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COMMUNITY ANTENNA TELEVISION JOURNAL

NUMBER ONE

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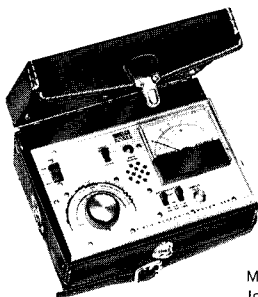
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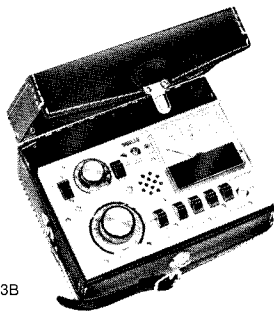
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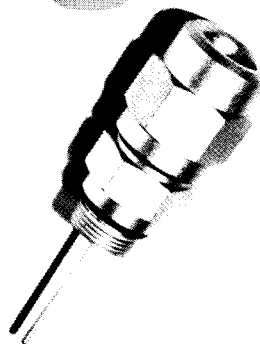
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—OUR COVER—

CATV field engineer John Falconer puts the Jerrold/Texscan VSM-1 through the paces, something that CATJ will also do in the January issue as we wrap-up signal level reading devices, Part 4.

CATA -TORIAL

KYLE D. MOORE, President of CATA, INC.



RE-REGULATION

There has been a bunch of talk recently about something called "re-regulation". It boils down to this...

When the FCC adopted new rules in 1972, they gave the CATV industry until 1977 to **adapt to the adopted rules**. Part of the adapting process includes all pre-1972 systems having technical compliance with the 1972 rules.

The problem is that the 1972 rules are **not really rules**, as far as technical compliance is concerned. They are "suggestions", or if you will, "interim rules". At about the same time the FCC adopted these rules, they agreed to the formation of C-TAC, or the Cable Technical Advisory Committees (see Pages 41-46, CATJ for October). C-TAC is charged with the responsibility of developing industry sponsored guidelines for things such as technical compliance and technical standards.

So the sequence of events went something like this:

- (1) FCC announced new hard rules, including technical standards, **February 1972**;
- (2) All systems were told that they had until March 1977 to bring the systems into compliance;
- (3) There was a furor with testing procedures and test equipment manufacturers had a busy month or two;
- (4) Then the formation of C-TAC was announced, and the Commission said that pending the outcome of the C-TAC program, some of the technical compliance requirements **would be frozen**;
- (5) And test equipment sales went to pot in a hurry;
- (6) Then the FCC announced **further freezing of standards** in areas such as co-channel measurement, inner-mod, and so on;
- (7) C-TAC meanwhile plunged ahead, and now they expect to have their formal proceedings wrapped up **by the end of January**;
- (8) In the interim, nearly three years of the five year "compliance period" will have run out, and now we, as an indus-

try, are saying "help" (or **HELP!**) to anybody and everybody who will listen.

An NCTA panel has "studied" the problem, and they are about to unload on the FCC **their "findings"** that the industry will spend upwards of \$450,000,000 to comply by 1977. They make the point that this is roughly 50% of the entire amount the whole industry has spent in **building all systems to date**, since the beginning of CATV. They also make the point that in today's tight money market, raising \$450,000,000 to comply with new FCC mandated technical standards is not feasible.

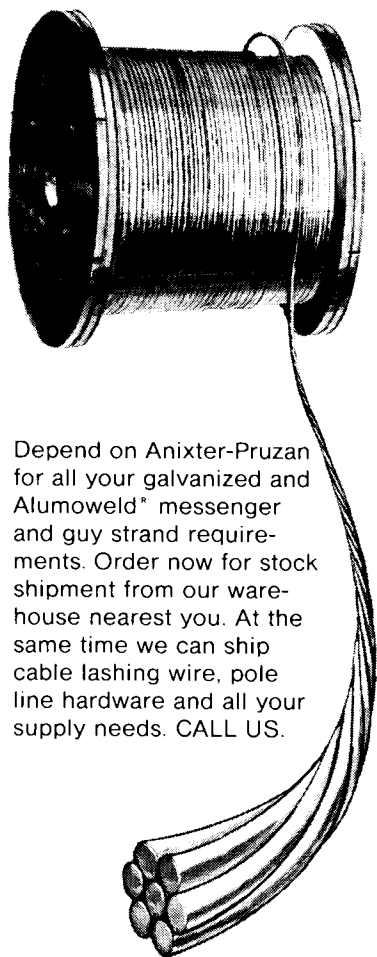
So a movement is afoot to **suspend or set back** the March 1977 deadline. The FCC shows some sympathy for the problem, and Commissioners Robinson and Quello have been appearing at cable gatherings spreading the "good word" that they are leaning towards "at least a postponement" of the 1977 date.

Meanwhile the FCC Cable Bureau's Re-Regulation Task Force, **headed by Jim Hudgens**, is adrift in a sea of uncertainty. Hudgens is pleading with the industry to give him facts and figures, "Tell me why you can't comply by 1977?" Apparently the input to Hudgens is slow.

The industry has an **opportunity** to speed up that input in December at the Western Cable Show in Anaheim, California (December 4-7). During this trade show a large contingent of FCC personnel, including Hudgens, will be on hand to man a "Re-Regulation Task Force Suite". They are inviting operators to come and discuss their problems with making 1977 compliance. They are also asking operators to **bring facts and figures** on just how many dollars they will have to spend to make compliance... **hard facts** that the task force can then put to work getting us out of the 1977 deadline.

You may not have considered going to Anaheim in December. **Consider it now**. If you go, and **if you make strong points with Hudgens** about what the dollar effects of 1977 compliance will be in your system, the few hundred dollars it might cost you to make the trip will seem **small**, when compared to the cost of your having to comply with 1977 rules. A few hundred spent now could avoid tens of thousands spent next year or in 1976.

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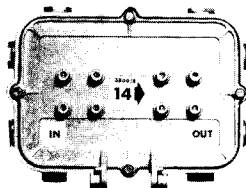
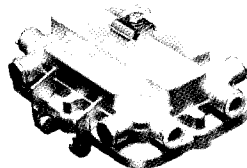
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CABLE CAPTIONS

Let's talk about satellites. The August CATJ carried a feature on the ATS-6 educational (instructional) satellite program now underway. The September issue up-dated that report with the notation that some technical problems were holding up our description on how to equip for ATS-6 reception. In October, CATJ said nothing about the subject, simply because nothing new had transpired. Now it appears that between program-problems (**they** are still having them), time running out (the program **expires** in mid-May), and the general ho-hum attitude of readers ("...don't tell us about ATS-6" several wrote), we have decided the best thing to do is to "**can the project**". We are not alone. Remember the TelePrompTer package put together by Scientific-Atlanta and demonstrated at the Anaheim, California 1973 NCTA meet? Well, TelePrompTer has sold the package (reportedly for \$110,000) to the Canadian government. The TPT earth terminal, mainly demonstrated with ANIK-1 (Canadian) signals, has now been installed at Radisson, Quebec, to provide workers at the 11.9 million dollar James Bay project there with television. Last year workers at that project rioted "**due to boredom**" and caused more than 4 million dollars in damage. Television... **the great pacifier!**

Horrors of 1977? The September issue feature on the rough road ahead for full compliance by March 1977 has drawn as much mail as anything we have published to date, and a flurry of telephone calls from the Cable Bureau. Other than taking us to task for using the phrase "federal mentality" (Pages 24 and 25, September), Cable Bureau personnel admitted that something must be done to protect the vested investment of existing system operators; and the suggestion has been made that, **perhaps for initial 1977 first-full-term certification**, all existing operators with a **demonstrated track record** be given special treatment in the re-franchising process.

Technical horrors of 1977 are not hard if you adopt a procedure quite general in Canada, according to one reader. "Canadian operators are re-building their plants from the back to the front," he writes, "putting in all new line extensions and trunk extensions with full bandwidth, high capacity equipment. As the older equipment becomes hard pressed to cascade any further, selected sections of main trunk are replaced to allow the system to continue to expand." This of course results in a slow, planned change-over to new equipment and specifications, and in many cases, it can be done almost entirely from internally generated cash flow if the system operator plans carefully. At today's cost of money, the Canadian wisdom deserves careful consideration.

System operators are reminded that the FCC is not **totally** unaware of the transition problems to 1977 "full compliance" in areas of technical, access, and franchise standards. The Commission announced on May 17th that a "Task Force" within the Commission has been created to study ways to make the changeover easier on the lives of system operators. The Task Force wants to hear from all operators (write-**1977 Task Force, Cable Television Bureau, Federal Communications Commission, Washington, D.C. 20554**) on any and all problems you see coming up for 1977. In this case, a simple letter or a telephone call (**Jim Hudgens, 202/632-9797**) is all that is required. Perhaps if your CATV association asked to **have a representative** of the 1977 Task Force **speak before your next gathering**, you could not only learn what the Commission has in mind, but you could give the Commission representative an ear full to take back home with him!

August two-way survey card... nearly 9.3% of August readers returned the Two Way Talk Back Card appearing in the August issue, as a form of readership survey. The results are interesting: "What is the biggest single problem in the (CATV) industry today?" we asked. More than 20% thought and thought and then said "**Too much regulation**". Then we asked, "After **that** problem, what is the next biggest problem in the industry today?" And more than 13% thought and thought and said "**Too much regulation**". On the subject of copyright, we asked how many were "happy with the copyright settlement" and 4% said they were. Another 6% said "I could care less about copyright"; while 51% said "I am unhappy with the copyright settlement". The balance declined to answer.

We asked two questions about the FCC. "How do you rate the Cable Bureau" was the first question. "Doing a good job" was the answer chosen by 6%. "Trying hard but **failing**" was the response of 49%. We then asked, "Do you believe the seven FCC Commissioners understand CATV well enough to regulate our industry?" "Yes" was the answer of only 4%. "They do **not** understand us" was the response of 57%. The full summarized report was recently made available to industry leaders. A few (limited) copies are available for general distribution.

Instant analysis of your subscribers? The science of psychiatry has moved into the living room according to a trade press report in the October 7th issue of **Television Digest**. The exaggeration of television screen colors **as adjusted by a viewer** tells us the following about that viewer, according to TVD: "**Oversexed**, aggressive, confident viewers tend to **favor the reds**. Trusting, **optimistic** people tend to adjust for unnatural amounts of **yellow**. Content, **lazy**, easygoing people tend to accentuate the **blues**. Shy, **weak** people and people under stress tend to hit **dark blues** the heaviest (and they are dangerous when crossed, the report notes)." People who like **purple** are "**having sex problems**, possibly homosexual", although purple is also a favorite of "handicapped people and pregnant women". Technicians going into a home to "**check the cable**" and finding the lady of the house all wrapped up in a mid-day soap with **lots of reds showing** had better be prepared for the worst (three hour red-adjustment service calls are **definitely** suspect!).

PART TWO: HOW THE FSM/SLM INSTRUMENT FUNCTIONS IN CATV

READING THE SCALE

One of the most difficult things for any new user of any FSM instrument to master is the *proper interpretation of the meter scale*. Most FSM manufacturers recognize this fact and try to make the learning process less complicated with multi-colored scales. In the first part of this four-part series on signal level instruments, we made the point that the scale (or range) actually is a static thing; that is, it remains the same basic scale with voltage levels broken into either 10 or 20 db "windows" and the range chosen by placing one or more fixed precision attenuators in front of the basic instrument.

Let's review for just a paragraph. Most instruments read a basic calibrated range of -40 dbmv (10 microvolts) to -20 dbmv (100 microvolts), with all external front-end attenuation removed from the signal path to the instrument. As the tear-out reference chart to the right shows, this region (-40 to -20 dbmv) is really at the bottom of the signal level regions we deal with. This means this is a range or region which we seldom *really* use, except at the head end, and then only when the head end signals are frightfully weak. The expansion of the basic range of any instrument is accomplished by switching fixed pads into the signal path; between the instrument input and the basic range electronics. Switching 10 db of pad into the

instrument results in the basic range moving upwards from -40/-20 dbmv to -30/-10 dbmv; switching 20 db of pad into the instrument results in the basic range moving upward from -40/-20 dbmv to -20/0 dbmv; etc.

The easiest and quickest way to adjust to any new instrument is to ask yourself one question: *What is the basic range of the instrument*, with switched pads in place (i.e. switched in)?

Once you determine that answer, your actual range for any given measurement is that basic range, *plus* the cumulative total of the switched-in pads.

Where we usually get into trouble is with the negative and then positive values of db's. Many-many years ago industry pioneers established that 1,000 microvolts was a desirable set-delivered signal, and borrowing from the audio industry, the dbmv log scale was developed. In the audio (and radio communications) industry the end result is usually converted into sound (audio). The decibel scale originated with Bell Labs as an engineering handle on the *relative measurement of sound loudness, as detected by the human ear*. It is a peculiarity of the human ear that an increase (or decrease) in audio loudness is directly related to the amount of audio *power* involved. In audio, a 1 db change in *audio power* is just about the smallest (or lowest) net-change which the hu-

man ear can detect (as change). By the same token, for the average human ear to respond with "that is twice as loud as before", the change in *audio power* required is an increase by a factor of four. In real numbers, a 1 watt audio amplifier delivering a steady tone output would have to increase to 4 watts of *audio power* before the listener would say "now it is twice as loud". In a nutshell, the human ear has a logarithmic response.

Tests conducted by the TASO group (1), along with Bell Lab tests previously conducted, indicated that the human eye has characteristics (when viewing a television screen) very *similar* to the characteristics of the human ear.

In CATV, our db scale is an *expression of voltage levels*. That is, 0 dbmv is 1,000 microvolts, while +20 dbmv is 10,000 microvolts. The decibel scale is also used in power level ratios. Chart One indicates the differences between voltage (or current) ratios on a db scale, and power ratios on a db scale. In the audio world, the db scale is used primarily as a power scale.

In CATV, the db scale we live with is referenced to a 75 ohm line and a 75 ohm termination. In referencing db's of this to db's of that, we must always compare apples and apples, which means we must always be talking about *the same characteristic line impedance*. For example, all audio db's are referenced to a 600 ohm balanced line, and some TV decibels are referenced to a 300 ohm balanced line (2); but fortunately, in CATV we almost always think about 75 ohm unbalanced line.

So for CATV purposes, we have established 0 dbmv as a 1,000 microvolt (or 1 millivolt) reference level, in a 75 ohm unbalanced transmission cable, terminated on both ends by a 75 ohm (essentially) resistive load or source/load.

Most human eyes, like most human ears, can just barely detect a 1 db

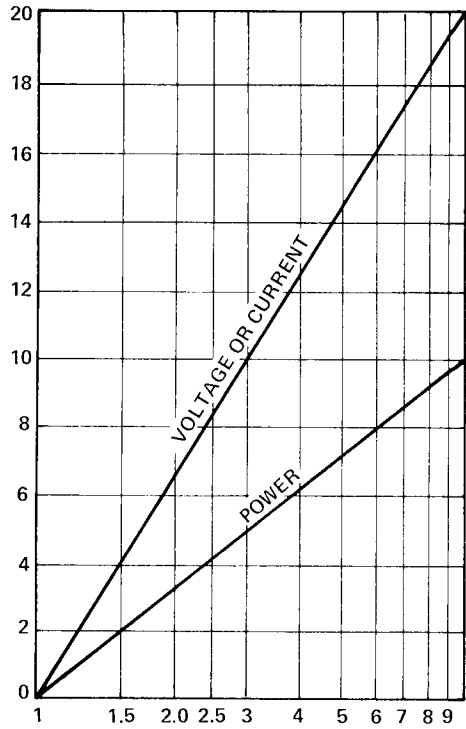


CHART ONE

power change (not voltage change), and a 1 db power change is *approximately* equal to a 2 db voltage change. Most human eyes will see a "twice as loud" improvement in a TV picture when there is a 400% *power increase*, which is the same as 6 db of power increase, or 12 of voltage increase.

In real life, subjective picture quality ratings run something like this when you take a sufficiently large sampling of test-viewers to develop norms or averages:

Microvolt Level	General Viewer Reaction	dbmv Level
100 μ V	Reference signal	-20 dbmv
130 μ V	"I think it is better"	-18 dbmv
200 μ V	"I know it is better"	-14 dbmv
400 μ V	"Twice as good as original"	- 8 dbmv

(1) See CATJ for June 1974, Page 7.

300 OHM vs. 75 OHMS

The entire CATV world is referenced to 75 ohm (impedance) voltage levels. Yet there are 300 ohm receivers and some 300 ohm antennas that must be "mated" with the 75 ohm system.

All FSM instruments we will discuss are 75 ohm instruments; their scales and attenuators are 75 ohms. If you run into a 300 ohm antenna (for example) and need to know the voltage level (at 300 ohms) of the antenna, install a good quality 300 to 75 ohm matching transformer at the antenna and take your readings. Multiply the readings at 75 ohms, through the 300 to 75 ohm transformer, by 2.2 (i.e. 200 microvolts $\times 2.2 = 440$ microvolts) **to determine the 300 ohm impedance signal level present.**

If you suspect a television receiver is sending its local oscillator signal back into the cable system via the drop, and you need to determine the **level of the local oscillator**, connect a 300 to 75 ohm matching transformer to the TV set antenna terminals and a short length of RG-59/U cable to the input of the FSM from the matching transformer. Tune the FSM and note the 75 ohm local oscillator level present. Multiply by 2.2 to determine the 300 ohm local oscillator level present.

Unfortunately, electronic equipment is much more exact as to its operating parameters than the human eye. A 2 db *voltage* change will cause most people to *think* they saw an improvement (or degradation if the signal went down). But when you are operating an amplifier within 2 db of its *maximum* rated output specs, and you increase its input level by 2 db, the 2 db rise in *output power* will suddenly show up as cross-mod. Now, every eye in town will *know* the picture is *worse*!

(2) See 300 ohm vs. 75 ohms of this article.

Because our industry adopted *part* of the audio 0 dbm scale (1 milliwatt across 600 ohms) and found it fit fairly well to the kind-of-level that a TV receiver "liked to see" for a quality picture, we ended up with negative and positive db's.

In most measurement schemes, zero is zero; but not in all. The temperature scale is a good example of a scale that has both positive and negative numbers. Most of us cope with the negative values of temperature quite well. Zero degrees Centigrade is simply the freezing point of water; minus values are *colder* than the freezing point of water.

Minus 1 dbmv is simply a signal that is 1 db weaker than 1,000 microvolts (0 dbmv); +20 dbmv is simply a signal that is 20 db stronger than 1,000 microvolts (0 dbmv). It really is not all that complicated.

Most of us run into scale-reading errors when we have a combination of differing switchable pad values to "play with". If the basic scale is simply -40/-20 dbmv, and *all switched pads* are 20 db attenuation steps, it is fairly easy to stay on top of the scale range we are actually dealing with. But when some of the attenuators are 6 db, some are 10 db, and some are 20 db, we are forced to add and subtract in more than simple 20 db steps.

IF THERE IS A MENTAL PROCESS

If there is a mental process you should go through, it is simply this:

- (1) Determine, as previously noted, *the scale range with no attenuation switched into the front end pad system*;
- (2) *Note how many total db of front end pad you have switched into the instrument to obtain an on-scale reading*;
- (3) Add the range db's from Step 1 and the db's from Step 2. This will tell you the scale range for

the pad position you are reading.

That means that if the full scale no-pad range is -40/-20, and you have switched in 40 db of pad, the real scale you are reading is now on a range of +0/+20 dbmv (-40 plus 40 = 0). The *low end* of this range *becomes 0 dbmv*, and the *top end* of this range *becomes +20 dbmv*.

SIGNAL LEVEL REFERENCE

CHART

On Page 9 there appears a special 3 db step signal level reference chart prepared by CATJ. This chart lists dbmv levels in 3 db steps, from a -40 dbmv level to a +59 dbmv level. The far left hand column and the far right hand column note signal levels in dbmv values. The second column from the left lists the dbmv to microvolt conversion; for example, +11 dbmv is the same as 3,600 microvolts on a 75 ohm line.

The third column from the left is titled "Antenna Level Signal", and it contains statements about the signal level quality which you should *expect* with dbmv (or microvolt) levels throughout the -40/+59 dbmv range.

The fourth column from the left notes the typical head end output voltage levels most CATV systems employ. The fifth column from the left notes typical CATV trunk line and distribution (extender) line level signals between amplifiers. The sixth column from the left brackets the normal signal ranges for CATV drops. Note that *FCC* requirements call for *all signals to be between 0 dbmv and +12 dbmv*; although as we note, levels for black and white receivers can be most-subscriber-acceptable for something lower than the 0 dbmv *FCC* specified minimums.

As you can see, if you do most of your work in and around CATV head

CHANGE YOUR F CONNECTOR

How many times each day do you insert (shove, push, etc.) an F fitting into the F-81 (or similar) chassis mounted connector on your FSM?

The spring-tensioned metal in the center of the connector **gives a little** each time you insert a piece of 59 into the fitting. Many operators have used the same meter for years and have never thought about the fitting.

They wear out . . . much sooner than you suspect.

You go in at an angle, forcing the metal contacts apart even further than a straight-ahead shot would do. A little bit of moisture, dirt or grime on the end of the 59 center conductor inserted into the fitting, **and corrosion sets in.**

A corroded, loose-tension fitting on your FSM can cost you 1,3,6 or even 10 db of meter sensitivity (and therefore accuracy).

So you set out to change it . . . the fitting.

Some fittings are a direct part of the input attenuator, and getting to them involves (1) taking the case off of the meter, (2) removing the input attenuator from the innards, (3) taking the input attenuator apart, (4) replacing the fitting, (5) putting the input attenuator back together, (6) re-installing the input attenuator to the innards, and, (7) putting the case back on.

It sounds like a bunch of work, and it may take two or three hours with some FSM instruments. However, **it is something you should do**, possibly as often as once a year for an average meter, more often for a meter that is used heavily. And it is a bunch easier than having to go back and re-set a whole bunch of amplifier levels in the middle of the evening because the levels were actually 3, 6 or 10 db higher than your **otherwise** accurately calibrated FSM indicated!

ends, the ranges you can reasonably be expected to measure run the full spectrum from very weak (-31 dbmv) to the very strong (+52 dbmv processor out-

put levels are common). The head end instrument *use-range* is the most diverse of all CATV uses of the FSM.

And while the range for measurements is high, the only area where really accurate measurements (i.e. within say ± 0.5 db true voltage level accuracy) is required in the head end is at the trunk output to the system. This happens to be typically in the +32 to +52 dbmv region, a measurement area where 70 to 90 db of switched-in pad is employed. *If there are errors* in the switchable pads, they tend to *accumulate* for maximum real error in this region, simply because of the high total db of pad switched in to read in this region.

On the opposite end of the system, the measurement region required for house drops is tightly congested between 0 dbmv and +12 dbmv. The degree of absolute accuracy required in checking house drop levels is minimal; it is almost a "go/no-go" situation. A meter for installers only is basically a different "animal" than those currently being discussed in this series (3).

Perhaps the greatest requirement for exact, *true voltage level readings* is in the CATV plant. Most amplifier input/output signal levels fall within the +11 dbmv/+42 dbmv *range*, although a few go slightly higher than this. The call for *high accuracy* is usually on amplifier *outputs* rather than inputs, since most amplifier installations tend to be more tolerant of slightly incorrect input levels than of incorrect output levels. This means the highest calls for accuracy in the system is at the *CATV head end output*, and at the *amplifier output* areas. Both fall well *up the scale* of relative signal voltage levels, and cumulative errors in switched-in pads tend to be greatest here.

REVIEWING METERS

In the course of this four-part series, we will be investigating the operation-

al characteristics of five separate FSM instruments. They are:

- (1) *Blonder-Tongue Model FSM-2*
- (2) *Delta-Benco Model FST-4*
- (3) *Jerrold Model 727*
- (4) *Mid-States Model SLIM*
- (5) *Sadelco Model FS3SB*

Additionally, in the January issue we will review the *Jerrold/Texscan Model VSM-1*, an instrument that lives in the "twilight zone" between field strength meters and spectrum analyzers. It is also our intention, in the January issue, to discuss field calibration of FSM instruments. We will review the *Delta-Benco Model FSM-C4* calibrator and the *Measurements Model 950* calibrator, and because calibration of *absolute voltage levels* is an important function, this calibration methodology will be explored in some detail.

One of the greatest dangers when reviewing a product is the terrible *temptation* to be a design engineer, or to try to second guess why the people who designed the product approached it exactly the way they did. If you have some designing and manufacturing background, your first thought often is "that is not the way I would do that". And if you allow yourself to think along these lines throughout the analysis of a specific product, you may end up *liking none of what you see*. The design-type person always thinks his concepts are better than others, at least until he is shown differently, and the fellow who designed the instrument is seldom there to defend his philosophies, so naturally the reviewer always wins the argument!

We are reminded of a letter from a CATJ reader who said, "*Why don't you guys review some equipment, and tell us in plain language what is good and what is bad... don't pull any punches!*" That seems like a pretty reasonable suggestion, except many

(3) *Installer meters will be the subject of a later series in CATJ.*

POLICY ON EQUIPMENT REVIEWS

Reviewing equipment is filled with dangers. First we run the risk of making CATJ advertisers unhappy. For a publication that depends upon advertising to a large measure, for operating expenses, that alone is a significant danger.

Second, there is the danger of sounding pompous and know-it-all. That turns readers off, and aggravates design people who might one day be asked to **cooperate** with future equipment reviews by providing equipment for test and design data.

Third, there is the danger that if we don't point out real failings, readers who already own the particular piece of equipment and know about those failings will say "aha...they didn't even mention the backwards mounting whammy!".

The safest thing to do is to not review equipment, and say nothing at all about anything. This safest of all roads is also the dullest, and if, in fact, we know something that CATV operators would profit by also knowing, then this is also the most dishonest approach (in the vernacular of the times, "sandbagging") we could possibly take.

Our equipment review policy is straight forward, and it is bound to make some people unhappy sometimes.

- (1) Tell it like it is;
- (2) Be very careful to accentuate the positive features, because one really positive feature may well make the minor negative features not so very important afterall;
- (3) Recognize that nobody has ever (yet) built a perfect anything (and that includes a perfect equipment review!);
- (4) Finally, **provide ample and adequate opportunity** for the designer or manufacturer of any unit reviewed to respond to the review, at the earliest possible date (through the TECHNICAL TOPICS column here in CATJ).

Our **"equal opportunity to reply"** extends to **readers** as well. Your own comments and observations are welcomed. Please understand however that if you have information to contribute and it is new information covering some aspect of a product which we overlooked, that before we print any **new** "negative comments" we will ourselves check out the observation, and go over it with the manufacturer before rushing into print with your letter.

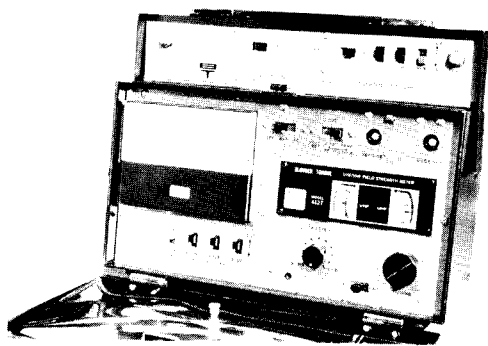
When all is said and done, our primary objective is to be objective, **and accurate**, in anything we report here. That is the only way we can gain and keep reader confidence and supplier support.

would have us compare the Sadelco FS3SB directly with the Mid-States SLIM. Yes, both are field strength meters, but there any possible direct comparison ends. Another CATJ reader wrote, *"I see you are going to review field strength meters....I hope you will tell us which one is the best unit."* Best? Best for whom? Best for what use?

None of the five units we will be reviewing are even similar. Yet, they represent the bulk of the instruments available today in the industry with "full-range capabilities". A CATV sys-

tem looking for *certain* specific functions will find the Mid-States SLIM "best" for them. Another system looking for other specific functions will choose the Jerrold 727. Systems looking for general all-around meter usage will choose the Blonder-Tongue FSM-2 or Delta-Benco FST-4. Systems concerned about size will choose the Sadelco FS3SB, or a similar Sadelco unit.

As we review each instrument in this series, we hope you will keep in mind the fact that *there are advantages and disadvantages to every in-*



BLONDER-TONGUE FSM-2 with auxiliary sub-band converter covers through 83

strument. There is no perfect, "do-everything" CATV FSM instrument on the market, simply because it would be so big, so heavy, and so complicated that it would not be useable on a pole or up on the tower (and would therefore no longer be "perfect"). Every instrument on the market today makes one or more *compromises*. If the compromise is in an area where you have little use for a function, or where accuracy is not important, the compromise means little to you.

In each individual review we will point out the positive things the meter does, as well as point out where the meter design compromises make it less desirable than another unit on the market. When you consider new meters for your own system, you should begin by making a list of the *exact uses* to which you will put the instrument and the percentage of total operating time you expect each function to take. Then you will be able to select the meter best suited to your own requirements.

REVIEW — BLONDER-TONGUE FSM-2

The *Blonder-Tongue FSM-2* meter was perhaps one of the most difficult instruments for CATJ to review in a standard format because of the multiple-functions found in the instrument. The meter offers features such as *peak*

or *average detection*, VHF and UHF, and a pot controlled 0-20 db *i.f. attenuator* in a combination not found in any other instrument.

The general FSM-2 specifications are shown here. Like virtually all instruments in this series, the basic electronics range is -40 to -20 dbmv; 100 microvolts is a full scale reading with no pad attenuation switched-in. The full attenuation-in range is +70 dbmv full scale, or 3.2 volts.

The front panel (see photo) has four slide switches selecting attenuation in the input attenuator of 10/20/20/20 db (left to right) for a total of 70 db. Additionally, the *i.f. attenuator* is a variable control that adds an additional 20 db of attenuation (90 total). The 0-20 db *i.f. range* pot is a 100K control located in the emitter circuit of the first *i.f. amplifier*. *It is extremely important that when the operator advances the first full 20 db of attenuation into the instrument (i.e. to read -20/0 dbmv) that this i.f. attenuator control be the first attenuation inserted.* With it in the "in" position, the basic range of the unit becomes not the standard -40 to -20 dbmv, but a new -20 to 0 dbmv. Unless this control is switched into the full attenuate position (the control "clicks" and locks) the *i.f. amplifier* stages in the FSM desensitize and the *i.f. selectivity* decreases rapidly. If you are having trouble separating adjacent aural and visual carriers with an FSM-2, check first to see if the 0-20 db *i.f. attenuator* is in the "in" or "on" position (*clicked and locked*).

The FSM-2 has the following options:

- (1) *Converter - Model 4132*, covering 5-54 MHz (see photo). This unit attaches to the top of the FSM-2 and extends the range of the FSM-2 to 5 MHz on the low end, making it continuous from 5-220 MHz, and 470-890 MHz.
- (2) *Converter - Model 4728*, covering 220-280 MHz. Like Model

4132, this unit attaches to the top of the FSM-2.

- (3) *Handle Kit - Model 4134*, provides a method of rapidly attaching the FSM-2 to a suspended aerial strand (i.e. messenger).
- (4) *Cover Kit - Model 4135*, provides a cover to fit over the front of the instrument for use in rainy weather.

- (5) *Factory Calibration* — The specified accuracy of the FSM-2 is ± 1.5 db over the frequency range 54-216 and 470-890 MHz. For many years the FSM-2 came from the factory with factory calibration notations provided in the instruction manual (i.e. correction factors). Currently *this is a \$35.00 factory option* and a factory calibrated unit has the designation *FSM-2C*.

MEASURING MODULATION

One of the unique features of the FSM-2 is the peak or average detector circuit. *All CATV measurements for signal levels are made in the peak detector position or mode.* Virtually all other instruments employ only peak reading detectors and when you see output levels of amplifiers, etc. specified, it is always in a *peak* mode.

By offering either peak or average detection, with the aid of a simple chart appearing in the FSM-2 manual, you can quite accurately set or check percentage of modulation on a video (RF) modulator.

- (1) The FSM-2 is adjusted (through a combination of switchable pads and the variable linear 20 db i.f. attenuator control) to give a full scale reading of exactly +10 db (on the -10 to +10 scale) with the meter in the peak reading mode.

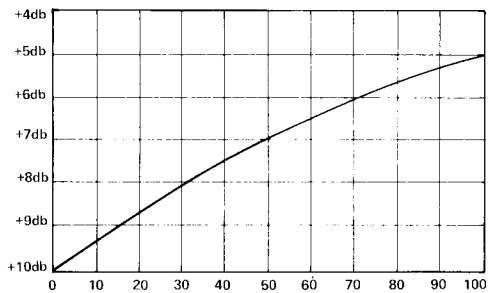


CHART TWO

- (2) The detector selection is moved to the average position, and the drop in signal level noted. The *difference* between the peak read mode level and the average read mode level is found on a chart (see Chart Two) which gives you the modulation percentage.

Working backwards, it is an easy manner to set video drive to a modulator, or to set up the modulator "modulation control" to reach not more than 100% modulation peaks. By setting up modulators in this manner, you should be a little more assured that you are not driving the modulator into over-modulation and clipping sync pulses in the process.

NOTE: It must be emphasized that in normal CATV signal level measurements the meter *must be in the peak reading mode*, or all levels set by the operator may be *up to 5 db higher* than he thinks they are, with the result being cross mod or overload (from being that *far off* in plant amplifier level settings).

SETTING AUDIO CARRIER LEVELS

One of the more troublesome settings at a head end is setting the aural carrier level down the FCC specified 13 to 17 db below the visual carrier level for that channel. CATJ talked with several FSM-2 users who do it in this manner....

PEAK READING DETECTORS

Measuring the peak of sync tips is a challenging task. Peak detectors generally have **different efficiencies at different voltage levels**. With a 20 db scale range on the meter face, the peak detector **range** is 10 to 1. For the detector to remain at the same operating efficiency over a 10-1 voltage range is no easy trick. The inaccuracy of the peak reading detector is one of the major contributors to meter-scale-inaccuracies simply because the detected voltage fed from the detector to the meter amplifier and meter movement does not track true (as detector efficiency changes) over the 10 to 1 range.

By adjusting the visual carrier level to the proper output level, a reference for the aural carrier level is established. This is usually done at a fairly high level measurement point, and consequently the 0-20 db i.f. attenuator is "in" or "on". With the visual carrier level adjusted, the i.f. attenuator control is slowly turned from the full "in" position clockwise until the meter moves to full scale (+10 on the -10 to +10 meter scale). *Then the meter is tuned to the aural carrier and peaked.* Now the aural carrier level control (trap, etc.) is adjusted to read -3 db to -7 db on the -10 to +10 scale. The visual carrier reference was set to +10 with the i.f. attenuator pot and the only FSM control touched was the main tuning dial. Without changing any pads or switches, and without any mental computation, the same scale range is used to set the aural to the specified -13 to -17 below the visual.

This "trick" is made possible by the variable i.f. attenuator feature of the FSM-2. Anyone who has set aural levels and gone through the mental gymnastics of switching in or out 10/20 db of pad ("...let's see, +42 dbmv, switch out 10 db, I am looking for +29 dbmv, which will fall...") to set aural levels knows the frustrations involved.

However, there can be a problem with this technique. Recall in the first part of this series we pointed out that the basic meter movement normally has its *greatest degree of accuracy* in the 60-80% of full scale range, and its *greatest degree of inaccuracy* in the far left (-10 to 0) portion of the scale range. Thus when you crank in the i.f. attenuator to conveniently read +10 on the scale (full scale) and then tune to the aural carrier to look for a reading that is 13 to 17 db lower down, you are going to be right down there in the "most inaccurate region" of most meter scale/movements. When you add this inaccuracy potential to the ± 1.5 db inaccuracy of the instrument itself, you might be 5 db or more off reading with the aural/visual carrier relationships.

UHF TUNER

The FSM-2 is one of the few instruments to provide UHF as a *standard feature* (i.e. you cannot buy the instrument without it). Blonder-Tongue builds in two separate "tuning heads": one for the standard VHF channels, and one for the standard UHF channels. A balancing network inserted between the VHF/UHF tuning heads and the input to the 40 MHz i.f. amplifier string provides a factory adjustment (R6, a 3K pot) to insure that the meter sensitivity (i.e. calibration) is the same on UHF as VHF.

The VHF and UHF tuning is accomplished with the same dial (knob). The user selects whether he is tuning for VHF or UHF with a slide switch on the front panel.

OTHER OPERATOR CONTROLS

In addition to the 10/20/20/20 db slide switches in the front end attenuator, the 0-20 db i.f. attenuator pot, the VHF or UHF selection switch, the detector switch (average or peak), and the frequency selection (tuning) knob,

the user also has the following up front controls:

- (1) Off / Battery / AC selection switch
- (2) A mechanical-zero control screw for the meter
- (3) An electrical meter-set control (compensates for changes in input operating voltage from AC or DC supplies)
- (4) A detected video output jack

The detector output provides up to 2 volts peak to peak of detected (AC) signal, or 50 microamps of current (*across 500 ohms*). These are available at the front panel jack with full scale readings (i.e. +10 on the -10 to +10 scale), with the meter in the average detection position (mode). The 2 volts p/t/p sounds like it should drive a video monitor, but it won't. First, there is the problem of bandwidth (the 60 db down i.f. bandwidth of the FSM-2 is ± 0.9 MHz). An adequate amount of video information simply does not get through the selective (reference selectivity of a TV receiver) FSM i.f. to provide *video plus sync* information to hold a monitor stable. Second is the mis-match problem. The 2 volts p/t/p is approximately 500 ohms and the transfer loss without a matching device is considerable (approximately 10 db). However, the *50 microamps is adequate to drive a chart recorder*; a subject to be discussed in greater detail in a later portion of this series.

CALIBRATION

Calibration is a double-edged sword. *First there is absolute calibration*, against a "standard" (i.e. being assured that +17 dbmv is in fact +17 dbmv, within the ± 1.5 db factory specified accuracy); or in the case of the FSM-2C (factory calibrated model), within the tolerances specified.

Secondly there is the matter of meter-scale accuracy within any given 20 db scale range. All instruments to

CALIBRATE IN POSITION

Most meters require (or strongly suggest) the user set the mechanical zero of the meter before use. This is done with AC (or DC) power off against a meter-needle reference line usually imprinted on the meter face.

The purpose of this adjustment is to insure that the meter movement has a fighting chance of starting from zero-zero when power is applied. Meter movements are tension devices and subject to mechanical change as they age, get bounced about, or rest in an unusual position. The meter should always be used in one position (i.e. upright if so specified) and the mechanical meter zero control should be set with the meter (as specified by the manual) with the meter in the recommended position.

Mechanical zeroing of the meter movement is usually accomplished by adjusting the meter movement front cover screw located at the base of the instrument needle.

Failure to mechanical-zero a meter as a part of the calibration procedure will result in even greater readout errors in the already compromised -10 to 0 db portion of the scale in particular.

be reviewed by CATJ will include measurements made of the scale accuracy, and of the *apparent* absolute accuracy of the instrument itself.

Absolute accuracy is the area where people will be quickest to fault us, our equipment, and our techniques. All five instruments were measured at the same time, using the same calibrated source (*Measurements 950*). Measurements were made on channels 2, 6, 7, and 13 in the following manner:

- (1) All instruments were set up per their instruction manuals for mechanical zero, electrical zero, tuner compensation, etc.;
- (2) All instruments were operated from 110 VAC source(s);
- (3) The standard (source) was first set up on channel 2. All instru-

ments (five FSM devices) were checked for their real indicated signal levels when the Measurements 950 was set to 0 dbmv output (actually +6 dbmv output with a precision Wavetek 7510 step pad inserted between the 950 output and FSM unit-under-test input);

- (4) We waited 15 minutes and repeated the same series of tests on channel 2;
- (5) We immediately moved to channel 6 and made the same tests, waited fifteen minutes and repeated;
- (6) We immediately moved to channel 7 and made the same tests, waited fifteen minutes and repeated;
- (7) We immediately moved to channel 13 and made the same tests, waited fifteen minutes and repeated.

Then we waited four hours, with all instruments operating on 110 VAC for that period, and repeated the tests exactly as noted above.

The numbers you will see in these reviews are the average readings measured, and worst-case readings. Where there were significant "cold-start" errors noted, the individual FSM reviews will indicate this. The *only purpose* of this test series is to measure the accuracy of the instrument relative to our Measurements Corporation Model 950 "standard".

The matter of scale-range accuracy was checked in a separate test. The tests were repeated twice, once with the Measurements 950 as a +10 dbmv source, and then with a stable TV signal as the +10 dbmv source. Both tests were made on channel 9. The +10 level was chosen because on most of the meters checked, it is a "full scale" reading (on the Sadelco it is a near-full scale reading). We would be able to stay in the same meter-range (i.e. switch in no internal meter pads)

to go down in external step attenuator 1 db steps and read the indicated meter change. We did this with both the Measurements 950 CW carrier and a real TV signal to detect the differences, which we suspected were there, between reading a CW (unmodulated, with sync pulses) carrier and one modulated with normal TV video and sync.

B-T FSM-2 ABSOLUTE LEVEL CHECKS

We experienced some difficulty in setting up our Blonder-Tongue supplied FSM-2 for electrical zero. The manual suggested that you first set mechanical zero with the meter off, and in the operating position. This we did. Then the manual suggests two ways to set "electrical zero":

- (1) Place the 20 db i.f. attenuator "in" and disconnect any RF input;
- (2) Turn on the electrical-zero screw on the front panel until the meter needle lines up with the *electrical-zero reference line* on the meter scale.

This we did.

Then they suggest a "better method" is to tune in a real TV signal with the 10 db slide switch attenuator "out" or "off", and obtain a reading of approximately 5 db on the -10 to +10 meter scale. Then:

- (1) Turn "out" i.f. attenuation with the variable pot until the indicated level moves right to a *full scale +10 db reading*;
- (2) Switch "in" the 10 db slide switch attenuator and note whether the meter needle *drops exactly 10 db* to the 0 db position on the scale;
- (3) If it does not drop precisely 10 db, adjust the electrical-zero control and then the i.f. attenuator, back and forth (switching the 10 db slide switch attenuator "in" and "out") until you

have the electrical zero control set so that when 10 db of pad is taken "out", the meter drops from an indicated +10 on the scale to an indicated 0 on the scale.

On the meter B-T supplied us, the *best we could* do was an indicated +1.5 (or an 8.5 db indicated scale drop when 10 db of pad was switched "in"). While we had this best case going, when we disconnected any RF input from the meter the needle dropped not to -10, but *off scale* to the left of -10 to approximately the same resting place as meter-off *mechanical zero*.

We confirmed the 10 db slide switch pad was accurate with an external pad, and then tried the same procedure with another FSM-2. *We had no difficulty in making the second FSM-2 set up as the manual suggested*; only when we disconnected any RF from this second. FSM-2. The meter fell back and rested *not at -10, but at -8 db on the scale* (considerably up-scale from the normal no-signal condition). We have brought this to the attention of Blonder-Tongue and they have the opportunity to respond to our tests in our TECHNICAL TOPICS section of CATJ as soon as they wish.

Moving on to the absolute level tests, we used the instrument B-T supplied, adjusted to the best-case position for scale accuracy (as noted previously, this was an 8.5 db scale drop with a 10 db RF level drop), and here is what we found:

UNIT: Blonder-Tongue FSM-2

SPECIFIED ACCURACY: ± 1.5 db

TEST INPUT LEVEL: 0 dbmv

Channel	Average	Worst Case
2	1.0 low	1.5 low
6	0.0	0.3 high
7	0.5 low	2.0 low
13	0.5 low	1.5 low

From a cold start, we found we needed approximately five minutes at room temperature for the tuning dial to sta-

FSM-2 SCALE ACCURACY TESTS

Specified Accuracy: ± 1.5 db

Test Input Level: +10 dbmv

Input Types: CW (unmodulated) carrier
Modulated channel 9 carrier

Input Types:

CW (unmodulated) carrier

Modulated channel 9 carrier

Input Level (True)	CW Carrier Reading	Modulated TV Reading
+10	+10	+10
+ 9	+ 9.2	+ 9.5
+ 8	+ 8.5	+ 9.1
+ 7	+ 7.8	+ 8.3
+ 6	+ 7.0	+ 7.5
+ 5	+ 6.0	+ 6.9
+ 4	+ 5.1	+ 6.0
+ 3	+ 4.2	+ 5.0
+ 2	+ 3.2	+ 4.0
+ 1	+ 2.5	+ 3.5
0	+ 0.9	+ 1.8
- 1	- 1.8	+ 2.8
- 2	- 1.3	- 0.7
- 3	- 2.8	- 2.0
- 4	- 3.9	- 3.0
- 5	- 5.1	- 4.5
- 6	- 6.9	- 6.2
- 7	- 8.5	- 8.1
- 8	-10.0	-10.0
- 9	-10.0 +	-10.0 +
-10	-10.0 +	-10.0 +

bilize (where we could set it and walk away, and come back and still find it was peaked on the carrier). The stability seemed independent of VHF channel being measured.

B-T SCALE ACCURACY CHECKS

As noted previously, a methodology for checking individual 20 db scale range accuracy was devised, using both the Measurements 950 as an unmodulated CW source, and a modulated commercial TV signal on channel 9. The results appear here in table form.

The FSM-2 scale tracking errors are most apparent in the modulated TV signal tests, with worst case showing up around 11-14 on the 0-20 scale, and then again at the very low end (0-2). The meter (*contrary to many others*) tracks quite well in the -3 to -7 region.

BLONDER-TONGUE LABS, INC.

FSM-2

Frequency Range—VHF: 54-220 MHz
UHF: 470-890 MHz

Full Scale Sensitivity:
100 microvolts to
3.2 volts in 10
ranges

Input Impedance: 75 ohms

Selectivity:

at 3 db points, ± 0.25 MHz;

at 60 db points, ± 0.9 MHz

Accuracy: ± 1.5 db

Temperature Range: -20 to +120 degrees F

Power Requirements:

105/130 VAC, 50-400 Hz

18 VDC (2-9 vdc, series)

Weight: 13 lbs. with batteries

Size: 12-5/8" x 7-3/4" h x 7" d

Battery Drain: 15 mA

Minimum Battery Voltage Required:
13 volts

Price Range: \$410.00

front panel (there are 11 total) should *not* be assumed to be 20 db divided by 11 indicator marks. However, once calibrated, you should go back whenever you do a full meter calibration and re-check your custom calibration marks.

Some users try to use this i.f. control as a tuner compensator *to correct for errors* across the VHF (or UHF) bands. This is probably a mistake, since even with accurate calibration of the i.f. control, you are still subject to meter-scale errors. The accuracy of the compensation, as applied at i.f., *will only be good for the particular portion of the meter scale originally used in calibration.*

Finally, users are cautioned always to check whether the meter is in the average, or peak detector position. One user we spoke with liked the meter "for the first six months" but "lately it has been reading low". After chatting awhile, we happened to ask whether he had ever used the average detector for modulation checks. "Yes, once, about two months ago" was the response. "And how long has the meter been reading low?", we asked. "About two months", he noted.

Yes, he had never *returned the switch* to the peak position (and had not checked the volt set) in the two month period.

REVIEW—DELTA ELECTRONICS

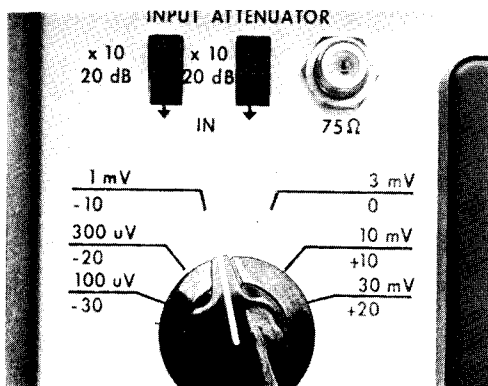
FST-4

The Delta-Benco Electronics FST-4 meter is a completely solid state instrument that can be powered from either AC mains, or internal battery (DC) supply. The user automatically switches, with no actual manual switching, from DC to AC operation (or AC to DC operation) by inserting (or unplugging) the AC line cord from the outlet. Thus, if the instrument is operating from AC mains and the power goes off, the unit will continue to function by internally switching to DC operation.

OTHER OBSERVED FEATURES

Any given instrument can have good, fair, or poor dial accuracy (an FSM is *not* a frequency meter). The FSM-2 tracked well through the low band range, but read slightly high in the high band range. The only problem this presents is being certain you are on 9A, rather than 10V, when you are reading aural and visual levels in a fully loaded system. By starting off with the lowest carrier present (i.e. channel 7 video) and working up, you should have no trouble keeping tabs on the one you want. Of course you can use an earphone and obtain audio from the detector jack to listen for either audio or sync buzz, depending upon the "type" of carrier you think you are after.

The 0-20 db i.f. attenuator in an FSM-2 can be custom calibrated by the user with an external 1 db step pad, and some type of marking machine, on the front panel. The black dots on the



DELTA-BENCO FST-4 10 db step attenuator simplifies read out interpretation

The unit employs the standard format discussed previously in this series (October CATJ). A switched front-end attenuator works in 10 db steps and the front panel is calibrated, around the rotary attenuator switch, in the ranges you are utilizing. There are a total of six 10 db rotary step positions, and two additional 20 db slide switch attenuators.

The meter is commonly used in the following ranges:

- 40/-20 range (-30 dbmv mid-scale)
- 30/-10 range (-20 dbmv mid-scale)
- 20/0 range (-10 dbmv mid-scale)
- 10/+10 range (0 dbmv mid-scale)
- 0/+20 range (+10 dbmv mid-scale)
- +10/+30 range (+20 dbmv mid-scale)

Then for a +30/+50 range, one of the 20 db switchable pads is brought "in". For the +50/+70 range, the second 20 db switchable pad is brought "in". Because of the 10 db steps in the rotary ranges, the first 20 db switch can be brought "in" at any point, as well as at the end.

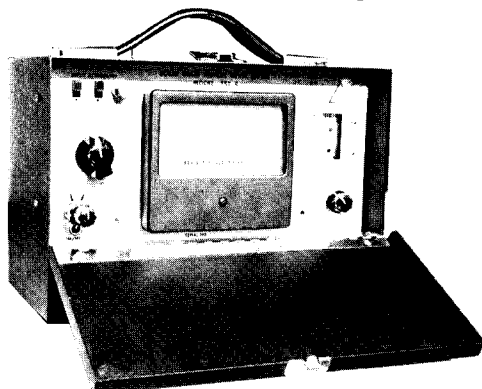
The straight-forward rotary attenuator in 10 db steps makes getting used to the meter's calibration ranges quite simple. The rotary switch tells you the exact range you are in (up to the +30 dbmv range, after which you bring in the first 20 db slide switch pad), and this keeps human error to a minimum.

As the photo of the front panel of the unit shows, the panel includes a tuning compensator for adjustment to the absolute value calibration scales. This compensation factor is affixed to the front panel with a special ink. It will wash off with some moderate pressure and a detergent, but it should stay in place for years of normal use.

The power on/off switch includes a battery-check position, although the checking consists of measuring the supply voltage from the regulator. The power supply, in addition to including a circuit that automatically switches from AC to DC (or vice versa) when AC is taken away (or initially supplied), includes a protection circuit to insure that damage to the unit cannot occur should battery polarity be reversed.

Range tuning in one continuous band from 54 to 250 MHz is accomplished by employing the time-tested Mallory Inductuner, which has been around in one form or another about as long as television. This makes for a very stable tuning system, and in reasonable environments, frequency drift is practically eliminated, due to the mechanical construction of the tuner.

The FST-4 has separate video and audio output jacks. The video output is approximately 0.75 volts peak to peak through a standard F fitting. The audio output has its own audio amplifier out-

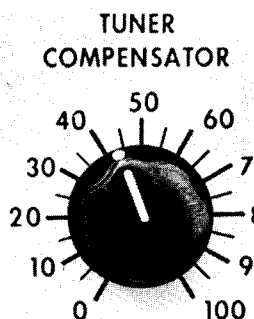


DELTA-BENCO FST-4 is completely self-contained with AC/DC supply

put stage, and a small earphone is provided.

Apparently, the everyday use of this meter by Canadian operators, in an environment which frequently gets much colder than that experienced by state-side operators, has caused the "spec writer" for the instrument to think twice. As the small table inset at the beginning of this review notes, the accuracy of the meter is specified as "settable to" ± 0.5 db. Delta mentions they calibrate meters with a Hewlett Packard type 431B power meter and a 8402A calibrator. Their manual covers re-calibration with their own FSM/C-4 calibrator simply enough so that most anyone, who has modest experience, can do the job. The specification for meter accuracy to an absolute standard reads "overall accuracy from 0 degrees F to $+120$ degrees F is ± 2.0 db". But they note, "...the final calibration and testing holds the accuracy of each unit to a figure of ± 0.5 db." Of course, a great deal of the *real accuracy* depends upon the care with which one sets the tuner compensator

10 P.	44
11 P.	39
12 P.	38
13 P.	38
230 MHz	30
240 MHz	31
250 MHz	37



FST-4 tuner compensator includes front panel compensation settings

control, and the care with which the initial compensation values were set and noted on the front panel. When we ran our absolute accuracy analysis with the Measurements 950 calibrator, we found the accuracy to be within the ± 2.0 db range specified, but also found that for very little effort we could correct it to the same accuracy as the Measurements 950 (one tracked the other) within the ± 0.5 db range. More about that shortly...

The manual with the FST-4 is not elaborate, but its detail is to be commended. There is just the right amount of circuit designer theory and a nice, readable amount of "what to do in case of trouble" data to keep the meter in *your* hands most of the time, and out of the factory repair depot. Many, many problems can be corrected by the average technician, *if* he is given just a few basic design and operating facts with which to work. We feel instrument manufacturers who attempt to keep the user in the dark about the mysteries of the black box, only end up hurting themselves. The straight-forward approach of Delta in their manual is a step in the right direction. If the manual were expanded just a tad to include several inside-of-case photographs, with call-outs of the various important sections and stages, as a guide to locating measurement points within the meter, it would be about as

DELTA ELECTRONICS FST-4

Frequency Range:

54-250 MHz, continuous

Full Scale Sensitivity:

100 microvolts to 3.2 volts in 10 ranges

Input Impedance: 75 ohms

Selectivity:

at 3 db points, ± 0.25 MHz

Accuracy: ± 2.0 db (*)

(*—Settable to ± 0.5 db accuracy)

Temperature Range: 0-120 degrees F

Power Requirements:

105/130 VAC, 60 Hz

18 VDC (2.9 vdc, series)

Weight: 8 lbs with batteries

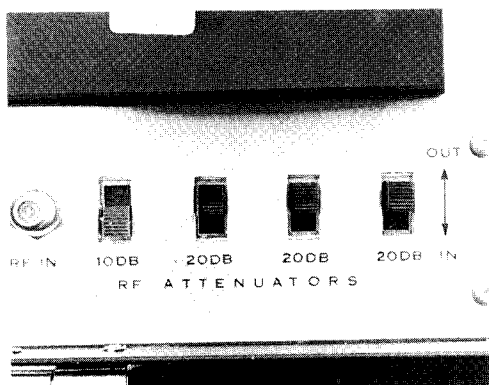
Size: 10-5/8" w, 8" h, 6"d

Battery Drain: 13 mA

Minimum Battery Voltage Required:

11 volts

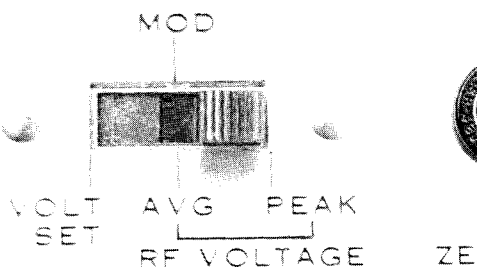
Price Range: \$345.00



BLONDER-TONGUE FSM-2 front end attenuators are slide switched

complete as any CATV tech or engineer could want.

We took the FST-4 with us for a week of tramping around on mountain tops and muddy head ends. We used it to chart record an off-the-air signal one night for a fellow who wondered how far down (and up) his signal wandered for a particularly difficult 110 mile path, and we got into the "trenches" of a buried plant to help set up a series of trunk and extender amplifiers. In short, we used it quite hard for that length of time. Our major complaint is with the dial which reads out the channel or frequency to which you are tuned. It tracks very, very well, but mechanically it has a few problems. We actually had two FST-4 units—one with a small knob inset within the side of the case (a good idea to keep you from busting off an extended knob), and another with a (protruding) geared extension knob and drive. Both units were almost identical electrically (i.e. accuracy). The only difference was in the mechanical knob. We felt the geared drive moved too slowly. Getting from 2 to 13 simply took too long. *Both units had a similar problem with the imprinted channel/frequency calibration sheet that is glued (or somehow implanted) onto the rotating drum that turns behind the window. The imprinted strip is flat when it begins, and it is affixed to a circular drum. This*



BLONDER TONGUE FSM-2 operational switch includes battery check

means there are two natural ends to the strip. On both units, the *end* of the imprinted strip on the low frequency end (channel 2) came loose very quickly. As you operate the unit, the fly-away end rattled and banged around; we suspect, sooner or later, the entire imprinted sheet would come loose. Repairing it is no big deal. We simply think it should not have come loose in the first place. And since it did on both units, we suggest Delta re-check the way they affix these strips to the drum!

FST-4 ABSOLUTE LEVEL CHECKS

Because there is a tuner compensator on the front panel of the FST-4, we were obliged to include setting this compensator to the correct position with the mechanical checks specified in the manual, before proceeding to reference the FST-4 absolute level measurements against the Measurements 950 standard we used for all of these meter checks.

The FST-4 had no worst case and best case differences in measurements on any channel; *it always checked the same*. So, that showing will be eliminated in this report section.

UNIT: Delta Electronics FST-4

SPECIFIED ACCURACY: ± 2 db (*)

Test Input Level: 0 dbmv

FST-4 SCALE ACCURACY TESTS

Specified Accuracy: ± 2.0 db (*)

Test Input Level: +10 dbmv

Input Types:

CW (unmodulated) carrier

Modulated channel 9 carrier

(*—settable to ± 0.5 db)

Input Level (True)	CW Carrier Reading	Modulated TV Reading
+10	+10	+10
+ 9	+ 9.1	+ 9.2
+ 8	+ 8.2	+ 8.2
+ 7	+ 7.2	+ 7.1
+ 6	+ 6.2	+ 6.0
+ 5	+ 5.3	+ 5.0
+ 4	+ 4.4	+ 4.2
+ 3	+ 3.5	+ 3.1
+ 2	+ 2.6	+ 2.1
+ 1	+ 2.0	+ 1.1
0	+ 0.8	+ 0.1
- 1	0.0	- 1.0
- 2	- 1.1	- 2.0
- 3	- 2.0	- 3.0
- 4	- 2.9	- 3.9
- 5	- 3.9	- 4.9
- 6	- 5.0	- 6.4
- 7	- 6.2	- 7.5
- 8	- 7.0	- 8.8
- 9	- 8.0	- 9.8
-10	- 9.1	-10.0 +

(* 0-120 degrees F; settable to ± 0.5 db)

Channel	Level	TC Spec	TC R/S
2	+1.0	77	68
6	+0.8	70	64
7	+1.9	34	15
13	+2.0	38	18

In the above tabulation, the "level" is the indicated level when the Measurements 950 was set to 0 dbmv output. The "TC Spec" column is the tuner compensation setting specified on the FST-4. The "TC R/S" column is the re-adjusted tuner compensation value to match the 0 dbmv output of the Measurements 950 with a 0 dbmv indicated level on the FST-4.

FST-4 SCALE ACCURACY CHECKS

The same technique for checking FST-4 scale reading accuracy was employed with the B-T FSM-2 (see previous description in this report). FST-4 results appear here in table form.

The FST-4 tracked exceedingly well through the ranges from 20 (+10) down to 5 (-5), falling apart (*relatively speaking*) only in the lower few db on the far left-hand portion of the scale. Interestingly, the peak detector tracked sync signals *better than the CW carrier* for the full range. The accuracy of the scaling was better on tracking sync tips, than on an unmodulated carrier all across the range, *except* at 18-20 (+8/+10).

OTHER OBSERVATIONS

For a small, lightweight, relatively inexpensive meter, the FST-4 has a great deal of accuracy and (we suspect) dependability going for it. It is not a fancy instrument. It is a basic, frills-cut frequency selective voltmeter.

Anything you might want to add would result in greater weight, perhaps greater bulk (although there is plenty of room left in the innards of the case), and more money. The most obvious feature missing is a UHF tuning head. UHF has come to Canadian telecasting only recently, and we suspect that some arrangement for use of existing FST-4 instruments for UHF cannot be far behind. There is in fact a UHF entry line on the tuning compensator, and an entry on that line for compensation of the tuner when used for "UHF", which are not explained in the manual.

However, by *leaving* UHF out of the basic instrument, Delta has been able to concentrate on providing a quality VHF instrument which they adequately explain in their manual. We suspect many technicians already appreciate this instrument.

SYNOPSIS

This series will continue with Part Three in the December issue of CATJ. At that time we will review the Sadelco FS3SB (with super band), the Jerrold 727, and the Mid-States Model SLIM.

COMPLYING WITH ANNUALIZED FCC MEASUREMENTS FOR 1974/75

MEASUREMENTS FOR 1975

On or before March 31, 1975 a series of system measurements must be completed by all systems. These are the "Phase Two Measurements" required under the Rules and Regulations of Part 76 (1).

The CATV industry is, at best, *slightly confused* by the measurement requirements dictated by Part 76. The primary confusion is the fact that *all systems must make certain measurements* on or before March 31, 1975, but that *only specified systems must comply* with the technical requirements of Part 76.

All systems (i.e. any system with more than 50 paying subscribers) are required to comply with all of the provisions of Part 76. Systems in operation prior to March 31, 1972 *comply by making measurements* in phased groups that began March 31, 1974 and continue through March 31, 1977. *Complying with the rules* for these *grandfathered systems* is full and complete by *merely making the tests* required in 1974, 1975, and 1976. . . 1977 is a separate matter, as we shall see.

For grandfathered systems, compliance (up to 1977) is merely a matter of making measurements. Technical compliance, that is system technical compliance, does not become mandatory until 1977. However, interim compliance, or the making of certain specified tests, is no matter to be taken lightly.

Section 76.601 (c) states, "the operator . . . shall maintain the resulting test data on file at the system's local office for at least five years. It shall be available for inspection by the Commission on request."

This simply means you *must make the tests* required, and *keep the written records of the tests* in your files for a period of not less than five years. Should an authorized representative of the Commission appear on the scene, you are directed to allow him to inspect those records.

If you do these things, and are a grandfathered (pre-March 31, 1972) system, *you have complied.*

What about a system that was not in operation prior to March 31, 1972? That is, a system that came into being after the Cable Television Report and Order of 1972, and is therefore operating under the written authority of a Certificate of Compliance (CAC). What about the measurements which it must perform, and the standards to which it must adhere?

All systems that began operation after March 31, 1972 are assumed to be legal systems, operating with CAC approval. Among the many things they agreed to do in order to obtain their CAC was to obey (i.e. live under) the Rules and Regulations of Part 76, which *includes* Sections 76.605 (technical standards) and 76.609 (measurements). Thus, all such systems must not only make measurements, as set

forth in Section 76.609, but must also assure themselves that the systems meet or exceed the technical requirements of 76.605. This is directly contrary to so-called grandfathered systems, which are required to make certain measurements each year through 1977, but do not have to have system technical compliance (with 76.605) until 1977.

If all of this is still confusing, check the box insert here for what you have to do, in either system category.

EXCEPTIONS

Grandfathered systems are allowed to make their measurements in phases; that is, only certain tests were required on or before March 31, 1974. Those same tests, plus *a few additional tests*, will be required on or before March 31, 1975. All of the 1974 and the 1975 tests, *plus yet more additional tests*, will be required by March 31, 1976. Finally, by March 31, 1977, all of the tests spelled out in 76.609 (pursuant to the technical standards spelled out in 76.605) will be required. At the same time, the system must *also* have technical compliance (with 76.605). The "phases" are spelled out in the box insert shown here.

Although all systems that began operation after March 31, 1972 are assumed to be in full technical compliance with the provisions of 76.605 at all times, and all measurements are to be made annually (1), there are two exceptions. Two of the measurements required have been suspended pending further study. They are 76.605 (a) (9) . . . a measurement of co-channel interference levels, and 76.605 (a) (10) . . . a measurement of intermodulation distortion. We will have more to say about this shortly. For now, understand that *if your system is new* (after 3-31-72) *you are required to annually make all measurements*, except those for 76.605 (a) (9) and 76.605 (a) (10). Even

WHO MAKES WHAT/WHEN?

Grandfathered systems were required to make the following measurements prior to March 31, 1974:

- (1) **76.605 (a) (4)**—Visual signal level (minimum) on all channels;
- (2) **76.605 (a) (5)**—Signal level variations between adjacent channels and all channels;
- (3) **76.605 (a) (6)**—DB difference between all visual carriers and their companion aural carrier levels;
- (4) **76.605 (a) (9)**—Signal-to-noise ratio of all Grade B or better grade signals;
- (5) **76.605 (a) (12)**—Radiation from cable plant;

Grandfathered systems are required to re-make all of the above (1974) measurements **plus** the following new measurements prior to March 31, 1975:

- (6) **76.605 (a) (7)**—Measurement of percentage of hum modulation present;
- (7) **76.605 (a) (8)**—Measurement of in-channel response;
- (8) **76.605 (a) (11)**—Measurement of terminal isolation between any two subscribers;

New systems are required to make all of the above measurements before March 31, 1975, and the following:

- (9) **76.605 (a) (1)**—Measurement of frequency boundaries of all off-the-air system channels;
- (10) **76.605 (a) (2)**—Measurement of visual carrier frequencies of all system off-the air channels;
- (11) **76.605 (a) (3)**—Measurement of separation of visual and aural carriers.

New systems must **comply** with the specifications of 76.605 (a) 1 through 12 (including compliance with the Radiation Standards). **Measurement** of co-channel interference levels [76.605 (a) (9)] and intermod [76.605 (a) (10)] are presently waived, **although compliance is not**. All of these measurements will be discussed at length in the December CATJ.

(1—See data given above)

though you are not required to make measurements for 76.605 (a) (9) and 76.605 (a) (10), you are required to *certify your system complies* with the requirements of 76.605 (a) (9) and 76.605 (a) (10).

How is that again? We must comply with the technical requirements of co-channel (36 db or more down within Grade B pick-ups) and intermod (46 db or more down), but we are not required to measure it? That's it in a nutshell. We are told that the Commission has chosen this strange approach to these two measurements because both measurements require sophisticated equipment (a spectrum analyzer) to perform. The Commission has directed the C-TAC group to study how the "intent of the technical requirements could be met" *without actual measurements* being made. Since the C-TAC panel is still out, and will not make firm recommendations to the Cable Bureau until January 31st, the matter of measuring these two specifications for your system has been suspended, pending the receipt of the C-TAC study.

This year new systems are required to make all measurements, and old systems are required to make certain measurements, but only new systems are required to comply with the technical standards of 76.605. There is one standard or provision of 76.605 with which all systems including old systems, must comply. *That standard is 76.605 (a) (12), which is the radiation standard.* In 76.605 (a) (12) the Commission has gone back and picked up an old (pre-cable) set of rules originally known as Part 15 (something called "incidental radiation"). In the original "incidental radiation" standards, the Commission sought to assure that unlicensed devices did not interfere with the reception of licensed transmitters. If you will look on the back of most any television or radio receiver, transceiver, etc. you will see a sticker which

states, "*This Unit Complies With Part 15 Radiation Standards, In Effect At The Time of Manufacture*", or something similar. Here the Commission is worried about things like receiver local oscillators radiating throughout the neighborhood and becoming unwanted interfering signal sources that disrupt normal receiver operation. When it was found that cable television systems could on occasion radiate signals up and down the block, the standards of Part 15 were enlarged to include CATV. So, from virtually day-one of this industry, we have had something similar (if not identical) to 76.605 (a) (12). The Commission has had the authority, under earlier Part 15, to make life pretty miserable for any CATV system that was found to be line (or plant or apparatus) radiating more signal than the permissible standards allowed. *There is nothing new about this standard, and it applies equally to all systems (old and new).*

GRANDFATHER MEASUREMENTS

If you are a new system, you have gone into the CATV business with nothing less than a full understanding that you would be required to make measurements each year you were in operation. Our theory in presenting this material in this issue, and completing it in the next issue, is that as a part of that understanding, you comprehend the legal and technical requirements for making these tests, and that you have already made one full set of tests on or before March 31, 1974.

On the other hand, grandfathered systems are making many of their tests for the first time this year. These new tests which approximately 2,900 systems have never been required to perform before, are the tests to which we shall devote the majority of our report. We will also cover all of the grandfather-system-required tests for

this year, which includes the tests that were made for the first time last year. Our theory is that in making the tests for the first time last year, *you may have done more (or less) than is really required*, and now is as good a time to catch the error.

WHERE TESTS ARE MADE

One of the items which confuses some operators is the location of the tests. Section 76.601 (c) states that, "... tests shall be made on each (off-the-air) cable television channel...at no less than three widely separated points in the system, at least one of which is representative of the terminals most distant from the system (head end)."

To satisfy the testing requirements, each system must make identical full-range measurements at no fewer than *three locations*. This does not mean that a system can comply with the technical standards of 76.605 at *only three* (minimum locations). It means *the tests*, to validate the testing procedure, *must be done at no fewer than three locations*. As a matter of fact, the Commission may require "... additional tests, repeat tests, or tests involving specific subscriber terminals...to secure compliance with the technical standards".

The Commission also says, "*Successful completion of the performance tests (at the three designated locations) does not relieve the system of the obligation to comply with all pertinent technical standards at all subscriber terminals.*" Of course, for now, this pertains mostly to newer systems. The point is made that "handpicking three prime locations" and conducting your tests at these locations is not "full compliance with the technical standards", but rather *is compliance only with the measurement (instruction) requirement*.

Once again, many operators are confused with the difference between

KEEPING PROPER RECORDS

Section 76.601 spells out how system performance tests shall be recorded. All systems, new or old, shall:

- (A) Maintain at their in-town office a complete listing of all stations (and channels) carried on the system, showing channels added or deleted as permanent changes take place;
- (B) Maintain a listing of all subscribers connected to the system;
- (C) Conduct system performance tests once per calendar year, but in no case any less frequently than at 14 month intervals;
- (D) Maintain as a part of the recorded test procedure a description of the equipment utilized to make the tests, and a statement of the general qualifications of the individual(s) conducting the tests;
- (E) Record the results of all tests made, and keep those test results on file for a period of not less than five years;
- (F) Make the full set of records listed here available to any authorized employee of the Commission, and be prepared to show that the record keeping process (grandfathered systems) and the measurements themselves (new systems) are in full FCC compliance.

measurement requirements, and technical standards. *The measurement requirement is essentially a paper-work function.* Recall that when you make your measurements, you must compile a written log of the measurements (see box insert) and maintain those measurement logs on file for at least five years at your system office. In effect, *making these measurements satisfies only the requirement that you make measurements.* It is up to you, having made the measurements, to determine *whether or not your system meets the*

technical standards set forth in 76.605, which is an entirely *different* situation. A grandfathered system is totally exempt from meeting any *technical standards* [except radiation, 76.605 (a) (12)] until March 31, 1977.

Must the measurements be made inside of subscriber homes? No. Section 76.601 (c) states, "...the measurements may be taken at convenient monitoring points in the cable network, provided that data shall be included (in the written test results) to relate the measured performance (taken at the monitoring point) to the system performance as would be viewed from a nearby subscriber terminal."

Again, this confuses some operators. Let's go back to "three widely separated points in the system". Can one of these be at the head end? *Probably* not, because 76.601 (c) says "...as would be viewed from a nearby subscriber terminal". You might argue that you *could* have a subscriber at (or near) the head end, and in some cases you may actually start service *right outside* the head end site. In fact, you had better at least have a potential customer *and a way to serve him* (i.e. a feeder line or a DT in the trunk) *at the location*, if you choose the head end for one of your three measurement points. Sure, some systems use their head end test point, through a splitter or DT, to serve a farm house located on the same property as the head end, but that is "pretty thin" to defend. It is *virtually impossible* to defend if you have *no potential subscribers* within reasonable service distance from the head end. ("Would you believe a family lived in a trailer right outside the head end door, and they *just* pulled the trailer away as you drove up?" This might be hard for the visiting FCC man to swallow!).

There will probably never be anything like a *standard set of three measurement locations* in this business, but they might be as follows:

- (1) *The head end* (if you can substantiate that a customer is being served or could be served from there);
- (2) *Your office* (assuming it is on the cable);
- (3) *A customer service location at the far end of the plant* [this satisfies 76.601 (c) "...at least one of which is representative of terminals most distant from the system (head end) in terms of cable distance..."].

The term *representative of terminals* keeps cropping up. What does it mean? It means that you can make the measurements *at some location other than inside of a subscriber's home*. For example, if you are at the number three location suggested above (the most distant cable point in the plant), you could be making your measurements (1) *inside the home* at the end of the drop cable at the end of the longest and most distant feeder run in the plant, (2) *outside of the home*, off of the service DT using an unused output port on the DT, or (3) *off of the output* (or even input, although we cannot fathom why you would want to) test point on the last amplifier in the line.

To the Commission, *representative* means that *when* you measure at any physical point *except* the specified in-home location, that *'your measurements be corrected* for additional passive losses that could (or would) exist between the point of actual measurement and the point of actual connection to the subscriber's antenna terminals. In other words, make your measurements at the DT unused port if you wish to avoid disrupting the subscriber's life for twenty four hours (24 hours? Yes, we will get to that shortly.). When you note your measurement levels in your log, subtract from your RF level type measurements (and others that are quantitative in nature) *any additional loss that would occur from the DT test plug-in point to the*

subscriber's receiver (such as cable losses for 100 feet of RG-59/U drop cable). These "adjusted" numbers are the numbers you log, so that your log represents the real levels inside of the home.

This same situation exists for the other two measurements as well, when they are made at any point *except* at the end of the drop cable where it plugs into the matching transformer hanging on the back of the subscriber's receiver.

24 HOURS?

If you rushed right out and purchased a copy of the *Federal Register* for February 12, 1972 (which contained the initial 1972 release of the Part 76 Rules and Regulations), you probably missed the "later update" released in June, 1972 in the *Cable Television Report and Order and Reconsideration*. In the "reconsideration", Section 76.605 (a) (5) was modified to read:

"The visual signal level on each channel shall not vary more than 12 db *within any 24 hour period* and shall be maintained within:

- (i) 3 db of the visual signal level of any visual carrier within 6 MHz nominal frequency separation, and
- (ii) 12 db of the visual signal level on any other channel, and (iii) a maximum level such that signal degradation due to overload in the subscriber's receiver does not occur."

The portion added in italics (*within any 24 hour period*) may have missed your attention previously. This little "hooker" changes the rules of the game substantially. Previously where you could "best case" yourself into compliance, now you are required to stretch your "best case" into a period of at least 24 hours in length! We will deal with how you can comply with 76.605 (a) (5) subsequently.

MULTIPLE SYSTEM TESTS

There is one more confusing point in the rules. Because the Commission determined in their Cable Television Report and Order [76.5 (a)] that "...in general, each separate and distinct community or municipal entity (including single, discrete, un-incorporated areas) served by cable television facilities constitutes a separate cable television system, even if there is a single head end and identical ownership of facilities extending into several communities", you may have more than one complete set of tests to make.

Let's suppose you have your primary system in Podunk, a municipal entity which granted your firm a franchise. This requires three measurement points, all located within Podunk proper. Now you have extended your trunk into Left Overshoe, a smaller community that is served by the Podunk trunk after it goes through Podunk. You have a franchise for Left Overshoe, or at least permission to operate there, and you file a separate Form 325 on the Left Overshoe system. That is three more measurement points, except *these three must all be within Left Overshoe*. Finally, between Podunk and Left Overshoe (or beyond Podunk) you are also serving a group of customers in the country. They happen to number 51 subscribers, which makes them a legal separate cable facility. You have no franchise at the moment (for whatever reason), but the system is separate and distinct as far as the FCC is concerned because the 51 homes served are outside of Podunk or Left Overshoe, and that is *three more measurement points*.

If Left Overshoe, or the un-incorporated area happen to have fewer than 50 subscribers, the Commission doesn't call these separate facilities "CATV Systems" and therefore, no measurements are required.

Before you go straight through the roof, remember how glad you were when you found out that each separate, distinct system had to have more than 500 subscribers before that nasty cherry picker station up the road could force you to provide non-duplication protection? When you *split up your billings* into Left Overshoe, Podunk, and the un-incorporated area [following Commission 76.5 (a) guidelines], you found that Podunk had 476 subscribers, Left Overshoe had 123, and the un-incorporated area had 51. This is a net effect of 650 homes connected to the head end, *but in no case 500 in any one (community) system.*

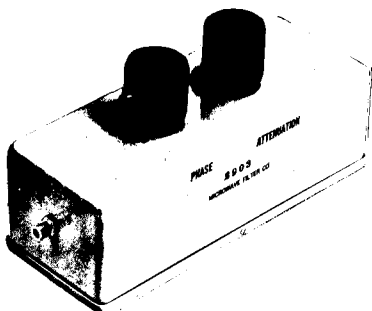
At that point you *loved* having (by FCC definition) three "separate" systems. Now, you are going to have to pay a small price (two more sets of measurements) for that luxury!

WHAT NEXT

Now that we have established the "ground rules" for the measurement technique, or at least the record keeping portion and the definition segment, what about the actual measurements? Can they be accomplished with only a field strength meter? In the December CATJ, we will complete this two-part series and cover step-by-step the 1974/75 crop of measurements.

ATTENTION STATE/REGIONAL ASSOCIATIONS

A new monthly **CATJ News Service** is being planned by CATJ. The latest FCC technical releases and rule change releases are being prepared by the CATJ staff in "news-story format" for mail-out to CATV state and regional associations for use in their newsletters. There is no charge for this service, which will begin in January. To get on the **CATJ News Service** mailing list for your association publication, place Heather Pennington, CATJ, 4209 NW 23rd, Suite 106, Oklahoma City, Oklahoma 73107 on your state/regional association mailing list, and drop us a note telling us to whom we should send the news service.



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SOL SCHILDHAUSE SPEAKS ON COPYRIGHT

SOL SCHILDHAUSE SAID

"Like many of you here today, I have an abiding interest in cable and what is in the best interests of this industry. **I can tell you that in my judgement there are traps built into copyright**, in that bill that passed the Senate (S.1361), **that can endanger the very survival of CATV**, and at the least keep us from amounting to anything more than the industry is today, and perhaps set us back to someplace where we were ten years ago.

I have been following the progress of the copyright matter for a number of years, and I have watched the issues narrow down. I understood the industry wanting a bill when the **FCC was telling us that there was a ransom price in our getting out of their freeze**; that they would keep us frozen in on distant signals until we agreed to pay (copyright). And there were those two cases, Fortnightly and the CBS/TelePrompTer case, which had they gone the other way, would have really

FULL CASSETTE TAPES OF SCHILDHAUSE AVAILABLE

During the course of the Lexington Copyright Summit, a cassette recorder "copied" the text of the Schildhouse presentation, as well as the remarks offered by others present.

CATJ makes these tapes available in either of two sets:

- (1) *SCHILDHAUSE EXCERPTS*—Approximately 90 minutes of Sol Schildhouse, Harold Farrow, and others discussing the "body of the bill". Excerpts of the Schildhouse presentation appear here in CATJ. The price for this set of cassette tapes is \$15.00. Order "*Schildhouse Excerpts*" (with payment enclosed) from CATJ, 4209 NW 23rd, Suite 106, Oklahoma City, Oklahoma 73107.
- (2) *LEXINGTON IN TOTO*—Approximately 2-1/2 hours in length, includes all of the Schildhouse, Farrow, Moore, NCTA President Foster, Charlie Erickson, and other remarks. Price for this set of cassette tapes is \$25.00. Order "*Lexington In Toto*" (with payment enclosed) from CATJ, 4209 NW 23rd, Suite 106, Oklahoma City, Oklahoma 73107.

Why would you want these tapes? Simply put, the tapes provide you with the best possible cram-course education on the vital copyright matter you could obtain anywhere. For \$15.00 (or \$25.00) you have the opportunity to review over and over again all of the arguments, all of the statistics and all of the facts. If you are not willing to spend \$15.00 (or \$25.00) to find out what these facts are, you may (as Sol suggests here) "wake up one day and find yourself dead".

wrecked our business. So it was understandable that we ran to the Congress and we asked them to rescue us. And we said, **'Legislate the kind of copyright which we can live with...'**, and that means compulsory licenses or special fixed rates, so that we wouldn't have to negotiate (with every copyright owner), because basically there is no free market. Unlike ordinary markets where there are buyers and sellers, if you don't like what that seller is asking of you, you go to another seller. In this business the FCC says to you **that you must carry these local signals**, every program, every commercial, every test pattern, without change. So we have to go to the guy that has those programs and commercials and test patterns, the fellow who owns those copyrights. **And when you do that, he's got us.** It's impossible to negotiate.

"You may wake up one day and find yourself dead"

The same thing goes for distant signals. They are as important to us as our local signals. You can't keep this industry going without them.

So it is important that there be some kind of compulsory license. A compulsory license really means that 'the guy who owns the copyright is deemed to have given you the right to use it whether you know who he is, have ever met him, have ever talked to him, or have ever had any correspondence with him'. You pay him the money, and you've got the license.

So we won the two cases, it turns out. **I give terrific credit to the NCTA**; these were magnificent fights and the rumor is that a million bucks was spent on the Fortnightly Case, but it was worth it. And now the FCC has 'freed us up', although it may not be much of a freeing.

The other side, if you think about it, **has played its hand**. They lost the two cases, which they were sure were going to frighten us into some kind of copyright legislation which we couldn't really live with. And we now know what the FCC was intending to give us in return for our paying copyright. **And in my view it really isn't worth paying copyright for**, when you think about it. It

hasn't freed up the big markets and we are plagued with all kinds of problems.

Well, we were committed. Or at least our national apparatus was committed. There we were on the road to copyright, following the copyright track and **we couldn't get off of it**. Well, maybe we could salvage something. Get the fees cut, and get rid of that obnoxious sports blackout, for example. And these were the issues that our attention was directed to. We won big, we were told. The trade press labeled the bill's passage in the committee as a victory for CATV.

What is this bill? This bill is 100 tightly written pages of dry reading material. **Then there are 138 pages of 'translation' from the baloney.** But even the 'translation' doesn't help you very much; there are hundreds of open (un-answered) questions.

When I saw this I began to ask around, 'Had anybody ever done an in-depth analysis of this bill?' Wherever I asked, I drew blank responses. If it had been done, nobody seemed to know anything about it. So I did it myself.

And I tell you, and I tell you in absolute seriousness, that if you haven't read the whole bill, there are some real surprises in store for you. **You may wake up one day and find yourself dead.** Now after you hear me, you can shrug it off and say, 'So what?' But I think you ought to know about it, and this is what this little exercise is all about."

FIRST OFF

"Let me get to the so-called 'cable victories' and examine them. They are what I like to call 'tip of the iceberg issues' or romance issues. These are important, I don't deny that, **but they are not the whole bill.** As a matter of fact **they are not even victories.**

"The Commission has its own proposal outstanding for restricting sports."

Let's take the halving of the (copyright) fee schedule. That thing is only a temporary matter, as I shall show shortly. But I can assure you that the process for re-doing these fees starts almost immediately after this bill becomes effective. And there is no question

that most of the Senators who were following this in the Senate expect that those fees are going to go up. Now I did the unpardonable; I read the Congressional Record. I looked at the debate on this bill on the floor of the Senate. Here is Senator Tunney (California) talking about the fee schedule, 'The Judiciary Committee ultimately decided to establish a low schedule of fees with the understanding that the Copyright Tribunal would very quickly examine and establish the fee schedule without being affected by the Congress's initial decision.' So there is no question that if those fees don't go up, and quickly, there are going to be some surprised people in the Senate.

"Congress didn't think they were doing any big deal by taking sports blackout out of this bill..."

Now on sports. All of the provisions dealing with the sports blackout were stricken. However, **the Commission has its own proposal outstanding for restricting sports** (carriage). It is not as tough as the one in the original bill, but it can be very troublesome for every operator in this group. And the Commission **will do something**; and I tell you that they had better do something because the Congress is saying that if the Commission doesn't do something, that they (Congress) will do something.

Let's quote Senator Gurney of Florida, who is not really unfriendly to the cable industry on this issue. He said, 'If I were a member of the FCC, I would get the impression that the U.S. Senate is telling me that cable television is not good for sports; and as a Commission, look at it and do something about it.' Now there is Senator Hruska from Nebraska, and he too by the way is not unfriendly to cable on this issue, who said, 'It will be wiser to wait for the FCC's decision on this matter, expected by year's end (than to include sports in this bill), and then assess in thorough hearings the need for further legislation on policy instructions to the FCC.'

In my view, very clearly we are being told that the Congress didn't think they were doing any big deal by taking this (sports blackout provision) out, because the Commission was going to take care of it for them. And

BECAUSE YOU WERE

NOT THERE

CATV operators representing systems in at least 18 states gathered in Lexington, Kentucky October 3, 1974 to participate in what had been billed in advance as a "*Copyright Summit*". Headlining the event was the participation of former Cable Bureau Chief Sol Schildhouse, ably supported by California attorney Harold Farrow. The purpose of the "summit" was to bring together acknowledged leaders in the industry to hear Schildhouse and Farrow explain their views on Senate Bill S.1361, passed by the United States Senate September 9th.

At a time when many in the industry have been saying, "This is a good bill for CATV...", or "This is the best bill CATV can expect...", Schildhouse and Farrow have been suggesting, "This is a terrible bill that will wreck CATV as we know it today, and prevent our industry from ever being anything like its real potential." Because Schildhouse and Farrow make their case so convincingly, and because they are traveling around the country to present their views of the bill to as many CATV operators as they can, CATJ is devoting several pages this month to excerpts from the Lexington, Kentucky program.

Issues are raised which have not been raised previously. By providing a forum for these issues, CATJ hopes that all operators will take the time to conduct their own study of this very vital issue now before our industry.

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when we were in Boise the other day, Commissioner Quello was saying very nice things about cable, but when he got to sports, he said, **'On sports I feel otherwise and I feel we have to do something about that.'**

So both of the victories on the romance issues are going to be short-lived. I am not downgrading the 'victories', but I do feel that we ought to keep a proper perspective at all times.

**"The real crux is establishing by
law that cable owes copyright"**

The real crux of copyright is the principal of establishing, by law, that cable owes copyright. That is the big thing. Once the broadcast industry gets that on the books, they will work out tougher terms for cable over the years. And they can do it; the bill lets them do it."

INEVITABLE?

"Now I notice in making meetings here and talking with cable operators that there is a feeling that this bill is inevitable. My God, the bill passed 70 to 1, it is a steamroller that is going to swallow us up.

This bill is not inevitable, not by a long shot. First off, a bill of this kind has been pending in the Congress for ten years now. As a matter of fact the Copyright thing started in 1955, with an appropriation by the Congress to the Copyright Office to start looking into this thing. It took them eight or ten years to get studies out, to get pamphlets printed, and so forth. And after ten years, a bill was introduced. And I think that we are not any closer to a bill than we were seven years ago (1967). In 1967 the House passed a bill by 379 to 29; that seems roughly comparable to the 70 to 1 Senate passage on September 9th. Another feature of that House bill was that it passed in April of 1967; that means one house was finished in April of 1967, and the Senate was at that very moment sitting, holding hearings. And there was almost two full years to go in that session. **And they failed to bring a bill out.**

Now when you think about it, this is an Omnibus Bill. **Omnibus is a fancy word that**

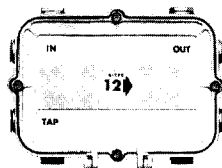
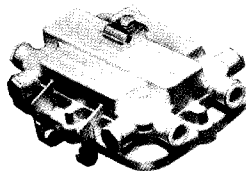
means the bill covers the whole spectrum of **copyright**. There are juke boxes, cable, performance by broadcasters, and new fee schedules for guys making records, just to name a few of the many included. In all of these, there are complications. For example, Section 114 which was the performance royalty for broadcast stations. This fee schedule would have had the broadcasters paying Bing Crosby for singing **White Christmas** or whatever. That section is now stricken. But CBS, which owns a number of large broadcasting properties, will 'fight in the House to get Section 114 reinstated'. Why would a broadcaster fight to pay a new royalty fee? **Because they have a big records division**, and they figure to make more money extracting from the broadcast pool than their owned and operated stations would pay in. The record manufacturers are sore as hell about Section 115, which under the present fee, they pay 2 cents a record, but under this section, they would pay 3 cents a record. If you read the record industry trade press, you see that some of their spokesmen are predicting that the records-fee issue will be major battleground in the House...expect that to happen. You know Senator Pastore himself, when this thing was being debated in the Senate, said, **'The Senate is wasting a lot of sweat in considering such a controversial bill that has no chance of passage in the House.'**

And the speculation is that Pastore will vote to kill this bill if Section 114, the broadcast performance royalties, are reinstated. Pastore of course chairs the Senate Commerce Committee, which, while not authoring this bill, has special prerogatives and concerns about this bill, as we saw in the recent July/August period.

There will be hearings in the House, and endless debate there. And I don't want to overlook the fact that the whole bill really can flounder in the interaction and jealousies between the Commerce and Judiciary Committees of each house.

There will therefore, in my judgement, be ample opportunity for cable to intrude and make its case, old and new, at every step of the legislative ladder. When a proposed law would set up economic advantage for one group over another group, there is constant lobbying and weighing of economic interests. And Congress is going to have to resolve these issues. And this endlessly delays doing so. **There is a ten year record to prove it. Be-**

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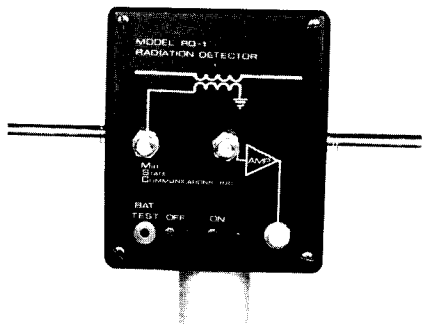
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cause some constituency is likely to be hurt no matter how each Congressional vote goes, so this entire copyright package, and I have to emphasize the fact that it is an Omnibus Bill, not merely cable, and a very shaky stringing together of a number of compromises, any one of which can come apart and delay further the bringing off of an Omnibus revision bill. I am saying that this bill has been there for ten years, and I am not so sure that cable should be breaking its neck to bring that thing off as a piece of finished legislation."

WHAT DO WE DO?

“What should our position be? I suppose that we are at the point now where we ought to adopt statesman-like poses. Our position should be one in the best interests of cable and have some decent logic going for it. It is not enough to say, ‘Hell, we don’t want to pay because it costs.’ Clearly, it is in the interests of cable to not pay because it does cost. But it is also logical. **The Supreme Court has said twice that we do not owe;** that cable does for the viewer what he could do for himself. And the viewer doesn’t owe. But there is other logic against copyright, and I want to deal with that for a bit.

"The Supreme Court has said twice that we do not owe..."

For example, this copyright bill does dampen cable's chances for wiring the country and for providing all of the great benefits that we are supposed to be getting from a wired nation one day. **Now you have to remember that copyright is going to be a permanent bite**—forever. Forever meaning, at least, since 1909 was the last revision and this is 1974, we are talking 65 years I suppose. In our lives, that is a long, forever-type time. It will take a good chunk out of industry revenues that would otherwise be available for new construction or rebuilding. The broadcast industry knows this and is pushing copyright like crazy, even though it is hard to see how they gain from it, except by hobbling cable's future. Which I will suggest as we go on is part of this. **I don't have a conspiratorial**

view of life, but I am slightly suspicious. Now in terms of how much money will be siphoned away from cable, it is probably a workable ball park-like figure to take present year industry revenues of six hundred million dollars, which would be subject to taxation. Then take a 2% rate, which I kind of picked as an average between the low end 1/2% rate which applies to only small systems and low subscriber totals, and the high end 2-1/2% rate which applies only to the larger systems, and you have twelve million dollars a year. If you want to think in terms of estimating company liabilities, ATC will owe about a half million dollars, Cox about four hundred fifty thousand, and TelePrompTer a million to a million and a half dollars for the current year. And that is just going in, mind you. And that is absolutely permanent if you believe that changing this legislation is going to be quite difficult.

"I don't have a conspiratorial view of life; but I am slightly suspicious. . ."

Now, I say this is only going in. You have to remember that the machinery for adjusting this bite upwards is built into the bill, and that it starts very soon after the bill is passed. These rates are going to go only one way.

Now there is a correlary to cable's growth being dampened by copyright. And that is the fact that the broadcast monopoly is being perpetuated. That is all part of this copyright thing. **Broadcast TV**, if you think about it, **operates in a climate of scarcity**. There are basically three networks; the stations don't exist to build a fourth. There are enough advertising dollars to support those three networks, and maybe not any more; and the only threat of possible competition to the existing network system is the possible activation of UHF assignments, and there are not enough of those operating now, or planned, to really scare the broadcast network people."

NOW ALONG COMES CABLE

"Now along comes cable. And what does cable do? **Cable offers the threat of origination, advertising, new network, pay, all of**

which figure to compete vigorously with conventional TV; and conventional TV kind of likes the way things are. So anything broadcasting can do to cripple cable, they will try to accomplish. And copyright is one of those things.

Let me give you a perfect example of why I think this argument is irrefutable. Let's take somebody like CBS. CBS is different from a guy who has a theatre, where he sells you a performance. **You buy a ticket and you go in there and you watch that performance.** CBS is taking you, the viewer, and selling you to an advertiser. It is taking your attention and selling it to an advertiser. **It is not selling you the program;** what it wants is lots of your attention. So what it does is take its (CBS) program and go to a local affiliate and says, 'Look, what we want you to do is to get us lots of viewers, and we will take these viewers to advertisers and if you get us lots of viewers, we get more advertising dollars which we will share with you.'

Now here in the same town is another means of distribution for those CBS programs... the cable system. **You do the very same thing for CBS; you get them viewers.** And they look at you, and they say, 'Oh hell, you pay us, because that is what copyright is.'

What they are doing clearly, in my judgment, is discriminating in favor of an existing system or apparatus and breaking their necks to shut out this competing form.

Not because they don't want the viewers, but because they are afraid that if this industry ever grows to something, it is going to give them the kind of competition that they don't want. And the kind of competition they don't want is the fourth and fifth networks.

". . .the broadcast monopoly is being perpetuated. . ."

Now, as part of its strategy to shut out cable, the broadcast industry is going after the pay cable thing. It is going after it with a vengeance. They have a special NAB group and separate war chest. There are FCC rules on the books which limit the amount of sports and movie products available to pay cable. And they are fighting hard to keep the FCC

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from easing those rules. The rule is called anti-siphoning, and it is a sick joke when you think about it.

Broadcasters are buying up every big blockbuster in sight, on the theory I suppose, that's the way to ruin this generation's pay cable effort. If enough pay-cable boxes are taken out of subscriber homes, in existing situations, because over-the-air films are so great, and if the three or four principal guys in the pay cable business go under, nobody will try it again for five or ten years. Actually, this is siphoning in reverse. **They are taking product away from us.** And this generation of pay operators could no more buy **The Godfather** away from network TV for that ten million dollar price that NBC paid, than they could fly to Mars.

"Actually, this is siphoning in reverse. . ."

And it is no surprise, if you buy this view, that there is a hooker. There is a section in the copyright bill against pay cable. The bill going in **does not** levy against pay revenues. But the Copyright Office, and the Copyright Tribunal which the Copyright Office is permitted to put together, **can broaden the base to include pay revenues.** The tip-off on what to expect is the fact that at the very beginning you must **report all of those revenues** even though at the outset you do not have to pay.

Section 111 kind of innocently says such such things as, 'Every three months, if you are a cable system, you have to file a statement with the Registrar of Copyrights at the Copyright Office, for the preceding three months.' And you have to tell them (1) **the number of channels on which the cable system made secondary transmissions**, (2) **names and locations of all primary transmitters**, (3) **the total number of subscribers to your system**, (4) **and the gross amounts paid to the cable system.** Then, you have to submit **separate statements** of the gross revenues paid to the cable system for advertising, leased channels, and cable casting for which a per channel, or per program, charge is made; and you have to report that every three months.

I am suggesting that is not in there accidentally, and I will demonstrate to you as I go on, that you can expect that when it comes to adjusting percentage rates and broadening the base, which is what the Tribunal can do, that **this is what they will do**, or are likely to do, or there is a real threat that they will broaden the base to include these additional cable revenue sources. Now I think this is really one of the great dangers of this bill.

When you think of this view of copyright, it really diminishes cable's ability to compete, and it perpetuates the broadcast monopoly. When you look at it this way, copyright **which really** ought to be imposed in the interest of encouraging creative types to write and produce, **is against their interests**. It is going to cripple a technology which offers new hopes for a film industry that has staggering unemployment. Creative people have an awful lot to gain from a healthy, expanding cable industry, and from sharing in a copyright pool as it is now being structured. Cable enlarges audiences and it should make their current output worth more.

It was no accident that Jack Valenti (MPA Chief) was down at that great NCTA Board Meeting at La Costa... **I thought it was a splendid meeting**... saying, 'We are with you; we want to break those anti-siphoning rules because our creative ability is elastic; you demand movies, we'll make them.' And so it is in the best interest of copyright holders, and this is a case that can be made when we start to make them, that this present bill actually inhibits creative production, because it inhibits this industry.

Now with all of these great things, how is it that we are being pushed into paying copyright? Aside from the sheer power play of the broadcasters who want to leave everything as it now is, **what is this all about?**

"This is really one of the great dangers of this bill. . ."

There are a couple of arguments going around. One of these is a gut feeling that **since cable makes money, it ought to pay**. This is the old **piracy** argument. But I swear to you that it does not hold up under examination at all.

Cable, for example, increases audiences, and therefore **figures to make more money** for the program people. Secondly, as I have pointed out, cable figures to make a lot of new money for program creators and suppliers; **if cable ever gets rids of its shackles**.

". . . cable is becoming a growing voice. . ."

Now getting down to that piracy argument, not everybody who makes money out of copyrighted materials has to pay, either under the present law passed in 1909, or under the new law. **There are a great range of people who do not pay**. I want to touch on just a handful of those. There is the guy who makes the receiver, and the guy who makes the antennas. How about the guy who sells used books? He doesn't pay anybody. He is making money out of some other guy's creativity. This list is endless.

The question of copyright has always been 'How far should the copyright monopoly really extend?' It doesn't cover everybody who uses copyrighted materials. It shouldn't cover a technology, such as ours, **which benefits the copyright holder**. Now they also tell us, **we must get right with the FCC**. There is the matter of the Consensus Agreement. We agreed as an industry to support a Copyright Bill in exchange for a freeing up of the rules. **And there is worry about retaliation by the FCC**.

The FCC has already promulgated the program under which we must live. **And it isn't much**. It has slowed growth and impeded our natural development. The FCC is not likely to take it back, as little as it is worth. To begin with, the broadcast industry thinks it is reasonably okay. They are pretty satisfied with it, so the Commission is too.

Secondly, cable is becoming a growing voice, and **could create a considerable popular stir if the Commission ever tried to cut us back**. Now I have learned that from coming to meetings like this. I think it is possible to rouse those people up out there. People who watch television on cable are a different breed from those who watch it directly off the air. A guy who watches television on cable went to a lot of trouble to make sure

he's got cable service. The rest of us don't have it, we take it or leave it, and don't care either way. I think it is possible to stir up an awful lot of popular sentiment and I think the Commission knows that; **and they wouldn't want to do that if there is no great big prize for them.**

"All of the signs point to our continuing to fare badly at the FCC. . ."

Thirdly, I think now it would be way too difficult. **I don't know what it is we have that is worth so much they could take it back.** It would be too difficult to avoid the clear appearance of retaliation against a new technology.

Now as for helping us, if we knuckle under to copyright; that seems too far fetched to me. **The broadcast industry, candidly, is still the more influential constituency of the FCC** and would effectively resist. All of the signs so far continue to point towards our continuing to fare badly at the FCC. The pay issue, which has been delayed for a couple of years, is delayed again. They have heard the arguments over and over and over again. Non-duplication continues on the back burner; even though everyone (including the Commission) knows how unfair and difficult it is. **A rule eliminating sports carriage is a certainty,** because the Commission has a mandate from Congress. Then there is the two tier and three tier problem, and what do they give us but task forces and committees. I think what the Commission is telling us is that, **'No matter what, we aren't going to get any big break-throughs from them.'**

THE BILL IS TERRIBLE

"Now, let's get into the realities of S.1361. **I think the bill is terrible.** And that is kind of beating around the bush! It is terrible and it is one-sided. It is much more than a simple 2-1/2% bill with a mild or no sports provision. That initial fee schedule is only temporary. Dick Jencks, who is the big CBS gun in Washington, was quoted as saying, **'The most important thing to come out so far is establishing the principal of copyright.'**

Six months after this bill becomes effective, the Copyright Office gets the process

underway. This is not covered in Section 111; that is why it never gets much attention. There are really eight chapters to this bill, and this one is buried way in the back.

Now on July 1, 1975, and this assumes passage of the bill on or before December 31, 1974, 'The Registrar of Copyrights shall cause to be published in the Federal Register Notice of the Commencement of Proceedings for the Review of Royalty Rates specified by Sections . . . ' and 111 is mentioned. What does the Registrar do? He sends communications out, and he notifies everybody with an interest in the rates. How that is to work we don't know yet. Some people believe that a notice can be published in the Federal Register; others say, 'No, they must send a letter to everyone involved.'

The next thing he does is to write the American Arbitration Association and he says, **'Send me the names of three arbitrators.'** And, they send him the names of three arbitrators, professional people, possibly lawyers, with a good deal of experience in labor law, but probably very little, if any, experience in this new field.

He takes these three names and he communicates them to everybody with an interest. You look down the list and you probably don't have any familiarity with any of these people. However, if there are any objections to any of these people, the Registrar of Copyrights has the right to say, 'Okay the objections are well taken, and I will knock them out . . . ' or, he has the right to say, 'No, the objections are invalid and I will keep them on.' But I assume he will be conservative and knock them out.

"Congress does not have to intervene"

Then what? Then he goes back to the American Arbitration Association and he says, 'Send me more names.' **The next batch of names they send him—that's it.** That becomes the three-man panel which makes up something called the Copyright Royalty Tribunal. They have a limit of one year on how long they can take to re-assess the fee schedule.

At the end of that one year period, their recommendations go to the Congress. And Congress **can** pass a resolution voting it down. **If they don't do that in ninety days, then the recommendations become effective and that is it.** Congress does not have to intervene. They can just ignore the matter, and it will automatically become effective. I don't think Congress would want to intervene, because they don't want these endless legislative battles. So we are talking about, two years after this bill becomes effective, having whole new rates and perhaps a broadened fee base. And every five years thereafter, Copyright Tribunal review is an automatic thing. So we are talking 1977 for the first review, again in 1982, again in 1987, and so on.

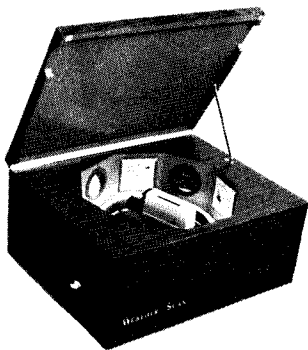
I said that the Copyright Tribunal cannot only adjust rate percentages, **they can broaden the base from which fees are extracted.** This can include pay cable, advertising, leased channel revenues, and so on. I read that section to you in which you must report not only subscription income, but also income from all other sources. Now there is another provision, and that is Section 801. That says,

'Subject to the provisions of this chapter, the purpose of the Tribunal shall be to make determinations concerning the adjustment of the copyright royalty rates, specified by Section 111 (and some others), and to assure that such rates are reasonable, and in the event that the Tribunal shall determine that the statutory royalty rate or a rate previously established by the Tribunal, **or the revenue bases in respect to Section 111,** does not provide a reasonable royalty fee...'

"...it in no way restricts the independence of the Tribunal..."

In other words, if they determine that the 2-1/2% is too low, or that the base (covering only subscription income) is too narrow, **they can make the adjustment,** broaden the base, do any damn thing they want to do. Now that is the kind of thing that is going to happen beginning six months after the bill becomes law.

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Now suppose they are a bunch of nutty guys? What do you do about it? Suppose they go crazy and do a bunch of dumb things?

Let me tell you what their instructions are, from the bill. They are to fix reasonable rates. This is what that is supposed to mean. The bill's translation, part of that 138 pages, says, **'With respect to the adjustment of the statutory royalty rates, the purpose of the Tribunal is to assure that such rates are reasonable. The Committee in fixing the royalty rates has had to weigh various considerations, such as the circumstance that certain users will be paying copyright royalties for the first time, and that a new performance royalty is being established. While these considerations influenced the Commission's determination on rates, it in no way... it in no way... restricts the independence of the tribunal to make adjustment of these rates to assure that these rates are reasonable, according to whatever criteria the Tribunal deems appropriate. The Committee does not intend that the rates in this legislation shall be regarded as precedence (the 2-1/2%) in future proceedings of this tribunal.'**

"...the Committee does not intend that the rates shall be regarded as precedence..."

Nothing could be clearer.

Suppose that they do something goofy? What do you do? Ordinarily when you are aggrieved, you go to court. Let's see what happens on that.

Your chances of stopping this are slim. You won't even be able to get to court, probably. You won't even be able to get to court, for example, if they decide to broaden the base to include pay cable revenues. You won't even be able to get to court to argue that full copyright liability was originally paid on the films. The reason you won't be able to do that is because this bill says, **'We don't want any court review.'** Page 205 of the report reads, 'It is the view of the Committee that the Copyright Royalty Tribunal affords the most practical and equitable forum for final determinations concerning...', and so on and so forth. And it concludes, **'The Committee believes that no useful purpose will be served**

by providing for a general review of such determinations by the Federal Courts.'

And so they say the **only** cases where you can go to court to attack one of those awards is where you can prove that it was secured through **corruption, fraud**, and so on. You have about as much chance of doing that as you have of flying.

"...we have unleashed people that we don't know..."

What we have done is unleashed people that we don't know to decide what our rates should be, what our revenue base should be, with Congressional blessing that there are no restrictions of what they can do. They can do as they damn please and then we are all told, '...and you can't go to court to stop them.' **Now that, to me, is extremely dangerous.**

Now the one way you can stop them, and I want to deliver it all, is to go **back** to the Congress and get them not to approve the rate increase or broadening of the revenue base for the royalty fees. **Now that is not a very promising prospect.** We would be facing an array on the other side that includes movies, sports, broadcasters, and **the same old line up** that are visiting our current miseries on us. And that is tough going to have to do that periodically."

WHAT NEXT?

"Now putting aside for the moment that cable should not pay any copyright, and assuming for the moment too that cable will be able to handle the fee schedule going in, the likelihood that there will be rate increases after two years, and after five more years, are an unsettling circumstance. You know, the people in Washington, the Bureaucrats... and I was one of them... make all kinds of speeches that this industry is never going to amount to anything until they settle one of the variables in their budget. They said, 'Bankers are not going to take a chance because the copyright thing is unsettling.' They were telling us, 'How can you plan your operating expenditures and your cash flow, when you don't know what the copyright bite will be?' So they are saying, **'Agree to a copyright bill like this.'**

But the likelihood of upward rate adjustments, in this bill, actually **increases** the uncertainty of our future operating budgets. Now we know what the going in costs will be for a year or two or three, but after that, **we are faced with even more uncertainty than we have today!**

There is no final settlement of liability in S.1361; **the sky is the limit.**

Let me tell you another little thing about this. Cable is being singled out, with respect to broadening of the base to include pay, leased channels, and all of that; **cable is the only industry among all of the new compulsory licenses created that are subject to that condition.**

Let me tell you a little story about this bill. How do you get changes in this bill? On the floor of the Senate, somebody made a motion to strike juke boxes from the compulsory tribunal structure. You know juke boxes didn't want their rates to be periodically adjusted upward. Then Senator McClellan said (from the Congressional Record), **'No, don't tamper with this thing. Let an expert body handle it.'** That expert body being the Copyright Office. And then he said, **'The cable industry has pretty well been cooperative in this thing to try to work out something they could live with; they have agreed to the Copyright Tribunal and I think juke boxes should go along also.'**

"...we have got to avoid putting the Copyright Office in the cable business..."

Let me tell you what happened on that one. The cable industry, **which has been so nice**, is still in the Tribunal's act. And the juke box people? They were so lousy and wanted out, **and their amendment got through**, striking the juke box people from the Tribunal. **There may be a message there."**

THE COPYRIGHT OFFICE

"Now this bill authorizes the Copyright Office to write rules and regulations to carry out Section 111. You can expect regulations on **uniform methods of accounting** (that is a natural when they are collecting reports and data from the whole industry), **maintaining subscriber lists**, and perhaps even **supplying**

subscriber lists to that office. How would you like to have to do that; send your subscriber list outside your office?

On logging of programs? Why not. They are going to say, **'We want every program you carry on every channel logged** so that we will know how these monies are to be distributed.' The FCC already requires a little bit of logging, but that will be peanuts compared to what the Copyright Office will require.

I think the danger of being caught in a cross fire between the FCC and the Copyright Office, each having different requirements for the same situation, is considerable. **We have somehow got to avoid putting that Copyright Office in the cable business.**

I have to get back to the Congressional Record report on the debate for this bill. Senator Pastore said, **'We are going to have the most monstrous bureaucracy before we get done...'**, and I have to agree."

A NUMBER OF THINGS WRONG

"This bill has **no exemption** for small systems. Even though the **Consensus Agreement** said that systems with fewer than 3,500 subscribers **would be exempt**. The FCC has always supported small system exemption. Now the Congress tells us, 'You are getting a bargain rate on the first \$160,000 revenues collected.' But really there should be no payment at all; and **that bargain rate can, and will, evaporate** just as soon as the Copyright Tribunal gets into the act. Remember what CBS's Jencks said after the bill passed? He said, **'The most important thing to come out so far is establishing the principal of copyright.'** And recall that the Senate has told the Copyright Tribunal, **'The Committee does not intend that the rates in this legislation shall be regarded as precedence in future proceedings of the tribunal.'**

"...small systems provide a fill-in service..."

Generally small systems are in out of the way places and they provide a fill-in service. They are barely keeping their heads above water financially, and have no noticeable impact upon broadcasters, except in a positive way.

As a matter of national policy, actually **they should be supported and subsidized**, and not be made to pay because they basically fill in the deficiencies of the Federal Government's own artificially contrived television allocations plan that doesn't bring television to everybody. And people who help fill in these 'holes' ought to get some kind of a break.

Now that Cotton Amendment, which you all heard about, would have left way too much to interpretation of the Copyright Office. **It never got off the ground because Cotton never pushed it**; it was clearly a gesture he made for someone.

If small systems deserve exemption, I think **it should be across the board without regard to when the system started up**. It makes no difference when the system began. If the proposition is right that they are in out of the way places where the television allocations scheme perpetrated by the FCC misses direct home coverage, then they are serving worthwhile purposes. **It should make no difference whether they started tomorrow or yesterday**.

The exemption should also **not be geared** to system size. Otherwise what happens is that you get an operator with 3,499 subscribers and he stops. **It should be geared to the size of the community**. Take a number like 20,000 people. At 50% saturation of the 6,000 homes there, you have 3,000 cable homes connected. That way, when an operator builds a system in a town with 20,001 people, **he knows what he is getting into right at the beginning**. That way, no matter how many people you sign up, you are exempt, or you are paying copyright from the very start. This creates **one less unknown** for the new system and **adds stability** to the industry.

"... imagine the billion dollar cable industry paying Bing Crosby only \$7.82. . ."

All local signals should be exempt. It is crazy to charge copyright for carriage of local (Grade B or better) signals. When the cable system carries only local signals, **there is no question but the copyright has already been paid**. The broadcasters in your Grade B coverage area have already been to the payment

desk for all of the homes in their service area. **Paying for these same homes again is nutty**.

The broadcast/cable fuss has **always** been over **distant signals**. All of the FCC Chairmen which I can remember, with the possible exception of the present one, have urged a free ride for local signals. **Even the Registrar of Copyrights urged this**. Even Senate Bill 1361 recognizes this fact, and let me tell you how. **It exempts from copyright liability MATV systems that carry only local signals**. So what is the difference between an **MATV carrying local signals**, and a **CATV carrying only local signals**?

"... the TV station is empowered to take you to District Federal Court. . ."

So what is the difference? It is assumed that **MATV systems will not originate**, and they **won't inter-connect** for networking. And that is really what the broadcast industry is after. They don't see that threat coming from MATV's, and that being so, they would just as soon avoid a fight with the real estate lobby.

Then there is the matter of aural signals, from AM and FM stations. They get into the act as claimants to the Copyright Pool. That means **every** song writer, **every** composer, **every** arranger, **every** artist, and so on is going to be filing against the CATV portion of the Copyright Pool. I view this as a bad situation because with such a great number of claimants many of the 'awards' are going to be very small. And arbitrators sitting on these panels are going to see \$7.82 going to Bing Crosby, and they are going to say, 'Imagine the billion dollar cable industry paying Bing Crosby only \$7.82!' **And that kind of emotionalism is going to add to the pressure to raise CATV rate structure for royalty payments.**

THEN THE PENALTIES

"I tell you quite frankly that the penalty provisions are absolutely a mind blower.

First off, if you carry programs or signals **not permitted** by the FCC Rules and Regulations, you are subject to all of the penalties and remedies set forth in Chapter Five of the

Act. I am sure these penalties will apply to not complying with the non-duplication provisions and syndicated exclusivity rules of the Commission. The syndicated exclusivity rules are particularly tough to work with; you may not understand them or be able to interpret them.

For example Henry Geller, former General Counsel for the Commission, recently made a filing with the Commission, in which he said, **'No member of the Commission understands these rules or can explain them.'** And you are being asked, as a cable operator, to not only understand them, but to comply with them. Now if you make a mistake in applying those rules, I think you are in the remedy suit and subject to the penalty clauses of Chapter Five.

"Guess what the station has the option of doing next?"

And what are they?

First of all, **'...for the purpose of instituting actions for alleged infringements of copyright, Section 501 (C) makes the TV stations legal or beneficial owners of copyright...'** That is tough. The local television stations are given the legal right to act as if they were the legal owners of copyright, by Section 501 (C), **to bring suit against you**, the cable system operator, in the local District Federal Court. Here again **cable television is being singled out** by the bill for special action. If a man bootlegs or copies a song on tape, it is up to the **real owner** of that copyright to find that bootlegger in Oshkosh and bring suit against him. **But** in the case of cable, the suit is **brought against you by the TV station**, the same TV station that is already giving you fits with non-duplication protection, same-channel carriage, and all of those other numbers.

The TV station is empowered in 502 (A) to take you to court in the local District Federal Court, where **they need only allege** that you have violated their exclusive program rights. They bring suit against you following Section 1498 of Title 28, for **'...failure to carry fully, and with copyright exclusivity, any and all programs transmitted by that station...'** under Section 111.

The remedies which the station can seek run the gamut. For example, they can ask for a **temporary or permanent injunction** against your operation. They **could** ask that you be prevented from carrying any and all signals which might violate their exclusivity rights. And the Court is empowered under 502 (B) to enforce any injunction granted under **contempt proceedings**.

And the Court is further empowered by Section 503 (A) to impound any and all records of the system, **perhaps even the system**, pending an outcome of the suit!

And that ties you up just pretty good. For example, where are you going to find a lawyer versed on copyright in your area? There are very few in the whole United States. Can you afford to import one from New York or Los Angeles for the trial in your District Federal Court? Probably not.

Now what about damages? **The station sues you in District Federal Court alleging that you have violated their exclusivity.** And they ask for an award of damages. Section 504 (A) states that they may ask for **actual damages plus any additional profits which you may have earned** as a result of violating their exclusivity. Here is the clinker. The cable system is required by 504 (B) to **provide a statement of his gross revenues**; and then you are required to **prove** that every penny of that gross revenue was not profit! Think of the endless string of witnesses which you would have to troop to the witness stand in that one.

"Can you imagine the impact on your banker..."

Now suppose the station, having had you in court all of those weeks, sees that you are about to prove that your **actual profits were, or are, small**, and that they are not going to collect very much, if anything, for actual damages plus profits. Guess what the station has the option of doing next?

They can elect, under Section 504 (C) (1), at **any time** before the judge renders his final judgement and awarding of damages, to seek not actual damages plus profits, but **statutory damages**. Now statutory damages are set by the bill. They are a **minimum of \$250**,

And I need to point out that every incident of violation means **each and every program**. If your non-duplication switcher faults for an entire evening, and six programs run on a channel that duplicates the local 'protected channel', you have just chalked up six separate violations.

On the minimum basis, that is six times \$250, or **\$1,500, for one evening in which your switcher failed!** And the station gets to elect that statutory penalty, remember, **right up to the point where the judge would otherwise be ready to rule on actual damages** plus profits. At this point you may have already spent several very expensive days in court with your own attorney defending what your actual profits really are. **All of that goes for nothing**, when the station switches its request to statutory damages.

There is more. We have assumed up to this point your alleged violation was **unintentional**. Now suppose the carriage of another station or programs was intentional, on your part. Where it is up to the station to **prove that you did this thing intentionally**, and they do so, then the judge has the right under Section 504 (C) (2) to increase the statutory award maximum from \$10,000 per violation to **\$50,000 per violation!** Can you imagine the impact on your banker when he finds out that if your switcher fails, and you are not of a mind to fix it right then and there, **that an evening of programs, six let's say, could cost you as much as \$300,000 in fines?**

Finally, to add insult to the considerable injury, the court is given the power under Section 505 to award to the station **all attorney fees** and court costs borne by the station, **if you**, the cable system, **lose the case**. So the broadcaster has finally gotten the ultimate weapon against CATV. He has a threat that is mind boggling in its implications. He must only **allege** that you have violated his exclusivity to take you to court. He can obtain **injunctions** to slow down or stop your operation while you are in court. He forces you to hire **expensive specialty attorneys** who understand copyright. He forces you to **prove** that not only did **you not violate** his exclusivity, but also that when you did it, **you made no extra profits** by doing so. Then if you can do that, he has the right to still **ask for an award of a fine** set by the law itself, and to ask that your company **pay his attorney fees**.

At this point you should be numb. **There is more.**

If it is found that you **willfully** violated the station's exclusivity rights, and this extends right down the chain of command in your cable system to include a technician **willfully forgetting to set up the switcher properly**, then Section 506 (A) directs the court to levy **'a fine of not more than \$2,500 per violation and place the violator in prison for not more than two years, or both'** and this is just on the **first** violation. For a second or repeat violation, the fine jumps to **\$10,000 per violation** and the jail term goes to **three years**.

Earlier I said that you may wake up one morning and find that you are dead. If your non-duplication switcher quits, or you find out that the syndicated exclusivity rules were incorrectly interpreted by you after the fact and after you land in court, **you might well wish you were dead.**

Thank you."

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TECHNICAL TOPICS

LINE EXTENDER PLANTS

Editor

The article by S.K. Richey (September CATJ, Pg. 28) on an all-line-extender plant confirmed my belief in current thought. This same idea occurred to us about a year ago because of the high quality of our own MX-404-4LE line extender. We have begun action on that thought and, if the small-system-building readers of CATJ will hold off until early 1975, we hope to have some encouraging news.

Our 4-LE extender has specifications which exceed those basic criteria specs set forth by Richey, to wit:

Gain	28 db
Cross mod at 50 dbmv output for 30 channels flat	-57 db (*)
Cross mod at 42 dbmv output for 30 ch./with 5 db block tilt	-77 db (**)
Cross mod at 35 dbmv output for 30 channels with 5 db block tilt	-91 db (**)
Noise Figure	10 db (***)
AGC	optional
Equalizer	plug-in

*—for 12 channels at 50 dbmv output, cross mod will be -65 db or better

**—I believe Steve Richey neglected to take his 5 db block tilt benefit to cross mod, of about 3 db; so his 12 channel cross mod would be -76 db (not -73 db) or -90 db (not -87 db); for 12 channels our spec is -84 and -98.

***—I believe Steve Richey has left out a needed paragraph which would be titled "**Objection—Noise Figure Buildup**".

Long cascades of line extenders, as proposed, with several amplifiers having real outputs less than the design operational output implies a noise buildup overall. Because most line extenders are level-adjusted via plug-in pads and variable controls **at their input**, the value of this front-end attenuation (for level adjustment) must be added to their real (in operation) noise figure. For instance, a line extender quoted as having a normal output of +50 dbmv with an operational noise figure of 12 db will need 15 db of input attenuation to achieve an output of +35 dbmv. Hence the operational noise figure becomes 27 db (12 plus 15 db of pad), the actual amplifier voltage gain being constant.

However, if the output (voltage) levels are controlled interstage and not at the input, there is significantly less effect on noise figure, on the order of 20%. In AGC amplifiers too the noise figure will vary in direct proportion to the input range, for a constant (i.e. AGC'd) output if the AGC action is employed at the input. For example, +/— 5 db change in the input for a 0.5 db change in the output results in a real life +/— 5 db variance in operational noise figure (as the input level is automatically "padded"

by the AGC circuit). However, if the AGC is interstage, noise figure may only be affected by +/— 1 db. Slope compensation (to look at a similar problem) whether padded, seasonally adjusted or thermally compensated, offers an identical opportunity for real life noise figure to get out of hand.

Thus, in cascading line extenders, it is essential to know the extent of the effects on noise figure of altered levels and (so-called) "gain" and "slope" variations, by your particular (chosen) equipment style. Noise, in fact, **not cross mod**, may well be the limiting factor in cascading line extenders for 12 channel service.

One additional consideration should be given to your system layout before you build with line extenders only. Small communities may grow faster than larger ones; planning for adequate growth in the beginning will save an expensive rebuild later on. Small systems can no more afford to be "penny wise and pound foolish" than their larger counterparts.

Finally, in the August issue, pages 18-25, there was a discussion on low band only trunking, and concern was expressed about a lack of solid state low band equipment. The Magnavox model MX-404 Series 4-6 might partially solve that problem; it is a 25 db gain (12 channel cross mod at +49 dbmv output is -57 db) 5 to 108 MHz amplifier.

J.B. Emerson
Director, Communications
Magnavox CATV Division
Manlius, New York

Richey Responds

You are absolutely correct; our model amplifier for this report was based upon the TRW CA 601BU module which has a flat output spec. We assumed a worst-case cross mod situation, and did neglect the improvement due to 5 db tilt. Thus, in this area, our numbers were conservative and in an actual situation, the cross mod would be 3 db better than our report suggested.

On the matter of noise build-up, you have made the assumption that the extender would "have a normal output of 50 dbmv", run out at +50 dbmv. Normally, this is not the case. If we have an amplifier with a 28 db of gain (i.e. the Magnavox 4-LE) and a noise figure of 12 db (our initial design criteria), and we go into it with +10 dbmv and operate it at 25 db of gain, we will be attenuating the input by 3 db (the difference between 28 db of operational gain and the 25 db of gain selected). Hence the operational noise figure becomes 12 db plus the 3 db input attenuator, or 15 db, not the 27 db noise figure you suggest.

Now if we go further and adopt the theoretical minimum 75 ohm noise figure of a perfect amplifier (-59 dbmv) and add to that the 15 db noise figure of the amplifier under discussion, we have an operational noise factor of -44 dbmv (a real voltage level). To this we must add an additional 6 db of noise which results from cascading 4 line extenders utilized as trunk amplifiers (Pg. 32, September); we now have a real noise factor of -44 plus 6, or -38 dbmv. Thus at this point it would be possible to have a signal plus noise to noise ratio of 44 db with inputs as low as +6 dbmv (-38 plus 44 db). With +10 dbmv inputs, there is no actual degradation.

Your question concerning the "\$20.00 AGC option" is best answered by referencing to the Jerrold price sheet. Their model SLE-300 extender lists for \$225.00, and this extender has the design criteria which we spelled out in the September report (as do other brand units). Jerrold also lists the SLE-300A which is the same extender with an AGC module addition for \$245.50. This is an increase of \$20.50 for the AGC option.

Finally, please tell us more (even if in January) about your own firm's plans along this design-area. I am sure many of CATJ's readers will find the information exceedingly useful!

SELECTIVE FM RECEIVER

Editor CATJ:

May I comment on your article on the Heath AJ-15 appearing in the September CATJ? You quote an "adjacent channel rejection spec of -70 db". This is in truth the spec for "alternate channel rejection". In case you may not be familiar with the phrase "alternate channel", it comes from the IHF (Institute of High Fidelity) Standards. Defined, it means "next immediate non-adjacent channel". For example, the "alternate channels" to 98.5 are 98.1 (lower alternate) and 98.9 (upper alternate); whereas in CATV lingo the "adjacent channel" to 98.5 are 98.3 (lower) and 98.7 (upper). This is a most important distinction because, rather than talking -70 db at 200 kHz spacing, we are talking -70 db at 400 kHz spacing. In CATV spec language, the rejection at +/- 200 kHz (true adjacent channel) is more like 38 db.

Morrie Goldman
Bell & Howell, Inc.
Chicago, Illinois

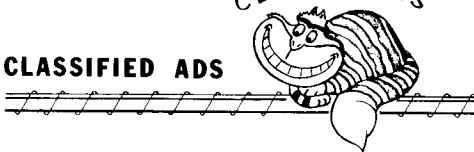
Morrie:

Yup, you are right. We re-dug out the AJ-15 manual for this spec. It reads, "Selectivity -70 db*". Down at the bottom of the page, the * translates into "Rated IHF Standards". We couldn't find what "IHF Standards" were in the manual so we checked further and finally found them to be as you note here. We can't fault Heath for listing it the way they do "afterall, this is a tuner designed primarily for audiophiles, most of whom are consumers", although we wonder how many consumers understand IHF Standards. Nor can we really

fault the staff member of CATJ who prepared the report; in our language "Selectivity . . . -70 db" means the rejection to the nearest adjacent channel carrier. In the future we will certainly be more careful when quoting specs that originate outside the CATV industry! Oh yes, we brought two AJ-15's into the lab and "measured" the adjacent channel selectivity on both. One was measured at -39 db and the other at -40.5 db, so your "-38 db" is pretty close.

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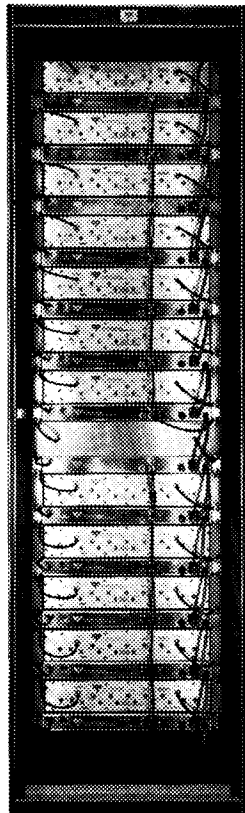
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FCC Public Notices Describing Decisions

Summaries of Basic Decision, Establishment of Advisory Committees on
Federal State Relationships and Technical Standards
Rulemaking on Sports Blackouts and

representing the most comprehensive first general rules have been adopted by the FCC. The range of issues from importation to cable systems, and from line of the proposed rules was issued 5, 1971. The Commission had adopted generally adhere modified in some respects to exclusivity and distant signal by groups in cooperation Communications Public 1971, 1972. The Commission of caution, we are delivering early requested so that we may reconsideration prior to the for more than three years we soliciting views, hearing arguments, maintaining alternatives, authorizing experts to public panel discussions unique in the making

Under the new rules, stations and three from 51 to 100, and two independent carry three channels are not be able to in service.

In addition, systems in the two additional have been in ment of state permitted Cable be permitted to in works and one in

The Commission additional signals minimal amount of investment capital needed for cable's potential open the way for full development of cable's potential

Cable Systems Outside of TV Markets

When a program is not available on a station because of non-duplication

system immunity limits from maximum stations. The wide latitude foreign gener

icated program a priority length—station have the highest antation rights at. The exclusivity In the top 50 carrying syndi have been notified

local station that carrying the program. The restriction applies for one year in cases of first run syndicated programs and for the run of the contract in exclusive contract situations. While exclusivity also applies in the second 50 markets, it does allow for greater accessibility of programs

