to be placed into contact with any firm that offers engineering planning and consultation leading to the specifying of equipment and overseeing the installation of systems that will work here.

Reginald Peters
Managing Director
Marathon Radiators (Trinidad) Ltd.
14 Tenth Avenue
Barataria
Trinidad, West Indies

We suspect you will hear from several people who see the cold fronts coming and who would like to trade some time in the Trinidad sun this winter for some consulting **work!**

SPACE STORE

We are having a show-designed display made for our new satellite antenna store and we are in need of some photos and related charts of satellite equipment. We have one chart by Microwave Associates entitled 'Worldwide Communication Satellite Data Chart'. We wonder if **CSD** has any charts available, space maps, or photos suitable for wall display. We are a member firm of SPACE and feel you would be pleased with the high standards we have set for our space store and related activities. On completion, we will be happy to furnish photos.

Gordon H. Lawhorn
WorldSat
6325 Camberlayne Road
Mechanicsville, Va. 23111

The Microwave Associates Chart was actually done by Coop, first back in 1979. Those versions with MA advertising on the front were used by Microwave Associates as hand outs for their display booths at trade shows around the country, and subsequently were updated several times for STT to distribute. This large wall shart is slowly becoming quite out of date, and Coop is currently re-designing the full wall chart. A new, 1982/3 version will be available from STTI (P.O. Box G, Arcadia, Oklahoma 73007) **by late this fall. As far as large poster-type artwork suitable for store display . . . it seems likely that many** (or some) **of the equipment suppliers should have such displays available. Perhaps some of our readers can advise us?**

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.

BIG SHOT In arm for European 4 GHz market may be not far away. A major US cable programmer is negotiating with cable firms in Switzerland, Belgium, Holland to take service to them via Intelsat. Precedent is in place; recall that CNN will go **west** via Intelsat to Australia/Japan starting around first of '83. European cable homes involved number over 1,000,000. One of the major hang-ups is which band to use for **final** delivery. English STC currently using experimental OTS bird to deliver nightly service to Switzerland, Malta, Finland at 12 GHz. Possible service would go from US to Europe on 4 GHz, then 'double-hop' to cable systems on re-fed 12 GHz service from UK.

SUPER STATION EUROPE meanwhile is getting increased visibility. Evening 12 GHz feed averages nearly three hours per evening now, with program schedule appearing in major Swiss newspapers along with terrestrial services.

CAST 83 is name given to first European/Middle East/Africa satellite and cable television trade show and exhibition. Event will be held in National Exhibition Centre in Birmingham September 11-14. Show's timing is considered 'excellent' by trade because of expected launch of 4 GHz 'services' plus natural refinement of 12 GHz service plans by this coming fall.

INTELSAT grip on exclusive satellite communications market, in Europe, may be relaxed. Under intense political pressures, Intelsat Board has decided to give Intelsat only five year period of additional 'exclusivity' for world's communications. European nations, represented on Board, are fighting to have Intelsat exclusivity **dropped** so that planned future European domestic and regional satellite systems can compete in open marketplace for satellite services.

DIRECT reception from US domestic birds, along fringes of Europe, is project presently receiving plenty of attention. Calculations indicate that RCA F4 at 83 west would arrive on coast of Scotland at 1 to 2 degree look angle. Two possible late '83 launches may improve situation; Western Union hopes to get FCC approval to launch 24 channel Westar 6 to 79 west spot (now held down by older Westar 1 and 2 birds in joint flight) while Hughes Galaxy 2 satellite will launch to 74 west spot at about same time. Neither W6 or G2 have any announced plans for **video** at present time, but Europeans as far east as coast of France are hopeful.

CBS CABLE suddenly pulled financial plug, shutting down Westar 5 service. CBS reportedly lost in excess of $30M on service in first year, could not see future in continuing 'cultural service' further. Viewership was not problem, at least not in 'reach' department, as service ended life reaching more than 6M homes. Analysts project that reduced network income coupled with expanded demands of network news departments for cash expansions created crunch on cable service. CBS shopping to sell off transponder rights on Westar 5 and possibly other back-up transponders they have interest in.

JAPAN may be next major communications power to open up skies. Growth of satellite communications in North America, planned growth in Europe combining to cause Japanese leaders to re-evaluate their present monopolistic approach to broadcasting, telecommunications, and satellite use. This is apparently first step to putting Japan into business of operating satellites, private and semi private, on a worldwide basis.

FAILURE of Ariane (L5) bird to place two satellites in operation traced to apparent faulty turbopump. European pride severely wounded by failure and French getting primary blame. It is expected that L6 will 'go' as rapidly as possible to attempt to hold scheduled launch of three Intelsat V birds in first half of '83, plus launch of Westar 6 bird in September of 1983.

INSAT 1B, near copy of failed INSAT 1A, getting intense re-look at builder Ford Aerospace. It is hoped that original July '83 launch date will be met. Bitter disagreements between Ford and Indians seems to have cooled somewhat although Indians are extremely upset with failure.

APPROVAL of Comsat's Satellite TV Corporation 12 GHz DBS package by FCC had strings attached. FCC decided to limit Comsat's

Getting the right stuff to the right place at the right time takes more than good intentions. It takes planning, experience, skill, resources, and dedication focused on achieving the goal. The exact qualities that separate professionals from amateurs.

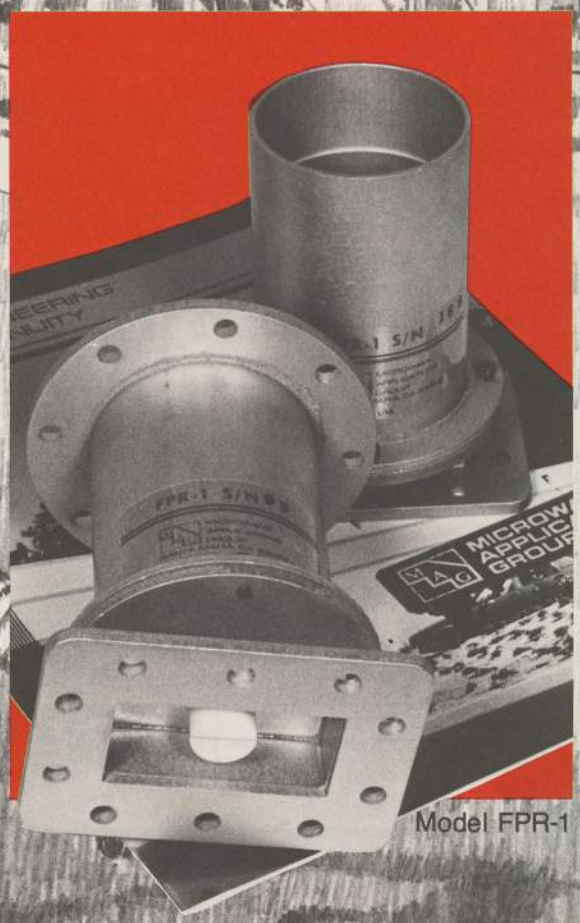
At MAG we understand that you need support from suppliers in order to score with your customers. That's why we've put our professional team and our outstanding resources behind assuring a steady supply of Model FPR-1 Ferrite Polarization Rotators, for use in low-cost TVRO antenna feed assemblies.

And you don't sacrifice quality for delivery. Our unit electronically switches polarization from feed to LNA in milliseconds, yet retains capability of infinitely fine adjustment. Its insertion loss is so low (0.2 dB max., 0.15 dB typical) you probably won't know it's there. A unit designed and tested for operation from −60 to +160°F, with control power typically around only ½ watt (80 ma. into 80 ohms). And with no moving parts, its rugged, sealed construction is designed to give years of trouble-free service.

Best of all, we're ready to deliver, in quantity, right now! Grab the ball and run with MAG quality, performance, price, and delivery. You'll love the cheers you get from satisfied customers.

Delivery. More than promises.

MICROWAVE APPLICATIONS GROUP
3030 INDUSTRIAL PARKWAY
SANTA MARIA, CA 93455
A CALIFORNIA CORPORATION [805] 928-5711



MAG FERRITE POLARIZATION ROTATORS

Model FPR-1

search for funds, to put system into operation to $225M, further limited **sources** for funds to insure that Comsat does not end up draining their Intelsat programs to make DBS fly. National Association of Broadcasters (NAB) is appealing FCC grant to Comsat through federal courts.

RCA AEROSPACE will build STC's DBS birds, and FCC approval is **only for** eastern time zone feed system. Will STC launch an 'interim' service using ANIK C or other 'early' 12 GHz bird? It looks less and less likely since any such effort would drain manpower and financial resources STC will need for their own service. Best estimate of actual service to eastern USA? Not before late 1985 or early 1986.

INTERIM DBS services getting discussion at all levels worldwide. Germany talking with Intelsat about leasing spot beam 12 GHz service capacity to precede 1986 announced launch of German (French) DBS bird. USTV, the firm planning to use ANIK C to accomplish early-entry into DBS in North America, says it will program four channels initially for around $30 per month. Of that, a pair will be advertising supported (ESPN and CNN likely candidates) and a pair will be 'premium.'

EVIDENCE now suggests that much of the 12 GHz DBS programming will be re-cycled 4 GHz or simultaneous to 4 GHz feeds. Likelihood that wholly original, new programming will be created just for 12 GHz services lessens every month. Certainly in start-up years, very little will be seen on 12 GHz which is not already available at 4.

ANOTHER movie in schedule is avenue taken by Modern Satellite Network's F3R TR22 daytime service. MSN had **hoped** for successful sale of advertising to help carry cost of operation. New schedule will include a movie in mid-day portion just ahead of 'Daytime' slot on same transponder.

LATEST INTELSAT V bird, F5, launched to 63 east location. Bird's original launch schedule of September 23rd was delayed to re-check solar array mechanical drive system.

STAY IN ATLANTA an extra few days and attend the 8th annual **Scientific Atlanta Satellite Communications Symposium.** Location is Atlanta Marriott Hotel and speakers include MPAA's Jack Valenti. Dates are November 1 to 3.

INTELSAT has announced receive-only terminal standards. Designated 'Standard Z,' it applies to domestic terminal systems licensed or authorized to receive Intelsat transmissions. Final dish size not selected but with spotbeam 4 GHz service from higher power V series birds, antennas as small as 5 meters **could** get approved. Similar 12 GHz V bird service may only require a 3 meter dish.

STEVE BIRKILL, English innovator of low-cost TVRO hardware systems, met with NEC/ALCOA in United States in September to consider possible position as chief engineer for American portion of joint Japanese/US firm. NEC brings electronics knowhow, ALCOA aluminum (antenna) expertise to joint firm which expects to be major supplier of 12 GHz receive terminals worldwide. After meetings, Birkill decided to stay in UK (for now) and to concentrate on development of 4 and 12 GHz systems for European marketplace. A six meter ADM antenna is currently in UK, will be installed by Satellite TV Antenna Systems, Ltd. firm that includes Birkill, in south of England. STVAS has been appearing at UK broadcasting shows demonstrating

SPACE

The Society for Private And Commercial Earth Stations

It is with great pride that SPACE honors the following PIONEER and DEALER members.

These companies have taken the lead in our trade association and in the earth station industry. By joining SPACE as PIONEER or DEALER members, these companies have ensured that they will be on top of the developments which affect the earth station industry. PIONEER and DEALER members of SPACE receive specialized newsletters, such as the weekly **Inside SPACE** for PIONEERS and **SATVISION** for DEALERS. These newsletters are designed to make sure that the PIONEER and DEALER members have up-to-date and indepth information on industry developments — information which is essential in an industry like ours which is developing so rapidly.

SPACE is honored to be supported by such distinguished members and looks forward to their continued effort to bring the benefits of earth station technology to all Americans.

PIONEER MEMBERS

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ALLSAT INC.
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SATELLITE TELEVISION TECHNOLOGY INTERNATIONAL, INC.

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(Dealers in earth station equipment)

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ADVANCED EARTHSTATIONS
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AJAK INDUSTRIES, INC
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ALASKA CABLE SYSTEMS
ALBIN RADIO & TV SERVICE INC
ALEXANDER & RAY'S TV & APPLIANCES
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AMERICAN TELEVISION SYSTEMS INC
ANTENNA SERVICE CO
ANTENNAS UNLIMITED LTD
APPLIED SPACE TECHNOLOGY
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ARNOLD POOL COMPANY
AUDIO VIDEO
AUDIO VIDEO SYSTEMS
AUDIO CONCEPTS
AURORA COMMUNICATIONS
AUTOMATION CONTROLS
AZC-TECH DISTRIBUTING
BALENTINES TV
BEN'S TV & APPLIANCE SERVICE CENTER
BERNIE'S TV & APPLIANCE
BERTZ (TV) SALES & RENTAL
BILL BAER SATELLITE ANTENNA
BILL'S RADIO & TELEVISION
BIRDSELLS T V
BLOCKER ELECTRONICS
BOATRIGHT'S ELECTRONICS
BOB GRANNEMANN RADIO & TV
BOB JOHNSON APPLIANCE CENTER
BONE & CO INC
BOONE TV & ELECTRONICS
BRANCIO ENTERPISES
BRAZOS RECORD & TV CENTER INC
BROADWAY ELECTRONICS
BRUCE'S SALES & SERVICE
BRUCE'S T V
BUCKHANAN SUPPLY INC
C A I E COMMUNICATIONS INC
CABLE SAT INC
CAPITOL ELECTRONICS
CARBON COUNTRY T V & RADIO SHACK
CARLSON TV & ELECTRONICS
CARPENTER ELECTRIC
CASABLANCA VIDEO
CHAMNESS TV & APPLIANCES
CHANNEL ONE
CHRISTY SALES INC
CHUCK'S TV & MICROWAVE CENTER
CNI SATELLITE SYSTEMS INC
COIN SPORTS DIST INC dba SATVID
COLORWORLD TV RENTAL INC
COLORADO SATELLITE SYSTEMS
COMPUTERS 'N STUFF
COMSTOCK T V
CONSUMER SATELLITE SYSTEMS INC
COOKSEY TV
COUNTRY CABLE INC
CROSS CURTIS MATHES SHOW ROOM INC
CURTIS MATHES HOME ENTERTAINMENT CENTER
CUSTOM SOUNDS
D & D ELECTRONICS
D & L SPECIALTIES
D-R HARDWARE & ELECTRONICS
DAVIS T V & STEREO
DAVIS TV & VIDEO
DEITZ ELECTRONICS SERVICE
DEL CITY MUSIC
DE WALL'S VIDEO SERVICES INC
DESERT TV & APPLIANCE
DICOMM
DON PEASTER TV
DON'S ELECTONIC SERVICE
E M V COMPANY
E T L CORP
EAGLE SYSTEMS BY GMR
EARTH STATIONS MANNING & SUMTER
EARTH STATIONS OF COLUMBIA INC
EASTERN MICROTECH INC
ELECTRONIC ANALYSIS & REPAIR
ELECTRNOIC MEDIA SERVICES INC
ELECTRONICS-BY-HECK
ENERGY SYSTEMS LTD
ENGLAND DAN'S
STAN R. ESECSON
STEVE ESSLINGER
FEVOLD ELECTRONICS
FIBER-CLASSICS SAT CORP
FINGER LAKES COMMUNICATION CO INC
FRANKLIN ELECTRONICS
G/C ELECTRONICS
GENE'S TV
GEORGE ALARM CO INC
GERMAN CORNER TV SALES & SERVICE
GHERE'S OF MANHATTAN
GLENTRONICS INC
COBLE L P GAS & APPLIANCE
GRAVES H V A C
GREAT EGG EARTH STATIONS
GREELEY GAS & ELECTRIC INC
H&B CORP -SATELLITE DIVISION
H&H ELECTRICAL SYSTEMS INC
HAGENS FURNITURE & T V
HANK'S RADIO TV & APPLIANCE INC
HAWKINS DECORATIVE CENTER
HAYES TV INC
HEPHNER TV & ELECTRONICS INC
HI-PIX
HIAWATHA ELECTRONICS INC
HINKLE-YOUNG SATELLITE
HOME TV SALES & SERVICE
HOME VIEW MICROWAVE
HOUSE OF TELEVISION
HOUSE'S GOOD HOUSEKEEPING SHOPPE
HUB SUPPLY
HUBERTS II INC
INTELSAT INC
INSTRUCTIONAL MEDIA ASSOCIATES
INTERNATIONAL SATELLITE SALES INC
J M C DISTRIBUTORS
J & J LEASING
J V ELECTRONICS
ALLEN JACKSON
JENSEN'S TV
JERRY HALL'S
JERRY'S RADIO COMMUNICATIONS
JERSEY JIM TOWERS TV
JIMMY AND ELECTRONICS
JOHNNY'S T V
JOHNSON'S TV & APPLIANCE
KKH ENTERPRISES
KAUFFMAN T V
KENNY'S TV
KING'S ANTENNA SERVICE
ROBERT KROHLEIN
LAKESIDE TELEVISION
LAURIE VIDEO INC
LAVON'S TV SALES & SERVICE
LEWIS TV SERVICE
LINDLY TV & APPLIANCE
LOCK'S ELECTRIC
LOGSDAN MAGNAVOX
LONGVIEW HOME CENTER
LORENSON PLUMBING & APPLIANCE
MACK'S TV
MASTER ANTENNA INC
MASTER CRAFT OF OWATONNA INC
McCANN ELECTRONICS
MEL'S T V
METSAT (Metro Satellite Systems)
MICHAEL'S FOTOSHOP
MICRO-LINK TECHNOLOGY
MICRO STAR
MIDWEST COMMUNICATIONS
MIDWEST COMMUNICATIONS
MOORE TV INC
MORTEC INDUSTRIES INC
NATIONAL SATELLITE COMMUNICATIONS CORPORATION
NEISTADT INC
NORMAN ANTENNA INC
NORWOOD-LOWELL T V
NUNNERY ELECTRONICS
ODOM ANTENNAS INC
ODOM T V SALES & SERVICES
OPEN SKY SATELLITE TELEVISION
PACIFIC TRADING COMPANY
F K PENDARVIS
PFEIFFER FEED & SEED INC
PHONOSCOPE INC
PIONEER SATELLITE SYSTEMS INC
POTOMAC SATELLITE SYSTEMS
PRECISION SATELLITE SYSTEMS
PIVATE COMMUNICATIONS
QUALITY APPLIANCE CENTER
QUARLES ELECTRIC CORP
RANCHLAND ELECTRONICS
RAPID ASSOCIATES
RAYNEL'S INC
REFLECTIONS
REYNOLDS SALES
SAT-COM MARKETING INC
SAT PRO
SAT-VIEW SYSTEMS INC
SATELLITE COMMUNICATIONS CORP
SATELLITE CONCEPTS INC
SATELLITE DOWNLINK
SATELLITE HOME ENTERTAINMENT INC
THE SATELLITE LINK INC
SATELLITE RECEPTION SYSTEMS
SATELLITE RECEPTION TECHNOLOGY
SATELLITE SCANNERS INC
SATELLITE SUPPLY INC
SATELLITE TECHNOLOGY INC
SATELLITE TELEVISION INC
SATELLITE TELEVISION SYSTEMS
SATELLITE T V SYSTEMS
SATELLITE VIDEO DISTRIBUTORS INC
SATELLITE VIDEO SUPPLY
SATELLITE VIDEO SYSTEMS
SATELLITE VIDEO SYSTEMS INC
SATRACKER SYSTEMS
SCHMIDT T V
SHAFER TV
SHAW TV & APPLIANCE
SKY-SCAN OF KENTUCKY
SKYLINE SATELLITE SYSTEMS
SMITH MUSIC & TV IN
SNIDER'S T V
SOLID STATE COMMUNICATIONS INC
SOONER TV
SOUND ROOM
SPERRY TV
STAN'S ELECTRONICS
STAR-COM SATELLITE SYSTEMS
STAR SYSTEMS
STARTECH INC
STEGER T V RADIO CORP
STELLARVIEW SATELLITE SYSTEMS INC
STEREO CITY WAREHOUSE
SULLIVAN ENTERPRISES
SUNLIFE
SWITLIK'S EAGLE ELECTRONICS
TABLER FURNITURE INC
TELE-SAT INC
TELEVISION SATELLITE SYSTEMS
TELSTAR ENTERPRISES
TOWN & COUNTRY ELECTRONICS
TOWN & COUNTRY TV
TRANSLATOR TV INC
TRANSVISION CORP
TRI-LAKES ELECTRONICS INC
TRI-STATE AVIATION
TRI-X ENGINEERING INC
TULSAT CORPORATION
TURNER SATELLITE SYSTEMS
TV LAND
UNIVERSAL HOME SATELLITE
VERN'S TV & RADIO
VIA SAT COMM
THE VIDEO CENTER
VIDEO KINGDOM
THE VIDEO SET
VIDEO TECHNOLOGY INC
VIDEO WAREHOUSE
VIDEO WORLD
VIDEOSAT INC
VIDTECH COMMUNICATIONS INC
VISALLI SATELLITE SYSTEMS INC
VOGT INC
WALDENA T V CENTER
WALTON SATELLITE TV
WEST-HILLS ELECTRIC
WEST WINDS CONSTRUCTION
WESTAR ENTERPRISES INC
WESTAR SATELLITE AND COMMUNICATIONS
WETHERELL MANUFACTURING COMPANY
WHEELER COMMUNICATIONS
WORLD SAT - DIVISION OF LAWHORN INC
WYOMING SATELLITE TELEVISION

For information on SPACE, please write or call:
SPACE, 1920 N Street, N.W., Suite 510, Washington, D.C. 20036 (202) 887-0605

4 and 12 GHz reception packages they now offer, plans to field full line of hardware for both bands by middle of 1983.

ARTHUR C. CLARKE, the man who created concept of geostationary satellites, is donating $25,000 of his recently received Marconi Award to the 'Clarke Centre' for advanced space studies. Clarke received Engineering Emmy in New York September 28th, will be in New York City November 15th to appear on **TODAY** program where he will be promoting his soon to be released space science fiction story **'2010: Odyssey Two.'** This story is currently being serialized in **PLAYBOY,** first segment appeared this past September. The latest Clarke story is recommended reading, as is scheduling a look-in for his TODAY SHOW appearance November 15th.

SALES OF LNC units having their problems. Many dealers are shunning equipment for what they claim are 'performance reasons.' Apparently the massive move to LNC packaging forecast by many earlier this year is happening slower than anticipated, resulting in some LNC overstocking at distributor levels.

120 DEGREE LNAs also in something of an overstock at many distributors. One possible explanation; at least some of the more popular 10 foot dish antennas are not performing as well as expected, and dealers selling these units have been forced to step up to 100 degree units to get customer satisfying pictures.

ASK YOUR antenna supplier what protection his antenna has against ultra-violet (UV) radiation / absorption. Growing concern that **some** of the production techniques employed for antenna mass production could lead to long term problems (out 3 to 4 years) with dishes holding up. This same 'scare' swept through cable industry in period 1977-78 when fiberglass dishes first appeared on market.

IF YOU WATCHED ABC coverage of October Mount Everest climb, you were watching our industry at work. The **Ken Schaffer Group** (KSG) put together the entire package for ABC after learning of the expedition in **CSD.** Three pound Hitachi Denshi camera / transmitters mounted on each of the final assault climbers transmitted pictures and accounts back to a microwave relay facility installed at Khatmandu Sheraton Hotel. From there, a portable uplink fed the coverage to Indian Ocean Intelsat bird (I-IV-F) which carried it to Madley in England. Madley double hopped signal via Atlantic Intelsat to Nova Scotia where the coverage was fed into US and Canadian DOMSAT birds. Two-way voice links connected ABC and CBC anchor coverage personnel live to the climbing teams, back through the Intelsat birds, from New York and Toronto. Canadian Nelson Ethier was the first person from our industry to get involved and Ken Schaffer of KSG packaged the entire event for worldwide satellite distribution. Look for a detailed report in an upcoming **CSD.**

OAK in partnership with UK Racal Electronics will supply pay television program services to portions of Western Europe and the United Kingdom. Several different delivery formats will be used for service, including perhaps DBS birds.

SCIENTIFIC ATLANTA apparently believes the future of scrambling will be great; inspite of recent quarter balance sheet losses, S/A has acquired Canadian Digital Video Systems; creator of digital based encryption system for scrambled TV distribution. DVS has supplied considerable advanced technology scrambling gear to terrestrial and

Randy Thomas (left) Manager of J. P. Family Inc., Feedlot And Ted Treider, TREIDER ELECTRIC & SUPPLY

OUR DEALERS ARE ALL SMILES!

They Know Winegard's Square Dish Makes A Difference You Can See!

"The picture quality is very good. And I knew if I had any problems I could get them solved by Winegard."

Ken Douglas, LAKESIDE TELEVISION
Forest Lake, Minnesota

"I've looked at a lot of competitive models but I've never seen anything that will outperform it. . .I can buy some cheaper brands than Winegard but right now, for the price, I think Winegard's got a good rig and I don't have any intention of changing."

Ted Treider, TREIDER ELECTRIC & SUPPLY
Lazbuddie, Texas

"It's super. . .it works perfect! It's certainly as good as anything I've seen, if not better!"

Cecil Wade, WADES MAGNAVOX HOME ENTERTAINMENT CENTER
Fulton, Kentucky

"The head engineer of the cable company came out while we were setting up our demo model. He had seen several other competitive models. He thought, dollar for dollar, Winegard's was more satellite for the money."

David Thomas, MELODY MUSIC MAGNAVOX HOME ENTERTAINMENT CENTER
Union City, Tennessee

"We were able to use an ordinary pick-up truck to take it to the site. . .The reception is really good. Every time we look at it we get a good, clear picture."

Richard Mucklow, DAY 'N NIGHT TV SERVICE LTD.
Freeport, Grand Bahama Island, Bahamas

The performance has been real good. I'm sold on Winegard. They've got a good product. One customer was concerned about the mounting. Last week we had a 70-mile-an-hour wind — it knocked down trees and everything else. The dish turned, but outside of that it didn't get hurt one bit."

Larry Turner, HOME ELECTRONICS SALES & SERVICE
Belmond, Iowa

"Quite frankly, I can't believe the way it works! It's like watching television in a prime area of the United States. . .Everyone takes a look at it and sees it's not as big as the 20 to 25 foot dishes. And, in all cases that we've checked out, Winegard's dish works better than the larger ones."

Alfred Ritchie, RITCHIE ELECTRONICS
New Providence, Bahamas

"Our picture is beautiful! People come in and look at it and can't believe it. We've had other people say, 'well, we saw a competitive brand and theirs doesn't look anything like yours.' "

Genevieve Heffner, C. DAVID HEFFNER
TV ANTENNA INSTALLATION
Lenhartsville, Pennsylvania

Get The Satellite Picture. . . Get It Better With Winegard!

Write for details and name of your distributor.

WINEGARD®

WINEGARD COMPANY • 3000 KIRKWOOD STREET • BURLINGTON, IOWA 52601

satellite program services, may well be front runner for HBO scrambled service via satellite.

BAD SHAKE UP for Mexican Peso apparently has curtailed the progress for Mexican domestic satellite system. At same time several other northern South American and Central American nations are considering feasibility of regional 'Domsat' bird system to serve their needs. Possible marriage of Mexican lack of funds, and participation in Mexican system by other nations, in offering.

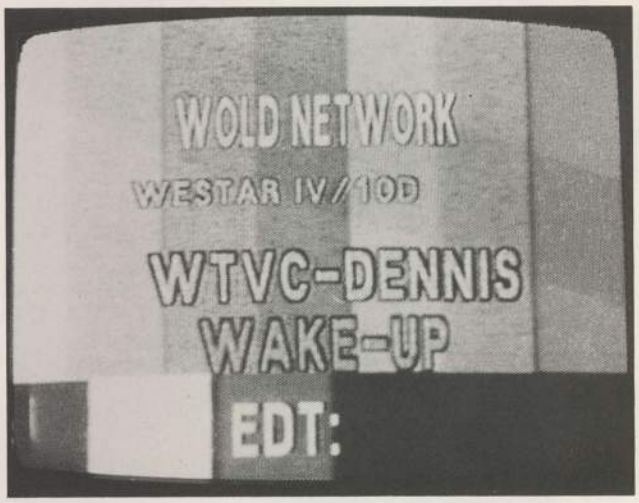
PERU is latest South American nation to begin transmission of regular domestic video programming via (Intelsat) satellite. Venezuela will probably be next with lease of Intelsat transponder to begin with and a dozen terminals including two for uplink.

AS PREVIOUSLY forecast in **CSD,** final details of US/Canadian border exchange of each other's domestic satellite signal services does **NOT include** any exchange of video programming. Entire area of authorizing US television to be received in Canada directly from US satellites remains a political 'no-no' in Canada where intense national pride in home grown product is building.

VICTORY for private industry came with successful launch in September of privately owned Conestoga rocket from Matagorda Island off Texas coast. Owners in private rocket launch forecast eventual savings as great as 80% for launch of satellites. Present launch costs for geo-stationary bird are in region of $30M.

BLACK ENTERTAINMENT TELEVISION will be only service catering to black US market until at least 1983. Apollo Entertainment TV was scheduled to launch service in November, using ad-supported approach of BET, USA Net and others. However, Apollo has pushed back start up date, instead will do one or two pay-per-view events between now and start of advertiser supported service. AET plans to program 8 PM to 2 AM (ET) daily when start up comes. They will probably end up on W5 although earlier F4 announcement had been made.

ANIK D started off with a bang when it was testing, placing a strong set of test signals into areas of the Caribbean as well as throughout much of North America, from 104.5 west. But as the testing proceeded, the signal levels outside of Canada began to drop down so



that by the end of the testing sequence those who had started off hoping D would provide substantially improved coverage in new areas, were back lamenting the 'good old days' of ANIK B. It all remains to be sorted out, but for now, it looks like the Canadians, by moving virtually all of their video to the new D bird, may have accomplished their previously stated goal of 'correcting' wandering footprints from the B bird.

BIG SHAKE UP ahead in the European Ariane program. The September loss of Ariane's 5th flight, ending some 13 plus minutes after lift off with the disappearance of the rocket and two on board birds, has many space planners very concerned. Of 5 Ariane flights to date, two have failed during lift off exercises and prior to first orbit. Many US satellites are scheduled down the road to use Ariane, including three new Intelsat V birds in the first half of 1983.

ANOTHER SPACE failure in September saw the faltering INSAT

1A bird, India's hybrid multi-band domestic satellite, collapse. INSAT had bad problems after launch, failed to properly unfold or deploy solar panels and 4 GHz antenna systems. Indian flight techs used up several years of thruster rocket fuel trying to 'jar loose' the two unfurling parts, then prematurely used balance of control/thruster fuel trying to fly bird on a daily basis in semi-crippled state. On September 5th last of attitude control fuel was gone and bird tumbled helplessly in orbit. It lasted less than six months of expected seven year life.

SLIGHT adjustment in expected operational date for the new family of French domestic satellites; Telecom 1 and 2. French now hope to have the twin birds operational in early 1984 from locations of 7 and 10 west. Birds will carry at least a pair of C band TV transponders for servicing outlying French islands spread from Indian Ocean to North America.

ANOTHER ADJUSTMENT, perhaps tentative at this point in time, places the launch dates for Mexico's two domestic birds in the first six months of 1985. Mexico's currency problems could push these dates back even further.

THE LEARNING CHANNEL is to be the formal, new name for the daytime user of TR16 on F3R. The Appalachian Community Service Network has been providing daytime tutorial and instructional courses to cable systems for several years here and is adopting new name for better 'marketing visibility.'

GROUP W/WESTINGHOUSE has dropped out of another programming service. After disposing of its interest in SHOWTIME (See **CSD** for October), they have now backed out of 50-50 deal with Disney to fund the Disney Channel. The new children's service is scheduled to begin operations in early April of 1983, on a pair of transponders. Split apparently came over inability of two firms to agree on what programming would consist of, and which partner should make programming decisions.

KEYFAX teletext service kicks off on vertical interval transmission mode of TR6, F3R, this month. Service was previewed by Southern Satellite Systems at STTI gathering in Fort Worth this past March. Initially, only 3,000 home terminal packages will be available for marketing and field test. One, **promised to CSD,** will be used to acquaint TVRO dealers with the scope of new service.

CANADA is asking that they receive six 12 GHz DBS orbit spots. US is up in arms since Canada is requesting more spots than US had planned to ask for, at 1983 regional conference that will meet to decide fate of 12 GHz orbit spots for all of western hemisphere.

SOVIETS have launched first of their 11 GHz birds, stationing it at 53 **east.** The higher band capability is built into a May 1982 launched Ghorizont family bird and is considered to be a test prior to final design and operation of Russian 11/12 GHz Loutch birds (see **CSD** for September).

OLD LINE TVRO receiver supplier, Hughes, may be getting out of the 4 GHz receiver business. Hughes recently licensed a smaller California firm to build and distribute their TVRO receivers and there is speculation that Hughes may be backing out of TVRO field. Hughes receivers have been sold primarily to cable firms, and a few broadcast users. Their visibility level has never been high, after first six months to year of marketing starting in 1977.

CONTINUED / from page 3

their kids to college and watch jets land at the Providenciales new 8,500 foot runway. That is alot of change to ask of a people in just 14 years. And as you might well suspect, since this is less than a generation in time, some of the old habits are not completely gone.

When we introduced television in the fall of 1980, everybody loved us. We got the first TV station going while we were living in a rented beach home; and as old timer **CSD** readers will tell you, we used an ADM 11 foot dish mounted on a hunk of plywood, in the sand, to bring down a few hours per day of Westar 1 and 3 news and sports. Television was the first glimpse of the outside world that the natives had. They saw, for hte first time, how the rest of the world worked and played and slept. I think the sleeping may have been the most educational.

I decided early that I was not going to anything to contribute to

their shaky perception of moral values. I figured with the recent history of D8's plowing ashore, $2 canned corn and $5000 drums of aviation fuel, they didn't need to watch a string of Bruce Lee movies and decide that the outside world went around chopping each other up in little pieces. So we carefully pre-selected TV programming, trying to mix a certain amount of culture and education with entertainment. What I didn't understand was that local moral and family values were already deeply seated.

Violence is a no-no here. Yes, people get angry and yes they even hit each other on occasion. But the last murder on Provo was back about 1860; if you overlook the rumored slaughter of some drug guys (by **some other** drug guys) back in '72 or so. They never found any bodies so it remains a rumor for now.

Nobody has guns here except for a few strange-breed American Ex-Pats (ex-patriots), and knives and other weapons are just not carried or used. The last armed robbery was never (not in recorded history) and the last rape, at least reported, was also . . . never. If the natives can be faulted for anything, it is their passive nature and what **you and I** might consider an unusual attitude towards sex. You understand that unusual is a term used to describe behavior which **you** may not **yourself** engage in, or accept as the 'norm.'

Natives are very religious, as a body, if not individually. Local churches (mostly Baptist) are well attended, and Sunday is an occasion. It is a local law that you cannot enter into any type of contract or binding business deal on a Sunday. A contract to buy a piece of land, from the guys with the D8, signed and dated for a Sunday, can be held invalid, for example.

If you can't enter into a business deal on a Sunday,that does not preclude sex on a Sunday. Or a Monday or a Tuesday . . . etc. Now before you get the idea that walking the roads of Provo is akin to visiting a replay of the back hill side of **Woodstock,** let me state that I lived here for more than a year before it was pointed out to me that creating children was not considered a function of marriage. One of the neatest guys I know has the words **'Island Bull'** enscribed on his pickup truck. He has 14, I believe, children, by 12 young ladies, and he supports **each** of them. He is not married, never has been, and possibly never will be. What the natives were doing here **before** the D8 landed, and what they have continued to do since then, is what some might call 'selective breeding.' This particular chap is tall, strong, bright and capable. He is also very good looking. All local virtues.

I think Susan tumbled to the local extra-curricular activity far before I did. I guess my studious nature kept me from seeing the obvious in this case. Susan, I am sure, didn't want me exposed to this, fearful that some dormant male hormone in me might get into a tug of war with the particular moral values which my mother and family instilled in me. Since I did finally figure out what was going on, out of sight to be sure, I have become a semi-serious student (as in scholar) of the local phenomenon. When you are of a scientist mind, and you live in a test tube, the least you can do is observe what is percolating around you.

You may be wondering now, with sweaty palms, **what any of this has to do with satellite television.** I'm coming to that.

The average tourist misses this extra-curricular activity. In fact, the natives for the most part don't mix their own pleasures **with** the visitors. I'm sure when Ed Grotsky from Arunta was here for a whole week, he never once saw or heard anything that made him wonder about what the natives did in their spare time. But others who come here **looking** for 'action' certainly can find it. If not from natives, from the non-natives who populate the island. Or at least a small segment of them. One of my favorite stories, and it is no story, involves a young lady who came down here about March or so of this year. She came for a weekend, and is still here. Her family lives in Miami, and she wants to open a business here. A dress shop or something like that. The reason she stayed was that she is relatively average looking but down here, with the frequent turn over of tourists and so on, the fact that she is single and ostensibly alone sets her out. She is also boastful, and I think most people lost count at around 35 or so male conquests for her. And that was her first week (I joke; it was probably her first two weeks).

You are now really sure I am not going to connect any of this with satellite television, and you probably are going to file this issue of **CSD** away with **Playboy.** Hang on.

I could go on but I think I'll save the **good,** descriptive stuff for a book I am writing. I've made my point. People don't get murdered or stabbed here. Or raped. They don't have to get raped.

So here **we** are hand selecting television programs, oblivious to what the moral codes really are, and carefuly staying away from anything with violence in it, or more than the top of a female human breast. And when somebody asked me why all of the movies we show always **'stop showing what two people are doing while they still have their clothing on,'** I typically laughed and figured I was getting my leg pulled. Usually the person asking was a local preacher or a deacon of a church. Little did I know . . .

We started out with a 4 hour television day. A few old sitcoms, a movie, and a satellite fed newscast. Like I said, everyone loved us. Then when we finally got out of the rented beach house and into the first of our own buildings, the 'Annex,' we expanded first to 12 hours

TOM HUMPHRIES fights the noon-day sun to complete retro-fitting SatFinder ten foot dish with down converter and LNA package at WIV.

per day and then 24. All of this time we were **not** charging anything for the service, nor were we accepting advertising. That situation dragged on for just about one year. Susan didn't like the fact that we were providing a free service, and neither did I. But we had so much going on at once that getting into a receipts-mode for WIV was just not high on our list of priorities. I kept telling her we were building good will, and allowing enough time for people to save their money and buy television sets. When you are competing with canned corn at $2 a can, you have to make allowances for individual family cash flow.

In October of 1981 we began accepting advertising. We did a decent campaign to get local businesses to support us, and tied the length of the television broadcast day to the amount of support we could sign up. The result was that we had a 'table' wherein so much support equaled a four hour TV day, more equaled an 8 hour day and

WIV COMPLEX in early September of 1982. Quartet of satellite antennas handle complex receiving chores for national television system.

so on. Keep in mind that on September 30th of 1981 we were on the air 24 hours per day. On October 1, with some support, we dropped back to 18 hours per day. The six we eliminated were in the wee hours between 12 midnight and 6 AM.

I learned several painful lessons here.

When we simply ran 24 hours per day, Kevin or I would drop into the control room every now and again and when we felt like it, 'change' the satellite input service channel from WTBS to WGN, or whatever. We did this often enough so that people would not get bored with a steady diet of one program director's creation, but not so often as to cause us undue hardships. When we began the 18 hour 'scheduled day,' we had gone out and sold sponsorship 'blocks.' News from 7 AM to 9 AM, movies to noon, cartoons to 3 PM, PBS to 6 PM, and so on. A company or sponsor bought a 'block' and we opened the block with a credit to them, dropped in a simple character generator visual credit during the block augmented by a tastefully done audio message from them, and then came off the block with another credit for them, a station ID, and a new credit for the next block's 'sponsor.

This all sounds pretty simple. But when you are doing this 18 hours per day, seven days per week, having to be in the control room at certain, specified times every day can put a real crimp into your lifestyle. I quickly discovered that scheduling a block-change or break at 3 PM ended my afternoon naps, and made it impossible for Susan and I to take off for a beach trip. Getting up at 6:55 AM to make a 6:59 AM sign on, and 7 AM block start, was also not much fun. Staying up to 12 midnight to shut us down was also not much fun. But we did this for four months and I decided there had to be an easier way to take in what amounted to perhaps $50 a day.

On January 1st we installed and turned on a scrambler system. I will talk more about the pitfalls of scramblers in the feature here this

month. Suffice to say that there are certain combinations of scrambling techniques and transmitter techniques which do not marry well. Our's happened to be one of these. I'll explain why, technically, elsewhere in this issue, but, when you have a scrambler that only works with color TV sets, and when the $69 drug-store-special Korean black and white portables **don't even know** that you have the scrambler system turned on, you have a big-big problem in Paradise!

As I write this, in September, we are **still** using the same system we activated back on January 1st. Out of perhaps 500 television sets on the island, we have slightly under 100 paying for 24 hour service. We still run four hours per day 'unscrambled,' and into that four hours we sell local commercials. We get from 10 to 18 commercials into that four hour period and I create them all with my little typewriter and my best Howard Cosell or David Brinkley announcer's voice. About half of the commercials are a spoof of the businesses that pay their $8 per commercial. For example, a local garage ran a lady's special on Wednesdays. Lube jobs were free with oil and filter changes. The commecials start off by stating that the two young men that run the garage spend far too much time on their backs under 57 Chryslers, and they have developed 'problems' as a result of this strange position. Then one of the commercials goes on. **"Vaseline is a lubricant. A can of Three in One is a lubricant. And on Wednesdays any single, unattended lady who brings her car, truck, three wheeler or front end loader into Provo Auto Supply will get a free lube job . . . while Marshall and Gil change her filter."** Our commercials are very popular, since we figured out where local instincts are. They would also get our license lifted in the states if we ran them there. Oh yes, the first day we ran the above commercial, there was a long line in front of Provo Auto Supply at 8 AM. Not a single vehicle had more than one person in it, and all were female.

With about 80% of the island 'stealing' our scrambled service, through the simple ploy of only buying $69 Korean black and white TV sets, I decided that enough was enough. First I tried to talk satellite engineer David Barker into designing me a scrambling system which I understood. My concept was that since we have plenty of un-used spectrum down here, we would transmit our 'scrambled' service as **wideband FM,** centered on 70 MHz. Yes, that just happens to fit TVRO demodulators and I figured we could round up 'descramblers' by taking a TVRO demod box, less the huge amounts of IF gain found in most TVRO receivers. David is still working on all of this. With the new 'second year of scrambling' deadline coming on fast, I had to think of something to get people to pay for what they were watching. The natives who had paid for the first year service, because they **believed us** when we said that they would **have to have** a scrambler **to see us** after January 1 (1982), were understandably hostile when they found out (after paying for a year of service) that their neighbor got decent pictures **without** a descrambler! And without paying for it. So I decided to get our popular transmissions off of any standard TV channels, and onto something that required a special down converter. I also decided that we would have to go to a more elaborate sync suppression scrambling scheme just to keep everyone honest. I wanted them to watch the four hours per day that we make available unscrambled. Advertising revenue is not big, but it is a decent service,

and with no local radio, nor newspaper, there is a need for advertising announcements and messages.

To clean up our act, we are taking everything but the real 'pap' of WGN et al and moving it to Channel X. Our regular WIV service is becoming more instructional and educational, with sitcoms and news in the unscrambled portion. We don't want to preclude those who legitimately cannot afford the subscription fee from having access to news and some entertainment; at least four hours per day. We do want to force those who can pay, who like movies and sports, to pay us. HBO would understand where I am coming from!

Channel 'X.' The channel designation "suggests" to those who have that kind of mind that some (or all) of the programming fare may have some 'sex' on it. I have done nothing to destroy that myth, although you and I as seasoned satellite people know that there is only so much of the 'just-short-of-X' programming actually on the bird(s). We installed a test transmitter for Channel X late in August, and placed **two sets** in public places. One is a business open from 9 AM to 4 PM, the second is a popular restaurant open from 7 AM to midnight. In both locations, we installed our 'microwave' down converters and de-scrambler gear and put the service on public view.

After the sets had been in service for a week, it was obvious that I had finally hit the right 'nerve.' Would-be subscribers started coming out from under rocks all over the island. We package daytime soaps (noon to 4 PM) with 20 hours of movies to make up a 24 hour schedule. There are two, unattended "switches" per day. One at 12 noon, and one at 4 PM. Neither Kevin nor I have to worry about getting in a station break, or running commercials. It is automatic and I love that.

Our choice of afternoon soaps may mystify you. Let me quote some dialogue which I observed today while studying the reactions of 30 local people packed into one of our two points of display, watching a 3 PM soap that is very popular in the states.

Actor He: "I am moving out."

Crowd watching: "That's telling her, the dirty . . . ". "Take your clean underwear with you!". "He can't do that, she loves him . . . ".

Actor She: "You are leaving me for Marian? I **knew** you were sleeping with her!".

Crowd Watching: "He's no fool . . . Marian is a better _____ than she is!". "He should have left last week; Pauline gave him the _____." ". . . Take your underwear with you . . .".

Like I said, it took me a while to figure out where the sensitive zones were down here, but I finally think I have a handle on it. Anytime you can pack 30 people into an office that is barely ten by 12 feet for an hour, and they stand there yelling at a television set for 58 minutes, you have identified some basic instinct.

And you didn't think I was going to tie all of this sex to satellite television!

Naturally we don't show, nor have we ever shown, 'soaps' on WIV. That was a lucky move on my part. Not being conscious of **(1)** what they were doing on soaps these days, and **(2)** the intense following soaps have in some quarters, I never anticipated (until recently) just what a drawing card I had tucked away on a seldom used satellite transponder. And like I said, before I got into the technical parameters of bringing off-satellite television to a new area of the world, I wanted to deal with the emotions of television. Clearly it would have been out of place for me to lace my technical report with this sort of background. Now you can tear out these pages and throw them away just in case you don't allow 'R rated' publications in your home, and we'll get on with the technical parts of satellite television.

I think Channel X will fly. Much of the value of the service is in the word of mouth advertising we are getting. **People perceive it to be** something I don't really think it is. What I have really done is to package all of the really suggestive programming into one place, and call it something which starts people's imagination running. Since we have established what the local national sport **really** is, it was merely a matter of marketing the product after that.

WIV? Well, I am stuck with providing a national 'clean air' service. I think that by the time 13 year old Kevin is 23 or 33 or 43, it may break even. He's a great kid and I don't want to leave him with an albatross around his neck, so I will keep plugging away at making it less work, better technical quality, and more and more representative of the 'surface needs' of the islands. But hidden away on a discreet, secret 'microwave' frequency we'll keep on cranking out those great lines of

soap dialogue, 24 hours a day.

"And take your underwear with you!".

WHO DO YOU BELIEVE

My telephone rang early one morning and on the other end was Guy Davis of Intersat. "I've had several telephone calls from people who swear up and down that there has been a collective decision by all of the major premium programmers, to adopt a single scrambling standard, and to start scrambling with 6 to 8 months." What did I know about it.

My instant reaction was 'BS.' I told Guy to quit worrying about scrambling and get back to worrying about delivering 2,000 home terminals per month out of his overtaxed plant. On reflection I probably should have given him a more thoughful answer. Anybody that calls me while the Today Show is on runs the risk of getting a less than well thought out answer.

Following Guy's call came several more, and a well thought out response to the rumor(s) from SPACE General Counsel Rick Brown, to all members of the board and Pioneers. The rumors seemed to be popping up everyplace, and there was either a reasonably well planned and directed campaign underway to spread the rumors, or, there was some truth behind all of the stories making the rounds.

Let's analyze where everybody is on this one.

HBO has been very public about their intentions to scramble. I have no quarrel with that and actually think we will end up far better off with them scrambled since that will give us additional strength to argue for a piece of legislation that forces them to give individual home terminal operators 'right of access,' for a fee. Showtime has said they are considering it; The Movie Channel folks came out against HBO's approach to scrambling, and then quietly tucked their tail between their legs and slipped into the background.

Other lesser players, such as HTN and SelecTV haven't said very much, although SelecTV did promise to scramble a year ago; long before HBO said anything firm. Cinemax is owned by HBO so as HBO goes, so too will Cinemax go.

There is a natural fear on the part of people in this business that **if** one or more of the premium folks scramble, home terminal sales will go to heck in a hand basket. I may not agree on the lure of premium programs but I respect and label as 'unknown' just **what** the fascination **may be** for 'first run movies.' Certainly if I were manufacturing hardware, and I had seen the industry grow by perhaps 300% in the past 12 months or so, I would be very concerned about any threat to stunt that growth. Scrambling of HBO, inspite of our industry pronouncements to the contrary, has got to be labeled a potential stunt force to continued growth.

From the position of HBO, being the first (and perhaps the only) premium service to scramble is a terrible gamble. Scrambling systems have problems. The premium programming business is very competitive, at the subscriber level, the system level, and in the marketplace where each programmer is purchasing films. The cost of scrambling, for HBO to do it alone, was forecast to be in the neighborhood of $5M. If HBO pays that cost for HBO affiliates alone, that's $5M out of HBO operating funds which could have gone into subscriber promotion, buying new films, and so on.

On the other hand, if HBO could talk one or more of their competitors into adopting the same system they have chosen, and spread the cost of their tooling up for scrambling, that puts their competitors in the same position vis a vis spending cash for what HBO (and the others) must consider a non-productive purpose. They are smart to lure their competition into the same tar pit.

The arguments for everyone adopting the **same** system, and everyone implementing the same system, are strong. That minimizes the amount of new technology cable systems have to learn to live with. Back up supplies for one will probably be good on-the-shelf replacements for the other(s). There will probably be economies of scale for the cable system users; 'main frames' for descramblers can be outfitted with one, two, three or a larger number of individual descrambler units. This will cut the total cost of putting descrambler units into individual cable headends.

The folks who will really do well, if this rumor turns out to be totally true, are the pirate folks. The same folks who have cracked the ON TV and other terrestrial pay scrambling codes and who have gone underground to turn out 'black boxes' which they sell in markets such as LA, Detroit, Boston and New York City. Having but a single system to 'unravel,' one that will descramble **all** of the pay services, has to be a boon to their engineering departments. I predict that within 45 days of formal confirmation that two or more premium programmers have adopted a system, and that system begins to show up as test signals on transponders, I will have a 'moral decision' to make here at **CSD.** Through the mailbox one day will come the first advertisement offering 'satellite descrambler equipment.' Will I run it? First I will have to determine that the system offered for sale works. **Then** I'll have a tough decision.

I am in favor of scrambling because I feel we **must** have a **legal right** to access the services on the birds. To gain that legal right, we have to get Congress in a position where it sees private folks out there are **really losing** something. A **threat** that they **may** lose something is not good enough. If you ask for help from a Congressman today, he tells you to 'come back when it happens.'

I am therefore in favor of people being able to unscramble. And

'pirate unscramblers' certainly would do that, if they work. My inclination at the moment is that I would 'cut a deal' with the premium folks; I'll run the pirate descrambler ads **until** the premium programming folks come to the bargaining table with SPACE, and work out a system that allows private homes to order and pay for the service, at a reasonable fee. As soon as I can send money someplace, they accept my money, and provide me with a legal right and the descrambler to allow me to watch their programs, then I will promptly cease to accept 'pirate descrambler' ads.

I'm certain somebody will try to make a case against **CSD,** if we elect to accept 'pirate descrambler ads,' for aiding and abetting the violation of Section 605. That one would be interesting since **CSD** is owned and published by a Turks and Caicos Corporation where Section 605 doesn't mean anything. I'll cross that bridge when any, or all, of this happens.

So is there universal scrambling in our future? Actually, it makes far more sense than HBO going it alone. If this whole thing turns out to be a farce, and there are adamant denials followed by vehement splitting of the premium programming ranks, we'll just chalk this one up as another sick joke. I can see it happening that way; everyone now knows that the fall season is the big season for sale of private terminals. A well placed, timely rumor, floated at just the right time, could probably lop a thousand or so home terminals off the fall sales season for the industry. Those are the kinds of games being played because the stakes are getting higher and higher every day.

OPERATIONAL CLAIMS

Last month in the October **CSD** I slipped up. There appeared in **CSD** an advertisement for JV Electronics which under my usual inspection would not have been allowed to run in **CSD.** The advertisement promoted a series of TVRO antennas, and a TVRO receiver, for which certain operational specifications were quoted.

I have always had problems with people who insist on making statements for their products which defy certain known laws of physics. I am reminded, as I often am, of a similar period in the history of television and the unrealistic advertising claims that period spawned.

During the late 1950's and early 1960's, there was an intense competitive war between many of the manufacturers of home television antennas. As television stations came on the air, and more and more viewers had access to more and more stations, the people building antennas designed better and better antennas to pull in weak, 80 to 200 mile distant stations. In a couple of years the state of antenna technology was pretty much mature, as far as antenna **gain** was concerned. That was the point where magazine advertisements **should have** seen 'gain claims' level off. There was, afterall, only so much 'gain' you could squeeze out of an 'All Channel' antenna.

Unfortunately, the antenna manufacturers had become so used to 'upping' their claimed gain every couple of months that they found it very difficult to break the habit. During the technology growth period, increased claims for antenna gain probably had **some** merit. With a 'mature' antenna technology, such claims quickly lost track of reality. And pretty soon antenna manufacturers were forced every few months to increase their 'claimed gain' just to stay competitive, in print, with their real world competitors. It didn't take very long before gain claims were so out of line with the real world that the entire home antenna field lost credibility.

I have been mindful of that scenario since TVRO antennas began to quote antenna gain claims in print and on data sheets. I have been fearful that under the intense competitive pressures, manufacturers would find it expedient to tack an extra .5 or 1 dB of gain on their gain claims just to stay ahead of the competition's claims. There have been some isolated examples of this over the past few years, but when the STTI shows started the antenna measurement tests much of this exaggerated claim business disappeared. There's nothing like an up front, frank discussion of antenna gain to put the fear of retaliation into somebody who might want to fudge on numbers.

So along comes the JV Electronics advertisement for October. JV is a distributor of product, not a manufacturer. JV is, to my knowledge, one of the stellar distributors and Joe Valentino is a person of high integrity. His advertisement included gain claims for three different models of a popular line of antennas. The 13 foot claimed a gain of 44 dB.

Now the novice dealer might look at that number and then go

through **CSD** or data sheets trying to find another 13 footer with as good or better gain claims. Hopefully he didn't find any in October. And starting this month, he won't find that same number repeated for the JV distributed product either. A 13 footer with 44 dB of gain? Doubtful. Some of the best (very best) **15 to 16 footers with FCC certification barely reach above 44 dB.**

The problem here is that nobody knows enough about antenna gain to know when the real world stops and hype takes over. Joe Valentino, I learned, was given this number by the manufacturer. I also learned that the manufacturer obtained his number after getting a 'professional appraisal' of his product from a consultant in the field. No antenna test range tests were performed. Hard numbers (whether they are or were 42, 43 or 44 dB) were therefore impossible to substantiate.

If a 44 dB gain 13 footer was not enough to ruin my attempt at maintaining advertising integrity for one issue, the same October JV Electronics ad also hawked the virtue of another new product, a receiver, which JV now distributes. The advertising copy said that the receiver had a threshold of 6.5 dB. **Ouch.**

Whereas antenna dBs like to get bigger, receiver threshold dBs like to get smaller. The problem is the same, however. The very best commercial, super expensive, super sensitive receivers as well as the very best home field receivers may have a **threshold approaching** 7.5 dB for just the right kind of video scene. Receiver threshold is easier to measure than antenna gain; but, few receiver manufacturers really know how to do it, or have the equipment to do it. **A claimed threshold of 6.5 dB is unrealistic.**

I do not fault JV Electronics for their advertisement. I fault myself for allowing the advertisement to get into publication. I caught it after there was a chance to correct the statements and that happened because JV received an extension for getting their advertising into the printer.

And whereas JV got their antenna gain claims from the antenna manufacturer, they got their threshold claim from their receiver manufacturer. JV just happened to hit the jackpot, twice (!), in one month.

So it appears I need to re-spell-out the rules of the road for preparing advertisements for publication in **CSD.** There are three difficult areas to police in home hardware. They are LNA gain/noise temperature claims, antenna gain claims, and receiver threshold claims. All three can play an important part in the performance of a system. **Low** LNA noise, **high** antenna gains, and **low** receiver thresholds combine to make the **ideal** system play.

I don't want gain-claim-wars started, or nurtured, in **CSD.** The key word here is **'claim.'** I have no problem with legitimate numbers. To deny the use of numbers in advertising, as some electronic publications do, is not the answer. But we must have some semblance of order, and rational use of numbers, or we are as a field doomed to a slow death by drowning in our own hype and saliva.

I will accept, for publication, antenna gain claims which equate to antenna efficiencies as high as 65% for prime focus fed antennas. I won't question, unless I receive adverse feedback from field users, any gain claims up to that point. I will accept numbers greater than that only when there is substantial technical data, from an antenna test range, to back up higher claimed gain numbers.

I will accept, for publication, LNA noise temperature claims and gain claims without reservation. **Provided** nobody is claiming LNA noise temperatures lower than 75 degrees K for an uncooled GaAs-FET LNA. Noise temperatures below 75 K will require suitable test lab verifications.

And, I will accept for publication, receiver threshold claims as low as 7.5 dB when the advertiser spells out exactly **what type of video** is in use (i.e. color bars, 'moving video'). Anyone claiming a threshold better than 10.0 dB will have to spell out the type of video involved. Anyone claiming a threshold lower than 7.5 dB for **any** kind of video is going to have to back up the claim with suitable engineering lab test measurements.

There is a danger, of course, that I am establishing an 'end of the road' for engineering by setting these levels of my 'advertising threshold' for advertising acceptance. Just to nip that in the bud, let me re-state that antenna gain claims for efficiencies greater than 65% for prime focus antennas, or receiver threshold claims lower than 7.5 dB for moving video will be accepted; the advertiser is simply being

required to substantiate his claims before we will accept the numbers for publication.

All of this is designed to prevent a repeat of the 50/60's TV antenna gain-claim wars, and, to protect the dealer and distributor who relies on what he reads in **CSD.** I don't expect somebody who was running a hardware store in Oshkosh two months ago to have learned enough in sixty days to know when he is being hyped. I do expect that this person has a right not to be mis-led by his industry trade publication.

WRITE WHAT I SAY . . . Not What I Said

With a modest background in published journalism, I 'broke' into big time journalism fresh out of college by going to work for an ABC radio affiliate in California. My first job was to re-write a fresh five minute newscast each hour so the news guys could update listeners hourly. The first two weeks were miserable for me because I thought you had to re-write the scope and the content of the news every 60 minutes. In five minutes time, less commercials, a person can speak around 600 words in typical radio announcer speed so that meant in a typical 8 hour work day I was writing around 5000 new words.

I had a fantastic teacher; an old school radio news director who thought everything should be straight, short, and factual. He didn't like extra wordage, and wanted the opening sentence of every story topic to tell the listener all of the important facts.

After a few months I graduated to writing a daily 15 minute (less commercials) station generated newscast; today's equivalent to the local TV news shows. This was a major step up for me since I was **also** responsible for collecting the raw data, as in being a reporter, for the stories involved. I'd be up at 5 AM to start the rounds of the police and fire blotters, then get to the station early enough to put together an early morning 5 minute newscast covering the local scene for 7:25 AM airing. I spent the remainder of the morning chasing down interviews, facts and background to create the longer noontime news. By 2 PM I was through for the day, and shot.

Under my direction, the tone of the local noon newscast slowly changed from a soft, easy news to a hard hitting, ABC type newscast which uncovered dozens of local corruption stories. I'll remember as long as I live, I suspect, being called into a prison riot to talk with the rioting prisoners. They were threatening to kill some hostages and burn down the prison unless their demands were met, and their leaders was a regular 'fan' of mine. His list of demands started off with having me come into the prison to act as their intermediary to the authorities.

I'll also carry with me the memory of carrying a .38 police special for several months, and having a policeman hanging around for weeks everywhere I went, because a story I uncovered and put on the air resulted in my becoming the object of gang retaliation. A person can get himself into alot of trouble with a typewriter and a microphone when he is 22 or 23 years old!

Through all of that 'training' I developed a considerable pride in being an accurate, straight forward journalist. Foolishly, perhaps, I didn't flinch when my station car blew up under me one day when I turned on the starter (fortunately for my children, the bomb was poorly conceived); nor when we had to evacuate the station on another occasion because of repeated telephoned bomb threats. I did get a two week 'sabattical leave' out of the latter event, however, after the station manager figured out **he too** was in the station at the time! During that two weeks, the story that precipitated the bomb threats worked its way to the back burner, and the people involved bartered a settlement with the authorities.

I tell you this bit of previously unrecalled background because it may help you understand some of my commitment to dealing with news stories as straight, honest, factual events in life, which require (I believe) straight forward reporting. A case in point was a story that leaned largely on a telephone interview with Boman President Robert Maniaci, in the October issue of **CSD.**

I spent 30 minutes or so, privately, with Maniaci during the Omaha show. We sat in his hotel suite and talked about some of the problems Boman was having getting what Maniaci considered 'proper recognition' for his firm and products. I suggested that we do an in-depth interview, over the telephone, when I returned to the states in mid-August.

With a Sony cassette recorder, a Radio Shack telephone pick up

mike and a prepared list of questions, I reached Maniaci on the telephone on a Sunday afternoon. After some small talk which included Maniaci's relating an amusing if not earth shaking story of how somebody lifted $7000 in equipment from their Omaha suite, I pushed us towards the interview with the ground rules.

"I have a list of prepared questions. They may not be in the sequence which I will select for writing the story, but they are the questions that will form, with your answers, what will appear in print. If there are any questions you wish to have deleted, as I ask them, just tell me you wish to skip that question. If at anytime you want to go 'off-the-record,' **let me know and whatever we talk about will be private between us."**

Maniaci said OK, let's get started.

Ten days later a copy of the interview, as it would appear in print, was mailed to Maniaci. I do this, on occasion but certainly not always, as a courtesy. It also allows the interviewed person the opportunity to spot any **factual** errors and give us an opportunity to correct those errors before it appears in print.

Shortly after he received the story our Carol Graba received a telephone call.

"We do not want you to run the interview." Carol asked him to put that in writing.

A few more days, and the letter arrived. It said that they had withdrawn their 'permission' for us to publish the interview. When I received the news, it ruined my day. I also could not recall needing their permission to **publish** the interview; only to obtain the interview initially.

A few more days went by and while I was wrestling with the problem, my Provo telephone rang and there was Bob Maniaci. It was one of those all-time great telephone connections; I could even hear Maniaci breathing. Since we usually have trouble hearing people shouting, that alone was an important event.

Maniaci said that in the 14 pages of copy, he loved pages 6 through 14 but he could not 'allow' me to publish pages 1 through 6. I asked why.

"You start off with the premise that everybody in the industry copies everyone else, and having said that, you then in effect say 'Now let's interview Bob Maniaci'." The message, **he thought,** was let us interview a 'copy cat manufacturer.' Detecting a bit of thin skin on this issue, I said I would review what was said. I pointed out that being this close to the editorial deadline was abit of a problem. He offered to rewrite the first six pages for me. And I told him to do so and ship it on to Fort Lauderdale, using Federal Express.

Now one of the major premises in effect when I started **CSD** more than three years back was my recognition that since you send me $50 (or $75 offshore) a year, I have a very real obligation **to you** to see that **you have** advanced warning on important trends in the industry. In the Maniaci interview I saw an early warning of many possible trends ahead, and I felt the publication of the interview more than met my criteria for fulfilling my obligation to subscribers. I know that $50 or $75 is a bunch of money to spend on a publication, but I also know that just one or two early warnings a year, and a fellow in the business feels he is getting his money's worth. I know I tense up every year when it is time for me to renew my subscription to a couple of the $250-400 per year, weekly, newsletters that are available in this industry.

Maniaci suggested that 'if this industry is going to mature, you (meaning me) have to adopt a professional attitude.' He felt that my publishing the first six pages of his freely given interview would be unprofessional. He also pointed out that 'there are now a couple of other magazines in this field and if you are going to survive, you need to be professional.'

I was of course grateful for the warning. I have been accused of many things in the years that I have been publishing (it all began 22 years ago). To the best of my recollection, being unprofessional was not one of those things. I guess in my old age I have been getting sloppy. A person has to be careful of losing their 'professional edge' in their declining years.

In mid-September I sat down in my Fort Lauderdale motel room and put together the October issue. The Robert Maniaci interview was included. I did go back and re-read the opening few paragraphs which I had originally written to set the tone for the interview, and I made a few editorial changes. Upon re-reading it, I had to admit that I was

intimating that Boman was a firm that started in the business by copying others. That was, actually, my own summary of what the first few pages of Maniaci's own words would themselves say to the reader as he plowed into the interview. Since Maniaci was going to say what he said anyhow, it seemed redundant to summarize out front.

I know the Boman / Maniaci interview rankled some people. I am sure that Maniaci wished he had **not said** some of the things he did say. I am equally sure that some of the people he spoke about wished he had not said what he said.

However, Maniaci's suggestion that **he** rewrite the text of the opening pages was not the right answer. If you wanted press-agent created text in **CSD,** I'm sure you would let me know about it. Getting you $50 worth of information a year is my number one objective, and Maniaci's attitude about the industry was reflected accurately in the telephone interview; not by his re-written version. Publishing his re-written version would be publishing a somewhat less than accurate 'advanced warning' to you, as a part of this industry.

I suppose the 'easy' thing would have been to simply cave-in to Maniaci's concerns and demands. History is filled with examples of people saying things they wish they could retract. Maniaci had two opportunities to 'retract' his answers; he had the right to ask me to skip a question, or to ask that we go off record, at any time. He did ask that we go off record on occasion, and I even shut down my tape machine when we did so. He never asked me to skip a question.

Anyone who is big enough a boy to be playing in this industry should also be big enough to stand by what they say. None of what Maniaci said was in a moment of passion. He was calm, cool and collected, and totally at ease, through the full 90 minute interview.

Boman is, I suspect, 'here to stay.' Robert Maniaci is, I hope, here to stay. Unless I miss my bet, what Boman does in the next 12 months will directly affect us all. And we will revisit that impact from time to time as the events unfold before us.

DIRECTORY / directory

If you or your firm was kind enough to complete and send in one or more of the CSD Directory forms, you will either already have received, or should in the next 20 days receive, some proof sheets for **your** Directory listings. Instructions for what to do with the proof sheets were included.

My concept of what an industry directory of equipment and services should be has changed a tad as the first of what I hope will be an annual affair came together. My idea was that anyone who wanted to look up the general specifications on pieces of equipment would be able to turn to the appropriate section of the Directory and quickly see who made two-piece single conversion receivers, for example, what the specifications of each are, and compare apples and apples. And do the same thing for virtually any other product category in the field.

As a general rule, the original equipment manufacturers have **not** supplied the data as I had hoped they would. The dealers did very well and the distributors fell someplace in between.

I was tempted to go back to each of the OEM's that failed to supply the data, either at all or in a proper form,and 'bug' each for proper data. I thought about how involved that was bound to become and decided that since I considered our original data-sheet-questionnaire to have been more than amply instructive, if some firms didn't want to supply the data, that was their concern and not mine.

That is not a good attitude on my part, but given the constraints of time and the massive effort involved in pulling the Directory together in any form, that is the way it will be this first year. What I secretly hope is that when the first Directory Issue is out, that those who did it right by supplying the proper data on a timely basis will stand out head and shoulders above those who elected to do it wrong, or not at all. I believe that those who spent an hour or two getting their own data together for us will see many direct sales for their products totally from the Directory. The time they spent preparing the data may well end up being the most sales-dollar-productive time they have spent all year; shows included!

With the data finally 'in stream' we will be putting the finishing touches on the Directory issue over the next 30 days or so. This particular issue will virtually stand on its own, and as such could be 'plugged in' at virtually any point in the normal publication year. As it now stands, I anticipate it will be the February 1983 issue. Watch for it.

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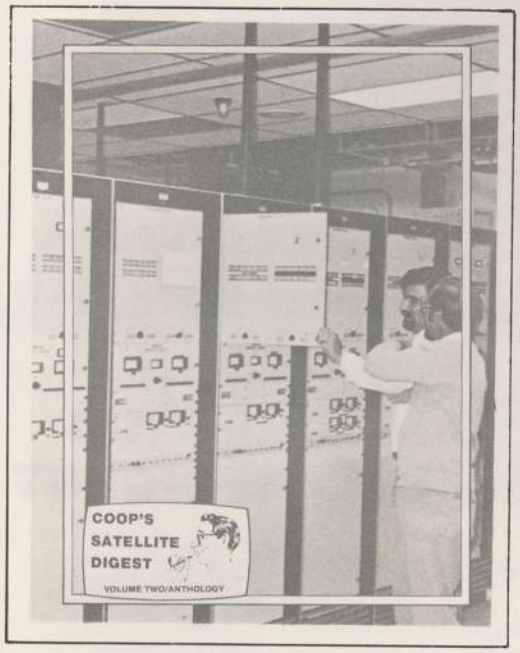

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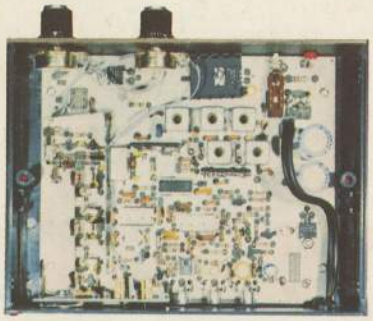

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