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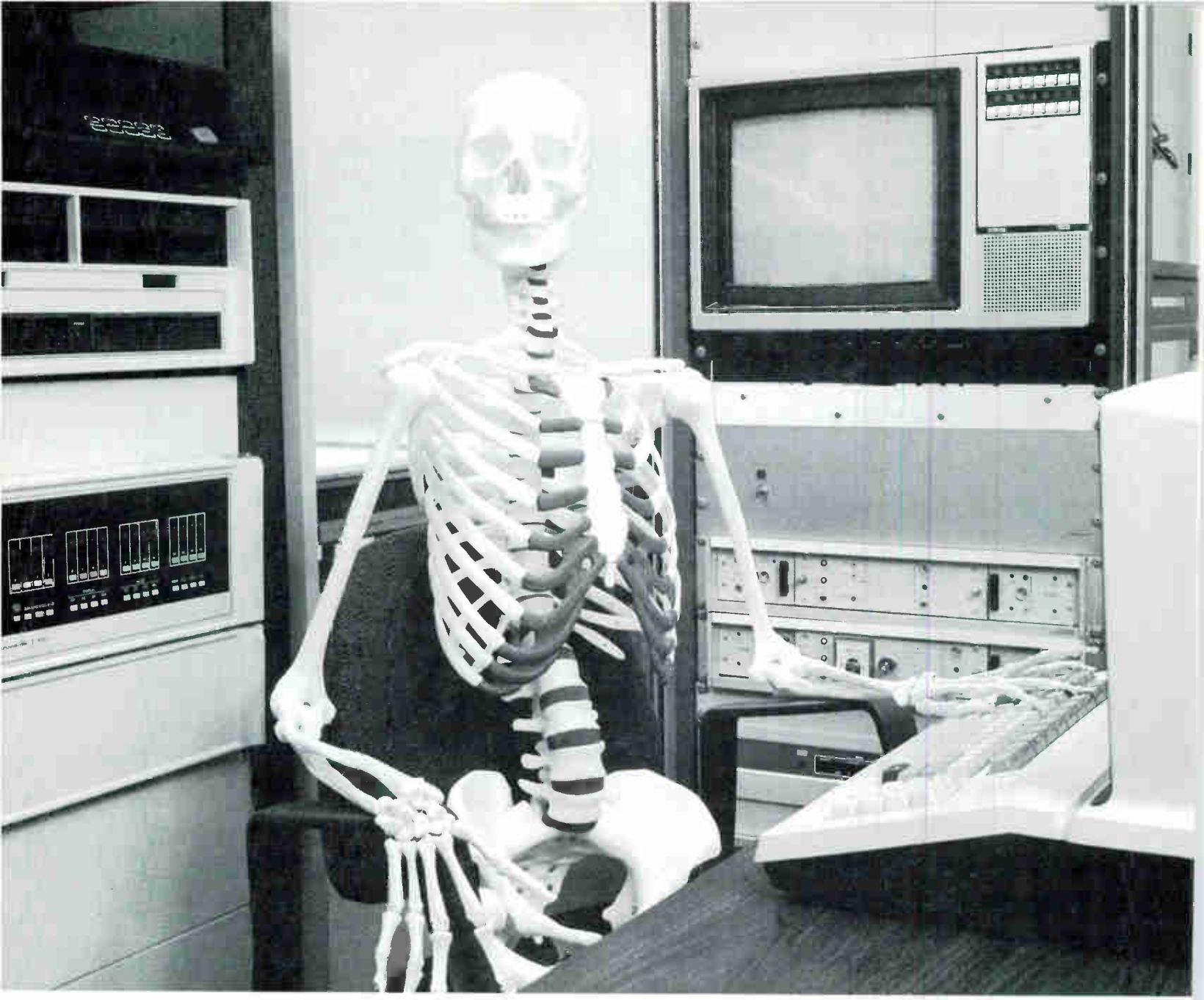

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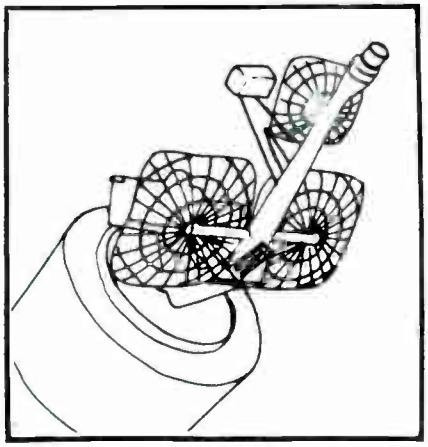

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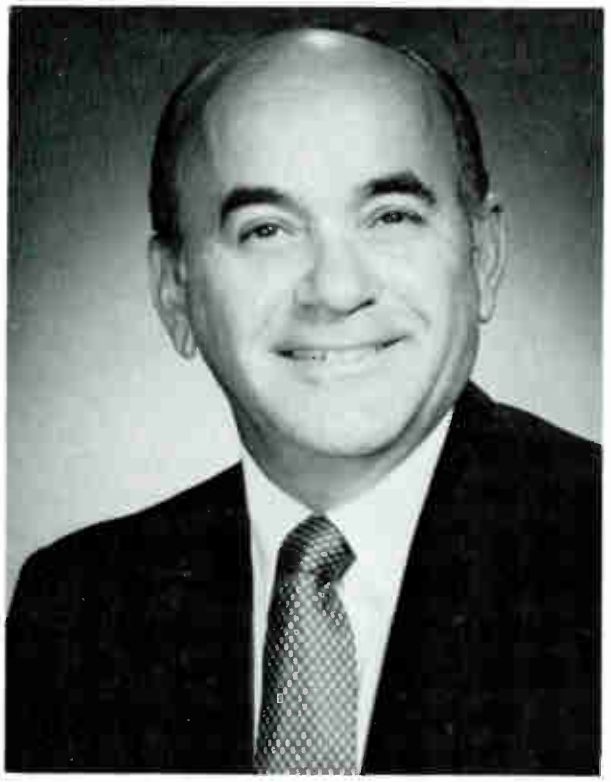

Peter Athanas
PRESIDENT OF CATA

COPYRIGHT — IT'S NOW, OR TOO LATE!

There are two bills in the House of Representatives right now dealing with copyright relief for cable operators. Both bills are designed, in different ways, to remedy the gross unfairness of the decision by the Copyright Royalty Tribunal to impose a 3.75 percent penalty on the carriage of distant television signals. Both bills are firmly supported by CATA.

In recent meetings on Capitol Hill, CATA representatives have learned that there is a major misunderstanding about the bills, and that the only way we are going to get the relief we need is to do a very quick educational and lobbying campaign. We need you to write letters to your Congressman, and to the members of the Copyright subcommittee right away! A telephone call might even be in order. There are some indications that the bills might be considered by the subcommittee as early as mid-March. So we do not have any time to waste!

As you should remember by now, the two bills are H.R. 2902, introduced by Mike Synar of Oklahoma, and H.R. 3419 introduced by Sam Hall of Texas. Both bills deal with the 3.75 percent rate increases, but they do it in different ways — and they have different problems. Let's take the Synar bill first. H.R. 2902 simply says that all American citizens should have the same rights as those in the largest television markets. In those markets the FCC said that three independent signals should be considered a minimum. Of course, under the old, and now discarded FCC rules, the smaller the market you were in, the less programming was allowed. But that was a rule presumably designed to protect the broadcaster. Once the Commission decided that the broadcaster no longer needed that protection — indeed had not ever needed the protection — it eliminated the rule. Unfortunately the CRT decided to reimpose the rule through a contorted economic mechanism that results in smaller market citizens being denied service. The Synar bill says that the 3.75 percent penalty does not get imposed until after the cable system carries at least three signals.

Unfortunately, because the FCC rules were so convoluted — with all sorts of exceptions, caveats, etc., H.R. 2902 suffers from attacks by those opposed to any reform that it is really giving away too much. We don't think three distant signals is too much, but the negotiations are already under way to cut that back to two. The real culprit here is the confusing nature of the old FCC rules themselves. We urge you to support the Synar bill as written — and to tell Mike Synar as well that you support it that way. It is true that the way the bill is written just about all cable operators, even those in the largest markets, get relief from the imposition of the 3.75% fee on at least one signal. But what's wrong with that?

With the Hall bill, H.R. 3419, we have a different problem. That bill says that any "national cable broadcast network" may be ignored in the calculations for compulsory license copyright fees paid by cable operators because, by definition, a national cable broadcast network is one a broadcast station that acknowledges its national stature and pays copyright fees directly to the programmers based on that status — thus there is no reason to pay them twice — once by the marketplace mechanism that is developing and then again through the fees cable operators must pay. The bill is elegant in its logic and simplicity of application. The only problem is that, as we are all aware, there is only one station right now that would qualify as a "national cable broadcast network" — Ted Turner's WTBS. Therefore folks on Capitol Hill are reluctant to support the bill because they say that it is "private interest" legislation. They are wrong — it is just like saying that the defense budget is private interest legislation because there is only one Pentagon. It is not Turner's fault that no other station has yet stepped up to the challenge of being a national cable broadcast network. They can if they want to, and the bill would probably even encourage such a move! Further, considering that WTBS is already seen in almost 82 percent of all cable homes it does not benefit Ted Turner as much as it does the 82 percent of the cable viewers who would be able to watch an additional signal! Cable operators and subscribers are

the real beneficiaries of H.R. 3419. Sure, Ted gets a benefit too — it makes it easier for his people to go after that last 18 percent — and more power to them! But we here are concerned about the larger cable universe and if by passage of H.R. 3419 a vast majority of cable operators would be able to carry an additional distant signal without penalty, then we do not think it is fair to malign this bill by saying it is simply "special interest" legislation for WTBS. It can provide significant benefits for everyone, and it is very hard to argue against the logic of the bill. We cannot urge you strongly enough to get on the telephone, or write some letters, or send a telegram RIGHT NOW to not only your Congressman asking him to support the two bills, but also ask him to contact the members of the Copyright Subcommittee IMMEDIATELY and urge them to support them too. We're including the names and address of the members of the subcommittee so that your job will be a little easier. Please — it's now, or too late.

House Courts, Civil Liberties & the Administration of Justice Subcommittee
Room 2137 Rayburn
Washington, D.C. 20515
225-3926

(When writing to Congressmen, simply put his name, U.S. House of Representatives, Washington, D.C. 20515 — you do not need office or room numbers)

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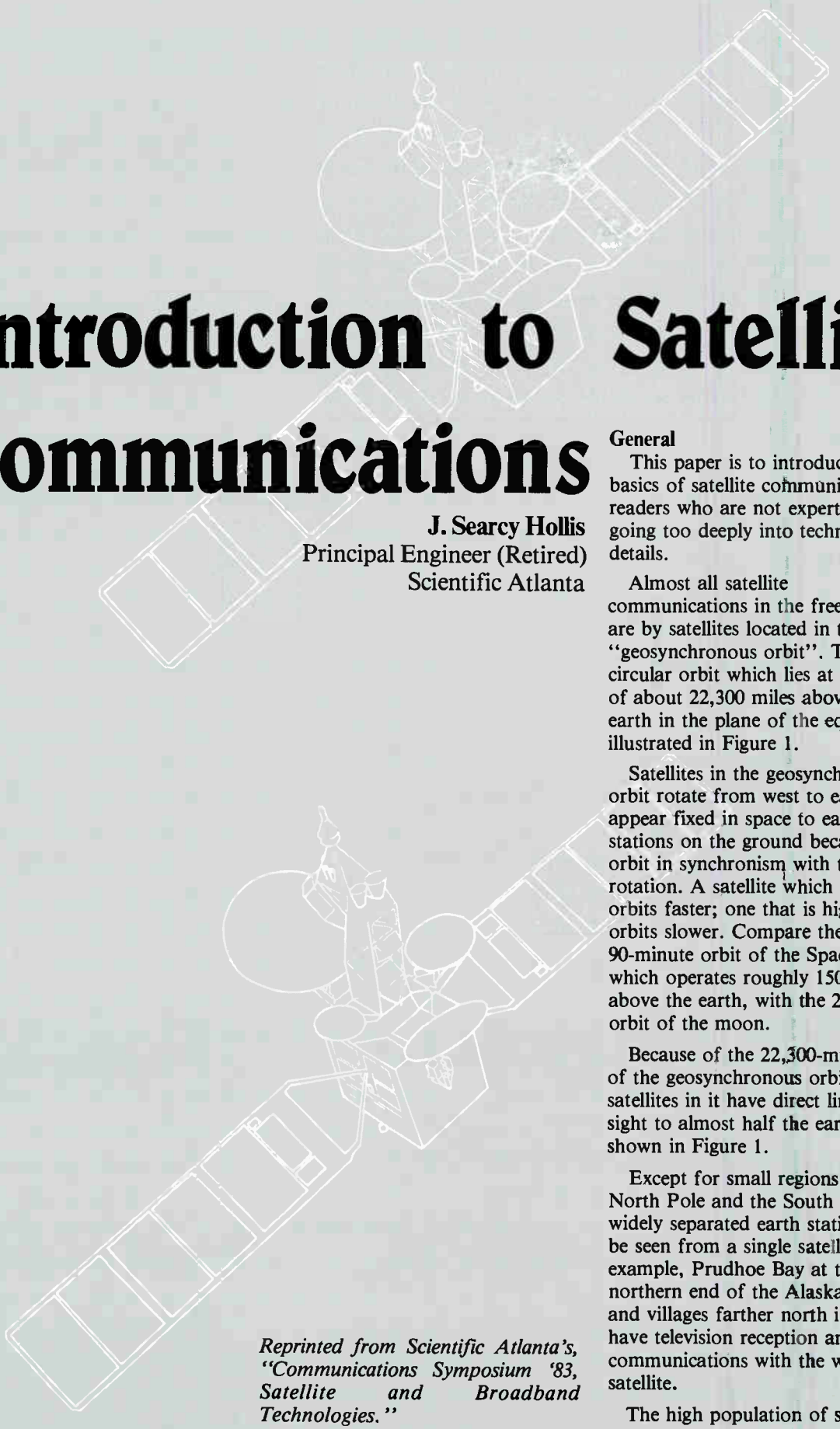
Introduction to Satellite Communications

J. Searcy Hollis
Principal Engineer (Retired)
Scientific Atlanta



Reprinted from Scientific Atlanta's, "Communications Symposium '83, Satellite and Broadband Technologies."

General

This paper is to introduce the basics of satellite communications to readers who are not experts without going too deeply into technical details.

Almost all satellite communications in the free world are by satellites located in the "geosynchronous orbit". This is the circular orbit which lies at a height of about 22,300 miles above the earth in the plane of the equator, illustrated in Figure 1.

Satellites in the geosynchronous orbit rotate from west to east. They appear fixed in space to earth stations on the ground because they orbit in synchronism with the earth's rotation. A satellite which is lower orbits faster; one that is higher orbits slower. Compare the 90-minute orbit of the Space Shuttle, which operates roughly 150 miles above the earth, with the 28-day orbit of the moon.

Because of the 22,300-mile height of the geosynchronous orbit, satellites in it have direct lines of sight to almost half the earth, as shown in Figure 1.

Except for small regions near the North Pole and the South Pole, widely separated earth stations can be seen from a single satellite. For example, Prudhoe Bay at the northern end of the Alaskan pipeline and villages farther north in Canada have television reception and voice communications with the world by satellite.

The high population of satellites

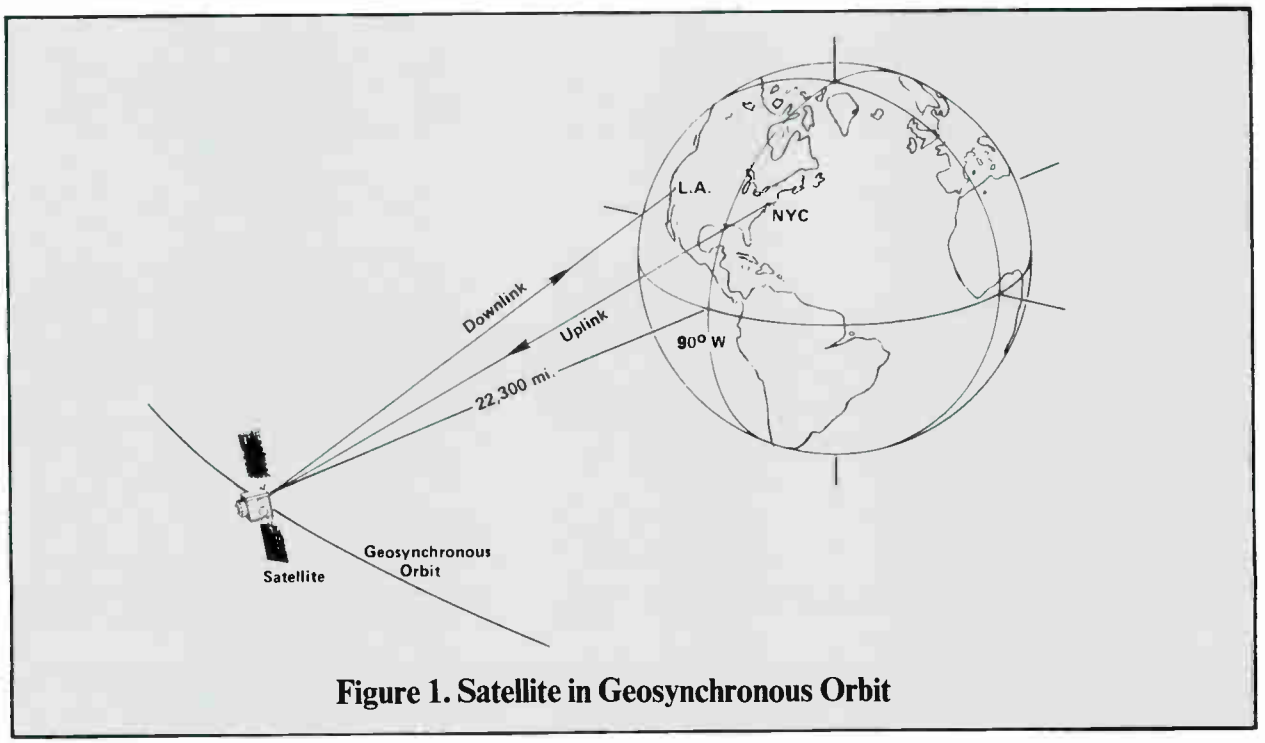


Figure 1. Satellite in Geosynchronous Orbit

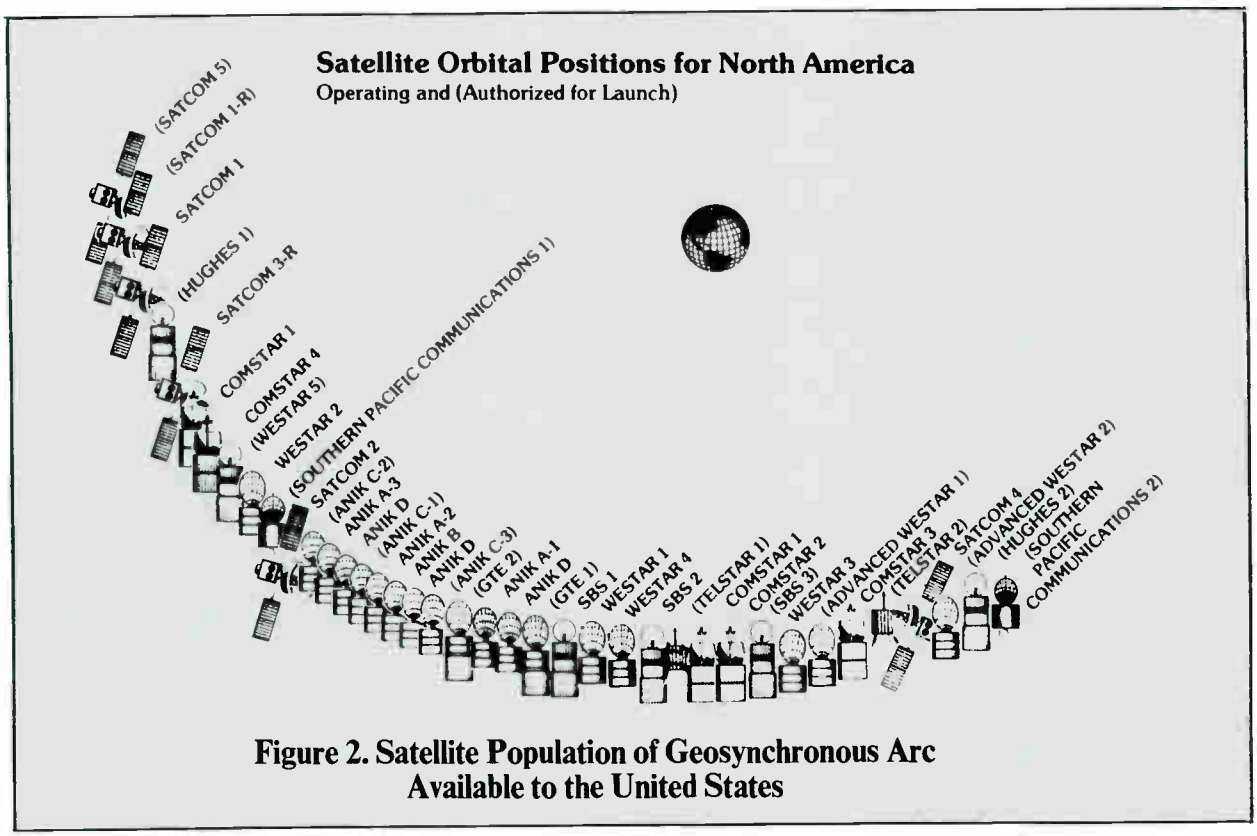


Figure 2. Satellite Population of Geosynchronous Arc Available to the United States

located on or authorized for the geosynchronous arc available to the United States, Canada and other countries of the Americas is illustrated in Figure 2.

Communication by satellites was made possible by parallel advances in space technology and electronics. Arthur C. Clarke, the noted British scientist and science fiction writer, proposed relay stations in geosynchronous orbit for satellite communications in 1945. He proposed manned relay stations because the short life expectancies of

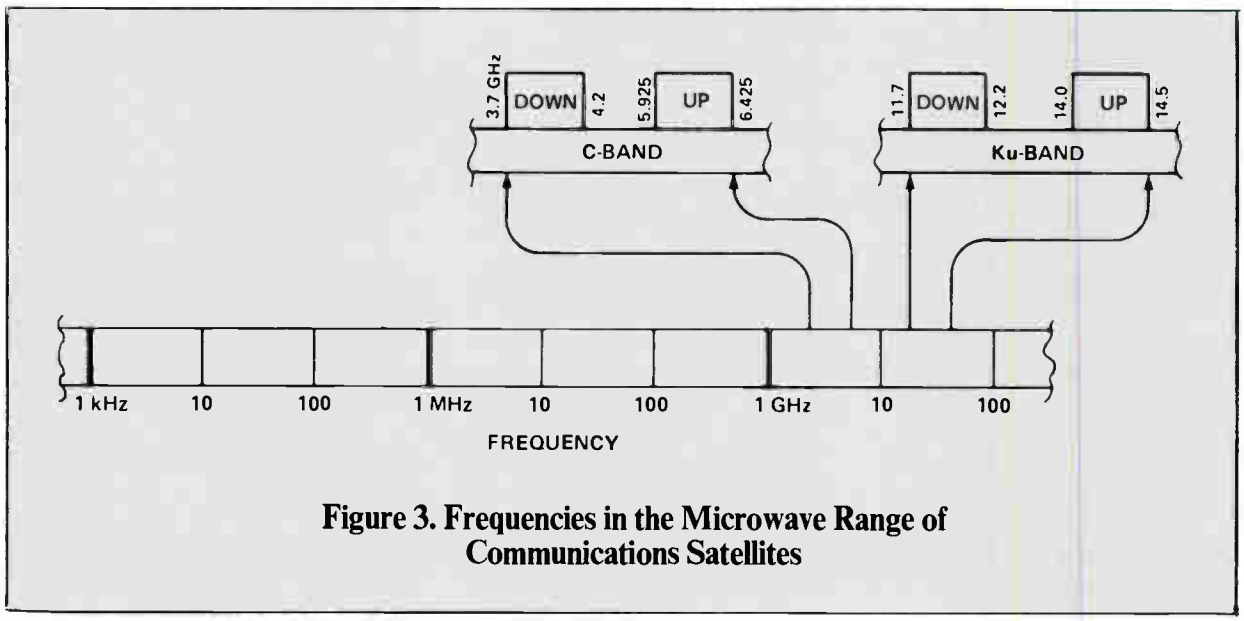


Figure 3. Frequencies in the Microwave Range of Communications Satellites

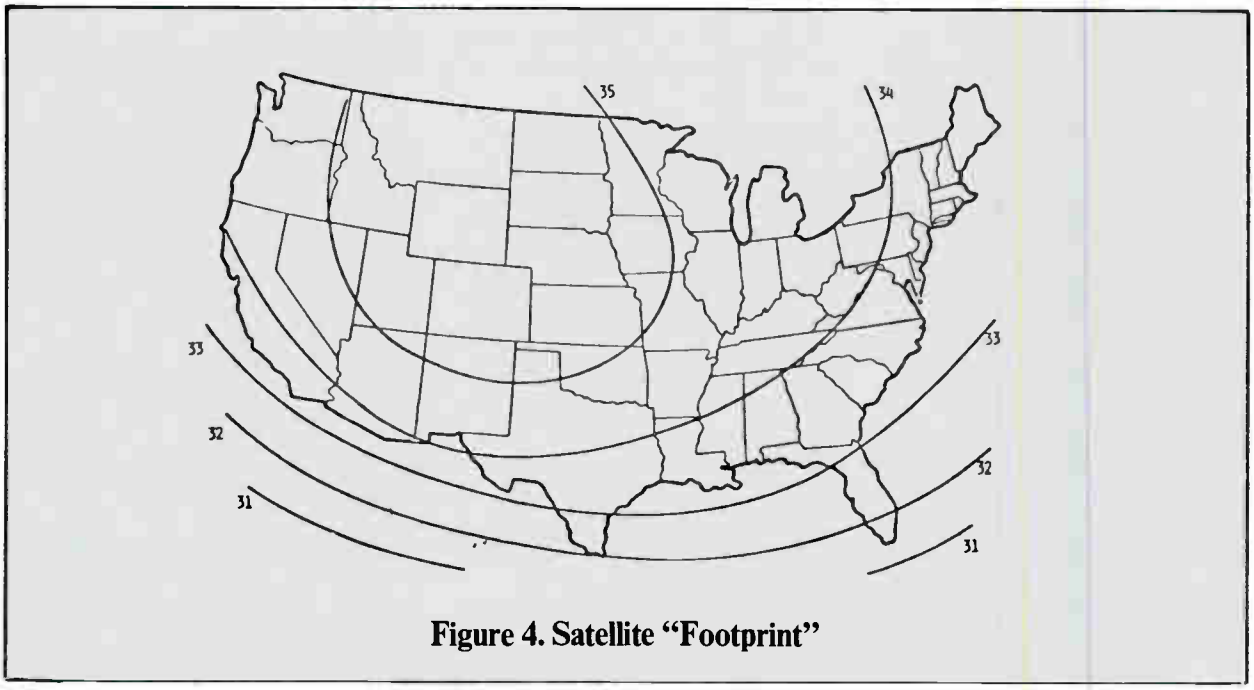


Figure 4. Satellite "Footprint"

vacuum tubes ruled out unmanned satellites.

Synchronous orbits had not been achieved in 1945. Indeed, a satellite was not put even into a nonsynchronous orbit until 1957 with Sputnik, and launching a satellite into synchronous orbit did not come until 1963. Nevertheless, advances in rocketry during World War II indicated to a man of Clarke's imagination that heavy payloads could be launched into synchronous orbit with sufficient research effort.

On the other hand, in spite of Clarke's vision, satellite communications as we know it today would not be possible without transistors, which are small, use little power, and have extremely long life expectancies. The invention of the transistor by scientists of Bell Telephone Laboratories in 1947 was one of the key factors that let the United States land men on the moon. It and other advances made relatively lightweight, unmanned satellites possible and economically feasible.

moon. It and other advances made relatively lightweight, unmanned satellites possible and economically feasible.

Communication by satellite is completely different from that by long-distance radio. Long-distance communication at radio frequencies is possible because the "ionosphere", produced by bombardment of the upper atmosphere by the sun, usually acts as a mirror to reflect certain radio waves back to earth.

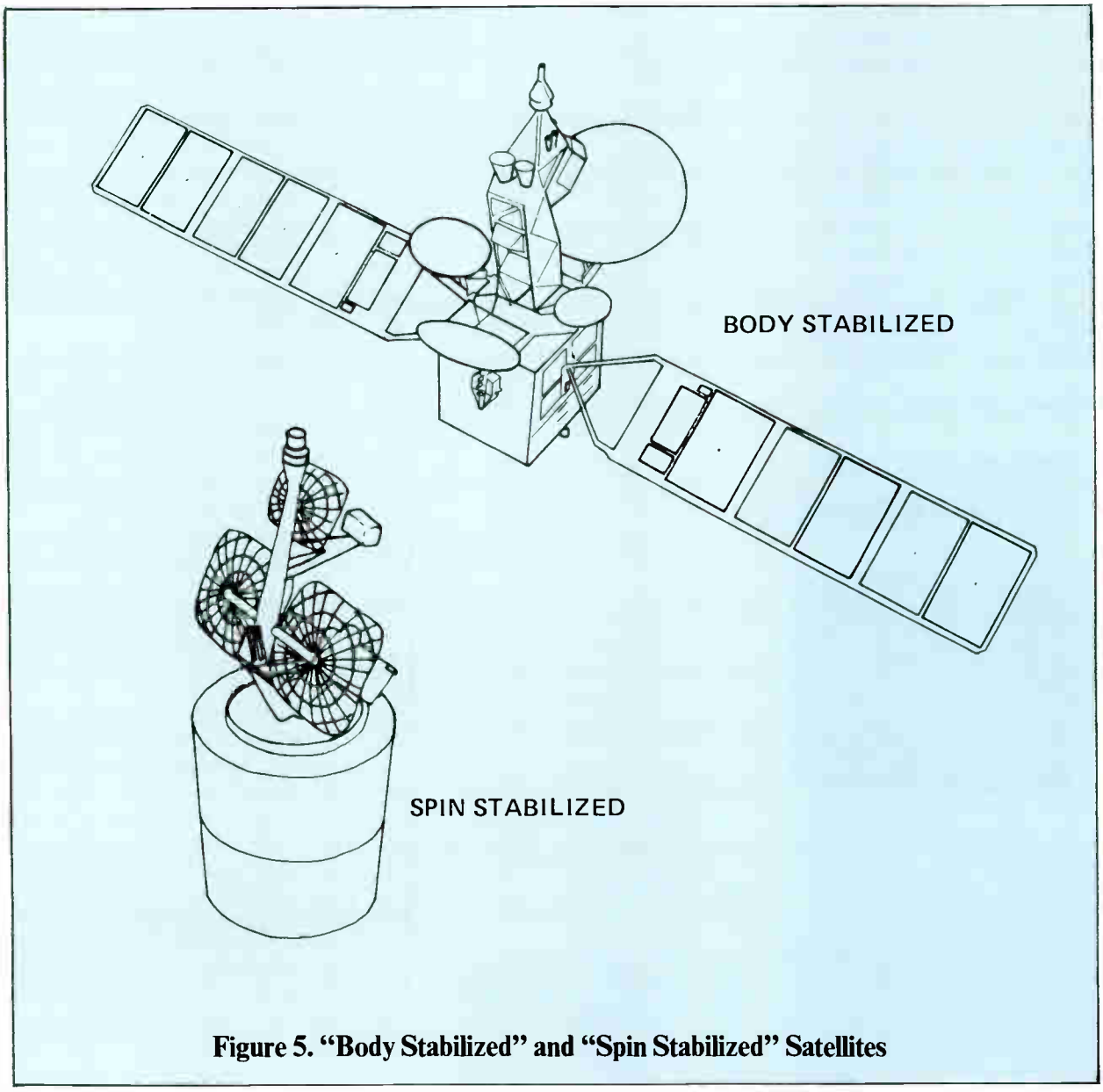


Figure 5. "Body Stabilized" and "Spin Stabilized" Satellites

As the frequency increases, a critical point is reached where the ionosphere ceases to act as a reflector, letting the waves pass through into space. We know, of course, that long-distance transmission of television signals, which are in the radio frequency range above 54 MHz. is not usually possible.

Communications satellites operate at much higher frequencies, in the microwave range, as shown in Figure 3. Here the ionosphere is always virtually transparent regardless of sunspot activity or time of day, permitting continuous, almost loss-free transmission to and from satellites in orbit.

Most current communications satellites operate in the split frequency band which is designated "C-Band" in Figure 3. The uplink band from the earth station to the satellite is at 6 GHz: the downlink band is at 4 GHz. Taken together they are called variously "the 6/4 GHz" band, the "4/6 GHz" band or C-band.

Our discussions here will be directed initially to the 6/4 band, although higher frequencies, especially the 14/12 GHz band (also called Ku-band) are coming into use as more spectrum is needed to handle the ever-increasing flood of information.

Stationkeeping

It was stated that the synchronous satellite appears "stationary" in space. Actually, a synchronous satellite is never perfectly stationary, because a number of forces including the pull of the sun and moon perturb its orbit. If left alone, it would eventually drift out of position. To overcome this, the position of the satellite is continuously monitored by an earth station, called a TT&C (telemetry, tracking and command) station, and

small jets of a propellant such as hydrazine are used to keep it in position within a "station-keeping" box.

The station-keeping box is typically a square which is ±0.1 degree on each side and is oriented with the sides parallel with and perpendicular to the orbital plane.

Sufficient hydrazine must be carried on board the satellite to last for its predicted life, which is usually from 7 to 10 years. The TT&C stations must be highly accurate to make optimum use of the on-board propellant.

Footprint

The transmitting and receiving antennas on the satellite are designed to cover only desired regions of the earth's surface. This has several purposes. It concentrates the power radiated from the satellite into desired directions, increases the sensitivity of its receiving antennas, and helps prevent interference with signals from other satellites.

The part of the earth's surface covered by a satellite is called the satellite's "footprint". The footprint may cover one or more relatively localized regions or a complete hemisphere. A typical footprint is shown in Figure 4. The footprint is, of course, not sharply defined. The 3 dB contour represents the half power level. Signal strengths tend to peak near the center of the footprint and roll off fairly steeply past the 3 dB contour.

The power levels radiated by typical satellites which operate in the 6/4 GHz band are of the order of a few watts. Those operating in the 14/12 GHz band usually radiate somewhat more power for reasons that will be explained later.

The effective power radiated toward the footprint (called the effective isotropic radiated power or EIRP) is typically increased to between 2,000 and 4,000 watts (33 to 36 dBW) by the beaming action (gain) of the antenna.

All the power radiated by the satellite is supplied by solar panels, which convert sunlight directly to electricity.

The solar panels have to face the sun to be effective, while the antennas have to be directed to keep the footprint in place. There are two basic types of satellites, based on the method of stabilization and control of the direction of the solar panels. These are the "body stabilized" type and the "spin stabilized" type, shown in Figure 5.

The body-stabilized satellite is designed to keep the antennas pointing correctly while pointing all of the solar panels toward the sun. The spin-stabilized satellite is cylindrical and has its solar cells mounted around its periphery. The body spins about its axis for stabilization while the antennas are "despun" to point independently toward the earth. In this case about one-third of the cells effectively face the sun at one time.

Batteries are used in almost all satellites to take care of solar panel outages during times when the satellite is eclipsed by the earth. Monitoring and control of the attitude of the satellite is the responsibility of the TT&C station.

Polarization

Electromagnetic waves and antennas are always "polarized" in some manner. The polarization may be linear, circular or elliptical. For our purposes in this paper we will dismiss elliptical polarizations as being nonideal cases which are intended to be either linear or circular.

Linear polarizations and circular polarizations are illustrated in Figure 6. A linearly polarized antenna receives maximum power from an incident linearly polarized wave if the "tilt angles" of the wave and antenna polarizations are aligned in space as in Figure 6(a). The wave is then said to be "co-polarized" or "polarization matched".

As the tilt angle of the wave or antenna rotates from co-polarization, the received power decreases. When the tilt angles are 90 degrees apart as in Figure 6(b), the antenna is "cross polarized" to the wave and receives no power from it. The antenna and wave then have "orthogonal" polarizations. A given wave can have two orthogonal polarizations which exist simultaneously and carry different information without interference. It will be seen that this principle is used to increase the "information capacity" of satellites and of the geosynchronous orbit.

Circular polarizations have either right-hand (RHC) or left-hand (LHC) "senses". RHC and LHC polarizations are orthogonal. A circularly polarized satellite and a circularly polarized earth station are co-polarized if they have the same senses and are cross-polarized if they have opposite senses. The relative tilt angles of circularly polarized antennas and waves are of no consequence and are not even defined. This represents an advantage of circular polarization over linear polarization, since the title angle of the earth station does not have to be adjusted for a particular satellite. On the other hand, there are a number of trade-offs, especially because circularly polarized antennas tend to cost more than linearly polarized ones. Most domestic satellites are linearly polarized while INTELSAT satellites are circularly polarized.

Satellite Information Capacity

One of the major reasons for the impact of satellites is their tremendous information carrying capacity. This is because of the large bandwidth available at microwave frequencies.

The information carried by any type of modulated RF or microwave "carrier" is contained in "sidebands" which spread out on each side of the carrier. Transmission of information at a high rate requires a large bandwidth to accommodate these sidebands.

A typical satellite has 24 transponders. Each transponder has a bandwidth of approximately 35 MHz and is capable of accommodating one high-quality television channel or about 2,000 voice-grade telephone channels. In contrast, the complete radio broadcast band has a bandwidth of only about 1 MHz.

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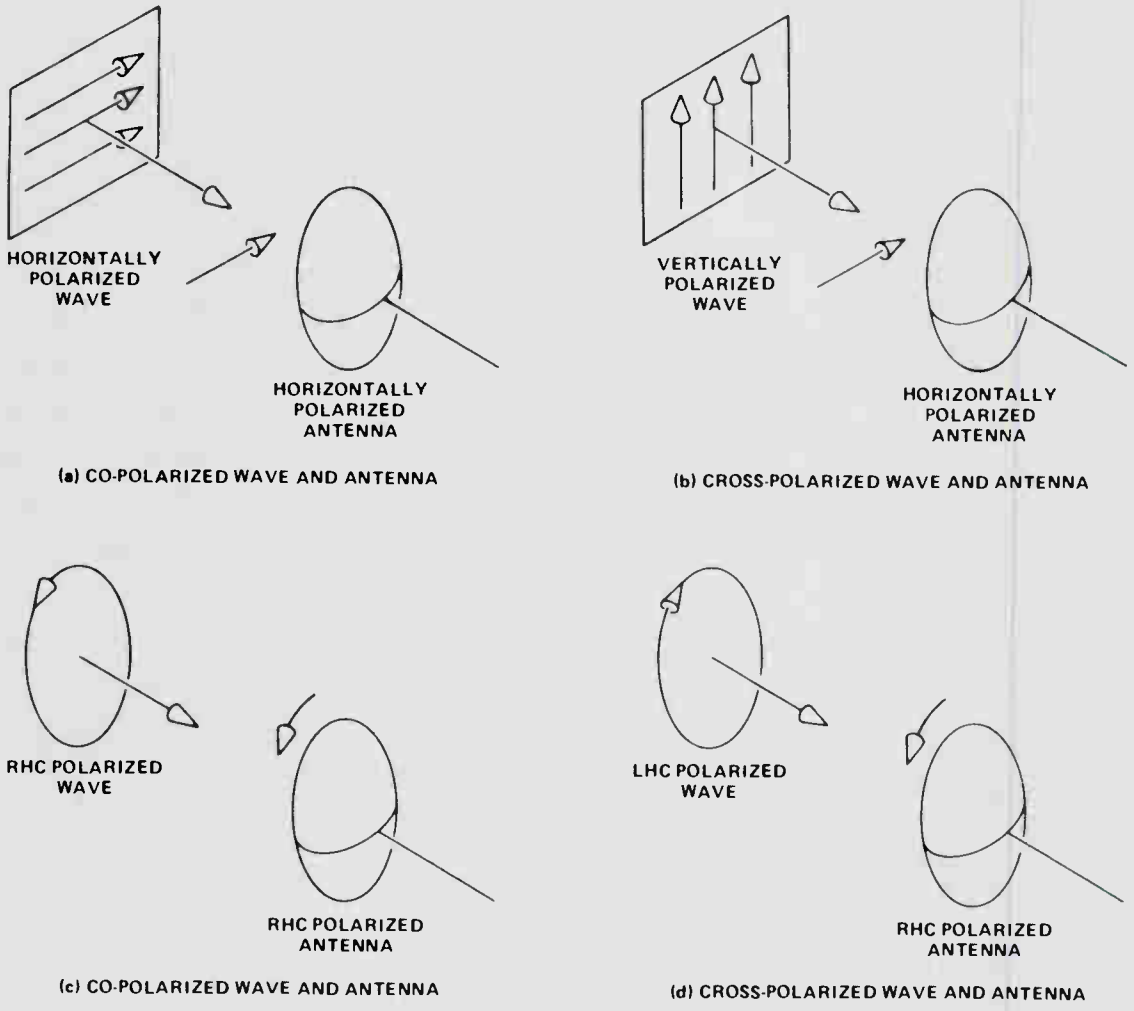

Figure 6. Linear and Circular Polarizations

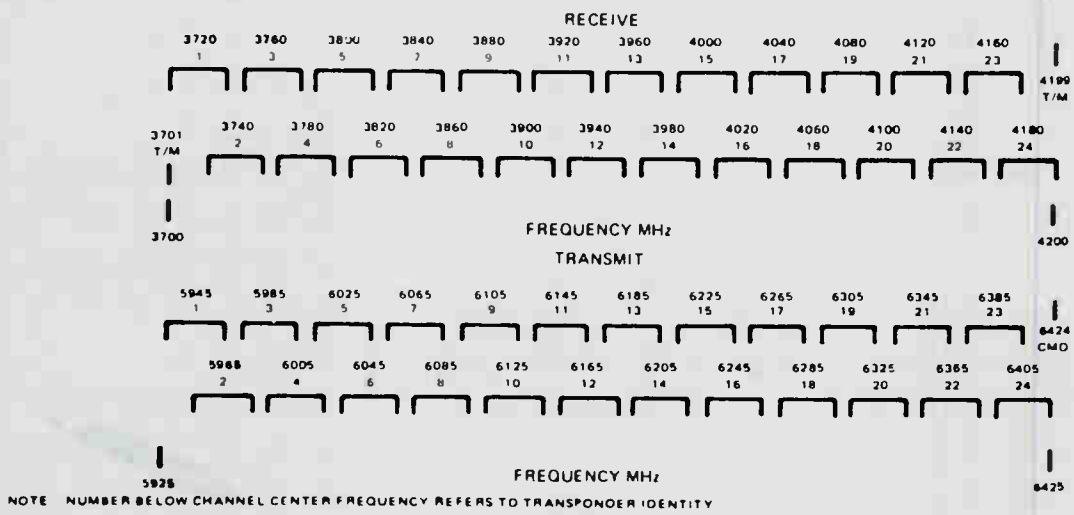

Figure 7. RCA Satcom Satellite Frequency Plans

As an example of a typical satellite, the transmit and receive frequency plans of an RCA Satcom satellite are shown in Figure 7. The numbered brackets represent each channel. The bandwidth of the channel is represented by the width of the bracket. The carrier frequency, which is shown above the channel number, is centered on each channel.

Note that the total bandwidth covered by the 24 transponders is 500 MHz. Squeezing 24 transponders into this amount of spectrum is accomplished by a process called "frequency reuse by polarization diversity", which we will call simply "frequency reuse".

Frequency reuse is implemented by staggering the microwave carriers of alternate transponders so that only sideband energy overlaps and by use of orthogonal polarizations.

The signals of alternate transponders in the frequency plan of Figure 7 are nominally orthogonal. If they were exactly orthogonal and the associated earth stations were ideal, there would be no interference caused by the overlapping sideband energy of adjacent transponders.

In practice, the polarizations of the antennas of the satellite and earth stations are not ideal. Some small amount of interference occurs, but the combination of nearly orthogonal polarizations and use of a staggered frequency plan provides for high quality transmission under almost all weather conditions. This permits 24 transponders in the same band that was used for 12 transponders in older satellites which do not employ frequency reuse, essentially doubling the information capacity of the satellite.

INTELSAT accomplishes frequency reuse by using right-hand (RHC) and left-hand (LHC) orthogonal polarizations on the alternate transponders.

Although the term frequency reuse by itself is used to mean frequency reuse by polarization diversity where the meaning is clear, it can also be applied to the reuse of available spectrum by other means, such as by using several spot beams

on a satellite. INTELSAT V and certain of the other later-generation satellites make use of this technique. It will become more prevalent as satellites become larger and more complex.

Earth Station Antennas

One of the major advantages of using geostationary satellites is the simplicity of the earth stations which are used with them. An earth station has to have a relatively narrow beam to let it pick out a particular satellite and to increase its effectiveness in transmission and/or reception of signals. Since the satellites appears stationary, the complex electronics and drive mechanisms are eliminated which would be required to keep the beam on a moving satellite.

A number of different types and sizes of earth-station antennas are used in satellite communications depending on the application. High information capacity and high-quality link performance tend to demand larger antennas. The largest antennas routinely used in satellite communications are 30 meters in diameter. These are used in INTELSAT A stations and in certain extremely high performance domestic systems.

At the low end of the scale, the smallest diameter antenna that can be used is determined by the spacing between satellites because the beamwidth of an antenna at a given frequency is essentially inversely proportional to its diameter.

At first glance it may seem that the geosynchronous orbit could yield an almost infinite information capacity by adding more satellites. This is not true, however, because the closer the spacing between satellites the narrower are the required beamwidths of the earth-station antennas.

The minimum orbital spacing between United States domestic satellites has been 4 degrees until recently. This spacing permits high-quality transmission of television signals, data and voice in the 6/4 GHz band with antennas that are as small as 4.5 meters in diameter and usable signals with antennas as small as about 1.5 meters for certain applications.

Because of the pressure for more orbital capacity, the Federal Communications Commission has recently decided to ultimately reduce the minimum spacing between U.S. domestic satellites from 4 degrees to 2 degrees in the orbital arc between 55 degrees and 143 degrees west longitude. The closest spacing that exists at this writing is 3 degrees between the Galaxy I satellite and the SATCOM III-R satellite.

It will take some time for all the orbital slots to become filled, but decreasing the orbital spacing to 2 degrees will ultimately increase the inter-system interference to some extent for all types of service. Predictions of the resulting interference have been made, but the ultimate effect will not be known for a number of years.

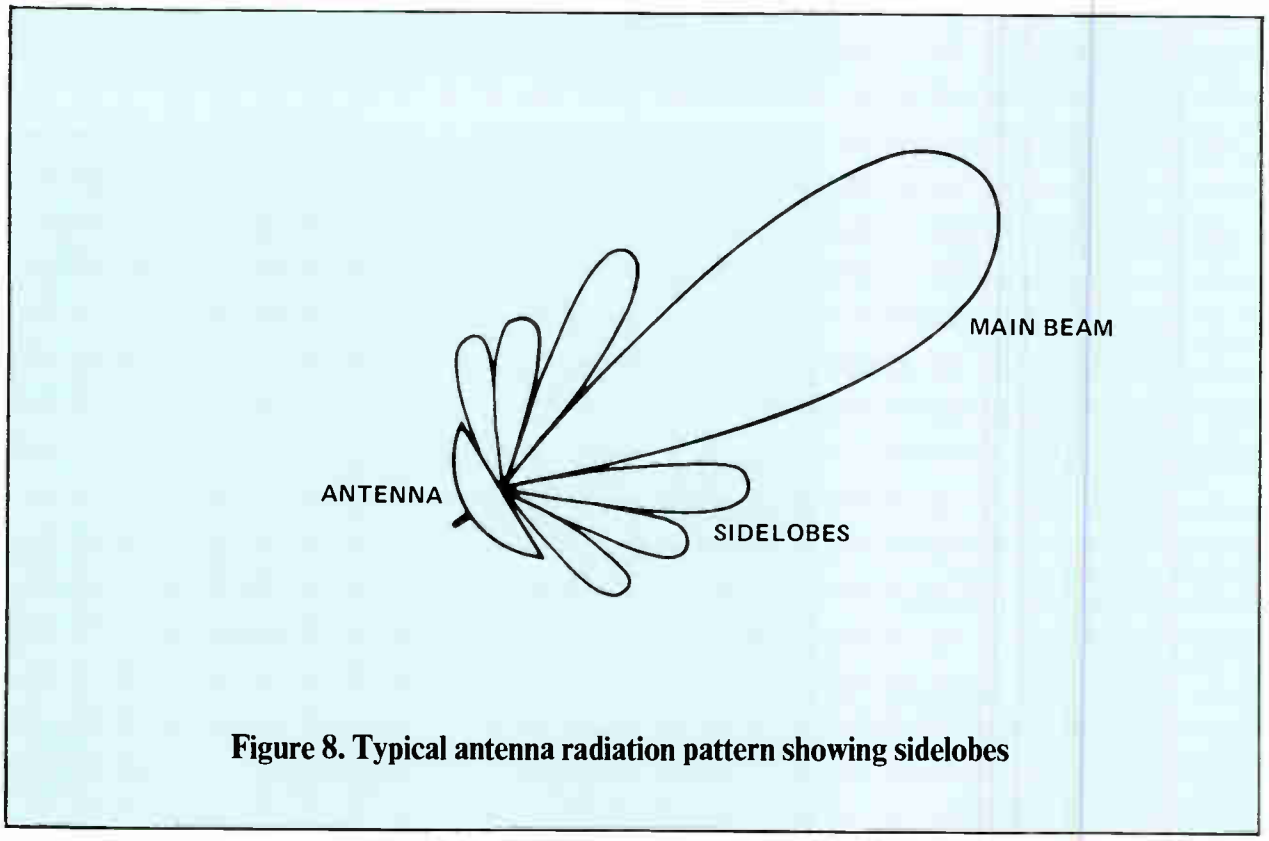

Figure 8. Typical antenna radiation pattern showing sidelobes

Side Lobe Control

A communication antenna has a main beam as shown in Figure 8,

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but all antennas radiate some energy into unwanted directions or receive unwanted signals through "side lobes". Side-lobe energy of a transmitting earth station can interfere with other satellites which have orbital slots near the desired satellite and with terrestrial systems. Side lobes of a receiving earth station can receive interfering signals from other satellites and from terrestrial systems.

Well designed communication antennas have low side lobes. The FCC has lowered maximum allowable side-lobe levels of regulated earth station antennas as part of its program of decreasing the orbital spacing between satellites.

Noise and Sensitivity

"Noise" is the combination of disturbances that tends to obscure the information content of a signal. The sensitivity of a satellite communications system is limited by noise. Noise can enter a system from a number of sources, as shown in Figure 9.

The sensitivity of a receiving system is limited by its ability to discriminate against noise in favor of the desired signal. This is determined by the electrical size of the antenna and its ability to reject noise and the noise rejection of the earth-station receiver itself.

High power is radiated by an earth station to overcome the spreading loss of the signal in traveling the large distance to the satellite and to override the noise at the satellite receiver input.

Because the signal at the earth station from the satellite is very low and because large antennas are expensive, it is important for the earth-station receiver sensitivity to be as high as practical.

The most sensitive receivers use cryogenically cooled microwave amplifiers, but these amplifiers are expensive and are used only in the highest performance earth stations.

Relatively inexpensive uncooled field effect transistor amplifiers based on a semiconductor called gallium arsendide (GaAs FETs) have been developed which give adequate sensitivity for many systems. The low cost of GaAs FETs has been one of the major factors in the growth of satellite communications.

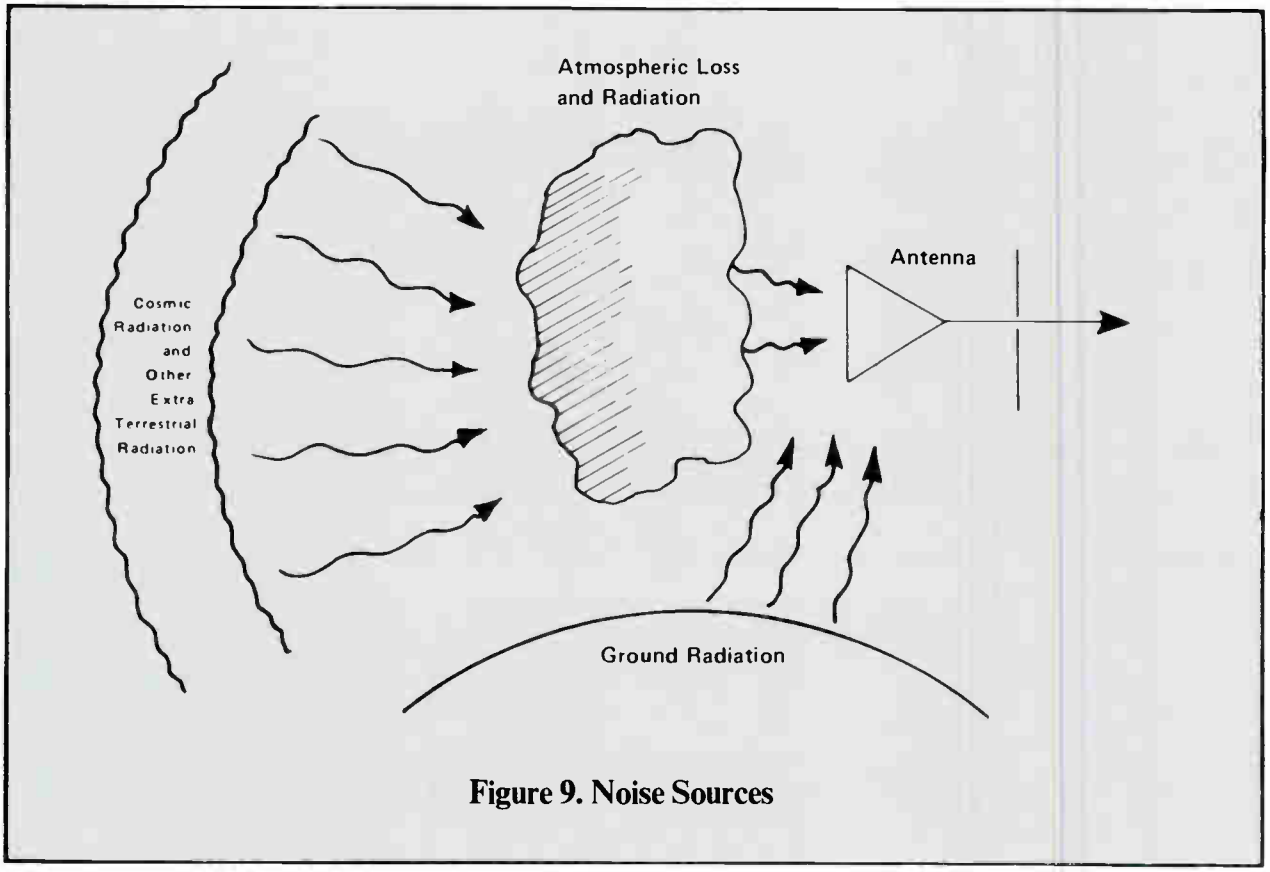


Figure 9. Noise Sources

Modulation Formats and Access Techniques

The modulation formats employed for various satellite communication applications are determined by the requirements of the application. Video and voice signals are commonly transmitted in an "analog" format while computer data, for example, are transmitted in a "digital" format. Analog signals are electrical replicas of the information being transmitted. Digital signals are numerical codes which represent sampled analog signal levels or numerical values such as computer data.

Analog-to-digital converters are often used to transmit analog signals digitally. The digital signals are then reconverted to analog form at the

receiving end of the system by digital-to-analog converters. Systems of this type are coming into increasing use as the costs of digital circuits decrease.

Video signals are likely to occupy a complete transponder, using frequency modulation (FM). Where many narrowband channels such as voice-grade circuits are required, the channels are combined by a technique called frequency division multiplexing (FDM) and used to frequency modulate a carrier (FDM/FM).

For full-transponder video or multiple-channel signals multiplexed on a single carrier, each transponder is accessed by (receives power from) a single earth station at a given time. For lower-capacity applications, a transponder will be shared by a number of earth stations, each of which may use a number of carrier frequencies. This technique is called frequency division multiple access (FDMA).

In one of the important applications of FDMA, a single voice-grade signal is transmitted on each carrier. This approach is designated single-channel-per-carrier (SCPC). It permits installation of stations which need only a limited capacity and permits easy addition of channels as required.

SCPC, using a technique called demand assignment multiple access (DAMA), permits an earth station to use a channel only as required, making the channel available to other earth stations when it is not needed. This greatly increases the use factor of a given transponder which is assigned to this service.

Digital modulation formats are becoming increasingly important as advances in digital technology continue. The cost of digital transmission is rapidly decreasing, and it is likely that in the future both analog and digital signals will be sent largely by digital systems.

There are a number of digital modulation formats. We will indicate a few. Popular formats vary the phase of a carrier or subcarrier in steps of 180 degrees (BPSK) or 90 degrees (QPSK). Time division multiplexing (TDM) is a technique in which a number of signals modulate a subcarrier sequentially in closely spaced time slots without interference. It is the digital equivalent of frequency division multiplex (FDM) in analog systems. A number of earth stations can access the same transponder by means of a controlled technique called time division multiple access (TDMA) to accomplish a function somewhat like that which FDMA accomplishes in analog systems.

The quality of any communications system is determined by the difference between the output signal and the input signal. In an analog system, the difference is measured by distortion and noise. In a digital system, it is measured by bit error rate (BER). Bit error rates of one error in 20,000 provide high-quality audio. Data transmission usually requires much lower error rates. Techniques such as forward error correction (FEC) can be used to decrease bit error rates by factors of 100,000 to a rate of one error in 10,000,000 bits.

Effect of Frequency on Satellite Communications Systems

Because of the virtually unlimited applications for satellite communications and the limited information capacity of the 6/4 GHz band, the higher frequency satellite bands, especially the 14/12 GHz band, will come into greater use in the future. It is therefore interesting to consider the effect of increasing frequency on the design and performance of satellite communications systems.

As the frequency increases, the major effects are (1) narrowing of the beam of an antenna of a given size, (2) increase in losses, and (3) increase in the required surface accuracy of the reflector. For a given satellite EIRP, the increase in frequency increases the earth station receiving antenna cost in at least three ways:

- by the tighter surface tolerance, which requires a more accurate and stiffer reflector,
- by the increased difficulty of pointing the antenna toward the satellite, which requires a costlier antenna mounting structure, and
- by the fact that the increase in atmospheric attenuation and the inherent increase in LNA noise force a larger antenna diameter, which acts to reinforce the difficulties associated with the first two factors.

The net result is that if earth station costs are to be kept low, the EIRP of the satellite must be greater at the higher frequency band so that smaller earth station antennas can be used. This increases the cost of the satellite because the increase in EIRP must come from either higher-power transponders or from footprints covering smaller areas.

The smaller footprints do not represent a disadvantage where a small area is to be covered, such as Japan, or a country in Europe. On the other hand, where a large area is to be covered such as the United States, the smaller footprints require multiple beams, each with some number of transponders determined by the level of service to be provided. The net effect is an increase in satellite solar-panel power requirements and in overall weight and complexity of the satellite. Typical system designs for low-cost receiving systems are based on four or five beams covering CONUS (continental USA).

In spite of the problems indicated above, a move to higher frequencies for new satellites is inevitable for the United States because of orbital crowding and use of the 6/4 GHz band by terrestrial and satellite systems. Systems are already being implemented for the 14/12 GHz band. In fact, once sufficient cost is transferred to the satellite so that small antennas can be used and sufficient system information capacity is provided, many new applications such as direct broadcast satellite (DBS) open up. It is evident, however, that satellite systems at 6/4 GHz are here to stay because of their inherently low cost and because the 6/4 GHz frequency band exists. □

John George

Patriarch of the George Family CATV

The Avenue TV Cable Satellite Control Room

by Kathleen Sheldon

Very few MSO employees will ever experience the secure stable life of a man like John George who, today, provides cable television service to the residents of the very community where he grew up, and whose children are following in his footsteps.

John is a big, quiet man, a man of and for his community, and a family man — husband, father, grandfather. He is the sort of person who doesn't say much in a meeting or a crowd, but who listens intently, understands all that is said, and leaves knowing more than those who were more concerned with talking than listening. He describes himself as intense and determined, a perfectionist and an "entrepreneur who loves being his own boss." He speaks softly during a conversation and his laughter comes frequently from deep within his large frame. He doesn't raise his voice often, but when he says something, those around him listen and know that he is serious and when he wants something done a certain way, that is the way it will be done.

John was among the first independent cable operators to sign on with CATA and he has strongly supported its activities through the years. "I believe CATA is doing a great job at handling my interests," he says, adding that it

"has been and is very beneficial and informative as to my concerns and needs as an independent cable operator." He goes on to say that CATA has succeeded as the independent operator's spokesman to the government and the industry and that, in technical and management areas, the association has been helpful in bringing "valuable ideas that have worked in . . . some systems to the attention of the other systems in CATA." However he does express some concern about "CATA's identity as to what it was and is going to be as more and more independent systems are acquired by the larger MSOs."

No large MSO manager will ever know the satisfaction that is felt by an operator such as John, nor will he have John's diverse skills nor take his pride in the system's service. To men like John George, cable television is a way of life.

When he connected his first eight taps and began providing community antenna service in January, 1951, he probably never envisioned that someday his subscriber base would increase more than a thousandfold, that his cable service would include nearly thirty viewing choices or that the operation would become a family venture. His son Stephen was a toddler at that time and his two daughters weren't born until years later.

What was uppermost in John's mind at the time was bringing television service to his neighbors who lived in the shadow of the Ventura foothills, shut out from Los Angeles television signals, and, in so doing, providing a new source of customers for his television sales and service shop. Before long he had connected two hundred and fifty subscribers, selling each of them a brand new TV set, and Avenue TV Cable was on its way. About this time local appliance dealers began to offer some competition to John for TV set sales in his cabled area, but the cable service revenues were solely John's.

Ventura, California, John's hometown, is located about sixty five miles north of Los Angeles where Highway 101 hugs the Pacific coast. The Ventura area is a fertile valley with mountainous country on three sides and the ocean to the west, and is rich with citrus groves, oil production and history. In the early days it was virtually cut off from the southern part of the state, and stagecoach drivers coming from the north had the choice of hazardous mountain trails or waiting for low tide when the horses could cross the wet sand. Until the completion of the Ventura Freeway from Los Angeles (the last link was finished in 1969) travel from the south continued to be slow and hazardous, although highways from other directions had been built earlier.

John grew up in Ventura, attend ing local schools and working part time in his parent's cafe. He played first string on the Ventura High School varsity football team. He and his wife, Fern, met while playing in the Foursquare Church band when they were in junior high school. They became good friends, but it wasn't until John returned from World War II years later, that they "developed a deeper relationship" and were married.

Before entering the military John was with the Civil Service in the Signal Corps working on aircraft radios. His military service included three years of experience with navigational radar. After leaving the military, this technical background led him into the business of television set sales and service and then cable television.

Like all cable television pioneers during the early 1950's he had to plan, design and build his own plant. He had heard that someone back in Pennsylvania had solved the TV reception problems of residents living "on the wrong side of the mountain" by putting an antenna on the mountain and sending the signal to the homes via cable. If it worked back there, then he knew it would work for him, too, but there were no "how-to" books, no seminars, no ready made amplifiers or reels of coax. This was strictly a do-it-yourself project.

During his military service he became familiar with beaded cable which the British used in radar systems on their battleships. This was a low loss cable, and John knew it would be just the thing for bringing TV signal down the hill. "Somehow, someway, that cable got back here to the States in 200 foot lengths . . . and we started splicing that together, and that's how we started. Luckily I had the experience when I was in the service overseas to see that cable and know how it worked."

During those early days John could produce most of the equipment he needed for his growing system. First he determined what he needed from a piece of equipment, then figured out how to build it for the desired result, using a combination of his electronics training, experience and background and what little literature was available on the subject at the time. His "chain amplifiers" were designed and built using this method. Faced with a limited supply of the beaded cable, John's primary problem at this time was a new source of cable. Eventually this was resolved when he sent a sample of the beaded cable to Plastoid Corporation who then produced 25,000 feet of similar spiral dielectric cable around a center copper conductor. By the time he had used this up, cable was being manufactured by several companies.

At the time, John didn't realize that his community antenna was

one of the first in the country. He connected his first eight subscribers without crossing any public property, and franchises were still an idea of the future. "The elements and nature have never been in the cable man's favor," says John recalling his first week of operation. "I put up a telescopic pole which was (secured) . . . with guy wires. I had eight subscribers at the time. The first weekend of operation, cattle were grazing in the area and one of the cows got its head caught in the guy wires and drug the whole pole and antenna to the bottom of the hill! The equipment was unsalvageable and I had my first subscriber complaints."

Today subscriber complaints are more apt to be due, not to outages caused by cows or natural elements, but to government restrictions. He says, "It's so difficult to explain to customers why the government allows decisions in copyright that are discriminatory to them (the subscribers) because, even though we are only 65 miles from Los Angeles, we are only allowed one distant (independent) signal without paying additional fees that crticially effect an independent company's income." This ruling is as puzzling and unfair to his subscribers as it is to most system owners.

John's cable experience has included all facets of the industry — designer, engineer, technician, installer and salesman. Since he began operation thirty years ago, he has upgraded his system six times, handling the mechanical work himself and depending on his installers and technicians for changeout of equipment. In limited portions of the system, some cable taps and amplifiers have been changed to an extent that amounted, in essence, to a rebuild of those portions. About three-fourths of the cable has been installed overhead, with the balance underground, particularly in the newer sections of town where city ordinances require underground utilities.

John's wife, Fern, worked along side him as secretary and dispatcher during the early years, but later devoted most of her time to raising the growing family that would someday take an active part in the business operation.

Their son Stephen, now 35 years old, is vice president of the company and has been actively managing Avenue TV Cable Service, Inc. for two years. Steve was initiated into the manual labor of cable systems during his high school vacation periods when John put him to work shoveling dirt and ploughing cable. Twelve years ago, with an electronics degree from California Polytechnic State University in hand, Steve began working full time as company engineer. Today his duties include all the drafting work and programming. He spends most of his time programming their IBM System 34 computer. Recently they added an addressable system, and Steve is in the process of interconnecting the two systems so they can talk to each other.

The George Family Portrait — 1981 prior to Steve's marriage to Janet

Arthritis has forced John to concentrate his energy on less physical work such as equipment repair, management supervision and keeping on top of industry trends. He looks forward to retiring "in about five years" and "sitting under a palm tree in Hawaii." However, he admits that he'll stop

(cont. on P. 25)

cont. from P. 23

by the office every now and then to see how things are going. "It's hard to just drop off," he says, but he knows that he will be leaving the operation in good hands. In addition to Steve, his oldest daughter, Pamela, works for Avenue TV Cable Services as Marketing Director. A total of seventeen persons keep the company going, and some have worked for John for more than twenty years and are retiring. When asked what his secret was for keeping loyal employees so long, he laughted softly and said, "I'm an easy going person, that's probably why."

Pam has a degree in business marketing from California Polytechnic State University and has been developing promotional strategies to make local residents aware of the many viewing options the system offers. She sees her job as one of education as well as selling. She offers free connections, money off and free gifts as incentives and says, "I have found that, although the 'free connection' increases subscriber numbers quickly, the 'money off' promotions are best for retention purposes."

With her college training behind her, Pam approaches her marketing job with enthusiasm. She says, "Until a year and a half ago, cable television had not been heavily marketed in Ventura. In the future, I will continue to educate as well as work to sell our services to our subscribers and will look towards other marketing practices such as telemarketing in the years ahead as these other forms of marketing fit our system needs and image." She finds that the ad slicks and direct mail pieces supplied by the satellite services are very useful.

Satellite services were launched last Spring and are offered in a variety of packages which include discounts for multiple services. There are four premium services plus pay-per-view. Basic service is primarily broadcast channels and Level II Service, which is priced and sold separately, offers eleven of the most popular satellite networks and an electronic program guide.

Pam George — the Marketing Director of the George Family-owned Avenue TV Cable Company

This tier arrangement was initiated as a result of a survey prior to launch of the satellite services. It offers the subscribers a choice suited to their own interests and has worked very well in Ventura, but a recent problem has developed because of it. The Cable News Network's representative has informed John that his payments to them must be based on total subscriber count, not just those choosing the Level II Service. This works out to a cost of substantially more than a dollar per Level II subscriber for the one network, on a service that offers eleven networks and sells for four dollars. Obviously this would not leave enough revenue for the rest of the expenses involved with providing this level.

Like many independent cable operators, John is committed to providing his subscribers viewing choices, with an emphasis on ser- ►

The current controlling member of the family, Miss Emily George, with her Grandpa George.

Steve George, Vice President of Avenue TV Cable, with his wife, Janet

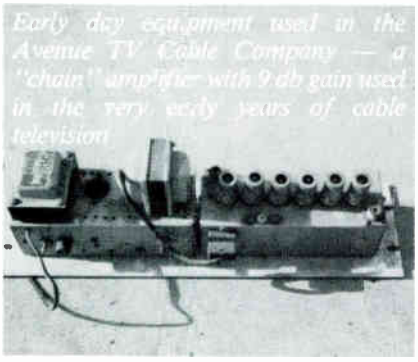
vice and attention to the preferences of his subscribers, rather than a dogmatic "take it all or nothing" philosophy. Since the change in CNN policy goes counter to this, he says he is regretfully, but seriously, considering discontinuing CNN. "Ted's been for the cable companies for a long time," he says, "but now it seems like he's turning around on things. I guess that's the way life is today."

John is not alone in this attitude. Many other independent cable operators say that forcing subscribers to pay for services they are not interested in simply antagonizes them and creates a poor public image. The net result may be slightly higher revenues for the operator, but his image in the community is seriously eroded. Every month when he pays his cable bill, the subscriber reevaluates whether it is really worth it to him to buy all the extras in order to get the stations he wants. It slows down payments and results in disconnects. On the other hand, it may help the bottom line of the broadcast and satellite network services when they can show potential advertisers the large number of homes where their programming is available.

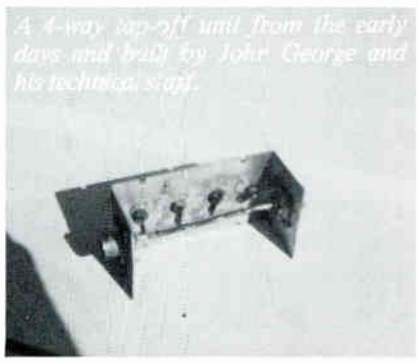
John says that, while all the servces he offers are of benefit to his subscribers, that the sporting events, presented over his local origination channel "have the most importance in terms of my community." They feature "The Game of The Week" selected from games played by teams from the two local high schools and the junior college. Local sponsors support the broadcast, which is taped at game time and then broadcast twice during the following week. They have provided this popular service for about thirteen years and find that most of the spectators at the games enjoy watching the taped broadcast at home.

This concern with doing what is best for his community is very evident in a conversation with John. It's as if he cares more about his community and his subscribers than he does about himself and his business, but in the end, what is good for the community is good for Avenue TV Cable Service. John wishes that it were more widely understood that most independent operators such as he, work to provide the best possible service to their subscribers. Often their efforts are undermined by the cities and the large MSOs.

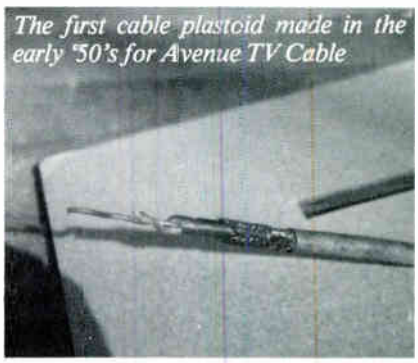
Last year when Avenue TV Cable Service came up for franchise renewal, the city hired a consultant which made a great many unrealistic recommendations, particularly in the area of local origination. John sees this as a direct result of the many big promises made by the corporate MSOs in some of the cities and points out that after the franchise is granted, many of these promises are not kept. That situation is par-



Early day equipment used in the Avenue TV Cable Company — a "chain" amplifier with 9 db gain used in the very early years of cable television



A 4-way tap-off unit from the early days and built by John George and his technical staff.



The first cable plastoid made in the early '50's for Avenue TV Cable

ticularly hard for an honest man like John, who takes his own promises seriously, to understand, especially when what happens in other franchise areas has a detrimental effect on his own operation. Avenue TV Cable went through some trying times during the franchise renewal process, including suing the city, but in the end the consultant was fired and the cable company was issued a new franchise agreement that was very similar to the one they had previously.

Avenue TV Cable Service, Inc.'s franchise serves about a third of the city. In the early 1960's a second company became interested in providing cable service to the residents of the eastern portion of Ventura. John had established himself in west Ventura where over the air reception was poor, but the residents of east Ventura could receive all the Los Angeles channels with a good rooftop antenna. The only programming available at that time was from broadcast channels, and John didn't think the residents of the eastern portion of town would be interested in buying cable service.

So Cablevision began to build on the east side, and John continued to serve the western portion. The two companies agreed between themselves who served which part of the community. It wasn't until 1968 when the City of Ventura decided it was time for a franchise, and the boundary lines were formalized based on the earlier friendly agreement between the two companies. In the mid 1979's Century Communications of Northern California purchased the cable operation that serves the eastern portion of Ventura.

A little over 37% of Avenue TV Cable's subscribers live in the area where over the air reception from Los Angeles is very poor. During the past year Avenue's subscriber base has increased by about 5%, and they recently passed the 9,000 mark! Most of the increase comes from new residents moving to Ventura from other areas where they had cable. Some of the increase is from new subdivisions. Pam attributes between two and two and a half percent of the increase to the addition of satellite services.

John has a second system in a mountain community about eighty miles away. Located in an oil town, this system was originally built and owned by Richfield Oil Company and had only three channels. Tired of maintaining it, Richfield asked John's company to come in, rebuild the system and take over the operation. Today John provides eight channels to 180 satisfied customers.

A major reason for John George's success and that of Avenue TV Cable Service, Inc. is the George family. They are a close knit group that enjoys doing things together and respects each other's rights and ideas. In addition to John, his wife Fern, thirty-five year old Steve and twenty-five year old Pam, there is their younger daughter Rebecca, who is twenty-three, Steve's wife Janet, and the pride and joy of the George family, Steve and Janet's daughter, eighteen month old Emily Christen George.

Tower at the head end sight in the Ventura foothills of California

John and Fern are both involved in community activities, including those of the Ventura Missionary Church where Fern takes part in the women's group and is in charge of arranging for refreshments for church meetings. Fern is a kindly, motherly woman who gives the impression of completely enjoying her role of mother and homemaker, taking an enthusiastic interest in the activities of everyone in the family.

Rebecca (Becky) is working on her masters degree in speech pathology at Biola University in La Mirada, California. She earned a bachelor's degree from Biola last December, and her ambitious plans include teaching and working with children with speech and hearing difficulties, some missionary work and eventually opening her own clinic. Prior to going away to college, Becky did her stint in the cable office during school vacations. If anyone comments that Becky is not following the rest of the family into the cable business, family members answer that Becky has chosen a different line of the communication field.

When Steve wants to get away from it all, he joins a group of friends on a chartered boat for some deep sea fishing for two weeks off Baja California and brings back "some pretty big fish" such as tuna.

Sporting events have always been a source of pleasure for John, going back to before his own days on the high schools varsity football team. Today he particularly enjoys watching the Rams and Raiders games.

Some of the community activities that have received John's support are the Ventura Youth Basketball Association and the Ventura College where he once served on the advisory board of electronics. The local Telephone Pioneers of America recently honored him for his support of the Crippled Childrens and Arthritis Telethons.

John's idea of the perfect family vacation is relaxing in the sun in Hawaii, but most of all he likes to spend his leisure time entertaining his granddaughter. Sandy haired Emily has her mom's eyes and her dad's smile; she likes to flirt and is often the center of attention. She and Grandpa enjoy watching The Disney Channel together. Other times they have fun building with Emily's blocks or blowing up balloons and letting them go, to bounce and fly around. Emily loves to ride her toy horse, and a few hints have been dropped (that maybe someday Grandpa will buy her a real one!

George family celebrations are usually an extension of family business as conversations around the bountiful dinner table center on discussing cable issues. However cable is not the only topic that holds their interest, as this family that likes being together and sharing ideas enjoys lively discussions about politics and world events. Working and playing together, sometimes not knowing where one ends and the other begins, this family has pooled their diverse interests and talents to build a successful business and a stable family life. □

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The $200,000,000 Question

"Will You Still Love Me In The Morning?"

By: Bob Cull
Cable Marketing Services

Lest some of you think we have changed the subject, remember that the subject is marketing, and the rhetorical question is one being asked of cable subscribers by operators all over the country. At last count, some would estimate it to be a $200,000,000 annual question industry-wide. It symbolizes one of the great unsolved mysteries in the cable world — that of how to retain subscribers once you have them.

Retention . . . that word rolls off the tongues of thousands of cable people on a daily basis — generally with an air of question and awe rather than conviction and promise. The question is often raised, and often answered, but only with marginally successful results. The severity of the problem varies a great deal, from a relatively stable situation where off-air is impossible, to the 12,000-on, 9,000-off statistics reported by a major urban system in one 30-day period. But, even if you are located in an area where off-air signals are unavailable, an upgrade or rebuild with addition of services may land you smack in the middle of the multi-pay maze.

Our assumption in dealing with this subject is that everyone reading this article either has had or will have retention problems. Another assumption is that many of us view retention as a given statistical comet which flies around our cable universe outside our control. A third assumption is that most of us view retention as a series of events or activities which occur after a subscriber is obtained. A fourth, and final, assumption is that there is a group out there who scoff at such problems and point to a subscriber base so stable that even an eagle could not discern movement. To this group, we can only relate the story of our conversation with a bank board member.

". . . every decision we make has some effect on our ability to acquire and retain subscribers over the long haul."

It seems the board was in the process of reviewing loan portfolios of various loan officers. The board member was critical of one portfolio because it showed absolutely no losses over a relatively long period of time. Our quizzical look brought the explanation that real growth opportunity and high return were possible only by operating "at the margin". The flawless record indicated that the officer was probably passing up some opportunities to increase volume and yield in order to be "safe". So, while a stable base is desirable to some degree, in the extreme it may indicate a lack of aggressiveness for that cable business at the margin. Therefore, we are going to enter our discussion of retention on a note which says that a certain amount of movement is probably a healthy sign that you are continuing to probe the marketplace in marginal areas in order to maximize profitability. The amount of movement which is acceptable varies a great deal based on such factors as addressability, labor costs and other items which are so specific to each situation as to make it difficult to address here.

But, so much for the claims and disclaimers. The balance of our time will be spent primarily trying to help you identify retention issues throughout all stages of development, and suggest some approaches which could help to minimize its efforts.

First Things First

Some of you may feel that we have the subject of retention out of order in relation to other marketing issues. But the understanding we must achieve is that retention becomes an issue the day the first rough draft of a franchise Request-For-Proposal is drawn, and continues to run through the fabric of franchise life every day thereafter. The point we must come to in our understanding is that every decision we make has some effect on our ability to acquire and retain subscribers over the long haul. Even technical questions involving the type and quality of physical plant, the converter brand, and whether it is to feature remote control are all basically marketing and retention issues.

continued on page 32

Standard's Agile 24:

"If it wasn't the best receiver for the money, we wouldn't use it."

American Television & Communication Corporations (ATC)

ATC is not the kind of company to pass out comments like this lightly.

One of the oldest cable operators around— 1968—with more than 135 systems nationwide, ATC can afford to be extremely picky when it comes to choosing the types of equipment specified for their systems.

Which is why they took a long hard look at Standard's Agile 24 receiver, putting it through its paces in such diverse environments as Columbus, Ohio; Two Rivers, Wisconsin; Kissimmee, Florida; and Raleigh, North Carolina.

ATC also liked the Agile 24's specifications, and price. But it was nearly a year before they would let us say it. They wanted to be sure, and we respect them for it.

Our relationship with ATC is no different than any other customer. They expect quality, reliability and service —and we're becoming known as a company that delivers this and more.

In addition to the Agile 24 stand-alone, 24-channel receiver, our TVRO product line also includes MSO quality low noise amplifiers/block down converters, microwave interference filters, and earth station antennas, plus full system design service and field technical support.

Standard has the industry knowhow to put you in the cable business or improve the quality of your service.

Let's talk about your specific system requirements.

Standard Communications

P.O. Box 92151 • Los Angeles, California 90009-2151 • 213/532-5300

...the TVRO System people

Are we saying, then, that you are not a cable system operator but rather a marketing organization in the business of selling information and entertainment to subscribers through a vehicle called a cable system? It is different, you know. It is different in the sense that decisions are no longer made only on the narrow criterion of cost, but on the much broader criteria of consumer acceptance, cost as it relates to price, quality of service, and others. In other words, what benefit is there in adding a premium service with a cheap license fee if there is no evidence it will sell, or remain once it is sold? What benefit is there in buying inexpensive converters if they are difficult to operate and create customer confusion? Our problem, then, is trying to incorporate the ultimate effect on the consumer into every decision we make. On the surface, this sounds like a major retention program. What we will suggest here is that this represents only a beginning, and only serves to assure that we will adopt an attitude of retention in our minute-to-minute and day-to-day decisions. It is sometimes helpful to illustrate a process by building a decision model. We have done this in Figure 1, in the hope that it would further clarify what we are saying.

A World of Ideas

In this portion of our discussion we hope to provide some sense of overall direction for an effective retention program. Bear in mind that we do not have a corner on the universe of retention concepts or ideas, and that some ideas work well in certain markets but not in others. The idea is to stimulate your thinking and motivate you to experiment to find those procedures which work best. Having given ourselves this parachute, let's try to define some general territory by establishing what we feel are the guiding principles for retention. They are (not necessarily in order of importance):

1. Develop a comprehensive community profile.
2. Build programming, pricing and packaging models aimed at that profile.
3. Use an educational approach to sales.
4. Sell the Basic service.
5. Communicate with subscribers about the future.
6. Develop specific and continuous reinforcement techniques.
7. Don't let 'em off without a fight.
8. Continue the fight.
9. Create economic points to consider at time of downgrade or disconnect.

Now that we have laid some track, let's try to expand on each area.

1. Develop a comprehensive community profile; and,
2. Build programming, pricing and packaging models aimed at that profile.

On the surface, these two points seem elementary. In fact, most of us would argue that we know our communities very well and this is certainly one area where "we need no assistance, thank you." Well, we don't want to make you mad, but we do want to point out some market subtleties which may go undetected.

In the community where we live, most of the people we know would define it as white, middle to upper-middle and beyond, well-educated and family-centered. Certainly if you look at the city leadership structure and read the local newspaper, you could reach that conclusion. However, there is a large blue-collar population who work in a heavy manufacturing facility. Also, there have been 15-20,000 apartment units built in the last decade, over half of which are adult-only facilities. Will those 8-10,000 apartment dwellers be interested in children's programming — not hardly. But the market does have a large segment who are interested in children's programming.

We are taking this circuitous route only to point out that we pick up many of our "facts" from impressions built on our contacts with a certain strata of the community and the communication we receive from various sources. It is imperative that we have some definition of each segment of our market, its relative size within the total, and what impact this has on the full range of decisions which must be made. The buzzword is market segmentation, and that's just "marketingese" for identifying the groups within your community audience and tailoring some part of your marketing message to each one.

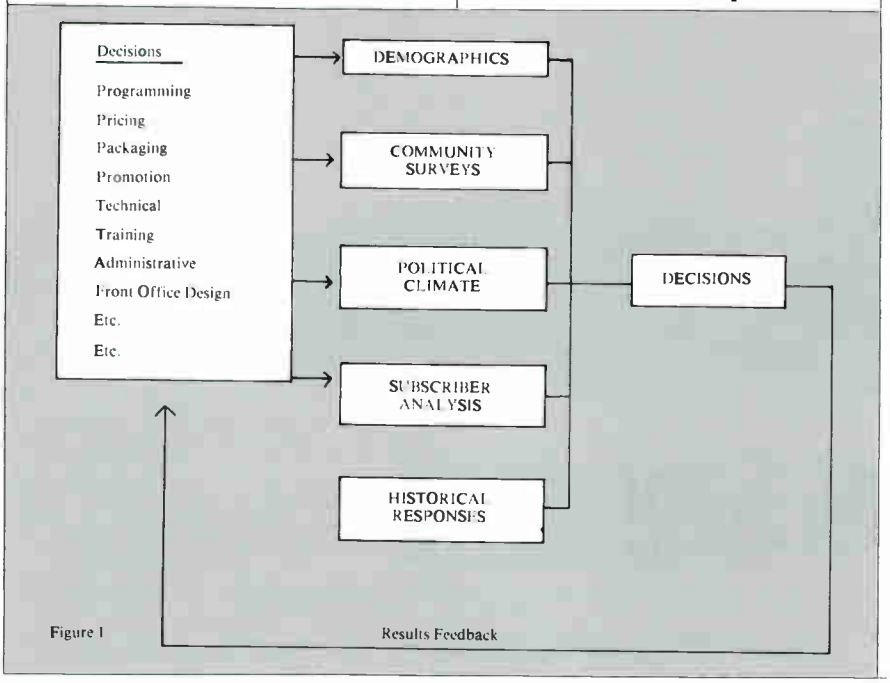


Figure 1


Janice Cail, president of Cable Marketing Services

3. Use an educational approach to sales.

We are of the opinion that educating is almost always selling, while selling may or may not be educating. We also feel that a subscriber who is well-educated in cable and cable programming is more likely to be a satisfied customer. There is a place for hype, such as "24-Hour Sports" or "24-Hour Movies" or "Blockbuster Movies." As attention-getters, they work well, but retention is more likely to occur when a subscriber understands the meaning behind the hype, and the value of the programming as it relates to their particular viewing habits and tastes. In some of the direct sales campaigns we conduct, we accomplish this through the use of prepared materials which offer an in-depth look at all of the available choices. We feel that a subscriber who knows why they made a certain decision is more likely to be content with that choice.

4. Sell the basic service.

We have already ducked since we anticipated a couple of rotten tomatoes for having said something so dumb! But, we have found something interesting in our travels. That is that many of us in cable take Basic for granted and spend most of our promotional effort on premium services. Don't misunderstand, those premiums are vital to our financial growth and well-being. But, particularly in markets where off-air signals are available, we need to spend time helping people to understand and appreciate the tremendous quality and variety available on basic. Only by having the basic subscriber do we even have a shot at a pay unit, and it is critical that we create both desire and value with regard to Basic service. The number of satellite services


CMS Marketing Teams

available to expanded or expanding systems make this a true educational opportunity. Certainly, hanging onto them at Basic is better than losing them altogether, and it gives you another clear shot to reestablish pay units later.

5. Communicate with subscribers about the future.

All of us like to have something to which we look forward. In the cable industry, we are fortunate that we know in advance much of the quality and quantity of both Basic and premium programming. This provides an excellent opportunity to create anticipation on the part of subscribers and add to the perceived value. Thus, if you have subscribers who are having second thoughts (and we all do), this future-oriented communication could be the spark which rekindles their interest.

6. Develop specific and continuous reinforcement techniques.

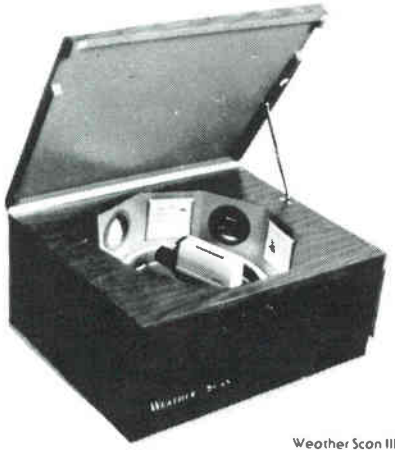
Those of us in sales are acquainted with something called "buyer's remorse" and recognize it as that phenomenon which occurs following a buying decision. We also know that one way to minimize its effect is to provide positive reinforcement for the decision. Now, in many sales situations, once the transaction is complete and time intervenes, the need for reinforcement diminishes. However, since cable subscribers may opt out at any point in time, we are in the unique position of having to provide reinforcement on a continuing basis. This means a fairly consistent series of messages like "Aren't you glad you did", or "Look what a great deal you got," or "If you think it's great now, just look at what's coming."

There is another approach to this situation, however. That is to minimize the frequency with which the buying decision is made or to eliminate it for long periods of time. Tools which have been used in some systems for years are annual subscriptions and bank draft programs. These programs keep the customer at arm's length from the continuing transaction and do not raise the question of continuation as often or as conspicuously.

7. Don't let 'em off without a fight; and,
8. Continue the fight.

How many times have we witnessed a situation where a subscriber calls in to downgrade or

First In Reliability



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Impressive quality . . . surprisingly low price. Just $3295 for the most reliable unit available (at any price!).

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NY/HI/AK/Canada (Collect) 315-437-3953

disconnect and the scenario goes something like this:

$ubscriber:
"I need to get rid of my cable TV."

Cable Person:
"Your name please?"

$ubscriber:
"Mary Mary . . .it's just costing too much."

Cable Person:
"Your address."

$ubscriber:
"2105 Garden Street."

Cable Person:
"Will you bring in your converter?"

$ubscriber:
"No, you'll need to pick it up."

Cable Person:
"Will this afternoon be all right?"

Now that fight was lost by TKO before the telephone even rang. If the right attitude, training and materials had been in place the very **worst** circumstance would be that we lost the subscriber but with a full and complete understanding as to **why** we lost them. At best, we might have saved some or all of their levels of service with a red flag on the account to give special attention in the future. Please understand that we are not suggesting that you get "pushy" or surly with the potential disconnect, but only that you take a justified proprietary interest in **your** customer and what it is that prompts them to terminate the relationship.

It might have been legitimate in the above scenario, for example, to inquire why cost was a problem now (assuming there were no recent price increases) when it had not been in previous months. We say this because cost is generally used as a word to describe the fact that the customer doesn't see enough value to justify the dollars being spent. If you can work through to this reality, there may be an opportunity to reestablish value by discussing future programming or other benefits.

This is only one example. There are many ideas and programs which can be explored as possible ways to enhance retention. We will cover these in more depth in the future.

9. Create economic points to consider at time of downgrade or disconnect.

While we do not recommend punishing a subscriber for dropping services, we also do not recommend making it totally painless. Partly, this is due to the fact that the administration and execution of a downgrade or disconnect has a real cost which needs to be paid. The balance is due to the fact that we need to create an "economic grey area" which almost demands that they put the pencil to their decision.

Also, if you have made your pricing and packaging decisions with retention in mind, that free remote may have to be forfeited when they downgrade or their total billing may not drop in a straight line because of discount pricing based on volume of services. In any case, remember that you are attempting to give the subscriber pause before finalizing their decision.

But, if you lose them for the moment, that does not mean that the war is over. This subscriber became a customer at some point in the past for what they thought were good reasons at the time. Given a strong, consistent follow-up with other good reasons, they may be recovered. Thus, not only is it important to identify who and where they are, but to develop specific programs aimed at rekindling their interest in cable television.

Summary

As you are aware, the subject of retention is about as wide as the subject of the cable industry itself. In this article, we have attempted to establish retention as a common consideration which should run through all decisions from the outset. Further, we have sketched out the broad areas involved with a comprehensive retention program. The detail of specific program ideas and materials will be developed at a later time as we continue to probe the area of cable marketing and sales. □

TRIPLE CROWN ELECTRONICS INC. PRODUCT FAMILIARIZATION PROGRAM

By: Dave Emberson
Vice President-Marketing
Triple Crown Electronics, Inc.

It is the intent of this program to explain various methods by which Radio Frequency (RF) signals are received, processed and distributed through coaxial cables. Each different system will be covered repeatedly with increasing detail, to permit instruction to different technical levels.

In this manner, it is hoped that this program will benefit both technical and non-technical employees and help them understand how the products manufactured by us are used by our customers.

Radio and television signals transmitted through the air are received by an antenna and transformed into electrical energy. The electrical energy is carried on metal conductors or antenna wire to the receiver which converts the electrical signals into sound or pictures.

In the case where more than one receiver must be operated at the same time, it is necessary to "split" the signal in a manner that doesn't distort or destroy the signal.

When it is necessary to provide signals to numerous receivers, more care must be exercised in the "splitting" of the signal, as well as, some method use to boost or amplify the signal. As the number of signals to be distributed are increased, the difficulties encountered in maintaining signal quality also increases.

There are simple ways to feed two or three receivers. *(see diagram 1)*

If sufficient signal is obtained at the antenna, it can be split so that a portion of the signal is presented to each receiver. If the signal from the antenna is too weak, it can be amplified before it is split to feed each receiver. *(see diagram 2)*

If more than one signal is received and they are different strengths, the use of an amplifier is complicated because the weaker signal may not be amplified enough — while the stronger signal may be amplified too much causing interference to both signals.

To correct this problem it is necessary to separate the two signals and amplify them separately and then add them together in the same cable so they can be split to feed the receivers. *(see diagram 3)*

In the case where both signals are not received in the same direction, it is necessary to use a separate antenna for each signal. In this instance, only the desired signal can be allowed through the amplifier and be recombined in the single cable. *(see diagram 4)*

Figure 1

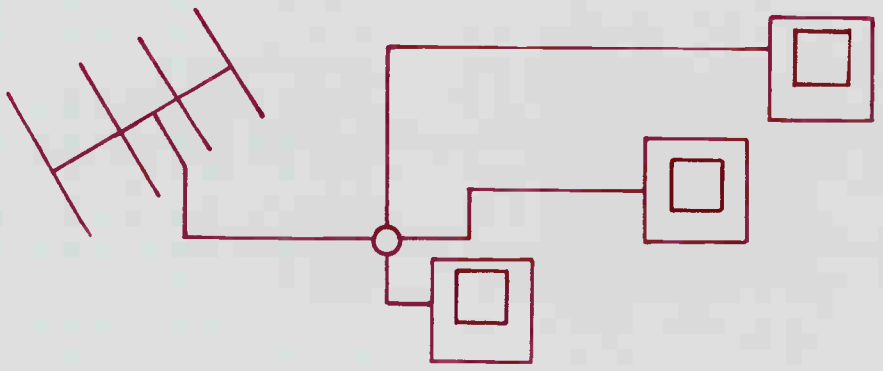


Figure 2

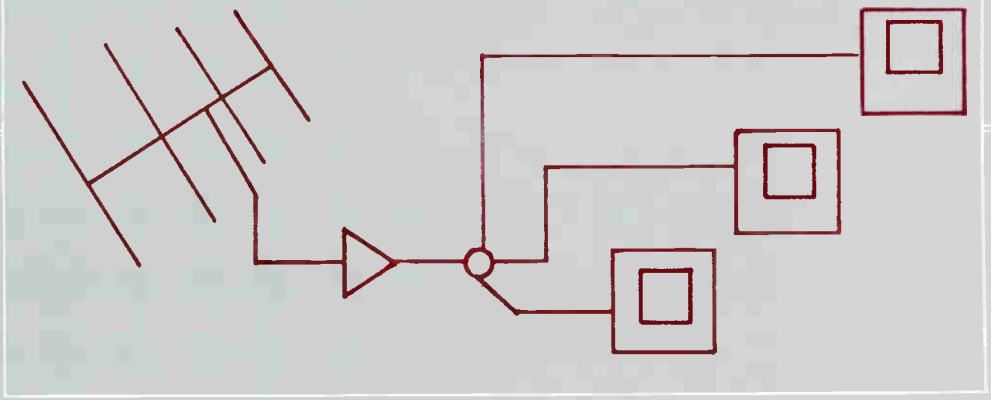
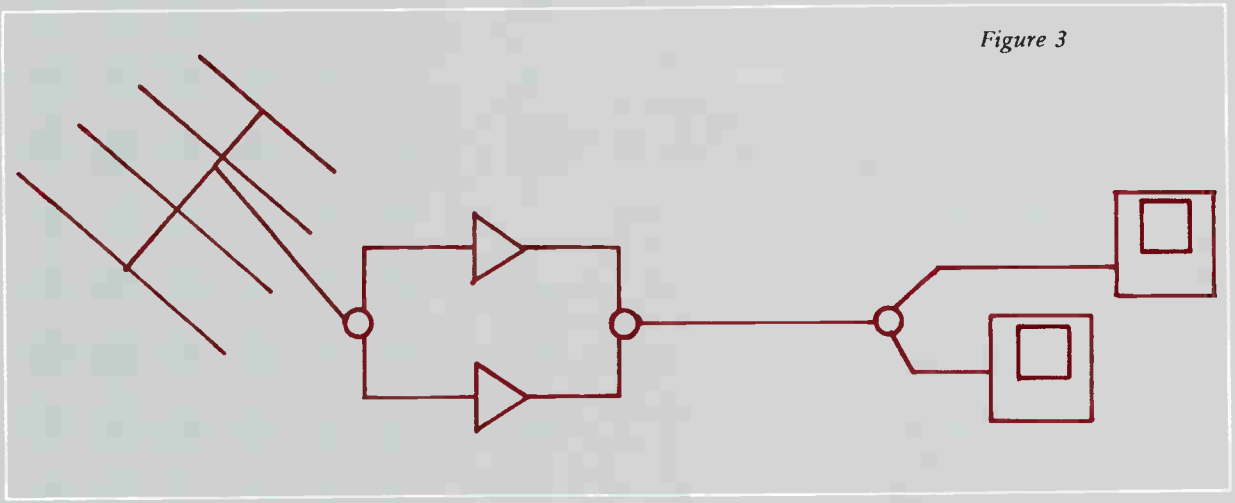


Figure 3



This is accomplished by using electrical filters which pass only that signal to which they are tuned, much the same way as you can tune a single station on a radio or television set.

Filters can pass one station and yet prevent the undesired station from getting through to the combiner. By using filters and amplifiers it is now possible to select, amplify and combine many more signals. *(see diagram 5)*

Figure 4

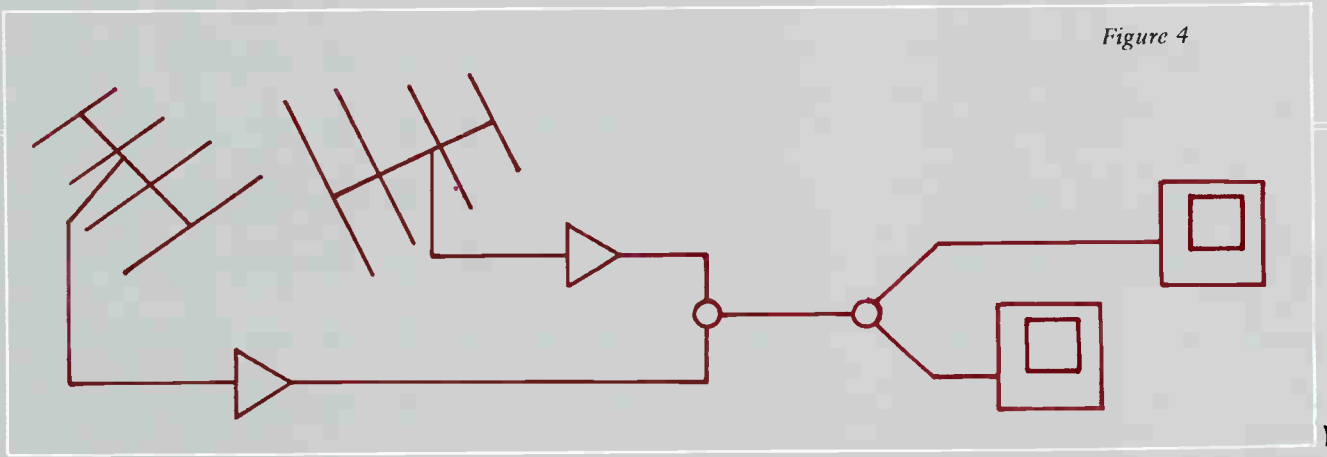
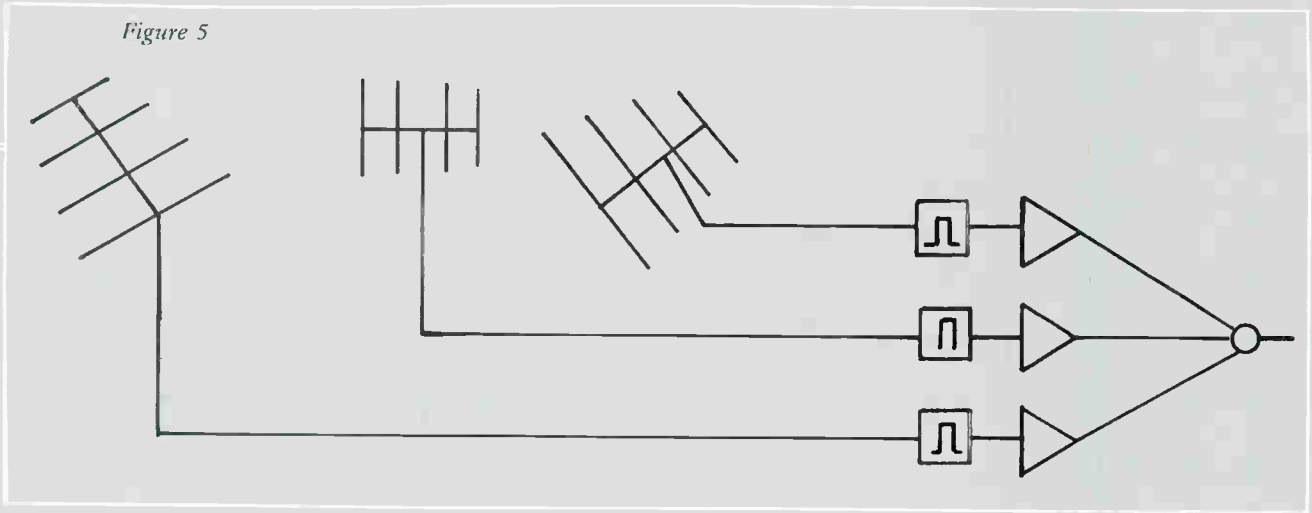


Figure 5



It is now possible to take signals from many different sources, filter, amplify and combine them to produce the desired channel line-up on a single cable.

Definitions

Master Antenna Television (MATV)

Usually found in apartment buildings and multi-unit dwellings. Such systems can range from very simple to moderate degrees of complexity involving TV Cameras for surveillance, character generators and alarm systems.

Satellite Master Antenna Television (SMATV)

Similar to MATV systems but employs Satellite receivers to provide additional channels. Such systems can provide Pay TV Services and therefore tend to use higher quality equipment and TV picture scramblers and encoders.

Community Antenna Television (CATV)

Cable TV is designed to cover much larger areas than MATV systems and the cables are installed on poles, buried in the ground or even in conduits under the roads.

These systems provide cable service to individual homes, apartment buildings, condominium developments, institutions, hotels and motels. The greatest part of the system is located outside, exposed to the elements. Greater channel capacity is necessary to permit carriage of the many different services which can be offered from numerous sources including satellite, microwave, digital and even locally originated programs, such as city council meetings, etc.

Antennas

A device used to convert electromagnetic energy into electrical energy. There are numerous different kinds of antennas used for receiving transmitted signals from radio and television stations, communication satellites and various other radio broadcast signals.

Television antennas range in size from local reception devices called rabbit ears to larger outdoor antennas usually mounted on a mast or tower.

The antennas for outdoor use can be single channel or "broadband", that is capable of picking up a wide range of television channels.

While the domestic "home type" antenna is usually of the "broadband" type, the commercial antenna is "cut" to a specific channel or even range of channels.

Different antenna shapes (or designs) offer different features and benefits which can be applied in different situations to produce the necessary results.

It is the use of different antennas for different channels, with the antennas mounted or "phased" in different configurations, which give these "master systems" the advantage over the standard "home installation."

Whereas a home installation cost is borne entirely by the individual householder, the expense of a properly designed antenna site is shared by many people. In this manner, it is possible to increase the sophistication of the antenna system and the necessary associated electronics to improve overall quality plus permit reception of otherwise unavailable signals.

This includes signals which may have been too weak, or were subjected to interference by other stations. This could also include signals which are not normally available at all and must be brought in by a microwave system with possible multi-hops to the final destination or even by Satellite from thousands of miles away. FM radio signals are picked up by antennas similar to TV antennas.

Television Signals — waves of light from an object are changed into electric waves which are transmitted by radio or wire and then changed back into waves of light to produce an image of that original object. This signal is usually comprised of three main components — picture (or video), colour information and sound (audio).

Each of these components must be processed properly to avoid loss of quality. Loss of quality is most difficult or even impossible to correct in most cases.

Frequency — number of complete cycles per second of an alternating current. Direct current is when electrons flow in only one direction, that is from negative to positive.

Alternating Current — is when the flow of electrons reverses at certain intervals. Hence, when the flow of electrons is reversed at a frequency of once per second, the frequency of this electrical energy is said to be changing at One Cycle per second.

An early radio pioneer was physicist H.R. Hertz, who experimented with electro magnetic radiation produced by irregular fluctuation of electrical energy within a conductive material.

Therefore, the correct term for the expression of radio frequencies would be in so many "Hertz" per second or Hz. in recognition of the contribution of Dr. H.R. Hertz.

The range of radio frequencies is indeed great. As already explained, an electrical charge in polarity (or direction of electron flow) is termed as being a "Frequency" of 1 Hz. per second or simply One Hertz.

The radio frequency band is divided into different ranges to facilitate identifying a specific range or "band" of frequencies.

The associated "Frequency Allocation Chart" identifies these bands and shows the "Bandwidth" of each of the specific allocations.

From the audible range of frequencies to the light frequencies, there is a dramatic increase in frequencies.

The frequencies **we** are most interested in, for our discussions, are between 5 Megahertz and 450 Megahertz per second. These are the frequencies used within a coaxial cable distribution system which will be explored during the next few pages to be presented to you.

The band allocations within the coaxial distribution system are:— ►

5 - 30 MHz.	Sub Low Band
50 - 88 MHz.	Low Band
88 -108 MHz.	FM Radio Band
108-175 MHz.	Mid Band
175-220 MHz.	High Band
220-300 MHz.	Super Band
300-500 MHz.	Hyper Band

This is Very High Frequency Band or VHF Band. In addition, some TV stations broadcast between 475 and 890 MHz. and this is the Ultra High Frequency band or UHF.

The satellites that we previously mentioned operate in 2 different microwave bands.

One band between 3.7 and 4.2 Gigahertz and the other is between 11.7 and 12.3 Gigahertz.

The next satellite system is to operate around the 30 Gigahertz Band.

Operation of the frequencies above 450 MHz. will be covered later in these pages.

Bandwidth is **not** predicated by the size or weight of the Bass Drummer.

Band is defined as — a particular range of wave lengths in broadcasting or as a particular range of frequencies.

Band WIDTH is defined as being the extent of the range of frequencies between the lowest and the highest frequencies.

This is usually qualified by the degree to which the electrical energy is attenuated (loss) or amplified (gain) in absolute signal level.

Filters — a device for controlling electrical energy by either passing or restricting the passage of certain frequency ranges. "Bandpass" filters permit electrical energy to pass whereas "Band stop or reject" filters restrict the passage of electrical energy.

These filters are designed and "tuned" or aligned for specific frequencies or bandwidths.

Amplifiers — a device for strengthening electrical energy. In the transmission of signals through cables, the energy is slowly dissipated or absorbed by the materials of which the cable is composed. This energy is converted into minute amounts of heat and is then lost to the air surrounding the cable. In order to preserve the signal quality represented by this electrical energy, it is necessary for more energy to be added into the network. This function is performed by the amplifier.

If the signal into the amplifier is too weak then the picture will get snowy ("or noisier").

If the signal is too great into the amplifier, this may cause distortion of the signal and the pictures are distorted and blurry.

These problems can be predicted and corrected by proper amplifier design and careful manufacture.

Every amplifier must be checked to assure that it is operating to peak performance. The user must ensure it is correctly installed and adjusted to achieve the necessary operating results.

The amplifier must exactly compensate or "correct for" the loss of energy throughout the coaxial distribution system.

Coaxial Cables — Cables with conductors having a common axis. An insulated connecting cable containing conducting materials surround a central conducting member, used for transportation of electrical or electronic impulses by hertzian waves.

The cable most commonly used in the communication industry for purposes of distribution of television signals is the coaxial cable. This cable is comprised of a wide range of materials but can be divided into three main components.

1. Centre conductor — the centrally located conducting member which acts in conjunction with the outer conductor to propel the electrical energy is propagated. This can be anything from air to rubber.

2. The Dielectric — the material separating the centre conductor from the outer conductor through which the electrical energy is propagated. This can be anything from air to rubber.

Note: — Cable for normal use is plastic polythene, bubbles or solid.

3. The Outer Conductor — see paragraph #1.

The design and manufacture of coaxial cable is indeed a science and an art which will be covered in a later page.

It is necessary to appreciate the term Cable TV!

The cable is **the** most important component of the entire system, without which, the industry could **not** operate.

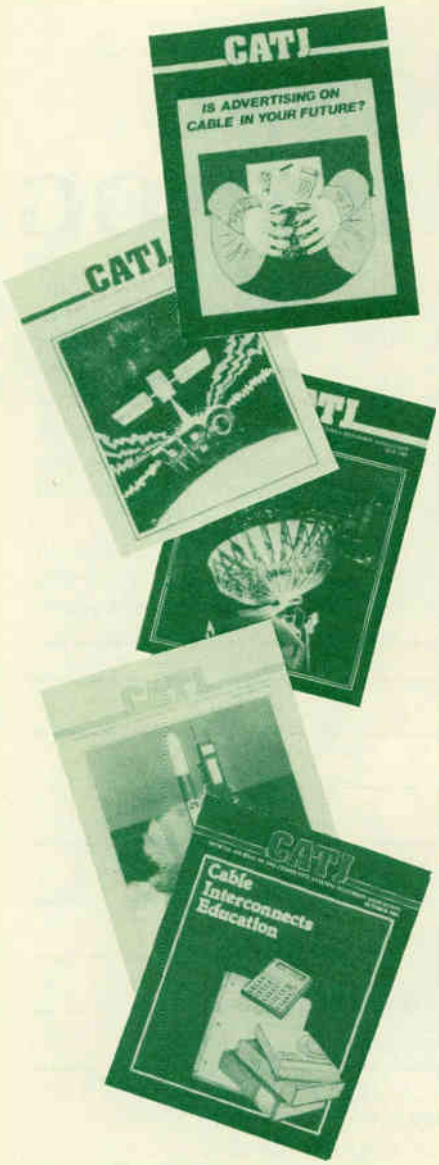
Many years of research and development have been needed to permit the production of these highly technical products. Improper handling and poor installation practices can destroy the electrical properties of coaxial cable.

Well handled and installed cable will operate properly for twenty years or more.

Trap — A device for collection, a unit which accepts but does not return, to take.

This device self-explains its function. It can accept a frequency or band of frequencies and absorb the electrical energy completely, rendering the injested frequencies useless. □

you can't afford not to Subscribe.



NAME _____

COMPANY _____

☐ CABLE TV SYSTEM
☐ SUPPLIER ☐ OTHER

ADDRESS _____

CITY _____ STATE _____

ZIP _____ PHONE _____

TITLE ☐ MANAGER ☐ CHIEF ENGINEER
☐ CHIEF TECH ☐ INSTALLER ☐ BUSINESS OFFICE
☐ ALL OF THE ABOVE (CHECK PRIMARY FUNCTION)
☐ OTHER

SIGNATURE _____

DATE _____

☐ $22.00 Enclosed for 1 Year
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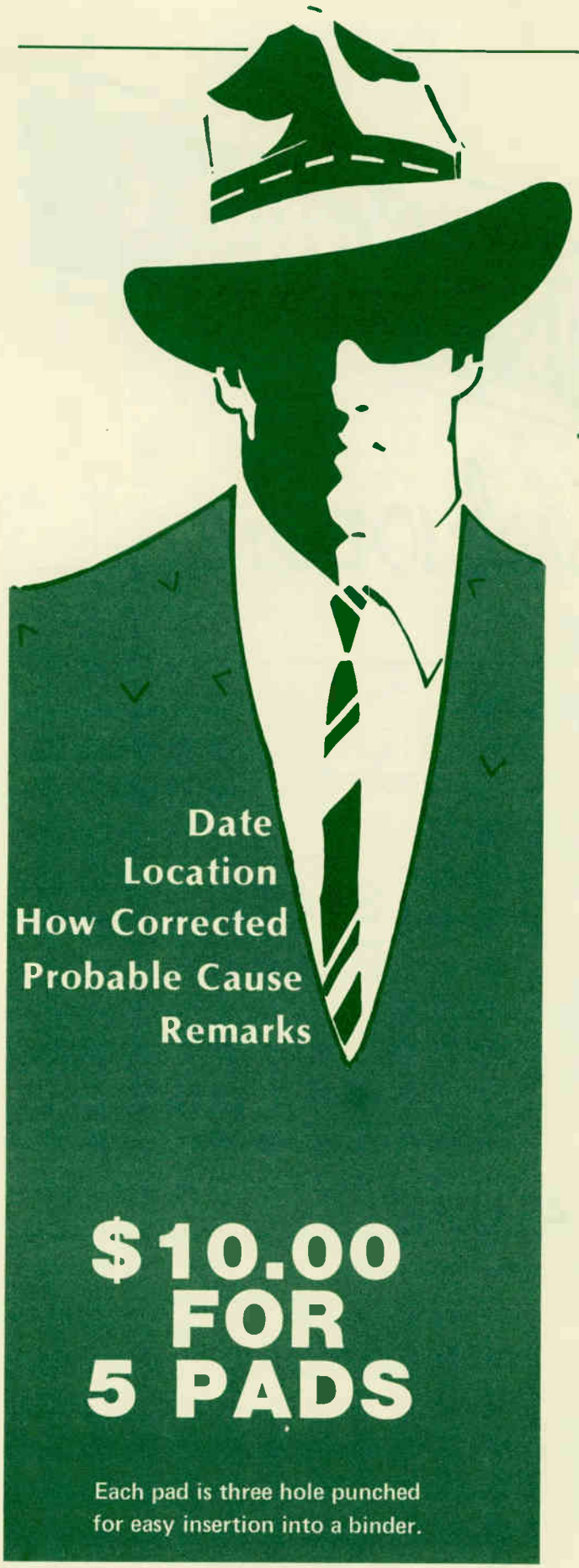

Detection and Correction

SIGNAL LEAKAGE LOG

This Signal Leakage Log satisfies the requirements of the FCC Rules and Regulations, Part 76, Subpart K, Paragraph 76.610(d). Although the log is intended for recording cable television signal leakages in the Aeronautical frequency bands (108-136 MHz and 225-400 MHz), it may be used by cable system operators to record all system signal leaks and insure an effective on-going signal leakage detection and correction program.

When using this log for recording signal leakage in the Aeronautical Frequency Bands, the log sheet must remain in the file for a minimum of two years.

$10.00 FOR 5 PADS

Each pad is three hole punched for easy insertion into a binder.

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ADDRESS _____
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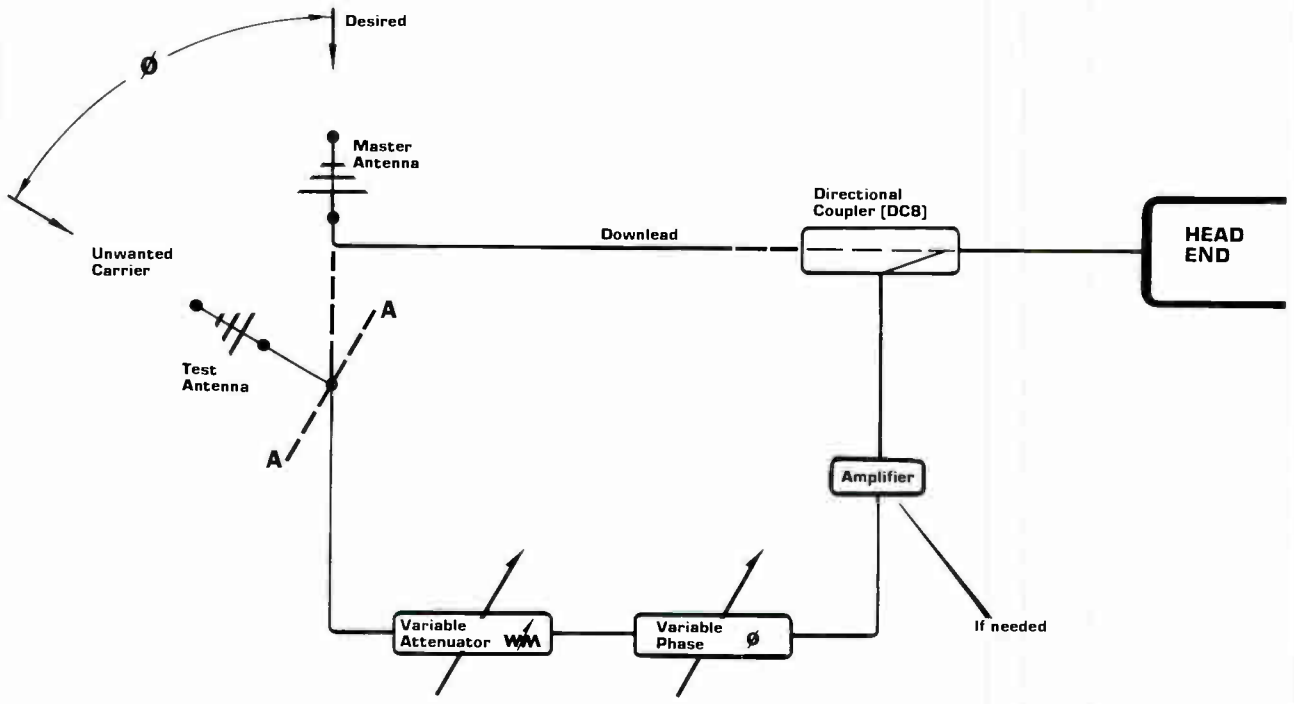


Figure 1

SCHEMATIC OF INTERFERENCE PHASE OUT METHOD

The Phase Out Method

Figure 1 shows the situation schematic. A separate test antenna is pointed at the interference to pick up a sample. Note that the master antenna is also picking up a sample — otherwise we wouldn't have a problem.

The test antenna sample is injected into the master antenna-to-processor downlead through a directional coupler (DC-8). So the processor sees two samples: the master antenna sample and the test antenna sample.

Note that the test antenna sample runs through a variable attenuator and a variable phase shifter ("line stretcher"). While looking at the picture, we adjust the attenuator and phase shifter until the interference disappears: this happens when we have made the amplitude of the test antenna sample the same as that of the master antenna sample, but, **opposite** in phase, **at the processor.**

Why Isn't the Desired Channel Damaged?

The reversed phase test antenna sample removes the master antenna sample, and no more, because

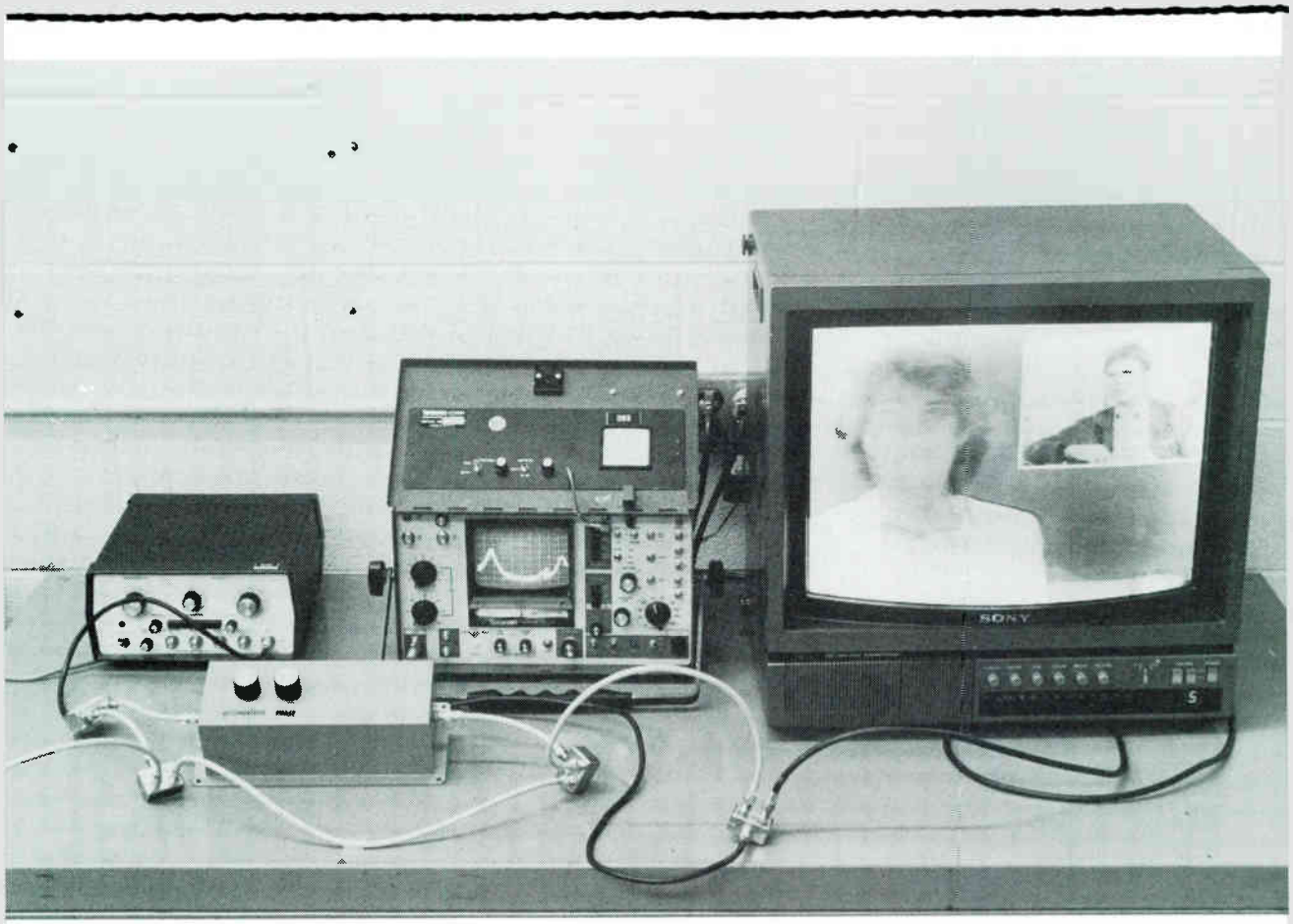


Figure 2-A

Equipment hook up to simulate in-band interference & suppression.

their modulator envelopes **exactly** match. The desired channel information, underneath this envelope is **not** affected, either in amplitude, phase or chroma delay.

What Kinds of Interference are "Phasable"?

The short answer is **narrow band carriers** whose bandwidth is only a few hundred KHz. This is because **perfect** phase out occurs only at a **single frequency** and, so the phase-out phenomena is very sharp. As we depart from the "perfect phase out" frequency, the method **reduces** the undesired master antenna sample, but does not completely eliminate it. Typically, at plus/minus 100 KHz, the attenuation to the master antenna sample is about 20 db. So this sharp response of the method does not prevent it from being useful for interfering spectra as wide as, say 250 KHz.

The longer answer includes some representative types of interference reducible by the phase out methods: co-channel interference, in-band reception of harmonics of lower frequency

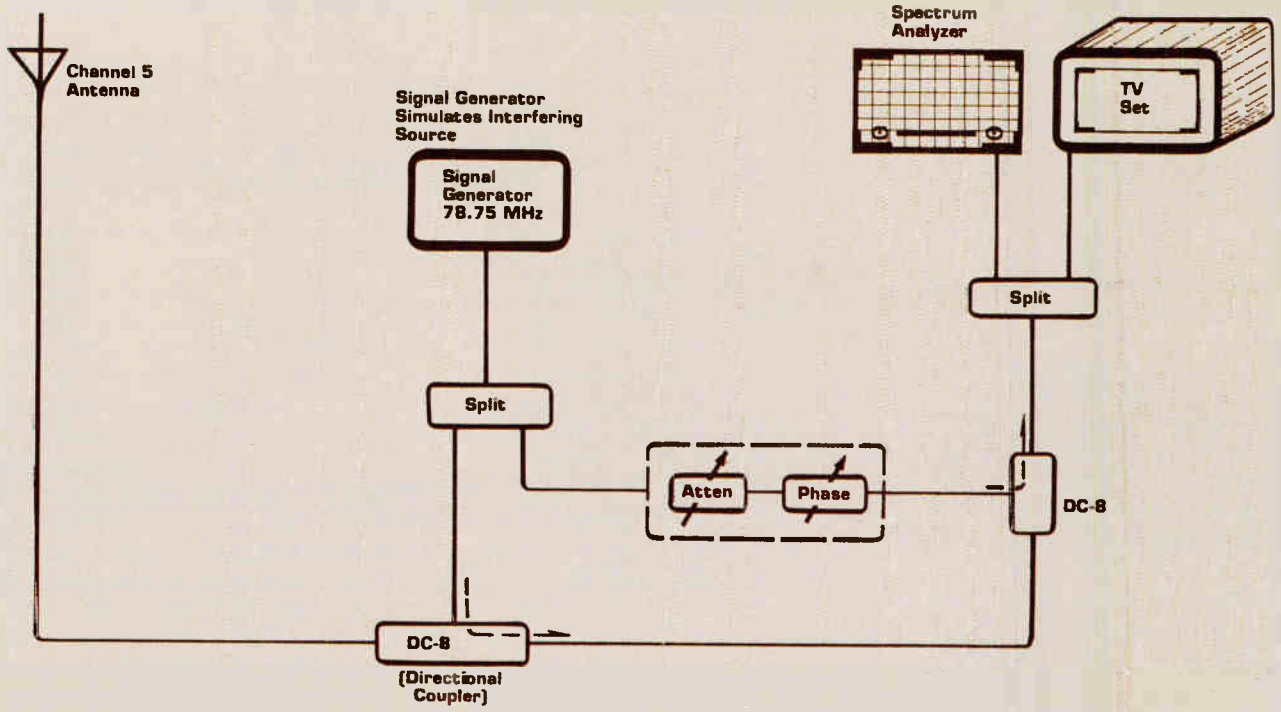


Figure 2B

SIMULATION OF UNDESIRED INTERFERENCE TO DEMONSTRATE THE PHASE-OUT REMOVAL METHOD

transmitters, strong adjacent, unwanted channel reception, FM adjacent interference, noise generated by nearby, faulty power transformers and other generators of wide band noise (a splatter of which falls into the desired channel)

Example

Let's choose a tough case: an undesired carrier right in the desired channel. We don't know its origin, so we can't ask the owner of the low frequency transmitter to install a low pass filter. We don't have a spectrum analyzer, so we don't even know the exact frequency. And if we did, we wouldn't use a trap we'd gouge out our desired signal. **Figures 2 and 3** show how we simulate this situation. We use a signal generator to inject an undesired carrier just after the antenna, so the processor will think an undesired off-air carrier has come in with the desired channel 5 signal.

We tap off some of the signal generator output (as if it came

FIGURE 3A

Control picture, prior to injecting interference (Blurring due to camera speed)

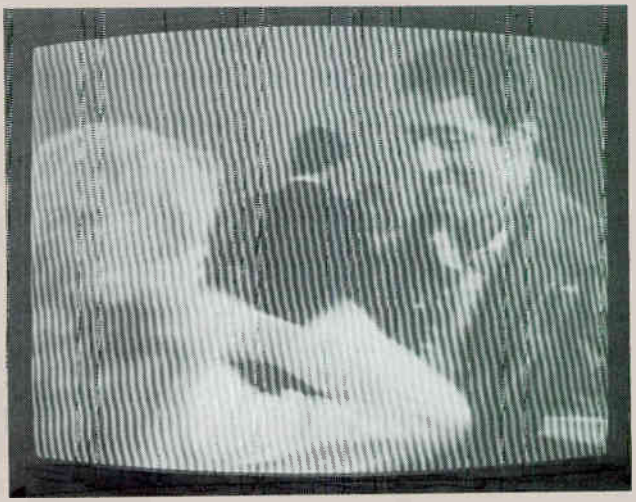


FIGURE 4A

Affect on video of injecting the interfering carrier

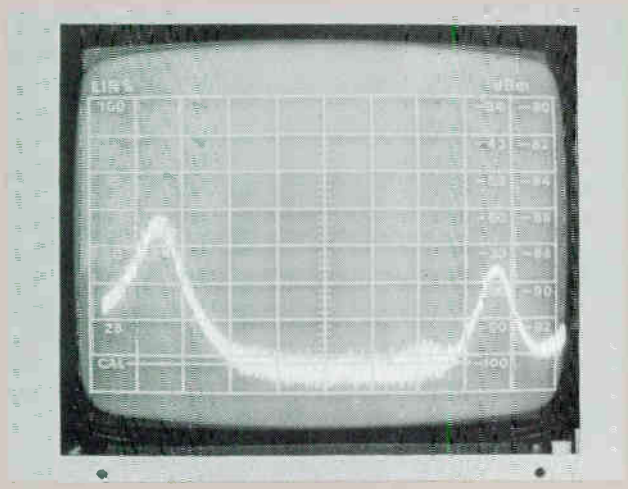


FIGURE 3B

Spectral response of channel 5

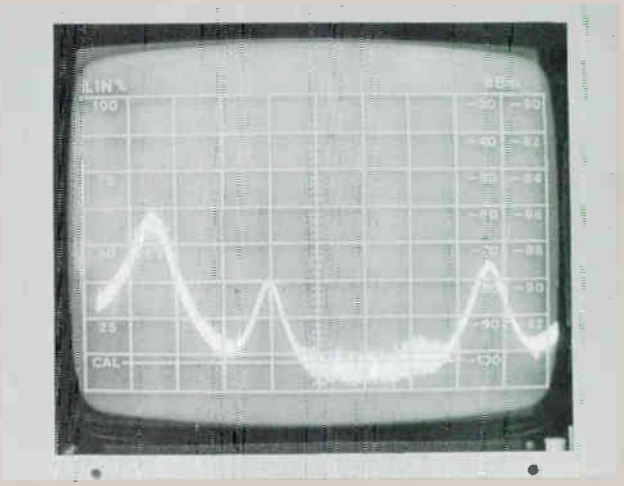


FIGURE 4B

Spectral response of channel 5 showing the interfering carrier

from the test antenna) and run it through a "phasor" — containing the variable attenuator and variable phase shifter depicted in **Figure 1.** After emerging from the "phasor" the test antenna signal is mixed with the master antenna sample, and the off-air channel 5, using another DC-8, and the TV set sees all three of these.

Figures 3 through 5 are video and spectrum response photos showing results of using the phase out method.

Figure 3A (with its spectrum picture 3B) is a test picture — taken before injection of the interfering carrier. (The slight blurring is due to camera speed.)

Figure 4A shows the effect of connecting the interference into the first DC-8, with the "phasor" disconnected from the final DC-8. The interfering carrier is visible in the spectrum sweep, **Figure 4B.**

Figure 5A is the video screen after the phasor was carefully adjusted to phase out the interference. Note that its spectral sweep is identical with the pre-interference sweep — showing ►

FIGURE 5A

Video screen after careful adjustment of the phasor

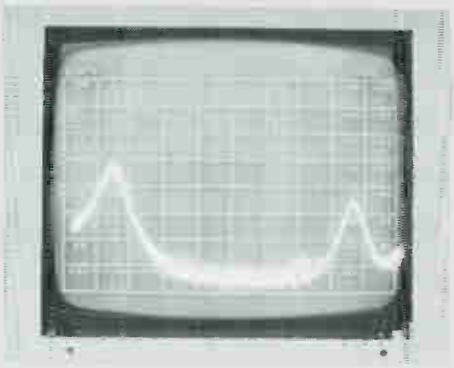


FIGURE 5B

Spectral response of channel 5. Note that it is identical to 3B indicating no damage to desired channel information.

that we have not damaged or removed any of the desired channel information. Since the interfering carrier has some width, this indicates that the phasing method is not **extremely** narrow band.

Precautions

The function of the test antenna is to pick up a sample of the interference, without picking up a large amount of the desired off-air channel. If the latter occurs, we might inadvertently phase attenuate the desired channel information in the process of phasing out the interference.

This means that there must be some reasonable difference in bearing between the off-air channel and interference originating points. Even if we do pick up some of the off-air channel in the test antenna, the chances of **severe** attenuation by the phasing process are not great, but just possible. So beam separation is desirable, but not absolutely necessary.

In cases of close angular separation, where this can not be prevented, one should try tilting the test antenna to vertical polarization. This discriminates against the desired TV transmission while usually picking up enough of the interference to be useful.

Doesn't This Resemble Co-Channel?

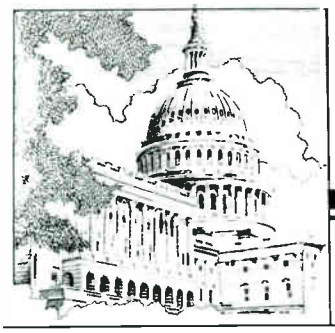
Yes. In co-channel interference, the "interference" is another channel having the **identical** frequency allocation. We have just demonstrated that it can be phased out also.

Next Time

Next time we'll demonstrate how the phasing method can be used to suppress interference to a selected, desired channel due to wideband RF noise, some of which falls into the desired channel. Among generators of such noise are faulty power line transformers, broken insulators, neon lights and rotating electrical machinery.

Acknowledgements

Thanks to Carol Ryan for her mighty word processor, Rich Green and John Greatrex for line art, Bob Arnold for equipment hook-up, Dave Skeval and Steve McIntosh for photography and to Chris Bostick for the sketch. □



Washington Update:

Steve Effros, Executive Director, CATA

H.R. 4103 — BACK TO THE NEGOTIATING TABLE — AGAIN!

For perhaps the final time the cable deregulation effort that we have mounted for the past three years has been sent back to the negotiating table for a last-ditch attempt to resolve the differences between the cable industry and the cities prior to the now-promised showdown on Capitol Hill. Despite what you might think, this is a very hopeful sign for the legislation.

Here is what happened; As we have been telling you for some months now, the deregulation effort, embodied in H.R. 4103, was bound to come up against serious opposition, and demands for compromise at some point along the legislative path to hopeful passage. The resistance was avoided in Congressman Wirth's Communications Subcommittee when an informal agreement was reached that the main effort at reformulating the bill and dealing with some of the thorny issues like data transmission would be delayed until full Commerce Committee consideration of the bill.

As everyone is well aware by now, the Commerce Committee in the House is chaired by Congressman John Dingell (D-Mich). He is not an easy man to please, and he is most definitely a very tough adversary — especially when you are trying to get legislation through the Committee he firmly oversees! So, with the bill already cosponsored by a majority of the members of his Committee, Mr. Dingell still held the balance of power — or appeared to — over H.R. 4103.

The folks opposed to the bill, particularly the National League of Cities, which abandoned its support for the bill several months ago, and the U.S. Conference of Mayors knew all about the strength of John Dingell, and also knew that he didn't like the bill.

The NLC and company thought that they could simply use John Dingell to block the legislation from ever coming up in his Committee. A very effective way to kill H.R. 4103. Fortunately for us, Mr. Dingell doesn't see it that way. In a recent speech to the USCM Chairman Dingell reiterated his personal opposition to the bill, but said there is a lot of support for it in his Committee and that he does not intend to stand in the way of consideration of the bill by the Committee. He told the city folks that they have done a terrible job of explaining their position on Capitol Hill (we think that may be because they don't have much of a position to explain!), and that they should not assume, even though he personally opposes the bill, that there will not be cable legislation adopted by Congress this year.

It came as quite a shock to the city folks. But Mr. Dingell did more than just lay out the political reality of the situation. He added to it by calling on the cities to stop simply blankly opposing the bill and instead sit down with the cable industry and try to resolve the differences. In other words, another round of negotiations. The Mayors agreed, and so did Tom Wheeler of the NCTA. The understanding is that they will sit down with the entire slate clean once again. That all of the compromises of the past — and there have been plenty of them from the cable side — are open for renegotiation.

An additional part of the strategy is that Mr. Dingell has assured the cable industry that he will not sit still for the cities simply sandbagging the proceedings in the hope that by delaying things long enough we will get too far into the election year for there to be any politically realistic hope for passage of the bill. In other words, there is a time limit for how long these negotiations will continue.

CATA supports the effort to find some common ground. We question, however, how much farther the cable negotiators can go without gutting the legislation to the point where it is no longer worthy of support. We, of course, will be watching that very carefully. You can be assured that if CATA believes that the line has been crossed — that too much has been given away, we will say so loud and clear!

There are several key aspects of this legislation that are essential from our point of view, and are odious from the city point of view. The provisions of this bill have been negotiated over and over again. The industry has given and given and given. We really question how much more room there is to give. It will indeed be a challenge to see if the cities are really interested in settling our differences. One of the key ones is our absolute need for some stability in the renewal process. Without that provision in the legislation it is not worth what we are giving up! However, we know that the cities are totally opposed to losing their power to conduct three-ring-circus franchise bidding processes every fifteen years or so. That, as we have said many times before, is highly destructive. We will oppose any legislation that does not contain a reasonable expectation of renewal for cable franchisees who have met their legal obligations as franchisees during the initial term.

Similarly, the current legislation has rate regulation restrictions built into it. We do not believe there should be any rate regulation of cable television. The industry is facing increasing competition every day. Indeed Congressmen can see this now for themselves since Direct Broadcast Satellite service is being introduced in the Washington D.C. area ahead of a cable system being built here. In fact, that type of distribution competition may result in it being economically prohibitive for any cable system to be built in the Nation's Capitol. That would be the ultimate irony of the franchising process that the cities are so stridently trying to defend as being in the public interest! ►

Unquestionably the cities will try to negotiate away any limitations on their ability to regulate rates. Once again we would oppose such legislation. The FCC has already limited the cities and states to regulating the rates — at maximum — of basic service only. We don't need legislation to accomplish that, particularly if the legislation gives away so much in the bargain.

What should be taken out of the bill? Well, how about the virtually guaranteed 5% franchise ransom for one? Why should the city be allowed to impose a hidden tax on cable subscribers when viewers of DBS, STV, Video Tapes, MDS, LPTV and the like are exempt from paying similar tribute to the cities? We do not object to paying the cost of regulation of our use of the city streets and ways to assure that the public safety is not jeopardized. But beyond that we should not be converted by Federal Law into hidden revenue source for the cities.

All of the "free" access channel demands should similarly be taken out of the "compromise" agreement. Why should we be forced to give away our assets to the city for "free"? Of course we all know it is not "free". The subscribers pay for it — and again these channels become a hidden tax imposed on cable subscribers while our competitors need not include such costs in their revenue projections.

To put it mildly, there are lots of things that can be renegotiated in this legislative package, but most of them do not come from the cable side of the ledger — we have already given up most of the store to get the legislation this far. We applaud Mr. Dingell's willingness to sponsor and oversee one last set of negotiations between the parties, but we hope he understands that there are certain basic needs which we cannot abandon. Should it turn out that an impasse is reached and no further progress can be made we trust he will allow us our day in the Committee to argue the case for the validity of our positions. While many things have been written about the way John Dingell controls the Commerce Committee, it is not often heard, but absolutely true that he is true to his word. He will, we believe, honor his committment.

And, should legislation not turn out to be the vehicle for relief of the problems we are experiencing with the franchising process, then other avenues, including the FCC and the Courts will have to be taken. We have little doubt that ultimately we would be successful in those forums. Stay tuned.

THE BIG-CITY FRANCHISE HOUSE OF CARDS FINALLY COLLAPSES

It should certainly come as no surprise to anyone who has been reading the CATAcable that the franchise promises in the big cities are now starting to be withdrawn. We have been saying for several years now that the overexpectations created by the franchise bidding wars in the urban centers would some day come back to haunt all the participants. It is now happening. Drew Lewis, Warner Amex Cable Communications Chariman, has started touring the big cities where Warner Amex has "gold-plated" franchises and is informing the city officials that the gold is turning to lead, and his company cannot keep carrying it — they will go broke if they do! In Milwaukee he told the officials there that Warner wanted to renegotiate the franchise to cut channel capacity, access, studios and the like. They want to cut millions of dollars in costs in order to make the system viable. In Dallas he told the city folks that "There's one thing that's clear: We're not going to stay in Dallas and lose $20 million a year for the next 20 years." Reality.

The most interesting part of what is going on is that some city officials and consultants are claiming they are surprised by it all. This can only be disingenuous. Many, many people in the cable industry have been warning the cities and the consultants for years that their insistence on forcing up the bidding wars for the franchises would only produce ultimately, unrealistic franchises. That is exactly what has come to pass. The cry of the city folks that ". . .we made a deal — the cable operator promised all those things and now must deliver. . ." is silly. The fact that you can find someone to promise something — even in the best of faith, based on extremely questionable presumptions of future business growth does not mean that once those growth projections don't turn out to be correct you still have to provide all the city perks based on those projections.

Sure, if pay-per-view had taken off, if two-way interactive systems could sell the technology to subscribers, if alarm systems and electronic funds transfer and data had proved to be major new revenue sources then the promises would have been kept. The projections would have been correct. They weren't, and many of us said they were terribly over optimistic from the beginning. Does this constitute a "changed circumstance" as contemplated in H.R. 4103? That is what some cities are complaining — they are saying that if the legislation is passed companies will be able to simply renege without lifting a finger other than saying "changed circumstances". We don't think so. The legislation does not contemplate the massive changes being asked for in some of the big cities. But even if it did it is of little relevance. Those changes are going to have to be made regardless of whether there is legislation or not — clearly they are already being made. Reality is a very hard bargainer. Warner or any other company finding itself in the same position does not need any legislation to figure out that when the franchise is simply too overloaded and they cannot make a profit on the system they will have to cut their losses. That is what is happening. It is going on right now both in the glare of publicity, as is the case with the Warner franchises, and in quiet negotiations which are taking place in many other cities. This has nothing to do with legislation, and the sooner everyone understands that, the better.

In fact, what is happening in the major urban franchise renegotiations proves the very point we have been making all along about H.R. 4103 — that is that the process of franchising for cable television does not work. It is a process that forces the overbidding and

overdemanding that has taken place. The operators knew there was trouble ahead — they told the cities, they told the consultants, but it happened anyway. We are all stuck in the process. The cable operators know that the only way to get a franchise is to be overly optimistic about the business prospects of cable television because the city officials and consultants have been convinced that those prospects are true. They will not accept anything less. The City officials vote for the "highest" bid because that is what bidding wars are all about — to force the price as high as they can get it to go! So neither side can break the cycle. Congress must do so before we get into the major round of refranchising coming up. The reason for that is simple: in a refranchising situation the cable operator is in an even weaker position. The money is already in the ground. The operator can do nothing but bid above what he expects the highest unrealistic bid to be, because that is the only way he can protect his investment. Renewals take place, but at what cost?

The bottom line here is that the "bad" press you have been reading lately about big cable operators going back on the big promises in the urban centers is good news. Reality has finally arrived in cable franchising, and it's about time!

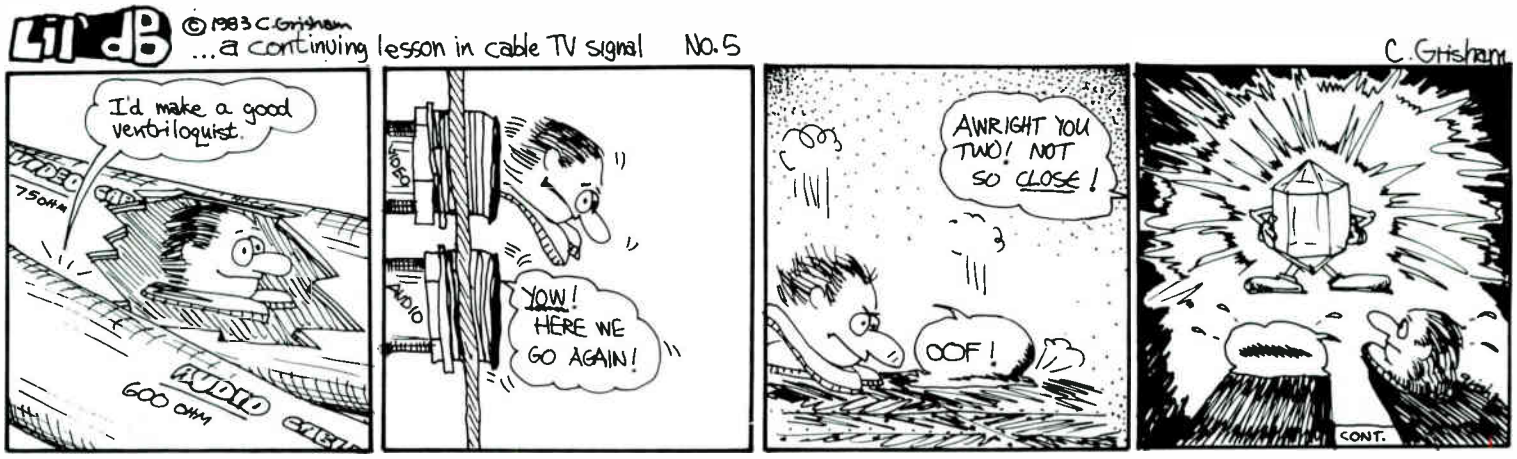
FEES CAN BE REDUCED FOR PRE-1969 CABLE FRANCHISES

If you are operating with a franchise that was written in 1969 or earlier you may be able to get a reduction in your franchise fees. A little-remembered section of the FCC's franchise fee limitations (Section 76.31) grandfathered existing franchises. That is, the 3 to 5 percent limitation did not apply to those franchises until the end of the system's current franchise period, ". . . or until 15 years from the date of initial grant of the franchise, whichever occurs first."

That means that if your franchise fits into that 15 year category and you are paying more than three percent you now may have the right to apply the FCC's limitations to your franchise. Don't do it without consulting your lawyers first, or at least call us to get more details. CATA just thought you ought to know.

CABLE TELEVISION LAW — A NEW BOOK WORTH HAVING

This is not a book for everyone. It is not really needed by the operator of an independent system who rarely has a legal question and can always call the Washington CATA office when help is required. But if you have a bunch of systems, or you really want to know the ins and outs of cable law — how it got the way it is, how it relates with broadcast law, common carrier, etc. then you really should get yourself this three-volume set. It is called, simply "CABLE TELEVISION LAW: A Video Communications Practice Guide". It was written by former FCC Chairman Charles Ferris and two of the brightest guys to come out of the Commission in a long time, Frank Lloyd and Tom Casey. They both worked for the Chairman when he was at the Commission and are now in private practice with him at a major Washington firm. They have put together what has got to be the definitive legal package on cable television. It includes all the history as well as all the rules — not only the cable rules, but also the broadcast rules, the CARS microwave rules, the Communications Act, the Copyright Act, and much more. It's got sample RFP's, franchises, pole attachment material, FCC forms, and we could go on. It will also be updated twice a year. All of this does not come cheap. After all, you get entire sections talking about antitrust implications of franchises, tax issues in cable and the like. The cost: $210 for a three-volume set. Update costs have not been set yet. Given that you could spend that much for two hours of a Washington attorney's consulting time when you get in to a franchise scrape we think it is well worth it for larger operators. If you're interested, you can get the set for 30 days risk free by calling 800-833-3630. We don't get any money for telling you that this book is worth it. What we do get, though, is more informed members. And that is important to us. Of course our telephone is always open to answer your questions when we can, but we can assure you that it will be a lot easier for all of us if you have the material right in front of you to show the doubting local mayor or city attorney! Enough said. □



Showcase

THE NASHVILLE NETWORK (TNN) LAUNCHES NEW CONSUMER CAMPAIGN ON CABLE

"Stand Up For Your Country" New TNN Theme

A unique new consumer marketing concept designed to promote viewship and distribution of The Nashville Network (TNN) launched nationally on January 18. The "Countrygram" campaign is significant and unique in cable marketing, combining the largest cable media buy to date with a telemarketing program to alert both consumers and cable system operators of TNN benefits.

This initial "Countrygram" campaign consists of 30-second spots airing nationally on six advertiser-supported services. Over 2000 spots will air for a ten-week period on ESPN, Lifetime, USA, CBN, The Weather Channel and WTBS. The buy, consisting of over a half million dollars worth of airtime, also represents the largest cash commitment by a basic cable service on other services.

These spots, featuring TNN programs and personalities, are targeted to households with and without TNN on the system. For those with TNN, the messages encourage viewership as well as tune-in to specific programs. Viewers who want but do not have TNN on their system, are encouraged to call in the TNN toll-free "Hotline" and request a "Countrygram" message to be sent to their system operator. The "Countrygram" will be mailed within 24 hours, alerting the operator of his subscriber's desire to see TNN added to their system. Simultaneously, the requesting subscriber will receive a confirmation that the "Countrygram" has been sent. This is a very significant use of telemarketing by a program service and will ultimately demonstrate viewer interest in TNN.

In addition, cable affiliates will be helped by this campaign. Subscriber requests will not complicate their already burdened telephone lines. And if TNN is on a tier, the "Countrygram" will serve as a sales lead for the operator.

Commenting on this unique campaign, Lloyd Werner, Senior Vice President Marketing and Sales, Group W Satellite Communications, said, "We're supporting our own belief in the effectiveness of cable advertising through this unprecedented cable buy targeted to cable subscribers. We're putting our money where our mouth is.

"This campaign is designed to build awareness and viewership of TNN," he added. "And we anticipate an enormous viewer response."

The "Countrygram" campaign was taped on location in Nashville. Numerous variations on the "Countrygram" campaign feature country music personalities Brenda Lee, Ed Bruce, Ralph Emery, Jim Ed Brown, Bill Anderson and Riders in the Sky, all encouraging viewers to "Stand Up For Your Country." Additional artists will tape "Countrygram" messages as they visit TNN.

In addition, these spots will capture the spirit of Nashville, focusing on a city that is the heart of country music and the home of TNN.

The Nashville Network (TNN), an entertainment service with a country music emphasis, is one of the fastest growing cable television services, reaching almost 12 million subscriber households. Programming for this 18-hour-a-day, advertiser-supported service is produced by The Nashville Network, a division of Opryland USA Inc. of Nashville, while sales and marketing functions are handled by Group W Satellite Communications of Stamford, Conn.

For further information, contact:
Pamela Giddon (GWSC: 212-983-5075)
Donna Sparks (TNN: 615-889-6840)

GILBERT ENGINEERING INTRODUCES NEW CABLE ASSEMBLIES

Gilbert Engineering, Phoenix, Arizona, has recently introduced a new line of cable assemblies for the Satellite Signal Receiving Industry.

Gilbert's NEW RG 214 and RG 213 cable assemblies are assembled using the highest quality Mil Spec cable and terminated with a custom designed Gilbert Type "N" connector, to provide the most reliable electrical and mechanical performance for earth station and TVRO installations.

The NEW RG 214 assemblies are 50 Ohm and are 100% electrically tested (swept) to 4 GHz, while the RG 213 assemblies are also 50 Ohm and tested to 2 GHz. Any length available. Price will vary according to length.

The attached 5/8" crimp ring provides the necessary cable retention, strain relief, and shielding that assures high performance. The all brass construction and bright acid tin plating improves both mechanical performance and resistance to corrosion. The connector's slim design allows easy application of shrink tubing.

The cable is RG-214/U MIL-C-17E with the center conductor being 7/.0196" silver covered copper. The dielectric is solid polyethylene, the shield — 2 each — is 96% braid and is silver covered

copper. The jacket (black) is made of polyvinylchloride.

For further information regarding **Gilbert's** NEW cable assemblies, part number GJ-214-3008-3-XX and GJ-213-3008-1-XX, contact Gilbert Customer Service - TOLL FREE: 800-528-5567 or write: P.O. Box 23189, Phoenix, Arizona 85063. □

LEMCO TOOL CORPORATION ANNOUNCES NEW PRODUCTS: MODEL A 202 CABLE-TEC & MODEL B 1283 TRAP SERVER

Lemco Tool Corporation is proud to introduce Cable-Tec as the first continuity tester/signal generator designed for the cable industry. Designed by an installer, for installers, Cable-Tec is 100% accurate, guaranteeing installers quality workmanship.

EASY TO USE— MINIMUM TRAINING REQUIRED

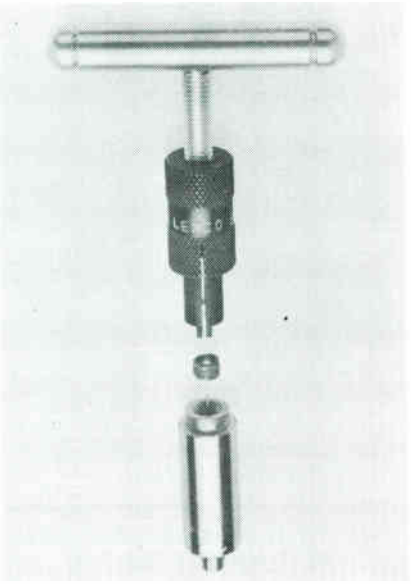
Cable-Tec consists of two parts, the "beacon" and the "beeper". Used alone, the beacon unit is a continuity tester. Used with the beeper, Cable-Tec becomes a signal generator.

The beacon has a push-on sleeve for easy, one hand operation. Its' bright red led lights up to indicate shorts, splitters, or other self grounding devices in the line. "No shine" means a clean line.

The beeper is used with the beacon to confirm clean lines and identify specific lines at the lock-box. Its' audible tone

sounds only when a circuit is made with the beacon. No other line will give this result. Both units can be used with any coaxial drop cable.

Together, Cable-Tec's two parts weigh 5 oz. each, is compact is size, measuring 3¼" x 2 1/8". Powered by one 9 volt battery. Price per set: $33.35.



Lemco Tool has also introduced a new product which removes broken F-ports from traps enabling the user to put the trap back in service. Until now, traps with broken F-ports were thrown away at a cost of anywhere from $4.00 to $17.00 each per trap. Insert Lemco's Model B 1283 Trap Saver into the trap and broken F-port. Expand the mandrel by turning it on the threaded stem until it engages. Turn the handle to remove the broken F-port. The steel tool is hardened and zinc plated for durability.

Additional information available from:
Lemco Tool Corporation
R.D. #2 Box 330A
Cogan Station, PA. 17728
Toll Free: 800-233-8713
(717) 494-0620 in Pennsylvania □

SCIENTIFIC-ATLANTA INTRODUCES OFF-PREMISE ADDRESSABLE TAP SYSTEM

Scientific-Atlanta, Inc., has introduced its Series 2470 addressable tap system designed for the mini-cable (SMATV) operator desiring off-premise addressability. The addressable tap minimizes theft of service by selectively trapping out non-authorized channels before a signal reaches the viewer. Up to eight locations can be controlled with each outdoor tap.

The Series 2470 system includes the addressable taps, a microprocessor-based controller, and a rack-mounted cable signal insertion unit (CSIU). The controller, located at the headend, sends a digital signal to the CSIU. The CSIU converts the signal to an RF data carrier allowing communication with all addressable taps mounted in traditional cable tap locations. The system can authorize service for up to 16,000 homes.

Additional system features include pay-per-view and time-of-day capabilities as well as direct dial-up for the mini-cable operator utilizing multiple headend sites. Delivery of the Series 2470 addressable tap system will begin the first quarter of 1984.

For additional information contact: Tom Smith, Division Manager, Security Division (404) 449-2333. □

SHOWTIME/THE MOVIE CHANNEL INC. CONVENES FIRST ANNUAL NATIONAL MEETING

President Mike Weinblatt Addresses Opening Session; Welcomes Newly Consolidated Team

"We're a company on the move. We've demonstrated our leadership in every aspect of our business and we enter 1984 with tremendous momentum and strength." With those words, SHOWTIME/THE MOVIE CHANNEL INC. President and Chief Operating Officer Mike Weinblatt convened a two-day national meeting here for all employees of the newly consolidated company.

On the heels of several critical developments — the successful joining of SHOWTIME and THE MOVIE CHANNEL; the acquisition of the Spotlight service; and the signing of a five-year exclusive output agreement with Paramount Pictures — Mr. Weinblatt opened the first session with an emphasis on the meeting's dual themes of Professionalism and Teamwork.

"The joining together of these two strong organizations has afforded SHOWTIME/THE MOVIE CHANNEL Inc. with the best team of professionals in the pay television business," he said. "We now have the resources, and the manpower, to make SHOWTIME/THE MOVIE CHANNEL the major force in our industry."

Touching upon those recent events, he said, "We have just gone through a trying, yet tremendously exciting period in our history. The merger of the SHOWTIME and THE MOVIE CHANNEL teams, plus the recent agreements with Paramount and Spotlight, which will push the combined SHOWTIME and THE MOVIE CHANNEL subscriber counts well over the 8 million mark in February, have put us in an extraordinary position for 1984. We are embarked not only upon a year of opportunity, but a year of explosion, and we expect to exceed all forecasts."

Executives representing all operating divisions of the company addressed the assemblage throughout the two days of meetings. Recent history was summarized, and new departmental directions and organizational structures were outlined in every area of activity.

Jack Heim, SHOWTIME/THE MOVIE CHANNEL's Vice President of Sales and Affiliate Management, echoed Mr. Weinblatt when he said, "We know that triples will become the dominant multi-pay purchase in American households and we intend to have two of the three services in every package." He reiterated the company goal for 1984 of significantly increasing market share, while continuing the long-term policy of working closely with affiliates and delivering the highest caliber service. He said that the cross-training of sales and affiliate marketing professionals, to educate former SHOWTIME and THE MOVIE CHANNEL employees about each other's service, has already seen excellent results and will continue as a priority in 1984.

It was also disclosed that a special markets representative will be assigned to each regional office to foster cable operator interest in hotel/motel, SMATV and other non-residential business.

In announcing that SHOWTIME/THE MOVIE CHANNEL now has nearly 200 sales and affiliate marketing representatives, Mr. Heim said, "We may not have the biggest force, but we have the best, most aggressive, and most innovative team in the industry, with all the programming and corporate support necessary to be tremendously successful."

Fred Schneier, Vice President of Film Acquisition, elaborated on the recently announced agreement with Paramount Pictures, a five-year deal giving SHOWTIME/THE MOVIE CHANNEL exclusive national pay cable rights to all Paramount theatrical products, and including such 1983 blockbuster hits as "Flashdance," "Trading Places," and "Terms of Endearment."

Calling Paramount, "the most successful studio in Hollywood today, and the one with the best track record over the past eight years," Mr. Schneier predicted that at least fifteen top-quality films a year would emanate from the deal. He added, "In 1984, SHOWTIME and THE MOVIE CHANNEL will have the strongest motion picture lineups in pay tv. We have acquired nine of the top ten box office hits of 1983, and we have three of them exclusively. The sole reason we don't have the tenth is that it is not yet available to pay tv."

The two-day meeting was highlighted by an awards banquet, attended by 480

SHOWTIME/THE MOVIE CHANNEL employees. The company's prestigious Dru Strange award, given in recognition of regional sales and marketing excellence, was bestowed upon Ellie Pines of the Western region, and Jan Cowley of the South Central Region.

Company-wide national meetings will now be held by SHOWTIME/THE MOVIE CHANNEL Inc. on an annual basis. Said Jack Heim, "This type of meeting is a unique opportunity to expose all employees — no matter what their region or department — to the many exciting developments within the organization. As they each go out to represent our company in the field, they will be better informed, more effective, and more fully cognizant of the strong corporate team backing them up."

Mr. Weinblatt noted at the close of the meeting, "This meeting was an ideal inter-departmental communications tool, and fostered a tremendous sense of comraderie, motivation and enthusiasm among everyone involved. We look forward, as the company continues to grow, to more of these gatherings in future years and a heightened sense of Professionalism and Teamwork among all participants."

BLONDER–TONGUE ANNOUNCES TECHNICAL SEMINAR

April 11 and 12, 1984: A Blonder-Tongue SMATV/MATV/CATV/TVRO Technical Seminar will be held at the Ramada Inn East, Reynoldsburg, OH in conjunction with Benchmark, Inc.

Contact: Betty Karas (201) 679-4000 or Benchmark, Inc. (614) 861-2070.

WINEGARD INTRODUCES NEW 100° LNA

Winegard Company has introduced a new 100-degree LNA which combines extremely low noise figures with low input and output and the gain slope/group delay characteristics vital to wide band communications performance.

The gain figure (at 20 degrees C) is 53dB minimum, while the noise figure (at 20 degrees C) is rated at 1.3dB maximum. Input VSWR is 1.25:1 maximum and output VSWR is 1.5:1 maximum. The circuitry features protection against reverse polarity voltage, surge voltage and lightning.

Each LNA is enclosed in a rugged one-piece cast aluminum weather-proof housing. The input connector is a standard CRP-229G waveguide flange. Output connector is 50 ohm type female connector. Dimensions are 7.9 inches long by 2.7 inches high by 1.8 inches deep.

Model SC-8101 100-degree LNA's are now available, with pricing close to that of standard 120-degree units. For more information, contact the Winegard sales office, 3000 Kirkwood, Burlington, Iowa 52601 (319) 753-0121.

MICRODYNE INTRODUCES VERSATILE NEW KU-BAND VIDEO RECEIVING SYSTEM WITH 72-CHANNEL CAPABILITY

Microdyne's new Ku-band video receiving system increases the flexibility of video earth stations while reducing installation costs.

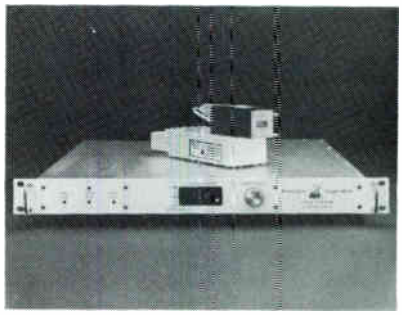
The system is comprised of two units, the 1100 BDC-12 block downconverter and the 1100 DCR-12 72-channel video receiver. The BDC-12 mounts to the antenna and reduces the incoming 12 GHz satellite signal to the 270-770 MHz range.

The technically advanced DCR-12 receiver features a PROM-controlled, frequency-synthesized tuner that can be programmed by the factory for virtually any satellite format. Since the receiver can be used with either the new Ku-band or Microdyne's C-band block downconverter, an earth station can have access to both C and Ku-band satellites with a single receiver when the appropriate plug-in PROM and block downconverter are used.

In addition, international frequency formats can be accommodated.

The system helps reduce installation costs because of the antenna-mounted block downconverter. The relative low 270-770 Mhz band allows the use of lower-cost 75-ohm cable and fittings for the run to the earth station headend. This lower frequency also reduces line loss, so system margins can remain high even with long cable runs. For multiple-channel systems, further savings can be realized by the use of lower frequency power dividers.

The new Ku-band block downconverter and 72-channel receiver are the latest additions to Microdyne's full line of uplink and downlink equipment for the broadcast and cable television markets.



Full specifications for the Ku-band video receiving system are available from Microdyne. Phone (904) 687-4633 or write to Microdyne Corporation, P.O. Box 7213, Ocala, FL. 32672.

2 AND 2.5 GHz PORTABLE MICROWAVE SYSTEMS FROM M/A-COM

M/A-COM announces the availability of portable microwave systems in the 2 and 2.5 GHz bands for local origination programming. This same equipment is currently in widespread use by broadcast TV stations for ENG and special events coverage.

The basic system consists of a small portable transmitter designed for tripod, bucket truck, or mast mounting. Camera and microphone outputs are connected directly to the transmitter control unit.

At the central receive site, the Omnipole™ antenna picks up the signal. Its LNA output feeds directly to the receiver, easily accommodating ranges of up to 20 miles. This low-cost, lightweight, low wind-load antenna is easily mounted on tower or rooftop locations for operator-free 360° coverage.

M/A-COM offers a variety of remotely controllable central receivers, including the MA-2GUX, the MA-2.5GD, and the new MA-2MRC. This low noise, wide band, dual conversion receiver features electronic tracking filter and high overload protection for superb performance even in highly congested locales.

For further information contact: Mr. Erik Stromsted, Marketing Manager, M/A-COM MVS, Inc., 63 Third Avenue, Burlington, MA 01803, (617) 272-3100, X4302 or Mr. Joseph Burke, Marketing Services Manager, M/A-COM MVS, Inc., 63 Third Avenue, Burlington, MA 01803, (617) 272-3100, X4518. □

Distributors	Manufacturers	Service Firms
D1—Full CATV equipment line	M1—Full CATV equipment line	S1—CATV contracting
D2—CATV antennas	M2—CATV antennas	S2—CATV construction
D3—CATV cable	M3—CATV cable	S3—CATV financing
D4—CATV amplifiers	M4—CATV amplifiers	S4—CATV software
D5—CATV passives	M5—CATV passives	S5—CATV billing services
D6—CATV hardware	M6—CATV hardware	S6—CATV publishing
D7—CATV connectors	M7—CATV connectors	S7—CATV drop installation
D8—CATV test equipment	M8—CATV test equipment	S8—CATV engineering
D9—Other	M9—Other	S9—Other

Associate Roster

Note: Associates listed with * are Charter Members.

Alpha Technologies,
1305 Fraser St. D-G,
Bellingham, WA 98225
206—671-7703
(M9, Standby Power Supplies)

AMCOM, Inc.,
Bldg. E, Suite 200,
5775 Peachtree-Dunwoody Rd., N.E.,
Atlanta, GA 30342
404—256-0228
(S9, Brokering & Consulting)

* **Anixter Communications**
4711 Golf Road,
Skokie, IL 60076
312—677-2600
(D1)

Apple/Store
Rte. #1, Box 156,
Beaver Dam, WI 53916
414—885-6249

The Associated Press,
50 Rockfeller Plaza,
New York, NY 10020
212—621-1513
(S9 Automated News SVC)

Automation Techniques,
1550 N. 105th E. Ave.
Tulsa, OK 74116
918—836-2584
(M9)

Avantek, Inc.,
481 Cottonwood Dr.,
Milpitas, CA 95035
408—946-3080
(M8, 9 TVRO Components)

Av-Tek, Inc.,
Box 188,
Aurora, NE 68818
402—694-5201
(M8)

BEI
P.O. Box 937,
Olathe, KS 66061
800—255-6226
(M9 Character Generators)

Ben Hughes Communications
P.O. Box AS,
Old Saybrook, CT 06475
203—388-3559
(M6, 9)

Blonder-Tongue Labs, Inc.,
1 Jake Brown Rd.,
Old Bridge, NJ 08857
201—679-4000
(M1, 2, 4, 5)

Broadband Engineering, Inc.,
P.O. Box 1247,
Jupiter, FL 33458
1-800—327-6690
(D9, M4, S9)

Budco, Inc.,
4910 East Admiral Place,
Tulsa, OK 74115
1-800—331-2246
(D9, Security & Identification Devices)

CATEL,
4800 Patrick Henry Dr.,
Santa Clara, CA 95054
408—988-7722

* **C-COR Electronics, Inc.,**
60 Decibel Rd.,
State College, PA 16801
814—238-2461
(M1, 4, 5, S1, 2, 8)

CCS Cable
P.O. Box 14710,
Phoenix, AZ 85063
602—272-6855
(M3)

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

CableBus Systems,
7869 S.W.
Nimbus Avenue,
Beaverton, OR 97005
503—543-3329
(M1)

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

Cable Health Network,
1950 Spectrum Circle
Suite B-310
Marietta, GA 30067
404—952-4620
(S4)

Cable-Text Instruments,
Div. of Telpar, Inc.
P.O. Box 796
Addison, TX 75001
214—233-6631
(M9 Generators)

Capscan, Inc.
P.O. Box 36,
Adelphia, NJ 07710
1-800—CABLETV or 222-5388
(M1, 3, 4, 5)

Comm/Scope Company,
P.O. Box 1729
Hickory, NC 28603
1-800—438-3331
(M3)

Communications Equity Associates,
851 Lincoln Center,
5401 W. Kennedy Blvd.,
Tampa, FL 33609
813—877-8844
(S3)

Comprehensive Cable Enterprises
206 Westminster Ct.
Madison, WI 53714
608—249-3442
(S1, 2, 4, 5, 7, 8, 9)

Computer Video Systems, Inc.,
3678 W. 2105 S. Unit 2,
Salt Lake City, UT 84120
1-800—453-8822
(M9)

Associate Roster

COMSEARCH INC.,
11503 Sunrise Valley Drive,
Reston, VA 22091
703—620-6300
(S8, S9, Earth station placement frequency coordination)

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

DF Countryman Co.,
1821 University Ave.,
St. Paul, MN 55104
612—645-9153
(D1, S1, 8)

The Disney Channel
500 S. Buena Vista,
Burbank, CA 91521
213—840-5080
(S4)

Ditch Witch,
P.O. Box 66,
Perry, OK 73077
1-800—654-6481
(M9)

The Drop Shop Ltd., Inc.
Box 284,
Roselle, NJ 07203
1-800—526-4100 or
1-800—227-0700 (West)
(D3, 4, 5, 6, 7, 8, 9, M5, 6, 7, 8, 9 Plastics)

Durnell Engineering Inc.,
Hwy 4 So.
Emmetsburg, IA 50536
712—852-2611
(M9)

Eagle Com-Tronics, Inc.,
4562 Waterhouse Rd.,
Clay, NY 13041
1-800—448-7474
(M9 Pay TV Delivery Systems & Products)

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

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

Electron Consulting Associates,
Box 2029,
Grove, OK 74344
918—786-5349
(M2, D1, S1, 8)

Elephant Industries,
P.O. Box 3626
N. Ft. Myers, FL 33903
813—995-7383
(M9)

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

Franey & Parr of Texas, Inc., (Formerly Doherty & Co.),
One Turtle Creek Village,
Suite 524,
Dallas, TX
214—528-4820
(S9, Insurance)

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

General Cable Corp.,
1 Woodbridge Center,
P.O. Box 700
Woodbridge, NJ 07095
1-800—526-4385
(M3)

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

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

H & R Communications,
Rt. 3, Box 102G,
Pocahontas, AR 72455
1-800—643-0102
(M2, D1, S2, 3, 8)

Harris Corporation,
P.O. Box 1700,
Melbourne, FL 32901
305—724-3401
(M2, 9, S2)

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

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

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

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

KMP Computer Services, Inc.,
703 Central Ave.,
Los Alamos, NM 87544
505—662-5545
(S4, 5)

Karnath Corporation,
2001 Westridge,
Plano, TX 75075
214—422-7981 or 7055
(S1, 2, 8, 9)

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

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

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

Lash-Ade Company,
P.O. Box 147,
Guntersville, AL 35976
205—582-6333
(M9 Cable Protector, S9 Equipment Repair)

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

Lemco Tool Corporation,
Box 330A,
Cogan Station, PA 17728
1-800—233-8713
(M8, 9 Tools)

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

Lindsay Specialty Products, Ltd.,
50 Mary Street West,
Lindsay,
Ontario, Canada K9V 4S7
705—324-2196
(M1, 2, 4, 5, 7, 9)

M/A Com Prodelin, Inc.,
P.O. Box 100
Claremont, NC 28610
704—459-9762
(M2, 3, 7, S2)

Distributors	Manufacturers	Service Firms
D1—Full CATV equipment line	M1—Full CATV equipment line	S1—CATV contracting
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D7—CATV connectors	M7—CATV connectors	S7—CATV drop installation
D8—CATV test equipment	M8—CATV test equipment	S8—CATV engineering
D9—Other	M9—Other	S9—Other

Note: Associates listed with * are Charter Members.

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

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

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

Mullen Communications Construction Co., Inc.,
P.O. Box 1387A,
Green Bay, WI 54305
414—468-4649
(S2)

National Farmers Union Property & Casualty Co.,
12025 E. 45th Ave.,
Denver, CO 80251
303—371-1760
(D9, Insurance Service)

Octagon Scientific, Inc.,
4 Adler Drive,
East Syracuse, NY 13057
315—437-4405
(M9)

Phasecom Corp.,
6365 Arizona Circle,
Los Angeles, CA 90045
213—641-3501
(M1)

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

Quality RF Services, Inc.,
825 Park Way, Suite 3,
Jupiter, FL 33458
305—747-4998
(M4, S9)

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

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

Scientific Atlanta, Inc.,
3845 Pleasantdale Rd.,
Atlanta, GA 30340
404—449-2000
(M1, 2, 4, 8, S1, 2, 3, 8)

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

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

Superior Electronics Center,
2010 Pine Terr.,
Sarasota, FL 33581
813—922-1551
(M4, S9)

TVC Supply Co., Inc.,
1746 E. Chocolate Ave.,
Hershey, PA 17033
717—533-4982
(D1, 2, 3, 4, 5, 6, 7, 8)

Teledac, Inc.,
1575 Taschereau Blvd.,
Longueuil,
Quebec, Canada J4K 2X8
514—651-3716
(M9 Character Generators)

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

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

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

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

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

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

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

Tyton Corp.,
P.O. Box 23055,
Milwaukee, WI 53223
414—355-1130
(M6, 7)

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

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

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

Vitek Electronics, Inc.,
4 Gladys Court,
Edison, NJ 08817
201—287-3200

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

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

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

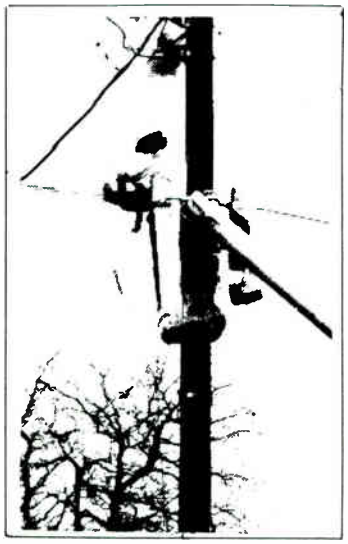
Weatherscan,
Loop 132,
Throckmorton Hwy.,
Olney, TX 76374
817—564-5688
(D9, Sony Equip. Dist., M9 Weather Channel Displays)

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

Winegard Company,
3000 Kirkwood Street,
Burlington, IA 52601
1-800—523-2529
(M1, 2, 3, 4, 5, 7)

Zenith Radio Corp.
1000 N. Milwaukee Ave.
Glenview, IL 60025
312—391-8195
(M1, 6) □

Classified



ATTENTION!

SYSTEM MANAGERS — TECHNICIANS

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