February 1985

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Permit No. 11
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COMMON POINT®

A MONTHLY NEWSLETTER FOR BROADCASTERS

50 cents per copy

Out-Of-State 800-558-0222 Distributed by Electronic Industries Inc., 19 E. Irving, Oshkosh, WI 54901 In-State 800-445-0222

HARRIS TOSSES IN TOWEL . . . INKS PACT WITH MOTOROLA!

QUINCY, ILL. -- Harris Corporation and Motorola, Inc. have announced a licensing agreement whereby Harris Corporation's Broadcast Transmission Division will manufacture and market AM stereo exciters and monitors using Motorola's C-QUAM® AM stereo system on a non-exclusive basis.

According to Gene T. Whicker, Harris broadcast group vice-president, "The selection process of AM stereo standards has continued since 1975. AM stereo is still trying to get established in the broadcast industry, and most importantly in the domain of the listeners. We feel this agreement is in the best interest of all in making AM stereo thrive as a popular new broadcast technology and consumer medium."

Whicker continued, "Harris' foremost interest is in providing AM broadcasters a high fidelity system comparable with FM stereo quality, and to develop transmission systems that will deliver the highest quality AM stereo to the listeners. We plan to concentrate our efforts on refining C-QUAM transmission hardware technology for the benefit of the broadcast industry."

William G. Howard, Motorola senior vice-president, said, "The Harris-Motorola agreement underscores the acceptance and acceleration of the C-QUAM system as the marketplace AM stereo standard. There are now a large number of major manufacturers committed to the supply of broadcast equipment, integrated circuit decoders and stereo receivers for the C-QUAM system."

Type Acceptance for the Harris STX-1B C-QUAM Exciter has been filed with the Federal Communications Commission with FCC approval expected soon.

Harris plans to offer its current system users a simple C-QUAM exciter modification kit and modulation monitor modification program after FCC Type Acceptance is received. There are approximately 200 stations now broadcasting using the Motorola C-QUAM AM stereo system. If all of the Harris system stations convert, there could be nearly 400 stations using the same C-QUAM standard.

DECISION LEAVES TWO

With the agreement, the number of companies now offering incompatable systems has been narrowed to two, Motorola and Kahn. Kahn was the first to win F.C.C. type acceptance and was the first on the air in July of 1982. Motorola's recent victories have been mainly accredited to the number of receiver manufacturers providing C-QUAM system only receivers.

Leonard Kahn, who is encouraging manufacturers to build multi-system receivers, believes that consumers will resist buying the single system radios because they will be unable to tune to stereo signals generated by the Kahn system.

It could be that the future of A.M. stereo will be decided in the courtroom. Kahn contends that the Motorola, Harris pact is a violation of the anti trust laws. Two competitors joining to compete with another. Kahn is currently consulting attorneys to determine what, if any, steps will be taken.

There is no doubt that the arrangement has given Motorola a large boost in its efforts to become the de facto standard. The decision does put Kahn on the defensive, but not without a substantial foundation to build on. In a recent NRBA survey of station engineers, the Kahn/Hazeltine system was voted as having the best modulation engineering approach of all the systems.

Kahn must convince the major market stations now broadcasting with his system to hold ranks, if the company has any hope of recapturing momentum. If those stations do hold,

(cont. on page 12)

Editor's Notebook

FEBRUARY . . . here it is, the second month of the new year already. I never could decide if it was good of bad that it was a short month. Looking forward to spring and the NAB Convention in Vegas, April 14th through 17th.

SCULLY UPDATE . . . Doing just fine, thank you. In full production once again. If you need a dependable cart machine at a decent price and can't wait long, we can meet your deadline. Give us a call at Electronic Industries.

ON AGAIN . . . Yes, the National Association of Broadcasters and the Daytime Broadcasters Association merge is on again. Looks like this time it will stick. Congratulations to President James Wychor of the DBA and all those involved with the organization, for their accomplishments. A well-deserved standing ovation.

12-12-12 . . . The Commission has changed its 12-12-7 rule, regarding ownership of AM, FM and TV stations to 12-12-12. This brings the television limit into line with radio.

DEREGULATION . . . The commission has also relaxed its rules governing the remote control operation of AM and FM transmitters. Broadcasters are now free to use whatever facilities and telemetry they like, to monitor. What will the manufacturers do?

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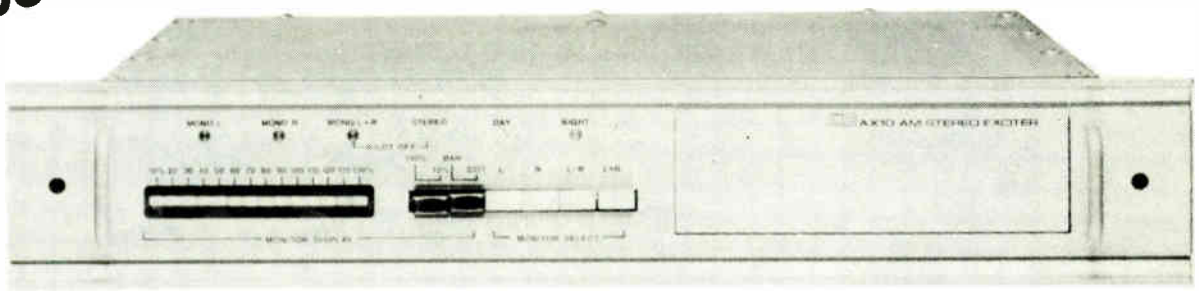
COMMON POINT® READINGS

BROADCAST ELECTRONICS INC

AX-10 AM Stereo Exciter

For High Performance AM Stereo Broadcasting

FCC Type Accepted



FEATURES

- **FCC Type Accepted**
- **Synthesized Operation**
- **Second generation C-QUAM* Digital Design**
- **Advanced-technology, independent right and left channel IF modulation technique**
- **Interfaces with virtually any existing AM transmitter**
- **Superior stereo performance, yet compatible with existing AM mono receivers**
- **Built-in LED bar graph, peak-reading modulation display**
- **Compact size - only 3½ inch rack space**
- **Independent equalization for two-transmitter or dual antenna pattern operation. Full remote control capability**

DESCRIPTION

Following the same superb product design concepts pioneered in the FX-30 FM Exciter, Broadcast Electronics now offers radio broadcasters the technologically advanced Model AX-10 Exciter for superb AM stereo transmission.

C-QUAM* COMPATIBLE DIGITAL MODULATION — The totally new Model AX-10 AM Stereo Exciter is designed to produce C-QUAM* system AM stereo modulation for interface with virtually any existing AM broadcast transmitter.

Through an advanced engineering approach which utilizes independent, non-interacting left-and right-channel digital modulators in an IF modulation configuration, the AX-10 exciter assures superior stereo performance and compatible mono reception.

ADVANCED DESIGN — This second generation C-QUAM* compatible exciter incorporates the most advanced AM stereo technology available. Frequency agility is accomplished through frequency synthesis in conjunction with a dual conversion scheme employing a single high stability 10 MHz temperature compensated crystal oscillator. This oscillator is readily calibrated to WWV Standards. It serves also as the reference source for the 25 Hz pilot tone. A facility for locking the AX-10 to an external 10 MHz source is provided to eliminate night time co-channel interference (platform motion).

The left and right channel audio inputs employ fully-balanced, transformerless instrumentation amplifiers capable of superior common mode rejection and excellent transient response. Balanced, 600 ohm output level to the transmitter is variable from −10 to +20 dBm with independent level adjustments for day/night transmitter operation. Broadcasters employing high degrees of processing may utilize a built-in adjustable clipper to limit negative modulation peaks from −90 to −100%.

SELECTABLE EQUALIZATION — For dual day/night transmitters, or changing antenna patterns, completely separate switch-selectable equalization adjustments are provided.

These each consist of individual group delay networks and low-frequency and high-frequency equalizers, combinations of which may be pre-selected, combined, and by matrix switching, inserted into either the RF modulator circuitry or the L + R transmitter audio input path.

FLEXIBLE INTERFACING — The AX-10 delivers up to 10 watts of RF output. A separate optional TTL-compatible RF adapter permits interfacing transmitters with digital input capability.

An extremely accurate front panel, peak-reading LED bar graph display monitors modulation peaks. A 125% peak-hold detector allows monitoring of asymmetrical modulation. Left, Right, L + R or L−R/pilot injection metering is pushbutton-selectable, with the selected meter function terminated in a BNC monitoring jack located under the hinged front panel door.

OPERATIONAL FEATURES — The AX-10 is fully capable of remote operation. Control and status indicators confirm the four operating modes and day/night equalization selection. Mono left, mono right, mono L + R or stereo modes are selectable without decreased signal loudness, in the event one audio feed is lost.

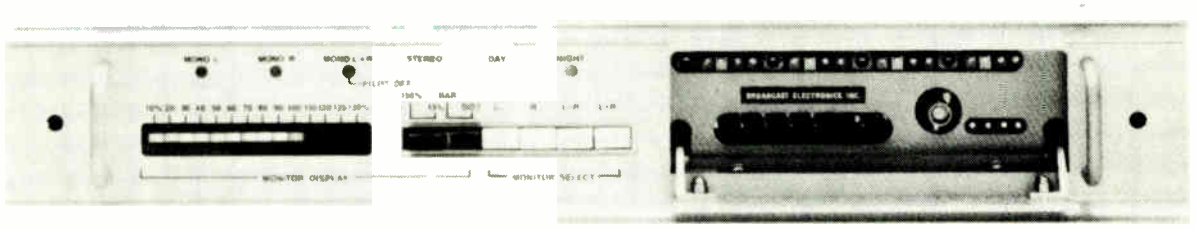
As another feature, the Model AX-10 AM Stereo exciter is capable of accepting an external pilot/subsonic phase modulated AM SCA signal.

Styled to harmonize with any transmitter color scheme, the Model AX-10 represents elegance in design and in appearance. The precision mechanical construction and elegant appearance is enhanced by the satin-gold anodized front panel which blends with the internal exciter housing. The entire Model AX-10 AM stereo exciter occupies only 3½ inches of standard 19" rack height.

C-QUAM* is registered trademark of Motorola, Inc.

BROADCAST ELECTRONICS INC

AX-10 AM Stereo Exciter



Hinged access door facilitates equalization adjustments and mode selection.

AX-10 AM STEREO EXCITER SPECIFICATIONS

RF Output Power: 0.15 to 10 watts rms into 50 ohms, continuously variable

RF Output Impedance: 50 ohms. BNC connector

Sample Transmitter Output: 2V p-p, 50-ohms. BNC connector

Frequency Range: 530 to 1710 kHz

Frequency Stability: within 10 Hz of assigned carrier frequency

L + R Audio Output: −10 to +20 dBm, adjustable

L + R Audio Output Impedance: 600 ohms, balanced, transformerless

Audio Input Level: +10, ±1 dBm, balanced, transformerless. Other levels accommodated by internal resistor selection

Audio Input Impedance: 600 ohms, balanced resistive. Adaptable to other values by resistor selection.

Frequency Response: 0, −1 dB, 50 Hz to 15 kHz

Stereo Separation: 35 dB, 50 Hz to 7.5 kHz; 25 dB, 7.5 kHz to 15 kHz

Harmonic Distortion (85% modulation): L=R, Monaural, 0.25% max, 50 Hz to 15 kHz **(70% modulation):** L, R, Single Channel, 0.5% max, 50 Hz to 7.5 kHz

Power Requirements: 97-133 or 194-266 Vac, 50/60 Hz, 50W

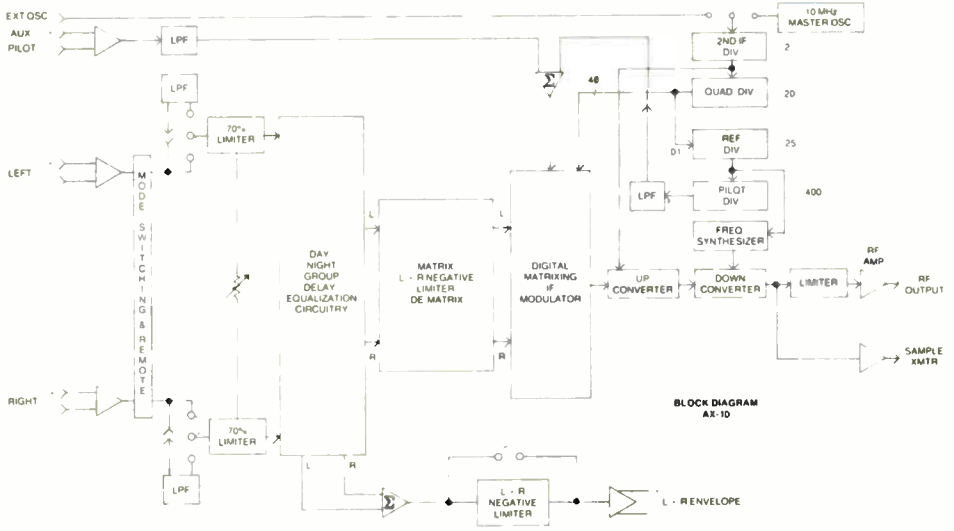
Ambient Temperature Range: 0° to 50°C (operational to −20°C)

Maximum Altitude: 15,000 ft. (4572 m) AMSL

Dimensions: 19" W × 3.5" H × 19" D (48.3 × 8.9 × 48.3 cm)

Note: The Model MA-1 AM Stereo Modulation Monitor is recommended for use with the AX-10.

Specifications subject to change without notice.



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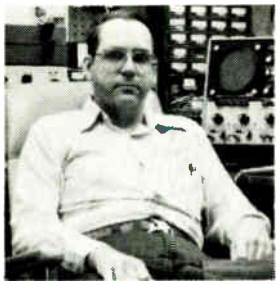

by
David L. Metz

HOOKING IT ALL TOGETHER

Having purchased the console, etc. for the new production studio, I had to decide how I was going to wire the whole thing together. This was really two decisions, how was the routing, switching to be done, and how would the physical connections be made.

The studio would have to do double duty. It would serve as the main production studio and as the standby on the air studio for our stereo main AM and FM studios. For that reason every monitor and source feed that both studios required would have to be fed to the production studio. Plus, it would have to feed everything else in the building!

I definitely was not going to use a patch bay for routing. In my questioning of the staff I discovered (not to my surprise) that patch bays were the most hated part of every production studio. After listening to a long list of horror stories about mismarked patch bays, noisy connections and lost patch cords, I started looking for a better way.

My first choice was a solid state routing switcher. A quick look at the catalogs showed I couldn't afford one, so that idea was out. I fell back on a cheaper, but more complex way of doing routing that I had used in the original studio, lots of switches.

Switches can get out of hand and be confusing too, so I used Switchcraft four and eight station interlocked gang push button switches. The switches are mounted on a panel just above the VU meter bridge of the console. Everything is clearly marked with engraved name plates.

The next problem was how to keep the 152 odd wires straight that ran to

(cont. on page 9)

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649B
Lavalier
105.85

667A
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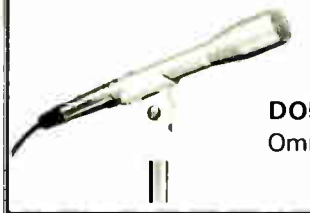
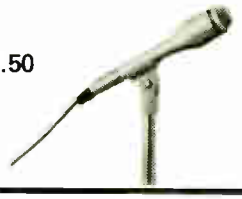
405.86

DL42
Cardiline®
405.86



DO54
Omnidirectional
109.41

DO56
Omnidirectional
Noiseless, Hand-held
89.50

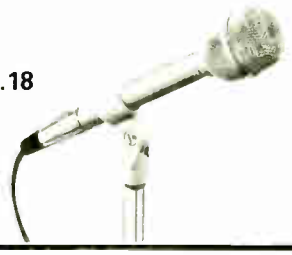


DO56L
with extended handle for ENG
99.53

DS35
Single-D Cardioid
117.53

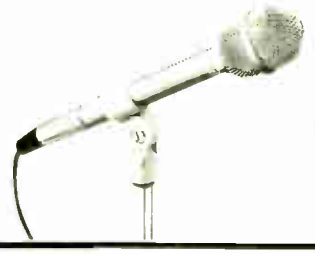
RE10
Variable-D®
Super-Cardioid
122.00

RE11
Variable-D®
Super-Cardioid
129.18



RE15
Variable-D®
Super-Cardioid
183.85

RE16
Variable-D®
Super-Cardioid
192.75



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Shepler Says. .

by John Q. Shepler,
Technical Consultant

Pad For Less Noise

Resistance is something we generally want to avoid. Resistors cost money, they generate heat, and they are just one more thing to go wrong. Why, then, would you want to add extra resistance in your audio chain?

Resistive audio pads are valuable for absorbing the level imbalances that occur when you connect audio equipment together. Each piece of equipment has an optimum level setting. Unfortunately, the optimum operating points of different components seldom agree.

Here's an example. Engineer Bill is building a new studio. The board is in place and the master level pots are set so that the microphone input peaks at 0 VU when the channel pot is at 10 o'clock. Now, Bill hooks up a cart machine and adjusts its output level so that the test cart also gives 0 VU when the board pot is at 10 o'clock. The levels are perfect, but Bill notices a lot of hiss from the cart machine. What's wrong?

The problem is that the cart machine is designed to operate at 0 dBm output for best S/N ratio. Unfortunately, the board input requires only -15 dBm for 0 VU output at the desired pot setting. Backing down the cart output solves the level problem but the output amp of the cart machine is still running full bore. Consequently the cart machine is 15 db noisier than it should be.

The accompanying diagram shows how most audio gear is constructed. The level pot is between the preamp and power amp stages. Since all audio amplifiers are somewhat noisy, you want to set the pot high enough to get the full range of the output amplifier without clipping on peaks.

The way to do this is to set the cart machine for 0 dBm output and add a

(cont. on page 12)

Why your station should have its own radar.

One, it will help serve listeners better with instant local weather information.

Two, your station can provide earliest possible warning of severe local weather situations.

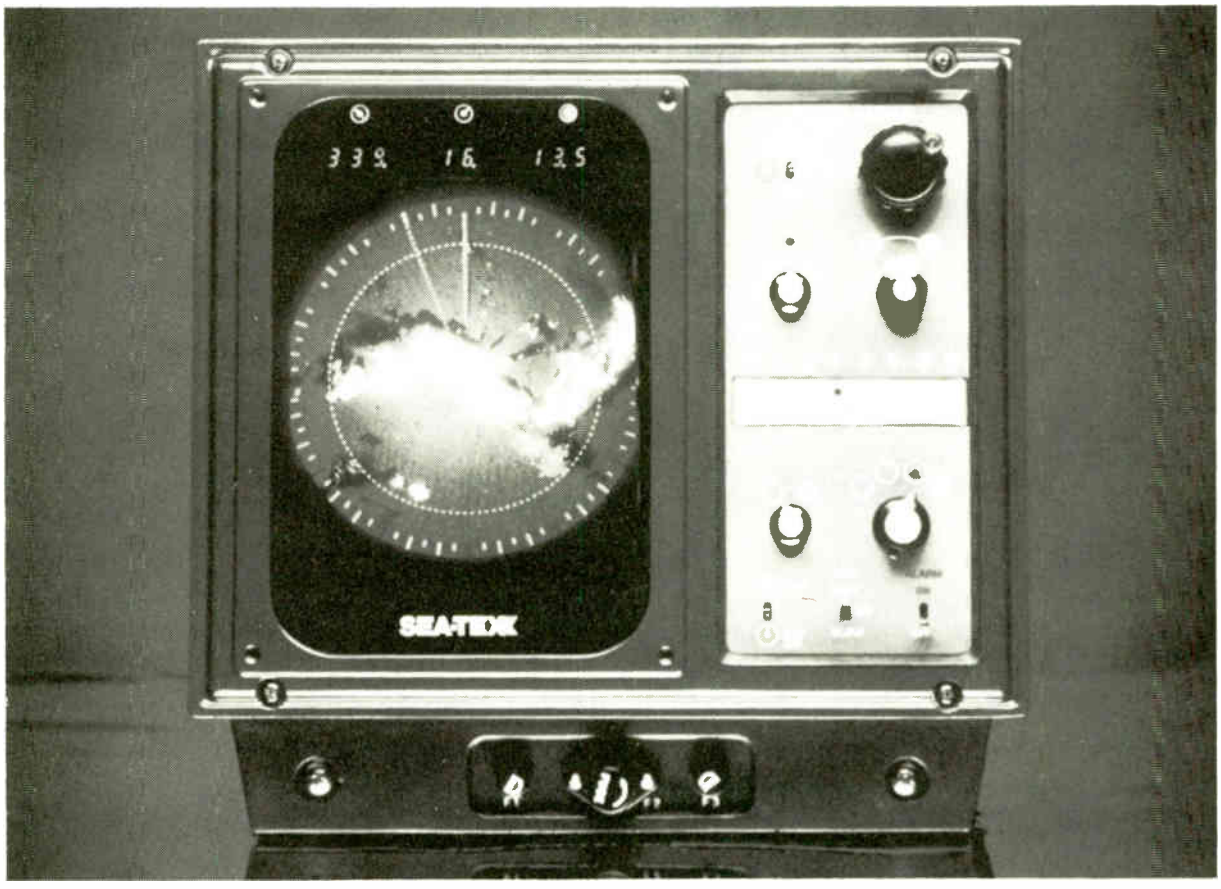
Three, promoting your own radar tells listeners that yours is THE station in the community to rely on for up to the minute local weather information.

Four, a radar of your own will provide a strong, highly promotable advantage over other radio stations in your market.

Five, as the cost for this radar is low, sponsorships of color radar weather broadcasts can easily pay for the system.

All of these are good reasons to get the CR-1011 weather radar system for your radio station.

CR-1011
COLOR WEATHER RADAR SYSTEM



It makes your local weather news truly local.

Canned weather radar services can be localized just so much. But now, your announcers or meteorologist can deliver local, up to the minute weather reports that are truly local and up to the minute.

The new CR-1011 Color Weather Radar displays absolutely brilliant color pictures of weather intensity that conventional radars can't touch—frontal systems, severe weather and just plain rain or snow.

The cathode ray tube presents weather in six different colors, based on intensity of return echoes. On a television type screen. With more brightness, crispness, definition and clarity than most color televisions.

There are eight selectable range scales, from 64-miles out, down to a half-mile from your station. A unique plotting feature can establish the history of a weather system so station personnel can easily track direction and speed. And alert listeners accordingly.

An audible alarm warns of strong systems entering pre-established guard zones, which can be as far away as 64-miles or any lesser distance desired.

Transceiver and antenna drive are both housed in the antenna assembly. Antenna operates in relative winds up to 80 knots.

For AM/FM stations with separate broadcast studios, a remote color monitor (CRM-1) is available to provide an additional radar screen for remote positioning up to 65 feet from primary CR-1011 radar.

Real Time Digital Weather Radar . . . . . Under 8000^{00}

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those switches! I settled on using ribbon cable. For example, an eight position stereo routing switch can be handled by one piece of 40 conductor cable. The color coding made it very easy to keep track of everything. I have used short runs of ribbon cable in several audio projects and have had no trouble with crosstalk or hum pick up.

I even ordered the console with 50 pin ribbon connectors on the rear for the audio connections instead of XLR connectors. Putting one 50 pin ribbon connector on is much simpler and cheaper then 20XLR connectors.

To terminate the ribbon cable, I used type 40 punch down blocks. The punch down block has been much neglected by broadcasters. A type 40 block can make 50 connections in minutes with just a punch down tool. Each connection has four terminals in a row. The two outer terminals are connected. The center two are not. You use one side of the block as input, the other side as output.

The final connection is made by spring steel "bridging clips". These little clips make it very easy to isolate grounds or reroute the wiring without disturbing the original connections. 600 ohm "H" pads are available that slip over the inner bridge terminals. They're much quicker then sorting out and soldering up some resistors.

The connection to the punch down block is made by forcing the wire between the slotted blades of the terminal with a special tool. The blade of the terminal cuts through the insulation of the wire, and a blade on the tool cuts off the excess wire.

When you purchase your punch down tool, be certain you get the "automatic" type. The automatic tool has a spring loaded snap action. It costs about $30.00 more than the "manual" tool, but works far better.

******

Crosstalk...

by ED DUELLMAN

Hey!! Duellman, what you do; give us a snow job on the satellite receiver and duck out? No, I didn't do that. My boss had this idea that he should have a class C FM station and that I am suppose to do that little task for him. With that project in progress, time did not permit me to spend the time necessary to complete the receiver. When I get reacquainted with my family, I will get on with that project. I do want to thank all of you who wrote and have expressed an interest in the project. I might add here that not all those I hear from on the receiver are engineers.

Soooo, let me tell you a bit about this over-grown Mr. Microphone project (class C FM station) the boss got me into. As usual a station can't be put on the air without going through all the red tape and lawyer lingo to thoroughly confuse the FCC into giving out that piece of paper called a construction permit. After conferring with mighty Sam in Washington and ringing all the numbers I could from the Thiensville flash, we got the precious "CP".

The boss, with hand trembling, handed over the mighty pen and a big check and said do your thing; he's still in shock from that move. Well, the first thing I thought we would need is a tower and the bigger, the better, in my book. After due conference with the crazy Belgian (tower painter supreme), he put me in touch with a fellow named Myron that had the biggest erector set I have ever seen. Ol' Myron calls his company Pi-Rod Inc. Myron figured he had enough parts to build a 1010 foot tower, so being conservative, I said

(cont. on page 14)

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AA4 with Capitol SGS-4	
10 SEC. TO 100 SEC.	$4.20
140 SEC. TO 4.5 MIN.	4.78
5.0 MIN. TO 10.5 MIN.	5.69

SHEPLER SAYS . . .
(cont. from page 7)

15 db resistive pad between the cart player and the control board. Now, all of the equipment is happy and the signal to noise ratios are preserved.

I won't get into the details of how to build audio pads since this information is available many places, including the Harris catalog. However, many times an inexpensive 1k audio pot will make a nice variable pad. This lets you re-adjust your system when equipment is swapped. If your board inputs aren't too fussy about the impedance they see, this is often the sensible way to go.

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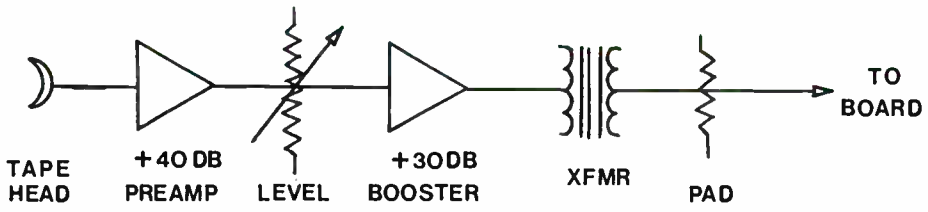

CIRCUIT PAD

TALKBACK

MONTANA . . . To the writer from Arkansas, "This is a record company's way to recoup some of that loss." BULL, THAT'S DISCRIMINATION . . . If they really want to recoup the loss, charge double on the records and cassettes. They ought to be glad the station promotes their record.

MINNESOTA . . . Preliminary reports of our class 4 night time signal at 1000 watts are very good. "LOUD AND CLEAR" calls are coming from greater distances than expected.

NEBRASKA . . . Editor! Remember, the F.C.C. did make "THE CHOICE" and what did we do? Piss and moan. I'm tired of hearing the F.C.C. blamed for this. I wrote in against Magnavox like everyone else.

WISCONSIN . . . Ed, "Here Comes Summer" was by Jerry Keller (not Rick Nelson). However, "Jingle Bells" by the Talking Dogs was correct.

OREGON . . . Enjoyed Shepler's article on coupling capacitors. It happened to me with out ITC cart machines.

KANSAS . . . So, Ed, I guess we buy two of the ZN414 chips for AM stereo, right? Just like dual windings for my stereo modulation transformer. Just put in a new Continental 315 R-1 5KW rig. It's a dream come true.

OREGON . . . Thanks, Ed, I've thought about that chip several times. Too bad it doesn't have an RF out tap, then a couple of FETs would give you a pretty fair RF amp for the Mod monitor.

*****

HARRIS-MOTOROLA
(cont. from page 1)

and consumers can not tune in their favorite stations on their one system receivers, the manufacturers may have to look twice at the multi-system approach.

At this point, only Sony manufacturers multi-system radios. But, that may change soon. Sony has recently announced that it is selling two integrated circuits, that will allow other receiver manufacturers to make multi-system receivers. The Sony automatic switching system circuits, could allow for an influx of multi-system radios, and make it an almost certainty that broadcasters will have a choice of A.M. stereo systems.

******

BROADCAST LINE CARD

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Marti
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Nortronics

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TRANSMITTERS AM

Pre-Sunrise Adapter-Eagle Hill
Wilkinson

TRANSMITTERS FM

Broadcast Electronics
QEI
Wilkinson

WEATHER RADAR

Si-Tex

*May be acquired through stocking affiliates

we'll take it. This monster has a five foot face and the legs are 3 inch diameter and constructed of solid steel, as are all of the cross members. Like I said, this guy has a big erector set. The tower has the above dimensions up to 910 foot level, the top 100 feet is 24 inch face unguyed and also made up of solid steel members. This is, of course, where the antenna goes. Triangular tower sections were used rather than a pole-type structure because it is more rigid and will cause fewer problems with the antenna down the road. We could have had a pole-type antenna mount, but the cost would have been higher for the same structural strength.

Next step was to choose an antenna, and I had that all picked out because of prior experience with the type. I chose the antenna nicknamed the "Rototiller", and it is manufactured by Electronic Research Inc. We went with 10 bays on the antenna because of the power of the transmitter (25KW), our TPO is 22.6KW with the above antenna. I would have preferred to use 8 bays and higher transmitter power, but I did not have a choice of transmitters. My preference would have been the BE FM-30. Anyway, let me tell you a bit about this antenna. The individual bays do look like the tines on a rototiller and in the high power version that we have, the elements are made of what looks like 3-1/8 inch rigid transmission line. Must be quite a pretzel bender they have at ERI to form the elements. One thing I like about this particular antenna is I didn't have to mess with deicers.

I'll put the cork in the bottle for this round and next month I will have some pictures of the tower and other parts of the installation. I do promise I will do the articles on the satellite receiver as soon as time permits me to complete the redesign of my prototype receiver using standard components. That's so you can get the parts to build one if you so desire.

73 Ed
K9FWR

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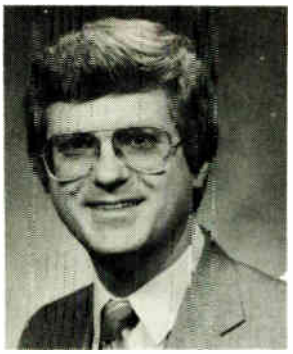

PERSONS' POST SCRIPTS

by Mark Persons

It looks like Harris made the only intelligent decision possible by signing an agreement with Motorola to build C-QUAM AM Stereo equipment. Harris AM Stereo systems, when modified, will then be **compatible** with envelope detectors in mono radios and Motorola C-QUAM AM Stereo radios which are now appearing in the hands of consumers. The General Motors/Delco decision to go with Motorola only AM Stereo decoders has been followed by Chrysler, Ford, Volkswagon of America, and others. The Harris decision to convert to Motorola C-QUAM is a big boost for both companies and AM Stereo.

This looks like a big year for AM Stereo. I expect the number of stations converting to AM Stereo to drastically increase before year's end. AM stations must convert to stereo in order to be heard in stereo on radios consumers are buying and to compete with FM stereo stations. Yes, it appears AM stereo has come none too soon to keep AM competitive in the market place.

Are you one of the decreasing number of doubters of AM Stereo? If so, then I recommend you beg, borrow, or buy an AM Stereo radio. A listening test will prove that AM Stereo can and does sound very good. Wide bandwidth, low distortion, and good separation are characteristics of a properly adjusted AM Stereo system. You will probably be pleasantly surprised at what you hear.

I am miffed that AM Stereo didn't happen fifteen years ago. AM would be enjoying a bigger piece of the pie if stereo was a part of its history.

AM stations, converting to stereo, usually sound audibly cleaner even on monaural radios. Some stations witness a dramatic improvement. The reasons are many and involve "cleaning up the act" of station equipment and operating technique. AM Stereo modulation monitors allow installers and maintenance people to often tune a transmitter better than it was tuned when it was new in the factory. Yes, that's right. Incidental phase modulation of an AM transmitter can be minimized by adjustment of the transmitter's controls while watching an incidental phase meter on the modulation monitor.

AM Stereo installers generally spend most of their time adjusting transmitters for lowest distortion and incidental phase modulation. Adjustment of the AM Stereo exciter is done ONLY after the transmitter is as clean as possible.

New audio processing, phone lines, studio console, turntables, phono cartridges, and cart machines add to the station's sound. When adjusted correctly, the sound can be spectacular.

AM Stereo has changed many stations from LO-FI to HI-FI overnight. Listener perception of the AM medium will improve as the trend to better sound continues.

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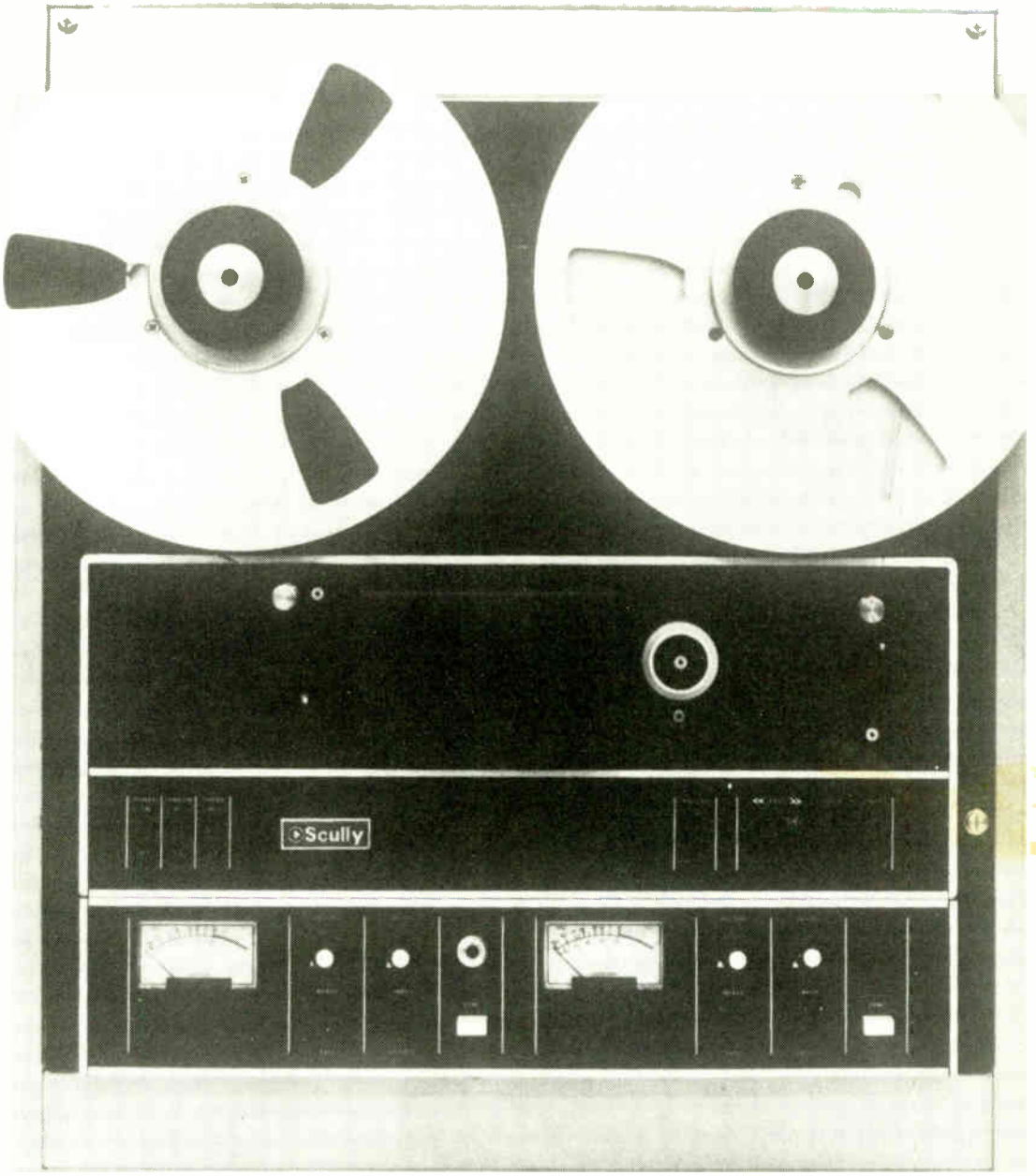

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