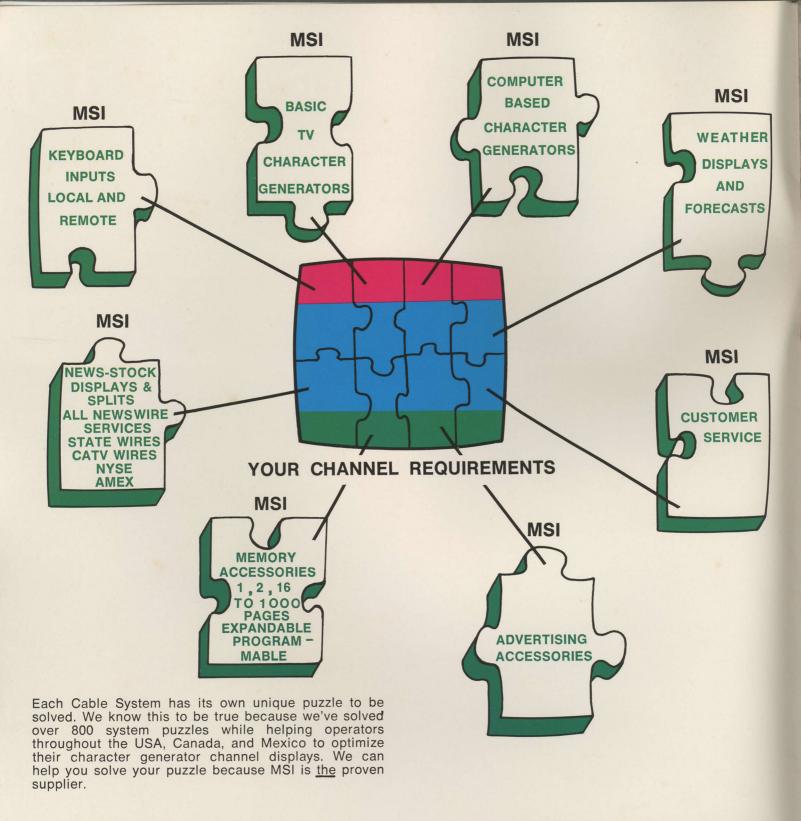


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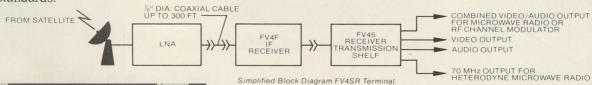
And some versatile plug-in options: AM and FM program transmission channels, orderwire channels, clampers, remote control and monitoring equipment, FM cueing, and 4.5/5.5 MHz aural carrier generators.

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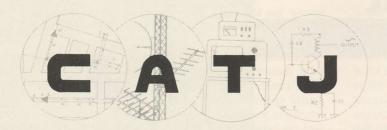
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# NOVEMBER 1977

**VOLUME 4 - NUMBER 11** 

PUBLISHED MONTHLY, AS ITS OFFICIAL JOURNAL, BY THE COMMUNITY ANTENNA TELEVISION ASSOCIATION, INC., OKLAHOMA CITY, OKLAHOMA, AS A SERVICE TO ITS MEMBERS AND OTHERS PROVIDING CATV/MATV SERVICE TO THE TELEVISION VIEWING PUBLIC AND BROADBAND VIDEO/AUDIO DATA COMMUNICATION SERVICE.

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CATJ subscription rates \$12.00 per year for non-CATA members, \$8.00 per year for CATA member-systems; \$9.00 per year for industry employed personnel for at-home delivery. In Canada, \$13.00 per year for CATV systems, \$10.00 per year for system employees. Foreign rates upon request.

Third class postage rates paid in Oklahoma City, Oklahoma, U.S.A.

The Community Antenna Television Association Inc. is a nonprofit organization formed under Chapter 19, Title 18 of the Statutes of the State of Oklahoma. As such, no part of its assets or income shall be the property of its members; such assets and income shall be devoted exclusively to the purposes of the Corporation.

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SBA Loans For Cable Coals To Newcastle Twenty Years In Space

High EMF?

OUR COVER =

BIG ANTENNAS IN MEXICO—VICA personnel Felipe Fernandez, Jose Alonso and Tony Frias atop the Ensenada, Baja California (Mexico) headend site inspect the recently activated 60 foot high by 120 foot wide 'half-bolic' designed by Frias and constructed by VICA personnel. The Mexican CATV industry is off and running at an exciting new rate; and importing U.S. signals deep into the country is playing an important part in the new growth. Report begins on page 18.

# CATA " TORIAL

KYLE D. MOORE, President of CATA, Inc.



#### The Show 'Bored'

Not too many years back there was a glut of trade shows within the industry. NCTA held its national, and then NCTA also worked out a program to supplement or work with regional and state associations so that in effect you ended up with an 'NCTA National' plus three or four 'NCTA regionals' each year. The suppliers, and I agreed with them, dis-liked the system because it meant sending out a complete booth and a staff to each of these shows each year. The costs were high and the returns slim. So the regional shows were cut way down and then finally they dis-appeared altogether.

And now it is all coming back and we are beginning to hear cries of pain and anguish from not only the suppliers but from many of the 'featured guests' who seem to travel these convention circuits with great regularity. And CATA must share its portion of the blame because we in truth re-created the regional meetings with our 'Mini' CCOS concept. Unfortunately, perhaps, for all of us, the 'Mini' concept worked just a little bit too good.

For example, I have before me the roster of attendees at the recent Pacific Northwest trade show held in Spokane in September. The list shows 162 people signed-in, of which we identified 56 as being people who represent various suppliers to the industry. That means the official Spokane roster had 106 cable-operational people in attendance. If you assume that each cable person on hand represented 3 cable systems (which is probably a tad high), you have 318 systems represented at the Pacific Northwest show; or roughly 8.6% of the total industry.

I also have before me the roster of the recent Oklahoma Cable Television Association state meeting held in September; 46 people of which 9 were supplier related. If you assume that the state meeting brought in 37 cable operators representing two systems each you have 74 systems represented; or 2.0% of the industry.

Late in October, but before this is read in print, the Mid America CATV Association will meet in Kansas City. If past years are any indication, there will be around 90 cable people on hand plus 50 or so suppliers. Again, around 190 cable systems represented, or 5.14% of the industry.

Why the passion for numbers? Well, it goes like this. Back some years ago the only forum for technical and nitty-gritty operational data and material was the national NCTA gathering. Unfortunately most of the really meaty-papers were presented by highly technical people to largely empty halls. If you really wanted to know about feed-forward amplifier techniques or the latest group delay compensating networks you were much better off spending a few dollars after the event for a transcript and then in the privacy of your own office studying the equations. Then along came CATA's CCOS and we demonstrated that you could take a complicated subject such as feed-forward amplifiers or earth terminal design and bring it down to a comprehension level where the novice-to-the-subject could understand all of the fundamentals. It is called 'zero-database teaching' and that simply means that you start off a new subject by assuming the student knows nothing (or very little) about the subject at hand. You gently lead the student through the preliminary data, bring him (or her) up to 'speed' and then get into the more complex stuff. It happens to be a concept that works very well, and when you combine this with 'hands-on' learning you end up with very large audiences and happy, smiling, comprehending faces in the crowd.

**Having shown how it is done,** and having proven that when you do it this way rather than by assuming the student is a PhD to begin with you get better interest and results, it didn't take long for the

word to spread. And now we find virtually every state and regional association 'going back to basics'; arranging programs and schedules for meetings so that a major portion of the meetings are turned over to 'zero-data-base-teaching'. **And there comes the problem.** 

Most of the people who have the necessary backgrounds to be 'zero-data-base-teachers' are highly paid, in high demand, professionals working for an equipment supplier. People like Raleigh Stelle of Texscan (who was teaching test equipment procedures before CATA brought along CCOS) don't grow on trees; you have to be a rare individual with a complete and thorough understanding of your subject if you are going to be successful in making a complex subject such as CATV plant testing comprehensible on a 'zero-data-base' level.

With more and more state and regional associations discovering the 'joys' of 'zero-data-base-teaching seminars' the crunch on those really qualified to teach such 'classes' or lead such 'programs' is considerable. And it is putting a new set of pressures on meeting planners and associations.

It is apparent that what we really have evolving within the industry is a new type of teaching procedure and meeting schedule. On the national level we have the NCTA show which is and will continue to be the primary 'new equipment/political show' of the year. The CATA CCOS annual, in the summer, is apparently destined to become the 'low/medium/high technology show' of the industry. And the California Western Show will undoubtedly continue to grow because it is in California, it is well scheduled and exceptionally well run.

That leaves the various state and regional shows someplace outside the main traffic pattern. If they continue to function (as many still do) largely dealing with state problems and state projects, they afford the systems in the respective states the opportunity to meet once or twice per year, exchange tips, gossip and it keeps a working, cohesive force ready to react should there be legislation proposed in the state that will be detrimental to the state's systems. The regional shows are a different kind of animal, and with the exception of the New England Association which functions as a 'superstate-alliance' their real purpose for being is difficult to understand; unless they adopt the 'Mini-CCOS' concept that depends upon 'zero-data-base-teaching'. But that brings us back to the earlier problem. . .not enough teachers to go around, and the time required of a 'teacher' in putting on such a seminar.

There are at least two possible answers. CATA has been experimenting this fall with video taping of various portions of our fall-time schedule of 'Mini-CCOS' meetings. We've put on tape around 40 minutes of the presentation on low-cost microwave and this means that certain personnel, such as CATJ's Bob Cooper, have been freed up from following the 'Mini-CCOS' circuit around the country. You cannot simply put 'Coop' on tape and expect that to answer the need however; and Microwave Associates has wisely seen to it that a very talented George Maier attends each of the 'mini' sessions this fall to augment the 'Coop-on-tape' format. Maier does a 'zero-data-base' introduction, switches on the tape, and then after the tape he expands upon the taped material and answers questions that arise from the students. There are some rough edges but it does work. It is a procedure which could be employed by virtually any company who has a qualified 'teacher'.

Another approach is to get out of the supplier area altogether and look inside of the organization itself for the talent to put on the seminar session. The Oklahoma state meeting this fall went into small earth terminals in some depth. A cable system operator (Mike McKee of Cablevision of Chickasha) did a first class job of 'zero-data-base-teaching', describing how his own new 5 meter terminal was engineered, installed and proofed. Mike even had handout copies of his 'paper' text for the group. With all of the CATJ (and other) reference material around these days, on subjects such as low cost microwave or small aperture TVRO's, an operator who wants

to put together a presentation such as McKee's can do it without too much trouble.

Of all of the possible program creation techniques available, I would personally favor greater participation by the system operators in the state or region. There is only so far that the limited resources of the suppliers and their personnel can be stretched. If we are to continue to mature as an industry, we need to develop our own experts and teachers from within. If this approach is augmented with 'video-taped-segments' from the 'outside world', we could well end up having the best of both worlds at out disposal. But it won't happen all by itself; it will require a game plan and a dedication on both sides.

Which brings us to a concrete proposal for the coming year. To the suppliers, we propose that you look inside your organization for your best talents; people who speak well, openly and freely with a better than average grasp of the subject matter. Create a 20 or 30 minute video tape from within, one that sells technology, not products. If you create the tape (or tapes) the industry will (we believe) see that they are put to good use. To the associations we suggest you too look inside for people who can stand before a group and tell a story; a story of what they did and how they did it.

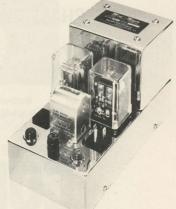
**We'll be happy,** through CATJ, to act as a clearing house for **both** sides. If you are a supplier, let us help you conceive the proper context for a 'teaching tape' and then find places for it to be shown. And if you are involved in a state or regional association, let us assist you in finding suitable program material, and outlines, with which your own people can put together a show.

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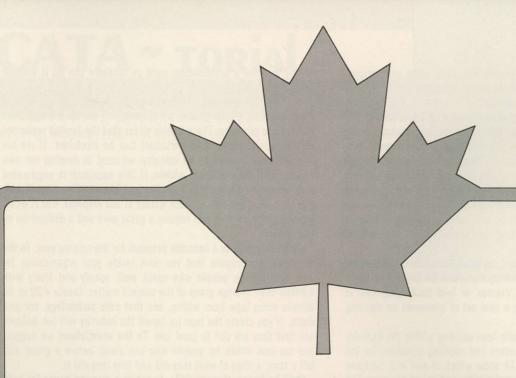




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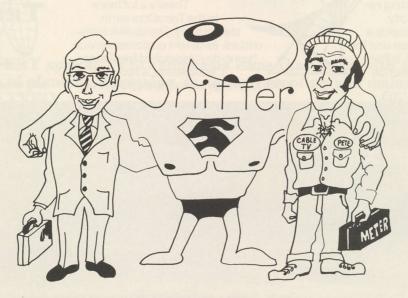
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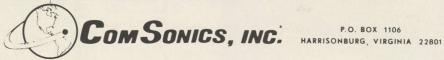






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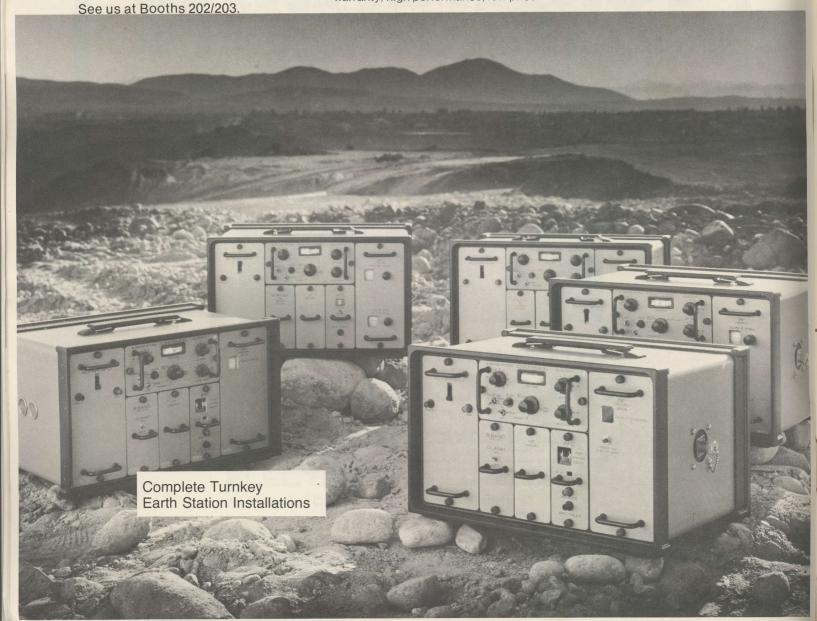
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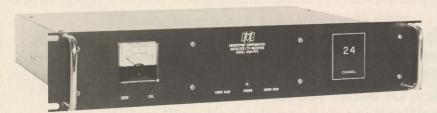
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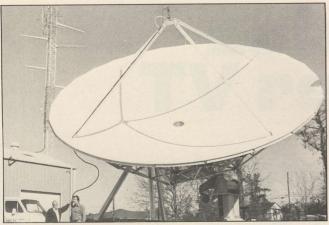
Compucon provides all necessary technical exhibits in compliance with the frequency coordination requirements of part 25 of the FCC Rules. Additionally, we assist in the preparation of the FCC applications for approval and licensing. We perform technical analyses to ensure compliance with established design and performance criteria. Finally, we continue to monitor the frequency interference environment around the satellite earth station to detect and prevent potential frequency interference from new or changing terrestrial microwave routes.

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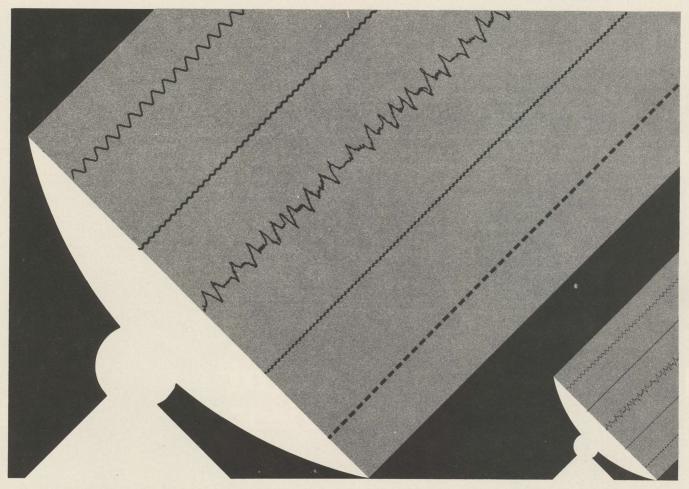
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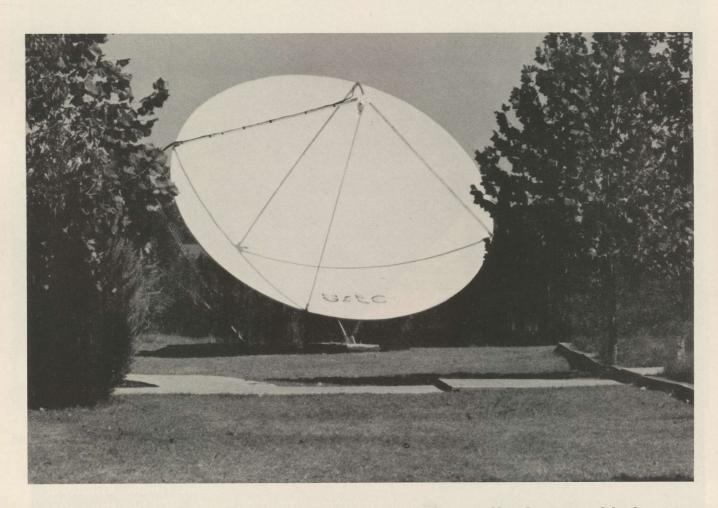
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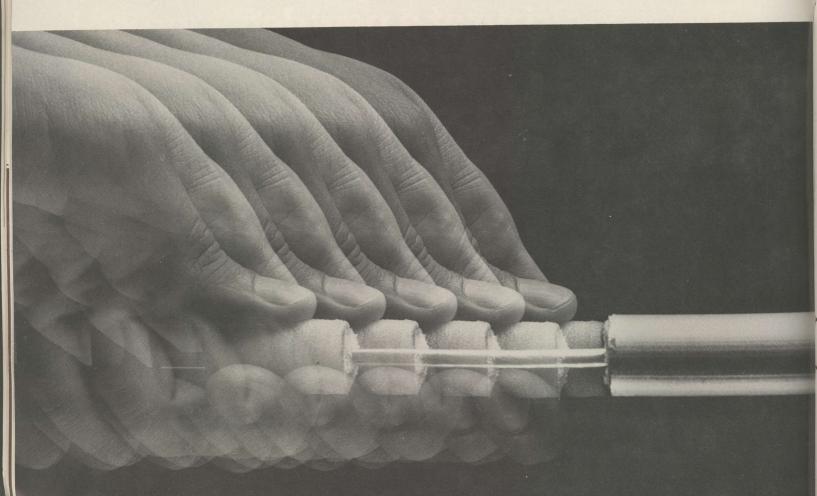
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#### **Modern Day Revolution**

The cable television industry in Mexico has been slow to catch on although most of the elements for a very successful industry have been in place for more than twenty years. Mexico is of course a very mountainous country. The country has approximately 52 persons per square mile (the United States, if you exclude Alaska averages 7 persons per square mile). There is a message there as we shall see.

Today Mexico has 47 operating CATV systems serving approximately 100,000 subscribers. An additional sixty systems are before the Mexican version of the FCC (the acronym is 'SCT' which stands for 'Secretariat (of) Communications and Transportation'; loosely translated) and a few are presently under construction.

Mexico's newest system, activated in early October, is located in Ensenada, Baja California. West coasters will recognize Ensenada as the attractive tourist community that sits on a beautiful bay some 90 minutes south of San Diego, along the Pacific Coast, down Mexico's highway "1". Easterners have probably never heard of Ensenada. A frame of reference is clearly needed for Ensenada. Let's try on Fort Lauderdale, Florida. The connection? Ensenada has just about the same population as Fort Lauderdale (around 140,000). Both are tourist oriented (there is a new four lane toll road south from San Diego to Ensenada), both are on the ocean, and both have reasonably attractive beaches. But there the comparisons end. Because Fort Lauderdale has plenty of television; and Ensendada, for all practical purposes, has none.

The highway "1" toll road from San Diego and Tijuana is one of those lazy, coast line scenic drives. The ocean pounds away to your west while steep mountainous terrain, virtually rising straight

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up out of the ocean, is on your left to the east. At a half dozen spots along the 90 minute drive you spot small 'development communities' hugging the coast line. Rosarito, Plaza Santa Maria... little communities, with perhaps 100 to 500 homes, largely the product of American capital and knowhow installed for wealthy 'Norteamericanos'. These \$100,000 homes look strangely out of place against a setting of wood shacks covered with scrap galvanized tin.

The largest system in Mexico today is located in Mexico City; it caters primarily to the wealthier sections of the nation's capitol. For some years the Mexico City system depended upon the microwave importation of border station signals from Texas's Rio Grande Valley. The microwave network was capable of bringing down a single channel at a time, so for a few hours you got CBS programming then for a few more hours you saw ABC programming. More recently the microwave system capacity has been expanded and now the 18,000 cable homes connected to the federal district's CATV system have access to a pair of American signals hauled nearly 550 airline miles by microwave. They also have all of the Mexico City signals plus some unique-for-cable programming. Because the Mexico City programming is (not unexpectedly) in Spanish, the cable service has its best appeal in those areas where people speak English. Off-air reception on the 'local' channels is not that bad.

The Mexico City system presents no 'problems' to the American owner, operator or system employee. It is much like cable systems in Minnesota or Texas or California. And it is **not like** most of the balance of the systems in Mexico. The second largest system in the country has around 8,000 subscribers; with 500 subscribers **per mile** (!). That's not homes passed; **that's penetration per mile**. And while it is amongst the highest in the country in homes per mile connected, it is by no means unusual. Ensenada will have 120 miles of plant when completed, and pass 25,000 homes (that's 208 homes per mile passed). Ensenada is, by Mexican standards, an 'under-dense' system.

Systems with 4,000 homes passed and 25 kilometers of plant (15.535 miles) are not unusual (that's 257 homes per mile). And that is one of the significant messages about the present and potential industry in Mexico. But we are getting ahead of our story.

### A Slow, Sporadic Start

Mexico's CATV growth began more than twenty-five years ago. Americans 'snuck' across the border, and in the absence of regulations prohibiting such activities, installed make-shift systems with a wary eye cast over their shoulders. The law didn't say you couldn't do it...but it also didn't say you could. Lots of old equipment got dumped in Mexico and eventually after several badly engineered false starts and some run ins with the 'local' law the Americans pulled out. Nothing much happened for several years thereafter.

During the late 50's and early 60's while the American cable revolution was running full force, a number of Mexicans with a smattering of cable technology began very small systems in areas nearby to television transmitters, but shadowed by the mountainous terrain from direct reception. There efforts probably would have gone unnoticed by the federales had it not been for the hatching of a grande scheme to bring U.S. television to Mexico City. The 'scheme'originally had U.S. financial backing and because it depended upon microwave to get the signals down to Mexico City, it required some federal approvals. It slid by unnoticed for a few months, then years and then it ran into trouble. The bottom line was simple enough; CATV became a subject of study and more study. Rules were proposed, discussed, put into motion and then withdrawn. It lasted several years and then finally after nearly a decade of very limited activity it began to move again.

The present rules are fairly simple, but quite rigid. To be in the cable business in Mexico you must:

1) Be a Mexican citizen;

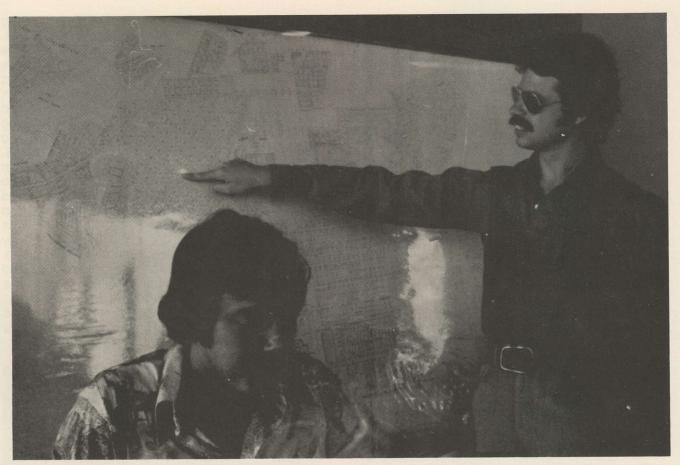
 Make application to the SCT for a 'federal franchise' or license to construct the system.

So far so good. If you are looking for a loophole there, **forget it.** The 'law' says that you must be 100 percent Mexican. That means no money, no ownership interest from outside of Mexico.

Now in applying for a federal franchise the procedure is reasonably straight forward. For example:

- 3) You conduct an engineering study for SCT which 'proves' that there is a need for the system. In effect, you show how poor or how sporadic or how scarce television reception is in the area proposed for service. If you can't show that, then you show how much 'better' you can make it; reference to the way it is now.
- 4) You provide a study to show how many channels of service you will provide. There are no signal-carriage rules in Mexico. You are free to provide as many signals as you can, by whatever means you can find them. But there are certain technical standards to meet, such as signal-to-noise on all signals; which pretty much keeps you from bringing in cruddy looking, distant channels that are sometimes there and sometimes gone.
- 5) You prepare an economic study of your system, how much it will cost, where the money will be spent, and how you expect to get your money back (i.e. return on investment).
- 6) You conduct a population study, which in many cases is a more accurate than any official government census available. (Mexico's population figures for the nation as a whole and for any given area change drastically in just a matter of a decade.)
- 7) Then you wait.

Ensenada's system waited for eight long years. But it was a special case.



ING. LUIS FELIPE FERNANDEZ OROXCO—right, the spark plug behind the VICA operation for Ensenada and Tijuana points out the VICA office location in Ensenada on the system cable map. Sixty miles of 120 mile plant is in and dedicated.

After the paper work is prepared and submitted to SCT it is studied. And studied some more. Finally, after say 90-120 days, it is published in a federal newspaper as a proposal. The federal government waits for 30 days to see who complains and what the nature of their complaint is. Then they publish the notice a second time. And wait another 30 days.

If, after the second publication there are no objections...the applicant is in business. Well, almost.

There is a small matter of setting your rate. You see, you don't do that yourself. The SCT does it for you. After they have studied your proposal, your plans to spend money to build the system, and the way you plan to operate, there begins a 'negotiation period'. The SCT, as part of its 'act', would like to charge the peso-equivilent of say \$2.00 a month. As an applicant you naturally would like something higher. As high as you figure the traffic will bear. Ensenada ended up with a monthly rate of \$7.75 (American) plus a \$40. installation fee.

Now if it looks like a program that would zip through from submission of application to the second (and final) publication of the notice in say 6-8 months time, why did it take Ensenada eight years to get into business?

The answer to that question varies with the circumstances. Those who have been through it say the situation varies from the ridiculous to

the serious. For example, in Ensenada the proposed system would bring into the community an (eventual) 12 television channels. Might somebody object to that? Surprisingly, no. Ensenada has been 'served' by a channel 23 station with an ERP of 223 watts since December of 1963. The station is owned and operated by the same family/company that wanted to put in the CATV system. No objections there. However, the Ensenada system would also bring in a half dozen or so FM stations, in stereo, from the San Diego area. And that's where the rub began. There are no stereo FM stations in Ensenada. In fact there are no FM stations there at all. There are four AM stations however (two of which are owned by the same family/company bringing in the CATV system signals). And the 'other two' AM's objected to the plans to bring in the stereo FM. It may not sound like much, but for eight years it was enough to keep cable out of Ensenada.

In other 'situations' the problems are more inexact. "At some point in time it pays to make a personal trip to the SCT to 'discuss' the delay" reports one recent applicant. What he means is that if you can locate, create or buy friends at the SCT, the permits move through much more smoothly.

#### **Time To Build**

With the federal franchise in hand you are off and running. There are no local permits to acquire; the cities to date have had very little to say in getting a permit moved through the SCT; or they can prove troublesome. Again, it varies with the politics of the situation. You must post a performance bond with the SCT; one that guarantees that you will start construction of the system within 6 months (180 days). The bond is presently 48,000 pesos (or \$1,920 American). The SCT is dead-serious about your starting construction, and being under real construction, within the 180 day period. There have been examples of systems getting an extension of 3-4 months but it doesn't happen often. Almost never unless you can 'prove' the delayed start was not your fault. Not having your own money ready to spend, or hardware on hand is seldom an adequate excuse for an 'approved' delay. Finally in the SCT area of interest, once you

(if indeed anything at all) about the granting of franchises. They may prove to be helpful allies

get started there are several more involvements with the federal agency. For one thing, you pay the SCT a whopping 15% of your gross revenues each month. That's your 'franchise fee' and its the same for every system. Each and every month the CATV system must supply the SCT with a complete list of all subscribers, the status of their accounts, and a check for 15% of the pesos collected during the past month. And you'd better

not be late.

Then there are the tests for technical compliance. Knowledgeable Mexican CATV operators describe the technical standards as being 'someplace between the U.S. technical standards and the Canadian technical standards'. In an much as the Canadian standards are tighter than the U.S. standards, that suggests the Mexican standards are tighter than our own in the United States. The SCT people visit the present 47 systems at least once per year; sometimes more often. "They are very thorough" notes one Mexican CATV engineer. "Frankly, we believe they are too tough on the smaller systems, say those with fewer than 1,500 subscribers. The smaller systems don't have spectrum analyzers or the money to buy them. But the SCT inspectors often do have such equipment and that makes it tough on the smaller operators". The Mexican CATV association (CANITEC) is actively attempting to get the SCT to either ease-up on smaller systems or establish a separate set of technical standards for them.

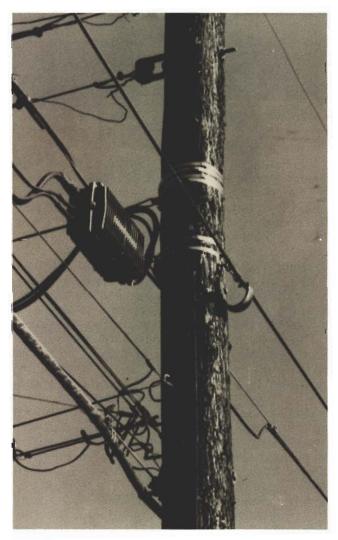
#### The Construction Scene

Just as the SCT was finally getting its act together a new problem presented itself to the Mexican CATV system builder; the devaluation of the peso. For years and years it rocked along on a basis of about 8 to the dollar or 12.5 cents each peso. Then the Mexican government decided the peso had to readjust its value to the American (and other) currency. Suddenly overnight the peso was worth 6 cents American.

Now the Mexican government has long sought to protect the Mexican industry; any Mexican industry. In fact there is a law which says that if a product is produced in Mexico, a Mexican busi-

ness **must** purchase the good(s) from an at-home supplier. For the cable operators this law has been a mixed blessing. Take hardware for example. For many years there has been a manufacturer of mundane pole hardware in Mexico. Three bolt clamps, 5/8th bolts and the like are produced in Mexico. Unfortunately, they are in short supply. . and expensive. Spending \$10.00 per pole for hardware was considered about average for many years, and then you had to face 3-4 month delays while the goods were produced and delivered.

So Tony Frias, a Mexican cable operator, designed a new way to hang cable on a pole. It may not be the first application of a new technology, but it certainly solved a problem for Frias and fellow operators. By utilizing a pair of stainless steel straps and clamps, Frias attaches his 'J' hooks or other mounting piece to the pole without the usual 5/8th or 3/4 inch bolts. In the case of heavy power supplies, he utilizes four of the stainless steel strap/clamp sets. What good does all of this do?



NO THROUGH BOLTS HERE—Magnavox amplifier and street crossing strand connections to pole in Ensenada are completed by using tension strap system developed by Tony Frias.



DOWNTOWN ENSENADA LOOKING NORTH—headend site is on second ridge north, beyond top of ridge showing in photo. Ranging hills north of town, which is virtually at sea level, block even sporadic direct reception from San Diego/Tijuana.

First of all, hardware costs dropped from \$10.00 /pole to around \$2.00 per pole. Secondly, the poles in Mexico vary from wood (treated) to metal to concrete; often along the same street. When you don't have to drill holes you save a bunch of time; especially with concrete and metal poles. Third, when you have to do any re-arranging on the pole you simply loosen the stainless clamps and slide the line up or down as needed. It is all very neat, and as Frias notes "we get immediate delivery on the stainless straps and clamps so we have also avoided the long delays in obtaining materials".

The next hurdle for Mexican would-be operators is equipment. Again, if any of the equipment is manufactured by Mexican companies for Mexican consumption the Mexican cable company must buy it. From time to time there have been small outfits in Mexico who have produced everything from line amplifiers to directional taps. But the experience of Mexican operators with this equipment has mostly been 'bad'. The equipment simply has not measured up, it has been expensive, and delivery cycles long. The most recent 'difficult experience' was with cable itself. A well known international company supplying cable set up a Mexican plant, and according to Frias the product was of poor quality. "We were forced to obtain it from that supplier, but the cable was so poor that we couldn't use much of what we received". Fortunately the supplier eventually

realized the error of its ways, shut down the facility for some time while it solved the production problems, and then eventually brought the cable back onto the market. "Since then things have improved" notes Frias.

Within Mexico there are really two separate climates in which cable operators operate. Baja California, that state or province which runs south along the peninsula below San Diego/ Tijuana, has both political and physical separation from the balance of Mexico. Baja is a free port; which means that goods can come into Baja for domestic consumption within Baja, without the usual duties and import restrictions. This is a 'concession' which Baja has wrestled from the federal government in recognition of its 'isolation' from the balance of Mexico. Because of the Gulf of water that separates most of Baja from the balance of Mexico (which restricts simple terrestrial transportation), and the extremely mountainous nature of the northern segment of Baja where the province does join Sonora to the east, Baja is largely dependent upon foreign supply sources. The U.S. is the largest supplier of course, through the San Diego/ Tijuana corridor.

This allows Baja cable operators a little more freedom in the selection of equipment than their counterparts in the balance of Mexico. It also creates some unusual costing situations for the

Baja operators. For example, with the freedom to purchase outside of Mexico, the Baja operators have been in a position to look for 'bargains' in the southern California area. One operator who is building and operating in primarily smaller communities regularily shops the 'used equipment' market in California and elsewhere. He recently was offered a large quantity of KCLE line extenders in 'first class' condition for \$30.00 each; they were being removed from a system in the Los Angeles area. The same operator regularily buys directional taps, used, at \$1.00 each. "In these small systems we had been charging

65 pesos a month for service (that was the rough equivilent of \$5.20 per month American) until the peso devaluation came along. With the peso worth half as much, we suddenly were getting the American equivilent of \$2.60 per month for service. Yet we were then paying twice as much, in pesos, for the used American equipment. Ouch. That obviously hurt. To get a rate increase the systems had to go back to the SCT for a redetermination. The 're-adjusted' rate turned out to be 85 pesos a month or \$3.20 a month. "It has been tough but we are surviving". The older system, once established with a rate, have a particular problem in getting rate adjustments apparently; even with the obvious need when there is a situation like the re-evaluation of the peso.

The Baja market is considered to be a low cost labor market for manufacturers. Tijuana, currently on the downhill side of a boom, has employed as many as 10,000 people at a time in as many as 300 separate electronic manufacturing plants. Sears television set modules were produced there for some time (although they no longer are). The minimum wage in the area is 133 pesos a day or \$5.32 American. If that sounds like the market is not affluent enough to afford cable services, think again.

The Tijuana system, operated by Felipe Fernandez and associates, began as a typical off-air system depending on a mish-mosh of yagis and logs to bring in the San Diego (local) and Los Angeles (distant) signals. "Our group purchased the system for debts. It had around 8 miles of plant in a city of around 800,000 people. You'd have to call it a token system" comments Felipe.

In spite of its tremendous size and apparent potential for CATV subscribers, the VICA system serving Tijuana is not getting the attention of other interests in Baja. "Tijuana is an unusual market. We now have around 50 miles of plant here. We have rebuilt using Magnavox/Phillips gear and started out fresh with a brand new headend." The headend and in particular the antenna system employed by VICA and designed by engineer Tony Frias will be the subject for considerable discussion here shortly; including a construction ('do it yourself') feature in our January issue.

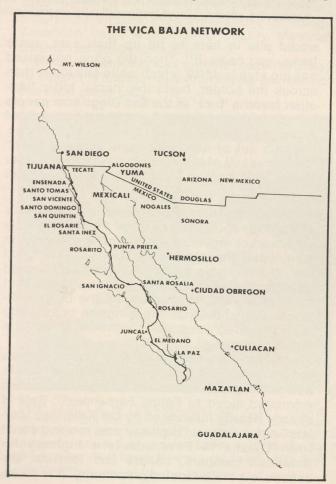
A combination of the ready-access to southern California, the border town atmosphere, and the free-port status of Baja does make it an unusual market indeed. The population has swelled to

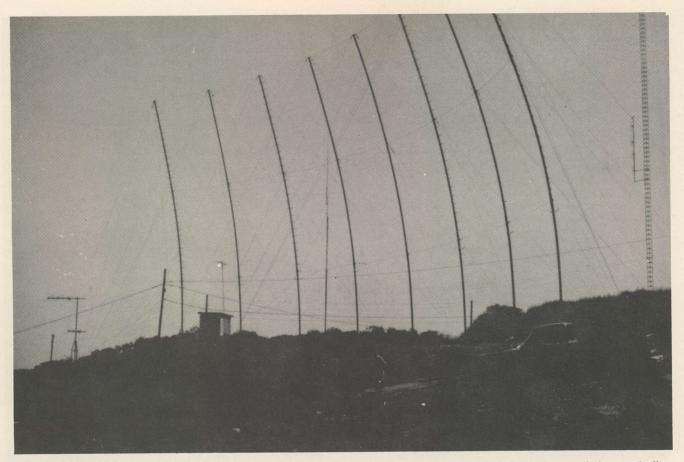
near the million mark largely in response to the proximity of the American soil. We drove along approximately four miles of the landlocked border; an eight foot chain link fence topped with a concentration-camp styled rolled-ring of barbed wire. Every few hundred feet we could see where the barbed wire had been pushed down by some fleet footed Mexican who probably threw a heavy tarp or 1 by 12 board on top of the defense line to allow him to scale the fence and drop onto American soil. The San Diego newspapers and television media daily report on the hundreds to thousands turned back along the border. The U.S. border patrol has added a 1,000 men to their forces recently. Every few hundred yards or so the chain link fence is either cut or smashed in where someone has made a break for the states with bolt cutters or a battered up vehicle. It is not a particularily pretty site.

The influence of the rich Americans is everywhere evident. American television is the temptation. The \$5.20-a-day Mexican laborers (and those are the ones fortunate enough to have a job) salivate at the Farrah Fawcett dolls and new cars that fill the commercial portions of the American tube throughout the day. Then on weekends Americans pour into Tijuana in tens to hundreds of thousand numbers to buy up the

lower cost Mexican goods.

"Until six months ago you could purchase regular gasoline in Tijuana for 28/29 cents a gal-Ion" notes Fernandez. "Every weekend Americans





THE TIJUANA 'FRIAS-BOLIC'—with Tony himself standing left of the XETV pickup truck. The eight 60 foot steel pipe parabolic supports are anchored in concrete at the base, 'stressed' forward with strand wire to form desired curve. Everyday galvanized lashing wire, spaced at 2 inch (horizontal) intervals forms back screen for reflector surface. Full details in January CATJ.

would pile in here to fill up their cars, spare tanks, you name it". Then the price got raised one big step to 48/49, which while still lower than across the border, hurts the 'home' folks. "Another favorite 'trick' of the San Diego area people is to drive down here on Sunday and buy up beef at prices about half of what they are in San Diego. They go out of here with trunk loads of beef." The end result of this modern day form of border raiding? No beef in Tijuana for the locals after late Sunday afternoon.

The message here is simple enough. American's shove their opulence down the throats of barely employed or unemployed Mexicans every day in many ways. The television screams out the 'good life'. The touristas flaunt it with big cars loaded up with cheaper Mexican gasoline and beef. That there is **any** way to stop **any** of the bulging Tijuana population from crossing the border into the gold paved streets of southern California is the wonder of it all.

"Will television from the United States carried deeper down the Baja peninsula create new social pressures on the local population' we wondered aloud to Felipe Fernandez?" Baja is already heavily influenced by the American tourists" notes Felipe. "Highway one, running south from Tijuana to Ensenada is a highway for American campers, trailers and tourists. Ensenada is a multi-faceted community. It is a sea-

port, a fishing port, a farming-market center. Cotton is shipped out of Mexico from Mexicali through Ensenada. There is a fairly good sized boat construction industry and some light manufacturing. And the good quality highway has made it very accessible to Americans." On the bottom line, nobody seemed concerned about the influence American television might have on the residents of Ensenada. Perhaps, because of the poor coverage and programming quality of the local channel 23, a bigger question might be 'how would television...any television...affect the life style of lower Baja residents'?

#### The VICA Grand Plan

The VICA group is an interesting one. They have close ties with Baja television station XETV and others throughout Mexico. One thing you learn quickly about Mexican companies. . .don't ask too many questions about the ownership 'tree'. Sooner or later, or so it seems, virtually everybody in Mexican telecommunications gets worked into the company!

VICA is an acronym for Vision Por Cable de Mexico (S.A.). Headquarters is in Tijuana but that is only because XETV is there. VICA is the sort of professional, feet on the ground CATV company you might expect to find in say Canada. There is plenty of emphasis on engineering and good quality pictures.

When VICA took over the decrepid 8 mile Ti-

juana plant for debts they set out to make the system work properly. To do this they tapped a number of the 'family', Antonio ('Tony') Frias who also serves as Chief Engineer for Tijuana's XETV. Frias looked at the poor quality Los Angeles signals (about 100 miles) and decided that while the plant was in poor shape, the headend was in worse shape. Frias says he studied articles published by CATJ on parabolic antennas (June 1974) and then got out his textbooks. The result was a 120 foot wide by 60 foot high 'half-bolic'. "I had a choice" notes Frias. "We had already talked to a cable operator in the San Diego area about taking a microwave feed from him for Los Angeles signals. That would have worked but I thought I could do it as well or better for a whole lot less money". And so after six months of careful research and plannig the 'Frias-bolic' was

The installation sits within 500 feet of the 550 foot tall XETV (6) transmitting antenna. The same distance applies to a similar tower for Tijuana's XEWT on channel 12. Being within 1/10th mile of a full power channel 6 would expectedly do some nasty things to receiving Los Angeles channel 5. And the same would apply in spades to receiving channels 11 and 13 from Los Angeles, through channel 12. The high band signals from Los Angeles are on channels 7, 9, 11, and 13. Frias has in addition to his 1/10th mile separation on channel 12 the two full power San Diego signals on channels 8 and 10; a bare 15 minutes away, and 'dead-in-line' with the Los Angeles signals.

"I knew what we could expect from bandpass filters and traps and good quality heterodyne processors" reports Frias. "But the key to taking Los Angeles off-the-air on VHF channels 2, 4, 5, 7, 9, 11 and 13 was going to be our ability to make the Los Angeles signals strong enough to allow us to filter and trap the locals on 6, 8, 10 and 12."

The 'Frias-bolic' differs in many respects from other, earlier attempts at large dimension troposcatter antennas. For one thing it is less expensive to build. Frias notes "I had offers from some Canadians to come down here and build us one for between \$25,000 and \$40,000". Frias spent under \$2,000 for his first half-bolic in Tijuana and by the time he built a second one for Ensenada he had shaved that cost even further.

Does it work? The measured gain on channel 13 is one the order of 28 to 28.5 dB over a dipole. Gain across the low band is in the lower 20's (over a dipole). Gain at UHF is right at 30 dB; it could be several dB higher with some slight modifications. The pictures of the pictures tell the story. They are first class at 100 miles. And no, the Tijuana site is not high up on a mountain; it sits around 900 feet above sea level with much higher intervening terrain in between the site and Los Angeles.

Note: CATJ is preparing an in depth construction article on building your own 'Frias-bolic' for our January 1978 issue. Included will be dimensions, construction details and photos of the system.

The half-bolic was then married to a brand new set of headend processing gear; each piece was chosen by Frias to solve the particular problem at head. Scientific Atlanta processors, Blonder Tongue processing equipment and Microwave Filter traps are evident in the headend. "We have 23 useable off-air signals from the Tijuana antenna" notes Frias. "Even Los Angeles channel 40, which is adjacent in dial position to local San Diego channel 39, is snowfree and interference free". We saw the pictures. . . they are everything Tony says they are.

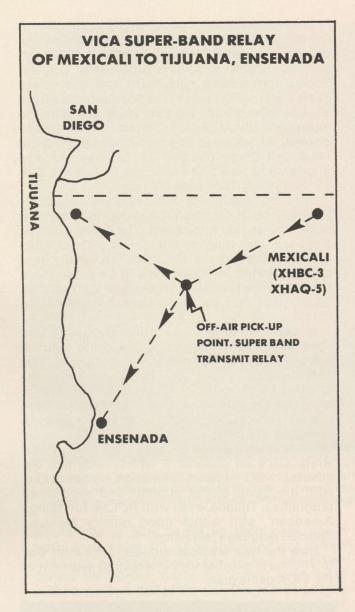
With the quality of input signals raised by several tens of dB, the VICA group then went to work on re-building the plant. The 8 mile existing plant was torn down and replaced with 50 miles of new Magnavox plant. "We are really just getting started in Tijuana; it will be many years before we are finished." In a city of 800,000 plus people that may be the understatement of the year.

In addition to the Los Angeles signals and local San Diego/Tijuana signals, the Tijuana system is also bringing in a pair of off-air signals that originate in Mexicali. "The Mexicali stations (channels 3 and 5) carry the Mexico City network programming plus some of their own orginiation". They are primarily intended to serve the Spanish speaking audience (Tijuana's XEWT on channel 12 is also primarily a Spanish language station while XETV on channel 6, which once had the coveted ABC network affiliation, is an 'indie' with the usual off-net sitcoms and syndicated programs.). Tijuana, even with its love for 'things American', still wants good quality Mexican Spanish language television.

**How** the twin Mexicali signals make their way to Tijuana is another very interesting segment of the VICA game plan.



LOW BAND L.A. IN TIJUANA—even with XETV's 100 kW transmitter but 500 feet away, this channel 5 L.A. signal is flawless at nearly 100 miles; off of Tijuana 'Frias-bolic'. Antenna cost was approximately \$2,000; which divided by the 23 channels it brings in, works out to less than \$100 per channel!



"We have in Mexico something called 'Super Band CATV Transmission" reports Frias. "The SCT has allocated a frequency span from 251 to 323 MHz for relatively low power CATV point to point relays. We have 12 channels there, each 6 MHz wide, and we are allowed to interconnect CATV systems with off-air signals using this frequency band". For the non-engineers in the crowd, having such a frequency allocation is about like finding an abandoned, full, 1 million gallon oil tanker parked in your swimming pool. It is an embarrassment of riches.

Using equipment manufactured largely in the states (Television Technology Corporation 'transmitters' made in Arvada, Colorado; SITCO customized yagis) the small hand-sized 1 or ten watt transmitters take off-air signals (such as 3 in Mexicali) "in" and spit out 'Superband' channels out (such as SB-1 which is 251-257 MHz). In the states we would call this a 'translator'. In Mexico, because of the frequencies and special licenses involved, they call it 'Super-Band Linking'.

Now between Mexicali and Tijuana sits a 7,000

foot mountain peak with power and roads on top. There the VICA group takes channels 3 and 5 off the air from Mexicali, and processes them out on a pair of superband channels. The two channels are then picked up at the Tijuana headend site with a simple broadbanded yagi antenna after a trip of some 60 miles. Not a bad haul for ten watts of power!

The same 7,000 foot site also relays the two Mexicali channels south towards the Ensenada headend. The transmitting antennas atop the 7,000 foot peak are yagis tuned to the appropriate superband channels.

And now the master program for VICA gets underway. Tijuana, because of its unique character and special problems, pretty much sits outside of the "grand plan" of VICA for the balance of

Baia California.

"We have done much of the preliminary engineering and we plan to ultimately have more than 50 separate CATV systems in Baja California and elsewhere along the eastern shore of the Gulf of Mexico" notes Felipe Fernandez. In a country that presently has 47 operating CATV

systems, that's a big number.

"My engineering plan calls for us to take Los Angeles and San Diego signals down the back of Baja, roughly following highway 1 to La Paz" points out Tony Frias. "Ensenada is the northern terminus for the system, and, when we get to the bottom of Baja there's where we will bring the Mexico City originated network signals back to the north via Guadalajara". What Frias is saying is that VICA intends to make Baja their own private cable land. U.S. signals will come down the back of the peninsula from the north via superband links while Spanish speaking network signals, live out of Mexico City, will come north on the reverse path of the same superband link.

"I see Baja in particular as a dual type of market" notes Fernandez. "First there are the Americans who have built homes down here, who come down for a month or two, or just for a weekend. Touristas are having a profound influence on this peninsula and the places they stay or reside are very hungry for American television". While we inspected the new VICA office in Ensenada an American couple from California came in to inquire about signing up for the cable. The office manager pointed out that the section of town where they wanted a connection was scheduled for the second-60-mile phase of the Ensenada plant (the first sixty mile phase is now activated). "Oh" said the lady turning to her husband "Can we sell our house and move over here?" she asked of him, pointing to a location on the map where other Americans had built homes...and where cable was now available. The lady was serious.

"Then there is the native market. They want American television and they want live, network, Mexican television. We have to be in a position to serve both needs." For now the Mexicali stations will serve the Spanish language portion

of the need.

We wondered about finances and the ability of the Mexican market to pay the \$40 installation

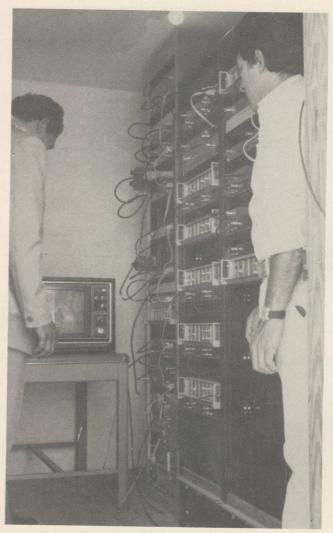
fee and \$7.75 per month.

"Our experience has been that television comes right after a roof on the house; sometimes before the walls!" They tell the story of running drops where you don't have to drill holes to feed the 59 cable into the 'building'. "There are so many holes in the sides of the places that you just pick one to shove the cable in" smiles Hernandez. Do these poor people pay their bills? "Before they pay anything else; even the rent" was the answer.

The Ensenada plant, all sixty miles of it at present and 120 miles ultimately, will pass 25,000 homes. Felipe Fernandez expects 5,000 of these homes to be signed on as regular customers in twenty four months. That's 20% penetration. "Yes, it is low on penetration but it is also in a community that passes 208 homes per mile. We'll end up with no fewer than 42 homes per mile connected when we reach our 5,000 homes projection. And it may go much higher." Another Mexican cable community, a mining community where wages are as low or lower than Ensenada, has an average of 500 subscribers per mile(!). Tony Frias notes "Until you have engineered a CATV system where eight outlet directional taps are put back to back on

the feeder cables, you haven't lived!". There has been one key element added to the Mexican CATV industry in the past year or so which had proved to be a major stumbling block in the past. Money. It is not that groups such as VICA are not capable of raising their own capital from traditional sources; people who own and operate television stations, even in Mexico, are not exactly hurting for "Magnavox/Phillips has done this country a great service" notes Fernandez. "They have brought modern day financing to cable television in Mexico." What he means is this. Banks would not touch cable TV in the past, unless the system was up and going. "We did get some one year financing from Theta-Com back before they were bought out by Texscan" notes Tony Frias. "That one year, if we really worked hard, was sometimes adequate to allow us to get the system burned in, and operating to the point where we could go to a bank and borrow traditional mortgage financing." But alas without the backing of Hughes (which sold out the Theta-Com manufacturing line last year to Texscan) the one year financing project ground to a halt. Now Magnavox, with its parent Phillips which is a large distributor and producer of electronic goods in Mexico, has come back with a five year plan which Felipe Fernandez describes as "sweet".

"This allows us to put down 15% of the total cost of the system, installed; plus we provide the headend and drop materials. They provide the cable (Comm Scope 3/4 and .412 in Ensenada) and hardware and electronics; and through a Mexican subsidiary they do the turnkey



TIJUANA HEADEND—Scientific Atlanta processors and solid state Blonder Tongue strips (and bandpass filters/traps) constitute major equipment in modern, new headend serving the border town.

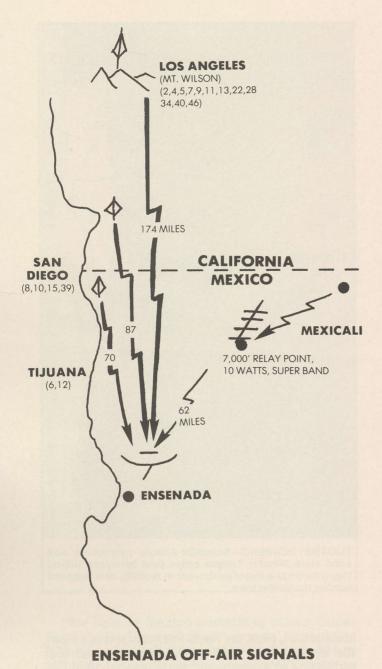
installation. Plus we have five year terms to pay the system cost off." With a 5,000 subscriber projection at the two year point it looks like they will have little trouble making good on the note.

The secret of course is that the Magnavox parent is well entrenched in the Mexican scene. They have the necessary expertise, Mexico City banking connections and knowledge of Mexican law to make such a commitment to the CATV

industry in the country.

"Our initial phase of this project is twenty systems; twelve major systems similar to Ensenada and another eight smaller in size; all in Baja California" says Fernandez. The Ensenada headend, because it is the jumping off point for to-be-cabled communities to the south, is a key element in the system. And there is where engineer Tony Frias has designed his 'Phase-II' version of the 'Frias-bolic'.

The 60 foot high by 120 foot wide half-bolic for Ensenada sits atop a hill that is approximately 1,000 feet above sea level. You reach it along a semi-improved dirt road that leads to a police



repeater and government microwave site. At the present time the site is feeding the two Mexicali superband link signals plus channels 6,8,10,15 and 39 from San Diego into the trunk that leads several miles down into Ensenada. The local channel 23 'station' is added at the site as well. The pictures are as crisp as you would see on the studio monitor in the station but then the distance is a 'mere' 70-87 miles.

'What about the Los Angeles signals here?' we asked Frias, knowing full well the path was 174

"We are very fortunate to have the Mt. Wilson transmitters within a few tenths of a degree of the San Diego heading" notes Frias. That means the big antenna is for all practical purposes 'dead-on' the Los Angeles signals. He moved a jumper cable and directly off of the small feed antenna into a Sony receiver we watched as he

flipped through Los Angeles VHF channels 2,4,5,7,9,11 and 13. There was just the slightest hint of a few 'sparklies' (noise) in the two lowest channels (2 and 4). It looked like a power line leak but it was far from objectionable. In fact, we had seen pictures no better at a Rancho Bernardo (north of San Diego) cable home the evening before at a distance of under 80 miles. The high band channels (7,9,11 and 13) were absolutely flawless, KCOP on channel 13 was so potent you would swear you were in their transmitter control room 174 miles north.

"When are you going to add these signals, or some of them, to the cable for Ensenada?" we

asked Felipe. He smiled.

"We have done no advertising at all. We have not even announced that we are ready to turn on the cable. Yet we have more than 300 people signed up for cable before we have opened the doors. We'll add some of the Los Angeles channels when we feel certain the signals will

hold up".

Tony Frias explained. "We want to watch the pictures for several months, perhaps even a full year. I've never seen them look any different than what you see here. But logic tells me that during the summer they may fade some. We don't want to be put into a position of giving them something that is not 100% reliable and perfect all of the time. The Los Angeles direct reception here is a bonus. We planned only on supplying San Diego, which has the three networks, PBS and the independent signal. If we find the Los Angeles signals do stay in like this all of the time, then we'll add a few of them to fill out the 12 channel dial."

One of the advantages of the Mexican SCT rules is that there are no signal carriage restrictions. You can carry whatever you can get; provided only that when the SCT engineer comes around to inspect, you have the minimum signalto-noise ratios required (36 dB) on all off-air channels. So unlike the FCC or the Canadian DOT rules, once you've done your best engineering and are satisfied with the signals, you are free to add them.

#### The Path South

On the way down 'Mexico-1' to Ensenada we had passed several American-looking resort communities along the way. At one we spotted what looked for the world like a small 150 foot self supporting tower with CATV antennas on

"That's an MATV system" responded Frias. The difference? In Mexico it is very plain

indeed.

If a cable, any cable including a drop cable, crosses over a street, any street, it is a cable TV system and is therefore subject to the rules of the SCT. If you can build a system and **not** cross any streets, you are an MATV system and you can forget about the SCT rules; including the ownership (i.e. no foreign ownership) rules.

"The SCT shut down a small system at Plaza Santa Maria recently because they crossed a

**street**". Moments later we went by the 120 foot guyed tower and stacked yagis beamed on San Diego. Sure enough, it did look like a CATV

system.

The Baja California expansion of modern day cable technology seems to be the right technology, the right people, and the right time. Felipe Hernandez, Tony Frias and the crew at VICA obviously are as skilled at the art of cable as any counterpart group in the United States. Even the Canadians might take a few lessons from some of the inventive engineering employed by Frias.

Cable in Mexico is into a new growth cycle. "We hope and expect that the present political climate will continue" notes Fernandez. "There seems to be shift back to individual initiative and a better attitude towards the businessman" notes Frias. The Mexican government stays in power six years, and the present one is

new. . . with five years to run.

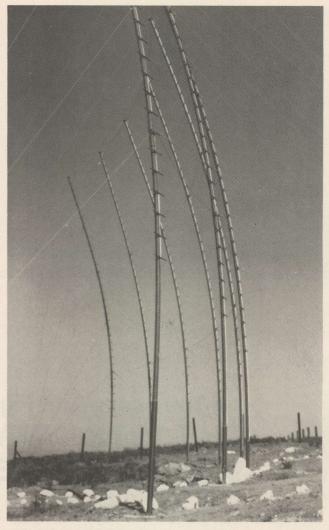
Cable In Mexico is at or even with American technology. "It is just like the states were twenty years ago" quips Fernandez. In some ways yes; in other ways no. The stateside systems did not have 300 MHz solid state amplifiers twenty years ago or Magnavox/Phillips financing. But it has probably been at least twenty years ago that a cable man in the states could walk into a town of 130,000 people with virtually no television of any kind and set up shop.

There are no known automated channels in Mexico; including weather. "The Mexico City system does quite abit of local origination but it is not representative of the balance of the country" notes Fernandez. VICA plans to carry nothing but broadcast signals; for now. "Satellites do intrigue me however" he admits.

The one missing element in modern day Mexican cable would seem to be marketing. "We hardly ever advertise and I don't know that any Mexican system has ever tried door to door solicitation" says Fernandez. "We just put up the best system we know how, and open the doors."

Even that may be changing. The Ensenada manager is a gent named Jose Alonso. 'Joe' is about the most likeable fellow you would ever find in charge anyplace. He spent four years as managing director for a mountaintop solar and deep space observatory near Ensenada before joining VICA as their first system manager. Joe reminds you of a combination of Dave Garroway and Jimmy Carter. In flawless English (and Spanish) he smiles a Carter-toothy smile and says things like 'Boy those are great pictures. . I can't wait to call on the hotels and commercial accounts', rubbing his hands together.

So just as the Great Canadian and American cable experiment seems to be drawing to a close with the past and heading for new frontiers with satellites and pay programming, a new revolution would appear to be underway in



ENSENADA 'FRIAS-BOLIC'—sits atop a 700 foot (amsl) hill north of town. Antenna is 60 feet high, 120 feet wide on edge of sharp terrain drop to north. Feed antennas are to left out of picture. Full construction details in January CATJ.



LOW BAND L.A. AT 174 MILES—Just the slightest hint of man-made noise mars an otherwise perfect picture that travels 'well beyond grade B contour line' to arrive at 60 foot high, 120 foot wide 'Frias-bolic' installed at Ensenada.



Mexico where the basics of cable are finally getting up a real-world head of steam. The coming decade of cable in Mexico will be interesting indeed and we'll watch it for you and with you as it develops.

HIGH BAND (CHANNEL 13) L.A. AT 174 MILES—Totally interference free video (although we can't say much for the film quality of the old Bugs Bunny cartoon flick!) over 174 mile path as it came off of Ensenada 'Frias-bolic', through broadband CATV pre-amp and directly into Sony receiver.

# All The Facts And Figures Are In... THE 1978 CATV INDUSTRY WHERE IT'S HEADED, AND HOW

Industry survey 77. A comprehensive study undertaken by CATJ and CATA during July and August of this year produced more than 200 detailed survey forms from CATJ readers throughout the world. The data from the 80 questions posed in this year's study has been evaluated, tallied and analyzed and highlights of that data appears here. Comprehensive and detailed reports have been prepared and circulated to industry leaders and industry suppliers.

**Industry '78** 

The CATV industry is clearly in a state of monumental transition. Where the changes now underway will lead next year, two years ahead or ten years ahead is uncertain. Tracking those changes as they occur, and perhaps just ahead of when they occur, was the thrust of this year's CATJ Industry Survey taken during the period July/August of this past summer.

For the past four years CATJ has selected either the July or August issues of this magazine to bind into the publication a reader survey/study card. The purpose of the card has been consistent; to elicit responses from readers as to their present day operations, their plans to change or expand their operations in the year ahead, and their attitudes towards change. This

year's study was put into high gear with the issuance of the July issue of CATJ; an issue into which we bound a four sided survey card with instructions. This year's survey card was more comprehensive than any previously undertaken (some 80 questions in all) although there was an 'incentive' for filling out all or some portion of the card. A CATJ-Lab supplied GunnPlexer microwave system was awarded to a randomly selected entrant to the survey-contest.

Whether the lure of the free microwave system or the format of this year's survey was irresistible the bottom line was impressive indeed; nearly 4% of all CATJ readers (3.96% to be exact) completed this year's survey card. The unusually high response (previous year responses had run

in the 1.9 to 2.2 percentile range) allowed CATA and CATJ to indulge in some sub-group studies never previously possible. For example, out of the broad representation of all readers turning in their survey cards we were able to sub-group study the responses of three categories of industry people; Canadian readers of CATJ, Owners/Operators of CATV systems (the modern day equivalent of the 'Mom and Pop' operator of the 50's and early 60's), and, System Managers (i.e. those who labor as employees managing a system or systems owned by others).

#### **Optimism Way Up**

With the possible exception of Canadian readers (who found some of our questions relating to FCC rule changes, rapid expansion of earth terminals and low cost microwave out of context with their own operations), all categories of industry personnel were plainly more optimistic about the future of their industry and their own system operations than at any previous period in recent history. The optimism displayed was particularily evident in the areas of new technology. With the possible exception of fiber optics (which the industry seems to be watching carefully with very few planning early application in their own systems), the newly emerging CATV technologies such as small earth terminals and GunnPlexer microwave are attracting a very high amount of interest. So too is system expansion, especially in the area of owners and operators. Let's see what this is all about.

#### **Low Cost Microwave**

Low cost CATV microwave began in April of this year when the industry's annual equipment show held in Chicago revealed a new type of microwave technology from a New England firm. Following the public showing of the gear in Chicago CATJ began an intensive study of the new approach to microwave equipment with feature articles appearing in the May, June and July issues. By the July issue of CATJ the publication through its affiliated Laboratory had developed our own operating version of the low cost microwave and circuits for system construction of the equipment were published. The equipment was also shown, in both the CATJ version and the commercial version, at CATA's CCOS-77 meeting held in Oklahoma in July. Thus by survey time there had been more than a dozen pages exploring the new technology in print by CATJ, plus some 600 cable personnel had the opportunity to inspect the equipment first hand at CCOS. Because of the pricing differential (the low cost microwave gear has been built by the CATJ Lab for as little as \$400 per channel hop although the commercial gear which meets FCC requirements is \$2,950 per channel), and the simplicity of operation and maintenance, the microwave equipment has attracted a great deal of interest. It comes at the right time; especially for owner/operator system complexes. With the recent (March 1977) FCC relaxation of rules for systems with fewer than 500 subscribers (plus

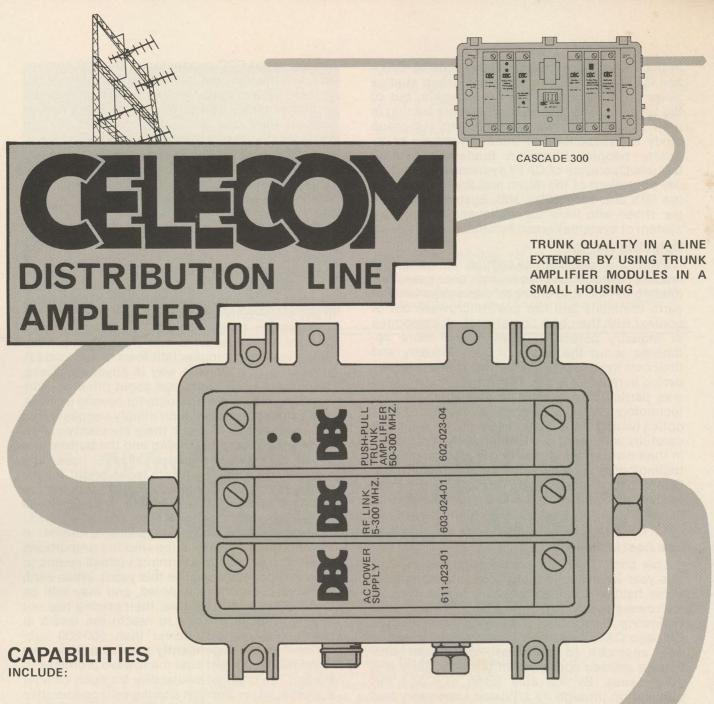
the expected FCC expansion of the 500 number to 1,000) the low cost microwave has contributed to many system operators looking at nearby smaller communities; towns previously too small to support their own full scale headends. As we shall shortly see, owner/operators expect to increase their total cable mileage 92.16% by January 1, 1979. Some of this will occur at the tag ends of their present systems but much will come with totally new, smaller, systems. In fact 38.90% of the owner/operators participating in the CATJ 1977-78 survey reported they intend to seek financing during the coming year to construct totally new systems. By extrapolation that suggests as many as 600 new smaller systems are in the planning stages at this time. Such a growth in new systems (of any size) has not been experienced in any single prior year of the industry.

Returning to the low-cost microwave, in its present GunnPlexer format it is the 'private' preserve of one supplier (Microwave Associates). How long it stays that way is anyone's guess. There have been rumblings about other new, innovative microwave products for several months. The safest prognostication simply suggests that the end is not yet in sight; there are plenty of new microwave products coming and the bottom line is apt to get smaller and smaller (or lower and lower if you will). The future looks bright for the marriage of lower cost microwave technology to the emergence of a new growth cycle for small

community CATV systems.

Another factor interplaying with the interest in lower cost microwave is the wild-fire proportions interest in small earth terminals (small seems to be a very popular adjective this year!). While earth terminal prices have tumbled, and may still be tumbling in some quarters, their pricing has not reached (nor is it likely to reach) the levels at which systems with fewer than 500-600 subscribers can independently purchase their own terminals. The lower cost microwave promises to expand the channel-availability for such smaller systems; either through sharing on a cooperative basis of terminal costs by several close proximity smaller systems, or by simply allowing a smaller system to take a video/audio feed from a larger nearby system with lower cost microwave as the transportation mode.

How much low cost microwave is likely to be installed in the future? The survey results and projections fairly boggle the mind. Chart one here depicts the results; but there must be this warning. The question asked (after the respondents were qualified with an earlier question asking whether they had any uses for low cost microwave) "...How many channels might you use between now and 1-1-79 at \$2,400 per channel?". The \$2,400 number was low (the gear turned out to be \$2,950 per channel when the final pricing was firmed up) and as a companion report in this issue points out, the additional pheriphereal equipment may well run another \$1,000 up per channel. It could be that when the total costs



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# Negative vs Positive Systems Audited vs Unaudited Systems Cable Traps vs Descramblers Lowest Overall Costs vs Lowest Front End Costs Single Channel or Multi-channel

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See Us At The Western Show Booth 42

## Negative vs Positive System

There's no doubt about it ... the Negs have it over the Pos. The greatest deterrent against theft of service is to not allow the premium channel into the home where it can be reconstituted ... to trap the signal of all non-payers at the pole where it is least subject to tampering.

VITEK Cable Traps *look like drop cable*, provide deep-notch depth (typically greater than 70dB), superior environmental stability and durability, are maintenance-free — and are *on the pole!* 

#### **Audited vs Unaudited Systems**

Auditing is easy with VITEK Cable Traps. Simply count your traps and compare with your current subscriber list. No contact with the subscriber is necessary. Since (Pos) descramblers are located in the home, installation records are your only clue as to who your "customers" really are. Gaining access to the residence can be difficult and may require numerous visits.

### **Cable Traps vs Descramblers**

If "they" don't pay... reconnect the cable trap... on the pole! Recovery and replacement of descramblers is time consuming, costly and may require legal action.

Any way you look at it... VITEK is the answer for PAY TV Security!



Descramblers can also be "loaned out" depriving you of additional income... but VITEK Cable Traps stay put ... on the pole!

#### Lowest Overall Cost vs Lowest Front End Costs

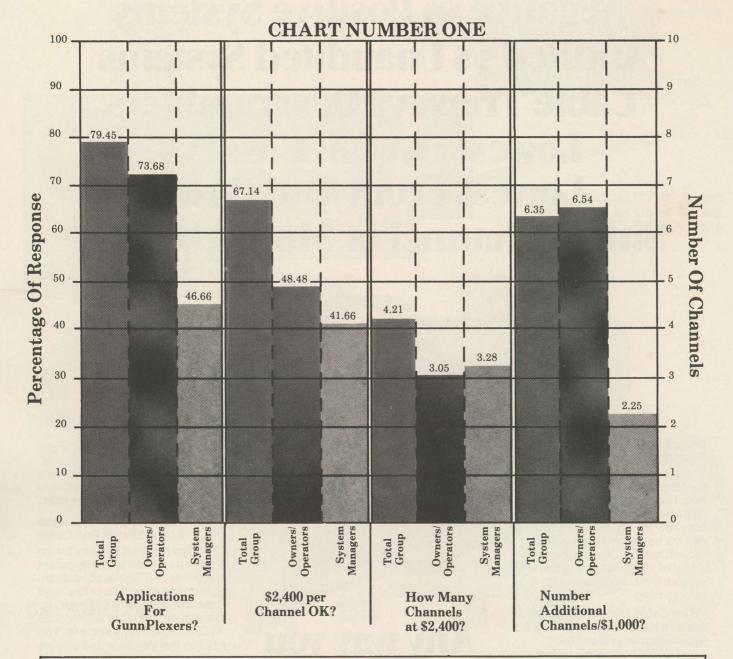
You get what you pay for, so don't be misled by the apparent economies of (POS) descramblers and terms like "self-amortize" and "absorbed costs". The larger the installation, the more economical VITEK Cable Traps become. You save on maintenance and service calls, recovery or replacement of equipment and in the end, there is nothing more foolproof and reliable than a VITEK Cable Trap to prevent theft of service . . . and that's what PAY TV Security is all about.

If you're successful, you'll outgrow the short-term economics and inadequacies of descramblers as others have and change over to VITEK's Cable Traps.

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Pay us Now ... or Pay us Later.

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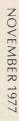


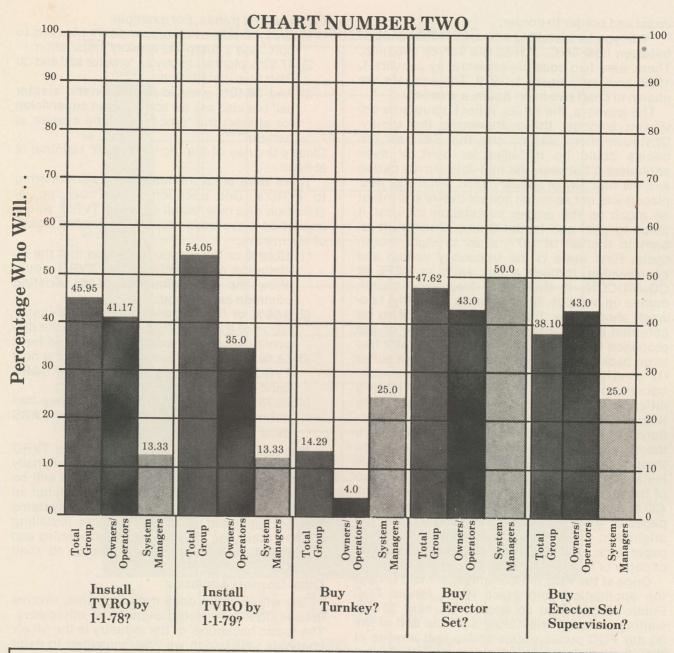
INTEREST IN LOW COST MICROWAVE—of all respondents submitting survey forms, 87.95% completed questions relating to their possible uses for low cost microwave system equipment, and their interest in the equipment.

per channel are **all** added up the "enthusiasm" shown by some of the industry will diminish.

There is one more significant comment from the survey results covering lower cost microwave. We asked the industry (after they had answered the previous question relating to how many channels they might use at \$2,400 per channel) "...how many MORE channels might you use at \$1,000 per channel?". There is of course no such FCC-licenseable equipment at the present time. The only equipment which comes close to that magic \$1,000 per channel number is the CATJ developed 10 GHz amateur version home grown microwave. But, as regular readers know, CATA and CATJ are currently working on a detailed developmental program to create a petition to be eventually filed with the

FCC in which we shall seek changes in present FCC rules so that such low cost gear can be utilized for short-haul applications (typically under ten miles). The response to this survey question was dramatic for its weight. By extrapolation, 62.65% of all systems in the country saw uses for \$1,000 per channel microwave in their systems. In fact, the average per system responding saw a need for 6.35 channels per system; a staggering 14,720 new channels of low-low cost microwave nationwide. The handwriting in this area is clearly evident; the need, the desire, the utility for such low cost microwave exists. Now all we need to do is to get the FCC to go along with the eventual program so the smaller systems of the country can realize their apparent considerable potential in bringing





INTEREST IN SMALL APERTURE TVROs—of all respondents completing survey forms, 44.58% answered questions relating to the installation of new terminals before January 1, 1979.

multiple channel television to yet under-served regions.

#### The Small Earth Terminal

FCC approval of the CATA submitted rule making petition that allowed CATV system use of TVRO antennas smaller than 9 meters in aperture came in the middle of December in 1976. Companion approval of the delivery of Atlanta's WTCG independent signal set the stage for one of the most far reaching revolutions in the history of CATV. When the small terminals and WTCG were FCC approved HBO was already in place on RCA's SATCOM II bird and an estimated 75 CATV earth terminals (10 or 11 meters in size) were operating. Terminal turn-ons during the fall of 1976 slowed down, way down, in anticipation of the small aperture ruling. Then as the details

of the ruling were released by the FCC late in December and throughout January of this year the pieces began to fall in line. But the widely anticipated industry explosion in terminal orders did not immediately materialize. Systems had surveys to make, financing to arrange, and construction plans to implement. It was in fact not until mid-summer, or during the CATA annual CCOS meeting in Oklahoma, that the lid finally did blow off the small terminal market. All of the long time frames for surveys, frequency searches, construction plans and equipment delivery finally began to move in place and by mid-September the order were flowing and the installations turning on. In one September week in CATJ's home state of Oklahoma four terminals turned on; and the process was being repeated from coast to

coast and border to border.

"Will you be installing a 'small' TVRO terminal between now and..." read the survey question. There were two possible answers; by January 1, 1978, and, by January 1, 1979. The answers are shown in chart two here. Again, a warning.

The answers, the totals, reflect a supreme optimism amongst those answering the survey. Obviously there was no way that 849 new terminals could be installed (or built or even engineered) between the mid-July survey period and the first day of January 1978. What was misplaced was not so much honest desire and intent as much as the proper calculation of what it takes to plan and install a new terminal. It is, early in the fall of 1977, a six to eight month cycle. First there is the frequency search and coordination, through a firm such as SAFE or COMPUCON. If the initial frequency search comes up positive, this job has a (typically) twoweek short cycle. But if there turns out to be potential or real interference at the site of the proposed CATV terminal, the cable operator has to go back to the drawing boards to select either (1) a different TVRO receive antenna configuration, (2) shielding of the antenna, (3) or a different location for the antenna. It all takes time. Following the initial survey and final selection of a site, antenna size and equipment line up there is a 30 day public notice phase to go through; to allow those who might object to the installation to do so. Then comes the preparation of the actual FCC application, using FCC forms 430 and 403. A typical application (\*) runs to 100 pages or more and there are 9 copies plus the original to file. It all adds up to a mountain of paper work; typical applications run to 15 pounds of paper or more.

Once at the FCC the Commission must accept the application, and place it on formal FCC Public Notice. And so begins the next 30 day waiting period. It will not be until the end of the 30 day FCC public notice phase that anyone at the Commission takes a close look at the application. And it may be longer, much longer, before that look occurs. Early in the fall the applications were 'resting' at the FCC from 70 to 100 days or more before approval came through. It doesn't take many of these 30 day segments to add up to a six or more month cycle between 'decision' and 'signal acquisition' from the bird.

And it has been that cycle which was apparently mis-judged by many of those who responded to the CATJ (July) industry study. Putting in an earth terminal for CATV use is not simply a matter of picking up the telephone and ordering in the component parts.

Aside from the optimistic outlook many respondents apparently had (and presumably still maintain) over their own plans for new TVRO's the survey revealed a number of other

TVRO related trends. For example:

 Only 14.29% of all respondents planned to purchase a complete turnkey installation;

2) 47.62% planned to buy an 'erector set' and do

their own installation;

 And, 38.10% planned to order in the 'erector set' but also ask for some expert supervision for at least the 'proofing' of the system at turn-on(\*\*).

Clearly the day of the 'do-it-yourself' terminal is

at hand.

There were other interesting answers relating to TVRO's. One question asked how the installation of a new 'small aperture TVRO' would impact on a system's present or planned usage of microwave.

- (1) 15.09% of the respondents said that the installation of a small aperture TVRO would allow the discontinuance of an existing common carrier feed.
- (2) 5.66% of the respondents said the installation of a small TVRO would allow the discontinuance of an existing CARS band feed.
- (3) **58.49%** of the respondents reported a new TVRO would create a need for a **new CARS** band (system).

(4) 20.76% of the respondents said they had neither a need for a TVRO or a (new) CARS band (system).

It would appear that the impact of the TVRO revolution may be far more reaching than originally envisioned. Some common carrier feeds will be abandoned (as existing contracts run out) but an even higher number of new CARS band systems will be generated as those systems installing

will be generated as those systems installing TVRO's make use of CARS band frequencies and equipment to tie still other systems to their TVROs.

**Other Channel Additions** 

The whole world does not, of course, revolve around TVRO delivered signals or microwave. The 'basic backbone' of the industry is the off-air channels with which we have managed to exist for some twenty-five years before satellites came along.

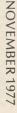
We asked systems about their 'channel/signal addition' plans **before** January 1, 1979. And here

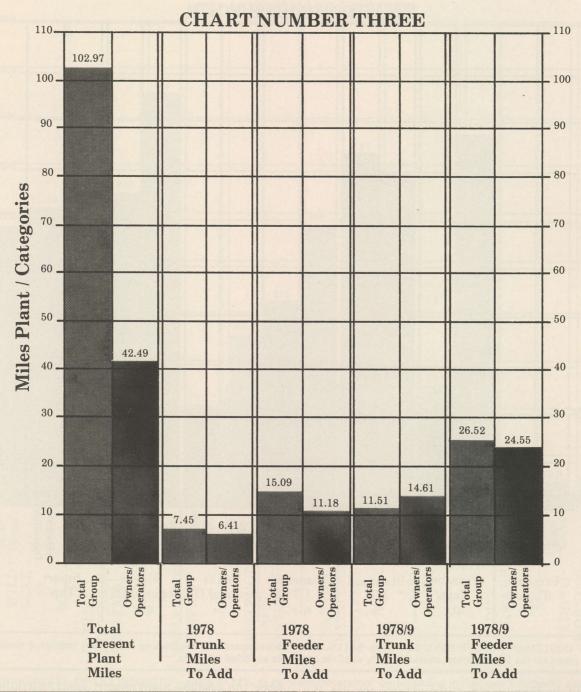
is what we found out.

- (1) 36.8% of all systems plan to add one or more information/data channels in that period; that works out to 1,362 systems adding 1.26 channels each (as averaged) for a total of 1,716 new automated channels.
- (2) Stand-alone systems (i.e. those owned by individuals or companies exclusive of joint ownership in other systems) will add 2,011 channels of off-air signals in the same period (981 systems adding an average of 2.05 channels each);

<sup>\* -</sup> The December issue of CATJ will explore what goes into an application and give step by step guidance on preparing your own TVRO application for submission to the FCC.

<sup>\*\* -</sup> The December issue of CATJ will discuss system proofing techniques, whether an outside consultant buys you anything, and the equipment and procedures necessary to do a satisfactory job.





PLANT MILEAGE GROWTH EXPECTED—of all respondents completing survey forms, 83.13% related their present system plant mileage and their plans to increase that mileage before January 1, 1979.

(3) Stand-alone systems (same definition as above) will add 4,455 channels of microwave delivered signals in the same period (1,694 systems adding 2.63 channels each on the average; inclusive of Canada).

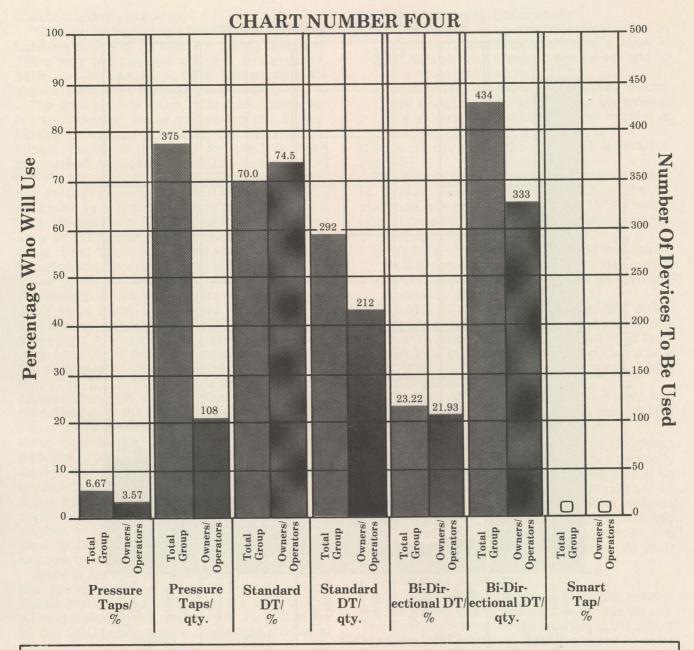
(4) Stand-alone systems will add 1,161 channels of TVRO delivered signals in the same period (936 systems adding 1.24 channels each average).

If one assumes that all off-air signal additions will be managed with newly acquired heterodyne or on-channel processing equipment, while all microwave and TVRO delivered channels will be

added with the assistance of a modulator unit on each channel delivered, some concept of the relative 'runs' on equipment in the period can be projected. It is also important to note that 'channel additions' are not limited to channels to be added to **existing** systems; new systems planned account for a fair hunk of this as the 'standalone' system operator becomes a 'multiple system operator' with the construction of his second (third, etc.) systems during this projected period (through 1978).

#### **New Plant Construction**

Because of the very apparent 'air of optimism'



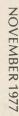
USE OF CUSTOMER TAP OFF DEVICES—while 92.11% of all 'owner/operators' completing the survey indicated their tapuseage plans for the future period, overall 72.29% of all respondents supplied this data.

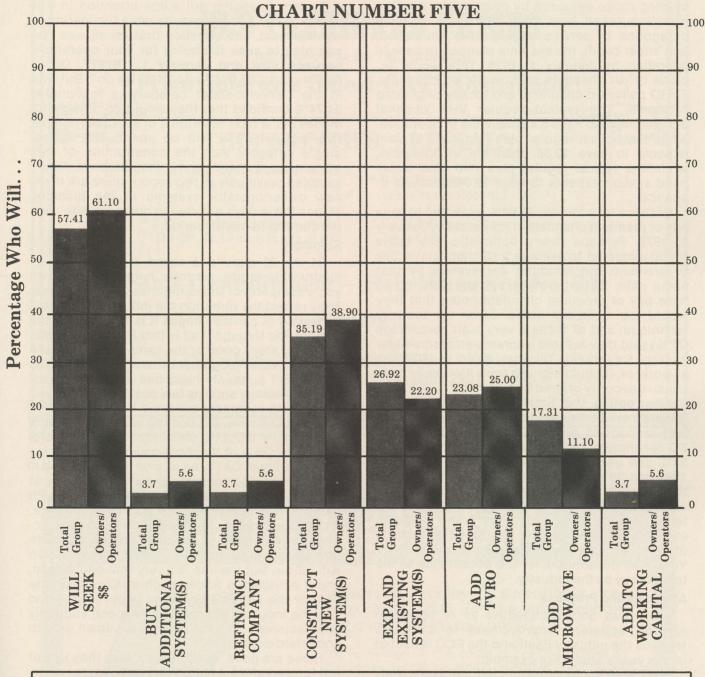
reflected in this year's survey-study results it **might** well be dangerous for the serious industry planner to become too emotionally attached to 'system plans to expand'. The response numbers suggest extremely large growth within the industry during 1978; growth that may be both beyond the capacity of the industry to deliver and the operators to perform. The most important bottom line to what follows may simply be that the 'thoughts are positive' and the attitude of the industry (or a major segment of it) far more expansion minded than during any previous period in the 70's decade.

Chart number three illustrates the type of growth projected for the period ending January 1, 1979. The average length of plant (trunk plus feeder miles) for all study respondents was 102.97 miles; while in the owner/operator 'cate-

gory' the average plant length was 42.49 miles.

Between survey time and 1-1-79 the average respondent plans to add 11.51 miles of trunk (against a total plant length of 102.97 miles presently) and 26.52 miles of feeder (again, against the same 102.97 miles of present plant). Over in the owner/operator category this group of owners plan to add an additional 14.61 miles of trunk (against a total present plant length of 42.49 miles) and 24.55 miles of feeder (against the same 42.49 miles of present plant). It would be wise to keep in mind a theme that runs throughout the study; cable companies owned and operated by the 'owner/operator' individual are planning considerable construction of new 'smaller' systems in the period ahead. For example, the same group reported that for an ownership base of 1,479 systems nationwide





FUNDING PLANS OF THE INDUSTRY—while 94.74% of all 'owner/operators' participating in this year's industry study supplied responses to this series of question, the overall response average was 65.06%.

they will be seeking financing for the construction of 575 new CATV systems during this period. In the context of 'plant expansion' or new cable miles constructed, the mileage growth projected for the 'owner/operator' group must therefore include a fair amount of totally new plant construction; at least the equivilent of the 575 new 'smaller' systems planned.

As pieces of hardware go, the omni-present signal tap-off device always seems to spark an uncommon amount of debate. Our survey this year asked operators what type, and how many, tap-off devices they planned to add to their systems between the date of the survey and January 1, 1979. There is more here than glee for those

who manufacture and sell tap-off devices. There is also a measure of the field-anticipated growth in cable system operations (and new subscribers to add to the present subscriber base).

There were four tap device categories offered to the respondent. The time honored pressure tap, the standard directional tap, the bi-directional tap and the new and struggling for acceptance 'Smart' tap. Chart number four tells the story. Of particular note is the lack of interest (0 is 0 no matter how you measure it!) in 'Smart' taps.

**Plant Components** 

The typical system responding to the 1977/78 study reported he had 8.78 off-air channels in service (that means broadcast channels, in-

cluding those delivered by microwave). Another question asked how many channels, in three categories of service (regular VHF, mid-band, and super band), the systems planned to have in operation by January 1, 1979. This would include off-air channels, microwave fed channels, TVRO delivered channels, and locally originated channels. The typical regular VHF channel system plans to have 8.42 channels in operation, while the typical regular plus mid band system expects to have 12.38 channels in operation, while the typical regular plus mid plus super band system expects to have 19.04 channels in service.

Of those responding, 45.94% expected to have pay or premium channels in operation by January 1, 1979. Perhaps overly optimistic, the same group expected to average 2.18 channels of pay or premium programming per system by that same date. Virtually every system planning to have pay or premium channels noted that they would be utilizing some form of security technique; and of those a very high percentage (77%) said they favored a scrambler/descrambler package for security. This may, again, be optimism at work, or, it could signal a transition away from passive security offered by trapping.

Fiber optics, the 'Smart tap' of 1977, appears to have a credibility gap to overcome. Of systems who responded, only 6% said they would apply FO technology before January 1, 1979; another 34% saw uses for the technology by January 1, 1982 and 38% said they did not see FO uses in their system "in the foreseeable future". However, as with any new technology so radically different from the past, a little real world hands-on experience (there is none yet operating outside of a small TelePrompTer experiment in New York) may do wonders for the acceptance of the technology by the industry.

#### **Attitudes and Progress**

There was both a collective air of optimism and an apparent improvement in attitudes towards the industry itself and the FCC reflected in this year's study. For example:

1) 67% of the respondents felt that technology was moving at about the right speed;

2) And a healthy 27% felt it could move faster (only 6% felt it was moving too fast);

3) 60% of all respondents (and 74% of owner/operator respondents) felt that FCC rules governing cable had become better in the past year;

4) 19% of all respondents (and only 11% of owner/operator respondents) felt FCC rules

had gotton worse.

And then there was the proverbial 'blue-sky' problem. It is of course still with us. Apparently anything that is not proven, or not available for hands-on-application falls into the blue-sky realm for much of the industry. In this regard, 27% of the responses said "we still have too much blue sky..." while 58% felt "we have about the right amount of blue sky presently...".

System financing got some attention in this year's study. And the results were luminating to say the least. The question first asked was "Do you plan to seek financing for your operations between now and January 1, 1979?". Of all respondents, 65.06% said "Yes, we do". But over in the owner/operator category, a resounding 94.74% confided that they would go outside for money in the next 15 months or so. Chart number five tells where it will be spent. The largest single category was the construction of new systems by owner/operator respondents. Again, as noted previously in this report, there are many new owner/operator systems in the planning stages these days and due to come 'on line' over the coming 15 month period.

#### Summary

Of the 80 questions asked in this year's industry-wide study, we have herein shared with you a sampling of the categories and responses. They reflect the direction the industry believes it is headed or perhaps hopes it is headed and the bottom line through it all is that (1) if the national economy stays good or the same (you can make your own value judgement there), and, (2) if FCC rules don't suddenly head bad again, and (3) if new technology such as low cost microwave and small earth terminals continue to be productive and cost effective, the coming year to 18 months in the CATV industry should (or perhaps could) well record one of the most-major growth cycles in the history of CATV. As all who have grown up in and through the industry know well, this is at best a very precarious business filled with dangers normal businesses do not experience. As long as things are heading in a good direction, the optimism to support continued growth and additional capital investments for expansion will follow. But the line is a very thin one indeed, and if extraneous forces such as Congress, the FCC or the nation's economy begin to pull and tug, the industry will react (we expect) suddenly and decisively to once again slow down growth and retard expansion.

These are good, heady times. May they last (if not forever) at least for several more years.

#### CORRECTION

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903 S. Kansas Ave., Olathe, KS 66061

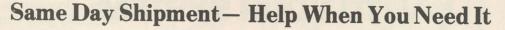
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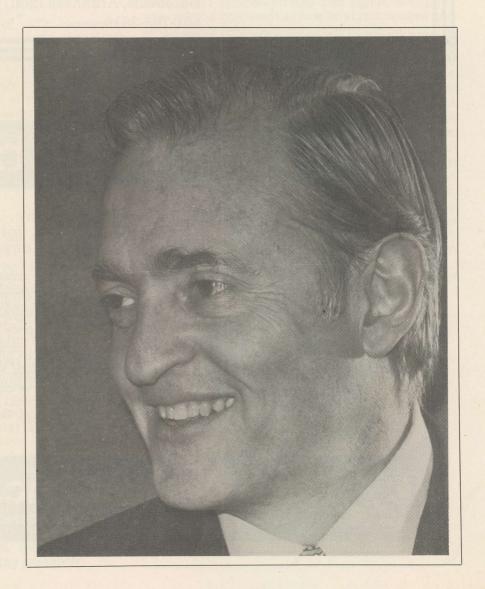
### The Forbidden Fruit...

# HOW SIGNIFICANTLYVIEWED SURVEYS CAN ADD NEW CHANNELS TO YOUR SYSTEM

by Robert Schultz, President VideoProbeIndex, Inc. Bayside, New York 11361

#### -The Author -

Robert Schultz knows the TV 'numbers game' very well. With a diverse background that includes a stint as a Media Supervisor and Planner at the Ted Bates Agency, Manager of Market Planning for Blair-TV (the nation's largest representative of TV stations) and as Manager of Special Projects at ARB (Arbitron). ..Schultz has been doing his own thing as President and Founder of VideoProbeIndex, Inc. (VPI) since 1971. VPI is CATV's only research company working in the area about which he writes.

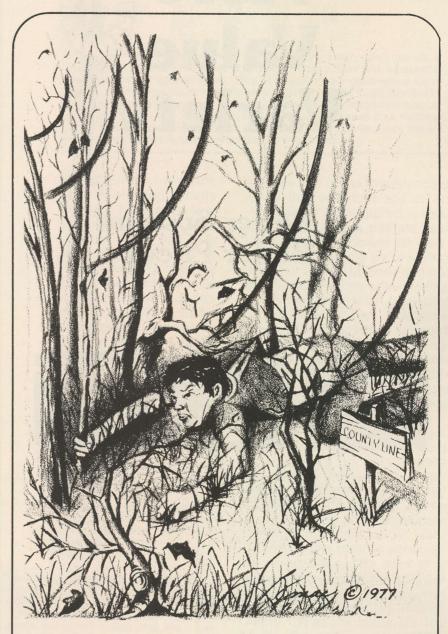


If you are a cable operator with more than 500 subscribers and are located in a defined TV market (35 mile radius for first 100 markets and Grade "B" zone for small markets), you can carry a defined limit of signals. Among these allowable signals are "Significantly Viewed" stations. These are nonlocal stations that are viewed at certain levels among noncable homes in the community. The FCC rationale for significantly viewed stations is not to deprive cable subscribers of signals they can otherwise view on their own antenna. The fact of being significantly viewed changes their status to 'local' for regulatory purposes.

Unfortunately, the FCC list of significantly viewed stations is by counties, based on a county-wide series of surveys conducted back in 1970 & 1971! Individual cable communities within the county could benefit by the coverage pattern of the entire county. Conversely, individual cable systems could and did-suffer by being forced to abide by the geographical spread of the sample to unrepresentative corners of the county. Historical data, more than six years old, and probably geographically unrepresentative, are indeed a poor guide for the vital "availability" of marketable channels. The FCC recognized this potential inequity by authorizing special showings based on community surveys as opposed to the generic county-wide data used for promulgation of the original station list. Thus we have the significant viewing survey of Cable Rule 76.54.

Again, unfortunately, this provision for special relief created a problem of its own. Many systems utilized a head-end that served a number of individual cable franchises that followed political boundary lines. According to the FCC rules, each political area franchise was a separate community for regulatory purposes. A headend serving nine "communities" would need nine separate surveys to demonstrate significant

viewing for pick up by the headend. The FCC, then recognizing **this** inequity, asked for comments when it sent out its notice of proposed rule making concerning re-definition of a cable system. VPI is proud of the fact that comments filed by VPI played a major role in the FCC's decision to allow head-end surveys instead of the more expensive community-by-community surveys. VPI's extensive significant



#### Why A Survey?

FCC rules present a thicket through which the bare-bottomed cable operator is expected to scramble without bleeding to death. One of the most onerous FCC rules restricts CATV signal carriage to those signals which are 'significantly viewed' in the county in which the cable operator is located. Unfortunately, television signals don't know county lines from Burma Shave signs and often flit into counties where they are not supposed to be. When a cable operator finds such an adventurous signal floating about his 'county' he is first supposed to check with the FCC signal rules to determine if such a signal is allowed into his county. If it is, he can proceed to set a snare to capture it for his viewers. And if it is not supposed to be there? He is to either ignore it, or 'get it immigration papers' at the FCC. That's what this is all about. Finding an 'alien signal' in your county, and getting it papered. At the FCC. Good luck...and keep the box of Band Aids handy!



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CABLEVISION WEATHER

TIME 12:34:10

TEMPERATURE 72°F

RAIN TODAY 0.76° MONTH 2.34°

WINDS FROM THE NE AT 24 MPH
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Lowest priced color digital weather system,  $10 \times 14$  Font, optional keyboard display, expandable features and services. Special \$3,995.00



Full digital weather with 8 page keyboard message and advertising display, 2 character sizes, line by line programable color, off line editing, elastic memory, expandable to 64 pages. Special \$7,995.00



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### Video Data Systems

Headquarters, Hauppauge, N.Y., (516) 231-4400 National CATV Sales/Western Region Office Salt Lake City, Utah (801) 363-0408 viewing survey experience gave us the evidence needed by the Commission to justify this change for the better. In fact, as this article is being written in September of 1977, we are conducting the first nead-end survey in a nine community system in New England. It is a single survey that follows the new rule of proportionate sampling among the nine townships.

As a cable operator, what factors encourage you to consider the possibility of a significant viewing survey? Our experience with systems in many parts of the country indicate the following "symptoms":

- 1. "My county does not view station X or Y significantly, but my system is near the county line of a county that does view X or Y. Also, my part of the county has favorable terrain in respect to X and Y, while the rest of my county is behind a mountain range of pure iron.
- "Most of the non-cable homes in my community have rotor antenna pointing right at Station X and Y!"
- "Picture quality tests show good or adequate reception to Station X and Y."
- 4. "Customers complain they used to be able to get Station X or Y when they had their antenna. Other customers use a switch to get Station X or Y on the roof antenna. Non-subscribers claim they get Station X or Y."
- 5. "My instincts tell me we should be getting Station X and Y".

Any one of these "symptoms" or combination of them or others will result in the decision to inquire about a survey for filing for special relief. Now let's examine the typical questions you, as a cable operator, might want to ask VPI:

# WHAT IS A SIGNIFICANTLY VIEWED STATION?

A network affiliate is significantly viewed in a community or communities if its viewing An independent station is significantly viewed if its Net Weekly Circulation is 5% (+ One Standard Error) and its Share is 2% (+ One Standard Error).

DEFINITIONS: Net Weekly Circulation is the percentage of the sample that views a particular station at least once during the 7-day survey week from Sign-On to Sign-Off.

Share of Viewing Hours is the percentage of the sample's total week's viewing hours achieved by a particular station.

Example—In a sample of 100 diaries, 20 diaries show viewing to Station X.

NWC is  $20 \div 100$  or 20%. The total sample views for 5,000 hours over the course of the week. Station X garners 250 of these hours. Share is  $250 \div 5,000$  or 5%

#### WHAT IS STANDARD ERROR?

This is the margin of error resulting from a theoretically perfect random sample. Sample size is the determining factor of Standard Error for a rating (NWC is a rating). In computing

NWC	50	Significant Total Needed		ARY SAMP Significant Total Needed		Significant Total Needed
5% 25%	±3.1 ±6.1	8.1% 31.1%	±2.1 ±4.3	7.1% 29.3%	±1.5 ±3.1	6.5% 28.1%
Share 2% 3%	(210)* ±0.9 ±1.2 1 S.E.	2.9% 4.2%	(420)* ±0.7 ±0.8 1 S.E.	2.7% 3.8%	(840)* ±0.5 ±0.6 1 S.E.	2.5% 3.6%

(\*NWC is based on a single observation per diary. Therefore, a diary has a statistical sample base equal to 1. Share, however, is computed from a diary with a potential observation value of 540 quarter-hours. This 540 quarter-hour observation value is modified by the average hours actually viewed (Home Using Television/HUT). Based on these factors, a sample of 100 diaries could have a statistical sample base equal to more than 400. The figures in parenthesis are based on a national average of 50 hours of viewing per home per week. VPI, of course, uses the individual survey area's viewing levels for its own computations.)

the Standard Error of a share, the amount of viewing activity (Homes Using Television) is a co-determinant along with sample size. A rating of 5 with a Standard Error of ±1.0 is actually the mid-point of a range of 4.0-6.0. The chances are 68 out of a 100 that a perfect probability sample would differ from a complete census by less than the One Standard Error. The chances are 95 out of 100 that the sample would differ from a complete census by Two Standard Errors.

## WHAT SAMPLE SIZE SHOULD WE USE?

The size of the sample will affect the quality of the survey, the cost of the survey

and the size of the One Standard Error that we must add on to the basic FCC required levels. Though a larger sample will cost more, it will lower the viewing level obstacle by lowering the One Standard Error add-on. A difference of one or two tenths of a point can be vital, especially in the more difficult to achieve share of viewing hours (amount of viewing to a station is more elusive than viewing a station just once). Let's look at the difference sample size can make when adding on that pesky One Standard Error.

As the table shows, a larger sample lowers the total viewing level needed to demonstrate significant viewing. A larger sample also offers potentially more accurate results. It the "truth" were to show significant viewing, then one would want to portray this truth as accurately as possible. The cost of a diary survey comes to \$30 per diary. Though VPI has done surveys of 50 diaries, we recommend 100 as the minimum. It's worth the extra cost. (NOTE: The FCC requires two separate survey weeks, at least 30 days. apart, no more than one of which can be done between April and September. A short rate is available to those who wish to abort week #2 because of negative findings from week #1. A 100 sample would have 50 diaries for each week.)

#### WHY THE DIARY?

The 7-day viewing diary is the basic tool of local market

Cable Video, Inc. or Norwich, Connecticut recently commissioned a viewer survey of homes in and around its Norwich CATV system. A total of 208 homes were sampled, 104 with cable, 104 without. The results are worth pondering.

Cable homes had an average television set viewing span of 51.15 hours per week while non-cable homes viewed the box 37.14 hours per week. Bottom line—cable homes watch more television (37.7% in this instance).

Homes with cable watched more than twice as much public television as non-cable homes (1.1 hours with cable, 0.5 hours without).

Homes watching VHF channels in cable homes averaged 41.2 hours per week while non-cable homes averaged 36.9 hours per week.

Indies Viewing Up

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But the big change between
cable and non-cable viewers came
with the non-network or independent stations. Cable homes averaged 9.2 hours per week of the nonnetwork signals while non-cable
homes watched 0.4 hours per
week.

Peter Matthews, President of Cable Video had hoped that the survey would show that his system's desire to carry Boston's WBZ (channel 4) could be fulfilled under the FCC's 3 percent share and 25% of non-cable homes formula. "Unfortunately this was not found to be the case" reports Matthews. "We found more than 30% of the non-cable homes do watch WBZ off their home antennas, but they spend less than 3% of their viewing time with WBZ". Matthews wanted WBZ because the station carries the Boston Celtic ball games.

TV measurement. The FCC station list is based on diary surveys. The diary measures the full week, the only reliable way of computing shares based on a total week's viewing. For purposes of showing viewing to "outside" stations, the diary helps eliminate the bias against the less familiar inherent in recall polling. The diary is available in the home for the recording of viewing as it takes place, less dependent on the vagaries of short-term and long-term re-call.

## WHEN IS THE BEST TIME TO SURVEY?

It is perfectly legal to select those weeks you feel will give the target stations the best opportunity to be viewed in your community. If the desired station(s) will have special programs or sports events not available locally in a particular week, by all means try to schedule a survey for that week. Generally speaking, try to survey when the re-run season tends to make local viewers restless enough

to sample other channels, including the "outside" channels. This is why the FCC limits the amount of surveying done between April and September—the traditional re-run season. Also, try to avoid such ARB/Nielsen "Sweep" months as November, February or May. Network and local hypo-ing may be deleterious to the viewing of the "outside" station. Avoid extended event periods such as the World Series, if it's carried locally.

When considering a significant viewing survey, keep in mind the various possibilities when filing the petition before the FCC:

1. Adding a new signal.

2. Establishing a currently carried imported signal as significantly viewed, thus opening a slot for an additional imported station.

3. Establishing a currently carried imported signal as significantly viewed so as to re-define it as "local"

for copyright royalty advantages.

4. Submission as evidence in filing for special relief from non-duplication protection. The FCC will consider survey data in waiver petitions concerning network non-duplication proceedings. Surveys should be considered for syndicated program non-duplication proceedings if the evidence is strong.

There are probably more uses of survey research in regulatory proceedings, but that can be the basis of a future article. It is our earnest hope that this article helps our friends in the cable industry—VPI's industry to wade their way through the regulatory thicket through the judicious use of survey research. In the meantime we pass along the encouraging fact that our clients have been able to add signals based on VPI surveys submitted to the FCC. The system works!



## **Updating The Status Of Low-Cost Microwave**

# WHAT ABOUT THE MODULATOR/DEMODULATOR INTERFACES (etc.) FOR GUNN PLEXER MICROWAVE?

#### Status One

Following the initial announcement of the planned availability of low-cost Gunn or Microplexer microwave in the May issue of CATJ, and the initial developmental articles appearing in the June and July issues of CATJ, it became apparent that a very high percentage of the nation's CATV systems did in fact have one or more applications for the low cost gear.

For example, survey results told us that:

- a) 87.95% of all systems participating in the survey answered the question "Do you have applications for low-cost microwave?"
- b) Of those answering, 79.45% said "Yes we do"; which extrapolates out to 2,585 systems that want or need low-cost microwave with a system base of 3,700 systems nationwide.
- c) Of those 2,585 systems saying "yes", 83.34% or 2,070 systems said that "Yes the \$2,400 price tag is cost effective".

Now it turns out that the cost of the basic transmitter and receiver system will run about \$2,950. per channel; **not** the \$2,400 forecast earlier. Logically some of those systems who were comfortable at the \$2,400 price level will **not be comfort-**

able with the \$2,950 number.

d) The 2,070 systems saying "yes" to the \$2,400 number would use 4.21 channels per system; or 8,635 channels of low cost microwave.

If you sum the present day useage of CARS band plus common carrier feeds to CATV systems, that amounts to around 150% as many low cost channels as are presently authorized using all other delivery formats.

e) Then we asked how many systems would be interested in one or more additional channels at the \$1,000 price level per channel. We heard from 62.65% of all survey respondents, which extrapolates out to 2,318 of the nation's 3,700 system data base. These systems projected useage of 6.35 channels per system, for an additional 14,719 channels of (really) low cost microwave; the stuff that ultimately may be available for around the \$1K per channel number.

OK, so the demand is present. Now where is the gear?

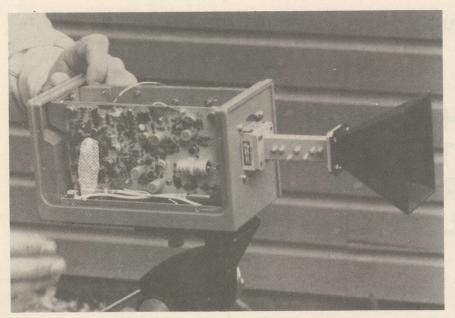
During the summer months attendees at CATA's CCOS-77 saw and heard a great deal about the Gunn or Microplexer gear. Many operators were sufficiently impressed to order the stuff on the spot, and that kind

of brings us to the present time.

Before new microwave gear can be sold in the CATV marketplace, certain FCC requirements must be met. For example, the receiver has to be tested and certified so that the manufacturer can assure the FCC that the receiver's local oscillator will not re-radiate into the airwaves and create interference with other microwave systems. This is a "self certification" procedure, one which the Gunn or Microplexer producer (Microwave Associates) had pretty much in hand by the time CCOS-77 was upon us. Once that is done, the receiver portion of the package is ready for production and sale. The first receivers were shipped out in September, to systems that already have operating 12 GHz microwave systems using other transmitter formats.

The transmitter requires some additional FCC work. The equipment specifications, and in some circumstances the equipment proper, must go to the FCC's type certification Lab in Laurel, Maryland. There, if it meets all of the FCC's requirements for cleanliness of operation, stability and all of that good stuff it is approved for sale.. Then and only then can the manufacturer (1) advertise it for sale, (2) show it around unrestricted, and (3) ship it.

At that point a CATV system



INNARDS of Microwave Associates 12XC series receiver; 'knobby' extrusion between case and (17 dB gain) horn antenna is 'channel filter'.

operator can take delivery on and proceed to install (assuming he has filed for his microwave license CP) his low cost microwave system.

Now the gear that has been shown (at CCOS and that in-

cludes this fall's series of mini-CCOS meeting) has been operating under an experimental license. Or, in the case of gear shown at CCOS-77, it has been the 10.3 GHz version of "amateur" equipment; which resuch "amateur gear" for commercial applications, such as CATV.) One of the things you saw at CCOS or at a mini-CCOS which you cannot expect to do yourself was the utilization of the little 17 dB gain bolt-on-thefront horn antenna. The FCC has a rule, that impacts on all CARS band (and other commercial) microwave, that says that any antennas utilized by microwave systems must have certain beam-width focusing parameters. That is, if the antenna utilized has a 3 dB beamwidth greater than 3 or 4 degrees, the antenna (as a part of the complete system) cannot be licensed. The horn antenna has a much wider 3 dB beamwidth than 3 or 4 degrees; so the little horn antenna is not legal.

quires no experimental license. (But it is also not legal to utilize

Which is probably alright for most applications anyhow, as tests this summer would explain. Let's assume you design your system so that is has a 40 dB fade margin. (A companion feature in last month's issue by Telesis Engineer John Schuble explains what this margin business is all about.) With the 17 dB gain horn, it is not possible to get a 40 dB margin unless the two units are within a few hundred feet of one another. So chances are you wouldn't be trying to establish a system with the not-legal-horns anyhow.

(It is worth mentioning that the reason for a 40 dB margin is to ensure that in the event of high rain attenuation or signal fading that you have sufficient margin to stay out of the noise. If you are fairly close together the likelihood that you would get 40 dB of rain attenuation plus fading is very small. That suggests, correctly, that a 40 dB margin may be a luxury you can neither afford nor justify on very short paths.)

So for permanent installations you must use an antenna with acceptable 3 dB beamwidths. The Andrew catalog lists a 2 foot parabolic dish with a 2.8 degree beamwidth, a 4 foot with a 1.4 degree beamwidth

#### "Is the money market in your plans?

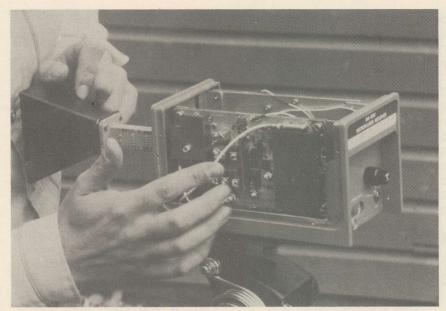
Now is the time to borrow money for CATV projects. It is available in a variety of terms for a variety of uses. Equity is also available. But if you seek assistance in the placement of funds, select your broker carefully. Your reputation is affected by the quality of his work.

See the professionals at the California show."

Metz + Jarvis Associates, Inc.

ONE NEWTOWN PROFESSIONAL PARK NEWTOWN, PENNSYLVANIA 18940 AREA CODE 215-355-9900 and a 6 foot with a 0.9 degree beamwidth. Thus for legal operation the 2 foot meets the requirements.

The business of calculating what is and is not an acceptable margin is difficult. Rain drops are the worst of all attenuation factors at 12 GHz: certain not uncommon rain drops happen to be around 1/2 wavelength "long" at 12 GHz and they work very well as absorbers of RF energy along the path. When you stack up enough of them in a line during a heavy rainstorm your path attenuation (which is normally simply atmosphere-space-loss function or signal-spread loss function) goes up dramatically. If you happen to be operating in a desert, you probably can get by with a much lower margin than 40 dB (on the assumption that it doesn't rain that hard that often where you are). But if you are along the Gulf Coast



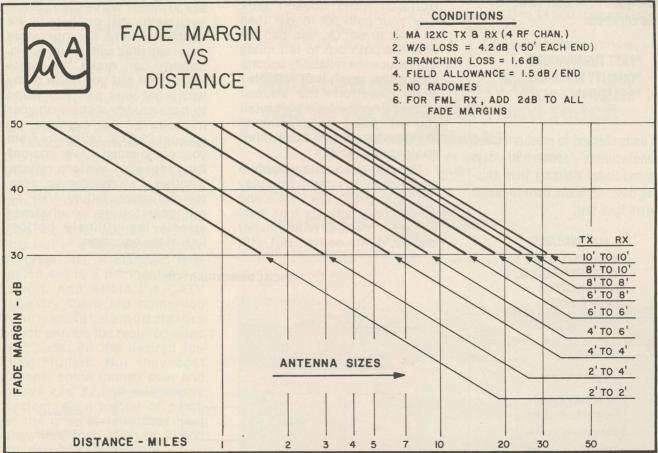
43 MHz RANGE IF SECTION of Microwave Associates low cost microwave receiver.

or in some other area where torrential downpours are fairly common, 40 dB of margin may not be adequate.

It all boils down to "down

time" due to path outages. We'll have much more to say about all of this in the coming months.

Now a certain amount of



THIS CHART—prepared by Microwave Associates, shows the type of 'margin' above 'full limiting' which can be expected with the 12XC Gunn/Microplexer series of CARS band FM equipment. The chart is labeled "Fade Margin vs. Distance", although it might better be called "dB above full limiting vs. distance". Fading is almost non-existant on paths under 1-3 miles, even with heavy rain. With line of sight paths the primary 'fade-causer' is rain. The 'magic line' for commercial (i.e. Bell) engineered systems is the 40 dB "fade margin" horizontal line. To attain "Bell-type" margins on a 4 mile path, for example, requires use of 6 foot dishes on both ends of the circuit.

controversy has developed around the distances which have appeared in print; distances which have been forecast as "reasonable distances" for the low cost gear to cover. Where there has been controversy it appears we are getting back into the numbers business again. As John Schuble explains elsewhere in this issue, calculating path loss is neither complex nor particularily complicated. But how one operator

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views down time may not be the way another operator views down time. A few hours per year sounds pretty good to most people who may now be losing a few hours per week on some of their off-air signals (due to co-channel or weather front disturbances). But to the "pro's" in the microwave business, anything less than 99.97% reliability (that works out to losing around 2 hours and 38 minutes of signal path per year) is "poor reliability" and "inadequate engineering". Perhaps so. . .but can you have Cadillac results with a Volkswagon budget?

The answer is that "yes you can" if you keep your paths short and your margins up. For example, if you take the Gunn or Microplexer gear and put a pair of six foot dishes on both ends, you can look for 99.97% reliability over paths of up to say 5-6 miles in length. Provided Hurrican Anita doesn't park over your path for longer than an hour or so. Or, you can extend the path out to ten miles and reduce the reliability accordingly. How much less reliable? Good question—the answer depends on the type of rainfall you are going to experience along your path, and some other engineering factors.

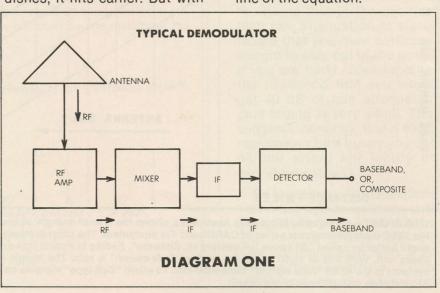
The rain attenuation problem really shouldn't come into play until you get in the 5 mile and up category with six foot dishes on both ends. With smaller dishes, it hits earlier. But with

larger dishes...it still pretty much starts at the 5-6 mile point. That's the nature of the rain absorbtion or attenuation.

What about fog or mist or snow? Much less of a problem. As long as you have adequate Fresnel zone clearances (again. see John Schuble's article in last issue of CATJ) you can just about neglect serious calculations of earth bulging or flattening (bulging is the worse of the two) for paths of under ten miles. The amount of atmospheric refraction or bending that is going to occur within or along a "short" path of say ten miles is just not going to bother you very much of the time. But on extended paths, say 15-20 miles in length where your Fresnal zone clearances are starting to get a little tight, you can begin to add "bending" or refraction of the wave front to your rain attenuation worries.

Could you run long paths, say 30 miles? We've seen several such paths that run here in the southwest and the operators seem satisfied with them. Again, nobody can make the value judgement but you. How many hours per year can you stand to have cruddy signals on your microwave? For example, do you get 99.97% reliability from your commercial power source? Any cause of system failure, whether it be microwave, commercial power failure, VHF input gear failure or whatever affects the ultimate bottom

line of the equation.



The subject is not complicated, and the easiest cop-out in the world is to stand fast and simply refuse to consider a system that is not 99.97% reliable. You can get this kind or reliability with low cost microwave, if the paths are kept at 5-6 miles and down, and you plan them well. You can also get pretty close to this with longer paths but it will ultimately depend upon where your path is and what type of rainfall you typically experience along that path.

So much for path considerations...for now. We'll come back to the subject in much greater detail in the months ahead.

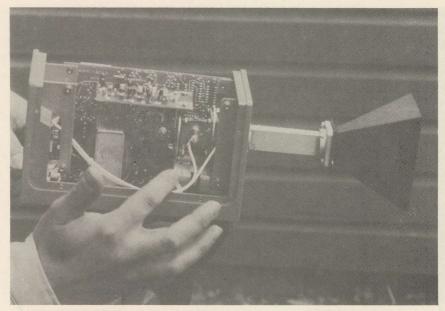
#### **The Demodulator Problem**

It apparently escaped some people in their initial enthusiasm over the price tag, but the \$2,950 price per channel is not exactly complete. Which brings us to our second level problem with low cost anything.

The basic Gunn or Microplexer system is an RF transmitter and an RF receiver. You have to provide the modulation at the transmit end, and then you have to figure out what to do with the demodulated signal at the receive end.

Taking the transmit end first, the type of signal you plug into the Gunn or Microplexer transmitter is baseband. That means you plug in either video, video and audio or composite (video plus 4.5 MHz audio). You get this out of a demodulator. See diagram one. A standard television set is a demodulator of a sort. And within the CATV industry there are numerous commercial demodulators which provide the required video and audio (in the desired format) signals. But they cost money; some money over and above the \$2,950 microwave system. As a matter of point, at the present time they cost anywhere from \$700 to \$1,500 per demodulated channel.

Naturally it seems kind of foolish to spend 50% or 100% as much for the demodulator for a channel as you spend for the 12 GHz microwave trans-



ANTENNA ON FRONT of experimental unit is not legal for CARS band applications because of broad front beamwidth (greater than 3 degree, 3 dB maximum allowed).

**mitter.** Is there another option? Several are on the horizon.

At least two well known CATV suppliers are working on lower-cost, high quality, state-of-the-art demodulators for CATV applications. The pricing will be in the \$400 to \$600 price

range (we are told) but the bad news is that the availability may be late first quarter to mid second quarter of 1978. Do you have an interim choice, to spending \$700 to \$1,500 for an existing product?

You might. For example, you

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might locate and get by for now with some of the old tube type Conrac AV-12E (Ameco had some similar units with a burnt vellow front panel) demodulators. On the used market they sell for prices ranging from \$100 to \$250 each and most of them have factory equipped 4.5 MHz output. They are not the best or the permanent way to go, but they would get you by for awhile. Another possibility is the no-longer-in-production Setchell Carlson DEM-919 solid state demodulator which also had video, audio or 4.5 output. The DEM-919 was largely sold to the school AV market although for a year or two Jerrold had a similar product (the UD-283A demodulator) available (it is also not currently in production although it is rumored to be heading back to production with some updates early in 1978 if not before). There are other low cost demods around as well; you might check your current Dynair catalog and shop around the school system AV market.

Ultimately it is likely that several new options will be available. For example, suppose you took a hard look at your heterodyne signal processor in your headend. On the assumption that you will start off with your new microwave hop at an existing (or new) offair headend, chances are good you already have a heterodyne processor or two in the rack. Look closely at the rear apron of the unit. See the IF output? What you have at this point in the processor is an amplified, filtered, AGC'd off-air signal. In other words, most of the hard work done by a quality demodulator has already been done for you by the heterodyne processor. Now what is missing is the conversion of the amplified, filtered, AGC'd RF signal (now at IF) to baseband audio and video (or video plus 4.5).

Diagram two illustrates what could be done; and is in the fact now being done by at least two heterodyne processor manufacturers on a proto-type basis. By jacking out of the heterodyne processor at IF you can then go into a filter system and a demodulator chip to create the baseband signal(s) you require to jack into your Gunn or Microplexer transmitter. The heterodyne processor is used to process the off-air signal for cable carriage in the normal fashion, while out of the IF spigot you derive IF signal to further process down to baseband to drive the Gunn or Microplexer transmitter for sending the processed signal onto the second "sub" headend for the second

What kind of money will it probably cost a system to add one of the IF to baseband demodulators? Unknown for sure at this time, but both companies working on the project see it being at or under \$200 per channel.

The "problem" is not going un-noticed and that is perhaps the best news of all.

#### **The Modulator Problem**

system(s).

Meanwhile, at the receive end of the Gunn or Microplexer circuit you have the same problem; in reverse. Out of the microwave receiver comes video, audio or video and 4.5 (as in composite).

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Now this is not a new problem to CATV. Every system with a weather channel, a message channel, a news channel or even a TVRO channel has already been to the "well" looking for the best buy in a modulator. For the record, in CATV lingo a modulator is a device that is driven by video, and audio, and it turns out a TV signal on a standard (or mid or super band) channel.

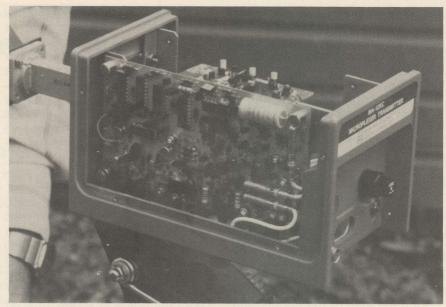
Only now with the low cost of the microwave package there is a new demand for low cost but high quality in such a device. The two may not necessarily go together; it may not be possible to get both low cost and high quality plus reliability to boot.

Modulators run the range from \$400 to \$1,500 per channel. Generally speaking, you pretty much get what you pay for in today's market. Some of the more complex packages are really miniature broadcast station transmitters; you could add a power amplifier or two and come very close to meeting all of the FCC's specs for a standard television broadcast signal with some of the units available. In other words, CATV modulators have come far in a decade or so.

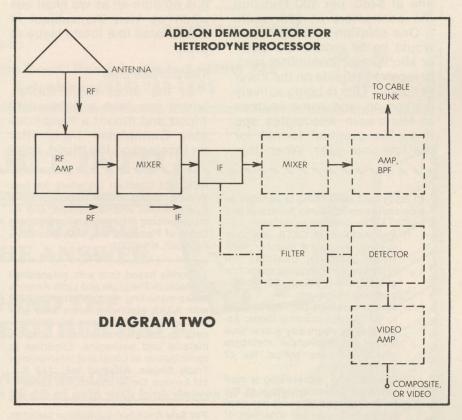
Because a TV modulator is essentially a demodulator in reverse, there is on the horizon some very interesting new technology which is bound to start showing up in the CATV modulator field. The art of building television receivers has recently gone through a series of revolutions; complete IC receivers are now on the market (in the 1978 year), with the exception of the CRT display portion of the system. IC's mean large volume and low prices per device. Thus as fall out from the IC revolution in TV receivers appears some interesting new, lower cost and higher quality modulators may be coming on the market. But not for six months to a year.

#### The System Cost Problem

When you sit down and do some hard pencil pushing for a planned microwave link, it may



HEAVY USE OF IC's is found in Microwave Associates 12XC transmitter series; this board includes crystal reference AFC system, video amplifier.



surprise you to discover that the microwave gear cost may not be the **major** portion of the installation. One system operator got very excited about ten channels of microwave gear for his Tennessee system. Then he sat down and calculated the cost of the site, the tower, the headend building, and everything that went into the planned system. When he got all done, whether he paid \$2,950 or \$5,500

per channel for the microwave made only a thirty percent difference in the cost of his projected system. The package was expensive even without microwave!

One of the hurdles in pricing at the moment is the mounting configuration for the Gunn or Microplexer equipment. The present generation of equipment is designed to mount indoors where it will plug into a

piece of waveguide that will carry the transmitted signal up to the parabolic antenna. Fortunately you can duplex or group multiple channels of gear into a single hunk of waveguide. using special devices known as circulators (again, see John Schuble's report in last issue). The reverse happens on receive; one antenna can drive multiple receivers, through circulators at the base of the waveguide.

But each circulator adds some loss to the system. And the waveguide is not exactly inexpensive. Take the Andrew EW122 elliptical waveguide as an example. At 12.5 GHz it has 4.25 dB loss per 100 feet. Plus the loss of the connectors. And it is not inexpensive; a recent Andrew catalog lists the line at \$460, per 100 feet and the connectors at \$78. each.

One solution to the problem would be to mount the Gunn or Microplexer transmitter (and, or receiver) outside on the tower or "pole". This is being actively worked on, and some sources at Microwave Associates see it as the eventual format for the low cost gear. When this happens you will send video/ composite up to the pole or tower mounted package via a convenient hunk of .412 or other typical CATV cable, and at the receive end take your demodulated signal out of the pole or tower mounted receiver with another hunk of inexpensive CATV type cable. But there will be a trade off here of course: you'll have to climb the pole or tower to work on the gear.

Another possibility is to mount the gear outside and feed a small 2 foot dish (or whatever size the system design requires) from the ground, looking up at a passive reflector mounted on the tower. This "periscope" shot approach is widely utilized in many services and has seen some application in CATV. But it is no cure-all as we shall see when we visit the subject in some detail in a future issue of CATJ.

#### The Bottom Line

In the most basic format, where you take a lightweight tripod and mount a hand-holdable Gunnplexer transmitter (or receiver) on the tripod, point the bolt-on-able 17 dB gain horn antenna on the front of the package in the direction you want to transmit to or receive from. . . microwave at low or reasonable cost is very appealing.

But between this basic short haul format and an operating system that is reliable, costeffective and installed into your own CATV system there are any number of financial and engineering hurdles. The purists in the crowd who demand 99.97% reliability and lots of reserve will quickly end up spending more dollars for the attachments than they will for the basic system. The nuts and bolts operator, anxious to provide the first 'quality' television to a service area in his region will have to learn new techniques methodologies and new if he is going to arrive at his goal 'under budget' and within the practical service margin limits he himself sets out as acceptable. In the months ahead we'll attempt to cater to both philosophies as the state of low cost microwave art matures.

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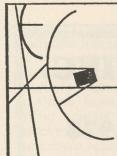
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#### Satellite/TVRO News

On September 27th UA-Columbia Cablevision, Inc. began using the RCA SATCOM II satellite (transponder 22) to relay Madison Square Garden sports and special events 'live' to CATV systems equipped to carry the

programs.

The first event was an NHL hockey contest between the Philadelphia Flyers and the New York Rangers (see off-screen photo taken at CATJ Lab site TVRO in Oklahoma). Events to be broadcast, 125 in all, include professional boxing and wrestling, World Team Tennis, the Westminister Dog Show, National Horse Show ECAC and NIT college basketball tournaments, track meets and AAU/U.S. Olympic championships.

UA-Columbia expects approximately 1,000,000 cable homes (including those served in the northeast via terrestrial



microwave) to be a part of the 'Madison-Square-Garden connection' by the end of the year. The Madison Square Garden 'events-package' is considered non-broadcast television and FCC signal carriage rules do not apply. The events are broadcast in 'real time', typically starting around 7:30-8:00 PM E(D)ST and averaging two to

three hours in length.

Microdyne Corporation (Box 1527, Rockville, Maryland 20850) reports recent satellite terminals supplied with Microdyne TVRO receivers include Owensboro, Kentucky (which added a new 4.5 meter dish, their second TVRO antenna, to bring in events from Westar II), Pampa, Texas and Taos, New Mexico.

Microwave Associates, Inc. (63 Third Avenue, Burlington, Massachusetts 01803) has formally announced a 'low cost' single channel TVRO receiver. Model VR-3 receiver sells for under \$4,000, has modular construction, baseband video and audio outputs, front panel meter and switching, and can be ordered with either optional phase lock and/or optional threshold extension features. The receiver has a pair of video (baseband) outputs, a composite output, audio output and an IF output for signal level monitoring. It

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JERROLD Electronics Corp., P.O. BOX 487, Byberry Rd. & PA. Turnpike, Hatboro, PA 19040, (M1, M2, M4, M5, M6, M7, D3, D8, S1, S2, S3, S8) 215-674-4800

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LARSON ELECTRONICS, 311 S. Locust St., Denton, TX. 76201 (M9 Standby Power) 817—387-0002 LRC Electronics, Inc., 901 South Ave., Horseheads, N.Y. 14845 (M7) 607—739-3844 Magnavox CATV Division, 133 West Seneca St., Manlius, N.Y. 13104 (M1) 315—682-9105 MICROWAVE ASSOCIATES, INC. 10920 Ambassador Drive-Suite 119 Kansas City, MO. 64153 (M9) Microwave Radio Systems-816-891-8895 MICRODYNE CORPORATION, P.O. Box 1527, 627 Lofstrand La, Rockville, MD 20850, (M9 Satellite TV Recs.) 301-762-8500 Microwave Filter Co., 6743 Kinne St., Box 103, E. Syracuse, N.Y. 13057 (M5, bandpass filters) 315—437-4529 MID STATE Communication, Inc. P.O. Box 203, Beech Grove, IN. 46107 (M8) 317-787-9426 MSI TELEVISION, 4788 South State St., Salt Lake City, UT 84107 (M9 Digital Video Equip.) 801—262-8475 NORTHERN CATV DISTRIBUTORS, INC., 8016 Chatham Dr., Manlius, N.Y. 13104 (D1) 315—682-2670 OAK INDUSTRIES INC./CATV DIV., Crystal Lake, IL. 60014 (M1, M9 Converters, S3) 815—459-5000

New products and services

from the industry are the life-blood of the continual expansion and progress by the cable TV system operators throughout the world. Products and services reviewed here are new or 'recent" from CATA Associate Member firms; always good places to do business!

is a rack mounting unit (5.25 inches tall) and limited delivery is now underway.

United Video Satellite Communications had announced a new 'flexible rate schedule' for its planned SATCOM II linking with Chicago's independent WGN. Under the plan three rates will be available for CATV systems carrying the WGN programs via SATCOM II and the UVSC common carrier service. For carriage of WGN from midnight to 6 AM, the rates will be \$0.02 per subscriber per month (a maximum of 200 hours per month carriage). For systems carrying WGN from 200 to 500 hours per month (the equivalent of 6.66 to 16.66 hours per day in a 30 day month) the rates will be \$0.05 per subscriber per month. For full time carriage the rate will be \$0.10 per subscriber per month with a maximum rate of \$3,000 (equivalent to 30,000 subscribers). USVC expects the threetiered rate will allow systems to utilize

some of the WGN program day as a fillin service where there are problems with FCC signal carriage for full-time service. USVC plans to begin service now 'early next summer' with a hopedfor 600,000 subscriber base.

#### Two New SLM's

Mid State Communications (174 South First Avenue, Beech Grove, Indiana



46107) has announced a pair of new "lightweight, compact meters" for CATV system use. Model SLM-13 is designed to measure carrier levels over the basic 12 VHF channels plus FM while model SLM-83 adds UHF tuning

to the VHF range.

Both units feature an optional 13th channel, which can be 'programmed' for any channel in either mid or super band. The amplitude measurement range is -25 dBmV to +70 dBmV with three 20 dB pads plus a 35 dB scale range. The scale resolution is 1 dB per step.

Model SLM-13 is priced at \$335 and model SLM-83 is priced at \$395. Delivery on both is reported to be three weeks from receipt of order.

#### **AEL CATV Moves**

The CATV Communications Division of American Electronic Laboratories (AEL) has completed a move to a newly constructed facility on Stump Road in Montgomeryville, Pennsylvania. The move to the new quarters gives the CATV Division expanded operating room, although it is only a few miles from the former location at AEL.

PRODELIN, INC., 1350 Duane Avenue, Santa Clara, CA. 95050 (M2, M3, M7, S2) 408—244-4720 Q-BIT Corporation, P.O. Box 2208, Melbourne, FL. 32901 (M4) 305—727-1838 RADIO MECHANICAL STRUCTURES, INC., P.O. Box 1277, Kilgore, TX 75662 (M2, M9, S2) 214-984-0555 R F SYSTEMS, INC., P.O. Box 428, St. Cloud, FL 32769, (M2, M6), 305-892-6111 RICHEY DEVELOPMENT CORP., 6920 Melrose, Oklahoma City, Ok. 73127 (M1,M4,M8,S8) 405-495-3953 RMS CATV Division, 50 Antin Place, Bronx, N.Y. 10462 (M5, M7) 212—892-1000 Sadelco, Inc., 299 Park Avenue, Weehawken, N.J. 07087 (M8) 201-866-0912 Scientific Atlanta Inc., 3845 Pleasantdale Rd., Atlanta, GA. 30340 (M1, M2, M4, M8, S1, S2, S3, S8) 404—449-2000 SCIENTIFIC COMMUNICATIONS, INC., 3425 Kingsley Rd., Garland, TX 75041, (M4 Low Noise & Parametric) 214-271-3685 SITCO Antennas, P.O. Box 20456, Portland, OR. 97220 (D2, D3, D4, D5, D6, D7, D9, M2, M4, M5, M6, M9) 503—253-2000 Systems Wire and Cable, Inc., P.O. Box 21007, Phoenix, AZ. 85036 (M3) 602—268-8744 TERRACOM, 9020 Balboa Ave., San Diego, CA 92123, (M9 Microwave Earth Stations) 714-278-4100 TEXSCAN Corp., 2446 N. Shadeland Ave., Indianapolis, IN. 46219 (M8, bandpass filters) 317–357-8781
Theta-Com, P.O. Box 9728, Phoenix, AZ. 85068 (M1, M4, M5, M7, M8, S1, S2, S3, S8, AML MICROWAVE) 602–944-4411 TIMES WIRE & CABLE CO., 358 Hall Avenue, Wallingford, CT. 06492 (M3) 203-265-2361 Titsch Publishing, Inc., P.O. Box 4305, Denver, CO. 80204 (S6) 303--573-1433 Tocom, Inc., P.O. Box 47066, Dallas, TX. 75247 (M1, M4, M5, Converters) 214—438-7691 TOMCO COMMUNICATIONS, INC., 1077 Independence Ave., Mtn. View, CA 94043 (M4, M5, M9) 415-969-3042

Toner Cable Equipment, Inc., 418 Caredean Drive, Horsham, PA, 19044 (D2, D3, D4, D5, D6, D7) 215—675-2053

Triple Crown Electronics Inc., 42 Racine Rd., Rexdale, Ontario, Canada M9W2Z3 (M4, M8) 416, 743-1481 TURNER COMMUNICATIONS CORP., (WTCG-TV), P. O. Box 4064 Atlanta Stadium, Atlanta, GA. (\$9) 404-522-7250 UNITED PRESS INTERNATIONAL, 220 East 42nd St., New York, N.Y. 10017, (\$9) (Automated News Syc.) 212-682-0400 UNITED STATES TOWER & FAB. CO. P.O. Drawer "S", Afton, OK 74331 (M2,M9) 918-257-4257 Van Ladder, Inc., P.O. Box 709, Spencer, Iowa 51301 (M9, automated ladder equipment) 712-262-5810 VIDEO DATA SYSTEMS, 40 Oser Avenue, Hauppauge, N.Y. 11787 (M9) 516-231-4400
VITEK ELECTRONICS, INC., 200 Wood Ave., Middlesex, N.J. 201-469-9400
WAVETEK Indiana, 66 N. First Ave., Beech Grove, IN. 46107 (M8) 317-783-3221 WEATHERSCAN, Loop 132 - Throckmorton Hwy., Olney, TX. 76374 (D9, Sony Equip. Dist., M9 Weather Channel Displays) 817–564-5688 Western Communication Service, Box 347, San Angelo, TX. 76901 (M2, Towers) 915–655-6262/653-3363 NOTE: Associates listed in bold face are Charter Members

#### Distributors:

D1-Full CATV equipment line

D2-CATV antennas

D3—CATV cable

D4—CATV amplifiers D5—CATV passives

D6-CATV hardware D7-CATV connectors

D8-CATV test equipment

#### Manufacturers:

M1-Full CATV equipment line

M2—CATV antennas M3-CATV cable

M4-CATV amplifiers

M5—CATV passives M6-CATV hardware

M7-CATV connectors

M8-CATV test equipment

#### Service Firms:

S1-CATV contracting

S2-CATV construction

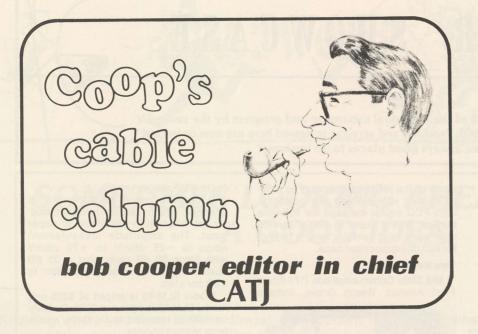
S3-CATV financing

S4-CATV software

S5-CATV billing services

S6-CATV publishing S7—CATV drop installation

S8-CATV engineering



#### The Terminal Explosion

This month's CATJ relates the 'plans' of cable operators to add TVRO facilities during the coming 14-15 month period. The numbers are staggering. Either we are a bunch of optimists or the TVRO hardware people are sitting on the edge of the darndest equipment explosion to ever come through the CATV industry.

And when all is said and done, we won't amount to a hill of beans as a market place for what appears will one day soon be a very large market. Let's say that another way. If every system forecast to add a TVRO during the next 14-15 months does so, we will as an industry generate between \$18 and \$22 million in business for TVRO hardware suppliers and installation firms. That assumes the typical TVRO ends up costing \$20,000 when installed. And we both know they may turn out to be a low 'average cost' for a system (although admittedly some will do it for far less than this).

That \$18 to \$22 million is a mere drop in the bucket to the size of the small aperture terminal market about to explode on the American countryside. There are serious efforts underway to expand terminal uses to a wide variety of users and most of the business or other groups considering such installations (as industries, not as individual users) are far larger than the CATV industry.

There are three major component parts in the CATV TVRO. The dish (or horn) antenna, the low noise preamplifier (LNA) and the receiver(s).

Let's look at each of these one at a time.

The antenna started out in the ten/ eleven meter class as a \$65,000 or so item. In the 4.5 to 5 to 6 meter class it is now down to under \$7,500 and there is reason to suspect that by 1980 (but probably not before) it will be even lower than that. What will bring it down by 1980 will be mass production, which is something we do not have now. Let's take a 5 or 6 meter dish of aluminum, aluminum/steel or steel construction. Depending upon who builds it, there is between 175 and 250 'man-hours' in a 'metal' 4.5/5/6 meter antenna, mount and feed. (We'll probably hear from those who say it is more...or less... but several manufacturers we talked with confirm these numbers). As long as the dishes are fabricated in sections or panels there is not much hope of dropping that hour number very far. And hours cost money of course. The other half of the antenna 'raw materials' equation is the steel, aluminum or whatever goes into the product. Metal prices have averaged between 6 and 9% cost increases per year for several years; there is little hope that trend will change. So the trend for mass production of dishes will slowly evolve but until it does the pricing we have now is the pricing we can expect to stay with us.

The low noise amplifier (LNA) presents an especially difficult present day problem. The parts inside of the box are a mixture of 'ho-hum' common and 'exotic'. The GaAs-FET transistor(s) are the exotic and they contribute heavily to the overall user price you pay. With the exception of Avantek

apparently no firm in the United States manufacturing the finished LNA unit also manufactures the GaAs-FET transistor. That means that if Scientific Communications wants to produce LNA's, it is at the 'mercy' of the firm that turns out the GaAs-FETS. One of the principal non-U.S. suppliers of GaAS-FETs is NEC of Japan. NEC sold quality GaAS-FET transistors but produced no GaAS-FET LNA's...until recently. Now that NEC is manufacturing and selling LNA's using their own GaAs-FET devices the NEC supply line to other finished product vendors has grown tight. NEC apparently assumes that if they can keep the coveted GaAS-FET transistors in scarce supply their competitive position with a finished LNA product will improve. It's called 'cutting a guy off at the pass' by seeing that he doesn't have the raw parts to compete with you. This isn't the only thing happening in the LNA world but it's enough to muddy things up pretty good. And LNA's are in short supply. At least for the 3.7-4.2 GHz frequency band.

The receivers are yet another 'can of worms', for totally different reasons from those affecting the antenna and LNA industries. Several companies have been in and out of the receiver field in a short period of time. ITT for example was instrumental in getting small aperture TVRO's approved at the FCC; only to drop out of active solicitation of CATV business six months thereafter. Some of the receiver suppliers have a difficult time understanding the CATV marketplace; and are in fact not staffed or equipped to sell receivers in onesy-twosy-threesy quantities. California Microwave, for example, has a bunch of satellite system receiver experience but they seem to not grasp how the CATV industry differs from say the military market or the big Alaskan satellite receive terminal system market. In other words, some companies can't seem to function effectively when they are bidding or selling or courting receiver packages of say fewer than 50 or 100 units at a whack. To the marketing comprehension problems the sudden emergence of the single channel dedicated receiver has added yet another facet. Suppliers who were just getting the bugs out of their mass production lines for tuneable receivers are now faced with engineering and re-tooling for a substantially varied product for the same market (Hughes is the exception here—they began with a single channel receiver and have now come on with a tuneable version). So the receiver field which should have been out of the bug stage and into high gear by now is still having difficulties getting up to speed.

And now comes the ingredient to the mix which simply defies explanation. With equipment supplies short and promising to get shorter (for the reasons just explained), pricing on TVRO's is going down; not up. And would-bebuyers are holding out for 'better deals'

when in fact the longer they wait to place the order the better the odds that they will be facing a very (very) long order-delivery-installation cycle. In any other business, at any other time, when supplies are short the prices go up. Coffee is a good example. But not in our crazy, mixed-up industry!

So here we are pushing on the suppliers to lower the prices still further, demanding instant delivery, and lots of free assistance. And the suppliers have empty shelves. It won't last much longer; one of several things is bound to happen.

Suppliers will follow the lead of ITT or RMI/S (which recently became the wholly owned antenna division of Harris) and get out of the CATV field, or, they will wise up and say 'Hey wait a minute...my shelves are empty, the next 60 days of production is sold out and here I am haggling with this guy over an additional 1% discount! Who needs it!!!'.

Farinon's Jim Hurd said it pretty succinctly to us recently when he noted: "Cash flow is the bloodstream of any operation, whether it be a system operator or a manufacturer. Both of us, from time to time, must borrow money for operations and as you are well aware, money costs money in interest.

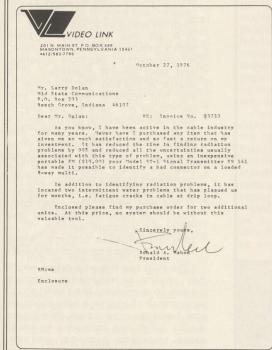
"We have both seen the customer

who waits until the last minute to order material, then puts pressure on the manufacturer to get delivery today. His favorite phrase is '...if I would have wanted it tomorrow, I would have waited until tomorrow to order it'. This same customer, after he has the equipment installed and turned on, feels no compulsion at all to make any attempt to pay us within 30 days or within the time period contracted. The interest on this slow turnaround money must also be cranked into the selling price of all equipment sold. It is unfortunate that those customers who pay per contract must be penalized for those other customers who do not honor their contract.'

The cable industry has been through an uncommon number of suppliers. With some justification the cable operator is leery of new suppliers in the marketplace, or suppliers who may have been around awhile but who have always maintained a lower than normal profile. There is, as Jim Hurd notes, alot of gear out there for which there are no attainable spares or replacements or parts. But fear of paying per contract or promptly because of concern that the guy may go out of business and leave you holding the bag is no answer. Sure enough if you don't pay him for long enough. . .your worst fears will come true.

Things are not that bad of course; nor will they get that bad. But the underscoring of a two-way street, a decent, honest relationship between the supplier and the user, is very real indeed. Equally real is the short supply of CATV related TVRO goodies. They are today short in supply; and within not more than sixty days they will be downright scarce. It is likely that today's low-ball pricing structure is about to head in the other direction. It may have already done so by the time you read this in mid-November.

Finally there is the very real fact that CATV's hold on TVRO equipment (i.e. we at the present time make up the bulk of the domestic market for dishes, LNA's and receivers in the satellite field) is not going to last forever. We are aware of several very important developments which will bring into the marketplace a number of new industries who will be using earth terminals in very large quanities; quantities so large as to pale by comparison the relatively miniscule marketplace presented by CATV TVROs. As the market unfolds and expands, the way CATV customers will be treated by earth terminal suppliers will depend in large measure on the way we treat them in the interim. You might keep this in mind as you 'negotiate' with the supplier of your choice.



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**THE CUCKOO**—Although barely one-half year old, this "new bird" is revolutionizing the way CATV systems patrol for radiation leakage. Install the Cuckoo at the headend and patrol with a simple FM portable or car radio. It's simple. . . accurate and it can be used with virtually no set-up time by anyone who can turn on an FM radio and listen.

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# TECHNICAL TOPICS

#### **Common Carrier Changes Ahead?**

"In the beginning, there was cable television. To add additional services and TV signals, cable television companies began using microwave, first in the business band, next in the common carrier band, and later in the common carrier band, the community antenna relay band and the common carrier satellite band. Community antenna relay, or CAR, is privately owned and operated, and common carrier is owned and operated by someone other than the majority of the users. Satellites utilize common carrier transponders and privately owned transponders. HBO is on a privately owned transponder, and WTCG, Channel 17, is on a common carrier transponder. All of the above mentioned services utilize microwave frequencies. All of the technology is basically the same.

"Over the last twenty years, various rate making philosophies and policies have been used by the various microwave entities for spreading out the costs of the microwave system to the users. In CARS band systems, there is normally a sharing agreement whereby each user puts up a certain portion of money to cover capital investment and contributes a certain portion to operating expenses. The agreements vary from system to system. Some require that each user contribute some capital investment towards the trunk of the system, while others require only that the users contribute for their drop

"Common carrier pricing has emerged in a similar fashion. Some common carriers charge a flat rate per hop; others charge by mileage, and still others charge a split rate based upon the size of the community being served (or numbers of subscribers in the system) plus a rate per hop.

'Much of the philosophy of the distribution of costs depends upon the geography and nature of the microwave system. In some of the eastern microwave systems there are many cable systems for each microwave repeater (many power splits and a high density of users) versus the systems in the west and midwest where the microwave might go several hops to serve one system and then another hop to serve a second system.

"In the first instance, it is very easy

to see that you could rate average each user on a flat fee basis easily, because most of them require identical capital investments and operating characteristics. In the latter example, a rate philosophy becomes more difficult. In my humble opinion, there is no completely "fair" way to fully allocate microwave rates. To illustrate this, let me offer several examples:

1) A microwave system with a very large city at the end of six microwave hops and three very small communities along the route: If the full microwave costs are \$6,000 per month (amortization, operating expenses and profit), this amount can either be all paid by the large user, which might be acceptable, or it might be split evenly between all four subscribers at \$1,500 per month, or it could be allocated by the size of the communities. Assuming that the three small communities cannot afford \$1,500 per month, they would not take the service if an even allocation were the only alternative. Therefore, the large city would have to pay \$6,000 in order to get the service. On the other hand, if the small communities would take the service at \$500 per month each, the rate for the large community would then be \$4,500. They would be \$1,500 happier, and each of the small communities would be \$1,000 happier.

2) A six hop microwave system with a customer at the first repeater, no customers for two more repeaters, and then several customers in a cluster at the end: The customer at the first repeater would say that he should not have to pay any of the costs required to get the service to the other users. On a per hop basis, the second customer, three hops out, would pay the highest rate. He would complain that the customers at the end should pay the highest rate. If one of the customers at the end was a very small community, he could not afford to take the service if his rate was high. Therefore, this situation compounds the financial burdens for all other users.

"The FCC has issued a ruling which may require all microwave common carriers to re-evaluate their tariff structures and to charge on a fully allocated cost basis. In most cases, this would require large rate increases to small cable television systems, and decreases in the rates to some of the larger cable television systems. The theory behind the FCC decision is that the rates for the subscribers should be directly related to the capital investment necessary for the service. Since the capital investment in the microwave system is the same for a 30,000 subscriber cable system as it is for a 300 subscriber cable system, the



FCC theorizes that both should be charged the same rate.

"They have left the door open for the microwave carriers to prove that a departure from this rate theory is in the public interest. If the carrier can prove that the small cable companies will either go out of business or not take the microwave service if the rate is raised to a fully allocated basis, the FCC will allow this value of service type of rate structure.

"The rate structure in question is either one based strictly on the number of subscribers or one based on size of community or the number of homes in

the community.

"The common carriers need help to prove that higher rates for many of the smaller cable television systems would either totally wipe them out or drastically curtail their development."

Roy L. Bliss Executive Vice President United Video, Inc. Tulsa, Oklahoma 74135

#### **Circular Polarization Report**

When CATJ approached the subject of circular polarization for CATV receiving antennas in our October 1975 issue ('Multi-Mode Receiving System'page 10) the television broadcast industry was just completing tests in Chicago and (Modesto) California with CP transmitting antennas. Our bottom line then was that more than two years of CATJ Lab test convinced us that if CATV systems employed CP receiving antennas now (or then as the case then was) they would realize from 2 to 1 20 dB additional average signal level from horizontally polarized distant channels. This worked (and still works) that way because signals that travel over or beyond the visual and radio 'horizon' lose their polarization 'integrity or 'sense'. That is, a horizontally polarized signal ends up over the horizon no longer horizontally polarized, for a major portion of the time.

Alas, other then some experiments by antenna manufacturer SITCO in Portland, Oregon, nobody in the CATV antenna biz followed our lead. The October 1975 report did cause several dozen CATV systems from California to Florida to construct their own homebrew 'corkscrew' antennas however and most report results justifying the

time and labor.

Then in the March 1976 issue of CATJ ('Where Are We With Multi-Mode?'-page 9) we again visited the concept, this time providing additional reports on a customized and experimental circular-polarized-log designed by USTC's Tony Bickel and run on our CATJ Lab test range for several months on a 205 mile path channel 12 signal. Again, modest interest but no commercial takers.).

In the interim period the broadcaster tests wound down to a close and the FCC finally authorized commercial (and non-commercial) broadcast station use of 'CP' on a regular basis. Accordingly, the following stations are reported to be either on the air with

CP as this is written, or planning an early start with CP transmitting antennas:

- WLS-TV (7) Chicago and KLOC-TV (19) Modesto (California) are now on the air with 'CP' transmitting antennas;
- KBYU-TV (11) Provo, Utah and WPBT-TV (2) Miami, Florida are scheduled to be on the air with CP this fall.
- 3) WRAL-TV (5) Raleigh, WTTV-TV (4) Indianapolis and XETV (6) Tijuana are scheduled to begin CP transmissions during the first half of 1978

Thus with CATV off-air antennas employing CP in those listed station situations here, you could pick up a theoretical 3.2 dB additional average signal voltage (at the antenna, input to pre-amplifier, etc.). You will also typically find that ghosting or multi-path either reduces substantially (the original reason for CP use by broadcasters) or eliminates altogether. When you have all stations employing CP transmitting antennas, and a receiving system employing CP receiving antennas, there is also possible a 20 dB reduction in cochannel interference. On top of this, based upon CATJ Lab results over a two-plus-year period, use of a CP receiving antenna even on horizontally polarized signals will often reduce rapid fading on 'distant signals' by no less than 2 dB average and often by as much as 20 dB average.

It is reported that various home antenna manufacturers will be offering CP home receiving antennas to the market shortly. However, CP CATV receiving antennas are still not in commercial production and with the exception of the experimental antennas developed by SITCO (cross-polarized yagis) and USTC (cross-polarized logs), none have been developed.

New Radiation Rules / 1-1-78

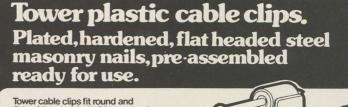
Cable system operators employing signal carriage in the 108 to 136 and/or the 225-400 MHz region are reminded that effective 1 January 1978 they are required to observe newly adopted standards and practices for the routine detection and prevention of cable plant signal radiation.

Under new rules adopted by the FCC on July 27, 1977 any cable system utilizing these two bands for carriage of any signals (i.e. TV, pilot carrier,

data, voice or whatever) must be especially concerned about both the on-cable frequency of these signals, and, the absolute cable and radiated levels of any such signals. These new rules are the outgrowth of the FCC's rule making proposal which did at one point actually propose that cable systems would be denied the use of these frequency spectrums. The rule making arose after a Pennsylvania cable system allowed a signal in the 120 MHz region to radiate at unusually high levels and there was an allegation that this signal was capable of creating interference with a vital ground to air navigational aid system. The FCC acted in response to formal protests from the FAA and CAA; upon whose shoulders falls the policing of safe aircraft communication systems.

Under the new rules:

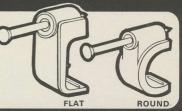
- Any cable system capable of producing peak power/voltage levels within the cable plant of +28 dBmV (within the frequency range 108-136 and/or 225-400 MHz) and where the cable plant is located within 69.1 (statute) miles of any aeronautical radio service transmitter (operating in either of these bands) must do the following:
- 2) Any such system must move the operating cable plant carrier frequency of any present (or future) cable carriers that are located within 100 kHz of the (emergency) frequency 121.500 MHz or within 50 kHz of the (emergency) frequencies 156.800 or 243.00 MHz. In other words, carriage of any carrier frequency closer to 121.500 than 100 kHz or closer to 156.00 / 243.00 MHz than 50 kHz will be illegal; after 1 January 1978.
- 3) Any such system (i.e. located within 69.1 miles of an aeronautical radio service station) must begin a new series of annualized radiation monitoring and detection tests. Under the new rules radiation testing must be accomplished with a radiation detection system which is capable of detecting leaks or signal radiation in excess of 20 microvolts per meter at a distance of 10 feet from the cable plant. Such tests must be conducted throughout all of the cable plant, on an annual basis.



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- 4) Such tests must be documented with testing logs. Such logs are to identify the date and time of tests, the equipment and methods employed for the tests.
- 5) Any radiation found, whether within the 108-136 MHz or 225-400 MHz region, or on other cable carried spectrum, must be logged in the following manner:
  - a) The date and time of discoveryb) The location of the leakage/rad-
  - iation
    c) The date of repair of the leak-

Such logs are to be kept as part of the system's permanent files for a period of not less than two years and the logs are to be made available to authorized representatives of the FCC upon request.

- 6) Any systems which now carry or plan to carry any signals (of any type) within the affected frequency spectrums (108-136 MHz and 225-400 MHz) must also file annualized reports with the FCC (FCC form 325, schedule 2 will suffice) listing the following information:
  - a) Carrier frequency of any signals in these bands
  - b) The identification of the signals (i.e. by TV call-letters, origination source, or a systemidentification given to system generated signals)

- c) Identification of any subcarriers present with the main carriers, the type (format) of modulation of the carriers, and the maximum (peak) power (in dBmV) of each of the carriers at their most 'potent point' (typically at the headend entry point to the trunk of the system plant).
- 7) The same information as supplied to the FCC (typically utilizing FCC form 325, schedule 2) must also be maintained on file at the system's local office; and be made available to any authorized representative of the FCC upon request.
- 8) Additionally, any system planning to add new signals in the 108-136 or 225-400 MHz bands must notify the FCC's Cable Television Bureau (1919 M Street NW, Washington, D.C. 20554) no less than 60 (sixty) days in advance of the addition of any such signals with a letter that sets forth all of the data in number 6 (six) here, plus, the FCC file number for the CATV system (the CAC number), the name and address of the system, and the full name of the individual making the notification to the FCC.

Questions raised in most operator's

minds will include "does this affect me?". The key element is the 69.1 (statute) mile radius which must be drawn around any and all aeronautical radio service facilities. The ARS includes the commonly found VOR transmitters, ILS transmitters plus a wide range of other transmitters including private approach control, government approach control, in flight service stations, the Unicom channels and so on. Both civilian and military transmitter sites are included in the 69.1 mile circle ranges and you have to be located within only a single 69.1 miles radium for any aeronautical radio service facility in the 108-136 or 225-400 MHz range to 'qualify' for the new

As a matter of both common sense and practicality, it is unlikely that more than one (1) percent of all CATV systems will escape the new rule. In other words, the proliferation of aeronautical radio service transmitters is so complete from coast to coast and border to border, it is unlikely that more than a handful of CATV systems will be 'fortunate enough' to fall outside the 69.1 miles radius of all such facilities.

Therefore it is generally presumed that all CATV systems, regardless of their location, should simply consider themselves to be affected by these new rules and to take steps accordingly to comply.



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#### Coals To Newcastle?

Since the CATJ six meter TVRO terminal was installed and turned on September 21st there has been a steady trek of CATV system operators, and suppliers, to the terminal. During September alone more than 40 CATV system operators 'dropped in' to see what a non-dedicated terminal can do (we are not dedicated to any particular satellite and are therefore 'free' to move about the geo-stationary orbit belt to see what is going on).

The new Microwave Associates VR-3 single channel receiver has been to the site for some tests, a couple of proto-types under development by a western outfit, and during October the new 24 channel Hughes SVR-461 receiver came to the site. Doug Rasmussen (Product Marketing Manager, Satellite Earth Stations) arrived late one fall afternoon just as a cold front blew by. After the Kansas dust had settled and the winds had dropped to under 40 knots Doug inspected the polar-mounted six meter antenna and watched as we switched from bird to bird.

The new Hughes tuneable receiver has a very interesting threshold extension system incorporated into its design, and we were in particular pleased to notice the impact of this feature on the very-slightly-sparkly ANIK-I signals at the Lab (ANIK is skew polarized from SATCOM and to clean up the sparklies you need to rotate the feed; something we don't normally do unless we are not otherwise pressed for time).

USTC's Tony Bickel, alerted to the Lab appearance of the New Hughes tuneable receiver, made a special trip to the Oklahoma City area to inspect the receiver and witness it in operation. We found Rasmussen to be a fund of valuable information, quiet but very thorough in his approach to the TVRO business. Hughes could do much worse than this young man as Product Marketing Manager.

Of interest also was the compact design of the SVR-461 receiver. If the old adage about 'most potential problems will be power supply related' holds true with TVRO receivers, the open design of the SVR-461 power supply will be a welcome place to work.

The Hughes receiver was just passing through Oklahoma on this particular visit; we'll have an extended opportunity to work and measure one of these units before winter comes and reports on its performance will be forthcoming in these pages.

#### High EMF?

"It has been proposed that our company construct a seven mile trunk extension to a small village outside our system in Kitimat. The problem I am facing is that the last two miles of the proposed trunk will run parallel to a 350,000 volt power line. This problem is compounded by extremely poor ground conductivity in the whole area, and an almost impossible situation visa-vis underground construction.

We are somewhat at a loss on where to start looking for information about construction practices in areas where there are potentially high induced voltages, and the compounding problem of poor ground conductivity. A microwave hop would not work; it would require two hops (because of the terrain). I have considered using doubleshielded or armored coax and isolating the amplifiers from the messenger. Can anyone with either experience or a good grasp of the theory involved provide me with any assistance?"

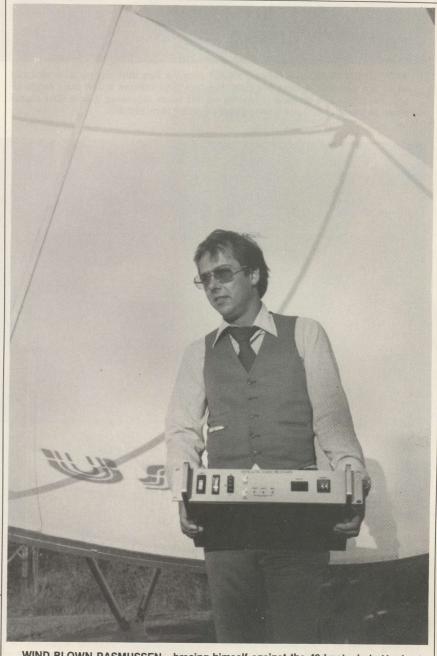
David L. Cain Cablevision Supervisor TK Cablevision 4625 Lazelle Avenue Terrace, B.C. Canada V8G 1S4

#### David-

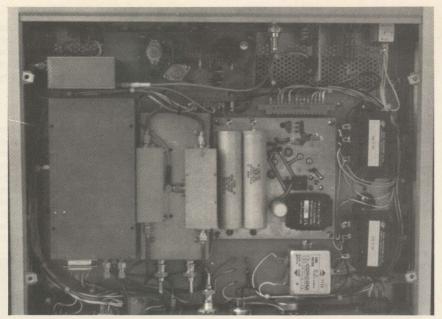
The best way to get the help you need (we hope!) is to pass your problem along to the industry here. This fellow has a potential (pun intended) problem of considerable magnitude. Can anyone help him out?

#### SBA Loans For Cable?

The Small Business Administration has for many years allowed the loaning of SBA guaranteed funds to cable television systems—provided—the CATV systems involved did not in any way have local origination capabilities. For some years the SBA has included 'weather and news channels' in their local origination definition; and therefore any system planning to operate



WIND BLOWN RASMUSSEN—bracing himself against the 40 knot winds Hughes' Doug Rasmussen displays the new 24 channel tuneable SVR-461 receiver in front of CATJ's new six meter terminal.



WIDE OPEN DESIGN—Huges SVR-461 receiver has thin styling with virtually all of the goodies accessible from the top. Unit utilizes a 700 MHz range IF and the larger sub-module container on left takes incoming 3.7-4.2 GHz signal down to baseband. Open power supply system is on right.



TELL ME MORE—USTC's Tony Bickel (right) chats with Hughes' Doug Rasmussen about INTELSTAT and other world-wide satellite systems in a corner of the CATJ Lab.

even an automated weather channel was precluded from borrowing SBA guaranteed funds.

A recent rule making petition before the SBA, backed by both CATA and NCTA, would have re-written the internal SBA rules to allow funding of CATV systems engaged in 'limited local origination'. However after several months of 'study' and internal debate, the SBA turned thumbs down on the petition.

The SBA's pre-occupation with not loaning funds to companies engaging in communications (or the media) has been across the board; including funds to broadcast facilities. According to SBA 'logic' if a company receives

funds from the federal government (which SBA is), and the company is in a position to 'mold public opinion', and there is the rub, federal money cannot be spent when it will be used to 'mold public opinion'.

Apparently the lunacy of the policy, when it is extended down to prohibiting weather channels or data video news wire channels, is slowly coming into focus at SBA. It has been reported that SBA is now seriously considering revising the policy, apparently under the theory that the FCC regulates CATV (and broadcast) services, and that any 'mis-use' of federal money (from an SBA loan) for 'improper public opinion molding' would be effectively pro-

hibited or administered by FCC rules and regulations.

Accordingly, the SBA is reported to be readily a **new** rule making proposal, one which if adopted, would extend SBA loans to both CATV and broadcast properties, for either construction of new facilities or purchase of existing facilities. No time frame has been established for the proposal; action is expected however before the end of 1978.

#### **Twenty Years In Space**

The 'Space Age Era' began October 4, 1957, or just over twenty years ago. In that intervening pair of decades man has managed to:

- Launch more than 4,480 satellites, space stations, spent rockets and other pieces of hardware into orbits of one type or another;
- Put a dozen human beings on the moon;
- Send unmanned space probes to every planet from Mercury to Jupiter, with spacecraft now on their way to Saturn; perhaps to Uranus and Neptune.

Of the hundreds of orbiting pieces of hardware above or around the earth at the present time, we have gear to watch the weather, relay television and telephone and data, provide guideance systems and navigation systems for ships at sea and aircraft, 'spy' on the 'enemy', monitor crop conditions, survey the earth's dwindling natural resources, watch the stars and who knows what else. A pair of unmanned probes are sitting on MARS quietly (if not silently) watching the return of the Martian summer.

Space communications has changed the way we perceive our own limitations and broadened our horizons. Amateur radio operators have communicated from mobile (or car/auto) low power transceivers through orbiting OSCAR satellites to other amateurs thousands of miles away. Hundreds of millions of people have simultaneously viewed historic events such as the first landing of man on the moon and lesser events such as world championship boxing matches.

Through geo-stationary satellites such as SATCOM remote portions of the United States (i.e. the Alaskan Bush country) actually enjoy more channels of television than some unfortunates located within 50 miles of New York City or Los Angeles.

And the 'entry price' to become a part of all of this has dropped impressively. Early INTELSTAT ground receive terminals cost upwards of several million dollars each. Present day CATV 'small aperature' terminals are being installed for under \$15,000.

It has been a most impressive first twenty years; from the first unnerving reception of the early faltering CW (Morse code) signals of Sputnik (I) on 20 MHz to today's experimental transponders aboard ATS-6 and others operating in the 35,000 MHz region. What will the next twenty years bring? Stick around and see!

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