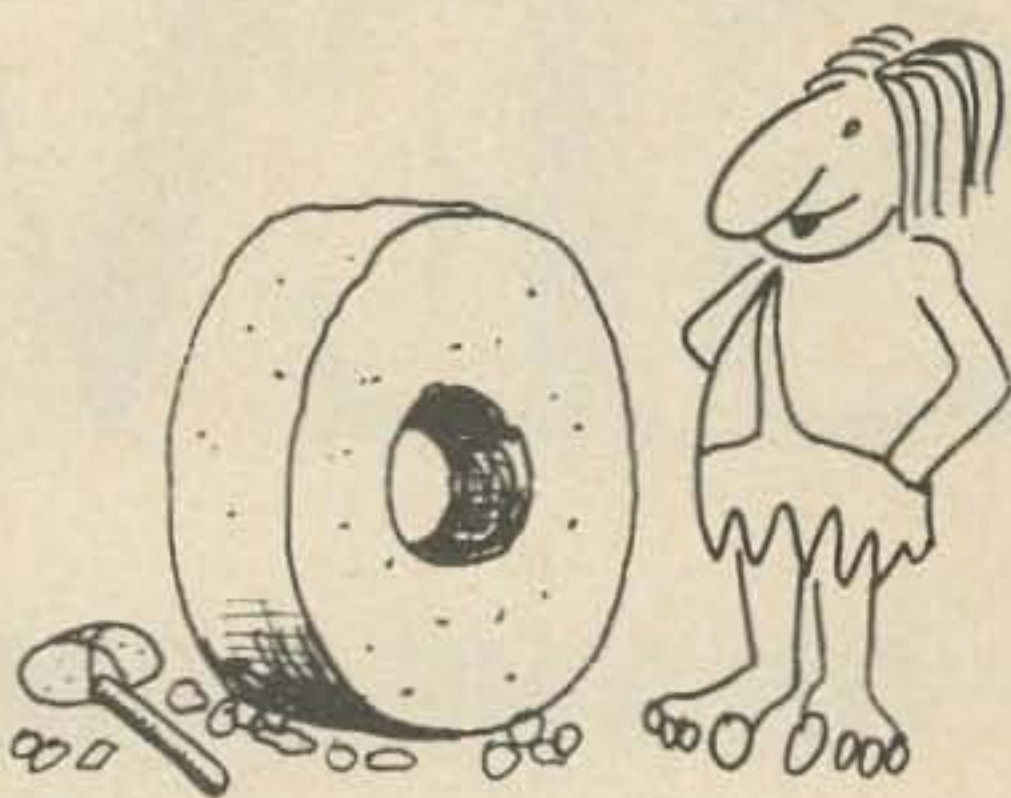


NEW PRODUCTS

KLM's ECHO II



Well, the ECHO II has finally arrived! KLM Electronics, long known for its line of VHF log periodic fed antennas and FM power amplifiers, is finally filling the gap left when Gonset quit making the Sidewinder.

The ECHO II, known as the LINER II in Japan, has seen wide use in JA-land. Over 10,000 units have been sold in the past few years there. While one or two other firms have begun making SSB rigs, none are priced as low as the moderately priced ECHO II.

Single sideband has become popular in Japan for several reasons. Their two meter band covers only two megahertz (144-146) and no repeaters are allowed. Many VHF operators hold the special Japanese *no code* ticket which is limited to 10 Watts output. Certainly the narrow bandwidth of SSB helps keep down QRM under these conditions, and sideband greatly extends the useful range of a 10 Watt

transmitter as well. SSB consistently gives twice the simplex range of FM, often more!

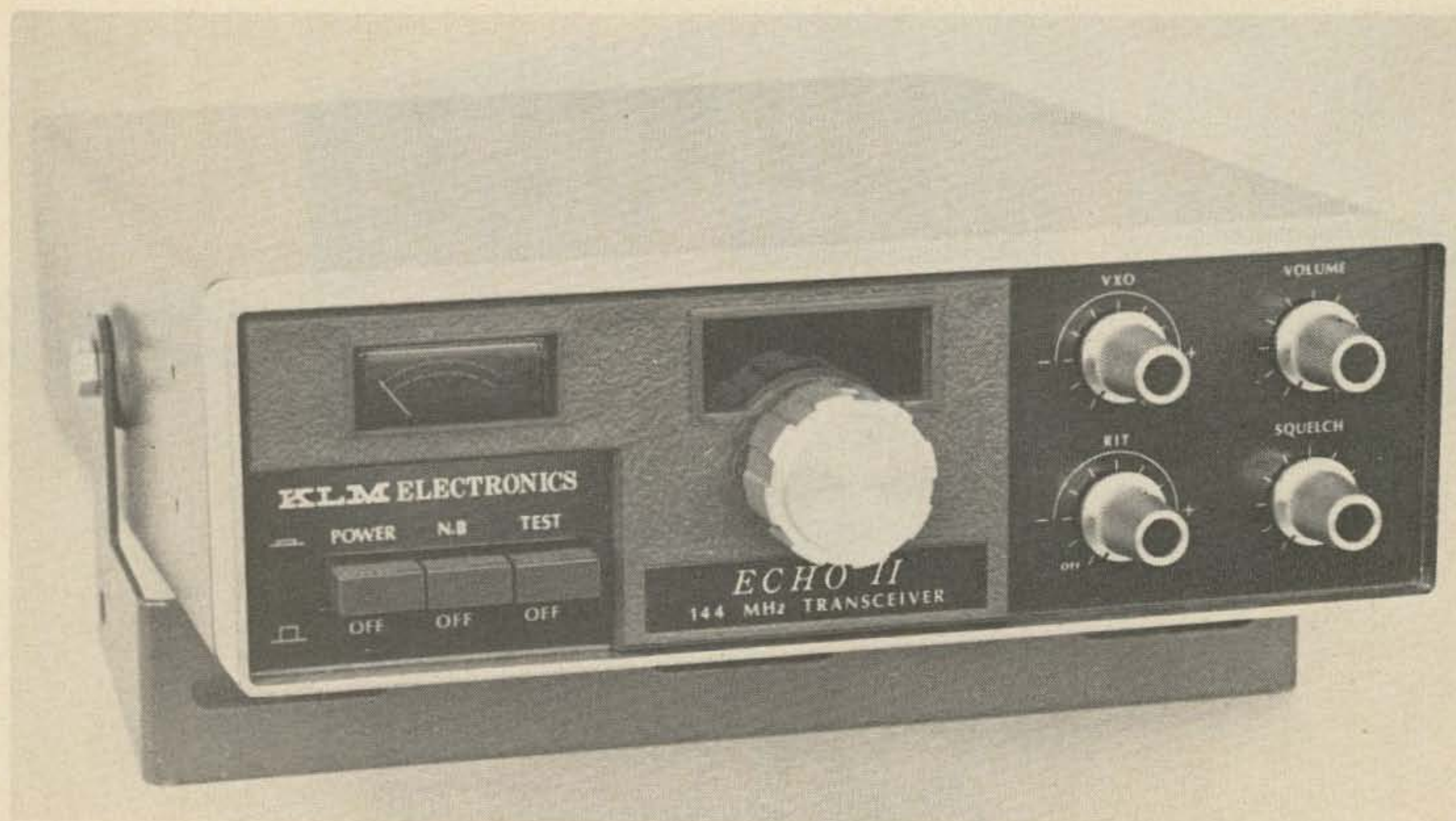
Aside from the range advantage and smaller occupied bandwidth required, a 3 kHz sideband signal is not affected by multipath distortion nearly as much as FM. I have used both SSB and FM while mobile in the Santa Cruz Mountains and I find that there are numerous areas where FM modulation is completely wiped out by multipath and phase distortion. While sideband shows obvious signs of multipath, the modulation remains "Q-5" in these same locations. In fact, I am able to maintain communication throughout the mountains where FM yields only marginal communication through a repeater located in the same area!

Of course, the Japanese are not the only ones feeling a frequency bind on two meters! Since every repeater in this country takes up at least 30 kHz

even with channel splits, many areas are really feeling the pinch. In fact, even with channel splitting the typical repeater takes up 45 kHz, since each also requires a UHF control link. That's nearly as much spectrum for one FM repeater as the entire band-pass required for Oscar 7! Eight sideband stations could get lost in that much space, and ten could easily fit.

I think that the ECHO II has come along at just the right moment. It's time we start to think about conservation of the two meter spectrum. With the extended range offered by SSB, repeaters are not required for most point-to-point communications. For mobiles, a sideband repeater is not beyond the possibilities and *could* give even better range than FM repeaters, if the performance of the Oscar satellites is any example!

I've used the ECHO II for more than a year. I've derived a great deal of pleasure from the little machine.



I've heard Los Angeles on several occasions (320 miles), worked Sacramento twice (125 miles), and regularly work most active stations within a 60 mile radius in spite of the mountains. I've worked mobiles as far as 60 miles and I've heard high powered mobiles (140 Watts) as far as 125 miles. My best mobile-to-mobile contact has been Watsonville to San Jose, some 43 miles! I've done this with both the barefoot 10 Watt rig and easily with the 140 Watt linear.

The ECHO II has the following features: AGC, ALC, VXO, RIT, squelch, noise blanker, "Crystal-Plexed" synthesizer, "S"/RFO meter, semi break-in CW, and an external speaker jack.

I have found the 10 kHz channel steps to be a valuable aid when mobile. It eliminates the need to look at the dial to change frequency. If you know where you are in the band, just count 10 kHz for each step until you get where you want to be!

Setting up skeds on a given frequency is simplified, too. Since the 10 kHz steps vary no more than 100 Hz from channel to channel, accurate monitoring of an agreed on frequency is assured.

The VXO allows ± 5 kHz deviation from the center of each channel while the RIT varies *only* the receiver to allow fine tuning off frequency stations (± 1.5 kHz). This latter feature is especially appreciated during round-table QSOs.

I find the squelch invaluable to my type of operation. I like to monitor our local calling frequency while going about my other business, but I don't like to listen to receiver noise while doing so. With the ECHO II, I just squelch it up and forget it until someone calls!

The noise blanker is helpful, too. FM, of course, features built-in limiting, not a feature of SSB. However, the ECHO II's noise blanker, in conjunction with its squelch, gives much the same effect. Though FM is better (at least, quieter) with strong signals, SSB certainly has it beat when signals are weak!

This particular noise blanker is quite effective considering its simplicity. It takes the ignition noise of my VW bus completely out of the picture. Its only drawback, common to simple blankers, is a tendency to crossmod

ECHO II Specs

Sensitivity: 0.5 μ V/10 dB (0.18 μ V typical)*

Selectivity: 2.4 kHz @ -6 dB

Frequency: 145.0-145.23 & 145.77-146.0 MHz supplied

Output Power: 10 Watts PEP

Audio Output: 2.5 Watts

AGC: 1 μ V-1,000 μ V/15 dB af (0.1 μ V-1,000 μ V modified)

ALC: 3 dB rf change with 13 dB audio change above the level giving 5 Watts PEP

Features: Squelch, VXO, RIT, "S"/RFO meter, ALC, AGC, CW (semi break-in), noise blanker, all solid state

Power Req'd: 11 16 V dc @ 3 A (transmit)

Size: 2.5 x 8.5 x 9.75 inches

Price: \$399.00. \$499.00 with 70 Watt linear and 9 element antenna.

\$579.00 with 140 W linear and 14 element antenna. (Omni-directional horizontal polarity mobile antenna available soon.)

**Measured with Singer 6201 Generator and HP 331 Distortion Analyzer. Typical value of three units the author has tested for other people.*

when strong, nearby signals are present. Turning the blanker off cures this, of course.

The AGC works quite well above the 1 μ V level. It is not very effective below 0.5 μ V, however. This can be annoying when working both weak DX signals and strong locals. My solution was to add an extra PNP complementary amplifier in the AGC i-f circuit. Now my unit compresses 0.1-1,000 μ V into less than 12 dB of audio change. I can send details to anyone interested who sends me a self-addressed stamped envelope.

I've had opportunity at work to put the ECHO II through its paces on an HP spectrum analyzer. Third order distortion products are about 20 dB below each tone of a two-tone test signal (-26 dB according to ARRL standards). In using the unit with the KLM 10-140BL amplifier, I like to drop the power back to 8 WPEP, and at this level the ECHO II shows only -26 dB third order products (-32 dB ARRL). I did not check the 10-140.

Spurious output and harmonics are all better than 55 dB down. Most are better than 60 dB.

ALC is very effective. A 13 dB change in audio input above the level that gives 5 Watts PEP is compressed to an rf output change of only 3 dB. This keeps the average modulation up where it belongs.

Finally, the ECHO II is *the* rig for the experimenter. As I mentioned, I modified the AGC to be more to my liking. I've also added lower sideband for reception of Oscar 7, AM carrier insertion, sidetone and an rf gain control. My current project is a low noise preamp (under 2 dB).

Other projects could be an up-converter from 10 meters to make the ECHO a self-contained Oscar station, transverters to other bands (such as 220 MHz where that noise blanker would really help!), or an external vfo. I've made numerous Oscar contacts with the unit, so I'm sure the first project is practical. I'm working on the second one and the third should be easy.

There is plenty of room to work in the ECHO II. Unlike older two meter rigs (especially the Sidewinder), this unit is *not* built from the inside out. Everything is readily accessible on PC boards.

Two meter sideband is flourishing throughout the rest of the ham world. In the US it is just now beginning to get started in a big way. Unlike FM, which received a huge boost when surplus commercial rigs hit the market at ridiculously low prices, SSB is having to make it on its own merits. But when stations in San Jose and Santa Cruz consistently work stations 320 miles down the mountainous length of California *without repeaters*, that gives some of us plenty of incentive to get going! The other opportunities include long-haul tropo, increased mobile simplex distance, and just the fun of roundtables over 60-80 mile paths with no QRM. For the more daring, there is Moon-bounce. For the operator with a sense of adventure, there is Oscar. The ECHO II is a great way to start!

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