

# acc notes

Advanced Computer Controls, Inc.

AMATEUR RADIO

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## Repeater Mini-Notes

### ID of the Month

A great collection of synthesized speech IDs from Kevin Ritchey, KD8IE ...

"Caution, you're in a QSO zone. This is KD8IE."

"This is KD8IE, e i e i o."

Even with the ability to *record* IDs using our DVR, there's nothing quite like letting the folks inside the repeater have their say. They're a great part of the personality of the machine. More great IDs on page 2!

### Amateur Radio Week

We heard this on a local AM radio talk show - "This is Amateur Radio Week ... Just tune around the dial and you'll hear a lot of that going on."

### Read About Other Groups

We've gotten lots of feedback from our request in the last issue to tell us about your repeater systems. Much of this issue shares some of what we've heard. More next time.

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### Also in this issue ...

Flathead Valley Repeater Group 2	
More Great Ideas from KD8IE	3
On the Bridge	3
Iridium Nuggets	3
Into the Telecosm	7
More Feedback From Readers	8

## Version 5 Software / Hardware for the '85/'96

Through a combination of technological advancements and software design innovation, we've been able to offer a major upgrade for your RC-85 or RC-96 Repeater Controller.

We've added *all* of the most requested features to the new software. They include ...

#### • Time-of-day clock / calendar

Several time and date "run-time variables" are like speech words, but instead of being fixed words, these variables *say* the current time, date, AM or PM, morning/afternoon/evening, and day-of-week when programmed into messages. The run-time variables can be included in IDs, tail messages, bulletin boards, etc., using the message editor. And the time can be interrogated with a Demo command.

#### • Scheduler

The scheduler works with the clock/calendar and your existing macro sets. It relieves you of the chore of manually selecting different macro sets at different times of the day and days of the week. It's like an automatic control operator.

#### • Expanded vocabulary

We've added female words and sound effects, along with a few more male words. The vocabulary now totals 535 words. Juliet, the new female voice, announces the time.

#### • Support for an HF remote base

Since we discontinued our ShackMaster product several years ago, many people have asked for the

ability to operate an HF transceiver connected to their repeater. Now you can use the link port on your '85 or '96 to add HF to your repeater. We selected the Kenwood TS-440S transceiver (and others that are 100% compatible) for this purpose.

#### • Miscellaneous improvements

Some of the many additions and improvements include ...

- Can interrogate Autodial numbers over the phone. There is no need to extend the telephone timer when loading numbers.

- Added 5 "permitted area codes" and selectable 7 or 8 digit count for more flexible toll restrict.

- FC-900 operational improvements, including lockout of band units not present in your stack.

- "Don't Answer" COP command to allow sharing a phone line with a modem connected to an '850.

- Tone panel regeneration ('96).

The new upgrade is easy to install - the modules just plug in. Here are the caveats:

- Very old '85s (shipped *approximately* before 1988) may need an 8Kx8 E<sup>2</sup>PROM upgrade (\$35).

- If your link port connects to a fixed frequency, BCD or FC-900 link, or Spare Audio source, it isn't available for HF.

- HF support with the '96 requires ACC's '96 serial port board (\$50).

Availability of the upgrade is from stock, and the Amateur discount price is \$250. *Now you can have even more fun with your repeater!*

"An ACC RC-850 controller ties the system together."

## Integrated Repeaters III: Flathead Valley

QST Magazine featured the Flathead Valley Repeater Group in its monthly FM/RPT column.

"You might not expect a state-of-the-art repeater system in north-western Montana, but the Flathead Valley Repeater Group (FVRG) has just that on 146.02/62 and 442.075/447.075 MHz.

"The system is 400 feet above the northern end of 35 mile long Flathead Lake on Chapman Hill, in the rustic community of Bigfork, 3300 feet above sea level. The location is a former telephone-microwave site with a 62-foot tower and controlled-environment building. There are 12 telephone lines, 200-ampere electrical service and ample ground provisions. An additional 20 feet of tower was added to the existing structure.

"The system includes a Motorola MSR-2000 2-meter repeater, an ICOM IC-RP3010 440 MHz repeater, Wacom duplexers and ICOM FM remote-base modules on 10 and 2 meters, and 220 and 440 MHz. An ACC RC-850 controller ties the system together. The repeaters use Celwave collinear fiberglass verticals and the remote bases are equipped with Hustler G-10, G7-144, G7-220 and G6-440 antennas.

"The controlled-environment shack houses an automatic-change-over 12V dc auxiliary power system that announces itself as it comes online. A 117V ac generator-powered system is ready for use when needed.

"The 2-meter and 440 MHz repeaters are hard linked so that transmissions on one are sent out on the other and vice-versa. The digital voice recorder (DVR) can immediately play back short transmissions for testing, should a user wish to check a new antenna, mic, ampli-

fier, etc. The DVR will record and hold messages for the mailbox system and a DTMF pad test function is available. The autopatch includes access to police, fire and ambulance services in four counties.

"FVRG members use personal DTMF codes to access the autopatch and remote bases, and each member is assigned five autodialer slots in the autopatch system for home or other often-called numbers. All control and operational parameters can be accessed by telephone. Computer users may access the RC-850 controller via a telephone modem. A personal computer can do all the programming and file downloads for system

status and accounting.

"With 45 members, the FVRG had a successful first year of operation. The ".62 machine" offers a regular Tuesday evening net, local information and goodwill for travelers, and has coordinated emergency services for highway accidents, a boating emergency on Flathead Lake and an emergency situation at an area campground. If you're traveling in the Flathead Lake area and have an emergency (or just want to ragchew with a fellow amateur), give a call on 146.02/62 or 442.075/447.075 and you'll get a friendly response."

*Harry M. Johnson, NV7K,  
Kalispell, Montana*

## More Great Ideas From KD8IE

Here are some more great ideas submitted to us by KD8IE, KD8IE's kitchen and the Heirloom Repeater Organization (HRO) will be in East Ohio on 146.19/19.

"To get action on our repeater, push your mike button and identify. This is KD8IE."

"For what's new in computers, check out the computer net, Monday night at 9. This is KD8IE."

"Watch your p's and q's, it's April fools. This is KD8IE."

"This is 76 ... April Fools 79. KD8IE."

"Motor on down the road with 79. This is KD8IE."

"Please wait 3 seconds for other traffic. This is KD8IE."

"A bored ham radio operator is a terminal one. This is KD8IE."

"Hi, this is KD8IE Repeat Repeat [explosion] Repeater."

"It's not easy be'in me. This is KD8IE."

"79. The lean mean repeating machine. This is KD8IE."

"Ham it up on 79. This is KD8IE."

"Set your eyes for DXCC on our ten meter remote base. This is KD8IE."

"Wake up, you may have missed the dinner meeting. Call me. This is KD8IE."

"With two times ten to the minus four mega watts ERP, this is amateur repeater KD8IE."

"Why is it called two meters? I have one. This is KD8IE."

"As one of the thousand points of light, this is KD8IE."

"Icy winds are decreasing, snow is not for long. Next come rain and storming, Root Root Root it's April 1! This is KD8IE."

*Warning* – don't try to record some of these messages on your DVR. Only Romeo and Juliet could possibly say them with a straight face!

## On the Bridge

*(The following customer asked that his identity be withheld so that he isn't besieged with requests for space at his ideal repeater site.)*

"I am happy to report that the RC-850 controller we had purchased from your company is now in operation with (our local) Rapid Transit system installed on top of the --- Bridge. I am learning and have learned a lot about the '850 by working with it.

"The equipment has lived and performed fine during the cold winter days, and believe me, it gets cold up there. We installed the system in December. The antennas had been installed last August and had to be walked up the suspension cables because a 25' fiberglass antenna does not fit into the elevator. Bringing the antennas up was a job by itself. We had to start from the center of the bridge and slowly walk up to the bridge tower where the cables are at a 45° angle. Special foot gear and safety belts were a must.

"The remote temperature sensors inside the 850, outside on top of the bridge, and power amp heatsink are helpful. Forward and reverse power sensors are working OK as well.

"Altogether, the selection we made incorporating the RC-850 controller into this system was a good one. I can say nothing more but keep up the good work. We are pleased with the performance of your product."

## Dayton Notes

This was a great year for the Dayton Hamvention, and a great year for us as an exhibitor. The excitement over the codeless license was apparent with all the newcomers to the service. We seemed to make a lot of repeater owners happy with V5, and as always, enjoyed the chance to meet you face-to-face. See you next year!

## Iridium Nuggets

In an issue last year of *ACC Notes* we described an overview of Motorola's proposed cellular satellite system, consisting of 77 LEO (low earth orbit) satellites. Iridium (named after the element with 77 electrons) is intended to supplement terrestrial cellular systems where cell sites aren't feasible for economic or other reasons, and would provide full-time handheld-to-handheld telephone service between any points on earth. Telephone service could be provided anywhere – for example, a simple solar powered phone booth could be set up in the middle of the Arabian desert. Here are some technical details we've picked up that we found interesting.

All 77 satellites will be in polar orbits in seven planes – 11 satellites per plane. Having all in polar orbit might seem inefficient relative to other configurations, but it offers several advantages. Redundancy as the satellites converge on the poles will allow satellites to periodically shut down to recharge their power systems. The symmetrical nature of the orbits simplifies crosslinking – calls can be passed through several satellites to reach distant destinations. Keeping track of where to aim is simplified through the symmetry. The two satellites "in front and behind" are reached

through fixed antennas, and the two in the adjacent orbital planes are tracked by mechanically steered antennas.

Iridium is the reverse of conventional cellular. In terrestrial systems, the *cells are fixed*, and the *users move*. Cell boundaries are determined by the locations of the cell sites and geography. Users travel from cell to cell, creating the need for complex handoff of users by the system. In Iridium, however, the *users are stationary* relative to the speeding satellites (even someone on a jet airliner is effectively stationary), and the *cells move* in a predictable way up and down the earth. The handoff issue is simplified.

There will be 1628 cells covering the earth, each moving at about 7,400 meters per second. Each satellite would produce 37 antenna beams, creating up to 37 of these hexagonal cells on earth, each one 372 miles in diameter.

The satellite altitude of 413 nautical miles above the earth was chosen to lie within two constraints. Below 200 miles, drag makes it difficult to keep the satellite up long-term without carrying on-board fuel. Above 600 miles, it becomes more costly to protect the satellite from radiation effects.

Motorola expects to have an operational system by 1997.

## '85/'96 PC Terminal Program Updated

Andy Kadvan updated his PC terminal program to include new features and support Version 5 software. The terminal program uses your Hayes compatible modem to generate DTMF to the controller just like you do on the phone. It can also reduce the need to refer to the manual for programming.

A new feature is the ability to

control the repeater through its control receiver input rather than phone for direct connection to the modem if your repeater is at home.

Andy can provide a detailed description of the program – send him an SASE. The program is \$39.95 plus \$3 shipping. Andy Kadvan, 1835 Lynn Mar Avenue, Poland, OH 44514.



## Other Notes of Interest

### Meteor Burst and More

Hams are among the very few people in the world who know that meteor trails can be used as passive repeaters (for brief periods of time, that is).

We ran across what may be the only book on the subject – Meteor Burst Communications, by Jacob Z. Schanker. It describes theory, applications, and includes details of an HX.25 meteor burst packet protocol. It also details the pro-

posed Federal Standard 1055 Protocol for meteor burst communications to insure interoperability among government systems.

Artech House, the publisher, has other interesting specialty communications titles as well – ask for their catalog.

Meteor Burst Communications is \$60 plus \$4 shipping; a companion software disk is \$30.

Artech House, 1-800-225-9977 x4002. In Mass., 1-617-769-9750.

### Land Mobile Radio Systems

This book from Prentice Hall is a good primer on two-way radio. It describes techniques used in commercial services that can be of value in amateur radio, particularly as our VHF and UHF bands become more crowded. It also offers technical explanations of the components that make up two-way radio systems. It's available from Prentice Hall, 200 Old Tappan Rd., Old Tappan, NJ 07675. \$36 + sales tax + \$4 shipping.

*"Your equipment makes the repeater reach out and say 'I am here, at your service.'"*

## Williams County Amateur Radio Club

"You asked in your last newsletter for information about our club. Our's is called The Williams County ARC. Williams County is the northwest most county in Ohio. We are bordered by Indiana on the west and Michigan on the north, and 28 miles of the Ohio Turnpike runs through us.

"In 1982 I became a ham and a quick lover of the club's 2-meter repeater. This machine was located on the area's CATV tower at 2,980 feet, using an Antenna Specialists ASP-602 antenna, 1/2" aluminum cable and a home built machine using Spectrum RF boards.

"We have come a long way baby! I was made aware of a tower that was for sale that had never been erected, so I went looking. After six months of work I had moved this tower from Cleveland to Williams County. It is a Rohn 80 guyed tower, stands 340' tall, is double guyed, and is capable of supporting

five 10' solid microwave dishes and ten Super Stationmaster antennas. This thing is strong.

"I then built a 10'x8' steel building complete with A/C and heat and alarms. I installed a state-of-the-art electrical service and lightning protection systems, two Antenna Specialist ASP-602 antennas (one at 345' for receive and one at 320' for transmit, both fed with 1/2" Heliac), and a 3 dB gain base station antenna on the torque arm at 125' for the remote base (also fed with 1/2" Heliac).

"I have purchased a Motorola MSR2000 100 watt continuous duty repeater. It is equipped with as much ACC equipment that is possible at this time – a fully outfitted RC-850 controller, a fully outfitted DVR, FC-900 Interface and 2 meter ICOM module. It includes full battery backup capable of 12 plus hours of continuous operation.

"The tower and building are worth an estimated \$125,000. The repeater equipment and ACC hard-

ware and accessories are valued at \$20,810. This may seem like a lot of money for one person to invest in a repeater system, but the fact that it is rated the number one 2-meter repeater in the area makes it all worthwhile.

"I would like to thank you for your time, but most of all for the great equipment and dedication you all have for ham radio operators nationwide. Your equipment makes the standard repeater reach out and say "I am here, at your service." Before I used your equipment on my repeater, most non-hams did not even know about our ham repeater. Now many people have 146.820 programmed into their scanners. They tell me they like to hear it talk.

*David Mohre, KA8OFE(1R)  
Trustee and owner of the 82 machine in Williams County, Ohio*

## Cellular Fraud

Your amateur radio repeater isn't the only kind of radio system that can have problems with security and unauthorized users. Cellular companies across the country are losing about \$200 million a year on widespread fraud.

In one scheme, phones with the same ID as legitimate users are sold on the street for up to \$5000. The buyer gets 30 to 60 days of unlimited calling until the legitimate owner gets the bill and complains.

In a more sophisticated scheme, the memory in the phone is altered to produce a bogus ID. Since cellular users can legitimately "roam" into any area of the country, these illegal users are considered to be roamers. By the time the different cellular companies can "compare notes", the illegal phone user may have made lots of calls.

The simplest approach to fraud has been phoney applications to obtain service.

The users of these illegal phones are drug dealers who want untraceable mobile and pocket telephones to "keep in touch", and "service providers" who operate "phone booths" out of their cars, offering cut rate telephone calls to anywhere in the world. Some cellular companies have shut off direct dial service to South America, because that seems to be the destination of many of these illegal calls.

In New York recently, six people were arrested for running an illegal operation. Undercover officers posed as customers and made calls. The felony offenses included computer tampering and falsifying business records.

Law enforcement tries to uncover scams, and cellular phone companies are working on technical solutions. Faster communications between cellular companies will end the roaming fraud, and tightened security checks will reduce fraudulent applications. But there is no total solution to the problem.

## Into the Telecosm

A twelve page article in the *Harvard Business Review* (March-April 1991) by George Gilder offered a unique perspective into the future of telecommunications. His fear is that archaic regulations which are hampering our communications infrastructure will cripple our ability to benefit from the rapid advances in computing and our ability to compete globally.

The cost of computing power is dropping at a rate of as much as 50% per year. And the number of transistors that can be put on a chip quadruples every three years. These trends are leading to distributed computing power that is growing far more quickly than the ability to communicate over public networks. In the next decade, the mismatch will be enormous.

Gilder defines a "telecomputer" as a future device which will not only perform computations and display numbers, letters and graphs, but will process voice, video, news, education, sports, film and photos. Its output will be high resolution video and sound, even three dimensional images. Computers will offer a "virtual reality" (travel in imagination) but will require gigabits of data. While hardware to support these capabilities is under development, and software will follow, there isn't sufficient bandwidth in our country's communications infrastructure to support these advances. That's where regulation gets in the way, says Gilder.

He expects to see a "flip-flop" in how information is carried. What's carried now over wires, like voice, will be carried over the air with wireless pocket phones, and what now goes over the air, TV video, will be carried over wires. Not copper wire but extremely high bandwidth fiber-optic lines. Fiber will be combined with high speed digital switches to form a nationwide network linking telecomputers.

The present regulatory environment prevents U.S. phone companies from laying fiber networks into the home to get the ball rolling. The initial application for this home fiber network would necessarily be entertainment video to create profits for developing other applications in education, culture, etc. The cable industry has been given a monopoly for entertainment video in the home, locking out the only industry with the capital to fiber-wire the nation - the phone companies.

Gilder sees fiber in the home as the driver to provide the momentum for linking future computers with their high data rates. A public communications infrastructure to support telecomputers will allow the U.S. to reap the fruits of its computer technology.

If you're interested in a wide ranging futuristic discussion of communications, find the article in HBR in your library.

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## RBI-1 Remote Base Interface

Doug Hall Electronics has made available its RBI-1 Remote Base Interface. The product makes it easy to connect any ACC controller to the Kenwood TM-X21 through TM-X51 series mobile radios. The interface converts your controller's BCD data stream into the control format accepted at the Kenwood radio microphone jack.

Using information supplied by your controller in response to DTMF commands, by recall of remote base memories, and by selection of macros, the RBI-1 interface provides CTCSS control, high/low power, frequency, and band control. It also supplies 8 User Function remote control outputs.

RBI-1. Doug Hall Electronics, 815 E. Hudson St. Columbus, OH 43211. 1-614-261-8871.

# More Feedback From Readers ...

"The combination of our RC-85 controller, FC-900 remote base and DVR make it easy to project a friendly, fun and welcome personality for our repeater. Users enjoy that and respond in kind. The flexibility of this combination is especially useful when originating and exporting our nets to other repeaters or importing nets from other area machines for enjoyment by our users. ACC makes our repeater a fun place to be!"

*Scott Bogue, KE7LE*

"Our small group was not seeing any growth or activity. We put up the 440 machine with the RC-96 controller. It seemed that everyone then wanted to get involved. We have gotten five new hams in the last year and a half. Not bad for a small rural area."

*Danny Lloyd, KB4MDD*

"Line of sight from Bellingham to the repeater site is about 19 miles, but to get to the island it's a 45 minute drive, then a 1 1/2 hour ferry trip. So being able to program the repeater controller from Bellingham is very handy. The repeater is on Orcas Island in the San Juan Islands. The site is at 2400 feet and our antenna is at 275 feet on a 400 foot tower."

*Allen Hart, N7FYU*

"Most of our equipment is homebrew. We recently converted our 220 MHz aux. links over to 900 MHz using homebrew transverters.

"Our group has about 150 dues paying (\$15/year) members and maybe 50-100 other non-contributing users. We advertise open autopatch and emergency autodialer with all other functions reserved for members only. We publish a 60 page user manual and give out membership cards. We average 20-

30 autopatches per day (max. 100+, min 5-10). The alarm system is very important. We have had one successful and one unsuccessful break-in in the past four months. Alarm sensors worked well."

*Robin Rumbolt, WA4TEM*

"The synthesized voices on our '850 acquired the names "Harry and Nancy" (this is a long and spicy story!), and any repeater problems are usually blamed on these two's antics!"

"For your readers, Bermuda offers a pleasant and friendly environment, particularly to enjoy ham radio. Reciprocal licensing is quickly and easily accomplished (free, too!). For holders of U.S. General and higher classes of license, more information is obtainable on 14.275 MHz, Sundays at 0830 eastern time on the "Bermuda Net."

*Thomas Trimmingham, VP9KG,  
Radio Society of Bermuda*

**Archive of K6COP  
WR6COP Repeater**