

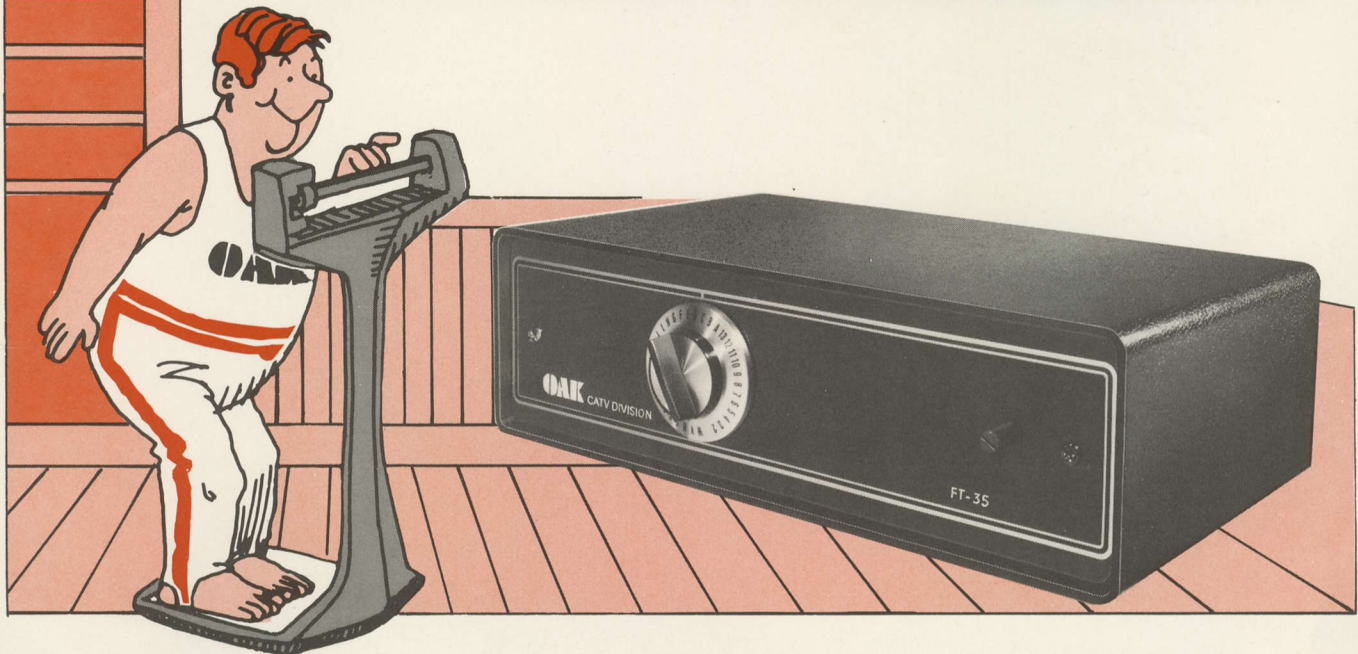
OFFICIAL JOURNAL
OF THE
COMMUNITY ANTENNA
TELEVISION ASSOCIATION

JANUARY
1979

CATJ



New Oak Trimline FT Reduces Overhead ...Builds Performance



Trims hardware costs— not quality

Now you can trim your hardware costs without shaking loose from famous Oak quality and performance. Trimline FT, an economy 35 channel converter, with manual fine tuning, is a new addition to the high-quality Trimline converter series. Very high adjacent channel rejection and low noise figure ensure unmatched reception quality.

35 channel strength

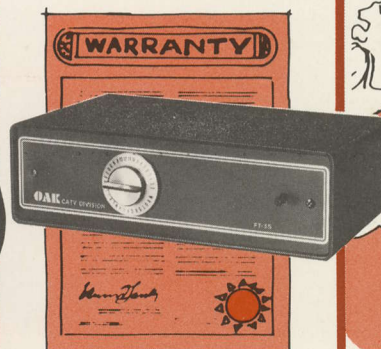
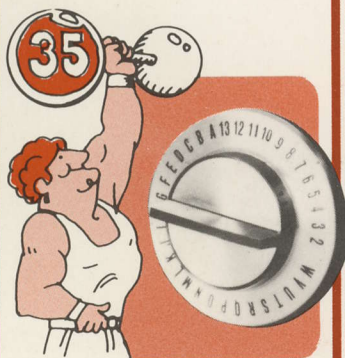
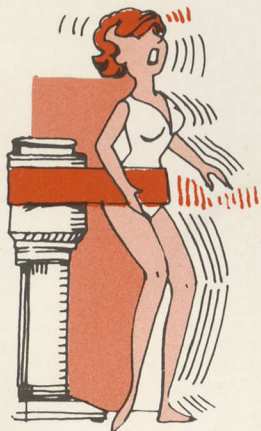
Trimline FT allows for full 35 channel coverage, with accurate tracking for minimum customer fine-tuning. Each channel has its own tuning potentiometer and frequencies are factory set to assure channel selection accuracy. Even if you don't need 35 channel capability, Trimline FT allows room for growth.

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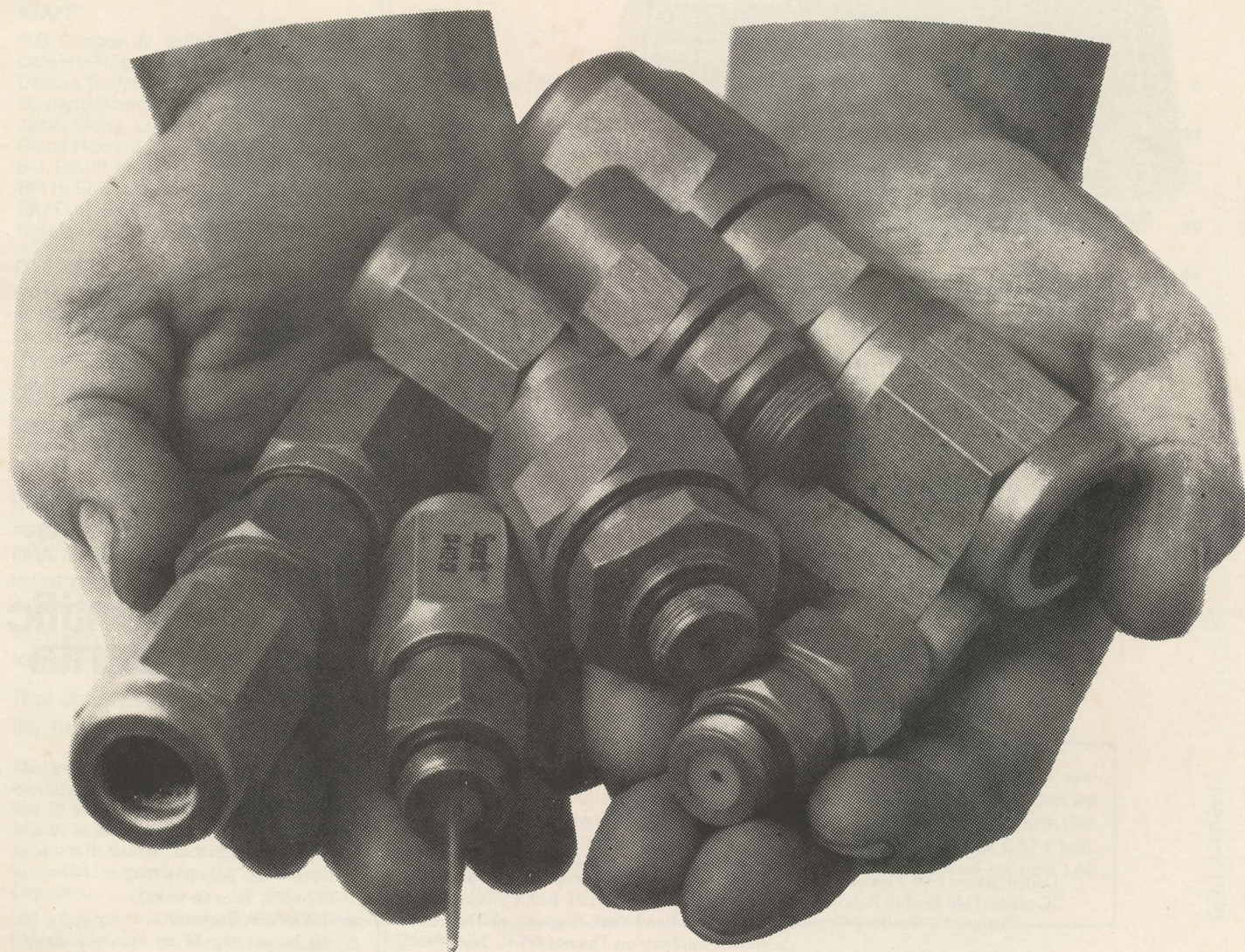
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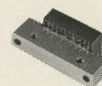
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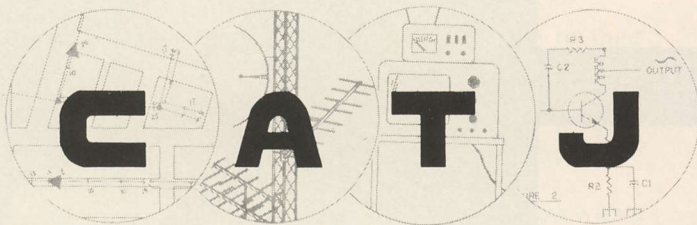
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JANUARY 1979

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OFFICES

CATA/CATJ
4209 NW 23rd, Suite 106
Oklahoma City, Oklahoma 73107
(405) 947-7664
CATA (Washington Office)
Steve Effros, Executive Director
1100 17th St. NW (Suite 506)
Washington, D.C. 20036
(202) 659-2612

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YOU ASKED FOR IT—Dozens of letters per week are asking for back issues of CATJ and listings of articles printed in 'the Journal' in the past. Here is a 52 Issue index (through August 1978) which will help you locate much needed material from the early years of CATJ 27

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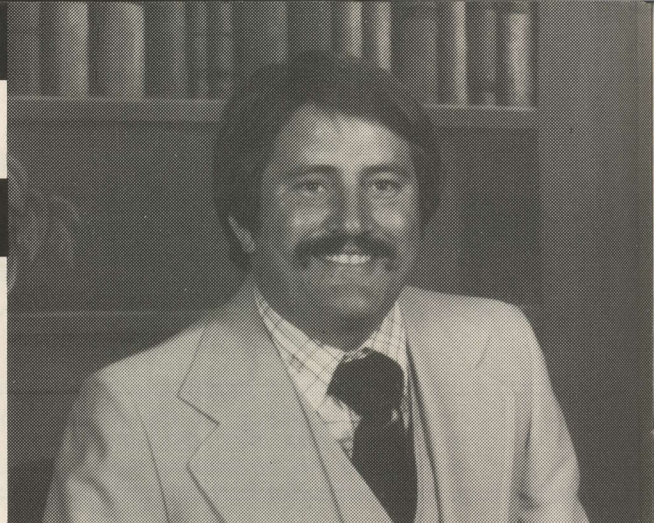
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—OUR COVER—

TOWER CONSTRUCTION—perhaps a less 'important' part of new system construction (or system upgrading) than in years past now that we have satellite service. Or is it? A future issue of CATJ will explore this aspect of cable operations in the spring. Photo taken at CATJ Lab, USTC tower crew installing star mount at 160 foot level on new Lab tower.

CATA "TORIAL

BEN CAMPBELL, President of CATA, Inc.



The Coming Of 'UNIQUE'

The November (1978) issue of CATJ carried an editorial in which we urged all cable operators with TVRO capability (or planning same during 1979) to give serious consideration to carrying the proceedings of the U.S. House of Representatives via transponder 9 and the facilities of **C-SPAN**; the cable industry's non-profit corporation created to bring the nation's elected representatives 'back home again' on a daily basis. We suggested that C-SPAN was cable's first (and only) 'unique' service.

'Unique' is likely to become a much overworked word in the cable trade press in 1979. Come's now the formal announcement of Nickelodeon, a **"young people's satellite network"** from Warner Cable Corporation. Those of us who were fortunate to attend the Western Cable Show in Anaheim early in December were able to learn first hand from Warner personnel just how 'innovative' (perhaps another word destined to be overworked in 1979) the cable industry is becoming and how what here-to-fore looked liked an island of experimentation in advanced cable technology is now blossoming into a national network that may well have as much (or more) impact in Tonopah (Nevada) as it does 'back home' in Columbus.

Nickelodeon has been called the 'daughter of QUBE'. Here is what it is, and why whether your system carries it or not Nickelodeon promises to be the forerunner of an entirely new and exciting era in cable service delivery.

Cable's days as a **largely passive conveyor belt** for programming created at the three networks, PBS and a handful of indie stations are numbered. The satellite has changed all of that because the satellite makes possible instant 'networking' throughout the United States. As Jeff Reiss of SHOWTIME points out, **"programming is very very expensive; not even the very largest systems can afford to create 'unique' and attractive (to the audiences) programming"**. It is the merging of dozens or hundreds of outlets for programming which provides the economic base that can support **professional program** people dedicated to producing professional programs.

And while the trade (and other press) has largely been concentrating on the Warner Columbus QUBE system as a 'test tube for two-way communications' QUBE has actually been doing something much more

significant. It has been developing a children's program channel unlike anything now available on commercial television or on PBS. On approximately February first that largely unnoticed element of QUBE will go nationwide via the satellite (transponder 5). On the bird it will be known as Nickelodeon, and it is being billed as a **"young people's satellite network"**. It will be 'up' 13 hours per day on weekdays and 14 hours per day on Saturday and Sunday with approximately 9 hours of brand new programming each day.

Warner has developed programming for Nickelodeon by bringing in a professional staff that includes Dr. Vivian Horner; a lady that was recently appointed to a Presidential Commission on International Studies and a former associate of Children's Television Workshop (Sesame Street, etc.). The staff of QUBE responsible for producing the Columbus children's programming has had the unusual opportunity to be able to **instantly 'measure' the response** of the young people to the programming offered. By using the QUBE 'feed back system' they have been able to directly monitor what children like and don't like. From this combination 'research/programming' has come a package which Warner officials feel very confident will appeal to children on a national level. And as Gus Hauser of Warner is fond of saying, **"Nickelodeon is unique to cable; it is not programming taken from some other medium"**. To that we would add that because of the 'unique' use of Warner's QUBE system Nickelodeon is also a fascinating use of our own 'unique' technology. Warner has utilized QUBE's ability to 'interact' with viewers to refine and shape the programming itself.

All of the programming on Nickelodeon will originate in Columbus. It is broken down into 'segments' for three different age groups. The **under-7** set will have their programming block centered around a program called **'Pinwheel'**. For the **7-12** age group a set of programs built around the title **'By The Way'** will feature prize winning short films from throughout the world. For the **teenagers**, another group of programming built around **"Bananaz"** (pronounced like the edible fruit) will occupy a portion of the Nickelodeon day. The format is actually several times as expansive as this short outline, including day to day serials patterned after the famous Saturday afternoon movie

fare of several decades ago, something called 'Video Comic Books' and more.

And cable operators who add this service to their channel line up will be paying a flat rate of ten cents per home per month. That so much 'custom created programming' can be fed through the bird to your cable system for a dime a home per month may be the most 'unique' part of the whole program.

Clearly, the cable pot is beginning to overflow with a richness and abundance of 'unique programming' which even as recently as one year ago few dared dream about. Equally clearly, any cable system that **has** invested, **is** now investing, or **will** in 1979 invest in its first earth receive terminal and is hoping to continue to be a viable business operation with 'only' 12 channels of capacity is missing a very important message. In this month's lead-off feature report we find that approximately 62% of all operating (U.S.) cable systems **still have** but 12 channel capacity. **However** 20% of all systems are now rebuilding (or actively planning a rebuild) for increased channel capacity. **Another 13%** of all systems accept that "someday" they will have to rebuild their plants for mid and/or superband capabilities. Which leaves us with **29% of all systems** who believe they can **get along** with 12 channels **for the foreseeable future**. If all 29% of these systems were below the 500 subscriber level, we might go along. But a substantial number are not in that boat; rather they are simply assuming that they can get along without satellite service, or if they have taken the satellite plunge they are 'safe' by offering a Christian channel, a pay channel and an indie.

Perhaps that type of thinking is on borrowed time. During November, the National League of Cities held its annual gathering and in the display area at least two of the satellite TV programmers were on hand. Peter Kendrick's Home Theater Network played it low key and explained to interested mayors, city managers and other city officials how HTN offered an 'alternative' to 'R' movie pay cable fare. Several dozen city officials went home making noise about 'talking with' their local cable firms. Warner was there also with a short public explanation of how Nickelodeon would work. When they finished around 100 city officials flocked to the Warner booth to request data to take back to their communities. Perhaps some cable operators have already 'heard' from their own city officials about 'carrying' Nickelodeon; or HTN. 'Unique' programming is going to be more and more difficult to hide under a bushel basket. Cable's 'unique look' is becoming more and more evident and cable operators are going to be under more and more pressure to add services they now perhaps consider 'not worth the effort'. The wise cable operator will recognize that (1) 12 channel service is a thing of the past, and, (2) 'unique new services' are the key to increased basic rate structures or packaged pay channel offerings.

Cable's image is improving. Rapidly. Each new satellite offering increases the distance between the 'off-air-look' and the 'cable look'. 1979, I believe, will see the gap widen even further. The day may actually come where our conveyor belt carriage of network off-air signals amounts to the 'least attractive' part of the cable package. After thirty years of trying, cable is finally establishing itself as a 'unique medium'. Is your system preparing to be a part of cable's "new look"?

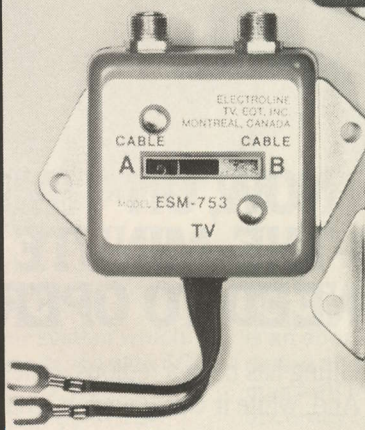
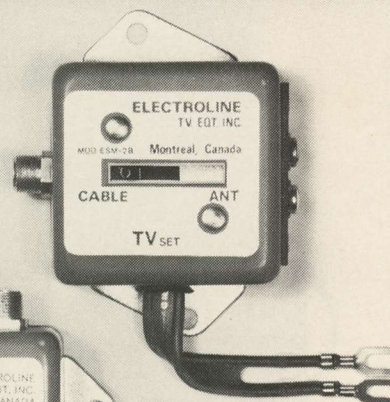
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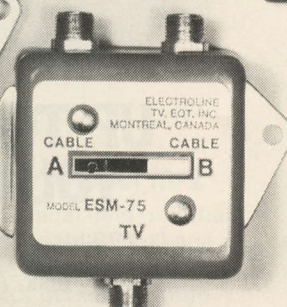


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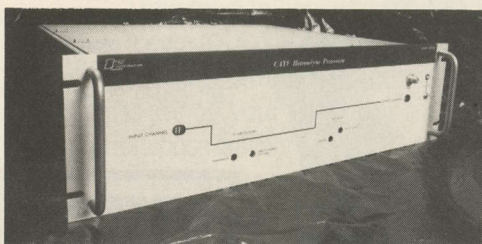
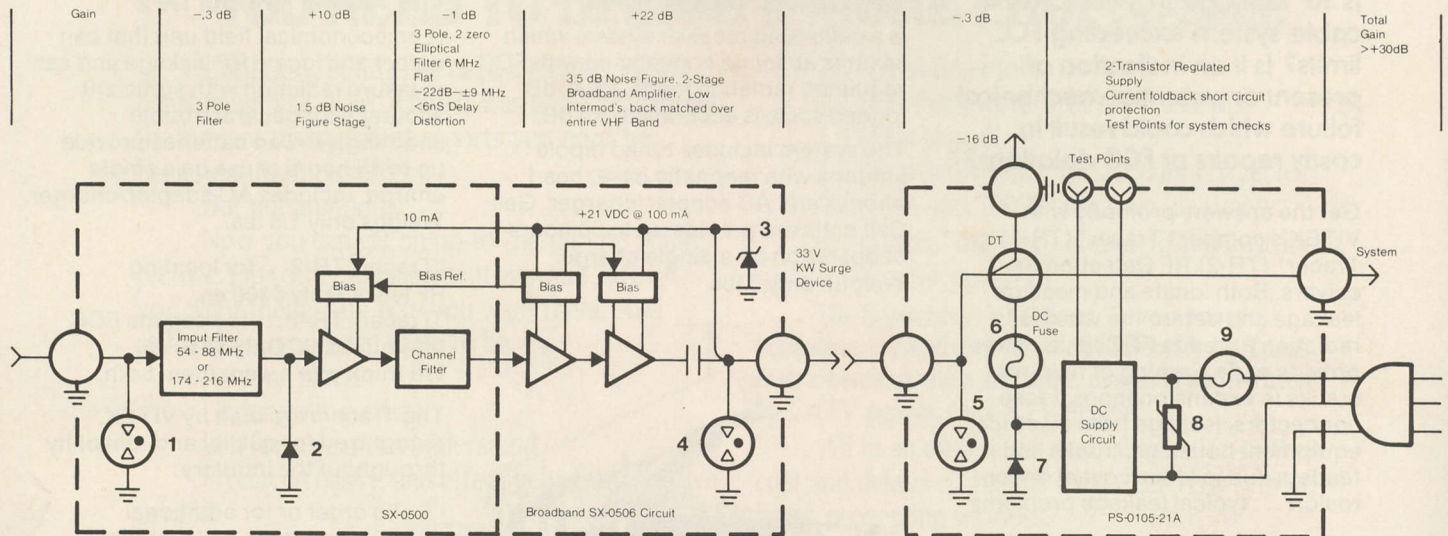
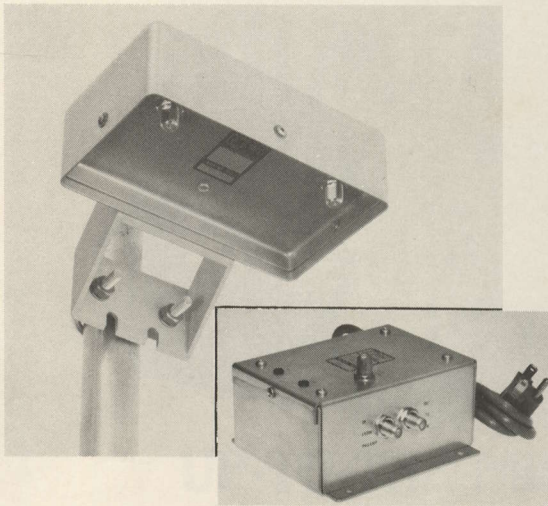
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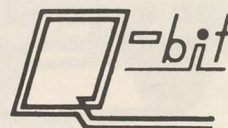
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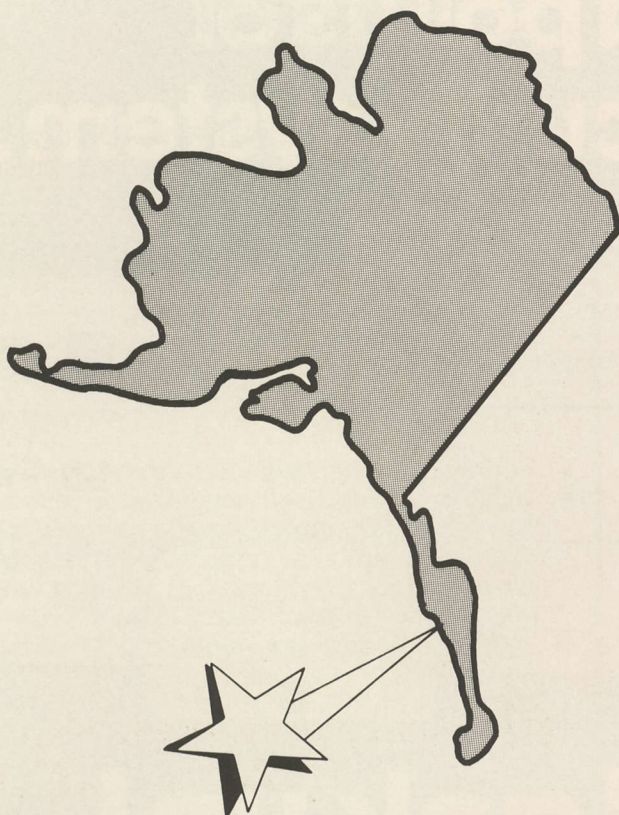
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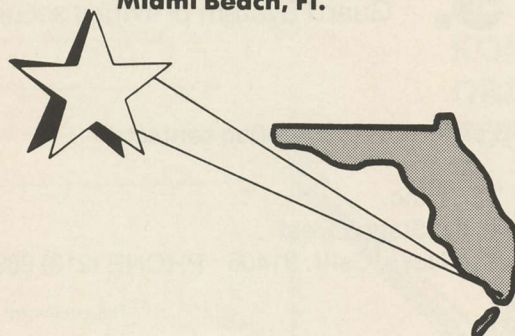
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AUDIENCE. THAT'S THE GROWING WORD FOR CHANNEL 17 IN MORE THAN 2.6 MILLION HOMES NATIONWIDE.

In the audience rating business, the standards for reporting audience to a distant station are more strict than those applied to local broadcasters. Despite such restrictions, Arbitron produced audience estimates for WTCG in many markets beyond Atlanta for the May 1978 survey. Here is what the rating reports are saying about WTCG's acceptance.

On weekend afternoons in May 1978 WTCG programmed movies and Braves Baseball, and captured the following shares of *total* market viewing (cable and non-cable homes): Albany, Ga. (14%); Zanesville, Oh. (11%); Meridian, Ms. (10%); Anniston, Al. (13%); Alexandria, La. (10%) and

McAllen-Brownsville, Tx. (16%). With cable penetration in these markets ranging from one-fourth to one-half of the television homes, WTCG was frequently averaging between 30 and 40% of the viewing occurring in CATV households!

Although movies and sports are mainstays of WTCG's programming, Channel 17 has built a solid record with other types of programming as well. In Zanesville, Ohio, for example, WTCG is the leading station for kids 2-11 from Noon-7:30 PM, M-F. During the 7-9 AM period, M-F, more of Zanesville's kids 6-11 watch WTCG than the rest of the stations combined, and Channel 17 averages an 18% share of the market's

households viewing during the time period!

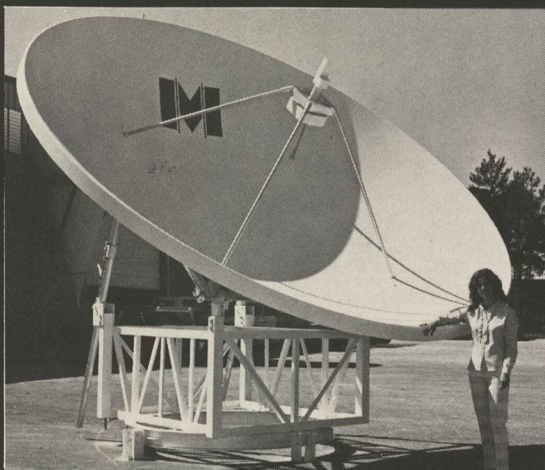
During the 7-9 AM early morning hours, M-F, WTCG is the leading station among kids 2-11 in Panama City, Fl., while in Meridian, Ms. and McAllen-Brownsville, Tx., WTCG takes the lead for kids 6-11 during the 7-9 AM daypart. And in Anniston, Al. WTCG leads among teens. M-F, 4-6:30 PM.

Source: May 1978 Arbitron local market ratings. ADI reports.

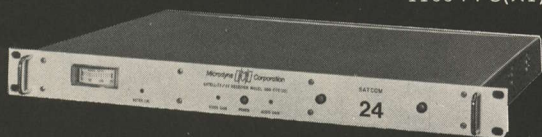
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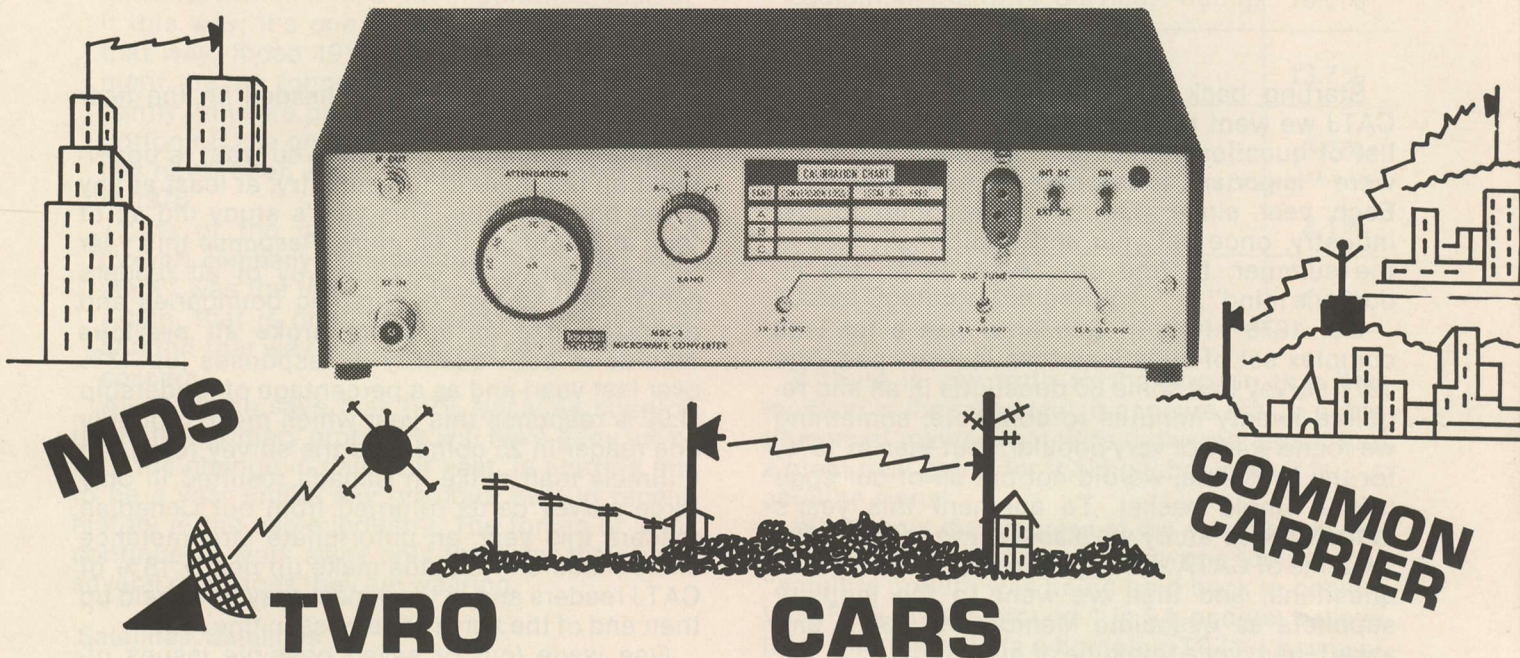
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Is That What's Bothering You. . .

THE PULSE OF AN INDUSTRY — '79

Starting back in the August 1974 issue of CATJ we went to the CATV industry with a long list of questions which our intelligence told us were **"important, unresolved issues of the time"**. Each year since then we have gone to the industry, once per year and traditionally late in the summer, to find out "What is on the industry's mind".

Our 1978 effort in this area was a far less complex set of questions than in years past (the 1977 survey had some 80 questions in all and required twenty minutes to complete; something we found was not very popular!) but then in 1978, for the first time, we did not put all of our eggs into a single basket. To augment this year's industry wide study we **also went** to the member systems of CATA with an entirely different line of questions, and then we went to the industry suppliers as Associate Members of CATA and asked them yet a third line of questions.

Our approach to locating the "pulse of the cable industry" in 1978 differed from years past because we preconceived that the industry had changed. Perhaps quite dramatically. And in any event we wanted our 1978 study to be sufficiently broad that when completed we would have a more "four sided" view of cable and its conception of itself and its own problems than in years past.

Studies of this sort can usually tell you from one to four different things:

- 1) **How good** the industry is doing, or conversely
- 2) **How poorly** the industry is doing.
- 3) **Where** the industry **has been**, recently, and perhaps

"An operator called and asked for a price quote and our delivery schedule on a field strength meter. I gave him the price and told him delivery would be six weeks. 'Six weeks' he exclaimed, 'At last I've found somebody with off-the-shelf delivery!'"

Larry Dolan
Mid State Communications

- 4) **Where** the industry is **headed** (in the near future).

Some studies can also tell you what is uppermost on the mind of the industry; at least at any given point in time. This year's study did all of this, and perhaps a bit more. **Response** this year to the 'plain-Jane' CATJ survey of all readers (which cuts across geographic boundaries and operator size categories) **broke all previous records** in both quantity of responses (up 13% over last year) and as a percentage of readership (4.02% response this year which means roughly one reader in 25 completed the survey form). An untimely mail strike in Canada resulted in only three survey cards returned from our Canadian readers this year; an unfortunate circumstance since readers in Canada make up nearly 18% of CATJ readers and in years past they have held up their end of the survey business in fine form.

One issue (out of seven possible issues offered) showed a surprisingly strong response. We'll dwell upon that issue in some length towards the latter portion of this industry report. Which issue might that be? Equipment. Plain old vanilla hardware. Or more precisely, the **lack of hardware**. Very few systems felt it was **not** an important issue in 1978. We see it as becoming even more crucial in 1979 and we'll explain why.

Trot Out The Issues

Before you get biased by reading what everyone else says is on their mind most these days, stop a minute and ponder. **What one issue of all issues** before you as a cable person most troubles you these days?

We offered six possibilities to CATJ readers completing the survey, and room to write in their own topic just in case we mis-read vibrations in recent months. Here's how they stacked up when tallied:

47.4% of readers felt the **most** concerning issue of the day is the fear of the unknown; just **what is going to happen** (if anything) **with the proposal to re-write the basic communications law of the land**, the 1934 Communications Act (also known as HR13015).

24.2%, or approximately half the number concerned about the HR 13015, said **their biggest worry** was the **"rapid growth of the satellite service"**. Now just in case you read the wrong

thing into that 1 in 4 response, be advised that a later question found only 13.0% of all readers indicating they believed that the satellite service was (is) "growing too fast for its own good". That leaves 1 person in ten or 10% of the industry worrying about the "rapid growth of the satellite service" for reasons **other than the present rate or speed of growth**. 19.0% said they were **more concerned about equipment** delivery (and reliability, servicing and pricing) than any of the other options offered. Just in case you think that 19% is a minority (which it is) of no importance, look at it this way; it's one cable person in five. Put that way, those 19% concerned about equipment are no longer so unimportant! Significantly, in years past this topic has never even gotten off the ground. Equipment (since 1974) has never been a major issue. But, clearly, it is in 1978.

13.7% of the industry said that "**telephone (power) company attitudes towards me/my system**" was the thing that bothered them most. Again, that is one cable person in roughly 7 and put that way this too is **not an insignificant concern**.

All of which says that 1979, because none of these five primary problems will have gone away with the change in calendar year, is starting out to be a year unlike any previous year in recent history in the cable industry. The forces of 'evil' continue to work away only this year they have several new faces they are wearing.

Satellites, Satellites

With one operator in four 'concerned about the rapid growth of the satellite service', a little more depth into their satellite concerns is in order.

One question gives some insight into the 'feel of the operators' towards the satellite delivered signals:

71.0% **believe** satellite delivered signals are **the best thing to happen** to cable in a long time. 20.4% **feel** the satellite signals are "**better than some of the terrestrial services available**."

An insignificant 4% or so found satellite signals 'overrated' or 'no better than' terrestrial signals.'

HOW WE FEEL ABOUT SATELLITE SERVICES

Satellite Signals Are. . .	% Response
Best Thing to Happen to Cable	71.0%
Better Than Some Terrestrial	20.4%
No Better Than Terrestrial	4.6%
Overrated as to Subscriber Appeal	4.0%

WHAT CONCERNS US "MOST"?

Issue Considered	% Concerned
HR13015 (Rewrite Comm. Act)	47.4%
Rapid Growth Satellite Services	24.2%
Equipment (Delivery, Service, Pricing)	19.0%
TELCO/Power Companies	13.7%
Telesat Failure (Canada)	3.2%
Franchise Attitudes	2.1%
Cable Operator Competition	1.1%

If there is any truth to the illusion that 'the medium is the message', it appears that in cable personnel minds a satellite delivered signal has a great deal going for it simply because it is. . . a satellite signal.

What about the progress of the satellite delivery service? It is hard to imagine anyone feeling that "satellite growth was being held back in cable"; but 15.2% (that's around 1 in 6.6 people) believe it is! The majority (a whopping 71.7%) however believe we are experiencing 'healthy growth' in assimilating satellites as our own technology.

With 17 SATCOM F1 transponders now dedicated to the almost exclusive use of the cable industry and a perceptible nervousness amongst satellite signal suppliers that we may be approaching some type of economic barrier to additional satellite signals via the bird, how do the cable operators feel about **more services** via satellite?

- 1) 52.2% **feel** there should be CATV services available on **more than one satellite**
- 2) 28.3% would like to see (still) **more options available** in the **pay-cable** programming area
- 3) 23.9% would like to have 'access' to **ANIK** (Canadian satellite) programming in the U.S.
- 4) 16.3% would **extend U.S.** satellite signal access to **Canadian cable** systems (remember, virtually no Canadian responses are included here because of mail strike in Canada)
- 5) 29.3% are in favor of the U.S. government adopting an '**open skies**' policy allowing U.S. systems to legally receive signals from '**any satellites**' in the sky.

Operators were allowed multiple choice answers in this question, accounting for the 100% plus participation. With more than half of the operators pushing for service on two (or perhaps more) satellites, seemingly the expense of dual antenna installations is not considered

ON SATELLITE — WE'D LIKE TO SEE

Possible Areas of Expansion	% Response
Services Available on Multiple Satellites	52.2%
Open Sky Policy—U.S. Use Non-US Signals	29.3%
More Pay Service Options	28.3%
Canadian Signals Available in U.S.	23.9%
U.S. Signals Available in Canada	16.3%

insurmountable by a majority of the industry operators.

The Cable Plan

Amongst the suppliers there has been a popular theory that the satellite explosion may be the catalyst the industry needs to go back through the older single ended (12 channel) plants and rebuild for greater channel capacity. While a majority of the plant miles constructed in new systems since the FCC's 1972 entry into cable regulations have been built utilizing plant electronics capable of more than 12 channels, **what about the older plants** (built prior to 1972); or, the smaller size system plants built subsequent to 1972? Are these operators still 'satisfied' with their limited (12 or less) channel capacity?

62% of our survey respondents indicated they **still have 12 channel** (or less) capacity. Of this 'sub-group':

- 1) **46.8%** (29% of all systems) believe their present (12 channel) capacity will "take care of my community needs for the foreseeable future"
- 2) **32.3%** (20% of all systems) are "expanding now or planning now for additional (super and/or mid band) channel capacity"
- 3) **21.0%** (13% of all systems) believe they "someday will have to rebuild their plants for super and/or mid band capability".

ARE 12 CHANNEL SYSTEMS RE-BUILDING?

Possible Responses	% Response
Present Channel Capacity Adequate	46.8%
Planning or Rebuilding Now	32.3%
May Rebuild Someday	21.0%

With 1 system in 5 (that's system, **not system-mile**) now planning or re-building for increased capacity we identify why a portion of the crunch on hardware suppliers exists today. The FCC in adopting 1972 rules attempted at one point to **force** cable operators with less-than-12 channel capacity to engage in wholesale plant re-construction in the interest of "making available public access channels". That was quickly withdrawn in a hue and cry that could be heard from coast to coast. Now marketplace considerations are accomplishing the same result the FCC had in mind, only this time the operators are doing it willingly. If you sum those now expanding or planning expansion with those who accept that "someday" they will be expanding their plants (20% of all plus 13% of all) you arrive at the conclusion that at least half of the existing 12 channel plants will be converted to 12-plus channel capacity in the "foreseeable future". The plant hardware and converter supply business looks to remain 'brisk' for several years to come; and hardware supplies in these areas are likely to remain tight for some time to come.

The Future Technologies

For the past couple of survey years we have had the 'promise' of two new cable related technologies lying just over our horizon. One is **fiber optics** while the second is (security) **alarm systems** operated through the coaxial cable network as an adjunct to normal broadband RF delivery services.

Operator attitudes about these new technologies is important simply because it provides a method of measuring just how blue-sky these innovations may be. A comparison of attitudes in the last complete measurement year (1977) against those found in 1978 is useful. In the fiber optics area we found—"FO will be used in our plant. . .

	Within Next Year
1977 Response	6%
1978 Response	1.3%
	Within Next 2 Years
1977 Response	34%
1978 Response	3.8%
	Within Next 3 Years
1977 Response	22%
1978 Response	7.5%
	Sometime Thereafter
1977 Response	38%
1978 Response	87.5%

During 1977 several prominent suppliers of cable hardware demonstrated at the annual NCTA show working (although experimental) FO systems. The 'technical breakthrough' received considerable attention during 1977 in the trade press. In the interim, a handful of small (experimental for cable TV) systems were launched and an equal number are in advanced planning stages. It would appear that the 'excitement' generated in 1977 has waned considerably, perhaps overpowered by the rapid advance of

satellite technology. It has been said that the cable industry is only capable of assimilating a single new (major) technology per five year period and if this is so, fiber optics may well have to wait its turn until 1982 or thereabouts. And even then it may be challenged by yet unannounced technology innovations waiting in the wings.

Alarm (or security) systems may be a different kettle of fish. In 1977 two-way supported security/ alarm technology was approximately where FO was in 1976; known to the industry but little considered as an alternate income source. The most expensive part of adding elementary two-way capability may well be the cable plant itself; and when plants are re-built for greater-than-12 channel capacity they often **acquire** the ability to **add** two-way signal service in the process. If not directly, as an additional (relatively) low cost option. With satellite signal availability pushing the rebuild of 12 channel plants so dramatically, many systems are moving to phase one of two-way for **non two-way** reasons. And apparently this is causing more operators to view the possible expansion of their business bases into two-way service areas. The comparison between 1977 "interest" in security/alarm and the 1978 "interest" levels is considerable. Operators believe two-way/alarm/security:

	Is Now Starting To Move
1977 Response	15.1%
1978 Response	27.2%
	More than 1-3 Years Away
1977 Response	65.6%
1978 Response	51.9%
	Never in My System
1977 Response	19.2%
1978 Response	21.0%

Those who just don't see this service helping them remains about the same in the two most recent measurement years; but significantly the number of operators who feel positive about the service ("Is now starting to move. . .") has almost doubled in one year.

"Where are our own component part lead times going? Try twenty eight weeks for simple carbon composition resistors! It is the little standard stuff that is killing us; we spend more time backing up sources for parts than we used to spend handling all parts scheduling."

Tom Humpheries
Scientific Communications, Inc.

In yet a third related area of 'new technology' we asked the industry about their reflections on the Warner 'QUBE' system in Columbus. The QUBE system has received a great deal of publicity during the past year, perhaps more **outside of** the cable press than from within the industry. Warner obviously feels this is the 'wave' of the

FIBER OPTICS ATTITUDE 1977 vs. 1978

Operator Sees Own Use of Fiber By	1977	1978
...1979	6.0%	1.3%
...1980 (1982)	(34.0%)	3.8%
...1981 (After 1982)	(22.0%)	7.5%
...After 1981 (Not Forseeable)	(38.0%)	87.5%

future. But how does the industry feel about the 'experiment'?

- 1) **92.9%** found the QUBE experiment a "noble one", while the usual percentage of non-believers (7.1%) thought it was "dumb".
- 2) **31.7%** saw the QUBE experiment as having **some** impact on the way they operate their own cable system by the year 1984 while 41.7% saw QUBE's impact sometime after 1984. A relatively high number (26.7%) suggested that they "didn't see what the QUBE experiment was all about".

QUBE is of course basically a sophisticated (for 1978 technology) two-way, inter-active system. It differs from the afore-mentioned alarm/security system two-way system primarily in that in QUBE the emphasis is on **subscriber inter-action** for programming response purposes; not alarm purposes. QUBE attempts to get the subscriber 'involved with his TV set', turning the receiver into a 'terminal' capable of 'talking back' to the system and its operators. **QUBE is significantly Japanese based technology** and there may ultimately be a message here for American inter-active two-way cable growth.

The Equipment Snare

Ultimately every expansion of cable (at any level) depends upon the feasibility (cost, ability to perform reliably) of equipment, and, the availability of the equipment. In recent years equipment reliability has become less of a problem (i.e new products seem to work well before they get into mass use) but equipment availability has become a serious problem.

When the FCC announced all preemptive cable rules in 1972, the prognosticators saw a bright future for cable equipment suppliers. Many new firms jumped in at that point and several established firms pre-anticipated the demand and started building larger assembly lines and eventually large inventories. Only it turned out that the promise of the 72 rules was more of a curse than a box of plenty and virtually every supplier in the market suffered in the

LEAD TIME PLANNING AID — "A"

PRODUCT CATEGORY	% Bought Last 90 Days	Mean Lead Time	Best Case	Worst Case
VHF Antennas	50.8%	30 Days	Off Shelf (31.3%)	90 + Days (6.3%)
UHF Antennas	28.6%	40 Days	Off Shelf (16.7%)	90 + Days (11.1%)
TVRO Antennas	20.6%	80 Days	60 Days (23.1%)	90 + Days (76.9%)
Towers	15.9%	35 Days	Off Shelf (20%)	60 Days (10%)
VHF Preamplifiers	49.2%	20 Days	Off Shelf (45.2%)	90 + Days (3.0%)
UHF Preamplifiers	28.6%	30 Days	Off Shelf (44.4%)	90 + Days (5.6%)
TVRO LNAs (preamplifiers)	25.4%	90 Days	60 Days (18.8%)	90 + Days (81.2%)
Heterodyne Processors	38.1%	65 Days	Off Shelf (4.2%)	90 + Days (33.8%)

decay the market experienced in 1974 and 75. Most of the suppliers have sufficiently long memories (or their bankers do) that when things began to look better in 1976 and 77 there was something less than universal enthusiasm for the better times ahead. Withdrawal symptoms persisted.

Traditional growth indicators (new plant miles being one of the most often used) do not begin to measure the depth of the present boom. While new miles constructed ran ahead in 1978 of any year since the early 70's, it was not a large enough number to be significant. Yet more equipment and services money was changing hands than at any prior point in the industry's history. If it wasn't going into new plant miles, where was it going?

Satellite terminals (the basic antenna, LNAs and receivers) are running along at a brisk \$30,000,000 per year. That's just for the primary hardware; engineering, back up receivers and expansion adds another \$5,000,000 per year today. So there is a mini-industry doing 35 million dollars per year here which three years ago did

not exist. This may amount to as much as 25% of the total hardware business being done in the industry today. **And that is just the opening of the business created by the satellites.** There are modulators, subscriber converters, traps, scramblers and descramblers to scratch the surface. These add another 10 million per year. Much of this business activity level, too, was non-existent prior to the satellite.

So as much as one third of the total hardware business going on today is directly related to the satellite signals; take them away and the business would stop. But how much else is similarly dependent upon the satellite signals?

"In Dalhart, Texas we've been kind of growing a little bit at a time for years and years. Then we put channel 17 on the system and for the past few months we never have enough drop cable, fittings, matching transformers or man hours. We've even brought additional installers into this town. Satellite reception has turned it around." A not-untypical report. Just plain old vanilla cable hookups, but hookups that did **not** exist **before** the satellite service and which would go away tomorrow if the satellite service stopped. Can you measure the increase in activity in 'regular cable equipment' that is sparked by the presence of satellite signals in a town? Probably not, but we have no difficulty attributing a total of **50% of all cable hardware business** to the 'presence' of the satellite signals. That's 50% of the present level of business in hardware which is but a portion (half) of the total hardware business out there.

"I would have never started this system without the satellite availability of CBN, WTCG and one of the pay channel services. The town simply was not viable before these services were available. Now here I am building a 70 mile plant in a town that just

OVERALL ATTITUDE — 1977 vs. 1978

Possible Responses	1977	1978
Operator Feels "Better"	60%	66.7%
Operator Feels "Same" (as year prior)	21%	31.1%
Operator Feels "Worse"	19%	2.2%

LEAD TIME PLANNING AID — "B"

PRODUCT CATEGORY	% Bought Last 90 Days	Mean Lead Time	Best Case	Worst Case
Strip Processors	44.4%	25 Days	Off Shelf (21.4%)	90 + Days (10.7%)
TVRO Receivers	27.0%	100 Days	60 Days (5.9%)	90 + Days (94.1%)
Microwave Systems	6.3%	120 Days	75 Days (11.0%)	90 + Days (89.0%)
Frequency Coordination	8.4%	20 Days	10 Days (33%)	30 Days (67%)
7/8ths (TVRO) Cable	7.9%	60 Days	30 Days (20%)	90 Days (20%)
Modulators (video/audio)	31%	80 Days	30 Days (14%)	90 + Days (43%)
UHF Converters (U to V)	26.4%	60 Days	30 Days (18%)	90 + Days (14.5%)
Character Generators	6.4%	75 Days	40 Days (50%)	90 Days (50%)

a few years ago looked dead for cable. That's what the satellite has done for me". Many of the new system starts, on the surface just part of the 1978 crop of new systems being constructed, fall into this same category. On the surface they look like the same type of cable systems being constructed in 1962 or 1972 or even 1975. Only they are not. They are 'Satellite Antenna Cable Systems' as opposed to 'Community Antenna Cable Systems'.

During 1977-8 (mid-year to mid-year) there were 182 new cable systems put into operation in the United States. That is 4.89% increase over the prior year. What is more intriguing is where those 182 new systems were concentrated. 65.38% were located in just 12 of the states:

- Kentucky - 15
- Kansas - 12
- Indiana - 12
- Pennsylvania - 11
- Oklahoma - 10
- Michigan - 9
- Florida - 8
- Missouri - 8
- Tennessee - 8
- N. Carolina - 7
- Virginia - 7

And the percentage of these new systems utilizing satellite? Over 50% going in. As dramatic as that number may be, if you take those new systems starting operation in the last six months of 1978 (for which less than complete numbers are now available) you find 72% of all of these new systems starting off with a satellite terminal.

Obviously the 'attitude' of industry people was better in 1978 than in recent years past. People

don't go on the line for long term credit commitments unless they generally feel 'upbeat' about the condition of the industry they are investing in. We measured how the operators feel about the FCC; a particular thorn in system sides since 1972. What we found, reflected here in a chart, shows that while only slightly more operators felt 'better' about the industry in 1977 than in 1978, a significant reduction occurred in those who feel 'worse' about the industry. In 1977 operators were asked to view their attitudes versus the year prior (1976) while in 1978 they were comparing the current attitudes against the 1977 attitude.

"If this turns out to be another nasty winter in the northeast the situation is going to get even worse. Many of the standard capacitor, resistor, etc. parts come out of the northeast. Last year's fuel shortage shut down many plants for weeks or more. Some never did make up the lost production time and now they are warning us to expect it all over again. Damn the Arabs!"

Prime parts buyer
Major CATV Producer

How Bad The Crunch?

If you take a listing of all satellite terminals approved by the FCC during 1978, and take a similar list of those pending either at the FCC or in the pre-FCC stage at frequency coordination

THE SUPPLIER VIEW

PRODUCT CATEGORY	0-10	11-30	31-60	61-90	91+
VHF Antennas	●		●	●	
UHF Antennas	●	●	●	●	
TVRO Antennas					●
Towers	●		●		
VHF Preamplifiers		●	●		
UHF Preamplifiers		●	●		
TVRO LNAs (amplifiers)				●	●
Heterodyne Processors	●		●		
Strip Processors		●	●		
TVRO Receivers				●	●
Microwave Systems				●	●
Frequency Coordination	●	●			
7/8th's (TVRO) cable		●		●	
Modulators (video/audio)				●	●
UHF Converters (U to V)			●		
Character Generators			●	●	

houses you begin to get a grasp of the type of new system construction activity that might be expected during the first half of 1978. **While the measurement technique is not infallible it does give direction.** And it suggests an additional 120 to 140 new cable systems will start construction during the first 6 to 9 months of 1979 **based upon satellite terminal applications only.** You can compare these numbers against 1978 system starts and come to an educated conclusion that **no fewer than 225 new system starts** will occur during 1979; although not all of the systems may be completed during the new year. Since plant miles can vary so widely (from ten miles to

“What’s in short supply to us as a prime system supplier? Try on microwave components, antennas, LNAs, transformers, connectors, GaAs-FETs and even capacitors!”

Abe Sonnenschein
Hughes Microwave
Communication Products

several thousand per start) there is no easily obtained measuring stick for the amount of actual cable gear required (plant amplifiers, directional taps and so on). But if you utilize 1978 as a yard stick, it would appear to be in the 15-25% increase region over the 1978 numbers.

THE OPERATOR VIEW

PRODUCT CATEGORY	1-10	11-30	31-60	61-90	91+
VHF Antennas	●	●	●	●	
UHF Antennas	●	●	●	●	
TVRO Antennas				●	●
Towers	●	●	●		
VHF Preamplifiers	●	●	●	●	●
UHF Preamplifiers	●	●	●	●	●
TVRO LNAs (amplifiers)				●	●
Heterodyne Processors	●	●	●	●	●
Strip Processors	●	●	●	●	●
TVRO Receivers				●	●
Microwave Systems		NO DATA			
Frequency Coordination		●			
7/8th's (TVRO) cable	●	●	●		
Modulators (video/audio)			●	●	●
UHF Converters (U to V)		●	●	●	
Character Generators			●	●	

This simply suggests that if the manufacturers of hardware are at or very close to their internal ‘full capacities’ today, and business looks to be increasing in the 15-25 percentile region in 1979, whatever the delivery situation is today it is likely to go downhill (that is not get better) for at least the majority of 1979. Several things could happen to upset this generalized prognostication of course. The national economy could sour (many suggest it is already souring). Inflation and interest rates could make money unattractive again. Many financial wizards feel the industry is basically ‘recession proof’. That means they don’t forecast the economy turning down so rapidly or so badly that cable’s basic income (subscriber fees) drops off. The adage is as old as cable in the Kentucky and West Virginia coal fields; **“The last thing people want to part with is their television service; when times are bad, it is all the entertainment they can afford”.**

That doesn’t say what happens to the investment money needed to make cable’s wheels turn however. Interest rates have climbed enough recently to put the damper on at least a handful of otherwise anticipated new builds. If it continues to climb new system starts may feel the impact and quickly. Expansion of existing systems, on the other hand, are often financed by existing system cash flow or by short term borrowing at the local bank. TVRO terminals usually fit that expansion category and if pay cable movies become more important to cable

subscribers as the economy tightens then there is a reverse effect likely; systems that have held off contracting for pay cable services may feel that most people who feel the money pinch will be more receptive to pay cable as an alternate entertainment medium than they did when they were flush with spending money and traveling about the countryside enjoying life.

There is, in fairness, an untested opposite view. That pay cable will be one of the first 'non-essentials to be chopped out of household budgets' during an economic downturn. We've never been there before, so new is the service, and only going through such an experience is going to tell us whether ultimately, in tight times, subscribers feel "pay cable is the best entertainment value in town"; **even when money is tight.**

Bits and Parts

Many systems planning the start of WTCG or a pay channel or some other satellite delivered

"There's a very simply message here for cable operators. When equipment gets in short supply, the cable operator who pays us promptly is the guy who gets the gear. It's just that simple!"

Bob Toner
Toner Cable Eqpt. Inc.

service have ended up with 'egg on the face' when their announced start dates came, and went without the new service. Many operators feel that while component parts (i.e. hardware) is a real problem, an equally severe problem is finding labor to build new plant miles. Cable construction has been in the doldrums for years

THE SUPPLIER VIEW

PRODUCT CATEGORY	0-10	11-30	31-60	61-90	91+
Trunk Amplifiers		●			
Line Extender Amps	●	●			
Pressure Taps		●			
Directional Taps	●	●	●		
Customer Passives	●	●	●		
Drop Cable		●	●		
.412 Cable		●	●	●	
.500 Cable			●	●	
.750 Cable			●	●	
Connectors (drop)	●				
Line Connectors	●	●			
Replacement Parts	●				

and in those years the cost of everything has gone up. Very often the wages offered for cable construction personnel has not kept pace with other wage scale levels and therein lies the crux of the cable manpower problem. Coasting along at 1972 construction prices (per mile) for hard-

"Semiconductors, hybrids and filter capacitors are in very short supply today. Parts vendors are simply running behind their promised delivery dates and that slows down everybody concerned."

Fred Rogers
Broadband Engineering, Inc.

ware, too many operators and system constructors have attempted to also coast along at 1972 labor scale rates. **"We can't find anyone to work at \$4.00 per hour"** laments one contractor. Small wonder. Local fast food chain operations pay almost as much for counter tenders.

Hardware is the most obvious crunch. Operators (see Soapbox here) largely blame the suppliers. The suppliers have other thoughts and several are reflected throughout this report. A CATJ study reveals that **almost nothing is available off the shelf** these days. One of the few exceptions to that statement are passives and some of the frequently utilized subscriber drop materials. Even drop cable is often in the 30 day plus backlog category. **"Just one year ago I called up (major supplier) and ordered several heterodyne processors. I had them in two weeks. Last month I called up to order three more and I was told I could expect delivery in June of 1979. Hell, I could be dead next June!"**. Perhaps. But your processors

THE OPERATOR VIEW

PRODUCT CATEGORY	0-10	11-30	31-60	61-90	91+
Trunk Amplifiers	●	●	●	●	●
Line Extender Amps	●	●	●	●	●
Pressure Taps	●	●	●	●	●
Directional Taps	●	●	●	●	●
Customer Passives	●	●	●	●	
Drop Cable	●	●	●	●	
.412 Cable	●	●	●	●	
.500 Cable	●	●	●	●	
.750 Cable	●	●	●	●	●
Connectors (drop)	●	●	●		
Line Connectors	●	●		●	
Replacement Parts	●	●			●

won't be born until then.

The problem is not unique to cable hardware suppliers. And that is perhaps the most important thing to be learned here. Tiny bits and pieces that go into your much sought after equipment

"Our biggest problem has been the drastic change in lead times for small component parts. An expansion of our production, to meet increased sales activity, is hampered by a shortage of parts and a lack of trained personnel available to fill the new positions that expansion would create."

Harry Sadel
Sadelco, Inc.

have gone from 4-6 week lead times to 20-40 week lead times. It happened largely in the last six months of 1978. Let's say a supplier sat down in January of 1978 and he doped out his raw part needs for 1978. Then he ordered on **scheduled shipments** all of the resistors, capacitors, transistors, clips, knobs and trinkets that he needed (or anticipated needing) for the balance of the

year. Towards the last quarter of 1978 he began to hear rumblings about lead times lengthening. So he decided to sit down 'early' for 1979, say in October, to work up his parts requirements lists for 1979. He turned it in during November and the suppliers responded with **"We can start delivery against this schedule in April"**; a 20 week lead time. **"But what will I do for parts the first quarter of 1979"** lamented the hardware builder. **"I'll not be able to ship anything for the first three months of the year!"**. Sad story. A true story. And many CATV suppliers are just small enough that they have not been watching the parts situation closely enough during the course of the year.

"Yeh, we heard stories about supplies drying up" reports one parts buyer **"but I have to function as parts buyer, chief engineer and number one salesman as well. I just didn't have time to really check it out"**.

Most CATV suppliers are large enough that they **were** on top of the situation. Specialized parts buyers do nothing all day long but source parts. Then as they saw the parts line getting longer and longer they had to go to their management for advance commitments. **"We need to place parts orders now (October) for next June"** noted one. **"Only I'm having trouble convincing management that we can afford to budget money**

LEAD TIME PLANNING AID — "C"

PRODUCT CATEGORY	% Bought Last 90 Days	Mean Lead Time	Best Case	Worst Case
Trunk Amplifiers	49.2%	30 Days	Off Shelf (19.4%)	90 + Days (6.5%)
Line Extender Amplifiers	47.6%	20 Days	Off Shelf (43.3%)	90 + Days (13.3%)
Pressure Taps	44.4%	15 Days	Off Shelf (35.7%)	90 + Days (3.6%)
Directional Taps	65.1%	25 Days	Off Shelf (43.9%)	90 + Days (9.8%)
Customer Passives	52.4%	15 Days	Off Shelf (63.6%)	90 + Days (3.0%)
Drop Cable	69.8%	15 Days	Off Shelf (56.8%)	60 Days (9.1%)
.412 Cable	57.1%	20 Days	Off Shelf (50.0%)	90 + Days (2.8%)
.500 Cable	54.0%	25 Days	Off Shelf (41.2%)	60 Days (14.7%)
.750 Cable	11.1%	30 Days	Off Shelf (28.6%)	90 + Days (11.8%)
Connectors (drop)	54.0%	15 Days	Off Shelf (46.4%)	60 Days (10.7%)
Line Connectors	46.2%	20 Days	Off Shelf (32.1%)	60 Days (12.4%)
Replacement Parts	38.2%	15 Days	Off Shelf (43.6%)	90 + Days (18.7%)

LEAD TIME PLANNING AID — "D"

PRODUCT CATEGORY	% Bought Last 90 Days	Mean Lead Time	Best Case	Worst Case
Pay Cable Traps	17.5%	70 Days	30 Days (27.3%)	90 + Days (54.6%)
Pay Scramblers	17.5%	85 Days	30 Days (9.1%)	90 + Days (72.7%)
Pay Descramblers	17.5%	80 Days	30 Days (9.1%)	90 + Days (63.6%)
Mid/super band converters	22.0%	60 Days	30 Days (36.4%)	90 + Days (32.8%)
Signal Level Meters	28.6%	40 Days	Off Shelf (32%)	90 + Days (27.8%)
Spectrum Analyzers	7.9%	75 Days	60 Days (60%)	90 + Days (40%)
Sweep Test Gear	6.4%	45 Days	30 Days (50%)	60 Days (50%)

into parts expenditures that far in advance. I don't see how we can't afford not to; if we don't we won't have any production!"

Everyone involved has their own problems with 'the problem'. Each level of participant is wrestling with the uncertainty of the future.

The end of the line is you; the cable operator. All you know is that you have to wait for equip-

ment. And your cable subscribers (or would be subscribers) have to wait for service. And your banker...he's waiting for you to start repaying the money he loaned you on a 180 day note. **"You told me that you'd have that thing installed and operating within 90 days and the extra cash flow would start coming back here to pay off the loan after 180 days. Now it's 150 days and you still**

OPERATOR SOAPBOX

"Pay related equipment and test equipment; those are the tough ones". **Taos Cable TV.** "Waiting, waiting, waiting." **Country Cablevision, Inc.** "When you finally get an order of trunk cable you have waited for far too long, to discover the shipper laid the reels over on their side and damaged the cable!". **Westgate Cable TV.** "I got good delivery on TOCOM modulators but I'm still waiting for my Prodelin Antenna, SCI LNA and MSI weather channel." **Televue Cable TV.** "Shippers still don't know how to handle aluminum cable!" **Valley Cable TV, Inc.** "Slow freight delivery on top of late equipment shipping dates is very frustrating. Can you imagine three weeks in transit from Phoenix to Mansfield, Louisiana???" **Mansfield Cablevision.** "Line extenders and modules ordered back on August 15th were still not here November 6th". **Butler Cablevision.** "Microwave antennas ordered in July not here in late November". **Tel-Tech Cable TV.** "Salesmen are in too much of a hurry to give you good, accurate information and they make promises that are not even related to their firm's real ability to deliver." **EMCO CATV, Inc.** "On top of the manufacturer's slow delivery now we have to try to put up with very slow shippers. Egads, will it never end?" **Princeton Cable TV.** "The shortage of LNAs scares me because we only have one and if it goes out we are out of service with our TVRO." **Atoka Cablevision.** "U to V converters are our only real problem; sometimes ten week delivery". **Knob Hill TV Cable Co.** "Our biggest problem is finding time to fill out all of these forms and still have time left to run a cable TV system!". **Crestview Cable TV.** (Touche'-CATJ)

"Seems like the only thing holding back the industry from expanding is the industry suppliers". **Lakeland Cablevision.** "Delivery should really not be a problem if each system will properly anticipate his needs." **Cablevision/Newport.** "Suppliers who fail to inform you they are out of some portion of an order and who therefore don't ship any of the order at all!". **Indian River Cablevision.** "If the order is of any size at all, that just seems to delay shipment". **Beaver Cablecom.** "Suppliers who don't follow the exact (required) shipping instruction". **Sierra Community Systems.** "The biggest problem is getting sales reps to give realistic delivery dates". **Bellaire Antenna Systems, Inc.** "Salesman very rarely stop by anymore...it's all done by us having to call them". **Shippin TV Cable Co.** "Manufacturers don't keep enough gear in inventory; they wait to schedule production after they receive an order". **Meadville Master Antenna, Inc.** "Seems as if small orders are laid back". **Lincoln TV.** "Getting any headend equipment with crystal components". **Youngsville TV Corp.** "Problems? No problems." **Chattaroy Cable Co.** "I've been waiting for a set of new VHF antennas for a new headend for over sixty days". **Vurite, Inc.** "Scrambler equipment for the headend and subscribers descramblers". **See TV Co.** "We don't buy enough new parts to worry. But getting our older equipment repaired...that's a different story!" **Medicine Lodge CATV, Inc.** "Shipping delays are eating us up". **Gutenberg TV Cable.** "Junk parts or cheap equipment is easy to find; quality parts are hard to come by". **Silsbee Cablevision.**

THE SUPPLIER VIEW

PRODUCT CATEGORY	0-10	11-30	31-60	61-90	91+
Pay Cable Traps			●	●	
Pay Scramblers				●	
Pay Descramblers			●	●	
Mid/Super Band Convert.					●
Signal Level Meters			●	●	●
Spectrum Analyzers				●	

don't have that thing in!". Familiar?

"I think what this country needs is a recession" offers one knowledgeable supplier. "Not a big one, just one good enough to slow things down. There are too many people trying to buy stuff at the same time. We've simply drained the well dry." The only problem with that suggestion is that nobody yet has ever been able to 'program' a recession.

"I understand, I think, what the suppliers are going through. But I wish they would take their sales people aside and force feed them some truth serum. When a salesman tells us we can expect something in sixty days, all sorts of things start happening based upon that commitment. Marketing programs are drawn up, money is arranged at the bank, personnel shifts are planned or even made and everything that has to be done to start something new and major gets underway. Then when 60 days becomes 90 or even 120, we spend

"Sure parts are in short supply. But the cable hardware manufacturers were badly burned by the industry in 1974 and 1975 after tooling up for what was expected to be a massive growth period. It didn't happen and now the manufacturers are no longer willing to speculate on operator's whims or put money into finished goods inventory."

Jim Emerson
Northern CATV Dist. Inc.

tens of hours re-arranging our whole plan. I blame the supplier sales people squarely for this problem and believe me I won't be quick to forget!" Many suppliers we talked with acknowledged this problem. Most said they had made specific attempts to 'discipline' sales people on this issue. "But alas, sales people will be sales people...that's a fact of life" offered one shrugging his shoulders.

THE OPERATOR VIEW

PRODUCT CATEGORY	0-10	11-30	31-60	61-90	91+
Pay Cable Traps		●	●	●	●
Pay Scramblers		●	●		●
Pay Descramblers		●	●		●
Mid/Super Band Convert.		●	●	●	●
Signal Level Meters	●	●	●	●	●
Spectrum Analyzers				●	●

There is another side to this of course. As many suppliers pointed out to us "When equipment becomes hard to get, one of the first things any intelligent seller does is to review his accounts

"Customers have got to learn they cannot wait until the last minute to order; some people apparently do not realize how much more active CATV has become, largely because of the explosion in pay cable."

Kerwin F. McMahon
RMS Electronics, Inc.

list. Those who take too long to pay, or those who hassle you unfairly over some aspect of the purchase suddenly find 'their lead time' is much longer than anyone else's". In short, if you don't pay promptly (or according to the terms worked out at the time of the purchase) or if you give the supplier grief which he considers unfair, you may find nobody has anything in stock to sell to you. Not even in the future. Good paying accounts, those that keep the cash flow moving and the doors open are the ones that get the service.

There is one more aspect to the problem; adequate planning at the system level. "We have been encouraging our regular customers to look ahead, six months to as much as a year, to project what they will need and when they will need it. Some systems mis-interpret what we are doing, thinking I guess we are trying to nail them to a long term commitment. Actually, all we are trying to do is to help them get what they need when they need it. The cable industry needs to be doing planning in advance, something only a few of the larger MSOs have done in the past. If we can anticipate...that's the key word...equipment purchase volume six months or more in advance, we can in turn schedule production, raw parts flow and shipments. The day of off-the-shelf, for now at least, is a thing of the past".

FULL 52 ISSUE INDEX for CATJ

In the January 1976 CATJ, and again in the April 1977 CATJ, we prepared a subject by subject listing of all article titles, letters and editorial briefs run in CATJ up to their respective publishing dates. What follows is a 52 issue index, of all CATJ material from the first issue in May of 1974 through the August 1978 issue.

Material, for ease of finding topics by subject matter, is broken into 17 different categories. Four of these categories are new with this listing, reflecting primarily increased editorial space devoted to terrestrial microwave and satellite microwave during the past two years. We have engaged in a modest amount of cross-listing; that is, where one article deals in some depth with material that might be considered to fall under two (or occasionally more) headings the article is listed in more than one location.

For the most part, back issues of CATJ are not available. However if you find a topic which interests you, for a Xeroxing copy fee of ten cents per page (paid at the time of the order) material listed here can be copied by CATJ Librarian Janet Stone. To determine how much to send for such copying, write: Janet Stone, CATJ Librarian, Suite 106, 4209 NW 23rd, Oklahoma City, Oklahoma 73107. **Specify the year and month and the article you wish copied for a quotation as to the charges involved.** There is a minimum charge of \$1.00 for copying material in this fashion.

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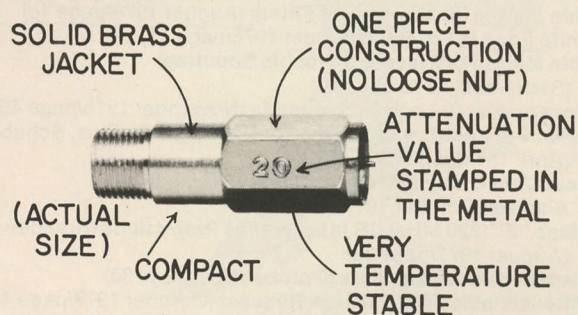
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The Staff of CATJ & CATA
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OHM's Law

In any electrical or electronics circuit, the 'law of the land' is OHM's law. Defined, given three electrical quantities (voltage, current and circuit resistance) the current flow is directly proportional to the total circuit voltage and inversely proportional to the total circuit resistance.

This is probably the most important single theorem in the field of electronics simply because it has so many applications. As a 'law' it is simple to remember and easy to apply. And at the same time it forms the basis for much more complicated circuit theory and even analysis of complex systems.

Three Keys

OHM's law considers these properties of an active electrical circuit:

- 1) **voltage** or electrical 'pressure', measured in volts and represented by the symbol **E**
- 2) **current** flow, measured in amperes and represented by the symbol **I**
- 3) (circuit) **resistance** to the flow of the current, measured in ohms and represented by the symbol **R**.

OHM's law states that the voltage in a circuit equals the total current flowing multiplied by (times, or 'x') the resistance. Or, $E = IR$. A commonly employed analogy is a hydraulic system. Think of electrical pressure (voltage, sometimes expressed as EMF) as being hydraulic pressure; picture the current flow as you would picture hydraulic fluid, and think of electrical resistance as you would picture the internal roughness on the interior of the pipe carrying the hydraulic fluid. Just as a hydraulic pressure in a hydraulic system is created by a pump, a battery (or other voltage source) provides the electrical pressure (voltage or EMF) in an electrical system. As the fluid flows in a hydraulic system, so does current (the movement of electrical charges) flow in an electrical system. Resistance in a hydraulic system, such as the roughness on the inside of a pipe or a sudden change in the diameter of the pipe, is comparable to the resistance to current flow in a piece of wire, or a specific component such as resistor.

For a fixed flow of hydraulic fluid, the higher the degree of roughness (resistance) in the pipe, the harder it will be to make the fluid move through the pipe, and therefore the greater the (hydraulic pump) pressure must be. Likewise for a fixed flow of current, the higher the electrical resistance the greater the electrical voltage must be.

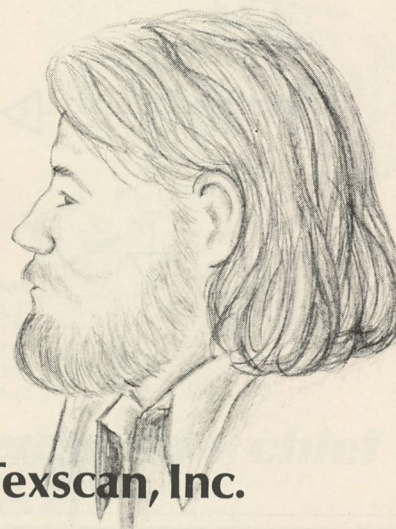
Put another way, for a fixed hydraulic pressure the greater the pipe's resistance, the lower the rate of flow for the hydraulic fluid. Likewise if the voltage is fixed and the resistance increases, the lower the (rate of) flow of the electrical current.

Power Key

Directly from OHM's law we have a law which deals with the measurement

R. Stelle's Technology Corner

Raleigh B. Stelle - Texscan, Inc.



of power. If a certain (specified) level of energy is applied to an energy absorbing device, at least some part of the energy will be absorbed and dissipated in some fashion. Or it may be stored by the device for later release. Accordingly the amount of energy left over for use elsewhere will always be less than the amount you started with. Electrically, **this energy is known as power** and it is measured in **watts**. From OHM's law we can see that if, for a fixed current flow, we have a fixed specific resistance at some point in the circuit, **there will be a pressure or voltage drop across this resistance**. The power or energy absorbed by the resistance is equal to the current times the pressure (voltage) drop which occurs across the device. In other words, power absorbed by a resistance equals the amount of current times the quantity of voltage drop across the resistance ($P = IE$).

Similarly, the power absorbed in an entire electrical circuit (or system, as opposed to that absorbed by a single point or component within the system) is simply the total voltage (pressure) in the system times the current flow in the system. Power required in a system equals the total current through the system times the total voltage across the system.

This concept of power can be compared to the example hydraulic system where more energy must be expended to move a fluid through a very rough pipe than through a smooth pipe.

Moving Right Along

If you have tired of playing with pipes, let's see how Mr. OHM's law can be applied to the everyday business of running a CATV system.

- 1) Each item of electrical or electronic equipment in our system (other than our passive devices which must be treated as resistances) requires some certain amount of power (P) for its operation. Therefore when that item (say an amplifier) is designed for a

specific fixed voltage, the piece of equipment will absorb the required amount of power (P) by drawing sufficient current as needed ($P = EI$).

- 2) All electrical conductors (as in wire or cable) will have a specific (usually very small) value of DC resistance, **measured in ohms per foot**. And the resistance of the wire (cable) will be inversely proportional to the diameter of the current carrying conductor (i.e. **smaller** wires have **higher** resistance).

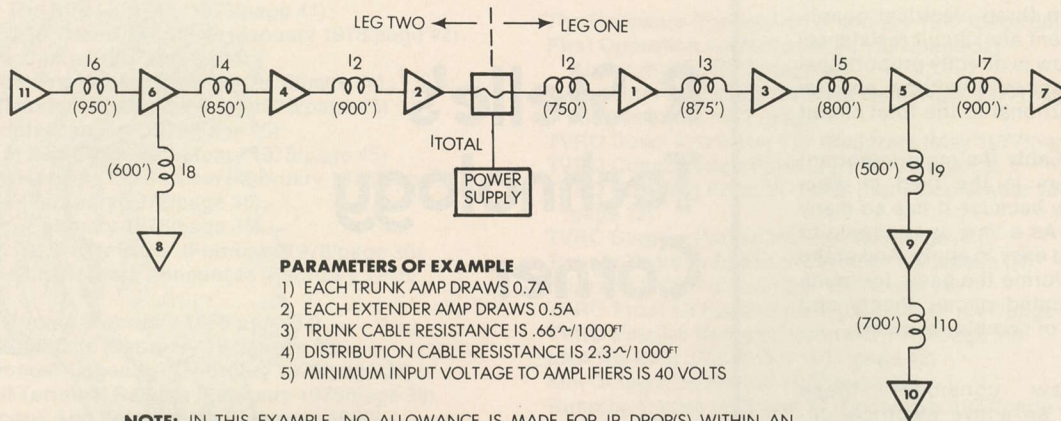
Therefore, because of OHM's law ($E = IR$) any section of wire carrying a current will have an extremely small voltage drop per foot of length. And, as the amount of current flow increases the amount of voltage drop per foot will also increase. In the real CATV world the voltage drop over a very long length of wire (cable) becomes appreciable; in a short length it does not. A very long length here is measured in terms of thousands of feet.

Power companies solve the same problem with their very large cross country transmission lines by using very high voltages. It then follows that a great deal of power can be delivered using a low value of current, which consequently will keep the voltage drop between power stations low.

In designing CATV equipment manufacturers have attempted to employ this same principle. Years ago all cable

$P =$	$E \times I$	$I^2 R$	$\frac{E^2}{R}$
$E =$	IR	$\frac{P}{R}$	\sqrt{PR}
$I =$	$\frac{E}{R}$	$\frac{P}{E}$	$\sqrt{\frac{P}{R}}$
$R =$	$\frac{E}{I}$	$\frac{P}{I^2}$	$\frac{E^2}{P}$

POWERING EXAMPLE



NOTE: IN THIS EXAMPLE, NO ALLOWANCE IS MADE FOR IR DROP(S) WITHIN AN AMPLIFIER STATION NOR IS THERE ANY ATTENTION TO POSITIVE OR NEGATIVE "1/2 CYCLE" POWERING TECHNIQUES; BOTH TOPICS FOR A FUTURE COLUMN.

products that were line powered were designed around 30 volt (AC) line powering levels. The present breed of CATV line equipment will often operate from either **30 volts or 60 volts**. Since a single powering station can supply only a limited amount of power, by electing to use 60 volts rather than 30 volts as the line powering voltage **often** a greater total cable distance can be covered from the single powering location because the voltage drop (and therefore power loss) over a specific

distance will be lower than with 30 volt powering (because not as much current is flowing through the cable).

Clearly the end result can be a requirement for fewer power supplies throughout a CATV system.

Variations in the popular application of OHM's law are shown here in table form. Additionally, a sample powering 'problem' calculating the actual input voltage available to each amplifier is also shown.

Number One: Find Loop Resistance of Each Span

Trunk	R	Distribution	R
I6-950'	.627	I9 -500'	1.15
I4-850'	.561	I8 -600'	1.38
I2-900'	.594	I10-700'	1.61
I1-750'	.495		
I3-875'	.577		
I5-800'	.528		
I7-900'	.594		

Number Two: Find (sum) the Total Current Each Span

I1 -4.2 amp	I2-2.6 amp
I3 -3.6 amp	I4-1.9 amp
I5 -2.9 amp	I6-0.7 amp
I7 -0.7 amp	I8-0.5 amp
I9 1.0 amp	
I10-0.5 amp	Total current -6.9 amp

Number Three: Find Voltage Drop Across Each Span ($E = I \times R$)

I1 x .495 = 2.13 volts	I2 x .594 = 1.54 volts
I3 x .577 = 2.07 volts	I4 x .561 = 1.07 volts
I5 x .528 = 1.53 volts	I6 x .627 = 0.44 volts
I7 x .594 = 0.42 volts	I8 x 1.38 = 0.69 volts
I9 x 1.15 = 1.15 volts	
I10 x 1.61 = 0.8 volts	

Number Four: Subtract successive drops from 60 volt supply

60 - 2.13 = 57.87 at input to 1
57.87 - 2.07 = 55.80 at input to 3
55.80 - 1.53 = 54.27 at input to 5
54.27 - 0.42 = 53.85 at input to 7
54.27 - 1.15 = 52.70 at input to 9
52.70 - 0.80 = 51.90 at input to 10
60 - 0.0 = 60.0 at input to 2
60.0 - 1.54 = 58.46 at input to 4
58.46 - 1.07 = 57.39 at input to 6
57.39 - 0.69 = 56.70 at input to 8
57.39 - 0.44 = 56.95 at input to 11



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ASN - Too Late A Start?

In December of 1977 there appeared at San Diego, during the Western Cable Television Show, a chap named Frank Merklein who was pushing a then-new concept. Merklein, through something called ASN, was going to bring up three major market indies (markets 1, 2, and 3) plus a movie channel on WESTAR II. Merklein got mixed reviews, mostly bad, by the knowledgeable cable operators who saw this proposal filled with difficulties; not the least of which was the FCC's then-present signal carriage rules.

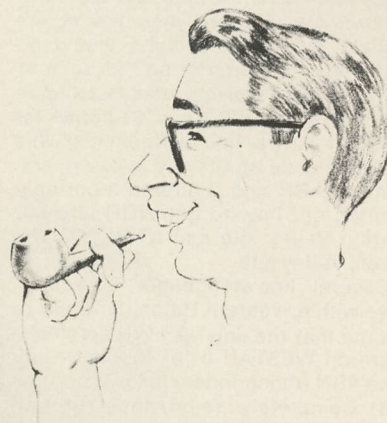
Then in the spring of 1978 Merklein came back with a slightly modified program for ASN, still on WESTAR II. ASN put together a marketing team, arranged for a public demonstration of their programming via WESTAR II during the late April/early May NCTA bash and we did an in depth look at the people behind ASN and the program itself in our April 1978 issue. We remember SSS's Ed Taylor saying to us, after reading the April CATJ report, "I don't think they can do it but when you have somebody like Mike Paolini involved nothing is impossible". Shortly after the NCTA bash, where they variously reported 250,000, 350,000 and even 500,000 'cable homes signed up' the ASN program ended up in an FCC "in basket" where it languished throughout the long, hot summer.

ASN tried an 'end run' around the FCC's rules. They tried to be a seller of satellite relay services without being a formal 'common carrier'. The FCC, never known for its ability to improvise, didn't "recognize" the forms ASN filed and so the forms sat in a basket. ASN kept relying on what they imagined to be the "muscle of Western Union" to push the 'forms' through the FCC. Either WU has no muscle or they didn't push very hard because the 'forms' didn't budge.

Finally on November 22nd the FCC acted on the forms, but only after insisting that ASN re-file as a 'regular satellite common carrier'. On the 22nd of November the FCC gave ASN permission to put up on the satellite Chicago's WGN, Los Angeles' KTTV and New York's WOR. On the surface that sounds like a winning package; three top rated indies from the three largest markets in the nation. ASN, through a sister corporation, said they would also put up a 'movie channel'; a 'mini-pay' service which when combined with the three indies would cost the cable operator \$1.61 per month for the four channels.

At the 1978 Western Cable Show in Anaheim there was ASN with a corner booth and four television sets; one each dedicated to each of their four channels. I had been told that ASN would bring into Anaheim, via WESTAR II, something they called "sneak selections" from the three indies involved. That translated down to an hour here and an hour there from this indie and that indie. It turned out there would only be two on at a time, maximum, and then only for a couple of hours each.

Coop's cable column



**bob cooper editor in chief
CATJ**

On December 6th there was nothing on the ASN screens that we could see; the TVRO antenna supplier whom ASN had negotiated with had his antenna pointed due east as late as noon on Wednesday. Finally on December 7th we learned that if somebody wanted to see any of ASN's "sneak selections" they had to wander out to the parking lot and climb into a portable building that housed a receiver. Things didn't go well for ASN at Anaheim, at least not technically.

In our December CATJ we reported that ASN, even if approved by the FCC, looked like an unlikely candidate to make the grade. We noted that our sources told us that first they were going to have to raise the money required to get into operation, and if they did that, they were next going to have to convince Western Union to do massive transponder re-juggling to find

room for four near full time 'channels' on WESTAR II. During the Western Show we asked Bill McDonald, Chairman of the Board of ASN (and its parent Digital Communications) and George Milne of Western Union to "join us in front of the SATELLITE MAGAZINE color camera to tape an interview" for airing to the industry. McDonald liked the idea and he urged Milne to accept the invitation. Milne thought about it overnight and then declined. His reasoning for not appearing on camera was (we thought) a little hazy. He said "Western Union is not an exhibitor here". They don't grow oranges in Alaska either and I told him that was just as relevant a reason for his not appearing as the reason he gave me. "Changing the subject..." he responded and we parted.

McDonald did appear (the program was seen December 21 and 28) and he told me (1) "Money is not a problem",

CATJ SATELLITE MAGAZINE - SCHEDULE

The cable industry's weekly 'news and feature' satellite distributed "video magazine" schedule for January and the first portion of February is as follows:
January 4 and 11: SATELLITE MAGAZINE relives some of the highlights of the cable industry's first use of the satellite to inter-connect an industry national meeting with cable operators who stayed at home. **Three excerpts from CCOS '78 are presented**, including the famous in-studio report of how the 11 meter CCOS '78 uplink was constructed, a replay of the first cable industry 'program' to be televised (from CCOS '78) and a re-look at TVRO receiver design techniques.

January 18th is a 'holiday' week with no program scheduled.

January 25th/February 1st: SATELLITE MAGAZINE will have interviews with Al Parinello of Nickelodeon/Star Channel, Jeff Reiss of SHOWTIME, Roy Mehlman of UPI, Larry McClellan of Colorado Video and Abe Sonnenschein of Hughes Microwave Communication Products.

February 8th/15th: SATELLITE MAGAZINE will feature interviews with Cliff Gardiner of Gardiner Communications Corporation, Don Edelman of RMS and Bob Toner of Toner Cable Equipment Company.

Videotape copies of SATELLITE MAGAZINE are now available on popular 1/2 inch and 3/4 inch formats (see order card between pages 8-9 this month). SATELLITE MAGAZINE is transmitted at Thursdays at 12 noon eastern (11 Central, 10 Mountain, 9 Pacific) on transponder 24. You are encouraged to make use of the program as a training aid, to tape the program (no copyright!) for subsequent use and re-use, and to utilize it for state and regional meetings.

and, (2) "Western Union has given me every assurance that they have the transponders ready for us, when ever we are ready". McDonald said he would be ready around March or so "as soon as we get off-air receiving sites installed in New Jersey for WOR and California for KTTV". Mike Paolini, the technical whiz kid that heads up the day to day operations of ASN and Digital is reportedly figuring out how to get WOR into the Vernon Valley site and KTTV into the Steele Valley site.

Several knowledgeable sources I have within Western Union continue to tell me that the only way WU can make room on WESTAR II for four near-full-time ASN transponders is for WU to:

- 1) **Completely re-do their ground station network** that now carries WU message traffic on a dedicated basis on 8 of the WESTAR II transponders (we heard cost estimates as high as 4.5 million dollars to accomplish this), and/or
- 2) **Take all of the occasional user traffic off of WESTAR II** (Robert Wold and others who get very special low rates because they buy bulk time on a 'time as available basis'). "Take off" is perhaps misleading. Kick off is closer to what is involved here, since if they are taken off of WESTAR II they really wouldn't have any other place to go, except perhaps RCA SATCOM F2.

On top of that, two of the WU transponders (1 and 12 typically on WESTAR

II) are what is known as 'load-shedding transponders'. That means they get turned off for up to a couple of hours per day during the 'eclipse season'. Western Union doesn't go around 'load shedding' their own message traffic transponders. Logic and past performance suggests they 'shed' people like ASN.

Several questions arise. Very few answers are evident. If ASN really believes that WU does have four transponders ready for them "**WHEN WE ARE READY**" (and I believe McDonald does believe this to be the truth), then ASN is pursuing their program in good faith. On the other hand, what about WU? If they have all of this capacity available, why do they need WESTAR III in such a hurry? And why do so many inside of WU knowledgeable sources tell me (well, they did until this appeared in print!) that "**at peak load times (mid afternoon through mid evening) we are running at 90-95% capacity**"? Numerous non-WU sources confirm this incidentally.

Is Western Union mis-leading ASN? Or is WU holding back some trump card just waiting the proper moment to toss it onto the table?

One knowledgeable source suggests to me that perhaps Western Union is using ASN to simply raise the rates on Robert Wold and the other bulk time buyers. "Wold bought thousands of hours of time at bargain basement rates years ago" says my source. "WU sees

this time being much more valuable today than it was then". So what?

Well, if ASN (which is willing to pay WU rates considerably higher than RCA rates for the first year or two) buys out the assigned-to-video transponders, or even acts like it might, "WU might use this 'serious ASN purchase effort' as a lever to get Wold to come up to a higher rate schedule as well". That suggests WU is not really taking ASN seriously; only serious enough to use ASN to get Wold up to higher rates. Serious charges of course and we label them for what they are. **Simply a hypothesis presented to us by someone who has the experience to know what he is talking about.**

Aside from all of this financial and transponder intrigue, there remains another question, perhaps of greater importance to the cable industry. One year ago, or even last May the "three indies plus a movie channel" package promoted by ASN looked very attractive to many cable systems. Today there are three indies on SATCOM F1 and more movie packages than you can shake a stick at. Plus there is religion, sports and a host of special services. A cable operator thinking about dedicating his first terminal to WESTAR II, or putting in a second terminal for WESTAR II, will have a much tougher time today reaching a "WESTAR decision" than he would have had back last May.

Where will it all end? Stay tuned and see!

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Circuitry Corner

Richard Hagensick of Kickapoo Antennavision, Wisconsin, writes to recommend an FM video demodulator circuit he has used successfully on a 'Gunnplexer' microwave system. He has chosen the Signetics NE564, an inherently higher frequency phase locked loop than the familiar NE560/561/562 series employed by the writer for level-dependent (i.e. below limiting) variable bandwidth demodulation. (See CATJ October 1978, page 48A). Richard's schematic is reproduced in **diagram 1**. The NE592 differential video amplifier provides inversion as required and brings the video output up to standard 1 volt level. We have not tried this circuit (nor any of the other integrated PLLs that have become available since the launch of the 560 series) but its performance should be at least equal to the task.

Energy Dispersal: What is it? Why is it used?

Roger Bunney, operating an experimental terminal at Romsey, England, asks for clarification of this recurrent term. The consideration is the maximum power flux density, usually expressed in dBW/m² per 4 kHz, at the Earth's surface. A limit is agreed internationally to avoid interference to terrestrial services using the same band, as well as to other satellite services. **Since this is a 'density' or 'per Hz' figure, i.e. inversely proportional to bandwidth at any instant, the limit is more likely to be exceeded or interference caused at low deviation levels,** for a given transponder carrier power. Both TV and FDM telephony exhibit statistical variations in the energy distributions of their modulated spectra. If our TV picture changes from a scene full of detail (**diagram 2, A**) to black

level and syncs, and we consider components below pre-emphasis crossover frequency, we can see the 'carrier' power which was spread over say 5 MHz of the band suddenly become concentrated at two frequencies (**B**); that corresponding to black level and that corresponding to sync tip, in the modulated FM signal. **If the modulating video were completely removed (C), all the carrier power would appear on one spot frequency,** the undeviated center frequency of the FM oscillator. Similar conditions can be imagined for telephony loading. So in order that adequate power can be radiated (see 'The Down-link Equation', p.40A, CATJ November 1978) when dispersed by video, **without exceeding the permitted power flux density at low information rates,** a waveform is applied continuously to the FM modulator of the up-link transmitter. For TV this is generally a symmetrical triangular waveform (**D**) at half field frequency, at such a level as to give a deviation of about 1 MHz peak. This waveform has the property that its instantaneous voltage is continuously changing with time—it has no 'stationary' turning points, as would a square wave or sine wave, to give peaks in the dispersed spectrum. **Line clamping is then required in the receiver to remove this energy dispersal waveform,** or it will appear as a 30 (or in Europe 25, or 12.5) Hz 'ripple' or 'flutter' superimposed on the picture. Receivers for CATV terminals typically employ 40 dB of clamping.

International Satellites

To complement last month's diagram of Atlantic satellite visibility limits in North America, here (**diagram 4**) is the west-coast experimenter's view of the 'other' birds—the Pacific Ocean satellites, proceeding westward beyond Satcom F1 at 135°W:

140°W Applications Technology Satellite 6 (NASA)

170°W Stationar-10 (USSR), 1980 launch.

181°W Intelsat Pacific spare, currently IV F4

186°W Intelsat Pacific Primary Path, currently IV F8

ATS-6 is principally in use for direct broadcasting experiments involving its 860 MHz and 2.6 GHz downlink frequencies. **It does however carry a 4 GHz capability** and may at times be observed radiating the experimental programs simultaneously in this band. Its global beam horn antenna provides a beam-edge EIRP of 24 dBw. The reduced population of **Intelsats** over the Pacific is a reflection of the smaller demand for international circuits here, compared to the Atlantic region.

Before concluding our tally of interesting geostationary objects visible from the U.S. there's something else we shouldn't overlook in our quest for new 4 GHz signal sources. Parked near the center of that 'prime real estate' of the North American orbital arc at **116°W** is **Hermes—the Communica-**

**FM VIDEO DEMODULATION CIRCUIT
USED BY RICHARD HAGENSICK**

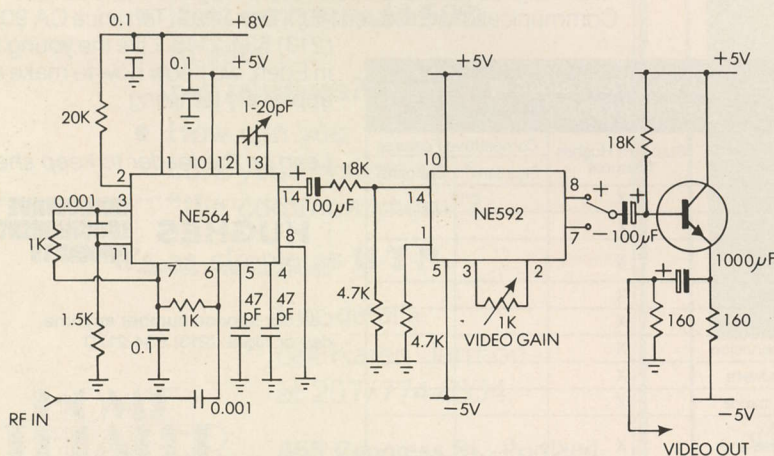


DIAGRAM ONE

EFFECT OF ENERGY DISPERSAL ON SPECTRAL DISTRIBUTION OF POWER

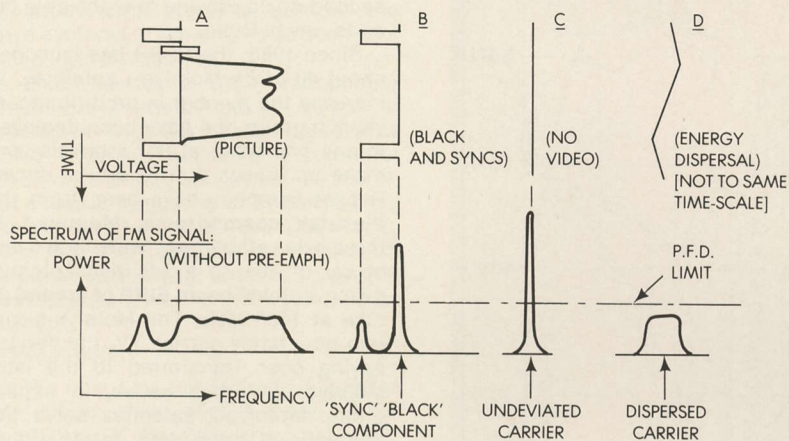


DIAGRAM TWO

tions Technology Satellite—launched as a joint venture by NASA for the Canadian Department of Communications, and capable of delivering an EIRP of around **one megawatt** (60 dBw) in its 2.5° steerable beam, at a frequency of **12 GHz**. This is a frequency band every satellite user will have to become familiar with over the next few years. Already, Japan has its **BSE** (Medium-Scale Broadcasting Satellite for Experimental Purpose), covering the Japanese islands with TV transmissions at an EIRP again just below the megawatt level, from its 110°E orbital station. Other nations worldwide have their plans for TV broadcasting satellites in the 12 GHz band, while the adjacent 11 GHz telecom-

munications allocation (actual band limits vary in different regions of the globe) will contain the next generation of international (Intelsat V) and domestic (SBS, Anik-C, TDRSS/Advanced Westar, or in USSR, Loutch) comsats. Europe has its own complementary experiments: **OTS**, the Orbital Test Satellites, forerunner of an operational European Communications Satellite, and the forthcoming high-power broadcasting satellite **H-Sat**, both employing uplink frequencies around 14 GHz and downlinks in the 11/12 GHz bands. **Experimenters in England are already receiving good quality TV pictures from the 47 dBw spotbeam and 37.5 dBw 'Eurobeam' of OTS.**

WAVEFORMS IN ENERGY DISPERSAL

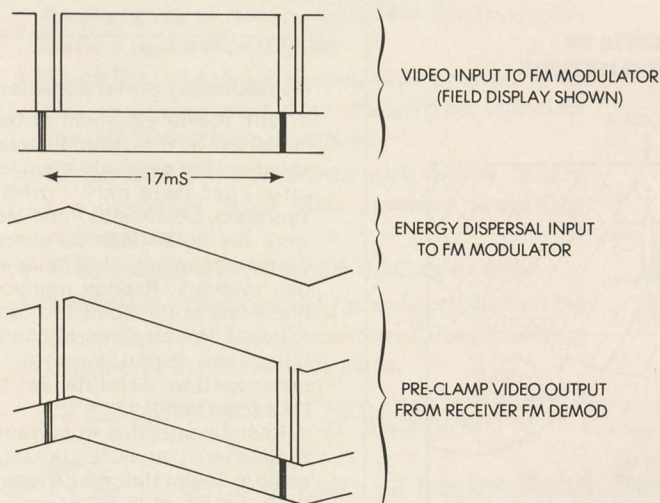
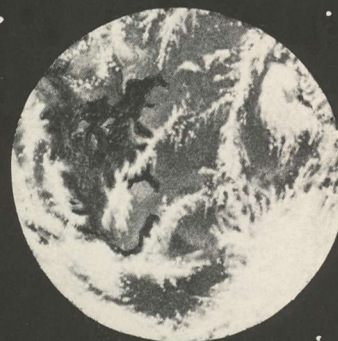


DIAGRAM THREE

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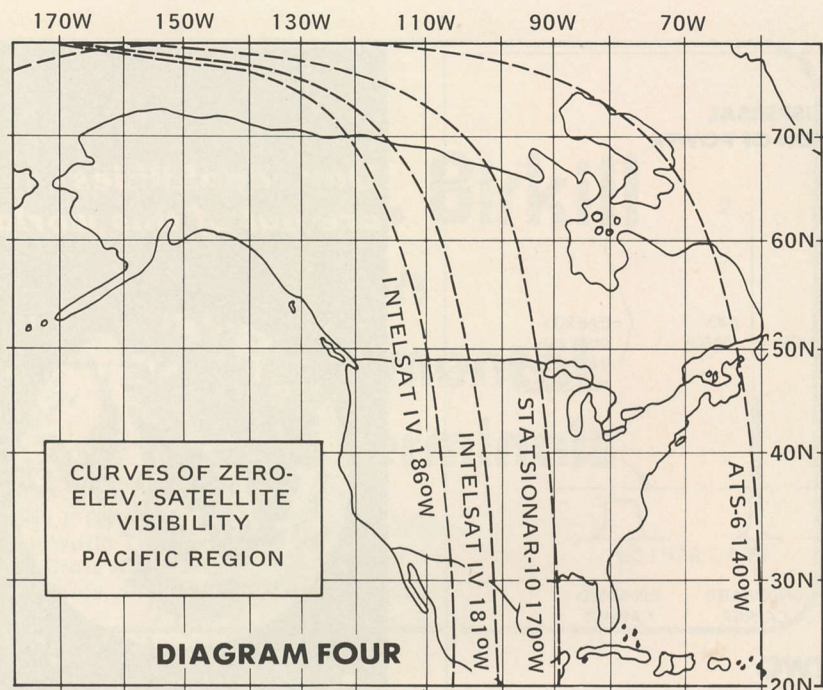
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January 1979



The Soviet Systems

These divide naturally into two classes: **geostationary** and **inclined orbit**. On April 23, 1965, the Soviet news agency Tass announced the launching of Molniya, (Lightning), the USSR's first communications satellite. The 2200 lb spacecraft, whose mission included the relay of Moscow's Central Television to the far-flung regions of the Soviet Union, was placed in an **elliptical orbit of 12 hour period and 65.5° inclination**. At that time the Soviets did not have the capability of putting satellites into geostationary orbit, due to the combination of the latitude of their launch site (the **Balkonur cosmodrome** at Tyuratam is near latitude 45°N compared with 28°30' N for Kennedy Space Center) and the limited payload capacity of their existing launch vehicles. The

highly elliptical (538 x 39,300 km) orbit chosen had a property which to some extent outweighed the disadvantage of requiring continuous tracking by the earth stations. At apogee in the Northern hemisphere the satellite appears from the Earth to be moving very slowly, and in the same direction as the Earth's rotation. Plotting the ground track of the subsatellite point on the Earth's rotating surface (diagram 5) reveals that **for a period of over 8 hours per day the satellite remains within a few degrees of a point in the sky of 60°N declination**, then sweeping rapidly away to perigee in the southern hemisphere, and **spending a further 8 hours near a second 60°N point, 180° removed in longitude from the first**. Thus, by spacing three similar spacecraft equally along this orbit, 24-hour service can be maintained by

switching from one satellite to the next at the end of its 8-hour 'quasi-stationary' period. **Coverage is maintained right over the pole** (impossible from the geostationary orbit), and if the "first apogee point" be used for internal Soviet communications, the second could provide over-the-pole circuits, **say to Cuba**.

Since 1965, the USSR has launched about **40** of its Molniya-1 satellites, to increase the number in orbit (in recent years a group of 4 have been deployed in any one orbit, at 90° intervals) and make up losses due to orbital decay. Recent launches have been from the **Plesetsk cosmodrome**. Molniya-1 is three-axis stabilized, with down-link power of 40w to a 3-ft dish antenna, giving a **global-beam EIRP of around 33 dBw at 1000 MHz**. The Molniya-1 system now **rarely carries TV**, the service having been transferred to the later **Molniya -2 and -3 series**, in similar orbits. Molniya-2 satellites serve the domestic (Orbita) and international (Intersputnik) systems. Downlinks are in the band 3.75 to 3.90 GHz and EIRP is believed to be 29 dBw, **earth coverage**. The Orbita stations generally feed local broadcast transmitters, and their number is now approaching 100. Standard antenna is 12 meters diameter.

IDEALIZED MOLNIYA ORBIT WITH THREE SATELLITE GROUP

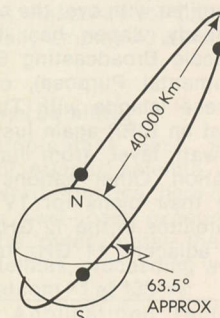


DIAGRAM FIVE-A

EARTH TRACK AND VISIBILITY ZONES OF MOLNIYA-TYPE ORBIT (MERCATOR PROJECTION)

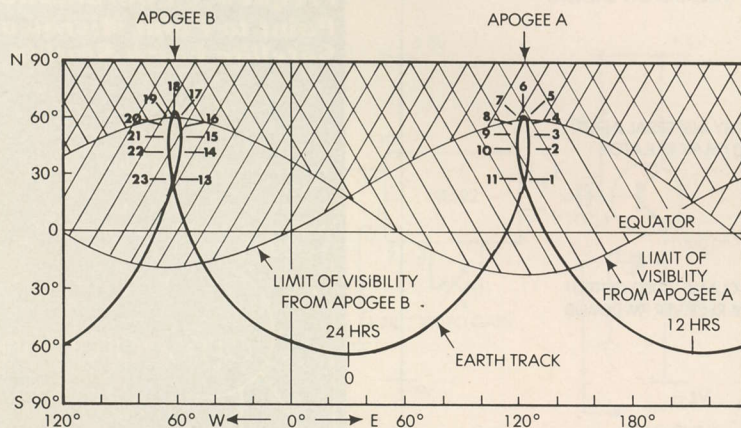


DIAGRAM FIVE

Geostationary Soviet Satellites

With the development of the D-1-E-e launcher in 1974, the Russians were able to place payloads of up to 5,500 lb into geostationary orbit, from **Tyuratam**. Cosmos-637 and Molniya-1S were the initial test satellites for the Statsionar series. Statsionar embraces two systems: **Raduga** (rainbow) satellites for both domestic and international **TV relay** and telecommunications; and **Ekran** (screen), a **direct broadcasting satellite in the UHF broadcast band**.

Raduga satellites in current use are Statsionar-1, at 80°E, linking the far eastern Soviet Union with Moscow, and Statsionar-2, at 35°E, covering Europe and western USSR. This class of satellite employs a 'northern hemisphere' beam of 29 dBw in the band 3.4 to 3.9 GHz. Statsionar-2 is particularly well re-

ceived in the U.K. (photo 1). The Statsionar network is planned to achieve global coverage by the time of the Moscow Olympics in 1980, giving Intersputnik facilities **parallel to those of Intelsat**. Indeed, a glance at the proposed locations shows **the probability of interference problems** between the two systems. It remains to be seen how these will be resolved.

Ekran carries a 200w transponder feeding a broadside array of 90 helical radiators to give a beam of 56.5 dBw EIRP, covering the northern regions of the Soviet Union, between 60 and 80°N, **at a center frequency of 714 MHz**. Also known as Statsionar-T (for Television), **this satellite can be received with simple rooftop yagi antennas** throughout Siberia from its orbital station at 99°E.

Compatibility

We now turn to the question of the extent to which any of these 'other' satellite TV transmissions are compatible with a receiving system designed for North American domestic standards. There are six headings under which any differences can be classified:

1. Channel frequency. For the present we shall consider only '4 GHz' satellites. The band limits, 3.7 to 4.2 GHz, are common to all western '4 GHz' systems, but the channel frequencies used by Intelsat (within this band) are **not** in general the same as those used by Satcom, Westar, Comstar and Anik.



RUSSIAN CHANNEL 4 received in Northern England on 3820 MHz via Statsionar-2 on Birkill home experimental terminal.

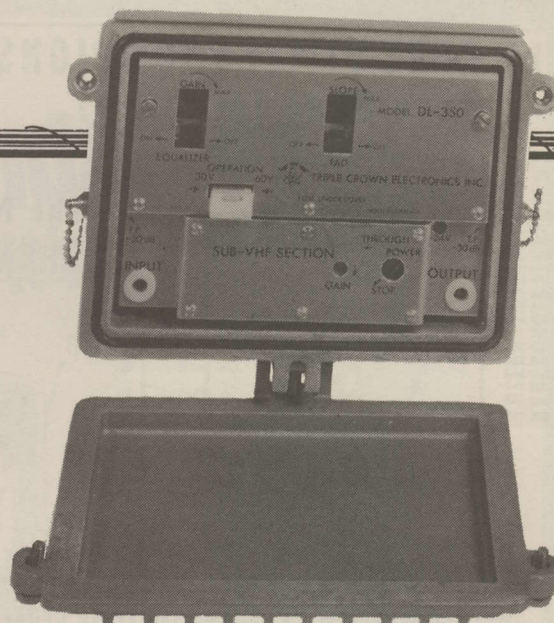
In addition to the difference in transponder frequencies, **there is the variation of carrier frequencies within each transponder**, for such reasons as half-transponder working, now standard for TV in the Intelsat system. Along with

this goes **the variation in deviation** employed for the video signal.

We can list the Intelsat transponder center frequencies for comparison with those of the 12- and 24-channel domestic birds (see box here).

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RCA-Satcom / Comstar			Westar / Anik		Intelsat-IV	
chan no.	freq MHz	pol H/V	channel no.	freq MHz	transponder no.	freq.
1	3720	V	1	3720	1	3725
2	3740	H				
3	3760	V	2	3760	2	3765
4	3780	H				
5	3800	V	3	3800	3	3805
6	3820	H				
7	3840	V	4	3840	4	3845
8	3860	H				
9	3880	V	5	3880	5	3885
10	3900	H				
11	3920	V	6	3920	6	3925
12	3940	H				
13	3960	V	7	3960	7	3975
14	3980	H				
15	4000	V	8	4000	8	4015
16	4020	H				
17	4040	V	9	4040	9	4055
18	4060	H				
19	4080	V	10	4080	10	4095
20	4100	H				
21	4120	V	11	4120	11	4135
22	4140	H				
23	4160	V	12	4160	12	4175
24	4180	H				

It will be observed that Intelsat transponders 1-6 are offset **plus** 5 MHz from a vertical (odd-numbered) Satcom

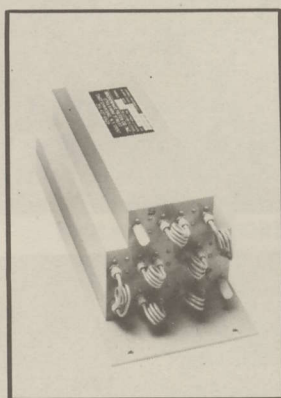
channel, and 7-12 by **minus** 5 MHz (in the opposite direction) from a horizontal (even-numbered) channel. Also

that, if we assume the **half-transponder carriers** are offset by ± 10 MHz (a typical figure) from channel-center, **they move to a spot 5 MHz away from a Satcom channel of the alternate polarization**. This means that we should have no difficulty (given sufficient C/N) in demodulating the Intelsat video with our 24-channel receiver. **The effect of half-transponder format will be to reduce video output amplitude and signal/noise ratio by 6 dB**, unless we use a variable bandwidth demodulator to take full advantage of it. (This assumes carriers in the other half of the Intelsat transponder are not strong enough within our receiver passband to 'capture' the demodulator. A narrow-band tunable demodulator would also overcome this problem. See page 40-A, October 1978 CATJ).

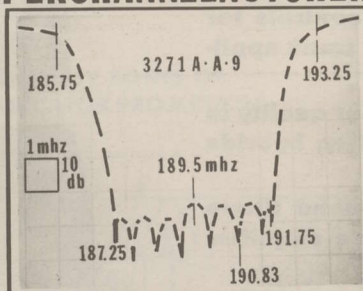
If now we wish to cover the Statsionar down-link frequency range, our lower band-edge has to extend downwards **from 3.7 to 3.4 GHz**. There is a choice here: either live without the channels in this range (Statsionar-2 does carry a TV channel on 3890 MHz), or build a down-converter specially for them. For instance if we choose a first local oscillator frequency of 3250 MHz (as used by the writer) to bring the 3.7-4.2 GHz range down to 450-950 MHz, capable of being tuned by a standard voltage-controlled UHF TV tuner, then, so long as we have taken care to provide sufficient bandwidth in RF and mixer stages, we merely need to explore this 'tunable i.f.' down to 150 MHz, using standard CATV-type heterodyne processor techniques. This may prove to be unnecessary; **observations** to date **implying** that the Statsionar downlink

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Launch Date	Satellite	Longitude	Uplink, GHz	Downlink, GHz
12.22.75	Statsionar- 1	80°E	5.75-6.20	3.42-3.87
7.23.77	Statsionar- 2	35°E	5.75-6.20	3.42-3.87
1978-1979	Statsionar- 3	85°E	5.75-6.20	3.42-3.87
1978-1979	Statsionar- 4	14°W	6.00-6.25	3.65-3.90
1978-1979	Statsionar- 5	58°E	6.00-6.25	3.65-3.90
1979-1980	Statsionar- 6	85°E	6.00-6.25	3.65-3.90
1979-1980	Statsionar- 7	140°E	6.00-6.25	3.65-3.90
1980	Statsionar- 8	25°W	5.75-6.00	3.42-3.67
1980	Statsionar- 9	45°E	6.00-6.25	3.65-3.90
1980	Statsionar-10	170°W	6.00-6.25	3.65-3.90

frequencies may have **more overlap** with our own that the published figures suggest.

2. Sense of Frequency Modulation

Not all satellite TV modulates its carrier in the same direction for a black-to-white transition—to cover the possibility of receiving inverted video we need to provide our receiver with a **switchable inverter** or 'phase-splitter' at the video output of the demodulator, and before the clamp circuit to retain correct clamp-pulse generation.

3. Audio System

Unfortunately there is little standardisation here. 6.8 and 6.2 MHz subcarriers are the exception rather than the rule on international circuits. Intelsat channels leased for internal or overseas TV program distribution (for example by certain African

nations—more details next month) may employ subcarrier audio. The best way to find this is to have a **tunable FM audio demod** to explore the baseband above video—tunable over say 4.5 to 8.5 MHz. This will take care of any likely audio subcarrier frequency. The USSR uses **two simultaneous** audio subcarriers—a situation occasionally found much nearer home.

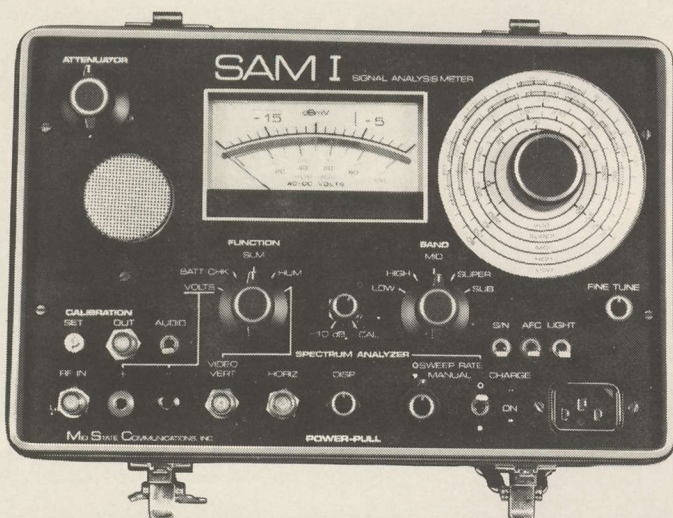
More usually, Intelsat TV channels will employ **separate carriers within the same transponder bandwidth** for the audio signals. A modified FM broadcast receiver is the handy solution here. If the normal 88-108 MHz tuning range be extended to 50-90 MHz, the receiver can be fed from the 70 MHz output of the TVRO video receiver, and tuned over the transponder bandwidth to locate the audio carrier.

Another possibility is that **no audio signal is present** within the trans-

ponder. An international news item carried by satellite ('birded') may send its audio over a telephone channel, routed possibly on a different transponder or even a different satellite to the video, or alternatively by land-line. **Sports events for international distribution** commonly employ an 'international sound' channel carrying little more than background sounds and spectator response, on a music quality audio circuit, while **commentaries in individual languages** are transmitted over telephone-quality circuits.

Other audio variations are possible. The USSR time-division multiplexes **two low quality** (7 kHz bandwidth) audio channels into its video waveform for satellite transmission, by **analogue modulation of the width of two pulses inserted within the line blanking period**, either side of a reduced-width

this versatile meter is dependable—and it's a workhorse!



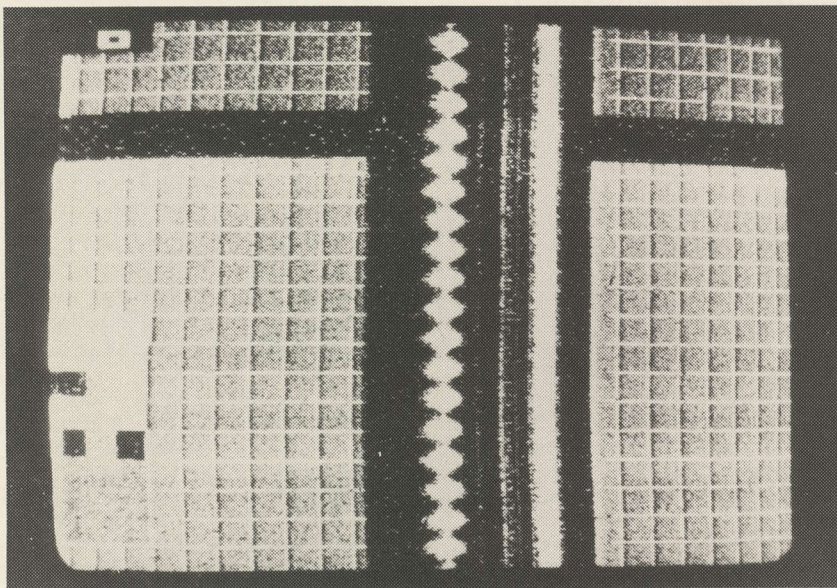
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WIDTH MODULATED audio pulses carrying pair of 7 kHz audio channels on Russian Statsionar-2 bird. Analogue modulation is inserted within line blanking period.

line sync pulse. (photo 2). Programs exchanged between European broadcasters commonly use the digital sound-in-syncs system developed by the BBC to carry high-quality (15 kHz bandwidth) audio. Both these systems require sync-timed gating and sub-

sequent processing to recover the sound channel.

4. Video line standard

Two standards are used for TV worldwide, with rare exceptions that need not concern us. Outside the Americas

and Japan the 625-line standard is dominant. This in itself is no great problem. The line (horizontal) frequency of 15.625 kHz is only one percent different to that of the 525-line standard. The field (vertical) frequency is 50 as against 60 Hz, which on some monitors will require an adjustment to the vertical hold control and reduction of picture height (field amplitude). But along with the change of line standard goes a more significant change.

5. Color System

NTSC color is employed **only** on the 525-line standard. On 625, the SECAM color system is used by the French and the Russians. Most others use PAL. These color systems are sufficiently different to that of the US to be **completely unresolved**. So unless the experimenter has a suitable decoder or transcoder, his 625-line Intelsat and Statsionar pictures will remain in glorious monochrome.

Final difference—very important—6. Polarization

Unlike the US domestic comsats, Intelsat and Statsionar downlinks are **circularly polarized**. When received on an antenna with plane-polarized feed, a **3 dB loss of gain will be apparent**. This wasn't intended as a cliffhanger, but I've about used up my space for this month so we'll describe construction of a polarizer next time.

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Satellite Technology News

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ASN 'Was Up'

During the Western Cable Television Show in Anaheim, December 6-8, **ASN** (Americom Satellite Network) was transmitting 'sneak selections' of programming via WESTAR II from Los Angeles KTTV (transponder 12), Chicago WGN (transponder 4) and New York City WOR (transponder 1). ASN received FCC approval as an 'interim' common carrier on November 22nd and arranged the part time feeds for the Western Show.

ASN's Bill McDonald (Chairman of the Board) told CATJ he was moving ahead to install off-air receiving site towers at Vernon Valley to bring WOR to the Western Union site there, and outside Los Angeles at the Steele Valley WU site for KTTV. WGN will come off-air at the Lake Geneva site from an existing tower. McDonald expects these towers

to be installed and operational by March of 1979. On an interim basis the KTTV and WOR signals must be transmitted from downtown New York and Los Angeles off-air sites via existing Western Union terrestrial microwave to the pair of uplink sites. Because of the heavy demands on the existing terrestrial microwave links full time carriage via these links is not possible.

McDonald also told CATJ that he anticipates having their movie channel in operation (transponder not specified at this time) at 'about the same time' as the off-air indie signals. For more details and observations on this program see Coop's Cable Column, this issue of CATJ.

RCA Will Launch F3

RCA American Communications announced early in December that it

has completed arrangements with NASA to launch SATCOM III via a Thor Delta 3914 rocket "no later than December 6, 1979...and perhaps 30 to 60 days prior to that date". This announcement has considerable impact for the further development of cable services via satellite since all cable traffic in existence at the time the F3 bird is operational will move to the new bird.

F3 will be 'sandwiched in' at an orbit position of 132 degrees west. This is some 5 degrees west of COMSTAR I (128 degrees) but only 3 degrees east of the existing location of RCA F1 (135 degrees). In their application to the FCC, RCA 'suggested' that it would be willing to 'scoot' F1 west by another degree, to 136 degrees west to create the more-acceptable-to-the-FCC 4 degree spacing between F3 and F1. However, RCA's Andy Inglis suggests that "RCA engineers believe that the 3 degree spacing is adequate" and they will be asking the Commission to allow them to leave the F1 bird in its present location "at least until it is proven by actual use that there are interference problems with the (closer) 3 degrees spacing". FCC action on the application is not expected before the latter part of winter or early spring.

Here is what will happen when F3 is put into operation:

- 1) **The bird's formal launch date is December 6, 1979;** however it may gain a launch date as early as October 1979, if other scheduled launches now on the NASA books 'slide' back.
- 2) **Between 60 and 90 days after launch,** F3 will be in its designated orbit position and RCA will then ask the cable industry to go through another 'massive moving day' period. At that time, it is anticipated that 20 of the 24 transponders on F1 will be carrying CATV programming. **All 20 will move to F3 at one time.** (The move, which includes re-positioning of CATV receive terminal antennas on the ground, should be much less traumatic than the F2 to F1 move since we will be moving only 3 degrees 'to the left'.)
- 3) **With the move,** an additional four transponders will be available on F3 for new, additional CATV services. RCA is calling F3 the "CATV satellite"; indicating that **only CATV programming traffic** will be on this satellite.
- 4) If the CATV industry requires additional transponders, **beyond the 24 available on F3** after the launch and program shifting date, Inglis says that 11 of the present transponders on F1 (likely to be the 11 now-operational horizontal transponders or all of the even numbers from 2 through 24 except 4 which is broken) will be available for what RCA calls

CATV TVRO STATISTICS — JAN. 1979

Applications Filed/FCC	Sept. 1978	Oct. 1978	Nov. 1978
1) 11 meter	0	0	0
2) 10 meter	1	1	1
3) 7 meter		2	1
4) 6 meter	5	12	9
5) 5 meter	42	68	54
6) 4.5 meter	19	29	42
Total Apps	67	112	107
Cost Max.	\$109,000	\$136,200	\$209,000
Cost Min.	\$12,600	\$17,815	\$9,995
Avg. Cost	\$34,662	\$34,123	\$31,883
Channels Requested	136	284	241
Average Channels	2.06	2.5	2.3
Requesting WTCG	35	61	57
Requesting CBN	35	73	54
Requesting HBO	44	69	60
Requesting MSGE	13	38	25
Requesting SHOWTIME	5	12	21
Avg. Cost Per Channel	\$16,826*	\$13,649*	\$13,862*
TVRO's Licensed/FCC	73	91	85

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

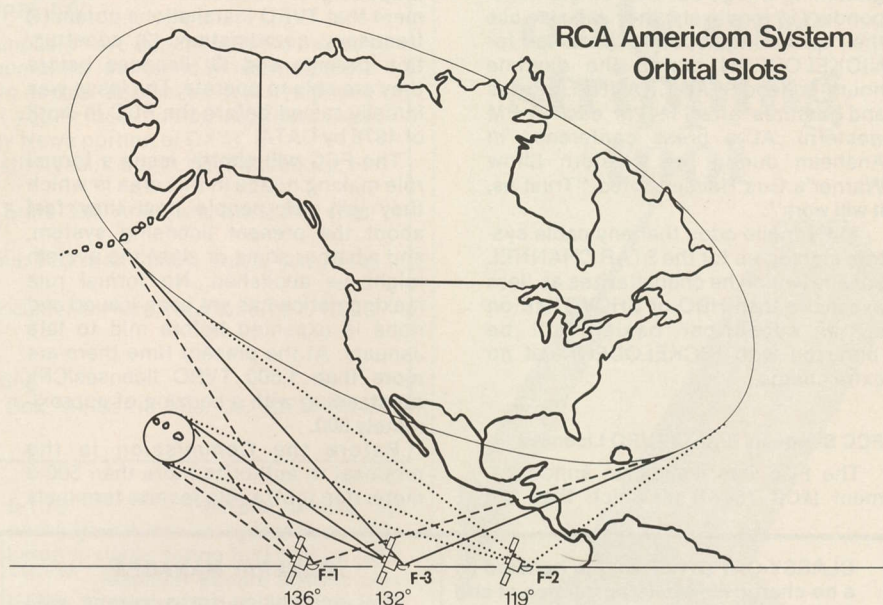
"a second CATV network". If the CATV industry ends up being a 'two satellite industry' RCA feels that both satellites should be RCA satellites. That would create a maximum channel capacity for CATV of 35 transponders, between the two satellites.

While the F3 bird is essentially the same bird as F1 and F2, RCA is retrofitting F3 with several refinements which should prove very useful to the cable industry. Foremost amongst these is a set of four extra 'TWT output stages'. The normal SATCOM configuration provides four separate sets of six transponders, each of which feeds signals to a separate transmitting antenna array (there are four transmitting antenna arrays on SATCOM birds). The retrofitted F3 will have one spare TWT output stage per antenna array which can be commanded, from the ground, to replace a TWT output stage on the bird should a TWT go bad. This means that one spare TWT per set of six transponders will be available.

In addition to the back-up or spare TWT output stages, F3 will also have a slightly increased battery capacity and a slightly increased fuel capacity. On the bottom line RCA feels they will be extending the life of F3 from the present "8 year forecast life" to a "10 year forecast life" with the changes on the bird.

RCA is also approaching the "classes of service" on F3 in a different way than on F1 or 2. At the present time there are three classes of service available; protected, unprotected and pre-emptible (see pages 28-29, December 1978 CATJ). Under the plan for F3 there will apparently be 20 protected (i.e. guaranteed service) transponders and 4 pre-emptible transponders. This will mean higher tariffs for CATV program suppliers (current pre-emptible users pay \$670,000 per transponder per year while protected users pay around \$1,300,000 per year for their transponders) on F3 about which Inglis notes "I do not see how the cable industry can afford to build a solid business foundation on a satellite delivered service package which may cease to be because of a transponder failure".

For the time being the launch of F3 will have no direct bearing on the development of TVRO systems being installed or sold. The equipment you are now utilizing, or will install during 1979, will function just as well on F3 as it now does on F1. RCA did say that they expect to do some "fine tuning" of the EIRP patterns on F3 as the last retrofitting is done on the bird prior to launch and Inglis noted "We anticipate that we will be able to bring up EIRP levels with F3, over F1, in some portions of the country; in particular in the southeastern United States". As numerous prior reports in CATJ have reported, F1 levels have been something of a disappointment to cable operators along the Gulf Coast and down into Florida.



Footprint maps for F3 are not expected to be available prior to the formal FCC approval of F3; sometime late in the winter or early in the spring of 1979.

Warner's Satellite Use

Warner Cable Corporation utilized the Western Cable Television Show setting as a time and place to reveal the details of their new satellite fed services which are tentatively scheduled to begin operation on February 1st.

Warner announced a pair of services, using a 'shared transponder format'. One was the much anticipated STAR CHANNEL package which is Warner's proprietary pay cable movie package. The second had been rumored but never previously confirmed; a "children's satellite network" to be known as NICKELODEON. Here is how it will all work.

NICKELODEON is to be a 13 hour per day feed, probably on transponder 5. It will run from 10 AM to 11 PM daily (tentatively on 5) eastern time (7 AM to 8 PM western time zone) with an extra hour added on Saturday and Sunday (starting at 9 AM eastern on those two days). NICKELODEON has been dubbed "the daughter of QUBE", largely because the 13/14 hours per day is being created in the Warner system in Columbus, Ohio where QUBE is operational. Warner's approach with NICKELODEON is to create totally new for 'young people' programming; and subjecting each new concept to 'field test' in the Columbus QUBE system. By utilizing the QUBE two-way interactive testing grounds the children's programming created for NICKELODEON will be refined and adapted to the formats which children indicate (via QUBE) they like the best. The programming will be broken into three major age-group appeal levels; one set for the pre-school children (i.e. under 7 years old), another for the children 7 to

12 years old and a third set for teenagers. All of the programming is new programming, none has come from other media (such as broadcast television) and all will be tested on the two-way interactive QUBE system before it lands on the satellite. The per cable subscriber charge for NICKELODEON will be ten cents per home per month.

Warner's second leased satellite channel, transponder 11, will be dedicated to feeding their pay program service (STAR CHANNEL) to both Warner owned and operated cable systems and to other (non-Warner) systems which might like the STAR CHANNEL format. Al Parinello, formerly with RCA and now Director of Sales and Marketing for Warner's Pay TV Services, reports that "While we will not create nor operate the type or large, extensive field and home office sales and marketing operation that other pay cable programming operations have put together, we will be interested in taking on affiliates for STAR CHANNEL which are non-Warner systems". Of particular interest perhaps is the 'different approach to pay cable programming' which characterizes the STAR CHANNEL format. Warner has been servicing their own cable systems with STAR CHANNEL service via video tape (not unlike the SHOWTIME approach until they went 'satellite' last spring). STAR CHANNEL provides a movie showing at 9 AM, 12 noon, 6 PM, 9 PM and 11:30 PM. Parinello notes "By providing the extra two showings, at 9 AM and 12 noon, we make it possible for shift workers and housewives to get more value from their STAR CHANNEL programming service". Of course the time frame will change somewhat with the bulk of the STAR CHANNEL service confined to a single transponder but the principle established via the tape fed system will remain the same.

Warner reports that while the majority of the STAR CHANNEL pro-

gramming will go out via a single transponder (11 tentatively) they will also use their second transponder (reserved for NICKELODEON during the daytime hours) to feed STAR CHANNEL movies and features after 11 PM east (8 PM western). At a press conference in Anaheim during the Western Show Warner's Gus Hauser noted "Trust us, it will work".

Al Parinello adds that any cable system signing up for the STAR CHANNEL service (which he characterizes as 'less expensive than HBO or SHOWTIME on a per subscriber basis') will be 'bonused with NICKELODEON' at no extra charge.

FCC Suggests End To TVRO Licenses

The FCC has issued an announcement (#CC 78374) in which they are

proposing to re-assess their requirement that TVRO installations obtain (1) frequency coordination, (2) construction permits and (3) licenses before they are able to operate. The issue was initially raised before the FCC in April of 1978 by CATA.

The FCC will shortly issue a formal rule making notice in this area in which they will ask people how they feel about the present licensing system, and whether some or all of the system might be abolished. No formal rule making notice has yet been issued and none is expected before mid to late January. At the present time there are more than 1,300 TVRO licenses/CPs outstanding with a backlog of approximately 300.

Before the Commission is the proposal to authorize more than 500 3 meter (ten foot) audio receive terminals

for Mutual's radio network, and upcoming are more than 300 Holiday Inn video receive terminals.

KTVU Scheduled Up

San Francisco/Oakland independent signal KTVU (channel 2 off air) made its debut via satellite common carrier Satellite Communication Systems on December 16th on RCA SATCOM F1 transponder 1. The FCC approved satellite carriage of KTVU on November 22nd.

The per subscriber charge for KTVU, via SCS, will be 8 cents per home per month through December 15, 1979; going to 10 cents per home thereafter. The FCC tariff also allows a 15% discount for annual prepayment by cable systems.

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, CATU, Suite 106, 4209 NW 23rd Oklahoma City, Ok. 73107.

FOR SALE

Two new 4 foot Andrews 13 GHz antenna, 10% off cost. (817) 865-7520, Gatesville, Texas.

GENERAL MANAGER

We are looking for a person with substantial experience and successful record in management and operation of a large cable TV system to assume full management control and responsibility for rapidly expanding system in a major market in the Eastern U.S. with a current gross annual income of approximately \$3 million.

Generous fringe benefits includes incentive plan, a company car, life, health, accident and dental insurance.

Master's Degrees in Business Administration or Economics desirable, but not required.

Minimum starting salary \$30,000. All replies held in strict confidence.

Reply To:
Box 111378
% CATJ

FOR SALE

1-352 R.S. "Carousel" (a broadcast quality, automatic, programmable audio-playback cartridge deck), New, never used. \$2,100 new, goes for best offer. Call 913-226-7553.

"1-200' Self-Supporting tower, angle legs 2-300', 1-180', 2-220', guyed 48" face towers, angle legs. All used TELCO microwave towers with all guy wire. Also 10', 6' and 4' parabolic dishes, 1-200' Rohn 18" face, w/g wire. 901-794-8625 days 901-853-8037 nights

Field Engineers

Immediate openings for Field Engineers. Must be experienced in CATV maintenance and willing to travel. Responsibilities to include head-end maintenance, FCC Testing, unusual line problems and extension layout. Good salary and excellent benefit package available to qualified individuals. Please send resumes with salary requirements to:

Telesis Corporation
Ed Cooper or Gary Cox
1018 Lincoln Avenue
Evansville, Indiana 47714
(812) 424-5541

Construction Foreman

Immediate opening for experienced CATV construction foreman willing to travel in the Indiana, Kentucky area. Must be able to deal with utilities and know their standards. Balancing and making minor field adjustments in design, if necessary, desired but not required. Salary and excellent benefit package available to qualified individuals. Please send resumes with salary requirements to:

Telesis Corporation
Ed Cooper or Gary Cox
1018 Lincoln Avenue
Evansville, Indiana 47714
(812) 424-5541

CHALLENGING OPPORTUNITIES AVAILABLE

Young and very aggressive MSO located in the Tennessee, Kentucky and Virginia area has positions for aggressive self-starters desiring career advancement.

SYSTEM TECHS

Responsibilities to include customer services, trunk and distribution operations, some tower and small in-house extensions; craftsmanship a must.

Excellent benefits and quality working conditions. Opportunity for excellent compensation based on your contribution to company growth. Send resume with salary history or call today.

MATRIX ENTERPRISES, INC.

P.O. Box 2000
Franklin, TN 37064
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REGIONAL SALES MGR.

Individual needed to plan and execute sales effort in new and existing systems. HBO experience necessary. Young systems with plenty of potential.

INSTALLERS

Contract and permanent positions available. Detail and thoroughness a must. Consistent and coordinated work.

FINDING NEW SATELLITE PROGRAM SUPPLIERS

Numerous new satellite programming suppliers have appeared in the marketplace during the last 30 days and some operators interested in learning more about their services may not be able to locate addresses and telephone numbers. The following list should assist you in locating new suppliers mentioned in this month's Satellite Technology News portion of CATJ.

ASN - (Americom Satellite Network) 310 14th Avenue South, St. Petersburg, Fl. 33701 (813/821-7869)

C-SPAN - 1745 Jefferson Davis Highway, Suite 308, Arlington, Va. 22202 (703/892-4200)

KTVU - Satellite Communications Systems, P.O. Box 45684, Tulsa, Ok. 74145 (918/664-4812)

NICKELODEON - Warner Cable Corp., 75 Rockefeller Plaza, New York, N.Y. 10019 (212/484-6826)

SPN - see KTVU listing

STAR CHANNEL - see NICKELODEON listing

KTNB - Trinity Broadcasting Corp., P.O. Box 'A', Santa Ana, Ca. 92711 (714/832-2950)

Transponder Update

A certain amount of 'musical transponders' continues in the satellite field, the result of re-arranged programming start priorities and the re-appearance of the ASN format over on WESTAR II.

WESTAR II (123.5 W)

- 1 - WOR (New York)*
- 4 - WGN (Chicago)*
- 7 - SIN (Spanish International)
- 12 - KTTV (Los Angeles)*

* - On very limited schedule pending completion of final arrangements with Western Union and off-air receiving sites.

SATCOM F1 (135.0 W)

- 1 - KTVU /HTN/SPN (SCS)
- 2 - PTL
- 3 - WGN (United Video)
- 4 - not in service (broken)
- 5 - NICKELODEON/STAR CHANNEL (west) (*)
- 6 - WTCG (SSS)
- 7 - ESP (**)
- 8 - CBN
- 9 - Madison Square Garden/C-SPAN (***)
- 10 - SHOWTIME (west)
- 11 - STAR CHANNEL (east/west) (*)
- 12 - SHOWTIME (east)
- 13 - not in service (broken)
- 14 - KTNB (Trinity)
- 15 - RCA message traffic
- 16 - FANFARE/Holiday Inns (****)
- 17 - RCA message traffic
- 18 - Reuters (****)
- 19 - RCA message traffic
- 20 - HBO reserve/Madison Square (*****)
- 21 - RCA message traffic
- 22 - HBO (west)
- 23 - HBO TAKE 2 (*****)
- 24 - HBO (east)

And the explanations. * - NICKELODEON/STAR CHANNEL due for February 1st start date, to be fed initially from an uplink station near Buffalo, New York. ** - ESP (New England regional service) is still talking about 9-1-79 start date. *** - C/SPAN now scheduled for February 15/March 1st start. **** - Holiday Inns will share FANFARE transponder and utilize many FANFARE movies according to current plans; start date probably near

5-1-79. ***** - Reuters service apparently will not be aggressively marketed to cable during first half of 1979. ***** - Madison Square Garden continues to evaluate dual-feeding (horizontal 20, vertical 9) on a month to month basis and may cease use of 20 at any time. ***** - HBO's 'Mini-Pay' service scheduled to begin service around 2-1-79.

Last Two On F1?

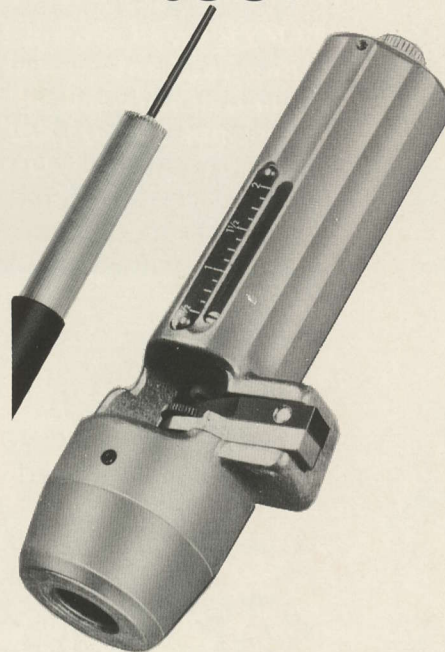
RCA, in announcing the launch in the last quarter of 1979 of F3, also revealed that they will clear an additional two transponders on F1 for CATV use "on or near the 1st of February, 1979". RCA also indicated that the two additional transponders (21 is mentioned as one of those to be available after February 1st) will be the last two made available on F1; "CATV will have a maximum of 20 transponders on F1 and no additional transponders will be available prior to the launch of F3".

Who will get these last two transponders, and will there be another 'bidding process' such as there was in September? "There will be no additional sale of transponders; customers for the last two transponders are already in place" indicated RCA Americom President Andy Inglis. Speculation that Ed Taylor will receive transponder 21, as a replacement for his originally assigned but now defunct transponder 13 continues to make the rounds and neither Taylor nor RCA will deny the probability that Taylor will have a shot at one of the two remaining.

SSS Atlanta Uplink Ready

The new Southern Satellite Systems uplink site in Douglasville, Georgia was completed and ready for turn on early in December. The uplink terminal, purchased as a turnkey installation from Scientific Atlanta, will become the new ground origination point for SSS's WTCG signal as well as providing an origination point for the Home Theater Network family movie package, United Press International's Newstime and the new Satellite Program Network (SPN).

NOW only one stripping tool



for most foam-poly cables!

SST-A Cable Preparation Tools 75 OHM Cables

For Solid Aluminum Sheath Coax Cables with Dielectrics of Foam Polyethylene, Gas Injected Poly and Fused Disc.

Strips aluminum sheathed cable to the same precision dimensions every time... regardless of user. A must for the proper installation of connectors. Assures proper impedance of the cable where other methods cannot uniformly meet this test!

With this uniform trim, the coring operation can be accomplished without further reforming operations.

Let the engineer "sleep nights", knowing the cable is trimmed without distortion.

**FAST—EASY—ADJUSTABLE
UNIFORM—CLEAN CUTS—SAFE**

Write for literature and name of nearest distributor.



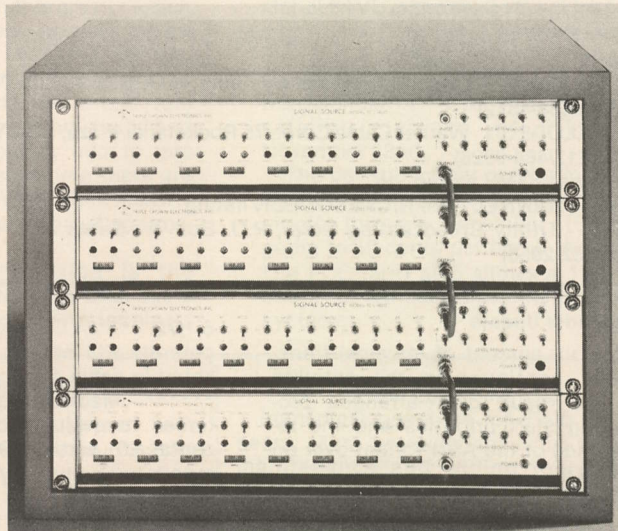
RIPLEY COMPANY, INC.
UTILITY TOOL DIVISION

CROMWELL, CT 06416 (203) 635-2200

TRIPLECROWN ELECTRONICS, INC.

SIGNAL SOURCE—Model TCS 1800

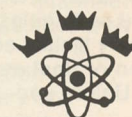
A laboratory necessity for serious amplifier evaluation and system design. Provides 8 CW or square wave modulated carriers for fast, reliable check of inter-modulation and cross-modulation performance throughout the complete spectrum of CATV broadband amplifiers. The modulation frequency is 15.75 kHz (internal) or 10-100 kHz external. Up to 4 TCS-1800 sources may be combined to provide 32 channels of simulated operation.



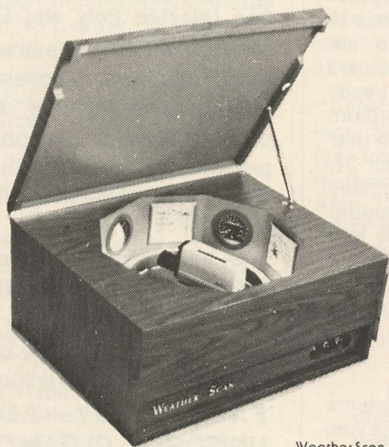
32 channel system simulator (4 x TCS 1800)



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Telephone (416) 743-1481



First In Reliability



Weather Scan III

Impressive quality...surprisingly low price. Just \$2965 for the most reliable unit available (at any price!).

We have been in the cable television business for 23 years...and providing weather information systems for the past 16 years. We know what you need and we know how to manufacture it. For reliability and performance.

The Weather Scan III comes complete with Sony AVC-1400 camera with separate mesh vidicon and 2:1 interlace sync. Includes Time, Temperature, Barometric Pressure, Wind Velocity, Wind Direction, plus four card holders. Compact cabinet is just 28" wide, 23" deep and 14" high. For complete information call or write.



Weather Scan, Inc.

An R.H. Tyler Enterprise

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PAYMATE[®] offers you the most economical converter/descrambler yet designed. Our competitive edge allows you to convert one or two mid-band channels to a single low-band channel. This enables you to carry up to 14 channels on your system.

If you are a cable operator looking toward the future, PAYMATE[®] offers three reasons for providing the highest return on your investment: security, flexibility and a proven field-failure rate of less than 2 percent over the past two years.

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