July 1984

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A MONTHLY NEWSLETTER FOR BROADCASTERS

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AM STEREO UPDATE: HARRIS MATCHES MOTOROLA!!!

In a surprising reversal of marketing strategy, Harris Corporation announced plans to modify its AM stereo system, so that the signal can be received on radios designed to receive only the competing Motorola system. The announcement was made by Gene Yaeger, vice president and general manager of Harris' broadcast transmission division, at the 62nd annual NAB convention held in Las Vegas, April 29th through May 2nd.

The modification involves the adjustment of the pilot tone frequency from 55 Hz to 25 Hz. The reversal followed a reported letter sent to receiver manufacturers from Harris in February of this year which stated that Harris would not change its pilot frequency due to the imcompatability of the two systems (Harris and Motorola).

Harris executives now believe that stations would choose their linear stereo system over the Motorola C-QUAM system because of the difference in quality and the fact that the Harris system is now receivable on both single and multimode receivers.

Where does all this leave Kahn communications? Well, President Leonard Kahn stated that he does have options available to him, but would first discuss those options with stations now using his sytem prior to making a decision.

The Harris decision was no doubt brought on by the fact that Motorola had taken the marketplace momentum. The C-QUAM system was the choice of the larger percentage of AM stations which had decided to go stereo. Plus many of the major receiver manufacturers shyed away from producing multimode receivers and opted for the Motorola signal.

The fact that the larger numbers were rolling toward Motorola was recently confirmed in a survey conducted by the N.R.B.A. Preliminary results of the AM stereo survey were released in the May 21st issue of the NRBA Monday Morning Memo. Surveys were sent to all AM stations in the United States in mid April with a total of 1255 or 26.4% of them responding.

Of those stations already broadcasting in stereo, Motorola was the number one system being used, with 40.5% of the total. Runner up Harris has been selected by 29.8% of those stations. Kahn is the next choice at 23.7% and the Magnavox system is being used by 6.1% of those broadcasting in stereo.

In adding up the numbers the NRBA found that 10.4% of the AM broadcasters who responded to the survey, are now broadcasting in stereo. Two percent have their stereo equipment on order and a whopping 87.6% are not in stereo and are waiting.

Other interesting points revealed by the survey included that among stations not broadcasting in stereo, and not including those with equipment on order, over one-third (36%) have stereo capability. Another 3.3% are in the process of making their stations stereo capable. However, virtually one-half (48.5%) indicate they do not have the capability for broadcasting in stereo.

The Harris modification will no doubt change the figures, but in which way, no one knows for sure.

*****

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Editor's Notebook

It was reported in the May issue of *Common Point* (NAB Wrap Up) that next year it's on to Dallas with bigger and better things. Well, I hope that you haven't made your reservations as yet. The 1985 NAB convention has another run in Las Vegas, before moving on. The schedule actually looks like this . . . 1985, April 14-17 in Las Vegas . . . 1986, April 13-16 in Dallas.

MERGE . . . According to Gert Schmidt, chairman of the National Association of Broadcasters (NAB), a merger between the organization and that of the Daytime Broadcasters Association (DBA) will take place upon completion of proceeding the DBA had initiated with the FCC. Schmidt reported that the NAB will pick up the nearly $40,000 debt accumulated by the daytimers.

Ye Olde Editor

REAL TIME . . . Reports from those stations currently using the SI-TEX color radar unit point out that precious time is being saved in reporting severe weather. The CR1011 is the most cost efficient real time, color radar unit on the market today. Install listener confidence in your coverage area now . . .

REMOTELY RELATED . . . With the fall football season sneaking up on us, it's time to check out your remote equipment. If yours has seen better seasons, you may be interested in the Zercom MAXI TWO special, outlined on page 9.

******

SEE HOW OUR NEW STEREO GENERATOR STACKS UP!

SG 800 STEREO GENERATOR SPECIFICATIONS

Dimensions: 19" rack mount by 1¾" by 12"
Operating Temperature Range: − 10° C to + 40° C.
Power Requirements: 10 watts nominal, 110 to 125 VAC.
Input level sensitivity: − 10 dbm
Input Impedance: 600 Ohms, balanced or unbalanced. Active Transformerless input.
Composite Output Level: 6 Volts, peak
Audio Frequency Response; 10Hz to 15kHz, plus or minus 0.2 db.
THD Distortion: (10 to 15kHz) less than .03%
IM Distortion: less than .03% (60Hz/7kHz at 4:1)
S + N/N: 80db or greater, referenced to calibrate level
Pilot Frequency Stability: Less than 1Hz from − 10° C to + 40° C.
Crosstalk: Left/Right and Right/Left, 60db or greater
Crosstalk: Main to Sub and Sub to Main, 60 db or greater
Pre-emphasis: none
Low Pass Filter: none

Contols: Left and right input levels
Pilot on/off
Pilot injection level
Composite output level

Indicators: Power on/off
Pilot on/off
Audio input level

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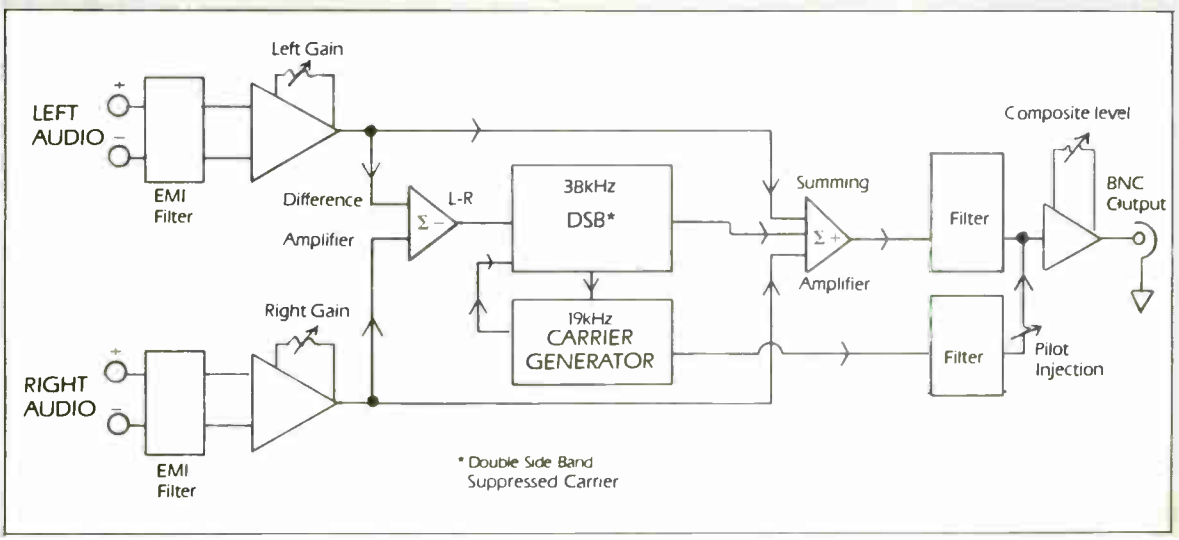


Crosstalk...

by ED DUELLMAN

If you recall, some months back in this column we published a computer program to plot the design of a parabolic reflector, or satellite dish. Well, I built a seven footer using that program and had intended to show you some pictures of my home built dish and receiver.

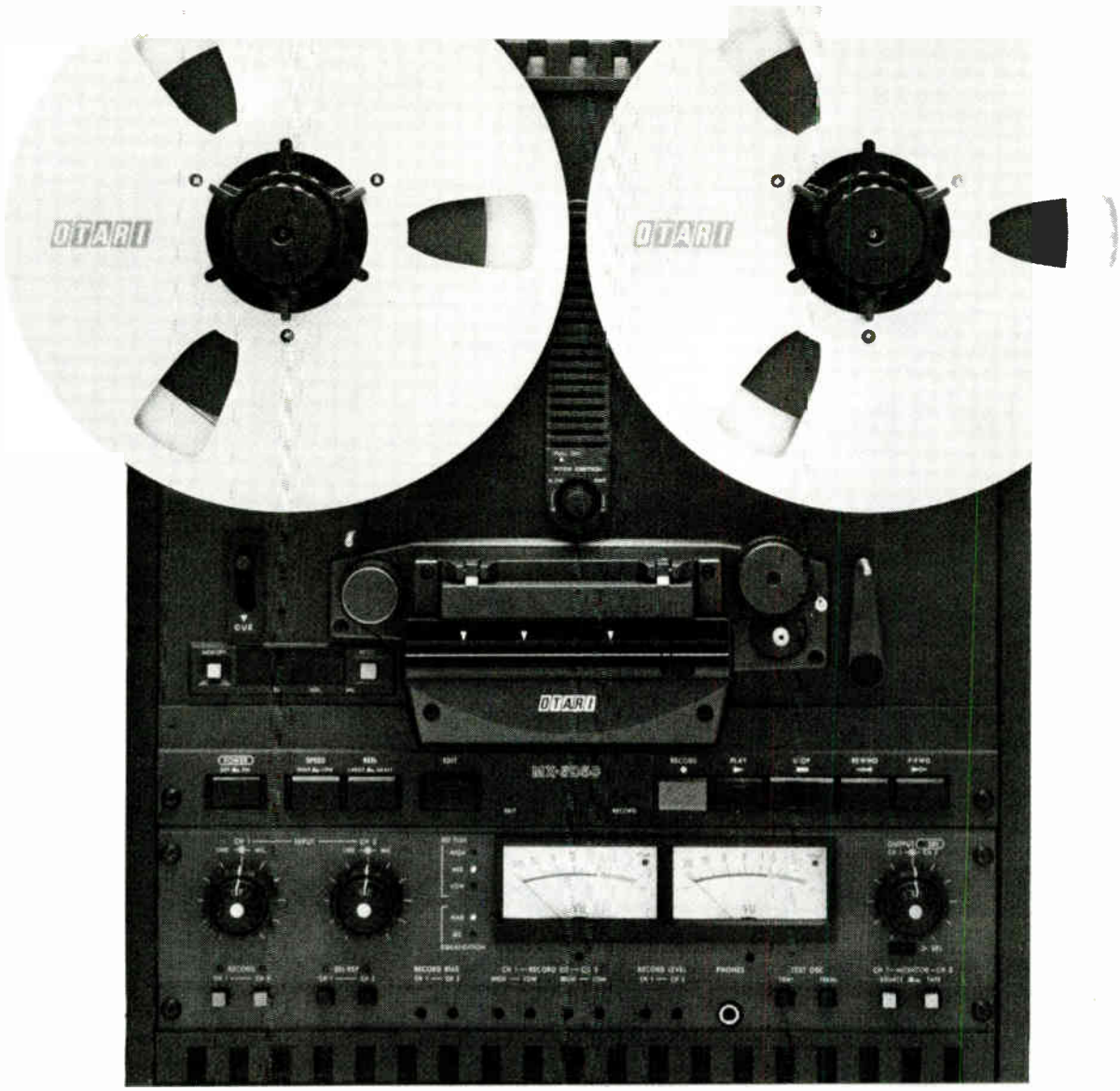
As things would have it, my camera decided it was lunch time and ate the film, the pictures along with it. If all goes well with me and the camera, next month we can all have a look-see at the kid's handywork. By the way, the darn thing works pretty good and is easy to build.

So instead of letting you all sit there and stare at a blank page (some would prefer that), I thought that I would discuss single channel per carrier - SCPC - method of satellite transmission and reception. Probaby a number of you are using that system and are familiar with it.

SCPC is an analog system and is quite simple compared to the digital system that is used by the big three (ABC - CBS - NBC) radio networks. The SCPC signal is not a subcarrier tagged onto a video signal. It is transmitted as an independent signal in the passband of the satellite transponder. If you use Westar III, transponder 2 you have a 40 MHZ wide bandwidth and can put quite a few carriers in that space. One catch, though, all the carriers combined cannot exceed the maximum power of the satellite transponder. Most SCPC carriers are about 20 dbw or a video signal in the central U.S. Need a big dish, no 6 foot TVRO job for this service.

(cont. on page 12)

Model 5050 B-II
¼" Two Channel Recorder



- Transformerless balanced inputs and outputs with XL type connectors.
- Line output switch selectable for +4 dBm or −10 dBV level.
- Mic input has switch selectable 20 dB pad and mute.
- Mic/Line mixing on each channel.
- Headphone monitor output.
- Lighted VU meters with L.E.D. peak indication.
- 3 speeds switch selectable in 15/7.5 ips or 7.5/3.75 ips speed pairs.
- Record reference level switch selectable (185, 250, 320 nWb/m.)
- Equalization switch selectable (NAB, IEC).
- Reel Size switch selectable (5"-7", 10.5") EIA or NAB.
- Low frequency reproduce eq. adjustable.
- Fourth head switch selectable for ¼ track stereo playback.
- Plug-in head assembly with hinged cover for easy access.
- Front panel record setup adjustments.
- Integral splicing block.
- Built-in test oscillator (1 kHz, 10 kHz).
- Microprocessor-controlled HRS/MINS/SECS real-time counter with L.E.D. display.
- Dump Edit and Cue (lifter defeat) modes.
- D.C. capstan motor, servo controlled.
- Variable speed control (±7%) usable in record and play.
- Memory stop switch selectable to stop tape when rewinding past 0:00:00.

The 5050 B-II Recorders are covered by a one year parts and six months labor limited warranty. Heads, pinch-roller, fuses and lamps have a 90 day parts warranty.

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Shepler Says. .

by John Q. Shepler
Technical Consultant

IN-PHASE OR OUT?

Here's a little puzzle. Should stereo equipment be hooked up in-phase or out-of-phase? The answer is YES.

Stereo phasing may seem pretty obvious, but don't get trapped by rigid thinking. There are times when you need to avoid textbook solutions to solve a problem. Here's such an example.

In an earlier column I showed how valuable a set of headphones could be in probing audio circuits. Some of you caught the fact that the phones were connected out-of-phase as shown in Figure 1. An April Fool's joke perhaps? Well, not exactly.

The reason for wiring the ears out-of-phase is to present a high impedance to the circuit under test. If each ear is 2,000 ohms and they are connected in series, the input impedance is 4,000 ohms. This is the easiest connection, since you need only clip to the TIP and RING of the stereo phone plug. A side effect is that the phones are out-of-phase.

If you use the standard connection to convert stereo headphones to mono, you wind up with the circuit in Figure 2. The phones are in-phase, but the impedances are in parallel. The total impedance is now 1,000 ohms. This results in four times the loading to the circuit you are listening to.

(cont. on page 10)

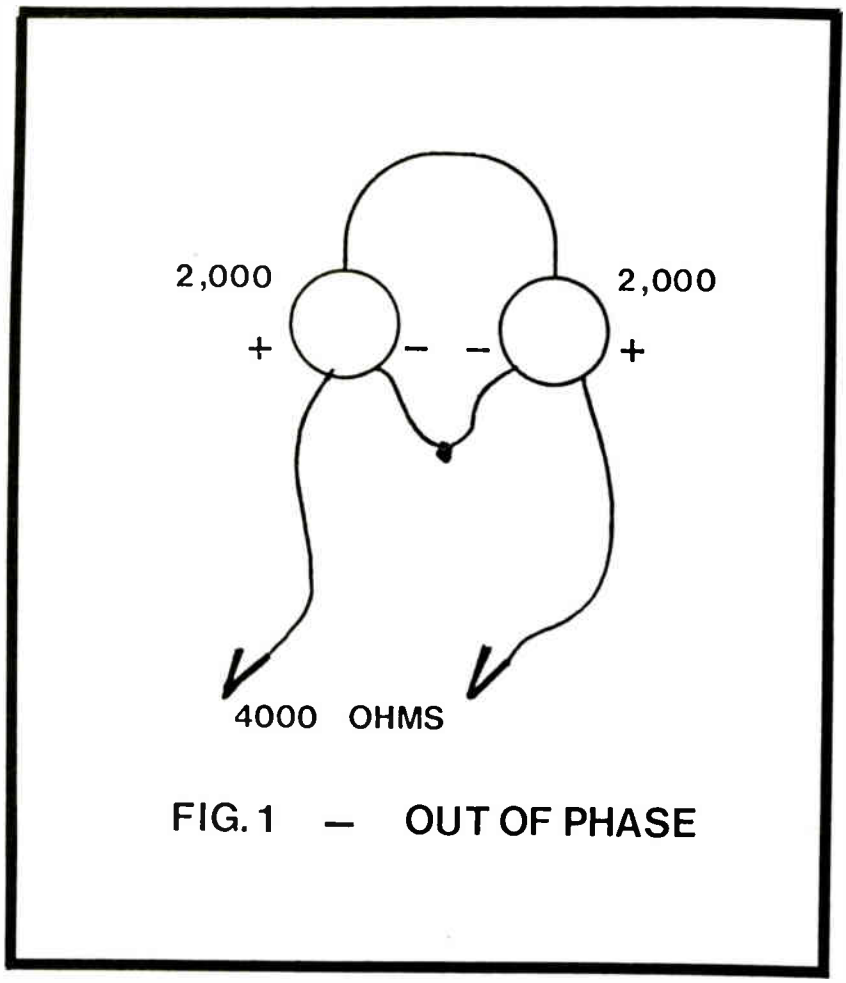

FIG. 1 — OUT OF PHASE

TALKBACK

ARIZONA . . . In Vegas, was impressed by NAB's general disregard for most engineers - SBE seems more concerned with bylaws instead of improving the lot of small market engineers.

KANSAS . . . Radio is being cleverly RE-regulated not DE-regulated as we have been misled into believing.

KENTUCKY . . . Amen to April Crosstalk by Duellman, Soap Box and all, enjoy it and pub..each month.

NEW MEXICO . . . Ham radio reception at NAB great . . . feet ready to fall off. Maybe we can talk them into more chairs next year.

WISCONSIN . . . Enjoy RFI elim. hints from Metz. Trying ferrite bead solution on our stereo radio, (disguised as audio console.) Thanks.

OREGON . . . Keep ham articles coming . . . engineering problems are engineering problems be they ham or broadcast.

IDAHO . . . AM now is stereo. So far no rush by mfr's to produce. Small Sony only quality receiver. Stations will have to educate public to new sound to stimulate action. It's not going to come automatically.

NEBRASKA . . . Good words from Metz re: RFI . . . also enjoyed TOWER FALLS . . . who put the bee in Duellman's bonnet?

OKLAHOMA . . . Isn't TV stereo going smoother than AM stereo? That's what happens when FCC does their job correctly . . . . .

******

MEMO FROM METZ

by David L. Metz

Some Thoughts On The Tower

I've been told that some stations have such a poor record of tower maintenance that their insurance companies are now requiring yearly inspections at the station's expense. One station is even required to inspect its tower every six months!

No doubt the management of those stations are chuckling over the money they've saved by not maintaining their towers. I'm sure they expect the insurance company will buy them a new tower when the old one falls down.

Don't count on it. You do have a legal obligation to maintain high risk property like a tower. And it takes months to gain back the lost audience and advertisers when your only tower falls down.

In the last year I've had more experience with the station tower than I wanted to have. So it's time to pass on what I've learned from the tower maintenance crews that have worked here.

Paint can be a serious and expensive problem. I made the mistake of taking the low bid once. I had two idiots smoking joints on my tower while they painted. The tower was a real mess, and the paint peeled off in a couple of years. If your tower is galvanized, the paint's only purpose is for visibility. In that case there is little difference between latex and enamel paint. The only latex recommended was Rustoleum and then only if the paint was fresh from the factory. A major advantage of latex paint is ease of clean up. It's amazing how far paint spatter will carry in the wind. With latex you can

(cont. on page 14)

Solve Those Remote Broadcast Blues Now With MAXI-TWO by ZERCOM

Exclusive Features:

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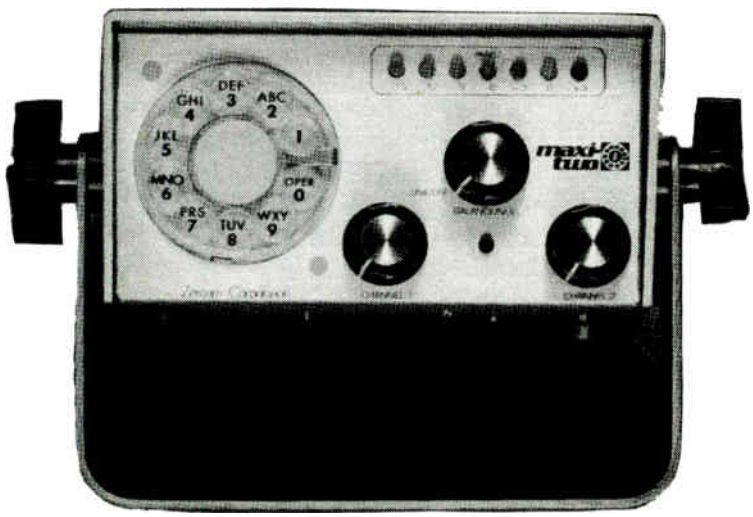
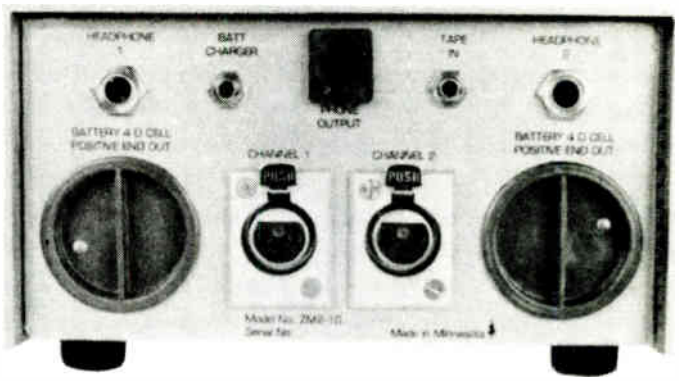
- Ladder Logrithmic VU Indicator
- AC or DC Battery Operation





INDICATORS:
VISUAL: Low battery LED begins to flash with 8 hours of life left and flashes faster as time reduces.
AURAL: Telephone ringer

POWER REQUIREMENTS:
8 standard "D" cells for 60 hours of broadcast or 120 VAC (120 VAC adaptor/charger standard equipment).

HEAD ROOM:
25 db at rated output

INPUT LEVEL:
– 50 dbm at 150 ohms

OUTPUT LEVEL:
– 9 dbm at 900 ohms

MISC:
AGC/Dimensions: 13" x 7" x 3½"
Shipping Weight: 6 lbs.

INPUTS:
MICROPHONES: Two
TAPE: One miniature jack

OUTPUTS:
Two headphone jacks
One telephone line jack - modular
120 VAC/12 VDC adapter

CONTROLS:
One, Mic 1/Volume
One, Mic 2/Cassette/Volume
One, On-Off/Headphone Volume
One, Telephone Dialer

METERING:
7 step logrithmic LED VU from
– 15 dbm to + 3 dbm

SIGNAL TO NOISE RATIO:
Better than 55 dbm

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(cont. from page 6)

Sometimes the difference is trivial. Other times, you will be listening to high impedance stages that become distorted when the headphones are clipped in. This is especially true if you are using 8 ohm or even 600 ohm phones.

But, don't out-of-phase headphones sound pretty strange? Why not give it a try? It's an interesting effect. For a real treat, reverse the connections to one ear and listen in stereo. It doesn't sound quite normal, but the separation is pretty wild.

I think we've accidentally stumbled on something receiver manufacturers were trying to keep secret. One nifty feature on some portables is a "stereo expander" switch that flips the phase to one of the speakers. How about your car? Better check to see if that BIG sound isn't being derived from phasing effects.

OK, one last trick and that's it for this month. If you are having trouble with mic feedback on the air, see if a pair of out-of-phase headphones doesn't help. Figure 3 shows what happens. The sound leakage from the ears is out-of-phase accoustically and cancels at the microphone. Unfortunately, it only works if you talk straight into the microphone and resist the urge to dance with the music.

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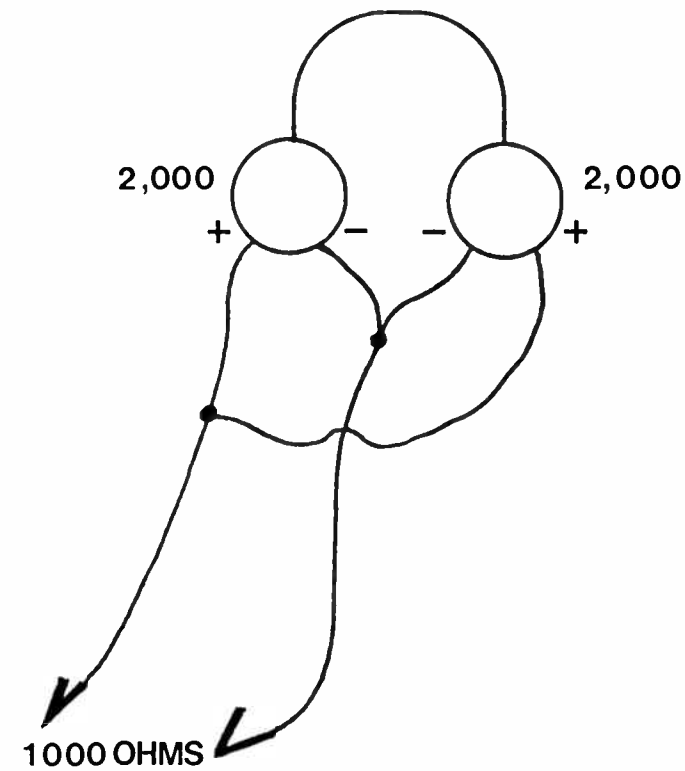

FIG. 2 — IN PHASE

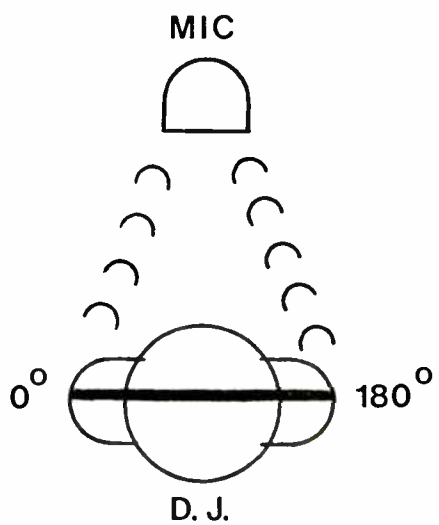

FIG. 3
FEEDBACK
CANCEL

New From Fidelipac . . .

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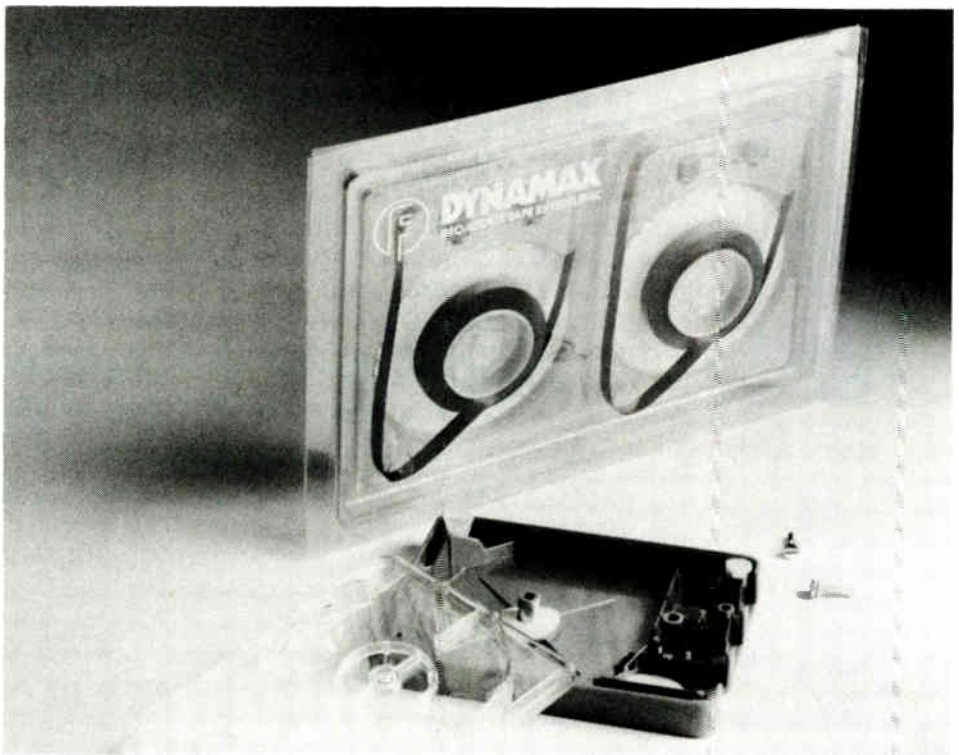

DYNAMAX RELOAD KIT

DYNAMAX RELOAD KITS FOR FIDELIPAC TAPE CARTRIDGES

TIME AT 7½ IPS	UNIT PRICE
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20 Seconds - 100 Seconds	$1.20
2 Minutes - 4½ Minutes	1.50
5 Minutes - 10½ Minutes	1.80
Series 500 H.O.T. Tape (For use in Master Cart II)	
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5 Minutes - 10½ Minutes	2.00
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20 Seconds - 100 Seconds	$1.60
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CROSSTALK
(cont. from page 4)

To receive an SCPC signal you would start out with a down converter with the front end tuned to the center of the satellite transponder. This down converter would probably have an output center frequency of 70 MHZ plus and minus 20 MHZ giving a bandwidth of 40 MHZ. With me yet?

Now you put an FM tuner able to tune from 50 to 90 MHZ across the IF output (the 70 MHZ signal) of the down converter and tune away, lots of things to listen to. If you don't get anything, check to see if you installed the dish and hooked the whole thing up.

So, as you can see, SCPC is simple, but old catch 22 comes into play here. You can't just modify an FM tuner and hook it to the down converter. The SCPC signal may be wide or narrow band, may use 25, 50 or 75 microsecond premphasis. The signal usually is companded at a 2:1 or 3:1 ratio. The FM tuner, or demodulator as it is called, has to accommodate the transmitted signal to get broadcast quality.

There you got 'er, a simple analog satellite transmission system that is capable of excellent audio quality for the radio broadcaster that shouldn't break your bank.

73
ED K9FWR

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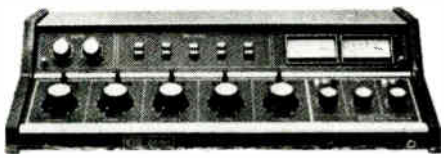
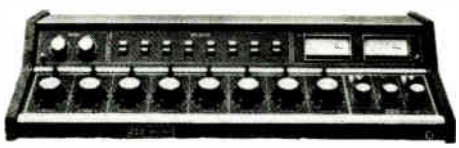
 Model 5S150, 5-MIXER STEREO	NOW $2422 ◀ reg. $2850	 Model 5M150, 5-MIXER MONO
 Model 8S150, 8-MIXER STEREO	NOW $3017 ◀ reg. $3550 NOW $2375 reg. $2795 ▶	 Model 8M150, 8-MIXER MONO
 Model 10S150, 10-MIXER STEREO	NOW $4377 ◀ reg. $5150 NOW $3565 reg. $4195 ▶	 Model 10M150, 10-MIXER MONO

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 Model 5S250, 5-MIXER, DUAL-CHANNEL STEREO	NOW $3017 ◀ reg. $3550 NOW $2290 reg. $2695 ▶	 Model 5M250, 5-MIXER, DUAL-CHANNEL MONO
 Model 8S250, 8-MIXER, DUAL-CHANNEL STEREO	NOW $3952 ◀ reg. $4650 NOW $3055 reg. $3595 ▶	 Model 8M250, 8-MIXER, DUAL-CHANNEL MONO
 Model 10S250, 10-MIXER, DUAL-CHANNEL STEREO	NOW $4925 ◀ reg. $5795 NOW $3952 reg. $4650 ▶	 Model 10M250, 10-MIXER, DUAL-CHANNEL MONO

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clean it up with soap and water.

On galvanizing it is important that the zinc surface of the tower be etched before painting. Fresh galvanizing is so smooth that paint sticks poorly to it. The etch can be done one of two ways. The tower can be "pickled" in acid at the factory or if time permits, simply left exposed outdoors til the normal coat of oxide forms.

If your tower is new, have its first coat of paint sprayed on while the sections are on the ground. Once up in the air, hand application with mittens is best. Temperatures and humidity should be moderate. If it's too hot or dry, the paint will skin over too fast and not cure properly. In cold weather it sometimes won't stick at all.

Repainting should be done every five years or at the first sign of cracking or chipping. The cracks are the real problem. Once they form, they will let water under the surface of the paint. This causes oxidation of the galvanizing that you don't want. Then the paint loses its grip on the tower and begins to flake off. Old cracks continue to grow and open up right through new paint and the problem just gets worse. Then your tower painter tells you that you need an expensive scraping and wire brushing job!

Waiting too long between paint jobs is false economy. In the long run (remember that tower will stand for 30-50 years), it will cost a lot less to do it right.

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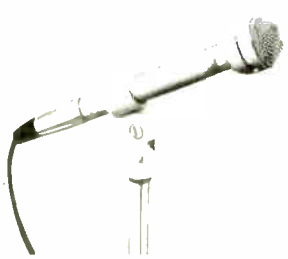

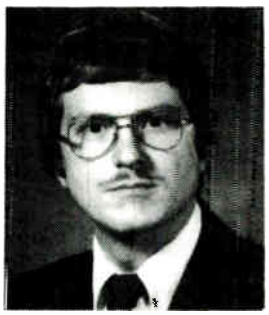

PERSONS' POST SCRIPTS

by Mark Persons

Well, it happened again. This time it happened at KHOL in Beulah, North Dakota. My car was backed up to the front door of the station and there I was loading boxes into it at 3 a.m. in the morning. This may be normal for broadcast engineers, but not very normal for the rest of society.

You guessed it, suddenly there was a police spotlight in my eyes and a stern voice from a police car bullhorn saying, "put up your hands and don't move." Well, I looked like a complete idiot while the single police car was joined by no less than three others.

Meanwhile, the police were telephoning the manager of the station, Wally Baardson, who wasn't home at the time. He was in the bathroom at the station blissfully unaware of the situation. Things started to get a little drawn out when Wally stuck his head out of the window to ask what was going on. Fortunately one of the policemen knew him by sight and confirmed everything was OK. That policeman, as it turned out, was a part-time announcer at the radio station as well.

This wasn't the first time I've been stopped by the police. There have probably been other engineers who have wound up in jail before they could explain what was going on. I only hope that every policeman is smart enough not to shoot first and ask questions later.

While trying to do an AM Audio Equipment Performance run (Audio Proof) at WAIT Radio in Chicago recently, I found a 2 DB dip in the frequency response at 3 KHz. The dip was quite broad going from about 500 Hz to 5 KHz at the one-half DB points. This was quite puzzling.

To divide and conquer, I disconnected the transmitter audio line at the output of the audio processor and drove the transmitter with an audio oscillator. The problem remained so I carefully checked the transmitter and especially the feedback ladder for problems, but could find none. It's easy to explain a high or low frequency rolloff, but a dip in frequency response is a tough one. I used an oscilloscope to check levels on both sides of the transmitter's modulator section with and without the feedback connected.

Finally, I found that audio being delivered to the transmitter had the dip in response as well. Checking the audio generator into a 600 ohm resistor showed its response was flat, but when connected to the transmitter line, its output dipped in the 3 KHz region. Disconnecting the audio line at both processor and transmitter ends allowed a check of that forty feet of wire. Sure enough, something was bridged onto the line.

Dave Dybas is the chief engineer of WAIT. He traced the wire inch-by-inch and found, much to everyone's surprise, that the station's McMartin E.B.S. generator was connected directly to the line.

The dip occurred at the best coupling frequencies of the output transformer in the EBS generator. To further complicate the situation, the op-amp output stage in the EBS generator saw program audio coming in backwards thru its output. Feedback to the op-amp's input caused the amp to work against program audio.

The solution was to add relay switching to connect the EBS generator to the transmitter audio line only during the broadcast of EBS tones.

This kind of snafu is typical in an installation where wiring documentation is not precisely kept. Dave said he is in the process of verifying and updating the information left by the previous engineer. Only when documentation is 100% correct can an engineer be sure what is connected to what.

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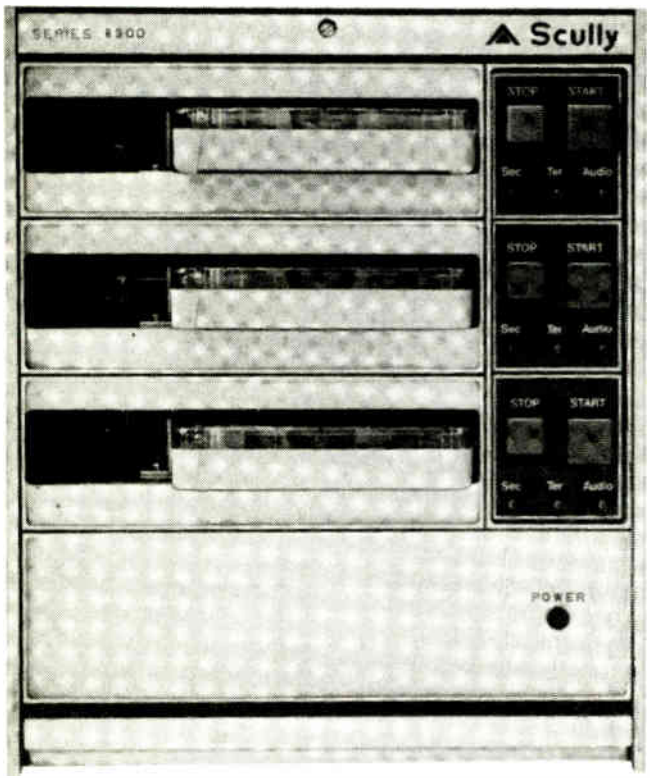
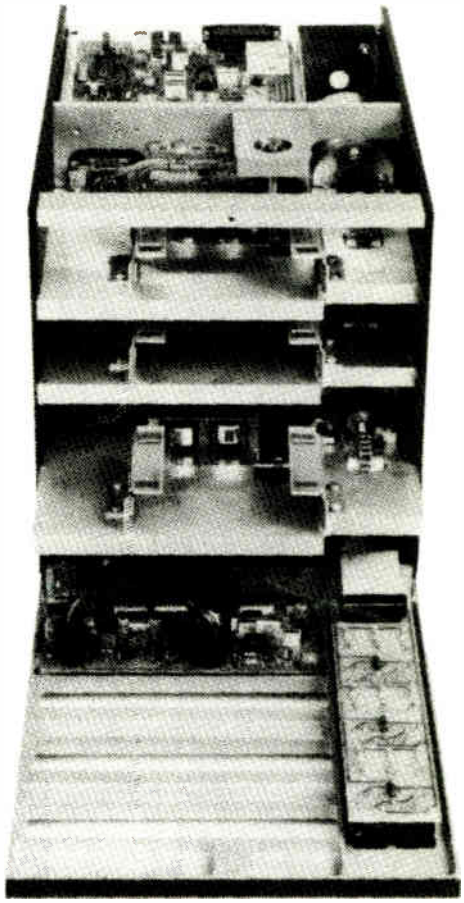
. . . A New Standard of Excellence





The new Scully Series 8300 three deck tape cartridge reproducer provides a new standard of excellence in a convenient modular configuration. All presently marketed three deck machines were evaluated, which resulted in a new packaging concept with all decks removable, a new servo motor without bearing adjustments, a new head bridge assembly, and graphics that won't wear off.

Standard features include a two bearing crystal-controlled D.C. brushless servo motor, 150 Hz secondary cue tone, audio mixer, audio switcher, and a reload indicator.

Modular construction allows field conversion from Mono to Stereo, as well fast and easy maintenance.

Sold & Serviced by

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