CQ REVIEWS:

The NCG 10/160M HF SSB/CW Transceiver

BY DAVE INGRAM*, K4TWJ

Okay, equipment buffs, how's your knowledge of modern gear? Relax a couple of minutes and then name today's manufacturers of all-band HF transceivers. If you stopped after four, return to square one and start enjoying more time browsing through the advertising section of our magazine. Looking at ads is a fascinating and inspiring pursuit, and it resembles a constant running hamfest without the related crowd and interruptions. Sometimes an ad eludes our quick glance because of its size or color, but a closer look reveals a very impressive unit. The NCG 10/160M transceiver featured in this *CQ* review could easily fall into that category. It hasn't been highlighted in a multipage, multicolor "bright lights and glamor" display, but it is a sharp rig. As an opening opinion, I think the NCG is stout-performing and economically priced transceiver with some very attractive features and frills built-in and ready for action. Its autowatch band scanning works great, its receiver can be offset by any amount for split-frequency DXing, and it can be used in the home or car as desired. There's more, naturally, so read on!

The NCG 10/160M is a midsize amateur-band-only transceiver covering 10 through 160 meters including WARC bands, and it is enclosed in a black case measuring 5"H × 12½"W × 14½"D (including its 2½" rear heat sink). The unit is fully solid state with PLL synthesizer tuning, cool-running internal AC supply, rear-panel 13 volt DC socket, VOX, RIT, IF Tune/Shift, audio speech processor, CW wide and narrow filters, four programmable memories, and a bottom-mounted speaker. Both CW filters are preinstalled, and a hand mike is included. A front view of the rig is shown in fig. 1 and additional specifications are included in fig. 2. There is a carrying handle on the transceiver's left side and four rubber feet on its right side, making it a "single cabinet station" that can be set up and enjoyed almost anywhere. In fact, that's exactly what Sandy, WB4OEE, my XYL, and I did much of the time during the NCG unit's review. We routed an "extension coax" from our new A-3 beam into her room for 10 meter DXing, I moved it into the den for 30 meter CW while reading and watching TV, and later it returned to the ham room for serious study. The NCG went through all trials and scrutinizations with flying colors.

Fig. 1– The NCG 10/160M HF Transceiver is a midpriced, midsized unit easily carried and operated almost anywhere.

The NCG's front controls are arranged in a smooth-operating and quite comfortable manner. Synthesizer tuning steps of 1 kHz, 100 Hz, or 25 Hz are panel selectable, and they provide 100 kHz, 10 kHz, or 2.5 kHz coverage, respectively, during each full revolution of the tuning knob. That knob, incidentally, has a well-balanced feel with just the right amount of

SPECIFICATIONS

GENERAL		**TRANSMITTING**	
• Frequency Range	160 m Band 1.8 – 2.0 MHz	• Final Stage Input (PEP)	200 W (160 m–12 m), 100 W (10 m)
	80 m Band 3.5 – 4.0 MHz	• Modulation Method	Balanced Type
	40 m Band 7.0 – 7.3 MHz	• Carrier Suppression	More than 40 dB
	30 m Band 10.0 – 10.15 MHz	• Side-Band Suppression	More than 50 dB
	20 m Band 14.0 – 14.35 MHz	• Spurious Radiation	Less than −40 dB
	17 m Band 18.068 – 18.168 MHz	• Microphone Impedance	600 Ω – 50 kΩ
	15 m Band 21.0 – 21.45 MHz		
	12 m Band 24.89 – 24.99 MHz	**RECEIVING**	
	10 m Band 28.0 – 29.7 MHz	• Circuit Type	Single Superheterodyne
• Mode	A3j (SSB) A1 (CW)	• I.F Frequency	SSB 9.0000 MHz
• Tuning Speed	3-step (1 kHz/100 Hz/25 Hz)		CW 9.0007 MHz
• Stability	Less than ±200 Hz within 1 Hour	• Sensitivity	Less than −12 dBμ (0.25 μV)
	Less than ±20 Hz after 1 Hour	• Selectivity	SSB, CW Wide CW Narrow
• Power Supply	AC 120 V 60 Hz		−6 dB More than ±1.1 kHz ±200 Hz
	DC 13.8 V Minus Ground		−20 dB Less than ±1.5 kHz ±500 Hz
• Power Consumption	AC Transmitting 550 VA		−60 dB Less than ±3.0 kHz ±800 Hz
	AC Receiving 50 VA		Note.... CW Narrow is required to install option CW Filter.
	DC Transmitting 20 A		
	DC Receiving 0.6 A	• Spurious	Image Ratio..... More than 60 dB
• Antenna Impedance	50 Ω		I.F Rejection ..... More than 60 dB
• Number of Semiconductors	30-IC, 6-FET, 124-TR		Other Spurious Ratio ..... More than 70 dB
• Dimensions (Max.) mm	322(341)W, 132(139)H, 316(402)D	• Delta F Range	More than ±1 kHz
• Weight	9.5 kg	• I.F Tune Range	More than ±1 kHz
		• Audio Ouput Power	Internal Speaker 0.5 W (10% THD)
			External Speaker 1.0 W (10% THD)
		• Audio Ouput Impedance	8 ohm

Fig. 2– Technical specifications of the NCG 10/160M Transceiver.

*Eastwood Village No. 1201 So., Rt. 11, Box 499, Birmingham, AL 35210

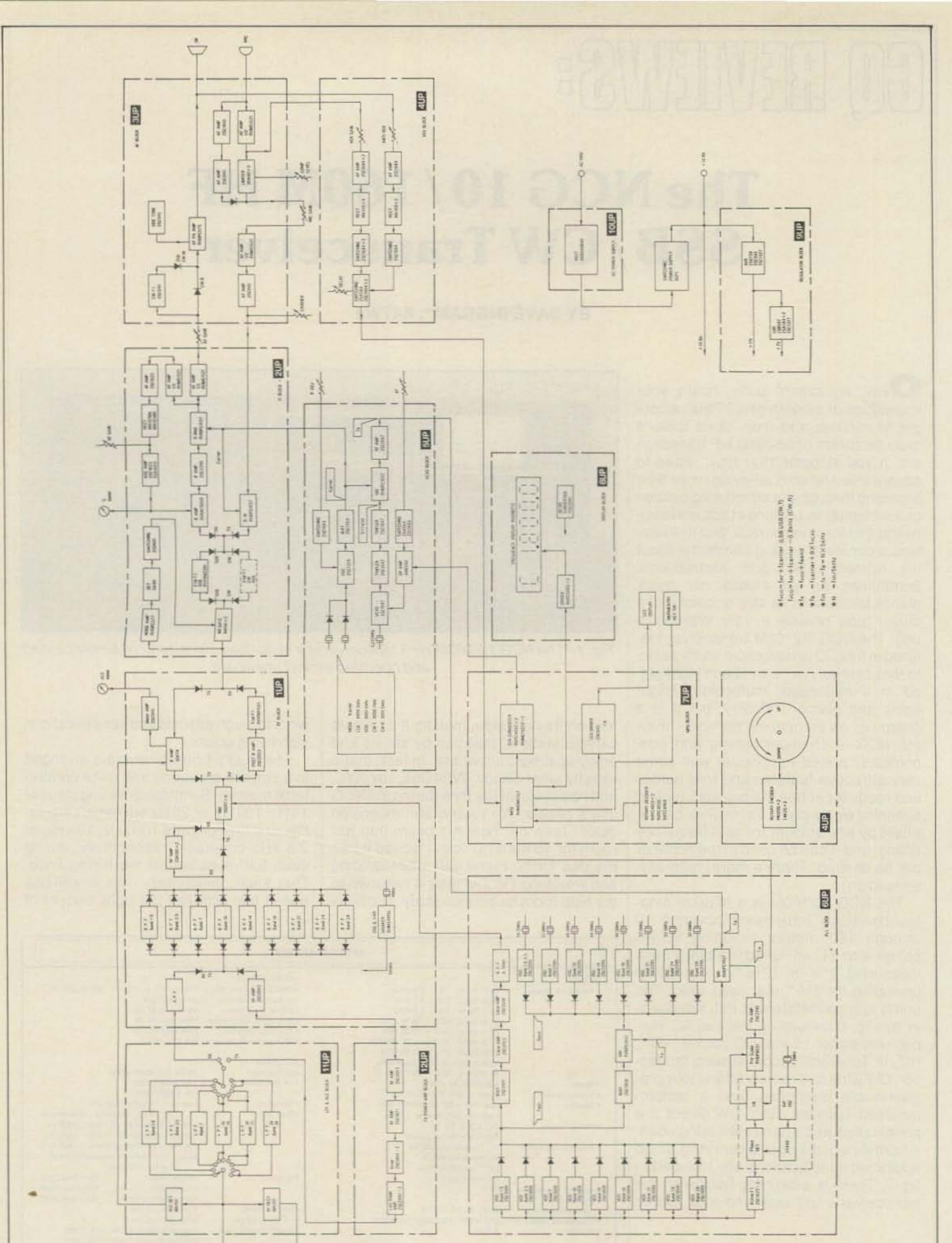

Fig. 3– Block diagram of the NCG 10/160M Transceiver. Discussion in text.

drag or tension to produce a professional touch. There is also an up/down lever switch for hands-free tuning.

Selection of the unit's wide or narrow CW filters is accomplished via the mode switch, and combined use of those filters with the IF Tune and RIT (labeled Delta Tune on the NCG) provides good DXing flexibility. All of the control's rotation range is utilized, so you can easily center a high-medium- or low-pitched tone in the passband for good copy and minimum QRM. A separate control is included for speech processor adjustment, and it works like a champ. Three recessed controls on the right side adjust VOX sensitivity, SSB and CW T/R delay time, and anti-VOX insertion. Internal adjustments include noise blanker level, CW sidetone, dial calibration, and S-meter sensitivity.

Special Features

As previously mentioned, the NCG includes several standard features some amateurs consider "extras." Heading that list are VOX, semi-break-in CW, noise blanker, 100 kHz marker, audio speech compression, and a convenient front-panel key jack. Additional features of adjustable receiver offset for split-frequency operating, four programmable memories, and trimode scanning reflect a noticeable amount of human engineering, however, and warrant further discussion.

Generally speaking, most amateurs approach split-frequency DXing in a similar manner. We tune across a pileup, synchronize our second VFO, then shift one VFO down to the DX station's transmitting frequency while leaving the other VFO on the DX's receiving frequency. The NCG "fits" that technique perfectly. As an example, let's assume you tune into a massacre . . . err pileup . . . on 14.200 MHz calling a TR8 on 14.160 MHz. You press the NCG's **RX OFFSET** switch (its LED illuminates) and then tune down to 14.160 MHz and copy the TR8. When you switch to transmit, the NCG shifts back to 14.200 MHz—simple, effective. If you wish to check pileup action or shift your transmit frequency, merely press the NCG's **TX/RX/REV** switch (the dial changes to 14.200 MHz) and tune as desired. A second **TX/RX/REV** switch press restores split operation on 14.160 and 14.200 MHz (or your newly selected transmit frequency). After working the TR8, you press the **RX OFFSET** and **TX/RX/REV** buttons simultaneously and single frequency operation is restored.

The NCG's four memories can be used in a "fixed" or "tunable" manner, and considering its front-panel rotary bandswitch, four memories are quite ample. I've yet to work more than four stations simultaneously, and using memories as a glorified bandswitch isn't always logical to me. Typically, I'll store a couple of DX stations in QSO using memories 1 and 2 and continue DXing with the VFO. I'll then briefly recall "fixed" memorized frequencies until a QSO ends. After working the DX station, I'll press memory 1 (or 2), write, and VFO, then tune to another station, restore it in memory 1 (or 2), and continue operating. In other words, you can shift frequencies from VFO to memory or vice-versa, or even shift frequencies from memory to memory. The only things you can't do are operate the memories as four independently tunable VFOs and program a memory with a new frequency while that memory is in use (super-operating).

Surely the NCG's most clever feature is its unique **AUTO WATCH** scanning. This scanning may be set in one of three ways: full band scan, programmable upper- and lower- limit scan, or skipping any undesired range and scanning everything else on a band. Relating that to 20 meters, you could scan 13.950 to 14.400 MHz, or 14.00 to 14.027 MHz, or 14.00 to 14.090, skip to 14.175 MHz, and continue on to 14.400 MHz. Specific functions here are programmed according to frequencies entered in memories 3 and 4. The **AUTO WATCH** button activates and stops scanning, and that feature also functions in a unique manner. Scanning begins at a fast and 1 kHz stepped rate, but shifts to a quite slow and 100 Hz stepped rate when it approaches a strong signal. You have time to listen for a few words, then reach over the stop the scanning or let the NCG continue tuning. Six kHz further, scanning switches back to fast mode until it spots the next strong signal. Then again it shifts to slow speed and you have time to decide if stopping is desirable. Signal strengths for determining scan speed shifts, incidentally, can be selected according to the **RF GAIN** control's setting. If you like to keep an ear on band activity or listen for a DXpedition to fireup while you're working in the shack, you'll love the NCG.

Circuitry Overview

As I've mentioned in several of my *CQ* World of Ideas columns, viewing any unit's block diagram is an efficient and unbiased means of technical comparison. Let's thus briefly discuss the NCG's designs illustrated in fig. 3. The print is quite small, so your pocket magnifier will be useful. Let's start at the antenna and follow the receive path (left top). Liberal use of bandpass filters indicates this rig should perform admirably in high RF environments, and the RF amplifier's dual 2SK195s reflect modern low-noise designs. Single conversion is utilized with a 9.000 MHz IF, and popular Japanese devices such as 2SC2053s and 2SC945s are employed in several "low level" receive and transmit stages. Look close "before" the last audio stage and you'll notice the (AF level) CW Narrow Filter.

Moving to the diagram's right side, we can trace the transmit path from the mike, through its amplifier stages and audio compressor, and to the balance modulator. Once again, the use of time-proven and popular designs is apparent. Continue through the crystal filter to the 3SK74 IF amp, bandpass filters, and into the power amplifier section. That section's use of 2SC2053, 2SC1945, and 2SC2097 "finals" is also "modern classic" in design. They've been used with overwhelming success by Kenwood and ICOM and are a positive credit reference for NCG.

The PLL tuning system uses an LED beam-chopping flywheel pulsing an encoder. That stage drives the microprocessor, which in turns sends "count data" to the master oscillator-referenced phase locked loop. That PLL controls the exact frequency of a particular band-selected VCO. The VCO's output is then routed through a buffer, two amplifiers, a filter, and on to the first mixer stage for VFO/frequency control. This single PLL concept is also classic, straightforward, and proven.

Two additional points are not apparent in the block diagram. The NCG uses hefty T/R relay contacts for external linear amplifier control. Its rear socket is a common DIN jack. Also, the rig's output is 100 watts on 160 through 12 meters and 60 to 65 watts on 10 meters. Overall, I personally like NCG's use of tried and proven designs. There's a good feeling of confidence and reliability that's quite important in today's world.

On the Air

The NCG's all solid state circuitry and single box design make it super convenient to set up and operate almost anywhere or anytime. You can move it into a den or onto a patio for a pleasant "out of shack" change of pace, use it mobile, or carry it along on weekend outings. A simple wire antenna completes the latter setup, and you're on the air in minutes. Very nice.

Sandy and I both agree that the auto watch scanning feature is really beautiful. You can set the rig tuning for action and then continue some other nearby pursuit. The NCG switches to slow tuning when spots a station, allowing time to listen, stop scanning, or continue tuning. The use of front-panel pushbuttons rather than a rotary switch for memory selection is another definite asset. I continuously use memories while operating, and stepping through 1, 2, and 3 to reach 4 is slightly awkward.

The IF tune control has good "knobspread" (like bandspread on a dial, eh?) and does a good job of minimizing adjacent channel interference. My QTH is noise infested during several months of a year, and the NCG's blanker couldn't perform miracles. The blanker works great, however, on pulse-type ignition noises. My pet peeve is hot-running solid state transceivers (they remind me of an iron with knobs), and I'm proud to report the NCG runs as cool as a cucumber. The only negative points I've found are the lack of SWR metering and a deficiency of technical theory-of-operation in its owner's manual. The latter item is probably available separately from NCG.

Conclusion

Overall, I think the NCG is a hearty midsize transceiver with impressive performance and features. It isn't overly expensive or cheap; it is "midrange" and practical. I've ran several direct comparisons between the NCG and other modern transceivers, and it holds its own with the best. Actually, all of today's transceivers (not yesteryear's "battlecruisers," but today's solid state gems) are great performers. You really won't hear signals on one rig that you won't hear on another unit. There's also still no substitute for good operator know-how.

The NCG 10/160M transceiver is manufactured by Matsushita Electric Industries Co., Ltd., and imported to the U.S. by NCG, 1275 N. Grove St., Anaheim, CA 92806. It is priced at $985.00. Write to NCG directly for more information. CQ