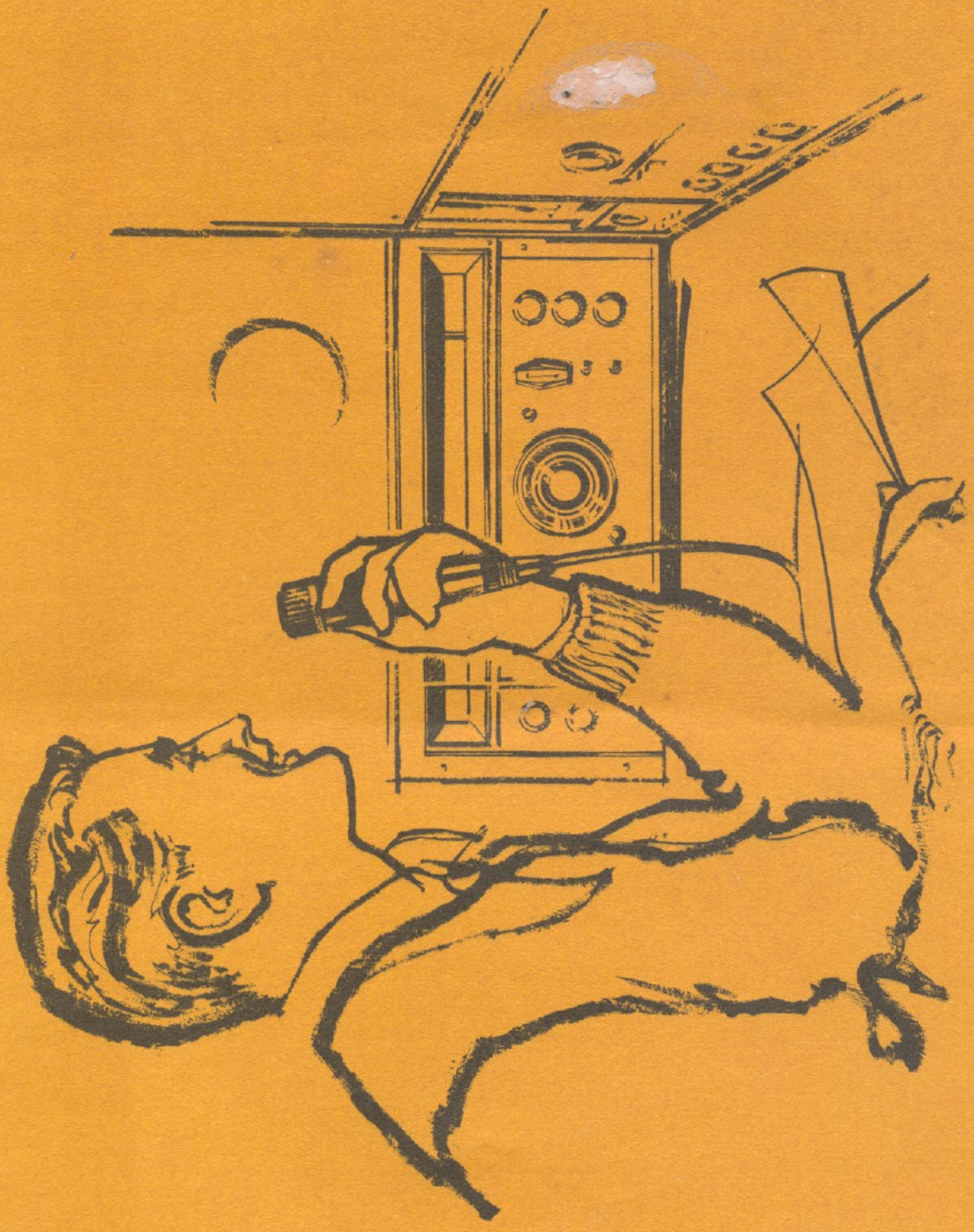
National®



National

For nearly half a century National products have been recognized as the finest communications equipment available. As America's oldest, most highly respected manufacturer of superior amateur and short wave receivers, National has engineered a long line of products that have dramatically influenced the development of the entire communications industry.

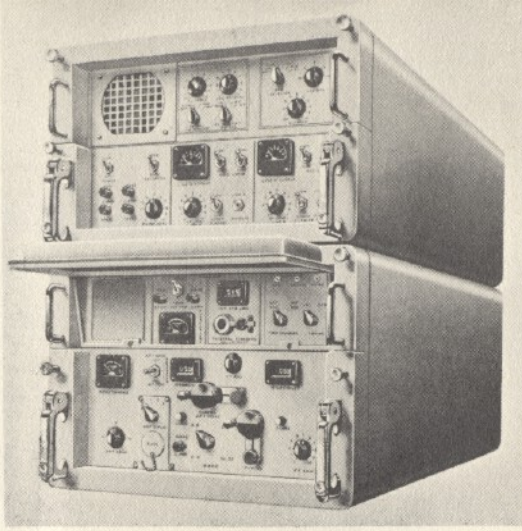
These were the grand old receivers that introduced today's old-timers to amateur radio . . . that every ham looked forward to owning . . . the National-Browning Tuner, the SW-5 "Thrill-Box," the SW-3, the FB7-X, the AGS — and, of course, the mighty HRO — the most widely acclaimed receiver ever produced. The old-timer remembers these and many more . . . the NC-100, the NC-101X, the NC-200, the 240D . . . Today, National products offer you even better values — reflecting almost fifty years of unequalled experience in design, craftsmanship and quality control. More than 75% of our highly skilled test and assembly people have been with us for more than 25 years — an astonishing record in the relatively young electronic industry. Our people know their business . . . take pride in fine workmanship — workmanship so outstanding that many National receivers bought over 30 years ago are still in daily use.

National — The company tuned to tomorrow — today builds the most advanced receiving equipment in the world.

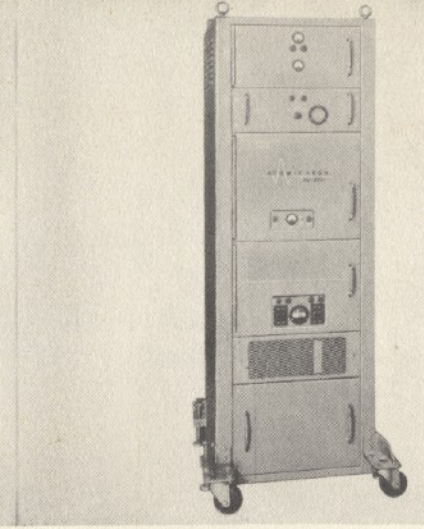
An important example is National's drift-cancelled WRR-2 super-stable SSB receiver. Developed for the U. S. Navy's Bureau of Ships, and currently the standard SSB receiver for shipboard use, the WRR-2 is the most stable and accurate receiver ever manufactured. For example, long term stability after only a five minute warm-up is 1pp 10^7, or the equivalent of one cycle at 10 MCI Currently in development is National's solid state Wide Dynamic Range receiver. This instrument is being provided by National to meet the increasingly critical problem of adjacent channel interference. So successful is this approach that the military has classed our technique as one of the greatest advances in radio receiver design in the past 25 years.

National is actively engaged in such diverse areas as Maser and Laser research, space and secure communications and ultra-high-bit-rate communications — even one of the most promising air collision avoidance techniques.

National's research and development team has pioneered many new concepts of importance to America's scientific effort — notable among these is the world-famous Atomichron® primary time and frequency standard. The first, and still the only commercially available primary standard in the world, the Atomichron provides the most accurate time and frequency measurement known to man. The U.S. Naval Observatory A.1 atomic time, for example, was initiated with an Atomichron. You can be sure that many of the ideas and advanced circuitry incorporated in these and other National Company advanced products are put to work in new equipment for the commercial and amateur markets.



National's WRR-2 Super-stable SSB receiver is the most advanced communications receiver in the world. Long term stability and resetability is one cycle (at 10 MC).



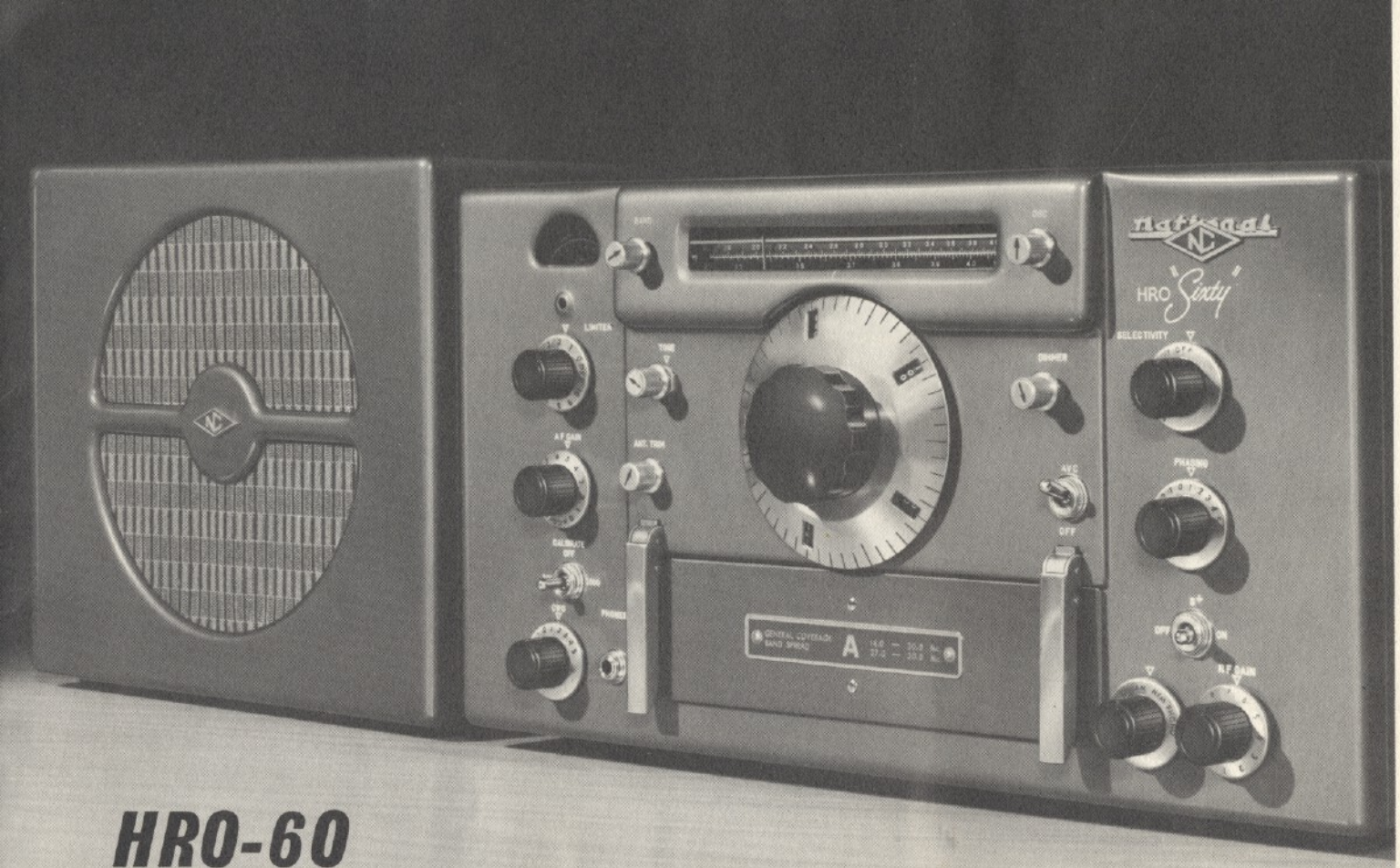
National developed and manufactures the Atomichron — the most accurate frequency standard known to man. The NC-2001 Atomic primary standard has an accuracy equivalent to the gain or loss of only one second in 1000 years.

For many years National has been a prime supplier of electronic components to other important electronic manufacturers and government agencies. Because we manufacture most of the components used in our equipment, we enjoy unusual control of component part quality. Our quality control is unrelenting. Every receiver is tested as it comes off the assembly line . . . not just random samples. This is why National Radio Company can offer the equipment industry's only one year guarantee.

The purchase of a new receiver is an important investment. As you look through the pages of this catalog, take time to compare National receivers with others on the market. Note particularly the extra features National offers . . . the obvious care with which they are designed to give you the best possible return for your investment. Your choice of a National receiver is your assurance of advanced design, exceptional performance, and guaranteed reliability in equipment that will bring you many years of enjoyment.

National . . . A History of Leadership

- First superheterodyne ham band receiver
- First crystal filter amateur receiver
- First turret tuned amateur receiver
- First amateur VHF transceiver
- First VHF only amateur receiver
- First "slide rule" dial
- First amateur kit receiver
- First amateur receiver with double preselection
- First selectable bandspread receiver
- First amateur receiver incorporating ferrite cup-cores for variable selectivity
- First general coverage industrial SSB receiver
- First drift-cancelled SSB receiver
- First Wide Dynamic Range receiver
- First synthesized solid state SSB transceiver
- First atomic Primary Frequency Standard
- First One Year Guarantee in the amateur equipment industry



HRO-60

The widest frequency range of any receiver currently available distinguishes this latest in the long line of HRO receivers — the most famous receiving equipment in the world. As a result of its frequency coverage and extreme sensitivity and image rejection, the HRO-60 is ideal for the laboratory as well as for general communications applications.

Maximum sensitivity and image rejection is achieved by the use of *two* RF stages, high efficiency plug-in coil drawers and dual conversion on all frequencies above 7 MC.

Frequency coverage is 50-430 KC: 480-54,000 KC. Direct frequency-reading slide-rule dial.

The circuit employs two RF stages with three tuned circuits at signal frequency. A separate high-frequency oscillator is provided and feeds the first mixer to produce an IF output of 455 KC for signal frequencies below 7 MC or to produce an IF output of 1720 KC for signal frequencies above 7 MC. A second converter stage converts the 1720 KC first IF signal to 455 KC. The 455 KC IF circuit employs three stages using ten tuned circuits plus a highly selective crystal filter. The output of the 455 KC IF is fed to the second detector. A separate beat-frequency oscillator is provided. A separate AVC detector is employed. The output of the AVC detector is fed to five stages and to the S Meter amplifier for signal strength indication.

The output of the second detector feeds a balanced, double-ended noise limiter which effectively clips both positive and negative peaks of the signal and may be used in all modes of operation. The audio amplifier employs one stage of pentode amplification, a phase inverter and a high power, low distortion, push-pull output circuit which is capable of feeding either an 8Ω speaker or a 500Ω transmission line. In addition to the operating circuits, the receiver employs an AC operated power supply which may be fed from 110 or 220 volt AC power sources. Voltage and current regulation are provided for extreme stability.

SPECIFICATIONS

AUDIO SYSTEM: Push-pull audio output stage delivers 8 watts at less than 10% distortion. Output impedance is 8 and 500 ohms. A high impedance phono-jack is located on the chassis, and a phone jack is provided on the receiver panel.

SENSITIVITY: Better than 1.5 microvolts from 2 to 30 mc.

SELECTIVITY
NORMAL: (Crystal off) 6 db–3.5 kc; 60 db–10.5 kc

CRYSTAL IN POSITION #5: 6 db–100 cycles

CONTROLS: Tuning; Dial Selector; Oscillator Trimmer; Tone; Antenna Trimmer; Dimmer; AVC; Limiter; Calibrate Switch; BFO; Phasing; Selectivity; AF Gain/AC On-Off; RF Gain; CW-AM-NFM phono; B + ON/OFF.

ANTENNA INPUT: 50-300 ohms, balanced or unbalanced.

SIZE: Table 19¾" wide x 10⅛" high x 16" deep. Rack 19" wide x 10½" high x 17⅛" from rear of front panel incl. 1⅛" handle.
FINISH: Smooth grey enamel

SHIPPING WEIGHT: 88 lbs.

OPTIONAL ACCESSORIES:
HRO-60-XCU-2 — 100/1000 kc crystal calibrator
HRO-650S-6V vibrator type supply
HRO-60TS — Table Model Speaker

COVERAGE: COIL SET	GENERAL COVERAGE	BANDSPREAD
A	14.0-30.0 mc	27.0-30.0 mc (10 meters)
B	7.0-14.4 mc	14.0-14.4 mc (20 meters)
C	3.5- 7.3 mc	7.0- 7.3 mc (40 meters)
D	1.7- 4.0 mc	3.5- 4.0 mc (80 meters)
*E	900 -2050 kc	
*F	480 -960 kc	
*G	180 -430 kc	
*H	100 -200 kc	
*J	50 -100 kc	
*AA		27.0-30 mc (10 meters)
*AB	25 -35 mc	
*AC		21.0-21.5 mc (15 meters)
*AD		50 -54 mc (6 meters)

*Optional accessories

TUNING SYSTEM: Large PW worm gear dial with changing numbers gives a logging scale from 0-500, equivalent to a scale length of 12 feet. In addition, a slide-rule direct-reading scale is ganged with the PW dial to show frequency setting directly. Plug-in coils for separate ranges provide maximum versatility.

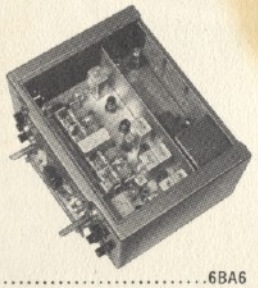


IMAGE REJECTION
(At high end of band)

BAND	IMAGE RATIO
A	65 db
B	80 + db
C	80 + db
D	80 + db

TUBE COMPLEMENT

1st RF Amp.	6BA6
2nd RF Amp.	6BA6
1st Frequency Conv.	6BE6
High Frequency Osc.	6C4
2nd Frequency Conv. and Osc.	6BE6
1st IF Amp.	6SG7
2nd IF Amp.	6SG7
3rd IF Amp.	6SG7
Det. — AVC	6H6
Noise Limiter	6H6
S-Meter Amp. Phase Inverter	6SN7GT
1st AF Amp.	6SJ7
Audio Output (2)	6V6GT
BFO	6SJ7
Voltage Reg.	0B2
Current Reg.	4H4C
Rectifier	5V4G

NC-400

Here is the most versatile communications receiver ever designed: National's NC-400 . . . a multi-purpose single-sideband general coverage receiver incorporating a total of vitally important features available in no other competitive equipment. Its unique design provides not only extreme sensitivity and image rejection, but maximum flexibility of operation to satisfy the widest possible variety of communications requirements.

The NC-400 covers 540 KC to 31 MC in 7 bands with dual conversion above 7 MC. Provides AM, CW, and selectable SSB reception. Choice of manual tuning or five crystal controlled preset channels is provided. The MX-400 multi-channel adapter provides 50 crystal controlled preset channels. Master oscillator allows the use of external synthesizer. Full space or frequency diversity reception can be obtained with DMK-400 adapter without expensive modification, as well as choice of internal or external oscillator control. The NC-400 provides enormous IF bandwidth versatility — 150 cycles to 16 KC plus optional mechanical filter selection. Selectable sideband, SSB product detector, fast attack, slow decay AGC and adjustable noise silencing for maximum ease of SSB or CW reception. All oscillators may be crystal-controlled, including BFO. The NC-400 may be removed from cabinet and rack-mounted. If your requirements demand high performance for either sophisticated or simple applications, the National NC-400 is your most logical choice.

SPECIFICATIONS

FREQUENCY RANGE:	GENERAL COVERAGE:
Band 1	.54 - 1.1 MC
Band 2	1.1 - 2.1 MC
Band 3	2.1 - 4.1 MC
Band 4	4.1 - 7.0 MC
Band 5	6.9 -12.2 MC
Band 6	11.8 -20.4 MC
Band 7	19.6 -31.0 MC

NOTE: Bandspread dial provided with 0-100 logging scale and calibrated for 80, 40, 20, 15 and 10 meter amateur bands.

FREQUENCY STABILITY: Long term stability after warmup — .002%.

SENSITIVITY: 1 microvolt for 10 db signal/noise ratio.

SELECTIVITY: 4, 8 and 16 kc positions provided with 6 tuned circuits. 3.5 kc wide upper and lower sideband positions provided with 14 tuned circuits. 3.5 kc sharp position activates plug-in crystal filter providing 5 additional degrees of selectivity below 3 kc plus phasing notch. Accessory plug-in MFH-400 Filter Housing provides front panel selection of three mechanical filters without modification of receiver.

SSB PROVISIONS: Separate SSB product detector, "fast attack-slow release" AGC. Instant sideband selection accomplished by National passband switching techniques, or single sideband mechanical filters may be installed and switched from front panel.

FIXED CHANNEL OPERATION: HF oscillator has 5 crystal sockets for use in fixed channel operation. Channels may be selected by front panel switch. In addition, HF oscillator may be controlled from external master oscillator selected by front panel switch. Exclusive "S" meter "Tune" position permits rapid tuning of receiver to crystal controlled channel. MX-400 Adapter allows choice of up to 50 crystal-controlled channels.

DIVERSITY PROVISIONS: Basic receiver may be operated from master oscillator as noted above. An accessory Diversity Modification Kit (DMK-400) allows choice of internal or external control of all oscillators. Rear panel selector provisions make possible use of any receiver either as master control, or slave fed from other oscillator sources. IF, detector and AGC outputs available for feed to external loads or combiners.

IMAGE REJECTION:

BAND	MIDBAND IMAGE REJECTION
1	100 DB
2	100 DB
3	85 DB
4	65 DB
5	95 DB
6	90 DB
7	80 DB

FRONT PANEL CONTROLS: Main tuning • Band spread tuning • Band selector • Calibrate-tune switch • Audio gain and power switch • High-frequency oscillator selector switch • Noise limiter • Stand-by switch • Crystal phasing (or blank when mechanical filters are used) • Crystal select switch (or mechanical filter select switch) • BFO • RF gain control • IF selectivity • Mode switch • Phone jack • "S" meter.

REAR PANEL FUNCTIONS: Audio output (3.2 or 600 ohms); Stand-by circuit terminal panel; Coaxial antenna input connector; Accessory socket; High-frequency oscillator test jack; Beat-frequency oscillator test jack; IF output connector; High frequency oscillator input; "S" meter zero adjust.

When the diversity modification is installed, the following additional functions are provided on the rear panel. Panel punchings are provided to accept these modifications:

Intermediate-frequency oscillator input; Beat-frequency oscillator input; Intermediate-frequency oscillator master-slave switch; Beat-frequency oscillator master-slave switch; High frequency oscillator master-slave switch.

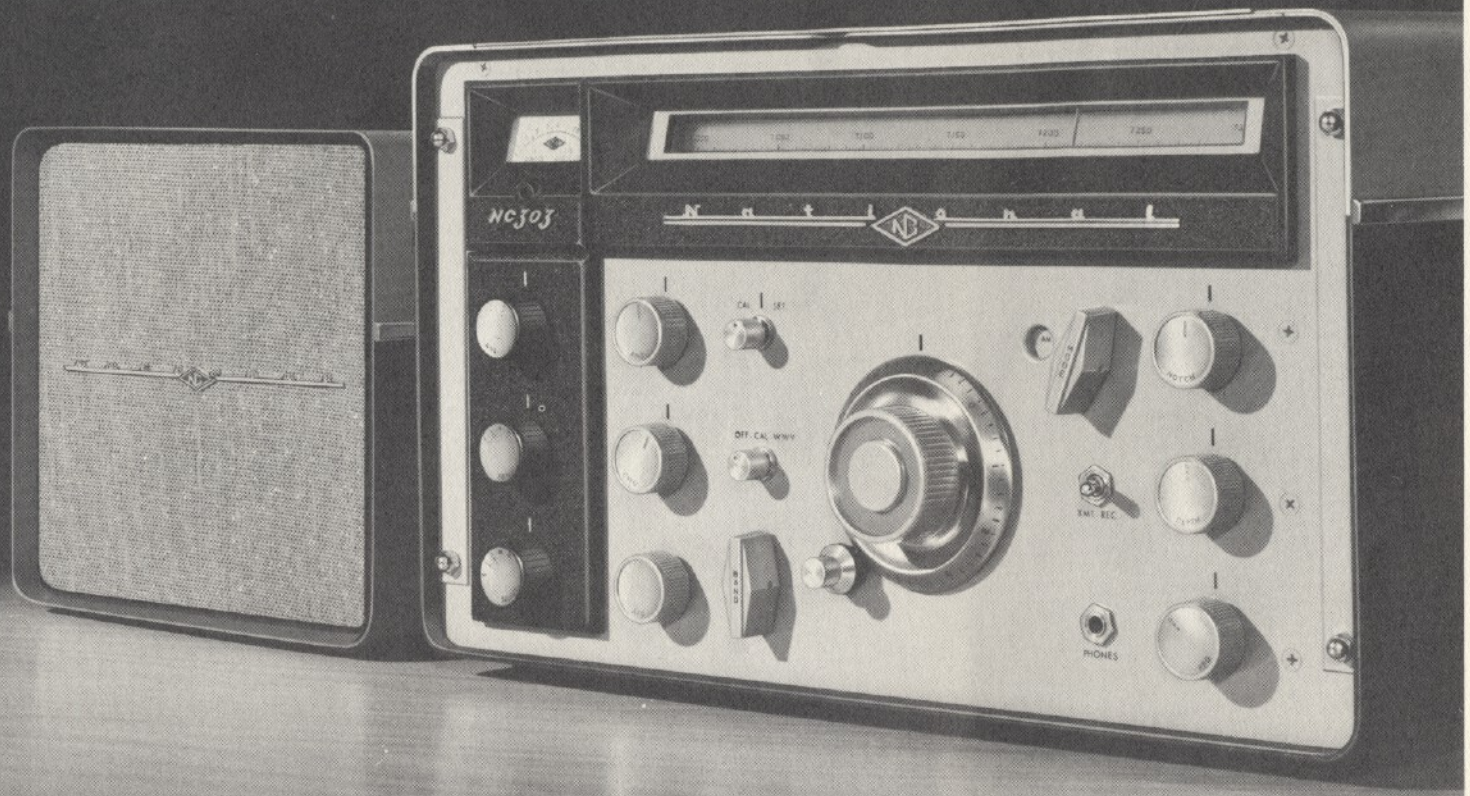
ACCESSORIES: XCU-400 100KC/1 MC crystal calibrator; MX-400 50 channel adapter; DMK-400 diversity kit; MFH-400 mechanical filter housing.

INTERNAL CONTROLS: 110-220 volt switch; Fuse

TUBE LINEUP: 6BZ6 1st RF amplifier; 6BZ6 2nd RF amplifier; 6BE6 1st mixer 455 KC output; 6BE6 1st mixer 1720 KC output; 6BE6 2nd conv./oscillator; 6BA6 1st IF amplifier, 6BA6 2nd IF amplifier, 6BA6 3rd IF amplifier; 6AL5 AM det./automatic noise limiter; 6BE6 Heterodyne product detector; 6AL5 Manual noise limiter, 6U8 Beat-frequency oscillator; 12AT7 "S" meter amplifier/1st audio; 6AQ5 Audio output; OB2 Voltage regulator, 4H4C Filament regulator, 5U4GB Rectifier.

POWER REQUIREMENTS: 115/220 V.A.C. 50/60 cycle.

DIMENSIONS: 19¼" wide x 11¼" high x 16" deep. May be removed from cabinet and rack mounted.



NC-303

The most versatile and feature-packed amateur SSB receiver on the market today, the NC-303 has the highest thermal and mechanical stability, greatest sensitivity of any receiver in its price class. Amazingly smooth tuning mechanism and *direct* dial calibration to 1 KC on 160 meters, 2 KC on 80-15 meters provide unparallelled ease of operation. Manufactured to National's famous standards of quality, the NC-303 covers 160 to 1¼ meters with 10 separate dial scales and exclusive converter provisions for 6, 2 and 1¼ meters. Utilizing dual conversion on all bands, the NC-303 employs a crystal controlled second converter oscillator. Separate product detector for SSB and CW, front panel instant SSB selection, and IF selector with five degrees of selectivity provide truly remarkable SSB performance and versatility in all modes of operation. "Q" multiplier with 60 db razor-sharp rejection notch. Automatic single-ended noise limiter for AM. Double-ended manual noise limiter for SSB and CW. Fine tuning vernier dial drive provides super-precision tuning. New "fast-attack, slow-release" AGC circuit for SSB and CW. Provision for external control of RF gain during transmitting periods. Accessory socket for powering converters. And many, many more plus features. In fact, if it contributes to performance or operating ease the NC-303 has it.

SPECIFICATIONS

COVERAGE:

160 meters — 1.8 to 2.0 mc; 80 meters — 3.5 to 4.0 mc; 40 meters — 7.0 to 7.3 mc; 20 meters — 14.0 to 14.4 mc; 15 meters — 21.0 to 21.5 mc; 11 meters — 26.5 to 27.5 mc; 10 meters — 28.0 to 29.7 mc; 6 meters — 49.5 to 54.5 mc;* 2 meters — 143.5 to 148.5 mc;* 1¼ meters — 220 to 225 mc*
*With Accessory Converter.

CONTROLS: RF Gain and AC ON/OFF; AF gain; Tone Control; Mode Switch; CW pitch; Main Tuning; Calibration Adjust; Antenna Trimmer; Limiter; IF Selectivity; Band Switch; Phone Jack; Tuning Vernier; Calibrator OFF, CAL, WWV; Notch Frequency; Notch Depth; Standby-receive.

TUNING SYSTEM: Combination gear/pinch for smooth inertia tuning. Special vernier drive for superfine SSB and CW tuning.

TUBE COMPLEMENT:

RF Amplifier	6BZ6
1st Converter	6BA7
1st Oscillator	6AH6
2nd Converter	6BE6
"Q" Multiplier	12AX7
1st IF Amplifier	6BJ6
2nd IF Amplifier	6BJ6
ANL and Detector	6AL5
Heterodyne Product Detector	6BE6
Manual Noise Limiter	6AL5
1st Audio and "S" Meter Amplifier	12AT7
Audio Output	6AQ5
Current Regulator	4H4-C
Voltage Regulator	OB2
Rectifier	5Y3GT

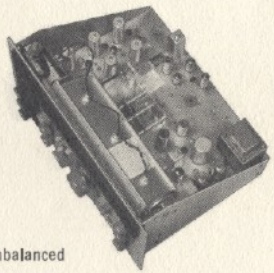
AUDIO SYSTEM: The audio amplifier uses a single 6AQ5 output tube. Has front panel phone jack. Output impedance is 3.2 ohms.

SENSITIVITY: Better than 1.0 microvolt (with 50-ohm dummy antenna and 10 db signal/noise ratio).

SELECTIVITY

	Sharp	SSB-1	SSB-2	Medium	Broad
6.0 db	0.4kc	2.0kc	2.0kc	3.5kc	8kc
60 db	3kc	9kc	9kc	12kc	30kc

BAND	IMAGE REJECTION
160	80 db
80	80 db
40	60 db
20	75 db
15	55 db
10	50 db
11	50 db



OTHER SPECIFICATIONS

ANTENNA INPUT: 50-70 ohms unbalanced

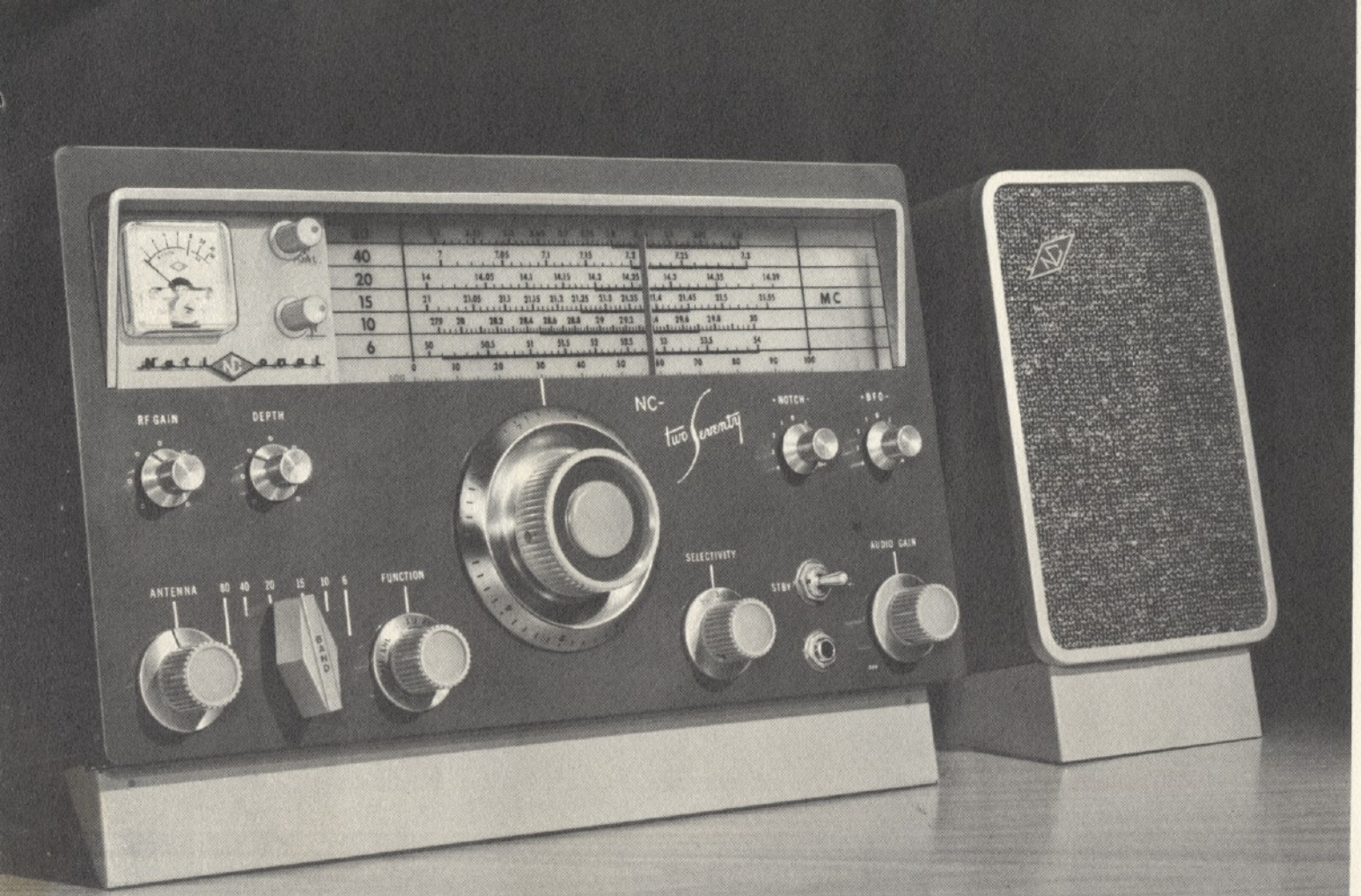
SIZE: 19¼" wide x 11¼" high x 15" deep (19" rack out of cabinet)

FINISH: Attractive black and grey enamel

SHIPPING WEIGHT: 64 lbs.

OPTIONAL ACCESSORIES:

NTS-2 speaker
XCU-300 Plug-in Crystal Calibrator



NC-270

This fine precision double conversion receiver is the only 80 through 6 meter SSB receiver in its price class, with ham band performance and features not found in equipment costing hundreds of dollars more. National's exclusive high-frequency Ferrite Filter provides five degrees of IF selectivity from 0.6 to 5 KC, including instantaneous selectable upper or lower side band. More than 50 db rejection of interfering heterodynes can be obtained with the front-panel BiFilar T-Notch and Depth controls. Sensitivity better than 1.0 uv for 10 db S/N on all bands, *including* 6 meters! Amazing mechanical and electrical stability results from use of solid ⅛" steel panel, crystal-controlled second oscillator, ceramic coil forms, fully perforated cabinet and National's High Zero temperature compensation. Separate product detector for SSB and CW, distortion-free automatic noise limiter, built-in 100 KC crystal calibrator with lateral dial set. Unique Flip Foot provides greater accessibility and flexibility. If you're looking for a superior ham-band receiver in the medium-price area, the NC-270 is your best buy.

SPECIFICATIONS

FREQUENCY RANGES: 6 meter band (50.0 — 54.0 Mc); 10 meter band (28.0 — 29.7 Mc); 15 meter band (21.0 — 21.5 Mc); 20 meter band (14.0 — 14.4 Mc); 40 meter band (7.0 — 7.3 Mc); 80 meter band (3.5 — 4.0 Mc).

TUNING CONTROL: 12:1 step down ratio with pinch type drive for smooth inertia tuning.

CALIBRATION: Built-in 100 Kc crystal calibrator and exclusive National lateral dial adjustment provide for extreme calibration accuracy.

INTERMEDIATE FREQUENCIES: 1st IF — 2, 215 Kc, 2nd IF — 230 Kc.

SENSITIVITY: Better than 1.0 microvolt for 1 watt output, 10 db signal to noise ratio.

SELECTIVITY: Ferrite Filter provides instant SSB selection and the following bandwidths: Very Sharp — 600 cycles, USB — 2.5 Kc, LSB — 2.5 Kc, Medium — 3.0 Kc, Broad — 5.0 Kc.

RECEPTION OF AMPLITUDE MODULATION SIGNALS: A separate diode detector is used. Front panel selection of Automatic or Manual Gain Control.

RECEPTION OF SINGLE SIDEBAND SIGNALS: Ferrite Filter provides instant selection of upper or lower sideband with special linear product detector and separate carrier re-insertion.

RECEPTION OF CW SIGNALS: Heterodyne detector circuit with separate beat frequency oscillator.

INTERFERENCE REJECTION: "BiFilar T Notch" rejection circuit, tunable over entire IF bandwidth, provides greater than 50 DB of interfering signal rejection.

NOISE LIMITER: Automatic type, self-adjusting to various signal levels.

SIGNAL STRENGTH METER: Calibrated in S units from "S-1" to "S-9" (at 50 uV input) and "10 DB" to "60 DB" above S-9.

AUDIO POWER OUTPUT: 3.0 watts, better than 1.5 watts at 10% distortion.

ANTENNA INPUT: 50 Ω, unbalanced on all bands.

OUTPUT CIRCUIT: 3.2 Ω for loudspeaker. Separate front panel headphone jack.

CONTROL CIRCUITS: Standby-Receive switch with separate set of contacts for external control available at rear of receiver. Rear panel circuit is closed in the Standby position only.

ACCESSORIES: NTS-3 matching speaker.

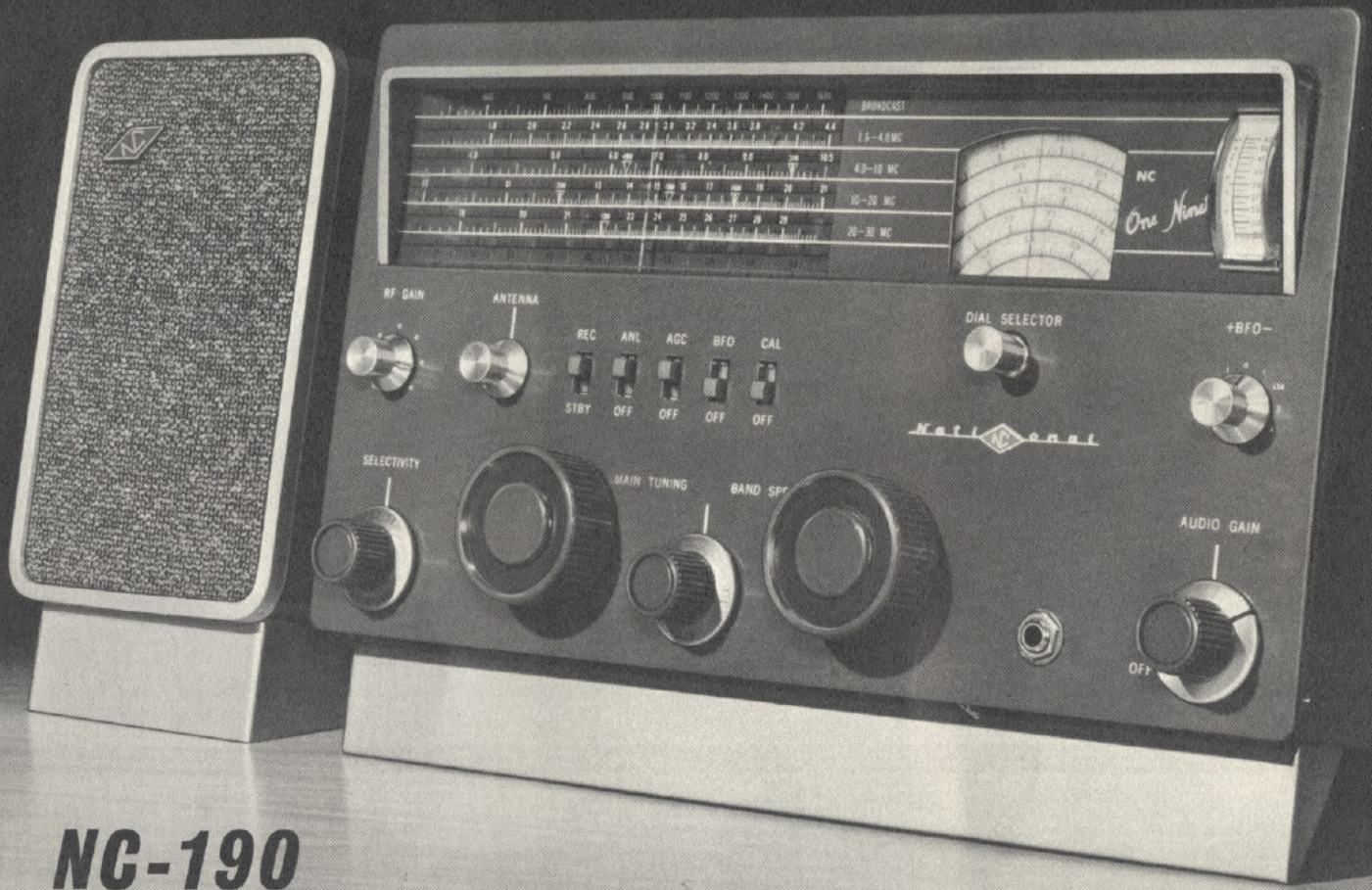
POWER LINE REQUIREMENTS: 105-125 volts A.C. 50-60 cycles, 75 watts.

FRONT PANEL CONTROLS: Tuning • Radio frequency gain • Notch depth • Notch frequency • Beat frequency oscillator • Antenna trimmer • Bandswitch • Mode switch • Phone jack • Standby-Receive switch • Audio gain control • Calibrator switch • Calibration set.

SELECTIVITY SWITCH WITH THESE POSITIONS: 5.0 KC • 3.0 KC • USB 2.5 KC • LSB 2.5 KC • 0.6 KC.

FLIP FOOT: Unique "Flip Foot" on receiver and matching speaker for maximum operating convenience.

DIMENSIONS: 8⅝" high, 15⅝" wide, 9" deep — Shipping Weight 28 lbs.



NC-190

Top SSB, AM and CW amateur band performance plus calibrated foreign broadcast bandspread result in the equivalent of two receivers in one . . . The incorporation of every desirable feature necessary to conquer crowded amateur band conditions makes the NC-190 most attractive to the amateur, while these features plus National's exclusive Dial Selector to provide shortwave as well as amateur bandspread results in what has been called "the shortwave listener's dream receiver"!

Also ideal as a general coverage receiver for the advanced ham-band-only station or as a tunable IF for use with VHF converters, the NC-190 provides double conversion, true variable IF selectivity from 0.6 KC to 5 KC with the Ferrite Filter, and sensitivity better than 1.0 uv for 10 db S/N. A separate product detector, SSB AGC and calibrated USB/LSB BFO control result in excellent SSB performance, while the use of a 60:1 planetary tuning mechanism in the bandspread dial offers ease of tuning superior to any other two-dial general coverage receiver at any price, and equivalent to the better ham-band-only equipments. Frequency coverage from 540 KC to 30 MC in *five* main tuning bands, rather than the usual three or four, provide superior stability and high frequency calibration, and bandspread scales are provided for 80, 40, 20, 15, and 10 meters as well as the five most popular foreign broadcast bands. Coaxial antenna input, voltage-regulated oscillators, SSB/CW IF noise limiting as well as AM limiting, an edge-reading S-meter operative on all reception modes all combine to offer more receiver for the money than ever believed possible.

SPECIFICATIONS

AMATEUR BANDSPREAD
10 Meters (26.6-30.0 MC)
15 Meters (21.0-21.5 MC)
20 Meters (13.8-14.5 MC)
40 Meters (6.9- 7.5 MC)
80 Meters (3.5- 4.0 MC)

INTERNATIONAL BROADCAST BANDSPREAD
13 Meter Band (21.5-22.1 MC)
16 Meter Band (16.4-18.0 MC)
19 Meter Band (14.6-15.4 MC)
25 Meter Band (11.7-12.0 MC)
31 Meter Band (8.6-10.0 MC)
49 Meter Band (5.9- 6.3 MC)

MAIN TUNING RANGES
540-1600 KC
1.6 - 4.0 MC
4.0 -10.0 MC
10.0 -20.0 MC
20.0 -30.0 MC

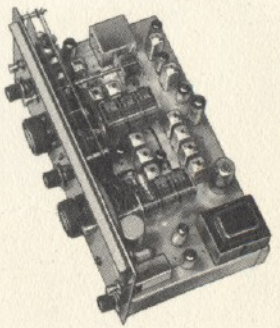


IMAGE REJECTION: 6BZ6 RF Stage and double conversion above 4 MC (1st IF — 2215 KC, 2nd IF — 230 KC).

AUDIO AMPLIFIER: 3.2 ohm output. More than 1 watt at 10% distortion. Front panel headphone jack.

STABILITY: The use of a ⅛" steel panel, 1/16" steel chassis, ceramic coil forms and rugged oscillator components assure excellent mechanical stability. All oscillators are voltage regulated, which minimizes frequency changes as a result of voltage variations.

CALIBRATOR: Accessory XCU-109 calibrator provides 1 MC markers throughout tuning range.

AUTOMATIC GAIN CONTROL (AGC): AGC operation is available for both AM and SSB/CW signals, allowing effortless tuning of any type of signal under widely varying signal input conditions.

"S" METER: Edge-reading, operates on all reception modes.

NOISE LIMITERS: Automatic series gate for AM, IF limiting for SSB/CW.

PRODUCT DETECTOR: triode type for SSB/CW with separate diode detector for AM.

TUNING RATIO: 60:1 bandspread ratio with built-in National Velvet Vernier.

SELECTIVITY: 230 KC. Ferrite Filter provides 600 cycle CW, 3 KC SSB, and 5 KC AM bandwidths at 6 db points.

TUBE COMPLEMENT: 6BZ6 RF Amplifier, 6BE6 HF Converter; 6BE6 2nd Converter; 6BA6 IF Amplifier; 6BA6 IF Amplifier; 12AX7A Product Det-BFO; 6T8 AM Det, ANL, AGC, Audio Amp.; 6CW5 Audio Output; 5Y3GT Pwr Rect.; OB2 Voltage Reg.

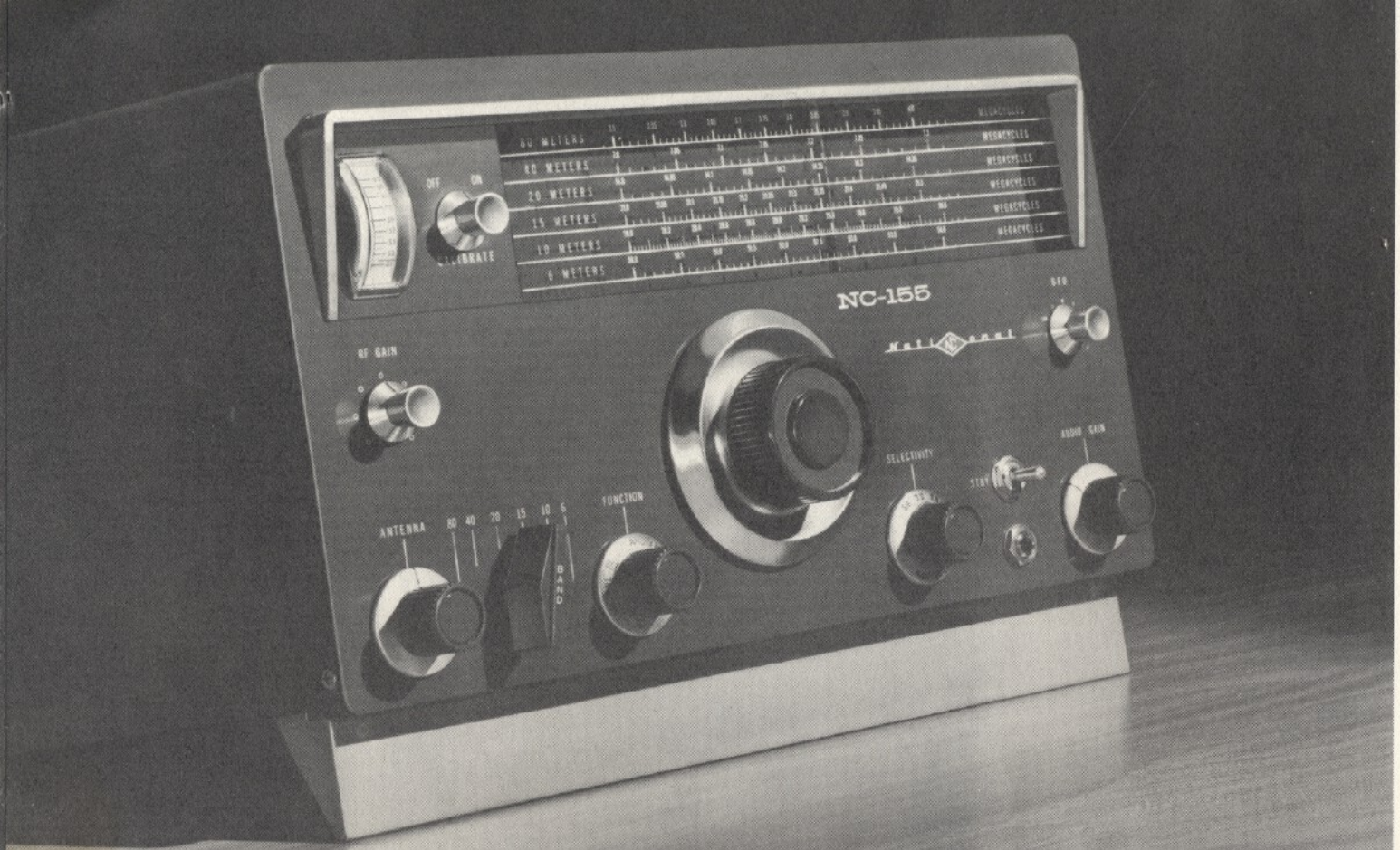
FRONT PANEL CONTROLS: Main tuning, Bandspread, Dial Selector, RF gain, Antenna trim, REC-STBY, ANL, AGC, BFO, Calibrator, BFO adjust, Selectivity, Bandswitch, Audio gain, Earphone jack.

POWER REQUIREMENTS: 105-125 volts AC, 50-60 cycles, 75 watts.

DIMENSIONS: 8¼" high, 15¼" wide, 9" deep.

SHIPPING WEIGHT: 28 pounds.

ACCESSORIES: XCU-109 Crystal calibrator; NTS-3B matching speaker.



NC-155

The Ham Band Performance Pace-setter — That's the description best fitting the new NC-155. In a price class by itself, the NC-155 offers the amateur double conversion, variable IF selectivity from 600 cycles to 5 KC, and ease of SSB reception unmatched by any receiver within hundreds of dollars of its price.

1. Exceptional Stability, both mechanical and electrical. Average drift on 80 through 10 meters over a 5-hour period from warmup is only 1 KC.

2. No compromise on 6 Meter Band. The NC-155 gives amazingly good performance on the 6 meter band. Sensitivity is better than 1.0 microvolts for a 10 db signal to noise ratio.

3. Superb SSB Performance. Unique Velvet® 60: 1 dial reduction uses National's Planetary Vernier, resulting in a tuning ratio almost twice as high as any other amateur band receiver on the market. The new NC-155 also utilizes a separate linear product detector and effective sideband AGC making SSB signals practically as easy to tune as AM.

4. Meets Any Receiving Conditions. Variable IF selectivity using National's exclusive high frequency Ferrite Filter provides three discrete steps of selectivity: 600 cycles, 3 KC and 5 KC.

5. Maximum Image Rejection. The new NC-155 utilizes double conversion on all bands for maximum image rejection.

6. Time-Tested National Circuitry. The design of the new NC-155 is based upon the popular, higher priced NC-270.

SPECIFICATIONS

FREQUENCY RANGES: 6 meter band (50.0-54.0 Mc); 10 meter band (28.0-29.7 Mc); 15 meter band (21.0-21.5 Mc); 20 meter band (14.0-14.4 Mc) 40 meter band (7.0-7.3 Mc); 80 meter band (3.5-4.0 Mc).

PLANETARY TUNING CONTROL: 60:1 ratio with vernier pinch for smooth inertia tuning.

ACCESSORY XCU-109 1 MC CALIBRATOR: Crystal calibrator and lateral dial adjustment for extreme calibration accuracy.

INTERMEDIATE FREQUENCIES: 1st IF-2,215 Kc — 2nd IF — 230 Kc.

IMAGE REJECTION: 6BZ6 RF Stage and double conversion superheterodyne circuit provides optimum image and intermediate frequency rejection on all bands.

SENSITIVITY: Better than 1.0 microvolt for 1 watt output, 10 db signal to noise ratio.

SELECTIVITY: National's Ferrite Filter provides the following discrete bandwidths: Very Sharp — 600 cycles; Medium — 3.0 Kc; Broad — 5.0 Kc.

RECEPTION OF SSB AND SW SIGNALS: Ferrite Filter allows selection of upper and lower sideband with calibrated BFO control and linear product detector with separate carrier re-insertion.

RECEPTION OF AM SIGNALS: Separate vacuum tube diode detector.

SIGNAL STRENGTH METER: Calibrated in S units from "S-1" to "S-9" (at 50 μv input) and "10 DB" to "60 DB" above S-9.

AUDIO POWER OUTPUT: 3.0 watts.

ANTENNA INPUT: 50Ω, unbalanced on all bands.

OUTPUT CIRCUIT: 3.2Ω for loudspeaker. Separate front panel headphone jack.

CONTROL CIRCUITS: Front panel standby-receive switch with separate set of contacts for transmitter control available at rear of receiver. Receiver may also be controlled externally from rear panel connection.

POWER LINE REQUIREMENTS: 105-125 volts A.C., 50-60 cycles, 75 watts.

FRONT PANEL CONTROLS: Tuning, Radio frequency gain, Audio gain, BFO-USB/LSB, Beat frequency oscillator. Antenna Trimmer, Bandswitch, Phone jack, Standby-Receive switch, Audio Gain Control, Calibrator switch, Calibration set.

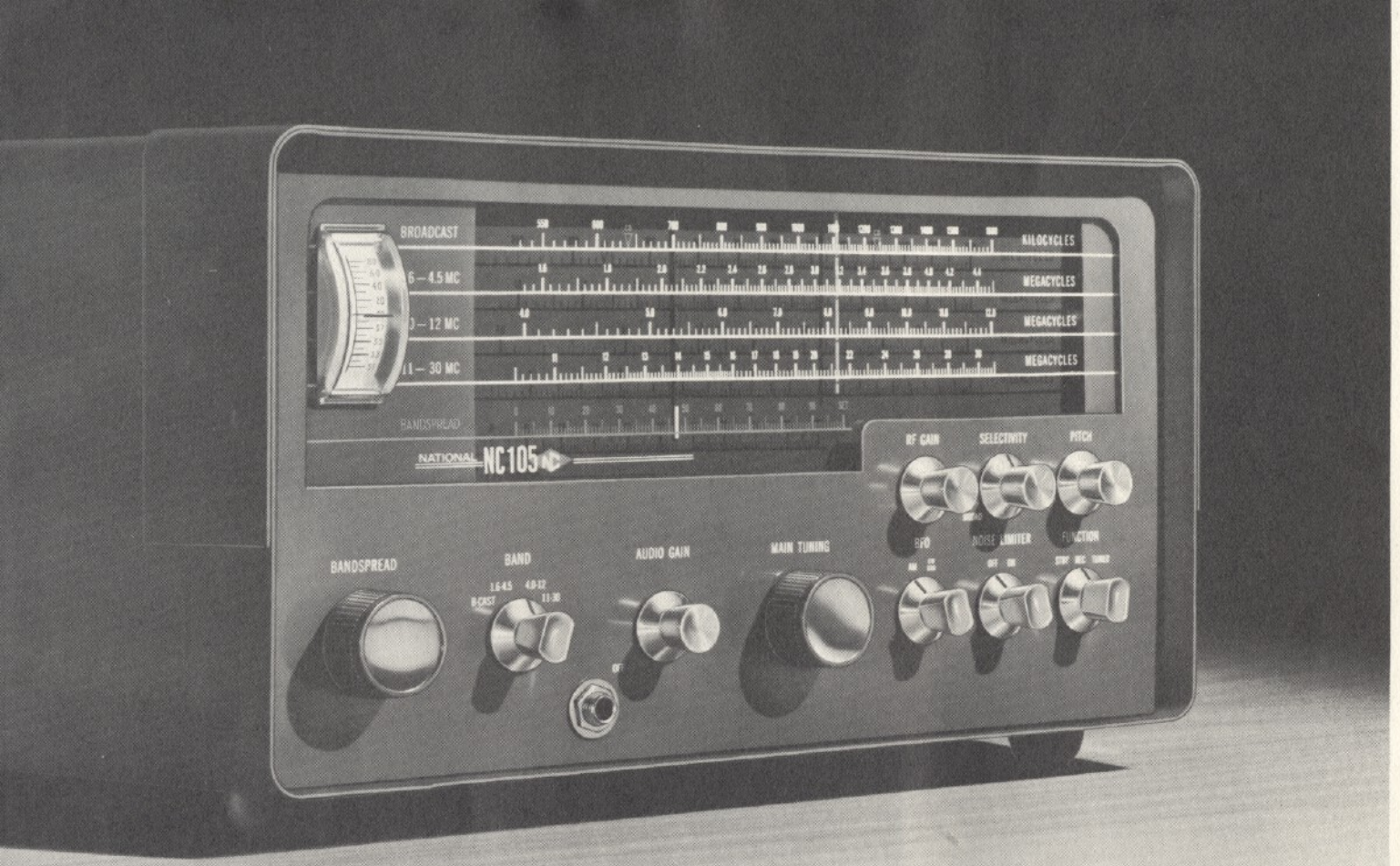
SELECTIVITY SWITCH WITH THREE POSITIONS: 5.0 KC, 3.0 KC and 0.6 KC.

MODE SWITCH: AM, ANL, CW-SSB with AGC on; CW-SSB, AM, ANL with AGC off.

FLIP FOOT: Unique "Flip Foot" on receiver and matching NTS-3B speaker for maximum operating convenience.

DIMENSIONS: 8⅝" high, 15⅓" wide, 9" deep. Shipping weight 28 lbs.

OPTIONAL ACCESSORIES: XCU-109 1 MC. Crystal Calibrator NTS-3B matching speaker.



NC-105

Only National could bring you such a feature-packed, top performing receiver at so reasonable a price. In the new NC-105 general coverage receiver you get all the features you want and need, the performance and finish of equipment costing half again as much. The NC-105 provides continuous coverage from 550 KC to 30 MC in four bands, and includes such important features as a large illuminated edge-reading S meter, a product detector, a peaking Q multiplier operative on CW as well as AM and separate RF and audio gain control.

For the Novice. There's no need to invest a great deal of money in a first receiver or compromise on second-hand or inadequate equipment. The new NC-105 gives you a new and better choice. You'll agree when you look over the features listed on this page.

For the Shortwave Listener. The new NC-105 gives superb shortwave performance. National's exclusive bandspread calibration charts make it easy to locate and identify foreign broadcasts by frequency. Continuous coverage includes shortwave, marine broadcasts and international aircraft communications. Even listen to signals from the satellites and our astronauts!

For the High-Fidelity Enthusiast. Enjoy (and tape) musical broadcasts from all over the world through your high fidelity component system. The new NC-105 is the only general coverage receiver that includes a special Tuner Output, so you can connect the receiver directly to your amplifier.

The NC-105 also comes in an optional hand-rubbed oiled walnut enclosure (Model NC-105W) perfect for use in your living room or den.

SPECIFICATIONS

The NC-105 Broadcast and Short Wave Receiver is a general coverage communications receiver featuring variable selectivity on all receiving modes, bandspread tuning (with foreign broadcast and amateur band calibration charts), an edge reading illuminated S Meter, separate RF and Audio Gain controls, and Automatic Gain Control for all modes of broadcast and short wave reception.

MAIN TUNING RANGES: 550 — 1600 KC, 1.6 — 4.5 MC, 4.0 — 12.0 MC, 11.0 — 30.0 MC.

SPECIAL CALIBRATION CHARTS are provided for the following short wave bands:

AMATEUR & CITIZENS BAND: 10, 15, 20, 40, 80 Meters and Citizens Band.

FOREIGN BROADCAST: 13, 16, 19, 25, 31, 41, and 49 Meter Bands

ANTENNA INPUT: 50-300 ohms.

I.F. Selectivity (Q Multiplier) — Adjustable from 5 KC to approximately 500 cycles by front panel control. 7 KC bandwidth for full fidelity broadcast reception in broad position.

AUTOMATIC GAIN CONTROL: Operates on all modes including Single Sideband (SSB), Code (CW), and AM reception.

S METER: Operates on AM, Single Sideband and Code reception. Calibrated in S units and in decibels above S-9.

NOISE LIMITER: High performance automatic series gate noise limiter for maximum impulse noise rejection without signal distortion.

Q MULTIPLIER: Highly efficient vacuum tube fixed-tuned peaking type to obtain maximum selectivity for any listening requirement. Continuously variable from 7 KC to 500 cycles.

SEPARATE PRODUCT DETECTOR: Combination triode product detector — BFO circuit to assure optimum performance and minimum distortion during code and single sideband reception.

AM DETECTOR: A separate vacuum tube diode detector is used for AM reception.

TUNER OUTPUT: Audio output from either diode or product detector is available for use with an external Hi-Fi system when the FUNCTION switch is placed in the TUNER position. Output level is set by the AUDIO GAIN control.

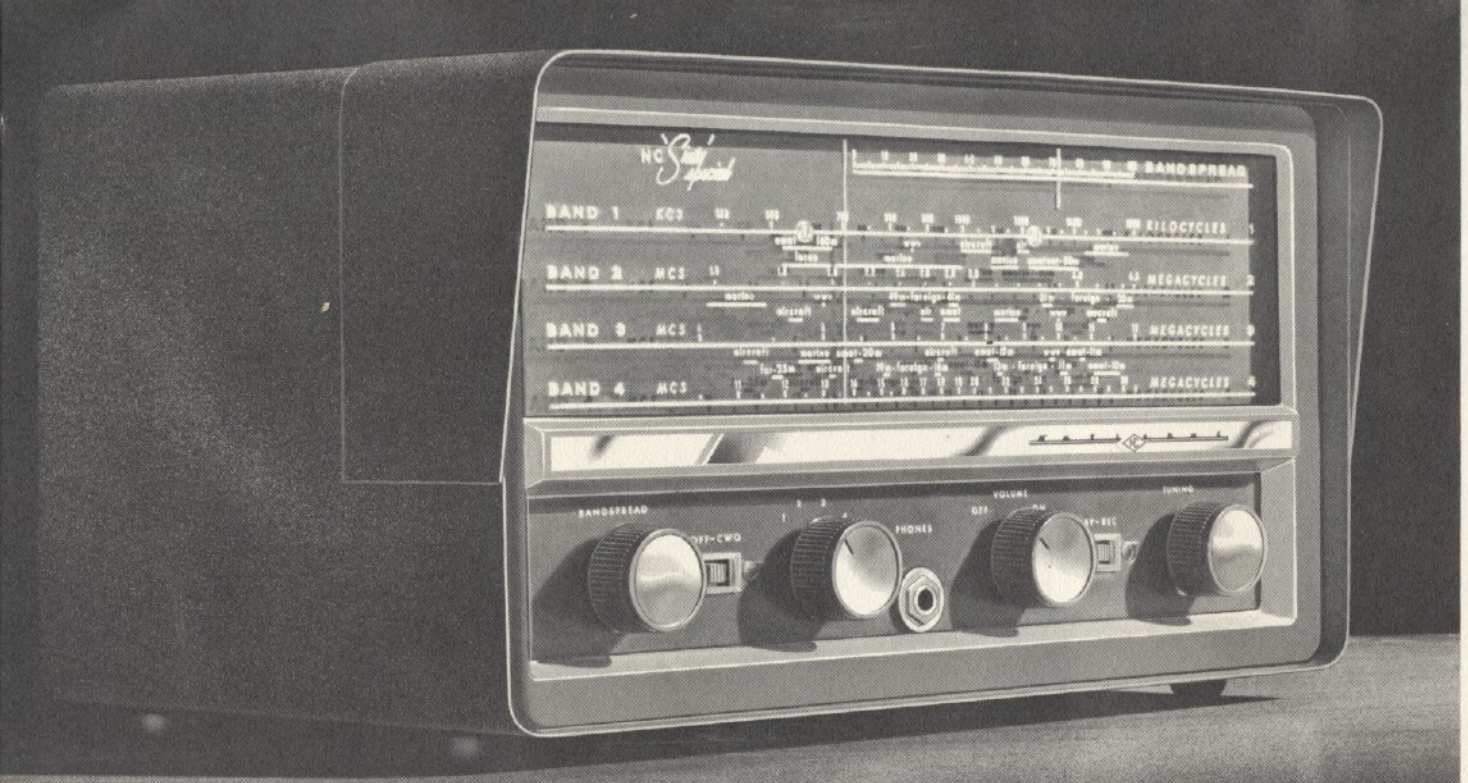
AUDIO SYSTEM: Built-in 5" speaker. 3.2 ohm output circuit for earphones or external speaker available at front panel phone jack.

POWER SUPPLY: Full wave vacuum tube rectifier, transformer operated.

POWER REQUIREMENTS: 105-125 volts AC, 50-60 cycles.

POWER CONSUMPTION: 49 watts.

DIMENSIONS: 7⅝" high, 13½" wide, 8⅝" deep in steel case. 7 1/16" high, 14¼" wide, 9⅜" deep in oiled walnut case.



NC-60 Special

The perfect choice for the beginning shortwave listener or novice amateur, this low-priced superheterodyne shortwave receiver with time-tested National circuitry assures you maximum reliability and performance for your first investment.

Continuous coverage of AM Broadcast, Amateur, and world-wide shortwave bands with full electrical bandspread on all frequencies.

Giant easy-to-read dial with standard broadcast, civil defense, WWV, marine, aircraft, amateur and foreign shortwave frequencies clearly marked.

Excellent sound reproduction provided by built-in 5" permanent magnet speaker. Audio system has two-stage audio amplifier with 50C5 output tube and front panel phone jack.

Exceptional sensitivity and selectivity provided by separate tuning coils for each band. Separate general coverage and bandspread tuning capacitors connected in parallel. Bandspread knob may be used as a vernier on all frequencies. Full electrical bandspread on all frequencies. 0-100 calibrated logging scale.

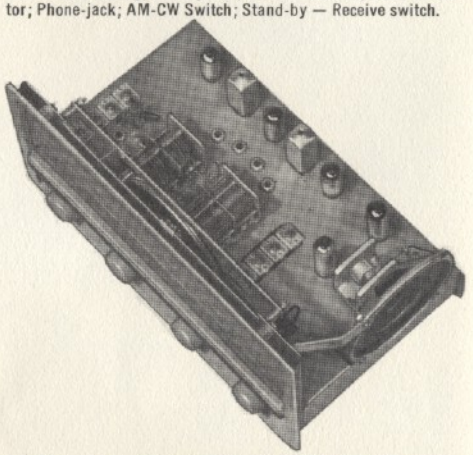
The performance of the NC-60 Special is the result of 48 years of design experience and know-how in the manufacture of fine quality receivers. Thousands of shortwave listeners throughout the world are enjoying National's NC-60 — you too can thrill to the drama of world-wide news in the making with this popular performer.

SPECIFICATIONS

BAND	GENERAL COVERAGE
1	540-1600 kc
2	1.6-4.5 mc
3	4.0-12 mc
4	10.5-31 mc

SELECTIVITY: 6 db; 5 kc;

CONTROLS: Tuning; Bandspread; AC OFF-Volume; Band Selector; Phone-jack; AM-CW Switch; Stand-by — Receive switch.



TUBE COMPLEMENT: 12BE6 Converter • 12BA6 CW Oscillator-IF Amplifier • 12AV6 2nd Detector-AVC-1st Audio • 50C5 Audio Output • 35W4 Rectifier

ANTENNA INPUT: 50-300 ohms

SIZE: 7⅝" high x 8⅝" deep x 13½" wide

POWER REQUIREMENTS: 115 volts AC/DC 40 watts

FINISH: National Blue

SHIPPING WEIGHT: approximately 15 pounds

NC®

VFO-62

A precision variable frequency oscillator designed to operate with most transmitters using crystal oscillators in the 8-9 mc region, or with most equipment using overtone oscillators in the 25 to 27 mc range, National's VFO-62 provides full coverage of both 6 and 2 meter Amateur bands.

Outstanding features of the VFO-62:

- Full coverage of both 6 and 2 meter Amateur bands.
- Completely self-powered, self-contained. Plugs into 105-125 Volt AC outlet and transmitter crystal socket. Needs no power from your rig.
- Has front panel controlled internal crystal oscillator for use with 1 Mc. calibrating crystal. Provides for crystal calibration without accessory equipment or without changing connections.
- Front panel crystal socket allows instant selection of your favorite crystal without changing transmitter connections.
- Built-in phone jack allows direct detection of calibrating markers.
- Precision vernier drive provides precise tuning control.
- Frequency stability better than .005% after brief warm up. Separate tuned circuits on each band provide maximum stability.
- Housed in an attractive grey plastic cabinet for maximum mechanical stability.

Size: 5½" deep x 6½" wide x 5¼" high. Shipping weight: 6 lbs.

NATIONAL...

America's Finest Communications Equipment

Here's what the experts say . . .

". . . all veteran, experienced DX'ers know that for supreme sensitivity and S/N ratio no other commercial receiver compares with a . . . National HRO . . . for pulling an AC-5 through early morning hiss it is superb . . ."

Don Chesser in DX Magazine, November 1961

"The NC-400 . . . 'the receiver for the man who wants everything' . . . offers just about everything anyone could want . . . No expense has been spared to provide both long and short term stability . . . Observed warm-up drift is almost nil."

QST, February 1960

While low in price "The NC-190 and NC-155 offer features and performance equal to most receivers of similar types selling in the medium to high priced areas, and in a couple of instances . . . provide conveniences that are found in no other units that we are aware of . . ."

73 Staff, 73 Magazine, June 1962

"The sensitivity . . . electrical and mechanical stability of the NC-400 (is) excellent . . . meets just about any selectivity requirements . . . fulfills its promise and makes an ideal general coverage communications receiver for the amateur."

CQ, April 1960

"The NC-190 . . . is a little wonder . . . we found the receiver to be remarkably sensitive in all modes of operation . . . with excellent electrical and mechanical stability. SSB operation is easier than we ever thought possible on a general coverage receiver . . . Offers a surprising amount of performance for 220 bucks and seems to us to be an ideal receiver for the ham who wants excellent ham band performance along with general coverage at a relatively low price . . . the combination of price and performance on this package is hard to beat!"

73 Staff, 73 Magazine, June 1962

"Stability, both mechanical and electrical, is exceptional . . . the NC-270 works well enough on 50 mc. to encourage a VHF enthusiast to design his converters so that they will work into the six meter range rather than into the lower bands . . . He can skip the construction of a 50 mc. job. The NC-270 should do all he'll need in that range."

QST, January 1961

"There is a new Receiver on the market — the kind SWL's have been dreaming about for years . . . It's the National NC-190."

Hank Bennett, W2PNA/WPE2FT in Shortwave Report, *Popular Electronics, 1961*

"The NC-270 retains all the 'feel' of the more expensive receivers for which this company is known . . . Mechanical stability is impressive . . . An extremely stable and sensitive receiver."

CQ, May 1961

"...the NC-155 was more than able to hold its own in far higher priced company!...extraordinarily smooth tuning mechanism . . . as mechanically stable as any receiver we have tried with a crystal controlled front end . . . Electrical stability was as impressive."

73 Staff, 73 Magazine, June 1962

While the NC-60 is National's lowest priced receiver, it has garnered remarkable reviews from many experts. From *Radio-Electronics* — "Neat combination of design and technical features." From *Electronics Illustrated* — ". . . pulls in the SW stations, a pleasure to recommend it." "Looks like a real winner", says *Popular Electronics*. From *Radio & TV News* — "A boon to the shortwave listener."

From National...the Industry's ONLY

ONE YEAR GUARANTEE

All of the equipment shown in this catalog is backed by an iron-clad guarantee against component failure for one full year from date of purchase. This amazing guarantee is by far the longest available in the industry. In fact — the vast majority of other manufacturers dare offer you only one-fourth as much protection.

This one-year guarantee applies to all National Radio Company communications equipment . . . regardless of price. You can buy with the complete assurance that National stands squarely behind your purchase . . . that the unit you select offers long-term reliability, as well as more superior features and performance.

WHY IS THIS EXTENDED GUARANTEE POSSIBLE?

1. National has manufactured fine communications equipment for almost half a century. Our experience is unequalled. Over 75% of our highly skilled test and assembly people have been with us for more than 25 years — an astonishing record in the relatively young electronics industry. They know their business . . . take pride in their fine workmanship — workmanship so outstanding that many National receivers purchased thirty years ago are still in daily use.

2. National manufactures most of the components used in its equipment . . . the same components specified by other important electronic manufacturers and government agencies. Therefore, National has maximum control of component part quality from design to manufacture to end application. If a special part is needed, National simply makes it, rather than compromise design to fit less satisfactory parts already available on the market.

3. Every National receiver goes through an intense series of rigid quality control tests before it leaves the factory. National tests every receiver as it comes off the assembly line . . . not just random samples.

The purchase of a new receiver is an important investment. To insure this investment look for the National Seal of Quality. Purchase of any of the superb National Equipment in this catalog assures you of advanced design, exceptional performance, and guaranteed reliability over many years of continued use.

ELECTRONIC SUPPLY, INC.
222 SEVENTH AVE.
HUNTINGTON, WEST VIRGINIA

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