



# The SPARTAN

VOL. III • NO. 6

NOV.-DEC. 1974



BOB ("HOGAN'S HEROES") CRANE . . . portrays a DJ in this episode of "Police Woman" (above), while Angie Dickinson, as Sgt. Pepper Anderson (center background) works to unravel his plot. Crane is using the familiar Sparta "Showcase-3" complete with Century Series tape cartridge equipment and GT12 Turntables. Other actors in view are unidentified. —Burbank Studios Photo

## Quarles Named To Sales Post; New Territories

Sparta's national sales territorial boundaries have been altered to provide better services for broadcasters due to greatly increased sales activities, Jack Lawson, vice-president, sales, announced.

Of major importance is the appointment of James E. Quarles to the Sacramento staff as factory sales engineer. His territory for sales and representative affairs includes Central California, Nevada, Utah, Colorado, Nebraska, Kansas, Missouri, Iowa, Illinois, Indiana, Kentucky, Ohio, the Virginias, Maryland, Delaware and South Carolina.

States lying north of Quarles' territory remain the responsibility of Jerry Gallagher, while Chuck Rockhill manages all sales matters in the southern tier of states.

Quarles, a native of Texas, served with the U.S. Navy as a shipboard electronic

## Sparta Smiles ... It's On TV In "Police Woman" Series

A rush order sent a Sparta Showcase-3, and related equipment, to Burbank Studios for a "Police Woman" filming recently. The series segment, titled "Death Pays All Debts," centers on a conflict between the show's stars and a high-caliber DJ who steps seriously outside the law.

The complete Showcase left Sparta by van for Burbank where it was met by Gary Maggiore, 10-year Sparta employee and Fabrication Shop foreman who had flown down to supervise its setup. Burbank Studios personnel shot the series the following day and loaded up the van for a return trip to Sparta where the Showcase was inspected for quality control only one week after it had left for its TV role.

Burbank Studios is a joint effort of the old Warner Brothers and Columbia Studios located on the former site of Warner Brothers main studios.

"Police Woman" is seen Friday night on NBC, 10 p.m. Pacific Time.

## Your Sparta Catalogue Can Help

The self-mailing registration card in the back of your Sparta catalog No. 101 should be sent to us without delay!

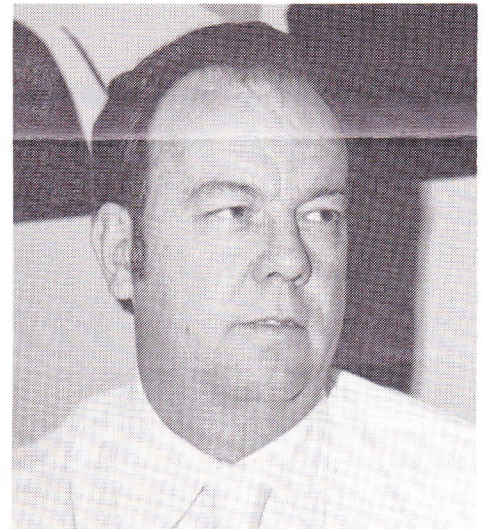
We are holding up distribution of additional catalog material pending receipt of more registration cards for the self-correcting address file.

The card to which we refer is at the very top of the first page of reply cards, following catalog Page 104.

PLEASE, give this matter just a few minutes of your time; mail it TODAY!

Thank you.

—The Editors



James W. Quarles

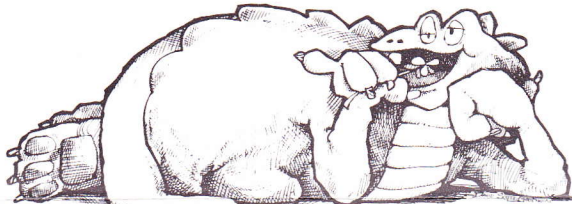
—Sparta Photo

technician. After service, and taking his degree, he went into electronic servicing. He was Service Dept. Manager for Admiral Corp. in the Bay Area before starting his own company in Sacramento.

With his wife and two children, Quarles makes his home in Sacramento

# These Are The Ads We're Talking About!

## Who's that messing around with my eggs?



A long while back there were huge, not-too-bright creatures who dominated the earth. Their size and lack of competition helped them rule the world for many millions of years.

It wasn't instant disaster that brought an end to those Dinosaurs, but a bunch of busy little fellows who hustled around destroying all the Dinosaur eggs they found. The Dinosaurs were so contemptuous of the ambitious newcomer Mammals that they tried to ignore them. They didn't even think too seriously to protect their nests. Suddenly, no eggs, nor baby Dinosaurs. And shortly, no Dinosaurs at all!

That history should tell us that getting



to be big and old and having things our own way isn't good for you. And history does have a way of repeating itself.

The Dinosaurs in today's broadcast equipment business are also vulnerable to criticism for slowness and complacency. Their eggs are pretty much in one basket. Are they perhaps too big and old to notice you? Or us?

We want you to pay attention to us relative newcomers. Acquaint yourself with the quick, medium-size manufacturer who helps you personally with your equipment needs FAST. The company with the growing egg collection.

**We're in the business of You.**



5851 Florin-Perkins Road, Sacramento, Ca. 95828  
 (916) 383-5353 • Telex 377-488 • Cable SPARTA  
 a Subsidiary of • Colec Corporation

("Broadcasting" Magazine, Oct. 21, 1974)

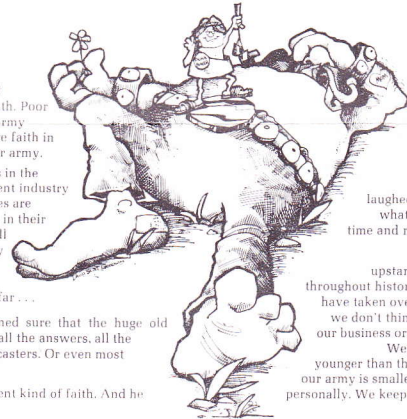
## Being the biggest can be just a headache.

We all know what David did to Goliath. Poor Goliath. And the army which put its entire faith in Goliath's size. Poor army.

There are Goliaths in the broadcast equipment industry today whose armies are boasting that faith in their sheer size solves all problems for every station. BIG is BEST, they say. over and over. So far...

We're not so darned sure that the huge old Goliaths DO have all the answers, all the time, for all broadcasters. Or even most of the time.

David had a different kind of faith. And he



had youthful speed and endurance. Plus a different kind of 'technology' remember, which surprised old Goliath considerably. Goliath laughed, but David delivered what he said he would. On time and right where it counted.

Without an upstart David now and then throughout history the giants would all have taken over long since. Frankly, we don't think that's healthy... in our business or for people in general.

We're smaller, faster and younger than the Goliaths. And since our army is smaller, you get to know us personally. We keep the faith, because...

**We're in the business of You.**



5851 Florin-Perkins Road, Sacramento, Ca. 95828  
 (916) 383-5353 • Telex 377-488 • Cable SPARTA  
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("Broadcasting" Magazine, Sept. 30, 1974)



DOWN NEW ORLEANS WAY ... the Sparta sales force, headed by Jack Lawson, VP sales, pushed Sparta products at the recent three-day NAFMB convention in New Orleans. The Sparta booth was freshly done in yellow, orange and black for the show which Lawson described as "an outstanding event ... well attended and well planned." The headquarters staff of Martin, Zienkoski and Browne Associates, Sparta sales reps for Texas, Louisiana, Arkansas and Oklahoma were also on hand as was Chuck Rockhill, sales engineer for the southern territory. —Sparta Photo

a little of ...

## EVERYTHING

Quite a number of our broadcasting friends have mentioned the entertaining ads which we have reprinted above. A few express puzzlement over our objective in the series, however. Those latter few, we have confirmed, just haven't been listening to our competition's salesmen!

For years Sparta has been subjected to innuendoes such as "those newcomers", "that little West Coast company", "those guys who make the little consoles", and the like. Frankly, we finally got fed up with it.

Our new Centurion console line, our full line of AM and FM transmitters, our huge international equipment orders, all surely give evidence of much more muscle than the opposition would like to give us credit for.

So the theme of these particular ads is to try to set the record straight: (1) we're here to stay, (2) we're growing solidly and steadily, and (3) we'll keep doing business in the personal, quick and innovative way that so many broadcasters around the country, and world, approve of. We're darned proud of our accomplishments and prospects.

"Relative" newcomers, yes. As the ads quite cheerfully admit. But not so green that we don't know our way around the race course!

**BILL OVERHAUSER**  
 President  
 Sparta Electronic Corporation

# Little Pats On The Back

From time to time a Sparta equipment user writes such a nice letter that we can't help but be more than appreciative. Here's such a one, from Mark Durenberger, CE at WCCO-FM in Minneapolis, to Bill Overhauser:

"Our technicians have loved working with the AS40B and two GT-12SY turntables . . . they've been doing full-time duty in our main control room . . . in a bit over a year, we have not had one second's down-time on any piece of Sparta equipment! (Durenberger's emphasis; Ed.)

"I know this is not unusual for your products, but we are just a little more picky than usual . . . and it's nice to be able to say that we have had no complaints or problems since the day we installed the gear.

"Keep up the excellent work . . ."

And Bill Overhauser's reply contained these paragraphs:

"Your comments concerning SPARTA equipment are very much appreciated and very flattering. I doubt, however, that we can take the entire credit, as good preventative maintenance and routine servicing is an important factor in gaining 100 percent performance from any type of equipment, whether it's an automobile or electronic equipment.

"So, turning things around, Mark, thanks a lot for helping in making SPARTA look good."

Any further thanks from the Editors to Mark Durenberger would be superfluous, we think. But we can't help but be struck by the justice of Bill's reply; getting the most out of your broadcast equipment is a joint effort by the manufacturer who puts his best into it, and the engineer who wants to get the most out of it. We couldn't say it better than above . . .

Happy maintenance . . . !

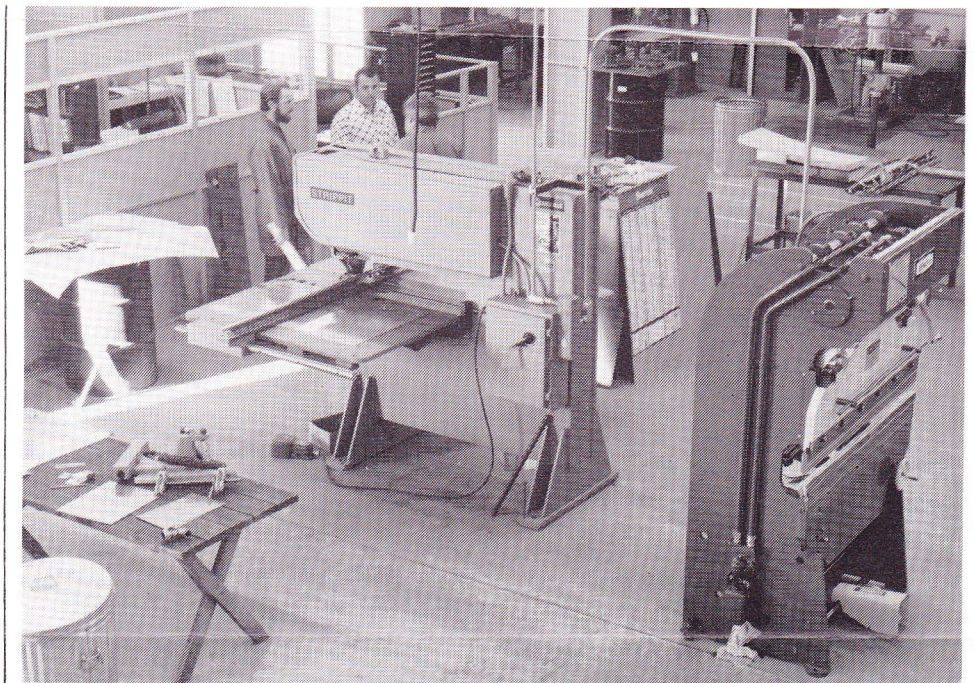


Published Bi-Monthly by

## SPARTA

**ELECTRONIC CORPORATION**

5851 Florin-Perkins Road, Sacramento, Ca. 95828  
(916) 383-5353 • Telex 377-488 • Cable SPARTA  
a Subsidiary of Cetec Corporation



NEW MACHINES SPEED PRODUCTION . . . Sparta fabrication shop revamping has produced a number of changes already with more new equipment on the way. The first two major pieces of machinery to go into service are pictured above. They are a Strippit Fabricator pantographic duplicating hole punch and notch machine and a Furnas hydra-power 17-ton press brake by Di-Acro. Pictured are Mark Pingree, fabrication specialist (left) and Gary Maggiore, fabrication shop foreman as they talk to their supervisor, John Fernandez, near the Fabricator (connected to the press brake at right).

—Sparta Photo

## ==Tech Tips==

—by DAN PELUSO  
Mgr. Customer Service



Peluso

Even here in Sacramento the leaves are falling, so in much of the country winter is just around the corner. Spring, and replacement transmitter parts, are months away.

With the shortages we are experiencing in obtaining components we'd like to remind you to carefully look over those seemingly simple, easily-replaced parts that by their very nature are too often taken for granted. Like the transmitter cooling system . . .

First, do you HAVE a spare blower or fan on hand? We are reluctant to even guess how much time would be involved to ship certain older model replacements. So, if yours even looks a bit shoddy, we suggest you order a spare right now and also stockpile other spare parts as well.

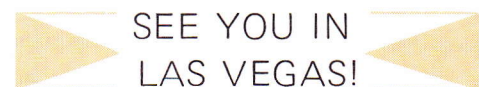
If you think the old fan will weather the winter months, give it a few minutes of preventative maintenance. Make sure the autumn's harvest dust is cleaned out . . . re-lubricate bearings per manufacturer's specs. Too much lube can be just as bad as too little if cold weather stiffens the lubricant. The blower cage, or fan blade, should spin freely with a flip of the finger. If not, check for friction in bearing well or sleeve.

Clean and relube and play it safe.

After transmitter shut down, check the motor and any bearing well, or sleeve arrangement, for heat. They should not be so hot that a hand cannot be held comfortably on them. How are the bearing cages? They may be a bit warmer than the motor without indicating potential trouble.

While all air intake and exhaust filters should be checked regularly by all means check them now after a dusty summer. Many problems with transmitters can be traced right back to cooling problems.

Name of the game, Part I: KEEP IT CLEAN! In my job, I hear a lot of sighs and groans from engineers who didn't take time to clean and maintain those very basic devices.



The N.A.B. staff hosted the annual Exhibitors' Meeting in Las Vegas October 16th. Exhibitors' representatives discussed methods of handling exhibit materials and equipment, security, and related matters. The Convention Center floorplan for the April 6-9 N.A.B. 1975 Convention was unveiled.

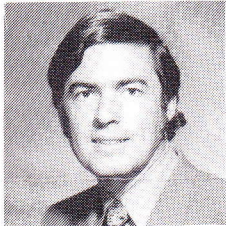
The Sparta/Jampro/Vega/Cetec Audio booth is a 1,350 sq. ft. area in the North Hall of the Center. It affords designer Keith Belcher a great creative opportunity, on which is he already at work.

The booth, under the banner of Cetec Broadcast Group, will feature an audio demo center within the display area.

# Audio Console Distortion Specs

-by DAVE EVANS  
Audio Products Manager

**EDITOR'S NOTE:** This concludes Evans' two-part article, the first of which appeared in the Sept.-Oct. issue.



Dave Evans

in audio consoles used in various applications.

Unfortunately, a harmonic distortion measurement can be very misleading in terms of actual sound quality. For instance, high order harmonics (3rd, 5th, 7th, etc.) which are not harmoniously related to the fundamental frequency in a musical sense are objectionable even in very small proportion<sup>1</sup> to the fundamental. Even harmonics (2nd, 4th, 8th, etc.) are musically related to the fundamental and effect only the color or timbre of the reproduced sound.<sup>2</sup> These may actually make it sound more pleasing when present in small proportions. Since harmonic distortion specifications are not weighted for high order content they do not necessarily give an accurate description of an amplifier's performance.

Further, music and speech consist of complex waveforms, not single sine waves as used to measure harmonic distortion. When multiple frequencies are simultaneously passed through an amplifier they amplitude modulate each other. Harmonics of the fundamentals are also modulated, producing sum and difference frequencies musically *unrelated* to the fundamental frequencies, and therefore objectionable to the listener; the resulting sound has a harsh or rough quality depending on the amount of distortion present. This is Intermodulation Distortion, which is probably more acoustically relevant<sup>3</sup> as a measurement of amplifier distortion than the more commonly used THD.

Intermodulation Distortion is usually measured by feeding two frequencies (typically 60 Hz and 7,000 Hz intermixed 4:1) through the amplifier. The distortion modulation components centered around 7,000 Hz are first AM detected, and then

separated from the high frequency test signal. The remaining distortion components are measured and then expressed as a percentage of the total detected signal.

IM measurements often reveal amplifier characteristics which are not disclosed by the usual kinds of harmonic distortion measurements. For instance, THD is usually specified at the rated output level of an amplifier, but yet the amplifier is usually operated at a much lower level. Due to crossover notch distortion, which is inherent in many older transistor circuits, an amplifier may have 5-10% IM at very low outputs. It is difficult to even measure harmonic distortion at very low levels because the measuring equipment, being of necessity broadband, starts measuring noise rather than distortion.

Remember that recorded music has a dynamic range of 40 db or so, and even if the VU meter is peaking up into the red, much of the music content is 20 db below the peaks. At the same time the monitor amplifier, which is rated for perhaps 0.5% THD at 10 Watts RMS, may actually be operating at less than 1 Watt with much of the music content producing only a few milliwatts. At this normal listening level the sound may be quite distorted even though the audio console meets its published distortion specifications.

Fortunately, state-of-the-art transistor amplifiers are relatively free of crossover distortion, but if your console is several years old and solid state, you may be transmitting a distorted version of the day's news.

At Sparta we are using a CROWN IMA analyzer to check all amplifier designs for IM distortion at *all* operating levels, not just rated output. We have found that circuit improvements made to reduce IM also reduce THD. The amplifiers in our new consoles have only 0.1-0.3% IM and, as a consequence, barely measurable harmonic distortion at most frequencies. They very definitely sound better.

To summarize:

(1) High order harmonic distortion is aurally offensive, but a harmonic distortion specification does not define the harmonic content; it therefore does not accurately describe or predict an amplifier's performance.

(2) A single sine wave, or one at a time, is used to measure harmonic distortion, but in actual usage complex waveforms will be amplified; therefore, IM measurements more closely simulate actual operation of the amplifier.

(3) Amplifiers should be tested at *all operating levels*, not just maximum rated output.

(4) At low operating levels older transistor amplifiers may have crossover distortion resulting in very high IM distortion



## Indispensable— Unseen—Vega's Wireless Mike

If you've ever wondered how audio is picked up so cleanly for sound-on filming, even with the actors far distant from the camera, the Vega Professional Model 55/56 Wireless Microphone explains it all . . . a well hidden product.

In the above photo actor Ernest Borgnine is getting ready for his TV-movie portrayal of Vince Lombardi, all taped and wired into the above mentioned Vega product. Jimmy Rogers, Universal Studios audio mixing technician, checks the pickup on the VU meter of the receiver seen at Borgnine's left shoulder. On Borgnine's belt is the transmitter unit, with the microphone taped just inside his jacket. The 55/56 transmission can be received by the unit Rogers is holding hundreds of feet away.

FCC decisions are expected shortly which will make certain transmission bands for Vega wireless microphone systems available for use in live broadcast production, as well as for TV and movie filming and stage and educational live A/V productions.

Vega is a division of Cetec Corporation.

which will not be revealed by conventional harmonic distortion analyzers.

### BIBLIOGRAPHY

1. EDEN, T. "Distortion; Cause and Effect", STUDIO SOUND (April 1973), p. 50.
2. TILLET, G.W. "Amplifiers," AUDIO (April 1971), p. 32.
3. STANLEY and McLAUGHLIN, "Intermodulation Distortion," AUDIO (February 1972), p. 38.

# Sparta On The Overseas Scene

Recent world-wide developments, involving Sparta broadcast equipment sales and promotional activities, have included the massive IBC '74 meeting in London . . . the Mexican National Broadcast Convention in Mexico City and the frequent visits of Radio Cadena Nacional officials from Bogota, Colombia to Sacramento where their \$½ million equipment order is under construction.

George "Mike" Angelou, European sales manager for Sparta products through Computer Equipment Company, Ltd., in England, prepared a booth at the International Broadcast Convention annual show in London. Dave Evans, Sparta audio products manager, flew over to give Mike a hand at the IBC.

The IBC was the occasion for Evans and Angelou to meet with representatives of several European firms and governments interested in Sparta equipment. The booth featured principally Sparta broadcast and Jampro antenna equipment at the Grosvenor House, Park Lane, location. The IBC is one of the world's three great exhibits, the other two being our own NAB (slated here in Las Vegas for April 6-9) and the continental convention at Montreaux, France, scheduled for May, 1975.

Evans reported being struck particularly by the European broadcasters' long-term negotiation and study of even relatively small equipment items.

With most broadcast facilities operated by the governments of the countries visiting the I.B.C., exhibitors find that in many cases custom equipment is necessary. Often the government-operated station, being unable to secure custom equipment to meet its particular specifications, will construct it on-site with operating personnel.

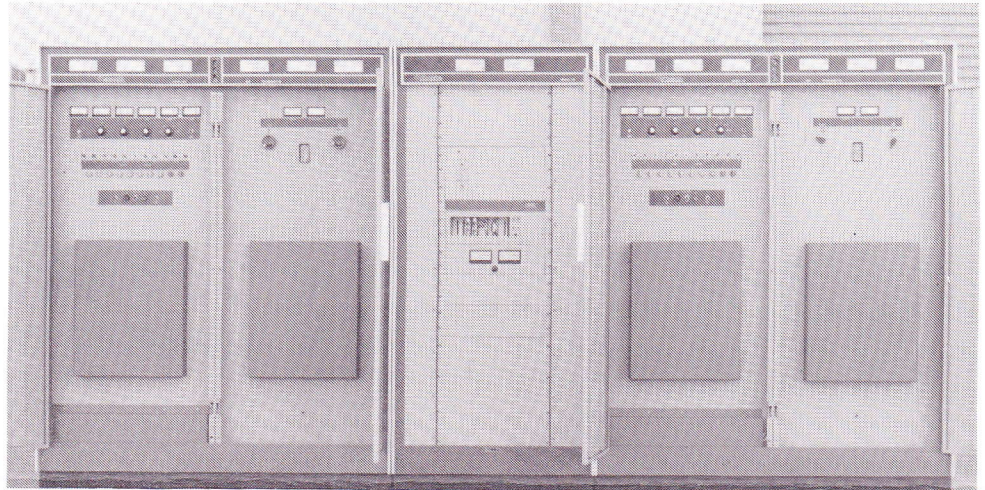
"A different marketing system altogether," commented Dave, "and one which requires particular expertise to sell to."

In another part of the world, Bill McGowan, Sparta controller, spent the better part of a week with Alejandro Zendejas, general manager, Esparta Mexicana, attending the annual autumn convention held in Mexico early in October. As controller, McGowan also oversees the financial affairs of Esparta Mexicana.

Radio Cadena Nacional officers and engineers have been commuting from Colombia to Sacramento at a frantic pace as their equipment order nears completion. (See "Product of This Issue" - Ed.) Some of the gear is being installed as this is written and, when the last of the huge Model 730 AM transmitters is shipped, the visitors from Bogota will return home . . . fully trained and ready to take complete charge of their modern new transmitters for RCN.

(See photos on next page)

## Product For This Issue



LOOMING LARGE ON THE HORIZON . . . above is the Model 730 AM transmitter, one of five dual-redundant 30 kw systems being shipped to South America. Each consists of two 15 kw Model 715 transmitters operating through the Sparta broadband ferrite combiner (center cabinet). -Sparta Photo

## Dual Redundant AM Transmitters

The basically European idea of having radio transmitters visited by engineering people for regular maintenance only at monthly intervals, or even less frequently, is drawing attention among U.S. broadcasters as the F.C.C. Rule 73 task force studies "automatic" transmitter possibilities.

In all Europe, in Canada, and many countries of the world where European consultants designed broadcast systems, the dual-redundant automatic transmitter system is considered unquestionably necessary.

In this country dual-redundant systems are fairly rare, Sparta having had a hand in designing and supplying some of the mere handful of AM's operating in this fashion.

There are several points to be made in favor of dual-redundancy despite its greater cost when compared to full-power main transmitter-plus-standby unit. The capital outlay provides: (1) half-power standby instead of a small fraction; (2) instant standby instead of switch-up time lag, so listeners are never aware of the change; (3) greater confidence in unattended operation at remote sites, thus staff and operating costs are reduced; and (4) with the Sparta unique ferrite broadband combiner, almost zero loss compared to "Egyptian-T", specially-tuned combining arrangements.

The optional Automatic Monitor, available with Sparta redundant systems, is adjustable by the transmitter engineer for time-delay flexibility (so momentary deviations do not turn off one transmitter). Degree of "action" level of both carrier and modulation is also selectable for the most desired operational conditions. Carrier level is compared to fixed reference levels, while modulation depths are compared to each

other.

Sparta's wideband ferrite combiner was first used in the 1968 installation of a 25 kw system at WRNG, Atlanta, GA. It replaced the "Bridged-T" circuit mainly by providing almost untuned combining of any two AM transmitter outputs, whereas the "Bridged-T" needed to be exactly matched to the transmitter frequency for which it was designed. The ferrite combiner allowed switching off one of the transmitters without effecting the other in any way, with RF switches providing full power of one transmitter direct to the transmission line while the other transmitter is switched to a test load.

There are three modes in which to operate a Sparta dual-redundant AM system. (1) Transmitters A and B parallel to the transmission line; (2) transmitter A to line, B to load, or, (3) the reverse of mode 2. Optionally, the automatic monitor system will control these switching possibilities, according to the modulation and power parameters within which the engineer wishes it to operate.

Another, more recent, dual-redundant AM transmitter system is the Sparta Model 705D which is remote-controlled by KMWX out of Yakima, WA. (See "Spartan", Mar.-Apr. 1974, pp 3 & 8. Ed.)

The 705D is comprised of twin Model 703B 3,000 Watt AM transmitters and ferrite combiner.

KMWX CE Mel Burrill specified dual-redundancy for the high-power backup; 2,500 Watts from one transmitter covers by far the major part of KMEX's audience. Thus maintenance, even major work when called for, can be scheduled for daytime hours while the "spare" transmitter keeps

(continued on next page)

# Sparta Overseas

(continued from page 5)

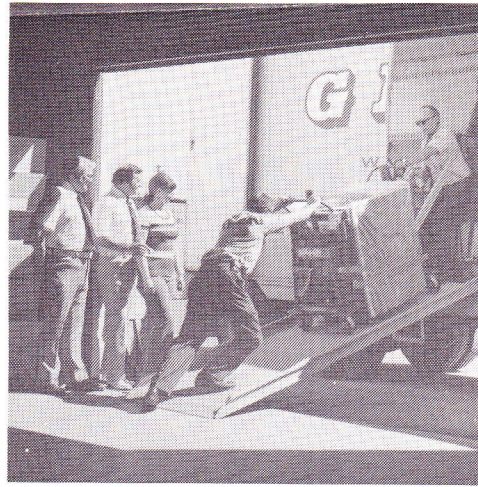


COLOMBIA . . . (l to r, above) Jorge Fergusson, VP of Postobon, Colombia's largest bottling company and parent company of Radio Cadena Nacional; Juan Gregorio, Sparta's multi-lingual RCN project manager and transmitter design engineer; Angel Antonio Pachon, manager, Electronica de la Sabana, Bogota, agents for the sale to RCN; Paul Gregg, Sparta transmitter products manager and Douglass Welch, project buyer for the RCN order.

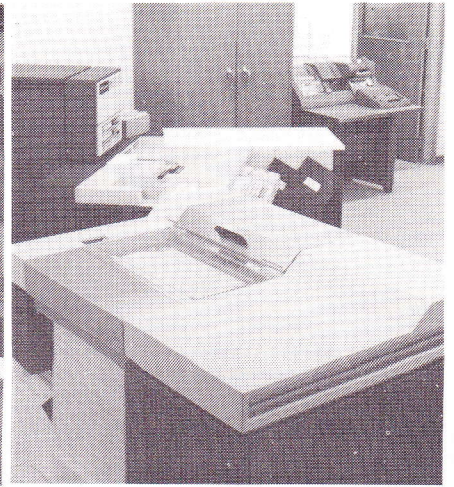
IN LONDON . . . George "Mike" Angelou, sales director, Computer Equipment Company, Ltd., England. He is responsible for sales throughout Europe, the Middle East, and Africa. His offices are located just outside London.



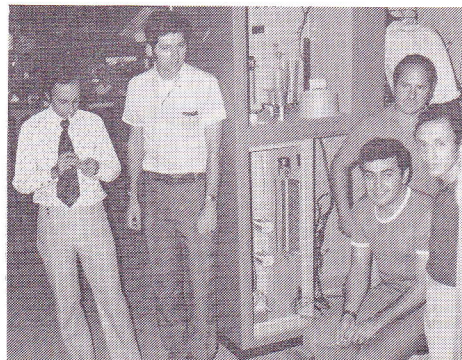
Angelou



EDP COMES TO SPARTA . . . the first of the Honeywell 58 Computer components comes off the truck for Sparta's new Electronic Data Processing Dept. Watching the operation, (l to r) are Sparta's EDP personnel: Charley Mann, operator/programmer; Don Mutton, administrative manager and Sara Randal, computer operator. Photo at right shows the new EDP office with the Honeywell 58 line printer in the foreground; the central processing unit with the operator's keyboard control center (mid-foreground) and the keypunch machine near the door rounding out the basic system which is expandable for future growth.



—Sparta Photos



FOREIGN GUESTS . . . visitors from Radio Cadena Nacional pause a moment in Sparta's Sacramento manufacturing annex. They are (l to r) Hernan Dario Restreppo, director of engineering; Sparta's Bob Hopkins, transmitter engineering staff; Armando Ujueta (seated) and Aristides Figueroa, RCN transmitter engineers; and Jorge Fergusson, Postobon VP, (behind Ujueta and Figueroa). —Sparta Photos

## —Dual Redundant

(continued from page 5)

the listeners informed and entertained.

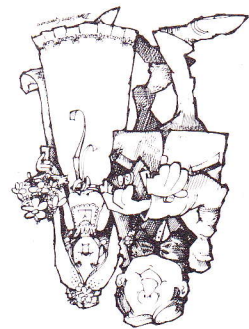
As the F.C.C. begins to close in on the "automatic transmitter" concept, which has guided European design for years, the dual-redundant transmitter designs of Sparta begin to loom larger on the broadcast horizon. A high percentage of Sparta's overseas transmitter orders have been for dual-redundant systems. Consequently, there has been a constant updating of techniques and materials to a full state-of-the-art potential.

The day may be near at hand, then, when the transmitter engineer can tell the nighttime DJ: "Give the sick transmitter a couple of aspirins and call me in the morning!" . . . knowing that the unattended Sparta transmitter will carry the station perfectly well at half power throughout the night without him.

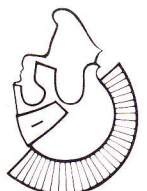
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