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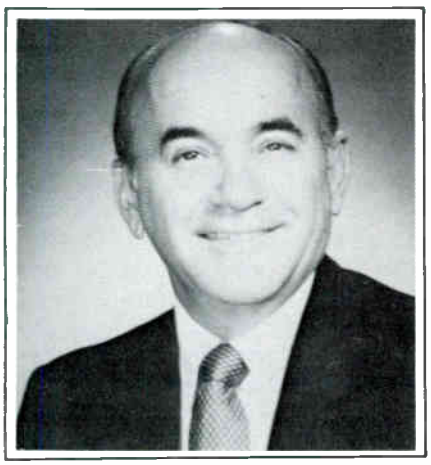

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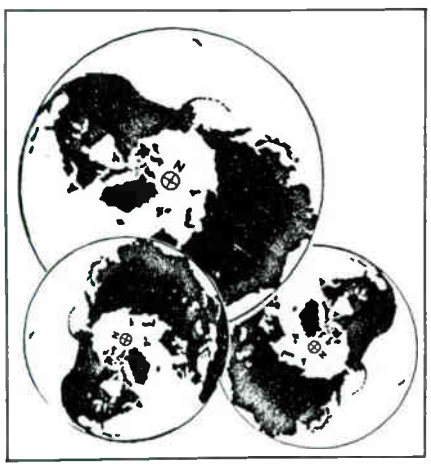

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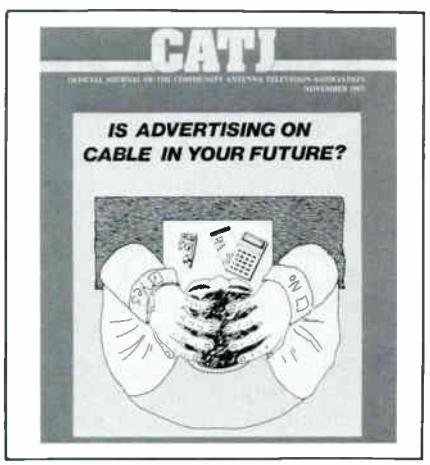

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Evolving Satellite Technology

By
Karl Poirier
Triple Crown Electronics
Mississauga, Ontario

ABSTRACT

The following paper addresses the problems of varying requirements for TVRO systems. The parameters which may be significantly different from one satellite source to another, and particularly, those functions which are mutually exclusive and therefore unattainable in a single system are discussed. In conclusion, a method of catagorizing system types is provided, with the final analysis serving as a guide to equipment selection.

INTRODUCTION

A TVRO manufacturer is constantly faced with decisions about his product. More often than not, the items of concern are exactly those which a prospective user must consider when purchasing a system. For the user, the availability or lack of a particular feature or operating parameter may result in a decision not to buy one piece, but to a manufacturer, it could mean the loss of many sales. For this reason, the manufacturer is constantly studying the science, art, and technology of satellite transmissions, and is usually very familiar with the overall requirements for today and tomorrow. It is important to convey to the CATV engineer and technician, not only the features and operations of TVRO systems, but also reasons why these features are included. This paper examines the items which most affect the design decisions for today's market. The items which most significantly affect the manufacturer and user are:

- Basic system concept of LNA, LNB, or LNC
- Channel frequency formats and the tuning problems inherent in the variety
- Baseband formats of the various services which may be required
- Standards of transmission employed by various telecom satellite carriers
- Market requirements, and the problems of adequately meeting consumer demands

BASIC SYSTEM CONCEPT

TVRO systems are available in three basic formats (Figure A).

1. Low Noise Amplifier (LNA) Format

This is the classic system originally employed by telecom carriers. The device at the antenna is a low noise microwave amplifier. The satellite signals are amplified and carried "on frequency" to the receiver. Most TVRO's in operation today are this format, and most technicians

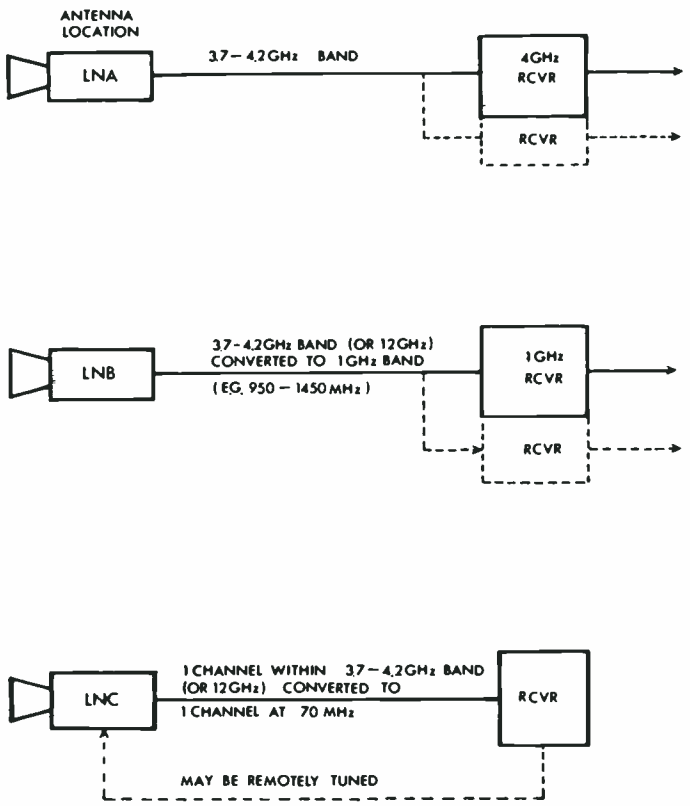

Figure A: Three Basic TVRO Systems

are familiar with its operation. In an LNA system, the outdoor portion (low noise amplifier) is a standard device which can be sourced or replaced separate to the receiver. This allows an MSO to spare one LNA for any number of receivers regardless of manufacturer.

There are, however, disadvantages as well. First, LNA systems require that the signal be carried from the antenna to the receiver(s) at microwave frequencies. This necessitates microwave cable, connectors, and work habits. Usually, both the cable and connectors are unfamiliar to the cable technician. Second, the requirement to carry the signal at microwave frequencies also limits the physical distance from antenna to receiver to typically 35-40m, which can constrain headend design. In particular, only very costly telecom systems employ LNA systems for 12 GHz reception.

2. Low Noise Block Converter (LNB) Format

The low noise block converter consists essentially of an LNA, in which has been incorporated the first frequency converter which would normally be found in the receiver. The benefits from this system are important especially to the Pay TV operator. Because the signal is converted to a lower band, there is no need to transport high frequency microwave signals into the receiver. This allows lower cost cable and connectors and is especially important at 12GHz where losses are very high.

The signals present in the entire microwave band are block converted to a wide band of frequencies in the area of 1GHz, which has lower loss and requires less complex splitters. These signals are each tuned to select a desired channel from the band. This method is certainly the most effective way we have today of receiving the ANIK C 12GHz signals, and is rapidly becoming popular for 4GHz multichannel installations. There are however, two major points of difference between the LNB and LNA systems which must be considered.

FIRST: Whereas the LNA is simply an amplifier, the LNB requires that the frequency converter including oscillator be placed outdoors where it is subject to drastic temperature variations. To this end, systems such as Dielectrically Stabilized Oscillators (DSO) must be employed.

SECOND: There has not, as yet, been standardization of LNB output frequencies, although there is strong support for the FCC recommendation of 950-1450MHz. Present systems, however, may output anywhere from 270 to 1800MHz, and in fact some systems convert the 12GHz band to the 3.7-4.2GHz band, and employ a standard 4GHz receiver. For this reason, unlike LNA's, LNB's are not necessarily compatible and exchangeable. This can lead to difficulties when trying to spare several systems, or when trying to find replacements during system outage.

It is interesting to note that LNB's are being manufactured for both 12 and 4GHz application. Because of this, an LNB compatible receiver should be (all things being equal), useable for both bands. As we shall see later, all things are not equal. An interesting sidelight to the growth of LNB systems concerns the manufacturers involved. An LNB is essentially a low noise amplifier, and a part of the receiver, in a common housing. Low noise amplifiers, and telecommunications are two highly unrelated technologies, and most receiver manufacturers are placed in the position of having to depend on LNB manufacturers for part of their product.

Some receiver manufacturers have begun work in low noise amplifiers, and some low noise amplifier manufacturers are building receivers, but both are encountering difficulties, which is to be expected. These are two very exacting sciences with long years of experiment and study inherent in their perfection.

3. Low Noise Converter (LNC) Format

The LNC is an LNA with a converter and variable tuning oscillator which converts one channel from the microwave band to the telecom standard I.F. of 70MHz. This was the first of the commercially available 12GHz systems, and is in wide use as experimental or home receiver development equipment. The system is not in wide use for Pay TV, because of the limitation to single channel operation, but can be employed for small systems where only one channel will suffice. The use of LNC's will become more significant with the advent of Pay TV on a DBS (Direct Broadcast Satellite) basis.

The LNC normally does not perform as well as an LNB system in one important respect. In an LNA or LNB system, the conversion from microwave to 70MHz I.F. involves 2 or 3 preliminary conversions. This allows the im-

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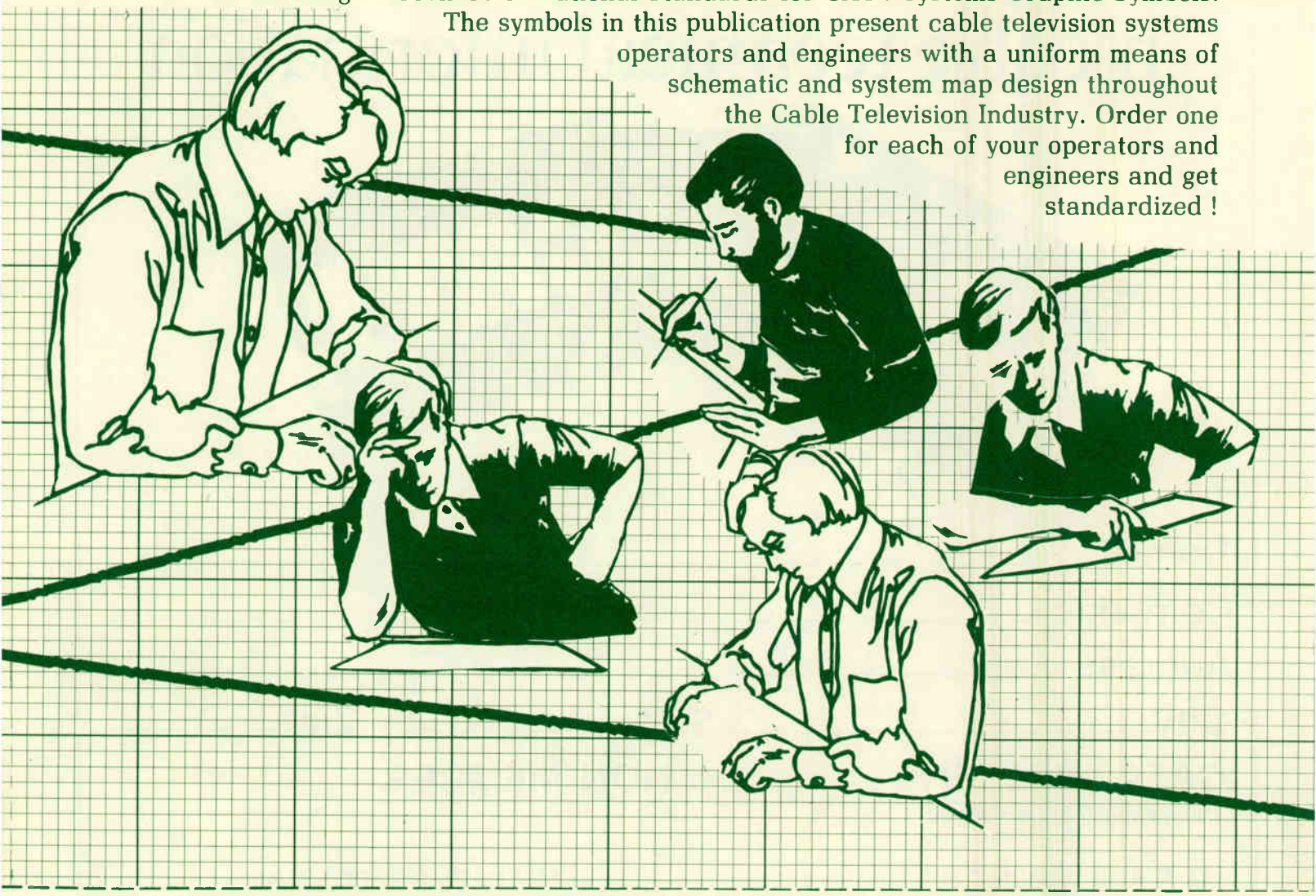

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age and IM products to be eliminated before the 70 MHz processing. In the LNC, the conversion from microwave to 70 MHz is usually accomplished in a single conversion. Image reject mixing techniques are usually employed, but the image performance is usually poorer than other methods.

Thus the three receiver systems have benefits and deficiencies and must be evaluated on the basis of cost, performance and future expandability, and no one system will satisfy all needs.

CHANNEL FREQUENCY ASSIGNMENTS IN USE ON SATELLITE SYSTEMS

Channel frequency assignments grew and varied as the need for more and more transponders became evident. In the beginning there was the basic 12 channel format common to Intelsat, and the ANIK A series. In the Intelsat channel pattern, the 3.7 to 4.2GHz band was divided into twelve (12) 36MHz channels, with a space (Figure B) between channels 6 and 7 left open for telemetry. The later ANIK A, and Westar I series satellites had the channel frequencies reallocated to provide twelve (12) 40MHz channels. The channels were all similarly polarized with ANIK/WESTAR employing horizontal, and Intelsat employing right hand circular. The channel centre frequencies, however, do not correspond, although the Intelsat service are rarely accessed by the Canadian cable operators. In an attempt to obtain more channels, the format common to the Satcom series was developed. This involves interlacing a second set of channels between the first set, and rotating the polarization of the second set by 90° from the first set, which provides additional isolation (typically 26dB). The first set of channels are on the ANIK/WESTAR I frequencies but with vertical polarization. A second set of 12 channels are transmitted on horizontal polarization with centre frequencies conforming to the band edge frequencies of the vertical channels. The combination of half channel offset and cross polarization allows the separation of these overlapped channels. For a while, the industry standardized (unofficially) on vertical polarization for the odd number channels, and horizontal polarization for the even numbered channels.

As the demand for more and closer spaced satellites prevailed, the system of cross/cross polarization was developed. This system inverts the polarization/channel number scheme from one satellite to the next adjacent satellite. Thus ANIK D and WESTAR IV have horizontal transponder I, 3,5 etc. and vertical transponder 2,4,8 etc.

In search for additional channel capacity, Intelsat began working television signals on half-transponder format. This consists of two, similarly polarized signals side by side within one transponder. This generally allows more channels in exchange for lower transponder power (i.e. larger antennas).

A further attempt at channel squeezing now in operation on ANIK C, is the cross polarized half transponder format (Figure C). This format involves two channels on the same polarization carried within the same transponder, with cross polarized transponder offset by half channel frequency. This method, while allowing 36 channels in a 500 MHz band requires larger receiver antennas to make

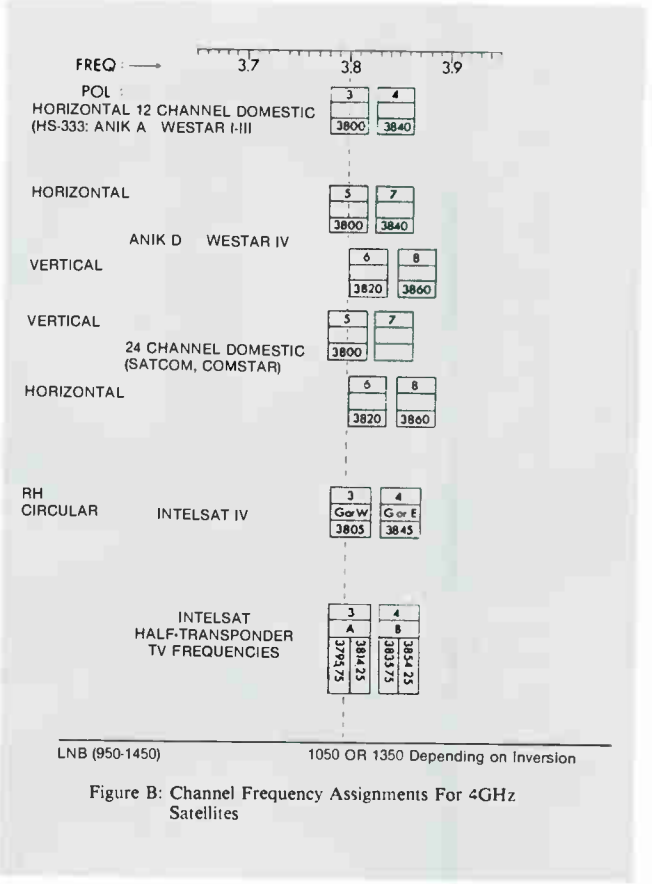


Figure B: Channel Frequency Assignments For 4GHz Satellites

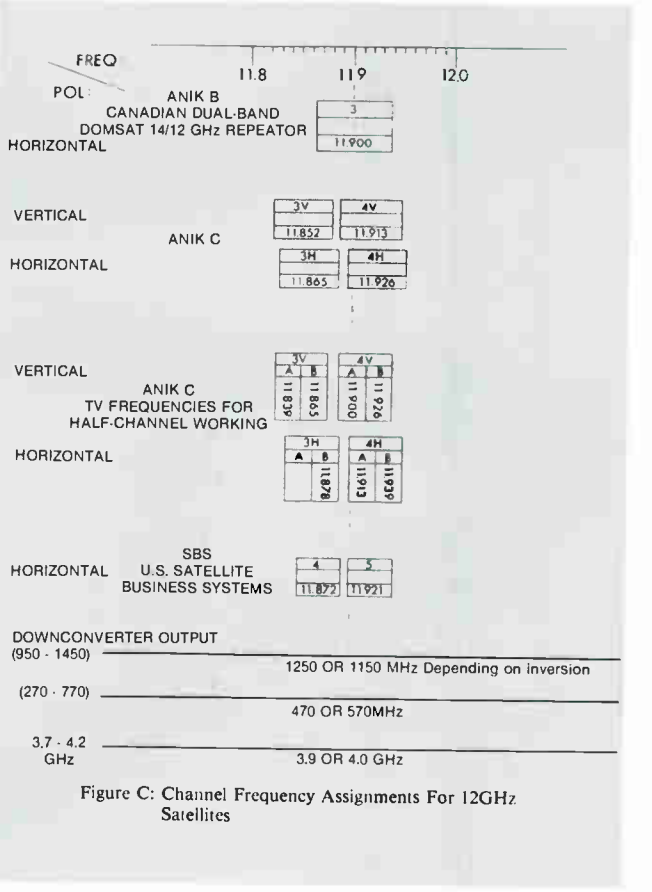


Figure C: Channel Frequency Assignments For 12GHz Satellites

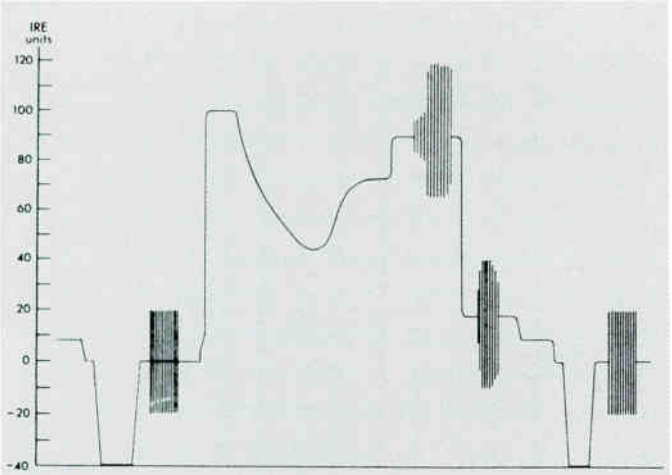


Figure D: NTSC Video Signal

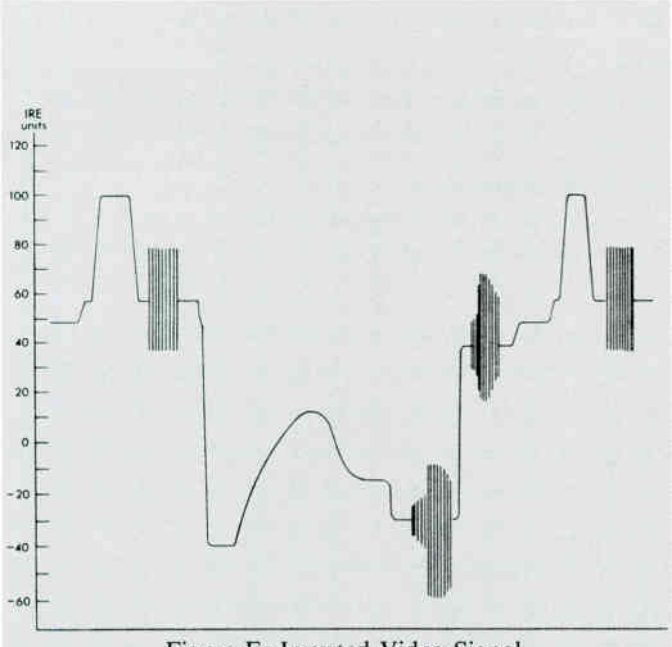


Figure E: Inverted Video Signal

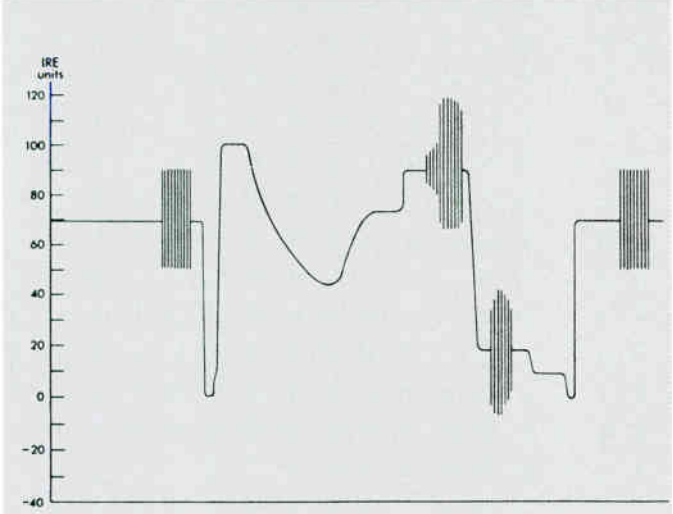


Figure F: Suppressed Sync Video Signal

up for the individual channel power backoff (typically 5dB). Some use is evident on ANIK C and Intelsat of what is commonly called enhanced half transponder bandwidth, with close to full transponder power, and light loading in the unused half. These many formats present significant tuning problems for the receive equipment, and are compounded when an extra converstion (such as LNB) is added to the system. The needs for channel tuning capability for today and also for future services must be considered, as the satellite distribution network continues to grow. Figures B and C show the centre frequency tuning required for LNB systems, approximately 3.8GHz and 11.9GHz with the various satellite formats. The requirement may prevent most LNB receivers from operating in both 4 and 12GHz bands without significant realignment.

BASEBAND FORMAT OF THE DESIRED SIGNAL

In most cases, the TVRO system was originally designed to receive normal NTSC/CCIR video, with high level aural subcarriers for TV sound and one or two auxiliary radio services. With the trends toward security for Pay TV, the receive system must now accommodate something possibly quite unlike normal NTSC (Figure D) video. For example, television networks occasionally employ a form of soft security consisting of inverted video (Figure E). This requires that the receiver be switchable from negative sync processing to positive sync processing. In this mode, all of the sync related functions such as clamping, AFC, video processing, must be able to receive, re-invert, and process the signal in order to recover the television information. Pay TV systems will require a much harder security such as full encryption combined with data. This signal may have the sync removed (Figure F) completely or partially, and may also include polarity inversion.

There are many manufacturers competing for the market in hard and medium-hard security equipment. These systems are all distinctly different, and each of them may require different TVRO operating parameters. Because of the delay in scrambling the Canadian Pay TV services, many operators will not know until the last minute whether their equipment will be suitable for the encryption method selected. In addition, the encryption will probably be at least partially digital, which presents a whole new series of problems when interfaced with RF analogue transmission. The digital information may be carried in various portions of the spectrum, and indeed may originate from different sources. For example, an encrypted signal may have a data stream for address and authorization of decoders. It may also have the audio or part of the video digitized. In addition, auxilliary services such as teletext and news services may be included. Some of this information will be removed at the receiver system, with new data being inserted for terrestiral encryption systems. In general, the overall performance requirements of the receiver system are much more stringent then for a traditional television satellite receive system.

The transmission of the aural portion of the program has perhaps seen the greatest evolution. Until several years ago, the high level monaural subcarrier (Figure G) was the only method in use for satellite TV. Since then, two

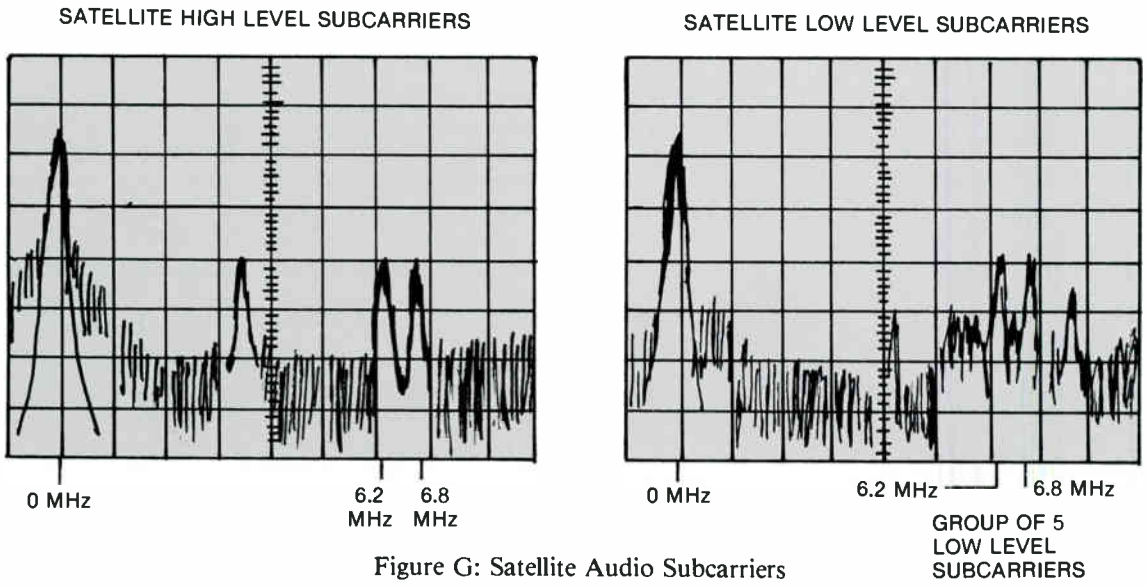


Figure G: Satellite Audio Subcarriers

SATELLITE	VIDEO DEVIATION	EDW	IF BW	SUB DEV	SUB FREQ
ANIK D	10.75 MHz	1MHz	36MHz	10KHz	6.8,6.17
ANIK C	8.5 MHz	200KHz	27MHz	50KHz	5.41
SATCOM III R	10.75 (nom)	Various 0 - 71MHz	36MHz	75KHz	6.8,6.2

Figure H: Transmission Standards For Different Satellites

distinct thrusts have been encouraging developments in this area. The first, is the desire for more radio services without increased transponder loading. The second, is the desire for improved aural (particularly music) quality. Several developments led to where we are today.

— multiplexed (two channel) audio on the ANIK B satellite (characterized by an annoying whistle on the main channel audio) which required special demultiplex filters to be added to the receivers. To meet the need for higher quality, WGN and others

SYSTEM TYPE	VIDEO PERFORMANCE	G/T	AVAILABLE MAINTENANCE	ALLOWABLE COST	CLASS
Home	Good Picture	Low	Poor	Low	1
DBS	Encryption (good)	Low	Poor	Very-Low	2
(Remote CATV) (Cancom etc)	(Encryption) Excellent	Low-Med	Poor	Mid-Range	3
CATV/Pay	Excellent	Med-High	Fair	Mid-High	4
Telecom	Network Quality	High	Good-Excellent	High-Very High	5

Figure I: Parameters Related To Receiver Performance Requirements

began carrying stereo using high level subcarriers with standard FM broadcast modulation.

— the need for still higher quality stereo led to the MTV format of two high level subcarriers with left plus right on one, and left minus right on the other. This format, while producing excellent stereo, required special equipment to decode, and significantly increased transponder loading.

— This combined need for quality and channels has led us today to the low level companded multiplexed aural systems. However, today, all of the foregoing systems are in use, and are encountered as one selects different satellite programs. Some of the required receiver system parameters for varying format may be mutually exclusive, and a decision must be made before purchase as to the aural requirements of today and tomorrow.

TRANSMISSION STANDARDS

In the area of international communications, organizations such as Intelsat, Teleglobe etc. have adopted transmission standards which simplify the transfer of program material throughout the system.

Because satellite transmission is essentially a "once up" point to multi-point relay (as opposed to "point to point" the same sort of standardization appears not to have occurred.

In a receive system designed to receive one program source forever, this is not too critical. However, when an operator wishes to have a flexible system to accommodate future needs, the problem becomes apparent. To a manufacturer the problem is sometimes frustrating, and certainly always of prime concern.

In particular, the parameters for video deviation, Energy Dispersal Waveform (EDW) deviation, subcarrier frequency, transponder bandwidth, and aural carrier deviation can cause major operating difficulties. A simple comparison (Figure H) of ANIK D, ANIK C, and Satcom III R shows the differences which must be accommodated.

A receiver will normally be optimized for one path through these parameters, and more often than not, it will be the Satcom III R parameters, due simply to the vast market in North America for American Pay TV. The newly purchased receiver, if America, will almost certainly require some form of realignment for Canadian use, and this alignment can be anywhere from simple to impossible. For example, IF SAW filters most certainly require replacement rather than alignment.

APPLICATION/SYSTEM REQUIREMENT

It is in the area of customer application that the greatest disparity between receiver systems can be seen. As per the chart (FIgure I) we can analyze a receiver performance requirement on the basis of four parameters, and arrive at five basic operating classes, with increasing system cost from one to five. The parameters are:

a) Video performance
b) Available G/T
c) Available maintenance
d) Allowable cost

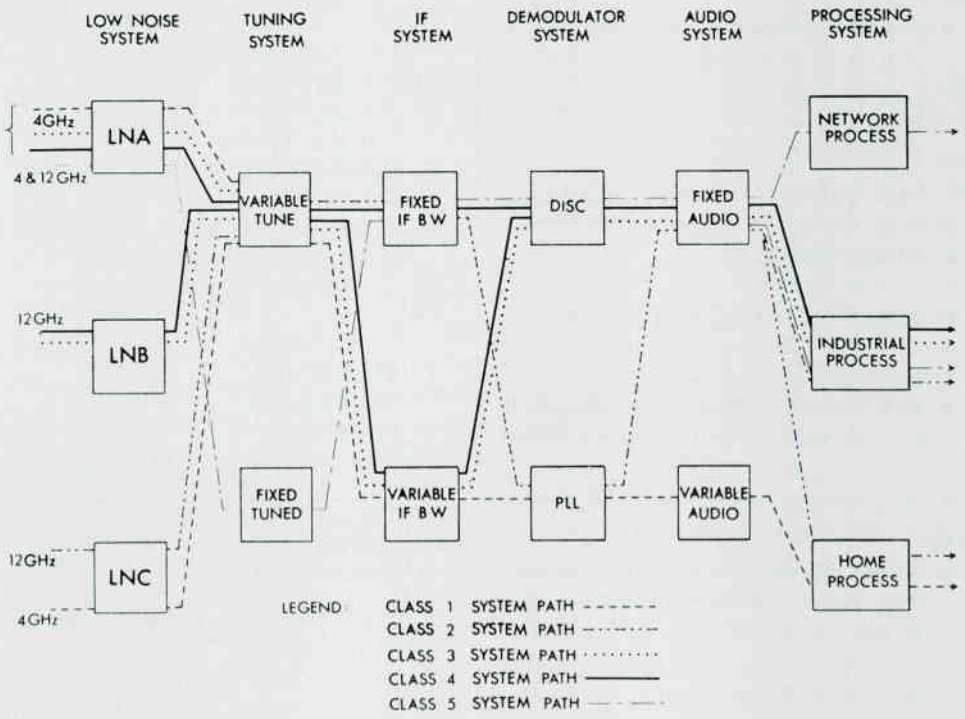


Figure J: Design Paths For Different System Classes

An explanatory note on some of these parameters:

1. Video performance is related primarily to the need to handle encryption data and the need to further transport the signal by land based methods.
2. Available G/T is a function of antenna size (and of course available space and capital).
3. Available maintenance concerns availability of technical know-how and test equipment for microwave maintenance.
4. Allowable cost is arrived at by trade off of number of customers served vs. required quality.

By itemizing these parameters on the basis of system requirement, we arrive at five basic system classes.

1) Home/experimental
2) DBS/Pay
3) Remote TV (Cancom Etc.)
4) CATV/Pay
5) Telecom/Network

Once we have analyzed the system requirements and arrived at a service class, we can now follow this class path through the maze of receiver system parameters, and arrive at an optimum system design.

If we group the receiver system parameters into six categories we can then construct an optimum flow for each system class. The parameter catagories are:

Low noise system
Tuning system
IF system
Demodulator
Audio system
Video system

The system parameter catagories are itemized as follows:

Low noise system:
LNA, LNB, LNC.

Tuning system:
Two catagories, fixed, and tuneable with tuneable signifying field adjustable to any desired channel with no test, alignment, or spare parts required.

IF system:
Signifies variable bandwidth or fixed with variable being field variable.

Demodulator system:
Is catagorized as discriminator type or PLL type system which typically trade off video performance for lower threshold.

Audio system:
Is catagorized as single fixed discriminator, multiple fixed or adjustable, with fixed signifying factory tuned or module replacement.

Video processing:
Is catagorized as Home — Suitable for feed to television receivers. Industrial — Suitable for feed to LPTV or CATV systems. Network — Suitable for network high performance operation.

As we can see from the chart of Figure J, there are sometimes several paths through the maze, but the end result is the most efficient and flexible system for the application. Thus from the chart, we can arrive at the following:

Class 1 (Home system)
- LNA/LNC (4GHz)
- Variable Tuning
- Variable IF BW
- PLL Demod
- Variable Audio Tuning
- Home Processing

Class 2 (DBS)
- LNC (12GHz)
- Variable Tuning
- Fixed IF BW
- PLL Demod
- Fixed Audio
- Home/Industrial Processing (encoding)

Class 3 (Remote TV)
- LNA/LNB
- Variable Tuning (Sparing)
- Variable IF BW (Low G/T)
- Discriminator (Video Performance)
- Fixed Audio (Possibly Multiple)
- Industrial Processing (Encryption)

Class 4 (CATV/Pay)
- LNA/LNB (4,12GHz)
- Variable Tuning
- Fixed/Variable IF BW
- Discriminator
- Fixed Audio (Possibly companded stereo)
- Industrial Processing

Class 5 (Network/Telecom)
- LNA (High G/T)
- Fixed Tuning
- Fixed IF BW
- Discriminator
- Fixed Audio (Possibly multiple)
- Industrial/Network Processing (sync, proc, etc)

OBSERVATIONS

In outlining the various system classes, some items may be unclear, or may evoke different opinions, and something should be said about the reasoning involved.

In the class 1 and 2 systems, a PLL is the most likely choice, because the PLL exhibits two features of note for these applications. The performance of the PLL exhibits a lower threshold for which we trade video performance, and in three classes, small antennas are the primary requirement. Secondly, the PLL performance is less dependent on alignment, and can more readily be mass (machine) produced.

You will note that I have outlined DBS (class 2) a 12GHz transmission. This again appears to be the only logical outcome, although some attempts at 4GHz DBS have been attempted. (Again the small antenna requirement becomes paramount).

In the class 3 and 4 systems, variable tuning becomes a critical factor for reasons of sparing. The requirement in

most applications is for a single receiver to spare several complete sites, and to be easily replaceable.

On these classes (3,4) variable IF bandwidth has been required for two different reasons. In class 3, it is required for low G/T situations, and in class 4 it is required in order to spare both 4 and 12GHz systems.

Other items and selection may not meet with total agreement, but they do stand as general industry guidelines.

CONCLUSION

This information now allows the selection of a cost efficient system, for the required application. We have not examined the variables within the items, as these are more often a matter of manufacturer's preference in design and result in similar operation. For example, variable tuning may consist of VTO or frequency synthesizer, and fixed IF may be surface wave or LC circuits. The net effect is similar from an operation viewpoint. These are, of course not the only combinations available, but are rather guides to selections in a very confusing marketplace.

The major point is that satellite receive systems are quite new to most cable TV operators. Indeed CATV satellite systems are quite new to most Telecom systems, and therein lies the problem. A receive system built by a home hobbyist, and one built by Telesat, will both work, and neither will be exactly right for a cable system. The cable operator himself must learn about TVRO's, and choose the system right for him. The choice is yours, but LOOK BEFORE YOU BUY.

KARL POIRIER

Karl Poirier joined the cable television industry in 1965, with Grand River Cable TV, Kitchener, as field service/installation technician. In 1968, he transferred to Ottawa Cablevision where he progressed to the position of headend quality control supervisor. He was directly involved in the first BP23 Proof of Performance requirements, and testing.

In 1974, Karl transferred to Raytheon Canada Ltd as microwave field engineer and was involved in the CN/CP overbuild, CBC Olympic Back-Haul, and Maclean-Hunter northern microwave service.

In 1977, Mr. Poirier became chief technician for Maclean-Hunter Cable TV, Guelph Ontario, where he remained until joining Triple Crown Electronics in 1979.

Karl is Vice-President Engineering for Triple Crown Electronics, and is in charge of the product development and engineering functions of the company.

Karl has had several articles published in the USA and Canada, including a series of basic satellite users manuals.

He is currently a member of the I.E.C., the CCTA Technical Subcommittee on Teletext, and is second term President of the Society for Cable Television Engineers of Ontario. □

S.J. BIRKILL on EXPERIMENTAL TERMINALS

Satellites in Orbit

With the phasing-in of the FCC's blend of 2°, 2.5° and 3° orbital spacings, and the definitive DBS specifications set by RARC-83, the time has come for a re-draft of the old geostationary chart (**Figure 1**).

In the North American arc, there has been a general reshuffling of allocated slots, and it is now possible to see a coherent pattern where there had previously existed incompatible claims by more than one operator, for the same orbital location. The remaining anomalies take the form of (for example) apparent one-degree or half-degree spacings between birds occupying the same band, but in fact these disappear when it is realized that a number of satellites will be retired from service before their adjacent slots are occupied.

SBS-4 is an interesting departure from tradition: the satellite is being modified so that 5 of its 10 transponders will access a new shaped downlink beam placing DBS-type footprint levels over the north-eastern United States. Satellite Television Corporation plans early entry into DBS, with a five-channel pay service starting next year. EIRP will be in the region of 53 dBW, not a full RARC-type DBS but capable, according to STC, of reception with dishes as small as 2ft diameter.

The first of AT&T's new Telstar birds is up, and should be entering service about now. It is expected to take over from Comstars D1 & D2 at the new location of 96°W, after completing tests at 76°W. Also brand new is the second Galaxy at 74°W.

At the extreme eastern end of the arc, NASA's TDRS-1 makes its appearance in time to serve the Spacelab mission. Tracking and Data Relay Satellite A (now 1) was dumped into a sub-synchronous elliptical orbit when its IUS failed to complete the transfer maneuver following Shuttle launch back in April. The TRW-built spacecraft has spent 58 days climbing laboriously to geostationary orbit under its own steam, and is now declared to be operating nominally and little the worse for its adventure.

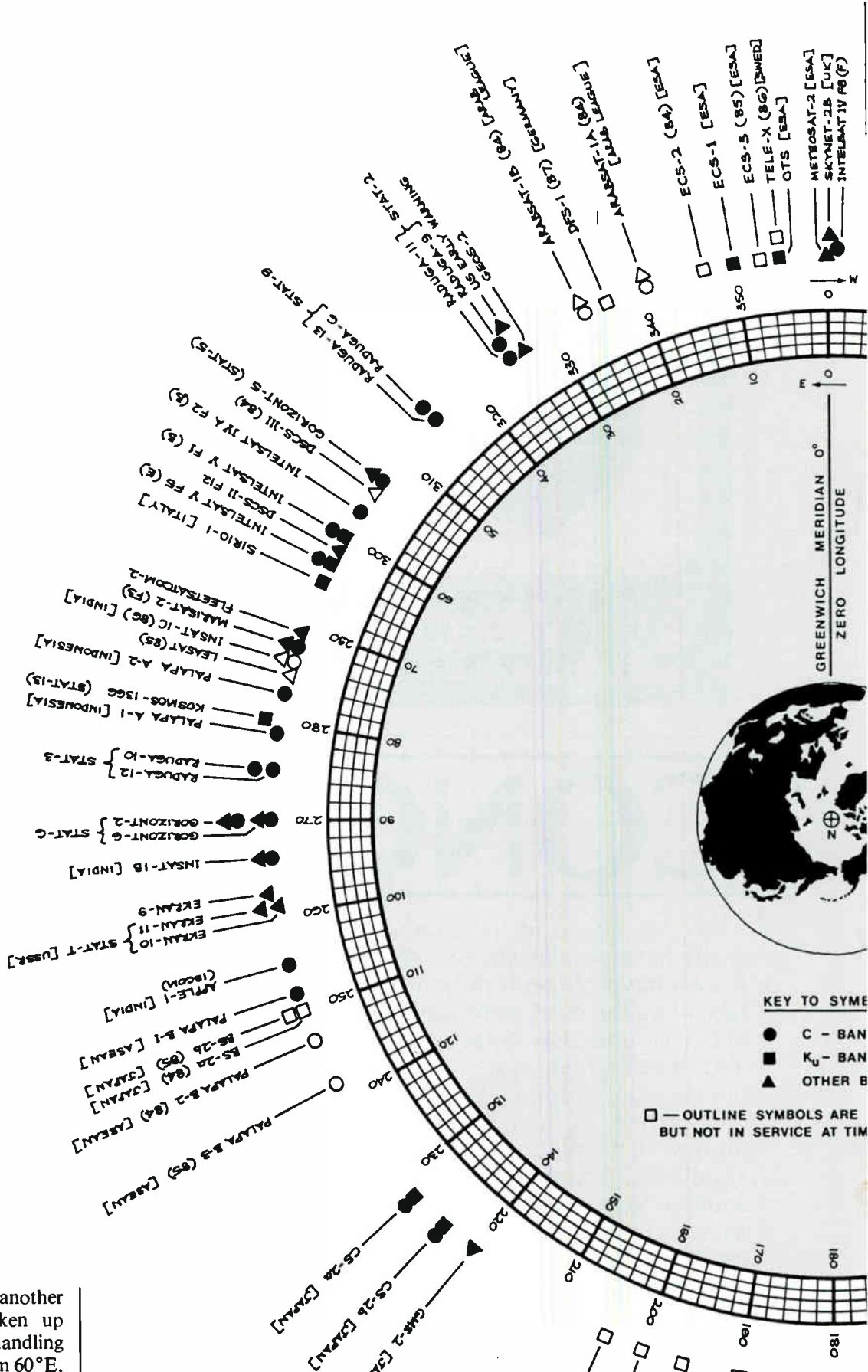
It seems most unlikely that any use will be made of the spare (ex Advanced Westar) C-Band payload on TDRS-1, but it is understood that a future flight model is being modified (as we suggested here in June's issue) to provide transatlantic service from 41°W.

Moving into the Atlantic region, projected locations have been added for two Orion satellites at 37.5 and 50°W. Like Britain's Unisat, these American-owned birds will offer transatlantic business services in competition with Intelsat on the most lucrative North Atlantic path, starting 1986/87. Elevation angles will be low on the US west coast and in eastern Europe, but Orion is well placed to provide service from the business centers of the US north-east to the major European capitals.

Intelsat now has 6 new Intelsat V birds in operation, having phased them into all primary, reserve and major path slots in the Atlantic and Indian Ocean regions. Over the next few months the Pacific region will acquire a pair of Intelsat V's, and the orbit will be brimming with spare capacity on displaced IVA satellites. Already one of these has moved to a new station at 31°W, in preparation for a redistribution of domestic lease services in the Atlantic region. The bulk of these are currently on Intelsat IVA F4 at 21.5°W, with a scattering on the 27.5 and 34.5°W Intelsat V's.

Status of Intelsat slots at present:

1.0°W (359.0°E)	Intelsat IV F8	Residual spare (int. lease)
18.5°W (341.5°E)	Intelsat V F6	Major Path 2
21.5°W (338.5°E)	Intelsat IVA F4	Reserve (domestic lease)
24.5°W (335.5°E)	Intelsat V F3	Primary
27.5°W (332.5°E)	Intelsat V F4	Reserve (domestic lease)
31.0°W (329.0°E)	Intelsat IVA F1	Residual spare
34.5°W (325.5°E)	Intelsat V F2	Major Path 2
53.0°W (307.0°E)	Intelsat IV F1	Residual spare (dom. lease)
179.0°E	Intelsat IVA F3	Reserve
174.0°E	Intelsat IVA F6	Primary
63.0°E	Intelsat V F5	Primary
60.0°E	Intelsat V F1	Major Path
57.0°E	Intelat IVA F2	Reserve (domestic lease)



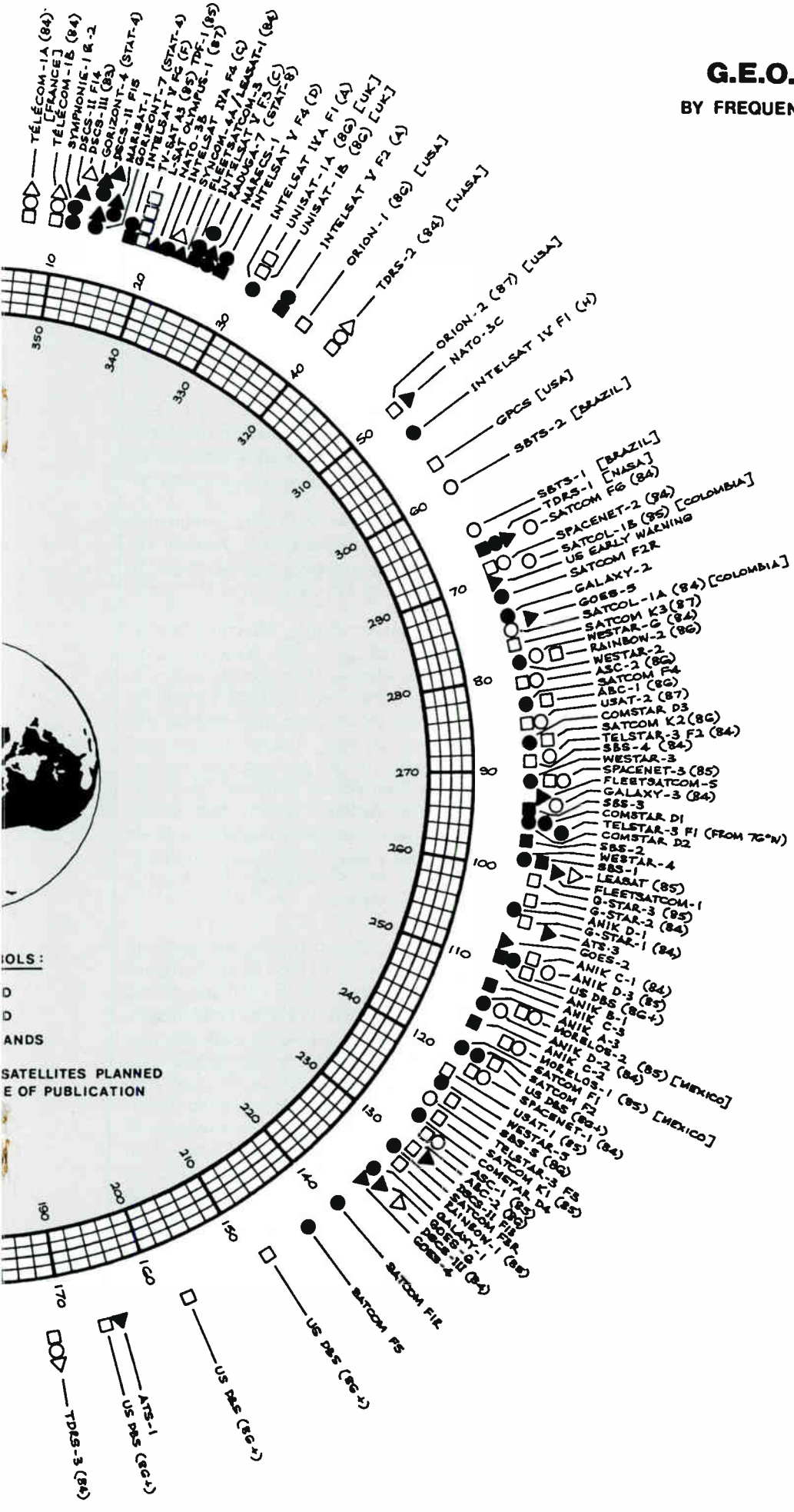
Over the Indian Ocean, another displaced IVA, F2, has taken up residence at 57°E and is now handling the IOR leases transferred from 60°E.

Between the regions are the only two Intelsat IV satellites still in operation. West of the Atlantic cluster, at 53°W, Intelsat IV F1 still provides spot-beam TV services to Mexico.

G.E.O. SATELLITES, 1983

BY FREQUENCY BAND AND ORBITAL LONGITUDE

(Not to scale)



Although bearing the F1 designation this was in fact the last Intelsat IV to be launched, in 1975. It still maintains a very high stationkeeping precision, befitting its domestic role.

Over 1°W, with a view of both Atlantic and Indian Oceans sits Intelsat IV F8, the second youngest in its

class. A domestic lease slot of long standing, this location was reactivated a year ago to provide live news to US forces in the Indian Ocean, Europe and the Middle East. 1°W has low angle visibility from the Comsat Atlantic station at Andover, Maine, and from the island of Diego Garcia in the Indian Ocean. By means of global beam Intelsat transponder 3 [US tpdr 5] a 24-hour per day AFRTS service, compiled from CNN and the major networks, is birded to the boys out there. (The same service is now being provided to the Pacific region, where incidentally Japan will shortly be joining Australia in taking full-time live feeds from US television.)

Also new on 1°W are three full-time leases for news feeds from London to New York. ABC and CBS share transponder 1 on a frequency-division basis, while NBC takes its feeds through global tpdr 8 [16] leased to Visnews/WU offshoot Brightstar. The Portuguese nightly news transmission to Madeira and the Gzores is now carried on this "residual spare" satellite, tpdr 10 [19] global.

Three other Intelsat IV birds are still controlled: F3 and F7 are held (loosely) near 40°W as possible emergency replacements for F1 or F8; F5 has a rapid westerly drift and is over the Pacific as I write. All have inclination angles well in excess of 1 degree. Although they carry no traffic, it is a simple matter to track these terminal cases by monitoring their telemetry beacons on 3947.5 and 3952.5 MHz.

Correspondent Mark Long keeps close tabs on Intelsat movements. Thanks are due to Mark for advising me of the 31°W activity. He suggests 4°W may be the next "old" slot to take a new occupant: presumably another displaced IVA. Around the same time (early/mmid 84) the 1°W operation will change to a IVA bird.

Another change affecting Intelsat lease occupany will come about in 1984, when Arabsat flies (assuming its solar panels will deploy!) Inevitably, sooner or later the Arab nations will give up their Intelsat leases and transfer to the new regional system. So hemispheric (Algeria, Morocco, Saudi Arabia, Sudan) and global (Oman) coverages will give way to an "Arab League" footprint — good for the Arabs at home but not so hot for the expatriates.

Insat-1B did finally sort itself out and seems to be locating to its original 94°E assignment, rather than taking over Insat-1A's 74°E as I had imagined it might. On-orbit tests are proceeding, and the satellite should enter service about the time you read this. Again this will mean an end to India's lease of Intelsat and Intersputnik capacity. A third Insat-1 has been ordered to replace the lost 1A. In addition to telecomms and (S-Band) DBS, Insat carries data relay and earth imaging payloads.

The Association of South-East Asian Nations has a new 24-channel Hughes bird at 108°W, taking over from the original pair of Palapa satellites (Anik A type) launched in 1976/77. This is providing higher signal levels than its predecessors over a larger region of South-East Asia.

Italy's experimental Sirio-1 Ku-Band satellite has been repositioned to 65°E, from where it will take part in a series of communications tests between Italy and mainland China.

The Soviet Union continues to maintain its multiplicity of time-zone feeds of Moscow's Central TV channels 1 & 2. Molniya-3 satellites operate in a 4-phase pattern in their elliptical orbit, while two groups of Molniya-1 satellites maintain two interleaved 4-phase patterns — 12 Molniyas in all.

3 Statsionar slots are occupied by Gorizont satellites and their reserves. The latest is Gorizont-7, entering service in late July from 14°W. Gorizont-4 is maintained as a co-located spare. Many observers expected the new Atlantic Gorizont to display improved north-south station-keeping, as the orbital inclination of Gorizont-4 had become something of a headache. Alas Gorizont-7 is but a little better, with an initial vlaue of 1.35° having improved to 1.2° in just over 2 months of service — at least the drift is in the right direction! It looks as though the initial inclination was intentional, in the interest of fuel economy. Now by the end of next year . . .

Operationally there is no change from the old Gorizont. 40W ch.6 [−1] serves the spot beam in "Moskva" mode. 15W channels 8 [4] (SCPC northern hemispheric). 9 [6] (Intersputnik video global) and 10 [9] (Intersputnik video northern hemispheric) are as before. Ch.7]1] is unused and ch.11 [11] carries occasional non-video traffic.

EIRP levels seem to have changed by about 1 dB, ch.6 measuring some 45 dBW here. Ch.10's power now varies with uplink source, suggesting a lower satellite G/T or a change of gain step. Berlin's uplink in particular is as much as 6 dB below saturation at times.

The latest Raduga launch (no.13) is to Statsionar-9, 45°E, already occupied by Raduga-6. This slot now operates full time a series of carriers, notably a high power, wide band digital data transmission at 3465 MHz, a format and channel that has operated for many years on the Statsionar-2 Raduga. Stat-9 though carries no video.

A total of 4 Statsionars are occupied by Raduga satellites and 1 by an Ekran (plus reserves). In all 16 geostationary satellites are maintained, at 9 locations.

Japan's pre-operational "BS" satellites launch 1984/85, and the Japanese have a pair of dual-band "Sakura" (CS) telecomms birds, largely for experimental traffic, at 132 and 136°E.

On the European scene, ECS-1 was successfully launched and entered service mid-October. During the course of 1984 its primary Spot West transponders will fill up with cable services, and extra European cable feeds will appear on some Intelsat V Ku-band spot beam channels. Even HBO is represented, in consortium with CBS and the movie operations Goldcrest, Fox and Columbia, under the banner of Television Entertainment Group. ►

ECS and Intelsat V were never designed for cable TV relay — 72 MHz is not an efficient channel width for standard definition FM TV. ECS could have carried 24 Spot West transponders of 36 MHz each, but the European PTTs were not interested in TV. They saw wideband digital telecommunication as Europe's satcom future and designed accordingly. They still don't like TV, although they've been forced to realize that's where the dollars are. So they demand encryption on all transmission, even the free ones.

Worse, economies of bandwidth are forcing the Europeans in some cases to specify half-transponder TV (2 channels per transponder), incurring a 6 or 7 dB power reduction. That in turn increases start-up cost for cable operators (5m minimum Ku-Band antenna, as against 3m typical) and delays cable's already doubtful profitability.

A second ECS will fly in 1984, to become Eutelsat's "Primary" (telecommunications) bird. A business systems 12.5 GHz payload is also included. OTS remains operational, and will continue to support experimental transmissions and outside broadcast feeds for some time to come.

The Symphonie satellites no longer carry regular TV (that's why you couldn't find them). Control has been transferred from France to Germany, and the Deutsche Welle overseas radio service is still there, on SCPC. Inclination now exceeds 4 degrees, so a wide declination scan is required.

France's Telecom-1 system could be operational by this time next year, with Ku-Band business and TV services to Europe, and C-Band "apple and banana" zones reaching the Caribbean, the US east coast and all of Africa (the Caribbean gets the apple). Like Symphonie, polarization will be left-hand circular.

The German Federal Republic has announced its own telecommunications satellite. DFS ("Postsat"), due 1987. Before that the Euro-DBS birds will turn on with EIRPs in the 65 dBW bracket, from (initially) 5°E, 19°W and 31°W. □

A Comprehensive Approach

SHIELDING THE ANTENNA

By: Glyn Bostick
MICROWAVE FILTER COMPANY, INC.

Last Time

We discussed the suppression method most suitable under the circumstances. The method, or combination of methods, required will depend on the reception quality required and the relative level of TI received at the downconverter.

These methods and their choice are summarized on the table.

This Time

We'll discuss physical shielding of the TVRO antenna: when it is needed, how to make it, and where to put it.

Remember, we're still discussing 4 GHz interference — the number one TI problem.

When to Shield

Almost any 4 GHz TI level can be notched out — if you can afford state-of-the-art filters. However, when the relative level at the downconverter reaches 30 db above the satellite signal and greater, there is danger of LNA intermodulation and the creation of excess noise. This noise persists even though the 4 GHz carrier is blocked from entering the downconverter: the damage has already been done in the LNA.

At this level and above, physical blockage should be employed to reduce the interference below the 30 db relative level.

Natural and Artificial Shielding

We use the term **"natural shielding"** to indicate features already on the site: **vegetation, building** and other **pre-existing structures. "Artificial shielding"** is our term for new devices built on the property to provide additional blockage. Typical of these devices are fine mesh screens placed between the interference source and the TVRO antenna.

Where feasible, external shielding is superior to suppression using filters in the electronics system of the TVRO. Microwave traps are narrow band and address themselves to one fre-→

Approximate 4 GHz Interference Reduction of Various Materials and Structures

Wire Mesh Screen	18 db
Tuned-Absorber Screen	25 db
Wooden Wall	5 db
Brick Wall	10 db
Concrete Wall [15"]	30 db
Cinder Block Wall	15 db
Earth Dunes [min. 4' thick]	35 db
Evergreen Thicket	25 db
Tree Stand Out of Season	10 db

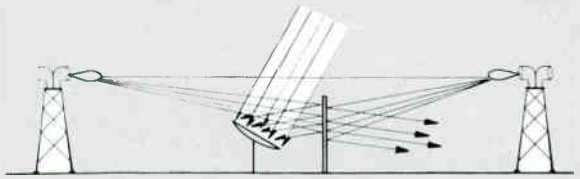
Approximate Tolerable TI Levels

Application	Maximum Relative TI
Home TVRO	-10 db
CATV	-18 db
Rebroadcast	-25 db

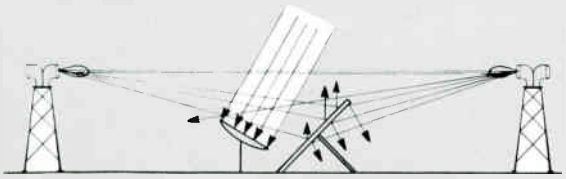
Suppression Techniques Required

TI Level	IF Notch	MW Notch	Shielding
<0 db	✔	Optional	Optional
0 db to +30		✔	Optional
≥30 db		✔	✔

✔ = Minimum Requirement

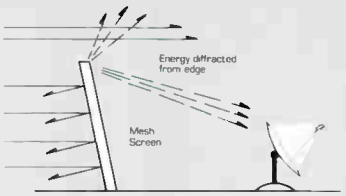


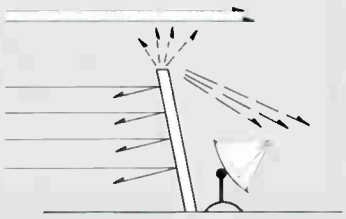
The perpendicular metal screen may divert rear receptions into forward (high gain) receptions.



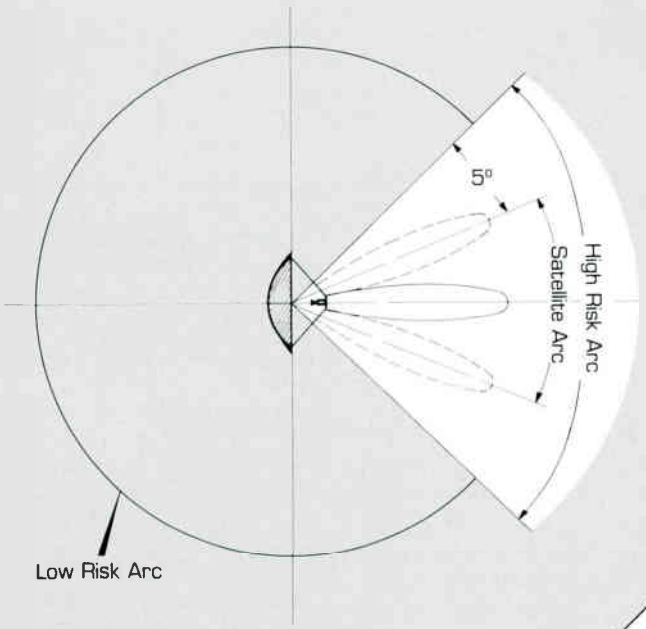
The inclined metal screen will reflect rear receptions upward and not into the high gain hemisphere of the antenna.

The TVRO here is located too far from the blocking screen — it receives microwave energy diffracted from the edge of the screen





The TVRO located near the blocking screen receives less diffracted microwave energy

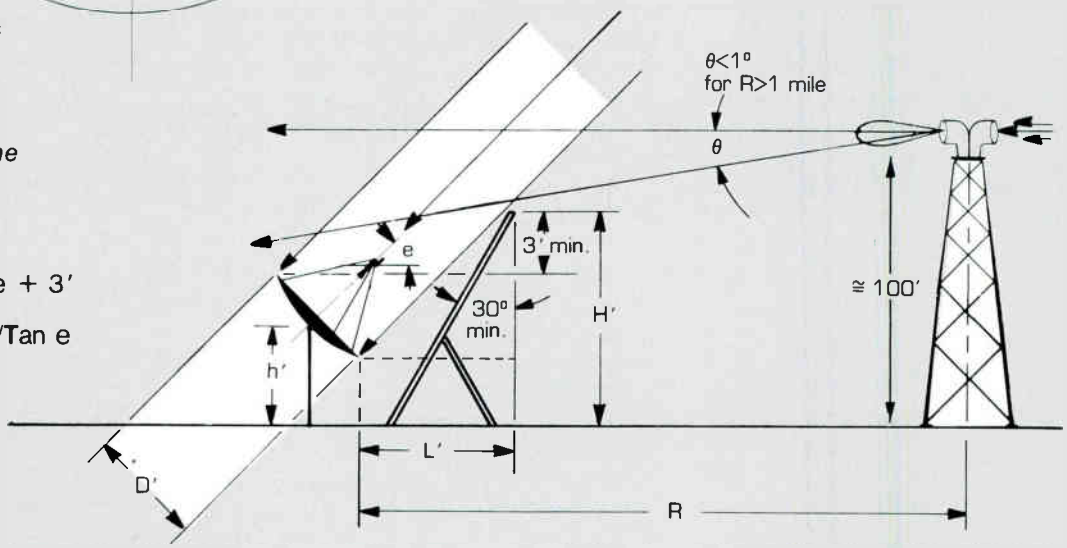


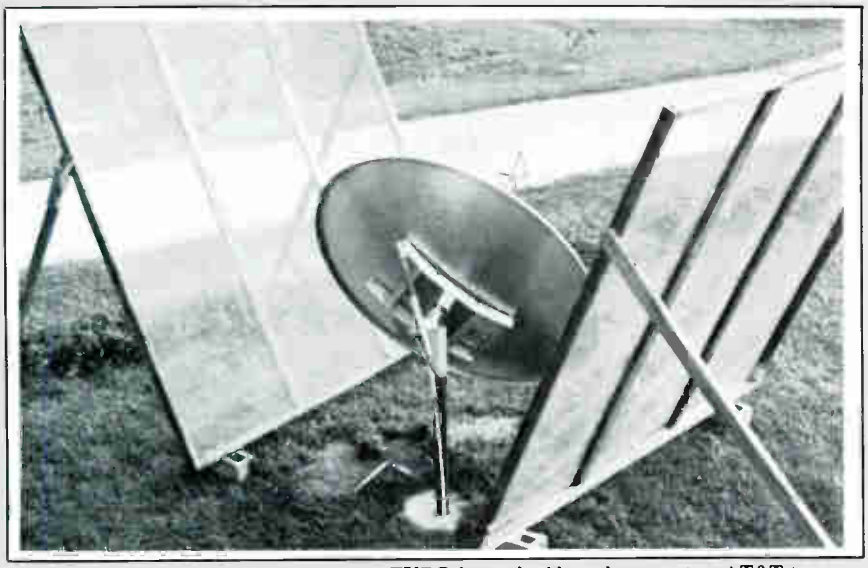
In the high risk arc, blocking screens must be carefully designed to prevent blocking of the satellite reception.

Screen design for the high risk arc.

$$H' = h' + \frac{D'}{2} \text{ Cos } e + 3'$$

$$L' = (D'\text{Cos } e + 3)/\text{Tan } e$$





System of reflecting screens to protect a TVRO located midway between two AT&T towers emitting a total of 12 carriers. All 24 channels were initially blank. Screens plus IF traps created acceptable pictures. Cost of screens: approximately $250 for labor and materials.

(Courtesy of Larry Cassada, Sidney, Ohio)

quency. If there are several interference frequencies, a coorresponding number of traps must be inserted. Whenever the microwave tower adds another interfering carrier, another filter will be required. On the other hand, shielding is broad band; if it is successfully blocking **existing** carriers, it will handle future carriers also.

A consideration which tilts in favor of shielding is the growing use of digital microwave carriers with wide bandwidths — up to 20 MHz compared with the usual 3-5 MHz FM deviation of the most common microwave carriers. These cannot be removed by conventional filters and the special electronic equipment to remove them is extremely expensive.

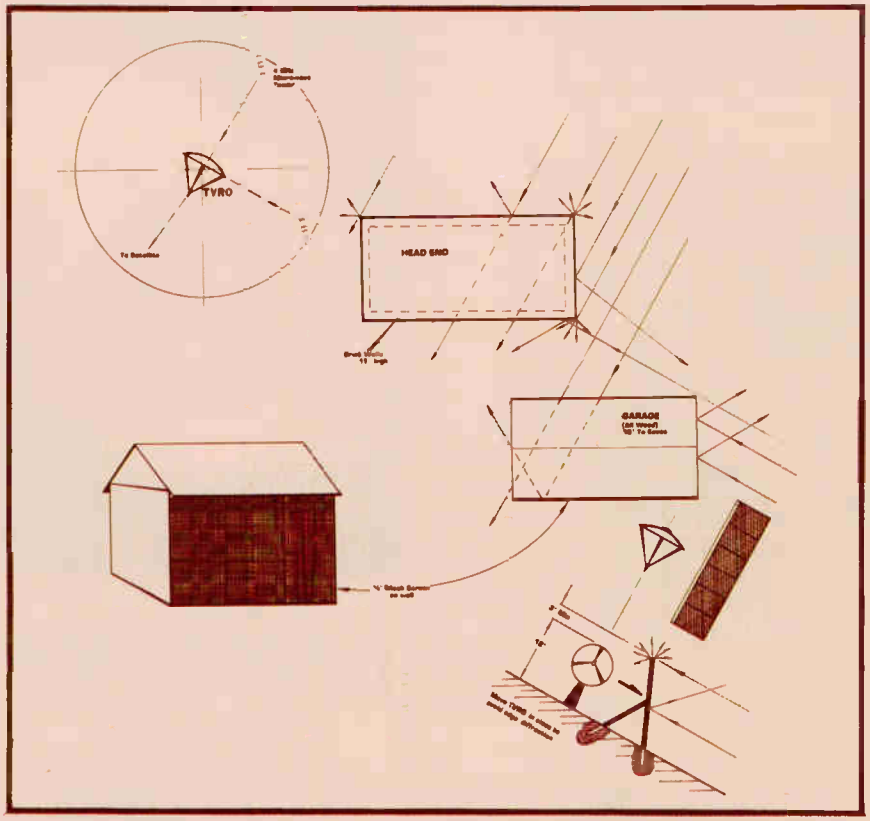
Effectiveness of Shielding (1)

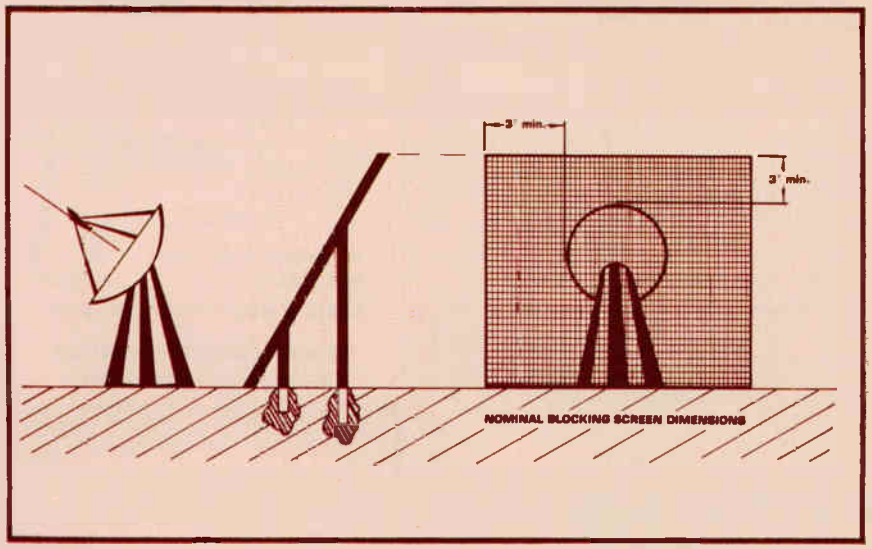
The table estimates the 4 GHz attenuation of various building materials, vegetation, and artificial shielding.

Best use of this data is at the **planning** stage, before any physical work (including site measurements) has been done, but TI level estimates and their angle of arrival are on hand.

By working with a map of the property which shows all structures and vegetation in detail, it is possible to make a tentative choice of the "quietest" site and to plan the placement of additional ("artificial") shielding.

→





Construction and Placement of the RF Shield (1)

The ideal RF shield is a metal plate placed between the interference source and the TVRO. To be **fully** effective, it should be **infinite** in extent. Of course, this is impractical, so no RF shield can give absolute shielding.

However, a shield which covers the dish outline with about 3 foot margins on top and sides, placed reasonably close to the antenna, will attenuate the interference 15-18 db. Larger dimensions will give more attenuation, but we would probably have to double these dimensions to get 3 db more attenuation.

The shield need not be solid metal. The above shielding can be realized with wire screen providing the opening is 1/4" or less. This construction gives lower wind resistance.

The reason that a metal shield with limited dimensions does not provide perfect shielding is because of edge diffraction at its edges, which causes apparent bending of the rays and conducts some energy behind the screen. Diffracted energy is weaker near the center of the screen. Hence, the antenna should be placed as near the screen as possible.

The screen is placed between the TVRO and the strongest interference and tilted away from the TVRO. This prevents reflection to the dish of interference travelling in the opposite direction from the main interference — from the more distant replying tower, for example.

At times the TVRO will be located between two towers giving high interference levels at the downconverter and it may be necessary to errect two, or more screens. Again, screens should be tilted **away from** the TVRO, otherwise captured interference may "ping-pong" between the two shields.

Shielding interference arriving in the satellite arc aximuth (the "high risk" arc) must be placed with care, to prevent them blocking the satellite signal. The screen must be moved far enough away that it does not intercept the **lowest** elevation angle of the dish.

The major cost of artificial shielding is the labor and materials required to build and place the framework which supports the wire screen. Where the opportunity exists for attaching the wire mesh to an existing building or other suitable structure, the cost is drastically reduced.

Next Time

We will discuss the growing tendency to broadcast interfering carriers with large bandwidth where conventional filtering is not practical. The phase cancellation method becomes applicable and will be illustrated.

Acknowledgements

Many thanks to Carol Ryan for editing and organizing, Dave Skevek for photography, and Rich Green and John Greatrex for sketches.

*(1) A more detailed discussion of the mechanism of RF shielding will be found in **ASTI — Avoidance/Suppression of Terrestrial Interference,** published by MICROFILCO PRESS division of MICROWAVE FILTER COMPANY, INC.* □

Editor's Note:
One of the most widely complimented and useful sessions presented at CCOS '83 was the one presented by Steve Richey on Advertising on Cable — so much so that the direction from the CATA Board of Directors at the Critique meeting following was that CATJ seek the information for publication. Steve is no newcomer to CATJ, and we are happy that he has once again joined the editorial staff and has agreed to present this material on advertising. You can expect a series of articles on this revenue generating aspect of your business. Look for these articles, the first of which is presented this month.

ADVERTISING IN YOUR FUTURE

By: Steve Richey
TelTran, Inc.
Azle, Texas

About four years ago I read the trade press telling about the future and beauty of local advertising sales in cable TV. The first thing that struck me was the statement that unless you had 15,000 customers, it was not possible. As I analyzed what they were saying, I realized they were talking about **spot sales** — selling a spot on the six o'clock program, a spot on college football, a spot on a particular game. My first thoughts were that if I could sell **all** the spots for a dollar apiece, I would make fifty thousand dollars a year! That was our first attempt — we did essentially sell **all** the spots in a town of about **seven hundred customers.**

We quickly found out that to generate that much advertising sales in a small community, we needed a fulltime salesman — one who would service the accounts regularly because we found that the people who were advertising expected instant results. This is one thing that Cable TV advertising really cannot offer in a smaller system with limited viewership — the instant sales are not there! What you have to sell is what we call billboard, non-event, or generic advertising. In other words if you blanket the town with advertisements about Joe's Boots, then Joe's Boots is up four or five times a day seven days a week three hundred sixty five days a year. The next time that Sam customer needs a new pair of boots, the first thing that comes to mind is Joe's Boots. When Joe's Boots decides they have too many Seal Skin Boots in stock and want to have a sale, then they do not belong on small-town Cable TV; they belong in the newspaper with a display ad or some other media — but not Cable TV advertising!

With this knowledge we implemented the second phase of our program — to identify eleven major merchants who could understand generic advertising or billboard advertising. Our first experiments were video, full motion ads, all done with super eight film, but we found we had a problem getting **movement** in the ads, although we would carefully set the scene with the people behind the cash register, merchants in the store and something to demonstrate. Once the camera began rolling, it was dif-

ficult to get the merchants or their sales people to move! They would stand there like **robots** and the only thing that would move would be their eyes to see if we were through filming. **Stage fright!!** A determination was then made based on this experience of stage fright, to use slides (35mm slides) instead of full motion video. Our first attempts at using slides were partially successful. We manufactured a machine that would put the slides live on the system. This worked fairly well although in the long term we had some mechanical problems with the slide projector, causing us to drop this approach, when we then modified our approach to slides on video tape. This approach worked well, and this is basically where we are now. We started with 4 slides per 30 seconds and then went to 10 slides per 30 seconds with 5 scenes. Doing a single scene we take two shots of that scene. Moving the point from which you photograph by eight to ten feet, taking a different angle, and then switching the slides every three seconds with a fader gives the appearance of motion which has become a fairly effective slide presentation for us.

We then determined that **eleven ads per channel** was the optimum number. This gives the advertiser the ability to be up on the screen a minimum of every three hours; therefore, if that channel is viewed three hours in a week, that ad is seen. One thing to remember is that you can cram a lot of advertisers in there, but it has to be of **value** to the advertisers, and he has to be **seen.** If an ad is only up once a day, it could get lost very easily. In addition, there is only select, specialized general viewership on any one channel, such as ESPN or Cable News Network. There is light viewership by most of the subscribers so you have to offer the light viewership maximum exposure to the advertiser.

We price our ads at **seventy five dollars a month,** and we try to put our advertisers on one year contracts. At the time we sell the ad, we create two distinct and seperate commercials and alternate them every three months.

Some of the things we learned after we got to the market place ws that the merchants must, or want, to see their ad before it goes on the air. The first approach was to go back around to the merchants and show them their advertising, but that takes a lot of time and effort. Our second effort was to add an additional twenty five dollars on the first month's price covering a video tape of their ads to be sent to the advertiser for viewing. This has proved to be successful!

Next thing to be careful of is that when you shoot the ads, shoot a generic ad. Recently I had to contend with an irrate advertiser who owns a dress store. She was upset because it was her impression we were going to change her ad monthly and her ad was showing her spring fashions and it was now fall! This is a problem we will have to solve somehow so learn from our experience and develop ads making sure they are either generic or billboard ads and not highlighting any particular item for sale or any particular season.

At the kind of prices we are charging for ads it is extremely hard to give the advertising customer a lot of service, but if you do not give them some, they will feel left out and refuse to pay. The service that we are giving is in the form of a newsletter that goes out with the monthly billing notifying them of new cable co-op availabilities which allow them to regain some of their cost from some of the manufacturers. Also, we include examples of advertisers experiences and success stories. We have a real estate lady that got two listings the first week she ran her ad on cable and we printed her story.

Another problem we had to address was the selection of the proper equipment to use, both in making the ads,

making the video tape out of slides, and in placing them on the cable system. When we started our first trial about four years ago, a tone decoder was in excess of $4000.00, and it operated a 3/4 inch tape recorder which was about $2000.00. We decided that was too much so we set out to design our own equipment. We built a tone decoder, a vertical interval switcher, and the timer mechanism necessary to operate a VTR. We also decided that the 3/4 inch tape was more than what we needed so we went to 1/2 inch tape. We located a 1/2 inch industrial playback machine and went with it **only** because, in the initial days, we used a combination recorder and playback and found out that in our own operation, some of our personnel tended to play with our recorders. By having playback only, it removes that temptation! It was necessary to modify the play back machine, giving us remote capabilities but by doing this, we saved about $500.00 per installation.

In the next two segments of this series, we will cover the modification, the vertical interval switcher in depth, including construction details, and also the tone decoder and the timing equipment.

In creating the ads, we used an automatic table with two slide projectors and a TV camera. The first slide projector projected directly onto the screen and the second slide projector was set for rear screen projection. As we alternated slide projectors this gave us a very good switcher fader effect. For a minimum amount of dollars, we got a professional slide presentation.

In subsequent segments of this series, we will give contstruction details on the table.

After we have done all this and put our system on, we offered our technology and equipment for sale to other cable operators and found there was a great reluctance to buy, so we formed **Teltran CO-OP Advertising.** Under this company, we will sign a contract with the cable operator to sell the ads, put the equipment into the system, and produce and service the ads, splitting the revenue as follows: the first year of ad service for cable operator, 90% to us and 10% to the cable operator with a minimum of $1000.00 guaranteed. The second and third years the split is 50-50 on a 37-month contract.

This article and the articles to come in the next few months will be to get you, the small cable operator, to start thinking about advertising and realizing it is possible and the possibilities it offers. For example, we did a system in Glen Rose, Texas, which has 500 subscribers, and generated **$10,000.00 a year** in advertising revenue. Granbury, Texas, has 1200 subscribers, and we are doing about **$22,000.00 annually** in advertising there. So **subscribers are not really the issue** — the issue is **how to do it** and, if you want to do it, you can do it anywhere.

The objective of this series of articles will be to convince you that **you can do it.** We will show you how if you want to build the equipment. If you want to buy the equipment from us, we will sell you the equipment. If you want to buy playback equipment with VTR, it is available for $2500.00 for the first channel and $1000.00 for each additional channel using the same VTR.

We will produce the ads for you if you send us the slides and ad copy; we will teach you how to build your own tape facility; or we will come in and do it for you at no risk to you, **only income.**

We hope that the above information has whetted your appetite and sparked your interest in this money-making venture with your cable system. By trial and error, we have worked this out to make it a **plus** for our systems and some for whom we are working this program. If you'd like more information, the series of articles will follow, or feel free to contact me at (817) 444-5606. □

CATA Filing Court Brief Supporting Turner Challenge of "Must Carry" Rules

Washington Update

Steve Effros, Executive Director, CATA

A Court challenge of the FCC's refusal to revisit its "must carry" rules has been launched by Turner Broadcasting. CATA is filing in support of the pleading which is designed to get the Court to force the FCC to initiate a new rulemaking aimed at eliminating the "must carry" rules.

CATA has, as you all know, consistently opposed the FCC "must carry" rules. We maintain that those rules violate the First and Fifth Amendment rights of cable operators and further that the Commission does not have the jurisdiction to impose those rules in the first instance. As we have noted before, we have been seeking the ap-

ORDER YOUR CCOG '83 SESSION TAPES NOW!

Cassettes are $7.50 each when purchased individually or $6.50 when purchased in orders of six (6) or more. The extended sessions are $12.50 for the set.

THURSDAY, August 11th SESSIONS

Quantity
____ 1. Buying & Selling Cable Systems
____ 2. Making A Clean Sweep of It
____ *3. Common Cable System Problems

Quantity
____ *4. Washington Update
____ 5. Confusing, Consternating, Contraptions...
____ 6. Double-Up Systems Channels...

FRIDAY, August 12th Sessions

Quantity
____ 7. The Scramble to Scramble Is On
____ 8. Tiering & Packaging Cable Services
____ *9. Cable Antennas For Le$$

SATURDAY, August 13th Sessions

Quantity
____10. Adult Entertainment...Cable Television
____11. Creating Effective & Profitable Local Ad Force
____ *12. Everything you wanted to know about the FCC
____13. Open Forum: Steve Effros, CATA, Exec. Dir.

Quantity
____14. Somebody's Interfering With My TVRO...
____15. New Technology on Fiber Optics
____16. Get Your Daily Paper On Cable

*Indicates 2 Cassette Sessions

Enclosed you will find our check for $ _____ to cover the tapes and mailing charges.

TOTAL ORDER _____
5% Postage Charge _____
Amount Enclosed _____

NAME _____
COMPANY _____
MAILING ADDRESS _____
CITY/STATE/ZIP _____
AREA CODE/TELEPHONE NO. _____

SEND ORDER FORM AND CHECK TO:

PERSONALIZED CASSETTE SERVICE
5600 Brookwood Terrace
Nashville, TN. 37205

PAYMENT MUST ACCOMPANY ORDER

BY POPULAR REQUEST
CCOS '82 SESSION TAPES

Cassette Tapes are $6.50 each, except for the sessions that were 1½ hour in duration, requiring two or more cassettes. These extended sessions are $10.50 each.

***Indicate 2 Cassette Sessions.**

MONDAY, July 5th Sessions

Quantity

____ 1. Solving Bad Debt Problems
____*2. What Is A Cable System
____ 3. Surely Insured

Quantity

____ 4. Let's Analyze The Situation
____*5. Refranchising Open Forum
____*6. Big Bucks in a Small Town

TUESDAY, July 6th Sessions

Quantity

____ 7. Advertising On Cable Pays
____*8. What Will Two Or Three Degree Spacing Do To Your TVRO Reception?
____ 9. Ad Spots On Satellite Programming

Quantity

____*10. Keep That System Equipment Operating Properly
____11. Equipment and Interface
____12. Find Out What's New On The Birds

TOTAL ORDER _____

5% Postage Charge _____

Amount Enclosed _____

Enclosed you will find our check for $_____to cover the tapes and mailing charges. Please send the tapes to the following:

SEND ORDER FORM AND CHECK TO:

PERSONALIZED CASSETTE SERVICE
5600 Brookwood Terrace
Nashville, TN. 37205

NAME _____

COMPANY _____

MAILING ADDRESS _____

CITY/STATE/ZIP _____

AREA CODE/TELEPHONE NO. _____

PAYMENT MUST ACCOMPANY ORDER

propriate legal test of those rules and it looks like that is now at hand.

Specifically, what has happened is that the Turner folks filed a petition for rulemaking at the FCC almost three years ago seeking a new rulemaking regarding "must carry". Their argument was simple: the rules were adopted at a time when there were no "cable programmers" as there are today. At the time the Commission only considered the interests of the cable operators versus the broadcasters. The public was supposedly also included in that equation because, the Commission claimed, the required carriage of broadcast signals protected the distribution of diverse programming and assured the continuation of the Commission's stated goal of protecting "localism". However lots of things have happened since 1965, when the rules were first adopted, that change the whole basis for the decision. Turner argued that those changes should result in the Commission relooking at the rules with an eye toward eliminating them.

In particular, Turner noted that since the 1965 decision to impose the "must carry" rules the Commission has found that carriage of broadcast signals by cable systems does not significantly threaten the viability of local broadcast stations. That's the rationale they used to eliminate the distant signal rules. Also, the Commission has acknowledged that the theory of localism may even be benefitted by competition, and that their "intuitive" decisions on cable matters were simply not very good. Finally, Turner pointed out that now, unlike in 1965, there are lots of cable programmers and the "must carry" rules really act to deprive local viewers of diversity since in many cases the rules require the duplication of programming rather than letting diverse new programming sources on the system. All of these arguments also fit in very well with the premise that the "must carry" rules violate the First Amendment in that the government is simply favoring one First Amendment speaker, the broadcaster, over another First Amendment speaker, the cable programmer. That, so far as we are concerned, is a clear violation of the First Amendment.

Anyway, Turner filed a petition at the Commission asking them to initiate a rulemaking to look at all these issues. The Commission has done absolutely nothing with that petition. They have not denied it — they have not granted it. They simply are letting it sit there. Why? Because if they deny it Turner and CATA and anyone else injured by the Commission's decision could go to Court. If they grant the petition they would, of course, actually have to deal with the issue — which we believe they are afraid of doing. After all, they may politically want to keep the rules, but if they find in a rulemaking that they have no legal basis for the rules they will have to eliminate them. So they have taken the "safe" route of just sitting on the petition.

That action, or inaction, has the effect, however, of

depriving us of our rights. Technically we are stopped from going to Court based on an adverse decision by the agency because the agency has not acted! So now Turner has gone to Court to try to force the agency to act — and CATA is filing legal briefs in support of that action. As should be clear, we really don't care what the Commission does — sure we would like them to simply acknowledge that the rules are wrong and eliminate them. But if they don't we are ready, once they deny the petition, to go to Court anyway. The one thing we can no longer sit still for is the Commission strategy of foreclosing our rights by not taking ANY action on the petition!

In our recent publication of the CATA Briefing Book on Capitol Hill explaining to Congressmen and women the issues in the cable television industry we noted the "must carry" rules. We also said that we were not asking the politicians to do anything regarding those rules right now because we felt the issue would be adequately dealt with in Court. Now they know why we said that.

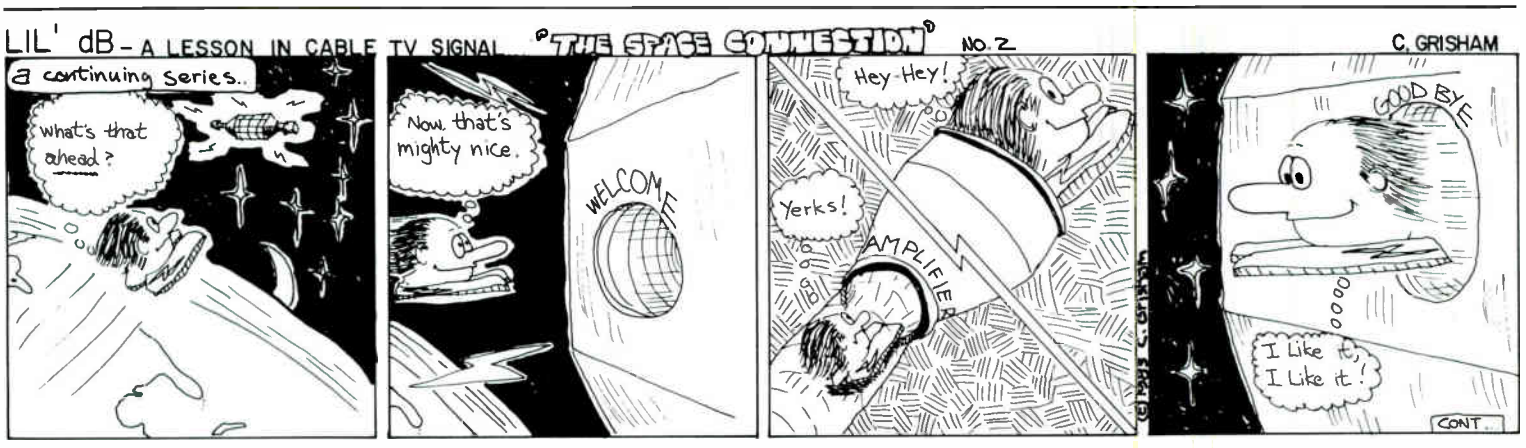
While this case is pending, there is another case, the "Quincy" case that is already before the U.S. Court of Appeals on the West Coast. In that one, as we have told you before, a small operator is challenging the constitutionality of the "must carry" rules as they apply to cable operators. It should be argued before the end of this year. Now we have another case in Washington dealing with the same issues, but from the cable programmer's point of view as well as the operator and the subscriber. It may take some time to get the Courts to act, but we believe we will be successful in this effort.

In this case it is far better for the Courts to deal with the issue rather than the politicians. After all, no matter how logical or legal our case may be, no politician wants to butt heads with the broadcasters and the special interest groups such as the religious folks just before an election! We believe we have a good case, strong legal backing in the Constitutional arguments, and a very weak position being put forward by the FCC. Again, while it may take some more time, the days of the "must carry" rules, we think, are numbered.

Some operators are afraid of our challenge of the "must carry" rules because they say it will result in us losing our compulsory copyright license.

Some operators are afraid of our challenge of the "must carry" rules because they say it will result in us losing our compulsory copyright license. However we see no logic in this objection. The Copyright law, and the compulsory license as it now stands would not automatically be changed should the FCC be forced to eliminate the "Must Carry" rules. The only way that law could change is with a frontal assault in Congress. Now while that could take place — and it probably will at some point regardless of what happens with the "must carry" rules, there is no real nexus between "must carry" and copyright. After all, the broadcasters really get very little from the copyright pool to begin with. They are interested in selling viewers to advertisers, and the way to do that is to get on cable systems. It is not, in our view, a rational fear to think that the broadcasters would, even if they got rid of the compulsory license, then not allow broadcast television on cable — they would be cutting off their own nose to spite their face!

In any event, CATA opposes the "must carry" rules. Any operator who maintains the position that the industry is a "first amendment speaker" cannot logically take that position and at the same time not fight the "must carry" rules. To the extent of our ability we will continue to do so. Should it come to pass that other reactions take place because of the elimination of the "must carry" rules then we will deal with those situations as they come up. But fear of such a potential is no reason to abrogate our responsibility to stand up for our rights! □



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,
1846 N. 106th 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)

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)

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)

Associate Roster

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)

* **Hughes Microwave Communications Products,**
3060 W. Lomita Blvd.
Torrance, CA 90505
213—517-6233
(M9)

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 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)

Magnavox CATV Division,
100 Fairgrounds Drive,
Manlius, NY 13104
1-800—448-5171 or
1-800—522-7464 (N.Y.)
(D4, 5, 7, M4, 5, 6, 7, S3, 8)

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)

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

Note: Associates listed with * are Charter Members.

* **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)

North Supply Company,
600 Industrial Pkwy.,
Industrial Airport, KS
66031
913—791-7000
(D1, 2, 3, 4, 5, 6, 7, 8)

Octagon Scientific, Inc.,
476 E. Brighton Ave.,
Syracuse, NY 13210
315—476-0660
(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 Entertainment, Inc.,
1633 Broadway,
New York, NY 10019
212—708-1600
(S4)

Southern Satellite Systems, Inc.,
P.O. Box 45684,
Tulsa, OK 74145
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.,**
3169 N. Shadeland Ave.,
Indianapolis, IN 46226
317—545-4196
(M9 Bandpass Filters)

* **Theta-Com CATV,**
2960 Grand Avenue,
Phoenix, AZ 85061
602—252-5021
(M1, 4, 5, 7, 8)

* **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) □

Showcase

BROADBAND ANNOUNCES FULL-BOARD MODIFICATIONS FOR TRUNK MODULES

Broadband Engineering, Inc., of Jupiter, Florida, has introduced the new two-hybrid, full-board modifications for Jerrold Starline SAM and SMM CATV distribution trunk modules.

Broadband's BMK-64 upgrades the Jerrold SMM manual trunk module, while the BMK-65 modifies the SAM AGC trunk module. Both modifications are available in 300 and 400MHz bandwidths and feature push-pull hybrids. Both offer gain of 29dB, while the noise figure is 6dB for the BMK-64 and 7dB for the BMK-65.

These new products are the latest in Broadband's line of replacement electronics which enable a system to increase channel capacity and improve reliability at a fraction of the cost of rebuilding. The concept involves the upgrading of older discrete transistor amplifiers to push-pull hybrid operation, utilizing existing housings, cable and hardware. Broadband has pioneered replacement electronics and now offers hybrid modifications for a wide range of CATV amplifiers manufactured by A.E.L., Anaconda, C-Cor, Kaiser/Theta-Com, Sylvania and Jerrold.

A subsidiary of Augat, Inc., of Mansfield, Massachusetts, Broadband Engineering also manufacturers house-drop, apartment and trunk amplifiers for CATV distribution systems and is also the industry's largest independent supplier of replacement components. For more information, contact Broadband at (305) 747-5000 or P.O. Box 1247, Jupiter, Florida 33458.

COMSONICS EXPANDS SATELLITE REPAIR CAPABILITIES RECEIVER

Considerable industry demand has prompted **ComSonics, Inc.** to expand capabilities in servicing satellite video receivers, it was announced today by company President Warren Braun.

The service is in addition to ComSonics, established repair capabilities that include headend, trunk, distribution, line and test equipment for the cable television industry.

"Our recent headquarters expansion and staff additions have enable us to broaden our research, testing and repair departments," Braun said. "The company has installed sophisticated new receiver testing and repair equipment and has added a satellite earth station for off-satellite testing capability."

ComSonics tests, realigns and repairs receiver defects and guarantees the repaired unit for 90 days. Serviceable units include both fixed frequency and agile tuning cable receivers.

ComSonics, Inc. is a multi-faceted, full service CATV company specializing in equipment repair, system engineering and design and product research and development.

For more information, contact ComSonics at 1-800-336-9681 or write P.O. Box 1106, Harrisonburg, Virginia 22801.

C-COR INTRODUCES COAXIAL DATA MODEM PRODUCTS

CableBus Labs, Inc. (soon to be C-COR Labs, Inc.) of Beaverton, OR, and **C-COR Electronics, Inc.**, State College, PA introduced the first production models of the CablePort 7120 Voice/Audio and the CablePort 7130 Asynchronous Data Modems on June 12, 1983, at the National Cable Television Association show in Houston, Texas.

CABLEPORT 7120 VOICE/AUDIO MODEM SYSTEM

The CablePort 7120 Voice/Audio Modem is a point-to-point coaxial cable modem which can be used as a telephone equivalent over a coaxial cable system. It may be used in conjunction with the 7125 Cable Phone especially adapted to be plugged directly in the Modem; and with the 7124 2 to 4-wire Hybrid Adapter which will connect the cable phone system to a regular 2-wire twisted-pair phone circuit.

Applications of the voice modem are anticipated to be:

Communication from headend sites to main office or other hub sites

Communication from technicians and installers from the field to dispatchers, the headend, or office personnel

Background music and paging

Facsimile transmission that requires an analog connection link

Remote listening security applications

Up to 210 7120 Voice/Audio Modems can be operated over a two-way cable system in one 6 MHz channel via a single Block Converter located at the headend. The voice modem is the first of a family of modems that share the same housing components, transmitter, receiver, and power supply.

CABLEPORT 7130 ASYNCHRONOUS MODEM

The CablePort 7130 Asynchronous Data Modem is a medium speed narrowband, point-to-point or multidrop mode asynchronous modem for use on coaxial cable systems. It is intended for communications between computers and remote terminals, or remote printers that many businesses and municipal agencies use for remote store and office locations.

Key features include the narrow bandwidth (25 KHz on each data circuit) and the exceptional performance in noisy cable systems (C/N as low as 7 dB). Up to 240 separate data circuits will fit into one 6 MHz television channel (210 thru a single channel block converter). The modems use ASK transmission, are RS-232 compatible, and are capable of data rates of 19.2 KBaud.

The CablePort 7120 Voice/Audio Modem and the CablePort 7130 Asynchronous Data Modems are very cost effective, while offering design and performance characteristics that are well ahead of the competition.

KLUNGNESS ELECTRONIC

Klungness Electronic Supply (KES) has introduced a novel new device for running drop cable through walls and partitions. The KES MODEL CP59-6U CABLE PULLER is simple, quick and easy to use. A stainless steel sleeve on the end of a bronze handle pulls back to expose two spring steel grippers. The drop cable is placed between these grippers and pushed into the sleeve to secure it. The handle can then be inserted into a predrilled hole and withdrawn from the opposite side carrying the cable with it like needle and thread. Once through, the sleeve is pulled back on the handle and the cable removed. This patented cable puller is exclusive with KES and can be ordered direct at $5.75 each. Quantity discounts are available. KES (Klungness Electronic Supply), P.O. Box 885, Iron Mountain MI 49801, 1-800-338-9292 (MI 1-800-682-7140).

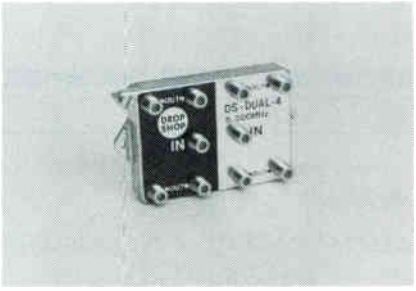
DUAL 2-WAY & 4 WAY 5-500 MHz SPLITTERS

Indoor/Outdoor Dual 2 Way and Dual 4 Way Splitters are now available from **The Drop Shop Ltd.**

Both **DS-Dual** 2 and **DS-Dual** 4 Way Splitters are full 5-500 MHz band-width passives, have an anticorrosion finish, high RF shielding, grounding lugs and over 100db isolation between sections. The top-mount design has machined threaded "F" ports spaced so as to allow usage of negative or positive traps and their shields.

→

Showcase



For more information contact:
The Drop Shop Ltd.
P.O. Box 284
Roselle, NJ 07204
or call
CA - (800) 227-0700
NJ - (800) 526-4100

SCIENTIFIC-ATLANTA INTRODUCES LOW-COST COMPACT SIGNAL PROCESSOR

Scientific-Atlanta, Inc., has introduced the Model 6130 low-cost signal processor designed specifically for mini-cable and SMATV applications. The high-performance, compact Model 6130 is unique in its design. Up to four processors may be mounted in a standard 19" rack width.

Important standard features include surface acoustical wave (SAW) filters, ability to permit adjacent channel rejection, automatic gain control, adjustable sound carrier level and high level IF switch. Front panel indicators and adjustments allow effective monitoring of unit operation and status of signal input.

The economical Model 6130 provides extensive signal processing offering standard VHF, midband and superband output channels as well as VHF, midband, superband and UHF input channels.

Scientific-Atlanta, Inc., (NYSE) is an international equipment manufacturer for the satellite communications, cable television, energy management and home security industries. The company's other area of concentration is the manufacture and sale of test and measurement instruments for industrial, telecommunications and government applications.

For additional information contact: David Chance, Marketing Manager, Commercial Markets, Communications Products Group, 404/925-5308.

NEW DESIGN FOR SADELCO'S SLM SCALES

Sadelco has a new and more functional design for their SLM scales. The new meter scales read true signal peak levels of picture signals and true RMS levels, of sound (CW) signals, at a glance, without using a correction graph.

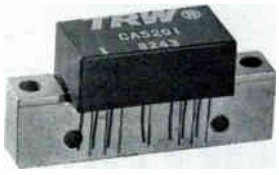
This design innovation for Sadelco's meter scales has been accomplished by incorporating a special color coded, easy to read scale on their Models 733C Super, 719D and FS 3D types.

The existing Sadelco SLM's in the field, may be upgraded with the new scale for a nominal cost.

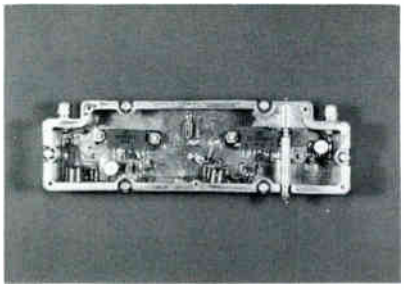
For additional information contact: Sadelco Inc., 75 West Forest Avenue, Englewood, New Jersey 07631, 201-569-3323.

QUALITY R.F. SERVICES, INC. PRESENTS NEW PRODUCTS

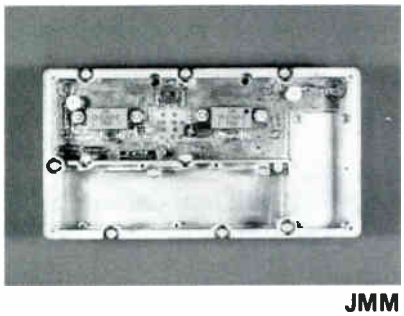
Fred Rogers, President, Quality R.F. Services, Inc., of Jupiter, Florida, has sent information concerning their new WRF-JMM, JAM, JBM, JSAS, and JSDH, as well as a new super Hybrid - CA 5201 (TRW and Motorola) now available from his firm.



HYBIRD



JBM



JMM

The JMM, JAM, JBM, JSAS, and JSDH will upgrade the JERROLD STARLINE TWENTY SERIES to 300 MHz, 400 MHz, or 450 MHz. Features include:

- **Hybrid Operation** - increase channel capability to 21, 35, 54, or 61 channels
- **Double Sided Impedance Matched P.C. Board** - long lasting, thus very cost effective.
- **Dual 75 Gain & Slope Controls** - provide extra stability by holding response flatness through gain and tilt control.
- **Transzorb Type DC Overvoltage Protection** - protects hybrids and other semi-conductors from runaway power pack modules.
- **Resistive Overcurrent Protection** - provides – 24.0 volts B-
- **Half-Board Option** - provides option of adding additional channels later, without replacing whole input board
- **Double Thickness Back Cover Plate** - Pre-drilled and counter-sunk for ease of installation

Replacement components are also available.

In regard to the new Super Hybrid - CA 5201 (TRW and Motorola), these are available also with 18 db gain - 450 MHz to add extra bandwidth to your system, as well as 300 MHz to 500 MHz hybrids with 17 db, 22 db, 30 db, 34 db (7 & 9 pin), and 39 db gain.

Quality R.F. Services stocks RF transistors (including 20's and 13's), filter capacitors, disc capacitors, trimmers, resistors, diodes, zeners, potentiometers, power transistors, and plastic transistors. Call TOLL FREE 1-800-327-9767 for a free catalog that lists all CATV amplifier manufacturers' part numbers, or write 825 Park Way, Suite #3, Jupiter, Florida 33458.

BROADBAND ENGINEERING,INC.

Broadband Engineering, Inc. of Jupiter, Florida has introduced a rack-mounted amplifier, the VFA-450, designed to amplify a system's head-end signals before feeding them into one or more system trunklines.

The VFA-450 may also be used as an instrumentation amplifier for field sweep amplification. By selecting higher gain options, the new amplifier may be used as a high-gain distribution amplifier where rack-mounting is desired.

The new amplifier will have a directional coupler for sweep insertion and a diplex filter, which may be used to recover return trunk signals. It will be powered by 120 VAC and will be capable of standby-powering by battery.

A subsidiary of Augat, Inc., of Mansfield, Massachusetts, Broadband also manufacturers house-drop, apartment and trunk amplifiers for CATV distribution systems. The firm is a leading manufacturer of replacement electronics and is the industry's largest independent supplier of replacement components. For more information, contact Broadband at P.O. Box 1247, Jupiter, Florida, 33458 or call (305) 747-5000.

Classified

FOR SALE

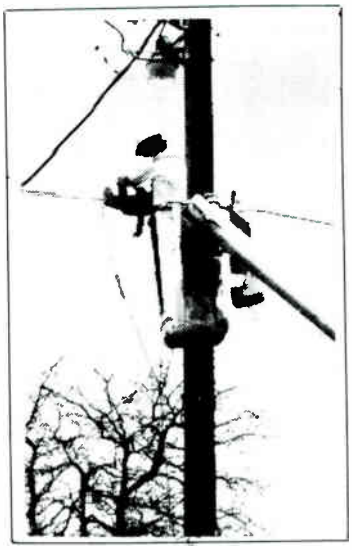
1,020 Maganavox MXMU Descramblers on 108 MHz. Good working condition, 4 years old, taken out of service. Make an offer. Also, 1 each Magnavox 108 MHz Scrambler with 108 MHz Pilot Bandpass Fitler. Make an offer. Call Dean Petersen - (417) 358-6059.

CATJ
4209 NW 23 #106
Okla City OK 73107
Box 1083

OPPORTUNITIES

Position Wanted

Chief Engineer with over 15 years cable experience seeking same position in new location in the South, West or Mountain States. Willing to relocate at own expense. 717 662-7145.



ATTENTION!

SYSTEM MANAGERS — TECHNICIANS NEEDED

Excellent opportunity for system managers and technicians for our systems in Colorado, Texas, and Oklahoma. Need qualified personnel for these Southwestern locations, good working conditions and opportunity for the right people who want to work and stay actively involved in the cable business. These systems have good equipment to work with and offer excellent situations to grow in the cable business. If interested, send resume to the box number indicated below.

Box 71080
c/o CATJ
4209 N.W. 23rd
Suite 106
Okla. City, OK 73107

CATJ classified advertising is offered as a service by CATA for its membership.

ANY member of CATA may advertise in the CATJ classified section FREE of CHARGE (limit of 50 words per issue — 3 issues per year.)

CATA offers three types of memberships:

1.) Systems — paying regular monthly dues based on number of system subscribers.

2.) Associate Members — pay an annual fee.

3.) Individual Members — pay an annual fee.

NON MEMBERS may also use the Classified section at the rate of 50 cents per word with a minimum charge of $20.00. Add $2.00 for blind-box. Non-members should include full payment with the ad insertion.

Deadlines for all Classified Advertising is the 1st of the month for the following month's issue.

Address all Classified material to: CATJ, Suite 106, 4209 N.W. 23rd, Oklahoma City, Okla. 73107.

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20 Antin Place, Bronx, N.Y. 10462-TOLL FREE (800) 221-8857 (Continental U.S.A., Puerto Rico, U.S. Virgin Is.) Call Collect (212) 829-1070 (N.Y. State Only)
Western Operations: 2900 W. Garry Ave., Santa Ana, CA 92704, (714) 662-1041, Toll Free (800) 247-8435—in Calif. only; (800) 624-2511—Continental USA, Puerto Rico, U.S. Virgin Islands, Alaska and Hawaii.