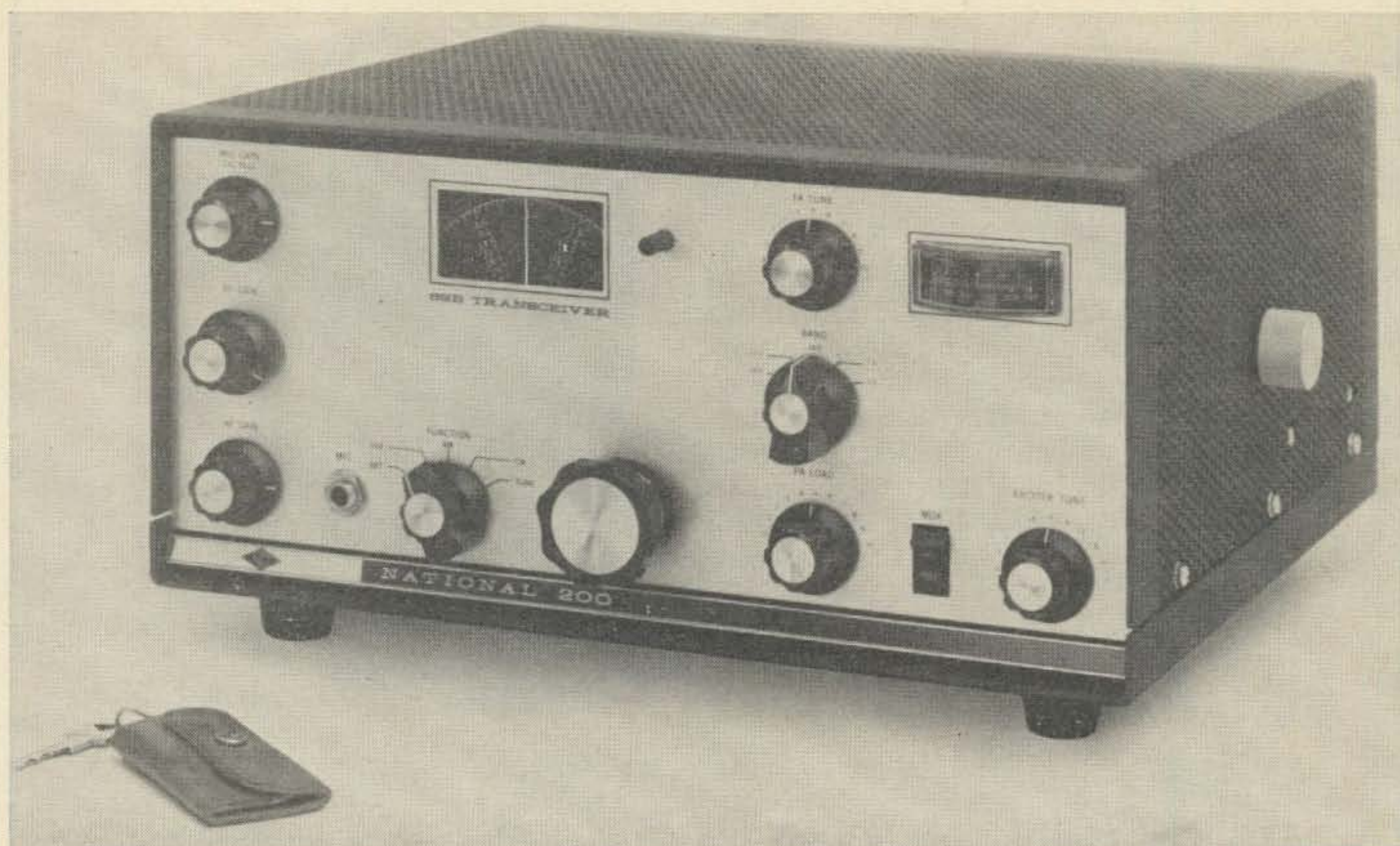




The National 200

Jim Fisk WIDTY
RFD 1, Box 138
Rindge, N. H. 03461

When National came out with their new model 200 transceiver a few months ago at a lower cost than any other five band transceiver on the market, I just couldn't believe that it would perform as well as the more expensive models. But—after using it for several weeks in chasing DX, I find that they have done a superb job and it performs right along with the best of them. The sensitivity is fine, the selectivity afforded by the steep-sided crystal filter is excellent, and the audio reports, if I am to believe the fellows on the other end, have all been good. Reports of, "tremendous audio quality," "really sounds good," and "very clean and crisp," have been normal reports during the time I have had the 200 on the air.

In the National 200 the final amplifier pi network and the driver tuning circuits also double as the rf circuits for the receiver.

The VFO and carrier oscillator are common to both transmitter and receiver and the first if stage in the receiver also serves as a low level amplifier in the transmitter. The use of common crystal filter and rf input components results in a sensitive and relatively image-free receiver and highly efficient ssb transmitter. Sideband switching is automatic with lower sideband on 40 and 80, and upper sideband on 20, 15 and 10 meters.

The front end of the receiver starts out with a 6BZ6 rf amplifier, followed by a 12BE6 mixer, the 5.2 MHz crystal filter, two 12BA6 if stages at 5.2 MHz, a 12AX7 AM detector, product detector and first audio, and finally, a 6AQ5 audio power stage. The AGC voltage is derived from the second if stage, run through a semiconductor diode voltage doubler to get it up to the proper level, and then applied to the

first *if* and rf stages.

The 8.7 to 9.3 MHz high frequency mixing signal from the VFO is premixed in a 6GH8 stage with a crystal controlled signal on 40, 15 and 10 meters so only one stage of conversion is required in the receiver itself. On 80 and 20, the VFO signal is mixed directly with the incoming rf signal to obtain the 5.2 MHz *if*. This procedure somewhat simplifies things and eliminates many problems with spurious responses and birdies that might appear in the receiver tuning ranges.

The tube lineup in the transmitter begins with a 6GH8 microphone preamp, then

to a 6GH8 speech amplifier and solid state balanced modulator where it is mixed with the 5.203 MHz signal from the 12BA6 carrier oscillator. The sidebands at the output of the balanced modulator are fed into a 12BA6 transmitting *if* amplifier and then into the crystal lattice filter. The sideband output of the filter goes through another 12BA6 for further amplification, then to a 6JD6 transmitting mixer where it is mixed with the VFO and carrier oscillator signal available from the 6GH8 premixer. A 6GK6 driver and two 6JB6's in the final complete the layout of the 200 watt ssb transmitter. The excellent sideband qualities are a direct result of the very steep sided crystal lattice filter and the use of double tuned circuits in the transmitting *if* stages.

The National 200 incorporates a very sensitive automatic level control (ALC) circuit in the final. This circuit makes use of the fact that when the control grids of the power amplifier tubes are overdriven on voice peaks, the resultant positive voltage on the grid causes grid current to flow. This current in turn causes a negative voltage change in the bias network; the resulting audio signal on the bias circuit is capacitively coupled to a voltage doubler for rectification and fed back to the first *if* stage to control the audio gain. When the final amplifier is overdriven, the gain of the first *if* stage is reduced, resulting in less driving signal at the final. The ALC voltage cannot discharge through the voltage doubling circuit, so the resultant action is a fast attack and slow release. The circuit is designed to provide an automatic leveling control for 10-dB variations in the audio signal. This makes the setting of the microphone gain quite noncritical and changes in the voice level or large background noises are controlled without distortion. When the National 200 is used with a linear amplifier, there is provision for using an external ALC signal from the linear to control the audio stages of the 200.

The variable frequency oscillator used in the National 200 uses a straightforward grounded-cathode Hartley oscillator. To minimize the effects of warmup drift and to insure long term frequency stability, all the frequency determining components in the VFO have been carefully selected. To further insure the frequency stability of the unit, the output is taken from the screen grid of the oscillator tube. After a 30-minute warmup, the stability seems to be very good. Variations in line voltage have

National 200 Specifications

Frequency Coverage:	3.5-4.1 MHz, 7.0-7.5 MHz, 13.9-14.5 MHz, 21.0-21.6 MHz, 28.5-29.1 MHz with crystals provided.
Types of Emission:	SSB (upper sideband on 20, 15 and 10 meters; lower sideband on 80 and 40 meters), AM, CW.
Power Input:	200 watts PEP SSB, 200 watts CW, 100 watts AM.
Power Output (Nominal):	120 watts PEP SSB, 120 watts CW, 30 watts AM.
SSB Generation:	Crystal lattice filter; 6-50 dB shape factor 2.2:1. Bandwidth 2.8 kHz at 6 dB. Carrier suppression -50 dB; unwanted sideband suppression -40 dB; 3rd order distortion products suppressed -30 dB at full output.
Receiver Sensitivity:	0.5 μ V for 10 dB S/N in SSB mode.
Features:	Full AGC and S-meter on receive, push to talk or manual operation on transmit with ALC for ssb. Automatic carrier insertion for AM or CW. Product detector for SSB and CW, AM detector for AM on receive. Grid block keying on CW.
Tuning dial:	45:1 tuning ratio. Dial calibrated at 5 kHz points on all bands.
Tubes and semiconductors:	16 tubes, 10 semiconductors, parallel 6JB6's in the power amplifier.
Accessories:	AC-200 power supply for either 117 or 234 Vac, 50/60 Hz; XCU-27 100 kHz crystal calibrator.
Size and weight:	6-3/16" x 13 3/8" x 11". 15 pounds.
Power requirements:	700 volts dc at 300 mA, 280 volts dc at 200 mA, -80 volts dc at 10 mA, 12.6 volts at 5 A.
Price:	\$359.00

NEW callbooks

**GET
YOUR
COPY
NOW!**



**Over 60% of listings
changed in only a year!**

Over 275,000 QTH's in the United States edition
plus other features \$5.95
The Foreign edition lists over 127,000 QTH's
plus other features \$3.95

See your favorite dealer or order direct (add 25c for mailing in U.S., Possessions & Canada. Elsewhere add 50c).

Radio Amateurs Reference Library of Maps—Order Your Set Today!



WORLD PREFIX MAP—Full color, 40" x 28", shows prefixes on each country... DX zones, time zones, cities, cross referenced tables postpaid \$1.00

RADIO AMATEURS GREAT CIRCLE CHART OF THE WORLD—from the center of the United States! Full color, 29" x 25", listing Great Circle bearings in degrees for six major U.S. cities; Boston, Washington, D.C., Miami, Seattle, San Francisco & Los Angeles postpaid \$1.00

RADIO AMATEURS MAP OF NORTH AMERICA! Full color, 29" x 25" — includes Central America and the Caribbean to the equator, showing call areas, zone boundaries, prefixes and time zones, FCC frequency chart, plus informative information on each of the 50 United States and other Countries \$1.00

WORLD ATLAS—Only Atlas compiled for amateurs. Polar projection, six continents, prefixes on each country... full color, 16 pages postpaid \$1.50

Complete reference library of maps—set of 4 as listed above postpaid \$3.00

See your favorite dealer or order direct.

**WRITE FOR
FREE
BROCHURE!**

RADIO AMATEUR



callbook INC.

Dept. B, 4844 W. Fullerton Ave.
Chicago, Ill. 60639

only a very slight effect; not enough to require retuning the station you're working. After an initial 5 minute warmup, the unit drifted about 1000 Hz over the next 25 minutes; after this 30 minute period the drift was insignificant.

In addition to operation on single sideband, the 200 may be used on CW or even AM. A simple adjustment on the back sets the carrier insertion for CW and AM. Once this control has been set for one band, it may be left alone. The mode switch on the front panel automatically suppresses this control for ssb operation but permits full carrier insertion on AM and CW. Actually, when this pot is switched into the circuit in the AM and CW modes, it is used to upset the balance of the diode modulator. In addition, for AM or CW, the bias is removed from the 12BA6 transmitting *if* stage, providing full carrier insertion of 60 to 300 mA.

This transceiver is designed to load into a 40 to 60 ohm unbalanced load. When the load is within these limits, it loads up very nicely and quite quickly with the three controls required. In this respect, the National 200 is similar to many other transceivers on the market—peak the exciter, load the power amplifier and tune for a dip. Since the receiver uses the transmitter tuned circuits in its input, when the transmitter is tuned up, the receiver is also matched to the transmission line. In the transmit mode, the meter reads final amplifier cathode current; in the receive mode it functions as an S-meter.

The National 200 may be used either in a fixed station from the 115 volt line with the AC-200 power supply, or mobile with a power supply that furnishes all the necessary voltages. To aid the mobileers, National has thoughtfully included a mobile mount in the package with the 200. This mount is a U-shaped bracket that may be clamped under the dash of your car; the transceiver fits into the bracket and is held in place with a couple of large knurled thumb nuts. To remove the unit for fixed station operation, all you have to do is disconnect the antenna and power plug and remove the thumb nuts.

All in all, the National 200 transceiver seems like a very good investment for those of you who are shopping around for a good all band transceiver. It is compact, lightweight, easy to use, and best of all, it works well. It's not often that you get all these attributes in one package!

... WIDTY