

# CQ REVIEWS:

## The Alinco ELH230D 2 Meter RF Amplifier

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Ten years ago, reviewing a 2 meter RF amplifier would have required including a preliminary discussion of FM concepts, repeaters, and OSCAR satellites. Today, however, 2 meter FM and SSB or CW operations are amateur radio's most popular and thriving areas of interest. Bearing those facts in mind, we will assume you are generally familiar with our present span of 2 meter activity and proceed with this discussion of an impressive new linear amplifier for talkies and low-power rigs.

The ELH230D is one of several new items recently introduced by Alinco Electronics Corp. of Reno, Nevada. It's a 2 meter 15 to 30 watt all-mode (linear) RF amplifier with an internal FET receiving preamp in a small and quite attractive cabinet. Two and a half or three watts from a hand-held talkie or portable rig will drive the Alinco to a solid 30 watts output. One watt of drive will produce at least 15 watts output from the amplifier. Minimum driving/keying power for the ELH230D is 200 milliwatts, and maximum drive is 5 watts. In other words, the unit is especially designed as "seven league boots" for most of today's talkies. An overview reveals two attractive points of the ELH230D: its small size and its smart-looking front panel. It can be hidden beneath a car seat, but it begs to show its flair from any auto's dash or center console. The amplifier's gray wraparound cabinet includes a full-length heatsink on top, and its front panel is black with two miniature switches and four LEDs. The switches control receive preamp on/off, transmit amplifier on/off, and a special 10 volt regulated output. LEDs indicate power, transmit/on-air, receive preamp enabled, and 10 volt output energized. The rear panel has SO239 input and output connectors, a small molex socket for power connection, plus a coaxial jack for the 10 volt output line (more about that feature later).

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The Alinco ELH230D 2 meter amplifier, an elaborate unit with some exciting features.

Frequency range: 143 to 149 MHz  
Mode: FM-SSB-CW  
Amplification: 10 dB minimum  
RF Power out: 3 W in 30 W out  
RF Power out: 1 W in 15 W out  
Maximum input: 5 watt  
FET RX pre-amp: 10 dB gain  
Transmit switching: carrier operated or manual control  
Matching Network: 50 ohms  
Antenna connectors: SO-239  
Power Required: 11 to 15 VDC  
Current Required: 6.5 amp transmit, 80 ma receive  
Regulated Power: for HT's DC volts  
Fuse: 10 amp  
Size: 7" x 3 1/2" x 1 1/2"  
Weight: 1 lb.

Table 1— Technical specifications of the Alinco ELH230D.

The amplifier includes an internal RF sensing circuit and relay for T/R switching, and a flush-mounted slide switch on the cabinet's bottom selects fast or slow time constants. Fast is used for FM, while slow minimizes relay dropout between words on SSB.

Installation and hookup of the Alinco amplifier is a snap and shouldn't require more than a few minutes. The amplifier's supplied power cord is first connected to

a 12 volt/6.5 amp DC supply, auto cigarette-lighter plug, or fuse-block push-terminal (connect it on the ignition key-switched side to avoid possible inductive spike damage during engine cranking). An antenna with an SWR of 1.5 to 1 or less and capable of handling 35 watts is connected to the amplifier's output, then a 3 or 4 foot interconnecting coax cable is mated between the amplifier and low-power transceiver. An included under-dash mounting bracket completes the installation. It's that simple. "Barefoot" or straight through operation is achieved with the amplifier off. When switched on, the 10 volt output is activated and the receive preamp is selectable.

### Points of Interest

A brief study of the amplifier's schematic (fig. 1) reveals some clever design ideas. Two transistors, TR1 and TR2, are used for activating relay RL1, which switches in transmit amplifier TR5 (note stripline circuits on its input and output), a nice feature for rugged use. TR4 regulates the bias on TR5, another "deluxe" feature. TR3 regulates the voltage to receive preamp TR6, a popular 2SK125 FET that provides 10 dB of gain with a noise figure slightly below 2 dB. It's not in

the GaAsFET category (that transistor alone would cost almost as much as this complete amplifier), but it's a definite help when tuning weak SSB signals or initially setting up a mode B OSCAR station. In fact, I use the ELH230D with my portable OSCAR 10 setup only for its preamp. It's also a good "backup" when one's GaAsFET preamp unexpectedly dies. Considering today's expansions in VHF/UHF technology, all-mode RF amplifiers with receiving preamps seem the only way to go. Incidentally, Alinco's 70 cm RF amplifier is an OSCAR operator's delight—30 watts output for mode B transmit and a low-noise GaAsFET preamp for mode L receive.

The unit's previously mentioned 10 volt DC output is obtained from its 7810 regulator circuit. This voltage can be used for externally powering a hand-held talkie while mobile without draining its rechargeable battery. Using this feature calls for checking your talkie's input voltage range, purchasing suitable connectors at a nearby Radio Shack, and wiring that cable. My own Yaesu FT208R, which uses a 10.8 volt battery pack, works fine from the 10 volt source, but some talkies require slight modifications for battery-pack bypassing and/or external powering. As another idea to consider, I rigged a clip for charging my TH21AT's extra battery pack from the 10 volt line rather than adding a series-wired dropping resistor and redrilling a battery clip for powering the (9 volt maximum input) rig. Use your own ingenuity in this area.

### Using the Alinco Amplifier

The ELH230D proved to be a great little amplifier, and it serves a dual purpose in my particular case. The amplifier is used mobile with a small talkie for "big rig" capabilities without flashy underdash enticements to possible vandals, and it's also swapped around for using only its receive preamp as needed with one of my OSCAR 10 setups. I'm also planning a large rechargeable battery pack for 2 meter operations with the amplifier and a portable 2 watt SSB rig. Visualize that arrangement: rig in one coat pocket, amplifier in the other, and a power pack slung over the shoulder... a real confederate amateur, eh?

Our first operations with the amplifier were through a repeater roughly 60 miles away while mobiling with an Avanti antenna on the auto's rear window. My TH21AT's barefoot signal was too noisy to copy; the ELH230D boosted it to almost full quieting. Subsequent operations continue proving likewise, especially when communicating over difficult "direct" paths—a rather normal part of our daily routine (and, according to reports, routines of many others). Once you become accustomed to the talkie and amplifier concept, you feel undressed leaving home without them. The amplifier gets slightly warm during periods of

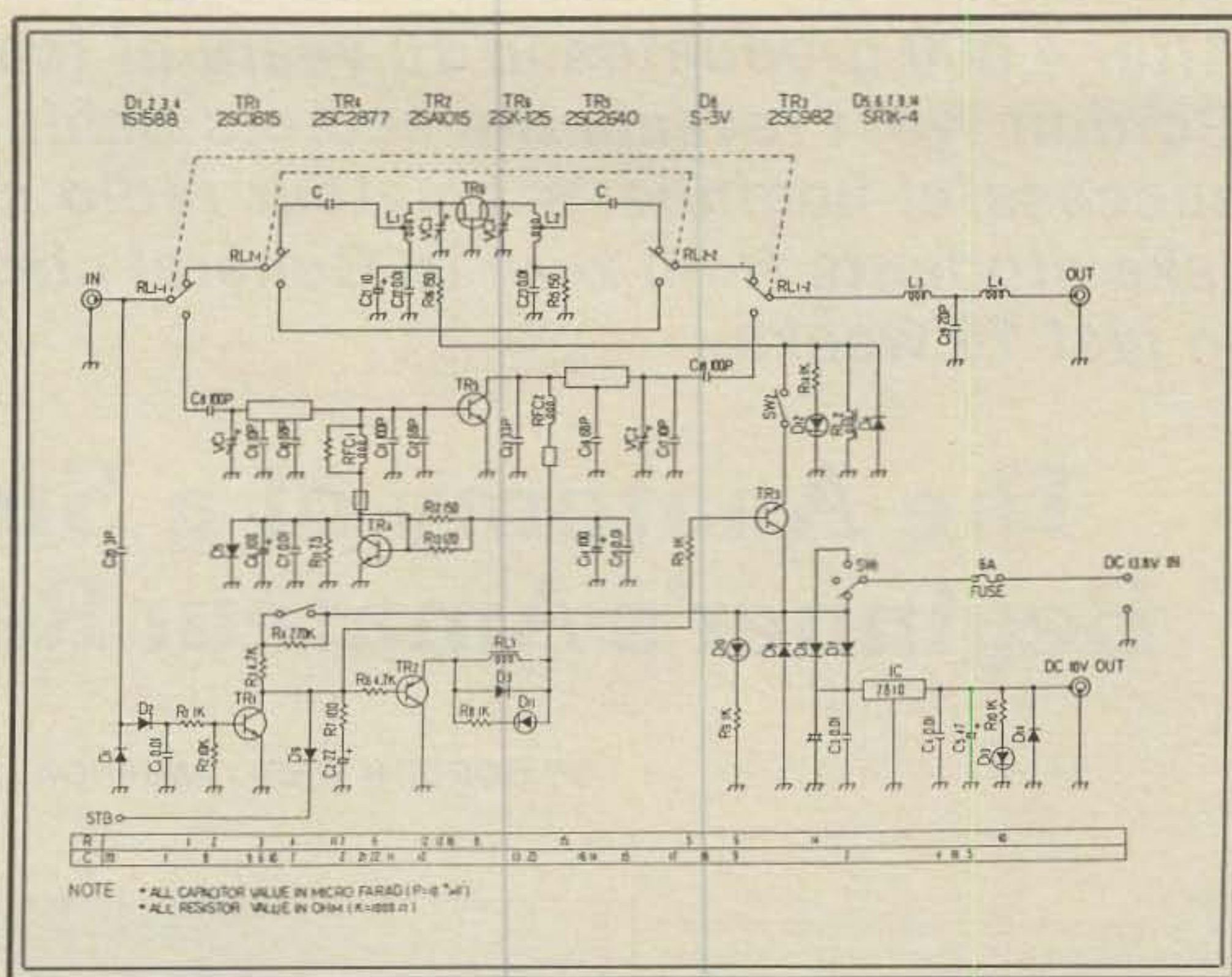



Fig. 1—Schematic diagram of Alinco's ELH230D.

heavy use, but that temperature seems to hit a leveling point rather than continuing to rise. Actually, it feels only as warm as a 25 or 40 watt FM transceiver. Performance of the receive preamp is more noticeable on SSB than on FM, mainly because of FM's capture effect and possible intermod increases in metropolitan areas. The (transmit) amplifier's signal quality on any mode is exceptionally clean, and its second harmonic output is practically nonexistent. That's probably because the amplifier's design is also aimed toward marine and commercial markets.

### Conclusion

If you're looking for a quality talkie amplifier at a fair price, the Alinco ELH230D

definitely warrants checking out. Its all-mode capabilities and receiver preamp are two assets which can only become more appreciated in the future. As we've said before, our VHF and UHF bands are tomorrow's prime spectrum of activity.

If you're interested in a higher output power 2 meter amplifier, take a look at Alinco's 1 to 3 watt input, 50 watt output ELH260D. If 70 cm is your desire, their ELH730D turns 3 watts input into 30 watts output and includes a GaAsFET receive preamp to boot. Current mating power supplies with dual metering are also available. For more information on any of these items, contact Alinco Electronics Corp., P.O. Box 70007, Reno, Nevada 89570, or one of their nationwide amateur products dealers. 

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