

## REPAIR TIPS: BEARCAT SCANNER RADIOS

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### Introduction

The original Bearcat scanner line was manufactured by Electra of Cumberland, Indiana. In the mid 1980s, Uniden bought out the Bearcat scanner line and Uniden's first Bearcat scanner was the 800XLT model.

Most of the models discussed in this article are base/mobile units made by Electra during the 1970s and 1980s. Electra stamped all of its scanners with a manufacturing date code on the rear of the cabinet. The code is comprised of a single character (C = Cumberland, Indiana, P = Puerto Rico), followed by four digits denoting year and week the radio was built. For example, "P8422" denotes the radio was made in the Puerto Rico factory during the 22nd week of 1984.

### Schematics and Parts Available

Schematic diagrams may be obtained from Uniden/Bearcat's parts department, (317)842-2483.

G & G Communications (telephone 716-768-8151) is a family owned company which repairs scanners and stocks parts for several older models, especially Electra/Bearcat and Regency brands. They are located at 9247 Glenwood Drive, LeRoy, NY 14482.

Electronic Repair Centers in Franklin Park, Illinois | (telephone 708-455-5105) has been repairing Bearcat scanners for several years. They charge a flat \$45 repair rate for programmable and \$30 for crystal scanners, and shipping is extra. Electronic Repair Centers will fix Regency scanners if they can obtain the parts.

### Bad Solder Joints Common

Before addressing specific symptoms, circuit boards in the malfunctioning scanner should be inspected for poor solder joints.

The Electra/Bearcat BC350, BC300, BC250, BC220, BC20/20, BC211, BC210, and BC210XL

models were hand assembled, and every one I've serviced had several connections that were either soldered poorly, or not soldered at all.

Resoldering joints on the ribbon cable connecting the RF and keyboard logic circuit boards in a BC250 attenuated the microprocessor/synthesizer hash noise noticeably.

A Bearcat 20/20 was experiencing periodic loss of memory on some, but not all channels. When the problem occurred, the frequencies on some channels would be completely changed. On other channels, the frequency would still be intact, but the channel would be locked out, and the delay toggled from "on" to "off". Some channels were not affected.

The 2 "AA" memory backup batteries, and their holder, tested good. Much time was spent tracing logic, heating and cooling components, and making voltage measurements.

One of the secondary leads from the power transformer was connected to the main circuit board through a hole drilled through foil traces on both the top and bottom sides of the board. A close examination revealed that this lead had been soldered only on the top of the board - the bottom side had never been soldered.

Soldering the lead on both sides of the board solved the memory loss problem.

#### Symptom: Blank Display

The BC300 scanner, and several other Bearcat models, employ a switching type power supply stage to generate plus and minus voltages in excess of 20 volts DC. When this switcher fails to function, the display goes blank, but the squelch control appears to work, and white noise can be heard in the speaker.

In almost a dozen of the BC300 scanners I've fixed, C98, a capacitor in series with the primary of the switching transformer failed, causing the output of the supply to drop below the level needed to power the display. The switching transformer is mounted on the RF circuit board, and is much, much smaller than the main power transformer, which is usually fastened to the metal chassis. The 22uF/16V capacitor used for C98 in early BC300s was marginal, and was replaced with a 47uF/25V capacitor in later units.

I replaced the 22 uF capacitor in the switching power supply stage of a BC210XL which caused the same symptom. Other capacitors in the switcher stage have failed. C114, a 4.7 uF/35V tantalum capacitor failed in at least one BC250, causing the display to blank.

A more sinister problem affects the switcher in earlier models. The switching supply stage in the BC250 and original BC210 is driven by a clock signal derived from a custom Exar NC57902 divider integrated circuit (designated IC6 in the BC250 scanner). I've seen this divider IC fail in several

BC250s, causing a blank display (except for a decimal point in the BC250's rightmost digit). This custom IC is no longer available from Uniden.

#### Symptom: Invalid Frequency Displayed

A common Bearcat 250 malady is manifested by an invalid frequency displayed on the readout. This condition is temporarily "cured" by unplugging the AC line cord from the wall, then replugging it. This condition is symptomatic of a power supply problem in which Q204, a Texas Instruments TIP-29 located on the feature circuit board, fails.

A Philips ECG291 will work as a substitute for the TIP-29. Don't try a Radio Shack substitute, it hasn't worked. See Martin Toomajian's article, "Bearcat 250 Erratic Display Cure", in January 1987 Monitoring Times.

A similar problem in the Bearcat 20/20 was discussed previously in the section on bad solder joints.

#### Symptom: Squelch Won't Eliminate White Noise

Most Uniden/Bearcat base/mobile scanners feature an AUTO squelch position, actuated by rotating the squelch knob fully counter clockwise. The BC350 used a separate pushbutton switch for this purpose. These scanners use a flimsy potentiometer (designated R81 in BC300s) internally mounted on the RF circuit board, to set the level of signal required to open the squelch when in the AUTO position. This pot also has an effect on the squelch action in the non-AUTO mode, and determines at which point the squelch knob must be positioned in order to silence the radio.

Although the potentiometer is adjusted at the factory, changes in component values due to aging often necessitate readjustment of this internal pot. Misadjustment of this pot has been the cause of "no squelch" complaints in two BC300s and a BC250 I fixed.

Another squelch failure is due to a blown transistor that acts as the electronic switch in the squelch circuit. I replaced this transistor in only one BC300, so I don't know if this is a common problem.

#### Symptom: Scanner Completely Dead

In Bearcat scanners using an internal power supply (e.g. BC350, BC250, etc.), the main power transformer is connected directly to the AC line. Since the on/off switch is on the secondary side of the transformer, current flows in the primary as long as the AC line cord is plugged into an active AC outlet. These transformers contain an internal circuit breaker, not visible without unwinding (destroying) the transformer. The internal breaker is known to fail prematurely in a batch of Bearcat power transformers.

If your scanner is completely dead, check the primary of this transformer for an open circuit condition.

#### Symptom: Keyboard Bounce

After much use, the Chromerics keyboards in Bearcat scanners start to wear out. The first sign of trouble is usually keyboard bounce on the most frequently used key, e.g., the MANUAL key. Replacement keyboards are usually available from UNIDEN, but replacement requires dexterity, as one must take care not to tear the flat, flexible strip connecting the keyboard to the logic board.

#### Symptom: Keyboard Completely Unresponsive

The keyboard matrix is "scanned" by the microprocessor. Another problem is when none of the keys seems to function; the receiver just keeps scanning in spite of key depressions. I found this condition in a BC210XL scanner owned by a heavy smoker. Perhaps nicotine smoke was to blame, as the resistance between two input port pins on the microprocessor was down to about 1000 ohms, fooling the microprocessor into believing that a key was stuck in the "down" position. Scraping the circuit board between the two pins with an X-Acto knife fixed the problem.

#### Other Problems

Complaints of low audio output and occasional microphonics in two Uniden/Bearcat 800XLTs were caused by a bad 47 ufd electrolytic capacitor in series between the external speaker jack and audio amplifier.

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