

CATI

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NOVEMBER 1984

H.R. 4130-S.66

Cable Franchise Policy And Communications Act-Its Now Law How it Happened and Why

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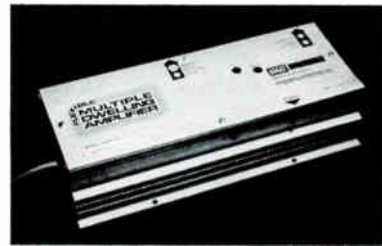
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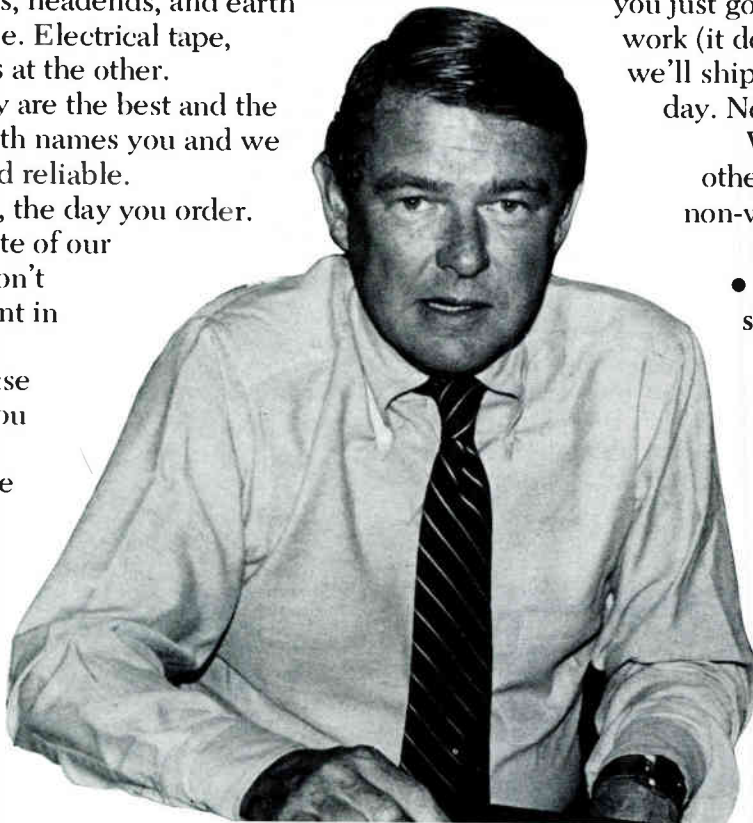
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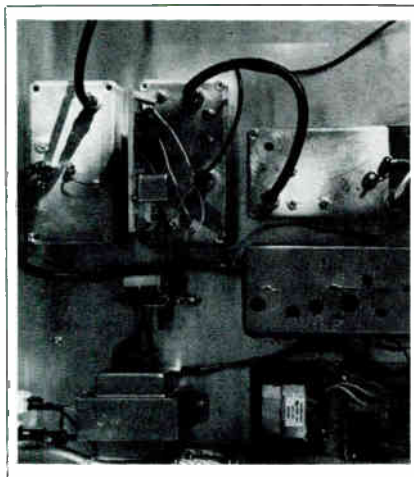
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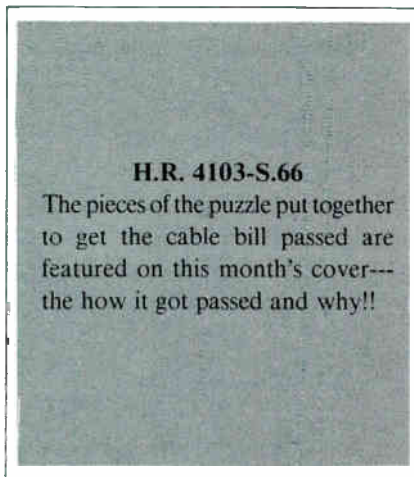
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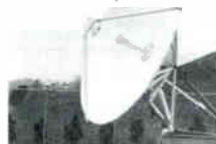
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Washington Update

Steve Effros, Executive Director, CATA

H.R. 4103/S. 66 IT'S NOW LAW!

How it happened, and Why.

There's an old saying about the inadvisability of watching either sausage or legislation being made — that was certainly the case with the new "Cable Franchise Policy and Communications Act of 1984". You might remember that as recently as one month ago we had big headlines saying the bill was dead, then there were major speeches threatening to kill it if it wasn't dead, and then, lo and behold, out comes a bill at the last minute in the waning days of the legislative session! It has been a very wild time, one that was moving fast. So here, to the degree we can, is an explanation of what has actually happened that resulted in the passage of this bill, and why it happened from our perspective. Starting next month we will have a series of articles on how the bill's specific provisions affect CATA members. We can't do that yet because this is being written before the final version of the bill is even printed.

Let's start by saying that the CATA Board of Directors, after looking at the totality of the bill, and how it really impacts the independent operators around the country, has concluded that the bill was supportable, and that in the long run it will be good for the cable industry. But getting to that point was a long, arduous, and expensive process.

If you will remember, in the last issue we left off in this continuing saga at the point where the city negotiators had refused to sit down and negotiate with the cable industry over modifying then-recently-concluded compromises regarding H.R. 4103. The new negotiations were necessary from the cable industry point of view because in the intervening time between the compromise agreement and the adoption of the bill by the Commerce

Committee during the summer, the FCC and the Supreme Court had teamed up to give the cable industry several major victories with regard to our relationships with the cities and states. It made little sense for the cable industry to ignore those decisions and go ahead with a compromise that was no longer reflective of the present legal status of cable television. The cities refused to talk, especially about modifying the rate regulation provisions of the bill and the bill, therefore, appeared dead. The city folks were saying that they were going to "force" the bill through the way it was and the cable industry was in full battle dress, notifying Congress that we did not support 4103 as written.

Suffice it to say there was no realistic possibility that the cities could have forced the bill through by themselves. It was a naive political decision on the part of the city strategists to even suggest such a thing, and the result was that the cable industry was able to point to the cities as the ones responsible for the demise of the bill, since they were the ones unwilling to negotiate. For many operators this came as a relief since there was significant question in the cable industry as to whether the bill was worth the effort. The questions raised by such independent operators as Leonard Tow, and the withdrawal of support for the bill by CATA, the California Association and the New England Association put a major cloud over the bill.

There were some operators, however, who were convinced the bill could be "fixed". They also felt that it was absolutely necessary to get a bill through during this session of Congress. They spearheaded a drive at the

NCTA, and particularly with the NCTA Board of Directors who were supervising the negotiations, to modify the cable position in the talks in such a way as to allow the cities to return to the negotiating table. CATA became very concerned about this turn of events because it appeared to us that the industry was in danger of compromising our position too much in the name of achieving a bill — any bill. We said so. We talked to many cable operators and to many State Associations, and they all agreed. The only result was that the NCTA clamped a very tight lid on any information regarding their “new more flexible” negotiating position. We, and most of those who questioned what was going on, were then effectively frozen out of the process. The additional flexibility granted to the cable negotiators by the NCTA Board was very specific, and it was intended to get the cities back to the negotiating table. That goal, as well as modifications the cable industry wanted that had to be worked out with various Congressmen (as distinct from “city” issues), was accomplished. The cities went back into the negotiations, and after many hours of closed door meetings a “puff of black smoke” came out of the meeting room — the negotiators had failed to reach an agreement on some of the key rate issues. The negotiations had failed. Once again, the bill appeared dead.

In fact, what had happened was that the cable negotiators had put four ideas on the table: eliminate all rate regulation within two years instead of four, grandfather all systems that had already “re-tiered” under the FCC Nevada case, allow cable to pass through any increased programming costs over the remaining two years of rate regulation, and finally, eliminate any last vestige of program content control by cities by saying that any specific program promises in existing franchises would not be grandfathered

(the remainder of the franchise, as had already been agreed, was grandfathered).

Much to the surprise of the cable industry, the cities could not agree to those conditions. In fact, while they agreed in the negotiations to the two instead of four year remaining term for existing rate regulation, the negotiators on the city side refused to even discuss the other three points. This did not seem to make much sense since the “Nevada Grandfather” provision, for instance, was the only practical solution to an existing situation. Had the cities “killed” the bill because they could not agree to that point, all they would have gotten was the Nevada decision anyway, so their position made no sense! CATA subsequently found out why this had happened — it seems that the city negotiators, having been kept totally in the dark about what the NCTA was willing to negotiate about (remember that tight secrecy lid?) simply had not been briefed on the issues of grandfathering, etc. and, therefore, the remaining negotiators (some had to leave early) were not willing to take a position on something that had not been discussed by their whole group!

The bottom line, however, appeared to be that the negotiations had failed and that the bill was dead. The following day we began hearing about meetings that were taking place between Chairman Dingell and the cable negotiators, Chairman Dingell and the city negotiators, and finally all of them together. We were getting more and more nervous. The telephone at CATA’s Washington Headquarters never stopped ringing as cable operators concerned about a “midnight deal” called in to tell us they wanted no part of a bill they had not first studied!

That, if you will remember, had happened to us before in this process — we were told about a “compromise” in early summer and given some

generalized explanations of what the agreement was supposed to be. Then we were told that the actual legislative language would be worked out later — not to worry. Well, when the actual language did come out it was terrible. That’s when CATA withdrew support from the bill in the first place. So we, and our members, and lots of other folks in the cable industry were simply not prepared to go through that routine again! A statement of “trust me” on the part of the NCTA Board, of the Executive Committee or the negotiators was simply not good enough. We needed to see the actual language before any recommendation could be made to the industry as to whether to support the compromise bill or not.

At this point Chairman Dingell really got into the act. Apparently his efforts to “knock heads” in his office between the cable and the city negotiators to get an agreement did not work. We knew they wouldn’t because unless he was willing to “impose” the cable position on the city folks, the cable negotiators had no way to turn — they did not have authority from their Board to negotiate any further. The Chairman put out a bitter, angry press release accusing the cable industry of being greedy, intransigent, having a “public be damned” attitude, and so on. He said that unless the cable negotiators were given more latitude to settle the rate issue, the bill was dead, and the cable industry was to blame. That was on a Friday. The NCTA Board had already been notified that there was to be an emergency meeting the following Monday. The stage was set, we were convinced, for the cable industry to capitulate. It was time for CATA to “go public” with the concerns we had been voicing privately within the industry for over a month.

On that following Monday while the NCTA Board was meeting, CATA Executive Director Steve Effros delivered a stinging speech to the luncheon audience at the Great Lakes

Exposition. The speech, which was distributed to the NCTA Board members during their meeting and was also sent to all State and Regional cable Associations and several folks on Capitol Hill, said that CATA was prepared to lead the fight against the passage of any compromised version of H.R. 4103. We said that the veil of


secrecy that had been imposed by the NCTA made it impossible for other representatives of the cable television industry to make any responsible analysis of what was going on for their constituents. Since that was the case we could not support something we had not seen, studied, and analyzed and that, therefore, we were organizing the

effort to kill the bill.

From that point on the phones in Washington almost literally burned off the hook! Let's make one thing very clear. CATA, in cooperation with our members and the State and Regional Associations, could have very easily killed the bill. There is no question that the NCTA is the largest and best financed representative of the cable industry. But it does not, by any stretch of the imagination represent the entire industry, and even a substantial proportion of its own members, at times, find it necessary to use other means to get their points of view across. That is why there are many cable operators who belong to both national organizations. In any event, given the political situation the bill was in the very last days of the session, knowing how to "play the game" on Capitol Hill, the bill could have been stopped no matter how many high-priced lobbyists the NCTA and the cities threw into the fray.

But other things started to happen too. To begin with, the NCTA got the message that it simply could not ignore the rest of the industry — that this was a decision far too important to leave to one Board, or one Association in the industry — that there had to be a consensus for the bill to succeed. CATA's call for a "Declaration of Interdependence" was heeded. We were fully briefed on all aspects of the negotiations, including all the legal language, within 24 hours of the speech. The material was sent, express mail, to all State and Regional Associations within 36 hours. That set up the final push for the bill. Because now the cable operators in each State, and the representatives throughout the industry could study the language and decide for themselves whether the bill made sense.

For CATA's part we analyzed the new language, and the proposals being made for a last round of negotiations

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with the cities (which everyone universally expected to be successful) from the point of view of whether or not the problems that the CATA Board had identified at its summer meeting, which resulted in our withdrawal of support in the first place, had been solved. We concluded they had. Thus we started the process of calling off the "guerrilla war" we had been preparing. That's not an easy thing to do. Once the process starts it is not all that easy to get the word out that the bill was supportable after all at the "grass roots" which, after all, is what CATA is all about. As a matter of fact, as this is being written, the final version of the bill has still not passed the Senate. We expect that to happen in the next 24 hours or so, but it still could be stopped. This full explanation is going to be printed in any event since we think it is important for all CATA members to know exactly what happened in this whole process.

Why? Because bill or no bill, this was a "dress rehearsal" for the cable industry regarding our relationships for the upcoming battles on copyright. We are hopeful that all segments of the industry have learned a lesson — that we are interdependent, that we must continue to talk and work with each other as equals or the synergy that it results in is lost, and we cannot achieve goals that are beneficial for all members of the industry. We will have lots more to say about that in the next few months.

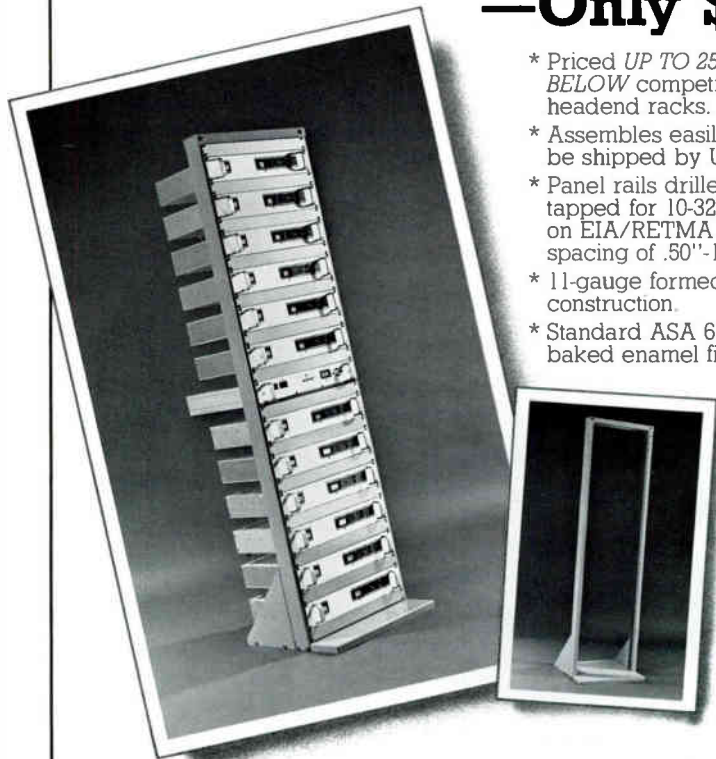
But back to the bill — is it good for the industry? Yes, we think so, if only to end the fractious issue of cable/city relationships and allow us to get back to focusing on our business. It was CATA's conclusion that even though this whole thing wound up to be a "last minute" solution, it is unlikely that we could ever have gotten a much better bill out of Congress than this one. Had we stopped this bill with the intention of starting up again next year, the likely

result would have been that any new bill — which would have taken at least another year to draft, if Congress was even willing to tackle the issue again for another year or two, would have wound up looking very much like this one when it was all said and done — so what was the point? Given that one of the principal benefits for many

operators in this bill is total rate deregulation in 2 years, or at the very least a guarantee of 5% per year rate increases, why delay that benefit for two years? The cost/benefit calculation fell in favor of the bill — but not by much.

On the favorable side, we would list the rate regulation relief, the renewal

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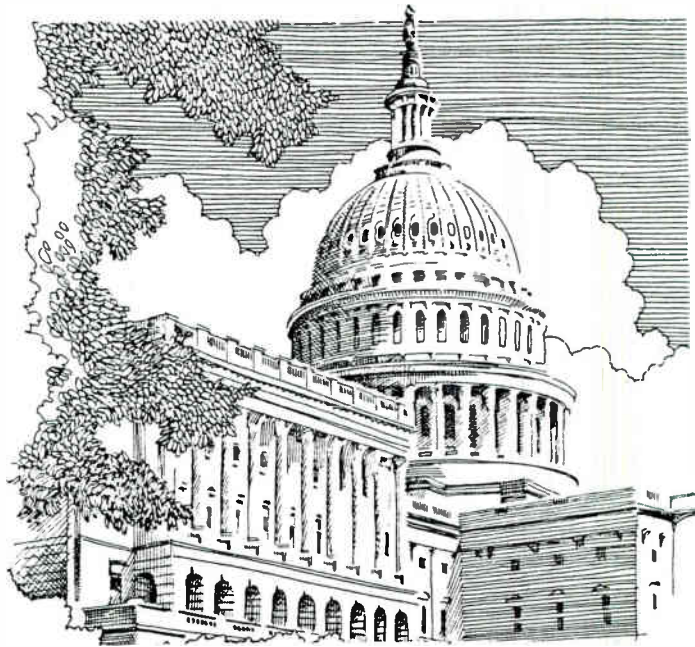
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appeals process (it is NOT an expectation of renewal, but it does pretty much assure that if you have done a good job in your community it will be very tough for the city to refuse you a renewal), and the general limitations that have been placed on "blue sky" franchises.

On the negative side, the bill supercedes the FCC Nevada decision. That decision was very helpful to folks in larger cities with multiple tier systems who were stuck with specific program promises in their franchises. It also negates the effect of the FCC Miami decision, thus, those folks who made lots of franchise fee promises are going to be stuck with them. Further, as noted above, the renewal provision does not really "protect" your franchise — if you have been doing a bad job in your community, then the bill creates a blueprint for how to throw you out of town. Frankly, most CATA members respond to that statement by saying that anyone who is doing a bad job SHOULD be thrown out of town and that we have never been pushing for a bill that would protect them!



Other negatives in the bill include more paperwork for EEO, more paperwork to notify our subscribers about their privacy rights (and you are subject to HEAVY fines if you don't — we will fill you in on what you must do in an upcoming issue), leased channel access requirements for systems with 35 channels or more, and the like. The fact is, however, that some of these things were coming our way whether they were in this bill or not.

Back to the positives, the bill still incorporates the FCC's telephone cross-ownership rules. Those are rules that are becoming more and more important to the industry — especially in the smaller cities, as time goes on. The FCC was about to unleash the telcos on us, and that has now been stopped.

As we have said over and over again — the cable industry can live with this bill — and it would have been in good shape without it too. On the whole it was better, in our view, to get legislation which cements these relationships into law. Sure, some other legal defenses were lost in the process, but on balance the bill will aid us in getting back to our principal concern of operating good businesses, which serve our subscribers and our shareholders, with a minimum of government

interference. The bill does not prevent our ongoing efforts to get the Courts to recognize cable's First Amendment status and eliminate much of the excessive use of "police powers" by the cities. We suspect, however, that the cities will now turn elsewhere to focus their regulatory zeal now that cable can no longer be a political football. And that, in the final analysis, could be the most important result of the bill. If that does indeed happen, then the industry's decision to support the bill was correct. The bill is so complex in its workings that its full effects will not be known or understood for several years.

Assuming that the bill is finally signed into law by the President (and there is always the chance that it will not be), CATA will begin a full-scale explanation of the bill. We will also start to focus on several of the other major issues which must be addressed now that this one is finally out of the way — one way or the other — such as copyright and the deteriorating relationship between the cable industry and program suppliers. Something is going to have to be done about runaway program costs and "take-it-or-leave-it" attitudes by the programmers. CATA is committed to assisting its members deal with this issue. It's time to get on with business. □

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LEE HOLMES

Cable ... With a Difference

by Kathleen Sheldon



Guam Cable TV staff in front of their office in Agana.



Joan and Lee Holmes

It is the pleasure of CATJ to present this month's featured personality in the CATA DECADE OF PROGRESS by focusing on one of the most unusual and unique cable television system operations known. Lee Holmes, his wife, Joan, their sons, Bryan and Mark, are to be congratulated for the development of this cable challenge on Guam, and for the solution to monumental problems and unique situations. The Holmes' cable operation requires a cooperative venture from Agana, Guam, with their programming source in Pasadena, California. CATJ is confident that you will find this segment intriguing as you read the



unusual arrangements and innovation to bring service to their subscribers.

CATJ is happy and proud to salute Lee Holmes and his family as the November featured CATA personality: we offer our congratulations on his remarkable story.

Imagine having your satellite receiving antenna five thousand miles from your subscribers! That is the situation for one CATA member, Lee Holmes, who operates Guam Cable TV in Agana, Guam, far from the footprint of Satcom IIIR and Galaxy I. In hundreds of daily ways, operating a cable system on an island in the Pacific

is very much like running one in Sayre, Oklahoma or Caribou, Maine, but there are some distinct differences, not only in logistics, but in local needs and lifestyle that have made this a challenging business for Lee, his wife, Joan, and their two sons.

Solving this and many other unusual problems is just regular business for Lee. As president of the company, he oversees its operation, but depends heavily on his several managers to handle the day to day demands.

A multiple feed, five meter antenna in the backyard of the company's office in Pasadena, California, picks up The Disney Channel, MTV, ESPN and numerous other satellite offerings. Off the air broadcast signals are received also at this site from the Los Angeles television antennas which are located just nine miles away on Mount Wilson. "We look right up (at them) and get beautiful signals, so we can deliver good pictures to our customers," says Lee. Programming from ten Los Angeles stations and from the satellites is captured on about 150 cassettes which are air shipped to Guam every day for the cable subscribers. The news shows are deleted from the Los Angeles broadcasts, since they would be out of date by the time they are played on Guam. Oceanic Cablevision records news programming for the company in Honolulu in time to make the midnight flight to Guam.

The one service they can't offer their subscribers are the popular premium movie services, Home Box Office, Showtime and The Movie Channel. When these companies negotiated with the movie studios for rights to the productions, they did not include the rights to carry the movies in Guam and several other distant areas. As a result, Guam Cable TV has to buy the cable rights directly from the movie studios, have them put on cassettes, and fly them to Guam. They carry the same movies as the outside services, at about the same time, sometimes even earlier, depending on individual scheduling.

This is the most obvious difference

in operating cable television. Guam style. A full staff is needed in California to handle the details of collecting the programming and another staff is needed in Guam to insert it on the cable. Not only is extra staff required, but additional equipment not usually part of a cable operation is needed, such as the large number of video recorders.

Thomas H. Engel is general manager in Agana, Guam. Engel is a 12 year veteran of ATC, Cablevision and Jones Intercable. The Pasadena end of the operation is managed by Bryan Holmes, Lee's 27 year old son.

There are three television stations on Guam which are also carried on the cable. KUAM is a commercial station, a cherry picker affiliate of the three networks. The other, KTGF is a government owned educational channel. A low power TV station which began operation on October 27, is being carried on the cable too.

Local origination is an important part of the Guam operation. A busy news staff gathers and presents local news on a regular one-hour weekday schedule and half hour holiday and weekend program. Lee says, "It was a (financial) loser, like most news operations are, for years, but it turned the corner of a few years back, and now it's carrying its own and is fairly profitable." Evidence of their professionalism is the fact that they won the ACE award in 1975 for the best story of the year, the coverage of the Vietnamese refugees coming into Guam; and in 1980 they won the ACE award for the best overall newscast. The international satellites can be received at their office in Agana, but the cost is extremely high. For that reason they limit the use of this service to ten minutes of daily news feed, which costs eleven dollars a minute. In addition, they have to pay the news service. Lee says, "Even if we had the programs available on international satellite, the rates are so high, it would probably be prohibitive. We have petitioned the FCC to be a domestic

LEE HOLMES

program common carrier, so some day there should be a break through. The bird is up there with a fine picture.”

Many events are covered live on the local origination channel including all sessions of the Guam legislature, midnight mass at the cathedral, and arrivals of well known personalities at the airport. Former President Richard Nixon stopped in Guam on his way to China in 1972. In addition to presenting this visit live to cable viewers, a 16mm print was preserved. This film added historical perspective to the live presentation of President Ronald Reagan's visit this year. Another prominent visitor two years ago was the Pope, and, again there was live coverage. Parades are another occasion for live coverage, particularly the Fourth of July parade and the Liberation Day parade which is July 21. This year the later was a particularly big event as it marked the 40th anniversary of the liberation of Guam. To celebrate, the Third Marine Division, which came ashore in 1944, sent a thousand man battalion landing team to the same beach. This reenactment was carried live on the cable.

A new feature is unique in the business, but particularly important in Guam's part of the world. “We're down close to the equator,” says Lee, “and that's where the typhoons start. Once you've been through a typhoon, you're very much interested in the weather! We've purchased a weather radar and a tower, and are in the process of putting those up now. We have a hundred eighty mile range, so it (should) help quite a bit. At the present time when the typhoon comes by, the U.S. Airforce sends out a plane about every twelve hours and you get a report of where the typhoon is. Typhoons show up very distinctly, all big storms like that do, on radar. We plan to carry that live on cable at any time there is any interesting weather information.”

When asked how smoothly his operation runs, now that the day to day

logistics have been worked out, Lee said, “A lot of things are fairly routine, but there are always changes that come along. I'd say the biggest problem is getting the schedules accurate. The networks make some changes. There're pre-emptions. We have to give non duplication protection to KUAM. They have the programs in on tape, and they're taking them from all three networks, so they don't play them at the same time that they're played in California, or the same day for that matter. They may move Thursday programs up to Tuesday or Wednesday, something like that. So that means we have to schedule around them. We may put in a particular program to play at a particular time, and then (a major news event will be) carried on all three networks. (As a result) the program we had scheduled for Wednesday morning at ten o'clock, for example, doesn't play. That's upsetting to television subscribers, the ones that really love TV (and) ... sit there in anticipation of a particular program at a particular time.” This problem is familiar to most cable operators, but it is further complicated in Lee's unusual position.

The cable movie channel has serious competition from the booming video cassette market of Guam. A large number of electronic technicians are stationed there with the Navy and Air Force. Whenever a new electronic device comes along, such as the video cassette player, these electronically sophisticated residents are quick to try it out. Lee believes there are more of these units per household in his area than anywhere else, and says that since movies are available to the cable market, that his pay subscriber count has dropped to 7,000 from a high of 9,000.

To promote services, the company opened a cable store this past summer.

Lee, a retired Marine Corps Colonel, came to the cable television industry from an impressive business and technical background. His father was in the Marine Corps, and Lee spent his

childhood in California, Spain, Panama, Texas, Puerto Rico, Rhode Island and Virginia. A graduate of the US Naval Academy at Annapolis, he spent eleven active years in the Marine Corps and seventeen years in the Marine Corps Reserves.

His wife Joan, a native of Corpus Christi, Texas, is a graduate of the University of Texas where she earned a bachelor's degree in sociology. She is vice president and secretary of Guam Cable TV, and takes a particular interest in the human side of the business, especially in the areas of programming, customer relations, and advertising.

Lee earned a Master of Science degree in aeronautics and astronautics from Massachusetts Institute of Technology in 1960. Several years later he earned a Master of Science degree in management from the same institution. He was president of Resources and Technology Management Company, a venture capital firm, and it was this position that led him to Guam where he got into the cable television business.

When the family bought their interest in the cable system in 1971, their son Bryan was 14 and Mark was 13. The following summer the boys began working on system construction. “Our younger boy was a little small for climbing,” says Lee, “but he grew and the next summer he was able to climb poles. They learned construction and worked as installers. When we went into new areas, they would take notices around and put them on the doors.”

When they went to college, they both took electronics courses. Lee adds, “They both took accounting the same year in college, so that summer they worked with the auditors, preparing all the schedules that they need, and it worked out pretty well.” Lee hesitates and then, with a sound of pride in his voice, says, “They found we'd been overcharged \$22,000 by a supplier. ...Mark found that, and they pretty well paid their way that summer, that's for sure! As I recall, the supplier had a change of ownership a little while after

that, so we would have had a difficult time getting credit if they hadn't found (the error) when they did."

When Bryan finished college he said he'd like to go to work for some big company in a big city where no one knew him to prove he could make it on his own. He worked for the telephone company in downtown Los Angeles as a management trainee, and his work included handling business customer service and billing complaints. Lee says, "When we mentioned that to the girls in our office, they were delighted and said they had taught him everything they knew, and they knew he'd do well."

Bryan stayed with the telephone company for a year, and after he got his first raise Lee told him he had proved his point and asked him to come back to work for the cable company. At about that time the Pasadena manager became seriously ill and was unable to work, so Bryan stepped in as general manager of the office and has been running the Pasadena end of the business since 1979. He's responsible for running the taping operation and for negotiating for the movies for the pay channel. This is a big responsibility as the price for the films are negotiable. To help him do the best for the company, Bryan has taken numerous courses on negotiating. He is now working on a Master of Business Administration degree at Whittier College.

Mark decided when he was in high school that he would like to be an attorney, but while at Brown University in Rhode Island, he pursued his interest in electronics as an engineering major. After graduation he went to Tulane University in New Orleans to earn a law degree. During his first summer vacation from Tulane, he clerked for the presiding judge on Guam. During the second summer he worked for a large law firm in New Orleans, and they asked him to join their firm after graduation, which he did. Guam Cable TV uses the firm's legal services whenever possible,

particularly in keeping them informed of new cases on cable television and researching cable legalities. Lee says that it is a very satisfying arrangement for all concerned.

In 1968 the Guam legislature decided not to pass a franchise law. This has meant that the system has operated without regulation and that the many services offered are a result of community needs and what is marketable, not regulatory requirements. It also means there is no exclusive status, and now they are expecting some direct competition. Congressman Cecil Hefstel of Hawaii, who sold his CBS television station in Honolulu before going to Congress, has decided to build a competing cable system in Guam. He expected to begin construction before the first of next year.

Lee says there is no reason why the congressman won't proceed, since he has the financial strength to build a system, and without a franchise law,

anyone can come in and offer competition. "We're obviously going to give him a good run for his money," says Lee. "It's going to be just regular competition which we think is going to come to the cable industry anyway. It certainly came to AT&T. ...We don't know why the cable industry should be any different. Once all the cities and towns are built, then the next thing that's going to happen is two or three cable TV systems (competing for the same customers.)"

Guam is at the south end of the Mariana Island group, about 1,500 miles east of the Phillipines. About thirty miles long and from four to ten miles wide, it has a coastline of 78 miles. Ferdinand Magellan stopped there on his famous expedition. The people, called Chamorros, were quite tall. Skeletons have been found that show that it was common for the men to be over six feet tall. The Spaniards of that era, on the other hand, were generally only four to five feet tall. Lee

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Kathleen Sheldon, the writer responsible for this entire series of featured personalities, had the opportunity to interview Joan and Lee Holmes at Tan-Tar-A during CCOS '84.



Joan and Lee Holmes — interesting people — interesting operation!

related a story about Magellan's visit that is popular on Guam. "Two of Magellan's men were filling up water casks by a creek close to the ocean," says Lee. "The story is that a Chamorro came up behind them and grabbed each one by an ankle and turned them upside down and ran around holding them up in the air at about shoulder height and getting great delight at all their yells and outrage. You've got to be a pretty big boy to pick up two people, even if they're only four to five feet high! (After Magellan's visit) the Spaniards pretty well neglected Guam for about a hundred years. Then they came in to Christianize and convert the heathens. The Chamorros didn't particularly care for that and they would ambush the

Spanish soldiers and kill them. The Spaniards got tired of that so they slaughtered all the men, brought all the people down from Saipan, Tinian and Rota, and made it a death penalty if you took your canoe out beyond the reef. By killing off the adult males they pretty well subdued the populace."

Today the islanders are about 95% Catholic. There are some 55,000 who consider themselves Chamorros, people who either speak the Chamorro language or whose parents did. About 20,000 military personnel and their dependents and 10,000 to 15,000 civilian state siders live on Guam. First and second generation Filipinos make up 15,000 of the population, and there are an estimated 3,500 Koreans, 2,500 Japanese and 1,500 Chinese. Pakistanis, Indonesians and Vietnamese also live there.

"We're a very integrated island," says Lee. "and a very integrated company."

"The people are extremely friendly and very outgoing," says Lee's wife Joan. The primary social event on Guam is the fiesta which is attended by persons of all ages. Joan says it's not like most parties in the United States which are generally for a single age group. Everyone, from little babies to elderly grandparents come to enjoy the

music, food and festivities. The island is made up of villages, and each village has a church which is a central part of village life. Since each church has a patron saint which is honored once a year, Joan says there is nearly always a fiesta being held in at least one village every Sunday. She says, "Even if you're a stranger visiting, if you walk in you'll be more than welcome. It's customary to bring food or, if the fiesta is in honor of an event, such as a wedding, to bring a gift, but it's informal to the point that everybody is included."

Tourism is the big industry on the islands in the Mariana chain. Lee says, "We have about 35,000 tourists a year on Guam, which is about three times what the population is. On Saipan it's an even higher ratio. ...Probably 80% of the tourists in both places come down from Japan, and most of them are honeymooners." Tourism is not only an important part of the local economy, but it is also important to the cable system which serves the hotels. A Pay-Per-Day service is offered at the hotels on Saipan, with a choice of The Playboy Channel, Japanese movies and American movies.

Many tourists come to enjoy the outdoor activities. Water sports, particularly scuba diving, head the list of favorites, but jogging, tennis and golf are popular, too. Joan says many Japanese visitors come to play golf because it is so much less expensive. She says, "One of my friends, an avid golfer with an extremely low handicap, laughingly said (that) it costs less to come to Guam for a weekend of golf than it does to play two rounds in Tokyo."

The wide variety of restaurants is another attraction. Joan says, "We have Korean, Vietnamese, Japanese, Chinese, Filipino, Mexican, Austrian and Chamorro restaurants. They also have numerous well known American franchise restaurants. The local dishes are all very spicy, similar to what you would have in Mexico."

The Chamorro language is a dialect spoken in Guam and Saipan, but with

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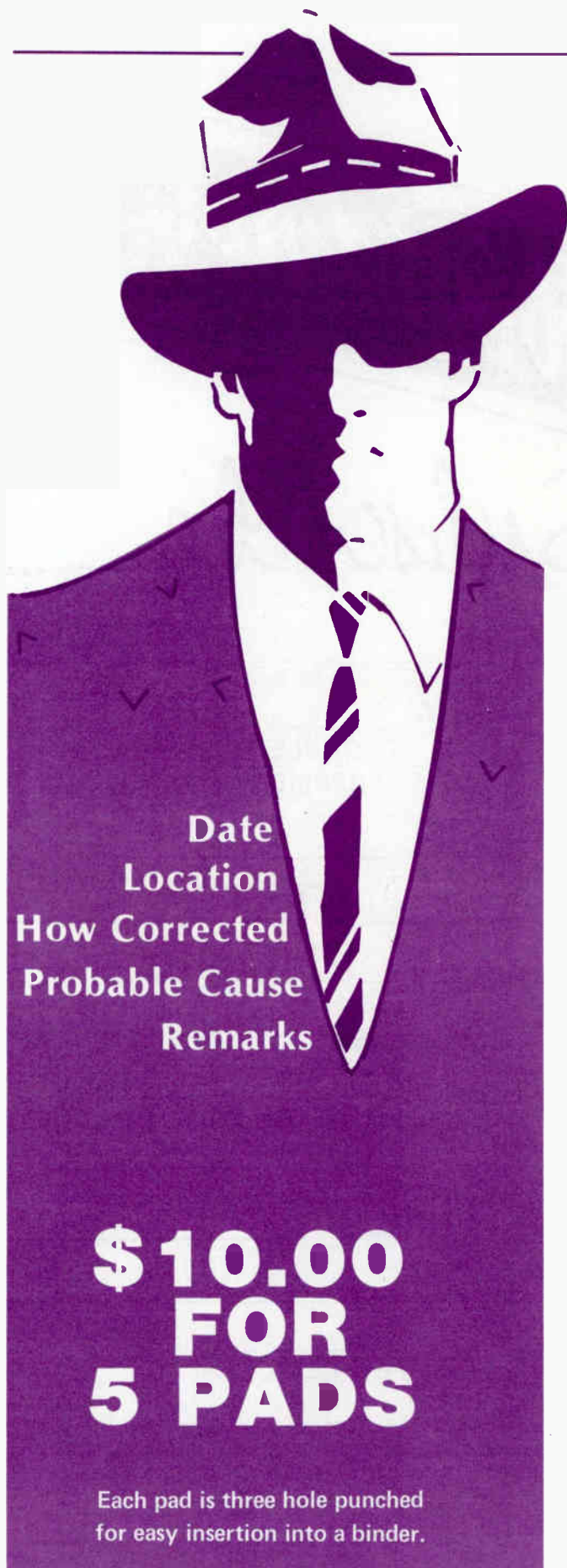
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regional accents. Joan says, "Local people tell us that they can tell if somebody is from Spain or from Rota, (and) even on the island of Guam, they can tell whether you're from the northern or southern or central part. ...The accents are easily differentiated."

The island of Guam is long and narrow, but the cable system has to follow the pole lines, so, although the island itself is only thirty miles long, there are almost 500 miles of plant and the longest run is thirty-four miles. Population density is considered rural with about twenty homes per mile of cable in many areas. In some situations where there are only one or two customers, the company asks them to pay a couple of years in advance before the cable is installed. They are given the usual free month for each annual payment in advance. This helps to offset the loss in cabling such a low density and lessens the problem of churn.

Somewhat over 18,000 individual residences are connected to the cable on Guam. Another 4,500 outlets are contract in major hotels, the large condominiums and large apartment buildings.

At one time the system used low sub amplifiers, but because of their limitation of twelve channels and the need to increase capacity, Guam Cable TV was one of the first companies to convert to the feed forward, Century III amplifiers. The 35 channel capacity system has 21 channels in use.

Lee said, "A lot of lashing gets torn loose in typhoons. We also have a corrosion problem, so we use three-quarter and half inch fused disc cable with integrated messengers. We've pretty well converted over the plant to messenger RG6 from RG59."

In addition to the cable system on Guam, the company operates two other systems in the northern Mariana Islands. The thirteen islands in the Mariana chain run essentially in the north-south direction. The other twelve were sold by Spain to Germany in 1898, right after the Spanish American

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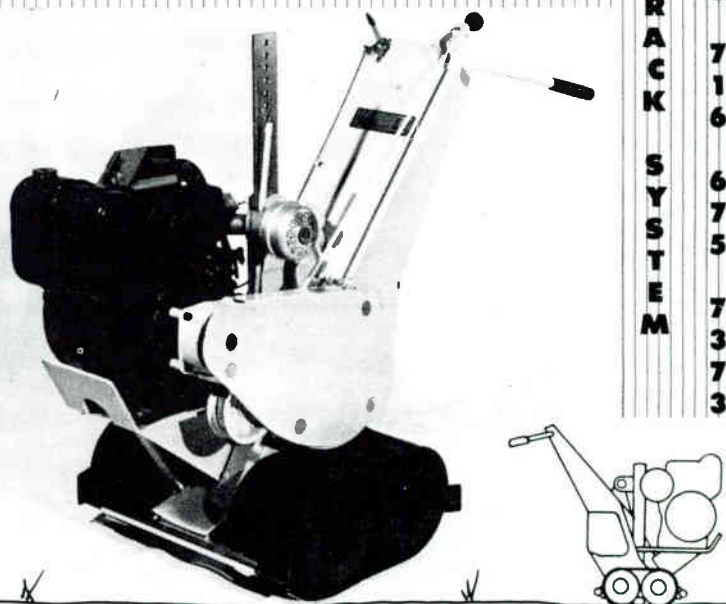
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War. The Japanese took possession of them during World War I, and the United States liberated them in World War II. In 1976 the northern Marianas voted in a plebescite to join the United States, and at about the same time, Lee's company built a cable system there. They connected their first customers on Saipan in June, 1976; today they serve over 3,000 subscribers. General manager of this system for the past three years is Ray

Motley who started his cable career as a technician for the Cox system in Bakersfield, California. Before he went to work for Lee, he was manager for the system in Whitehall, Illinois, (in the Saint Louis area.)

About 900 people live on the island of Rota, located forty miles north of Guam, and the cable system serves 150 subscribers there. Television station KUAM, the affiliate of three networks, and KTGF, the educational channel,

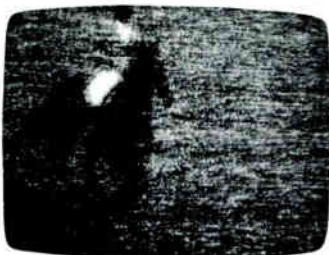
are carried on the system; and cassettes of other programs are sent there after they have played on Saipan. Four taped channels and the two off the air channels are carried on this tiny system which is managed by James Santos.

Lee's company is involved with other businesses which are separate from, but related to the cable operation.

When Lee took over the operation of the cable company he approached the local newspaper about running the daily program listing. The newspaper had dropped an option to purchase the cable company a short time before, and they told Lee they would charge regular advertising rates for printing the program guide, but as the system grew larger, they would reconsider whether running this information was a newsworthy public service rather than advertising. At the time there were less than 900 subscribers. When the subscriber count reached 4,000, Lee says, "They said we were still too small, and we said, 'When will we be big enough?' and they said they hadn't decided yet. So we decided to do something else."

They had a spare modulator so they devised a unique way of running the program schedule. "We put the schedule on a sheet of paper," said Lee, "and wrapped it around a coffee can. We put it on a barbecue motor, turned the TV camera on its side, and it looked like the schedule was crawling up the screen. That worked pretty well." However subscriber reading speeds varied, and before long, says Lee, "People who were crackerjack at reading and writing English, had read English all their lives, would call up and say the schedule was too slow. Then someone who was Japanese or Chinese and had learned English very painfully in school would say 'too fast.' So our operators were speeding up and slowing down the barbecue motor all the time. Finally someone wrote and said that at eight o'clock they just saw the channel they wanted to watch go by, but it took four minutes for it to

TERRESTRIAL INTERFERENCE.



ASTI is the first complete professional handbook on the avoidance, diagnosis and suppression of microwave *terrestrial interference* (TI) at TVRO earth stations. This 250 page comprehensive volume was compiled by an engineering team headed by Glyn Bostick, President of Microwave Filter Company, with valuable input from many

industry leaders such as California Amplifier and Scientific Atlanta. The result of their effort is an in-depth exploration of such topics as equipment selection for minimizing TI susceptibility, use of natural and artificial shielding, system filtering, and many other cost effective techniques! Send this coupon now to receive our free brochure on ASTI, and get TI out of the picture!



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come back again, and meantime they had missed the beginning of a program, so there was no point in watching the rest of it."

Deciding to have their own guides printed was easier than actually getting it done. No shop on Guam was equipped to provide the service, and after pursuing several avenues in various parts of Asia, they contracted with a printer in the Phillipines by the name of Cacho Hermanos. The first issue of TV Guam came out in August, 1973. Lee said, "We would fly the manuscript over Friday morning, and they would fly the magazines back on Tuesday morning. ...They were really great. We sent over typewritten manuscript, with dummies of the ads. They put all the ads together. They laid it out, proofread it. ...Despite typhoons, power outages and everything else you can imagine, they never missed an issue."

In 1981 air freight rates got so high that it was no longer economically feasible to continue this arrangement, so Lee organized a new company, Pacific Color Press, to produce the magazine in Guam. Printing presses and other necessary equipment were purchased to launch this operation. Heinz Grubert is the printing plant manager.

Jim Files is editor of TV Guam which has a weekly circulation of from 17,800 to 19,200 depending on the season. Jim came to the company from a newspaper editor background, and Lee says, "He has been called one of the five best writers in the United States. He's very popular on the island." A Saipan edition is published with a center section featuring the Saipan schedule and advertising, and the Rota edition features a much thinner center section for the schedules for that system. The rest of the magazine carries the usual sort of program and entertainment of news including a weekly column written by Joan called "Heard on the Set." She's never missed an issue in more than eleven years.

This year Lee's company added an FM radio station to its operation. Previously Guam had two AM stations and two FM stations, and Lee thought the market was there for another. He said, "We were going to make it a low key automated operation, then decided we could never make it that way, (and decided) to start off with a bang and see if we couldn't capture the imagination of the listeners and ...shoot of number one."

They decided to do this by putting on a fiesta and bringing in some show business personalities. Lee says, "We invited Erin Moran who played Joanie in Happy Days and Robert Hays who was the pilot in Airplane. Most people remember him because he has the line, 'I've got a drinking problem' and everytime he'd say that he'd miss his mouth. That was his drinking problem. They came out about the 24th of April. ...and they're both outdoor people."

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Fiestas are the most popular social event on Guam.



Lee held a fiesta to launch his new FM radio station KOKU.

They brought Erin's boyfriend and their press agent, and the four of them just went wild. We took them deep sea fishing, scuba diving, snorkeling, sailing, spear fishing and jetskiing. They had a ball. ...Saturday the 28th of April, we had a concert at Ypao Park, which is down on the beach, the largest park in Guam. We had two 1,900 watt speakers, and we hired two local rock bands that played starting at six o'clock to warm the crowd up. We had free hot dogs and free soft drinks. We thought about two or three thousand people would turn out. We only advertised on cable and in our magazine. We were very careful not to put in any radio, TV or newspaper ads because we wanted to prove that our advertising would draw. As I say, we expected two or three thousand. Well, the crowd started gathering about 4:30

and kept getting larger and larger and larger. We were to start our ribbon cutting ceremony at 8:30. We had a jeep with the top down, and we were going to drive Erin Moran and Robert Hays around the crowd. Well, the crowd was so thick you couldn't get any vehicle near the place. We were about ten minutes late getting them over there. Unfortunately Erin Moran got heat stroke, but Robert Hays took over, and the crowd just went wild when they saw him. We had emphasized that (the fiesta) was for families, and we had whole families, from babies in arms to grandparents, there. The last five minutes was sort of a formal ceremony. Our newly appointed Archbishop Flores, said some very kind words about cable TV on the island and the job he anticipated we'd do in radio for helping out the

people. The Guam legislature presented us with a resolution in appreciation of a new radio station coming on the island. We had a ribbon on a big five foot plywood switch that we sprayed with aluminum paint, and just at the stroke of nine, Hays cut the ribbon, the archbishop and I pulled the switch down. We were carrying this live on cable, and our disc jockey was watching his TV set, so as soon as he saw the switch close, he started a thirty minute cassette tape that we had made before. We had those 1900 watt speakers and we wanted to show how great our base was, so we started out with the Ride of The Valkyries. It went Rhoom, Rhoom, Rhoom and at the peak of this introduction that that music has, we started the fireworks. We had two ten inch fireworks mortars, and the crowd was watching the band, and the fireworks were behind them. They knew there was going to be fireworks, but they had sort of forgotten it was going to be synchronized to the music, so, at the key drum rolls, there was a POW at the same time, and you could see everyone looking startled. They all turned around, and then we went into Thriller and all those songs that were popular back in April, and the thing ended up thirty minutes later with a grand finale. The police estimated the crowd was 20,000 which was the largest crowd ever counted on Guam. We were pretty pleased with that."

The cable news is simulcast on the radio station which is known as Hit Radio 100. (It's at 100.3 megahertz.) "We chose (the call letters) KOKU," says Lee, "because there is a bird that is called the koko or koku, and it's the subject of a lot of interesting legends. One is that if a couple is childless, the song of the koko nearby will announce the news that they finally have a child coming. There's been a lot of kidding about our having to be careful about the kind of music we play. The song of the KOKU is bringing good news." Ernie Galito who started with Guam Cable TV as an installer in 1974 during

his summer vacation his sophomore year in college, is general manager of KOKU.

Telling some of the technical aspects of the radio station operation, Lee tells about an unusual way of getting the sound from the studio to the transmitter. He said, "We cannot see our FM transmitter from the studio, and because of high cliffs surrounding the studio and a high hill between the cliff and the antenna site, we were advised to put in a two hop microwave link to connect the studio with the transmitter. We pointed out to our consultant, Clayton Caughill of Honolulu, that our cable ended only a thousand feet or so from the transmitter, and we thought it made more sense to use the cable for the studio to transmitter link."

The consultant suggested they use a Sony digital audio pulse code modulation modem at each end of the link and put the signal on the cable. Lee says, "That's what we did, using (superband) Channel 0, and the results are terrific. The noise levels are so low you can't hear them, and the transmission sounds just the same at each end of the three and one-half mile run. Subscribers call in from time to time and ask about those 'funny patterns' of fast moving black and white bars' they see on Channel 0. That, of course, is the digital audio intended for the FM transmitter."

Cable television operation of Guam is one of the most unusual and challenging situations in the industry. Not everyone could have succeeded there, but Lee Holmes is an orderly man who has tackled the challenges and found viable solutions, whether it was securing a mixture of programming, getting a program listing to his subscribers or meeting a serious community need, he looked around at the choices, considered them, and then took appropriate action. He is an intelligent, articulate man who sees and enjoys the humorous side of life, yet deals with business matters in a straightforward, serious manner. □

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PRODUCT REVIEW



AFC-1 Interfaced with SAM II

by J. Richard Kirn

Superior Electronics' Automated Frequency Counter

Superior Electronics Center has introduced a new frequency measuring instrument for the cable industry. The instrument is a by-product of their computerized FCC proof-of-performance test development program. During this development a computer controlled device was required that could strip the modulation from the TV carrier, measure the carrier frequency and interface back into the computer with the carrier frequency. The solution is an instrument that has wide application in the CATV industry and is available as a standard product from Superior Electronics Center.

The AFC-1 (Automated Frequency Counter) is an instrument that interfaces with and uses the tuning capabilities of your existing signal level meter to measure carrier frequency. *Figure 1* is a simplified block diagram of the unit. An I.F. signal is extracted from the SLM and stripped of modulation in a conventional manner. A sample of the signal level meter's local oscillator is also sampled, amplified, and mixed with the I.F. signal. The sum of these frequencies is the original signal unchanged in frequency, but stripped of modulation. The signal is filtered, amplified and fed to a 1 Ghz frequency counter which displays the frequency on a LED read out that is quite legible even in sun light. A microprocessor controlled logic circuit samples a control signal from the SLM and automatically

P R E L I M I N A R Y

SPECIFICATIONS

for

AUTOMATED FREQUENCY COUNTER AFC-1

FREQUENCY RANGE	VHF Tuning Range of SLM being used Typical: 4MHz to 450MHz
AUTOMATIC RANGING	Frequency Range controlled via SLM switching (LED indicated)
INPUT SENSITIVITY	Typical: SAM Series -15dBmV 7200Series -23dBmV Measurement taken at 75% of full scale on SLM used and 10db above Noise Floor
INPUT SELECTIVITY	Dependent upon SLM being used
OPTIONS	RS-232 Interface for complete computer monitoring and testing with associated software (SAM IIID & IV only) NOTE: Frequency counter may be monitored via RS232 without SLM

FREQUENCY COUNTER PORTION

FREQUENCY RANGE	Direct	50Hz	To	50MHz	
	Prescaled	10MHz	To	1.2Ghz	
SENSITIVITY	25-50Mv	Typ	50Hz	To	25MHz (Direct)
			25MHz	To	300MHz (Prescaled)
	20-100Mv	Typ	300MHz	To	1GHZ (Prescaled)
	15-50Mv	Typ	450MHz	To	1.2GHZ (Prescaled)
RESOLUTION	Direct	10Hz/1Hz/0.1Hz			
	Prescaled	1Khz/100Hz/10Hz			
TIMEBASE	10MHz	Crystal proportional oven TCXO			
ACCURACY	±.05 ppm				
	±1 count	20 To 40 Degrees Celsius			
AGING	1 ppm	Per Year Typ			
INPUT IMPEDANCE	Direct	1 Megohm & 30pf			
	Prescaled	50 Ohms			
DISPLAY	9 digit LED, 0.5 inch seven segment display, leading zero suppression.				

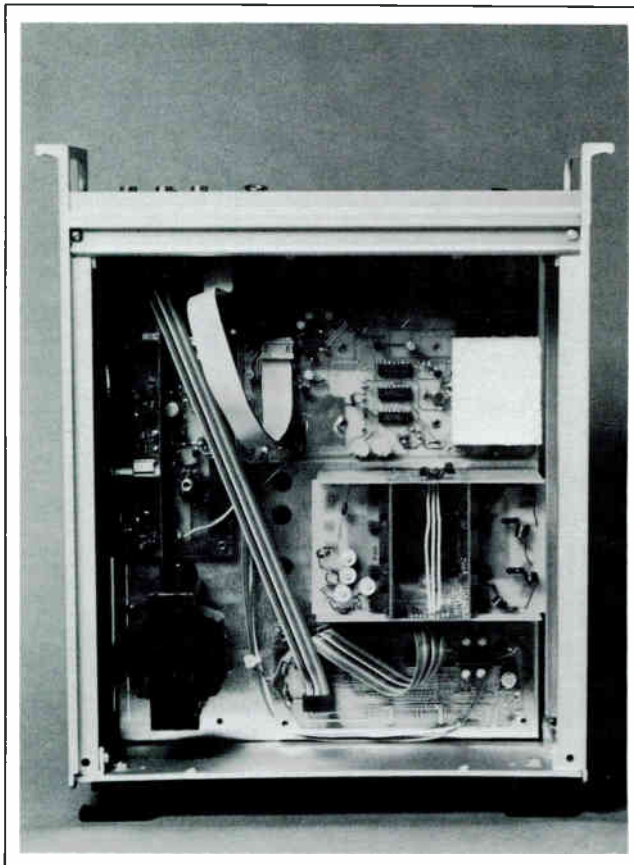
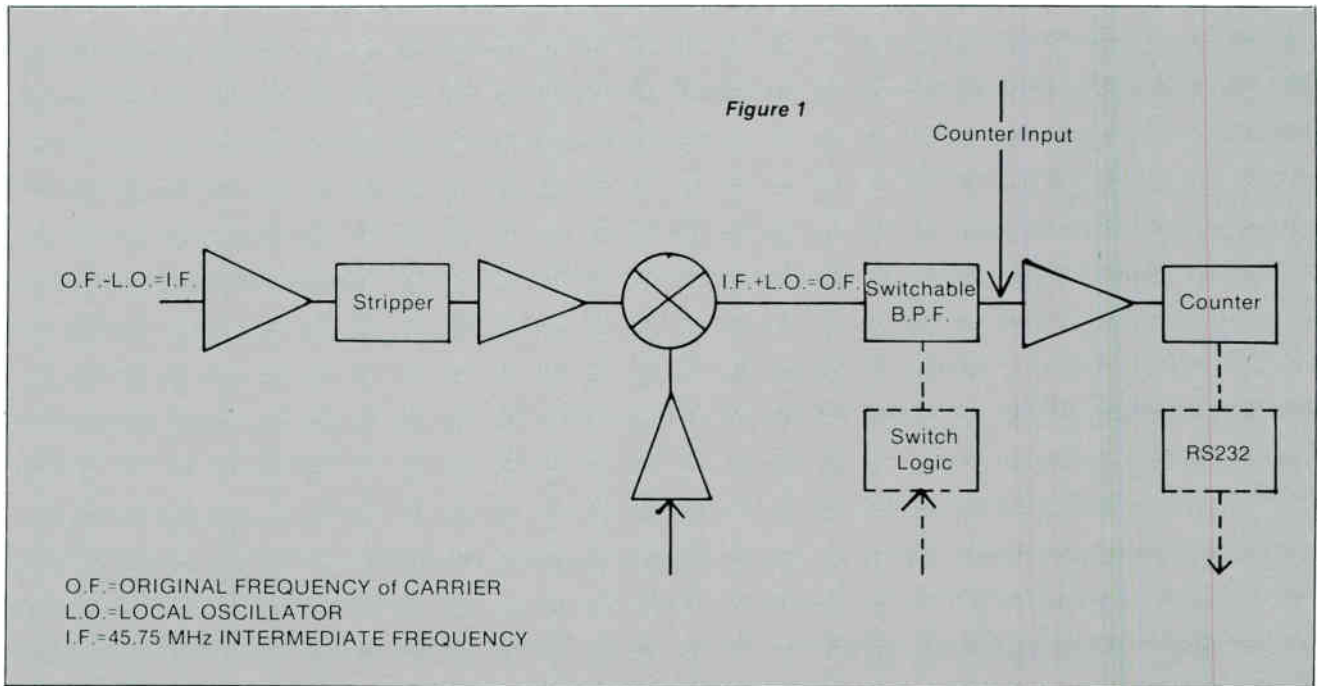
**specifications subject to change without notice.*



AFC-1 Frequency Counter



RS232 Computer Interface



Component Layout

selects the proper filter corresponding to the SLM Range selection, which is displayed through LED indicators.

The AFC-1 instrument is very convenient to use. All that is required is to tune to the desired signal on the signal level meter and read the frequency. Measurements may be made anywhere in the system with precise accuracy (.0001%) in a fully loaded system and at low levels. Input level and frequency range are controlled by the signal level meter range and attenuator controls. There are several additional features built into the instrument. A separate input is provided for operation as a conventional frequency counter for servicing head-end local oscillators, measuring variable marker generators, etc.

One available option is a standard RS232 interface which allows reading the frequency by a computer, either directly or remotely through a modem and a rack mounting adapter. Software programs for several personal computers will soon be available from Superior Electronics for measuring and displaying signal levels and frequencies.

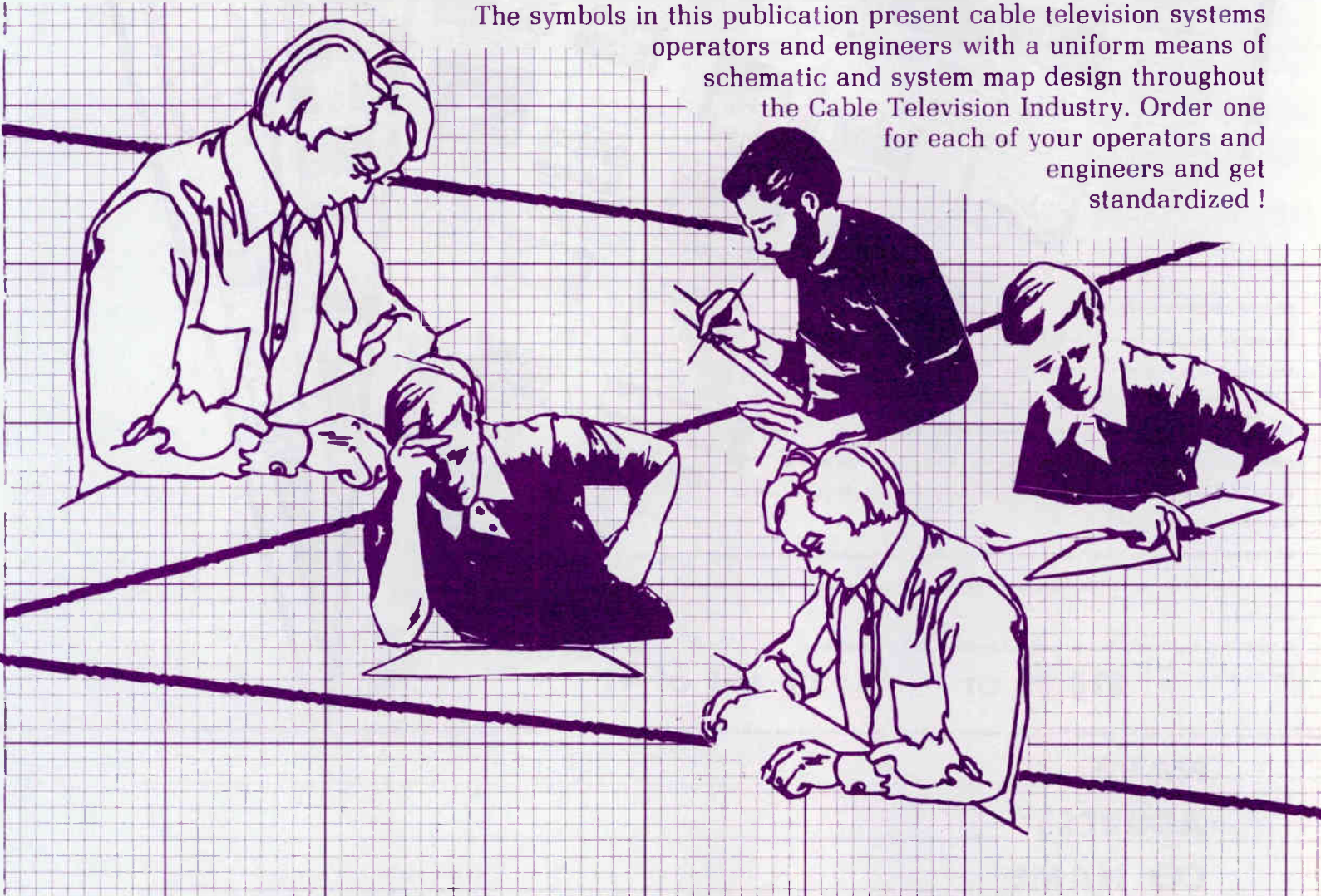
The AFC-1 will interface with most standard signal level meters such as the Jerrold 727, Texscan 7270, 7271, 7272; Wavetek Sam I, II, III, IV, etc. Coupled with the SAM IIID or SAM IV computer controlled signal level meter and the optional RS232 interface, a fully computer controlled read out of system frequencies is possible. Currently frequency counters suffer from a number of deficiencies such as inadequate coverage of the frequency range found in modern systems, reliability problems, erratic frequency readings, interference from adjacent carrier, etc. During my several days of testing and taking measurements in a real CATV system, the AFC-1 was easy to operate and predictable in results. Since the frequency coverage is dependent upon the signal level meter the problem of obsolescence is eliminated as the instrument can be interfaced with a new extended range meter. At a price of \$1,750.00 it is an attractive addition to any system's test equipment. □

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COMMUNITY ANTENNA TELEVISION JOURNAL

CITIZENS BAND INTERFERENCE COMMITTEE DIAGNOSTIC WALL CHART

CBIC

Diagnostic Wall Chart Instructions

The Diagnostic Wall Chart provides a step-by-step procedure for identifying and eliminating Citizens Band Interference. It is designed for use by both individuals and groups. The chart is divided into two main sections: "Recognize the Problem" and "Eliminate the Problem".

Recognize the Problem: This section contains 20 off-the-air photos of typical Citizens Band interference problems. Each photo is identified with a number and a brief description of the problem. The user is instructed to compare these photos with their own observations to identify the type of interference they are experiencing.

Eliminate the Problem: Once the type of interference has been identified, the user is directed to the appropriate section of the chart. Each section contains a detailed description of the problem, the causes, and the steps to be taken to eliminate it. The steps are numbered and easy to follow.

Recognize the Problem

Visually every form of interference which appears on a television screen has a characteristic or special waveform which is unique to that type of interference. The [sic] TV screen shows in the past only the most common forms of interference. Some of these are listed in the chart. The chart is designed to help you identify the type of interference you are experiencing. It is divided into two main sections: "Recognize the Problem" and "Eliminate the Problem".

Recognize the Problem: This section contains 20 off-the-air photos of typical Citizens Band interference problems. Each photo is identified with a number and a brief description of the problem. The user is instructed to compare these photos with their own observations to identify the type of interference they are experiencing.

Eliminate the Problem: Once the type of interference has been identified, the user is directed to the appropriate section of the chart. Each section contains a detailed description of the problem, the causes, and the steps to be taken to eliminate it. The steps are numbered and easy to follow.

COMMUNITY ANTENNA TELEVISION JOURNAL FM VIDEO TRANSMISSION WALL CHART

Possible Video Distortions



Excessive Video Level



Low Video Level



Inverted Video

Possible Transmission Distortions



Loss of Low Frequency Response (Presync/Back)



Loss of High Frequency Response (Presync/Back)



Loss of Sharp Definition (Phase Lock)



Noise



Impulse Noise from a Satellite Video Receiver

FCC COMPLIANCE TESTS SUBJECTIVE EVALUATION SYSTEM WALL CHART

This chart provides a systematic approach to evaluating the subjective quality of a television signal. It includes a series of test patterns and a set of questions to be answered by the viewer. The results are used to determine the level of signal quality and to identify any areas of concern.

HEAD END SIGNAL QUALITY EVALUATION COMPARISON CHART

This chart is used to compare the signal quality of a head end with that of a subscriber. It includes a series of test patterns and a set of questions to be answered by both the head end and the subscriber. The results are used to identify any areas of concern and to determine the cause of the problem.

FM VIDEO TRANSMISSION WALL CHART

This chart gives you a basic introduction to FM transmission, helping you to recognize particular distortions or set up problems, whether observed with a waveform monitor or a video monitor.

HEADEND/INTERFERENCE WALL CHART

has more than 20 off-the-air photos of typical (and not so typical) off-air headend type problems. Each is identified, and with this chart you can zero in on headend problems in one big hurry. Explains what headend interference looks like and leads you to solutions to eliminate it.

FCC TESTS WALL CHART

is the industry's best training tool for teaching system employees how to recognize everything from cross-mod to HumMod. Has more than 60 off-the-air photos of typical plant problems; things like Hum Mod (with calibration), signal to noise, co-channel and more.

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- B — CBIC — Citizens Band Interference Committee Diagnostic Chart
- C — FCC Compliance Tests Subjective Evaluation System Chart
- D — Head End Signal Quality Evaluation Comparison Chart

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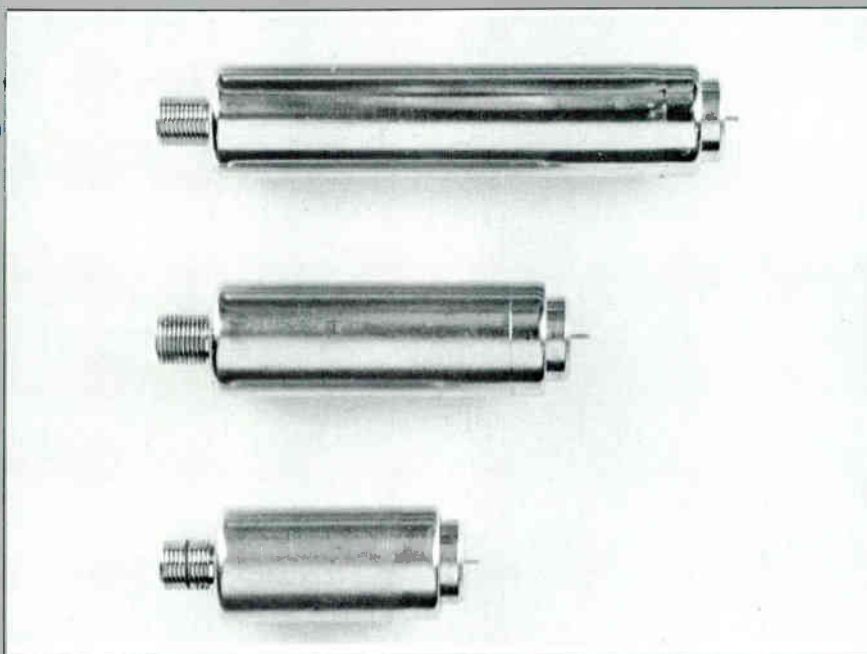
WorldRadioHistory



PAY-TV FILTER AND TRAP GUIDELINES AND OPTIONS

By: Carol Ryan
Allison Mau
Glyn Bostick

MICROWAVE FILTER COMPANY, INC.



Representative packaging of hi-, lo- or bandpass filtering filters (top)

Standard 70 db video notch trap (middle) and narrowband "lower sound saving" video trap (lower)

BACK TO BASICS

Some current rules of thumb, inherited from an earlier time, result in "overkill" — spending too much money to do the job. In other cases, cost-effective solutions using newly available hardware are often overlooked. Let's review the basics and new options in the light of filter state-of-the-art.

NEGATIVE TRAPPING: HOW MUCH NOTCH LOSS?

The video carrier (61.25 MHz for channel 3, for example) must be trapped with a *minimum* loss equal to the difference between subscriber drop level (approximately +12 dBmV) and the minimum signal detectable by the more

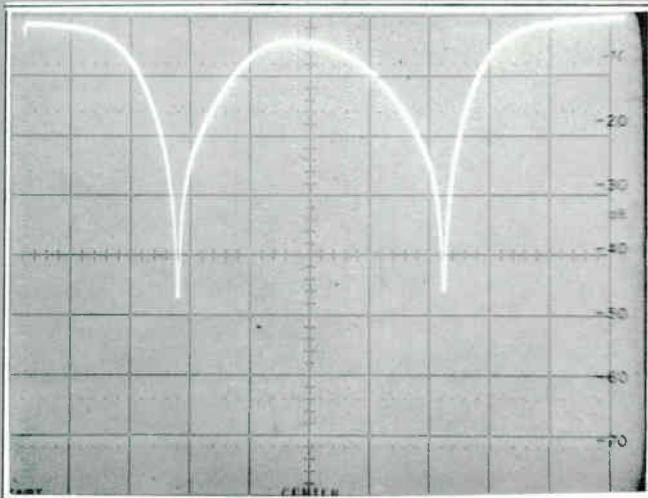
sensitive makes of TV receiver (about -15 dBmV). Hence, about 30 db trap loss will reduce the drop level to below the receiver sensitivity.

BUT IS 30 db ENOUGH?

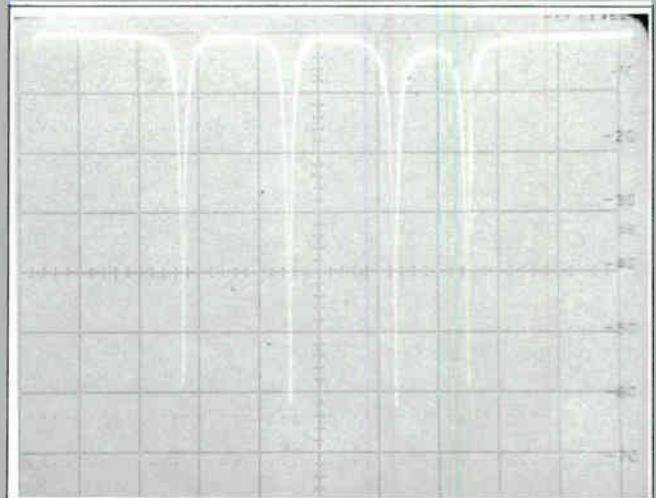
No — we must add some safety to retain at least 30 db at video after temperature drift. Many video traps on the market have 70 db peak loss, not because anywhere near this attenuation is needed, but because this results in wide bandwidth which can absorb temperature swings.

HOW ABOUT SOUND SUPPRESSION?

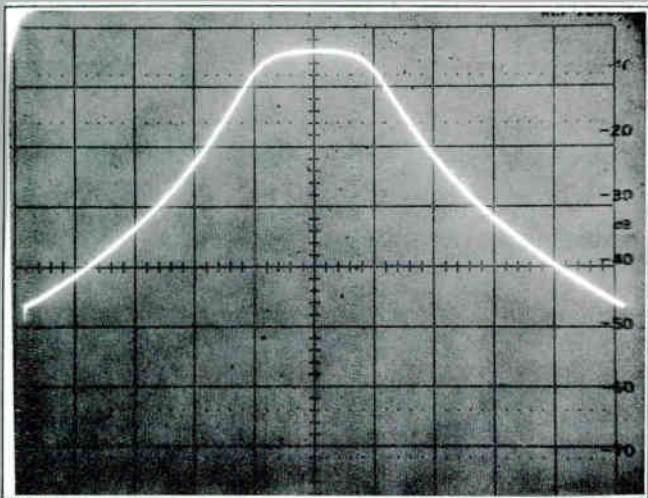
When video is suppressed enough to give a blank screen ("wipe-out"), the sound will also be suppressed. But simply "adequate" video trapping will not necessarily result in sound suppression. Video trapping levels just short of wipe-out can still produce adequate security. There is something there, but it is not recognizable as a picture and therefore has no entertainment value. In this case, audio will probably come through. ▶



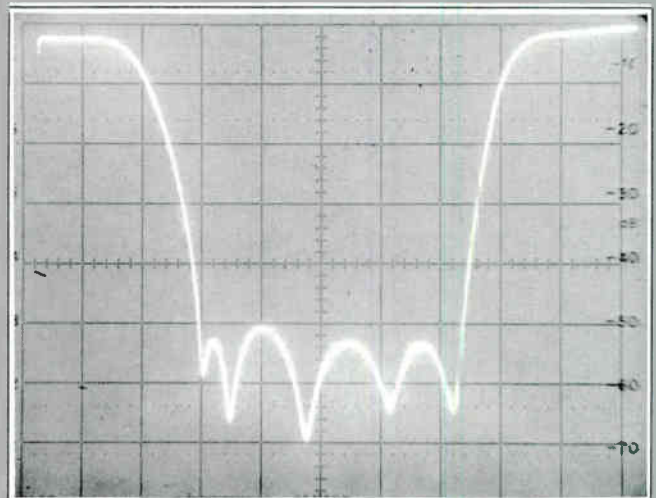
Sound + Video trap, using narrowband notches, in a common case. Lower double trapping mitigates the effects of temperature swings.



Multiple-video traps in common case, can trap contiguous or random channels using narrowband traps to preserve lower sound carriers.



Single Channel "pay only" BPF in standard trap package.



Wide notch traps suppress blocks of contiguous channels. This one traps the entire midband.

LOWER ADJACENT CHANNEL SACRIFICE

The sound carrier, for lower adjacent (standard) channels, is only 1.5 MHz below the trapped video carrier and therefore incurs some loss. This loss is an economic negative: it takes a part of our CATV spectrum out of service. But this is a consequence of our insistence on the "70 db" trap— which brings along with it a wide bandwidth.

SOME ADVANTAGES OF THE NARROW VIDEO TRAPS

In many cases, the lower adjacent

band traps are used. Smaller adjacent sound loss is purchased by tolerating less trap notch peak loss— somewhere between overkill 70 db and bare minimum 30 db. Such traps are feasible for controlled temperature environments or for climates without wide temperature swings. And their cost is much lower.

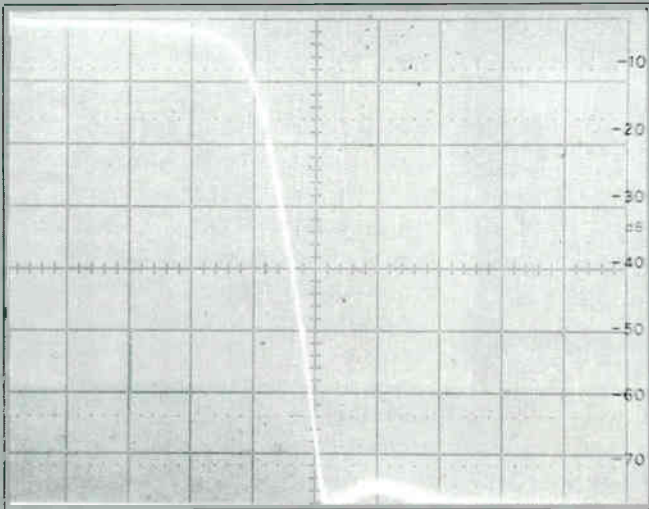
NARROW NOTCHES FOR TEMPERATURE EXTREMES

For about the same cost as the conventional 70 db trap, separate narrower notches can be placed on both the video and the audio. While extreme temperature

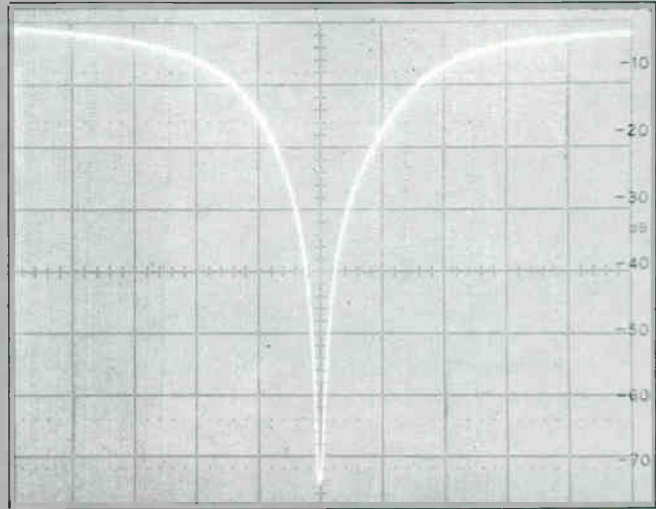
channel can remain in service if narrow-swings may result in "just adequate" trapping— no entertainment value, but no wipe-out— the audio remains suppressed due to its dedicated trap. This type trap allows the lower adjacent channel to remain in service in many cases.

CONSOLIDATION (MULTIPLE VIDEO) TRAPS

Several different video traps may be enclosed in the common sleeve, between the input and output connector, to simplify installation and inventory. If



Typical performance of standard video notch: deep, wide video notch also disables sound and has wide 50 db bandwidth but disables lower sound.



Typical low pass tiering filter. This one passes 2-13 and traps "L" and above.

one insists on the full 70 db trap, only two different channels can be accommodated in the case. If the narrowband trap is adopted, up to four different videos can be trapped with one filter. Select any channels from the CATV spectrum.

CONTIGUOUS CHANNEL TRAPPING

If all premium channels are in one continuous block, then even more channels can be trapped with one filter. The roll-off (to low attenuation on untrapped channels) is "lazier" than for discrete video traps. Therefore, one or more lower channels and perhaps an upper channel must be sacrificed (depending on how many channels are trapped). It is feasible to trap up to eight continuous channels. For four or less, the *consolidated trap* approach should be considered since it may be possible to preserve adjacents.

SINGLE CHANNEL SUBSCRIBER FILTERS

It is now feasible to produce a single

channel bandpass "pole filter"— for selling a single, select channel. So it's time to try a *different* sales approach on the long time hold-out. Those who've tried this approach report that a reasonable percentage of single channel subscribers eventually opt for the whole package. Since every new increment of revenue is important these days, this strategy should be considered in any pay option scheme.

ACKNOWLEDGEMENTS

Thanks to Chris Bostick for the sketch, Anne Marie Janack for spec photos and to our photo team: David Skeval and Steve McIntosh.

NEXT TIME

The long awaited trap package test results (anyone out there believe me?). □

Free Catalog of CATV/Telcom Equipment and Hard-to-Find Tools

Jensen's new catalog is your source for hard-to-find precision tools and test equipment used by electronic, telecommunication, and cable TV technicians, computer service bureaus, and government agencies. This popular catalog also contains Jensen's world-famous line of more than 40 tool kits. Call or write for your free copy today.



JENSEN TOOLS INC.

Dept. CJ, 7815 S. 46th St., Phoenix, Arizona 85040, (602) 968-6231



Mod Scan 2

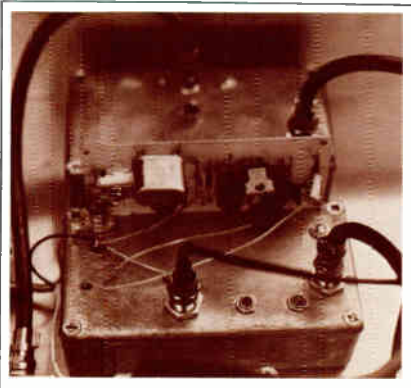
Steven Richey
 President
 Teltran, Inc.
 Azle, Texas

In the early days of CABLE when one channel was off for a period of time, one could explain to the customers that it was in for repair, and they would understand. Now with pay channels and a much more demanding public, we need to keep our channels on *at all costs*.

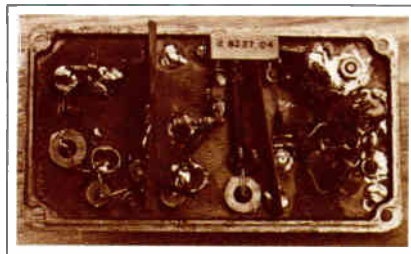
Recognizing this problem and researching any channel up converters and/or modulators, I found that the costs ranged from \$1,800 to \$4,000 dollars, depending on what features you wanted. It was at this time that I decided to build my own.

At first this seemed like it would be a large project until I realized that a standard phase locked CATV tuner could be modified to do much of the work.

First, let's look at how a 400 MHz CATV PLL converter works (See Figure 1). The signal at the input goes through a low pass filter with a 400 MHz cutoff and



Up converter with phase lock (top)



Up converter (bottom)



BPF-Amp

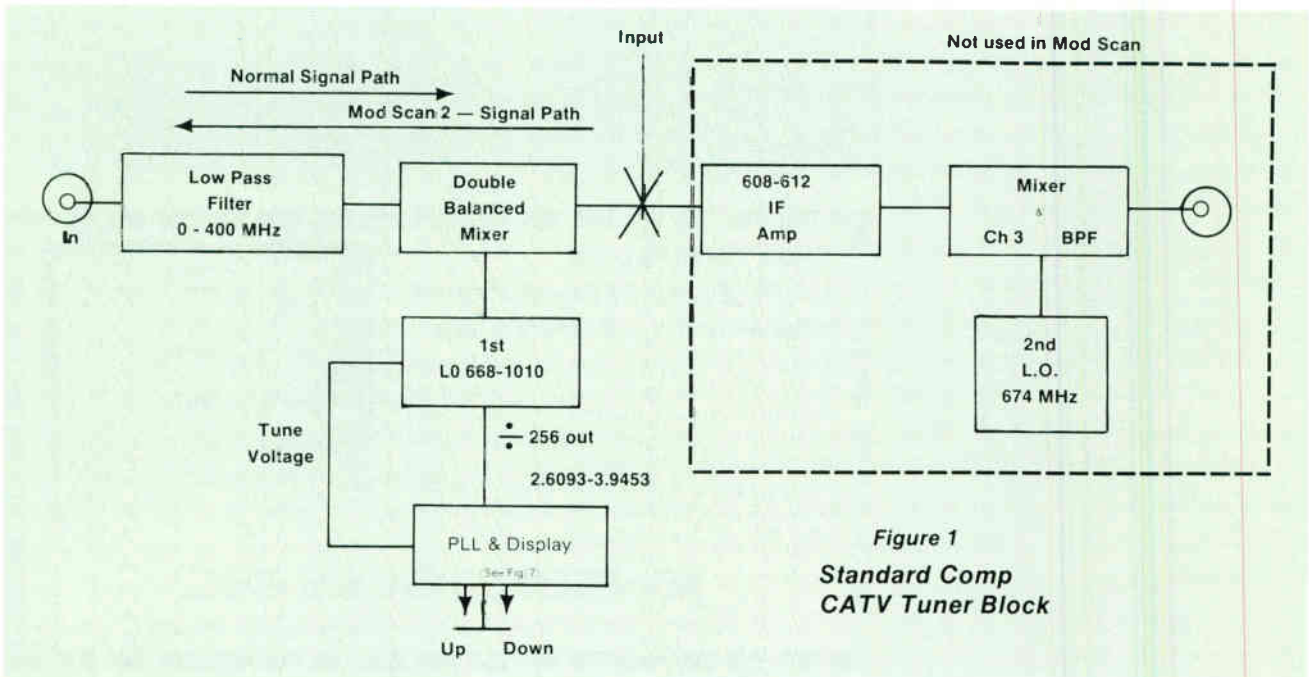
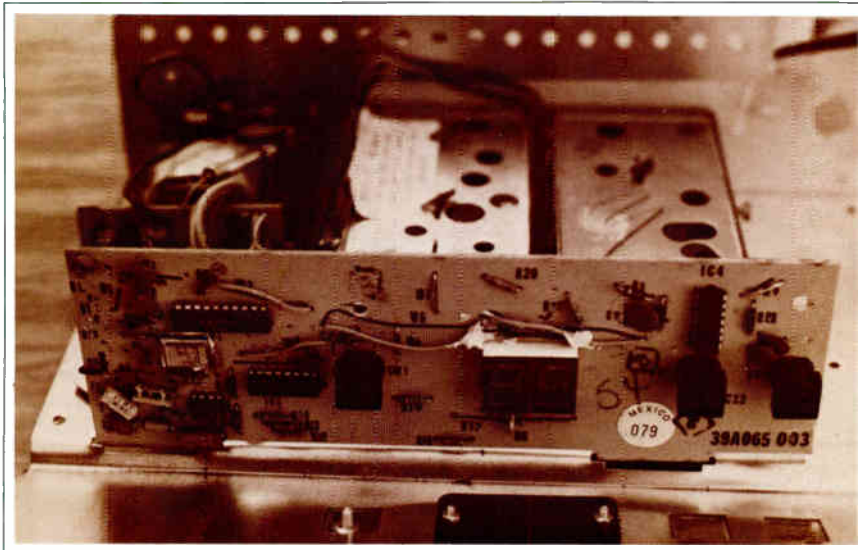
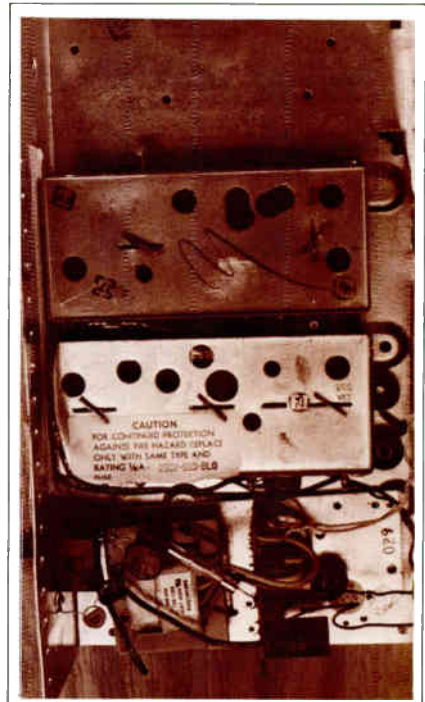


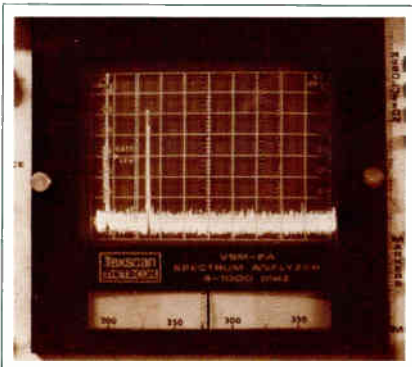
Figure 1
 Standard Comp
 CATV Tuner Block



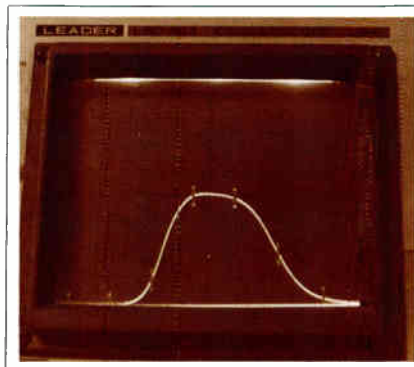
Converter before modifications



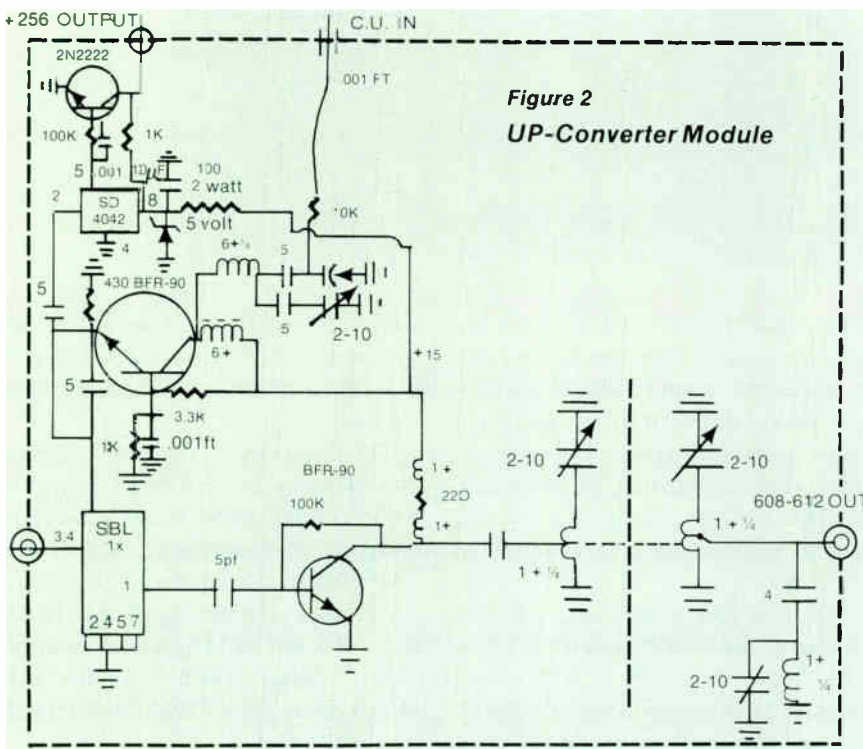
Converter before modifications Spectrum



Sweep 40-50 MHz in 26 db gain



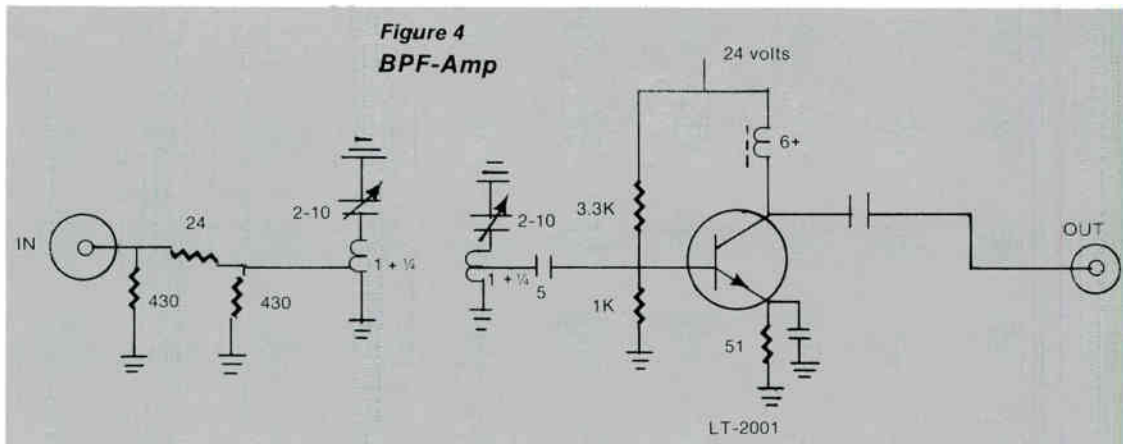
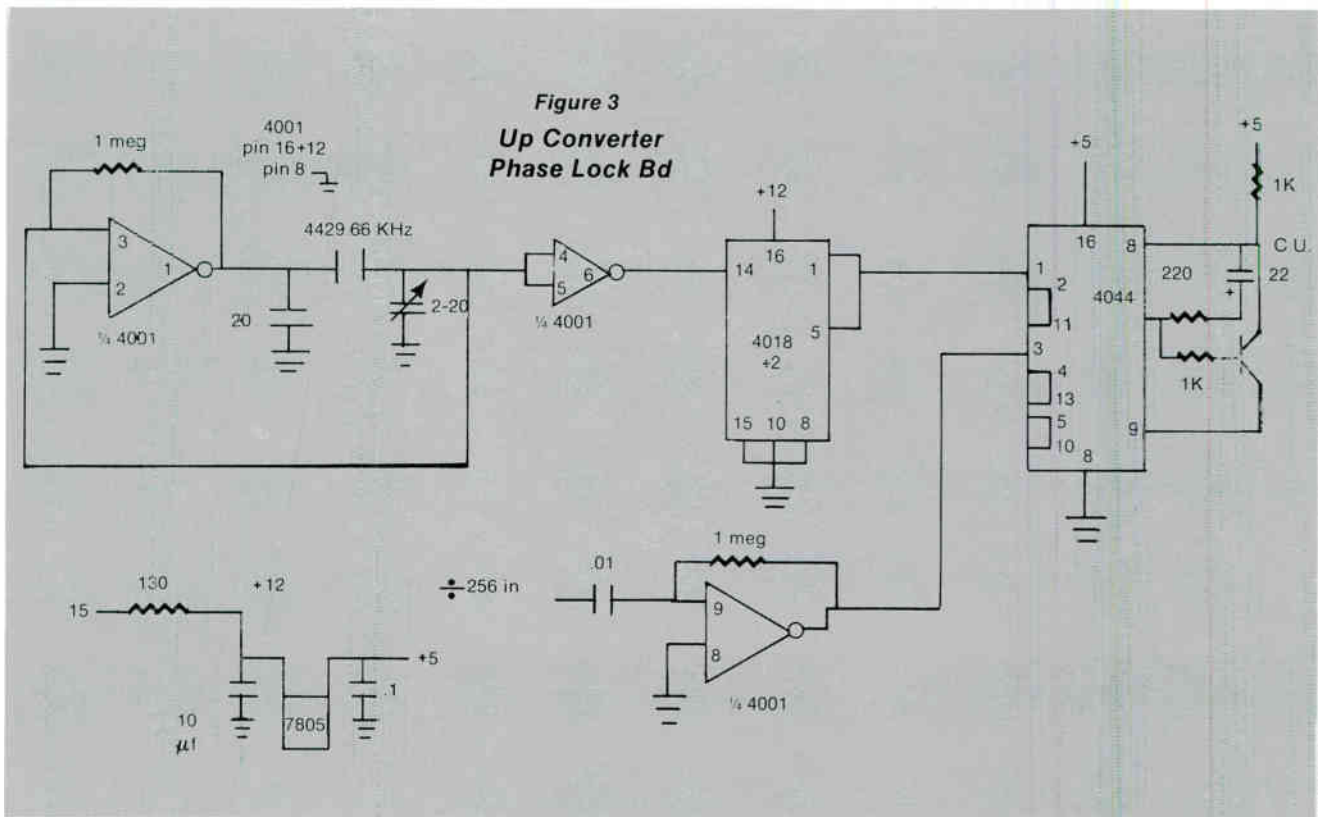
Analyzer display 100 MHz division channel 2 output. No visible spurious 50 db down.



then into a double balance mixer where it is mixed with the first variable L.O. (more about this L.O. later) to give an output of 608.25 to 612.75 MHz. This Hi IF is then amplified and fed to the second mixer where it is mixed with a L.O. of 674 MHz and outputted through a band pass filter on channel 3.

The first L.O. is variable from 668 MHz, where channeled at 55.25 is subtracted from 668 to give you 612.75, to 1010 MHz which converts channel 53 to 612.75 MHz. In older model converters, the L.O. was set by a series of pots but, in the new PLL versions, the V.C.O. output is divided, by a ECL (emitter coupled logic) IC, by 256 to give an output of 2.6093 to 3.9453 MHz. This signal is fed into a special motorola IC which is built to divide the input by N to achieve a set output on any channel; this is then compared to a known crystal reference and an error tuning voltage is created which tunes the L.O. to 55 preset frequencies with the accuracy of the reference crystal.

The first two sections of the converter, the low pass filter and the double balanced



mixer, are bi-directional, if you put 55.25 on the input and tune the unit to channel 2 you would have 612.75 on the output of the double balance mixer. Conversely if you put 612.75 in at the output of the double balanced mixer at the input, you will get 55.25. It is by using this fact that we make the Mod Scan 2 work.

I selected the Standard Components model for my converter; it has the filter, DBM, first L.O. as divided by 256 in one module and the 608-612 amp, mixer, second L.O. and channel 3 filter in a second module. First you remove the

control board, the two RF modules, and the power supply from the case and then separate the output side of the RF module and discard it. We then mount it in our chassis as shown in the photo. Then we can start to build the other three modules needed to make a CATV converter work as an any channel up converter.

The first part of our unit is the up converter which will convert a 41-46 MHz input to a 608 to 612 output (Figure 2) this is done in a SRAIX double balance mixer, mixing the input

with a 567 MHz local oscillator; the output is amplified and filtered in a 2 pole filter with a trap a 567 MHz trap at the output.

The Local OSC is divided by 256 to give an output of 2 214.83 KHz. After it is connected to the phase lock board, it is compared to a signal generated by the 4429.66 KHz OSC and then divided by 2 to create a reference signal of 2214.83 KHz. The MC 4044 generates an error control voltage which locks the 567 MHz L.O. to the 4.42966 MHz crystal (see Figure 3).

Reducing Trenching Costs In The 80s

by Michael J. Enault
New Development Manager
GILLCABLE TV
San Jose, California

As new systems are born and rebuild time approaches, the costs of trenching has become a high priority item. Gillcable TV, working with the Public Works Department of the City of San Jose, California, has outlined and performed a procedure that has cut trenching cost almost in half. While other municipalities may have different regulations regarding the placement of underground lines, our experiences in working with the franchiser to lower costs of construction may be of interest to other operators.

The City of San Jose "Standard Conditions for Utility Excavation Permits" specifies the "Narrow Trench Method" (a rocksaw cut of no more than 6" in width) to be backfilled with a minimum of 6" San Jose Class A Portland Cement concrete with a 1" cap of Type B ½ fine asphalt concrete. Formally, trenches were cut to a depth of at least 18".

Gillcable reasoned that if we are required to backfill with 7" of material and only utilize a 1" space for cable, why not an 8" deep trench? The City agreed to a trial trench. Gill was happy, the City was happy because of less construction time and less mess: a new standard was born.

When utilizing this new 8" trench, Gill direct buries armored cable. Christopher D. Huffman, Applications Engineer of Commscope, has verified that there is no chemical interaction between our cable and the concrete. Direct Burial? YES. In the past Gill utilized duct, however the labor of cut and glue, and actual cost of the duct raised the per foot cost of the trench dramatically. Use of duct is intended to increase protection and facilitate ease of replacement. Our new method encases the cable in 6" of concrete which should be protection enough.

Ease of replacement? It has been my experience with 15 years at Gillcable that trying to repull bad cable from duct generally does not work. An additional factor in our case is that Gill is a dual system and seldom do both cables go bad. Frequently it is difficult or impossible to repull a single cable. If you repull both, do you put the "good" cable back in the

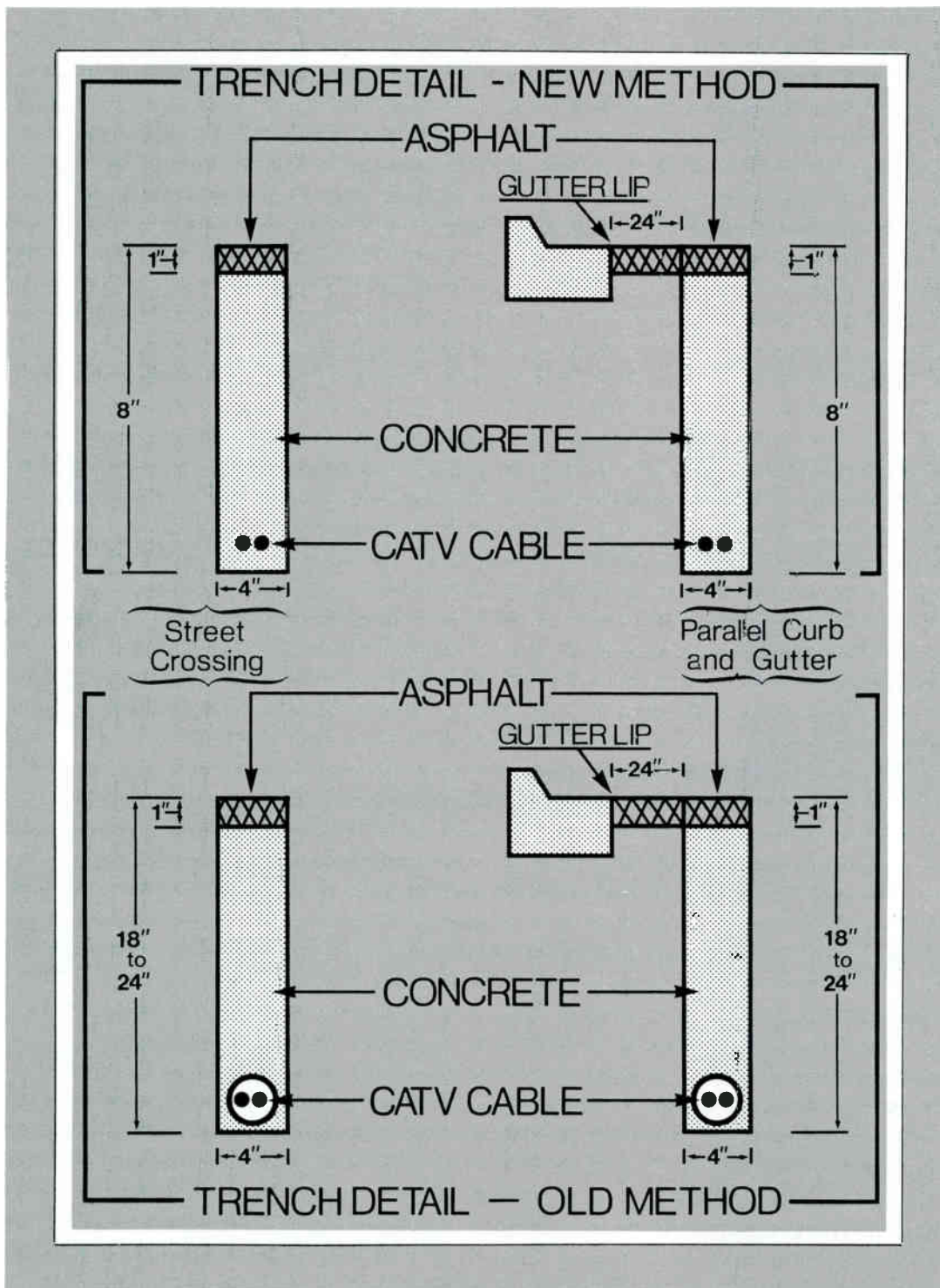
ground? Of course not, you put two new cables in. Now you have doubled your material costs. And this is if you *can* repull! With our 8" deep trench method, you merely locate the bad section, dig down maybe 10", and repair.

Let us consider the probability of the cable going bad in the first place. Cable goes bad 99% of the time because someone hits it or was it cut during installation? If your cable is in duct, PVC is not going to stop a backhoe, but the operator will know when he contacts a concrete backfill! Now, if he does break through the concrete and cuts your cable, you repair it, and the depth is just right for a small traffic vault, problem solved.

There are other advantages to the 8" deep trench. Very seldom do our contractors worry about hitting other subsurface cables or pipe. Of course, we contact USA (Underground Service Alert) trenching service and anyone else who may be in our intended trench area, but who else goes this shallow? There are little or no worries about stopped production while damages are repaired. Cuts are much faster, 20 to 25 feet per minute or more is not uncommon, and tooth wear is reduced.

Gill procedures call for the contractor to start the cut and after a sufficient lead time, Gill sends a small crew to lay the cable and right behind Gill's crew, the concrete crew is closing the trench. A smooth operation from start to finish. Following the concrete truck is a 5 ton vibratory roller. The concrete is poured flush with street level and vibrated down 1" (by vibrating the street and not the concrete, you keep the rocks from settling to the bottom and pushing all the water to the surface), allowed to cure a minimum of 24 hours, and then paved.

The readers final question should be "How does the trench hold up?" Well, the City of San Jose says our cuts should hold up as long as their streets. Therefore, I asked our contractors to be responsible for their paving for 2 years. Our oldest 8" deep trench is over a year old and looks as




good as the day it was done.

Gill's future plans are to reduce the sack content of the concrete. Right now San Jose requires 3600 PSI, but the City has indicated that this figure is negotiable, and I feel confident that working together we can reduce trench cost even more.

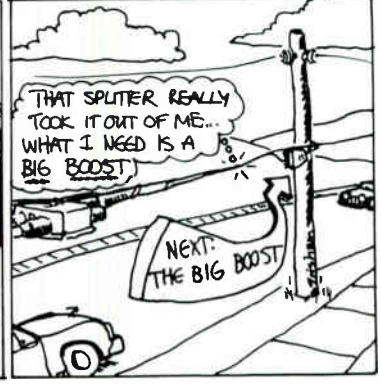
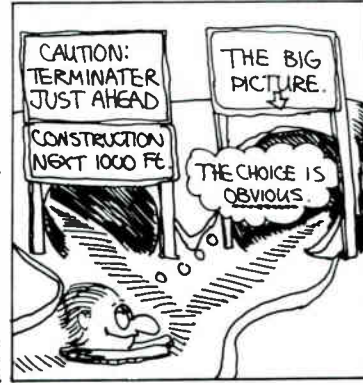
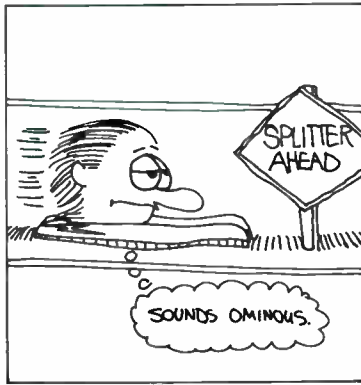
The ideas expressed in this article are not all Gill's but a compilation of ideas of the writer and other people. We and the City of San Jose just made it work. Readers interested in copies of Gill's trenching specifications can write to:

Gillcable TV, 1302 N. 4th Street, San Jose, CA 95112
 Attention: Engineering Project Manager □

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Showcase

CWY OFFERS NEW TVRO

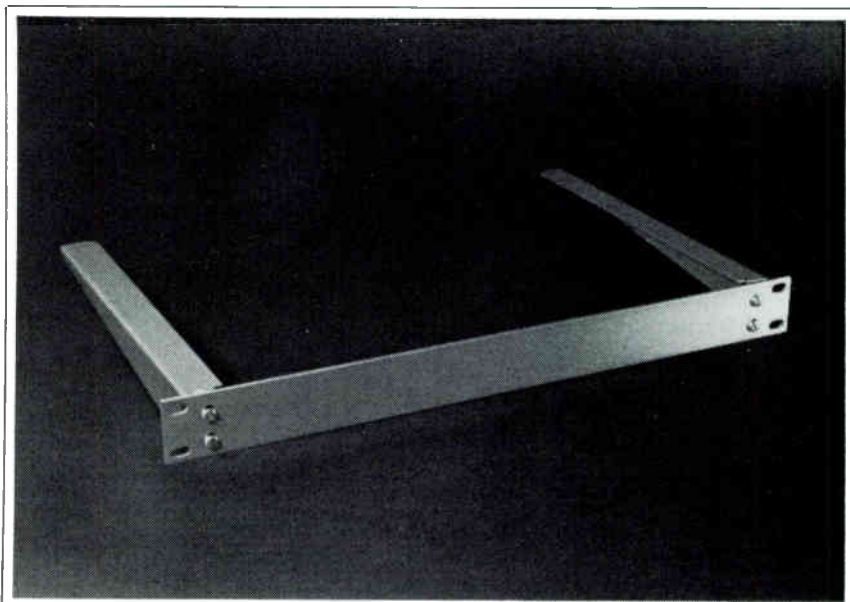
A new TVRO satellite antenna, introduced by CWY Electronics, offers system operators the opportunity to serve rural areas and markets beyond their density limitations. Available for leasing, renting or selling options, the new antenna is very economically priced — well below many inferior-quality models. Features include a durable, heavy-duty (7 gauge steel) plated frame assembly, baked enamel finish, high quality positioning actuator and a one-piece spun aluminum (H12) reflector with eggshell color baked enamel finish. Antenna diameter permits legal width transporting, and the polar frame and mount maintains the parabolic shape of the antenna. A declination adjustment provides exact tracing of geostationary orbit. For further information about the new Model CSA-8 satellite antenna, contact:



CWY Electronics, P.O. Box 4519, free: 1-800-428-7596, in Indiana: Lafayette, IN 47903, or call toll 1-800-382-7526.

CWY MOUNTED SUPPORT BRACKET

The new Model RSB rack-mounted equipment support bracket from **CWY Electronics** relieves stress and torque on rack-mounted equipment by adding rear support. The unit includes and is mounted to a single-space (1¾ inch) plate which allows for air flow around and through mounted equipment. The new support bracket does not interfere with servicing of equipment. For more information about the Model RSB equipment support bracket, contact CWY Electronics, P.O. Box 4519, Lafayette, IN 47903, or call toll-free: 800-428-7596. In Indiana: 800-382-7526.



Showcase

DESCRAMBLER PACKAGES AVAILABLE FROM RMS ELECTRONICS

RMS Electronics, Inc. announces four Descrambler Packages which are now available for use with existing converters (other than block type) with output on Channels 2, 3 or 4.

Package #1-Model #16D: Descrambles up to 16 tiers of service - unlimited channels per tier.

Package #2-Model #16SD: Has all the features of the #16D, plus the advantage of sound deletion.

Package #3-Model #8PPV: Descrambles up to 8 tiers of service - unlimited channels per tier, with the provision for pay-perview.

Package #4-Model #8PSD: Has all the features of the #8PPV plus the advantage of sound deletion.

The level of pay program may be upgraded with a change of the custom programmed decoding chip (factory programmed). Future changes in the descrambling programmed combination will require replacement of the decoding chip or chips. Replacement is very inexpensive and is done quickly by removing the old decoding chip

and simply plugging in the new combination decoding chip. Thousands of combinations can be programmed. With only two connections, the DESCRAMBLER can be quickly and easily installed to provide maximum channel security. Tamper-proof Security Closure Screws can only be removed by use of a special tool (extra charge for the tool). Regular closure screws are provided upon request. For further information, literature, etc. write to: RMS Electronics, 50 Antin Place, Bronx, NY 10462 or call toll free: 1-800-223-8312. •

C-COR TECHNICAL SEMINAR SCHEDULE

C-COR Electronics, Inc., will be conducting a technical seminar for CATV Technicians at the Sheraton-Tampa in Tampa, Florida, November 13-15, 1984.

The registration fee for the seminar is \$75 per person. Participants are encouraged to attend the full three-day session for maximum benefit, but are welcome to attend on any day provided that they join the group at either 8:30 a.m. or 1:00 p.m. and stay for the remainder of that half-day session. Please note that the \$75 fee is applicable whether attending all three days or any portion thereof. A certificate of completion will be given to each attendee who participates for a minimum of two days.

Because of space limitations, we are requesting that no more than three (3) personnel attend from any one system. The meeting facility limits total participants to a maximum of 50.

Should you wish to register someone now, you may call Debra Cree at 800-233-2267, Ext. 301.

Future Seminars

Los Angeles, CA, Jan. 22-24, 1985
Columbus OH, March 19-21, 1985
Dallas, TX, May 21-23, 1985
Boston, MA, July 23-25, 1985 •

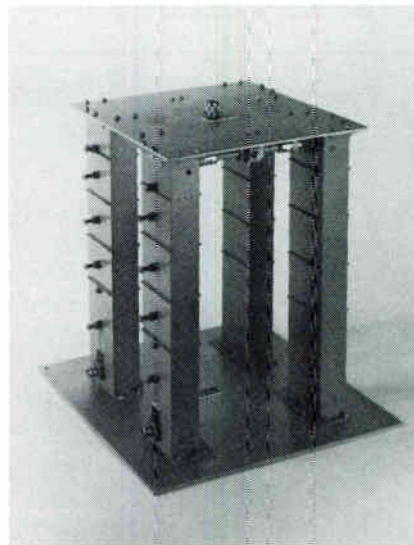
NEW LEMCO TOOL CATALOG

LEMCO's new 44 page "The Tools Of The Trade" catalog is a comprehensive walk through of products used in the construction and maintenance of Cable TV and Telephone Systems. The catalog is sectioned to include Reel Handling, Aerial Construction, Underground Construction, Splicing and Installation. Product descriptions, specifications, illustrations and prices are included for each item. The catalog is an excellent reference for anyone involved in outside plant operations.

Available free by contacting: LEMCO TOOL CORPORATION, R.D. #2, Box 330A, Cogan Station, PA 17728, Phone: (717) 494-0620 (Collect in PA) (800) 233-8713 (Toll Free). •

TRANSMITTER COMBINERS FOR MICROWAVE TV

Microwave Filter's series 4630(4) quadruplexers combine the four channels in any ITFS group: groups A through H (2500-2700 MHz).



Loss per channel is less than 1 db, power handling is 100 watts per channel and mutual channel isolation is 25db. Connectors are 50 ohm type N. Height is 18 1/4 inches above the 17 x 17" mount-

ing plate and weight is only 40 pounds and 8 ounces. The 4630(4) may be wall, floor or panel mounted.

Price and delivery are \$6,800 and 30 days respectively. For more information contact Emily Bostick, **Microwave Filter Company, Inc.**, 6743 Kinne St., East Syracuse, NY 13057. Call U.S. toll free 1-800-448-1666 or collect (NY/HI/AK/CAN) (315) 437-3953. •

**SCIENTIFIC-ATLANTA
PUBLISHES 1984/1985
BROADBAND
COMMUNICATIONS
PRODUCTS CATALOG**

Scientific-Atlanta, Inc., has published its 1984/1985 Broadband Communications Products Catalog. The 308-page catalog describes Scientific-Atlanta's complete line of broadband communications products including distribution equipment, broadband data products, coaxial cable, satellite receiving equipment, off-air antennas, head-end equipment, subscriber products and mini-cable/SMATV systems. Also included in the catalog is a guide to product support services.

New products featured in the catalog include the feedforward, sub-split trunk station, the Model 6810 feedforward distribution amplifier, the Model 6440-I data translator, the Model 6130 signal processor, the Model 9530/9530A video receiver and the System Manager II/LAMS.

To obtain a catalog, write to Scientific-Atlanta, Inc., Box 105027, Department A/R, Atlanta, Georgia 30348.

For additional information contact: Tina E. Mayland, Marketing Communications Manager, (404) 449-2000. •

**SHOWTIME/THE MOVIE
CHANNEL INC., ARRANGES
DISCOUNTS ON GALAXY
ANTENNAS FOR AFFILIATES**

SHOWTIME/THE MOVIE CHANNEL Inc., has established a special discount program for all affiliates requiring additional earth station equipment for the reception of Galaxy I signals, it was announced by Stephan Wm. Schulte, Senior Vice President, Operations and Production Services, SHOWTIME/THE MOVIE CHANNEL Inc.

Special arrangements have been made between SHOWTIME/THE MOVIE CHANNEL and two of the largest manufacturers of satellite antenna equipment, Scientific Atlanta and M/A-Com, allowing affiliates of both services to purchase the equipment directly from the manufacturers at significantly reduced costs. A mailing has been sent to all affiliates advising them of the types of satellite antenna equipment available, including specifications and discount prices.

In making the announcement, Mr. Schulte said, "The recent industry trend towards the transfer of satellite feeds to Galaxy I is intensifying, putting serious strains on many operators' capital expenditure budgets. This discount program will alleviate some of that pressure and make it possible for all operators to maintain a high standard of service to their customers. SHOWTIME/THE MOVIE CHANNEL Inc. urges its affiliates to capitalize on this opportunity."

Both SHOWTIME and THE MOVIE CHANNEL recently began dual-feeding their east coast feeds. SHOWTIME supplemented the existing transmission via RCA's Satcom IIR, transponder 12 with a feed on the more powerful Hughes Galaxy I, transponder 5. THE

MOVIE CHANNEL supplemented its eastern satellite feed on Satcom IIR, transponder 5 with a feed on Galaxy I, transponder 10. At that time, Mr. Schulte cited the number of satellite program feeds moving to Galaxy I as creating a need among all remaining programmers to provide options for their affiliates. These dual-feeds will continue as long as they serve the industry's best interests. •

**BEN HUGHES INTRODUCES
NEW TOOLS**

Ben Hughes Communication Products Co., Inc. announces the introduction of a new series of Stripping and Coring Tools for the Quantum Reach Cable produced by M/A-Com Comm/Scope.

The CABLE-PREP® SCT-QR series is available for 50 and 75 ohm cable. Made for both 500 and 860 cables sizes, this tool has an added feature that removes the outside jacket to manufacturer's specifications, eliminating an additional operation in the field.

The SCT-QR series tools will core the dielectric, strip back the outside conductor, and strip the outside jacket, all to the proper specifications.

Also being announced is the introduction of an SCT Stripping and Coring Tool for the General Cable MC² Cable. This new tool is specially designed to remove the extruded plastic dielectric, as well as strip back the outer conductor to the specified length.

The CABLE-PREP® SCT-MC² series tool is available for 440, 500, 650 and 750 cable sizes. This is the first introduction of a stripping and coring tool for this cable.

For more information, contact Ben Hughes Communication Products Co., 304 Boston Post Rd., Old Saybrook, CT 06475, (203) 388-3559. □

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222-5388
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CBN Center
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804-424-7777
(S9)

C-Cor Electronics, Inc.,
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State College, PA 16801
814-238-2461
(M1, 4, 5, S1, 2, 8)

CWY Electronics
405 N. Earl Ave.,
Lafayette, IN 74904
1-800-428-7596
(M9, D1)

Cable Graphic Sciences
7095 N. Clovis Ave.
Clovis, CA 93612
209-297-0508
(M9 Character
Generators)

**Communications Equity
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5401 W. Kennedy Blvd.,
Tampa, FL 33609
813-877-8844
(S3)

ComSonics, Inc.,
P.O. Box 1106,
Harrisonburg, VA 22801
1-800-336-9681
(M8, 9, S8, 9)

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Grove, OK 74344
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(M2, D1, S1, 8)

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Burbank, CA 91521
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(S4)

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Clay, NY 13041
1-800-448-7474
(M9, Pay TV Delivery
Systems & Products)

Eastern Microwave, Inc.,
3 Northern Concourse,
P.O. Box 4872,
Syracuse, NY 13221
315-455-5955
(S4)

**Electroline TV
Equipment, Inc.,**
8750-8th Ave.,
St. Michel,
Montreal, Canada
H1Z 2W4
514-725-2471
(M4, 5, 7, 9, D7, 9)

ESPN,
ESPN Plaza,
Bristol, CT 06010
203-584-8477
(S9)

**Gardiner Communications
Corp.,**
3506 Security St.,
Garland, TX 75042
214-348-4747
(M9, TVRO Packages, S1
2, 8)

Gilbert Engineering Co.,
P.O. Box 23189,
Phoenix, AZ 85063
1-800-528-5567 or
602-245-1050

**Group W Satellite
Communications**
41 Harbor Plaza Dr.,
P.O. Box 10210,
Stamford, CT 06904
203-965-6219
(S4)

Harmoh & Company
5660 S. Syracuse Circle
Greenwood Plaza,
Englewood, CO 80111
303-773-3821
(S3)

**Heller-Oak
Communications**
105 W. Adams St.,
Chicago, IL 60603
1-800-621-2139 / 7600
(S3)

Home Box Office, Inc.,
12750 Merit Dr.
Dallas, TX 75251
214-387-8557
(S4)

Ind. Co. Cable TV, Inc.,
P.O. Box 3799
Hwy. 167 N,
Batesville, AR 72501
501-793-4174
(D1)

**Jerry Conn Associates,
Inc.,**
P.O. Box 444,
Chambersburg, PA 17201
1-800-233-7600
1-800-692-7370 (PA)
(D3, 4, 5, 6, 7, 8)

**KMP Computer
Services, Inc.,**
135 Longview Dr.,
Los Alamos, NM 87544
505-662-5545
(S4, 5)

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D2—CATV antennas	M2—CATV antennas	S2—CATV construction
D3—CATV cable	M3—CATV cable	S3—CATV financing
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D7—CATV connectors	M7—CATV connectors	S7—CATV drop installation
D8—CATV test equipment	M8—CATV test equipment	S8—CATV engineering
D9—Other	M9—Other	S9—Other

Katek, Inc.,
215 Wood Ave.,
Middlesex, NJ 08846
201—356-8940

Klungness Electronic Supply,
P.O. Box 547,
107 Kent Street,
Iron Mountain, MI 49801
1-800—338-9292
1-800—682-7140 (Mich)
(D1, 8, S2, 8)

LRC Electronics, Inc.,
901 South Ave.,
Horseheads, NY 14845
607—739-3844
(M7)

Larson Electronics, Inc.,
311 S. Locust St.,
Denton, TX 76201
817—387-0002
(M9 Standby Power)

Lifetime
1211 Avenue of the Americas
4th Floor
New York, NY 10036
212—719-7230
(S9, Programming)

Lindsay America, Inc.
P.O. Box 15775
1202 B West 19th St.
Panama City, FL 32405
904—769-2321

MA/COM Cable Home Group
P.O. Box 1729
Hickory, NC 28603
1-800—438-3331
(M2, 3, 7, S2)

Magnavox CATV Systems, Inc.
100 Fairgrounds Dr.,
Manlius, NY 13104
315—682-9105
(M2, 3, 7, S2)

McCullough Satellite Equipment,
Route 5, Box 97,
Salem, AR 72576
501—895-3167
(M2, 9, D3, 4, 6, 7)

Microdyne Corporation,
471 Oak Road,
Ocala, FL 32672
904—687-4633
(M9 Satellite TV Receivers)

* **Microwave Filter Co.,**
6743 Kinne St., Box 103,
E. Syracuse, NY 10357
1-800—448-1666
(M9 Bandpass Filter)

Panasonic Industrial, Co.,
One Panasonic Way
Secaucus, NJ 07094
201—392-4109

Power and Telephone Supply Company, Inc.
530 Interchange Drive
N.W.,
Atlanta, GA 30336
1-800—241-9996
(D1)

Quality RF Services, Inc.
825 Park Way, Suite 3,
Jupiter, FL 33458
305—747-4998
1-800—327-9767
1-800—433-0107 (In Florida)
(M4, S9)

RMS Electronics
50 Antin Place
Bronx, NY 10462
1-800—223-8312
1-800—221-8857 (Poleline)
(M4, 5, 6, 7, 9)

Sadelco, Inc.,
75 West Forest Ave.,
Englewood, NJ 07631
201—569-3323
(M8)

Showtime/The Movie Channel, Inc.
1633 Broadway,
New York, NY 10019
212—708-1600
(S4)

Satellite Syndicated Systems, Inc.,
P.O. Box 470684
Tulsa, OK 74147
918—481-0881
(S9)

Telstar Marketing & Consulting
C.T.H."F" 2930
Blue Mounds, WI 53517
608—437-5460
(S9)

Tele-Wire Supply Corp.,
7 Michael Ave.,
East Farmingdale,
NY 11735
516—293-7788
(D1, 2, 3, 5, 6, 7, 8, 9)

* **Texscan Corp.,**
3102 N. 29th Ave.,
Phoenix, AZ 85017
602—252-5021
(M9 Bandpass Filters)

* **Times Fiber Communications,**
358 Hall Avenue,
Wallingford, CT 06492
1-800—243-6904
(M3)

Tocom, Inc.,
P.O. Box 47066,
Dallas, TX 75247
214—438-7691
(M1, 4, 9 Converters)

* **Toner Cable Equipment, Inc.,**
969 Horsham Rd.,
Horsham, PA 19044
1-800—523-5947
In PA 1-800—523-492-2512
also 1-800—523-5947 (PA)
(D2, 3, 4, 5, 6, 7)

Triple Crown Electronics, Inc.,
4560 Fieldgate Dr.,
Mississauga, Ontario,
Canada L4W 3W6
416—629-1111
Telex 06-960-456
(M4, 8)

Turner Broadcasting System,
1050 Techwood Dr.,
Atlanta, GA 30318
404—898-8500

TV Watch, Inc.,
1819 Peachtree Rd. N.E.
Atlanta, GA 30309
1-800—554-1155
(S9)

United Press International
220 East 42nd St.,
New York, NY 10017
212—682-0400
(S9 Automated News SVC)

United Video, Inc.,
3801 South Sheridan Rd.,
Tulsa, OK 74145
1-800—331-4806
(S9)

Viewstar, Inc.,
705 Progress Ave.,
Unit 53,
Scarborough, Ontario,
Canada M1H 2X1
416—439-3170
(M9 Cable Converter)

Vitek Electronics
710 Narragansett Park Dr.
Pawtucket, RI 02861
401—724-4400

Walsh, Walsh, Sweeney & Whitney, S.C.
P.O. Box 1269,
Madison, WI 53701
608—257-1491
(S9)

Warner Amex Satellite Entertainment Corporation
1211 Avenue of the Americas,
New York, NY 10036
212—944-4250
(S4)

* **Wavetek Indiana**
5808 Churchman,
Beech Grove, IN 46107
1-800—428-4424
TWIX 810—341-3226
(M8)

Weatherscan,
Loop 132,
Throckmorton Hwy.,
Olney, TX 76374
817—564-5688
(D9, Sony Equip. Dist.,
M9 Weather Channel Displays)

Western Towers
Box 347
San Angelo, TX 76901
915—655-6262/653-3363
(M2, 9 Towers)

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