RC-850 Controller Computer Interface
The Computer Interface option is now in the field! A long time in the making, '850 owners are being rewarded with more unique, new capabilities not available anywhere else, at any price – remote control, programming, and information access to their repeater system from their home computer. Other exciting additions in the upgrade include the Vocabulary Expansion Option, expanding the size of the speech vocabulary to over 530 words, and a new remote base interface to the ICOM IC-900 transceiver modules!

ACC continues to fulfill its original promise to keep the '850 controller the leading controller product in the world. Today's '850 barely resembles the original product introduced several years ago because of ACC's continuing innovation and invention in the area of repeater control. Yet even the very first '850 owner can (and has) upgraded his machine to today's performance. That's because ACC cares about you and your investment in our equipment. Rather than trying to obsolete your investment, we want to help you preserve it.

All registered owners have been contacted directly by mail with a complete specification of the board and V3.5 software, but reprinted below is a partial spec and terminal screen display examples.

V3.5 Software / Operational Description
• Bulletin Board System (BBS)
The user interface available through the serial ports resembles a packet BBS for familiarity and ease of use. It's menu driven with lots of on-line help.

Remote Repeater Control
All User, Control Op, and Programming commands may be entered through the serial ports with text command responses sent back to the port. The commands may be originated manually or automatically under remote computer control.

Message Editing
Programmable messages (speech, Morse code, etc.) stored in the controller may be viewed directly as text and may be reprogrammed by typing the letters, words, and other tokens directly (i.e., "meeting tomorrow"). It isn't necessary to refer to vocabulary codes.

Downloading of Repeater Information
Various information may be downloaded from the controller. It may be presented for visual display on the screen or may be used as input to user written data processing programs to analyze repeater activity and site characteristics.

Front Panel Display – An enhanced version of the LED front panel display may be viewed on the remote terminal or computer screen. The Front Panel Display option is not necessary to employ this feature.

Command Log – A listing of commands tagged with time and date may be downloaded. The particular commands to be logged may be specified with programming commands (i.e., log patches, linking, Control Op commands, unlocks, etc., but not Touch-Tone pad test, demo message playback, etc.).

Metering Information – A display of the 16 VRT channel meter readings may be requested. The measurements are tagged with a user defined description (i.e., heat sink temp.). In addition, the stored highs and lows for each channel along with the time/date for each reading are displayed.

Activity Information – VRT channels 25-32, which provide ongoing running totals on aspects of repeater activity, may be viewed.

E²PROM Contents – The contents of the E²PROM (the reprogrammable memory which stores Programming information) may be downloaded to be processed by a separate program running on IBM PCs and compatibles to print Programming Sheets, documenting how the controller is programmed. Programming Sheet software will be available Winter '88.

Voice - Packet Mailbox
Electronic messages may be exchanged between the voice repeater and the serial ports. Messages may be sent, listed and killed from either port. Mail may be sent by typing the source and destination callsigns and the mailbox message number. The list of mail currently in the controller may be displayed, including the source and destination callsign, message, and the time and day of entry.

On-Line Help
Extensive on-line help is available for each command to get the user going quickly.
In addition, lists of the names of the controller's programmable messages and the words in the speech synthesizer's vocabulary can be viewed to assist in programming messages without having to refer to a manual.

**Informational Text Message**
A programmable text message may be viewed by users to provide information about the repeater system.

**Security**
Access to remote repeater control, message editing and downloading of EEPROM contents through the serial ports must be enabled by a Touch-Tone Control Operator level command. Each port has a programmable access timeout. Typically, access to these functions would be enabled by entering the Control Op command on a Touch-Tone command channel, such as the phone or the Control Receiver. If this security is not needed, access may be kept enabled by setting the access timer value to 0.

**Independent Dedicated Command Channels**
Commands may be entered independently and simultaneously through the shared decoder on the main controller board and the two auxiliary decoders on the Computer Interface Board. Each auxiliary decoder may be assigned to replace a channel of the shared decoder with Programming commands.

Commands from each channel are acted on at their command evaluation point - when the command channel COG goes inactive, or after # if assigned to the phone. Command responses are directed to the repeater and link transmitters or the telephone.

Applications:
Connect to links/remotes for 100% coverage for incoming commands
Connect to Control Receiver so a transmission on the control channel doesn't steal the decoder from other channels
Connect to telephone audio so a call to the repeater doesn't steal the decoder from other channels (also, Touch-Tones will still mute over the air when someone is on the phone).

**ICOM IC-900 Remote Base / Link Support**
The ICOM IC-900 band units are supported as an alternative to BCD controllable radios for frequency synthesized remotes and links. Only the ICOM band units are needed - not the fiber optic controller - for a cost effective multiband remote. The FC-900 interface from ACC ties the repeater controller to the band units.

Connections to the FC-900 interface consist of RB CLK, RB DATA, RB STB, link COS, receive and transmit audio. The connection between the FC-900 interface and the IC-900 modules is simply the daisy-chained multiconductor cable supplied by ICOM. The FC-900 interface mounts on top of the stacked band units.

One or two FC-900 interfaces, each controlling up to six band units, are supported. One interface may attach to link ports 1 and 2 and a second to ports 3 and 4 if desired. The FC-900 interface includes a remotely programmable CTCSS (PL) encoder.

Any two band units may be on at any time on each port pair. For example, ports 1/2 could have 10M, 6M, 2M, 220 and 440 MHz transceivers used as remotes, while ports 3/4 might have 220 MHz and 1200 MHz transceivers as synthesized links. Ports 1/2 could have the 10M and 2M remotes up, while 220 and 1200 MHz links are up on ports 3/4. (FC-900 available Fall '88)

**Rotor Control Board**
The RCB-2 Rotor Control Board allows the RC-850 controller to control a Hygain/Telex CD-45-II, Ham IV or T²X Rotor System control unit.

**Vocabulary Expansion Option**
**Over 530 Synthesized Speech Words**
Including more amateur radio words, public service words, days of the week, months of the year, weather words, alternative inflections of key words, plus female words and sound effects. This upgrade gives the '850 vocabulary more words and more useful words than any other controller anywhere.

**Improvements to Version 3.42**
Various aspects of V3.42 software have been improved based on suggestions from customers.

**Terminal Screen Display Examples**
The user interface at the '850 serial ports resembles a packet BBS so that it looks familiar to many and is easy to learn and use by all. This is the long form of the menu.

del NASX-4 1440 Repeater: Date 108830 Time 1347 1 active message(s)
Messages: L - List, S - Send, K - Kill
Files: W - What, D - Download
Control: C - Command entry, T - Text message entry
F - Print a programmable message
E - Edit a programmable message
P - Front Panel display
Menu: X - Short/Long menu, I - Information, H - Help

Type x to select the short form of the menu.

> del NASX-4 1440 Repeater

> Help is just a keystroke away. Type H for help, or H and the letter of a specific command for help about that command.
VARIOUS FILES CAN BE DOWNLOADED FROM THE CONTROLLER TO BE VIEWED OR STORED ON YOUR DISK FOR DATA PROCESSING.

Repeater activity information (VRT channels 25-32) can be downloaded.

The command log tracks the commands of interest, and is available for analyzing usage of the repeater's features.

The controller's programmable messages, such as IDs, tail messages, and the hundreds of others can be viewed as text on your screen.

Electronic mailbox messages can be exchanged between the computer port and the voice repeater. It isn't necessary to know callsign slot numbers – just enter callsigns directly and the controller looks them up!

The RC-850 controller's Computer Interface is the newest state-of-the-art in repeater control – brought to you by ACC.
RC-96 Part 68 Registration
The telephone interface on our new RC-96 controller has been registered with the FCC. It's registration number is HIJ257-1771-OF-E, with a ringer equivalence of .2A. It's no longer necessary to supply the registration number to the phone company unless they specifically request it, but there it is, just in case.

RC-96 or RC-85 ... Which Controller is Best for Me?
Each of our mid-range controllers fills a somewhat different set of needs. We want you to choose – but it's really an easy choice!

The two units will sound the same on your repeater and will function nearly the same for your users. The main differences are in packaging.

If you want:
- The lowest cost unit with ACC's advanced controller features
- Availability in either rack mount cabinet, or board-only configuration for packaging in an existing enclosure
- Support of the Kenwood TS-711A or 811A transceivers as a remote base

Get the RC-85 controller!

If you want:
- Easiest cabling hookup and adjustments
- A front panel LED display and keypad
- The most extensive built-in lightning protection feasible
- Multiple CTCSS (PL) decoding capability
- An FCC registered telephone interface

Get the RC-96 controller!

Either way you get:
- All the same user, control operator, and programming capabilities
- ACC's quality design, construction, and product support
- Ongoing product enhancements

'96 or '85 – You win either way! For more details on the differences, request our '96/'85 comparison sheet.

RC-96 Touch-Tone Decoder
The decoder in the new '96 controller is capable of decoding up to 20 digits per second, allowing use with ultra-high speed autodialers. But there's always a tradeoff between decoding speed and voice talkoff. If your '96 falses on certain user's voices, clip diode CR16 and the decoder will slow down to a normal 10 digit per second rate and will be less likely to false.

Tarzan Yells on DVR
Michael Young, WBSCXO, recently heard an attention-getting commercial on an Akron radio station. The ad for potato chips included the Tarzan call made famous by Johnny Weismueller. The next time he heard it, he taped the Tarzan call and downloaded the recording into his Digital Voice Recorder.

Repeater users on both his 2-meter and 220 MHz systems love hearing the occasional Tarzan call. While dining in a local restaurant, a ham patron even asked Mike to play Tarzan! Turning up the volume on his 220 HT, Mike had the repeater play the Tarzan track and the restaurant clientele roared with laughter. The Tarzan yell is usually accompanied by his call sign and is part of a Special ID on his RC-850 controller. Talk about celebrity recordings on DVRs!

Frequency Synthesized Remote Bases – Past And Present
One of the many capabilities our repeater controllers offer is the ability to attach additional transceivers to the repeater to allow remotely controllable linking to other bands and frequencies through the repeater channel.

The benefits include allowing the repeater user to work more than one band from a single radio, the ability to work distant repeaters and other stations by benefiting from the repeater's elevation, and a capability which has proven invaluable – the linking together of repeater systems and groups during emergencies.

We introduced this capability in 1982 with a generic interface to BCD-controllable radios. Among the rigs usable as remotes are thumbwheel controllable rigs such as the ICOM IC-22U, IC-2A, 3A, and 4AT, Azden PCS-2800, Drake UV-3, and many others. All the IC-22Us still in existence have been scarfed up for this purpose! While the interface is generic, there are disadvantages – it involves some work to wire up, and there is no line of similar BCD radios covering all the bands of interest (29-1200MHz).

There are various computer controllable transceivers available, but they are prohibitively expensive for the application because they are high performance multi-mode rigs.

ICOM's new IC-900 transceiver system offers a perfect solution. It has made available simple, relatively low cost, high performance transceivers for use as remotes. The band units are basic "dumb" synthesized transceivers, with the potential for a consistent, simple hookup through a suitable interface to our controllers with appropriate software.
Price List and Order Form
August 1988

Date: ________
Call Sign: ________

Name: ____________________________
Repeater Organization: _______________

Shipping Address (not a P.O. Box):

Mailing Address: ____________________________

Day phone #: ____________________________
Alternate #: ____________________________

Comments:

To speed processing of your order, please . . .
✓ Provide both a mailing and shipping address
✓ Provide both day and evening phone numbers where you can be reached
✓ Shipping address cannot be a P.O. Box (UPS does not deliver to P.O. Boxes)

Warranty periods are:
RC-850 Repeater Controller - 2 years
RC-96 Repeater Controller - 2 years
RC-85 Repeater Controller - 2 years
Digital Voice Recorder - 1 year
ITC-52 Touch-Tone Control Board - 1 year

Limited Warranty - Advanced Computer Controls, Inc. warrants that the products manufactured by ACC will be free from defects in material and workmanship for the warranty period from the date of shipment. The liability of ACC is limited to repairing or replacing, at ACC’s option, any defective products which are returned to ACC, Santa Clara, California. In no case are products to be returned without first obtaining permission from ACC. The foregoing warranty shall not be valid: (i) if the products or parts have been subjected to misuse, accident, alteration, neglect, unauthorized repair or installation; (ii) for expendable items with the products; (iii) for custom equipment or products produced to Buyer’s specifications. ACC shall make the final determination as to the existence of any alleged defects.

PRICES - All prices are subject to change without notice. Prices do not include any taxes. Prices include packing suitable for domestic shipping. Export packing and freight are extra.

CANCELLATION AND DEFERRAL - Cancellation of orders to acknowledged orders are accepted only on terms that project ACC against loss.

TITLE AND SHIPMENT - All shipments are F.O.B. ACC, Santa Clara, California. Title to the products and risk of loss shall pass to Buyer upon ACC’s delivery to the carrier, regardless of any provisions for payment of freight or insurance of form of shipping documents. The method of shipping and packaging shall be in accordance with ACC’s then current standards. Shipping dates provided by ACC are approximate only. ACC shall not be liable for any loss, damage, or expense (consequential or otherwise) incurred by Buyer if ACC fails to meet specified delivery dates.

LIMITATION OF LIABILITY - ACC’s liability under or for breach of this Agreement shall be limited to refund of the purchase price, in no event shall ACC be liable for costs of procurement of substitute goods. Loss of profits, or for any special, consequential, or incidental damages, however caused, whether for breach of warranty, breach of contract, repudiation of contract, negligence, or otherwise.

SOFTWARE PRODUCTS RESTRICTIONS - No title to or ownership of any Software or any parts thereof is transferred to Buyer by any delivery of Software to the Buyer hereunder. All Software provided by ACC is subject to a separate license agreement between Buyer and ACC.

All ACC Products are sold under Software License Agreement. Prices and specifications are subject to change without notice. Prices quoted in United States Dollar only.

2356 Walsh Avenue, Santa Clara, California 95051
(408) 727-3330

August 1988
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<th>Description</th>
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<tr>
<td>Manual Only (includes in purchase)</td>
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<td>DT-3 Intelligent Touch-Tone Control Board</td>
<td>$49.00</td>
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<td>1200 00</td>
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Digital Voice Recorder

Discount: $9.00

**TOTAL** $19.00
This year at the Dayton Hamvention, we demonstrated software in our new RC-96 Repeater Controller and our prototype "FC-900 interface" controlling two of the IC-900 band units. The response from our current repeater controller owners was overwhelming!

We're nearing production on our interface which mates our controller's signals to the IC-900 band unit bus. Over time, we will be making available new software for our repeater controllers to support the IC-900 capability.

**The First Repeater**

In early 1940, what is believed to be the first licensed, unattended, automatic radio repeater system became operational in Contra Costa County in California.

Former Contra Costa County Sheriff's Department captain, George K. Burton, conceived the idea to improve radio coverage of the 750-sq.-mile county, 40 miles east of San Francisco.

Burton first thought of installing an elevated, remote VHF receiver linked to the dispatch center. He considered using a phone line to carry receive audio to the dispatching center, but five miles of line would have had to be built, and the cost was too high. Then Burton conceived the idea of a repeater: feed the receiver output to another transmitter on a second frequency to relay the signal to the dispatch center.

He gave the specifications to Fred M. Link at Link Radio. While the company designed and built the repeater, Burton applied for a license. The application was rejected.

Link helped smooth the way for the FCC to issue an experimental license. At the time, the rules didn't prohibit repeaters, but they didn't allow them, either. There hadn't been any.

The repeater was activated during the first quarter of 1940. The base station broadcast to the mobiles on 1,658 kHz. The mobiles transmitted on 35.22 MHz and were repeated out on 39.14 MHz.


**How To Fund A Repeater**

We often hear from people that would like to build a new repeater or upgrade their existing repeater to better serve their community or club, but they think they can't afford it. When a number of people are involved, it is possible to afford it — it may just take some creativity in figuring out how. The story of the West Valley Amateur Radio Association (Los Gatos, CA) shows creativity at work.

In 1981, a group of West Valley club members decided that they wanted the club to sponsor a new 2 meter repeater. The overall club members voted that the money couldn't come from the club treasury. Not easily stopped, the group came up with an innovative way to raise new money. They created a new class of club member. For a donation of $25 or more to the special fund, a member would become a Charter Repeater Member. The names of the Charter Members were inscribed on a plaque permanently put on display at the club station. Each week during the club's net, Charter Members are allowed to check in first.

The simple process of long-term recognition of the contributions of the Charter Members in the form of privileges raised the money needed for the purchase of equipment that continues to serve them now, many years later.

**Win $$$ For Your Repeater System**

Write us. Describe the fund raising activity that led to the purchase of your repeater system or the activity you're using now to raise money for a system. In upcoming issues of ACC Notes we'll publish the most innovative, resourceful, and unique fund raising solutions as part of a new series on funding repeater systems. And we'll award the author with a gift certificate worth $100 toward the purchase of any ACC product. Your fund raising efforts will go even further with ACC!

**ACC and Mickey Mouse at Disneyland**

The next time you visit Disneyland be sure to use the Disneyland Amateur Radio Club repeater. It's a split site system, with the receiver located on top of the Matterhorn and the transmitter located behind It's a Small World. It's on 146.34/94 MHz, usually carrier access but occasionally PL 1Z (100 Hz), and is controlled by an ACC RC-85 controller. There's an autotopup available — ask a control operator to bring it up for you.

The Disneyland Amateur Radio Club Repeater was founded in 1980 through a combined effort of the Disneyland ARC and Disneyland to provide a public service to the community and to all amateur radio operators residing in or visiting the southern California area. Feel free to use the repeater during your stay and while you are in the Disneyland area.

**Tech Support Line**

Just a reminder that our Technical Support Service is available for assistance with your ACC product weekdays between 9 a.m. and 12 noon, and between 12:30 p.m. and 3 p.m. Pacific time. The number is (408) 727-3414.

**For Sale**

The following excellent used or demo equipment and parts are for sale. Call or write.

- ICOM IC-720A HF Transceiver – $400
- Apple Imagewriter I – $100
- 256K Dynamic RAM Chips – $6.50 each
Well, I guess that you've probably heard by now that the FCC has acted on reallocating 220-222 MHz to land mobile services. Amateurs and the League fought a good battle, but the FCC was clearly determined to act positively on its proposal, despite public protests. Their motivation was either a "payoff by monied interests", as many amateurs claim, or a legitimate, determined belief that narrow band technologies need virgin spectrum in order to develop on a practical basis. We support continuing efforts by the League and others, including Petitions for Reconsideration and possible legal action. These may lead to a reversal, but that seems unlikely at this point.

Now, perhaps, it's time to look back on what happened, what could have been done in retrospect, and what can be done now to prevent a repetition of the situation to other bands.

The threat to 220 has been known for at least a decade. Old proposals by the Commission and more recent Petitions for Rulemaking, as well as the band's status as shared co-primary with other services, made the threat clear. Yet, when Docket 87-14 was issued proposing the reallocation, only then did organized amateur radio get into gear to protect the spectrum.

We met the President of the League at a local hamfest in 1984, shortly after Petitions for Rulemaking RM-4829 and 4831 were released for comment by the FCC. His attitude at the time was that the grass-roots amateur letter writing campaign underway (legitimate filing of comments by the public on Petitions for Rulemaking) was premature and unnecessary. He minimized the seriousness of the risk, indicating that the matter would need to proceed to a full-blown Notice of Proposed Rulemaking before anything would be acted on, and that could be years. Well it did, and has been, and we've lost part of our band. Only after amateur radio was massively shocked into being on the defensive by the NPRM was an organized campaign mounted by the League to defend our frequencies. And at that point, it was clearly too late.

What this points out to us is the need to mount an organized offense, concentrating on the bands most at risk in the future - perhaps 420-430, 902-928, and 1240-1300 MHz. The need for these bands should be thoroughly thought out and crystalized, their use should be encouraged, and then their use by amateur radio and the benefit to the public should be actively promoted to the public, the FCC and Congress. Only real, and publicized, usage of our frequencies at risk will allow us to keep them for the future of amateur radio.

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