STATUS OF STATISTICS

An analysis, **as of the 10th of this month,** of the current pricing and inventory status **trends** in the TVRO industry. Users of this data are warned that **CJR** 'samples' key OEMs and distributors on the 10th of each month to determine trends and averages. Dealers will find this data useful in planning their own purchasing schedules for the coming 30 day period.

CURRENT PRICING/LNAs

For 100 degree LNAs, 50 dB gain, CWO terms, 3 lot purchase.

1) Lowest price reported: **$249.00**
2) Highest price recorded: **$325.00**
3) Average price recorded: **$291.00**

CURRENT SHIPMENT/LNAs

1) Greatest decline reported: **−10** %
2) Greatest increase reported: **+20** %
3) Average 30 day change: **+18** %

CURRENT PRICING/ANTENNAS

1) Percentage reporting price declines **0** %
2) Percentage reporting price advances **60** %
3) Average 30 day change: **+09** %

CURRENT SHIPMENTS/ANTENNAS

1) Greatest decline reported: **−0** %
2) Greatest advance reported: **+37** %
3) Average 30 day change: **+22** %

CURRENT PRICING/RECEIVERS

1) Percentage reporting price declines: **20** %
2) Percentage reporting price advances: **04** %
3) Average 30 day change: **−10** %

CURRENT SHIPMENTS/RECEIVERS

1) Greatest decline reported: **−0** %
2) Greatest advance reported: **+25** %
3) Average 30 day change: **+16** %

EARLY WARNING (Next 30 days)

1) Equipment shortages predicted: **100° LNA, Receivers**
2) Equipment surplus predicted: **None**
3) Biggest downward price move: **Some Receivers**
4) Biggest upward price move: **Antennas**

In surveying individual OEMs and distributors for the 'raw data' that goes into the above monthly summary, **CJR pledges** complete anonymity to its 'sources'. Dealers are asked **NOT** to contact **CJR** for information on 'lowest pricing' or 'greatest declines' referenced here; our pledge to sources is unbreakable! Many issues of **CJR** do, however, contain 'insert flier' sheets from OEMs and distributors announcing (as in advertising) current marketing specials.

NOVEMBER 1983

MID MONTH MEMO

SCRAMBLING? It is frightening. But how **real** is it? The issue has such importance that **CJR** pre-empts much of the regular editorial space this month to cover in some depth the state of the scrambling 'art' today.

SPACE Orlando proved to be a very upbeat show attracting the likes of Ted Turner and Senator Barry Goldwater. Biggest news from the show? **Winegard** is now test marketing 8′ systems at 150 **Montgomery Ward** stores in mid-west, and, the battle between SPACE and STTI is over. The two will 'co-host' the March Las Vegas show using the STTI dates and Riviera location.

SFPC's $750,000,000 consumer financing program and warranty program got off to a spring-board start with more than 1,000 dealers signing up in Orlando.

NEW equipment at Orlando was scarce with most suppliers working on unveiling their latest lines in March. In one show-of-hands at an opening session, more than 75% of those in attendance conveyed that this was their 'first' industry trade show.

Cooper James Report

CJR/ (The) Cooper James Report is published and AIRmailed on the 15th of each month by **CJR Limited,** a Turks & Caicos Corporation with Corporate offices at Tower Plaza, Providenciales, Turks & Caicos Islands, BWI. All subscription requests, advertising requests should be directed to **CJR, P.O. Box 100858, Ft. Lauderdale, Fl. 33310** (call 305/771-0505 between 9AM and 4PM weekdays). An additional editorial office is maintained in Tulsa, Oklahoma (P.O. Box D, Claremore, Ok. 74017; telephone **301/997-9545**) where Larry James may be reached. Subscription price is $35 per year, AIRmail, within USA. Canada and Mexico; in US funds **only.** Elsewhere $45 per year in US funds **only.** Sample copy available for $5 in US funds. Material contained herein is considered **confidential** in nature and is for the study and use of TVRO dealers, distributors and OEMs **only.** Photocopying or extracting contents is prohibited without permission; copyright © by CJR Limited 1983/1984.

NEW PRODUCTS/ SERVICES APPOINTMENTS

ANTENNAS

Kaul-Tronics, Inc. (Box 292, Lone Rock, Wi. 53556/608-583-4833) recently completed **antenna range testing** of their model SS-112 (pressed) stainless steel dish. At Houston's Telsat Corporation, the 112 inch antenna had a measured efficiency of 64% equipped with a Chaparral prime focus feed or 39.5 dB mid-band and 40 dB at 4.2 GHz. In separate tests conducted at Twin City Testing and Engineering Laboratory in Wausau, Wi. the SS-112 was compared in 8 hours of testing against an unpainted spun-aluminum dish and a beige colored fiberglas dish. In those tests the focal point and LNA flange temperatures were appreciably lower than either of the other two test antennas. Full details from Kaul-Tronics. The firm presently manufactures a line of antennas from 7.5 feet to 13 feet in size, using both stainless steel and fiberglas construction techniques.

METALEX Corp. (Box 399, 1530 Artaius Pkway, Libertyville, Il. 60048/800-323-0792) has announced a **'precision expanded metal'** for high performance parabolic satellite dishes. The new metal surface can be formed into virtually any petal shape required using die-cut or high volume laser cut computer controlled, optical tooling, in sizes up to 48" by 72".

ODOM Antennas (P.O. Box 517, Beebe, Arkansas 72012/800-643-2950) is currently creating high precision fiberglass dishes from **steel template/molds** accurate to a thousandth of an inch. All of this is the result of computerizing the creative task of designing the first master mold or 'Master Plug' for an antenna design. Individual molds may require as much as sixty days of 'hand work.' Antennas from 8 to 20 feet in diameter are now being produced.

U.P. SATELLITE DISH CO. (2715 Danforth Rd., Escanaba, Mi. 49829/906-789-1027) is now manufacturing a complete line of mesh antennas from 6 feet to 25 feet in size. The aluminum mesh antennas are dubbed the 'Superior' line.

ANTENNA Accessories

NEMAL Electronics International, Inc. (1325 N.E. 119th St., North Miami, Fl. 33161/305-893-3924) has introduced a new line of **'combo-cables'** for the TVRO industry. The new, direct burial cable provides 9 conductors (5 — #22 stranded, 2 — #22 shielded, a drain wire and 2 — #18 stranded) including a 96% shield copper RG-59/U cable. All wires are color coded for prompt identification on both ends. Standard put-ups of 500 and 1000 feet are available. Nemal has been supplying a wide range of cable and connectors to the TVRO industry and others for seven years.

COMPUTRAC (641 W. Broadway, Farmington, NM 87401/505-326-4301) has introduced their model 4000-8000 **'ultimate tracking system'** designed around interfacing with the Atari 400, 800 or 1200 series computers. Using the system the user has complete on-screen display of satellites, position of antenna, warning buzzers to indicate limits. A special introductory offer ($599 shipping paid) includes an Atari 400 computer, electronic interface unit, Computrac 4000 cartridge for the computer, 18" actuator arm, Burr or Saginaw drive and attachments.

LOW NOISE Amplifiers

Gardiner Communications (3605 Security St., Garland, Tx. 75042/214-348-4747) is offering a **smaller LNA** package (1-7/16" x 2-1/2" x 7-9/16" including the cable connector) in configurations of 50

ODOM — Master Mold Being Prepared.

GARDINER's New Small LNA Package

NEW PRODUCTS/ continued page 15

NOTICE TO READERS

CJR is provided **without charge** to Dealer Members of **SPACE,** the North American national trade association of TVRO manufacturers, distributors, dealers and users. This contribution to the **SPACE Dealer Membership Program** is made by **CJR Limited** in recognition that a strong dealer network is an essential working part of the continued growth and success of the TVRO industry in North America. Non-dealer-members of SPACE may subscribe to **CJR** for a nominal annual fee by following the instructions found in the small print on the bottom of page 1; here.

Original **E**quipment **M**anufacturers (**OEM**s) are encouraged to submit new product releases and news of appointments to CJR's Assistant Editor **Carol Graba** (CJR, P.O. Box 100858, Fort Lauderdale, Fl. 33310) for consideration in our new product section. OEMs, distributors and others interested in reaching the TVRO Dealer Marketplace with product pricing and release news **in the middle of each month** are also encouraged to contact Ms. Graba concerning **advertising** rates and space availability (telephone 305/771-0505 weekdays between 9 AM and 4 PM eastern time).

SCRAMBLING PROFILE: WHO WHAT WHERE

UNDERSTANDING The Problem

The issue before the industry is scrambling. The issue before you, as a TVRO dealer, is how do you handle scrambling when you are engaged in conversations with would-be purchasers of home TVRO systems. Let's look at the state of scrambling technology, first, as a prelude of creating your own 'best-foot-forward' posture, as a dealer, on this sensitive issue.

Scrambling is, by definition, the reconfiguration of a standard television signal into a non-standard form. In a sense, a television receiver designed for use in Europe where the PAL television 'standard' exists would display a 'scrambled' picture in Japan where the NTSC standard exists. In other words, scrambling is not all that sinister; it merely denotes that somebody at the transmission end of the system has adopted a technical method of configuring the television signal which is different from your particular reciever demodulator standard.

There are more than a half dozen widely utilized television 'standards' in use in the world today. The one we are most familiar with, NTSC, came out in the early 50's as the North American (color) television standard. At about the same time there were totally different approaches to creating color television (and sound) being introduced in Europe, parts of South America, and within the Soviet Block nations. The only thing which these 'world' standards share in common is that they all end up painting a picture on the screen of a television receiver; and, they all came along within a time span of a few years.

Approximately 30 years has lapsed since the existing world standards evolved, and behind their release came millions upon millions of television receivers in mass production. In that thirty or so years we have seen dramatic advances in all fields of electronics, and it should not surprise you to realize that better methods of transmitting television pictures have also evolved in that period of time. 'Better,' of course, is a relative term. Better to CBS would mean High Definition Television (HDTV). Better in Europe might mean a picture that does not contain that annoying PAL 'Flicker.' Better in North America might mean improved control over the color content of the signal.

The standards that evolved in the 50's were designed for terrestrial transmission systems; largely 'AM' (amplitude modulated) systems which are relatively 'narrow band' in nature. Then along came satellite transmission where 'FM' (frequency modulation) techniques took hold, and where wide band transmissions were practical. When engineers realized that they were no longer 'constrained' by the limitations of 'AM' and 'narrow bandwidths,' they once again re-thought-out the television transmission process, searching for ways to improve the end result; the quality of the television picture on the viewer's screen. The CBS/Japanese experiments with HDTV is one result of this re-thinking process. The 'state of the art' (or, the technical excellence possible using the best technology available) has certainly changed a great deal since the 50s; especially when the wider bandwidths of satellite transmission is included in the equation.

What does this have to do with scrambling?

You must remember that if any 'standard' is used to transmit a picture other than **the standard** which your particular television receiver is designed to accept, the result is a 'scrambled picture' or scrambled sound, or both. Now, if the people who are doing the transmitting are going to make ANY change in the transmission standard, for the purpose of eliminating you as a viewer, they have two options:

1) Make some change which simply makes your viewing impossible, or,
2) Make some change which results in improved picture technology; which, since any change will render your picture 'scrambled,' actually does two things at once. It eliminates you as an unintended viewer, and, it also creates a better (higher quality) picture for the intended viewers.

This, then, is the crux of the various scrambling arguments. If you are going to make a change (any change) in the transmission 'standard,' do you make that change simply to eliminate unauthorized viewing, or, do you make that change to create a better, higher-quality picture, which also just happens in the process to eliminate the unauthorized viewer? Since there is an 'argument' here you can be sure that different firms approaching the scrambling question are not uniform in their approach to the question.

OAK Orion System

Oak did it first. They were the first to have an operational 'Satellite Security System.' It all began in 1980 and the first 'operating company' to offer the Oak service for hire was a firm called **VideoNet.** VideoNet is a satellite based closed circuit television services firm offering transmission and reception facilities to educators, corporations, sporting event promoters and others.

Oak includes in its customer list VideoNet, BizNet, the U.S. Army, the Canadian CanCom systems (four original channels; 4 additional channels added), the Catholic TeleCommunications Network, and overseas, the 12 GHz Satellite TV PLC service originating in London but seen via the 12 GHz ECS-1 satellite throughout Europe on cable.

Because Oak was a pioneer in this field, they suffered from some rather considerable start-up problems. And inspite of their substantial time-lead, there are today perhaps no more than 2,000 Oak Orion descrambler units carrying Oak serial numbers in the world. It has not been a mass produced product to date.

Oak's attitude concerning scrambling reflects their original intent with the product line. They were only interested in making the video (and audio) unusable. They were not intent (or conscious, or aware) on taking advantage of their 'non-standard' format decision to actually improve the potential quality of the service, after descrambling.

Oak's objectives were:

1) **To provide sufficient security** so as to deny the 'entertainment value' of the pictures to unauthorized viewing locations, and,
2) To implement a system of sufficient simplicity that, in their 1981-82 time frame of final design engineering, they could use then-current 'state-of-the-art' hardware.

Oak maintains that for 'entertainment programming' it is **not necessary** to scramble as 'hard' as it is for more 'sensitive' materials. Hard in this case refers to the visual difference between a scrambled signal and a non-scrambled signal. An Oak scrambled signal has recognizable human or other forms, as anyone who has tuned in the Orion transmissions on D4 or Anik D will recall.

Oak engineering began with the premise that all TV video images are redundant. That is, there are seldom dramatic changes in picture content within a picture you see now, and another one you see 'now.' The waveforms follow a 'standard pattern' and that pattern is established by the particular 'standards' (NTSC, PAL, SECAM, etc.) in use by the transmission system.

If these patterns are modified, on purpose, by re-arranging the sequence of the video information and the 'control' information, the TV receiver will no longer display a discernable picture.

So the Oak Orion system functions by simply re-arranging the 'sequence' of events that appear within a television picture, or which make up the 'instruction signals' transmitted with each picture 'frame.' The decoder is nothing more than a special receiver which has been built to function with an 'Oak-created' standard. Turning it around, it

would display a 'scrambled picture' if a regular NTSC standard signal was fed into it; just as a French television set would display a 'scrambled' picture if it were taken to Japan.

Oak gains no 'picture quality enhancement' with the Orion system. In fact, there are those who would seriously argue that any picture that begins as a NTSC standard signal, is converted to the Orion standard for transmission, is received as an Orion-standard signal and is reconverted back to NTSC in the Orion descrambler, ends up being of lesser quality than it started out.

The Oak Orion service found on Comstar D4, for **ON-TV,** is presently serving around 135,000 individual homes; through SMATV, LPTV and cable TV outlets receiving the service. This service uplinks from Salt Lake City.

The Oak Orion system operating for the Canadian **CanCom** service (4 Canadian and up to 4 US services) on Anik D has a multitude of uplink points. This is by far the most ambitious and therefore the most complex of the Orion networks. Let's see why.

The Orion-standard video (scrambled) is transmitted along with two types of decoding information. The decoding information is transmitted as a form of instruction to tell the Orion descrambler to unscramble the picture. Without that 'instruction' the Orion descrambler would not function. Each of the Orion descramblers has its own unique 'address code' and this allows the CanCom (or other) uplink site to tell each of the authorized decoders, individually and as a group, to descramble the service. Oak (and all of the other non-standard video system designers) is convinced that users will always like the option of telling specific receive sites that they can, or cannot, view certain transmissions. Thus the ability to 'address' individual receive locations has always been a part of the master game plan.

In the case of CanCom, there are individual video **programming uplink sites** in Quebec, Ontario, Alberta and British Columbia. However, there is only ONE central headquarters where all of the instructions (addressing) originates; **Quebec.** There, Oak of Quebec operates a computer addressing system which creates the individual 'address codes' for each of the seven/eight CanCom service channels for each of the receiving locations. Let us suppose that we have a cable headend in Ontario which has contracted for receipt of two of the services from CanCom. The firm wants to be sure that when they supply the descramblers to the cable system, the descramblers are installed just to receive the two channels of service for which the cable firm has contracted.

Each of the uplink sites does their own scrambling. However, only the Quebec site originates the addressing codes. This information is transmitted out of the Quebec site along with the information for TCTV/CHLT entertainment programming. Those authorized sites which receive the CHLT programming get their address codes 'direct.' At the Ontario sites (two) and the Alberta and British Columbia sites, this addressing information is taken off of the TCTV/CHLT signal and extracted at a downlink. Then it is fed through a device called a 'data repeater' which recombines the bulk Quebec-created addressing information with the local entertainment programming. In that way, the Quebec site controls all of the addressing and the addressing codes actually travel to the satellite and back **twice** before they end up at the addressee's location. This may help explain why you on occasion see the pictures on CITV (Edmonton), for example, **un**scrambled whereas the rest are scrambled. This means that someplace between Quebec's computer and the Edmonton site, the addressing data has gotten fouled up and it is not available to the Edmonton site for 'data repeating' with the CITV signal.

Oak presently has a trio of models available.

1) **Orion 'C'** is the generation 'one' family of decoders, currently produced for CATV and video conferencing and video networking purposes in a dual-decoder (redundant system) package. The early models had a single decoder inside of the box but Orion later changed to a model that had two electronically independent decoders in the same container, with the second unit switched on line should the first unit fail.
2) **Orion 'I'** is the stripped down version now being marketed for individual home applications in limited areas. This unit has a built-in modulator (channel 3 or 4) and the unit connects to the TVRO receiver at the (unclamped) video output spigot and fits in between the TVRO receiver and the home TV set.
3) Orion 'L'(SI) is not actually available yet, except in engineering sample quantities; it is scheduled to become available in shipping quantities in the first part of 1984. The **LSI** phrase is one you will be hearing much more of in the future; it stands for **L**arge **S**cale **I**ntegration and it has nothing to do with riding a bus in Biloxi.

LSI is a technique that allows very large, related circuits to be combined into a single integrated circuit. Only this type of 'IC' differs from other ICs because the circuitry is far more complex and far more single-purpose-minded than other IC devices. In the case of Oak, they have spent millions of dollars creating an LSI 'chip' device which essentially eliminates all of the individual parts in their decoder; it is, basically, a complete descrambler on a chip. It is designed to do just what the Oak Orion C or I does, without all of the individual parts.

Tooling up for LSI production is both time consuming and expensive. Those who take this LSI step had better hope that they will be producing and selling hundreds of thousands or even millions of devices using their LSI technology, or they could be in a heap of trouble financially. You don't write off the tooling up costs of LSI by building 5000 of something.

If the video/scrambling for Oak's Orion system cut across no new 'better performance' barriers, the audio is at least instructive to what you can expect from the other systems that came along at a later date. It is scrambled, but in this case it is no longer really adequate to call it 'scrambled.' We have to say it has been 'encrypted.'

Encrypted? That's scrambling done to a fine turn.

A scrambled picture may, like the Orion system, still have some recognizable imagery present. An 'encrypted picture' would have **nothing** recognizable on the screen. In fact, if it is really 'hard encrypted' you might not even know that a picture was being transmitted. We'll see what that is all about shortly.

The Oak audio is 'encrypted.' You can tune across the sub-carrier band with a TVRO receiver and you will not find a sub-carrier with program audio (you may, in the case of CanCom, find sub-carriers with **non**-program audio, such as FM, present however). The audio is simply 'gone.'

Oak, like others that followed Oak to the scrambling well, transmits their audio using a fairly new technology called 'digital audio.' There are, in this world, two basic ways to transmit intelligence. Until a few years ago, there was **only one** practical method and it was called (and is still called) **analog.** Analog audio is what you have with a sub-carrier. Analog video is what you have with WGN or USA Network (etc.). Digital audio is unlike any audio you have ever heard. It is so unlike analog audio that you cannot even tell it is being transmitted with an analog audio demodulator system.

Oak describes their digital audio in the following manner:

'The audio consists of two bytes sampled at a 2H or 31.5 kHz rate. The audio is compressed from 13 bit equivalent dynamic range to 8 bits per sample. Then the 8 bit sample is encrypted and inserted into the video signal.'

Actually, the system has another name; it is called **'sound in sync(s)'** and it is similar to the 'sound in syncs' approach used by the Russians for their northern orbit Molniya bird (see **CSD** for **November** 1983). Only the Russians are not 'encrypting' their audio as Oak does with Orion.

There are tremendous advantages, real-world performance advantages, to digital audio. The signal starts out as an analog signal, it is converted by sampling into a digital signal and then the 'digital data' can be inserted as data-bits into a portion of the video signal where it gets a 'free ride.' If you take this approach, you can eliminate the sound sub-carriers and immediately gain a transmission path advantage because you no longer have the sound sub-carrier sitting out there 'robbing' transmission power from the video carrier. We'll see what that is all about in some detail, shortly.

How well the Oak system performs is perhaps best measured by listening closely to the results of their largest ad-hoc network user; VideoNet. This firm started out on their own, and subsequently became a part of the Oak media empire. They continue to operate as an 'arm' of Oak today.

VideoNet began life by packaging around 95 receive sites for the

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PIONEER MEMBER OF SPACE

Holmes/Cooney fight. By May of this year they had grown up in size with more than 300 sites for the Crown Affair boxing package (where they used 7 different satellites and 9 different transponders to reach all of their receive sites; nationally and internationally). Their bread and butter, however, is video teleconferencing where they typically contract to provide scrambled service to perhaps 25/30 different sites. They are currently providing the Westar 5 scrambled horse racing service from New York to Las Vegas betting rooms (24 Las Vegas sites) as well.

Because Oak encrypts the audio into a digital signal, this gives them a freedom to back into stereo service by activating one or more sub-carriers as well. For example, with a rock concert they might employ a pair of sub-carriers for the respective left and right channels of program audio, and then continue to carry a 'sum' audio signal in the encrypted mode within the video signal. Or, for various professional fights, they might provide natural crowd audio on the encrypted digital audio channel and then provide one or two different commentator audios on sub-carriers.

M/A-COM Linkabit System

The heritage of the M/A-COM Linkabit system dates back into the late 1960's and the prestigious California Jet Propulsion Lab (JPL). There a system was developed to enhance the weak, noisy video images which NASA was beginning to receive from space flights. The limitations of normal NTSC analog video were becoming very evident as unmanned space probes traveled further and further from earth, and their tiny transmitters attempted to send intelligent video signals back to earth.

And whereas the Oak approach to scrambling called for a system that 'denies entertainment value' to unauthorized viewers, the M/A Com Linkabit system approached the problem from a different direction. They explain their approach in this manner:

> **"Your first challenge with a security system is to create a picture which cannot be pirated** (i.e. has no entertainment value). **Once you have gone that far, it does not really cost** that much more **to improve the system so that the image is no longer capable of being recognized."**

Just for the record, it is the Linkabit system which HBO (Home Box Office) has chosen and which you will see being inaugurated between now and the end of the year on west coast transponder 13 on F3R.

It has been said that if you are setting out to scramble the video signal, beyond the mere changing of standards, there are only two 'variables' which you can play with and still be in the analog video transmission mode. And they are:

1) **Varying the amplitude** of the video information,
2) **Varying the timing sequence** of the video information and/or the instruction signals that 'direct' the video information into a picture format.

Given that this is a correct statement, there are then six ways practical to screw up the video. And they are:

1) **Suppress** (i.e. weaken) the sync signals, thereby eliminating the ability of the receiver to 'lock onto' the instructions sent with each picture, causing the picture to 'float' or roll, or both;
2) **Invert** the image (turning light colors into dark colors, dark colors into light colors, creating a 'negative image');
3) **Reverse** the line sequence, in effect painting the picture backwards or parts of it backwards and parts of it frontwards, thereby destroying the continuity of the image on the screen;
4) **Taking the picture apart** by dividing up each of the nominal 400/525 picture information lines into say five 'segments,' and then randomly shuffling the five segments around on the screen so that they no longer make up a coherent picture;
5) **Taking the picture apart line by line** and sending the lines out of sequence so that the received lines make up a picture that is out of 'whack' with the original image, and then using 'storage techniques' storing all of the lines received from each picture 'frame' (image) and re-assembling the lines one frame at a time before allowing the lines to be seen on a picture tube;
6) **Modify or shift the 'time base'** so that the carefully controlled 'internal clock' that directs each picture image into a coherent image paints a non-coherent picture unless the receiver is equipped with a special 'modified time clock' signal.

The M/A COM Linkabit system is based upon approach number four and they call it **'Video Cypher.'** The individual picture lines are chopped up into segments and then the segments are moved around in a random fashion. The key word here is 'random.'

Let's assume that a full picture has 525 lines. This is not actually the case since while NTSC television does have a **capability of 525 lines,** many of those lines are used for other purposes normally, and do not contain video information.

Our 525 lines are now further divided into five segments each. Now rather than having 525 separate pieces of information to be transmitted for a full picture, we have 5 x 525 or 2625 individual segments to the picture. Now we start moving those segments around in a 'random' manner. We take segments A, B, C, D and E from their original 1, 2, 3, 4, and 5 sequence in line 1 and we re-arrange them with say segments out of line 4. Or 44 or 444. The number of combinations we have created, for our badly mangled picture is now 525 x 525 x 5 etc. Obviously it is one thing to chop something up into several billion parts. It is quite something else to put it all back together again, in the exact proper order, and do that 30 complete times each and every second (the television image you see on the screen changes 30 complete times per second).

Random.

Which brings us to another buzz word/phrase in the encryption world; **DES.** That stands for **Data Encryption Standard** and it doesn't mean much unless you say DES Algorithm.

Since we are taking the picture apart, a line segment at a time, and then transmitting the 'diced-up' picture out of its original line-by-line and line segment by line segment sequence, woe be the guy who has to figure out how to put it back together again without a **key.** It is the electronic equivalent of the world's biggest jig-saw puzzle when all of the puzzle parts are about the size of a pin head!

The DES Algorithm is a standard encryption 'key' and the key is essential if you are going to figure out which piece goes where in the re-constituted picture. The concept is that if you always took the lines apart in the exact same sequence frame after frame after frame, a clever person would eventually figure out the sequence you used to take them apart. And he (or she) would then proceed to put the pictures back together again. **But** . . . if you change the sequence, say several times per hour, or minute or even second, well, there are billions of possible numerical combinations out there and therein is the **real security** of the system. It never does the same thing twice for more than a minute or so and even if you do figure it out for one fraction of a second in time, by the time you have it figured out, the sequence has changed again. And again and again and again.

The DES Algorithm is the 'format key' in use and the key itself is sent along with the video information in an encrypted form.

If the Linkabit system leaves little opportunity for the casual or dedicated pirate to tinker his or her way into a picture, the audio becomes an even bigger challenge. Whereas the video remains analog in format the audio is, like the Orion system, digital. However, the Linkabit system offers up to three separate digital audio channels per satellite transmission. They are sent in the horizontal blanking interval portion of the encrypted video and they are 'bit by bit' encrypted once again using the DES Algorithms. There is no trace of audio as you tune through the channel simply because the audio is no longer analog. It is digital and you do not have a digital audio demodulator. And if you did? Remember the DES Algorithms. The audio is bit by bit encrypted and the key changes randomly every few seconds or so. Good luck.

Suppose you set out to find the keys and use them yourself? Back to the DES Algorithms. The keys (one for video, one for audio) are sent on something called the 'control channel,' as digital data, and they are **themselves** DES Algorithm **encoded!**

The Linkabit system makes the boast that it has a 1 to 2 dB 'advantage' over similar untreated (or non-scrambled) analog video. Where does this come from? Actually, it is due to the lack of any audio sub-carriers.

Remember that every satellite transponder has only so much maximum power available. That might be 5 watts per transponder or 8.5 watts per transponder. Remember, also, that the total power

available must be parceled out between the primary signal (the video) and the secondary or support signal(s); the audio. If there is but one audio sub-carrier channel present, that audio sub-carrier removes as much as 1 dB of available power from the video side of the signal. If there are say three separate audio sub-carriers present, the total power loss to the video side can be over 2 dB. And a 2 dB power loss for a 8.5 watt transponder brings the real power **left for the video** down to around 6 watts.

By eliminating any and all audio sub-carriers, the Linkabit system transforms the audio into digital signals carried along 'free' by the video. **No power is lost** to the audio portion, and the full transponder power available is now available to the video portion of the signal.

Remember that the Orion system offers the ability to address individual receive terminals; and that CanCom, for example, uses this ability to authorize individual cable headends to receive one or more of the 7 or 8 CanCom signals being transmitted. The Linkabit system has a similar capability. Individual addresses can be built into the various 'data streams' being transmitted by digital means. In fact, Linkabit claims that 'hundreds of millions' of individual receive sites can be addressed individually. We'll return to that subject before we are finished.

The present packaging and availability of the Linkabit system is all pointed towards the contract to supply HBO. As you read this the first of the descrambler units are being installed for the western time zone (TR13, F3R) clients of HBO. They **expect** to have the system fully operational before 1 January. HBO and Linkabit have also set June 1984 as a target period for the installation of the same packages at HBO client sites served by the eastern time zone transponder (24 or F3R).

HBO has no 'exclusive' lock on the Linkabit system. Linkabit is anxious to expand it to other premium suppliers such as Showtime, and has announced that a lower cost DBS version of the same technology will be available within the first six months of 1984. LSI or "V"LSI (for 'very') techniques are involved to bring the costs down dramatically.

HBO is intent on not repeating the reliability problems which plagued the early Oak/Orion CanCom installations. HBO has a trio of computers generating those DES Algorithms for **each** of the east and west coast feeds. If anything glitches on one computer, a hot standby is instantly ready to take over. The DES Algorithm keys will flow continuously, according to HBO. CATV and MDS clients of HBO will be equipped with a single HBO-supplied Linkabit descrambler unit and they will have the option of purchasing a standby unit for a cost in the $1500 region.

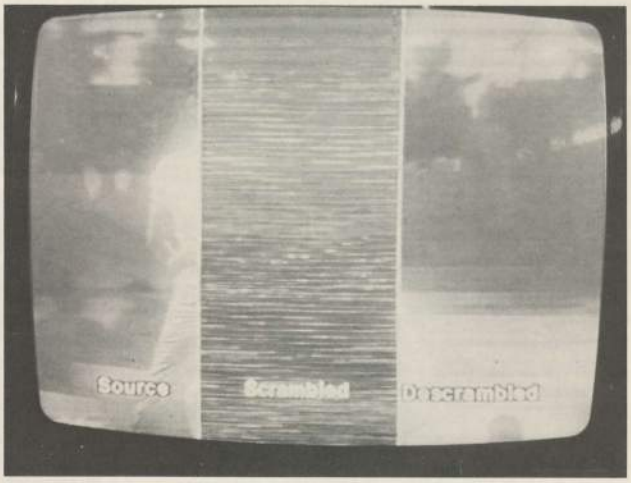
DIGITAL Video Systems (S/A)

This past January **Scientific Atlanta** purchased a relatively small Canadian high technology firm calling itself **Digital Video Systems.** DVS is well known in the broadcast field for its innovative work in the field of time base correctors and other high ticket gadgets which networks and broadcasters utilize to clean up 'dirty' video signals before airing. Inspite of its 'digital' nameplate, however, DVS is not yet into the full commercial production of totally digital video systems. Their approach, like Oak and Linkabit, still retains the analog 'base' for video transmissions.

What DVS is into is taking a whole-new 1983 look at how video signals are transmitted from point 'A' to point 'B.' They recognize that the NTSC system was created thirty years ago, and that given modern approaches to technology and modern component part hardware, that you can engineer around some of the problems inherent in NTSC. DVS is into the 'MAC' system of video (see **CSD** for **September,** page **3**).

From the DVS viewpoint, NTSC as a standard would never have been chosen if there had been satellite transmissions in 1953. They make their point by focusing on some of the shortcomings of the present standard and one of these should be familiar to the TVRO user.

Red. Flaming red, as a color on the screen. Just when you **think** you have all of the 'noise' and 'sparklies' out of a system, someone slips a bright red shirt on the screen and the red breaks up into a dithering field of black and white dashes and dots. The audio may



M/A-COM LINKABIT service (center of screen) **removes all signs of video information from non-authorized viewer's screen.**

even 'buzz.' DVS suggests you blame this on NTSC rather than your satellite terminal, per se.

The standard NTSC signal occupies 4.5 MHz of 'space.' For a terrestrial NTSC system, the video is transmitted as 'AM' or amplitude modulation. But when you transfer the same NTSC signal to an 'FM' (frequency modulated) system, you begin to run into problems. In an AM system, the 'noise' we find in the system is relatively 'flat' as a function of frequency; or bandwidth in this case. In an FM system, the noise tends to 'cascade' or build as the frequency increases. Now, the color portion of the signal is bunched up at 3.58 MHz or about 80% 'up' from the bottom of the channel. In an FM system, the noise in the channel increases with frequency. In fact, the noise of the system is actually proportional to the frequency. The higher the frequency in the baseband system, the greater the noise.

So the noise of the full system tends to slide off to the higher portion of the baseband channel and by the time we get to the 3.58 MHz region of the channel, we have plenty of noise present.

Now enter the human eye. It happens that your eye has the same type of frequency response through the visible light spectrum as FM; your eye also sees better at the 'low end' of the spectrum. When you demodulate the frequency modulated signal to baseband, you return the noise in the spectrum to the low end of the visible spectrum. Your eye has the greatest sensitivity to noise at the low end, and that's where the bright reds are found. Hence when there is a saturated red in the video, it ends up down where both the electronic 'noise' and the human eye's susceptibility to noise are peaked. The red 'breaks up' and it is largely the fault of the NTSC system we have going into and out of the satellite portion of the system.

DVS has an answer for this, starting all over again with 1980ish technology. Throw away the NTSC for as much of the system as possible. At least eliminate it from the satellite portion. And substitute for NTSC a system or standard which is 'satellite optimized'; one which is designed to compliment the 'FM' and wideband characteristics of the satellite video signal. There is more here than simply re-inventing the wheel.

Ideally, DVS would give us totally digital video and totally digital audio. Unfortunately, totally digital video is not yet cost effective; the necessary solid state 'memory' components are just not far enough developed to be available at reasonable cost (a totally digital video receiving terminal would cost upwards of $25,000 per installation today and it is not forecast to drop to the $200/500 region much before 1992). So lacking the component parts necessary to create cost effective totally digital video, the next step backwards gets us to the promise of the MAC system.

MAC? Multiplex Analog Component (system). Its origins appear to be largely British, coming out of a joint British engineering effort created to find a better and more 'transparent' satellite transmission

system. As discussed in **CSD** for September (see page **3**), the British felt that after experiencing three decades of attempting to shuffle television programming around Europe where a half dozen different 'standards' existed, it would be a good idea to find a common 'satellite standard' for the next generation of television. MAC, if finally adopted by the majority of the European broadcasters, offers that promise. It is a kind of 'neutral' standard which can fit in between the terrestrial video source and the terrestrial video receiving station, bridging the gap via satellite. And DVS believes that it has many applications in North America as well. They are hanging all of their cookies in the MAC cookie jar.

With MAC, you compress the video signal in time. It is therefore 'time compression.' Rather than allowing a full line to go all across the screen with redundant information across the full screen, they take the line of video information and compress it together. That gives them roughly a third of the screen 'width' to send other data; information which is separate from the basic video.

Each video line of information has two basic types of information present; there is **luminance information** and there is **chrominance information.** The luminance information is the detail, commonly recognized as the black and white data. A color picture is actually first a black and white picture that has been 'painted in' with color. Since the chroma or color is separate from the black and white, MAC separates the two for transmission purposes. NTSC marries the two together for transmission, and that is of course where NTSC starts to have problems.

MAC time-compresses the luminance or detail information to 40 microseconds and the chrominance or color to 80 microseconds. By separating the luminance and the chrominance, MAC alleviates that 'chatter' problem where both tend to talk back and forth when they are 'married together' on a satellite circuit.

The DVS/MAC system also offers some additional benefits to the system user.

1) **The sync is described as 'more rugged.'** Sync is short for synchronizing signals and they are the third element (after luminance and chrominance) in any standard TV transmission. Remember that the picture in the TV system is composed of millions of separate tiny signals. To make them appear on the picture tube in a coherent picture, you have to continually tell the tiny signals to 'stay in line' and be at a certain place at a certain time. The sync signals (two sets; one is the vertical sync signal and the other is the horizontal sync signal) play the role of traffic cop telling the tiny signals when to appear and disappear, and what order to stay in (one after the other). In a standard NTSC signal, the sync signals take up 20% of the total time in a picture 'line.' In the DVS/MAC approach, they take up only 0.2% of the total time. That's good since that leaves 19.8% additional 'time' or space to expand the detail in other areas. Additionally, because the sync signals are handled in an entirely different way with MAC, the circuits are able to create better sync than with NTSC. DVS speaks of their sync being 'more rugged,' meaning simply that even with a very weak signal, the picture stays rock steady on the screen.

Anyone who has tried to watch a jittering picture will appreciate that if there is a better way to hold the picture stable, it should be pursued. DVS tells us that even when there is a negative ratio between the carrier (desired signal) and the noise, the picture remains stable!

2) **The bandwidth of the signal is reduced.** This opens up an entirely new approach to 'threshold extension,' or the art of turning weak, noisy signals into clear, useful pictures.
3) **System costs can be reduced.** There is an inherent '3 dB advantage' with a MAC standard signal over an NTSC standard signal. **3 dB?** Well, that's like reducing the size or **total area** of a dish by 50%; and still having the same picture quality. For example, where it takes a 10 foot dish to be totally noise free with an NTSC signal, you could reduce the dish size to say 7 feet and still be noise free with a MAC signal.
4) **And scrambling.** It may be redundant to suggest that a person would have to 'scramble' a MAC signal, since by definition a MAC signal would appear scrambled on an NTSC receiver anyhow. But since the MAC advocates expect there to be a big production in MAC-standard-equipped baseband receivers anyhow, they figure that they will have to scramble MAC on top of the MAC standard to maintain the 'integrity' of the services using MAC.

MAC scrambling could be done any number of ways. DVS has approached it by using a time based scrambling system. Remember two things; that MAC plays around with time anyhow by using a time compression technique for creating the MAC 'standard.' Also remember that DVS came into this world building fancy 'time base correctors' for the broadcast market. They, therefore, understand well the art of playing around with the 'timing' or command (sync) instructions of a television signal.

DVS suggests that if you vary the 'blanking period' prior to the receiver clamping action, you can create some very substantial scrambling. As an example, they suggest that you can vary the blanking period to zero, or you could double it. You might do both of these things at different times, and then command the receiver with DES algorithms to follow the changing characteristics of the blanking period.

Not content with varying the timing and shoving the picture 'off to the side,' the DVS system then comes back and adds some 'confusion waveforms' to the video signal. This is a deliberate effort to deceive the would-be pirate. DVS adds extra timing signals to the edges of the picture, and these added waveforms are meant to reduce the odds of a pirate breaking the code more than momentarily using 'correlation techniques.'

What separates the DVS approach from the others is the initial decision **not to use NTSC at all;** but rather to use MAC. Since MAC requires changes in the system timing, it then makes sense to DVS to further mess around with the timing used to establish the MAC 'standard' as a means of scrambling the already non-standard MAC signal. They make the claim that the costs are held low because it requires no more additional circuits to scramble MAC than it does to make up a MAC signal to begin with.

If the video can**not** be digitized at this stage of the game, the audio certainly can be. DVS talks of having a 2 megabit data channel inside of the video waveform and this 2 meg channel contains the audio channel(s), error correction data, addressing data, the encryption key, the descrambling key and even has 'room' left over to individually send separate messages to as many as 4,000,000,000 separate receiving terminal locations!

The DVS encryption will, like Linkabit, use the DES algorithms and follow bit by bit encryption basics. The encryption codes and keys are changed 'every few minutes' thereby thwarting the pirate who stumbles onto the correct key at **some point** in time.

DVS began shipping their first decoder units this month. They will be into the 'thousands per month' region by January, they say, and plan to have a much smaller and far less expensive version available late in 1984; selling in the $100/$200 region. Their market interest is, of course, DBS.

TELEASE/MAAST System

Some credit former advertising marksman **Bob Block** with being the father of the fully addressable, scrambled, tiered concept. Block hopes the US Patent Office sees it that way since he has been attempting to patent the 'concept' of addressable/tiered/pay per view for some time now. His company formed back in 1972 and Block has been around the pay TV horn for quite some time; he was the first President and a founder of SelecTV, seen on Westar 5.

Less is known of the workings of the Block inspired **MAAST** system, than others, primarily because the corporate owner of the system, **Telease,** has recently entered into some type of licensing agreement with the Japanese **NEC** folks and that deal sealed off all normal avenues of information.

NEC has their eye on the 12 GHz DBS market, of course, and that means a quite low cost, secure, addressable, scrambling system. Block talks in terms of 'tiering' up to 200 different program packages per month with as many as 5 'in band' audio channels of information. He also says the MAAST system is capable of controlling as many as 240,000 different subscribers at a time with the speed to change

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the month 'key' for that many subscribers in 32 seconds time. That's fast.

If we don't know very much about **how** the MAAST system functions, we do know quite a bit about how it **will work** in the marketplace. Block's advertising background, and his natural talents in the PR field, make him more than talkative about 'what' the system will accomplish for the user.

Block believes that the average designer of scrambled, addressable, tirered systems has spent too much time in the laboratory and not enough time learning what the operators need and want. Block falls in line with the operators, naturally, because he has been one. Here is the scenario he sees.

The typical (DBS) viewer will subscribe for a basic service and perhaps pay $20 per month for that service. This could be a single channel of service or multiple channels of service. The programming will be scrambled by MAAST and without a MAAST descrambler there won't be anything to see or hear.

Using vertical interval techniques, the system will carry teletext messages which the user can 'super' over his picture by pushing a button. The teletext messages will be used to list program schedules and promote special block buster events; a special movie tonight, a special sporting event tomorrow night, and so on.

The viewer sees a movie coming up, but because he has subscribed for (and pre-paid perhaps, for) only the basic service, he will have to be willing to pay **extra** for the special movie. The scrambling code will change when the movie comes on and the subscriber has two choices; forget about the movie, or, cough-up say $5 for the movie.

Let's assume the subscriber wants the movie. He may get a five minute preview look at the movie and then his box scrambles the picture and sound and on the screen from the teletext portion of the box the subscriber receives instructions.

"Push Pay Per View Button Now."

Just to be safe, the subscriber has to push it **twice.** That extra push is to avoid people accidentally pushing the button in a moment of confusion.

Now the picture unscrambles and the sound comes in and the viewer watches the movie. Move ahead to the end of the month or the end of the billing period. During the month the subscriber has watched a month of basic service and has chosen some number of premium or pay per view events. The box on top of the TV set has remembered and coded each time the viewer watched a special event. It is, in fact, a microcomputer and a cash register, as well as a descrambler. On the 30th day of the month, without the user pushing any button, the box flashes a message on the screen.

"Time to pay."

The user pushes a button dedicated to totaling how much is owed and the teletext on the screen reveals the total bill.

"$46.00" is what it says and then it gives on screen instructions and tips for prompt payment.

The customer has some period of time (typically five days) to send off a check. On the check the customer prints a special coded number which appeared on the TV screen **along with** the total amount owed. The coded number identifies both the subscriber and it also tells the company operating the service how much money the viewer owes; in 'coded' form. That code is 'down loaded' from the uplink monthly and it changes monthly.

If the customer paid the correct amount (the dollars match the coded amount owed) then the next day after receipt of the payment the computer at the uplink sends new instructions **just to that descrambler/decoder** telling it that it is alright for the viewer to watch another month of television. If the numbers do not match, or if the viewer neglects to send in any money, the uplink shuts the descrambler/decoder off and that is all of the viewing that unit will permit until the bill is brought up current.

Block also envisions customers pre-paying, getting 'credit' which is loaded into their set top box and the box telling them each time they select a pay per view event how many dollars in credit they have remaining.

Thus in the MAAST package there are three important elements:

1) **The uplink signal carries a specific message** for each of the authorized descramblers, and that message directs the descrambler in its operation;
2) **The teletext channel** provides a continually updated program guide as well as a 'hype' channel to promote pay per view (and extra charge) events;
3) **The customer provides the 'feedback loop'** to the system operator with an electronic, automated billing system that requires each descrambler to keep tabs on the amount of viewing done by the subscriber and then to alert the viewer when either his credit has run out, or, when a monthly payment is due.

Block spouts statistics about the marketing advantage to his system. Others have tried 'pay per view' (PPV) techniques. Usually the viewer has to make a choice days or at least hours prior to the event. He may have to stop at his local cable office in advance of the program airing to arrange for delivery of the special event into his living room. Block claims that in a special test conducted in San Diego that when the viewers were given a **button to push,** for PPV, rather than having to drop by the cable office or stand in line on the telephone to order the event, **the rate of subscription went up 343%.** He feels those are significant numbers and they make his instant-PPV selection system a winner.

Losses? He admits that **some** of the people will attempt to steal **some** of the programming **some** of the time. He concedes that "around 1% of the viewers" may get away with watching programming which they somehow avoid paying for. But he also points out that if you use **his system** and increase your revenues by 343%, you really are not going to go broke if 1% of the total viewing 'universe' steals from you.

NEC? They have not said just exactly how they intend to implement the Telease licensed system but Block claims the Japanese firm is shooting for a $500 price tag for the **complete** 12 GHz terminal; **including** his MAAS addressable system. They are aiming at an April of 1984 market availability date and the system is, Block says, going to be of 'LSI' design from the very beginning.

WHO Uses What?

The only formal announcement to date has been that HBO is using the M/A-COM Linkabit system. None of the other premium service suppliers, none of the early entry DBS suppliers, have yet announced which system they will go with.

All utilize a digital audio and analog video approach. Only the Oak Orion system is known to employ a relatively 'soft' scrambling approach to the video. The others employ various techniques of severely destroying the video signal, and then varying the individual destruction 'codes' every few minutes or hours, on command from the uplink site.

Each of the systems apparently enjoys the ability to individually address far more individual receive locations than the pay TV 'universe' is ever apt to contain; at least in North America. At least one of the systems (Telease) marries the collection process with the viewing process, turning the descrambler into an automated 'cash register.'

Each of the systems plans an LSI or VLSI approach to the circuitry before the middle of 1984. That puts each into the same ball game of being capable of manufacturing huge quantities of devices for the mass-growth DBS marketplace.

One of the systems (DVS/S-A) takes an entirely new and perhaps novel approach to the transmission standard and it claims a 3 dB advantage over standard NTSC broadcasts. The M/A-COM Linkabit system makes a similar claim for their system, suggesting a 1 to 2 dB advantage, based upon the elimination of the traditional audio carriers. **This type of enhancement is important for the proposed HBO Galaxy I 4 GHz DBS package** since any technique that makes the six foot dish 'seem bigger' than it is will increase the ability of such a service to survive in the marketplace. And if a 6 foot dish using NTSC standards is truly practical using G1, then a 4.5 foot dish using MAC standards, for example, would be practical.

The growth of the scrambling industry to date has been slow and somewhat painful. Oak's Orion system, perhaps now outdated by the promise of more sophisticated systems at a fraction of the Orion cost, blazed a trail and bought the industry time to concentrate on making

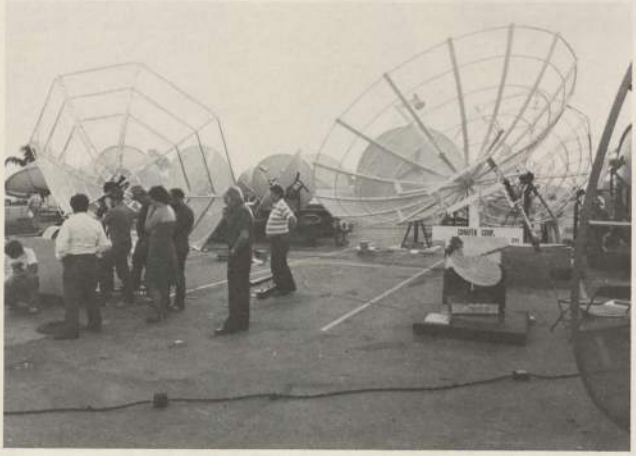
the best out of a bad situation. 1984, by all accounts, will see not only dramatic advances in the technology but considerably increased usage of scrambled transmission formats by a wide variety of satellite video users.

SPACE FALL '83: HIGHLIGHTS IN BRIEF

Playing to an overflow crowd of dealers, distributors and would-be entrepreneurs, the SPACE trade show and convention held at Disney World near Orlando November 3-5 proved to be an irresistible attraction to perhaps 1,500 'real' dealers, and another equal number of industry participants. All 200 plus booth spaces had been sold out weeks in advance, and the parking lot had an 'official' count of 99 operating antennas.

Because of the closeness of the show to the **CJR** deadlines, only a superficial look at the show can be accorded here. A more exhaustive review of the show, and what it brought to the industry, will be found in the December issue of **CSD.** The number-one crowd pleaser at the show was probably a toss-up between U.S. Senator **Barry Goldwater,** WTBS entrepreneur, **Ted Turner,** and, the Satellite Financial Planning Corporation $750,000,000 loan fund. If 'OSCAR' awards had been given for participating in the show, SFPC would have been awarded the 'Most Creative Product' award, Turner would have been recognized as the 'Most Creative Comic' and Senator Goldwater was the hands-down sentimental favorite for 'Best Actor' award.

Turner told the standing-room-only Friday evening banquet crowd that **he** was **'the first'** operator of a **'home TVRO,'** recalling that in 1976 he received FCC permission to mount a transportable 5 meter dish on a trailer and haul that trailer between his South Carolina home and his Newport (RI) racing center so he could follow the Atlanta Braves baseball games. Turner characterized the TVRO crowd as 'my kind of people' with the 'entrepreneurial spirit to conceive of a new industry and see it through to success.' He hoped everyone in the industry 'makes lots of money.'



ANTENNAS GALORE? An official count of 99 operational with a noticeable shift to screen mesh designs.

NEW SPACE PRESIDENT PETER DALTON announcing that the March show squabble had been resolved during SPACE banquet. Immediate applause followed by Dalton's quip "Gosh, and I have only been President for **one** day!".

Senator Goldwater brought down the banquet crowd by espousing his long held belief that **'any signals in my yard belong to me,'** alluding to the on-going arguments that **not all** satellite transmissions are in the public domain. He also told the audience that he started to build a home TVRO system back in 1980, but had not yet finished it because "my wife Peggy is still not convinced we need **another** antenna in our yard." Goldwater is a ham radio operator and already has a yard filled with antennas. The Goldwater speech was preceded by videotaped testimonials to the Senator from nearly a dozen leading Senators plus Vice President George Bush. The crowd watching the whole event could not help but notice the tears in Goldwater's eyes as the testimonials appeared on the screen, recognizing the leadership role the man has played in promoting new telecommunications technology in the U.S. Senate.

The Satellite Financial Planning Corporation presence at Orlando began early and lasted late. Private presentations, by the extensive SFPC staff, began the day prior to the formal opening of the show. Several OEMs, such as Paradigm and Intersat, invited their dealers/distributors to a series of private sessions during which the

SPACE/ continued page 14

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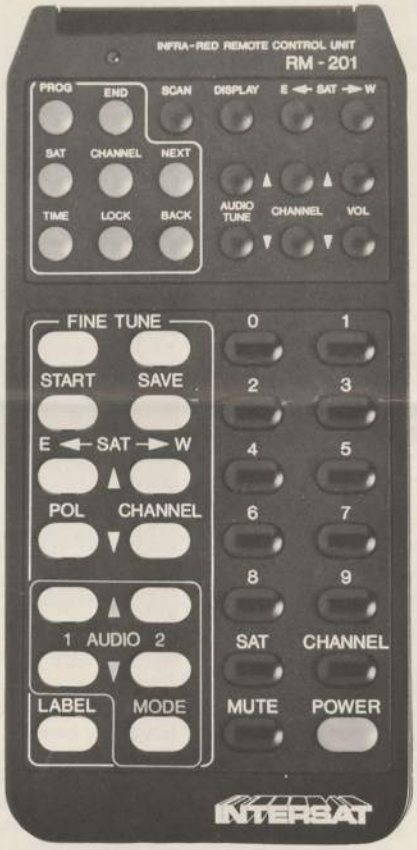

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COMMANDER
MISSISSAUGA, ON. L5M 2B5
416-826-8066

NATIONAL ELECTRIC
REGINA, SASK. S4R-1J1
306-569-2882

COLORADO
INTER-STELLAR SYSTEMS
LAFAYETTE, CO. 80026

FLORIDA
E.T.'s
OSPREY, FL. 33559
813-966-6916

GEORGIA
SATELLITE MARKETING
DOUGLASVILLE, GA. 30134
404-949-1300

ILLINOIS
RHODES SAT. CONNECTION
EFFINGHAM, IL. 62401
217-347-0469

INDIANA
KINGS ANTENNA SERVICE
ANGOLA, IN. 46703
219-665-7293

TOTAL SOUNDS INC.
EVANSVILLE, IN. 47711
812-477-6456

IOWA
SAT. HOME ENTERTAINMENT
MARION, IA. 52302
319-393-0965

KANSAS
SATELINK
KIOWA, KS. 67070
316-825-4239

UNIVERSAL SATELLITE
ANDOVER, KS. 67002
316-733-2487

KENTUCKY
RANDOLPH, HALE, & MEREDITH INC.
BOWLING GREEN, KY. 42101
502-781-1460

LOUISIANA
PETERSON ELECTRIC
JONESBORO, LA. 71251
318-259-8891

SAT. TECH
BOGALUSA, LA. 70427
504-735-9915

MISSOURI
ESA
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DOCKERY SATELLITE
WARSAW, MO. 65355
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MONTANA
BURTON SATELLITE
BIG FORK, MT. 59911
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NEBRASKA
SATELINK
NORTH PLATTE, NE. 69103
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NEVADA
CHALLENGER SAT SYSTEMS
LAS VEGAS, NV. 89122
702-452-2263

NEW JERSEY
PATMAR TECH.
BERNARDSVILLE, N.J. 07924
201-766-4408

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PORTER SATELLITE
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OKLAHOMA
STAR-COM
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BIRDWATCHER SAT. TV SYSTEMS
ALTOONA, PA. 16602
800-252-3871

WALTON SATELLITE TV
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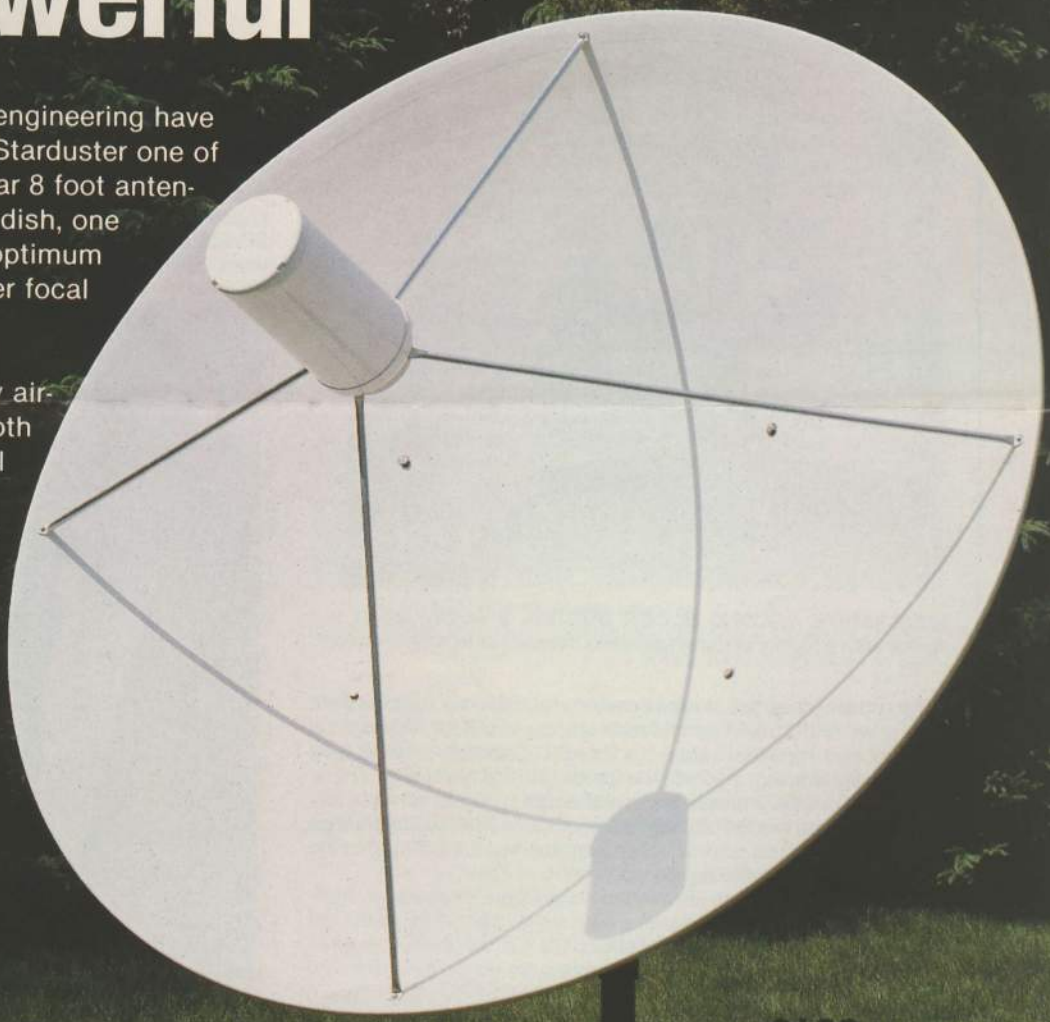

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SPACE/ continued from page 11

WINEGARD'S SECOND BLOCK BUSTER/ a screen mesh ten footer with a highly accurate surface, shippable in half-sections.

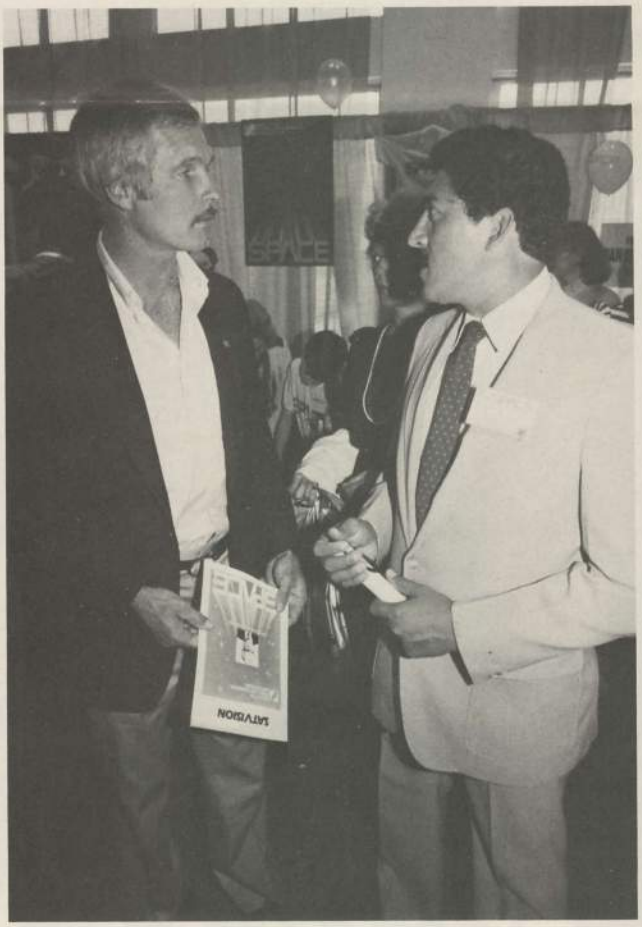
program was presented and the questions raised by the program were answered. SFPC's Bill Young and his entourage of legal and financial backers also appeared before the Board of Directors of SPACE on Wednesday evening, the 2nd. The formal SFPC presentation, Thursday afternoon (the 3rd) was the largest single crowd of the three day event with more than 700 in attendance. Private sessions (more than a dozen in all) continued until late on Saturday night (the 5th), after the Orlando show had officially closed.

Most of the questions concerning the program involved mechanical matters. A number of dealers were upset that SFPC could not supply 'reams' of customer applications at the show (thousands were mailed this past week, however). Others were concerned about the legality of the warranty program in their states. SFPC's legal people showed how the warranty program had been cleared in all 48 of the mainland states, plus Canada. Others were concerned about the $250 one time credit clearance fee paid for by the customer as a part of the package. It was pointed out that the customer could add-on additional purchases after the initial credit approval with no additional credit check fees. At least one OEM will be using the plan in conjunction with a series of nationwide retail outlets where satellite television system packages will be sold, starting this coming December.

At the SPACE Board of Directors meeting a new slate of officers was selected for the trade association. Paradigm's **David Johnson** is the new **Board Chairman** for SPACE; KLM's **Peter Dalton** is the new **President.** Drake's **Ron Wysong** is the new **Secretary** for SPACE while Hero Communication's **Bob Behar** is the new **Treasurer.** A committee including Dalton and Taylor Howard attempted 'one more

WHAT FALLS IN MY YARD IS MINE/ Senator Barry Goldwater with Cooper (behind, center) **and Coax Seal's Tom Harrington** (right); **three 'hams.'**

time' to work out with show entrepreneur Rick Schneringer an accord regarding the 'at-conflict' Las Vegas shows this coming March. Both SPACE and STTI had scheduled industry trade shows in the same month in the same city, approximately one week apart. After several



THEY LOVE YOU IN EL SALVADOR/ Operator Morgan Bojorquez **of San Salvador, El Salvador chats with WTBS's Turner on the exhibit hall floor about the impact of CNN service into Central America.**

TRIBUTE TO THE MAN/ New Space Board Chairman David Johnson (left), **Senator Goldwater and SPACE VP-Counsel Rick Brown** (right) **on stage.**

hours of serious negotating, Dalton and Howard came to a tentative agreement with Schneringer concerning the Las Vegas shows. An emergency meeting of the SPACE board authorized an agreement and when all of the negotiations were finished the conflict between the two show entities was a thing of the past. SPACE and STTI would not only cooperate at Las Vegas and do **one** joint show, but **all** of the remaining shows in 1984 would **also** be handled in a joint effort. An announcement to this effect by Dalton at the SPACE banquet in Orlando brought down the roof with applause.

The Orlando SPACE gathering was proclaimed a 'critical success' by all of those **CJR** talked with. The **exhibitors** were pleased with the traffic, the **attendees** were pleased with what they learned, and nobody had any complaints with the weather. Even the facility, bulging at the seams with the overflow crowd, stood up well. For a more detailed report, see **CSD** for December.

CJR DECEMBER will be mailed December 16th!

NEW PRODUCTS/ continued from page 2

dB gain and various noise figures from 120 down. Gardiner reports each LNA has a minimum 'burn in' of 48 hours prior to final test and shipping; options include cable or separate DC connector powering.

RECEIVER Accessories

Microwave Filter Company (6743 Kinne St., E. Syracuse, NY 13057/315-437-3953) is offering a new '48 Hour Interference Analysis' program to TVRO dealers. Information from field observations supplied by the installing dealer is integrated with a complex computer analysis program drawing upon the known microwave service paths in the region. From that, the dealer is given a set of probable cures to employ in fixing the TI problem.

The same firm has also announced a TVRO receiver bandpass filter with a 30 MHz bandwidth centered on 130 MHz for those receivers that employ the 'unusual' frequency range as an 'IF.' The unit is the model 3771-(30) 130.

SMATV

Microdyne Corporation (P.O. Box 7312, Ocala, Fl. 32672/904-687-4633) has begun manufacture of an **addressable customer service tap** for the SMATV industry. Developed primarily for SMATV operator Domestidyne Corporation of New Orleans, an SMATV operated operated with Microdyne ownership involvement, the system will allow a pay per view or pay per day viewing status for residents of hotels or motels served by the systems. The system will be computer addressable.

OTHER

KLM Electronics (16890 Church St., Morgan Hill, Ca. 95037/408-779-7363) has opened up a new 'marketing field' by engaging the services of **Dr. Robert H. Decker.** Doctor Decker pioneered school use of TVRO systems in Mount Sterling, Il. by installing one of the first educational TVRO systems in the country. He will be responsible for expanding the KLM 'educational TVRO market' throughout the United States.

The Pleasure Channel (614-349-7715 or 319-393-0965) has signed an agreement with Channel-Entertainment International for the marketing of the new adult rated satellite delivered service. Charges per (home) TVRO user will be $100 per year plus the cost of the descrambler system. No firm date for commencement of the service has been announced.

SatcoUSA (834 Cookson Av., New Philadelphia, Oh. 44663/800-362-8619) has opened a **new warehouse** facility in Lansing, Michigan. The new warehouse will be operated to serve Michigan and area TVRO dealers with products from Sat-Tec, LOCOM, Sat-Trol, ADEC, Draco, Chaparral and other products. SatcoUSA also manufactures its own line of antennas from 6.5 feet to 16 feet in size.

VIDEOSHOW, a professional show for the professional producers of educational and industrial video products and productions, will be staged May 22-24 (1984) at the L.A. Convention Center (North Hall) by the people who create **Videoplay Magazine.** Full information on attending or displaying at the show from 203-743-2120.

CALENDAR/ Through January 1st

NOV 19-20: 'Great Lakes/Ohio Valley Satellite Technical Show and Consumer Fair.' Day one — dealer seminars on marketing, product review sessions, manufacturer speakers. Day two, open to consumers. University Hilton, Columbus, Ohio. Contact 1-800-592-1956 (in Ohio 1-800-592-1957). **First time event,** no rating.

NOV 29: 'International Association of Satellite Users' meeting. No further details available (Washington, DC) contact Donna McCaughey 703/437-5457. **No rating,** unknown event.

DEC 13-15: Western (Cable Television) Show. Second largest gathering of cable television industry each year featuring cable, satellite and STV/DBS technologies. (Anaheim, Ca.) Contact 415/881-0211. **(***)**

NEW BIRDS/ Through January 1st

RCA F2R scheduled to begin regular service November from 72 west, 24 transponders, all 8.5 watts. **Note:** Dedicated to **non-video** services.

HUGHES Galaxy II testing at 74 west, 24 transponders, all 9 watts. **Note:** Dedicated to **non-video** services.

Explanation of Rating System:

* — Event not recommended.

** — Marginal event with one or more serious flaws.

*** — **Good event, recommended if topic matter is of interest to you.**

**** — Superior event, recommended if you have any interest in satellite communications.

NEW MONTHLY INDUSTRY TELEVISION PROGRAM

Satellite Financial Planning Corporation (SFPC) will be sponsoring a monthly 'TVRO Dealer' information, satellite delivered television program, starting either late in January or early in February.

The program will be 30 minutes in length, be scheduled over the weekend period to allow maximum opportunity for dealers to view the program, and is being formatted by former **Sat-Scene** producer **George Mitchell** under a contract with SFPC. The program will include advice to dealers on marketing TVRO packages, reports on the progress of the SFPC financing and warranty program, and selected interviews with industry people. Included on the first show will be a report prepared in Sri Lanka by members of the TVRO industry who will be visiting space visionary **Arthur C. Clarke** late this month.

The thrust of the program, according to sponsor SFPC, will be to provide an 'open forum' to the home TVRO industry allowing dealers to have access to the latest marketing techniques, technical tips and industry policy makers.

Great Expectations

We've used our considerable engineering and marketing experience to design and manufacture what we think will be the best performing TVRO system the world has seen. The new Paraclipse 16 will greatly reduce the expense and complexity associated with downlink for rebroadcast systems. The Paraclipse 16 offers outstanding performance at a very manageable size and price.

The Paraclipse 16 is lighter, stronger, more accurate and less affected by weather than any commercial equipment available. The Paraclipse 16 is shippable, easily assembled and can be installed almost anywhere. Our welded aluminum rib and ring truss system forms an incredibly strong framework that will remain distortion-free under the worst conditions. It is this perfect parabolic symmetry that allows us to reduce the overall diameter of the antenna with no loss of performance.

The new Paraclipse 16 is everything you have come to expect from Paradigm Manufacturing: excellent performance at an unbeatable price.

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