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COMMON POINT®

A MONTHLY NEWSLETTER FOR BROADCASTERS

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DAYTIMERS BATTING .500 WITH COMMISSION

After intense lobbing by the Daytime Broadcasters Association, the Federal Communications Commission under increased political pressure, acted quickly and with a unanimous vote to extend the available broadcast hours to Daytime broadcasters. With the new ruling, Daytime Broadcasters will be permitted to stay on the air until at least 6 p.m., even in the shortest winter days.

Under their currently approved new policy of "make it quick and make it easy", the Commission will notify those stations that qualify under the new ruling. Those stations can go immediately to the new hours with only a simple letter of intent to the Commission.

It was reported the Pre-Sunrise Authority also sought by the DBA was stymied by lack of agreement with Canada, however, information received pointed to an early solution in this area.

Started years ago by Ray Livesay, but brought to the political boiling point by its present President Jim Wycore,

RAY LIVESAY

JIM WYCORE

Daytime Broadcasters have sought a 12 hour minimum broadcast day. This Post-Sunset ruling will resolve the problems of some, but not all. Under present rules, stations operating on Canadian & Mexican frequencies must protect the closest border point, not the Primary station. This means a station 50 miles from the border but 600 miles from the Primary station could still be confined to Daytime hours.

The most encouraging statement toward the final resolution of this problem was "Possible Future Changes".

DEATH OF A SALESMAN??

After leaping into a commanding lead in the race for AM Stereo, Harris Corporation efforts were dealt a belly below by the FCC when ordered to take all STX-1 exciters off the air by September 1.

In a letter to Harris, the Commission said the system submitted for type approval, and that being sold, were not one and the same. In addition to being different, it was reported the Commission stated mono harmonic distortion on the unit being sold could exceed 20%, well above the FCC 5% Limitation.

Stories that Harris was aware of the problem for sometime remain unconfirmed. However, Broadcasting Magazine reported a letter from Harris early in August to the Commission prompted a review of the type acceptance, and the Harris letter was brought on by earlier inquires from customers. In a statement to the NRBA Monday morning memo, a Harris spokesman said that any technical changes needed would be minor, and that they had asked the Commission to reconsider and permit stations to continue using the present system until changes could be made. Another source reported that all AM Stereo systems would probably now be rechecked by the FCC and this could slow type acceptance on the Harris unit until late October or November.

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COMMON POINT READINGS

Page 3 Crosstalk--Entirely for Amateurs
Page 4 Memo from Metz--Improving Old AM's
Page 11 Shepler Says--Patches & Switches
Page 14 Persons Postscripts

Editor's Notebook

October, and things usually start tc cool down in this part of the world, but one area that is running hot at this writing is the shock of the commission pulling the plug on the Harris AM Stereo exciter. There are some very angry broadcasters who were said to have paid for their Harris System long before it was "market ready" just to be early in line, will now have to, first wait for Harris to get back in the good graces of the FCC, then, wait for the parts, or whatever, to bring their exciter into specs. It could be this year, but knowing the FCC speed, it will probably be next year. This is the second time within the past year we have heard of lawsuits or rumbles of lawsuits against equipment manufacturers.

Ye Olde Editor

AMPRO /SCULLY...still "dead in the water" as of this writing there are rumors of possible sale to manufacturer in Ky. Hope it's soon. It's getting harder and harder to get replacement parts.

Special Notice for TE-3 Owners . . . Rumbles that PT 3134E was no longer available and Harris was redesigning. Re-designing...maybe yes..maybe no. That the PT 3134E was no longer available...definitely wrong. We have them...latest report, they are in good supply. $75.00 per matched pair. Call me 800-558-0222.

... & Then There was None... Had another call this past month...and another engineer leaving the broadcast industry for a job in Industrial Design. It seems they are leaving faster than ever. The reason seems to be money...but let's find out. Is the pay too low? Are the hours too long? Has broadcasting lost that "something" that attracted good engineers for so long?

Let's hear your opinion. We won't mention names or places if you want to have your say.

*****

Crosstalk...

by ED DUELLMAN

DEVOTED ENTIRELY TO AMATEUR RADIO---To quote the ARRL* motto. This month's masterpiece shall be that. Amateur "HAM" radio is the roots of broadcasting and still remains to serve as an educational entity within the broadcasting service, although mostly in the engineering end. So you're not a HAM, that's what you've had for Sunday dinner, you do the old soft shoe for anyone that will watch, that's not the ham I was talking about! HAM, or amateur radio is what I had in mind, ever heard of it?? Now that I have your attention you may as well stick around, I've got something else to put on ya.

Amateur radio goes back to the roots of radio itself and especially the broadcasting business; you've heard of that--I hope. Most of the old timers in the broadcasting end of this trade got their start by getting their HAM ticket. I think you would find that many of the advancements in communications were invented by the amateurs. They managed to accomplish those feats because no one told them they couldn't. If some high-falutin engineer with a three foot pedigree said the thing they were trying was impossible; the amateur said, "What the hell, try it anyway." Usually the darn thing worked and there was a red faced engineer in the crowd. That was the case when it came to shortwave radio. Some big shot engineer told the amateurs that a one kilowatt transmitter could not generate enough antenna current to get out of their back yards so to say. Well, this engineer didn't know about skywave propagation, neither did the

(cont. on page 12)

MEMO FROM METZ

by
David L. Metz

IMPROVING THE SOUND OF OLD AM TRANSMITTERS

Like many other stations, KWPC has a twenty year old transmitter. It would be nice to replace it, but the funds just aren't available. That being the case, I have tried to locate the problems in the transmitter design and make what improvements I could.

The first thing I established was what the useful life of the modulator tubes was. I started out with a new set, and tested the response and distortion of just the modulator every two months. I discovered that the tubes would last one year before the distortion rose above 2%. The response curve did not change nor could I determine any drop in output.

As the tubes aged, there was a shift in characteristic curve. To insure lowest distortion this meant that the tube bias had to be readjusted periodically. If you stay with one brand of tubes, you should be able to determine a schedule for bias adjustment for your transmitter.

To make adjustment of the modulator easier, I installed an extra modulation monitor R.F. output jack on the rear of the transmitter. This enables me to remove the station's Belar AMM-3 monitor from the control room rack and set it up at the rear of the transmitter where I am working.

A two channel oscilliscope is set up next to the monitor. As a final test, program audio is compared to the output of the modulation monitor, to ensure that there is no clipping.

Another common problem in older transmitters is a weak power supply. One source of distortion in our old

(cont. on page 13)

CIRCUIT RESEARCH . . .
A GREAT ANSWER FOR SCA

After two years of research and extensive field tests, Circuit Research Labs. Inc. of Tempe, Arizona announces the availability of the SCA 300 subcarrier generator. This unit was specifically designed to solve the problems associated with older SCA equipment. The result is a statte of the art unit that brings a new quality to SCA signals. Using the new CRL unit, a station would gain increased coverage without increasing injection levels; improved protection of the main channel signal, increased stability of the whole subcarrier operation, and greatly improved fidelity and intelligibility. Replacing existing equipment with the SCA 300 will result in a dramatic improvement in quality.

This integrated SCA system includes audio processing, low distortion crystal controlled oscillator, non-overshootin low pass filters, pre-emphasis and a DC coupled data input port.

The audio processing section is a multiband limiter that incorporates a 150 micosecond preemphasis curve (overs are selectable), and additional filter to tailor the low and high frequency response of th audio to improve the clarity as received on a typical SCA receiver with the usual small speaker. CRL's patented, non-overshooting, low pass filter protects the main channel signal from SCA interference. This will typically be 80db down with 100% modulation of the main channel and normal programming at 6khz deviation on the SCA. This unit will provide a 3 to 6 db increase in loudness compared to most SCA units now in use.

The subcarrier generator frequency is adjustable from 40 to 115 KHzby changing internal jumpers; plus there is a front panel fine tuning control. No nulling or balancing is required when changing frequencies, and no filter changes are needed. There is a rear panel DATA INPUT port for transmitter telemetry or other data uses. The port is DC coupled and has no filtering. Modulation is adjustable by means of a front panel control. The OPERATION switch allows selection of remote control, audio processing bypass, locked ON or OFF, and AUTO. This allows the incoming audio to control the operation of the unit with adjustable delay times. Deviation is monitored by the front panel PEAK light that is calibrated for 6khz deviation. This light is of the peak hold variety that will sense the shortest peaks and hold them for 200 milliseconds. The calibration of this light may be changed by internal jumpers.

The SCA 300 sells for $1400. It is recommended that the APP 400 split-band processor or similar device be used in front of the generator to keep levels constant.

CRL MAKES SCA HAPPEN

Distributed by

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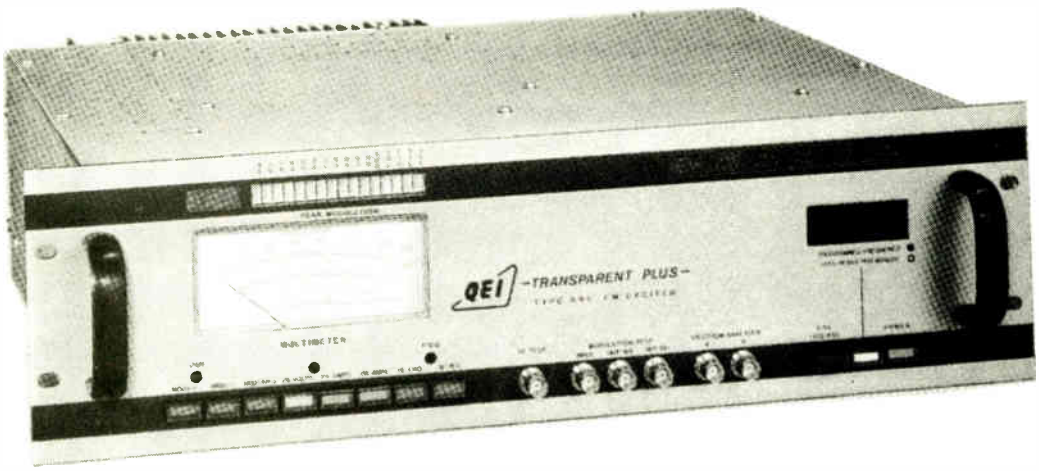
TRANSPARENT



The 695 FM Broadcast Exciter

General

The 695 is QEI's new advanced-technology FM exciter with more features and better performance than heretofore available to the FM broadcaster. It is designed for **unparalleled transparency** in the transformation of program material to an FM signal. Noise and distortion of all kinds are reduced to a point where they become difficult to measure. Many features that will appeal to the forward looking broadcaster are incorporated into the 695 and supplied as standard.

The 695 does it all. Performance standards way above the others. Features, that if purchased separately, would exceed the price of the exciter and it will provide a multiplicity of measurements, informational displays and diagnostics. Transparency plus this array of operating features make the 695 truly **transparent plus.**

The 695 accepts multiple wideband composite inputs. It will operate with any stereo generator or SCA generator (2) as well as providing a 600 ohm balanced input for monaural signals.

Whether part of the new QEI 695T series transmitters, or used to up-grade an existing transmitter, the 695 will make your station a leader in quality sound broadcasting for years to come.

Super Low Distortion

There is no "pre-distortion" circuitry in the 695. QEI does not believe that a design should add distortion in hopes of compensating for distortions built into an exciter's design. Our design staff simply did it right and came up with an ultra-linear FMO that is virtually distortion-free. What's more, the 695 will not only maintain this almost **distortion-free profile** in an engineering lab but will do it in your/our transmitter over a wide temperature range and under normal station operating conditions!

The Frequency Modulated Oscillator (FMO) is the "heart" of any exciter. QEI has put considerable design effort in achieving a linearity far beyond that which has been possible to date in FM exciters. While specifying a **distortion** level of **.025%** a **typical** 695 will be on the order of **.01%**.

Shielding and acoustical insulation of this unique circuitry allow it to maintain its high performance standards while installed in a heat-generating transmitter with a high-vibration blower and a multitude of stray electro-magnetic fields.

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PLUS

"Automod"

The "Automod" circuitry is an outgrowth of QEI's pioneering design efforts in Automatic Transmission Systems. It provides a singularly precise form of **Automatic Modulation Control.** This unique circuitry will maintain an optimum modulation level in spite of variations that may occur in the studio equipment or STL. Additionally, this modulation control is not temperature sensitive and will remain both accurate and effective over a wide range of environment conditions.

The Automod circuitry actually **demodulates, samples** and **measures** the RF signal, then precisely adjust the deviation to correspond to your pre-set modulation level. The 695 can obtain its RF sampling from its own output or that of the transmitter.

Phase-Locked-Loop Synthesizer

QEI designed and built the first commercially available synthesized FM Broadcast FMO in 1974. Shortly thereafter QEI began manufacture of the 675 FM Exciter, which was quickly adopted and labelled by several prominent transmitter manufacturers. With the introduction of the 695, QEI has again made a significant advance in FM exciter state-of-the-art. The 695 uses a new phase-locked-loop circuit that provides **lock in milliseconds** from the time power is applied. Its frequency is selectable in discrete 100 kHz steps and it may be changed easily in the field without retuning. The 695 does not require an oven to maintain its frequency over a wide temperature range.

Microphonics

No longer will tapping a pencil on the exciter's front panel sound like thunder on the radiated signal. Techniques developed for QEI's 675 exciter have been improved for the 695 so that microphonics are an aggravation of the past.

Complete Test and Monitoring Facilities

Every key operating parameter can be viewed from the 695's front panel. A multimeter allows measurement of eight important parameters by quick and easy pushbutton selection. A **bar-graph display** with 5% increments illuminates its green area during normal modulation (85-100%) periods, but will move in to the yellow area when the modulation drops below 85%. Should the modulation exceed 100% red will appear in the display area. Additionally, the lower half of the bar graph has a short term memory and will hold the highest peak occurring within an internally timed one minute interval. The exact number of peaks-per-minute (PPM) exceeding 100% modulation is displayed in a separate window. When the PPM display is not desired it can be switched to the exciter's operating frequency.

Fault Annunciator Panel

A Fault Annunciator Panel will identify any of the six major sections of the 695 that, in the unlikely event, malfunctions.

Modulation Monitor Built-In

An extremely linear, **calibrated demodulator** is included in the 695 and the front panel meter, when in the "modulation" position, has FCC ballistics. These features combine to provide an accurate modulation measurement, while modulation peaks over 100% are digitally displayed in a separate window.

Spectrum Analyzer Output

By simply connecting an oscilloscope to the front panel X-Y BNC connectors you can examine ±120 kHz from your center frequency for spectral density. And, by use of a built-in crystal derived 32 kHz sine-wave, you can peform a **Bessel-Null function calibration** of the modulation monitoring system.

Broadbanded Design

The 695 utilizes broadband amplifier circuitry throughout and requires no tuning or adjustment after it leaves the factory. Field tuning to a new frequency simply means changing the synthesizer frequency.

Constant Power Output

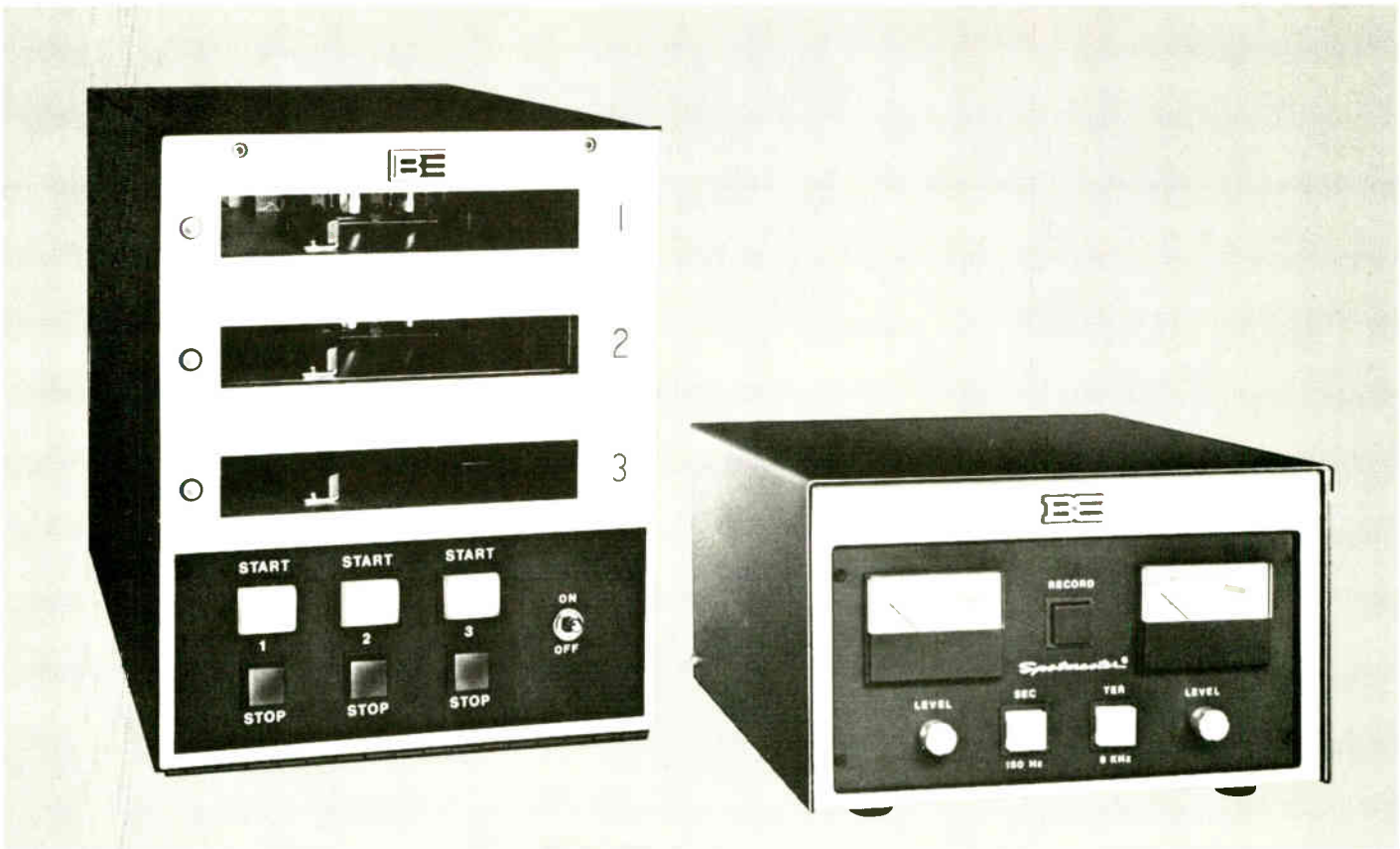
The 695 maintains a continual check of its output power and through a feed-back loop will adjust its power output to remain at the pre-set point. The output power of the 695 is continuously adjustable from 5 to 20 Watts.

ATION

TRIES INC.
WI 54901

414-235-8930

5300B Plug-In Multi-Deck with Companion Recorder Amplifier by BE



Professional Quality Three Deck Machines . . .

Over 1500 In Use

The Model 5300B: This top of the line professional three deck cartridge machine features all solid-state integrated circuits, a direct-drive hysteresis synchronous motor, quiet air damped solenoid and a one-half inch thick machined aluminum decks.

Every Model 5300B machine incorporates the Phase Lok IV head bracket with totally independent azimuth setting and top quality long life heads for superb response and performance.

Features unique to this multi-deck design are plug-in decks, all ribbon cable wiring and rear panel LED service aids. Run lights are adjacent to each deck.

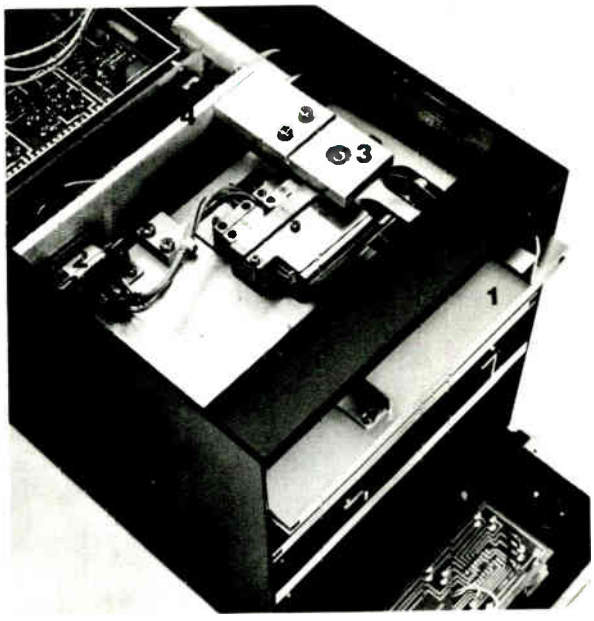
Unique Mechanical Design: The Model 5300B has a sturdy internal bulkhead mechanical design which insures stable and accurate deck and capstan positioning. The top capstan bearing mounting is mechanically supported by the sturdy aluminum bulkhead insuring consistent mechanical alignment independent of front panel reference. This design eliminates problems found with other three deck machines.

Cool Operation: The solenoid control circuit utilizes solid-state switching and a low-voltage regulated current source. With this circuit, solenoid operation is smooth and quiet and is unaffected by ac line variations. Heat dissipation is reduced and the combination of low voltage and solid-state switching significantly enhances reliability.

Advanced Electronics: A characteristic of the 5300B is exceptionally wide dynamic operating ranges which contribute to high quality reproduction. The companion recorder input circuits and the 5300B output circuits will accept and deliver, without introducing distortion, a greater range of signals than any competitive machine. Balanced transformer output with FET switching permits paralleling of machines.

Recording Unit: The optional recording amplifier (mono Model 5309 or stereo Model 5310) is available for recording on deck # 3 independent of the other two decks. Thus, the 5300 can operate as three separate machines; a record/playback deck and two playback only decks. Another optional unit is an audio switcher which automatically provides a balanced output from the last started deck while muting the other decks.

Design/Operational Features

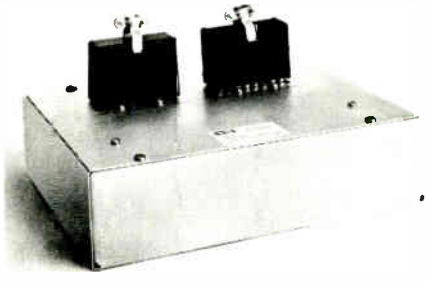


Removable Decks

Removing a Broadcast Electronics deck couldn't be easier. The front panel is hinged, **1** the decks pull out, and all electrical connections are made through a connector **2** that is a part of the deck.

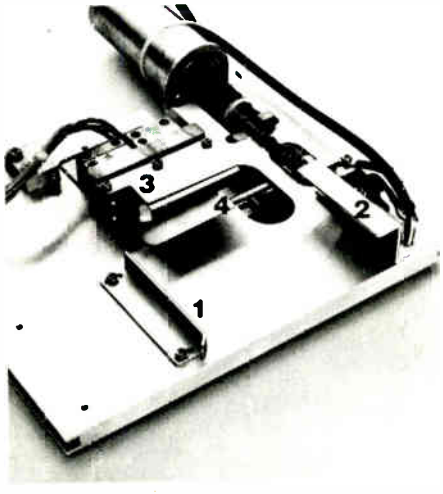
This photograph shows the top bearing support **3** and aluminum bulkhead **4** which provides the mechanical reference for the motor, decks and capstan.

Audio Switcher
(Multiple Machines)



Provides a single balanced output. Switchers can be tied together to provide a single balanced output from up to three 5300B machines. Selects last deck started and mutes other decks. If a wrong deck is started, pressing another start button will immediately mute the first deck and put the newly started deck on the output. The first deck started will continue to run, and will re-cue itself.

Unique Cartridge Guidance System



A simple yet extremely effective system for positive and accurate cartridge positioning.

The left side guide **1** is straight forward. The guide on the right **2** has a tapered overlap which directs the cartridge into the head.

Directly above the head **3** a beryllium clamp locks the cartridge into place. The force provided by this clamp insures positive locking regardless of variations in cartridge size. Also mounted above the beryllium clamp is a Mu metal shield to protect the head from stray electrostatic fields.

Mu metal shielding **4** is also located directly under the head and is recessed into the deck for the most effective location.

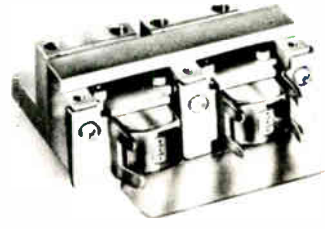
Plug-In PC Cards

Deck electronics are on individual plug-in pc cards with all gold to gold connections for high reliability. Also shown are mating connectors which are supplied with the machine. The record connector is in place (above the fuse holder) behind a protective shield.

LED Status Lamps

Servicing the equipment at the rear panel is simplified by LED lamps located on the pc cards. These provide a visible indication of the function being performed by the machine.

Phase Lok IV Head Bracket



For optimum adjustment of stereo phasing, these machines have the Phase Lok IV Head Bracket.

Phase Lok IV is the only head bracket to have a non-locking azimuth adjustment which is completely independent of the height and zenith adjustments.

TALKBACK

KENTUCKY...Glad your back..expand Shepler & Persons columns. Why doesn't some one come up with trouble shooting tips for bdcst xmitters..Like Symcure feature in E.S. & T. magazine for TV's?

TEXAS...Like Persons thoughts regarding NARB and NATB to replace NAB. So much of our interests are different.

ARKANSAS...Good article by John Shepler.

WISCONSIN...Would like to see computer programs from engineers. Example...I wrote one which prints out FM indirect method power chart based on xmitter efficiency.

WASHINGTON...Your people refer to C. P. as a rag...maybe so..but..since you are reasonably good information pub..why set opinion for new readers?

WYOMING...Good to see you back..was interested in your severe weather warning article.

NORTH DAKOTA...How many wrote today "Rapid City is in S.D."..wonder how many C. P. readers are "HAMS"? Maybe sometime you can get a tally from acknowledgement cards and print a list.

OHIO...Think FCC shirking their responsibilities particulary on AM Stereo. Second..To Shepler..I've heard high fidelity AM and agree that over processing is chasing away people we want.

ARIZONA...Shame you feel AM Stereo already dead. Why not promote the positives.. Like the Sony unit?

OREGON...Yes..I checked all three boxes..I am all three here..When are FM's going to wake up to quality instead of compressed garbage?

IDAHO...Tech logs deleted? Good, maybe? Remote Controls must still be calibrated weekly...Funny thing, the xmitter now safer totally unattended than used to be with technician (licensed) on duty at all times.

*****

Shepler Says. .

by John Q. Shepler
Technical Consultant

PATCHES OR SWITCHES

Patch bays and radio stations grew up together. We inherited patch panels from the telephone company along with racks, balanced lines, and 600 ohm terminations. In this age of microelectronics, however, just where do patch panels fit into the broadcast operation? What other alternatives are there?

Thirty years ago, every studio and transmitter room contained rows and rows of patch panels. One reason for this was that the tube-type equipment was none too reliable and might have to be replaced on a moment's notice. Plugging in a patch cord was a lot faster than physically removing a 50 pound amplifier.

Local loops for remote broadcasters were also more prevalent years ago. Many stations still have a few dedicated lines running to churches or stadiums, but the local loop has largely been replaced by RPU equipment and dial-up remotes.

You can still buy the double or single plug patch cords and jack fields and I believe they have a place in modern radio. A patch panel in the transmitter room provided a simple and fool-proof way to hook together studios, transmitters, and audio processors for emergency situations and test purposes. It's nice to have the outputs from all of your studios at a central location along with the inputs to your main transmitters and spares.

The advantage of a patch panel is that you can use the "normalizing" contacts to provide the usual circuit path. No cords are needed. In an emergency situation, you can positively disconnect one studio and connect another to the processing and transmitter.

In general, patch panels simply switch circuits and do not introduce any noise or distortion of their own.

(cont. on page 14)

amateurs but they tried anyhow. BINGO!!! You know the rest of the story.

That's the way it used to be, the amateur was the R&D man, the pioneer in the art of communications. Now we, the HAMS, have taken a back seat and seem to be satisfied to use what some engineer has designed for us. What happened was most of the HAMS ended up in the electronics industry in some way or the other. Some manufactured all the fancy gizzimos that they thought up and sold, others chose to use their skills in servicing. Now why should a young person, getting into HAM radio build a radio when you could go out and buy the other fella's rig? With that attitude hams became operators and as the years went by this situation became the norm. Then to top off the whole sad affair the FCC in all their wisdom created the monster called CB radio and put it in the 27 MHZ band.

They never heard of skywave propagation either (must have listened to that big shot engineer) and now there ws no reason to even get a HAM ticket, just buy a ham rig that would work on 27 MHZ and you had instant HAM.

Amateur radio in the USA has been sort of stuck in the mud and only in the last few years the clubs and national organizations have been trying to promote the hobby. Japan, now on the other hand has promoted the hobby, encouraging the younger people to join the ranks of the amateur radio fraternity. The Japansese HAM takes a lot of interest in the technical side of the hobby and the younger group are encouraged to continue on in the electronics field. That's one of the reasons that Japan leads the world in electronic technology. Amateur radio in this country was once a large source of people for the communications industry. Fact of the matter they started a lot of it, good example- -ZENITH. . .Amateur radio needs a good boost to get young people interested in the hobby and not just to blabber on a Japanese radio. This country needs a lot of good technicians and engineers. If we could get our younger generation interested in something other than goofing off we may again be able to compete in this high tech world.

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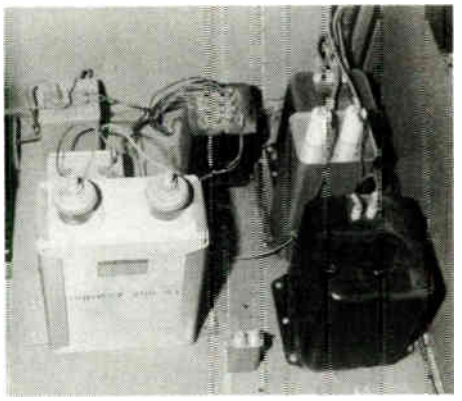
METZ
(cont. from page 4)

Gates was traced to audio feedback through the power supply. The power supply simply could not deliver the energy the modulator demanded with our highly processed audio. The main



NEW OLD

cause was too small a filter capacitor. Increasing it from 10MF to 50MF made a noticeable difference in audio quality.

With the larger value, no audio could be detected across the capacitor with an oscilliscope. Note that this test was made with a high voltage probe.

A year later we changed audio processing again. The new processor increased the load on the power supply again. This time the mercury vapor rectifier tubes proved to be the problem. By replacing them with solid state versions of the tube, the voltage was stable again. I had been replacing the 8008 tubes once a year, but now that yearly cost has been eliminated.

To protect the solid state rectifiers from high voltage transients from the incoming power, GE-MOV transient suppressors were placed across both sides of the power line to ground.

*****

SHEPLER SAYS . . .
(cont. from page 11)

Problems can arise in old panels, however, because the contacts may corrode slightly and impair the circuit. In strong RF fields, a corroded jack may even rectify the transmitted signal and feed it back into the audio. Worse yet, you can find your AM bleeding into the FM and vice-versa.

Other arguments against patches are that they are expensive and confusing for non-technical performers. The answer to this is to replace the studio patches with rotary or push-button switches near the console. Some boards have rotary selectors on the last 2 channels. You simply wire in your remote lines or other seldom used inputs and select them as needed.

I suggest making all of your board inputs bridging circuits rather than 600 ohm terminations. This way, any of several studios can select the same network line or automation output and not affect the audio levels. The same practice will work with patch panels if you terminate board outputs at the console or use normalizing contacts to provide the load resistor.

In the last 10 years or so, mini-patch panels and cords have become available. These aren't cheap, but they give you lots of circuits in a small area. You can hide one of these in an obscure corner of the studio and have a convenient way to connect your test equipment to all of the recorders and cart machines.

I suspect that most stations need a combination of patch panels and switches. Patch panels are great for engineering and switches are great for the air-talent.

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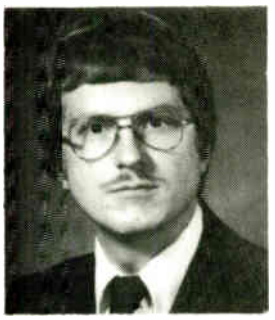

PERSONS' POST SCRIPTS

by Mark Persons

I received a letter from Elmo Reed of the Post Corporation regarding the Persons' Postscripts column in the July 1983 issue of Common Point. Elmo pointed out that OSHA (Occupational Safety and Health Administration) rules prohibit the use of more than 30 pounds per square inch of compressed air at an air nozzle. In the article I mentioned that 100 PSI of air was just great for cleaning electronic equipment. 100 PSI air compressors, tanks, and nozzles are available at almost every hardware store, but apparently are illegal in a factory or other business where people are employed.

I am reminded of the station that purchased a new FM transmitter and kept the old one as a standby. At least they intended to keep the old one as a standby. However, the old one ran pretty well once it was running. The trick was getting it going in the first place. It made a very bad standby because of the trouble it took to get it up and running. As I mentioned though, it ran fine once it was coaxed into running. The new transmitter, of course, started and ran beautifully from a cold start. After much discussion, it was decided to keep the old transmitter as the main and the new transmitter as the auxiliary. After all, the new one was almost guaranteed to come on line if the old one failed. The reverse was not necessarily true.

There are some dandy adjustable speed direct drive turntables on the market that really work well. In the case-in-point I am about to describe, they worked too well. I installed two at a radio station and the manager was very pleased...that is until he found his airpeople were speeding up or slowing down the turntables to make the last song of the hour end just before the news on the hour. Changing the speed several percent is fine for those listeners who don't have perfect pitch, but is a real turn-off for those who do. The manager was one of those people with perfect pitch. It didn't make much sense to spend a lot of money on a very good turntable and have the music just a little off speed. I finally defeated the variable speed feature in the turntable's logic section. Now they run at exactly 33 and 45 only!!!

Now a look into the past. In 1975, I flew to Spokane, Washington to visit T.O. "Jorgie" Jorgenson at KXLY AM-FM-TX. Greeting me, at the airport, were Jorgie and Ron Stiffler of KXXR in Spokane. It seems Ron had been recently hired as engineer for KXXR and had inherited a real problem transmitter. As I recall, it was a Collins 21B 5Kw AM that had been running at 400 watts out for six weeks. Several West Coast consultants had tried to get the power up to 5Kw again, but could not.

Ron and I spent two long nights analyzing the problem and repairing many minor ills in the transmitter. Every stage in the RF chain tuned, but power output remained low. Finally, I checked every component in the oscillator and driver sections. The only deviation from the schematic was a fixed capacitor in the RF driver output tuning network. The schematic showed one in parallel with a variable capacitor. However, only the variable capacitor was in the transmitter. With the fixed capacitor missing, the variable capacitor was tuning the driver output to the second harmonic of the operating frequency. Apparently the original fixed capacitor shorted killing RF drive to the final. The previous engineer removed the fixed capacitor and found the driver would tune "Just Fine." The final RF amplifier did not take too kindly to being driven by twice its normal frequency. Thus the power output was less than one tenth of normal.

There was much elation when the fixed capacitor was replaced and the transmitter ran at full power again. However, the celebration was short lived when the transmitter shut down intermittently and unexpectedly. An arc could be heard, but not seen, just before the transmitter shut down. After a bit of head scratching and checking, we found a feedthru insulator on the RF line between the RF driver and final amplifier was arcing over. The arc could not be seen because it was taking place in a two inch wide cavity between the center and left hand transmitter cabinets.

No replacement insulators were immediately available. The temporary solution that worked was using the center conductor and solid dielectric from a peice of RG-17U coaxial cable. An eight inch section was used in place of the bolt and insulators between the two cabinets.

Needless to say, everyone at the station was happy to see the transmitter running right again. I was glad to get some sleep.

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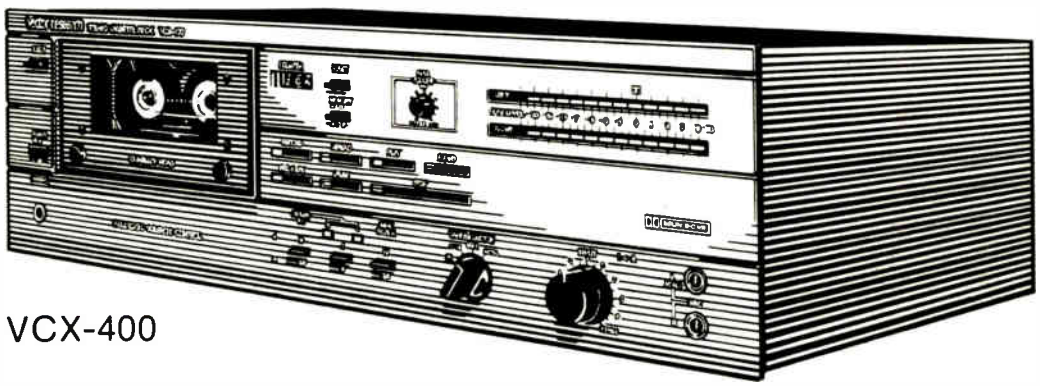

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VCX-400 SPECIFICATIONS

Track system	4 track, 2 channel stereo
Heads	Record and playback head: Duralloy
	Erase head: Ferrite
Motor	EG Servo DC motor
Type of tape	C-45, C-60 and C-90
Tape speed	4.75 cm/s (1-7/8 ips)
Wow and flutter (WRMS)	0.05%
Frequency response	
Metal	25 Hz—18 kHz
CO	25 Hz—17 kHz
FE	25 Hz—15 kHz
**S/N ratio (A WTD, REF 3% THD,	
Metal tape)	56 dB (DOLBY NR OFF)
Rewind/fast forward time	100 seconds (C-60)
Bias frequency	105 kHz
Erasing ratio	65 dB
Crosstalk	
Track, 1 kHz	63 dB
Channel, 1 kHz	33 dB
Input sensitivity/impedance	
Line in	60 mV/50 k ohms
Mic in	0.25 mV/–72 dB (600 ohms or more)
Output level/impedance	
Line	650 mV/1k ohms
Headphones	120 mV/8 ohms
Power requirements	120V AC, 60 Hz
Power consumption	30 W
Dimensions (W×H×D)	440×142×368 mm
	17-3/8×5-5/8×14-1/2 inches
Weight	6.6 kg (14.6 lbs)
Included accessories	2 connection cords

**Additional noise reduction with Dolby B and C-type NR

Dolby B	Up to 10 dB above 4 kHz
Dolby C	Up to 20 dB above 2 kHz

Specifications were determined using TDK MA (Metal), SA (CO) and AD (FE) tape unless otherwise noted.
Features and specifications subject to change without notice.
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