

CQ REVIEWS:

The JRC JRL-2000F HF Linear Amplifier

BY PAUL CARR*, N4PC

Perhaps Japan Radio Company is best known for its commercial marine equipment, but they also have established themselves as a supplier of high-quality radio equipment for the amateur radio market.

The first thing that impressed me when I removed the amplifier from its carton was the nice, "clean" appearance. Not only should this please the amateur, but the XYL or OM as well. The equipment will look good either in a dedicated shack or in a room shared by the entire family.

An Overview

Now let's see some of the features claimed by this equipment. The JRL-2000F is a fully transistorized, fully automatic HF linear amplifier. The final, which has 48 RF power MOSFETs, has a rating of 1000 watts output at a 100%

*97 West Point Rd., Jacksonville, AL 36265

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|--|---|
| Operating frequency bands: | 1.8, 3.5, 7, 10, 14, 18 & 21 MHz amateur bands. (24 & 28 MHz bands: antenna tuner only) |
| Rated output power: | SSB 1 kW PEP* 100% duty cycle, 24 hour. CW 1 kW* 100% duty cycle, 24 hour. FSK/SSTV 1 kW* 100% duty cycle, 1/4 hour. |
| Output impedance: | 50Ω unbalanced, VSWR 3.0 (16.7-150Ω) |
| Harmonics: | -60 dB or less |
| Intermodulation distortion (IMD): | -35 dB or less below PEP (at 1 kW output) |
| Input impedance: | 50Ω unbalanced |
| Exciting power: | 100W max. |
| Frequency switching time: | Less than 0.1 sec. |
| Power supply voltage: | 85 to 264 VAC, single-phase |
| Power consumption: | 2.5 kVA or less (at 1 kW output) |
| Input power factor: | 95% or more (at 1 kW output) |
| Temperature range: | -10° to 40°C |
| Protection circuits: | PA excess current; PA overheat; PA abnormal load; AC power supply excess voltage; power supply overheat; PA failure; excessive antenna VSWR; exciting power excess; and antenna matching anomaly. |
| Dimensions: | Approx. 17"W x 12"H x 17"D |
| Weight: | Approx. 62 lbs. |

*Note: Rated output on 200-240 VAC. The rated output power on 100-120 VAC is 750 W PEP.

Table I- Specifications of the JRC JRL-2000F linear amplifier.



Front view of the JRL-2000F amplifier. The unit can be placed anywhere in the shack and remotely operated via the NCH-365 Controller.



Resembling a TV remote control, the NCH-365 Remote Controller allows you to check and change things as easily as you would switch TV channels.

ICOM

| | |
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| IC-728 HF Xcvr./Gen. Cov. Rcvr. | \$809.00 |
| IC-729 HF/6-Meter Xcvr./Gen. Cov. Rcvr. | 1169.00 |
| IC-735 HF Xcvr./Gen. Cov. Rcvr. | 949.00 |
| IC-737 HF Xcvr./Gen. Cov. Rcvr. | 1299.00 |
| IC-751A HF Xcvr./Gen. Cov. Rcvr. | 1249.00 |
| PS-55 AC Power Supply | 204.00 |
| AT-150 HF Automatic Antenna Tuner | 399.00 |
| SM-8 Desk Microphone | 96.00 |
| SM-20 Deluxe Desk Microphone | 133.00 |
| SP-7 External Speaker | 56.00 |
| SP-20 Ext. Spkr. With Audio Filters | 150.00 |
| IC-R1 Communications Receiver | 449.50 |
| IC-R7000 Communications Receiver | 1189.00 |
| IC-R7100 Communications Receiver | 1229.00 |
| IC-228H 2-Meter, FM, 45 Watt Xcvr. | 359.00 |
| IC-229H 2-Meter, FM, 50 Watt Xcvr. | 369.00 |
| IC-2330A 2-Mtr./220-MHz, FM, 45W/25W | 619.00 |
| IC-2410H 2-Mtr./440-MHz, FM, 45W/35W | 779.00 |
| IC-3230H 2-Mtr./440-MHz, FM, 45W/35W | 699.00 |
| IC-2GAT 2-Mtr., FM, Handheld With T-T | 334.50 |
| IC-4GAT 440-MHz, FM, Handheld With T-T | 299.50 |
| IC-W2A 2-Mtr./440-MHz, FM, Mini H-H W/T-T | 439.50 |
| BP-4 Battery Case | 19.00 |
| BP-5 10.8 VDC, 425 mA, Ni-Cad Batt. Pack | 71.00 |
| BP-7 13.2 VDC, 425 mA, Ni-Cad Batt. Pack | 85.00 |
| BP-8 8.4 VDC, 800 mA, Ni-Cad Batt. Pack | 85.00 |
| CM-96 8.4 VDC, 1200 mA, Ni-Cad Batt. Pack | 95.00 |
| BP-83 7.2 VDC, 600 mA, Ni-Cad Batt. Pack | 53.00 |
| BP-84 7.2 VDC, 1000 mA, Ni-Cad Batt. Pack | 81.00 |
| BP-90 Battery Case | 17.00 |
| BC-35 Drop-In Rapid Charger; BP-2, 5, 7, 8 | 84.00 |
| BC-72A Drop-In Chg.; BP-81, 82, 83, 84, 85, Int. .. | 107.00 |
| CP-11 Cigarette Lighter Cable W/Noise Filter | 21.00 |
| CP-12 Cigarette Lighter Cable W/Noise Filter | 20.00 |
| CP-13 Cigarette Lighter Cable W/Noise Filter | 20.00 |
| AD-12 External Power Adapter For IC-2GAT | 27.00 |
| HM-46 Speaker/Microphone | 35.00 |
| HM-54 Speaker/Microphone | 51.00 |
| HM-65 Speaker/Microphone For IC-W2A | 37.00 |
| HM-70 Speaker/Microphone For IC-W2A | 39.00 |
| HS-51 Headset, PTT & VOX | 64.00 |
| HS-60 Headset, PTT & VOX, For IC-W2A | 71.00 |
| UT-40 Encode/Decode/Beeper Unit | 48.00 |
| UT-50 Encode/Decode Unit | 48.00 |

BENCHER

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| BY-1 Iambic Paddles, Black Base | \$64.95 |
| BY-2 Iambic Paddles, Chrome Base | 79.95 |

CUSHCRAFT

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| R5 14, 18, 21, 24, 28-MHz. Vertical | \$259.00 |
| R7 7, 10, 14, 18, 21, 24, 28-MHz. Vertical | 357.00 |
| ARX-2B 2-Meter, Ringo Ranger II Vertical | 47.00 |
| ARX-220B 220-MHz, Ringo Ranger II Vertical | 47.00 |
| ARX-450B 450-MHz, Ringo Ranger II Vertical | 47.00 |
| AR-270 2-Mtr./440-MHz, Ringo Vertical | 58.00 |
| A50-5S 50 To 54-MHz, 5-Element Beam | 116.00 |
| 124WB 144 To 148-MHz, 4-Element Beam | 47.00 |
| A147-11 146 To 148-MHz, 11-Element Beam | 62.00 |
| 13B2 144 To 148-MHz, 13-Element Beam | 95.00 |
| 224WB 222 To 225-MHz, 4-Element Beam | 45.00 |
| 225WB 222 To 225-MHz, 15-Element Beam | 95.00 |
| A449-6 440 To 450-MHz, 6-Element Beam | 38.00 |
| A449-11 440 To 450-MHz, 11-Element Beam | 55.00 |

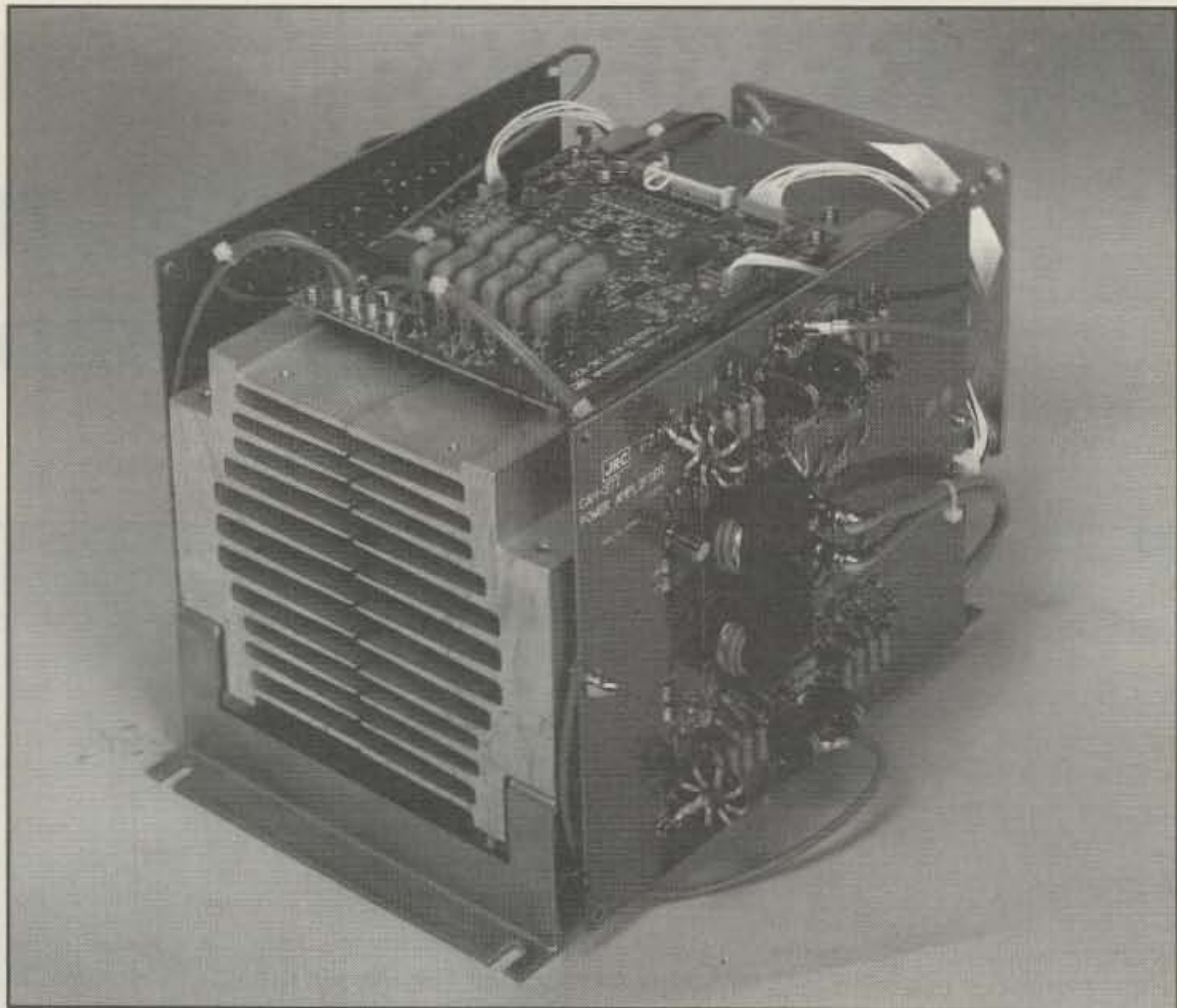
ASTRON

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| RS-7A 13.8 VDC, 7 Amp Int., 5 Amp Cont. | \$49.50 |
| RS-12A 13.8 VDC, 12 Amp Int., 9 Amp Cont. | 71.50 |
| RS-20A 13.8 VDC, 20 Amp Int., 16 Amp Cont. | 88.50 |
| RS-35A 13.8 VDC, 35 Amp Int., 25 Amp Cont. | 141.50 |
| RS-12M Same As RS-12A, With Meters | 82.50 |
| RS-20M Same As RS-20A, With Meters | 108.50 |
| RS-35M Same As RS-35A, With Meters | 159.50 |
| VS-35M Same As RS-35M, Adj. Volt./Curr. | 171.50 |

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This is what the solid-state PA module looks like.

duty cycle (CW and SSB) for 24 hours. (Yes, I did say 24 hours.) The second feature that caught my eye was the built-in automatic antenna tuner. This tuner has a memory capacity of 1820 channels to provide for instant QSY. There is also a self-contained switching power supply (input voltage 80 to 264 VAC). Additionally, there are provisions for connecting four antennas that are instantly selectable by panel-mounted push-button switches.

Think you have heard everything? Not quite. There is also a remote-control unit very much like a TV remote, which allows you to mount the unit anywhere in the ham shack if you so desire.

Specifications

Table I lists the electrical and physical specifications of the JRC 2000F. The

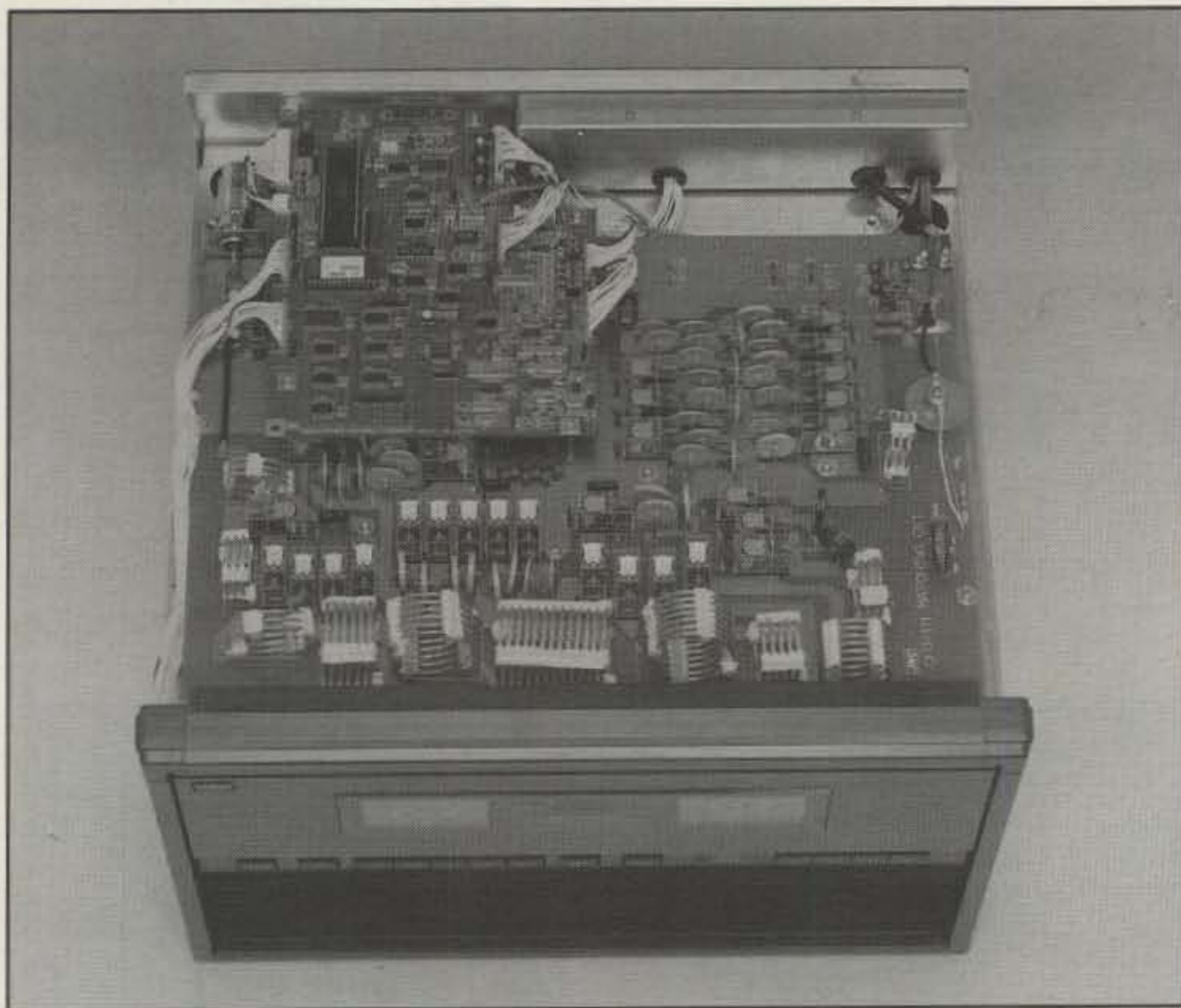
unit will develop full output power on all amateur bands from 160 meters to 15 meters. On 12 and 10 meters, only the automatic antenna tuner is functional as shipped. I found no condition where these published specifications were not met or exceeded. The amplifier can be made to operate on 12 and 10 meters by following instructions supplied by JRC. These instructions will be supplied only after receipt of a copy of a valid amateur license for those bands.

Procedure

Any HF transmitter or transceiver with a 50 ohm output impedance can be used as an exciter for the JRC-2000F. I used the Japan Radio Co. JST-135 HF transceiver and the prefabricated interconnect cable provided, but that isn't necessary. If the maximum output of the



An interior view of the antenna switching network.



If you were to remove the top cover, you would see the matching network.

exciter exceeds 100 watts, the over-current circuit in the power supply may be activated and distortion may result. Be sure that the ALC control line is connected so the exciter output does not exceed proper limits.

There are provisions for four separate antennas. These antennas should have an impedance between 16.7 and 150 ohms to stay within the limits of the automatic antenna tuner (VSWR of 3:1 or less).

If the exciter is a JST-135, simply connect the prefabricated cables as shown in the instruction booklet. If your exciter is different, there are clear instructions to show proper procedures for making all necessary connections.

Perhaps a brief synopsis of the front-panel controls is in order.

Power Switch: Turns the main power on and off. When the power is on, the LED is lit and the automatic antenna tuner will function. When power is off, the antenna switches will function, but the amplifier or automatic antenna tuner will not function: straight-through operation is possible.

PA Switch: This turns on the power for the power amplifier. If the LED is not lit and the power switch is on, the automatic antenna tuner will function and the power amplifier will operate.

There are two conventional meters on the front panel, both functioning as switched multimeters. The left meter is switched to indicate VSWR or power output. The right meter can be switched

to read drain current, drain voltage, or ALC. Between the two meters there are two eight-segment readouts to indicate band of operation or other functions during the tune-up procedure.

Tune Switch: Automatically tunes the antenna and stores the matching data in memory. An associated LED is lit during the procedure. There is also a drive indicator. If the light is green, the drive level is okay; if the light is orange, the amplifier is being overdriven by the exciter. Simply reduce the drive power.

The Remote-Control Unit

As indicated earlier, there is a remote-control unit (very similar to a TV remote-control unit) which has the same functions as the controls on the front of the amplifier. This allows the amplifier to be placed across the shack if desired while retaining full control at the operating position. It's a great "lazy ham" device.

Operator Conveniences

This is the first completely computer-controlled amplifier I have had the pleasure to operate, and to say I was impressed would be an understatement. As stated earlier, I found no place where the specifications were not met or exceeded. For example, I operated the amplifier with 115V input to the power supply. The rated output from the unit is 750 watts PEP under this condi-

tion. I am happy to report that the test unit easily exceeded the rating.

Another test which is difficult to quantify was the test for TVI. My QTH is in the country about 65 miles from two VHF TV channels that I watch (there is no CATV at this location). My $\frac{3}{4}$ wavelength 80 meter loop is located about 15 feet above my TV antenna. I use this antenna for TVI tests. If there are any problems, they should show up under these conditions. I am happy to report that the test showed only a slight flicker on a TV set located in the ham shack with the meter on the amplifier peaking at 500 watts output. That test was very impressive! Additionally, many unsolicited reports indicated a "clean" signal with plenty of punch.

The many built-in fault protection circuits make it almost impossible to put out a bad signal. The computer-controlled unit makes many critical decisions for you. You just sit back and enjoy the results!

The unit is available from Japan Radio Company, Ltd., 430 Park Ave. 2nd floor, New York, NY 10022. The price class is \$4900. This is a very impressive piece of equipment. ■

SGC

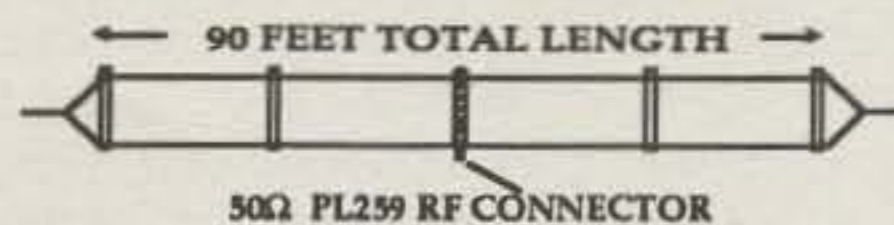
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