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CATJ

OFFICIAL JOURNAL
OF THE
COMMUNITY ANTENNA
TELEVISION ASSOCIATION

MAY 1979

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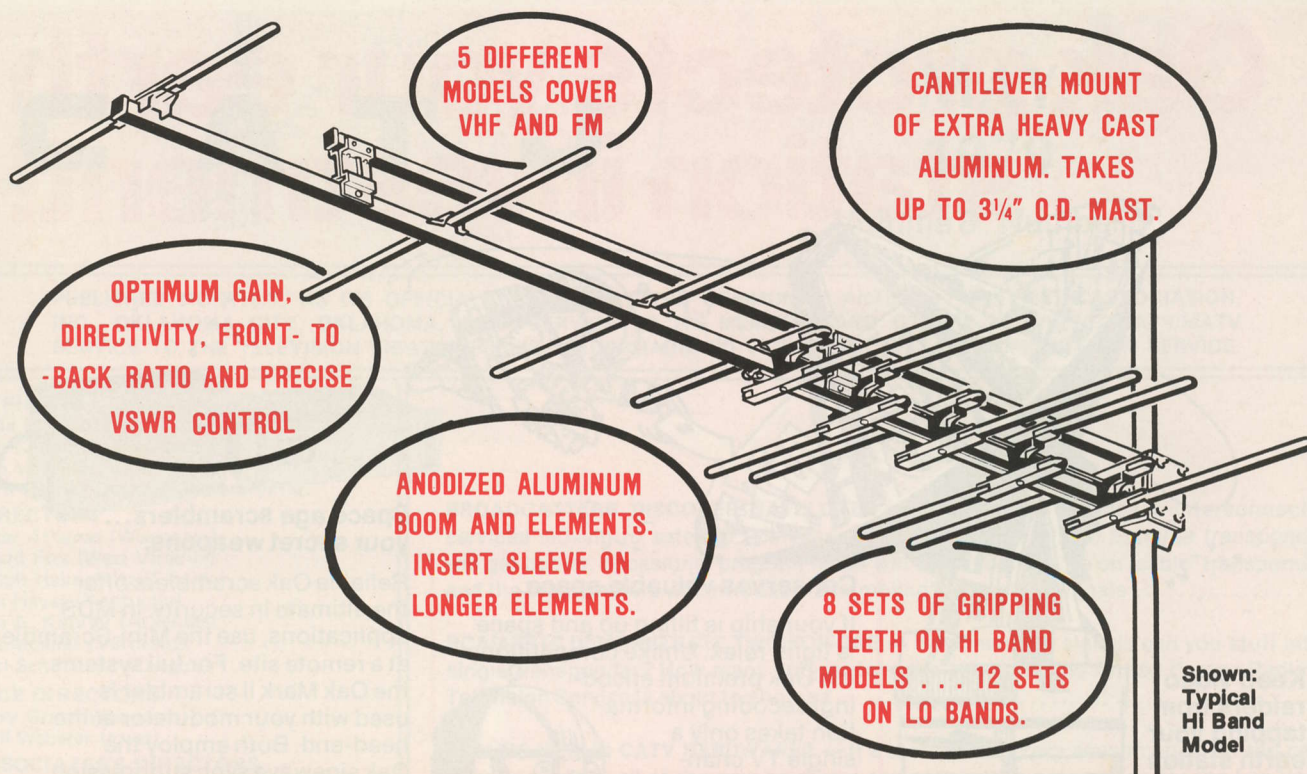
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Average Beam width 1/2 power pts.	58°	57°	43.5°	40°	67°
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NCTA SHOW — BOOTH 180

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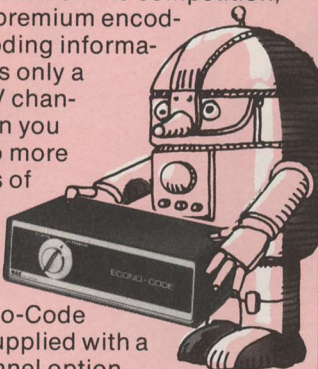
Three ways to land bigger pay cable profits.

Oak decoding products give your system the best pay cable security in the industry. For 12-channel or MDS systems, the Mini-Code is the effective and economical choice. If you already have a full 12-channel system, you can add a channel with the Econo-Code single channel midband converter/decoder. For larger systems, the 35-channel Multi-Code is the best way to land bigger profits.



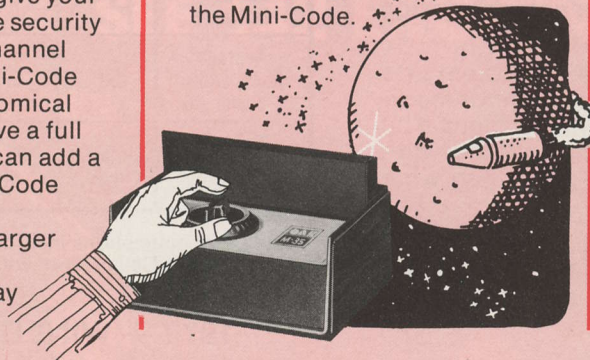
Conserves valuable space.

If your ship is filling up and space is tight, relax. Unlike competition, the Oak premium encoding/decoding information takes only a single TV channel. When you need two more channels of outer space without rebuild, the Econo-Code can be supplied with a two-channel option.



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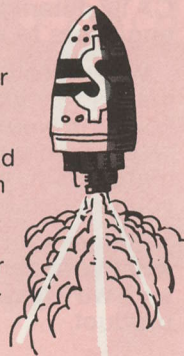


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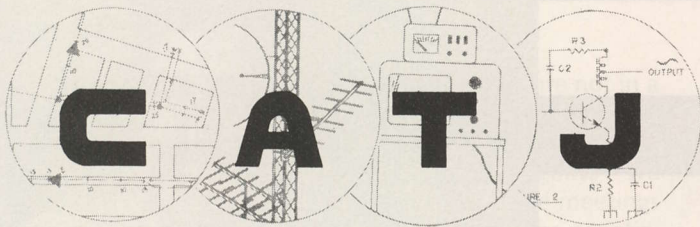
Bigger payloads!

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**MAY
1979**

Volume 6 Number 5

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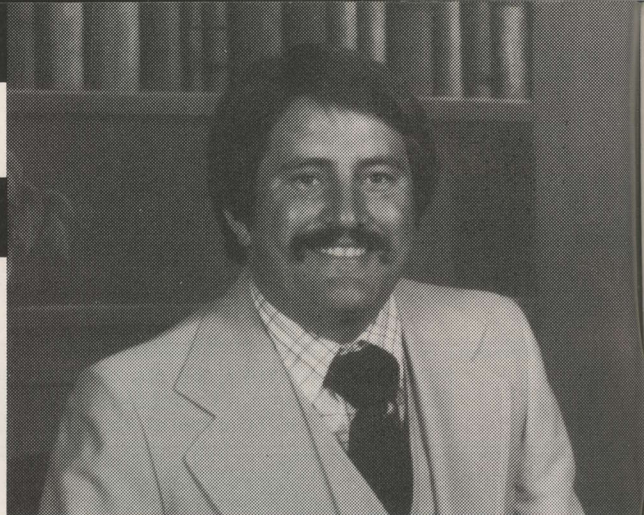
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"THE BROADCASTERS ARE COMING...". Texas/Oklahoma CATV owner/operator Chuck Davis, framed by his 400 foot tower in the background, contemplates the latest round in the cable-broadcaster tug-of-war as the broadcasting industry makes the big move to the satellites. See page 16 here.

CATA™ TORIAL

BEN CAMPBELL, President of CATA, Inc.



THE FIGHT IS ON — AND IT'S LIFE OR DEATH FOR CABLE

For the last year and a half, or so, CATA has been keeping its members fully informed about what was going on in Washington regarding the various "Communications Act Rewrites" that were being developed on Capitol Hill. It has been a long, sometimes very confusing process of trying to figure out exactly what the drafters meant, or what the proposed bill would actually do as opposed to what the press releases and speeches said the bill would do. During this time it was clear to everyone that a lot of "trial balloons" were going up, and a lot were shot down. Now, however, a bill has been introduced that its sponsors say they hope to have adopted in this session of Congress, and if it is, cable television, and particularly the smaller, independent operators, will be in severe danger of going out of business.

The bill I am referring to is the "Communications Act of 1979", better known as "Rewrite II" or the "VanDeerline Bill", after its author, Congressman Lionel VanDeerlin, the Chairman of the House Communications Subcommittee.

In simple terms, what has happened is this; during the last two years, and particularly since the popular wave of "deregulation" started (as witnessed by the popular vote adoption of things like "Proposition 13" in California), the regulators and legislators in Washington have decided to get on the so-called "free marketplace" bandwagon. CATA, and all other cable industry interests have been pushing the deregulation theme for many years, and we have been getting results—the regulations **are** going. The one set of regulations that remains is the signal carriage rules, and it looks like it is on the way out too.

All this deregulation got the broadcasters, and particularly the copyright holders nervous. The signal carriage rules were the only hope, as far as they were concerned, of keeping cable in check. **From the broadcaster's point of view** this was necessary to avoid competition. From the copyright holder's viewpoint the problem was more with how much money he would or

would not get from individual markets if programming could be shuttled around the country in an uncontrolled fashion by cable operators. This last concern is also topmost in the minds of the sports interests. So, recognizing all this, and also realizing that the 1976 Copyright Law, while it made cable pay some money, did not really deal with the "control" issue of where the programming goes, the copyright folks, in particular, mounted a campaign to change the entire system—to get rid of "regulations", and, instead, substitute the "free marketplace". From a politician's standpoint this was a very appealing idea. It could be "sold".

The Carter Administration got on the bandwagon with the NTIA proposal for "retransmission consent" submitted to the FCC by Henry Geller. Congressman VanDeerlin has now gone one step farther in his newly introduced bill and proposed "program consent" whereby cable operators will not be allowed to "re-broadcast" ANY programming, **including local signals**, without first getting the "consent" of either the broadcaster, if he has the right to give such a consent in the first place, or the person who owns or controls the exclusive rights to the program involved. What this means is that **cable will have to bargain for every program it wants to carry** in the so-called "free marketplace". You can bet that it won't be free!

There are so many problems with this idea that it is incredible to me that a Legislator as well versed on the issue of cable television as Lionel VanDeerlin would even suggest it. To begin with, what it would require would be massive negotiations between cable operators and individual stations and copyright holders to see if any agreements could be reached. The agreements, and presumably payments would have to be made and everything settled **within six months** from the passage of the bill. **At that time** cable would no longer have "compulsory licenses" under the Copyright Law, and would be limited to carrying only that programming which had been negotiated for and bought on an individual basis.

Well, as is clear to the cable industry, we are not in a bargaining position with relation to local broadcasters to get any agreement at all! And as for the small operators, we wouldn't even be in the ball game—we couldn't even afford the air fare to get to the meetings to argue our case! But even assuming that the negotiations could be done by "industry committees" on both sides, as some of the House Communications Subcommittee staff suggest, that still does not mean that agreement could be reached, or that we could afford to pay whatever Jack Valenti's pals want. **We would be in a take-it-or-leave-it position.**

What's worse, even if the agreements were reached (which I think would be highly unlikely), the technical problems alone would put us out of business. Remember that what this plan really calls for is "cherry-picking" on a program-by-program basis—even for local signals. In all probability we would not be able to simply carry a **single** broadcast station **all day long** on one channel. Instead, it would be a huge "chinese menu" type of affair, with one program from this channel, then two from another one, and so on. We would have to "create" channels of programming from the various places we got permission to use. Now the House staff says that they don't **think** it will work that way, that the local broadcasters would "of course" give us retransmission consent because it is in their best interest to be carried locally. And, they say, the "distant" programming would probably be "packaged" by **someone** and put on the satellite. But, and it is a BIG but—**what if it doesn't work out that way?**

From either point of view the proposal would require the cable operator to spend lots of money on negotiations, programming, and finally, probably, switching equipment and program guides just to be able to provide subscribers with at least the programming they already get! Either that, **or would we forget about broadcast signals completely and go strictly pay.**

No matter how you look at it, it won't work for the small operator. It will put him out of business. In a question-and-answer period during a speech recently CATA asked Congressman VanDeerlin how his bill would work for the small operators. He admitted that the bill was really aimed at the "biggies", but when it was pointed out by us that there was no exemption for the independent operators he just nodded and said we would have a chance to make that point during hearings on the proposal. **THE TIME IS NOW TO MAKE YOUR VIEW KNOWN!**

Write your Congressman—tell him what you think of the "Communications Act of 1979" (H.R. 3333). Be sure to send a copy to Congressman VanDeerlin, Chairman of the House Communications Subcommittee, U.S. House of Representatives, Room 2408 Rayburn House Office Building, Washington, D.C. 20515. Send another copy to the ranking Republican on the Committee, Congressman James M. Collins—he's in room 2419 Rayburn.

Remember, CATA is only as strong as the collective strength of its members—we need you to act NOW! It's your business we are fighting to save. Now is not the time to stand on the sidelines—it's time to join the fight.

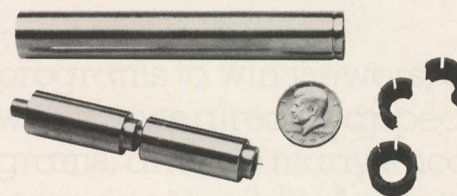
Eagle Quality



PAY TV SCRAMBLER

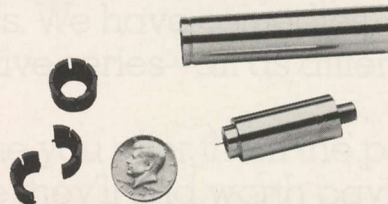
This generator is made to complement the Eagle Model 2-DF outdoor decoding filters to form a system that economically secures pay channel reception for the CATV system operator.

This scrambler is designed to deliver the encoded signal to the system without additional and possibly expensive peripheral equipment.



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Model 2-DF is ruggedly constructed and potted for temperature stability. The solid metal construction eliminates any RFI leakage problems. Outdoor application (Tap-Mounted) keeps it out of the hands of the subscriber. It requires special tools for installation and removal, making it tamper proof and theft proof.



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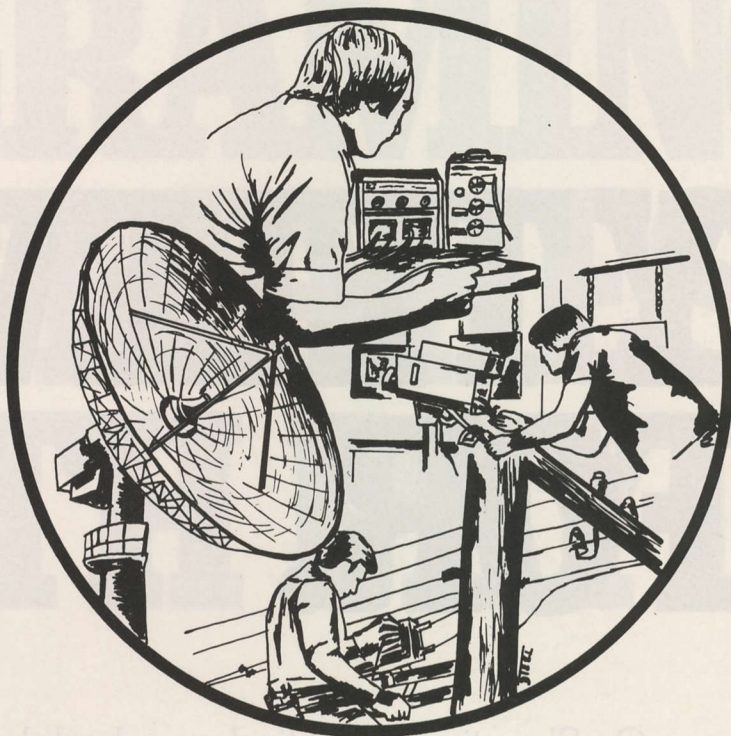
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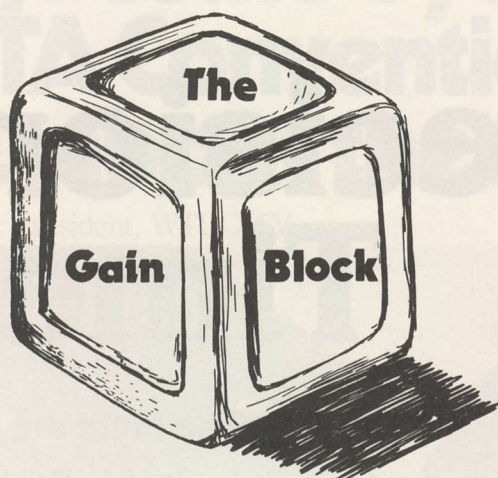


The Cable Industry Comes To Grips With The Challenge Of The '80s

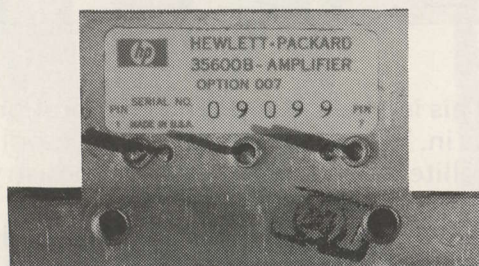
Changing times in the cable industry. Pressures from far and near are asking us to prove we have an on-going right to serve rural and suburban America with broadband communication services. The challenge of the 80's is clear; the rural and suburban cable operator must demonstrate by deeds, not promises, that he is willing and able to answer the broadband communication needs of America.

How will the typically rural and small cable systems respond to this challenge? Can we learn to cope with relaxed federal regulations and their logical replacement; the onrush of local and state regulations? How will systems cope with fast-paced satellite, fiber optics and computer technology? How will we meet the growing needs for training manpower, increased channel capacities and the satellite program explosion?

No single industry meeting can seek out and identify specific answers to such a wide variety of pressing problems and technologies in a single three day gathering. However CCOS '79, continuing the three-year tradition of innovation and perception will focus on as many of these issues as possible and CATA invites your participation to take a hand in analyzing and shaping the rural and suburban cable industry of the decade ahead. To register at CCOS '79, use registration card to right.



Very Instructional



Have You Ever Wished You Better Understood Hybrid CATV Amplifiers?

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THE GAIN BLOCK is detailed extensively in a feature report in this issue of CATJ. The basic 'block' unit kit is just the beginning. Additional plug-in modules (all plug in outside the container) will provide numerous additional test bench features including tilt, equalized gain, individual 'blocks of gain' and single channel gain. You may order your own Gain Block by using the order card to the left.



Decision Time!

The facts are in.

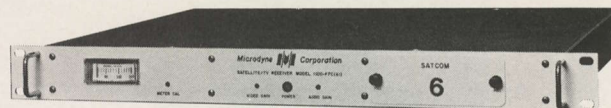
Satellite programming can be profitably marketed to your subscribers.

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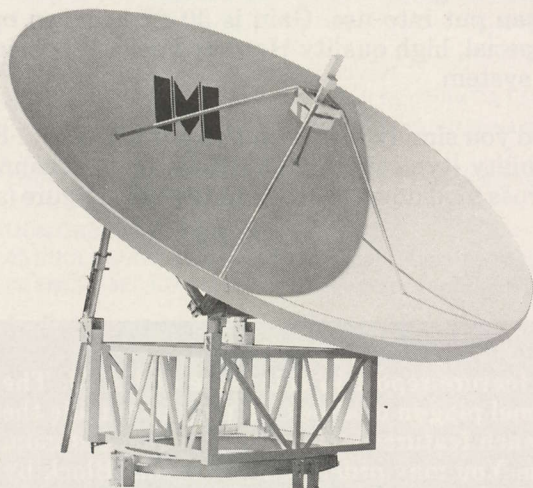
You have two alternatives. Be your own system's engineer and install components purchased from individual manufacturers. This is not as complex as it sounds and can save you money.

Or you can purchase a complete turnkey package including site selection and installation from a TVRO system supplier.

But first you should be talking to people: other station owners with on-line systems; equipment and system suppliers; and most importantly with experts who have knowledge and experience in this field.



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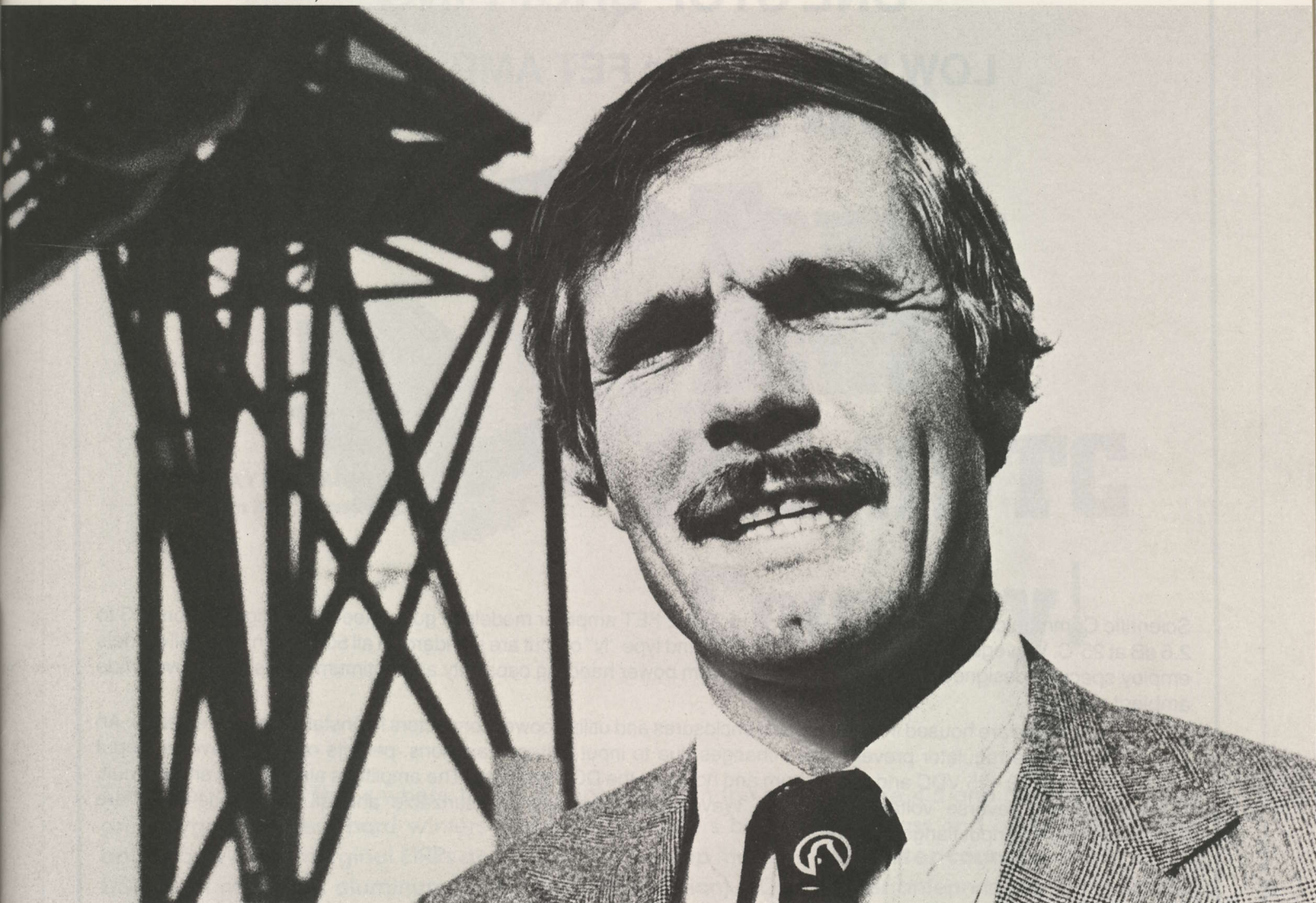
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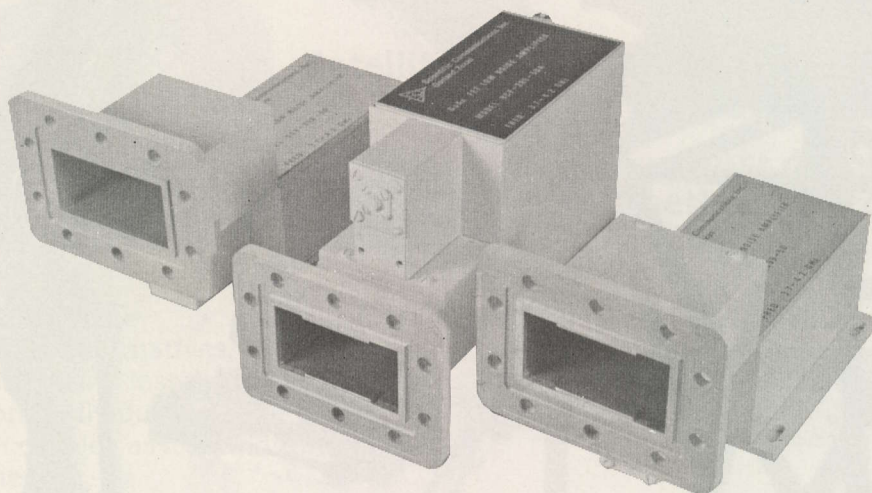
To find out how you can experience the impact that only the Super Station can provide, write Cable Relations, WTCG-TV, 1018 West Peachtree Street, Atlanta, Georgia 30309, or call (404) 875-7317.

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SCF-395-505	3.70-4.20	50	0.5	1.5	1.25:1	1.25:1	+10
SCF-395-50D	3.70-4.20	50	0.5	1.8	1.25:1	1.25:1	+10
SCF-395-50A	3.70-4.20	50	0.5	2.0	1.25:1	1.25:1	+10
SCF-395-50	3.70-4.20	50	0.5	2.6	1.25:1	1.25:1	+10



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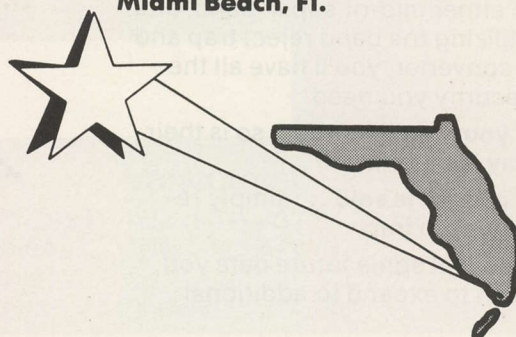
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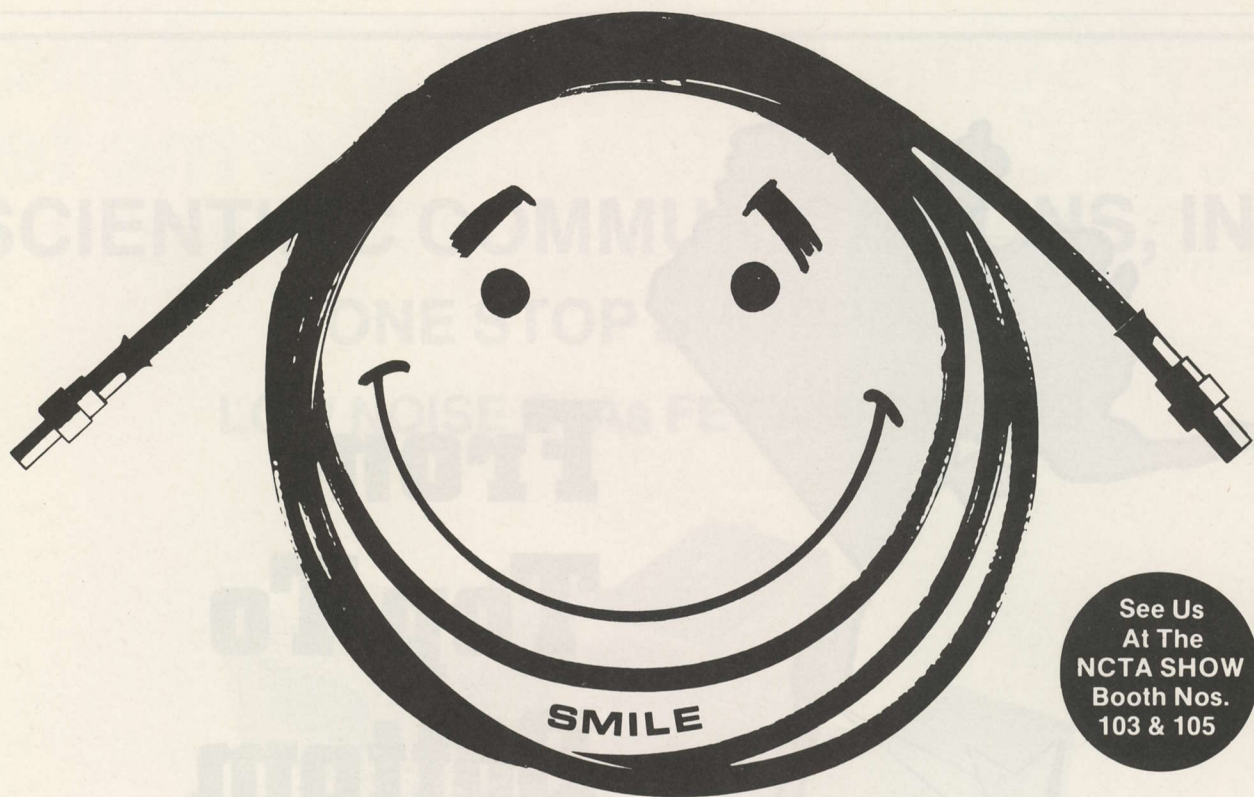


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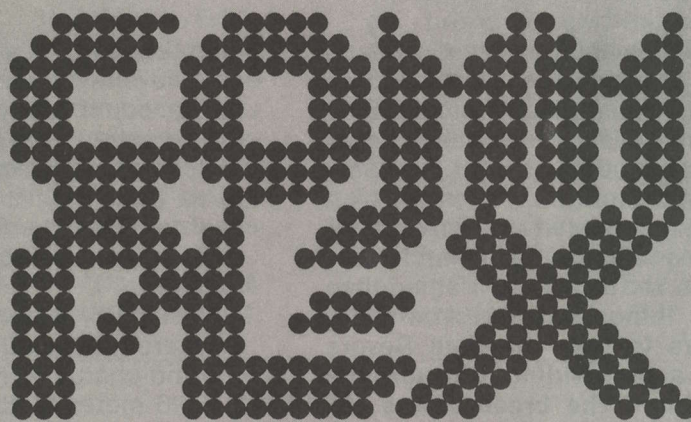


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Scrambled, STRAP and Addressable

BROADCASTERS 'DISCOVER' JUST HOW NEAT SATELLITES ARE AND HEAD FOR THE BIRDS

There are two ways to approach the dramatic announcement that the broadcast industry has finally awoken to the potential of the communications satellite. The pessimist probably would approach the bearer of the news with the same disdain saved for Chicken Little. "I don't think it will amount to much" suggested one network VP during the NAB meet in Dallas late in March.

And then there is the optimist. Rather than blaming the whole thing on a Chicken Little mentality, he prefers to take the Paul Revere approach sending a man riding through the countryside shouting "The broadcasters are coming...the broadcasters are coming...". In either event one is reminded that in ancient Per-

sian times the bearer of ill news was often dealt with severely; the ruler ordered his hands cut off so he could 'carry' no more bad news to any other corner of the kingdom.

Someplace between these two extremes is the truth. Let's look at what we do know, for fact or near fact, and then try to sort through what all of this may mean to the cable communications industry.

Fact: RCA Americom has announced a plan whereby they will install, operate and maintain at no charge to the commercial broadcaster a 4.5/6 meter earth receive terminal at each of the approximately 725 operating VHF and UHF commercial TV outlets in the United States.

PROPOSED POST - EXPERIMENTAL PHASE SMARTS RATES

UPLINK & SATELLITE CHARGES *
(\$/hr)

	NON PREEMPTIBLE		PREEMPTIBLE	
	PEAK TIME	OFF-PEAK TIME	PEAK TIME	OFF-PEAK TIME
OCCASIONAL USE				
1000 hr per year commitment	750.00	450.00	350.00	350.00
2000 hr per year commitment	520.00	300.00	250.00	250.00
	420.00	250.00	200.00	200.00
	PROTECTED		NON PREEMPTIBLE	
	PEAK TIME	OFF-PEAK TIME	PEAK TIME	OFF-PEAK TIME
FIXED TERM USE				
6 hr per day commitment +	276.83	125.00	213.00	100.00
12 hr per day commitment +	263.33	125.00	200.83	100.00
18 hr per day commitment +	246.66	125.00	187.33	100.00
24 hr per day commitment +		183.33		137.50

*Standard Tariffed Charges Now in Effect.
+ Consecutive Hours.

NOTE:

PEAK TIME - 5:00 pm to 1:59 am Monday Through Friday (NYT)
12:00 Noon to 2:59 am Saturday And Sunday (NYT)

OFF-PEAK TIME - 2:00 am to 4:59 pm Monday Through Friday (NYT)
3:00 am to 11:59 am Saturday And Sunday (NYT)

One glib competitor at Western Union labeled the RCA marketing move "**the old razor trick**". He meant that RCA was going to give a razor (TVRO) to each broadcast station, and then sell razor blades to the system. It is not a bad marketing ploy. Kodak never made much money on its cameras. Ditto Polaroid. Gillette probably loses money on their razors as well.

Fact: RCA left the NAB convention in Dallas late in March with more than 100 broadcast stations already signed on the line for the 'gratis' terminals. Some RCA sources were forecasting that number would reach 200 terminal-commitments by mid-May.

RCA is to purchase the terminals on the open market. RCA will probably use three or more 'turn-key suppliers' for the terminals and the same suppliers who have been making it possible for CATV to rush into the satellite era are now turning some of their attentions to RCA. An earlier announcement that suggested that Scientific-Atlanta had been chosen as the supplier prior to the first announcement is denied by both RCA and S-A although logic suggests that S-A is likely to end up with their fair share of the business as a minimum. For the record, their share of the **cable** terminal business these days is in the 60-65% region.

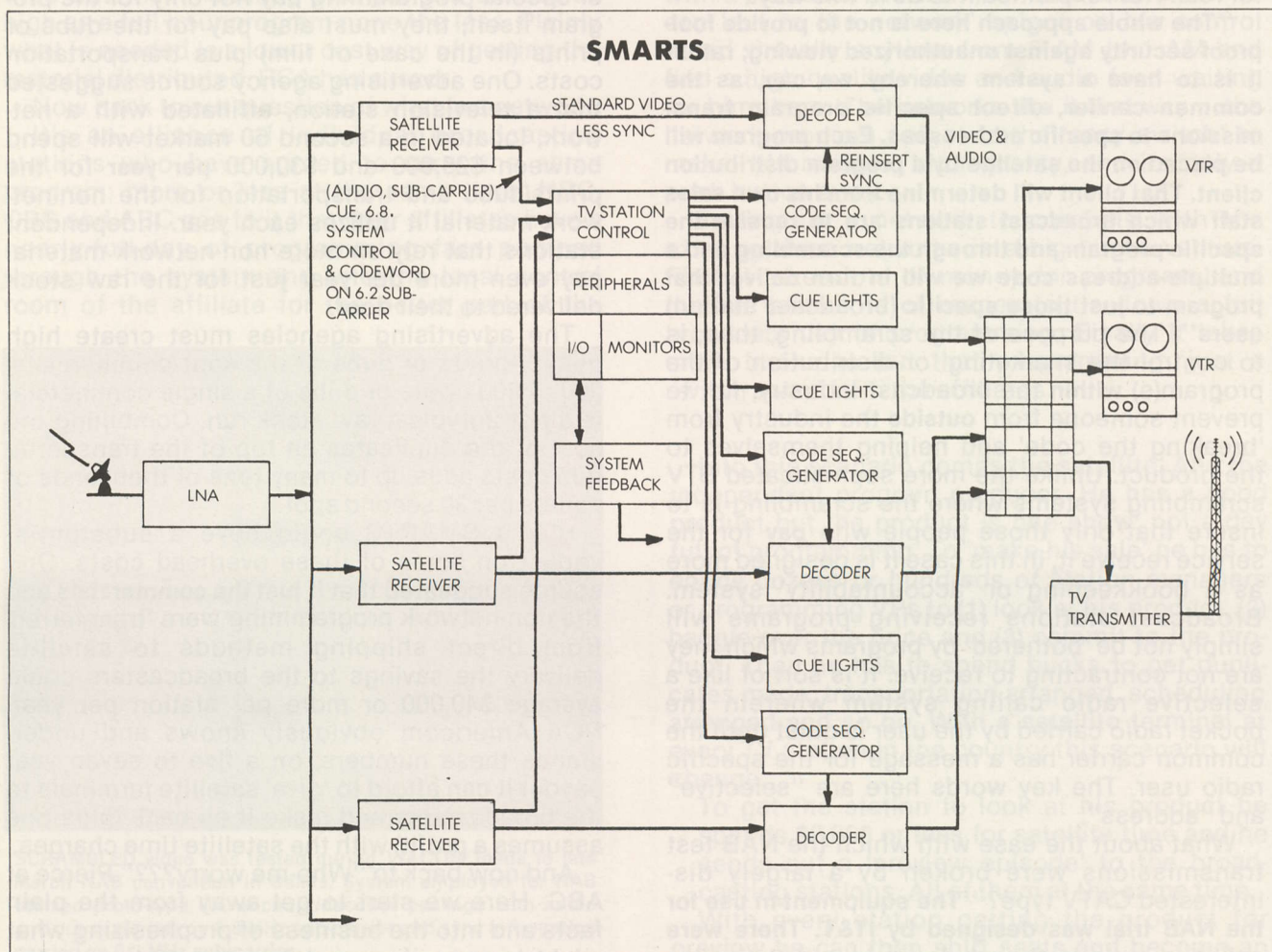
Fact: Four Post-Newsweek television stations (including WJXT Jacksonville, WPLG Miami,

WTOP Washington and WFSB Hartford) agreed with RCA and VIACOM (they have an 'interest' in SHOWTIME) to start conducting 'tests' of the RCA Americom satellite linking to broadcast stations as early as August.

RCA initially announced that the test would be conducted to determine the operational feasibility of their 'SMARTS' (Selective Multiple-Address Radio and Television Service) system. However, immediately following the NAB meet where RCA had so much success signing up broadcasters for the 'free' terminals, RCA indicated it would probably **bypass** the testing period and roll directly into the full scale implementation of SMARTS by late summer or early fall.

Fact: RCA demonstrated a prototype 'scrambling system' at NAB wherein the SMARTS transmissions were sent via satellite in a 'jumbled' format. RCA says that they envision all broadcaster-directed SMARTS transmissions being scrambled at the uplink/origination site.

The scrambled service signal was not watchable on a normal receiver alright (see photo here). The audio came through unimpaired. However, after it took one bright CATV type around five minutes to locate the scrambling signal over on the 6.2 MHz sub-carrier and to put everything right again CATJ asked several RCA people about (1) their real intent with the scrambling





approach, and, (2) whether this system was really for real. RCA explained it to us in this way:

"The whole approach here is not to provide fool-proof security against unauthorized viewing; rather it is to have a system whereby we can, as the common carrier, direct specific program transmissions to specific addressees. Each program will be placed on the satellite by a program distribution client. That client will determine from his own sales staff which broadcast stations are to receive the specific program and through the scrambling and a multiple-address code we will in turn deliver that program to just those specific (broadcast station) users". The purpose of the scrambling, then, is to control the 'marketing' or distribution of the program(s) within the broadcast industry, not to prevent someone from outside the industry from 'breaking the code' and helping themselves to the product. Unlike the more sophisticated STV scrambling systems where the scrambling is to insure that only those people who pay for the service receive it, in this case it is designed more as a bookkeeping or 'accountability' system. Broadcast stations receiving programs will simply not be 'bothered' by programs which they are not contracting to receive. It is sort of like a selective radio calling system wherein the pocket radio carried by the user is quiet until the common carrier has a message for the specific radio user. The key words here are "selective" and "address".

What about the ease with which the NAB test transmissions were broken by a largely disinterested CATV type? **"The equipment in use for the NAB trial was designed by IT&T. There were only two units in the whole world and they were**

here as prototypes for testing. This may not be the ultimate system put into use". An IT&T source at NAB explained that the system will use five separate techniques to 'randomly fold over sync tips and invert key video information'. That may be what they intend to do, but that is not what they were doing during NAB.

Fact: The networks say they are not interested in satellite distribution.

ABC-TV President Frederick Pierce is quoted as saying **"So far we cannot see where it will be to the network's advantage, economically, to utilize satellites for regular program distribution".** Mr. Pierce has larger worries with the satellites than shaving a few million off of his own network's operating overhead.

There are three primary suppliers of programming material these days. The networks are the largest such supplier and RCA apparently is not too concerned about this portion of the market for now. What does interest RCA are the two remaining categories:

- 1) **Advertising agencies** that must create, duplicate and then distribute spot commercials, and,
- 2) **Independent** (meaning everyone that is not on the networks) program supplies.

Here is some of the math involved. Television stations that purchase syndicated or off-network or special programming pay not only for the program itself, they must also pay for the dubs or prints (in the case of film) plus transportation costs. One advertising agency source suggested that a television station, affiliated with a network, located in a second 50 market will spend between \$25,000 and \$30,000 per year for the prints/dubs and transportation for the non-network material it utilizes each year. Independent stations that rely on more non-network material pay even more per year just for the raw stock delivered to their door.

The advertising agencies must create high quality prints or dubs of the spot commercials; 200 to 300 prints or dubs of a single commercial is a not untypical raw stock run. Combining the cost of the duplicates on top of the transportation costs adds up to many tens of thousands of dollars per 30 second spot.

RCA's SMARTS could have a substantial impact on some of these overhead costs. One source suggested that if **just the commercials** and the non-network programming were 'transferred' from direct shipping methods to satellite delivery the savings to the broadcasters could average \$40,000 or more per station per year. RCA Americom obviously knows and understands these numbers; on a five to seven year payout it can afford to 'give' satellite terminals to the broadcasters and make it all back (plus one assumes a profit) with the satellite time charges.

And now back to "Who-me worry???" Pierce at ABC. Here we start to get away from the plain facts and into the business of prophesizing what might happen if every television station in the

United States had its own TVRO. Define a network.

Let's see. Two or more stations (the FCC says ten usually) carrying the same program at more or less the same time. Now how do stations get the ability to carry the same program at the same time? Well, in the case of some of the special networks such as that formed by Mobil Oil to air 'Edward The King' this past spring, those expensive duplicates of the one hour program are made and shipped via expensive terrestrial transportation systems to say the 125 stations involved. They they are all airing the same episode at the same time and for this reason **they are a network.**

If high quality duplicates plus transportation came to \$200 per episode for each of the 125 copies of Edward The King that comes to a tidy \$25,000 per episode just for mechanics. Had the satellite SMARTS service been in operation the whole transmission could have been sent out once, by the folks at RCA, for around \$2,000 or so. Perhaps less. That's \$23,000 in somebody's pocket. And that's the kind of logic that RCA is using when it is talking with broadcasters (who must bear **their own share** of the transportation and copying costs) and with the program producers and syndicators. The same math holds for commercial spots. The spots may run less time but their handling charges are almost as high as a full hour program none the less. Plainly what is needed is a lower cost way of getting the material distributed. RCA has a razor.

Now back to our question of what is a network.

It's an alliance of individual broadcasting stations who have agreed to carry the same program; more or less at the same time. NBC, CBS and ABC see to it that their affiliates have a nearly-full-day of programming fare pumped through the system and into the local control room of the affiliate for the better part of the



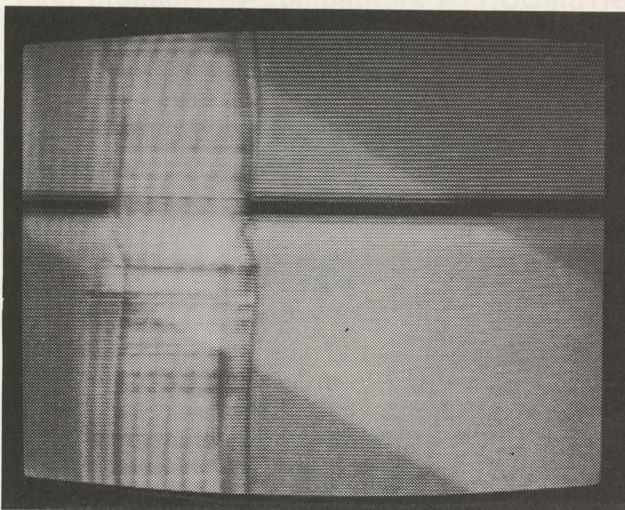
broadcast day. Seven days a week. A station manager, a program manager or whomever it is with a particular (network) affiliate knows that he can 'cut to the network' spigot on his control board virtually anytime from 6 AM to 1 AM and find a high quality video and audio feed waiting for him there. **The networks like it that way.** . .the network program spigot is the 'easy switch' to make. It's reliable, high quality, and its only a push button away.

Setting up a network to compete with the existing three networks is a big bucks venture. First it takes lots of money for programs, and then it takes lots of money to tie down a full broadcast day of programming. Finally it takes more bucks to put that programming 'just a switch away' from the affiliates.

Into this scenario comes the satellite. And the independent program producer. He has a good product but the product is one show; not a day full of programming. To 'make his sale' he has to entice dozens or hundreds of station managers or programming VPs to (1) look at his product, (2) haggle over the price and (3) commit to the product. Then he has to spend bucks to get duplicates made, transportation arranged, scheduling arranged and so on. With a satellite terminal at every TV station in the country this scenario will change.

To get the station to look at his product he spends \$2,000 or less for satellite time and he sends out a 'preview episode' to the broadcasting stations. All of them at the same time.

With every station getting the product for preview he can then shift seats and become an



SCRAMBLED video was tested during VIACOM feeds to late March NAB convention in Dallas. System employed for NAB utilized proto-type ITT encoder/decoder package with audio and cue materials on 6.8 MHz sub-carrier and sync information carried on 6.2 MHz sub-carrier.



SCRAMBLING on VIACOM test transmissions changed the normal sync information so that without decoding information viewer could not follow video material.

auctioneer rather than a suede shoe salesman. And he can do this for far less money than if he took his product to a trade show and rented a suite to show off the product to perhaps ten percent of the potential buyers. Best of all...he can do this in near real time. RCA will even help him out with special off-peak time satellite rates. He can transmit the preview program to hundreds of stations during the wee hours of the night, when rates are down (for RCA, like Ma Bell, charges less for transmission time when the circuits are not busy), and then go into the office the next day and wait for the telephones to start ringing. Too simple? Perhaps, but you begin to get the idea.

Now... if the independent program producer can now preview his product at virtually every potential client (i.e. broadcast station) in the country at one time, what about taking it a step further? Let's return to our control room console and the 'easy switch'. Remember one of the big attractions to the station manager is the ease with which he can switch to the network program feed. It sure beats worrying about where your next program is coming from.

If the modern control room has a single spigot out of which the network program feeds pops on command, **let's modify the console just a tad and put in 12 more identical spigots.** Now let's connect the 12 new spigots to say a bank of TVRO receivers; each of which is connected to a SMARTS channel on an RCA satellite.

Now we have not one but 13 'easy switches'.

On a given night the station programming personnel now have some decisions to make. They can make an 'easy switch' to the regular network fare, or they can select up to 12 other programs that are on the bird for them at that time. Let's assume the station programming personnel elect to dump LaVerne and Shirley this particular Tuesday evening in favor of a World Cup Soccer telecast from Brazil. The switch is easy enough

...simply push the spigot control button for the appropriate satellite channel.

The ramifications are immediate and widespread. Let's see what happens when L and S gets dumped by the local ABC outlet for one night:

- 1) **ABC loses its normal outlet** for L & S in that market and immediately they go to work to talk another station in the same city into picking up the dumped program. After all, the network gets paid for 'home circulation' and if they lose say 250,000 homes because of the pre-emptive dump they are going to start seeing their national sponsorship advertising dollar receipts dwindle.
- 2) Neither the CBS nor the NBC affiliates in the market elect to pick up L & S that evening: they are both into programming that began 30 minutes before L & S was to air.
- 3) But a local (UHF possibly) indie elects to take the L & S feed; for that night and that time period.

Now had say the NBC station been in a position to pick up L & S that would have left two regular network feeds 'hanging loose' in that market for that time period. The ABC L & S show would have shifted to NBC for that night only, and the NBC feed would have been up for grabs. Perhaps the local (UHF) indie would have opted to take it, or perhaps the UHF indie would have opted to take something out of the other 11 spigots that it has available at its own control room console. And all of this presumes that the program syndicators are sending everything down the pike (or through the satellite) in 'real time'. RCA believes that much of what is transferred through the satellite will run off-peak-time periods. One RCA source prognosticates that the busiest time of all may well end up being between 1 AM and 6 AM. He expects these lower cost time periods to 'sell out first'. RCA's SMARTS system is planned for that likelihood; in addition to sending down programming and de-



scrambling signals through the satellite system RCA will also transmit cue tones and other electronic signals that will turn on station VTR decks to record an off-peak-time feed, and then turn off the decks after the feed is over. In theory the broadcast station manager would come to work at 8 AM and find many hours of his next day's broadcast day all neatly rolled up on 2" quad tape ready to play when his local scheduling fit the program.

In his remarks prepared for the program syndicators RCA's Andy Inglis said "...this innovative satellite service provides a switching capability that enables the program supplier to select the precise combination of stations he wishes to reach. We can easily tailor the distribution to meet the requirements of each program supplier".

FCC Chairman Charles Ferris sees the other side of the coin.

"There is no magic in the number '3'. Economics may dictate that stations in different markets will cooperate in some organization form to select programs, gather news and sell advertising time. But it is not clear (in my mind) that there is room for only three networks. . .".

It is equally clear that a 'network' does not have to provide anything approaching the present 18-20 hours per day of 'easy switch' programming to be viable. The Spanish International Network, which actually beat the rest to the satellite more than two years ago, has been averaging under 12 hours per day (on WESTAR) for five to eight stations; and few of these take all that is fed via satellite. One is moved to observe that the networks have gotten away with their domination of programming for so long largely because **they were the easy switch**. The satellite promises to change all of that and soon. Chairman Ferris sees it that way. "I think most people who complain about networks in reality seek alternatives". The satellite system envisioned by RCA (and probably by competitors ATT/COMSTAR and Western Union/WESTAR) is going to provide those alternatives. Michael J. Gould, Vice President of Taft/H-B Program Services sums it up. "The bottom line is that it won't be very long before television programming, sales and networking will be considerably changed; if only by the technology of distribution."

What about the confusion that all of this program swapping and pre-emption will cause in the marketplace? Russell Barry, Senior Vice President for Worldwide Syndication at Twentieth Century-Fox Television suggests that the fierce network competition has paved the way for an unstructured television marketplace. "We have seen the regular television 'season' get shorter and shorter. Event television, mini-series and specials are on the upswing as network competition has escalated. We have an electronic entertainment revolution on our hands and we now have to deal with a liberated viewer".

Cable of course is a big part of the liberated viewer's new found freedom. With cable now into

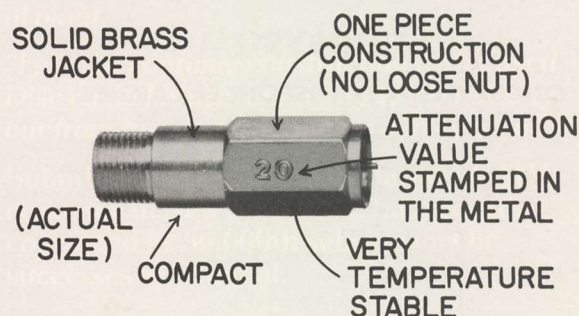
almost one American home in five (and pay-cable already into one home in 15) the day when a viewer was forced to accept the local station's viewing fare (or read a book) is almost in antiquity.

Cable will feel the broadcaster's jump into the satellite arena on several fronts. Viewer habits will become disrupted and systems required to provide syndicated program exclusivity will find it more and more difficult to keep up with extremely fluid program schedules that change by the day and perhaps by the hour. If the scrambling system proposed by RCA becomes an economical system, cable feeds may also turn to a scrambled mode for similar (addressable) reasons.

Some far sighted individuals suggest that with the broadcaster's discovery of satellites the operating habits of broadcasters and cable may come closer and closer together so that ultimately it will be difficult to tell one from the other. Chairman Ferris said it best of all at NAB in March.

"The FCC can take some credit for the recent increased networking opportunities. In adopting an 'open skies' satellite policy in the first part of this decade, and its more recently relaxed policies on small satellite earth station size, the FCC has now opened the door to the new marketing possibilities we now see entrepreneurs exploring. These decisions, taken together, stand among the most significant FCC actions of the past decade."

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Ultimate Scrambling System?

RCA/AFRTS DEMONSTRATE TWO-FOR-ONE SATELLITE TRANSMISSION SYSTEM

During the last week in March RCA Americom demonstrated at both the NAB convention and the Armed Forces Communications and Electronics Association annual meeting in San Jose, California the operation of the newly approved **world-wide** AFRTS television and radio transmission system.

The system has been demonstrated and is in daily use in a **modified** format to provide lower-48 television programming to the Alaskan Bush Terminal mid-route station in Anchorage. In the system, shown here in block diagram, RCA transmits a **pair** of television programs using the alternate field (line) approach of Thompson-CSF (see CATJ for February 1978, page 40). At the uplink site a **single** video transmitter is modulated with a **pair** of video signal sources; alternate lines (or fields) are taken from each of the two video sources and the "50% definition" video is combined into a single baseband source for modulating the transmitter. **In this way two video signals share the same transponder in real time.**

At the receive site the process is reversed with a few wrinkles thrown in. The individual video

signals are separated into a pair of 'channels' and the processing system looks at the line **immediately above** and **immediately below** the missing line and creates a new **replacement line** by averaging the electronic impulses for the above/below lines. This replacement line, generated at the receive site in the video processing equipment, then upgrades the 50% 'definition' video for carriage or re-transmission beyond the site.

A similar system, tested by CBS in the fall of 1977, is in use for some of the INTELSAT (international) video circuits.

To demonstrate for the Armed Forces Radio and Television Service just how much channel loading can be accommodated in this system RCA placed an audio carrier (unrelated to **either** video) on the standard 6.8 MHz sub-carrier, and then created a new sub-carrier at 5.5 MHz which it digitally modulated with **four separate audio channels**; two of which were the accompanying audio for the two video signals transmitted. Then to add additional versatility to the system RCA arranged to transmit an INFO-TEXT static video message display channel on the same

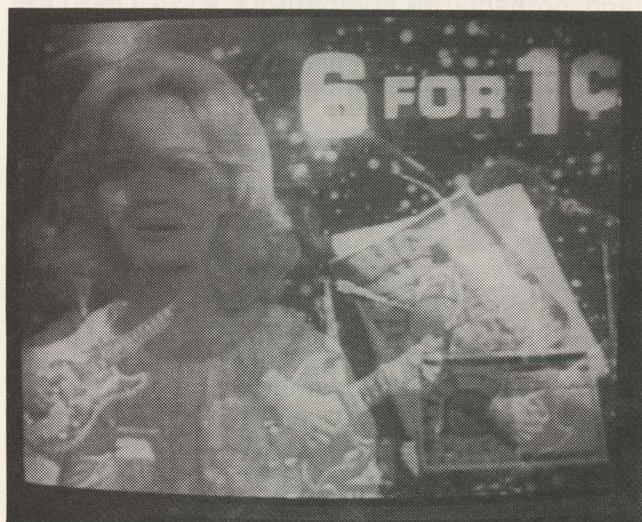
AFRTS SYSTEM

ONE SATELLITE TRANSPONDER CARRIES

- Two Video Programs (Alternate Line "Loading")
- Five High Quality (15 KHz) Audio Channels (1 At 6.8 MHz, 4 Digital Audio On 5.5 MHz)
- Graphic And Alphanumeric Information In Color (In Vertical Interval)

ACCOMPLISHED BY USING

Video	Alternate Field - Vidiplex - Thompson CSF (Similar To CBS 'Strap')
Audio	Digital Audio For Television - Date - DCC + One Conventional (FM) Program Channel
Graphics	Infotext - Micro TV



TWO FOR ONE VIDEO, shown during NAB convention, sent a pair of separate video channels through a single transponder. Audio on normal 6.8 MHz sub-carrier was unrelated to video; program audio was found on 5.5 MHz sub-carrier in digital format.

A Top Engineer... On Fused Disc Cable



Bob Bilodeau, Vice President, Engineering for Suburban Cablevision of East Orange, New Jersey had this to say in a recent letter to us:

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amplifier spacing (electronics density) and the parameters of power supply per mile of plant.

"I plan to continue constructing with Fused Disc cable for the remaining 1,600 miles of our franchised northern New Jersey area."

Suburban Cablevision is the largest CATV company in New Jersey and has recently connected its 50,000th subscriber. Our successes are mutual.

General Cable

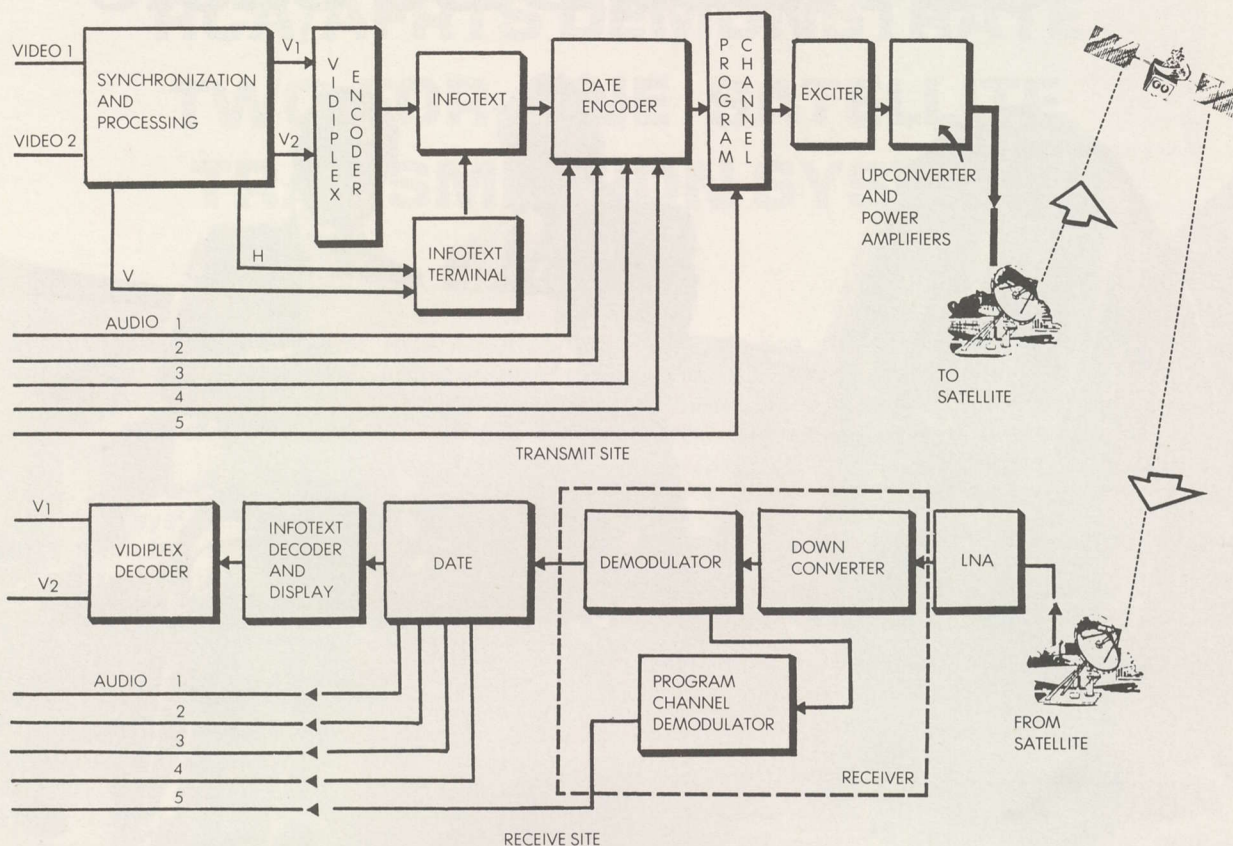
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BLOCK DIAGRAM OF SYSTEM



transponder. The INFO-TEXT system inserts pages of graphics or alpha-numeric information into the vertical blanking interval of the standard NTSC color signal. The INFO-TEXT signal essentially rides along 'for free' and provides the viewer with a changing display of static graphs and alpha-numerical pages of up to 20 lines per page with 40 characters per line.

RCA Americom was granted a contract last November to develop a system whereby U.S.

Armed Forces overseas would have via satellite relay up to a pair of simultaneously fed television programs (plus accompanying audio and unrelated audio such as AP and UPI voice news services) at virtually any U.S. military location in the world. RCA plans to implement this system by creating the master feeds for the programming at either Los Angeles or New York, and delivering the packaged programming (probably utilizing the alternate field approach

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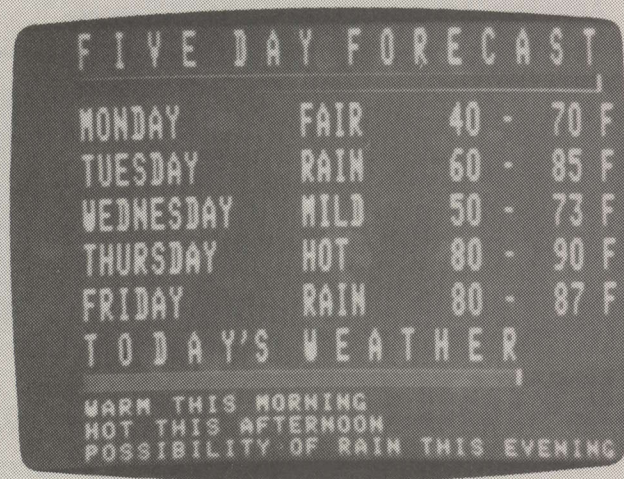
MICRO TV INFO-TEXT™ DATA TRANSMISSION SYSTEM



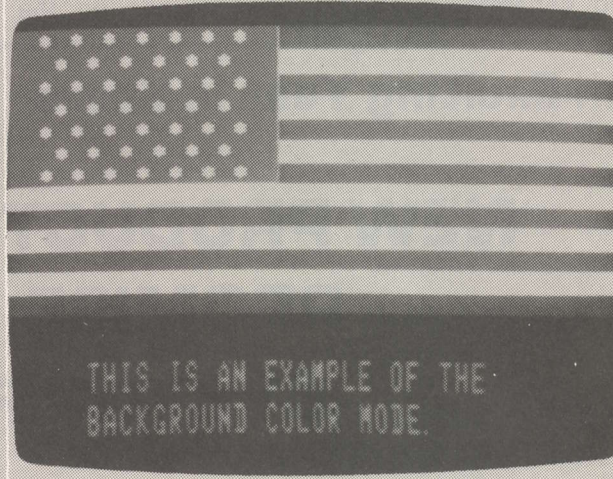
INFO-TEXT ENCODER TERMINAL



IF-2000 DECODER



WEATHER



PATTERN CAPABILITY

demonstrated) via RCA domestic satellites to U.S. bases that can be reached directly by SATCOM, or to so-called 'gateway stations' interconnected to the INTELSAT system for delivery overseas via INTELSAT birds.

Through the RCA domestic satellites, programming will be delivered directly to Shemya (Alaska), Guantanamo Bay (Cuba) and Roosevelt Roads (Puerto Rico) for local redistribution through either low power re-

A Product for your Pay TV Requirements

**New,
The MDS Mini-Combo ...
Combines the antenna
and downconverter into
one, economical unit.**



broadcasting stations (VHF or UHF), or, through cable re-distribution facilities. The same service will also provide service to a West Virginia 'gateway station' interconnected with the INTELSAT network, and a California station for the western INTELSAT birds. From there the INTELSAT facilities will carry the U.S. TV programming overseas through one or two hops of INTELSAT birds to U.S. bases throughout the Pacific, Asia, the middle east, northern Africa and Europe.

Up to the inauguration of this program (expected late 1979 or first quarter of 1980) U.S. forces overseas have been supplied with either videotapes of U.S. programming (one week to one month late) or in special circumstances (such as the U.S. forces in the Canal Zone) through 'occasional' satellite relay.

Some cable observers have suggested that RCA (Vidiplex) or CBS (STRAP) systems may harbor the seed for the 'ultimate scrambling system' for cable's use of the satellites. Not only does the system provide **two video signals per** (standard) 36/40 MHz wide **transponder**, but with two separate unrelated video images on the

screen the viewer unlucky enough to not have a 'separator' at the receiver is treated to an almost totally distracting pair of video pictures. The cost of the transmission end 'encoder' is (relatively speaking) quite inexpensive; \$5,000 per unit. However the present technology which allows the receive end 'decoder' (which functions at baseband) to work is a healthy \$30,000 per transponder channel (or \$15,000 per video channel). Several sources estimate that with 'quantity production' the cost of the decoders "**might be brought down to around \$15,000 per transponder channel**"; or \$7,500 per video channel. The system makes use of both storage and processing IC technology which holds out the hope that in (very) large production quantities these cost figures might drop dramatically as specialized ICs are developed for the application.

Low cost or not, by this time in 1980 it is likely that for at least some hours of each day anyone within reach of an INTELSAT satellite will be able to tune in American television originated by RCA for AFRTS and transmitted worldwide to the American Armed Forces.

An Exciting Year In Store

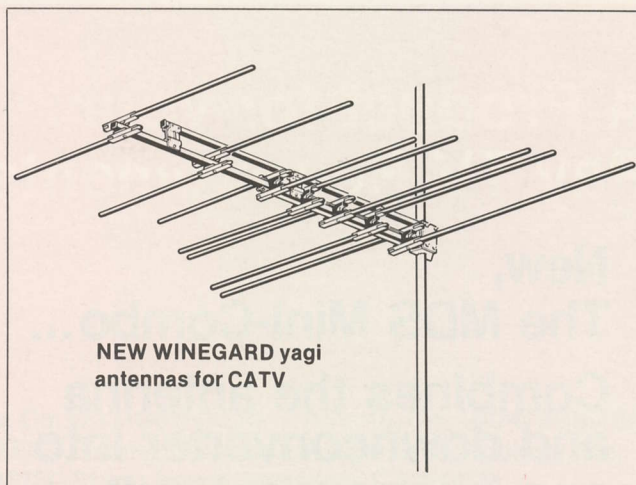
NEW PRODUCTS AND SERVICES PROMISE INCREASED SYSTEM FLEXIBILITY

What You See...

For almost as many years as there has been a CATV industry, manufacturers of hardware (and more recently software) have played the 'NCTA Show Game'. The rules are simple; you load up your advertising budget to spend 25-30% (or more) of the annual amount during the show month. Plus, you change the calendar in the R and D department so new products roll out of the labs and onto public display to coincide with the annual bash. And if you have any particularly large contracts being signed, you delay formal announcement of these signings until the eve of the convention. In other words it's called the bandwagon approach. A frenzied peak of activity, development and success all comes to a head once per year. This year because of scheduling changes and other snafus the last ten days of May are the target dates for the cable industry.

Because magazine deadlines seldom fall precisely where scheduling would allow the 'trade press' to break these announcements in

'monthly' or bi-weekly publications (**this** is being prepared more than five weeks in advance of NCTA) the industry 'obliges' by providing 'convention dailies' for distribution on the con-



NEW WINEGARD yagi
antennas for CATV

Introducing two new line extenders.



When new homes get built down the road next year, you'll be mighty glad you used Scientific-Atlanta 6552 Line Extenders this year. Because our new two-in-one design lets you extend service using nothing more than a hybrid chip.

When you want to grow just plug the chip into our 6552. And get a boost

from 32 dB to 35 dB just like that. Or you can buy our 6553 with the higher gain chip to begin with if you like.

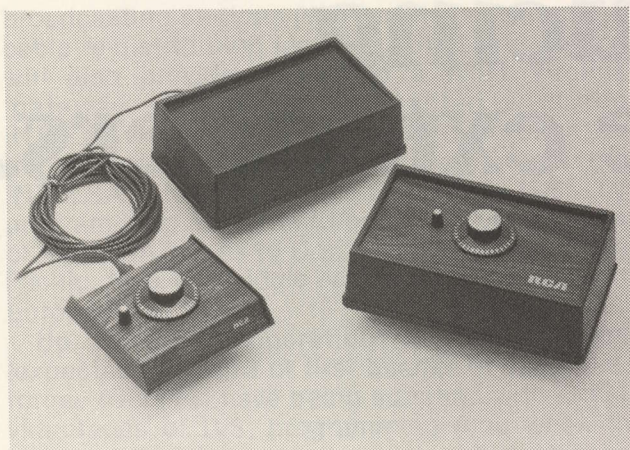
You'll find that our new line extenders also facilitate speed, accuracy and ease of set up. And feature lower power consumption as well. For more information on how we chip away at systems costs, call Skip Webb at (404) 449-2000.

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See us at NCTA — Booth 82



NEW RCA 36 channel converters

vention floor. Many products you will see (or subsequently read about) at NCTA are in fact still on breadboards as **this** is written. Obviously many CATV engineers and technicians are burning the mid-night oil at plants all across the country at this time.

Therefore not all of the products you will see 'new' at NCTA are mentioned here. Perhaps fewer than 25% are visible this far in advance. Some who have completed R and D are simply 'suspicious' of anyone asking for material in advance. Jerrold, for example, is 'rumored' to be planning a number of new subscriber converter products but they prefer (like most others) to wait until the opening of NCTA to pull off the wraps. **You can't blame them.**...if a competitor got wind of the particular approach they are taking with new products weeks in advance it is not inconceivable that the competition could show up with a proto-type similar product at the show. Security is tight because big bucks ride on new products. Especially in a free wheeling market such as we have today.

With those caveats out of the way, let's see what we **do know** about weeks in advance of NCTA.

Antennas and Tower Products

Off-air antenna products haven't changed much in possibly six years. One might suspect that with the advent of satellites and the rapid spread of AML and CARS band FM microwave that off-air signals would not attract much attention anymore. Well, a company that is no stranger to the antenna world (**Winegard Company**, Burlington, Iowa) will be announcing **their first** designed-for-CATV antennas. The CH series yagis are (1) ruggedized, (2) light weight, and (3) reasonably priced. There are five models available covering channels 2-4, 4-6, FM, 7-10 and 11-13. Gain over an isotropic source (subtract approximately 2.3 dB for a dipole reference) varies from 9.5 to 14.8 dB (i). Price range is around \$100 and NCTA booth number is 180.

Something you seldom give much thought to (but should) will be on display at the **Microflect**

booth. Waveguide for microwave (AML/CARS) doesn't just tape to a tower leg or lay on the ground; it has to be carefully supported with the appropriate 'hanging' equipment. One of the largest suppliers of this type of specialized hardware, Microflect, will be at NCTA showing us how you get up and down towers; in and out of buildings and around corners with the multi-buck-per foot microwave transmission line systems. If you don't know anything (or enough) about such apparatus, stop by for an education. This is one of those product areas where when you need it, you need it bad and there's no corner hardware store to bail you out.

Cables

Fiber optics transmission systems will be on hand in Las Vegas for 'generation three'. Now there are some reasonably long systems operating (Ontario for one) with field proven results, FO may be starting to attract more interest of cable operators. The primary use area at this time seems to be in Hub trunking and remote head-end links but the day is coming (we predict in the 1981-82 time frame) when you will need to seriously address fiber optics hardware for more mundane tasks such as distribution plant design. **Belden Corporation** now has a 20,000 square foot plant on stream producing 'pilot runs' of the stuff and we suspect part of their NCTA booth will be devoted to this futuristic cable technology.

At the far opposite end of the cable technology spectrum Belden also recently introduced a pair of **new RG-11/U** cables. Model 9011 utilizes 14 gauge solid copper-covered steel wire center, cellular poly dielectric, Duofoil® foil-film-foil shield with a 40% aluminum braid and a black PVC jacket. Style 9012 is the same with messenger. One thousand foot spools are available with suggested **resale** pricing of 13 and 15 cents per foot respectively.

(Subscriber) Converters

Converter technology is changing; perhaps dramatically. CATJ had originally intended to devote considerable editorial space to converters this month; much like we did MDS in April's CATJ. However so many of the converter suppliers said "**wait until we show at NCTA.**..." that we decided to put it off a while. If there are not some converter innovations worth studying at NCTA, we will be both surprised and disappointed.

The converter is a necessary evil. There is no other way to get more than 12 TV channels into the subscriber on a single cable. Converters are only utilized when there is a customer for the cable (therefore their cost is directly attributable to providing future income, unlike the plant itself which may pass miles of area with few if any connects). But the converter, unlike virtually everything that costs real money, is inside of the customer's home. Everyone knows the problem this creates. In a nutshell, the customer is

TOCOM_{INC} Introduces



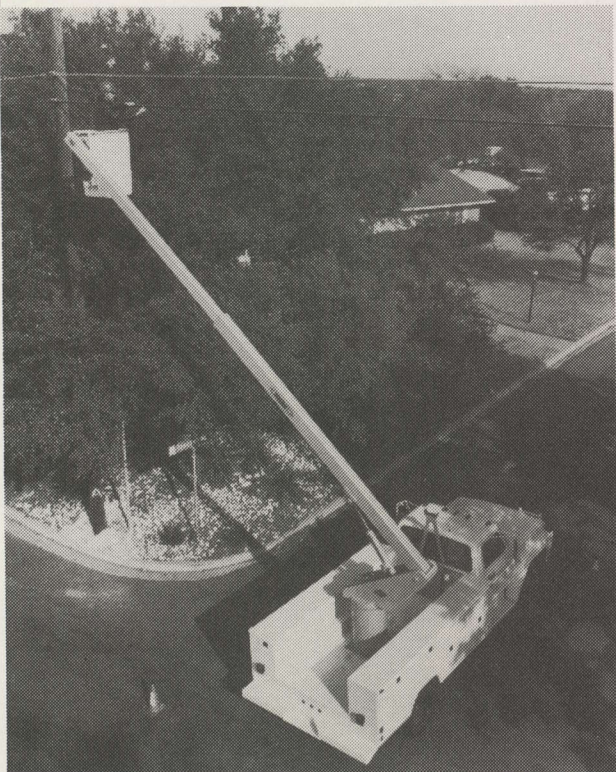
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TIME MANUFACTURING hydraulic lift for CATV

always right and the cable company's converter is always wrong.

If a converter was simply a frequency translation device, life would be fairly simple. Unfortunately the converter is turning into a **subscriber terminal**. It provides subscriber access to additional channels, it acts as a pay/regular TV selector, it may or maynot be capable of being remotely tuned or controlled and in some instances it is also turning out to be a descrambler or decoder. The cable operator wants it to do all of this for say \$20; because the cable operator figures that sooner or later it is going to be stolen, dropped and broken or used as a weapon in a domestic quarrel. He figures, begrudgingly, on losing it.

If you have need for converters (now or soon), shop around carefully and make it a point to investigate everything shown at NCTA this year. We'll do the same and then in a couple of months we'll try to sort out the facts from the fiction for you.

Oak Communications has made a very decent name for its converter products and at the Western Show in Anaheim this past December they quietly displayed a new "addressable technology" converter system. It works (basically) this way:

- 1) At the headend (or in your office through a box at the headend) an 'addressing machine' can be programmed to interrogate any matching Oak 'addressable Econo-Code converter/decoder' in the system. If you want to shut off a cable subscriber pay service, you simply dial up the appropriate key-

board code for that subscriber's unit.

- 2) The addressing signal is transmitted through the system and the specific converter addressed receives the message and turns on (or off) the pay service.

This sounds alot like addressable taps, only here you address a converter and the CATV plant stays like it originally was. This system is quietly being tested by Oak at **Brunswick, Georgia** and will also be tested by Century Communications in one or more of their systems soon. Oak's system is based upon some proprietary hardware they created for the STV over-the-air system in Los Angeles. This is probably too good a concept to go unchallenged by the competition. Oak will also be showing a new low cost block converter called appropriately "The Bloc" which provides seven channels of service (A-G), and a new 30 channel "Econo-Line Thirty" package.

AEL will be showing their AEL-DCU which converts and descrambles either two mid-band or two super-band channels to either channels 2, 3 or 4. Of interest is the noise figure; 8 dB is claimed.

RCA joins the battle of extra channels with a new 36 channel set top converter that is available in both one piece and two piece (as in remote control) versions. Specs on the new converter were missing at press time; categories such as overload performance and dynamic range were noted as "excellent". Output is either channel 2 or 3 (4 special order).

Construction Aids

With new construction for CATV plants heading towards a new annual mileage record one might suspect that there would be a host of new hardware in this area as well. One manufacturer, **Time Manufacturing Company**, has announced a new Tel-30/34 telescopic model 'medium height' aerial lift which has a rated lift capacity of 350 pounds for working heights of 35 and 39 feet and side reach capabilities of 22.5 and 26.5 feet. The new model(s) are designed to install on a 1.5 ton truck with a 60" minimum cable to axle measurement.

Head End Products

If you haven't looked very carefully at the full-line **Blonder Tongue** catalog lately, perhaps you should. BT has been adding a long list of new specialty products to their already large equipment line of late and two may have a special interest to you if you are into doing very high quality video transmission work. BT's model VM (4925) modulator is designed for **wideband video modulation** requirements (30 Hz to 8.125 MHz) with 13 different frequency models available ranging from 49.25 MHz carrier frequency through low, mid and high band groupings. With 8 MHz bandpass some really high quality (650 line resolution) pictures are possible. For the opposite end of the link, their model VDM (4924)

wideband video demodulator will bring you back down to baseband. BT also has a pair of high output capability single channel (on-channel) processors available; their model HMCA-b (4462) is rated at 76.0 dBmV (6.3 volts) while the MCA-b (4454) is rated at 68 dBmV (2.5 volts). And we've heard rumors of an even higher output capability (80 dBmV) coming from BT.

If you are looking for a tiny, compact box to reduce (drop) sound by say up to 12 dB, **Micro-wave Filter Company** has a new product for you. Priced in the \$25 range, model 3469 (sound reducer) measures 1 x 1.5 x 3 inches and with a single screwdriver adjustment allows you to knock down sound up to 12 dB. Three models are available, for low, mid and high bands.

Passives

The battle for passive sales seems to be going to opposite directions at the same time. Most firms now supplying in this market area have products in both, just in case one happens to catch hold fastest.

Theta-Com has a new tap which they headline with the price; \$5.75 for two outputs and twenty cents more for four. The specs are impressive, it has a plug-in module and it can be mounted either aerial or pedestal.

RMS counters with their Econo-Tap® which can also be aerial or pedestal mounted and they boast it will fit into a 4 inch pedestal enclosure.

RCA enters the passives area with not only directional (2, 4 and 8 way) taps but a line of directional couplers, splitters and a power inserter. All components can be pedestal or messenger mounted and have an integral hanger bracket which eliminates the 'need' for an extra bracket when the trunk cable (by) passes the device.

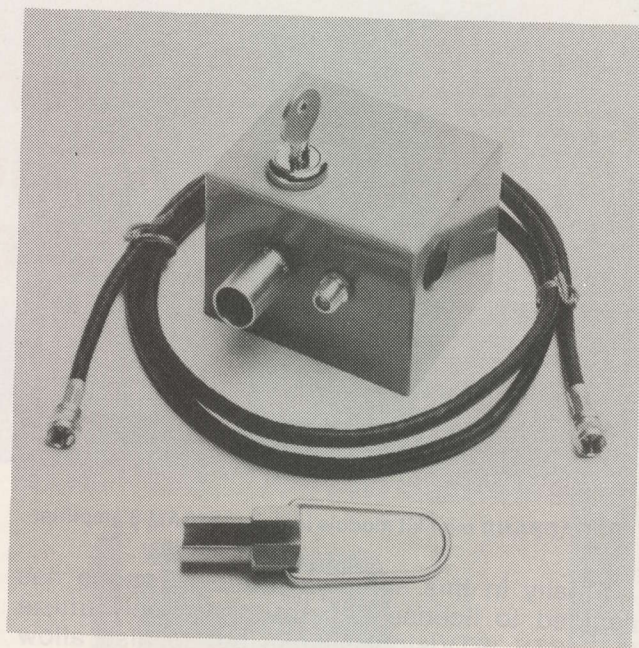
Pay TV/Security

The pay TV and/or security end of the business is beginning to merge into the converter area and perhaps in another year we'll be hard pressed to separate the two.

AEL has their AEL-D single channel 'descrambler' which they say is compatible with other descrambling systems. It can stand alone or be utilized with a converter and list price is \$18.95.

Microwave Filter Company brings on a Parental Control Switch for pay channels; a key activated trap to control access to a premium channel. The incoming system signals are inserted into a security shield to prevent disconnect or bypass by tool-handy subscribers and the output is jumpered to the TV set. Any channel (2 through W) can be supplied and two keys come with each unit. Quantity pricing is in the \$22 range with four week delivery.

In an allied area **TEST** will show their 'scrambler-booster' model SB-1; a high output (76 dBmV at 1 dB compression) 16 dB gain amplifier with a built-in power supply for driving MATV systems that require more soup than normal amplifiers can provide before going into distortion.



MICROWAVE FILTER's parental control key-trap

Merrill Cable Equipment Company (MCE) will be showing their CAP/TAP addressable tap. The addressable tap fortunes have not been too impressive of late, but Merrill has stuck by a basically sound idea from its inception where others have come and gone. In field tests the MCE package is proving itself as being a good contender for system control of premium (and other) program channel security and perhaps now that you have your TVRO in and paid for it is time to start thinking about better ways to police the people who are using your service.

Midwest Corporation

CATV DIVISION

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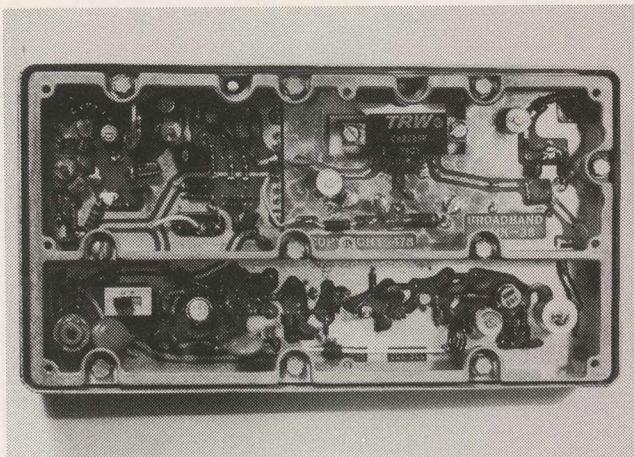
- Head End Equipment
- Line Amplifiers
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- Pedestals
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- Heavy Duty Antennas VHF & UHF
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BROADBAND mod-kit module installed in SAM-S amplifier

Finally in this sub-area **Blonder Tongue** has decided to license 'others' to not only utilize their STV (BTVision) system but to also allow other firms to manufacture (under license) the hardware that goes into the unique system. Blonder Tongue has been demonstrating their STV system for some years and it is certainly out of the R and D stage by now operating in over the air situations in both New York and Boston with Detroit planned for mid-summer of this year. Of

all of the scrambling techniques in use in STV, MDS and cable, we keep hearing that the BTVision system is the toughest to break even for extremely capable and well equipped 'experimenters'. Now BT wants to license 'qualified' firms to manufacture this equipment. We hope in the process they don't blow what has to now been an excellent security system to prevent unauthorized disclosure of the technical aspects of the system.

Plant Gear

Broadband Engineering (the folks who help you retro-fit older plant gear so that you can get many additional years of service out of it) has several new MOD-KITS which they will be showing at NCTA. The new kits cover both trunk amps, bridger amps and line extender amplifiers. Included is a complete line of push-pull mods for the (Jerrold) **Starline One SA-series** amplifiers, a 27 channel push-pull modification for the (Kaiser) **Phoenician** series, a push-pull hybrid approach to the (Jerrold) **Starline-20** series and finally a modification kit to allow you to change out the **SMM/SAM** series equipment 118.25 MHz pilot carrier to a (channel) operating frequency.

C-COR will be showing a new low cost (\$115) economy model line extender; the E-417. This unit operates on either 30 or 60 VAC (two versions), has the SPM-32 and gas diodes for protection from nasty voltage surges and transients, and is designed for the operator who wakes up one day and says "Hey—I do not now need, nor am I ever going to need two-way capability".

RCA is out with a 'new generation' of hybrid amplifiers which they say have 'improved noise, cross-mod, and composite triple beat' specs as well as 'improved module protection and heat dissipation'. Surge arrestors plug in from the top of the module without removal of the module covers. There are four new amplifiers in the line.

RMS will use Las Vegas to announce that they are now in the **power supply** business. They describe the new power supplies as 'Rolls Royce' units with no options; everything is built in standard. That includes time delay shut off for voltage transients, primary input circuit protection, gas-fired self healing 10,000 amp output rated voltage protection, a pair of output ports, 40 dB return loss 5-300 MHz, on/off primary circuit breaker, a pair of pilot light indicators for primary and secondary voltage indication, pole or cross arm mounting, Bell Telco outside finish corrosion resistant specs and 1600 volt bypass capacitors. Voltages available include 30 and 60 VAC. Plus about a half dozen other features. Price range is \$400.

Studio/Local Origination

A renewed interest in cable local origination, contrary to the recent Supreme Court decision on the topic, is likely at Las Vegas. Much of the hardware has been around for some months (or years) but has not been shown at cable shows of



Yep, it's a fact.

The BEI CG-410 costs only \$3600.00

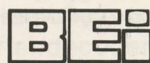
And includes as standard:

- 2 character sizes
- 2 speed roll & crawl
- Word flash & underline
- Automatic centering
- 1-2-4 line title window
- Helical Gen-Lock
- 8 pages of storage

(That's 3072 characters!)

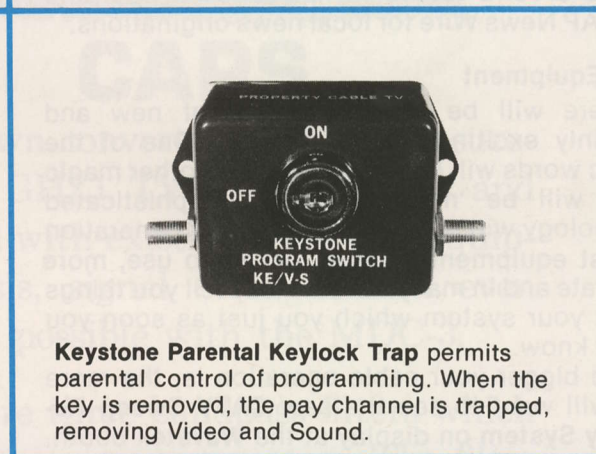
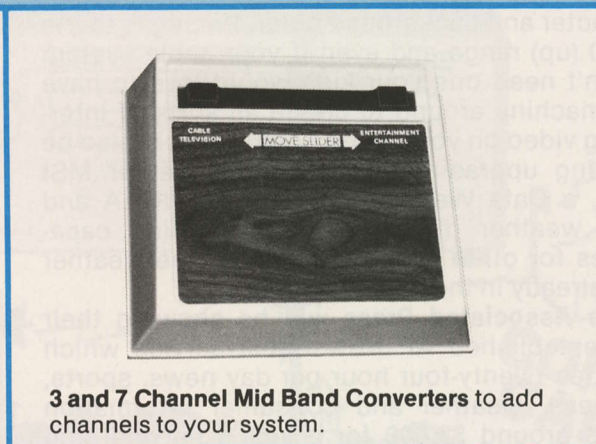
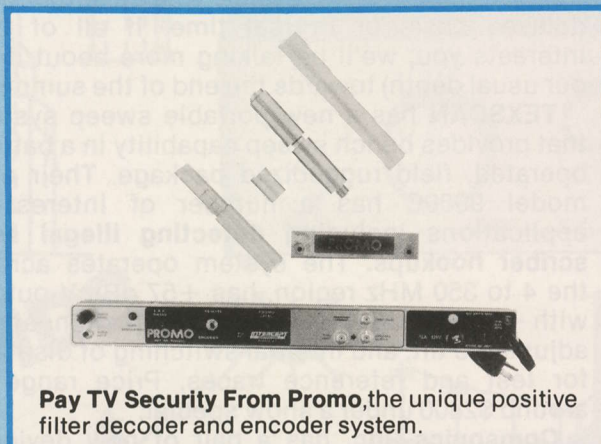


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late because of the negative feelings at most cable shops for LO production. With the industry growing and systems growing, the interest in local origination work is beginning to turn back positive again.

MSI Television will be showing their FLEXI-CASTER® 79-MC-2 two channel system which allows advertising displays, stock and/or news-wire displays and selections, titling (over) with a new easy to use page sequencing and insertion technique. Some of the new technology involved includes keyed color-character titling over all external video signals. A new "Intelligent Keyboard" with 112 keys, from 1 to 21 lines per page, 8 selections of character size, plus selections of character and background color. Pricing is in the \$4750 (up) range and even if your cable system doesn't need one your kids would love to have this machine around to create all sorts of interesting video on your home Sony. MSI will also be showing upgrading equipment for earlier MSI units, a Data Weather package for NOAA and local weather displays, and upgrading capabilities for other MSI equipment in the weather area already in the field.

The Associated Press will be showing their well established AP NewsCable service which provides twenty-four hour per day news, sports, business, weather and consumer information (starts around \$2,000 for a year's service) and their AP News Wire for local news originations.

Test Equipment

There will be a wide variety of new and certainly exciting test equipment. One of the magic words will be 'digital' while another magic word will be 'microprocessor'. Sophisticated technology will make this year's new generation of test equipment smarter, easier to use, more accurate and in many cases it may tell you things about your system which you just as soon you didn't know.

The bigger your cable operation is, the more you will want to see the new **CATV Sweep Recovery System** on display at the **Wavetek** booth. Here is an innovative approach to processed sweep techniques that allows you to run routine

tests or even FCC proofs without fear of irritating subscribers. As Wavetek will tell you, up to now you've had two system sweeping choices; low or high level. Low level requires expensive receiver-end gear (tracking spectrum analyzer) and resolution is typically ± 1 dB, or worse (with lots of carriers present). High level requires running the sweep at 3-5 second rates 15 to 20 dB above the signal carriers. For best results you use storage scopes and they aren't inexpensive. Wavetek has changed the whole approach, married it to a microprocessor control system and developed a system that allows the technician to hand to his superior either soft or hard copies of the proof from as many locations as he wishes; either on a delayed basis or in real time. If all of this interests you, we'll be talking more about it (in our usual depth) towards the end of the summer.

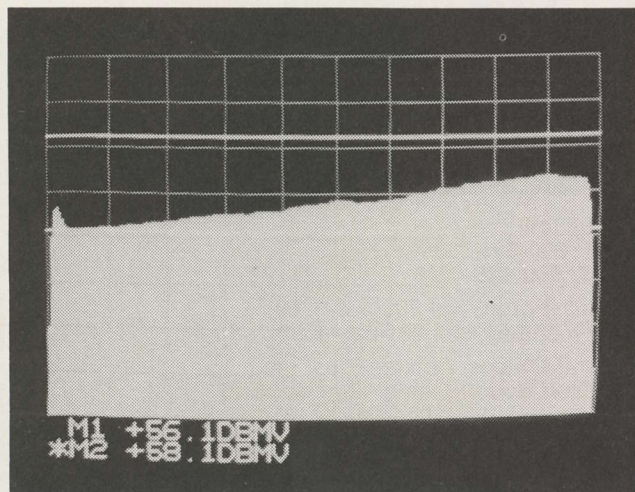
TEXSCAN has a new portable sweep system that provides bench sweep capability in a battery operated, field ruggedized package. Their new model 9900C has a number of interesting applications including **detecting illegal subscriber hookups**. The system operates across the 4 to 350 MHz region, has +57 dBmV output with ± 0.25 dB flatness, 1 dB step attenuation, adjustable tilt, and internal switching of displays for test and reference traces. Price range is around \$2800 under a show special.

Comsonics, Inc. has a pair of new devices; their Video Sensing Coaxial Relay is bound to find many applications both in test and headend applications. It has **no** third order distortion, 90 dB of isolation, a return loss greater than 35 dB and will switch with as little as 150 mV of video sync level. They will also be showing a new Sweep Insertion Device (SID) designed to provide an insertion point for summation sweep of CATV systems. The unit features low insertion loss (1 dB max) and high isolation with a good return loss match (greater than 20 dB). The unit has two modes of operation; normal and sweep. In the sweep mode the unit has unity gain to both the headend output signal(s) and the sweep signal. In the normal mode all active components are bypassed by a coaxial relay. A 20 dB output test port is operational in both modes.

Sadelco, Inc. will be showing a pair of new field strength level instruments; a model 719C is a new version of the well known 719B and it features improved VHF and UHF tuners, rechargeable battery with an AC option, a new molded carrying case in the \$350 price range. The MK-3 is a low frequency adapter that converts 4.5-54 MHz into the 114.5 to 164 MHz dial range. An internal amplifier 'cancels' the conversion loss resulting in ± 1 dB accuracy of the adapter.

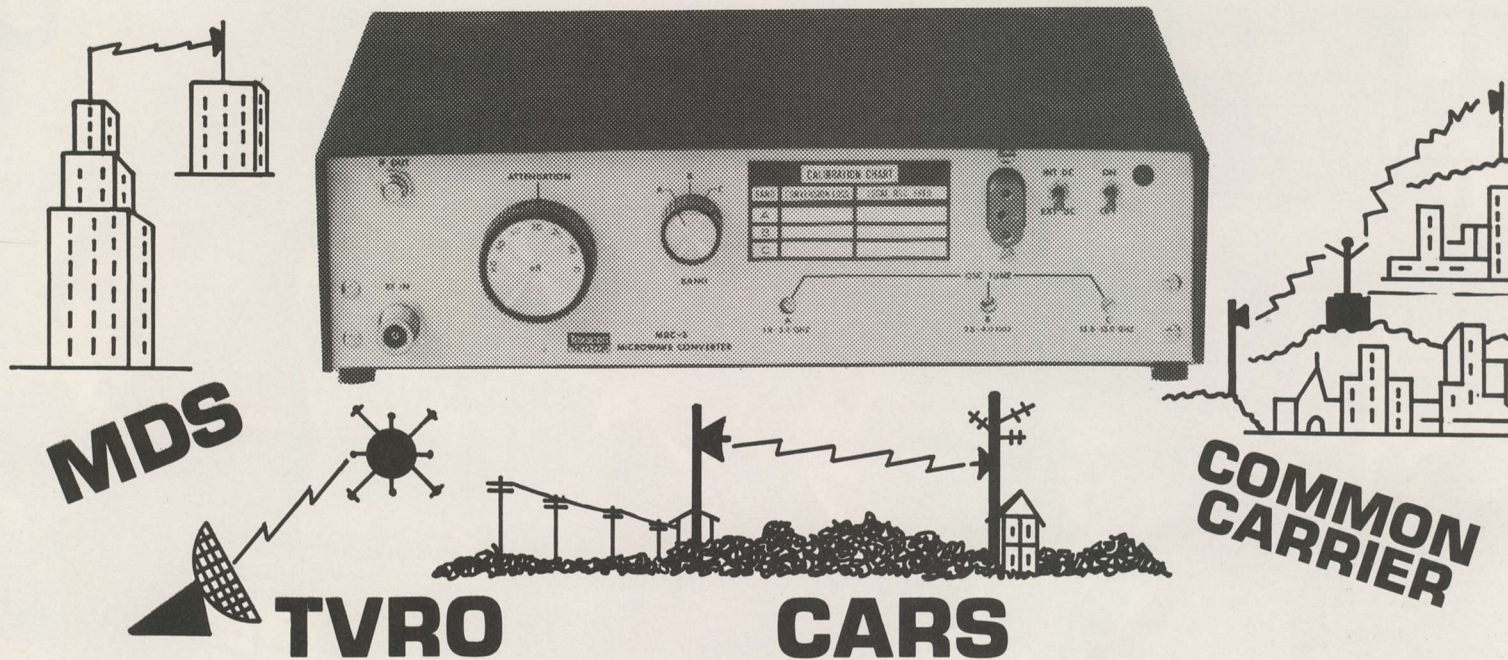
TVRO Hardware

The on-going trend in the sub-industry within an industry, the supplying of hardware for satellite terminals, seems to be continuing towards the 'lower cost' area. At the same time as this is moving ahead, a number of the established



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Texscan's microwave down converter permits measurement in the MDS (2.1 GHz) TVRO (3.7 GHz) and CARS (12.7 GHz) band with existing VHF test equipment. Spectrum analysis, signal strength and even microwave sweeping are possible with the MDC-3.

Available as an option are three bandpass filters which speed and simplify the measurement process. The filter kit is required for sweep operation. The MDC-3 has a calibrated insertion loss and adjustable local oscillator for each band. Other frequencies are available.

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NEW HUGHES 5 meter Cassegrain feed antenna

suppliers in this field are re-organizing their products to put them in better competitive positions for the next on-rush of terminal buyers from outside the CATV arena.

Hughes Microwave Communication Products will display a new 'low-cost' five meter antenna with two feed options; a high gain Cassegrain design for lower signal areas, and a (less costly) focal point feed for stronger signal areas. Unique to all of this is that the antenna can be 'expanded' to six meter diameter should additional gain be required at a later date. The

antenna mount is the now almost universal design type that allows the whole antenna to pivot at a central point around a hub; allowing the operator to have the advantages of a polar mount without the often cumbersome polar mounting system. In addition to the new convertible 5/6 meter dishes Hughes is also expected to show a new design concept in TVRO receivers featuring one master single channel receiver followed by (optionally) one or more 'slave' type units with 12 push button channels on each slave unit.

Scientific Atlanta will be showing a new series of receivers and a new 4.6 meter TVRO antenna. The 6601 is a single channel TVRO receiver of new design while the 6602 is a frequency agile radio. The single channel radio can be adapted to the frequency agile state by **changing out** the tuner module. Up to three subcarriers are possible and threshold extension is standard. The new 8005 Cassegrain antenna is said to offer performance equal to larger prime focus antennas. It consists of twelve metal panels formed using a die-stamp technique; panels can be interchanged or replaced in the field.

Harris continues to offer their model 6200 earth station which features a Cassegrain feed system and an equatorial mount.

USTC is expected to show a new 4 meter antenna with prime focus feed and possibly a six meter fiberglass antenna similar in design to their established six meter metal antenna.

Comsonics, Inc. has an uninterruptable LNA powering system that operates on a 115 or 220 VAC primary circuit providing 12.5 to 17.7 VDC through a twin Gel Cell configuration. 10 KA Gas Discharge and varistor components provide primary surge protection. Standby powering, when primary power is interrupted, will average 20 to 40 hours (two LNAs can be powered from the unit).

A Very Useful Box

THE GAIN BLOCK — CATJ'S LATEST KIT FOR LEARNING THE BASICS

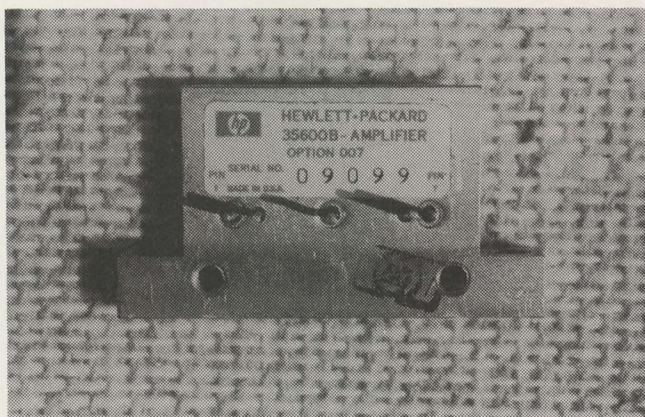
Gain Is Basic

Of all of the kits developed for the CATV industry in the **CATJ Lab**, none comes closer to being a basic working tool than "The Gain Block". The whole purpose of the gain block (kit) is to allow the cable technician and engineer to become more familiar with the operating characteristics of typical broadband hybrid amplifier

devices. And, to sweeten the pot just a tad, in the process of creating your own basic gain-block learning tool you will also come up with an extremely high quality standby or bench amplifier which will in a short time in your system become perhaps the standard against which you judge all other broadband hybrid amplifier devices. Plus,

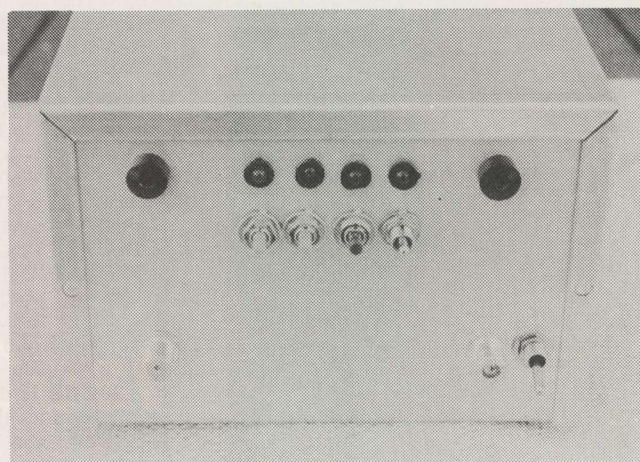
in a pinch (when you can spare it from the work bench!) you will be able to grab this self contained and self powered amplifier and run to a trouble spot to plug in 30 dB of gain or so while some regular piece of plant gear is down with the sick.

This project began when Coop was reading through one of the dozens of publications he receives each week from all over the world. There had been a rumor about for years that HP (Hewlett Packard), in developing a hybrid amplifier back around 1970-71 had produced approximately 15,000 of a very high quality hybrid amplifier chip device. Some rumors had HP trying to peddle the high quality (gold-sapphire substrate) hybrids to first one broadband CATV amplifier after another. Only, apparently, Anaconda opted for the HP device(s) and if you own a plant with some early 1970 era Anaconda amplifiers you are already aware that there are **no replacement hybrids** for these amplifiers available. Well, Coop found some. **Not a large stockpile** but enough to warrant CATJ designing a super quality kit around these devices.



CATJ initially acquired a pair of the devices and promptly sent one down to the hybrid amplifier brain of the industry Bob Savard at Broadband Engineering in Jupiter, Florida. Savard's Broadband outfit has done more to produce circuits and modification kits for those operators 'stuck' with out of date single ended (and push pull) plant gear than anyone else in the business today (see CATJ for May 1977, page 36). Savard's firm placed the sample unit into their Dix-Hills test system and ran the numbers for us. "This device was way ahead of its time; in fact it is probably way ahead of much of today's technology. It was simply too good (and too expensive) for CATV...and that's probably why it didn't catch on like say the TRW hybrids did" reported Savard. "By the way...can you get enough of these to allow us to help out those poor unfortunate souls with Anaconda amplifiers???" he asked.

The data on the basic hybrid amplifier chip, as mapped out by Broadband Engineering, appears here. One heck of a device. We asked Broadband to run it through the cross mod, second order and triple beat checks at a number of differing voltages. We got back this data plus current



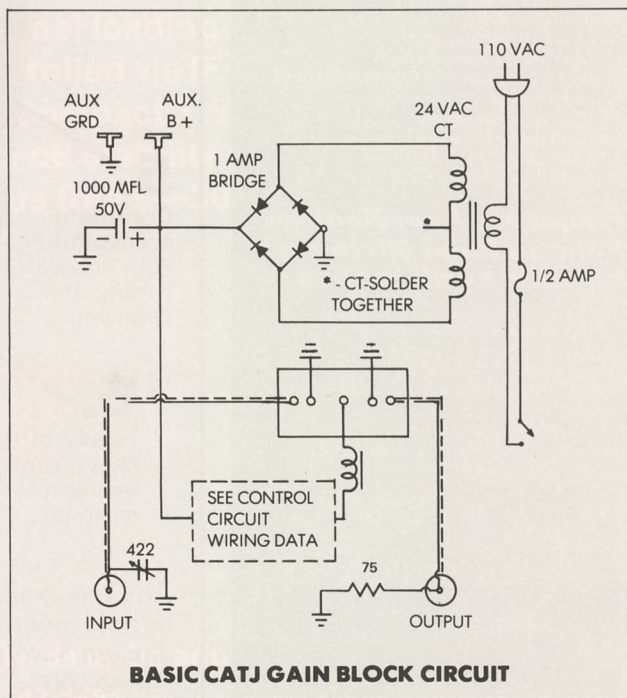
draw, and noise figure plus input and output match figures for the test devices. And we promptly bought up all that Coop had spotted in an obscure classified electronic ads publication.

Like we said, gain is basic. Good quality gain with the kind of amplifier operating specs you see listed here is gold-plated basic. But then it should be...these are very expensive hybrid amps and HP spared nothing in manufacturing them. **They** are even gold plated!

Now What

With the hybrids in hand and locked up in Gayland Bockhahn's office the next task became one of deciding just how the **most people** could get the **most education** from them. All you really have to do is apply 24 volts (or less down to say 12 volts as Savard found), connect an input source to one pin and an output load to another pin and you instantly have 30 dB of gain from 30 to 350 (+) MHz. That seemed about as basic as you could want and with the 53 (+) dBmV output

Continued on Page 42.



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Radio Networking Via Bird

A number of recent announcements in the national radio network area involving the distribution of radio and news-radio programming material via satellites warrants an update in this area. The following radio network and/or radio-news services are currently involved in satellite distribution via RCA SATCOM facilities:

- 1) **ABC Radio** has ordered a pair of full duplex (8 KHz) audio circuits between New York and Los Angeles.
- 2) **CBS Radio** has a similar duplex system also between Los Angeles and New York.

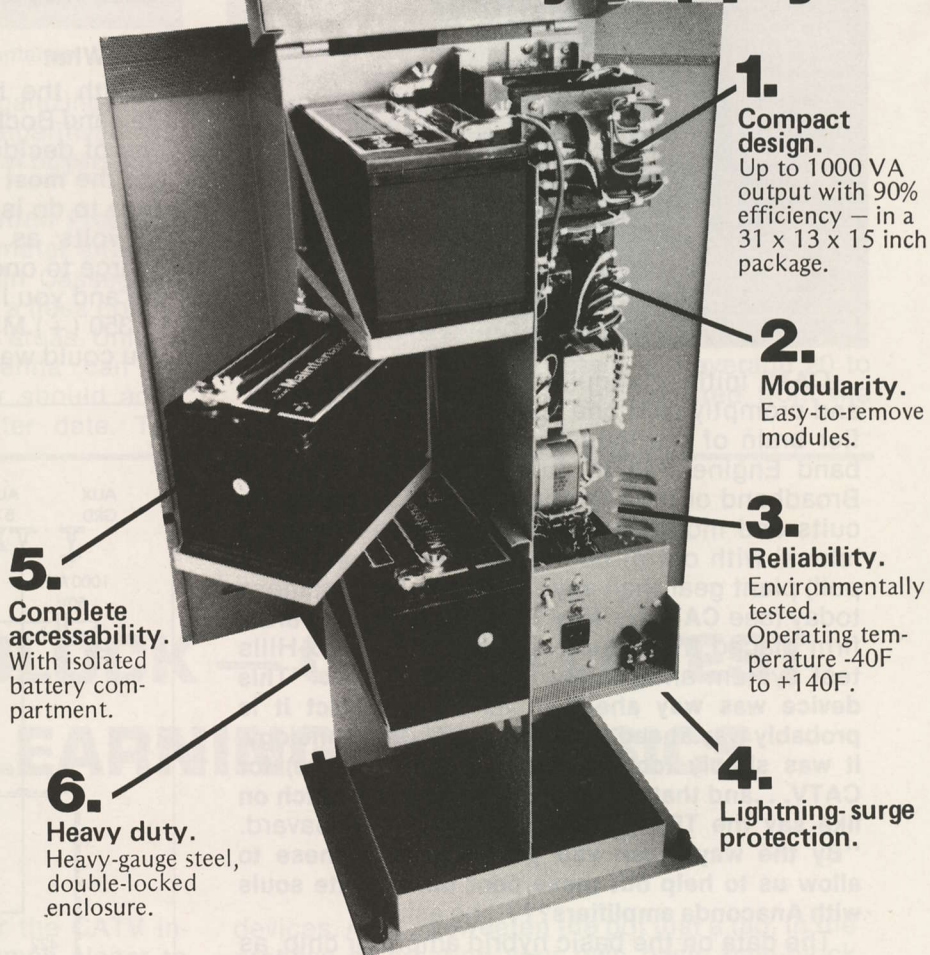
3) **NBC Radio** also has a similar system plus NBC drops off service in San Francisco as well.

4) **UPI Broadcast Services** leases a full duplex 5 KHz circuit between New York and Los Angeles with simplex drops in Houston, San Francisco and Chicago.

5) **AP News Radio Services** utilizes a simplex circuit with a New York origination point and service 'drops' in Chicago, Los Angeles and San Francisco.

All of these services are found on the SCPC mode (see **CATJ** for August 1978, page 25).

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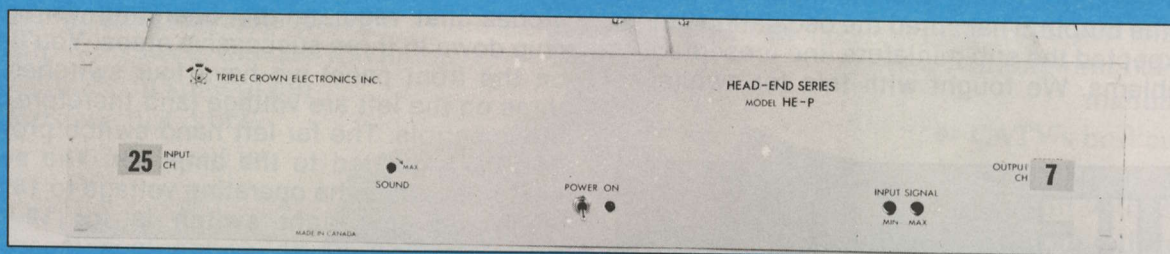
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capabilities for 12 channels (flat) input there was some tugging and debating on doing **just** that; packaging it with a simple power supply and two coax connectors. However it seemed a shame to stop there since the unit was really too good to just lay about amplifying TV signals all of its life. So we went to work to make it have greater **potential** than that.

Now anyone who has worked with hybrid chips in the raw has already probably found out that if you can couple input-in and output-out through very short (i.e. low capacitance) connections the gain-bandpass characteristics of the hybrid amp are pretty much determined by what is inside of the beast. On the other hand, if you want to set the hybrid over "here" and run a few feet (or even inches) of coaxial cable from a convenient jack to the pin on the hybrid you've just bought gain-flatness problems. We initially attempted to 'print' an input line and an output line on the bottom side of our double sided G-10 board to make the run from the front panel mounted F fittings to the input and output pins. The machine oscillated wildly; not sufficient isolation between the input and output 'lines' for the 30 dB of gain to ignore stray feedback. So we went to sub-miniature coaxial cable to link between the input fitting and the input pin and ditto on the output. That cured the oscillation but as we expected the sub-miniature line presented new problems. We fought with this for awhile,

then placed a trimmer across the input which results in a 'roll off control' for the high end (say 250 or 300 MHz up). Not the best engineering, but it got us out of a temporary design bind. We'll come back to this in later monthly installments in the gain-block add-on saga. **Ideally of course** the input fitting center pin should solder **directly** to the input pin on the HP hybrid amp, and the same for the output fitting. That's a tough mechanical assignment of course but we mention it here because we want other Gain Block experimenters to have the benefit of good engineering practice.

With the basic unit running on the basic power supply DC voltage of 24 volts (actually the supply loads down to around 26 volts **without** regulation with the 250 mA or so current at that voltage) we next turned our attention to making the unit handy to use for gain checks. We went back to brother Savard's numbers on what happens to gain (and noise figure, etc.) when the operating voltage is lowered. Our first thought was to simply place a linear voltage control pot across the B+ supply and allow the experimenter to crank the supply voltage around to fit the gain he wanted. That's still not a bad idea but we decided against it for mechanical reasons. We decided to go with three switches which operate zener diodes that regulate the operating voltage to chip down in three successive steps. You'll note on the front panel we have **four** switches; the three on the left are voltage (and therefore gain, etc.) controls. The far left hand switch provides **24 VDC** regulated to the amplifier. The switch next-right drops the operating voltage to **16** volts while the next right switch is for **12** volts operating. The fourth switch is a 'spare' for future projects we have in mind for Gain Block experimenters. All had LEDs to indicate which voltage is operating. Check the Broadband test results for each of these three zener regulated operating voltages and we think you'll agree that if you are going to have **three** spot-voltage-gain levels, these three represent the best choices. Of course a person could use the fourth switch (with an appropriate zener diode and impedance source resistor) for another voltage/gain level if he wished. However, we suggest you leave this position 'open' for now since we have some projects in mind for that switch later on.

Ahead

If you will look carefully at the back of the Gain Block you'll notice a pair of jacks. One supplies B+ and the other is a handy negative (ground) jack. This makes your supply useful for a **standby powering source** when you need 24 volts or so (DC) to run a bench project. Around 500 mA is available here if you switch **off** the Gain Block hybrid device.

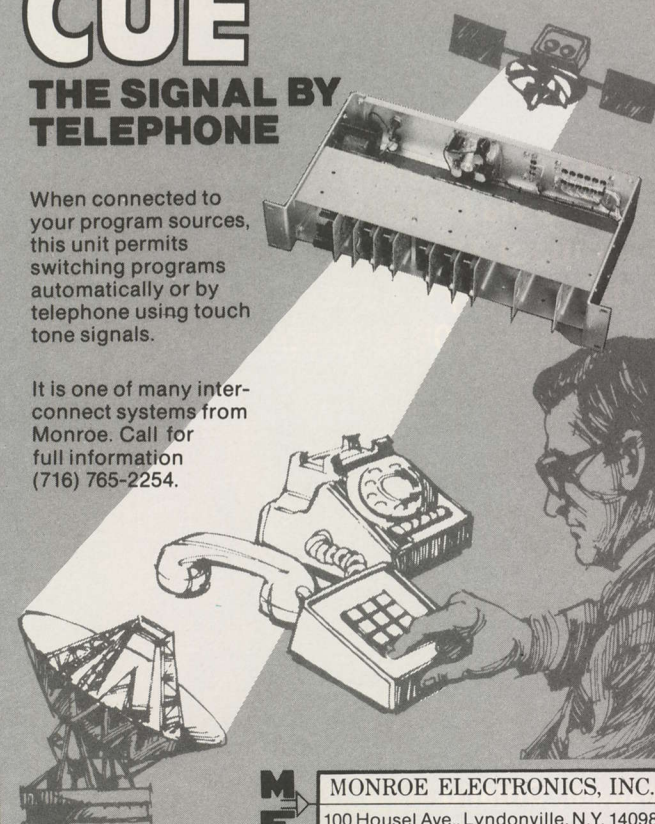
Now look at the front panel. Above both the signal input (left hand side) and the signal output (right hand side) F fittings are a pair of chassis jacks. The rear of these jacks, for initial projects,


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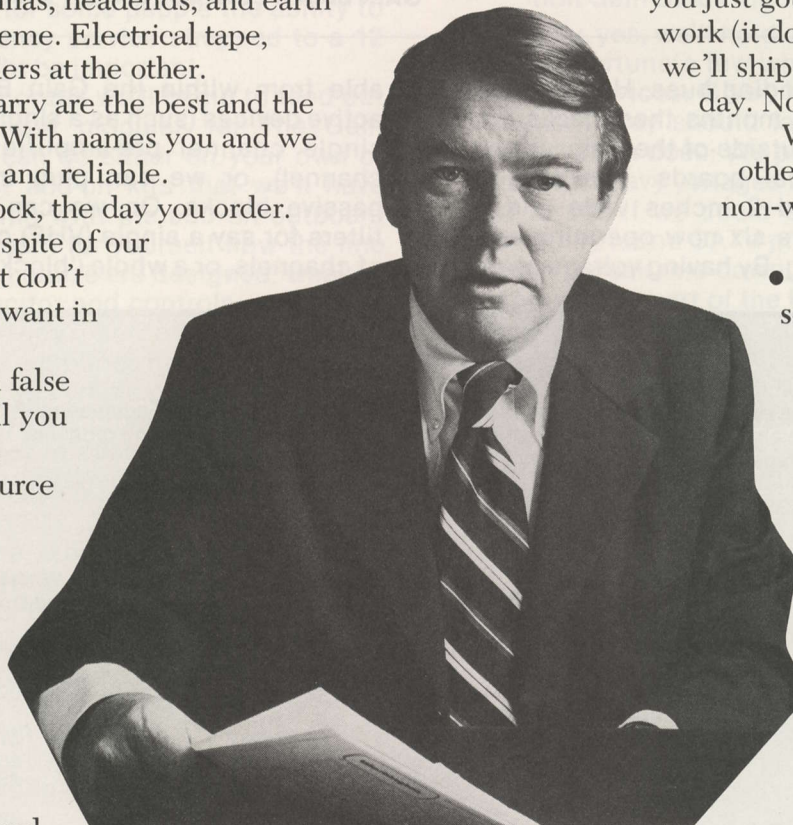
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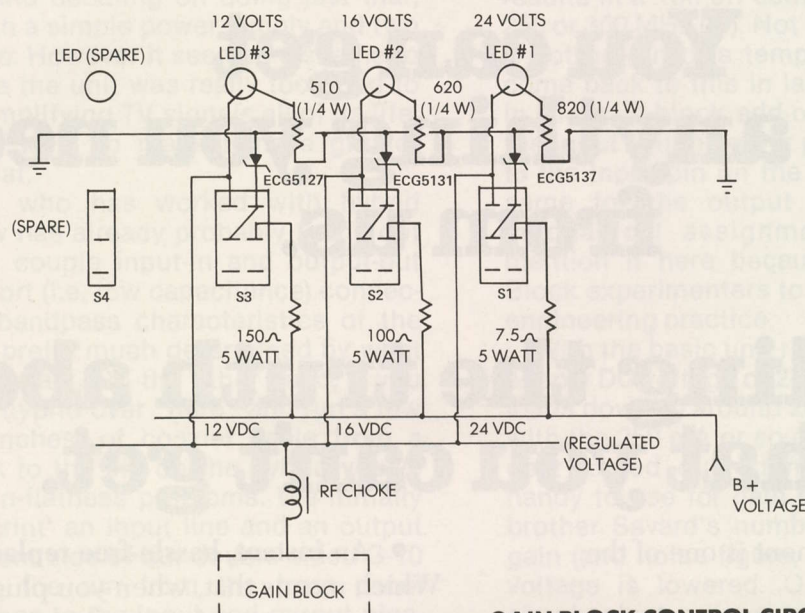
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GAIN BLOCK CONTROL CIRCUIT WIRING

go to ground on a grounding buss. However, as we shall see in coming months these jacks are key to plugging in outside-of-the-Gain Block aluminum case external boards. The plug-in boards measure around 2 inches wide and 4 inches tall and there are six now operating and several more in planning. By having voltage avail-

able from within the Gain Block, we can run active devices (such as a single or multiple stage single channel pre-amplifier peaked on one channel), or we can plug in tilt or equalizer passive blocks. Or, we can plug in outboard filters for say a single (VHF) channel, or a group of channels, or a whole ('block') band. This would

CATJ GAIN BLOCK - HP35600B AMP MODULE

CATJ sent a sample of the HP35600B 'surplus' gain block to Bob Savard at Broadband Engineering (P.O. Box 1247, Jupiter, FL 33458) to have the device checked on Dix Hills and other gear for noise figure, gain, second order and triple beat conditions under varying operating voltages. The results are tabulated here for instant reference.

Voltage	Current	Input VSWR	Output VSWR	Ch. 13 Noise Figure	Max. Output -57 dB Xmod*	Triple Beat**	Worst Case 2nd Order***	Typical Gain
+24 VDC	260 mA	14	13.5	6.0 dB	+53.5 dBmV	-70.5	-59	32 dBg
+21 VDC	220 mA	13.5	13	5.75 dB	+50.5 dBmV	-73	-59	31 dBg
+18 VDC	180 mA	13.5	13	5.25 dB	+48 dBmV	-73	-57.5	31 dBg
+15 VDC	140 mA	13.5	13	4.75 dB	+45 dBmV	-69.5	-49.5	31 dBg
+12 VDC	100 mA	12.5	13	4.5 dB	+39 dBmV	-75.5	-49	30 dBg
+11 VDC	92 mA	12	13	4.75 dB	+36 dBmV	-76	-45.5	30 dBg
+10 VDC	80 mA	10	11	6.25 dB	+31 dBmV	-79	-40	28 dBg
+ 9 VDC	65 mA	5.5	10	16 dB	+17 dBmV	-81	-31.5	19 dBg

Like any hybrid chip amplifier device, large amounts of current through the device improve its output capability and its ability to reject second order beats. Noise figure, however, is optimized (by a 1.5 dB improvement factor) in the mid range of the device (+12 VDC). Between 10 and 9 volts DC the device becomes almost useless for broadband amplification purposes; the noise figure rises to within 3 dB of its gain capability for -57 dBmV crossmod.

- * - -57 dBmV crossmod is based on 12 TV channels.
- ** - Triple beat reference maximum rated output.
- *** - Worst case second order at rated output.

turn the broadband Gain Block into a limited-band gain block. Where might this be useful? For everything from a signal pre-amplifier (notice that at mid-range operating voltages the internal noise figure of the hybrid chip **itself** is very respectable), to a post-amplifier.

In spite of its excellent output ratings there is a saturation point with the hybrid amplifier (see Broadband table). The chap we bought the HP devices from suggested that if you 'overdrive' the input with a CW carrier the device will reproduce the input CW signal at harmonic multiples "to well beyond 1 Gig". We tried this and sure enough, there are useful signal **levels** (say +20—40 dBmV) up into the 1 to 1.5 Gig region when the CW carrier is around 100 MHz. This suggests a number of other useful projects for the unit.

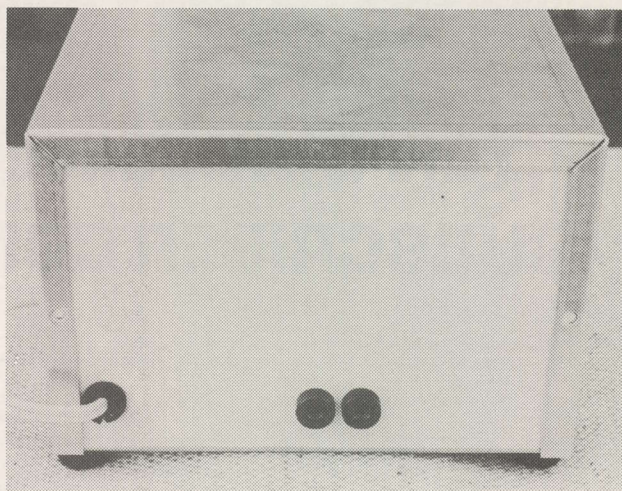
Also note that the hybrid chip will operate quite well at 12 volts. In fact, as Savard notes to us, **"the device holds up very well down to between 9 and 10 volts DC and then it just falls apart"**. So this suggests that for some people the ability to slap it into emergency service strapped to a 12 volt DC source might be important.

In the next few months we'll begin to feed out other outboard circuit modules for The Gain Block; things you can do either on your own or with very low cost add-on kits that we'll have available. By working with the add on outboard modules you can learn for yourself how the line and trunk amps you utilize are designed, what all of those coil, capacitor and controls are for and why and how they actually affect the performance of the amplifier hung on your line. That's the point of this whole project; to provide a learning tool that in the process you can justify to management (just in case you aren't management) as a 'standby emergency amplifier'.

Two Caveats

Ideally everyone working with broadband circuits would have a sweep generator with a detector and scope. Frankly the person who profits most from The Gain Block will be so equipped. However, if you have a known set of signal levels (such as a test tap on the work bench) and a reasonably good FSM/SLM, you'll be able to do most of what someone with a sweep test system can do. Beyond that there are two caveats:

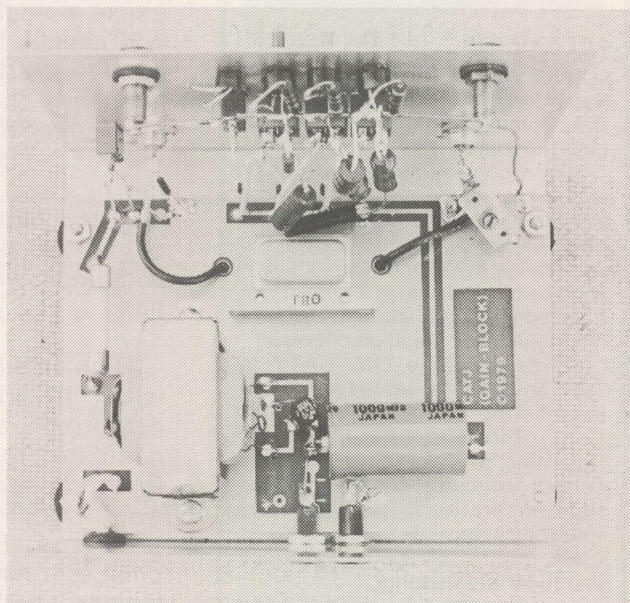
- 1) CATJ will **not** dig into our limited supply of HP hybrid devices for those poor, unfortunate souls out there who have ailing Anaconda amplifiers. **Sorry**. Don't even ask. The word has been out long enough that we are already being asked "to part with a few". We're sorry you have amplifiers for which you can't obtain plug-in replacement hybrids but our supply is very limited.
- 2) When our supply of the gold plated HP devices runs out, and assuming we don't run across some more, Bob Savard has assured us that he'll assist us in selecting a TRW hybrid chip amp for a 'second generation'



Gain block package. Of course because the TRW units are current and the pricing is higher than the HP devices, CATJ will have to increase the pricing on a second generation Gain Block module.

Finally, yes, we'll hold onto a few for spares for those unfortunate few who do something bad to their HP devices. Given just a modicum of kind treatment they should last for as long as your cable system does. We purposefully mis-treated ours with heavy voltages and transient switching just to see if we could break one down. Using commonly found CATV power supply sources we couldn't break one down. With the power supply we provide as part of the kit, we doubt you'll ever blow one up.

Can you take the circuit shown here and using a TRW chip duplicate your own? The answer is yes but you'll have to make some changes to get it to operate like the CATJ kit does. **Anyone doing this** is invited to submit their final design to CATJ for publication; we'd like to see **some version** of "The Gain Block" in use by every cable system in North America over the next twelve months!



Converters For CATV Subscribers

TEN GUIDELINES FOR SELECTING SUBSCRIBER CONVERTERS IN CATV

by
Art Johnson
Manager, Field Operations
CATV Division
Oak Communications, Inc.
Crystal Lake, Illinois

For the cable operator who wants to add channels and apply for a rate increase, today's CATV converters are the key to increasing channel capacity. The need for increased channel capacity is already apparent. During the 1980's, satellites could possibly deliver as many as 40 pay or

specialty services—some say more—in addition to those now offered via microwave links and stand-alone stations.

If you haven't considered a converter yet, here is a brief review.

Your basic choices are two: **block converter** or **multi-channel converter**.

The **block converter** takes a frequency band, usually in the midband range, and converts it to high or low band in the VHF spectrum. Some units convert the midband to the UHF spectrum. Either way, the **customer must use the tuning mechanism on his television set** for channel selection. Most block converters are offered with 3 channel or 7 channel (i.f.) capability.

The system operator can purchase a block converter, which will accept **inverted** or **normal** (non-inverted) carriers from the headend. The inverted carrier block converter is likely to be the less expensive (although the headend equipment costs slightly more), because the converter utilizes only one oscillator, with **high-side injection**.

High-side oscillator injection with inverted carriers is preferred against low-side oscillator injection with non-inverted carriers because of potential beat frequency problems. Perhaps the best choice is **normal** carriers (non-inverted) with **double** high-side

injection involving **two oscillators** with an i.f. frequency.

Either type of block converter is less expensive than the multi-channel converter.

The **multi-channel converter converts all input channels to a single output channel**. The converter output channel (i.f.) should be chosen which is different from any used by local broadcasters. In this way, the operator eliminates the troublesome effect of direct pickup, which a block converter cannot eliminate. The multi-channel converter specifications, such as noise figure, intermodulation, cross modulation, return loss, and freedom from adjacent channel interference are generally superior to those of a block converter.

Most multi-channel converters use a manual fine tuning control. Some offer automatic frequency control (AFC). This option takes a troublesome variable out of the subscriber's hands. Once a unit with AFC is installed in the subscriber's home and the TV set is properly aligned to the converter output channel, there should be no need for further adjustment, thus minimizing service calls. In marketing terms, this helps to give you a satisfied subscriber who will recommend your service to others.

Consider the converter's tuning mechanism. Your choices include rotary switch, pushbutton switch, slide



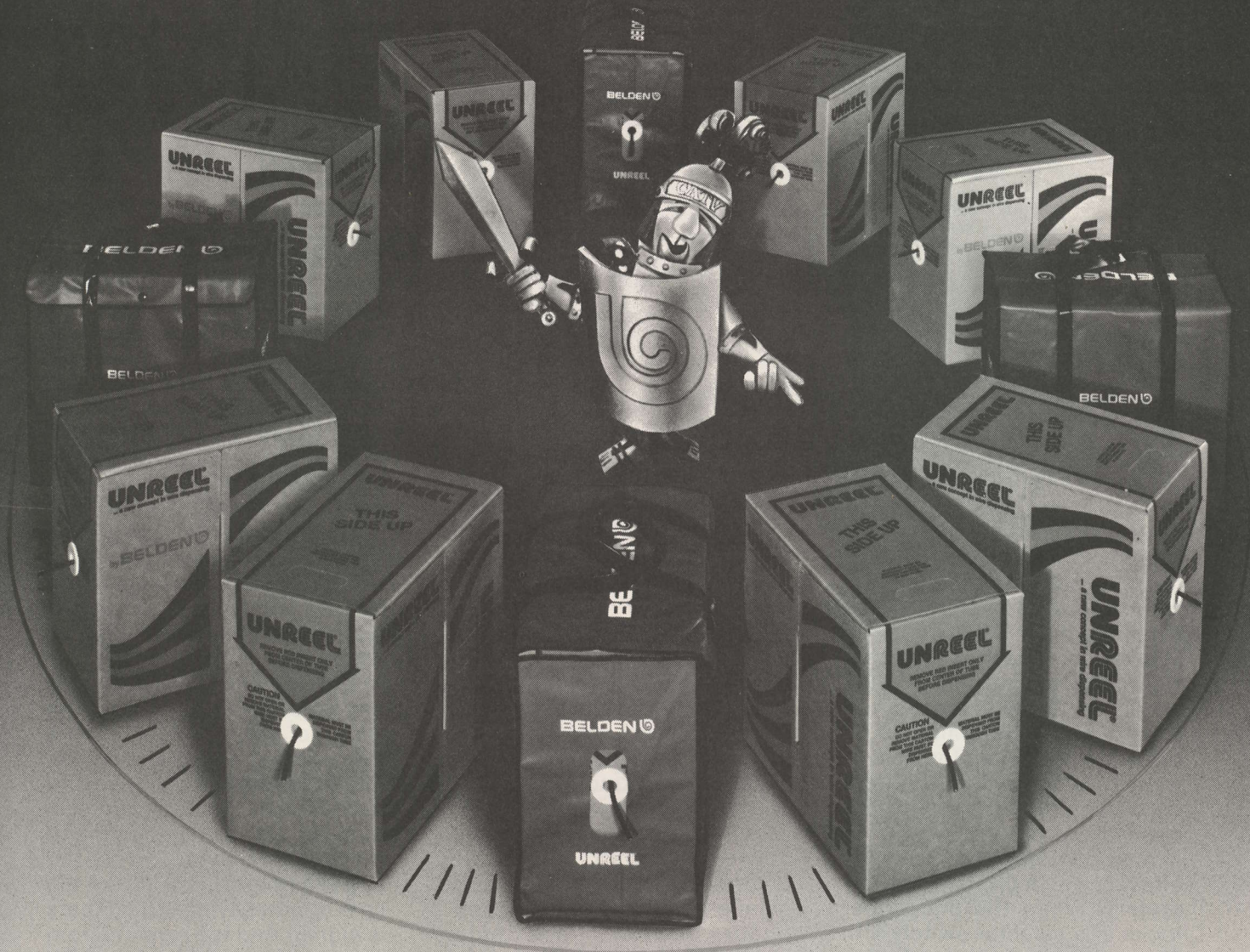
ART JOHNSON

Art Johnson is Manager, Field Operations, of the CATV Division of Oak Communications Inc., Crystal Lake, Illinois.

His responsibilities include CATV sales, market research, technical advice and demonstrations, and engineering field operations. He also frequently conducts industry-wide seminars for system operators in selection, installation, preventive maintenance and equipment repair.

Johnson joined Oak CATV in 1971. In 1973, he served as design engineering manager for Ampex Corp., Redwood City, California. Returning to Oak in 1976 as field service engineer, he was named field operations manager the following year.

He holds a B.S. degree in electrical engineering.



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switch and keyboard switch. It is up to you as a cable operator to determine which of these mechanisms is best suited for your purposes.

Consider channel capacity, which may vary from 3 to 35 channels. Are 35 channels too many today? Then think about tomorrow. Consider the cost of trade-offs to replace limited-capacity converters with 35-channel converters.

Also consider the marketing effect of a high channel-capacity system. When the subscriber looks at a selector switch with 35 positions, he's reading a statement of your optimism and your faith in the industry's growth!

Speaking of growth, do not overlook the 35-channel converter/decoder. It gives your subscribers a single unit for normal viewing and pay viewing. Thus, you can minimize your investment for pay viewing now, yet maximize your revenue base in the future.

Other points to consider are:

- **Credibility.** Be sure to choose a manufacturer who has a proven track record. Talk to other CATV operators and see what their experience has been.

- **Warranty.** Some manufacturers offer a three-month warranty, while others offer a one-year warranty and pre-and post-sales service. A strong warranty is a valuable offset against the converter's original price.

- **Delivery.** Sixty days, 90 days, 120 days, more? Be sure this is clear.

- **Price.** Only the converter's reliability will determine its long-run economy.

- **Adequate design.** When subscribers complain of interference due to adjacent channels because the majority of TV sets do not have adequate adjacent channel rejection, the solution is to use a converter with adjacent channel rejection. Built-in adjacent channel sound and picture carrier traps help reduce or eliminate this problem.

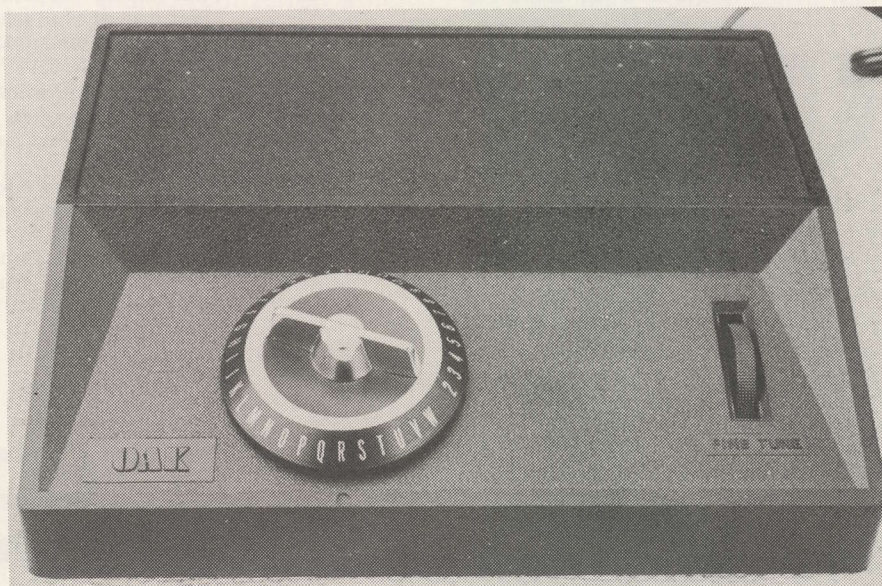
Your converter manufacturer may have other ways of solving problems that are unique to your cable system. Ask him.

- **Appearance.** Don't overlook it. The subscriber will have your converter conspicuously placed in his home. Therefore, an attractive converter will induce more subscribers. Also, if a cable operator decides he would like to sell the converter to his subscriber—which many cable operators are now considering—a stylish unit undoubtedly will help the sale.

- **Options.** The keylock option is available to subscribers who want to exercise parental guidance and protect their children from programs which may be objectionable.

The remote unit option is attractive to subscribers who want armchair convenience. A remote control unit gives the viewer his choice of up to 35 channels.

The addressability option is important to operators who want to protect their profits from illegal theft of service. The converter or converter/decoder can, itself, be addressable by electronic command from the head-end. The cost of such equipment is high; **but** the cost of non-paying subscribers is higher. And the revenue from tiered and per-program pay-TV—features that addressability makes possible—may be higher yet. An operator can offer a "super" pay programs for an extra premium by activating a special channel. Such



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limited to the first 75 applicants; there is no charge. In **Atlanta** on October 20-30-31 at the Marriott in downtown Atlanta, S-A is planning for a crowd of up to 500 for its fifth 'annual' symposium.

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A popular approach some system operators are taking today is **selling the converter to the subscriber**. A sale allows the operator to receive payment immediately and to circumvent potential theft. **However**, selling converters increases repair problems and decreases the operator's control of the unit's use.

A more sophisticated approach is to install a passive electronic device close to the tap outside a subscriber's house. The converter is then **modified** so that it cannot operate without the external unit. If the (indoor) converter is removed, it becomes inoperable.

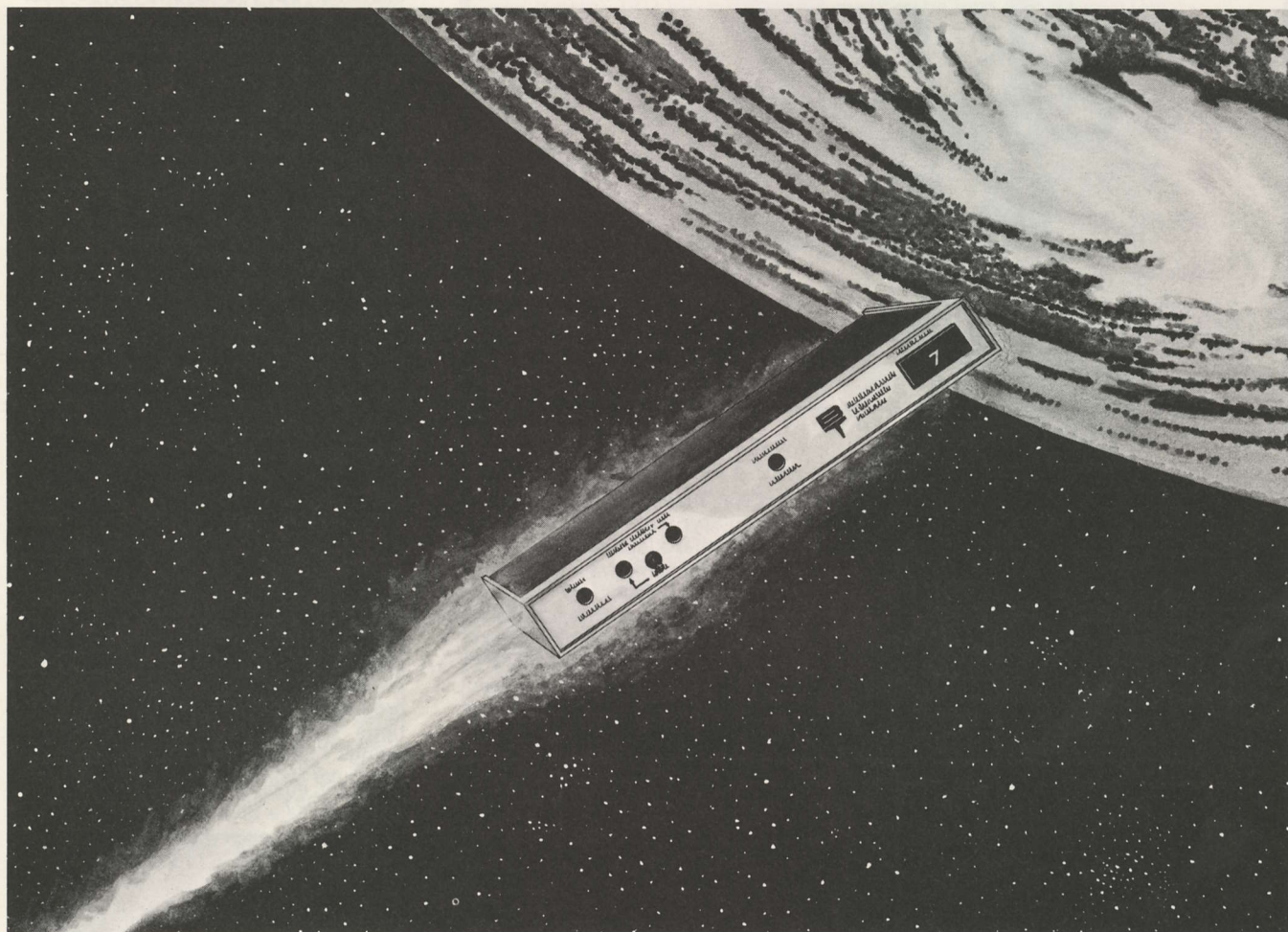
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*U.S. Patent No. 4,081,839


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Ray Daly on Computers In Cable

Ray Daly, President
Computer Cablevision, Inc.
2617 42nd St. NW
Washington, D.C. 20007

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Paperwork is a dreaded task.

The use of a microcomputer can reduce the time spent on paperwork. It also can increase it if you are not careful, but once people are aware of that fact it is usually avoided. Preparing letters, correspondence, and other routine documents can be a chore. Usually a great deal of time is spent handwriting a letter and more time at the typewriter. The computer can save you time and effort in doing this work.

Word processing is the 'buzzword' that describes how the computer can

help. Several manufacturers called it "Electronic Typing", "No Problem Typing", or other slogans. Essentially they all work the same way. Instead of typing directly on paper, all typing is done "on a TV screen." This electronic typing permits **easy editing** of any text. Once the text, be it a letter or other document, is in final form it then can be printed. As many times as needed; and it can be electronically stored for later use.

A most common use is the form letter; almost every office has some

letter in which very little information is changed before being mailed to different people. For example, a letter to a customer explaining that their service will be disconnected; essentially the same wording is used to every customer, but you have to retype it for each customer. With a word processing system you only need to change the name and address to have the letter printed.

And form letters are only an example; word processing machines are just as dramatic a change in writing as the typewriter. When used to write anything, including this article, it changes the way you write. Changes can be made just touching a few buttons. Whole paragraphs can be moved. And there are no excuses for typos!

Time though is the basic reason to invest in word processing. It is possible to dramatically reduce the time spent preparing correspondence, contracts, and other typing. No longer do pages have to be retyped to make corrections; draft copies can be prepared without having to retype the entire text when in final form. Time can be saved in almost every step. **And time is the most important asset in any business.**

All word processing has essentially two parts. The main function of the program is to electronically **store and manipulate text**, like this column. The program allows insertions and deletions of both lines and character strings. Searches can be made for particular words or phrases and once found they can automatically be

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5. (please fill this spot with your program)

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10. **Video Pager** from Computer Cablevision
described in March 1979 CATJ
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11. **FORTAN** from MicroSoft
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DOS 32k \$325.

To order any program write to Computer Cablevision, Inc; 2617 42nd St NW #2; Washington, DC 20007.
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Note: By submitting a program for the "Exchange" in Category One you can receive any three programs at no cost. Please submit programs with written instructions for other users.

changed. For example, if you use initials throughout a text, with just one command you can change the initials to the full name everywhere it appears in the text. There is also the ability to move about blocks of text, such as whole paragraphs.

The second function of the program is to "output" the text to a printer or storage device like a cassette recorder. You can save any text on tape or disk, depending on the program, for later use. The printout can even be right hand justified and the line length and the number of lines per page can be specified. The number of spaces between lines and many other parameters can be specified. Pages can be numbered and titled and more.

Large and small companies sell word processing. And they usually have the same basic features; a **keyboard** to type on, a video **monitor** to see what is typed, a **printer**, a means to **store** the information—either cassette tapes or floppy disks, and some electronics. Although the keyboard is always "standard", the rest can be different. The main features about a printer are its speed and its print quality. And since the printed word is the reason for the investment, the printer should be carefully investigated. The cassettes are slower but less costly than floppy disks. And some systems do not have a video monitor. The electronics always consist of a microprocessor and its associated circuits. Yes—it is a computer. But this computer is often configured in a very limited and specific manner. In other words, most machines can **only** be used for word processing and nothing else. And this is a shame.

Here comes the microcomputer. With a (Radio Shack) TRS-80 you can do a full word processing, using either cassettes or floppy disks, for less money than any other system I know of. With a 16k, Level I or Level II, Radio Shack TRS-80 microcomputer, a printer interface, a word processing program, and a printer (with an RS-232 interface) you have a complete word processing system. The cost, **excluding the printer**, is less than \$1250. But the printer is now the major cost. And there is no easy answer.

My system is only slightly more expensive. I use a TRS-80 with 16k, Level II, and the expansion interface. This costs \$1400 from Radio Shack. However, I installed my own 16k of memory which saved \$200, plus the \$99 cost of the "Electric Pencil" word processing program (see March column). The reason for my use of the expansion interface was so that I could attach a **modified IBM Selectric II** typewriter as my printer. This provided the high quality print quality that I thought was necessary. Many other printers produce "dot matrix" letters which (frankly) look like a computer printed it. This IBM Selectric is modified by **Micro Computer Devices** in California with the approval of IBM. This provides the reliability for the

TRS-80 CABLE SYSTEM POWERING

```

1 REM *** CABLE SYSTEM POWER DESIGN
2 REM *** BY BILL MARSHALL & RAY DALY 7-18-78
10 CLS: PRINT " CABLE SYSTEM POWER DESIGN": PRINT
20 N=0: M=0: D=0: I=0: T=0
100 INPUT "WHAT IS THE LOOP RESISTANCE PER 1000 FT (OHMS)"; R
110 R=R/1000
140 INPUT "WHAT IS THE POWER SUPPLY VOLTAGE (30 OR 60)"; P
150 IF (P=30) + (P=60) GOTO 180
160 PRINT "**** POWER SUPPLY VOLTAGE MUST BE EITHER 30 OR 60
VOLTS."
170 GOTO 140
180 INPUT " WHAT IS THE MINIMUM VOLTAGE REQUIRED"; V
185 IF V<PGOTO 200
190 PRINT "**** MINIMUM VOLTAGE MUST BE LESS THAN THE POWER
SUPPLY VOLTAGE."
195 GOTO 180
200 CLS
205 PRINT "AMP CURRENT DISTANCE VOLTAGE AMPLIFIER"
210 PRINT "# REQUIRED (FT) DROP VOLTAGE"
220 PRINT @ 960, "AMP #1 SHOULD BE THE MOST DISTANT AMPLIFIER.";
230 N=N+1: M=M+1
235 IF N>13 THEN PRINT: N=N-1
240 PRINT @ 64+N*64, M, " ";
250 INPUT C
253 I=I+C
255 PRINT @ 85+N*64, " ";
260 INPUT L
263 T=T+L
265 E=I*R*L: D=D+E
270 PRINT @ 98+N*64, E
275 S=P-D
280 PRINT @ 109+N*64, S
290 IF D<P-V THEN GOTO 230
500 PRINT "WHOA!!!! THE POWER SUPPLY MUST BE LOCATED IN THIS
AREA."
510 PRINT "THE POWER SUPPLY MUST BE LESS THAN"; INT (((P-D+E-V)/
I)/R); "FEET"
520 PRINT "FROM AMPLIFIER #"; M-1; ". THE TOTAL CURRENT FROM"
530 PRINT "THE POWER SUPPLY IS"; I-C; "AMPS.";
540 PRINT: PRINT "THE TOTAL LENGTH OF CABLE TO THE POWER SUPPLY
IS";
545 PRINTT=L+INT (((P-D+E-V)/I)/R);
550 PRINT " ";
999 END

```

printer, which is called a **Selectra-Print**. IBM will service the printer just like any other of their typewriters. In the Washington area IBM offers a service contract for \$11 per month. But this printer costs more than the computer—\$1925; and options cost more.

However, I feel it is worth every dollar because now I have the most flexible and lowest cost word processing system available. The **total cost** is **under \$4000** while other **dedicated** units cost \$12000 and up. But the flexibility is a most important feature. When the TRS-80 is not being used for word processing, you could use it as the Video Pager (see March CATJ column) or for doing engineering or business functions. And the typewriter could be used separately as a standard office typewriter. This is the way you can get the most out of your investment.

So if you are thinking about a new office **typewriter** consider the Selectra-Print and word processing with a Radio Shack TRS-80. The reliability of the

complete system, which a necessity for any business, is insured by both IBM's service for the typewriter and Radio Shack's service on their microcomputer.

Word Processing Programs

In doing word processing with the TRS-80 you have a choice of programs. The two best word processing programs are "Electric Pencil" and "Editor". The main difference between the two are price, storage medium, and how they handle "lower case" printing. "Pencil" cost \$99.95 while "Editor" costs only \$39.95. But "Editor" requires that you have disk drives and 32k memory while "Pencil" will work in Level I or Level II with just 16k of memory. In other words, "Pencil" requires a less expensive TRS-80. But, the major difference is how lower case "style" is accomplished. In my series of articles on microcomputers I stated that the **lack** of lower case on the TRS-80 was its biggest drawback. However, it is **possible** to get lower case.

Actually there are two ways. The way the authors of the "Electric Pencil" do this is by making a simple **hardware modification** to the TRS-80 (this modification will be covered in a future column). This modification produces both upper and lower case on the video

display and in the printing. **However, this voids the warranty with Radio Shack.** "Editor" works on a different method. No hardware change is made, so that your warranty is still valid. Instead everything **appears** as upper case on the video display but you type as usual

using the shift key. The way you make sure that you have correctly capitalized is to ask for a "proof" copy on either the video display or to the printer. On the video display, it gives you an "up arrow" **under** each capital letter.

Steve J. Birkill On Experimental Earth Terminals

Steve J. Birkill
Real-World Technology
128 Cross House Road
Grenoside, Sheffield S30 3RX England

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Receiving Techniques for Ku-Band

As low-noise, higher frequency technology develops, the margin between the performance of the best professional 'state-of-the-art' equipment and that of readily available consumer-oriented products is narrowing all the time. This is especially apparent in microwave circuitry. For many years, receivers for frequencies in C-band and above were based on radar techniques developed towards the end of World War 2. The antenna was waveguide-horn fed, and coupled to the receiver through a length of heavy rigid waveguide, being a thick-walled tube of copper or brass, of rectangular cross-section. On arriving at the receiver, the signal was down-converted to a frequency in the VHF range (normally between 30 and 120 MHz) where it could be processed using conventional vacuum-tube techniques. The local oscillator for this down-conversion process employed a reflex klystron, its oscillation frequency determined by a precision-made cavity, often integral with the klystron tube itself. Power supplies of **several hundred volts** were needed for this oscillator to generate a **few milliwatts of power** in the microwave range. The klystron output, in waveguide again, was injected via a directional coupler into the signal guide, and both frequencies fed to the mixer, a cartridge or coaxial point-contact germanium diode, coupled into the waveguide so as to absorb energy at both signal and local oscillator frequencies. The best such diodes were capable of a 6 dB noise figure at X-band (9 GHz) when working into an i.f.

amplifier of 1.5 dB noise figure at 45 MHz. As a result, when all losses and mismatches were taken into account, it was a good receiving system indeed that could claim a noise figure of better than 10 dB (equivalent to a noise temperature of 2610 degrees K). See **diagram one**.

With the signal levels achieved over terrestrial line-of-sight microwave links there was no need to improve upon this figure. In twenty years the design of microwave receivers changed very little, and the majority of SHF receivers in use today the world over are of basically the same pattern, though the klystron oscillator has given way to a crystal-locked solid-state oscillator-multiplier chain. But techniques had been developed to improve upon this

performance, and were finding their way into radio astronomy and space research applications, advanced defense and weapons systems, and satellite communications.

An order of magnitude improvement in sensitivity was obtained with the parametric amplifier: a variable reactance device modulated by a 'pump' power source at a frequency several times that of the signal was capable of tens of dBs power gain (enough to swamp the noise contribution of the succeeding crystal mixer) with a noise figure as low as 1 dB. Being a reciprocal arrangement, **input** had to be separated from **output** by means of a **ferrite circulator** to achieve **stable** gain. Early paramps suffered from excessively narrow bandwidth and had a reputation for instability. Modern multistage balanced idler amplifiers can give their performance over the 12½% bandwidths required in satellite communications. Cryogenically cooled units offer the lowest noise temperatures currently achievable anywhere—in the range 10 to 40 degrees K, dependent on frequency.

The first simple and cheap semiconductor microwave amplifier to appear was the **tunnel diode**. An appropriately doped **diode junction** presented **negative** resistance over a portion of its forward bias characteristic, offering the potential of amplification from DC up into the microwave region. Again a circulator was required to keep input and output defined and allow the two-terminal device to give gain without oscillation. Noise figure was typically 3 dB—a worthwhile improvement over the bare mixer, but the TDA's **principal limitation** was its **dynamic range**—strong signal handling was poor, and intermodulation became a problem where several carriers had to be amplified simultaneously. For this

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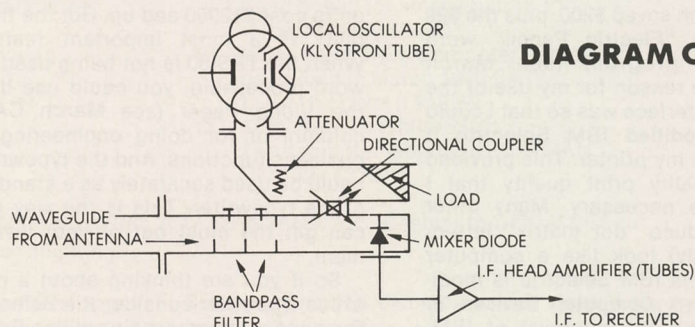


DIAGRAM ONE

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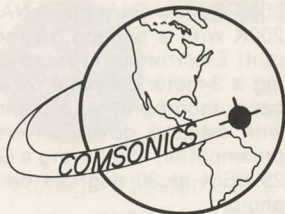
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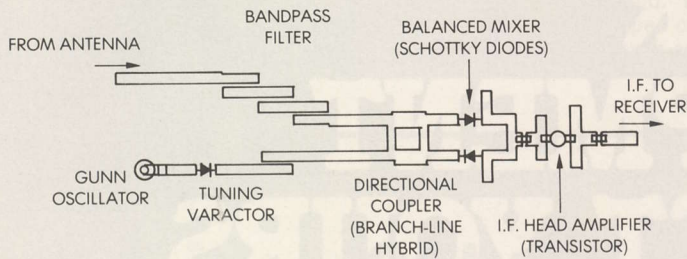


DIAGRAM TWO

reason, the TDA fell from favor as transistor technology made the bipolar and the field effect transistor competitive in the microwave region of the spectrum. Today's **bipolar** transistors have resulted from continuous refinement of silicon semiconductor manufacturing techniques, typical performance figures being 15 dB gain, 2.5 dB noise figure at 4 GHz, or 10 dB gain, 3.0 dB noise figure at 6 GHz. Above C-band frequencies bipolars suffer from their

inherent charge-storage limitation, but the gallium arsenide field-effect transistor (GaAsFET) continues to deliver useful results up to 18 GHz and beyond. Hewlett-Packard's HFET-2201 has a noise figure of 3.1 dB at 8 dB gain, at 14 GHz. The Plessey Company's new GAT 6 claims 3.5 dB at 7 dB gain in chip form at 18 GHz. These are commercially available production line devices—even more spectacular performance is being obtained in the

development laboratory. At our now-familiar 4 GHz allocation these same devices are yielding 1 dB noise figures—on a par with the uncooled parametric amplifier, but without the requirement for the 30 GHz (or thereabouts) pump source.

Alongside the semiconductor developments have gone the new circuit techniques that facilitate the use of semiconductors. **Microstrip transmission lines** enable the construction and mass production of circuit elements that would have required precision machining in waveguide. Broadband matching can readily be accomplished. Filters, circulators, directional couplers, impedance transformers, even antennas can all be etched directly onto thin substrates of suitable dielectric material—sapphire, quartz, alumina, ferrites, plastics, or teflon-loaded glass fiber material carrying conductors of copper or gold have replaced the bulky and often bandwidth-restricting plumbing of the earlier days of microwave. See **diagrams two and three**.

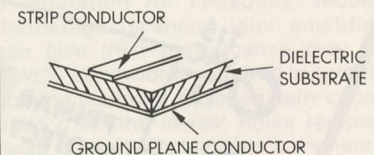


DIAGRAM THREE

To what extent is each of these techniques employed in satellite reception? The earliest communications satellite terminals used **Maser** amplifiers (Microwave Amplification by Stimulated Emission of Radiation) which like the varactor paramp require a pump source and cryogenic cooling, yielding very low noise temperatures. Tunnel diode amplifiers were used in the intermediate stages before down-conversion. Later earth stations in the international system were fitted with multistage paramps and transistor intermediate amplifiers for their improved dynamic range. This is still the standard pattern for large **heavy-route** terminals: the Intelsat 'A' specification calls for a G/T of 40.7 dB/K — antenna size is typically 100 ft diameter. 'Small' terminals, for TVRO or SCPC message traffic with G/T in the 15 to 25 dB/K region employ GaAsFET LNAs of perhaps 100 to 250K noise temperature, at 4 GHz. A similar terminal for Ku-band would achieve perhaps 300 or 350K from a GaAsFET LNA, or around 200K with a paramp. In the U.K., Ferranti Electronics Ltd. are demonstrating a 3-meter terminal for the 11 GHz band, incorporating a parametric LNA with integral down-converter and i.f. preamplifier, and having a G/T figure of 25 dB/K at 30 degrees elevation. See **photo**.

How simple can the Ku-band receiver be and still perform? The European



Ferranti's 3 meter 11 GHz terminal

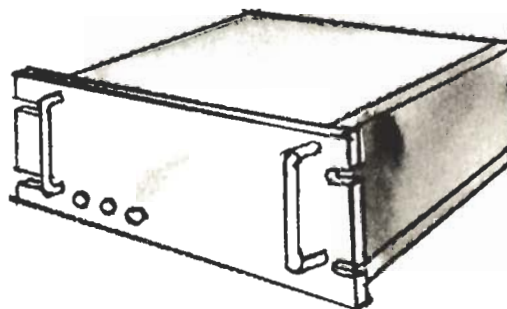


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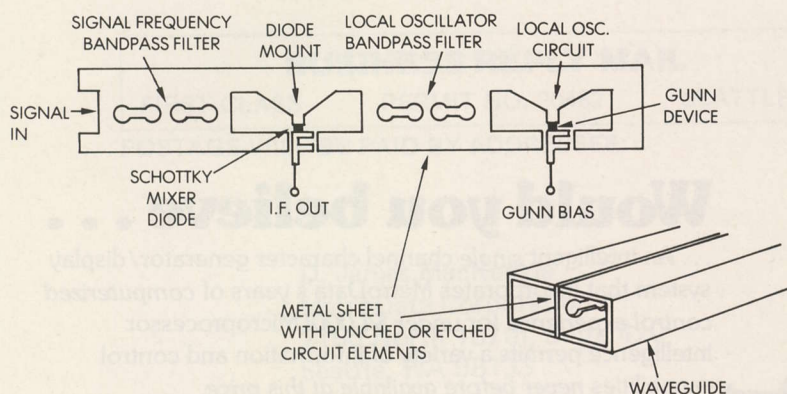


DIAGRAM FOUR

BLOCK SCHEMATIC OF IMAGE-REJECTION MIXER

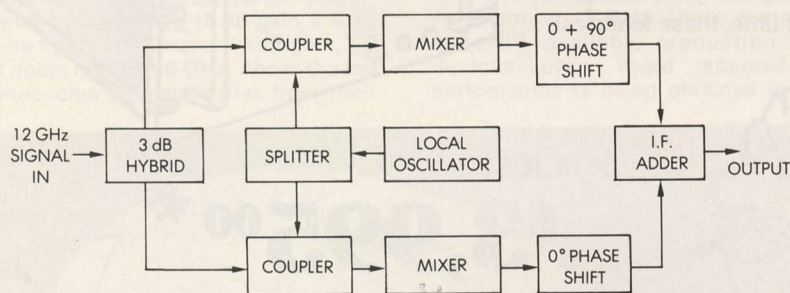
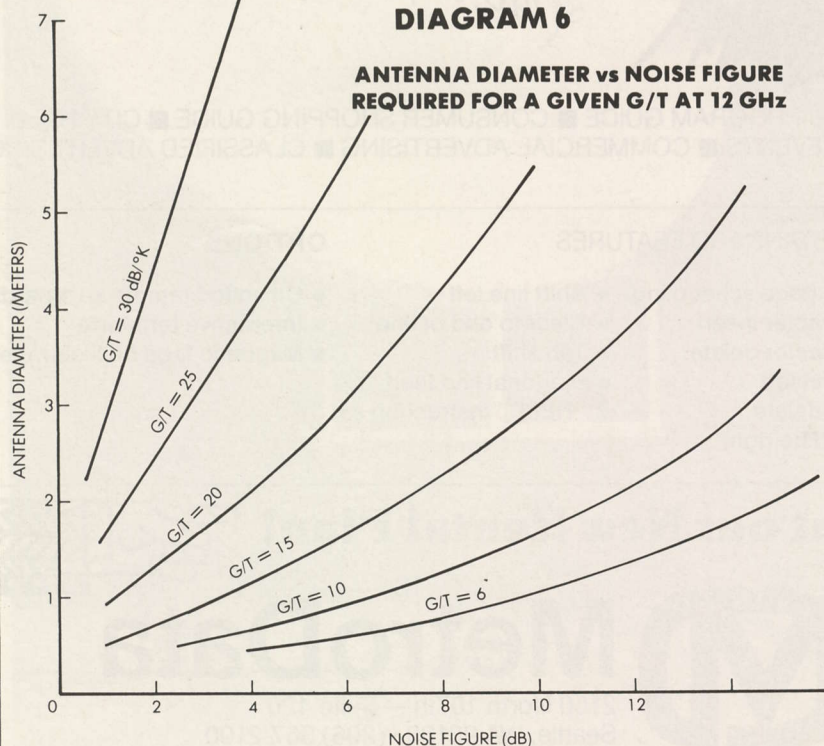


DIAGRAM FIVE

DIAGRAM 6

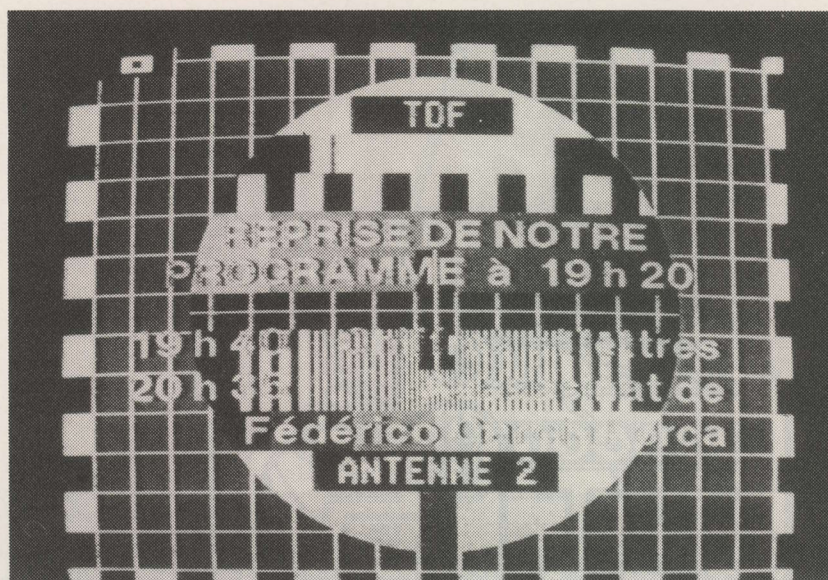
ANTENNA DIAMETER vs NOISE FIGURE REQUIRED FOR A GIVEN G/T AT 12 GHz



specification for TV broadcast satellite reception is for a G/T of 6 dB/K in a field of power flux density — 103 dBW/m². With the preferred size of antenna, diameter not exceeding one meter, this demands a receiver noise figure of about 8 dB (diagram six). The traditional direct mixer approach will only achieve this figure if carefully optimized—it cannot be depended upon to satisfy the requirement at a suitably low cost. Japan's NHK Laboratories have developed an experimental Ku-Band converter, the circuit elements being punched or etched into a thin metallic sheet inserted across the center of a rectangular waveguide, parallel to the E-plane. A Schottky diode forms the mixer, the local oscillator being a Gunn effect device (another example of semiconductor developments taking over directly traditional microwave roles—here the klystron oscillator). Bandpass filter circuits for signal and LO frequencies form part of the planar structure, as do the matching and frequency-determining elements for the mixer and oscillator. Attention to image-frequency impedance minimises mixer noise (a broadband mixer cannot distinguish between signal and image frequencies and so has a 3 dB noise penalty) and the laboratory unit gave a conversion loss of 3.4 dB, noise figure of 4.5 dB at an i.f. of 370 MHz and bandwidth in excess of 100 MHz. NHK claims the construction technique enables reproducible performance to be obtained in a mass production situation (diagram four). Philips Research Laboratories in the U.K. have investigated an image rejection mixer for broadcasting satellite applications—noise performance of the prototype unit was disappointing, due perhaps to the losses associated with the quadrature hybrid couplers used to split the signal path and form two balanced mixers (4 diodes in all). See diagram five. An alternative design employing a single balanced mixer, 2 Schottky diodes in microstrip construction with a cavity-stabilized Gunn device as local oscillator, was capable of about 7 dB noise figure. This converter was demonstrated in Canada with signals from the Communications Technology Satellite (Hermes). Another technique currently being investigated as a contender for low-cost consumer equipment is harmonic mixing with an anti-parallel diode pair. The principal advantage of this system is the less severe requirement in regard to stability and noise from the local oscillator source. For a 12 GHz receiver the local oscillator could operate in the 6-7 GHz region. Noise figures are expected to be 1 or 2 dB worse than the same diodes would give with fundamental mixing. The possibility of still simpler downconverters exists, in the shape of the self-oscillating mixer. The Gunn effect device, while not a true diode, can act as a mixer as well as an oscillator. Its high noise level in this application has been found to be due to the phase instability of its oscillation, which can be improved

considerably by application of **effective AFC**. Recent work has yielded noise figures of 10 dB with 15 dB conversion gain at frequencies above 10 GHz. Finally, in consideration of simple receivers, the possibilities of using the more expensive GaAsFET as a self-oscillating mixer should not be overlooked.

It is inevitable that eventually GaAsFETs of adequate performance will become cheap enough to incorporate as RF amplifiers in consumer equipment, thus easing considerably the design problem of the mixer stage. In the meantime, the GaAsFET is becoming established in professional Ku-band receivers as it already has at C-band. My own experimental 11/12 GHz receiver has two stages of GaAsFET RF amplification ahead of the single-ended Schottky mixer. The two RF stages give about 15 dB gain ahead of the mixer with a noise figure in the 4 dB region (438 degrees K) at 11.6 GHz. The photograph shows typical reception with the 8 ft. antenna in the Spotbeam from Europe's OTS, which sends about 47 dBw EIRP in this direction. Coincidentally, **this is the EIRP value of the spotbeams from Anik-B**, Telesat Canada's dual-band RCA-



TDF France second channel received through OTS during February 1979

designed bird launched last December and having recently assumed active service at 109 degrees west. I have little information on Telesat's plans for the 12 GHz downlink from Anik-B, except that they will include (Government sponsored) TV programming for

the Inouvit-speaking people of Canada. So those readers with 12-GHz converters will have some TV to look for. Channel width at 12 GHz is 72 MHz (though half-transponder operation is probable for TV) and there are six channel transponders in the band.

Transponder Changes

Another month and another regrouping of the SATCOM F1 transponder line up. During the month of April two new services began operation on a regular basis, one 'old-timer' abruptly moved transponders and yet a third new entry onto F1 was scheduled to begin service.

Nickelodeon began regular paying service on April 1st on transponder 11; this is a shared transponder with Warner's sister service **STAR CHANNEL**. The Warner pay programming service (**STAR CHANNEL**) actually began operation on February 1st on transponder 5 and 11 and 11 is now utilized for this pay service **after** Nickelodeon signs off for the day (around 11 PM eastern most days). Transponder 5, on the other hand, carries the full day's **STAR CHANNEL** service.

HBO's new family service channel, **TAKE-2**, began regular operation on transponder 23 during April. In other HBO related transponder news, transponder 22 (the west coast feed channel) which was exhibiting some signs of technical problems during February and early March seems to have stabilized. RCA sources report that this particular problem, with transponder 22, is an 'annual event' caused (they say) by some hard wiring design problems which they have experienced on both F1 and F2. HBO had been simultaneously feeding HBO (west) on transponders 22 and 20 during this period when several outages were reported (see **CATJ** for April, page 62). RCA seems confident that the inter-

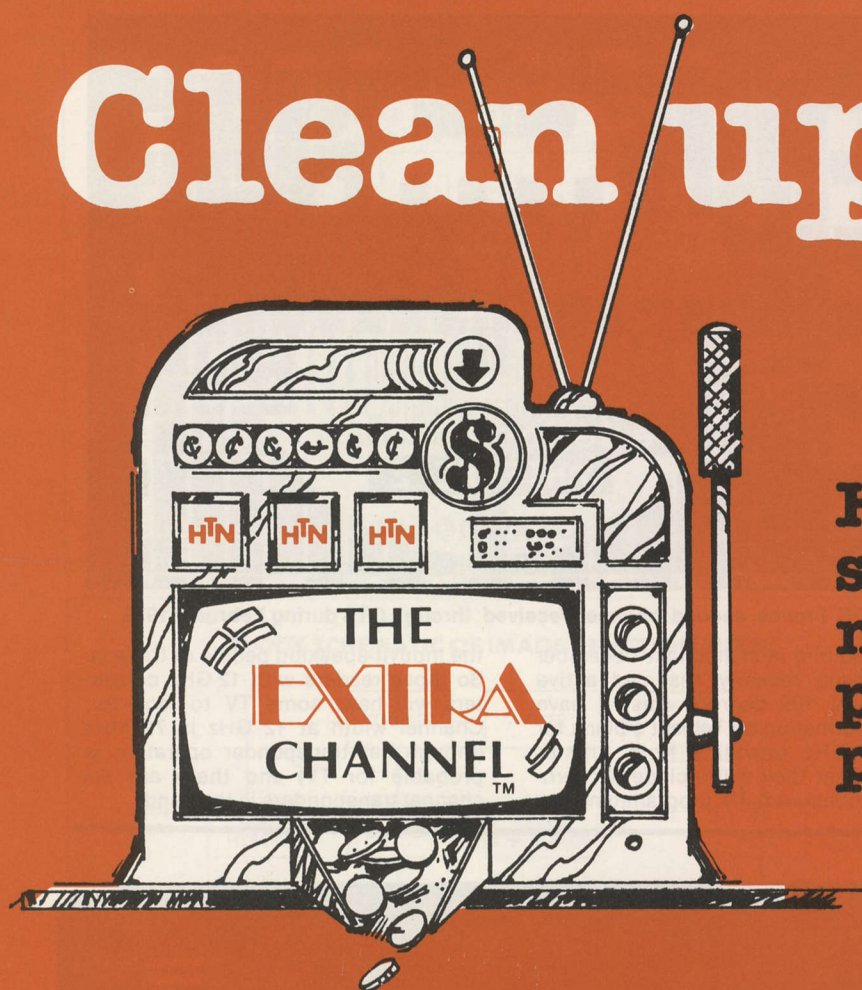


mittent nature on 22 this spring is not a sign of a failing transponder. Had HBO elected to get off of 22, several industry sources indicated that HBO (west) would move to transponder 14. The west feed channel must be on a transponder which places signal coverage into Hawaii (on the spot beam) and on the horizontal transponder set that leaves only transponders 2,6,10, 14 and 18 as 'possibles'. In that set of transponders, 14 was the most oft mentioned candidate for HBO (west).

However, early in April transponder 14 developed severe problems; the output

power from the TWT dropped off sharply and the occupant at that time (**Trinity's KTBN**) lost service for parts of several days. RCA came to Trinity's rescue by allowing them to move down to transponder 13 (vertical). You may recall from last fall that transponder 13 had been originally awarded to Ed Taylor's SCS for WGN in Chicago. Then shortly after the award RCA notified SCS that 13 had developed an intermittent problem and SCS opted not to take it. RCA sources indicate that since mid-fall the intermittent problem associated with 13 has not repeated and Trinity therefore moved to 13 as a

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Home Theater Network costs only a fraction more to double their prime time movie choice. And something else — some people just don't want their families watching R rated movies. The point is this: If you offer Home Theater Network, you can probably sell Home Theater Network. And isn't that the name of the game?

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CATV TVRO STATISTICS — May 1979

Applications Filed/FCC	Jan. 1979	Feb. 1979	Mar. 1979
1) 11 meter	0	0	0
2) 10 meter	1	2	1
3) 7 meter	3	0	0
4) 6 meter	5	4	8
5) 5 meter	70	64	88
6) 4.5 meter	16	12	20
Total Apps.	95	82	117
Cost Max.	\$60,000	\$103,000	\$89,112
Cost Min.	\$17,500	11,200	\$12,600
Avg. Cost	\$31,597	31,323	\$38,564
Channels Requested*	201	181	286
Average Channels	2.1	2.2	2.4
Requesting WTCG	43	40	63
Requesting CBN	44	35	57
Requesting HBO	51	39	79
Requesting MSGE	17	13	24
Requesting SHOWTIME	6	9	16
Requesting WGN	12	13	17
Requesting KTVU	6	5	3
Requesting Warner's Nickleodeon	0	9	5
Avg. Cost Per Channel	\$14,975*	\$14,237*	\$17,371*
TVRO's Licensed/FCC	76	75	104

Notes: *—may no longer be valid measurement stick due to method applicants now file with FCC. Data compiled from FCC sources, advances ahead one month with each issue of CATJ.

way of staying on the satellite. In the meantime RCA engineers are analyzing the data transmitted back from the F1 telemetering to determine what (if indeed anything) can be done from the ground to bring 14 back into full service.

And then there is the saga of transponder 17. RCA was to have started service on 17 for Eastern Microwave around the 10th of April; bringing up the fourth indie for F1, New York City's WOR-TV. Eastern has been carrying WOR throughout the northeast on terrestrial microwave for many years. Eastern had not, as of mid-April, completed a terrestrial microwave link to carry the WOR-TV off-air signal into the RCA Vernon Valley uplink complex and at presstime the actual start date for WOR on transponder 17 is not firm. When Eastern does (or did depending

upon when you read this) begin such service, it will be matched up in the WOR-TV off-air hours with late night movies from CBS network's flagship station WCBS-TV. Typically the late night viewers on transponder 17 will catch two full WCBS movies plus a portion of a third movie.

Keeping the transponder full during most or all of the broadcast day is also part of the expansion scheduled for Ed Taylor's SCS/SSS carriage of San Francisco's KTVU on transponder 1. Effective May 1st transponder 1 was to be carrying the full broadcast day of San Francisco/Oakland independent KTVU plus after the KTVU sign-off the late night movie service from CBS affiliate in San Francisco KPIX-TV. Like the WCBS late night service on transponder 17, this will typically amount to around 2.5 movies per night. Also on

May 1st the Satellite Program Network (SPN) was to begin its operation on transponder 21, moving there from transponder 1. SPN programs typically 13 hours per day in the 7 AM to 8/9 PM time slot (eastern time).

And yet one more change, again affecting transponder 21. HTN (Home Theater Network) which has been doing very well bringing up a five day a week G and GP service for mini-pay offerings is expanding their service from five to six days per week; adding Saturday as the new night of service. This too was to have begun effective with the first week in May.

As always, the watchword is flexibility and having in your satellite receive headend at least one 24 channel tuneable receiver for the inevitable changes that are going to occur.

Transponder	Service
1	KTVU + KPIX late night movies
2	PTL (24 hours)
3	WGN
4	broken, no service
5	STAR CHANNEL (Warner)
6	WTCG + UPI slow scan
7	ESP (*)
8	CBN (24 hours)
9	C-SPAN, Madison Square Garden Events
10	SHOWTIME (western feed)
11	NICKELODEON + STAR CHANNEL
12	SHOWTIME (eastern feed)
13	KTBN (Trinity)
14	out of service
15	RCA data
16	FANFARE
17	WOR + WCBS late night movies
18	Reuters (digital)
19	RCA data
20	HBO conferencing, spare, occasional users
21	HTN, SPN
22	HBO (western feed)
23	TAKE-2 (HBO family service)
24	HBO (eastern feed)

* - ESP is still officially scheduled to begin service in September; however, a recent change in controlling ownership may signal an earlier start date.

SPN Increases Schedule

The Satellite Program Network (SPN) which has been providing around 3-5 hours of programming 'fill' per day on transponder 1 is increasing the programming day to 13 hours per day effective May 1st when SPN moves to transponder 1. Under the newly expanded schedule SPN will be up from around 7 AM to 8 PM daily Monday through Saturday on transponder 21 (all times eastern) plus it will add an extra two hours per day on Sunday. HTN (the family movie package) starts its evening movie on transponder 21 at 8 PM (eastern) Monday through Saturday but is not on the bird on Sundays.

The growth of SPN has been quite spectacular. Cable systems carrying this non-broadcast, no-copyright

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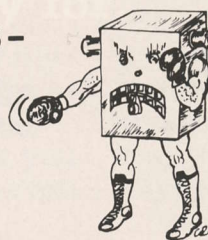
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liability, free-of-charge (**that's the bargain of the year!**) service have grown to where now SPN feels comfortable with a homes-reached number in the 850,000 to 900,000 region. Some systems are switching to SPN for filler material during local non-dup protection and the like but **most systems** carrying SPN are carrying the **full schedule** of SPN programs.

Part of SPN's growth can be traced to the unusual charges involved to programming people bringing programs to SPN for cable airing. For example, for a paltry \$40 per hour you can buy an hours time on SPN in the morning hours. The time fee rises to \$100 per hour in mid day and early afternoon, escalates to \$200 per day in the 4-6 PM (eastern) time slot and tops off around \$300-\$400 per hour in 'prime time.' Having access to 900,000 or so cable homes for \$400 per hour in prime time is part of the reason why SPN is attracting so much attention.

SPN will **also** be found on transponder 1 from 7 AM to 10 AM daily, ahead of the regular KTVU sign-on as a parallel feed to the transponder 21 fulltime service. SPN is the brainchild of the SSS group under Ed Taylor.

No License Terminals—Update

A report in the March issue of CATJ (see **Satellite Technology News**, page 60) indicated the FCC has an inquiry out relating to 'deregulation' of CATV earth terminals. And as suggested in March, the February filing date was indeed extended until March the 23rd.

Normally when such an inquiry goes out the FCC allows 90 days for comments to be filed; this one got a thirty day turn around initially and with the extension it went to 60 days. Several parties asked for an extension and the FCC agreed.

Now what happens next? After all of the comments are in place the FCC goes through the comments and creates a 'summary'; that is, a composite white paper reflecting the trends of the comments and extractions from some of the comments which they find most interesting. Anyone with the time and patience is able to go directly to the Commission and review all of the submissions on the matter. Interwoven into this will be a period during which those that filed comments may file "reply comments"; that is, additional wordage which deals with the wordage of others that filed. This presupposes that if you file you take the time to go in and read over what everyone else had to say on the same issue. The official date for filing reply comments is not firm but it is likely to be sometime in late May or early June.

After the reply comments and the FCC 'summary' will come a Notice of

Proposed Rule Making. If one assumes the summary is released in late June or July, this places the Notice of Proposed Rule Making in perhaps the September time frame, the Commission largely being vacant because of vacations in August. And this says that perhaps by late in 1979 there will be a new 'rule' in this area; one that changes the requirements for earth terminal licensing procedures.

Satellite Magazine Moves

Satellite Magazine, the CATJ produced weekly cable industry one

hour television programmed produced since last fall will shift from transponder 24 to transponder 21 effective with the May 17th program.

Satellite Magazine is produced by CATJ Editor in Chief Bob Cooper at the University of Oklahoma School of Broadcast Journalism studio in Norman, Oklahoma. The program airs every Thursday at 12 noon eastern time. The May 3rd and 10th program will air on **both** transponders 21 and 24 on a dual feed arrangement. However, after the May 10th program, Satellite Magazine will be seen exclusively on transponder 21 (again, Thursdays, 12 noon eastern).

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SPTS-79 August 14,15,16
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THE LOCATION:

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THE PURPOSE:

To provide a forum where the people who know how to do it will teach and demonstrate what must be done to make satellite (and other microwave range) television distribution systems perform with low cost, simple equipment.

THE PROGRAM:

Three full days. **August 14,15 and 16.** Specific sessions on low cost **antennas** (from 20' x 20' spherical antennas to small 6/8' build-it-yourself dishes), **LNAs** (both bi-polar and GaAs-FET designs), **receivers** (modified surplus equipment, module assembly and complete ground-up construction techniques). **Plus** - special labs set aside for you to review (and dub-copy if you wish) dozens of hours of videotape dealing with the satellite explosion, special synposiums for MDS converters, and 10 GHz low cost microwave.

THE INVITATION:

You are invited to attend. However, the maximum 'comfortable' accommodations limit us to 500 attendees and the registrations are already pouring in. When the capacity of the seminar is reached, registration will close. Additionally, if you wish to bring your own 1/2 inch format (BETA or VHS) video tape recorder and a supply of blank tapes with you, facilities will be available for you to videotape both seminar proceedings and to dub the dozens of satellite-topic videotapes on hand for a very nominal charge.

THE REGISTRATION:

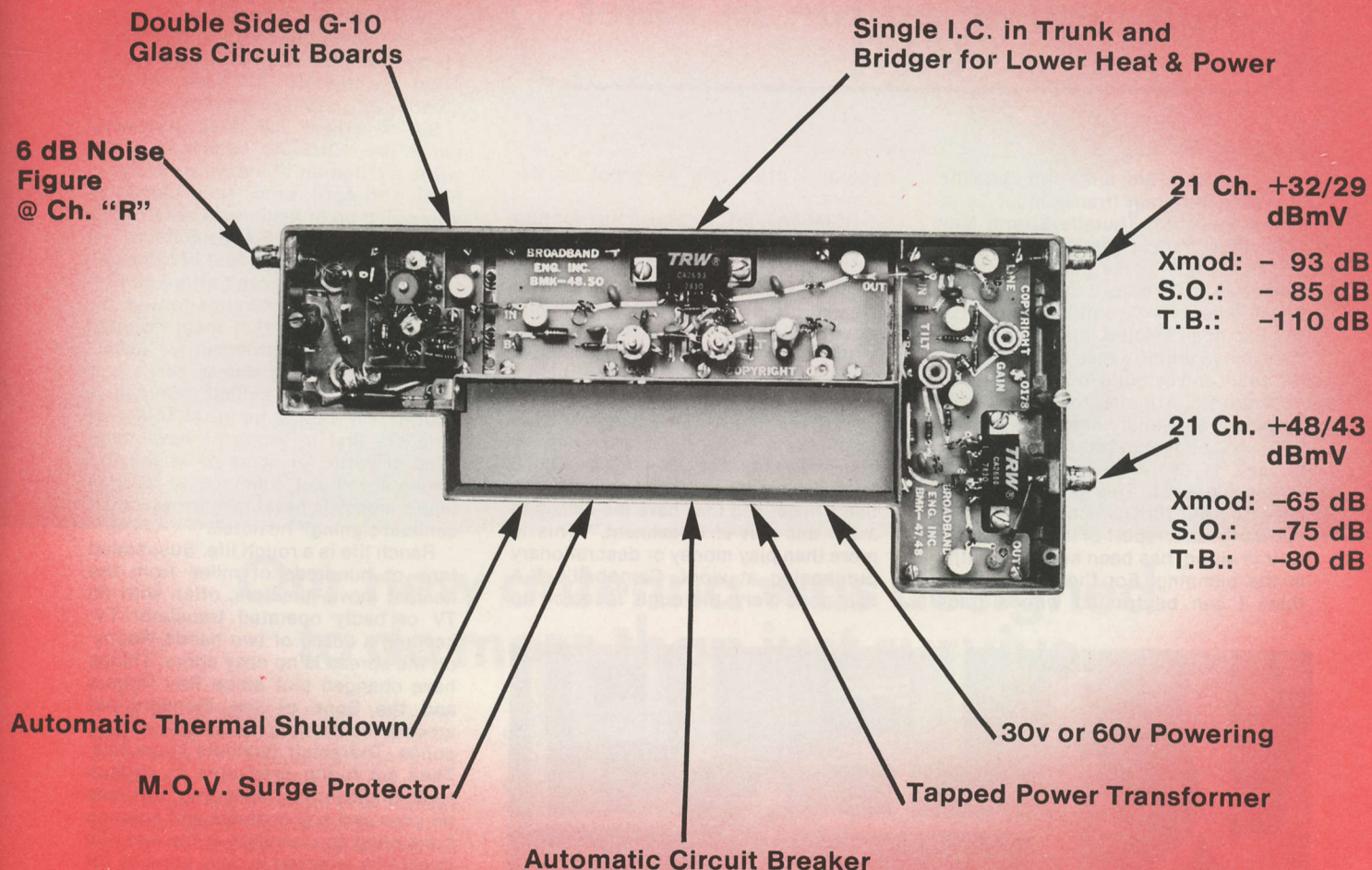
A Registration form is found on the insert card page to the right. Note that group-attendance is encouraged by sliding-scale attendance fees with lower rates for more than one person registering in the same group.

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Coop's cable column



**bob cooper editor in chief
CATJ**

HOMESAT, INC.

On my May 3rd and 10th Satellite Magazine program (transponder 24 at 12 noon eastern Thursdays until May 17th; then transponder 21 same time and day) I had as my guest **Richard J. Campbell**, Director of Business Development for Scientific Atlanta, Inc. Mr. Campbell elected this medium and this time to spring a real 'bombshell' on the cable and satellite industries.

Scientific Atlanta, through a new corporate subsidiary known as HOMESAT, INC., has entered the private (as in 'one in every backyard') satellite terminal market. This program, taped back on April 20th (which explains how you can read a report of it here virtually as it is airing) has been several months in the planning. For those who don't think I can be trusted with a trade

secret I offer this as proof to the contrary!

HOMESAT, INC. is a business venture of S-A which is initially concentrating on the marketing of high dollar (CATV grade) TVRO terminals to a specific market. In all or parts of 11 essentially western states S-A has identified some 46,000 + ranches or farms which have 2,000 or more acres each. Campbell's business philosophy is sound.

"People who live and work on large ranches are by in large separated by many miles from high quality, diversified television reception. They have an identifiable need, and they have the dollars to make this sort of investment." This is more than play money or discretionary purchasing at work. Campbell's S-A has done very thorough research to

identify both the needs of rural ranch America and to create a solution to that need. S-A has even worked out how a typical ranch can take advantage of investment tax credits and the like when they install a private terminal.

S-A is not asking the FCC to do anything special in the licensing of these terminals; they are being treated like a CATV application by S-A, full frequency coordination, the 4.5 meter dish and the whole 9 yards of 3 dB fade margin. S-A will, through my March column proposed 'Satellite Programming Registration Service' (see **Coop's Cable Column** page 56 for March), insist that every terminal purchaser be legally entitled (as in having a contract) to the programming sources they select. I'd tell you how this is going to work, but for now that's S-A's marketing program data and when they want to release it, I'll be the first to get the go-ahead. Trust me that it will work without creating any new issues or lawsuits.

S-A is already out there marketing under the HOMESAT banner. A state wide cattleman's meeting in New Mexico in April, other such meetings now going on or just ahead are livened up by a 4.5 meter S-A demonstration terminal on premises. Just in case you think the cattlemen can't afford such a 'luxury', take a few minutes to walk by your local supermarket meat counter these days! One cattleman we talked to responded "**Well shucks, that's just 30 head or so of cattle!**". Campbell caught on fast...he now talks to ranchers first in terms of how many head of cattle (or acres of wheat) the terminal will set them back. "**Some-time's money is never mentioned until a contract signing!**" he notes.

Ranch life is a rough life. Suspended tens or hundreds of miles from the nearest movie theaters, often with no TV or badly operated translator TV, keeping a dozen or two hands 'happy' on the spread is no easy chore. Things have changed alot since Roy Rogers and the Sons of the Pioneers sat around the campfire at night singing songs. The smart ranchers know this. They are hiring graduates in agricultural engineering, spending fortunes on crop and soil analysis and keeping consulting agronomists at the end of a telephone reserved in days gone by for the family doctor. Bringing some of the amenities of life to the ranches and farms of America is much more practical and necessary than might appear at first blush. I think S-A is on the right track but I also think that what S-A is doing here with HOMESAT will be but the tippy-top of the iceberg when other smart satellite gear producers and marketers figure out that satellites are good and necessary for many more areas of America than simply cable TV or broadcast stations. Campbell had several things to say about how S-A expects the cable operators (in rural areas) to join with S-A in this program. If you missed Satellite Magazine on May 3rd or 10th, you can either order out from **CATJ Tape Time** tape (dub) 010



S-A's Richard J. Campbell and Coop on the Satellite Magazine set during the April 20th taping of Satellite Magazine.



Our new antenna was designed to do more than just survive.

We set our standards high. We were determined to develop a high performance, low cost antenna that was versatile. It took a while, but we did it. It's a sweetheart. But that's not enough. Because Mother Nature can be very destructive at times. So we designed in strength to withstand winds of 100 knots without signal degradation. And survive winds of 140 knots.

The fiberglass composite reflector achieves maximum stiffness with minimum weight. We had our computer help us design it as well as a new kind of mount. It uses torsionally stable tubular members instead of the usual angle iron. We also included anti-friction roller bearings for azimuth and elevation so that they are not frozen when you need to orient or reorient the antenna quickly and easily. You don't need the state surveyor to align the foundation on this one.

The antenna provides two antenna feed options—a high gain Cassegrain design for maximum gain in weak signal areas or a focal point feed for strong signal areas. The 5 meter antenna is easily convertible to 6 meters should additional gain be required at a future date. That's built-in versatility.



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And The Next To Go ...

Many people in the industry who have a few bucks placed on the satellite service betting line are understandably nervous over the recent problems with SATCOM F1. RCA keeps telling us the bird is healthy, and probably it is. We certainly don't want to get into that squabble all over again. I convinced myself that RCA is a top notch outfit with lots of super people when I did the **Satellite Magazine** reports last November and December, and reported on the 'health' of the bird(s) in our special **CATJ** December (1978) issue.

However, Transponder 22 has the hiccups. Not bad, probably a mild case on indigestion. Transponder 4 quit before the bird got into orbit. Transponder 13 has been erratic for some years but perhaps now with

Trinity on this transponder the 'faith' will keep it alive and well. Transponder 14 developed a mysterious ailment at the end of March and Trinity abandoned 14 for 13. **At the time** it looked like they were hopping from the frying pan into the fire.

The question being asked these days is **"OK ... so transponders do fail. And since certain transponders have protected service and certain do not, can somebody (anybody!) tell us what service is going to get bumped when the next transponder quits???"**

Some of you are not going to like the answer. Here is the sequence of transponders which will be next in line to back up a failing transponder should another transponder (or two) fail.

1) When the next transponder fails, if that transponder was either protected or guaranteed, **that service will move to transponder 9.**

To make sure you understand what I just wrote ... let's say transponder 6 fails. OK, WTCG/SSS is protected so RCA would clear C-SPAN and Madison Square Garden off of 9 and put WTCG/SSS there.

2) **And after transponder 9?** The next sequence calls for the following transponders to be 'pre-empted' and the failed service placed thereon: transponder 3 (WGN), transponder 21 (SPN/HTN) and transponder 7 (ESP). In that order.

Now we all hope and pray that no more transponders cease to function **before** we have SATCOM F3 in position and operating. The **earliest** that F3 will be on station ready to take on CATJ traffic is around mid-December (if they

get an October launch) and the latest is say mid-February. RCA says that F1 has had far fewer failures than some engineers prognosticated. We are happy for RCA but the fact remains we have 2 dead and 2 more erratic at the present time.

RCA also says that when F3 is on station much of this will take care of itself because F3 has extra redundancy built in (four extra TWT stages, extra battery life and so on). But in the interim we are riding on thin ice and everyone should be aware of 'what happens next' If there is another transponder failure. If you have a tuneable receiver and can spare it for a back-up you are in good shape. If you have a crystal controlled receiver, I'd suggest you get in **house** a spare crystal **for transponder 9** just in case something you now are using suddenly moves to 9. If you are equipped **only for horizontal polarization** and you happen to notice that **all** of the backup channels **are vertical** ... well, you'd better call your antenna supplier for an ortho coupler and Tom Humpheries at SCI for a spare or vertical LNA.

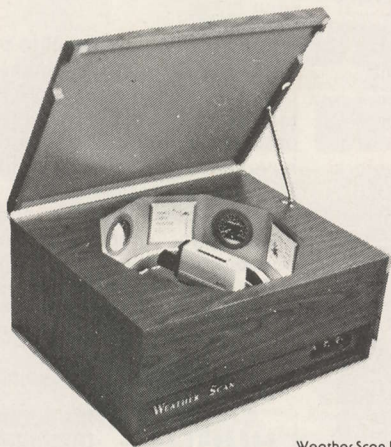
This whole business of doing everything humanly possible to be prepared for some type of system failure is becoming serious business. I was delighted to learn that Ed Taylor, at SSS, for example has just completed a direct hard wire interconnect from the WTCG control console to the Douglasville, Georgia uplink site operated by SSS. This means that about the time you read this WTCG will no longer be taken 'off air'; it will be patched from the WTCG studio

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through a microwave hop **directly** to the SSS uplink site. SSS has also installed a spare uplink transmitter as a backup for WTCG's feed to the bird, and upgraded WTCG to a protected status. Frankly, with so many homes depending on a service such as this, and so many cable operator dollars invested in taking the WTCG signal on into the home, the \$135,000 Taylor just spent to accomplish these three things seems like money well spent. As a cable operator you might keep this in

mind when you are talking with any satellite service supplier. Ask the chap just what **he** has done or will do to insure that your service from him is there all of the time. Does he have a **backup** transmitter? What is the **status** of his transponder channel? What is his **backup plan** should something fail? Sure he'd be dumb to not plan for an emergency but such planning and implementation costs bucks and I'm not so sure everyone bringing services to the bird has the foresight to

CATA ASSOCIATES

In recognition of the untiring support given to the nation's CATV operators, and their never-ending quest for advancement of the CATV art, the COMMUNITY ANTENNA TELEVISION ASSOCIATION recognizes with gratitude the efforts of the following equipment and service suppliers to the cable television industry, who have been accorded ASSOCIATE MEMBER STATUS in CATA, INC.

AmeriCom Satellite Network, Inc., (A.S.N.), 310-14th Ave. South, St. Petersburg, FL 33701 (S4) 813-895-4201
 Anixter-Pruzan, Inc., P.O. Box 88758, Tukwila Branch, Seattle, WA. 98188 (D1) 206-251-6760
 Applied Data Research, Inc., Route 206 Center CN-8, Princeton, NJ 08540 (M9) 609-921-8550
 AvanteK, Inc., 3175 Bowers Avenue, Santa Clara, CA 95051 (M8) 408-249-0700
 Belden Corp., Electronic Division, P.O. Box 1327, Richmond, IN 47374 (M3) 317-966-6661
 B.E.I. (BESTON ELECTRONICS, INC.), P.O. Box 106A, Olathe, KS 66061 (M9 Character Generators) 913-764-1900
 Bestvision Home Cinema, Inc., 5540 W. Glendale Ave., Suite C-106, Glendale, Az. 85301 (S9 Pay-TV programming and marketing) 602-931-9157
 BLONDER-TONGUE LABORATORIES, One Jake Brown Rd., Old Bridge, N.J. 08857 (M1, M2, M4, M5, M6, M7) 201-679-4000
 BROADBAND ENGINEERING, INC., 1525 Cypress Dr., Jupiter, FL 33458 (D9, replacement parts) 1-800-327-6690
 Budco, Incorporated, P.O. Box 4593, Tulsa, OK 74120 (D9 Security & Identification devices) 918-584-1115
 Cable TV Supply Company, 11505 West Jefferson Blvd., Culver City, CA 90230 (D1, D2, D3, D4, D5, D6, D7, D8, M5, M6) 213-390-8002
 CCS HATFIELD/CATV DIV., 5707 W. Buckeye Rd., Phoenix, AZ. 85063 (M3) 201-272-3850
 C-COR ELECTRONICS, Inc., 60 Decibel Rd., State College, PA 16801 (M1, M4, M5, S1, S2, S8) 814-238-2461
 Century III Electronics, Inc., 3880 E. Eagle Drive, Anaheim, CA 92807 (M1, M3, M4, M5, M7, M8, S1, S2, S8) 630-3714
 COLLINS COMMERCIAL TELECOMMUNICATIONS, MP-402-101, Dallas, TX 75207 (M9, Microwave) 214-690-5954
 COMM/SCOPE COMPANY, Rt. 1, Box 199A, Catawba, NC 28609 (M3) 704-241-3142
 COMMUNICATIONS EQUITY ASSOCIATES, 651 Lincoln Center, 5401 W. Kennedy Blvd., Tampa, FL 33609 (S3) 813-877-8844
 COMPUTER VIDEO SYSTEMS, INC., Suite E, 6290 McDonough D., Norcross, GA 30093 (M9) 404-449-3800
 Comsearch, Inc., 2936 Chain Bridge Rd., Oakton, VA 22124 (S8, S9 earth station placement frequency coordination) 703-281-5550
 ComSonic, Inc., P.O. Box 1106, Harrisonburg, VA 22801 (M8, M9, S8, S9) 703-434-5965
 Comtech Data Corporation, 15207 N. 75th, Scottsdale, AZ 85260, (M2, M6) 602-991-9580
 CRC ELECTRONICS, INC., 2669 Kilihaui St., Honolulu, HI 96819 (M9 Videotape Automation Equipment) 808-668-1227
 Custom Building Products, Inc., P.O. Box 32231, Okla. City, OK 73132, (S9, Underground Boring Equip.) 405-495-1935
 Daniels & Associates, 2930 E. 3rd Ave., Denver, Colo. 80206 (S3, S9 Brokerage) 303-321-7550
 DAVCO, INC., P.O. Box 861, Batesville, AR 72501 (D1, S1, S2, S8) 501-793-3816
 DF Countryman Co., 1821 University Ave., St. Paul, MN 55104 (D1, S1, S8) 612-645-9153
 Durnell Engineering, Inc., Hwy. 4 So., Emmetsburg, Iowa 50536, (M9) 712-852-2611
 EAGLE COM-TRONICS, INC., P.O. Box 93, Phoenix, NY 13135 (M9 Pay TV Delivery Systems & Products) 315-695-5406
 EALES COMM. & ANTENNA SERV., 2904 N.W. 23rd, Oklahoma City, OK 73107 (D1,2,3,4,5,6,7,S1,2,S7,8) 405-946-3788
 FANFARE TELEVISION, 10 Greenway Plaza, Houston, TX 77046 (S4) 713-960-8731
 FARINON ELECTRIC, 1691 Bayport, San Carlos, CA 94070 (M9, S9) 415-592-4120
 FERGUSON COMMUNICATIONS CORP., P.O. Drawer 871, Henderson, TX 75652 (S1, S2, S7, S8, S9) 214-854-2405
 Gardiner Communications Corp., 2000 S. Post Oak Rd., Suite 1490, Houston, TX 77056 (M9 TVRO Packages, S1, S2, S8) 713-961-7348
 General Cable Corp., 1 Woodbridge Center, P.O. Box 700, Woodbridge, N.J. 07095 (M3) 201-636-5500
 GILBERT ENGINEERING CO., P.O. Box 14149, Phoenix, AZ 85063 (M7) 602-272-6871
 Heller-Oak Communications Finance Corp., 105 W. Adams St., Chicago, IL 60603 (S3) 312-621-7661
 HOME BOX OFFICE, INC., 7839 Churchill Way—Suite 133, Box 63, Dallas, TX 75251 (S4) 214-387-8557
 HUGHES MICROWAVE COMMUNICATIONS PRODUCTS, 3060 W. Lomita Blvd., Torrance, CA 90505 (M9) 213-534-2146
 IBM Corp., P.O. Box 2150, Atlanta, GA 30301 404-231-6005
 Ind. Co. Cable TV Inc., P.O. Box 3799, Batesville, AR 72501 (D1, S1, S2, S8) 501-793-5872
 International Microwave Corporation, 33 River Road, Cos Cob, CT 06807, (M1, M4) 203-661-6277
 JERROLD Electronics Corp., P.O. Box 487, Byberry Rd. & PA. Turnpike, Hatboro, PA 19040, (M1, M2, M4, M5, M6, M7, D3, D8, S1, S2, S3, S8) 215-674-4800
 JERRY CONN ASSOCIATES, INC., P.O. Box 444, Chambersburg, PA 17201 (D3, D4, D5, D6, D7, D8) 717-263-8258
 Klungness Electronic Supply, P.O. Box 547, 107 Kent Street, Iron Mountain, MI 49801 (D1, D8, S2, S8) 906-774-1755
 LARSON ELECTRONICS, 311 S. Locust St., Denton, TX 76201 (M9 Standby Power) 817-387-0002
 LRC Electronics, Inc., 901 South Ave., Horseheads, N.Y. 14845 (M7) 607-739-3844
 Magnavox CATV Division, 133 West Seneca St., Manlius, N.Y. 13104 (M1) 315-682-9105
 MICRODYNE CORPORATION, P.O. Box 1527, 627 Lofstrand La., Rockville, MD 20850, (M9 Satellite TV Recs.) 301-762-8500
 MICROWAVE ASSOCIATES, INC., 777 S. Central Expwy., Suite 4-C, Richardson, TX 75080 (M9 Microwave Radio Systems) 816-891-8895
 Microwave Filter Co., 6743 Kinne St., Box 103, E. Syracuse, N.Y. 10357 (M5 Bandpass Filters) 315-437-4529

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Wanted: (2) area CATV engineers—one based in Dallas, Texas, one based in Southeastern United States. Staff position reporting directly to the Vice President of Engineering. Considerable travel. Theoretical and practical knowledge of all facets of CATV construction, installation and maintenance desired. FCC license desirable but not mandatory. Following company paid benefits:

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Vacations
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Group Life Insurance
Group Accidental, Death & Dismemberment
Long Term Disability Pension
Employee Stock Ownership
Sick Leave

Salary commensurate with experience. Call or write:

Hank Cicconi
214-670-9860
Vice President of Engineering
Sammons Communications, Inc.
403 S. Ackard
Suite 708
Dallas, Texas 75202

Microwave Engineers

A common carrier microwave company, specializing in long-distance video transmission, satellite distribution, and expanding into cable television and manpower is seeking applicants for the position of microwave engineer in two locations; Bloomington, Illinois and Lebanon Missouri. Qualifications include FCC Class II radio-telephone. 2 years experience in RF. Video experience extremely helpful.

- Salary DOE
- Bonuses
- Company vehicle
- Expense account
- Vacations
- Much much more

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Immediate opening with a large growing 600 + mile system in Florida. Must have strong management skills as well as extensive knowledge of all phases of construction, installation, and technical maintenance. Excellent company benefits and advancement potential.

Bill Langendorf
Storer Cable TV of Florida, Inc.
P.O. Box 1178
Sarasota, Florida 33578
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Chief Engineer
P.O. Box 20011
El Paso, TX 79901

SYSTEM MANAGER—TECHS

Immediate openings for two experienced manager-technicians. Newly built plants with best equipment. About 30+ miles. Satellite terminals, etc. Excellent opportunity. Call Michael McKee (405) 341-8370.

FIELD TECHNICIANS

Openings for CATV Technicians in large midwest system. Experience in system maintenance preferred. Good salary, benefit package and advancement opportunities for the right individual. EOE.

Send resume and salary history to:
Director of Engineering
Continental Cablevision of Michigan, Inc.
333 Washington Square North
Lansing, Michigan 48933

For Sale: **LNA's**
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In Stock

SATCO
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Louisville, TX 75067
214-436-9509

TECHNICIANS

Continental Cablevision is contracting 1300 miles of plant in sunny and historic Richmond, Virginia. Located just an hour from the beaches and mountains, Richmonders enjoy a mild climate for most of the year. Technicians are needed for this fast growing company that offers an attractive benefit package.

The company seeks Service Technicians and Field Technicians. All technicians should have two years of cable experience and field technicians should also have electronics education. Continental needs personnel who desire rapid advancement.

Write or Call
Richard Ashpole
Continental Cablevision
2040 Westmoreland Street
Richmond, Virginia 23230

EXPERIENCED CATV PERSONNEL

UA-Columbia Cablevision of Texas, Inc. has immediate openings in San Antonio, Texas for experienced CATV personnel. If you would like to get in on the ground floor of a new 3,000 mile, 35 channel, bi-directional system offering an exciting opportunity for advancement and growth, we are interested in hearing from you. Good salary and excellent benefit package.

Positions available:
District Engineers
Microwave Engineers
Senior Technicians
Construction and Installation Foremen

Experienced personnel should send resume to:

Personnel Director,
UA-Columbia Cablevision of Texas, Inc.
203 South Broadway
San Antonio, Texas 78205

SELL:

CATV channel modulators for use with TVRO's Ch. 2,6,7,8 standard/video/audio inputs Dynair TX4A \$350 or offer. Jerrold carrier generators TCG 73.5, 159.25, 112.5 \$75 ea. or offer. Jerrold AFM-2 stereo FM modulator \$50. B-K model 415 TV sweep/marker generator \$150. **WANT** TV camera & Avionics 913-651-6612 after 4 p.m. CST.

SATELLITE T.V. ANTENNA POLAR MOUNT.

Detailed plans for polar mount for 10'-12' dishes. "Instant" positioning for any satellite in geostationary arc. Includes suggestions for cost effective private earth terminal construction and how to find used dishes. Only \$10.00 postpaid. Satellite Innovations, P.O. Box 5673, Winston Salem, N.C., 27103.

CATV Franchise Available

The city of Metropolis, Illinois is requesting bid proposals for a cable television franchise. Proposals will be accepted until 7:00 p.m. June 12, 1979. For further information and application forms call or write L.W. Barger, City Clerk, 106 W. 5th St., Metropolis, Illinois 62960 618-524-2711.

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