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**vol. 24**  
**JULY 1980**

# PAARA

## GRAPHS



**PALO ALTO  
AMATEUR  
RADIO ASSN.**

MENLO PARK C.D. RADIO CLUB, K6YQT

# SHAVER RADIO, INC.

DAVID SHAVER  
K6DTX

1378 S. BASCOM AVE  
SAN JOSE, CALIF  
408 998-1103

SALES  
SERVICE  
INSTALLATION

**AZDEN**  
**REVOLUTIONIZES THE STATE OF THE ART**  
**AWE AND AZDEN INTRODUCE THE BRILLIANT NEW PCS-2000**  
**MICROCOMPUTER CONTROLLED**  
**2 METER FM TRANSCEIVER**

NOT \$550.00

INTRODUCTORY  
PRICE

SPRING  
SALE

\$299<sup>00</sup>

REG. \$369.00



## COMPARE THESE FEATURES WITH ANY UNIT AT ANY PRICE

- **FREQUENCY RANGE:** Receive and transmit: 144.00 to 147.995 MHz, 5Khz steps + MARS-CAP and MULTIPLE OFFSET BUILT IN.
- **ALL SOLID STATE-CMOS PL DIGITAL SYNTHESIZED.**
- **SIZE: UNBELIEVABLE! ONLY 6 1/4" x 2 1/4" x 9 1/4". COMPARE!**
- **MICROCOMPUTER CONTROLLED:** All scanning and frequency-control functions are performed by microcomputer.
- **DETACHABLE HEAD:** The control head may be separated from the radio for use in limited spaces and for security purposes.
- **SIX-CHANNEL MEMORY:** Each memory is re-programmable. Memory is retained even when the unit is turned off.
- **MEMORY SCAN:** The six channels may be scanned in either the "busy" or "vacant" modes for quick, easy location of an occupied or unoccupied frequency.
- **FULL-BAND SCAN:** All channels may be scanned in either "busy" or "vacant" mode. This is especially useful for locating repeater frequencies in an unfamiliar area.
- **INSTANT MEMORY-1 RECALL:** By pressing a button on the microphone or front panel, memory channel 1 may be recalled for immediate use.
- **MIC-CONTROLLED VOLUME AND SQUELCH:** Volume and squelch can be adjusted from the microphone for convenience in mobile operation.
- **ACCESSORY OFFSET:** With one optional crystal, three non-standard offsets become available.
- **25 WATTS OUTPUT:** Also 5 watts low power for short-distance communication.
- **DIGITAL S/RF METER:** LEDs indicate signal strength and power output. No more mechanical meter movements to fall apart!
- **LARGE 1/2-INCH LED DISPLAY:** Easy-to-read frequency display minimizes "eyes-off-the-road" time.
- **PUSHBUTTON FREQUENCY CONTROL FROM MIC OR FRONT PANEL:** Any frequency may be selected by pressing a microphone or front-panel switch.
- **SUPERIOR RECEIVER SENSITIVITY:** 0.28 uV for 20-dB quieting. The squeal sensitivity is superb, requiring less than 0.1 uV to open. The receiver audio circuits are designed and built to exacting specifications, resulting in unsurpassed received-signal intelligibility.
- **TRUE FM, NOT PHASE MODULATION:** Transmitted audio quality is optimized by the same high standard of design and construction as is found in the receiver. The microphone amplifier and compression circuits offer intelligibility second to none.
- **OTHER FEATURES:** Dynamic Microphone, built in speaker, mobile mounting bracket, external remote speaker jack (head and radio) and much, much more. All cords, plugs, fuses, microphone hanger, etc. included. Weight-6 lbs.
- **ACCESSORIES:** 13' REMOTE CABLE... \$29.95 \*MARS-CAP KIT... TBA. PCS-6R A/C POWER SUPPLY... \$49.95

VOLUME 24 NUMBER 7

July, 1980

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PAARAGraphs is the official organ of  
The Palo Alto Amateur Radio Association and the Menlo Park Civil Defense Radio Club

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PAARAGraphs STAFF

Membership in PAARA is \$6.00 per calendar year (payable in January) which membership includes a subscription to PAARAGraphs. Interested others may subscribe to PAARAGraphs for \$6.00. Make payment to:

PAARA, P.O. Box 911, Menlo Park, CA 94025

Written contributions to P. O. Box above, or, 1043 Del Norte Av., Menlo Park, CA 94025

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Editor	:	Bob Baum	W6BFH
Production	:	Dave Daniel	KB6WP
Advertising	:	Swede Swenson	N6CHL
Printing	:	Mellonics	A10K
Mailing	:	Ed Fairbanks	W6AIN
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R E G U L A R M E E T I N G

FRIDAY July 11, 1980

7:30 P.M.

Rooms 15 & 17, Menlo Park Recreation Center,

Alma at Mielke Drive

Menlo Park

FIBRE OPTIC COMMUNICATIONS

by

Jock MacKaig, N6YV

Telecommunications of the future. GHz Bandwidth! Everything you want to know, and more

Future Meetings: August 1, September 5, October 3...

PAARA Auction/Flea Market October 11!

PAST CORNER: The June 6 meeting got off with a good start welcoming Jim, N6IG, to the Club. Visitors were introduced and announcements made. Irene, WB6RAF, cited PAARAGraphs advertising and its advantages to the Club—with the request that, when appropriate, you let people know you saw their ad in the Club newsletter. Sy, WA6RON, described the purpose and activities of CCRC and the advantages to PAARA having a regular attendee at the CCRC meetings. Everyone sat on their hands when a volunteer was asked for.

Jim, K7UDG, gave a report on recent Scouting activity, commenting on the Western Wheelers Bikathon June 8; Blue ribbon for their Scout-O-Rama exhibit at Stamford; the start of a Thursday evening 8 week code and theory class beginning at 7:30 p.m. Call Jim if someone you know needs help.

Fred, K6YT, gave a report on Field Day preparation with the last gap filled by Pete, WD6CVP, who will head the Novice effort. Swede, N6CHL, will help Pete with the Logistics, and Alan, WA6AZP, with operators from Post 599. Cam, K6RU, will lead the CW effort and Bob, K6SEM, the phone.

The meeting broke for coffee and cookies and a reasonable amount of rag-chew, plus a look at the flasher in the front of the room.

The flasher was part of Gerry's, WA6LNV, talk about switching power supplies.

With examples of components and complete plug-in units, Gerry described regulators and converters. Those who don't know bucking, boosting and buck-boost regulators should have been there. Those who don't know push-pull, bridge, and flyback converters could have learned the easy way. A 200 watt power supply was a hefty little palm full but nothing compared to a comparable 60Hz supply. Gerry discussed construction methods and came up with a forbidding \$1.00 per watt cost for commercial equipment. He plans a near future PAARAGraphs article on either a switching 12 volt supply for 25 ampere transcievers, not uncommon on the market, or, his pet, a 1.5kW affair so he can put his 4-1000's to work.

The meeting, with 61 signed on the register, broke up about 10:20 after a raffle of goodies arranged for by Ed, W6AIN. A number of those who attended resumed power supply discussions over a bit of the foamy down the block and across the street.

o o o

BOARD CORNER: The Board of Directors assembled at the Club trailer to the steady drone of the 2.5 kW generator revitalized by Shannon, K6TNY. The machine was turned off so the meeting could

get underway about 7:30 p.m.

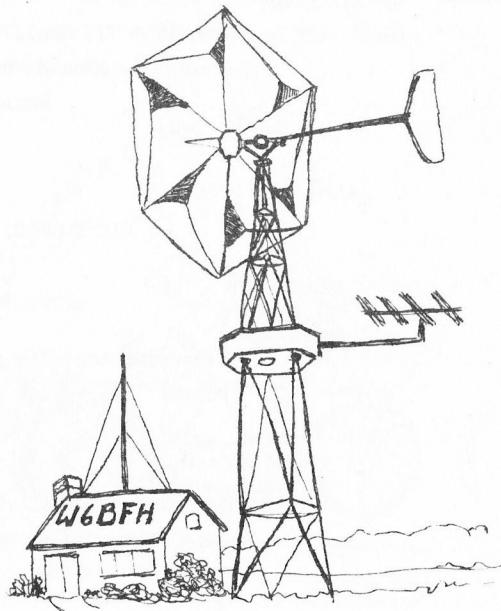
Attending were Bob, K6SEM, Eric, W6DU, Irene, WB6RAF, Jock, K6VV, Shannon, K6TNY, Gerry, W6NIR, Terry, N6RY, Gerry, WA6INV, and Ed, W6AIN—listing them as they sat clockwise around the table.

A candidate for our CCRC representative was discussed and chosen for his interest and ability to represent the Club. Field Day preparations were discussed. The equipment seemed to be ready. Shannon and Irene reported a form of alternative energy was ready and available. Bob, W6BFH, battered and bruised, told how his windmill blew up proper to the meeting but is ever hopeful.

Terry, N6RY, submitted his resignation from the Board effective June 23 when he will move to Oregon. The Board expressed its appreciation to Terry for all he has done for the Club—PAARAGraphs editor, Board member, equipment designer. Terry will be a difficult one to replace.

With Terry's news, those who were clockwise adjourned to the little spot down the winding road, across the main drag with the "walk" light and spilled a few suds whilst toasting Terry and Charolette.

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ROSTER CORNER REVISITED: Please change your April Roster to read:

Terry Conboy	N6RY	2631 S. W. Orchard Hill Place,	Lake Oswego, OR	97034
Jim Vanover	KA6KJP	VAMC, Sm 18, 4100 W Third St.,	Dayton, OH	45428
Gerry Hogsett		from KA6FYW to N6CCM		
Bill Narvaez		to HT1BN		

and add new members:

James Pratt	N6IG	2605 Central Av. Apt. C
Ron Panton	W6VG	5 Cedar Ct.

	Alameda, CA	94501 522 3718
	Menlo Park, CA	94025 854 4814

\*\*\*\*\*  
NEW MEMBERS CORNER: Jim, N6IG, received his first license when he was 12 and now holds the Extra Amateur Class ticket. You may recognize him from one of his other W6 Calls: WA6BMV or WB6IGY. A contester, or ragchewer, when there are no contests going, Jim has a KW on 2-meters and normally works any band from 80 meters to 450 mHZ, phone or CW, as need or desire dictates.

Jim belongs to the Northern California Contest Club and the UCARC; is a life member of ARRL, and a valuable addition to club.

We're glad to have you with us, Jim.

Ron, W6VG, is the old-timer of the month. He is a re-united PAARA member and has been a ham for 50 years. He is active on HF bands and on 2-meters. His usual haunt is 20-CW, but also on 15, and 10 when it's good.

Ron lost his W6CBE call when he became W7KRM, to change that in the '50's when he became K6AFE, calls some might remember.

We're glad to have Ron one of the crew.  
+ + +

GUEST CORNER: Counter-clockwise—as they sat at the meeting—were:

Dan Sakols, Palo Alto  
Don Ellsworth, Redwood City  
Ron Panton, W6VG, Menlo Park  
Dan Levin, N6BZA, Menlo Park  
Teresa King, San Carlos  
Georgia Grant, Foster City  
Paul Athins, call pending, Foster City  
Jay Sanders, K6KYA, Palo Alto  
Bill Bruff, N6CDV, Menlo Park.

A real good turnout of guests and visitors. We hope you all felt welcome and look forward to seeing you again at the next meeting when you will know a few more of us and we a few more of you.

o o o

UPGRADE CORNER: Jim Vanover, after a number of administrative misunderstandings by your editor, finally received his license—not in the 4th call area, but as KA6KJF.

Gerry Hogsett is N6CCS—what gives? The phone went unanswered trying to find out.

Bill Narvaez got his HT1BN call by going to Nicaragua but can't use the call until he gets his station on the air.

Perry Yelton, N6CDH, passed his Advanced exam and wrote a not of his experience for the guidance of those looking for an upgrade from General.

Congratulations to all and may the next upgrade exam seem easier than the last.  
! ! !

GOING TO THE CITY CORNER: When the new Kenwood TS-120-S developed a glitch that necessitated its return to drydock, I decided that as long as I was off the air, I would spend the weekend studying for the upgrade to Advanced, and maybe Amateur Extra, before the new exams were introduced.

I left Redwood City at 7:00 a.m. to arrive early enough to take the 20 wpm code test which sounds quite a bit slower than W6QIE's 20 wpm.

After telling them what I heard at 20 wpm, I learned that we were to be the first to get the new F. C.C. tests.

The Advanced test did not seem to cover any subjects that were not in the old syllabus. A calculator is a great time-saver working problems such as resonant circuits, all of which dealt with powers of  $10^{-6}$  and  $10^{-12}$ .

Passed the Advanced, then ran into a different can of worms in the Extra Class. Missed this one by three. After the test, I compared the questions with the new syllabus, as printed in the March issue of QST, and the May issue of 73 Magazine. The syllabus identifies and describes the questions very well, much more specifically than the old one.

Am looking forward to another go at that Extra next month, but next time I think I will take a little more than three days to prepare.  
de Perry, W6CDH.  
" " "

POWER SUPPLIES REVISITED: With the recent appearance of all the solid state transcievers on the market these days, low voltage power sources have become a big interest among amateurs. One of the first decisions is to buy or build a power supply. If you choose to

build, there are several basic types you should have in mind.

The first, and probably most important, consideration is power dissipation. Assuming a linear pass design, the voltage to the series pass transistor cannot be too high. Excessive heating of the transistor or too low early low line problems will result. An accepted voltage is between 20 and 24 volts rectified, no load, and cannot drop below Vce (sat) of driver and series pass for good regulation. Most designs use a transformer with a secondary voltage around 18 volts. The other power consideration is adequate heat sinks for pass transistor and rectifier diodes. You want to keep the transistor as cool as possible but this doesn't mean you have to use a heat sink as big as a wall. There are many different types of heatsinks on the market so choose one that best fits your design.

The next consideration is what circuit you are going to use. There are many good designs using both discrete components and IC's. I feel that probably using IC's is the easiest and the cheapest. Most of my experience has been with the uA723, MC723 (or equivalent). The circuit that is described in the last issue of PAARAGraphs (6/80 by K6ZJL) is a start. There are a few changes that will improve the circuit. For better stability the voltage divider resistor should be a one percent metal film. Pin 5 and 6 of the 14 pin dip package should have a resistor between the pins of a value of the parallel combination of the voltage divider. This makes both inputs see similar impedances. To get 15 amps or more out of this circuit you should use two pass elements in parallel with a driver transistor. This will give you the current gain for higher output currents and will reduce power needed from the uA723. You may want to mount the driver transistor on a heatsink if it gets too warm. For most SSB and CW operation I think a T0-5 will do. For better line regulation put a zener between pin 12 and ground and use about a 3000 ohm 1 watt resistor to the raw voltage.

For best load regulation the voltage divider resistors should be as close to the output terminals as possible. You may want to use remote sensing where the leads are connected to the back of the rig.

I hope these suggestions will help you in building a power supply for your rig. As soon as I get settled in Washington I plan to build one for my Atlas's

73's, David, WB6JFH.

UPCOMING CORNER: Ralph, WB6NNL, did a whale of a job compiling 10-meter beacons in operation around the world. See the August PAARAGraphs.

\* \* \*

UNCLASSIFIED CORNER:

FOR SALE: RTTY MODEM. PMA Model #PLL-1. Phase-locked loop. Adjustable shift 0.1-1.0KHz. With schematic and instructions. Like New. Only \$100. Call Leon, W6KTP, Palo Alto, 494 2613.

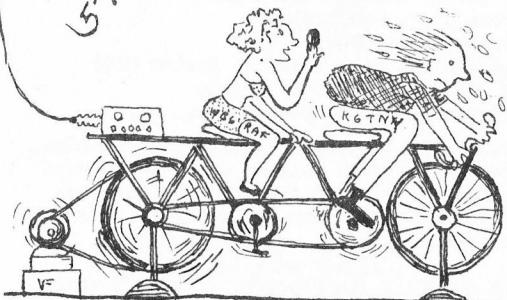
FOR SALE: 60' Rohn 25G tower in six sections without thrust bearing. 5 compression insulators at base for mounting the tower above ground potential. Insulated guys with clamps and turnbuckles...\$150. SB220 2-kw PEP amplifier with 10-meters, \$475. Call Tif, W6GNX, Menlo Park, 324 4524.

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ACTIVITIES CORNER: (from June CCRC CIRCLE)

- |                    |   |
|--------------------|---|
| July 25-27         | 1980 ARRL National Convention,<br>Seattle, Washington   |
| Aug 30-<br>Sept. 1 | ARRL Pacific Division Convention,<br>San Jose           |
| Sept. 5-7          | ARRL Southwestern Division Con-<br>vention, Los Angeles |
| Sept 13            | FARS Flea Market  |
| Sept. 13-14        | ARRL VHF Contest  |
| Oct. 4-5           | California QSO party                                    |
| Oct. 11            | PAARA Auction and Flea Market                           |
| Oct. 11-12         | ARRL CD Party.  |

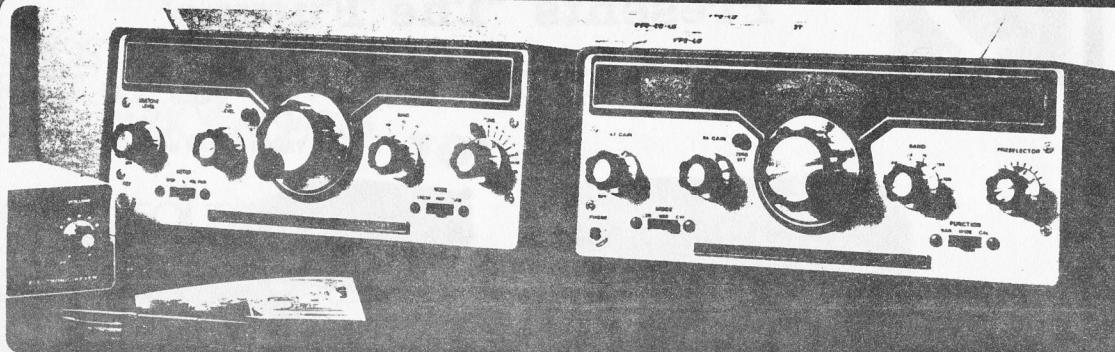
5.9 SANTA CLARA VAL...  
...ITS A DUPE



EDITORS CORNER: Writ whilst wondering why Virginia Fairbanks hasn't done our artwork before.

EOW

## Great CW and listening gear at prices you can afford



The HX-1681 QSK CW Transmitter has power to span the globe

**\$249.95**

- 100 watts out on 80-15, 75 watts out on 10
- No crystals — built-in VFO
- Rugged 6146 finals
- Full break-in (QSK)
- Solid-state TR switching
- Designed as a match for the HR-1680 receiver

Whether you're a veteran brass-pounder or have just earned your Novice ticket, the HX-1681 QSK Transmitter is the ideal CW rig for you. You get full break-in capability, so you can hear other stations whenever your key is up...even between individual dits and dahs of your transmission.

A pair of rugged 6146A finals combine with solid-state design to give you a clean 100 watts minimum on 80-15, and 75 watts out on 10. The HX-1681 features built-in TR switching, adjustable sidetone output, and receiver muting. Keying is provided for adding an external power amp.

This rig covers 3.5-4.0, 7.0-7.5, 14.0-14.5, 21.0-21.5 and 28.0-28.5 MHz. You need the Heathkit PS-23 power supply on page 23. 6 3/4" H x 12 3/4" W x 12" D.

Kit HX-1681, Shpg. wt. 16 lbs. .... 249.95  
Kit PS-23C, AC Power Supply, Shpg. wt. 17 lbs. .... 69.95

HR-1680 SSB/CW Receiver — ideal for serious Ham band listening

**\$229.95**

- No instrument alignment
- Dual conversion front end works 80 through 10 M
- 0.5  $\mu$ V sensitivity
- 4-Pole crystal filtering
- Active audio filtering
- Built-in preselector
- Built-in 100 kHz calibrator

Looking for your first receiver? The solid-state HR-1680 is the right choice. It combines high performance and low cost for serious Ham band listening. A hot dual-conversion front end and 0.5  $\mu$ V sensitivity covers 80 through 10 meters: 3.5-4.0, 7.0-7.5, 14.0-14.5, 21.0-21.5, 28.0-28.5, 28.5-29.0 MHz.

Selectivity is outstanding. With a matched 4-pole crystal filter in the IF, you can count on your 1680 to be razor sharp. A tunable preselector filters out unwanted signals. Also features built-in 100 kHz calibrator.

Assembly is easy, thanks to the detailed Heathkit manual. And you can align your HR-1680 without instruments. Match the 1680 with the HX-1681 Transmitter for an unbeatable pair. 120/240 VAC or 11.5-15 VDC. 6 3/4" H x 12 3/4" W x 12" D.

Kit HR-1680, Shpg. wt. 14 lbs. .... 229.95  
Kit HS-1661, Matching Speaker, 5 lbs. .... 29.95

### For Novice or Extra, at home or in the great outdoors, the HW-8 is your passport to the ultimate challenge of QRP operation

**\$149.95**

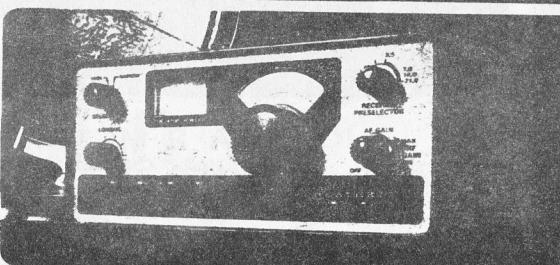
- 80, 40, 20 and 15 meters CW
- 0.2  $\mu$ V receiver sensitivity
- Adjustable T/R delay and semi-break-in
- Tunable preselector
- Two-position active audio filter
- Front panel meter to show relative power

Put more fun in a great hobby. Try QRP operation with the Heathkit HW-8. With your skill and this great little CW transceiver to back you up, you'll be amazed at what you can do. Join the growing number of Hams going to solar-powered QRP operation. Or power your HW-8 from a trail bike's battery, pumping that QRP signal into the great outdoors through a dipole strung between two pines. You can do it with this great little performer.

Performance starts with a quiet, super-sensitive receiver section. Hum and noise figures are minimal and as little as 0.2  $\mu$ V at the antenna terminal gives you a usable signal. There's a tunable preselector, selectable wide and narrow audio filtering, RF and AF gain controls.

The HW-8 pumps a minimum of 3 watts in on 80 and 40, 2.5 watts in on 20 and 15. Semi-break-in operation with adjustable T/R delay, a built-in relative power meter, pushbutton bandswitching, and stable temperature-compensated VFO. Runs on batteries (not supplied) or from optional AC power supply.

A great performer that's going to give you hours of fun in the shack or on a mountain peak — that's the HW-8. Order yours now so you can join the growing numbers who are discovering the fun and fraternity of QRP operation with the popular HW-8.



Kit HW-8, Shpg. wt. 6 lbs. .... 149.95  
Kit HWA-7-1, AC Power Supply, Shpg. wt. 4 lbs. .... 21.95

**HW-8 SPECIFICATIONS:** Transmitter — DC Power Input: 3.5 W (80 M); 3.0 W (40 M); 3.0 W (20 M); 2.5 W (15 M). Frequency Control: built-in VFO. Frequency Stability: Less than 150 Hz/hour drift after 60 minutes warm-up. Receiver: Sensitivity: 0.2  $\mu$ V for readable signal; 1  $\mu$ V or less for 10 dB S+N/N. Frequency Coverage: 3.5-3.75; 7.0-7.25; 14.0-14.25; 21.0-21.25 MHz. Power Requirement: 12-16 VDC, 90 mA, receive; 430 mA, transmit. Size: 9 1/4" H x 8 1/2" W x 4 1/4" D.

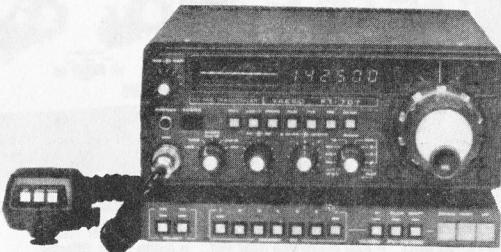
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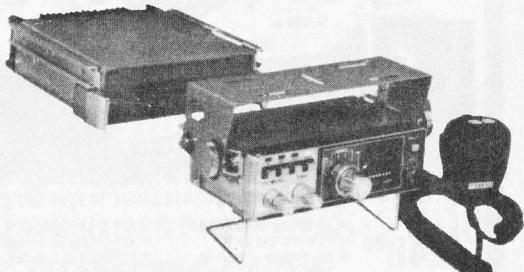


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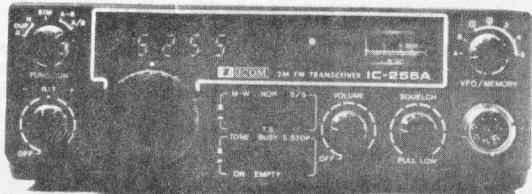
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**FT-707 DIGITAL  
SCANNING HF  
MOBILE  
TRANSCEIVER**



YAESU MUSEN USA INC.

**FT-720R 450 MHZ  
SYNTHESIZED  
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**IC-255A 2 METER  
SYNTHESIZED  
25 WATT**



**IC-260A  
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MOBILE**

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