

# acc notes

advanced computer controls, inc.

10816 Northridge Square, Cupertino, California 95014

(408) 749-8330

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**Version 3 Hits the Streets.** RC-850 controller Version 3 software has moved from the lab to a local repeater, and now the first beta test release has been shipped to several of the test sites around the country.

**HAMCON.** We're planning to be at the ARRL Southwestern Division Convention, to be held aboard the Queen Mary at Long Beach, on August 9, 10 and 11. See you there.

**HSC Paging.** We have a new application note, "HSC Paging Applications With Your RC-850 Repeater Controller". It describes the HSC signalling format, the use of the Standard Communications PG-50 pager, and ACC's HSC Tone Decoder Board, with your RC-850 controller. It includes several specific application examples, including a "Pager Speaker", which turns your transceiver into a sophisticated pager, and control of remote phone lines for the '850 patch. For a copy, send a self addressed envelope (no telephone requests for this item, please).

**ID's of the Month.** "Mornings, afternoons, and evenings, WA4NNO is ready at the press of a button."

"What's the time? (male voice)" "The time is three fifty two p.m. (female)." "OK cutie, this is WB6FIY, Repeater (male)."

**Dick Smith Electronics.** Brad Rulien, WB6IRC points out that a new hobbyist electronics retailer has arrived - from Australia. They carry some amateur radio kits and equipment, including two meter and 440 MHz transceiver kits. The two transceivers look like they're BCD frequency controlled, so they may be good candidates for remote bases, but they may or may not hold their own at a congested repeater site. We'll try to have more info on them next time. Call for their free catalog - (800) 332-5373, or (415) 368-1066.

**Got a Question?** When writing us about a problem or a question, please include your name, address, and daytime and evening phone number. We may be able to help you more quickly by phone than by letter.

**Repeater Docket.** The FCC is requesting comments on repeater coordination, through PR-Docket 85-22. They propose adding to the rules definitions relating to coordinated repeaters, and formalizing the preference coordinated repeaters have over uncoordinated repeaters. In addition, they seek comments on virtually all aspects of repeater regulation. The comment deadline has been extended to August 15. Refer to April, 1985 QST, p. 56 for details. We'll run our comments here next time.

**15 or 20 kHz on Two Meters?** Comments were filed recently on an FCC notice of proposed rulemaking which proposes allocation of the last of the 800 MHz land mobile reserve spectrum. This is virgin ground, and optimal spectrum utilization and a view to the future are primary considerations on how it will be allocated. Motorola, the largest two-way radio manufacturer, submitted comments that may be of interest to hams involved in repeater coordination. From Radio Communications Report (RCR), June 1, 1985, p. 15:

**"Flexible channelization** Motorola urged the commission to adopt a 15 kHz-based flexible channelization plan. The 15/30/7.5 kHz plan would permit both narrower and wider channels to be utilized within the 12 MHz allocation, the manufacturer said. Applicants would be permitted to use a wider 30 kHz channel where digital modulation may be required. The plan would also provide for the implementation of narrowband, digital and FM analog technologies. Motorola said the 15 kHz spacing provides adequate reliability for public safety, appropriate levels of channel protection, the greatest number of channels per megahertz in a given area and the greatest efficiency and quality of service for FM analog systems."

## Turning the Beam With ShackMaster.

ShackMaster lets you operate your home station from anywhere - crossbanded over the air, or from a Touch-Tone phone. Since directional antennas are a pretty common part of an amateur HF or VHF/UHF station, it's important to be able to rotate the beam when you're operating the home station remotely through ShackMaster.

The rotor control board is an accessory from ACC which mounts inside the Hygain/Telex control box for the CD-45, Ham IV, or Tailtwister rotors. It connects to ShackMaster, allowing it to simulate the rotate and brake switches, and to measure the rotor direction.

Touch-Tone commands may be entered into ShackMaster to command the rotor to turn clockwise or counter clockwise, to rotate to a particular direction in degrees, or to read back the current direction.

The rotor control board includes an adjustable delay circuit to allow the antenna array to coast to a stop before engaging the brake. When commanded to rotate cw or ccw, ShackMaster prevents the rotor from entering the area within 15 degrees of the end stops, to prevent ramming the rotor against the stops. Commands to directions within 15 degrees of the end stops are ignored.

The rotor control board doesn't interfere with normal local operation of the rotor control box. Remote control of your rotor is just one of many features integrated into ShackMaster to allow you to get more benefit from your home station by allowing you to operate it from anywhere. The rotor control board and ShackMaster are currently available from stock.

## Keep Your Control Transceiver Cool.

When operating your ShackMaster control transceiver at high duty cycles, such as when crossbanding, be sure it's rated for continuous duty. Most transceivers aren't, so it may be better to operate the transceiver in its low power position, and add an outboard power amp if you want the extra power.

**Don't Call the FCC.** We've said it before, but it's nice to see the League say the same thing. From May, 1985 QST, p.13 ...

"In view of diminished federal resources, Uncle Sam has made it "perfectly clear" that we are to resolve our own operating matters. Writing or calling the FCC about every questionable on-the-air event or dreaming up abstract regulatory hypotheticals is precisely the wrong way to show the FCC that we have the maturity and good judgment to deal with our own affairs. The best approach is to contact your ARRL Section Manager, who is the chief administrator of the Amateur Auxiliary in your section/state ..."

**Lightning Season.** It's the time of year again for the Lightning Demons to come down from the sky. We recommend protection on your ac power line, telephone line, and coax to protect against large transients which can damage your repeater. Design a good ground system, separate the protector from the protected, and insure your repeater system. For bottom line protection we recommend Lightning Elimination Associates TET-200-100 device on the phone line, SE-115-10-BF on the ac power line, and a PolyPhaser coaxial impulse suppressor on the coax. Amateur equipment insurance is available to members from the ARRL at a cost of just about \$50 per year for a typical repeater.

For a copy of our four page application note, "Lightning Protection for Your Repeater System", send us a self addressed envelope (no telephone requests for this item, please).

Lightning Elimination Associates, 12516 Lakeland Road, Santa Fe Springs, CA 90670

PolyPhaser Corporation, 1420 Industrial Way, P.O. Box 1237, Gardnerville, NV 89410

American Radio Relay League, 225 Main St. Newington, CT 06111

**Novice Rights.** Were you ever a novice? We were, and we tried as hard as we could, as quickly as we could, to upgrade out of the 40 meter novice band. The fact is, though, that many novices never get beyond battling foreign broadcast carriers on 40 meters. Their first exposure to amateur radio is less than pleasant, they give up, and let their licenses expire. The result is less than impressive statistics which reflect on the vitality of amateur radio today.

Several groups, including the League, have proposed enhancing the privileges available to novices. These new privileges would provide a better sampling of what amateur radio is really all about, which is what the novice license is supposed to do.

Voice privileges on 220 and 1200 MHz would allow novices to feel part of local groups, and let them participate in public service events and on the air club activities. Allowing digital communications on ten meters would introduce new hams to the tie between ham radio and computers.

The proposed capabilities would encourage the new ham to get his or her "feet wet", while preserving the incentive to upgrade.

Remember that novices aren't CB'ers or "no-coders", they're 100% ham, the future of the service, and they deserve our support!

## Is Your Remote Base a Repeater?

When possible, we try to help our equipment owners understand the FCC Part 97 rules which apply to use of our equipment. We aren't lawyers, but we don't believe you have to be a lawyer to understand the rules. And as a ham, you are responsible for understanding them.

From time to time, people have asked about the rules relating to remote base transceivers attached to repeater equipment. With the caveat that we're just presenting our opinion, and that only you are responsible for understanding and complying with the rules, our understanding is as follows.

For reference, a couple of definitions are relevant:

**§97.3(i) ... Repeater operation.** Radio communication, other than auxiliary operation, for retransmitting automatically the radio signals of other amateur radio stations.

**Auxiliary operation.** Radio communication for remotely controlling other amateur radio stations, for automatically relaying the radio signals of other amateur radio stations in a system of stations, or for intercommunicating with other amateur radio stations in a system of amateur radio stations.

The term "remote base" is never referred to in the rules, but it's generally considered to be an amateur radio station operated by remote control - this is specifically permitted by §97.88.

### **§97.88 Operation of a station by remote control.**

An amateur radio station may be operated by remote control only if there is compliance with the following: ...

A remote base transceiver attached to a repeater may be considered a remotely controlled amateur station. The fact that the station is physically located at the repeater site, and that the repeater input and output frequencies are "borrowed" for control and intercommunication with the remotely controlled base station, does not place the remotely controlled station into repeater operation. Your control and intercommunication with the remotely controlled station is auxiliary operation, and the "remote base" is an amateur station operated by remote control. Defining the remote base transceiver as a remotely controlled station is directly supported by the rules.

On the other hand, the rules equally support the view that the remote base transceiver provides additional input and output frequencies for the repeater, i.e. the transceiver is in repeater operation.

Since each approach is supported by the rules, we believe that the trustee is obligated to select which type of operation best describes his system. Each form of operation has restrictions in the rules, which would influence whether he should describe his system as one or the other.

If the repeater is 220, 440, 1200 MHz or higher, then the remote base transceiver attached to the repeater is best considered a remotely controlled amateur station. This is possible at 220 and up because control and intercommunication are considered auxiliary operation, which is permitted only on frequencies above 220.5 MHz (§97.61(d)). A benefit is that there are no other serious restrictions on the operation of a station by remote control (see §97.88).

If the repeater is a two meter system, where auxiliary operation is not currently permitted, then the remote base would best be considered additional repeater inputs and outputs, so that the intercommunication is not considered auxiliary operation. In this case, some of the limitations that would apply are restrictions on frequencies available for repeater operation (§97.61(c)); the restriction on retransmitting amateur signals on more than one frequency in the same band from the same location (§97.85(c)), i.e. a two meter "remote" on a two meter repeater; power limits (§97.67(c)); etc.

If and when the requirement that auxiliary operation be limited to above 220.5 MHz is lifted, then a "remote" on a two meter repeater would also best be described as a remotely controlled amateur station. A Petition for Rulemaking to remove the restriction on auxiliary operation is currently before the FCC.

**Fan the Flames.** Bruce Wachtell, K7IJ, suggests adding fans, with temperature sensor switches, to your repeater to keep things cool. Of course, hopefully there's enough convection cooling to keep your system running without fans, but even so, fans strategically aimed at heat producing elements can lengthen their lives. The purpose of the temperature sensor switches is to extend the life of the fans - almost infinitely. There's no need for them to run when it's 70° inside, but having them turn on when it gets above a hundred degrees or so helps things out.

**Voting.** We've come across a nice, low cost analog voter which appears to work well. It has "hooks" which can tie to your RC-850 or RC-85 repeater controller. Add an audio equalizer if you're using a variety of link equipment, and for about \$500 you can add a four channel, remotely controlled, telemetered, audio equalized voting system to your repeater.

The voter board is available for \$350 from Hall Electronics, 815 E. Hudson St., Columbus, Ohio, 43211 (614) 261-8871. It's available as a kit for \$200. The voter is based on in-band signal-to-noise comparison. We haven't used it ourselves, but we've heard good things about it - it's worth checking into.

The voter has a "disable" logic input for each channel, and "voted" outputs which indicate which channel is currently selected. The disable inputs may connect to the remote control outputs of your repeater controller. With the RC-850, you can schedule certain remote receivers to be on or off. For example, you may want to disable a certain receive site during the day on weekdays when there's lots of commercial activity at the site, which might cause intermod to your receiver.

The voted outputs may drive the courtesy tone select inputs of the controller. For example, with the RC-850 controller, connecting three of the voted outputs to the UT logic inputs of the controller, provides unique courtesy tones for each of the four receive sites. The courtesy tones can be sine wave tone sets, or Morse code characters indicating the site, such as "W", "SE", etc.

If your various link equipment has different audio characteristics, then an audio equalizer between each link receiver and the voter can make all the remote receivers sound the same. Stereo equalizers (two channel) sell for about \$80. For about \$160 you can independently equalize all four channels.

Add it all up and for \$500 or so you can put together a nice amateur repeater voting system.

**S-Meter your ICOM Repeater.** Jerry Porter, KA4WTT sends us this circuit for obtaining an s-meter signal from his ICOM repeater receiver, or any receiver using the Motorola MC3357 or equivalent fm i.f. chip. The output signal can drive your RC-850 or RC-85 repeater controller, or ShackMaster s-meter analog input.

**New Rep.** Ben Counts, WA4DDF is a new representative covering northern Florida for ACC. If your club or group would like to see our equipment, or would like a demonstration, and you're in northern Florida, contact Ben at 1705 Pennsylvania Ave., Palm Harbor, FL 33563.

**ACC** advanced  
computer  
controls, inc.

10816 Northridge Square  
Cupertino, CA 95014  
(408) 749-8330

**Archive of K6COP  
WR6COP Repeater**