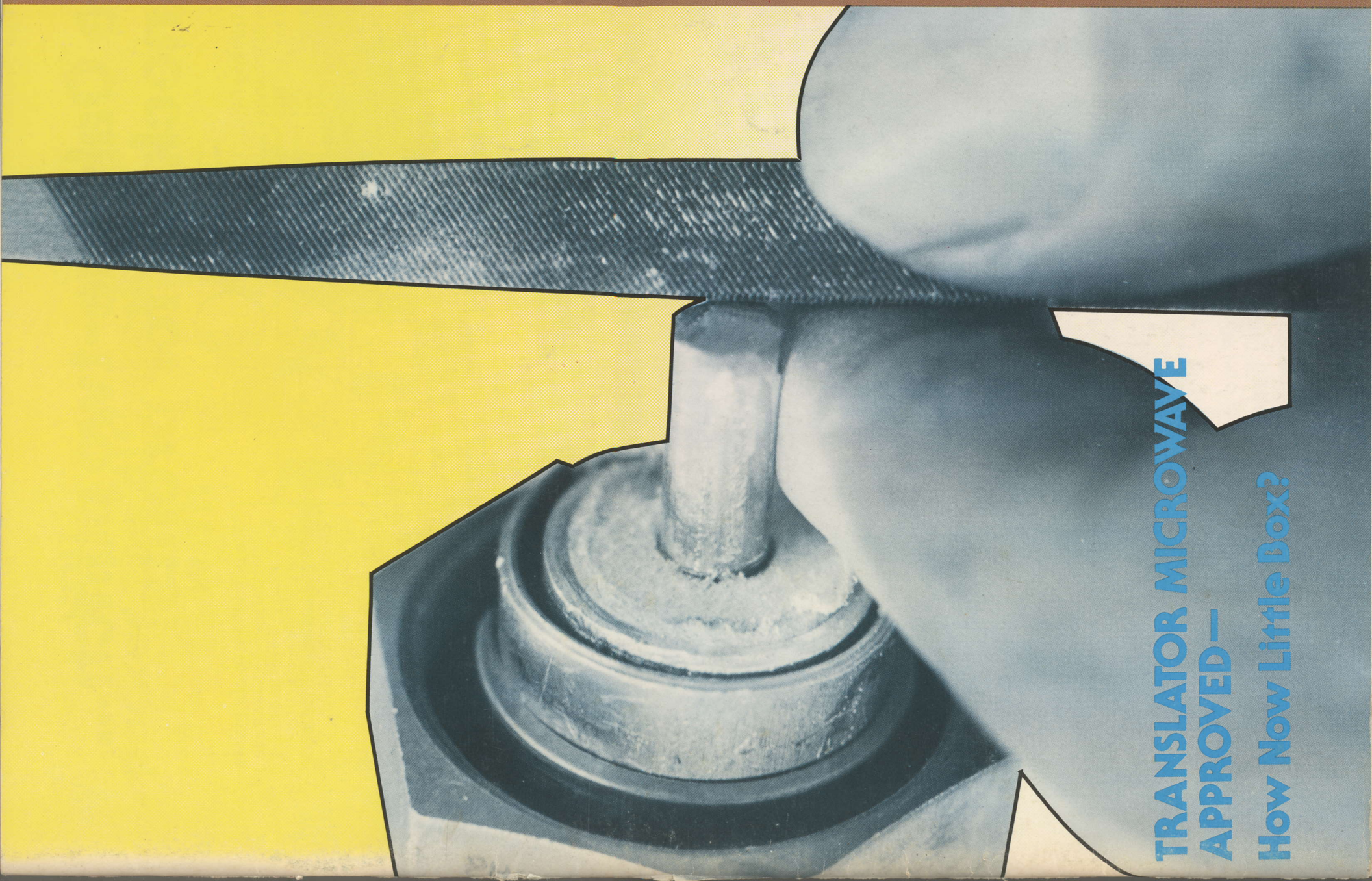
CATJ

MARCH
1978

OFFICIAL JOURNAL
OF THE
COMMUNITY ANTENNA
TELEVISION ASSOCIATION

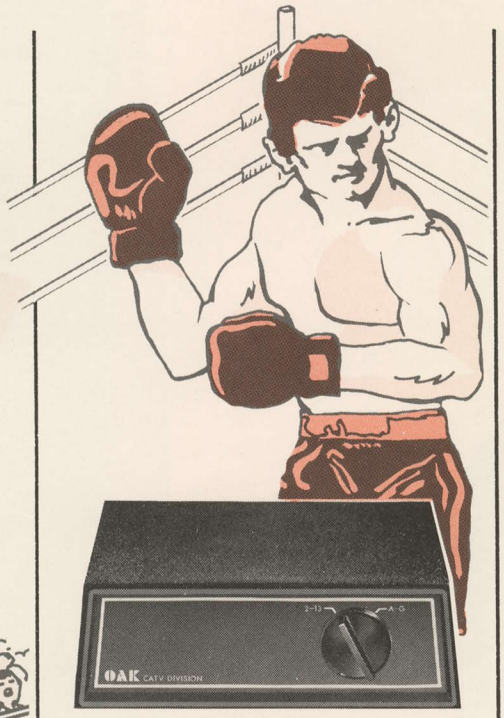


TRANSLATOR MICROWAVE APPROVED— How Now Little Box?

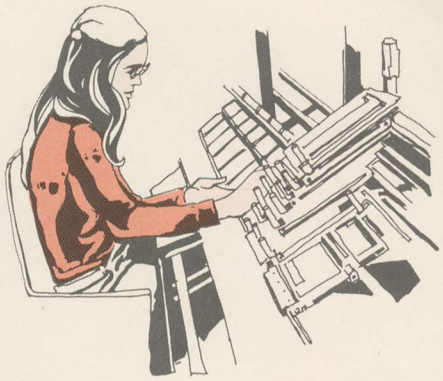
The Oak one-two punch... a knockout for profits!

This is the Trimline II— a champion 35-channel AFC converter.

It's a high quality unit with the toughness and versatility to meet the varying operational parameters of cable systems. It has wide dynamic range and high selectivity to defend against such opponents as cross-modulation and adjacent-channel interference—even at high input levels.



We build them in our plants. All Oak CATV products are made in company-owned facilities. We have a commitment to our customers and we back it up with prompt delivery and rapid service turnaround.

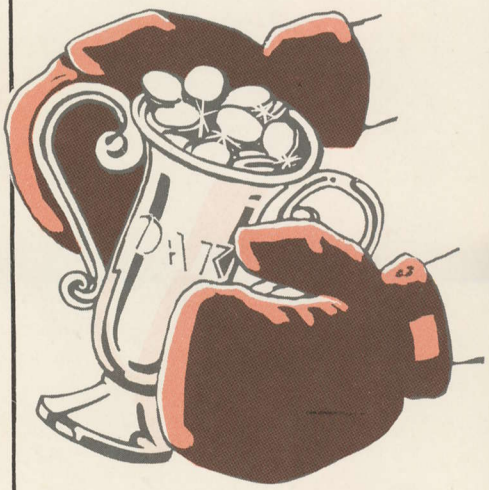


Great seats for the fans. You can offer your fans the convenience of set-top or remote "Jewel Case" operation. In either event, a built-in Automatic Frequency Control eliminates the fine tuning shuffle. The Trimline II is also available with an optional self-contained descrambler for premium programming with unbeatable security.

For the twelve rounders, Econobloc adds seven more. Oak ranks the Econobloc as the most economical way to expand your 12-channel system. Mid-band channels A to G convert to channels 7 to 13. Econobloc converters live up to their name by giving you a block of seven mid-band channels at an economical price.

The initial cost of a converter is only round one. Before you score the totals, ask yourself where and how the product is made, and by whom. Remember, reliability counts. The reliability of the Oak product stems from our control over the total production process.

The winner... Oak!



Compare Oak converters with all other contenders... but remember that there's more to the comparison than just the "black box." Market leadership and technological expertise are your assurance that the Oak Trimline II and Econobloc converters will go the distance. Oak converters are winners and your profit-wise choice.

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1. Another first for the RMS CATV DIVISION— the new RMS six-way directional tap could be your answer to a number of important system design problems.
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3. Rounding out the RMS 2, 4, and 8-way "UNITAP™" line, this new product development offers the CATV industry the most comprehensive line of directional taps and they're available now, for immediate delivery.
4. For additional information on this new product write or call collect.

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ELECTRONICS, INC.

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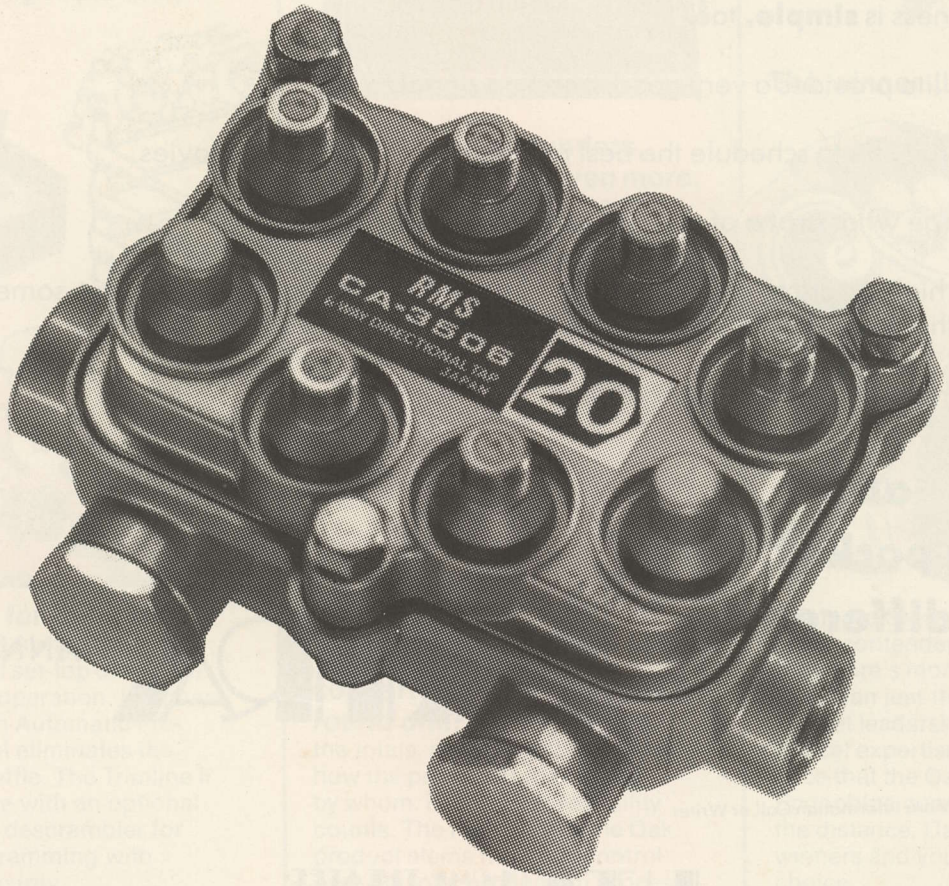

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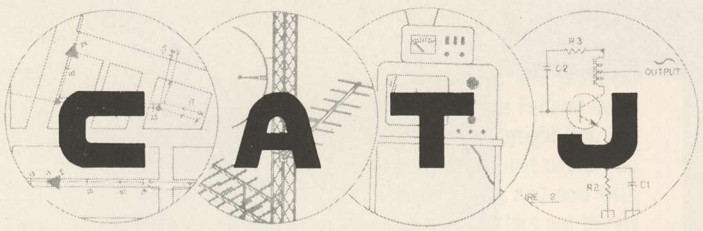

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—FEATURES—

—DEPARTMENTS—

OUR COVER

The Cable Connection. Lest we forget our humble beginnings in these days of satellites and microwave and 35 channel systems, it all began with a piece of cable. And for the immediate future, it still ends there. There's something 'unnatural' about this particular piece of cable. **Can you spot it?**

CATA-torial

KYLE D. MOORE, President of CATA, Inc.

After The Smoke

Last month's CATA-torial debated the rationale for handing to the FCC new authority to create a system of fines and forfeitures to be employed against CATV systems that are alleged to be in violation of FCC rules. As most will be aware by now, the FCC was formally handed that authority by Congress on February 6th.

There is no point in being concerned at this point who is responsible for this legislation getting through; anyone who wants to know can find out on their own. Suffice to say the **Community Antenna Television Association** was **not in favor** of this legislation, and did in fact defeat the legislation in the fall of 1976 when it first appeared headed for approval. We tried again this time around, but met with less success.

The concern now is not **who** did it, but **what** the legislation, now passed, is apt to do to us.

Large cable systems and large system operators seem hardly bothered about the prospect of fines and forfeitures for alleged wrong-operation. Until this legislation, if your cable system was accused of violating an FCC technical standard, or carrying a signal you were not supposed to be carrying, or not having proper files of your operation open for public (or FCC) inspection, the recourse the FCC had was to haul you to Washington to appear before them in a hearing. You could waive the right of a hearing of course, and then they moved onto the next level of enforcement which was to tell you to cease and desist. If you chose after judgement (or admission of guilt) not to cease and desist, they could push the issue through the Department of Justice office. In any event you had your day in court, **if you wished it,** and you also had the right of appealing the FCC 'court' decision if you wished.

Fines change much of this. Now if you are **alleged to be** in violation of a rule the FCC will be able to skip the preliminary hearings and simple assign a monetary fine against you and your system for the alleged infraction. Yes, you still have the right to a hearing if you wish to contest the fine, **but the hearing is no longer automatic.** The assessment of the fine presumes you are guilty and it is up to you to prove that you are not. This is, as has been noted previously, a strange way to treat a person or a company in a country where the presumption of innocence is 'guaranteed' by the Constitution. The fine procedure reverses the presumptive process and the responsibility of proof falls on the shoulders of the individual charged with the 'crime' as opposed to it falling on the shoulders of the accusor.

How might you first find yourself in a fine and forfeiture situation?

Obviously if one of those understaffed and overworked FCC field inspection vans should roll into your town and proceeds to make measurements, the chances that you will be charged with one or more violations is very good. I venture to say that there is not one . . .not one single. . .CATV system in the United States today that is operating under **total** conformity with **all** of the FCC rules and regulations throughout **all** of its cable plant. That simply means that no matter how good an operator you are, or how often you check for radiation or signal balance or signal to noise ratio, exposed as our plants are to miles and miles of open air and nasty environments, if someone **wants** to find you guilty of a rule infraction **they will do so.** It is not preventable.

Yet we hold no real fear about the infrequent FCC inspections. Not only are they unlikely to happen very often, but every FCC field man we have ever met has impressed us as a very responsible, very reasonable human being. We doubt, **left on their own,** they would **deliberately** set out to pin a guy to the wall. But. . .we certainly do not expect them to overlook repeated, flagrant violations either.

So if we expect a fair shake from the FCC field people, who is it we are concerned about? **Do you really need to ask?**

Let's go back abit to the adoption of the Copyright legislation in 1976. Do you remember that small section in the new Copyright Law that assigns to television broadcasting stations the 'right of an agent' to bring suit in local federal court against a cable system alleged to be in violation of the new Copyright law? Well, that's the way the law was written and that means that if a broadcaster discovers you are not giving him the protection he feels he is entitled to, the broadcaster can march into federal court and sue you, as an 'agent of the copyright owner', for violation of the law. That's the violation-section where the court can assess fines of up to $50,000 against a cable system found to be in violation of the Copyright law.

This seciton of the Copyright law was designed by the NAB to put the almost supreme power of life and death over area cable systems into the hands of the local broadcast station. All the broadcaster has to do is to catch you not giving him the full non-duplication protection he is entitled to, for example, on either network signals of those elusive syndicated programs, and he's got 'cause' to haul you into court for alleged violation of the law. If he is sure of his case, he has nothing to lose because the law rewards the 'agent' with not only potential cash damages but it also provides that the defendant (that's you) must also pay the court and attorney costs of the plaintiff (that's the broadcaster).

If that was not sufficient harassment power for broadcasters to have, the new fines and forfeiture authority of the Commission magnifies that 'power' by a power of squaring. Perhaps not on paper, within the law, but we are betting that when the rules are released that's how they turn out.

Let's say a broadcaster is not happy with your presence. If he can't nail you for a Copyright law violation, he can certainly find your operation in violation of radiation standards or systems flatness levels or any number of other 'technical specifications' at one or more points.

A news release from the NAB points up how the broadcasters are preparing to deal with this new found 'power'.

"The National Association of Broadcasters will sponsor a seminar (on February 24th) entitled 'Cable Television: The FCC, The Copyright Law and What You Should Know'. The objective of the seminar is to provide television broadcasters with specific and practical information on how to assert their rights under the Federal Communication Commissions cable rules and the new copyright law. . .".

If that sounds like a conference to plan a war against cable, you read it right. Armed first with the new Copyright law, and now with the FCC's fine and forfeiture authority, the broadcasters are purely relishing their new found role of 'protector of the public rights'.

The broadcasters have always wielded an uncommon amount of power at the FCC. There is every reason to suspect, to expect, even to predict that when a powerful broadcast station operator finds himself crossways with you as a cable operator, that he will:

1) **First check** to see if he can nail you on a copyright violation (afterall, that's a chance for him to boost his 'profit structure' by getting damages against you in a federal court);
2) **If he fails** here (and perhaps if he doesn't fail), we can expect him to send an engineer or two into your town to 'inspect your system'. Radiation will be the easiest thing to check; one of the commonly available CATV radiation detection systems and a dipole strapped on the roof of the engineer's car will give them most of the 'evidence' they need to call in the FCC.

Why would they do this to you?

Economics. There is seldom any other answer to a power play like this.

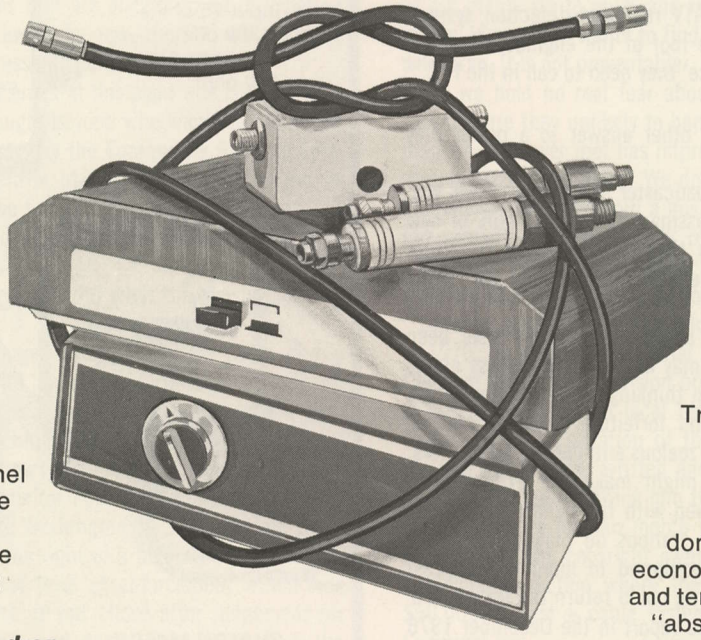
Now it may well be that every broadcaster in your area loves you, that they would never think of harassing you with any type of new found federal power. And for you the new fines and forfeiture authority of the FCC is not a big deal. If this shoe fits your shop, more power to you.

But if the broadcasters (one or more) in your area have been known to be 'anti-cable', well, you may have some sleepless nights ahead. It is high time that we began thinking about ways to 'return the favor' should the new fines and forfeiture authority become an 'overworked tool' in the hands of zealous anti-cable broadcasters.

There are several responses we might make. For example, the broadcast rules are pretty strict. Even with the benefit of counsel and/or top engineering, broadcast stations do make errors from time to time. **If we were better equipped** to monitor broadcast station performance I imagine that we could return the favor when the need arose. If you remember the report in the December 1976 issue of CATJ concerning the under-500-subscriber system in Sausalito, California you will recall that when San Francisco's channel 60 called in the FCC to investigate the Sausalito system's refusal to carry its signals (the system said the signal available to it was of such poor quality it could not carry it). . .**the FCC found three significant violations in the channel 60 operation.** And they cited the station for the violations. We might well, through the pages of CATJ, develop some helpful guidelines on what to look for and how to measure broadcast station performance. Just as a defensive weapon should you get attacked by an over zealous broadcaster.

There are other defensive positions we can take. And we will. But for now the very first thing **you should do** is to set out to (1) **mend your fences with you local broadcasters,** if they need mending, and, (2) **make very-very sure that your plant is in the best possible condition.** In this regard we would suggest that you immediately begin to keep a **daily log** of all routine and special maintenance you do to your system. Just take a notebook and keep a written record of what you do and when and where you do it. Be prepared to demonstrate that your system is maintained on a regular basis using the best techniques available to you. A person who can demonstrate he is trying to do it right is going to be in much better shape than someone who is suspected of simply not caring how his plant runs. Then as this whole new problem area evolves we'll visit it from time to time here in CATJ.

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



Negative vs Positive System

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

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

Audited vs Unaudited Systems

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

Cable Traps vs Descramblers

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

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

VITEK

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

Lowest Overall Cost vs Lowest Front End Costs

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

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

It's simply a matter of . . . Pay us Now . . . or Pay us Later.

For additional information call or write:

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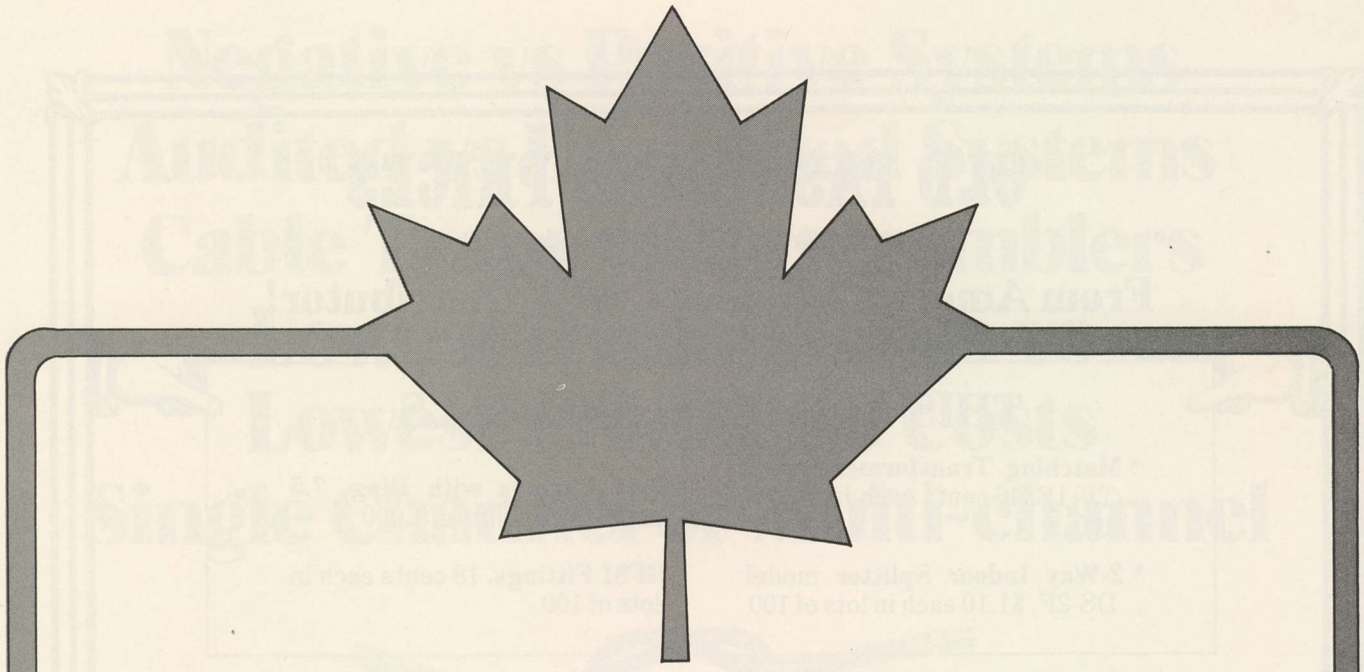
Tel: (201) 469-9400



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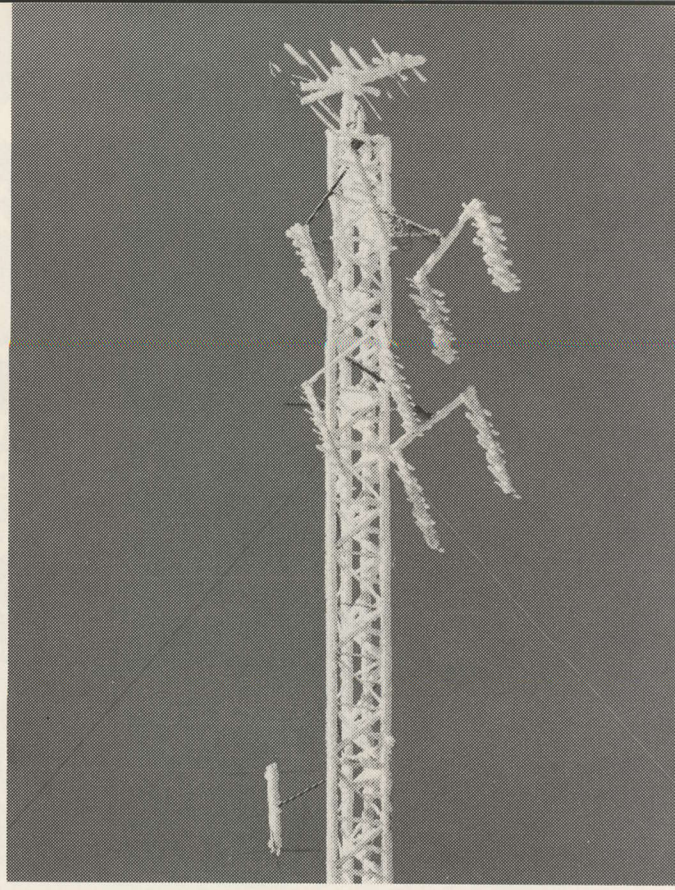

Chances are your CATV headend, or microwave site will never experience this kind of adverse weather. But it's good to know that should the forces of nature ever-combine to load up your tower with ice and wind, it can take it in stride.

USTC towers are stout. Big and beefy. . .perhaps they are even 'over-designed' for the normal kind of loading you might expect. There's a reason. It's called 'abnormal loading'. The kind you get when big winds blow, or four days of freezing drizzle and fog turns the tower members into two or three times normal dimensions. Or, and it happens, when you get both . . .together or immediately following one another.

USTC builds stout towers, stout VHF log antennas and stout six meter aperture TVRO terminals. Nobody can give you an unconditional guarantee that under any and every abnormal loading condition your tower or antenna structure will stay in place. But if you want the stoutest cost-effective construction in the industry with more than a decade of field-proven performance to back it up. . .you need to talk with the stout folks. That's us. USTC.

K. & K. Cable T.V., Corp.
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January 12, 1978

Mr. Danny Weathers
U.S. Tower and Fabrication Company
P.O. Drawer 'S'
Afton, Oklahoma 74331

Dear Danny:

Enclosed is a photograph taken of your USTC 400 foot tower installed for us here in Edmore, North Dakota. The photograph was taken on December 20th, two days after a fluke storm had stopped. For about four days we had temperatures in the 20-30 degree F range with a constant fog and drizzle. When the precipitation stopped, we then had winds up to 40 MPH on December 18th and 19th.

I am sure you can see why a person might be worried about how much ice and wind a tower can take. If you will recall, I lost a tower (from another manufacturer) three years ago and I really have no desire to go through that experience again.

Although we experienced some apparent antenna damage, I must say that USTC builds and installs one heck of a tower!!!

Sincerely,

Paul R. Keating
General Manager
K and K Cable T.V. Corp.

United States Tower and Fabricating Company not only builds (and installs) towers and antennas that can take it. . .we stand behind every product we produce. And that's one very-stout guarantee.

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Call Danny Weathers or Tony Bickel at 918/257-4257.

the TRACKER

FROM TEXSCAN.....

• The Tracker makes dynamic measurements up to 120 db—simply and accurately. The instrument combines all the features of a high resolution (500 Hz), sensitive (−60 dBmV) spectrum analyzer with a high level (+51 dBmV) sweep generator, display scope, dual channel switcher and return loss reflection bridge.

Observe these key specifications:

SWEEP

Frequency Range: 1 to 350 MHz; continuously variable center frequency.
Display Flatness: ±0.25 dB max. at full sweep width; ±0.1 dB across any 10 MHz band.
RF Output: +51 dBmV calibrated; 50 dB variable in 1 dB steps.
Harmonic Distortion and Spurious Signals: 30 dB down, typical
Accuracy:
Gain or Loss: ±1.0 dB calibrated at 20 dB loss (accuracy near 20 dB better than ±0.5 dB)
Return Loss: ±1.0 dB calibrated at 26 dB return loss (accuracy near 26 dB better than ±0.5 dB)
Display: Long persistence CRT, P7 phosphor, useful area 5.5″ × 7.5″; sensitivity 0.2 mV/div. to 0.2 mV/div.
Power Requirements: 115/230V, 50/60 Hz, 100W
Dimensions: 13.5 × 17 × 16.75 inches 23.75 × 42.5 × 41.5 cm

SPECTRUM ANALYZER

Frequency Range: 0.4 to 350 MHz
Frequency Response: ±1 dB
Resolution 3 dB Bandwidth: 200 kHz, 10 kHz, and 500 Hz switch selectable.
Shape Factor: 60 dB/3 dB ratio — 200 kHz 20:1; 10 kHz 4:1, 500 Hz 8:1.
Noise Sidebands: Greater than 70 dB down 15 kHz or more from input signal.
Intermodulation & Harmonic Distortion: 3rd order more than 70 dB down from two +10 dBmV signals separated by 1.5 MHz, at less separation, 60 dB down. 2nd order down 55 dB from two +10 dBmV signals.
Frequency Markers: Six plug-in jacks. Accepts single frequency or harmonic markers for frequency identification. Provides frequency identification in all modes. Accurate to ±0.05% during spectrum analysis and ±0.005% during sweep testing.
Dynamic Range (On Screen); 80 dB (121 dB total possible).

THE LOGICAL CONCLUSION: Your system test requirement can be met with one instrument—The Tracker—Texscan Model 9600—For a demonstration write or call

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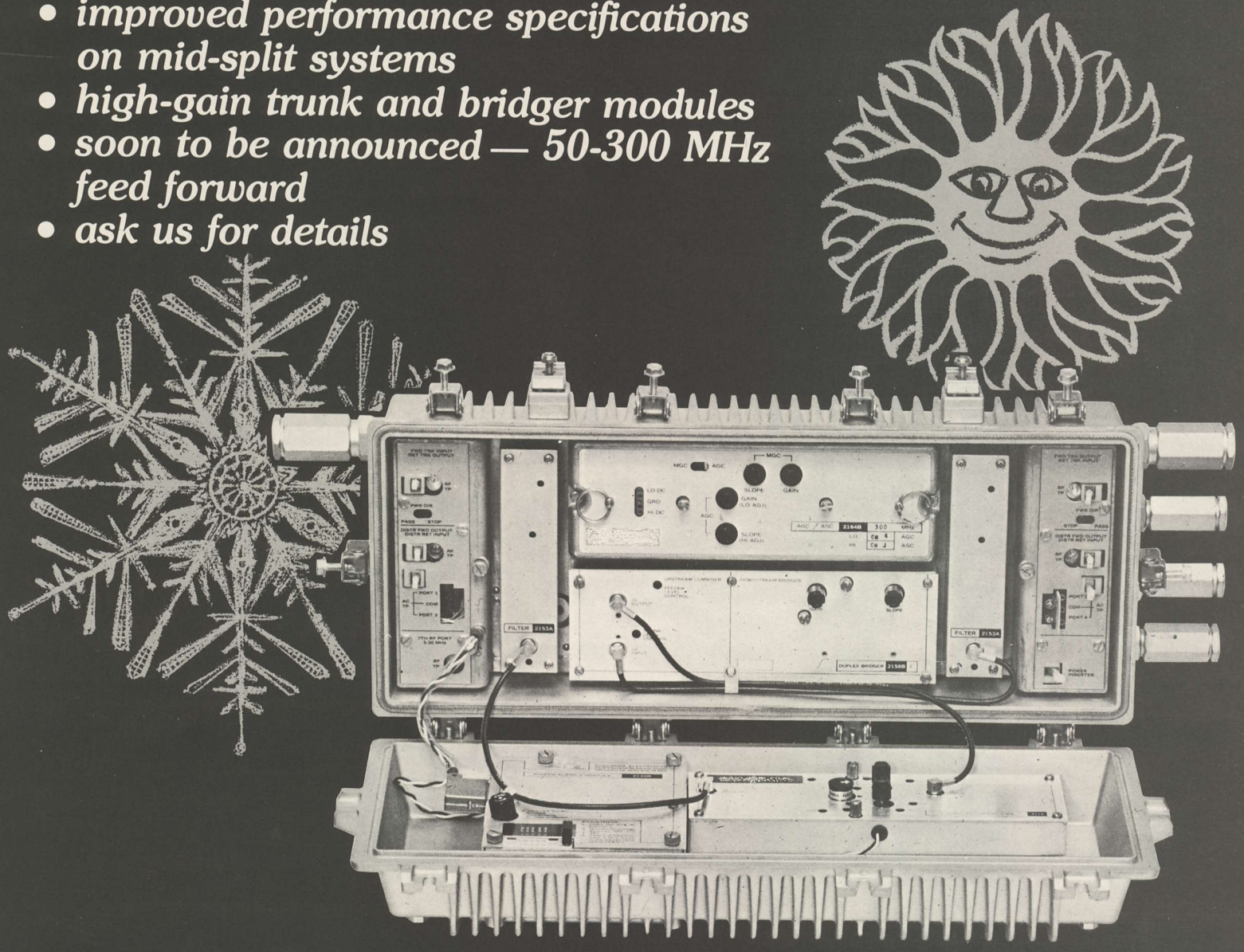
- *soon to be announced — 50-300 MHz feed forward*
- *ask us for details*



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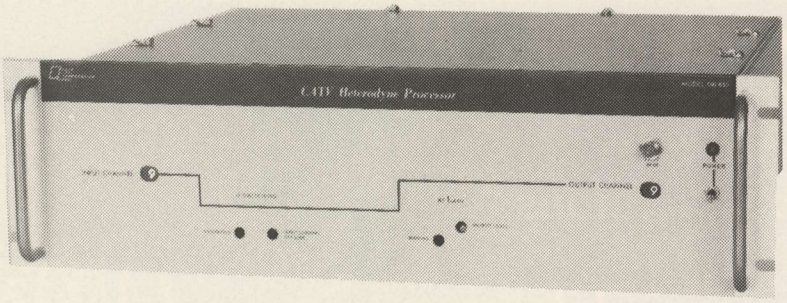

. . . *Cures Headaches at the Head-end*

QB-650 EXTRA'S

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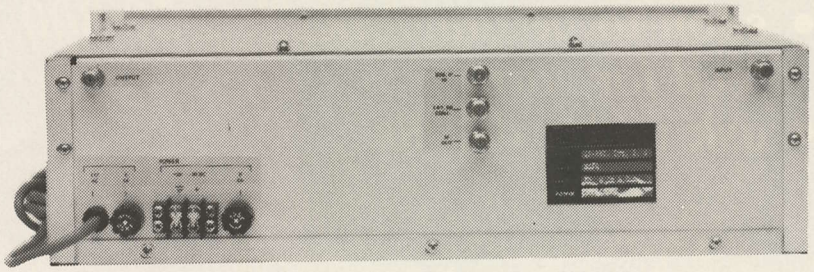
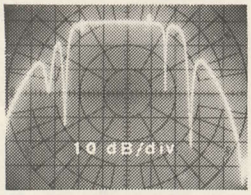
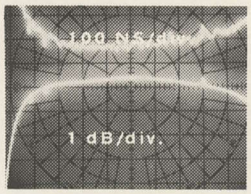
- standby DC powering standard
- output level safties, (instant switching with loss of AGC)

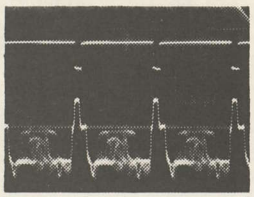




SPECTRUM CONTROL FOR STUDIO QUALITY PICTURES

- tight adjacent channel filtering
- flat passband
- low delay distortion





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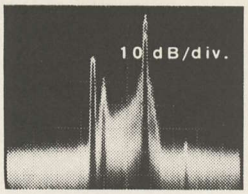

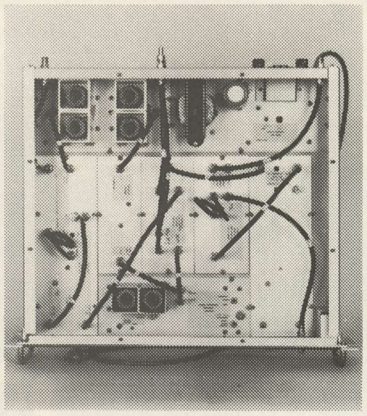

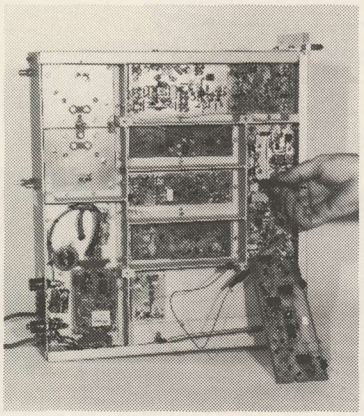

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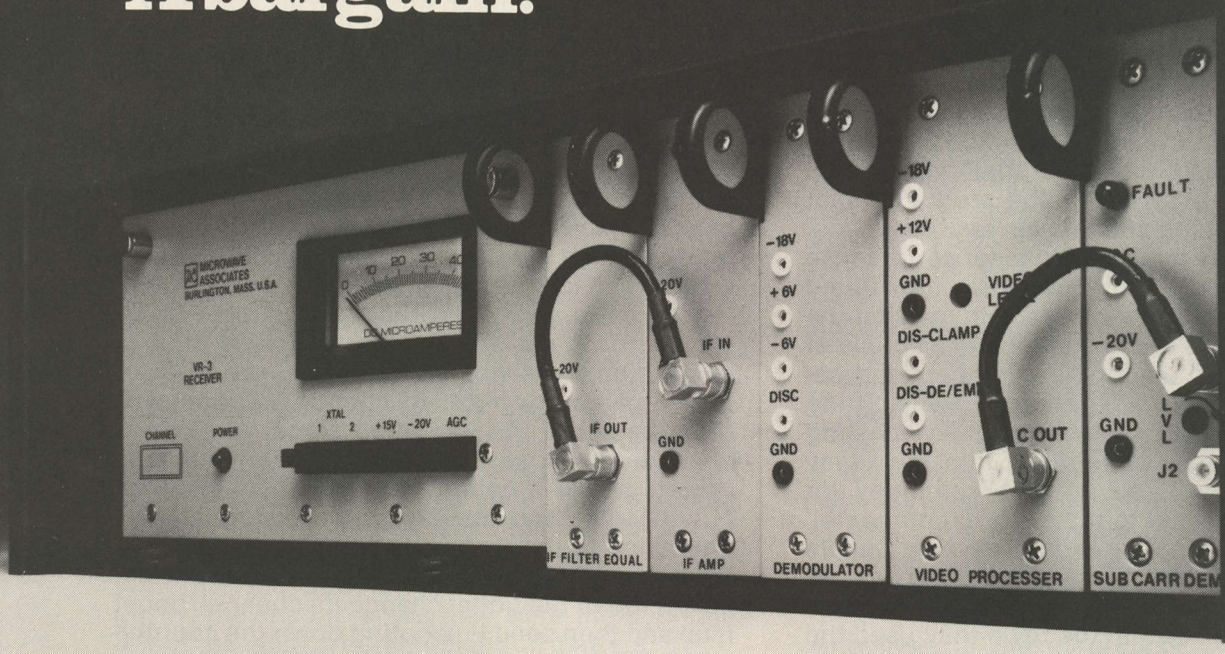

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FM Microwave Approved By FCC

TRANSLATORS GET NEW OPTIONS FOR SIGNAL FEED

—WHAT IT MAY MEAN—

The Newest Threat

The Federal Communications Commission has developed an interesting habit during the past couple of years; each December they pick some 'deserving segment' of the American public and drop a bombshell on them. Perhaps it is the Christmas spirit, or the sickening recognition that after 11 months and some odd days they **really** haven't gotten all that much done. . .**or perhaps the moon is just full.** Whatever the cause the sensation has now repeated two years in a row and one naturally wonders what they might do for an encore come December of 1978.

In December of 1976 the FCC removed the last roadblocks for cable's satellite fed future by approving small earth terminals. And we thanked them then and we thank them again. This past December it appears they have removed one of the last roadblocks for translator futures. And we aren't so sure thanks are due.

But to explain.

A translator is a relatively small electronic box that receives a television signal on one channel, amplifies the signal, and then releases the signal on a new channel. The input channel (say 2) is always different than the output channel (say 7). Translators began in 1948, in the hills of Pennsylvania, when a couple of enterprising engineers associated with a Sylvania tube products plant decided it was time their town had television. So they climbed a hill, erected a set of antennas and looked around for signals. When they found them they tackled the next problem; getting the hilltop signal down to the community a couple of miles away. Being electronic engineers and because they had an experience in transmitting systems their thoughts turned to re-broadcasting the received signals back down into the valley community below. And without ceremony (or FCC License) they put together an 'experimental' UHF transmitter that re-broadcast the signals they received on VHF channels 6 and 10 back out into the air in the **then not-allocated-for-television** 600 MHz region. Down in the town they used the good facilities of the Sylvania tube plant to crank out UHF to VHF converters so that their neighbors and friends could enjoy the same television they enjoyed. They probably would have gotten away with it, for years, had one of the pair involved not been so proud of the system he wrote up an elaborate 'how to do it' article for a national electronics magazine of the era. The FCC saw the article and shut the system down. The town subsequently got a cable TV system.

The early UHF experiment was (by 1948-50 standards) a pretty professional piece of work. The people who built the system knew as much about UHF and transmitters as anyone else around at that time. Those that followed, also without benefit of FCC License, were seldom as well planned, constructed or operated. The next 'phase' of translator growth began in the early 1950's in Oregon and Washington. And by 1955 it had spread to virtually every state west of the big river and a few on the eastern side as well.

When the end of the FCC's freeze came in 1952, and television failed to materialize in the valleys, gullies, nooks and crannies of the western states, **the local population took matters into their own hands.** By this time it was pretty well known that if no television was possible in the **bottom** of a valley, **some** television was often possible on the ridges surrounding the valley. The trick was to get the signals that were available 'on top' down below. A half clever person decided that all he really needed was a low power 'transmitter' or relay device to accomplish this. He looked around for the parts and found them at his local CATV distributor. A set of antennas to receive the signal, a signal pre-amplifier to boost the level of the signal, a converter to change (i.e. **translate**) the channel of the incoming signal to another channel not in use in his region, and a small (low power) signal amplifier operating on the 'output channel'. **And** one more set of antennas, this one tuned to the 'output channel' of the system. For around $400 or so a man could receive a signal on top of the ridge, change its channel, boost it up and then send it scooting down the countryside to his home and the homes of his neighbors. It was sure alot easier than running coaxial cable

from the antenna on top of the ridge down to the homes below, and often it was far cheaper.

The idea caught on. It caught on so well, so fast, that eventually word leaked back to Washington. People in the west called these ridge-top systems "Boosters" and it took some half-bright Washington bureaucrat to dream up the more impressive term 'translators', some years later. The FCC didn't like the idea and they wasted no time letting people know about it. After a quick study along about 1955 the FCC decided it had to take definitive action to 'stop this threat' to America; after all here were people operating unlicensed 'television transmitters' in clear violation of the 1934 Communications Act. So the FCC sent some field engineers out with instructions to 'shut 'em down'. Which they did. But the residents of the areas, who depended upon these "Boosters" for their television, didn't take kindly to the FCC field engineers and as soon as the FCC engineers left the area they turned the "Boosters" back on again.

Clearly, more decisive action was called for. So the FCC's Washington Office advised the field office personnel to not only shut down the "Boosters", but to **confiscate the equipment as well.** That brought two sets of results.

As soon as the FCC people left the area with the confiscated equipment, a new set came out of the closet and back up on the ridge. **It was prohibition all over again** and the FCC field people began worrying about their own safety on these field sorties. And then as FCC engineers and rural residents engaged in this tug-a-war for equipment, the State of Colorado stepped in. **Colorado Governor Ed Johnson,** incensed with the way the Washington bureaucrats were treating **his residents** issued a proclamation. It read, in part:

> **"This office hereby proclaims that the continued television service made possible throughout the State of Colorado by devices variously known as boosters, repeaters and translators, shall, by executive order, be allowed to continue in operation; not withstanding the existence of federal orders issued by the Federal Communications Commission to shut these units off and to dismantle them."**

That stopped the FCC's field sorties for awhile and there followed a series of legal manuevers and hearings and Congressional statements, which put the Commission on notice that it had better come up with a solution, and fast.

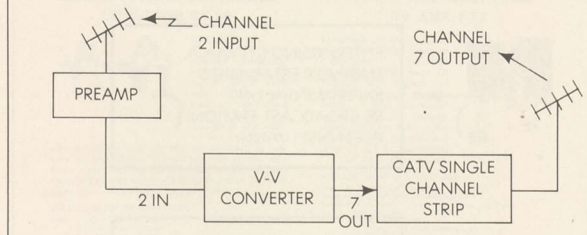
The problem was simple enough; people didn't have direct home reception, and they had discovered on their own a way to get it. To Governor Johnson, and a number of others, all the FCC had to do, **if it really cared about people getting television,** was to make "Boosters" legal. Sort of a 'if you can't beat them, legalize them' concept. Well the FCC was not about to give in quite so easily; they had to prove they were the supreme law of the land on communication matters.

So after a year or so of more manuvering the FCC came out with a new type of 'rural television service' and they called it the "Translator Television Service". Only bowing to pressure from the broadcasters, translators were authorized **only in** the upper reaches of the UHF band; **or channels 70-83.** The fact that nobody had equipment available in that band seemed not to bother the FCC. Although it bothered Colorado's Governor Johnson plenty. He retorted:

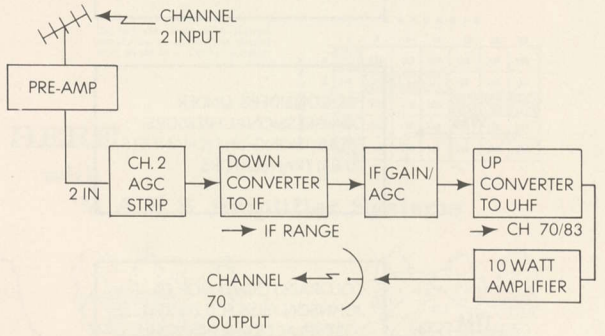
> **"Your UHF translator plan may be splendid for the Atlantic seabord, but it will not work in the Rocky Mountains. What is wrong with two different systems in this country? Just because you have found something that you believe may fit the areas with which you are familiar, please don't force it down our throats arbitrarily. Why are you picking on us mountain folks? We are people too!".**

The Governor's words fell on deaf ears. If people who lived in the mountains wanted television relay systems, they could use UHF. End of argument.

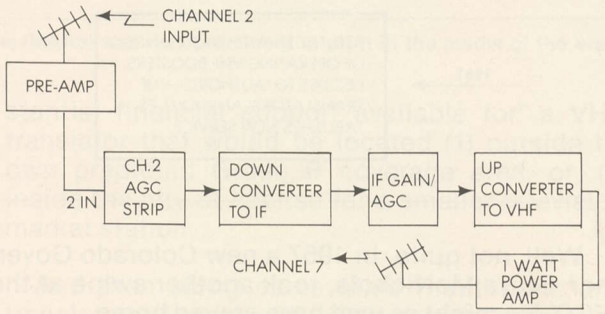
EVOLUTION OF TRANSLATOR EQUIPMENT



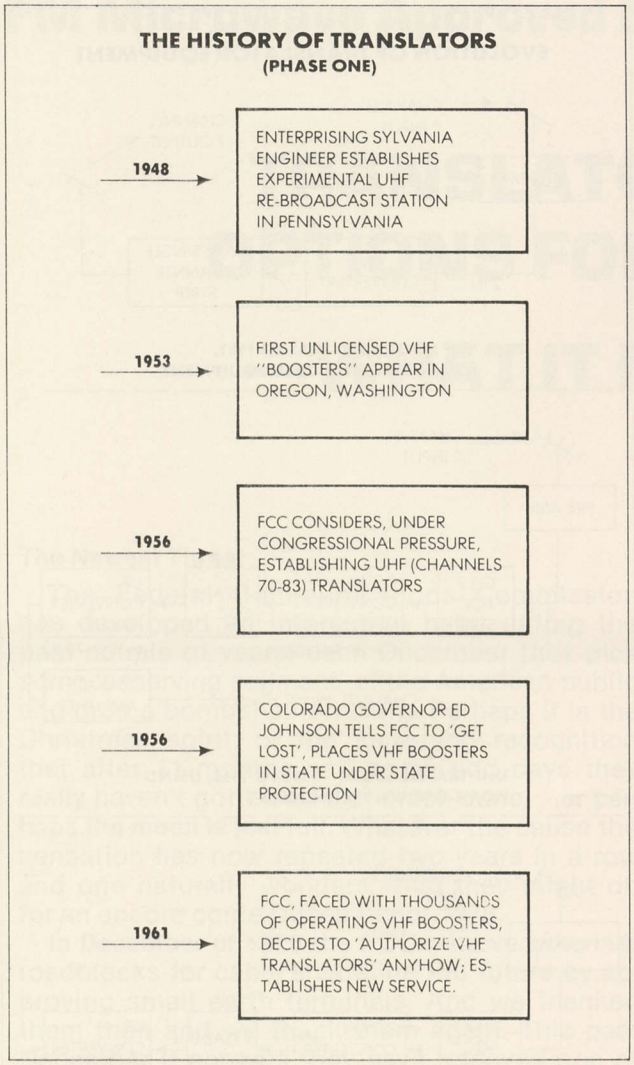
VHF BOOSTERS—1952 TO 1961, USING OFF-SHELF CATV EQUIPMENT



UHF TRANSLATORS—1956 TO 1966, USING HOME-GROWN TECHNOLOGY



VHF TRANSLATORS AFTER TYPE ACCEPTANCE/ LEGALIZATION 1961



Well, not quite. In 1957 a new Colorado Governor, Steve McNichols, took another swipe at the FCC. He might as well have stayed home.

"VHF boosters are preferable to and better adapted to the western geographical conditions than UHF translators. VHF boosters are less expensive, which means they can serve smaller pockets of people—pockets too small to afford UHF translators. I urge that both VHF boosters and UHF translators be legalized, jointly, with each being used where each can best serve the needs of the people".

The FCC didn't budge. UHF or nothing.

Well, again, not quite. The 'mountain people', Governor Johnson spoke for, paid little (if any) attention to the FCC's newest 'answer to their problems'. They went right ahead and installed more VHF "Boosters", wherever they needed them. By 1960 there were more than 1,500 of the little monsters sitting in metal boxes on poles all over the western USA and they were growing at a rate of several hundred per year. Finally in 1961, some 13 years after the first 'experimental UHF unit' in Pennsylvania, and some 8 or 9 years after the first "Boosters" went into operation in Oregon and Washington, the FCC cried 'uncle'. Even "Uncle Sam" knew when to throw in the towel, and so rules and regulations legalizing VHF Boosters (to be known thereafter as VHF Translators) were written and adopted.

Today there is (as Governor Johnson suggested there should be) a 'mixture' of UHF units (around 1050 licensed) and VHF (around 2300 licensed) spread throughout the United States. What began in Pennsylvania and later in Oregon and Washington has now spread to all states but Delaware and New Jersey. Even Guam, Puerto Rico and the Virgin Islands have the units licensed. Translators outnumber TV broadcast stations by more than 3 to 1 and they come very close to equalling the number of cable systems in the country.

Inspite of these impressively large numbers, translators have by in large been a miserable flop. Just this side shy of being a total failure.

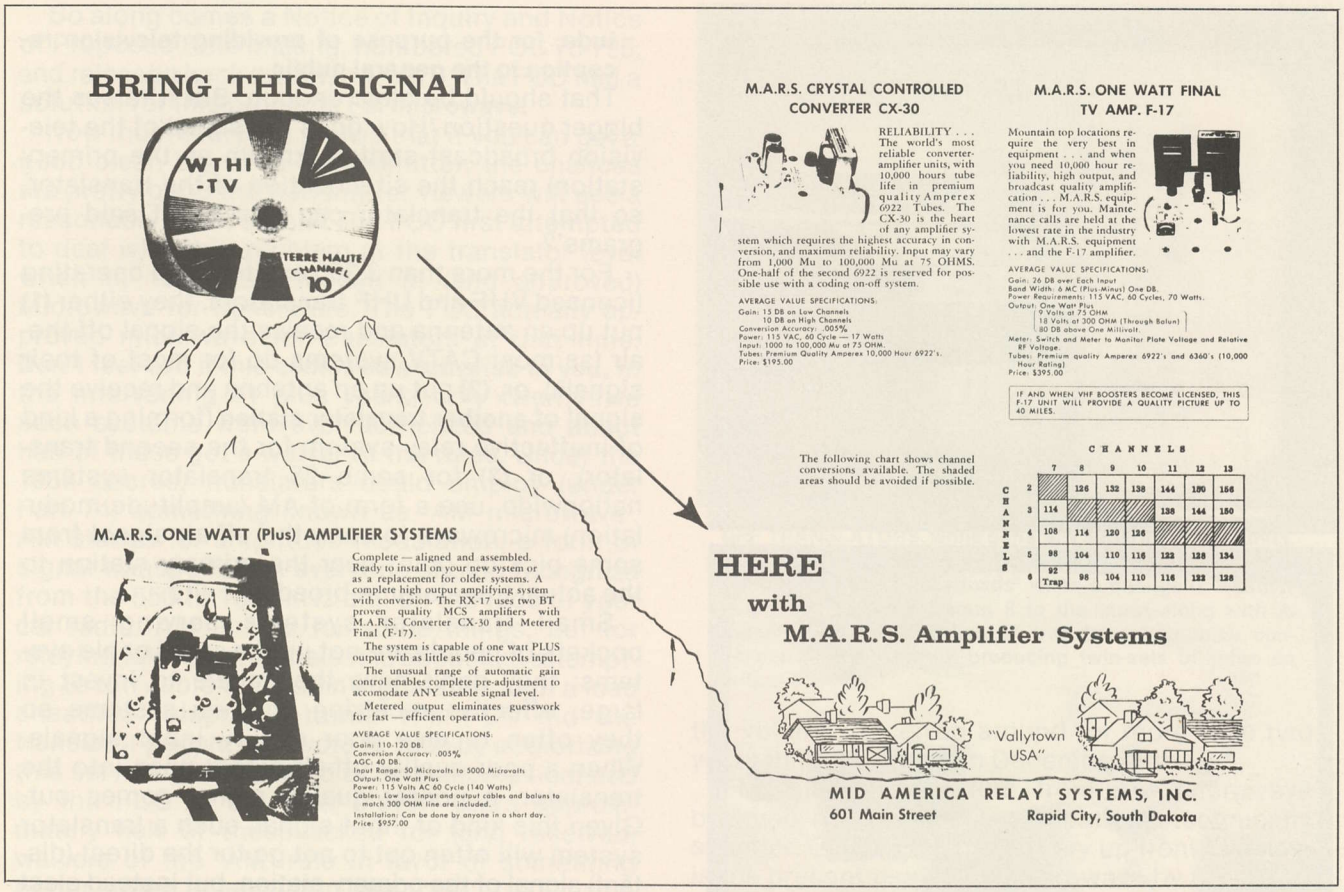
You can gauge the success of the translators by the number of successful suppliers of hardware in the field. A handful of small outfits (plus one operating subsidiary of a moderate size firm) who's combined annual sales could drop into or out of the CATV division of Scientific Atlanta and not even be noticed.

Most translator systems deliver poor quality television to their viewers. To be sure **some** work quite well, but **most** do not. A translator system is generally considered successful if it somehow manages to deliver a picture to the area which is good enough for the viewer to tell the difference between Cher and Ed McMahon.

Most VHF translator 'systems' go in on a shoestring; $1500 is alot of money to be spent on the whole package. Antennas, the 'magic translator box', building, power and accessories. Inspite of the FCC's attempt to force 'home-built' Boosters off the air with the adoption of 'lenient VHF translator rules' many of the VHF systems still operating consist of off-the-shelf CATV-type equipment.

It is a poor, impoverished market. There are simply not enough bucks out there for first class equipment. Even at $1500 **a channel,** if your system is going to serve say **ten homes** and they want **three channels** of service, it works out to nearly $500 per home initial costs. Plus somebody has got to keep the darned things operating. And that costs something.

In the early and mid 60's **some states** recognized that the costs were probably going to keep many people from having even the marginal service VHF translators could provide and so they did something about it. They approved (at the state legislature level) a taxation device known as 'Translator Tax Districts'. States like Utah, Colorado, Idaho and others adopted these taxation systems whereby whole county areas put in quite professional and amazingly well run country-wide translator systems. Everyone in the area is taxed, so much per year, to foot the translator system bills. In other areas of the country **the town or community** created their own translator program; financing the translators out of general revenues or through municipal 'viewing



LONG BEFORE VHF UNITS WERE LEGAL Mid America Relay Systems (MARS) was very prominent in print in the media of the era with equipment to relay television from one point to another.

taxes'. In still other communities local civic groups such as the Kiwanis conducted fund raising drives and knocked on doors to get sufficient capital to install translators for the town. In some it worked, in many it did not.

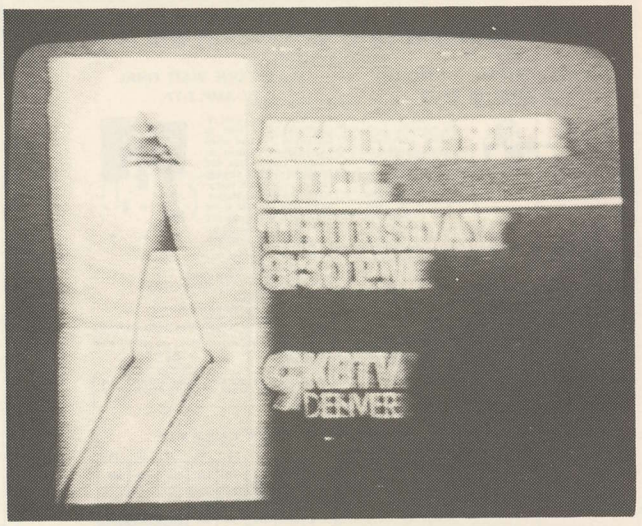
While grass roots support for translators was gaining a toehold in some areas, another translator use system developed. **Along came broadcasters** who saw translators as a **competitive tool** to allow them to extend their coverage areas, **selectively,** into nearby population centers just out of reach of their normal signals. Soon after VHF translators were authorized television stations began applying for the translator licenses. When the first FCC application form filed by a television station seeking to 'jump markets' into the primary service area of another TV station hit the Commission, a whole series of red lights went off. One of the earliest such applications was filed by station WLOS in Ashville, North Carolina. The channel 13 station sought **three** VHF translators licenses; **one each** in **Bristol** (Virginia), **Kingsport** (Tennessee) and **Johnson City** (Tennessee). WLOS, at the time, reached 29,000 television sets with a broadcasting plant estimated at $900,000 capital costs. **For another $7,000** in costs for three VHF translators, WLOS was going to pick up **30,000 additional sets.** The Commission closed the gate and went back to the drawing boards.

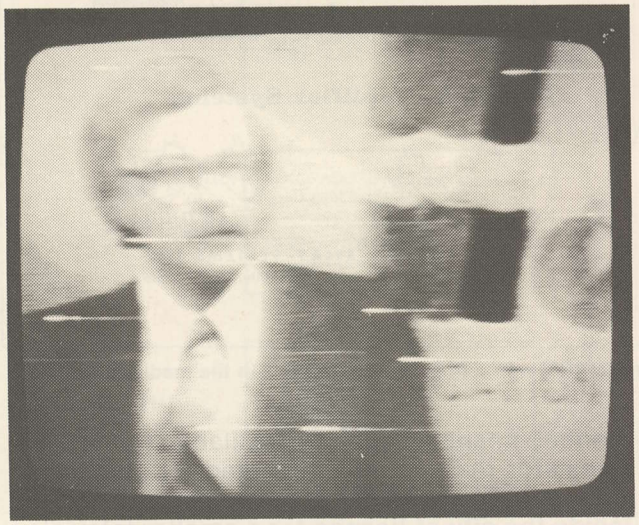
And out came a new rule. This one said that a television station could not pay for or 'make substantial financial support available for' a VHF translator that would be located (1) outside its own predicted Grade B coverage area, or, (2) inside the city of license for a smaller television market station.

And then along came state institutions and translators. Largely PBS/ETV television station networks operating within a state (such as New York), these state owned (and well funded) institutions decided that their mandates to provide PBS/ETV programming to **all** of the people pretty much meant that they had the obligation to use whatever technical means was available to deliver signals; even to small clusters of people. So translator equipment manufacturers picked up another market area, the ETV broadcasters.

The translator road has been a pathway dotted with false starts and a golden promise never quite delivered. Translator operators have been saddled with inadequate equipment, poorly maintained. But **the equipment has been less than ideal not because that is the best they could get,** rather because that was **the best they could afford.**

And so it all comes down to bucks; as it always seems to in this business. Translators in rural areas, serving a few dozen (or even a few hundred) homes produce poor pictures because there isn't a large enough economic base to afford better equipment or better maintenance.





THE TRANSLATOR TO TRANSLATOR 'relay' problem. When signals from one 'AM' type translator are picked up and re-broadcast by another 'AM' type translator, picture degradation (as well as sound) becomes especially apparent. Photos here show typical sync and resolution-limiting problems inherent with translators that have carried the off-air signal too far down the chain.

With the limited exception of those areas with translator tax districts, **garbage in equals garbage out.** And even the tax district areas are not without problems.

And the bigger markets have, in the past, been precluded from 'translator encroachment' because the FCC saw a broadcaster war developing.

All of this leads us, rather circuitously perhaps, to the most recent FCC translator action. On December 8th, the FCC approved a long standing proposal which now authorizes UHF television translators to 'be fed with FM microwave'.

How's That Again?

A television translator station is:

74.701

(a) A station in the broadcast service operated for the purpose of retransmitting programs and signals of a television broadcast station, without significantly altering any characteristic of the original signal other than its frequency and amplitude, for the purpose of providing television reception to the general public.

That should be clear enough. But it raises the bigger question 'How does the signal of the television broadcast station (known as the primary station) reach the site/location of the translator, so that the translator can retransmit said programs'?

For the more than 3,300 existing and operating licensed VHF and UHF translators, they either **(1)** put up an antenna and receive the signal off-the-air (as most CATV systems do for most of their signals), or, **(2)** put up an antenna and receive the signal of **another translator station** (forming a kind of ineffective relay system for the second translator), or **(3)** for some 25 translator systems nationwide, use a form of AM (amplitude modulation) microwave to carry the off-air signal from some pick up point near the primary station to the actual translator re-broadcast site.

Small translator systems serving small pockets of people are not unlike small cable systems; they don't have the dollars to invest in large, effective receiving antenna systems so they often receive poor quality input signals. When a poor quality off-air signal goes into the translator, a poorer quality signal comes out. Given this kind of input signal, such a translator system will often opt to not go for the direct (distant) signal of the primary station, but instead elect to pick up the signal of another translator station carrying that primary signal; **typically a translator station closer to the primary signal than it is.** The theory here is that a closer-to-the-primary-station-translator gets a better input signal to begin with, so why not simply 'use his input signal' to drive your own 'second-in-line' translator?

Well, it is the nature of the basic translator device that even the best of them do nasty things to the off-air television signal. This nastiness manifests itself with a smearing of the picture detail (which shows up on color as pictures that no longer have well defined images), a clipping or limiting of the sync pulses and 'ringing' or degradation of the original audio signal. It is estimated by the FCC that **some 25%** of all translators receive their input signals **from other translators.** If the first translator station contributes some garbage to the output signal, the second translator station rebroadcasts the incoming garbage **along with** a whole new set of garbage created in the second unit itself. You can carry this on to a third or fourth translator if you wish, but you won't be able to tell Cher from George Kirby if you do. Even the 'snow' changes colors after the second or third translators; black becomes white and white becomes black, or some variation in between.

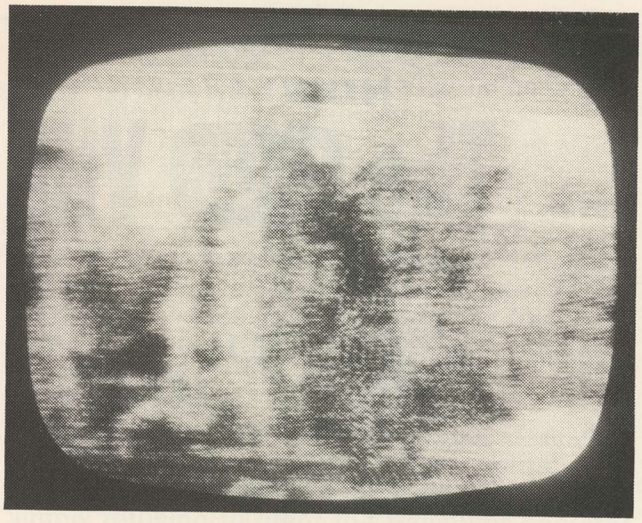
At the risk of overselling the basic problem, **garbage in becomes accentuated garbage at the output.** And the FCC in their wisdom recognizes this fact. So do some of the smarter translator operators.

So along comes a Notice of Inquiry and Notice of Proposed Rule Making, numbered FCC 75-796, and released back on July 11, 1975. The FCC had a solution for this problem. **FM microwave.**

Now most everyone knows that if you can get a good clean signal **to** a transmitter, the chances are pretty good the transmitter viewers will see a reasonably clean signal. The FCC first attempted to deal with this problem at the translator level when in 1966 they looked at (and approved) microwave for translators. The FCC actually approved microwave for translators at that time. **Don't feel bad if this comes as a surprise to you,** in the intervening 11 plus years, only twenty-five such systems were ever authorized and about half of these got a waiver of the rules. Under the 1966 decree, translators could employ (under Part 74) something known as 'AM microwave'. AM stands for amplitude modulation, a form of signal transportation everyone should recognize from the 550 to 1600 kHz dial on the face of your car radio. AM is fine for some things, but for relaying television signals it is about like attempting to run cable television signals through a lead sheathed telephone trunk. The FCC did the translator people no favors in 1966 by authorizing this service and of the 25 or so systems licensed by the FCC in the next eleven years approximately half of these asked for (and received) waivers of the 'AM' rule in favor of something better suited to television relay; 'FM'.

The AM system authorized, was in keeping with the FCC's concept of what translators were. Back to 74.701. **"A station. . .operated for the purpose of retransmitting programs. . .without significantly altering any characteristic of the original signal other than its frequency and amplitude. . ."**. The way AM microwave works, the input signal (say television channel 2) is heterodyned (frequency converted) just as it comes off the air to a **new frequency** (say 2,100 MHz) for 'microwave transportation' to another site. Then at the second site the microwave signal (again, 2,100 MHz) is heterodyned **back to a TV channel** (any VHF channel, it's simply a matter of selecting the proper conversion parameters). For a **single hop** of microwave transportation **this works very well,** if the equipment designer takes great care with the design of his equipment. **AML** is a perfect example of 'AM' **that works.** But 'great design care' costs 'great big bucks' and this was (and perhaps always will be in rural areas) contrary to the economics of the translator world. The FCC, **if** they were aware of this problem in 1966, showed a greater concern that **only** 'the frequency and the amplitude' of the off-air TV broadcast signal got messed with by the translator people. AM microwave fit that criteria perfectly, even if it didn't work very well. **But then translators didn't work very well either so it was a match.**

The 1975 look at translator signal quality problems finally accepted that at least technically translators were 'being held back' by the FCC rules. After accepting comments and shuffling



UHF TRANSLATORS, while generally superior to VHF units, have their own problems. Here a UHF unit with a channel 9 input (72 output) 'overloads' when a change in weather conditions brings a strong 8 to the input along with 9. Result is inter-modulation of translator frequency conversion (mixer) network producing twin-sets of video on output channel.

the volumes received around for more than two years the FCC acted on December 8th.

FM microwave differs from AM microwave because it is for **most** applications technically superior. One excellent and very up-front example is the present use of FM microwave by the TVRO systems sprouting at CATV headends all across the countryside. The FM (frequency modulated) signal uplinks from the transmitting earth station, goes through frequency conversion as FM in the satellite and comes back to your CATV headend as an FM signal. Without FM, for example, your 4-5 dB carrier to noise ratio would never be saleable to your cable subscribers as a 48-55 dB video signal to noise ratio signal. **FM simply has certain advantages for microwave work.**

By its December 8th order the FCC now allows translators to be fed with FM microwave.

And so, the game starts all over again. The game of trying to anticipate just what this may mean to the public in general, and the CATV industry in particular. And if the FCC 'shorted' the translator folks in 1966 by generously allowing them to utilize AM microwave, it appears they more than made up for it with the new rulemaking.

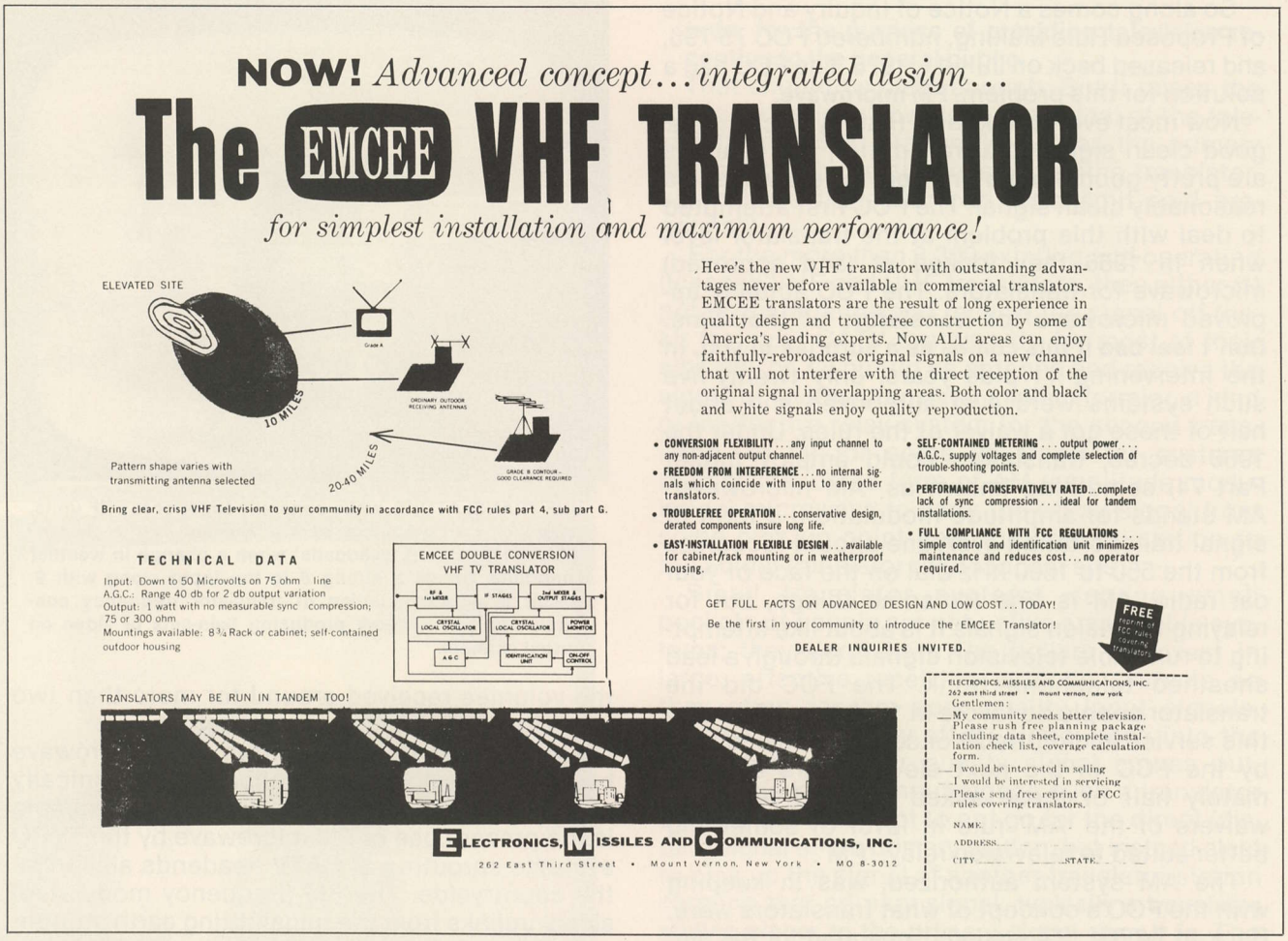
An Abundance Of Frequencies

First of all, the translator folks can now **share** (on a secondary, non-interference basis) virtually **all** of the microwave bands **held by the broadcasters** of this country.

Those bands include:

(A) **1,990 to 2,110 MHz** (1.99 to 2.11 GHz)
(B) **2,450 to 2,500 MHz** (2.45 to 2.5 GHz)
(C) **6,875 to 7,125 MHz** (6.875 to 7.125 GHz)

For the record, lower frequency microwave bands have certain advantages that higher frequency microwave bands do not have. For example, current state of the art allows an engineer to build a 2 GHz microwave transmitter with



FIRST LEGAL VHF UNIT (after FCC's legalization of VHF units) came from a then-new firm known as Electronics, Missiles and Communications (EMCEE); headed up by Dr. B.W. St. Clair, an early pioneer in UHF translators while employed at ADLER. EMCEE, after several interim corporate overhauls, still has an extensive line of VHF and UHF units.

several watts of power for far less money than it takes to build a 12 GHz transmitter with say **1/20th of a watt of power.** And then, lower frequency microwave has far simpler (that means far **less expensive**) receivers than higher frequency microwave. Finally, lower frequency microwave simply goes further than higher frequency microwave. **A 60 mile** single microwave hop at 2 GHz is about as difficult **as a 20 mile** hop at 12 GHz, assuming line of sight for both paths. If that suggests the lower frequency bands listed here at a 'nice present' to the translator people, you've got the drift.

But there are more frequencies involved in this. The FCC didn't stop by giving the translator folks just those three broadcaster bands to share; they then went ahead and gave translators the right to share **our** CATV CARS band frequencies as well. Now for a couple of years or so the CARS band has extended from 12,700 to 12,950 MHz. As past CATJ articles have reported (see **CATJ** for **June 1976,** page 30; **September 1976,** page 50) CATV does **not** have an 'exclusive' hold on this limited segment of the upper microwave region; **we share the assignment with broadcasters.** And in a companion action also approved by the Commission on December 8th, **the CARS band was expanded** to now include **12,700 to 13,200 MHz.** Translators get to share the whole band with us, and of course the broadcasters.

If that selection of four bands (totaling 920 MHz or 7% of all of the frequencies starting at 'zero' and working to the top of 'our' CARS band at 13,200 MHz) does not irritate your CATV blood just a tad, there is one final kicker in all of this that may be the most important segment of the December 8th action.

The FCC also authorized translators to be fed with FM microwave. . .received from satellites. That's right, translators may not receive signals from satellites in 'our' 3,700 to 4,200 MHz band.

So the lowly, undernourished and poorly operated translator, struggling along for some 30 years since the first illegal installation in Pennsylvania in 1948 now has access to 1,420 MHz of spectrum space for 'signal relay' **plus** 420 MHz of VHF-UHF spectrum space to reradiate (or transmit). Adding it all up, there is 1840 MHz set aside for television translators (FM translators have another 20 MHz available) to use; if you are a number fanatic it works out to 13.94% of all frequencies below 13,200 MHz are available for translator use. **They've come a long-long ways from Colorado Governor Ed Johnson's days.**

What does it all mean, in the real world? Well, first of all **FM microwave is not cheap.** The stuff

the broadcasters use is expensive; primarily (perhaps) because the broadcasters have the bucks to pay for expensive gear. FM microwave could be less expensive (our own CATJ/CATA Lab developed Gunnplexer equipment probably comes closer to being 'cheap' than any gear around) but there's a problem there as we shall see shortly. So if a translator system has a hard time coughing up $1,500 to put in the translator itself, where is it going to be able to afford $3,000-$10,000 a channel microwave? Most, certainly, will not find FM microwave cost effective for their pocketbooks. Some, through microwave link sharing projects (see **CATJ** for **December 1975,** page 33) will find that several systems can be fed from a single transmitter (receivers tend to cost less than transmitters) and to be sure the 'intended use' envisioned by the majority of the Commissioners in their December 8th action will catch on in some areas. But not, we suspect, in most.

Giving a man permission to use your Cadillac may not be very important to him if he can't afford any gasoline.

So, if the expansion of FM microwave to the translator signal delivery forum is not likely to mean much to people too poor to afford a $1,500 translator, **where is the impact likely to come?** Back to the FM part.

FM is FM

The original 'context' of the 1975 Notice was an investigation of the simple use of **F**(frequency) **M**(modulation) microwave for translators. Nothing at the time, seemed to indicate the extent of what the Commission had in mind. The December 8th decision states **"Television microwave signals, from STL's** (studio-to-transmitter-links), **inter-city relays, Cable Television Relay Service** (CARS) **stations and common carriers are readily available in many areas. If such a microwave signal path is close to a town desiring translator service, there appears to be no reason to prohibit the use of that signal as a source of television."**

With one limitation (which we'll look at shortly), **if** the signal is available in the air 'near the town', the town can use the signal to drive a translator. To which the December 8th Commission decision adds **"If we allow use of FM microwave by translator relay stations, there would be no reason to prohibit use of convenient television signals from other FM microwave sources".**

The limitation is as follows:

"A translator applicant or licensee who desires to use a satellite or terrestrial common carrier microwave feed will, of course, be required to purchase the service in the same manner as any other customers in accordance with prevailing tariffs."

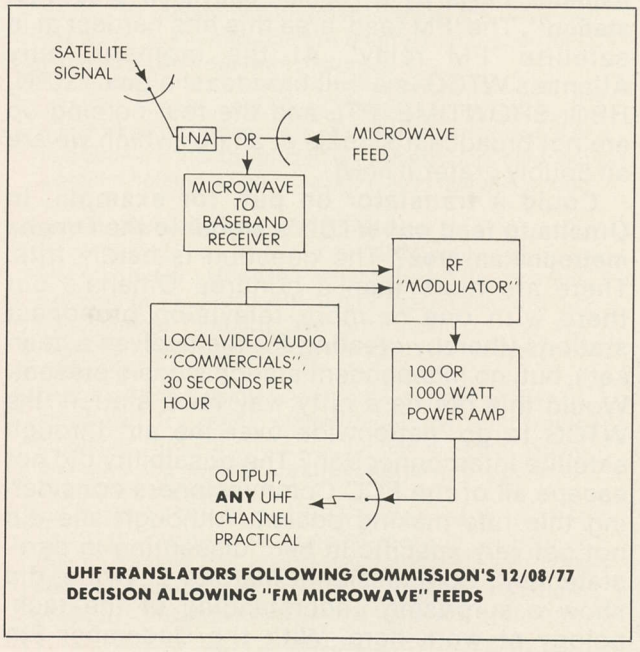
In other words, the translator system is going to have to pay somebody who has the common carrier feed available for the use of the common carrier signal, based upon 'prevailing tariffs'. Again, if you look at what **a CATV system** pays these days for say an independent television signal going into a cable town of perhaps 1,000 homes, that $400-$600 a month begins to look pretty steep to folks who have a hard time raising $1,500 one time for the translator.

There is one more limitation, perhaps a pair disguised as one. The translator operator is **limited to** translator retransmission of signals which **"are intended for transmission on a simultaneous basis by a regular television broadcast station".** And, before a translator can rebroadcast a station's signals (i.e. programs), the translator operators must have the permission **(in writing)** of the broadcast station who's signals they are retransmitting.

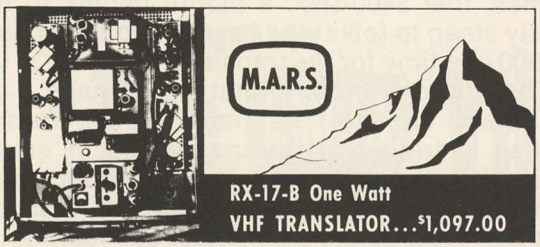
That means that a television broadcast station that wishes to deny a translator 'use rights' of its signal can shut down the whole project by simply refusing to grant the translator operator permission to use his signals. There are numerous examples of this nationwide; one shining example is station KTVT (channel 11) in Dallas/Fort Worth. KTVT is a top-rated indie station, carried throughout the southwest by CATV systems, many of who get the signal from a friendly common carrier microwave. KTVT is widely available over Texas (and that's a big state) Louisiana, Oklahoma and Arkansas via common carrier microwave. **But not a single translator has ever been authorized to carry the KTVT signal.** Management at the station simply refuses to grant permission, 'because of copyright and program procurement problems'.

Which raises another most interesting 'fairness' question. Translators got through the copyright fiasco without a scratch. Where the cable system in a town is now liable for copyright fees (if the signal is 'imported'), the translator is not.

So, the translator may have KTVT's signal available 'overhead' and it might even be able to figure out a way to afford the 'prevailing tariff'. But, if the station says 'no', that's all she wrote.



UHF TRANSLATORS FOLLOWING COMMISSION'S 12/08/77 DECISION ALLOWING "FM MICROWAVE" FEEDS



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AFTER BOOSTERS BECAME LEGAL, early 'pioneer' Mid America Relay Systems adopted the 'legal image' of an FCC certified-equipment producer. Note the $1,000 range price tag on the VHF to VHF unit.

At least as long as the FCC **insists** on having the translator operator **'get the station's permission'** before he starts rebroadcasting the signals.

The 'other half' of the problem is the small matter of the FCC insisting that the signal fed to the translator via FM microwave **''be originally transmitted or intended for transmission on a simultaneous basis by a regular television broadcast station''.** The 'FM feed' area this hits hardest at is satellite 'FM relay'. At the moment, only Atlanta's WTCG is a 'full broadcast signal'. CBN, HBO, SHOWTIME, PTL and the rest coming up are not broadcast signals at all (for which we are all doubly grateful **now**).

Could a translator be put, for example, in Omaha to feed out WTCG's signal to the Omaha metropolitan area? The question is hardly trite. There are more than a hundred Omaha's out there with one or more television broadcast stations (thereby creating for themselves a 'market'), but, no independent station signals present. Would this not be a nifty way for a station like WTCG to go 'nationwide over the air' through satellite interconnection? The possibility did not escape **all** of the FCC Commissioners considering this rule making docket. Although she did not get very specific in her "dissenting in part" statement, Commissioner Margita E. White, did show a surprising understanding of the technology at work here. With the December 8th decision (released January 12, 1978) Commissioner White wrote:

"The Commission today has placed the cart before the horse. It has authorized TV translators to use any method to obtain primary signals for carriage before examining the implications of the decision.

I support the extension of television service to rural areas. . .I disagree however with both the timing of the decision and its overbreadth.

It may well be that unlimited translator service to all parts of the nation (including urban areas) would be in the public interest. But the Commission. . .has not considered the policy implications of the integration of translator service into our national communications structure nor the impact of its action on the concept of local service.

This Commission action provides a cost effective method (for extending service by television station licensees), but no rules to guide its employment.

It is reasonable to assume that the flow of capital may be directed toward development of translator services in more populous (and more profitable) areas at the expense of less profitable rural communities. . .''.

Logic suggests Commissioner White hit the nail squarely on the head. What the Commission appears to have done is open the door through which anyone who can figure out how to make a buck at it can extend distant television signals into areas where sufficient population exists to make the venture worthwhile.

How Do You Pay For It?

Ultimately, of course, each and every television delivery service is paid for by the viewing public. As the **March** and **April 1975** issues of **CATJ** examined at great length, the development of television in this country has always been along 'big buck' lines. By taking the gross advertising revenues of all stations in a market and dividing those revenues by the number of homes in a market (see **CATJ** for **April 1975,** pages 30-35), one can arrive at a fairly accurate 'cost-per-home' for television services in a year. Advertising revenues paid to stations are directly included in the cost of goods and services bought by the people in the market so in effect the homes in the market pay some number of dollars **per-year per-channel** for the 'reception of free television'. Reno, Nevada (for example) worked out to $14.82 per-channel per-year in 1973 for each family in the market.

Translators have been poor because they have depended upon tax district money or donations to exist. Well, that's almost true. The FCC some years ago did authorize UHF translators to engage in the practice of 'deleting 30 seconds of primary station programming per hour', and the sale of local messages for that 30 seconds of time. The Commission authorized this 'local-commercial-substitution-practice' because they recognized that without some form of funding,

translators were forever destined to be poverty cases. This practice has had very little impact on translator solvency; those few who tried it found that the cost of the equipment to originate local commercials, plus the very small markets they operated in, simply did not add up to anything approaching an operating profit or surplus. But the rule exists none the less.

30 commercial seconds per hour is not worth much in Coaldale, Colorado (population 50 people). **But, in Omaha** it might be enough to sustain a virtually automated 1 kW satellite fed translator (or a 'network' of same located throughout the Omaha market core area). Let's consider what bucks are involved here.

1) **A 1 kW UHF translator** on its own site with top notch gear is a **$45-60,000 package,** based upon the monies currently being spent by educational broadcasters using these devices;
2) **A 4.5 meter terminal** installed with the necessary equipment is a **$25,000 package** top end;
3) **The local video tape** playback and sequencing equipment will add another **$7,500** to the installation.

That comes to between $77,500 and $92,500 to serve the 'core' of an area such as the Omaha market (i.e. Dodge County, Nebraska and the western half of Pottawattamie County, Iowa). There are 176,200 TV homes in the two counties. If you scale the 30 second commercial rates 'down' to reflect the potential audience size and the lower impact of non-network television programming (i.e. the kind that one finds on an indie such as WTCG), you end up with 30 second commercial rates of around $70. That works out to $1680.00 per day or $613,200 per year on a 'sold out' basis.

At the $92,500 capital cost level a UHF translator, satellite fed in Omaha with signals from an 'imported' indie, could be expected to return its original capital investment (without any operating cost or interest factor) if it sold out only 15% of its total available commercial time. And assuming it did not cost something to operate the translator (the satellite tariff is one important consideration), there is still plenty of margin for profit bucks.

The biggest cost hurdle on an operating basis is likely to be the **tariff** attached to getting the signal **to the translator.** Tariffs have a way of being 'audience conscious', which means the bigger the potential audience the more the common carrier customer pays for the signal. Take Southern Satellite Systems' tariff for WTCG,

FM MICROWAVE RULING—QUICK FACTS

The FCC issued its initial 'Notice of Inquiry and Notice of Proposed Rule Making' on July 11, 1975 (FCC 75-796). Docket number 20539, decided December 8, 1977 and released January 12, 1978 is the result of this rule making proceeding.

What Authorized—Stations licensed in the Television Translator Service will now be authorized to employ FM (frequency modulation) microwave feeds to provide video/audio (baseband) inputs to a translator station.

What Bands—Translators may take FM video/audio feeds from STL microwave, intercity microwave, CARS band microwave and common carrier (including satellite) microwave. This covers the 1,990-2,110, 2,450-2,500, 3,700-4,200, 6,875-7,125, and 12,700-13,200 MHz bands.

What Signals—Signals from 'any suitable source', provided only that the translator input signal is one originally broadcast by or intended to be broadcast by a regular television broadcast station on a simultaneous basis, and, the translator operator has received the 'written permission' of the TV broadcast station to 'rebroadcast' the signal.

Signal Format—Transmissions applied to the translator 'rebroadcast' station at baseband must conform to rule section 73.687 (paragraphs a and b), 73.682 and 73.99. Modulation index and purity requirements **only** apply to the **output of the translator transmitter,** not at intermediate points.

Technical Compliance—The installation, when completed, must be checked over by a properly licensed (first or second class radiotelephone) responsible party. This will be the equivalent of a 'television station proof' although the FCC will not require that such results be filed with them; only that the check be made (i.e. tests conducted), with results retained in the translator system files.

Ongoing Compliance—Systems are required to make a 'visual' off-air check on the quality of the translator transmitted signal once per day for ten minutes each day, 'by a person designated by the licensee'. Such a person does not need to hold any type of FCC operator's license.

Frequency Tolerance—Translators with 100 watts or less transmitter power are to maintain a frequency tolerance of 0.02% while translators with more than 100 watts transmitter power are required to maintain a frequency tolerance of 0.002%. The baseband-modulated translators are to maintain a visual to aural offset of 4.5 MHz, plus or minus 1 kHz.

Continuous Operation—Prior rules required microwave systems to 'shut down' when the input signal (such as an off-air feed) left the air. This requirement has now been dropped.

Operator Requirements—If the controls on the equipment are such that the normal operation of the equipment controls can**not** cause the system to operate off frequency or radiate unauthorized signals, the rules will allow the system to operate unattended (i.e. no first or second class operator required).

Periodic Maintenance—The Commission established no 'periodic maintenance check' requirements; although if and when maintenance is required or performed, it is to be done 'under the immediate supervision' of (or by) a person holding a first or second class radiotelephone license.

Licensing Basis—All stations licensed in the Translator Relay Service are licensed on a 'shared, non-interference basis'. However, established TRS systems will not be 'bumped off' their frequencies without considerable difficulty and later users of the frequencies may have to 'work around' the established TRS systems.

Subcarrier Communications—An aural subcarrier may be employed for voice communications, electronic command circuits and other functions which would facilitate the remote control/unattended operation of the TRS systems.

Local Support—The Commission reaffirmed its section 74.731 (f) which allows up to 30 seconds per hour of 'local commercial insertion/substitution' by UHF translator stations as a means of 'seeking or acknowledging financial support' for the translator system.

just as one example. SSS's Ed Taylor, not wanting to cut off his potential big-CATV-system market, charges ten cents per cable subscriber up to 30,000 subscribers; at that point the rate 'freezes' at $3,000 a month. In theory (although perhaps not in practice) the top rate for an Omaha translator designed to carry WTCG into Omaha would be $3,000 a month, regardless of the potential 176,200 TV homes out there. That's $36,000 a year, not an insurmountable feed-charge when the translator might be looking at $613,200 per year in annual gross income on a 'sold out' basis.

The SSS/Omaha **example** is just that. Neither has any special significance. Although, SSS's Ed Taylor does report that within days of the December 8th decision and long before any 'paperwork' was out on the street, he began receiving telephone calls from 'people' who wanted to inquire about 'what rate he would charge for a satellite feed to a translator'. In SSS's case, which like all common carriers must serve any and all customers legally authorized to receive the service without regard to who they are or what they want to do with the service, Taylor quickly palmed the inquirer off on WTCG. **"Because the translator operator must get the written permission of the originating station first, I figured there was no point in talking with them until they had that permission from WTCG".** Down at WTCG the whole matter was, on last check, 'under study'. It is just possible, even probable given the reliance on the cable industry for its present growth, that WTCG will follow the same gameplan adopted years ago by Dallas' KTVT (and other indies) and simply refuse to grant retransmission consent.

Which stops satellite delivered 'FM microwave' of simultaneously broadcast television broadcast signals dead in its tracks; **for now.** But, there is another group who viewed the FCC decision with far more enthusiasm; the religious broadcasters. Since the advent of small earth terminals and the reduction in installed TVRO prices there have been any number of 'studies' conducted to determine where and how satellite delivery of religious programming might spread to churches and other religious institutions. A 'gameplan' to bring installed TVRO's down to the individual church level has been formulating for several months.

The FCC's FM microwave program seems to fit the pattern called for by such studies. CBN, as an example, could expect several hundred 'CBN translators' in short order built with funds raised at the 'local' level by religious groups. **But, there is one small problem,** even with the CBN type of format. The signal as supplied to the 'bird' is **not a broadcast signal** intended for 'simultaneous transmission by a broadcast station'. CBN then has a pair of options open; it could go to the Commission and seek waiver of this requirement for their special-case religious format, or, they could simply convert the existing CBN SATCOM feed into a broadcast signal.

The latter is not without problems, mostly copyright. You may recall, that last summer CBN was hopeful that they could convert their existing 24 hour per day religious format on the bird into the direct feed now supplied to their WYAH, channel 27 in Virginia. However, the non-religious programming on WYAH (typical off-network, syndicated and movie fare) was a stumbling block. The copyright owners wanted compensation for that programming material if it was satellite distributed, and CBN on the other hand wanted the service to be 'free' or nearly so. Subsequently, CBN dropped the WYAH feed proposal, settling into their present 'created for cable' programming schedule. Now if CBN turned this 'created for cable' non-broadcast signal into a 'broadcast signal' so it could be legally carried by translators across the country, CATV use of the signal might diminish in a hurry. At the moment CBN's satellite feed is **not considered a broadcast signal** by the Copyright Office, and consequently no 'distant signal equivilents' (see **CATJ** for **January 1978,** page 31) count against its carriage. **Should** the **exact same programming** become available **on a television station,** the signal would probably be considered a 'broadcast signal' by the Copyright Office and that could hurt cable's willingness to carry the CBN feed.

So back to the drawing boards, even for translator carriage of satellite distributed CBN programming.

Guarding Against Abuses

Commissioner Margita White observed in her dissent **"The critical defect** (of this decision) **is that by opening up all areas for translator development via new transmitting methods, the Commission may have set back the development of the rural translator service."**

The majority held the view, **"We do not believe that it is prudent or sound, as a policy matter, to proscribe** (prohibit, condem) **a worthwhile project merely on the basis that the possibility may exist for abuse. The concern voiced. . .is essentially that the availability of FM microwave feeds will give rise to a proliferation of translators in areas where such stations have not heretofore been feasible. Institution of this new translator service will, it is claimed, result in fractionalizing audiences of small market TV stations and cable systems to their detriment. The Commission is not persuaded that adoption of the (new) rules would produce this result. . ."**.

So is the new set of rules good or bad for translators? Does it really impact on cable? Did anyone (including broadcasters) really understand what this whole matter was all about, before it happened?

A small market telecaster perhaps said it best. **"I don't believe the broadcasters have ever really used the translator tool as they might have been using it. Given the prior rules, we could have, had we wished, raised billy-hell with both larger market broadcasters and cable systems. I see the FM microwave ruling as a very big carrot just dangling out there before us. As soon as the first guy starts to nibble on it, I'm afraid we all will have to follow suit. I don't think the FCC had any idea what they were doing here."**

Trap It And Lose It

HOW TO GO ABOUT DROPPING A CHANNEL IN THE MIDDLE OF A SYSTEM

by
Bill Zajac
Assistant Chief Engineer
Microwave Filter Company
E. Syracuse, New York
13057

Channel Notcher

One of the more perplexing problems presented to the system technican or engineer is elimination of one set of programming energy or material from a system and substitution of another set of program material in its place. There are several ways to do this, most of them expensive. To set the stage properly let's establish an example to work with.

Let's say you have a 12 channel plant and you want to provide service into a motel complex. The motel owner is willing to take the full cable service, but he wants to keep or retain his existing video tape fed pay movie channel for his motel. Your dial is full and to make room for his pay channel you need to drop or eliminate one of your existing channels of service.

One sophisticated and expensive way of doing this is to simply go back to either baseband products (video and audio) or to heterodyne processing (or some of the more quality-conscious bandpass filtered strip amplifiers) for each channel on the system, and in the process of 're-processing' each channel simply cut off the non-desired input material and substitute at that point the motel's video tape fed data. A few systems have done this, but having a 'sub-headend' for every such problem in the system can be both expensive and troublesome to say the least.

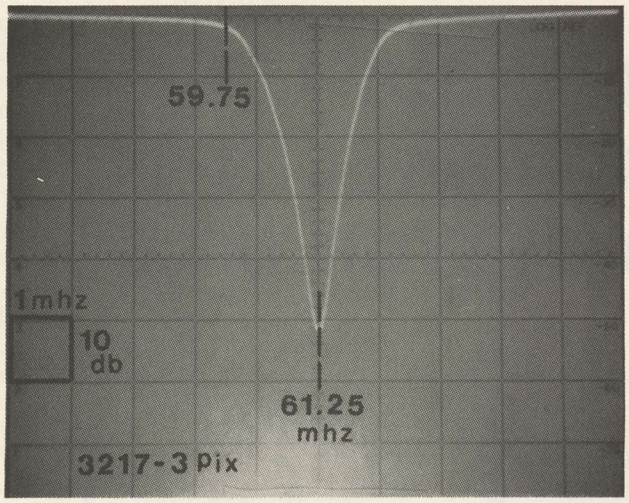
Others have suggested methods of trapping out the non-desired channel modulation products and carriers (see **CATJ** for **February 1976,** page 42). In the cited reference the circuit developer suggested utilizing four separate tuneable traps, one each dedicated to the picture carrier, the sideband of the picture carrier, the color sub-carrier and the audio of the channel involved. The traps were connected basically in series, housed in a shielded container (to prevent stray coupling from upsetting the trapping action) and a band absorbtion filter was used to catch any on-channel energy remaining **after** the selective trapping. The technique obviously worked (and probably continues to work) although it would appear to have stability as well as balance problems which might complicate long term use.

What has evolved from that CATJ report of two years ago last month is a more precise approach to the same problem, and the development of a commercial product which allows the cable operator faced with 'dropping a channel' a stable piece of apparatus to get the job done.

The Parameters

If you really want to get rid of a channel of information, completely and without any visible degradation to another set of programming which you would substitute in its place, the channel-material to be 'dropped' must be attenuated by no less than 50 dB and preferably by as much as 70 dB. **Not only** must you lower the dropped-channel material by an amount sufficient to remove any possible **co-channel** beat effects (which occur between carriers when the non-desired carrier approaches a signal level that is 40/45 dB below the desired carrier level), but you must also be concerned that in the process of dropping or lowering the non-desired channel material that you do not end up with modulation products originally imposed on the non-desired carrier, 'left over'. Modulation products are simply sidebands without a reference carrier, and they can and will attach themselves to any replacement carrier offered. The interference these modulation products or sidebands will create varies greatly with the type of modulation material present and the ratio between the two carriers; suffice to say you want to avoid the 'wormy', degraded look that comes when only the picture carrier is dropped and the modulation products remain.

In a world filled with $5.00 subscriber-drop type 'trapping devices' that often claim 50 dB or greater on-carrier attenuation, the 50-70 dB



SINGLE TRAP/LOW BAND shows extent of depth one can expect from a single tuned circuit system as described in text. Trap is on channel 3 picture (61.25 MHz) and depth is approximately 52 dB.

'down' spec required may seem rather easy state of the art. It is, but not inexpensively nor with the type of stability required for the channel dropping job. In other words, attenuating a carrier on a pay channel so the subscriber can no longer view the signal is one thing; but getting the whole 4.5 wide channel down far enough that the channel is 'clean enough' to allow the direct substitution of a whole new program-channel is quite another matter. The ease with which you drop one carrier sufficiently to degrade home viewing should not be confused with the instant problem.

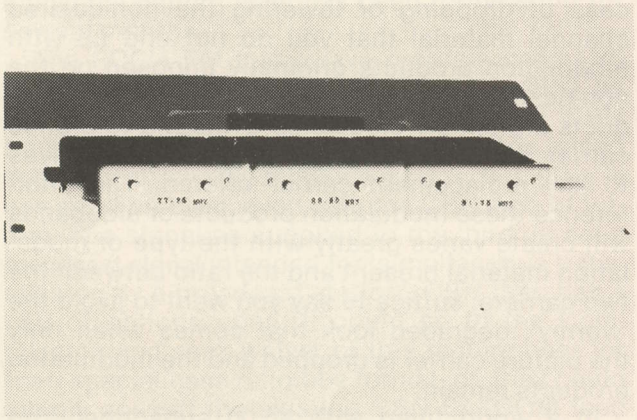
The type of attenuation required and across the bandwidth required lends to precision lumped-constant type designs for low band VHF (channels 2-6). But for high band VHF, where circuit Q (and therefore trap selectivity) is much harder to come by, descrete coils and capacitors in the final lumped constant form are no longer adequate. The correct answer for high band involves cavity design resonators, and this also holds true for superband channels.

In the past two general approaches to the problem have been utilized:

1) A wide-band channel reject filter, in which the device has high loss (around 50 dB) across a spectrum of at least 4.5 MHz (the modulation product channel-width of an American standards TV signal channel), with a 3 dB bandwidth of not more than 7.5 MHz (in other words the lower adjacent sound carrier and the upper adjacent picture carrier fall right on or just outside of the 3 dB bandwidth of the 50 dB wideband band-reject filter).

The ratio of the 3 dB points (7.5 MHz) to the maximum depth width (4.5 MHz) is called the 'form factor' for the device; and in this case 7.5 divided by 4.5 equals a form factor of 1.67. This is not an unreal requirement, but it is a costly requirement because to satisfy this relatively small form factor ratio requires a rejection filter design of many-many resonator circuits. This increases device cost and greatly increases device alignment time. If the alignment process is tricky the stability factor may also become burdensome since any component aging or 'drift' with time, temperature, humidity or a combination of these factors can create mis-alignment problems for field use.

2) The alternate approach has been stagger tuned traps, along the lines followed in the February 1976 CATJ-cited reference. In this system the traps are resonated at strategic frequencies within the channel to be rejected and 3 to 6 dB pads are placed in series with the traps to create 'forced-impedance-matching' between the normally poorly matched traps. The pads help maintain a degree of resonator/trap isolation, and this reduces the interaction between the traps. However this technique adds loss to all channels passing through the system, not simply the desired channel (because of the forced-match pads) and if the system is on low band you often find 2nd and 3rd harmonic trap 'spikes' appearing in upper frequencies which you do not wish trapped or attenuated.



LOW BAND NOTCHER utilizes tuned circuits as explained in text; in trio to treat main video carrier, color sub-carrier and aural (sub) carrier.

A Marriage of Disciplines

In the product developed to satisfy the problems presented by the existing technologies a little bit of both the wide-band reject filter and the stagger tuned trap appoaches are utilized. Combined with these approaches is some state-of-the-art application of VHF circuit **construction techniques,** which when all is said and done is probably the key to the performance of the system.

The low-VHF Notcher® is three traps in series, each tuned to the principal carriers involved in the TV transmission system (picture carrier, color sub-carrier and the aural carrier). The bandwidth of each trap is small (or tight) to minimize interaction between any two (or all three) of the traps. Getting the bandwidth small or very deep is probably the most important thing you must do since if the traps are tight enough they will simply not interact with one another when they are up to 3.58 MHz apart (or as little as 0.92 MHz apart in the case of color sub-carrier to

aural carrier). That reads easy, but doing it is quite another matter. As an added benefit of having tight or deep trap notches with very steep skirts you also avoid the problem of un-necessary attenuation on the two immediately adjacent carriers. If possible the degradation on the lower adjacent sound (removed by 1.5 MHz from the trapped picture carrier) and the upper adjacent picture (again removed by the same 1.5 MHz 'window') must be minimal. No attenuation at all would be a desireable design objective.

Figure 1-A is the familiar schematic of a three pole band reject filter designed to trap one carrier. Photo 1-B shows the response of the single section while photo 1-C shows the construction of the circuit. In 1-A, L1 and C2 determine the bandwidth of the circuit; they must be **large** for small bandwidth. The bandwidths of the picture and sound carrier traps must be tight and deep (or narrow at the 3 dB points in terms of megahertz) to protect the adjacent channel carriers.

For a 3 dB bandwidth (B MHz) equal to 3 MHz:

$$L1 \cong \frac{Zo}{2\pi B} = \frac{75}{2\pi 3}$$

$$= 3.98\mu H$$

$$C2 \cong \frac{10^6}{2\pi ZoB} = \frac{10^6}{(2\pi)(75)(3)}$$

$$= 707pF$$

This suggests very large inductors which would not only be part of a tuned circuit, but they would self-resonate somewhere in the 54-300 MHz band, and therefore impact (degrade) another frequency in the TV region.

In order to avoid this the coil (inductor) is wound as **a section of a helical transmission line.** This means the effective length of the helical section would be below the self-resonance point (or 180 degrees, in the language) to frequencies of 300 MHz and lower and the characteristic impedance (as a section of cable) is sufficiently high to yield the desired equivalent inductance at the design resonant frequency.

Figure 2 shows a typical coil, wound on a grooved polystyrene coil form fabricated for the job at hand. The form is slotted to retain the characteristics of the inductor though a wide variety of temperature extremes. Because the

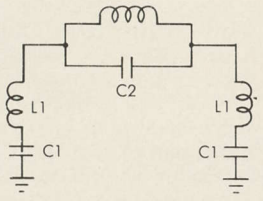
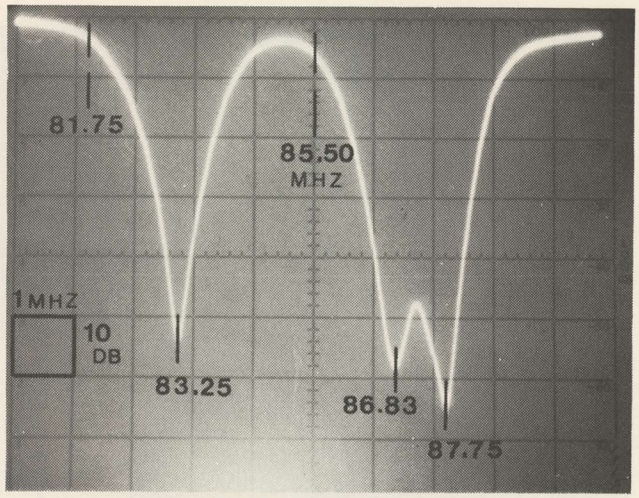


FIGURE ONE-A



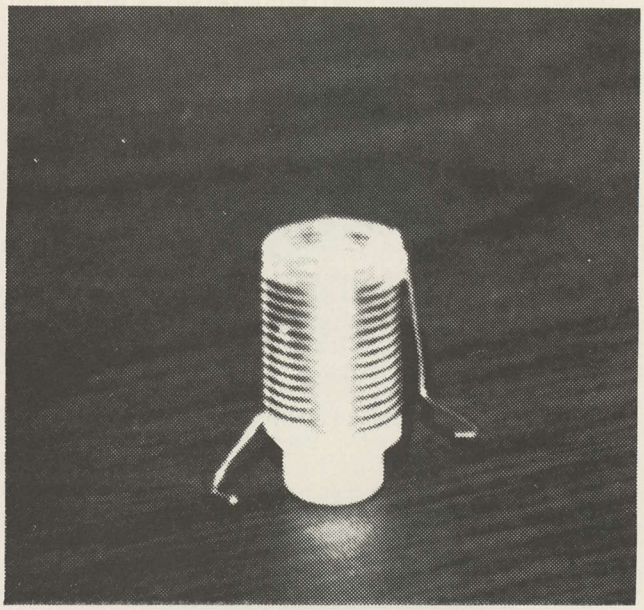
LOW BAND NOTCHER display channel 6. Vertical display is 10 dB per division while horizontal display is 1 MHz per division. Lower adjacent sound of channel 5 at 81.75 MHz must be protected from notcher trapping.

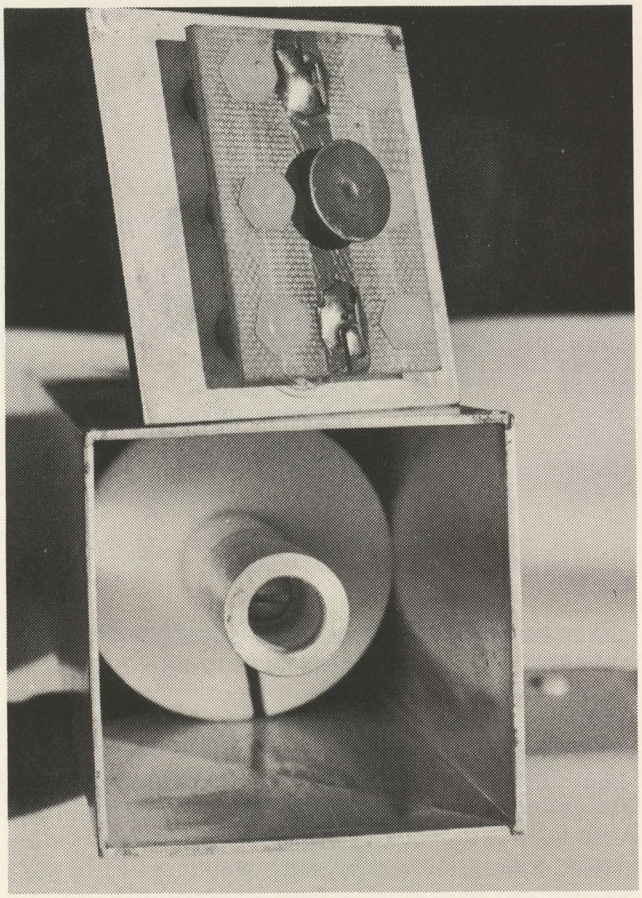
coil cannot be 'tweeked' (as you might do with a conventional inductor by spreading turns apart or pushing them closer together to slightly modify the resonant frequency) a high-Q trimmer must be used as the capacitor. In a series resonant circuit the inductance is small (because of the very large capacitance required to create a narrow bandwidth). When the inductance requirements get very small, a coil cannot be utilized (if you have ever attempted to wind a 1/2 turn coil you know the problem!).

Here transmission line theory comes to our rescue. The inductance is built up from a short section of two-wire transmission line and the inductive reactance is found by:

$$X_L = Zo \tan O$$

where Fo=characteristics impedance (determined in a two-wire line by the wire





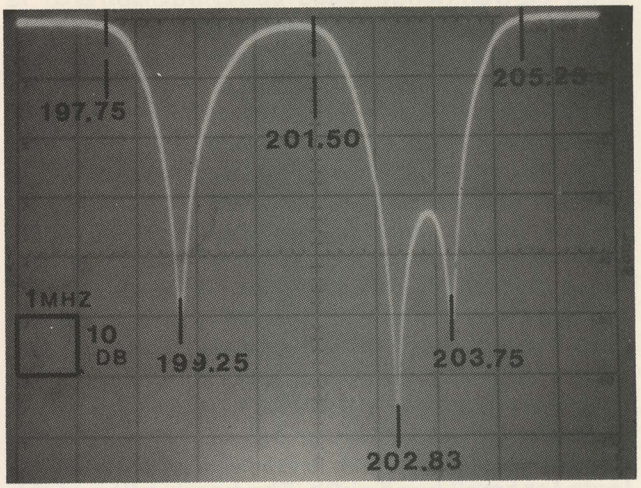
OPEN END OF RESONATOR cavity in high band NOTCHER. Assembly is really akin to a section of precisely tuned transmission line.

size and spacing between the wires)
o=electrical length of the wire at the operating frequency

Since Zo and o can be closely calculated, a very small inductance can be constructed very accurately.

A High-Band Notcher

The approach to the high-band notcher is the same as with the low band version, three trap pairs in series with each pair notching a carrier. At these higher frequencies the high circuit Q required is not available from conventional lumped constant circuits. The answer is to resort to cavity type resonators. By using two cavity resonators per carrier and tying the two cavities together with a special phasing line we can use the 'phasing line' as a third resonator to isolate the two cavity resonators from one another. This gives us a 'three pole' functionally similar trap that corresponds to the design criteria to the low-band lumped constant circuit. Photo 4 shows a cavity type resonator.



HIGH BAND NOTCHER display channel 11. Vertical display is 10 dB per division while horizontal display is 1 MHz per division. Lower adjacent sound at 197.75 and upper adjacent picture at 205.25 (MHz) must be 'protected'.

By combining the system into a set of six cavity resonator circuits, we end up with two cavity resonators per carrier plus the resonant phasing line section. This device is shown in figure 5 and the spectrum analyzer of its performance is shown in figure 6. The device shown in figure 6 has been tuned for surpression of all three carriers on television channel 11.

About 'Old' Half-Bolics

The three part series describing tropo-scatter half-parabolic antennas, concluding in this issue (see page 30) has generated an unusual amount of industry interest. The comments vary from **'a salvation for a small system too poor for microwave'** to **'anyone** that **far from the television broadcast stations should be employing microwave'.**

Several readers have written to report that they have (in varying states of condition) the 'skeletal remains' of 1960 era Half-Bolic antennas which some feel would be of use to those who might be considering construction of such an antenna. In the interest of putting these 'old relics' to some good use, we are offering to serve as a 'go-between' to put systems which have antennas like this available in contact with systems who are interested in installing such antennas.

Example one to start the ball rolling. A Western Oklahoma system has 8 towers constructed by Fort Worth Tower Company for a large 85 foot high by 170 foot wide Half-Bolic. The 85 foot 'upside-down-letter-Y' shaped tower sections come apart into three sections. The top of the 'Y' is about 43 feet long while the bottom of the 'Y' comes apart in two sections also each **about** 43 feet long. The tower face where the lashing wire-reflector surface is strung is pre-curved and is designed for 4 inch wire-to-wire spacing (vertical spacing between grid wires). **There are eight of these towers in the 'array'.**

This is an 'instant Half-Bolic' antenna; a user would simply locate concrete mounting piers in the proper location, and set the pre-fabricated 85 foot curved-surface tower sections in place.

The system that owns this array wants $3,600 for the 8 tower array which when you think about it comes to $450 per 85 foot tower. This is heavy duty construction, like all Fort Worth Tower products, with 2.5 inch diameter pipe on the bases. If you are interested in this array, or are just plain interested in locating such an array (perhaps closer to you than western Oklahoma), or, have such an array you'd like to dispose of, contact CATJ Editor Bob Cooper who has agreed to serve as a clearing house for this program. See address on page 3 of this issue.

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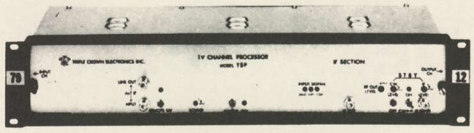

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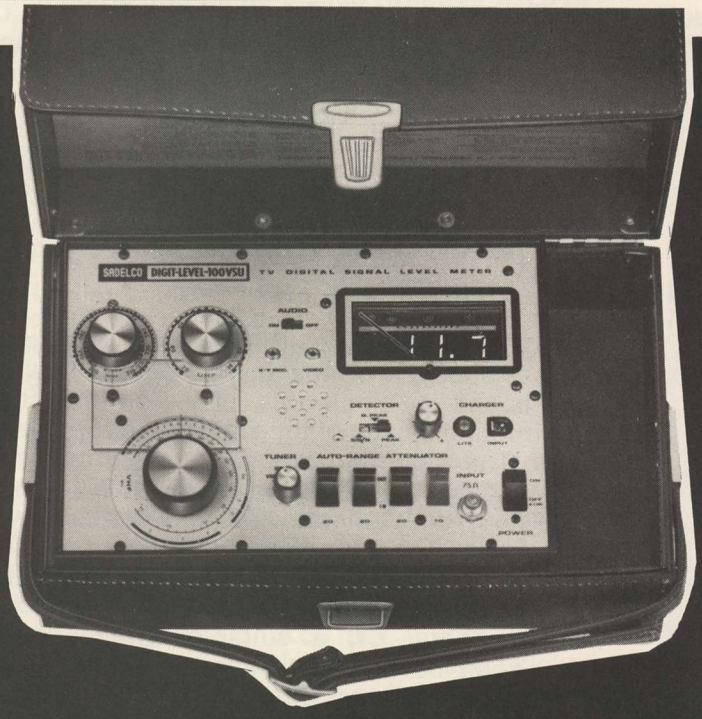

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FINAL CONSTRUCTION DETAILS FOR THE FRIAS 'HALF-BOLIC' DEEP FRINGE OFF-AIR ANTENNA

THE HOME STRETCH

If you have been with us for the past two months, you have learned about the unusually high forward gains, sharp receiving patterns, and other advantages that go hand in hand with construction of the Tony Frias re-created 'Half-Bolic' antenna system. Part one, appearing in January, discussed the design considerations for an antenna of this type, and went into the parameters of selecting a site and preparing the site for the antenna. Part two, appearing in February, revealed some of the secrets developed by Frias for his low-cost long haul antenna system in Mexico's Baja California. And it took us step by step up to the point of having constructed the site proper, preparing the forward and rear guy locations, and the eight support tubes for the reflector surface material.

The Reflector Surface

The reflector surface consists of parallel runs of small diameter galvanized wire. Because we are in the CATV business and because we have access to (more or less) reasonably priced good quality lashing wire, it is really the only common-sense material to utilize for the reflector surfacing.

In the **VHF optimized** array described in this series, there is a length of lashing wire (or some other substitute if you can beat the price and quality) every four inches (on the vertical plane). That works out to 180 strand-runs of wire that will be approximately 132 feet long per run. For those slow with a calculator that comes to 23,760 feet of reflective surface wire (4.5 miles). There's a great advertisement for the local newspaper hidden someplace in that number.

There are three primary concerns with the reflector surface:

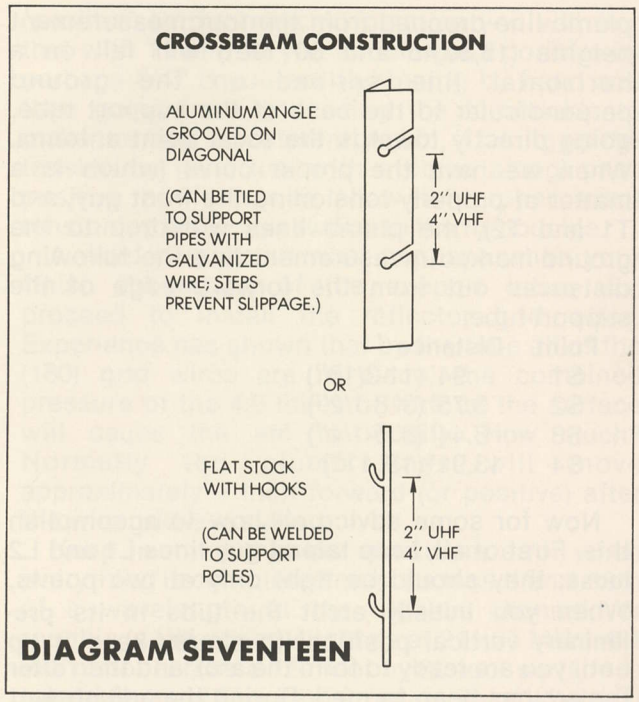
1) That once up and pulled taunt for each of the approximately 125 foot curved runs (the extra 6 feet comes in when you wind around the support tubes as shown in the photos here), that the wire stays taunt;
2) That when you pull 180 of these wires taunt that you don't 'cave-in' the parabolic curve you have worked so hard to create;
3) That the whole thing stay up there once constructed!

We'll come back to the reflector surfacing process shortly. For now our concern is how do you mount it, since this plays on the final construction design of the eight support poles or tubes. The mounting procedure must maintain the spacing between the horizontal (4 inch separated) reflector grid wires, and it must go up fairly easily. The 60 foot support tubes could be equipped with some type of 'eyelets' every four inches, as an exercise in welding or sinking eye-hook anchors. Or, a suitable wire-mounting frame could be made up separately and it placed on the support tube. This is the step taken in the antennas constructed in Mexico, and the specialized pieces are shown in **diagram 17** and in the photos here. In the top option a V or L shaped aluminum angle is grooved at an angle every four inches (2 inches at UHF) to allow the reflector surfacing wire grid to be slid into the groove. As the photos show, the groove can be 'closed' with a hammer after the wire is slid into place to prevent it from ever working out

Part Three of Three

The January (1978) issue of CATJ began a three part series describing construction techniques and operating parameters for very large (120 foot wide by 60 foot high) off-air VHF and UHF receiving antennas; the 'Half-Bolic'.

CATV engineer Tony Frias of Vica Cable (operating systems in Tijuana, Ensenada and in other Baja California communities) has developed a series of techniques which allow cable operators well beyond the normal reception regions to enjoy first class (if not Grade A) reception for their subscribers. Part one in January described the basic principles of the half-parabolic antenna, and the selection and preparation of a site for its installation. Part two, in February, described the first-phase construction techniques. This third and concluding part completes the step-by-step construction technique for this antenna.



(although if it is pulled taunt there is little chance of this).

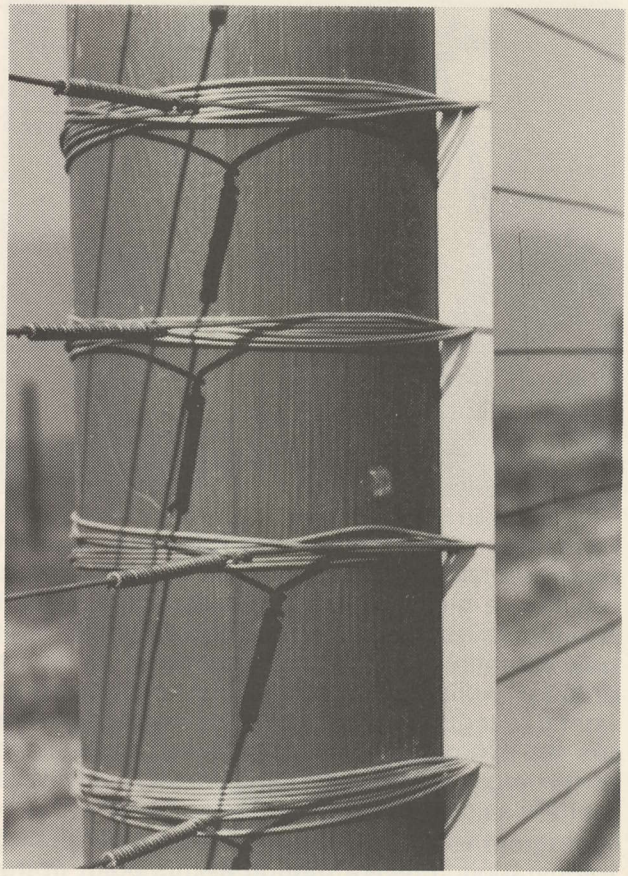
If you elect the angle aluminum approach (or eyelets every 4/2 inches), the work needs to be completed before the tubes are raised to their height and that is the reason for being concerned at this point. The angle pieces (whether 4,6,8 or 12 feet long in the raw-all are sizes that can be procured through traditional aluminum extrusion suppliers) must be prepared (i.e. slotted) and then attached to the support tubes **before** they go up. They could be attached with metal screws, bolts or simply wired in place with lashing wire (as one photo shows) by wrapping around the support tube and the angle piece several times. They should be placed on the **back side** of the support tubes (so as to be on the **outside** of the curve because the reflector wire grid is installed to the rear). We'll come back to the reflector grid installation shortly.

Forming The Parabola

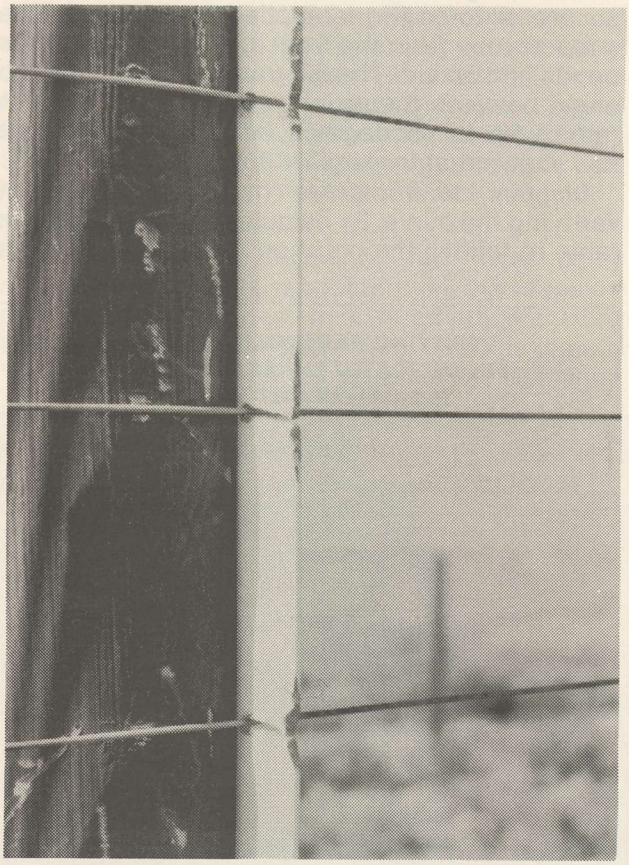
Before the support tubes are raised to their starting (vertical, un-formed) position it is necessary to 'build-in' a method of measuring or verifying the extent of the curve.

Before the poles are erected (or after if that is easier for you) plumb lines are attached to the poles (all eight) at heights 60 feet, 45 feet, 30 feet and 15 feet. These are the **above-ground heights** and remember that three feet of the 63 foot long tube will drop into the base support pier. If you attach the plumb lines after raising the support tubes it is better to mark (with masking or other durable tape) the points **where** the plumb lines **will attach** before raising the support tubes.

In initially raising the support tubes turnbuckles should be installed on all down-guy lines (T1, T2, L1, L2 and the front guy line as shown in diagram 14 in the February issue).



POLES 1, 3, 4, 5, 6, AND 8 are secured in this form.



ALUMINUM ANGLE grooved on diagonal. Note that slot is closed with hammer after reflector wire is inserted and pulled taunt.

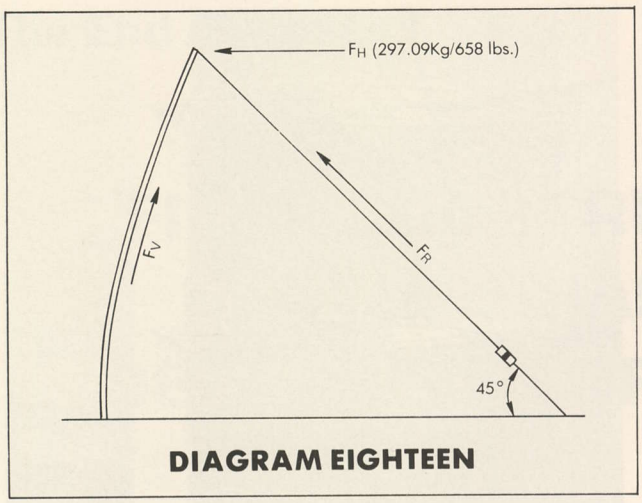


DIAGRAM EIGHTEEN

Remember T3 is utilized **only if** the pier support base tube extends 6 feet **or more above ground** to equalize a pier base elevation. Before you start making adjustments consider that the top **front guy wire** is going to come shorter by some amount while rear guys T1, T2, plus the two lateral rear guys L1 and L2 will extend out further in the forming process. Make allowances accordingly for the turnbuckles and guy wire lengths as cut at this point.

Diagram 18 shows how we go about perfecting the parabolic curve although at this point in the report anyone who has missed it simply has not been paying attention! The base is anchored and secure. A force (Fr) is applied to the top of the support tube from the front and the support tube bends into an arc. The diagram indicates that the angle between the ground and the front tension (guy) wire is 45 degrees, although experience has shown that **the angle is not critical** at all.

Diagram 19 indicates how you go about verifying the curve. By calculation we know (from table to follow) the point on the ground where a plumb line dropped from the four measurement heights (15,30,45 and 60 feet) will fall on a horizontal line scribed on the ground perpendicular to the base of the support tube, going directly towards the focal point antenna. When we have the proper curve (which is a matter of properly tensioning the front guy, and T1 and T2), the plumb lines will drop to the ground-marked measurement line the following distances out from the forward edge of the support tube:

Point	Distance
S1	.94' (11-3/16")
S2	3.75' (3' 8-1/2")
S3	8.44' (8' 5-1/4")
S4	13.91' (13' 11")

Now for some advice on how to accomplish this. First of all, keep lateral guy lines L1 and L2 **loose;** they should be tight only at two points. When you **initially** erect the tube in its **preliminary** vertical position (to simply keep it up until you are ready to form the arc), and then **after** the arc has been formed. During the adjustment phase keep them loose but out of the way.

The first pressure is applied to the front guy wire. While the line tension is increased (with a come-along device initially, later with fine tuning using a turnbuckle) the **opposite tension** on back guys T1 and T2 is kept taunt but allowed to loosen very gradually. Note that at the T1 location the tube must move forward (when we are done) by approximately 6 feet while at the T2 location it will move forward by approximately 18 inches. Therefore as the front guy is tensioned, some slack must be allowed at the ground anchor points for T1 and T2. With that much understood, tension the front guy wire until the top most plumb line (60 foot mark) coincides with the 13' 11" mark on the horizontal scale line.

Now adjust T1 so that you have a compromise between the proper S1 (11-3/16") and the S2 (3' 8-1/2") distances given. When the plumb line falls **short** (i.e. is **inside** towards the pier) we say it is **'negative'** of the mark; if it falls **ahead** (i.e. too far **forward,** towards the focal antenna) we say it is

VERIFYING PARABOLIC ARC WITH PRE-DEDICATED PLUMB POINTS AND PRE-CALCULATED VALUES

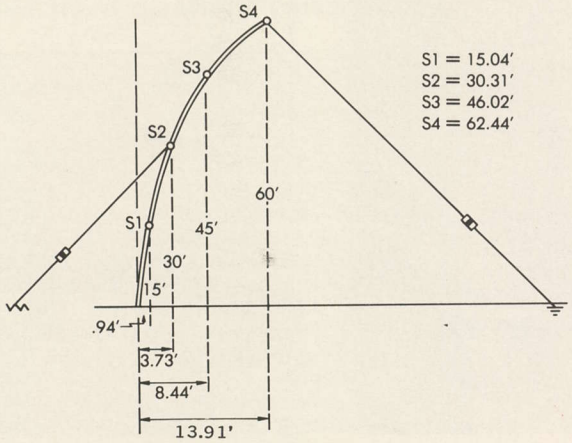


DIAGRAM NINETEEN

RAISING WIRE MESH ON SUPPORTS

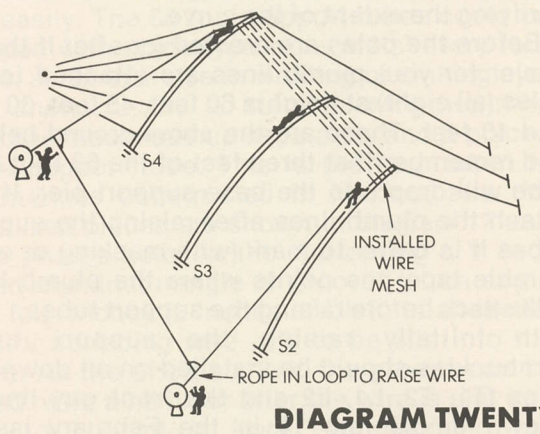


DIAGRAM TWENTY

'positive' to the mark. In practice you will find that with T1 and T2 you should pass positive by perhaps 3/4" if you are tightening by hand and then going back and using the turnbuckle to make the final adjustment. Again, if taking up the tension by hand (i.e. with a come along) pass positive by 1 inch to allow for proper exact tensioning when you switch to the turnbuckle.

A word here about what happens when your finish the arcing of the support tubes and proceed to install the reflector grid wires. Experience has shown that by the time all of the (180) grid wires are in place, the combined pressure of the 4.5 miles of wire on the surface will cause the arc to modify. **How much?** Normally the plumb lines will move approximately 1 inch forward (or positive) after the wire grid is installed.

Keep in mind that our maximum error when everything is completed must be less than 1/16th of a wavelength at the highest channel; or roughly (a tad under) 4 inches at 211.25 MHz. A 1 inch error across a 120 foot by 60 foot surface is tolerable, as is 2 inches. An example of what you might expect with the wire reflective surface added is shown here in tabular form. The bottom line here is that if you go **to the negative side** (i.e. fall short of the plumb line ground points) **by approximately 1 inch** during the truing exercise **prior to** installing the grid reflector surface, you will probably come out OK.

Installing The Grid Reflector Wires

There are probably several acceptable methods of installing the horizontal reflector (grid) wires. They need to be taunt and some provision needs to be made to allow them to be replaced if they give away in time. As shown in the photos of the angle-aluminum slotted to hold the reflector wires, the wires can be simply 'dropped' into the pre-cut slots (which are angled upwards for obvious reasons) and pulled across the full surface area; **diagram 20** shows one approach for 'stringing' say three support poles at a time. It is not wise to attempt to pull it across the full (approximately) 125 foot arc; it is difficult to keep control of the reflector grid wire or keep it taunt across the full span.

HIGH BAND LA at 174 miles, off of Ensenada Half-Bolic.

Another approach is to do one span at a time, say S4 to S3 (etc.) cutting the wire and wrapping it after each 4 inch separated grid is placed in and pulled taunt.

Another approach, widely employed in Canada where ice loading is a problem, is to place springs at one or both **ends** of the arc (say S4 **and** S4) and allow the springs to take up the tension when the grid wires load up with wind, ice or both. With 180 horizontal runs in the 60 foot vertical height that amounts to 360 'small' springs; not an insurmountable expense or additional work load, but one that you probably would not consider unless faced with difficult loading problems. In this case the wires should be free to move in the grooves on support towers S1/S1, S2/S2 and S3/S3 so the springs can maintain the tension on the grid wires.

The Focal Point Antenna

A detailed discussion of the focal point antenna parameters appeared in the January portion of this series. In a nutshell, the front horizontal lobe on the focal point antenna should 'see' the extreme edges of the 120 foot wide

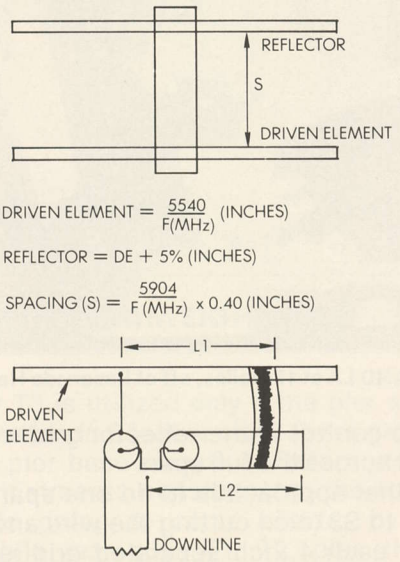
TYPICAL ARC PROOFS BEFORE AND AFTER ADDING REFLECTOR SURFACING

Measurements made per **diagram 19** and the text to verify the curvature of the half-bolic antenna after installation of support tubes but **before** installing grid wires (**SI-B, S2-B, S3-B, S4-B**) and **after** installing the grid reflector wires (**SI-A, S2-A, S3-A, S4-A**); and the type of change experienced (indicating movement amount and direction whether positive—towards the focal point antenna, or negative—to the rear). Note pressures exerted by the reflector surface wires are not totally uniform.

Support Tube	S1-B	S1-A	Diff.	S2-B	S2-A	Diff.	S3-B	S3-A	Diff.	S4-B	S4-A	Diff.
1	-1-1/8	-3	**-1-7/8**	-2	-3/4	+ 1-1/4	+ 1-1/4	+ 5	+ 3-3/4	0	+ 2	+ 2
2	-2-1/2	-2	+ 1/2	-2-1/2	-1-1/2	+ 1	+ 3/4	+ 2-1/2	+ 1-3/4	0	+ 3/4	+ 3/4
3	-3/4	+ 1/2	+ 1-1/4	+ 1/2	+ 1	+ 1/2	+ 1	+ 1-1/2	+ 1/2	-2-1/2	-2	+ 1/2
4	-1/2	0	+ 1/2	+ 3/4	+ 1	+ 1/4	+ 1	+ 2-1/2	+ 1-1/2	-2	-1-1/4	+ 3/4
5	-3/4	+ 1/2	+ 1-1/4	-1	0	+ 1	+ 2	+ 3-1/2	+ 1-1/2	0	+ 1/2	+ 1/2
6	0	+ 1	+ 1	+ 1	+ 1-3/4	+ 3/4	+ 1	+ 1-1/2	+ 1/2	-1-1/4	-1/2	+ 3/4
7	0	+ 1-1/2	+ 1-1/2	-2	+ 1/2	+ 2-1/2	0	+ 3	+ 3	-2-1/4	-1-1/2	+ 3/4
8	+ 1/2	-1/2	-1	-1	-3/4	+ 1/4	+ 1-1/2	+ 2	+ 1/2	-1	-2-1/2	**-1-1/2**

Note that **with the exception of** support tube 1 (and end tube) at the closest-in measurement, support tube 8 (opposite end of frame from 1) at the same measurement and support tube 8 at the furthest out measurement (see diagram 19), **all of the movement** was towards the front (i.e. towards the focal point antenna).

TWO ELEMENT (REFLECTOR, DRIVEN ELEMENT) FOCAL/FEED POINT ANTENNA



GAMMA MATCH FOR DRIVEN ELEMENT IS ONE APPROACH TO CONSTRUCTION OF FOCAL/FEED ANTENNA

DIAGRAM TWENTY-ONE

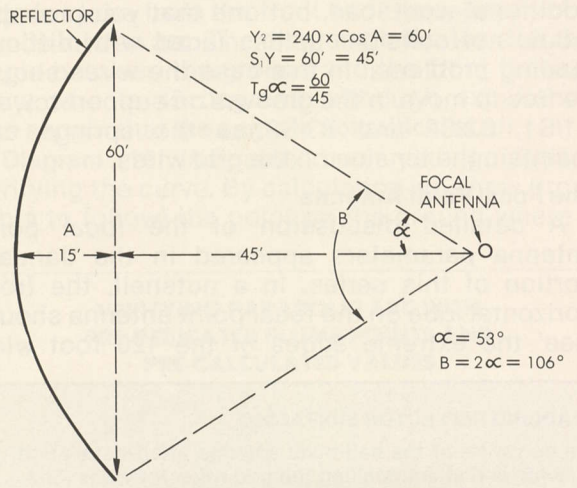


DIAGRAM TWENTY-TWO

reflector at the 3 dB (down) point on the focal point pattern.

This means that you **cannot increase the gain** of the antenna system by employing a **multiple-element** yagi or log as the focal point antenna; the additional (director) elements sharpen (narrow) the forward lobe on the focal or feed antenna and if you carry it too far the reflected signal arriving at the focal point antenna from the outer edges of the reflector is so far 'down' that it no longer contributes to the energy received at the focal point antenna. In a sense the outer edges of the reflector are 'wasted'. See part one in January for a full discussion.

Experience has shown that the higher in frequency you go, the more pronounced the focal **point.** That is, for low band VHF the signals tend to focus in an **area** up to perhaps a wavelength wide and from 1/2 to 3/4 of a wavelength high. The focal point antenna may be located anyplace in this 'region' and receive essentially the same signal. For high band the wavelength parameters are about the same but because of the shorter wavelengths the **physical area** where the signal focuses is **much smaller.** For UHF it **almost** becomes a focal **point;** that is, a move of a couple of inches will often result in big (3-6 dB) signal changes. Therefore you should always start off by installing first the focal point antenna for the **highest channel** to be received (or the highest band), optimize it in the horizontal and vertical plane, and then move down to the next lowest frequency range.

The most exact tests are made at the highest frequencies to be utilized. Here is where you will find the most precise focal point location and the most precise focal point antenna 'heading'. From these initial tests much can be learned about the construction integrity of the antenna. For example:

1) **If the focal point is not exactly in front of the antenna** (i.e. you find maximum signal left or right of the calculated focal point), this indicates you messed up in calculating the base line (i.e. the reflector is not perpendicular to the signal arrival path line at the center point on the reference line.

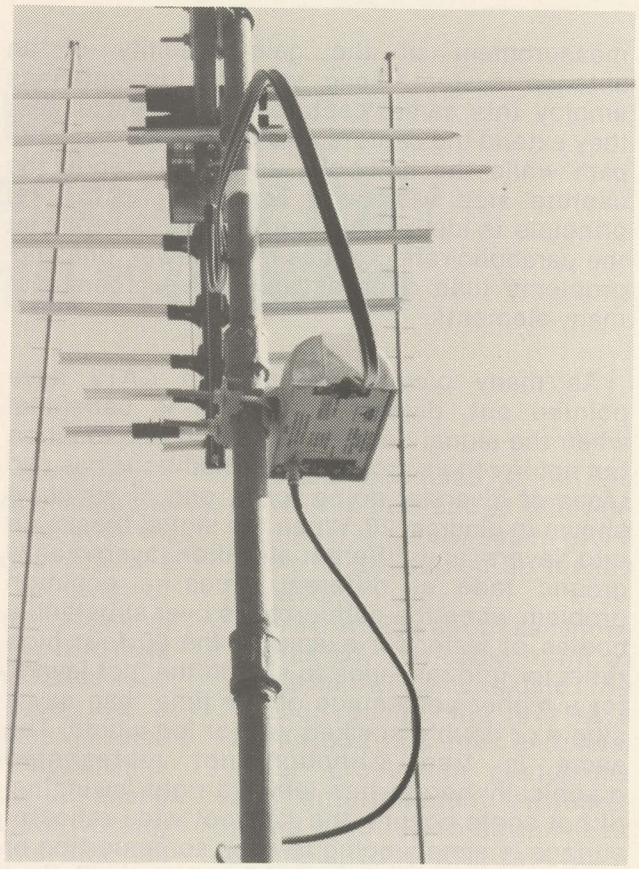
   If the descrepency is small (a matter of a wavelength or less), don't fret; you will be down a couple of dB in level from optimized gain.

The Focal Point Relationship With Aperture Size

For the full 60 foot high by 120 foot wide (aperture) antenna to function at optimum efficiency (i.e. maximum gain) the 3 dB points of the focal position antenna must be at the outer edges of the reflector surface. The focal length to diameter relationship (**focal length** is **distance** from reflector surface to focusing point, where the feed antennas are located; the **diameter** is the **width** of the aperture) or F/d of this antenna design is 0.5. That is, the focal length is 1/2 (0.5) of the diameter. A 120 foot diameter results in a focal length of 60 feet. The radiation pattern of a two element focal point antenna (driven element plus reflector) is calculated in **diagram 22;** it is approximately 106 degrees in the horizontal (side to side) plane. However, in the vertical plane it is approximately twice as 'tall' **as it should be** for optimized performance. For this reason optimized performance most probably comes from a stacked feed antenna consisting of a pair of vertically stacked two element yagi antennas (see discussion in January part one).

2) **If the focal point is down right on the ground** (i.e. the signal keeps getting **stronger** as you **lower** the focal point antenna), this indicates that either the ground slope is not adequate (hard to imagine if you measure it to start with) or the parabolic arc is canted forward (i.e. your arc-truing measurements with diagram 19 are not proper).
3) **Conversely, if the focal point seems to be too high above ground,** this indicates the arc cant is backward.
4) **If different channels from the same city** (and the same approximate transmitter locations) focus at widely different locations, seemingly as a function of frequency (i.e. low band focuses in one area, high band in another), this indicates the dish is considerably out of true from a true parabolic. Check the individual support tube arcs.

The transmission lines from the focal point antenna are best buried on into the headend, simply as a matter of good engineering practice. In any event don't run them across the aperture of the antenna above ground so they cross the region between the reflector and the focal point antenna. This would also be a good point to suggest that the front guy wires not be so long as to come close to the focal point antenna; keep them short enough so that they fall from 1/2 to 2/3rds of the way forward from the reflector grid surface towards the focal point antenna.



SIMPLISTIC LOG TYPE feed antenna with antenna mounted broadband (B-T) pre-amplifier.

The Pre-Amplifier and Signal Splitting

If you have only a single channel per feed antenna (i.e. one low band channel, and/or one high band channel, and/or one UHF channel), the **feed antenna can be optimized for that channel** and a single channel pre-amplifier inserted into the transmission line at the feed antenna. If you have **two or more** channels **per feed antenna,** some compromises must be made. The usual approach is to optimize the feed antenna resonances (i.e. design frequency) on the channel that measures lowest at the site, and then utilize a quality broadband pre-amplifier for the two or more channels per feed antenna.

The use of 'all band' preamplifiers on say **just** a low band feed or **just** a high band feed is a mistake; 'all-band' preamplifiers are hardly quality products to begin with, and unless you are using a single feed antenna for all channels (which is also probably a mistake) you should break your receiving segments up into low, high and UHF portions.

Signal splitting (i.e. into two or more equal parts) should take place inside of the headend where you will go into individual channel processing equipment.

Diversity

The effectiveness of the half-parabolic antenna is primarily due to its large 'capture area'; which is a handy, if not well understood, measuring stick for gain. Physical space interrupted by an antenna is a direct

FEEDLINES ARE CARRIED into headend buried from the feed antenna to the headend building.

measurement of the gain-capability of an antenna system. **Long** yagi or log antennas employ this same 'capture area' effect except they extend the capture area **lengthwise along the path** while the half-bolic antenna extends the capture area **width-wise across the path.** The principle is identical in both cases, except that the parabolic reflector has many fewer 'phasing' problems than does a yagi or log antenna of many elements.

As many previous articles in CATJ have pointed out, diversity reception is beneficial when the signal decides to fade in one location but not in others around it. The half-bolic has two types of diversity going for it, one of which is shown in **diagram 23.** When the signal breaks up into 'layers' and different elevation layers above ground fade at different times (a common problem when the path crosses over substantial bodies of water for example), the 60 foot high reflector grid manages to stay in the 'hot layers' for a higher percentage of the time than say a single or double stacked yagi or log would. The same is true (although not represented graphically here) when left and right 'swinging' of hot spots occurs; the 120 foot wide reflector surface is simply going to keep some portion of its surface inside of the arriving (but oscillating) wave front for a higher percentage of the time than will say a side by side log or yagi stack.

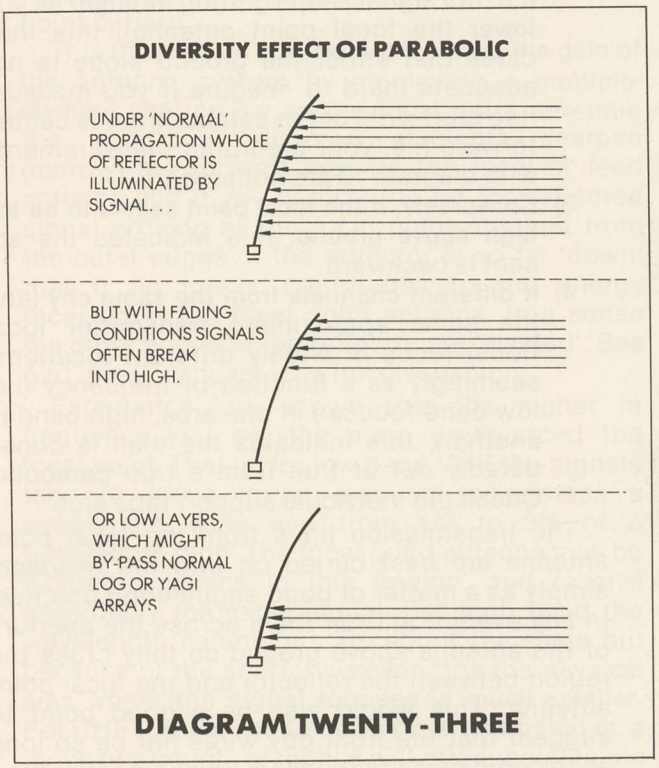


DIAGRAM TWENTY-THREE

Conclusion

Antenna system design for deep-deep fringe television reception has always presented the system designer with unique problems. **The half-bolic antenna,** like its brother antenna the full parabolic (see **CATJ** for **July 1974**) and its cousin the rhombic antenna family (see **CATJ** for **October 1976**) is one effective answer to far-beyond-Grade-B reception problems. Antennas of this type are in operation in Mexico's Baja California, directly south of San Diego at several locations. The designer of these antennas, Tony Frias, is available to assist others in designing such antennas for their own applications and he extends an invitation to other cable industry people to view the antennas in Baja California; the closest such antenna to the San Diego area is located in Tijuana (just south of San Diego), and Frias may be reached through Tijuana television station XETV (channel 6).

June First Is Start Date

FANFARE IS FIRST 'REGIONAL-APPROACH' PAY CABLE TO GO TO THE BIRD

Very Professional

The Houston, Texas based 'regional to the southwest' approach to satellite-delivered pay-cable programming is off and running. The wraps are off and from all outward appearances FANFARE is going to be a high class, very professionally run show with lots of excitement to keep the cable subscribers hooked up and loyal. That's the bottom line, and we give it to you up front because if you are too busy for details you can move off to some other reading material right now. What follows are the details of how FANFARE impresses us.

This is the third in a series of reasonably in-depth looks at the new-to-the-satellite-delivery-business offerings. In January CATJ looked at **SHOWTIME,** the national pay-cable product that went into regular service on transponders 4 and 10 on March 7th. Last month we looked at the **Home Theater Network,** that Maine-based firm that will be shooting at small cable systems and second level pay service in the bigger systems that perhaps will by their August 1 start date already have at least one higher-priced pay-cable service channel available.

Both SHOWTIME and HTN are national in scope. And while HTN is aiming primarily at the two eastern time zones, there has been a high level of interest in their product on the national level. FANARE throws away the book, says it "**. . .will not actively market the product outside of the five state area**" and promises that no matter how many systems may eventually end up taking their service outside of their five state target region, "**we will not change the regional concept nor will we sacrifice any programming of a regional nature**", in favor of more national-interest programs.

For the record, FANFARE is based in Houston, Texas (see 'Quick-Facts' box here), and is after CATV subscribers via satellite in the states of Texas, Oklahoma, New Mexico, Arkansas and Louisiana. At this writing (late in February) the firm has a firm start up date on SATCOM transponder 16 of June first when as a minimum systems in North Little Rock, Texarkana, Midland, Tyler, and Marshall (Texas) will inaugurate service. Doubtless, many other systems will also start up service either on one June or on July first when systems such as Fayetteville are scheduled to join the FANFARE network. At this writing some 17 southwestern CATV systems are signed up for the service.

FANFARE is about as 'showbiz' as any pay-cable outfit to come on the scene to date. The support behind the firm says Hollywood and film and television production companies and entertainment entrepreneurs from top to bottom. For example, FANFARE is a 'joint venture' between (1) Hollywood Home Theater, (2) Kenneth Schnitzer, (3) Pace Management and (4) MCI Productions. If few of these ring any bells, the credentials should set you straight.

Hollywood Home Theater is owned jointly by 20th Century-Fox, and United Artists; two

FANFARE

Ten Greenway Plaza Houston, Texas

Phone: 713/960-8731

FANFARE QUICK-FACTS

Company	**FANFARE TELEVISION**
Address	5 Greenway Plaza East, Suite C-290 Houston, Texas 77046
Telephone	713-960-8731
President	Jack L. Williams
Service	Seven nights per week, 7:30-12:30, southwest regional professional and college sports, first run for cable movies, entertainment specials
Satellite	SATCOM 1, transponder 16, starting June first
Uplink	RCA Houston
Rates	$4.75 per cable subscriber taking the service

SCHEDULE

Tuesday, February 7
6:00 Mother, Jugs and Speed (PG) 1:36
8:00 Spectrum Boxing
11:00 Racing from Keystone
11:30 The Omen (R) 1:51

Wednesday, February 8
1:00 Black Sunday (R) 2:23
6:00 Bound for Glory (PG) 1:58
8:00 Sixers vs. Indiana
10:30 Rocky (PG) 2:00
12:30 Jeremy (PG) 1:30
2:00 Sixers vs. Indiana *(replay)*
4:30 Racing from Keystone

Thursday, February 9
6:00 Buffalo Bill and the Indians (PG) 2:04
8:30 Black Sunday (R) 2:23
11:00 The Seven-Per-Cent Solution (PG) 1:53
1:00 The Ritz (R) 1:30
2:30 Harness Racing from Liberty Bell

Friday, February 10
6:00 The Slipper and the Rose (G) 2:08
8:30 The Eagle Has Landed (PG) 2:03
11:00 Racing from Keystone
11:30 CLASSIC: Stage Door Canteen 2:15
1:45 Burnt Offerings (PG) 1:56

Saturday, February 11
4:00 The Old Curiosity Shop (G) 1:58
6:00 The Seven-Per-Cent Solution (PG) 1:53
8:00 College Basketball: Temple vs. St. Joe's
10:00 The Last Tycoon (PG) 2:03
12:05 Demon Seed (R) 1:35
1:40 Seals & Crofts :60
2:40 Racing from Keystone

Sunday, February 12
5:00 Huckleberry Finn (PG) 1:58
7:00 Flyers vs. Washington
10:00 Black Sunday (R) 2:23
12:30 Buffalo Bill and the Indians (PG) 2:04
2:35 Racing from Keystone

(Continued on page 11)

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At precisely one o'clock on the morning of Saturday, November 6th, 1943, Heinrich Himmler, Reichsfuhrer of the SS and Chief of State Police, received a simple message: "The Eagle has landed." It meant a small force of German paratroopers were at that moment safely in England and poised to snatch British Prime Minister Winston Churchill from the Norfolk country house where he was spending a quiet weekend near the sea.

Based on the bestselling novel of the same name, *The Eagle Has Landed* is described by its author Jack Higgins as "fifty per cent documented fact and fifty per cent possible speculation." In the hands of veteran director John Sturges *(The Magnificent Seven, Gunfight at the O.K. Corral, The Great Escape, Bad Day at Black Rock)*, the film version is an intelligent, well-crafted and unbearably suspenseful action drama . . . with a star-studded cast: Michael Caine, Donald Sutherland, Robert Duvall, Anthony Quayle, Donald Pleasence, and Jenny Agutter. The tension is incredible during the movie's final minutes . . . with a final twist of the tale that's as logical as it is startling.

Feb. 10, 14, 18, 20, 23, 26, 28

SCHEDULE

Monday, February 13
6:00 The Slipper and the Rose (G) 2:08
8:30 The Seven-Per-Cent Solution (PG) 1:53
10:30 Burnt Offerings (PG) 1:56
12:30 The Sting (PG) 2:09
2:40 Racing from Keystone

Tuesday, February 14
6:00 Jeremy (PG) 1:30
7:30 The Last Tycoon (PG) 2:03
10:00 The Eagle Has Landed (PG) 2:03
12:15 Bound for Glory (PG) 1:58
2:15 Racing from Keystone

Wednesday, February 15
1:00 Demon Seed (R) 1:35
6:00 The Old Curiosity Shop (G) 1:58
8:00 The Omen (R) 1:51
10:00 Black Sunday (R) 2:23
12:25 Women in Love (PG) 2:09
2:35 Racing from Keystone

Thursday, February 16
6:00 Burnt Offerings (PG) 1:56
8:00 Flyers vs. Minnesota
11:00 Harness Racing from Liberty Bell
11:30 Buffalo Bill and the Indians (PG) 2:04
1:35 Flyers vs. Minnesota *(replay)*

Friday, February 17
6:00 Rocky (PG) 2:00
8:00 Sixers vs. San Antonio
10:30 The Car (PG) 1:38
12:15 CLASSIC: White Zombies 1:08
1:30 Mother, Jugs and Speed (PG) 1:36
3:10 Racing from Keystone

Saturday, February 18
1:30 Flyers vs. Detroit
4:30 The Slipper and the Rose (G) 2:08
7:00 Seals & Crofts :60
8:00 College Basketball: Villanova vs. La Salle followed by Wrestling—live
11:00 Racing from Keystone
11:30 The Eagle Has Landed (PG) 2:03
1:45 The Omen (R) 1:51

(Continued on page 13)

11

very significant forces in the movie production and distribution business. And in the pay-cable business, through HHT. The prime example of this is the Philadelphia (metropolitan) area regional (like FANFARE) operation PRISM. HHT owns 50% of this eastern microwave-integrated pay-cable network. HHT also is deeply involved in providing movies to various 'stand alone' operations; the type you run into in Hotel chains and Las Vegas.

Kenneth Schnitzer is a well known name in business circles in the southwest. He is Chairman of Century Development Corporation, a very large real estate development company and he holds the same position with Arena Operating Company, the firm that operates the 18,000 seat arena at Greenway Plaza, one of Schnitzer's developments in soutwest Houston.

If all of this looks like a pure investment for Schnitzer, think again. Because he is the majority stockholder in the Houston Rockets National Basketball Association team, the Houston Aeros World Hockey Association team and he holds an interest in the new Houston Hurricanes North American Soccer League franchise. Shades of WTCG's Ted Turner . . .the man probably sees FANFARE as an excellent way to build both at home and away audiences for his professional sporting team investments.

Pace Management is an entertainment booking agency. They create, build and promote everything from (rock) concerts and shows to motorcycle races in places such as The Summit, The New Orleans Superdome and the Houston Astrodome. All of which says they have an inside track on putting together shows and acts and gatherings which other people are ready, willing and able to pay good money to attend.

MCI Productions is (they say) 'the largest and most professional independent production company in the southwest'. They maintain full production studios for television programming at The Summit in Houston, along with production centers in Austin (the Texas capitol) and Dallas. You've seen their work on ABC Monday Night Football, Monday Night Baseball and various NCAA College Game(s) Of The Week.

This is the first venture into the cable arena for all of the participants with the exception of Hollywood Home Theater. But, as should be obvious by now, pay-cable is just another form of 'box office' and there is every indication this group from Houston has plenty of box-office-savvy going for them.

The FANFARE 'mix' is going to be a blend of movies (10 'encore' or brought back for another showing period, 6 'premiere' or new this month), sports (all sports will be built around the southwestern marketing region with heavy emphasis on not only the professional sporting teams that headquarter in the Houston area but college sporting events from throughout the five state area as well), and

entertainment specials. There will be a certain 'southwestern flavor' to the sports and entertainment specials, beyond the obvious use of southwestern area teams. For example there will be regular televising of horse races, high-southwest appeal entertainment specials ('Willie Nelson in Concert') and 'good old boy' television such as destruction derby auto races. The FANFARE transponder will be operating from 7:30 PM to approximately 12:30 AM seven days per week, 'R' rated movies will be run only after 9 PM and all times are CST/CDST because that is (with the exception of New Mexico) where their target area is.

If the product is appealing, and if transponder 16 is one of those transponders that covers the majority of the United States quite well (it is—see map on page 40-B for January CATJ), might not CATV system operators outside the five state area be intrigued with offering the service to their customers?

FANFARE President Jack Williams:

"It is very possible, especially in some of the Mexican border towns, that we might have a very viable product to sell. We have not discussed this possiblity with any CATV operators in Mexico to date, but is is certainly something we could consider for the future. It is also worth noting that we have had a very high level of interest from Alaska."

Alaska?

It makes sense after you think about it awhile. Alaska is in the middle of an oil-boom and Houston is home-base for many of the world's largest oil company firms. There are, it turns out, a very large number of 'transplanted Houstons' residing in Alaska; especially in the Anchorage area. There is nothing more appealng to a Houston resident away from home, it turns out, than the opportunity to 'keep tabs on home-town sporting teams'. Texas has never forgiven Alaska for coming into the Union and destroying the bigger-than-everyone else stories of old; this may be the perfect opportunity for Texas to get even!

Satellite Only Restrictions

PRISM, the similar-but-not-the-same operation in the Philadelphia area, is dependent upon terrestrial microwave and even some cable-links for its network. FANFARE will rely totally on the satellite. Protecting the gate is the problem; and **"CATV systems in the immediate Houston area will not be able to carry FANFARE because of contractural agreements with the various professional sport teams that will be featured on the service".**

With the recent announcement that Holiday Inns of America has joined forces with Ed Taylor's Southern Satellite Systems to form 'Holiday Satellite Systems' for the distribution of San Francisco's KTVU (starting August 1 on SATCOM 1's transponder 18) and the persistent 'rumors' that Holiday Inns will also take a second transponder for 'program delivery only to Holiday Inns', does FANFARE have any marketing plans to deliver their programming into such non-cable markets as San Antonio (or Dallas/Fort Worth) for motel, hotel or apartment distribution?

Jack Williams: **"That's a tough question. You can be assured that each individual variance** (i.e. other than cable) **will be thoroughly evaluated and the service will be provided wherever possible."**

Readers will recall that SHOWTIME execs John Sie and Jeff Reiss were quite adamant that even with their VIACOM television program production/distribution background that they would not be getting involved in 'company operated' production companies for non-movie programs. FANFARE takes the opposite approach.

Williams again: **"FANFARE will directly handle the production of all of its regional entertainment specials. This will not prohibit us from purchasing other entertainment specials, such as those produced by Columbia Pay Television, if we feel these specials would be of interest to our viewers."**

The FANFARE commitment to producing **regional** (and that word is stressed at every opportunity by Williams) is based almost solely on serving the FANFARE audience. Would specials and programs produced by their in-house staff be available for re-distribution by other pay-cable outlets or even broadcast outlets?

Williams: **"There are certainly opportunities to defray some of the production costs by second run syndication in other areas** (of the country) **or other markets. However the expenditures FANFARE will incur in producing these entertainment events will have been planned and budgeted** (for FANFARE alone distribution), **and, syndication of its products would strictly be auxillary income and will in no way affect our decision as to whether or not to incur the original production costs."**

Custom Marketing Service

Williams say he and Sandy Freeman (FANFARE's Director of Marketing) are very much 'aware' that no two cable towns offer the same marketing problems. **"FANFARE will work with each company to tailor a marketing package; the concept includes mass-media, direct mail, door-to-door and public relations approaches"** according to Williams. There are field representatives available to work with the individual system operators who need assistance in getting their (perhaps first) pay cable operation off the ground.

FANFARE has also taken on the legal and engineering assistance aspects of their potential affiliates; offering a 'cradle to grave' (no pun intended) assistance program that will, for first-time-users of satellites, allow the operator to simply 'order the system and service in' and then sit back and watch the pieces fly and the project come together. An arrangement has been worked out with another Houston based firm (Gardiner Communications Corporation) to provide 'turn-key' installation of terminals; through which both short and long term financing of the terminals can be arranged.

The FANFARE approach to the program guide will be similar to but different from say the

ONE OF FIRST SYSTEMS to contract for FANFARE service is United Cable Television Corporation's Tyler, Texas 21,000 subscriber system. Here United Prexy Gene Schneider (left) with United's Mark Van Louks (center) and FANFARE's Jack Williams (right) 'ink' the agreement.

HBO guide. The front and back cover will be four color, while the layout for the inside will follow the successful PRISM guide (an example of which is shown here). The guide will be prepared and mailed monthly, either bulk delivered to the cable system operator for mail out with his billing (if he so chooses), or it can be mailed by a computer billing service.

FANFARE is accepting **contracts** on a **one year basis** (and that differs from those now being offered by SHOWTIME and HBO). The FANFARE rate is slightly higher than either SHOWTIME or HBO although they do have an 'adjusting rate structure' that compensates for larger system operators. The FANFARE contract, like that from HBO and SHOWTIME, restricts pay-program delivery to 'private residences, homes or apartments'; commercial establishments are not 'fair game' for the service. The contract specifies that 'within any year' the program content shall include 'no less than' seventy-two feature films and one-hundred ten sports or special events' and the latter shall be inclusive of 'not less than twenty-five Southwest Conference (sporting) events, twenty-five Houston Astro (baseball) games and thirty Houston Rockets games'.

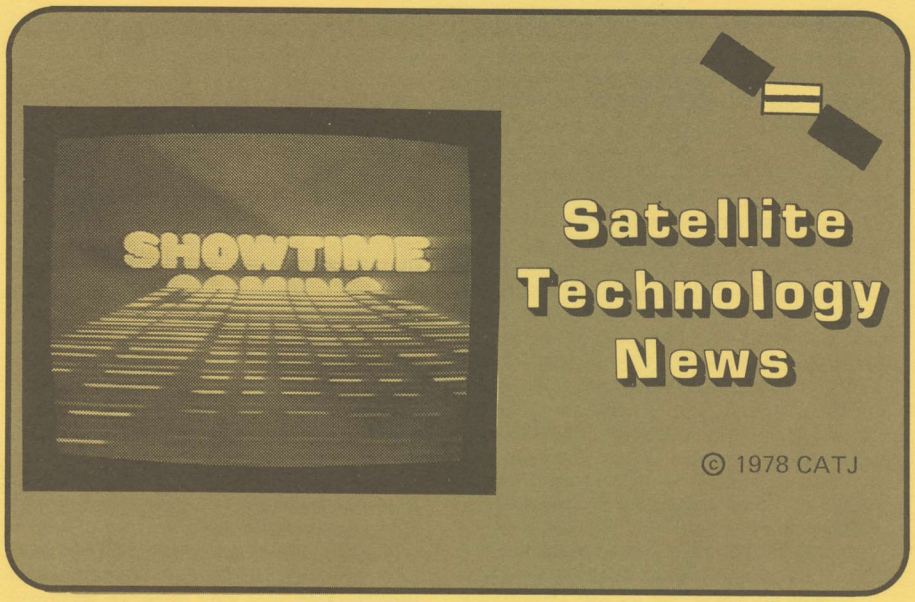
When does FANFARE expect to pass from the red ink to the black ink? The question is important because anyone contracting for expensive transponder time has got to be realistic enough to recognize that positive cash flow does not begin the first month (and probably not the first year).

Williams again: **"We project we will be profitable in the second year or early in the third year. The breakeven point will be attained when FANFARE is serving between 65,000 and 70,000 subscribers. However, the number of systems who have signed up to date to offer the service to their subscribers is running ahead of our projections so we might surpass our expectations by several months".**

. FANFARE, and perhaps to some extent the Home Theater Network program discussed in detail in the February CATJ, bring up the probability that before 1978 is over there will be a fairly extensive CATV system use of two (and perhaps more) pay-cable channels. VITEK's Bob Geissler, the firm that seems to have at least its share of the pay cable trapping market, reports their new 'multi-pay-service' trapping system is running so far ahead of their projections that he is very optimistic about the future of multiple-channel pay. VITEK traps (see CATJ for November 1976) are being ordered for two channels and in some cases in blocks of as many as five channels by cable companies getting into pay at this time. The CATJ 1977 Industry Marketing Study (see CATJ for November 1977) found that 45.94% of all cable systems planned to be offering (an average of) 2.18 pay-cable-channels by January 1 of 1979.

Indeed, some of the early affiliates of FANFARE already have HBO in place; and will be offering FANFARE as a second option in the pay channel area. Obviously many systems are figuring that there may well be enough regional identification with FANFARE that the system will appeal to people who do not perhaps find one of the 'national' services inviting.

And so yet another 'approach' to pay-cable programming is preparing to go into operation, via satellite. One June the first. A regional approach which, it would appear, will have both regional and national implications. If the PRISM terrestrial regional service can be deemed successful (and PRISM says it is), there is no reason why in areas of the country where terrestrial microwave is either lacking in facilities or is not cost-effective that satellite-microwave cannot do the job. **Will there be others to follow?** Nobody who might be in a position to say is saying, for sure; but there is the persistent rumor that if the sporting event coverage can be worked out to the participants satisfaction that a similar service may well be launched in the California/Arizona/Nevada area within a year or less; headquartered in the Los Angeles area and centered around Los Angeles area professional sport teams.



STN Statistics

Several significant things happened in the TVRO growth area of the CATV industry during the recently completed month of January; the number of applications received by the FCC topped 50 (53 actually) for the first time, and the number of channels being requested per applicant came back to almost the all time high of September (3.03 channels per applicant January versus 3.04 channels per applicant in September).

Also for the first time program sources (i.e. channels requested) began to move out of the familiar HBO/CBN/WTCG/ Madison Square Garden Events (MSGE) format with 9 applications for 'other channels of service'. These were primarily for SHOWTIME program delivery; and we'll begin a tabulation of such applications as a separate entry line with our April issue.

Using New Signals

The FCC has decided that if you already have an earth terminal license for F2 (or F2 and F1) that you may go ahead, **without FCC filing or permission or other paperwork** and add to your system any of the **CATV-authorized signals** on the bird(s) you are licensed for.

This simply means that if your license application originally specified HBO, for example, and you have determined that you wish to also pick up Madison Square Garden Events (for example) that you no longer need to file any paper work with the FCC to add the new signal.

There **are** two restrictions:

1) This 'open bird' policy extends only to those signals which are being carried on the bird for delivery to CATV systems (i.e. tapping into the NBC sports feed on transponder 16, for example, on a Sunday afternoon is still a no-no);
2) This policy only affects satellites which you have been cleared to use (most systems applied for F2/SATCOM II, and, for F1/SATCOM I as a 'backup' bird), not for example any CATV type signals that might pop up on WESTAR II.

If you have been thinking about using signals from WESTAR II, and your present license does not cover use of WESTAR II (virtually none do), the first thing you need to do is to go back to your frequency coordination company for a new set of frequency coordination numbers for WESTAR II. With interest in WESTAR II coming on fast it is suggested that anyone now in the process of making his interference coordination studies include WESTAR II in his studies (along with F1 and F2 of SATCOM) just so that much is done and out of the way should you later decide to add one or more signals/transponders from WESTAR II to your system.

The F2 to F1 Move Date

As reported in CATJ for February (see page 35) the options open to RCA for 'the move' were (1) either the first of a month, or, (2) the middle of a week. As it turns out, neither seem to be likely.

On February 23rd RCA and HBO got down to serious discussions on how the move would take place. An earlier 'forecast' date of **May 1 was tossed out** because of the conflict with the New Orleans industry convention. A later date of **'sometime between May 15th and June first'** was reached and a firm set of move dates will be worked out around the 10th of March.

When the move takes place, RCA will dual feed HBO (and probably SHOWTIME) to **both** F1 and F2 birds for several days time. That means that when you switch over your terminal to F1 anytime after the 'move period' takes places, you'll find the HBO (and probably SHOWTIME) signals there waiting for you. **Dual feeding of other uplink sites** (Atlanta's SSS carried WTCG/WTBN for example) are very **un**likely simply because RCA does not have two uplink antennas (or transmitters) available at such sites (it's the old you can't be pointing at two-birds-at-once problem).

The CATJ Lab did some engineering measurements of the F1 v.s. F2 C/N ratios late in February and we found that on transponder 8 on both birds (just as a prime example) we had a (worked backwards) 35.9 dBw EIRP level on F1 versus a 35.8 dBw EIRP on F2. The maps published on F1 and F2 contours in Coop's Cable Column for last January have been superceded by a 'beam tilting' or 'bore-sighting' exercise at RCA. F1 has been 're-adjusted' so that its boresight point is no longer 'way out west' in Idaho; now falling closer to Omaha. The end result is that dBw EIRP contour levels for F1 are now equal to or even slightly greater than the contours published for F2 in places such as Boston or central Florida. We'll have an updated set of maps for you in the April issue.

If the moving day sequence is available in time for our April issue, we'll have a full report; if not, it should appear in the May issue.

CATV TVRO STATISTICS—FEBRUARY, 1978

Applications Filed/FCC	Nov. 1977	Dec. 1977	Jan. 1978
1) 11 meter	0	0	0
2) 10 meter	0	0	0
3) 6 meter	4	11	12
4) 5 meter	9	11	28
5) 4.5 meter	6	4	13
Total Apps	**19**	**26**	**53**
Cost Max.	$96,000	$67,224	$61,172
Cost Min.	21,456	25,243	20,000
Avg. Cost	**36,328**	**36,843**	**37,166**
Channels Requested	46	70	161
Average Channels	2.42	2.7	3.03
Requesting WTCG	14	24	40
Requesting CBN	11	20	41
Requesting HBO	15	17	37
Requesting MSGE	3	9	29
Avg. Cost Per Channel	**$15,011**	**$13,645**	**$12,266**
TVRO's Licensed/FCC	32	40	**39**

Note: Data compiled from FCC sources, adjusts forward one month with each issue.

ASN Update-III

As reported in Satellite Technology News for February (page 37) ASN (the **AmeriCom Satellite Network)** folks appear to be getting serious about providing multiple channels of service on WESTAR II (123.5 degrees west, the next 'to the right' from SATCOM II).

The latest word is that ASN will be demonstrating in New Orleans, at the April 30-May 3rd industry gathering, 'limited hours of three satellite relayed independent signals' plus full time service on their 'M Channel' movie and information channel.

ASN reached agreement with Western Union on February 16 with a formal contract signing expected sometime before this appears in print. The agreement calls for ASN to utilize four of the WESTAR II transponders to relay the programming of:

1) **KTTV, channel 11, Los Angeles** (an independent that is heavy in LA area sports);
2) **WGN, channel 9, Chicago** (another independent that is generally rated as 'the best indie in the nation');
3) **WOR,** channel 9, New York (city) (yet a third independent, well rated and heavily into New York area sports).

ASN will also be providing 'M Channel', a combination movie and information channel which will be programmed with everything from new for pay cable (i.e. first run) P and PG movies to 'Movie Classics' (i.e. Cassablanca), financial and wire service alpha-neumeric displays and special events.

Present ASN plans are to have the four channels on WESTAR II, for display and show purposes, for 'approximately four hours per day' during the period of the April 30th-May 3rd New Orleans convention.

WESTAR II is a 12 channel (transponder) bird and the ASN package will initially tie up 1/3rd of all of the transponders on the bird. The bird is also where SIN (Spanish International Network) relays programs to affiliated television stations throughout the United States (see page 36, CATJ for February). The WESTAR II footprint is from 1 dB stronger (example: Memphis) to 1.5 dB weaker (example: Seattle) than SATCOM II (I) footprints in the United States. Because of its transmit antenna configuration, there is a 37 dBw contour on WESTAR II that runs roughly north by south from east central Illinois/ west central Indiana down to Mobile, Alabama (see page 17, September 1977 CATJ for contour map).

Cable systems wishing to utilize the ASN channels (1 to 4) may wish to start the 'wheels moving' towards getting WESTAR II onto their present or pending TVRO licenses. Systems with a license (or CP) in hand will have to go back through frequency coordination for the WESTAR II bird; systems still in the frequency coordination phase might be well advised to **have WESTAR II added to their coordination package** so that should they choose to add WESTAR II signals to their system they are not faced with the long turn around of frequency coordination and FCC licensing for the new 'signal source'.

We'll have a detailed report on the ASN 'program' in the April CATJ.

Transponder List Update

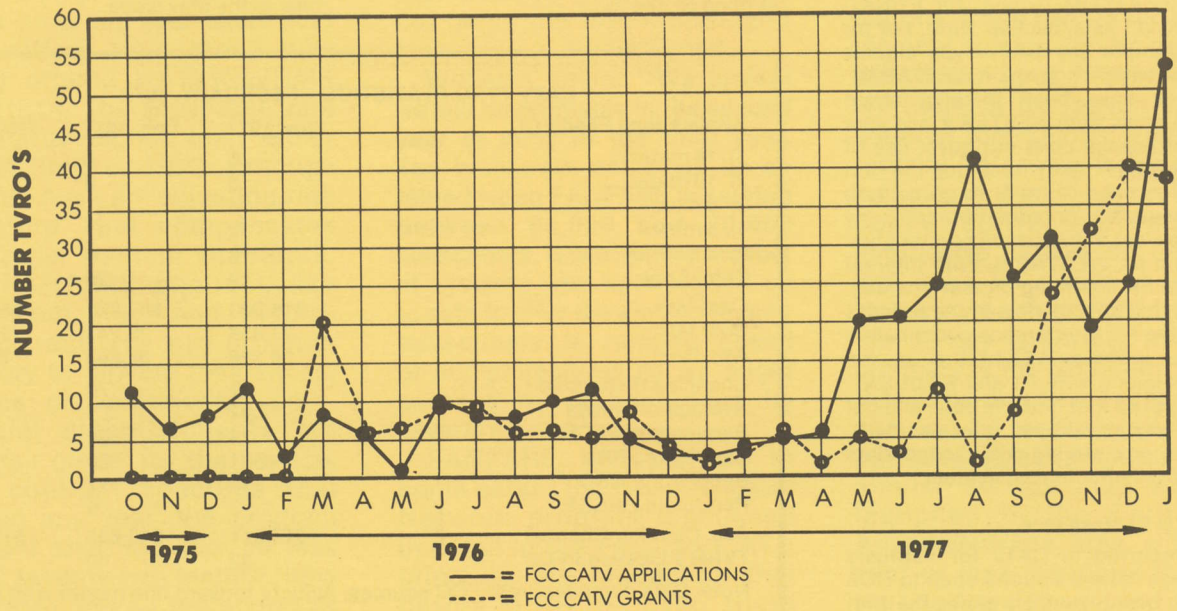
The data to follow is current through the end of February. It is provided for your reference in maintaining alignment and making initial tuning of your CATV TVRO.

The transponders are SATCOM II (F2), located at 119 degrees west, first number is transponder, second column is user:

2 **PTL** (*)
4 SHOWTIME east/central (**)
6 WTCG/WTBN
8 CBN
10 SHOWTIME rockies/pacific (**)
12 'broken'
14 Trinity Broadcasting (***)
16 FANFARE (6-1-78 start F1)
18 KTVU/HTN (8-1-78 start F1)
20 HBO rockies/pacific
22 Madison Square Garden Events
23 Alaskan Video (****)
24 HBO east/central

-PTL** is now formally set to begin 4-1-78. The installation of their uplink station has run into some local zoning ordinance problems which has delayed the construction of the uplink station. *-SHOWTIME** on transponders 4 and 10 should have begun regular service the evening of March 7th. *****-Trinity Broadcasting** will **either begin** on transponder 14 on May 1, **or,** on the same transponder on F1 as soon as the F2 to F1 move is completed (see separate report here). ******-For those equipped to check **vertically polarized transponder 23,** you will find video going to Alaska (in both the standard format with 6.8 MHz audio, and in the standard video format but with SCPC audio over on transponder 3) from 8-10 hours per day (typically 0700-1800 EST). You will also on occasion find half transponder video (two video signals) going to Alaska in the same period. **In the evening hours** (EST) you will find the intra-state Alaskan video feeding back from mid-route station Anchorage to Bush

TVRO DEVELOPMENT PROGRESS—THRU 1/28/78



Country terminals using a 'reduced bandwidth' 25 MHz video format (with audio over on SCPC on transponder 3).

If you want to check out signals on F1 prior to the move, look on **transponder 8** usually during the evening hours (5-7 PM EST) or on Sundays 3-7 PM.

CATV To Stay With RCA

As reported in some depth in the February **Coop's Cable Column** (page 44), there was a move afoot during December and January to get some or all of the CATV 'traffic' moved off of RCA's SATCOM family of friendly transponders over to the equally friendly skies of WESTAR. And as noted at the end of the February column, when all of the shouting was over, all parties returned to their almost original positions with CATV and RCA friends once again.

In the end the decision came down to channel capacity. In a nutshell, with the existing birds in orbit RCA has **twice the available channel capacity** as Western Union, on a bird for bird or a sum-of-all-birds basis (either way, take your pick). And because CATV appears to need growth room more than it needs other things for the immediate future, the decision to stick with the 24 channel transponders of RCA was the sound one to make.

In the process of running both RCA and Western Union through the 'mill' all over again (bidding against one another for the CATV traffic), the leader of the effort (HBO) did manage to get for CATV some lower transponder rates. And this works out to the betterment of the industry for the near future. For example, the first year rates for the new (ten year) contract period are as much as 50% lower than the rates would have been for the coming 12 month period under the older established tariffs. **Long term the rates end up being about the same** over a ten year period, but with lower 'going in rates' that means that some of those marginal transponder users who have been reluctant to take the big step (i.e. actually sign a contract with RCA and put money up) can now get on the bird for about half (initially) of what they would have paid previously. The appearance of San Francisco's KTVU, as an example, on August 1st is now doubly assured. Rather than needing 500,000 'sign-ups' to throw the switch, Ed Taylor and Holiday Satellite Systems can now feel quite comfortable with around 250,000 pre-sign-ups. This same rate reduction **should** also effect other potential users such as United's carriage of WGN (Chicago) and perhaps others who have been having problems getting enough 'signatures on the line' to cover their operating costs.

Another out-growth of the new contracts with RCA is the direction HBO **appears** headed. HBO will be utilizing a third transponder on SATCOM I (after the move), in addition to their use of transponders 20 and 24. HBO appears headed for a **different type of program channel** with channel number three for the firm and some have **speculated** that they **may** be planning to offer a 'second tier' of service (such as a half-rate pay movie channel) on their third channel. Such lower-rate channels have shown considerable success with tape-fed systems (Bestvision being one example of this successful format) and the Home Theater Network's use of two hours per day, five days per week of the KTVU transponder (see **CATJ for February,** page 28) is another example of how this type of service will be offered to the CATV industry. Yet a third example, the American Satellite Network program, is on the horizon (a full report on the ASN plan will appear in these pages for April).

Snow Creating Snow?

All of the text books tell you that if you distort the parabolic curve of your TVRO antenna by some fractional portion of an inch the gain of the antenna goes down. One reference work, for example, suggests that if the parabolic form is distorted by 0.010 of an inch the antenna gain will fall off by 0.1 dB; if the same antenna is distorted by 0.050 of an inch the gain will fall off around 0.7 dB. It is interesting to note in passing that most 4.5/5/6 meter antennas fall between the 0.010 and 0.050 (inch) tolerance range with installed antennas.

Now if the antenna skin tolerance is modified or pushed out of tolerance by say 0.10 inch the gain falls off by around 1.6 dB while an 'error' on the skin of around 0.250 (1/4th of an inch) can cause a theoretical loss of around 4.6 dB. This assumes, of course, random variations across the surface and in the real world the loss of antenna efficiency may be less (but probably not more) than these theoretical values.

Distortion of the dish skin is simply a change in the distance between the surface at some descrete point and the focal point; a change that shortens (or lengthens) the close tolerance **proper distance** between the two points. At

4 GHz a very small change can bring very large wavelength sections into play and ultimately affect the phase (or time relationship) between the antenna's reflection skin and the feed antenna.

One way to distort a dish is to push in or out on the surface. Another way to distort a dish is to place something on top of the surface; something that is not passive to RF signals. Wet snow is a good example of this, as several dozen systems found out during the big mid-winter snow storm that hit all across the nation's mid-south and up through the northeast just after the middle of January. Based upon observations from systems in the field, here is what we found happens when a heavy snowfall occurs:

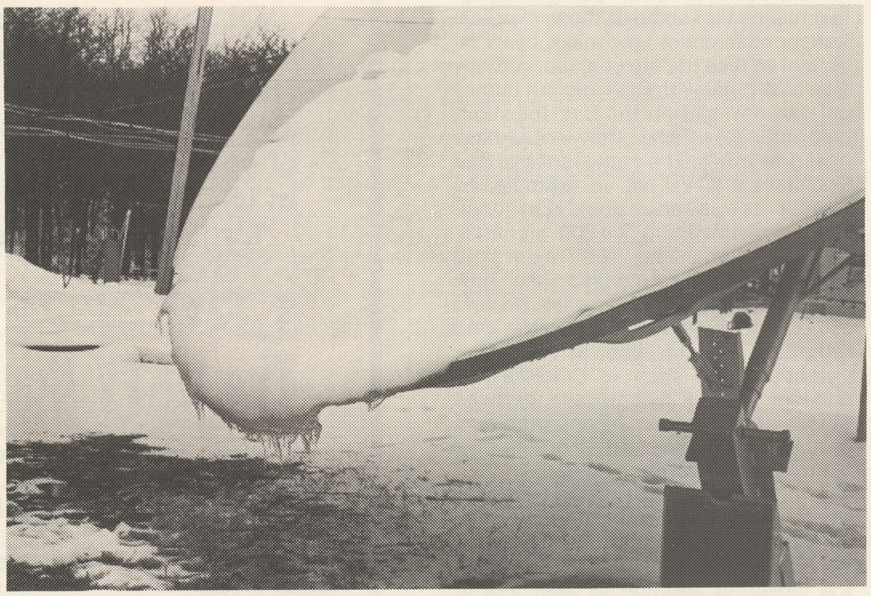
1) **Several systems reported** that while the snow built up (it was initially a dry snow without high moisture content in most areas) they watched the signals fully expecting the snow piling up on the lower half of the dish to create problems.
2) **Most report that they noticed no visible degradation** with the snow accumulating to as much as 4-5 inches on the parabolic's lower surface area although one system operator checked his C/N **after** a five inch build up and he felt 'comfortable' with a reading that indicated his C/N **had deteriorated** by around 0.5 dB with that much build up.
3) **Some systems took the time** to sweep the snow away **after** it stopped falling; most report they didn't notice any bad effects so left it alone. One noted **"It looked so pretty I hated to distrub it"**, a passion for beauty he was to later regret.
4) **When the warm-up finally did come** (it was up to a week after the snowfall in some areas) the problems began. Mike McKee of Chickasha Cablevision in Chickasha, Oklahome (which is normally not in the 'snow belt') had typical 'problems' with his 5 meter terminal. **"I first noticed sparklies on WTCG's system channel around noon. The temperature outside was around 30 degrees. It wasn't bad enough to really be bothersome, but I noticed it myself. By 2 PM the sparklies were plain annoying and we started getting complaint calls. I re-checked the signal at my home and then headed for the tower site. I fully expected to find an LNA on the fritz."**

"That was the quickest 7 dB 4 GHz fix I ever experienced" notes McKee. **"As soon as I scrapped the snow off with a hunk of 750 cable lying near the head end the C/N came right back to where it should be."**

The wet snow, laden with lots of water, had of course caused the effective skin reflector surface to rise up by someplace between zero inches and the approximate 1 inch depth of the snow itself. This 'distortion' of the surface accuracy along the lower portion of the antenna was enough to, in McKee's case, cost him 7 dB of precious C/N on the 4 GHz downlink signal.

A similar experience at the CATJ TVRO lab site cost us 4 dB of C/N with around 40% of the dish's lower surface covered with between .7 and .9 inch of very wet snow.

So a word to the wise. Snow on the dish may be beautiful, and it may not even be visibly harmful **while it is falling** or right after it falls. But sooner or later, as it melts and compresses into a thick blanket of water, there's trouble ahead for you. **So scrape it off after the storm** or you may end up like McKee spending a couple of hours on a Sunday afternoon chasing around during a 'warm-up' when you could better be doing something else!



MAYBE 6 dB OF SNOW?—Wet, compressed snow hanging on the lower half of a TVRO antenna distorts the true dish reflective surface causing loss of C/N and the appearance of sparklies at a terminal previously well 'above the noise'.

TECHNICAL TOPICS

Intriguing Haiti System

"I have seen very little mention in CATJ of systems operating outside of the United States and Canada, although I know that CATJ is well read in dozens of countries. I wish to congratulate you for producing such an informative and timely publication; it certainly helps us run our system here in Haiti!

Our system has approximately 10,000 subscribers. We bring programming to Haiti on tape, film and are exploring satellites. Programming comes from the United States, Canada, Germany and France. We utilize two channels for program distribution (channels 2 and 4). Channel 2 is utilized for French language programming (the official language of Haiti) while channel 4 is reserved for English and some occasional non-English programming. We plan to activate channel 6 with completely local programming sometime this year and are giving some thought to using channel 3 for (European and American) data services such as stock market reports, news channel material and the like.

For our distribution plant we used Jerrold and Anaconda modulators, Jerrold Starline 1A and some Sylvania and Kaiser amplifiers. We also have been adding Jerrold SLE300 line extenders of late and Com-Amp trunk and line amplifiers. For passives we utilize Jerrold splitters, directional couplers and multi-taps, plus some Anaconda multitaps. We have also begun using GAMCO passives recently.

This is quite a big system with bilingual subscribers. Because (at the moment) we take no signals off the air, it is more of an European design system (with everything originating at baseband rather than at RF) than an American/Canadian design system. I hope to be able to make the CATA/CATJ CCOS-78 meeting in Oklahoma this summer where I can meet and talk with other CATV system operators."

Tele-Haita S.A.
Port-Au-Prince, Haiti
West Indies

CATA-atoral Agreement

"The last paragraph of your January 1978 CATA-torial expresses so well one of the many reasons why I started Home Theater Network, a cable operator's pay cable package developed from repeated subscriber comments regarding price and quality.

Soon there will be a **choice** of Pay TV programming available to cable subscribers. That won't remove early-evening R's (from the cable screen) but at last there'll be another channel to turn to, another uninterrupted movie to watch."

Peter M. Kendrick
President
New England Cablevision/
Home Theater Network
Portland, Maine, 04101

Mr. Kendrick's remarks are directed at the point made in the January CATA-torial that perhaps **pay-cable is attracting something like 15% of the cable homes passed because only 15% of the homes want R and other potentially controversial material on their picture tubes. The Home Theater Network satellite fed channel was discussed at some length in the February CATJ.**

Wants More Material

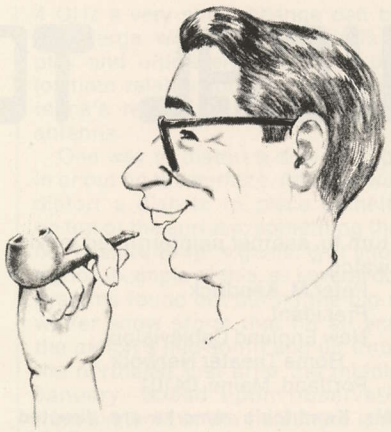
"Although I believe our CATV company has received virtually all of the issues of CATJ, we don't seem to have all of the copies on hand. I would like to avail myself and my co-workers of a full set of CATJ. Can you advise which back issues are available?

Would it be possible to prepare an article on CATV history, starting with the Astoria, Oregon system and going through tubes and transistors and all that has happened up to and including HBO? Do you have available a review or listing of past subject matters treated by CATJ?"

Lloyd A. Bushnell
Corvallis TV Cable Company
Corvallis, Oregon 97330

CATJ recently did some office rearranging and found a limited number of several early issues tucked away in a corner. At a price of $1.00 each, we have the following issues available: 1974—August, September, October. 1975—March, April, May, June, August, October, November and December. 1976—May, June and July. The 'best history' of CATV (and associated broadcasting development) in the United States appears in our March and April 1975 two-issue set. **In our April 1977 issue we carried a chronology of all subject matters treated to date (starts on page 40); we'll do another updated version in our May 1978 issue. Anyone wishing to pick up the issues listed here may do so by sending $1.00 for each copy requested to the attention of: Janet Stone, CATJ, Suite 106, 4209 NW 23rd, Oklahoma City, Oklahoma 73107.**

Coop's cable column



bob cooper editor in chief
CATJ

Small v.s. Smaller

Down in Garland, Texas at the plant facility of Scientific Communications, Inc. there sits on the east side of the building a ten foot parabolic antenna directed approximately 45 degrees above the horizon. Inside of SCI there are TVRO receiving units running, off of the ten foot dish. On the dish is a 100 degree Kelvin LNA. The pictures from SATCOM II are very good, on this ten foot dish.

The gain of a ten foot Prodelin parabolic is 39.4 dBi and the gain of the 4.5 meter is 42.9 dBi. The net difference between the two, according to the published specifications, is 3.5 dB.

For many CATV earth terminals located in the 35/36 dBw EIRP contours the received carrier to noise runs between 3 and 5 dB above the receiver threshold (the point where you begin to see sparklies on saturated reds). It can be said with some confidence that the difference between a ten foot and a 15 foot antenna is just about the same as the 'FCC margin' required (approximately 3 dB) for a license-able terminal.

There is some evidence that the approximately-3-dB FCC mandated margin may be 'generous' in the direction of being 'fat'. The 3 dB 'margin' is a sum of many small 'possible' degradations that 'might' creep into a system. The FCC assumes, in arriving at the approximately-3-dB number that **all possible degradations** that could in fact occur might occur **simultaneously.**

And there are two sensible approaches to improving the margin. The most obvious is of course having more signal to work with; another way of saying 'make the antenna bigger'. Another equally promising technique is to lower the receive system noise figure by utilizing lower (and lower) noise front ends.

There are other factors at work as well. On the negative side, as the antenna becomes smaller the 'noise threshold' for the system becomes higher. In other words noise contribution to the system from space noise sources, the earth noise source and so on becomes more substantial; a function of antenna beamwidths. As the front end noise figure goes down (with better and better LNAs) the antenna noise temperature comes up (with smaller antennas) so that you reach a point where additional improvements in LNA noise temperature or noise figure will result in no additional improvements in carrier to noise.

On the positive side, there is considerable evidence that if a person is willing to make certain design changes in the receiver, and allow certain tradeoffs, that PLL approaches to receiver IF bandwidth can produce some outstanding carrier to noise ratios with **very** low input signal levels. A number of people are working on PLL driven IF systems that limit the IF bandwidth to as little as a few megahertz; the IF bandwidth collapsing and expanding as a function of the video information present. A private terminal designer in Great Britain is producing watchable pictures from an Intelsat bird delivering an EIRP over his 8 foot dish terminal in the 26 dBw region. It is not commercially saleable video now, and with the bandwidth limitation it may never be commercial. Audio has to be recovered with a second IF system and color is impossible with such bandwidth restrictions. **But given the option** between black and white only pictures and sound, and no television reception at all, there are many areas of the world where the black and white service would prove very impressive indeed.

There are other tricks possible. A well known TVRO antenna manufacturer recently 'lashed together' a pair of under-15-foot TVRO antennas much like you might 'stack' or 'phase' a pair of VHF logs or yagis. He was primarily interested in creating a 'steerable antenna pattern' to put a 'notch' towards a terrestrial signal source, just as you might purposefully space VHF yagis or logs to eliminate an undesired co-channel source. The stacking 'process' resulted in a net improvement of between 2.1 and 2.5 dB in the carrier level from the SATCOM transponder. So 'stacking' antennas is feasible (few ever questioned that it might not be), although stacking has some problems of its own at 3.7-4.2 GHz. To put both sets of antenna-signals in phase you have to employ microwave type 'line stretchers' to 'fine tune' the two antennas into an additive-phase condition. The phasing sections are so frequency-critical that when the system is properly tuned for say transponder 6 the signals are out of phase only a couple of transponders away (say 10). Stacking, then, employing more or less standard technology is extremely narrow band in its application.

The bottom line on all of this is that there is no complacency in the TVRO technology area. In spite of there presently being a 'land-office' business level presently in TVRO terminal equipment there is apparently no resting on laurels.

A very large number of people, both private and commercial, are gearing up for the 'next land rush' in TVRO terminals. It is generally anticipated that the next land rush will be in the private (i.e. non-commercial) area. Most people believe it will come when there are operating satellites with programming material readily available in the K/Ku or 11/12 GHz bands.

The 11/12 GHz band satellites are without question the 'next generation'. To date tests run utilizing quite high power transponders (most in the 55 dBw EIRP catagory which is some 20 dB higher than our present SATCOM/ WESTAR 4 GHz birds) verify that with those types of downlink power levels small(er) antennas and less-costly receivers do in fact work very well. In the 1978-1981 time span, however, there is very little (if indeed any) liklihood that satellites operating in this frequency range will be transporting television programming of a mass appeal level to receive terminals in North America. Perhaps in Japan, and perhaps in Europe there may be such use of this band for this purpose, but for North America the odds are poor indeed. The **problems are primarily political.**

This says that if wider use of television programming via satellite is to come about in North America it will for the next half to one decade be forced to evolve **in our present 3.7-4.2 GHz region.** There is no point standing on a corner waiting for a bus to come along if the bus is not running. And that's where 11/12 GHz appears to be for us right now.

Political and legal considerations aside for the moment, what are the chances of extremely cost effective (meaning cheap) receive-only terminals evolving for the 3.7-4.2 GHz range? We think quite good. As the next (April) issue of CATJ will discuss in considerable detail, private terminals already exist in some number. Most have been put together following scaled-down CATV terminal technology and frankly those we have seen play are interesting scientific curiosities or monuments to the ingenuity and tenacity of their builders, **but they are not a commercial threat to anyone** or any established service.

However, as with any endeavor there are some people who are more clever than other people and the 'build it yourself TVRO crowd' has at least a handful of extremely clever people at work. Some come out of the TVRO industry; they are taking their vocation 'home with them' and on their own time playing with some schemes which probably fall on deaf ears at work. Many others have no background in formal TVRO technology, and these are often the most productive people because nobody has ever told them "hey, you can't do that". Absent such negatives they are setting out on paths uncharted to date and finding out what will and will not work on their own.

It all makes a most interesting study at this point in time and it all comes together in the April issue of CATJ.

While the hardware pioneers are tackling the matter of bringing TVRO costs down, there are some political pioneers at work as well. A case in point is Cânada. Our Canadian readers (and there are some 900 or so of them!) have been amazingly patient to date with **our pre-occupation** with DOMSAT (domestic satellites) here in the U.S. arm of the CATV industry. The Canadian's pioneered the 'forbidden fruit' CATV concept in the early 1950's when they began building massive (by our standards) CATV off-air VHF antenna systems to pluck weak, faltering U.S. television signals out of the air for the enjoyment of Canadian home viewers. Canada, as a nation, was an early pioneer of satellite technology with its ANIK series of domestic satellites. Unfortunately the Canadian approach to satellites has to date foreclosed Canadian CATV system use of satellite signals; **legally.**

This 'thou shall not use' policy appears to be headed for some type of limited change before summer. Quietly, with very little (if in fact any) fanfare there have been isolated situations where existing ANIK dedicated Telesat-of-Canada terminals have been 're-arranged' to bring in one or more U.S. domestic transponder signals. Some of these efforts have been short-lived, others continue to this day. There is at least one 'private' (meaning non-Telesat) TVRO terminal in operation in Canada providing ANIK service to a small cabled community which without the ANIK service would have no television at all.

Perhaps in response to this 'private initiative' the Canadian Ministry of Communications has been reviewing the present policy which restricts earth terminal ownership to the quasi-government run Telesat of Canada group. The present policy says that no-one may own and operate a terminal in Canada **unless** the terminal is owned and operated by Telesat. Telesat has a number of delicate political balancing acts going and the bottom line is that CATV use of ANIK has always been 'possible' but 'not practical'. Getting a CATV TVRO program going in Canada has been impossible under the present rules; obviously a person or concern is severely restricted if he can't get a terminal.

We see this changing. Perhaps before summer officially begins. And while it is unlikely that Canadian CATV systems will suddenly be allowed open and free access to both ANIK and U.S. DOMSAT signals, it is likely (in our view) that **some** Canadian communities will be granted official permission to access **some** U.S. DOMSAT signals. Likely such permission will come first for those communities where **no** U.S. signals are available off the air, either direct or via terrestrial microwave. Then, if our crystal ball is on target, U.S. non-broadcast DOMSAT signals (such as HBO, SHOWTIME, FANFARE, etc.) **might** be allowed under **some** circumstances in (again) **some** communities.

If indeed there are such policy changes coming for Canadian accessing of U.S. domestic satellites, it follows that the door may **still** be open a crack for the reverse path as well; U.S. accessing of Canadian DOMSAT signals.

All of which says that when you are dealing with a highly fluid technology, there is no such thing as a 'status-quo'. Change is everywhere about you and unless you are willing to stay current with the changes as they occur you are probably in the wrong business.

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.

Unique Farinon TVRO Installed

Farinon Electric has completed a turn key earth receive terminal for the CATV system serving the community of Sea Ranch in Sonoma County, California. The TVRO is 'completely automatic', receives signals from SATCOM and provides subscribers to Redwood Empire Cable Madison Square Garden Sports, WTCG and CBN.

The installation has a motor driven antenna positioning system so that the 4.5 meter terminal antenna can either be re-adjusted for any possible satellite drift or move to accomodate bird changes. Farinon created the complete system, including the full headend system, in a portable 8 by 16 foot building. The headend system was designed and wired up at the Farinon facility in San Carlos, California, and then moved to the site, dropped on the pad and turned on.

Mid State Two Channel

Mid State Communications, Inc. (174 South First Avenue, Beech Grove, Indiana 46107) has announced a rather innovative two channel installer type signal level meter that combines Ohmmeter functions which are often required when installing drop cables in multiple outlet buildings.

The DT-9R meter reads either of two RF channels (low and high band); a push button selection system picks the channel to be read which indicates on the meter only as long as the button is depressed. When the user lets up on the button, the meter returns to an 'off' state (thereby saving batteries). The meter uses a peak detector circuit which Mid State claims has less than a 2 dB differential between CW and modulated carrier levels.

The Ohmmeter function is built around a front panel F fitting which eliminates the need for test probes. With optional TK-9 terminations, the often frustrating job of locating which drop goes to which apartment or room is simplified. By terminating the various drop lines with different values of resistance (color coded in the TK-9 kit) the installer simply checks the various drops at the terminal block for the value of resistance shown. This identifies which drop line goes to which outlet location; the TK-9 test terminators are color coded for ease of operation.

Prices for the DT-9R meter are in the $149 to $169 range, depending upon the quantity of units purchased. Full details from Mid State Communications.

Magnavox Has New Products

Magnavox CATV Systems, Inc. (133 West Seneca St., Manlius, N.Y. 13104) has a number of new products to report.

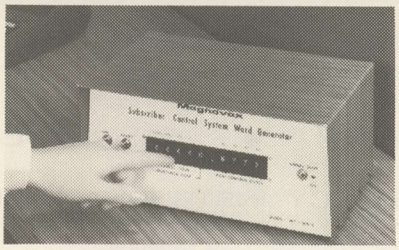
1) **An Addressable Tap System** con-

AEL, INC., CATV COMMUNICATIONS DIV., P.O. Box 552, Lansdale, PA 19446, (**M1, S2**) 215—822-2929
Anixter-Pruzan, Inc., P.O. Box 88758, Tukwila Branch, Seattle, WA. 98188 (**D1**) 206—251-6760
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
BESTON ELECTRONICS, INC., 903 South Kansas Ave., Olathe, KS. 66061 (**M9 Character Generators**) 913—764-1900
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.
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
COLLINS COMMERCIAL TELECOMMUNICATIONS, MP-402-101, Dallas, TX. 75207 (**M9, Microwave**) 214—690-5954
COMMUNICATIONS EQUITY ASSOCIATES, 651 Lincoln Center, 5401 W. Kennedy Blvd., Tampa, FL. 33609 (**S3**) 813—877-8844
COMM/SCOPE COMPANY, Rt. 1, Box 199A, Catawba, NC 28609 (**M3**) 704—241-3142
ComSonics, Inc., P.O. Box 1106, Harrisonburg, VA. 22801 (**M8, M9, S8, S9**) 703—434-5965
C R C ELECTRONICS, INC., P.O. Box 855, Waianae, HI. 96792 (**M9 Videotape Automation Equipment**) 808—668-1227
DAVCO, INC., P.O. Box 861, Batesville, AR. 72501 (**D1, S1, S2, S8**) 501—793-3816
EAGLE COM-TRONICS, INC., P.O. Box 93, Phoenix, N.Y. 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
FARINON ELECTRIC, 1691 Bayport, San Carlos, CA. 94070 (**M9, S9**) 415—592-4120
FEDERAL BROADCASTING CO., 600 Fire Rd., Box 679, Pleasantville, N.J. 08232 (**D9, S9**)
FERGUSON COMMUNICATIONS CORP., P.O. Drawer 871, Henderson, TX. 75652 (**S1, S2, S7, S8, S9**) 214—854-2405
FRANK L. CROSS & ASSOCIATES, INC., 5134 Melboune Dr., Cypress, CA. 90630 (**M9**) 714—827-0868
GILBERT ENGINEERING CO., P.O. Box 14149, Phoenix, AZ. 85063 (**M7**) 602—272-6871
G T E SYLVANIA, 3046 Covington Rd., Marietta, GA 30062 (**M1, D1**) 404—993-1510
HUGHES MICROWAVE COMMUNICATIONS PRODUCTS, 3060 W. Lomita Blvd., Torrance, CA. 90505 (**M9**) 213—534-2146
HOME BOX OFFICE, INC., 7839 Churchill Way—Suite 133, Box 63, Dallas, TX. 75251 (**S4**) 214—387-8557
ITT SPACE COMMUNICATIONS, INC., 69 Spring St., Ramsey, N.J. 07446 (**M9**) 201—825-1600
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
LARSON ELECTRONICS, 311 S. Locust St., Denton, TX. 76201 (**M9 Standby Power**) 817—387-0002
LRC Electronics, Inc., 901 South Ave., Horseheads, N.Y. 14845 (**M7**) 607—739-3844
Magnavox CATV Division, 133 West Seneca St., Manlius, N.Y. 13104 (**M1**) 315—682-9105
MICROWAVE ASSOCIATES, INC., 10920 Ambassador Dirve, Suite 119, Kansas City, MO. 64153 (**M9 Microwave Radio Systems**) 816—891-8895
MICRODYNE CORPORATION, P.O. Box 1527, 627 Lofstrand La. Rockville, MD. 20850, (**M9 Satellite TV Recs.**) 301—762-8500
Microwave Filter Co., 6743 Kinne St., Box 103, E. Syracuse, N.Y. 10357 (**M5 Bandpass Filters**) 315—437-4529
MID STATE Communication, Inc., P.O. Box 203, Beech Grove, IN. 46107 (**M8**) 317—787-9426
MSI TELEVISION, 4788 South State St., Salt Lake City, UT. 84107 (**M9 Digital Video Equip.**) 801—262-8475
NORTHERN CATV DISTRIBUTORS, INC., 8016 Chatham Dr., Manlius, N.Y. 13104 (**D1**) 315—682-2670
OAK INDUSTRIES INC./CATV DIV., Crystal Lake, IL. 60014 (**M1, M9 Converters, S3**) 815—459-5000
PRODELIN, INC., 1350 Duane Avenue, Santa Clara, CA. 95050 (**M2, M3, M7, S2**) 408—244-4720

MEMBER SHOWCASE

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

trolled by a word processor generator is designed to be operated only in those areas where the CATV operator experiences high customer turnover (i.e. churn). The word processor generator is said to cost 'a fraction the cost of a mini-computer' while performing the same on/off functions required.



2) **A new Super Tap** with silicone rubber 'F' port entry seals, an anti-corrosion dip-coated housing, anti-sieze compound on threaded fittings and a triple-plated olive drab finish are among the weather-resistant features of the new 'Super Tap' from Maganvox.

3) **A new two-unit high security descrambler system** wherein the customer has access to only a set top unit which is essentially an on-off switch; the descrambling electronics is housed in an aerial mounting 'activator' outside the home (available for single and dual subscriber service);

4) **A new low current drain** (18 watts of power) **mainstation trunk amplifier** utilizing recently developed IC devices. The new main trunk station also features improved (lower) noise figure, stable operation whether the carriers are modulated or unmodulated, improved second and third order distortion figures and a power supply with increased capacity capable of withstanding 300 volt peak surges.

Full details on all of the new products are available from Magnavox at the address given, or by calling the toll free number 800-448-9121 (east of the Mississippi), and 800-448-5171 (west of the Mississippi).

RMS Tech Report

RMS Electronics, Inc. (50 Antin Place, Bronx, N.Y. 10462) has a twenty page 'UNIPOWER' Series power passing line equipment technical report available.

The new line of passive equipment includes 2 and 3 way splitters, directional couplers and power inserters. Using a new concept RMS calls 'Micro-Circuit', a potted chip (manufactured in an integrated circuit format) performs the basic functions of a miniature hybrid network.

The report is available from RMS at the address given, or by calling RMS at 212-892-1000 collect.

Q-BIT Corporation, P.O. Box 2208, Melbourne, FL. 32901 (**M4**) 305—727-1838
RADIO MECHANICAL STRUCTURES, INC., P.O. Box 1277, Kilgore, TX 75662 (**M2, M9, S2**) 214—984-0555
R F SYSTEMS, INC., P.O. Box 428, St. Cloud, FL. 32769, (**M2, M6**) 305—892-6111
RICHEY DEVELOPMENT CORP., 6920 Melrose, Oklahoma City, OK. 73127 (**M1, M4, M8, S8**) 405—495-3953
RMS CATV Division, 50 Antin Place, Bronx, N.Y. 10462 (**M5, M7**) 212—892-1000
Sadelco, Inc., 299 Park Avenue, Weehawken, N.J. 07087 (**M8**) 201—866-0912
Scientific Atlanta Inc., 3845 Pleasantdale Rd., Atlanta, GA. 30340 (**M1, M2, M4, M8, S1, S2, S3, S8**) 404—449-2000
SCIENTIFIC COMMUNICATIONS, INC., 3425 Kingsley Rd., Garland, TX. 75041. (**M4 Low Noise & Parametric**) 214—271-3685
SITCO Antennas, P.O. Box 20456, Portland, OR. 97220 (**D2, D3, D4, D5, D6, D7, D9, M2, M4, M5, M6, M9**) 503—253-2000
Systems Wire and Cable, Inc., P.O. Box 21007, Phoenix, AZ. 85036 (**M3**) 602—268-8744
TERRACOM, 9020 Balboa Ave., San Diego, CA. 92123 (**M9 Microwave Earth Stations**) 714-278-4100
TEXSCAN Corp., 2446 N. Shadeland Ave., Indianapolis, IN. 46219 (**M8 Bandpass Filters**) 317—357-8781
Theta-Com., P.O. Box 9728, Phoenix, AZ. 85068 (**M1, M4, M5, M7, M8, S1, S2, S3, S8, AML MICROWAVE**) 602—944-4411
TIMES WIRE & CABLE CO., 358 Hall Avenue, Wallingford, CT. 06492 (**M3**) 203—265-2361
Tocom, Inc., P.O. Box 47066, Dallas TX. 75247 (**M1, M4, M5, Converters**) 214—438-7691
TOMCO COMMUNICATIONS, INC., 1077 Independence Ave., Mtn. View, CA. 94043 (**M4, M5, M9**) 415—969-3042
Toner Cable Equipment, Inc., 418 Caredean Drive, Horsham, PA. 19044 (**D2, D3, D4, D5, D6, D7**) 215—675-2053
Triple Crown Electronics Inc., 42 Racine Rd., Rexdale, Ontario, Canada M9W2Z3 (**M4, M8**) 416—743-1481
TURNER COMMUNICATIONS CORP., (WTCG-TV), P.O. Box 4064, Atlanta Stadium, Atlanta, GA. (**S9**) 404—522-7250
UNITED PRESS INTERNATIONAL, 220 East 42nd St., New York, N.Y. 10017, (**S9 Automated News Svc.**) 212—682-0400
UNITED STATES TOWER & FAB. CO., P.O. Drawer "S", Afton, OK. 74331 (**M2, M9**) 918—257-4257
Van Ladder, Inc., P.O. Box 709, Spencer, Iowa 51301 (**M9, Automated Ladder Equipment**) 712—262-5810
VIDEO DATA SYSTEMS, 40 Oser Avenue, Hauppauge, N.Y. 11787 (**M9**) 516—231-4400
VITEK ELECTRONICS, INC., 200 Wood Ave., Middlesex, N.J. 201—469-9400
WAVETEK Indiana, 66 N. First Ave., Beech Grove, IN. 46107 (**M8**) 317—783-3221
WEATHERSCAN, Loop 132, Throckmorton Hwy., Olney, TX. 76374 (**D9, Sony Equip. Dist., M9 Weather Channel Displays**) 817—564-5688
Western Communication Service, Box 347, San Angelo, TX. 76901 (**M2, Towers**) 915—655-6262/653-3363

NOTE: Associates listed in bold face are Charter Members

Distributors:
D1—Full CATV equipment line
D2—CATV antennas
D3—CATV cable
D4—CATV amplifiers
D5—CATV passives
D6—CATV hardware
D7—CATV connectors
D8—CATV test equipment

Manufacturers:
M1—Full CATV equipment line
M2—CATV antennas
M3—CATV cable
M4—CATV amplifiers
M5—CATV passives
M6—CATV hardware
M7—CATV connectors
M8—CATV test equipment
M9—Other

Service Firms:
S1—CATV contracting
S2—CATV construction
S3—CATV financing
S4—CATV software
S5—CATV billing service
S6—CATV publishing
S7—CATV drop installation
S8—CATV engineering

CLASSY-CAT advertising is handled as a no-charge membership service of and by CATA. The rules are as follows:

1) **Any member of CATA** (member-system, Associate member, individual member) qualifies for CLASSY-CAT advertising space free of any charge (limit 50 words/-numbers per issue);
2) **Member-systems** pay regular dues to CATA on a monthly basis; Associate members pay a one time annual fee; "Individual" members pay a one time annual fee of $25.00 per year.
3) **CLASSY-CAT advertising is also available** to non-members at the following rates: **50 cents per word** with a minimum per insertion of $20.00. A charge of $2.00 per insertion is made for blind-box numbers or reply service.
4) **Deadlines** are the 15th of each month for the following month's issue.
5) **Terms** for non-members is **full payment with order** (no invoicing).
6) **Address** all CLASSY-CAT material to: CLASSY-CAT Advertising, CATJ, Suite 106, 4209 NW 23rd Oklahoma City, Ok. 73107.

WANTED: Manual for Jerrold Model 900B Sweep Generator. Richwood T-V Cable Co., Richwood, WV 304-846-2551.

JERROLD TPR 5

Cavity tuned low noise channel five preamplifier with power supply. Used only one week: perfect condition. Will sell to best offer. Write:

A. Randaccio,
Suite 900,
511 Place D'Armes,
Montreal, Canada
or call: (514) 845-3191

TVRO SYSTEM LOANS—If your cable system is considering installing a satellite earth receiving terminal, we may have a bank loan program for you. Systems located in Oklahoma, Arkansas, Louisiana, Texas, Kansas and New Mexico have used our services for new system construction, re-builds and system acquisition for nearly 15 years. We know and understand the cable TV business and if you are located in our area we'd like to talk with you concerning a loan for a TVRO. Contact Ken Bass or Clark Bass, First National Bank of McAlester, Box 948, McAlester, Ok. 74501 (918/426-0211).

RESEARCH AND DEVELOPMENT ENGINEER

Advanced knowledge RF filters, converters and amplifiers for pay television. Eastern Pennsylvania location. 20—25K plus. Box S-21578, c/o CATJ, 4209 N.W. 23rd, Suite 106, Okla. City, OK 73107

FOR SALE

Reasonably priced Tocom Model CC213 processors with Cadco Model IPS-RPS-RM bandpass filters. Processors are available for every VHF input and every VHF output channel.

Theta Com Group D microwave transmitter for channels Pilot 8, 9, 10, 11, 12 model AML-MTX-132, with model AML splitband outdoor receiver with AML-IFU interface unit. Output channels can be changed.

Indiana Cablevision Corporation
815 E. Pennsylvania Ave.
South Bend, Indiana 46618

CALL CHIEF ENGINEER COLLECT:
219-234-5043

Why do 67% of all satellite TVRO stations use Microdyne Television Receivers?

Model 1100-FFC(1) Satellite Earth Terminal TV Receiver

PERFORMANCE – Industry's first Satellite TV Receiver with an unsurpassed performance record. Satisfied users (Microdyne's best salesmen) are amazed by the high quality video provided by such a low cost receiver.

Competitive field evaluations have shown that only two other receivers have ever equalled the high performance of Microdyne's 1100-FFC(1) Satellite TV Receiver. Both of these (one is a Microdyne Model 1100-TVR) are higher priced receivers. Other receivers, regardless of price or advertised claims, could not equal the performance of the 1100-FFC(1) for "pulling-in" signals under marginal reception conditions.

SIMPLICITY – Changing channels is as simple as one, two three:

1. Remove front panel channel-indicator cover to expose crystal receptacle and screwdriver slot control.
2. Plug in crystal for appropriate channel.
3. Adjust the single slot control for maximum signal strength on front panel signal level meter.

Nontechnical personnel can perform these steps in less than two minutes without special tools or test equipment.

VERSATILITY – One 1100-FFC(1) and selected plug-in crystals provides all the backup needed for your priority channels. It's EIA/CCIR compatible and will readily interface with an existing TV earth station or a new system scheduled for installation.

RELIABILITY – The 1100-FFC(1) is a natural extension of Microdyne's long experience and specialization in the design and development of high performance, high reliability receivers demanded by aerospace and satellite communications users throughout the world. This results in an MTBF reliability figure in excess of 15,000 hours.

LOW COST – Regardless of your application – a new installation, extra channels for an existing installation, or backup for priority channels – Microdyne guarantees that the 1100-FFC(1) will give you the highest quality picture available on today's market at the lowest cost.

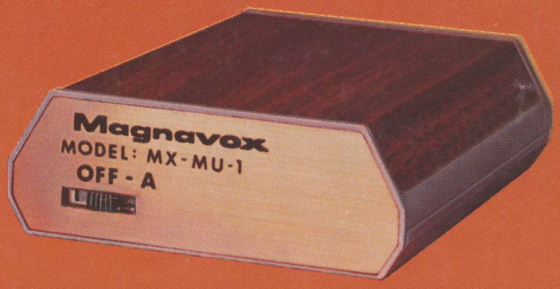
If you're still not convinced, give us a call and we'll gladly back up our claims with a demonstration.

why not go with Microdyne, the Receiver Specialists

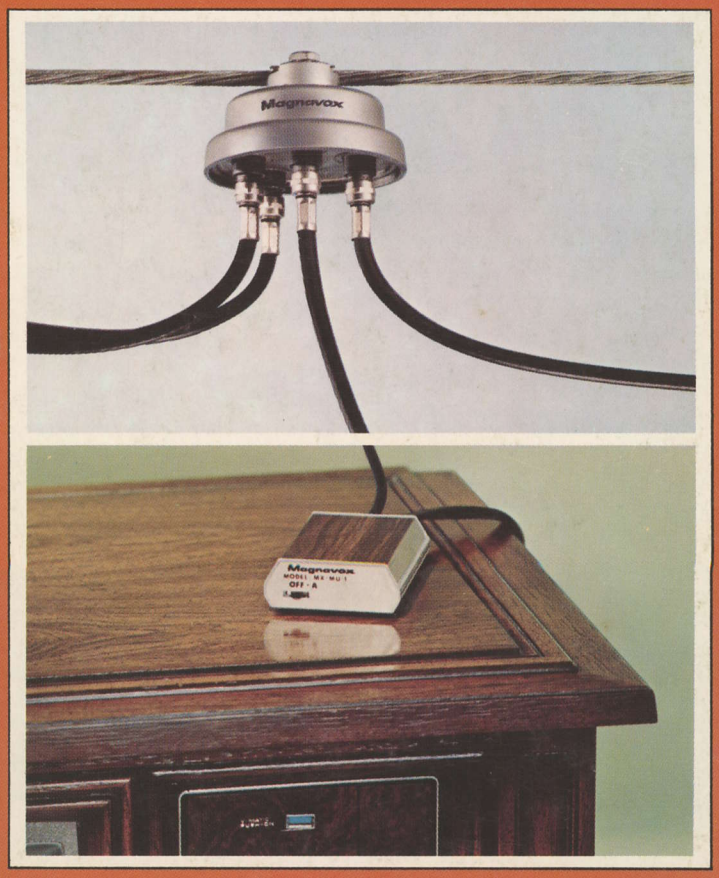
Microdyne Corporation

P.O. Box 1527 – 627 Lofstrand Lane – Rockville, Maryland 20850
Telephone (301) 762-8500 – TWX 710-828-0477 – Cable MICRODYNE Rockville, Maryland USA

The Most Popular Descrambler



...now comes in a High Security version



Introducing the new, doubly secure, Magnavox Descrambler II.

If the first descrambler looks familiar, it's probably because you've met. Our Magnavox MX-MU-1 Descrambler has become an industry standard since its introduction a year ago. Now, meet the next industry standard—Magnavox's new Descrambler II. An unbeatable combination of low price and high security, in a 2-unit descrambler.

The new Magnavox Descrambler II is doubly secure because it offers two-unit protection. Your subscriber has access to only one part of the Descrambler. More important, if he moves and gives his set-top unit to a neighbor, you will not be supplying free service. This is because the second part of the descrambling unit is housed in an aerial mount activator, mounted on the pole or wire outside.

And the new Descrambler II not only costs less than its main competitor, it can do more. Each new Magnavox aerial mount activator serves **two** subscribers*. Most competitive units serve only one.

For more information on how the new Magnavox Descrambler II can give you effective Pay TV security, economically, contact: Magnavox CATV Systems, Inc., 133 West Seneca Street, Manlius, New York 13104; toll free, east of the Mississippi: 800-448-9121; west: 800-448-5171, or 315-682-9105.

**Magnavox also offers a compact, single subscriber aerial mount activator.*

Magnavox