

The ICOM IC-718 HF Transceiver

BY DAVE INGRAM,* K4TWJ

What would you consider more fun and exciting than chatting with good friends and working DX with a room full of fancy gear? How about doing it with a brand-new, low-cost HF transceiver that is small enough to sit on a nightstand by your favorite easy chair and sports a number of big-rig features to boot?

Well, friends, that is exactly what I have been doing recently with ICOM's new IC-718, and I will bet a similar change of pace will add some newfound enjoyment to your life, too. How so? First, it is the famous old story of a special friend or a rare DX station that always hits the airwaves two minutes after you walk out of the shack or give up trying to copy weak, QRMed signals on a well-used and somewhat outdated transceiver. Second, there is unique radio magic in working the world with a neat little rig that must be experienced first hand to be fully appreciated.

Life is a one-shot deal. Why short-change yourself when new transceivers such as ICOM's IC-718 offer such high performance at such an attractive price?! The sunspot count is high, and the HF bands are better than they have been in a number of years. Get on the air and enjoy hamming to the max! I hear you asking, "What is special about the IC-718 and what makes it attractive for HFing?" That will take a few pages to explain, so be patient and read on!

Hey, Look Me Over!

Right from the first glance, the IC-718's 4" x 9.5" x 9" cabinet and front LCD-screen-type display produce a most favorable and "genuine ICOM" appearance (photo A). Indeed, the transceiver looks like a miniature IC-781, IC-746, or IC-756. Only three "official" knobs grace the front panel: AF and RF volume/squelch, RIT and IF Shift, and main tuning. Front push-buttons temporarily as-



Photo A—ICOM's new IC-718 packs a surprising amount of big-time performance into an exceptionally small case. The transceiver can also be tailored to your own operating preferences with optional accessories as discussed in text. (Photo courtesy ICOM America, Inc.)

sign various other functions to the main tuning knob, however, producing the equivalent of a 30- or 40-knob rig.

Let's step back a minute and review The IC-718's basic attractions. The transceiver covers 160 through 10 meters with 5 to 100 watts output on CW and SSB (40 watts on AM), includes 300 kHz to 30 MHz shortwave reception, and sports 101 tunable memories. Additional specs and technical details are shown in fig. 1. Big-rig features include dual independent VFOs, split-frequency capability, band and memory scanning, SWR metering, VOX, speech compressor, semi and full QSK (break-in), CW keyer, and noise blanker. It strikes me as a lot of rig for the money, and its inclusion of a front-facing speaker plus SWR monitor and keyer results in a compact "one box unit" that fits almost anywhere. All you need to get on the air with an IC-718 is a microphone (a hand mic is supplied), key, antenna, and a 13 volt DC/ 20 amp (peak current) power supply or auto-

mobile battery for mobiling or outbacking. The transceiver is fitted with a "standard" ICOM/Kenwood-type 6-pin DC socket, and the rear panel is flat without heat sink or fan protrusions.

Like other popular-model ICOMs, the IC-718's front-screen-type display indicates frequencies and modes in its upper area, while a bar-graph-type meter in its lower area indicates received signal levels, output power, SWR, and ALC (fig. 2). The bar graph also includes a peak hold function that freezes maximum level readings for approximately one second and makes them easy to read. Nice! When the IC-718's menu set is punched up, the display changes to indicate a selected feature or function, and adjustments are displayed on the bar graph as you rotate the tuning knob (fig. 3). This direct readout of selected adjustments is quite handy and user friendly, and it sure beats trying to remember the rig's full menu set or look it up in the manual during a QSO. That is not criticizing the manual; it is very

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Specifications of the ICOM IC-718 HF Transceiver

GENERAL

Frequency coverage:	Receive 0.03–29.999999 MHz* ¹ Transmit 1.800–1.999999 MHz* ² 3.500–3.999999 MHz* ² 7.000–7.300000 MHz 10.100–10.150000 MHz 14.000–14.350000 MHz 18.068–18.168000 MHz 21.000–21.450000 MHz 24.890–24.990000 MHz 28.000–29.700000 MHz
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*¹ Guaranteed range: 0.5–29.999999 MHz

*² Varies according to version.

Mode:	USB, LSB, CW, RTTY, AM
Number of memory channels:	101 (99 regular, 2 scan edges)
Frequency stability:	Less than ±200 Hz from 1 min. to 60 min. after power on. After that, rate of stability less than ±30 Hz/hr. at +25°C (+77°F). Temperature fluctuations 0°C to +50°C (+32°F to +122°F) less than ±350 Hz.
Power supply requirement:	13.8 VDC ±15% (negative ground)
Current drain (at 13.8 VDC):	Receive standby 1.3 A Receive max. audio 2.0 A Transmit max. power 20.0 A
Operatable temp. range:	–10°C to +60°C; +14°F to +140°F
Antenna connector:	SO-239 (50 ohms)
Dimensions: (projections not included)	240 (W) × 95 (H) × 239 (D) mm 9 ⁷ / ₁₆ (W) × 3 ³ / ₄ (H) × 9 ¹³ / ₃₂ (D) in.
Weight (approx.):	3.8 kg (8 lb. 6 oz.)
ACC connector:	13-pin
REMOTE connector:	2-conductor 3.5 (d) mm (1/8 in.)

TRANSMITTER

Output power:	SSB, CW, RTTY — 5–100 W AM — 2–40 W
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Modulation system:	SSB — balanced modulation AM — Low-level modulation
Spurious emissions:	Less than –50 dB below peak output power <i>*Spurious freq.: below 30 MHz, –50 dB; above 30 MHz, –60 dB</i>
Carrier suppression:	More than 40 dB
Unwanted sideband:	More than 50 dB
Microphone connector:	8-pin (600 ohms)
Key connector:	3-conductor 6.5 (d) mm (1/4 in.)
SEND/ALC connector:	Phono (RCA)

RECEIVER

Receive system:	Double conversion superheterodyne system
Sensitivity:	SSB, CW, RTTY 0.16 µV (1.8–29.999999 MHz) AM 13 µV (0.5–1.799999 MHz) 2 µV (1.8–29.999999 MHz)
Squelch sensitivity: (threshold)	SSB, CW, RTTY — less than 5.6 µV
Selectivity:	SSB, CW, RTTY More than 2.1 kHz/–6 dB Less than 4.5 kHz/–60 dB AM More than 6 kHz/–6 dB Less than 20 kHz/–40 dB
Spurious and image rejection ratio:	More than 70 dB (1.8–29.999999 MHz)
RIT variable range:	±1200 Hz
Audio output power: (at 13.8 VDC)	More than 2.0 W at 10% distortion with an 8 ohm load
PHONES connector:	3-conductor 6.35 (d) mm (1/4 in.)
External SP connector:	2-conductor 3.5 (d) mm (1/8 in.) 8 ohm

Fig. 1— General technical specifications of the IC-718.



Fig. 2— A “show all” analysis of the IC-718’s front-screen display. The screen shows selected frequencies, memories, and all operating parameters, plus a multi-function bar-graph-type meter.

easy to understand and use. On-screen guidance is just more convenient and time-effective.

Special Features

Due to its small size and low cost, many folks tend to visualize the IC-718 as a

rather “plain Jane” transceiver. Look closer, however, and you will discover it sports some rather elaborate features and options for a rig of its price range. The IC-718’s noise blanker, for example, is fully adjustable to fit varying band conditions rather than just being preset. An FSK generator complete with selec-

table tones of 2125, 1615, and 1275 Hz plus shifts of 850, 425, and 170 Hz is also included for RTTY/data mode operations. External linear amplifier T/R switching has also been streamlined to an RCA phono socket with the IC-718’s relay directly switching up to 16 volts DC at 2 amps. An external switchbox or interface thus is not needed for connection to most linear amplifiers.

A choice of five optional 455 kHz IF filters lets you tailor the IC-718 to your operating preferences. If CW or RTTY is your main interest, for example, you can add a 500 Hz/FL52A or a 250 Hz/FL53A in the rig’s optional crystal slot. A 250 Hz filter usually requires an extra-steady hand for tuning in signals and also has slightly more insertion loss, so most folks choose a 500 Hz filter. If SSB is your favored mode, you can add a wide 2.8 kHz/FL96, a very narrow 1.8 kHz/FL222, or an ultra-wide and great-sounding 3.3 kHz/FL257 in the IC-718’s single optional filter slot. The factory-installed/standard FL65 filter, incidentally, is 2.4 kHz

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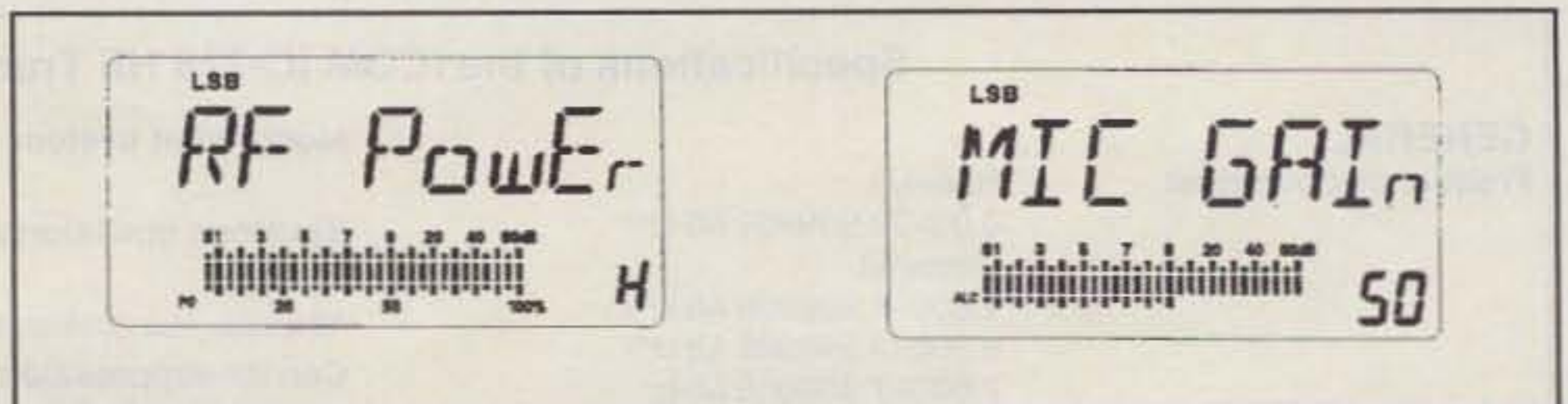


Fig. 3— Here you see two examples of how the IC-718's display looks when a menu-selected function is "called up" for adjustment.

wide. An optional filter must be soldered in place when installed, but "getting to" solder points is fairly easy. It just takes time and patience.

An optional UT-106 DSP module with automatic noise reduction and an automatic notch filter is also available for the IC-718. The noise-reduction section is really helpful for pulling weak signals out of the mud, but the "auto notcher" is a special gem. Whenever a tune-up heterodyne comes on frequency, you just push the "ANF" button and poof: It's gone. What a delight!

Some additional options and/or accessories for the IC-718 (and other model ICOM transceivers) also warrant brief recognition at this point. First is ICOM's PS-85 13.8 volt DC/20 amp power supply. This unit is exceptionally small, lightweight, and mates perfectly with the IC-718 to produce a complete "two box station" that fits almost anywhere. Next is ICOM's new IC-PW1, a fully solid-state 1000 watt output linear amplifier complete with automatic antenna tuner and detachable remote control/metering unit (photo B). It connects to antenna and accessory sockets on the IC-718 (or other ICOM transceivers with accessory sockets) and produces a fully automatic/no-tune station. You just select a band, and mode, dial up a desired power level on the transceiver, and the amplifier (plus tuner) "follows that lead."

On The Air

The real fun and games began when I connected the IC-718 to my new Hy-Gain AV640 vertical and hit the airwaves. Right off the bat I worked PY5BE in Rio, VQ9VK on Chagos in the Indian Ocean, and UA0AZ near Siberia. I could not stop the rig from working DX! It even reminded me of that old-time song about the chap in a little Nash Cosmopolitan (comparable to a Geo Metro today) outrunning a big Cadillac. After rat racing a few miles, the Nash

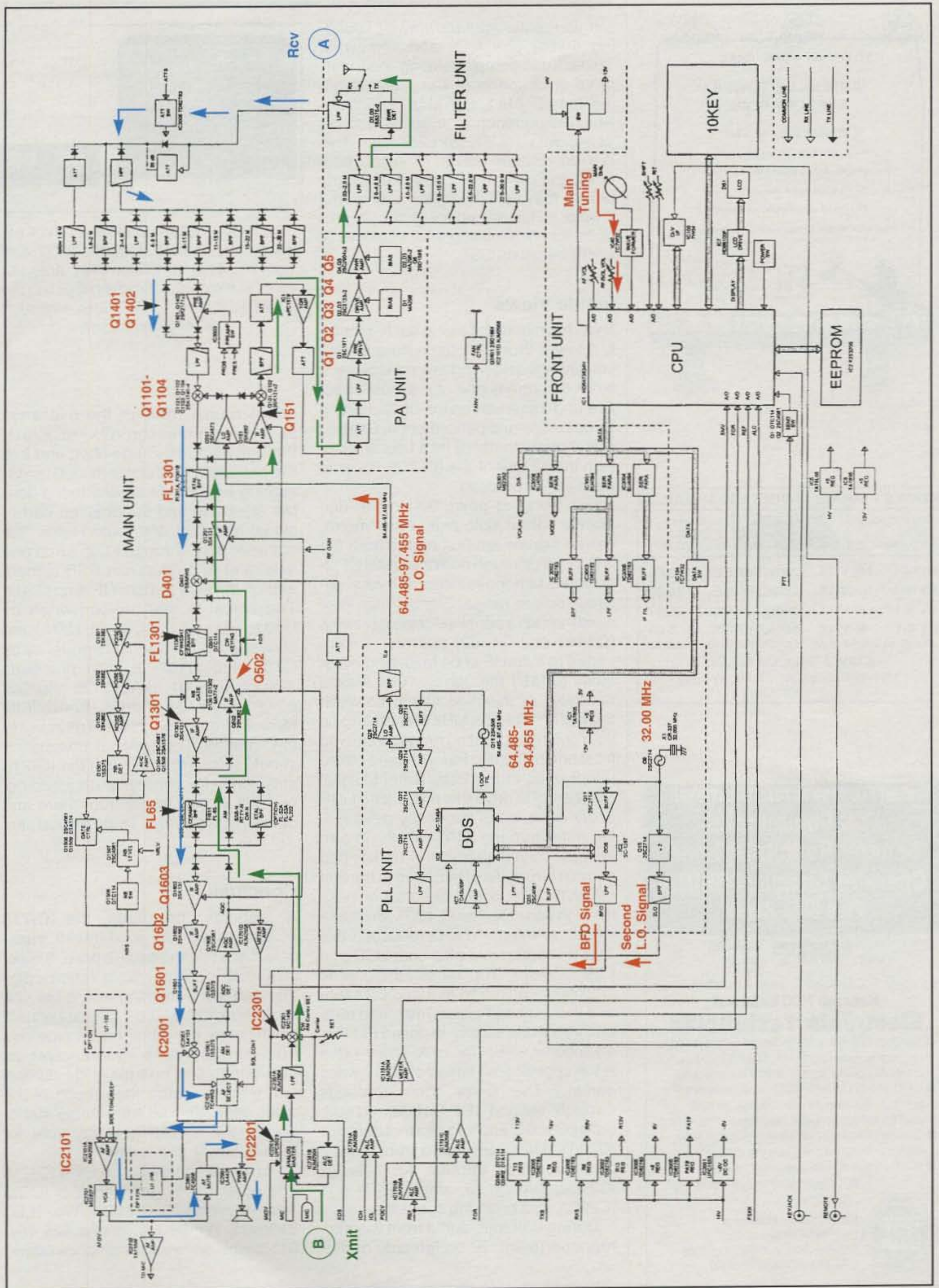
driver dropped back fender to fender with the Caddy driver and yelled out "Hey, buddy, how do you get this car out of second gear?"

Seriously, however, the IC-718 is a neat little economy transceiver with some good assets to its credit. It has good talk power for SSB, runs cool and calm at full output on CW, and is also fun to use on 29.0 to 29.1 MHz AM activities (FM operation, however, is not included). The IF Shift is quite effective for minimizing adjacent frequency QRM (It works better than expected!), and receiver sensitivity (which can be varied with the panel-selectable pre-amp or attenuator) is superb. The AGC is sort of fast and not directly adjustable, but that "busy band" or almost pumping sound it makes can be minimized simply by reducing the RF gain control's level.

Thanks to its iambic keyer, full QSK and, switch-selection of normal or reverse sideband reception, working CW with the IC-718 is a real pleasure. It also makes a killer QRP rig when throttled back to 4 or 5 watts output.

Earlier I mentioned that installing an optional 3.3 kHz/FL257 filter in the IC-718 could change its *receive* audio response from rather narrow-banded to rich, full-bodied, and super-sounding (a hot trend among serious SSBers). In my December "World of Ideas" column I also suggested adding a new Heil "Goldline" microphone to the IC-718 for equally great sounding *transmit* audio. Since that time Bob Heil has developed a studio-grade condenser mic specifically for ICOMs with 8-pin mic sockets, and it sounds absolutely phenomenal. Add one of these new mics to an IC-718, and you will have an awesome SSB signal (Bob's telephone number is 618-257-3000).

Fig. 4— Block diagram of the IC-718. For a brief technical explanation/discussion see text. →



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If you really want blow-away sounding audio, one final and somewhat "exotic" mic-complementing idea warrants quick mention. Consider replacing the IC-718's 2.4 kHz/FL65 filter, which is common to *transmit and receive*, with a 3.3 kHz/FL257 filter. This is a technical endeavor. It may not be a quick and easy swap, and if improperly done it may void the rig's warranty, but it (plus a Heil microphone) should produce totally exquisite audio seldom (if ever!) heard on SSB.

Inside Views

If you have been following our bi-monthly "How It Works" column here in *CQ*, you know that looking at a transceiver's block diagram is one of the most effective and impartial means of visualizing its operation and performance. Bearing that thought in mind, let's take a whirlash inside tour of the IC-718. Refer to fig. 4 as we proceed.

Beginning at point "A" on the diagram's right middle side, incoming/received signals are first routed from the T/R switch through one of several CPU-selected bandpass filters for your desired receive range. Signals then proceed through a panel-selectable preamp (Q1401 and Q1402) and are up-converted to a first IF of 64 MHz by the first mixer (Q1101 through Q1104). A local oscillator or injection signal between 64.485 and 94.455 MHz (depending on your desired operating range) is derived from one of the two PLL (Phase Locked Loop) units in the DDS (Direct Digital Synthesis) to drive this mixer. The DDS acquires its exact frequency-determining data from the CPU, which in turn accepts input data from the 10-key pad or main tuning dial. Returning to the first mixer, 64 MHz output signals then pass through ceramic filter FL1301 which limits bandwidth to 15 kHz (because this filter must pass AM plus both USB and LSB signals). The received signal is amplified, converted to a 455 kHz second IF by second mixer D401, and routed through the factory-installed FL65 or an optional SSB, CW, or AM filter. (This is the spot where I hinted at filter swaps earlier.) The signal then proceeds through second IFs Q1603, Q1602, buffer Q1601, and into product detector IC2001. Resultant audio from Q1602 then proceeds through AF selector IC2102, through AF amp IC2101 and IC2901, and on to the speaker.

During transmit, audio from the microphone (point "B" on left side of dia-

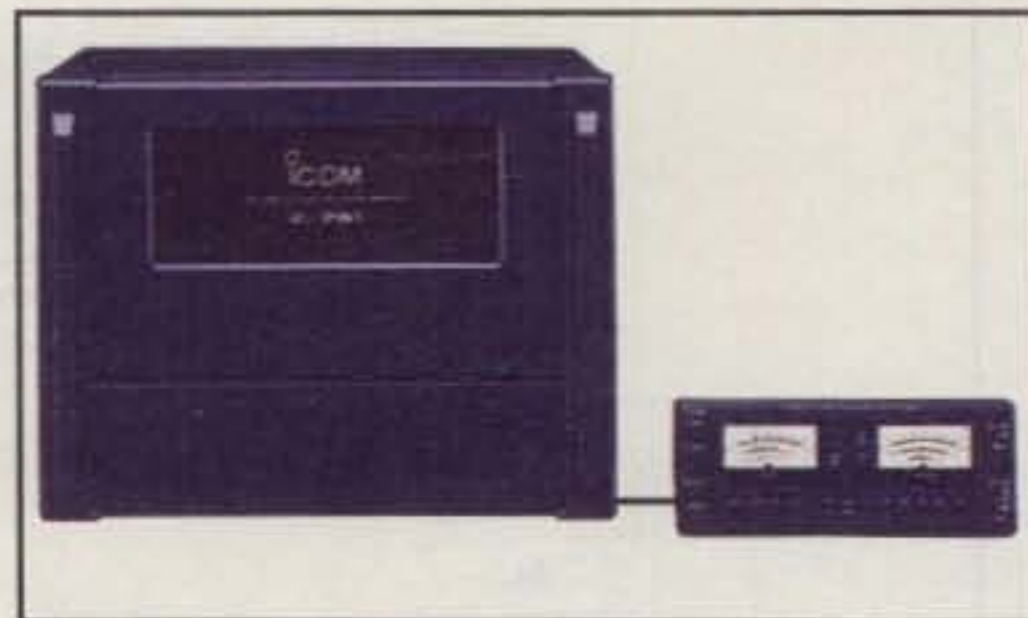


Photo B—ICOM's optional IC-PW1 all-solid-state, fully automatic 1000 watt output linear amplifier and antenna tuner is the perfect finishing touch to the IC-718 (or other ICOM transceivers). It is truly first class!

gram) routes through the mic amp/speech compressor/VOX (IC2201), through an audio-range filter, and into the balanced modulator (IC2301). Assuming SSB mode is selected, a double sideband and suppressed carrier signal is output and routed back "the opposite way" through FL65 (drop one sideband to produce an SSB signal), and on through transmit IF amp Q502. The signal is then up-converted by D401, passed through FL1301, and converted to the transmit frequency by Q101 and Q102. It then proceeds through IC1, 01, drivers Qs and Q3, power amps Q4 and Q5, transmit filters, and on through the T/R relay to the antenna. The previous description should familiarize you with the IC-718 sufficiently for general understanding, so I will let you take it from there and delve into additional study as you like.

Conclusion

All aspects considered, the IC-718 strikes me as a very good little HF transceiver at a fair and square price. It is not an IC-756 Pro, but I will bet a sharp operator can work anything with it he/she could work with a '756 Pro. I cannot necessarily say the same for transceivers from 20 or 30 years ago, however, as new generation rigs really do receive and transmit better than much of the older gear. Viewed from those standpoints, the IC-718 gets my vote for "affordable rig of the day."

For more information on the IC-718 and other ICOM gear, contact ICOM America, Inc., 2380-116th Ave. N.E., Bellevue, WA 98004 (phone 425-454-8155; web: <www.icomamerica.com>.