



# the RARA RAG

Published by

**ROCHESTER AMATEUR RADIO ASSOCIATION, INC.**

VOL.54

SEPTEMBER 2001

NO. 1

## JOTA

Marykay Vesco, KC2DPG

Our first meeting of the new season will be Sept 7<sup>th</sup> at 8:00 PM. It will be held at the Henrietta Fire Hall 3129 E. Henrietta Rd. Our Topic will be Jamboree On The Air (JOTA) and will be presented by Kevin Kinnally, KD2TJ. Kevin is a Boy Scout leader in the Eagle District.

JOTA is an annual event held the third weekend in October since 1958. There is some DX activity from Friday to Monday taking advantage of the time differences. This is an event in which Boy Scouts, Girl Scouts, and Guides from all over the world speak to each other by means of Amateur Radio. There are scouting experiences and ideas that are shared and exchanged via radio waves. JOTA has resulted in links between troops and pen pals that have lasted for many years.

Kevin has some pictures of the event from previous years, so come on down and join in the fun; this is what HAM RADIO is all about.

## RARA Meeting

September 7, 2001

8:00 PM

Henrietta Fire Hall,  
3129 E. Henrietta Rd.

Jamboree On The Air  
Presented by Kevin Kinnally,  
KD2TJ  
Boy Scout Leader, Eagle  
District

## RAGChew

Lloyd R. Caves, WB2EFU

Welcome to a new season with RARA. It is membership renewal time for all except our life members. For some of you becoming a member was new to you last year as you went through the license classes. That's why to you folks it is very important to renew your membership so you can now enjoy what RARA has to offer. Now that you have that new license let RARA help you get the most out of it. Let our members help get your stations up and running, answer questions, help debug problems that you may encounter, or just become new friends with a common interest. There are so many modes and bands to try in amateur radio that it never loses its interest, especially if you let others help you.

There are many good topics and fun at our meetings each month. It seems that our members that don't attend these meetings miss out on a lot. The chance to learn something new, try for a door prize, meet new friends (whether you are 8 or 80, reach out and shake someone's hand) or just get reacquainted with old friends over a cup of coffee and a doughnut. Have some laughs with others, none of us do enough of that. Amateur radio is fun and being with other hams is too.

Along with the meetings there are other events such as public service, radio coaches, boy scouts, operating committees, etc. to let you get involved. Remember that all these things can be enjoyable and help out others at the same time. Along with that there are always fun things to do such as going on family picnics with other members or attending the Rochester Hamfest. Remember, it is RARA that brings this event to you each year.

It has been along time since we have seen

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# the RARA RAG

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VOL. 54 SEPTEMBER 2001 NO. 1

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RARA Life Membership is available for twenty times the annual dues.

## The Prez Says

Peter Fournia, W2SKY

What a Board Of Directors (BOD)! Your elected officers and chairpersons have had 2 BOD meetings behind them in preparation of the coming "ham season". I've got to say that we are fortunate to have such dedicated people in the club. Several of our events have passed and much more is coming.

The June picnic was an enjoyable success with about 35 people attending. We were under budget thanks to those who brought food to pass. A non-ham found the foxhunt transmitter! Families played ball, mobile QSO's were made, and people chatted and ate well.

Your VP, Marykay Vesco, KC2DPG is planning an interesting array of meetings starting September 7<sup>th</sup> with Kevin Kinnally, KD2TJ's presentation about JOTA. Last October I heard many JOTA operations on the repeaters and on 10 meters. I can't wait to see how our local BSA troops did and how the boy scouts relate to ham radio.

There are some new events on our public service list. They will give you a larger and more varied opportunity to fulfill your public service "duty". The list is on our web page. Ed Holdsworth, N2EH has the usual listing of public service events. The Stuart Horse trial and Walnut Hill Carriage Show are now behind us. I highly recommend signing up for the Stuart Horse Trials next year. It is a fantastic experience to be a part of this professional and powerful horse show.

Control of the email reflector has passed from Scott Blystone, NY2A to George Masny, KA2GPJ. We have 24 people signed up. Although the message rate is light it's a good way to get automated meeting notices and keep in touch with club issues. See the webpage for signup details.

Our treasurer Dick Goslee, K2VCZ says we have a budget we can live with. Our secretary Bill Kasperkoski, WB2SXY is documenting meetings and keeping us on track. Norm Turner, WB2LQB, has a full line of instructors for the ham classes. His dates are settled and new meeting rooms are reserved. Our new membership chairman Keith Bozek, N3HGN

(Continued on page 4)

## Enjoyment Of Amateur Radio

Keith Bozek, N3HGH

Hello, my name is Keith Bozek, N3HGN and I am the new Membership Chairman for RARA. I have been a Ham for over 10 years and a resident of the Rochester area for 3 years. Beyond just signing membership cards and sending reminders of membership renewals, I also am interested in encouraging our members to become involved with club activities such as public service events.

One thing that I have really come to enjoy about RARA is the opportunity to participate in public service events with other hams. I get a great opportunity to socialize with other hams and get the chance to shake the dust off of my equipment.

Before coming to Rochester, I had never been actively involved in public service events. Now, I have been actively involved in activities such as Radio Coaches and Tour De Cure. The benefit? Plenty. I have never been actively involved in HF radio. As a result of my public service events participation, I have not only had the chance to use HF equipment but also learned a lot about HF just by talking to other hams. I am setting up my first HF station and I built my first radio project, a PSK-31 transceiver. I have also had the chance to use some of the more advanced features of my 2-meter radio for example.

As hams, we can participate in many public service events and activities and choose our level of commitment. Usually, most activities require only a few hours of your time and believe it or not, are very fun and interesting activities. Events range from the Stuart Horse Trials to the Hilton Apple Festival to the Fall Foliage Bike Tour as well as the Pumpkin Patrol and the Boy Scouts of America Jamboree on the Air – Just the tip of the iceberg of choices!

Always wanted to get more use out of your equipment. Are you a Ham looking to try something new or to get back into the hobby? Why not get involved in Public Service events? I think you will find them as much fun as I do.

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## License Classes to Begin

Norm Turner, WBLQB

I am pleased to announce the start of another year of License Classes. On behalf of our teaching staff I welcome one and all to participate and upgrade or encourage a friend to begin participating in our great hobby. The teaching staff for the 2001-2002 year is as follows:

Lynn Rosenberg, N2IZX — 5 WPM Code  
Allen Skiles, W2AES — Technician Theory  
Bill Kasperkoski, WB2SXY — General Theory  
Carl Preddy, KU2N — Amateur Extra Theory

I would like to thank these fine people on behalf of the amateur community for their willingness to participate on this project.

The registration meeting for the Fall Semester will be on Monday, Sept. 10, 2001 in Training Room # 1032 at the Monroe County Social Services building at 111 Westfall Road. The semester will run each Monday night through December 3, 2001 concluding on the 10<sup>th</sup> with a testing session. The class schedule will be as follows:

5 WPM Code and Extra Theory—7 PM to 7:50 PM

Technician Theory and General Theory—8 PM to 9 PM

Flexibility is built into the schedule—if the theory classes wish to go longer it can be done—all rooms are scheduled for us to use until 10 PM. The 5 WPM Code is a rigid 50 minute schedule however, as those students usually participate in a theory course of some sort. We have three classrooms plus the K2JD station available this year as there is moving and construction going on at the site. Classes will be assigned rooms according to space requirements. So, come one and all to this year's license classes. We have an excellent staff of instructors and look forward to an exciting year.

**Rochester Hamfest  
May 31 and  
June 1 and 2,  
2002**

## Public Service

Ed Holdsworth, N2EH

The last of the public service events for the year 2001 are fast approaching. The next event, the ADA Fall Foliage Ride will be held in October on the 13<sup>th</sup> and 14<sup>th</sup> and will cover 130 miles over two days. It will cover the counties of Seneca and Cayuga and will need volunteers for about seven hours each day. For more information, please contact Keith Freeberg, N2BEL at 458-8246 or kff@frontiernet.net.

The next event will be the Pumpkin Patrol to be held on October 30<sup>th</sup> and 31<sup>st</sup> from 7:00 PM till Midnight. We will try to cover all thruway bridges in Monroe County from Ontario County on the East to Genesee County on the West. Please contact Ed Holdsworth, N2EH to volunteer for this event or sign up at either the September or October meetings of RARA.

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## Prez Says *(Continued from page 2)*

started his job with a bang at the Hamfest. He organized and staffed the RARA booth with new membership forms and display materials.

Our RARA Hamfest keeps rolling along. Harold Smith, K2HC and his experienced staff pulled it off again under an adverse national trend. The big Hamfests are changing and he plans to survive the change. We know what we are changing from but the successful Hamfests have to figure out what they can change to. The hamfest committee is working on it and the BOD has been asked to participate more along with the club.

Keith Freeberg, N2BEL is active with what I'm calling the Youth Development Committee. He is still pursuing commitments for a Saturday licensing class with Rochester Recreation Dept. Of course the Radio Coaches are continuing as will the youth net. Keith will also make application to the local Boy Scouts council to start a multi session vocational program focused on radio.

There's more going on and more members involved. I'll save that for another time.

Your RARA is dedicated to the Rochester amateur radio community. We keep you informed through our *RARA RAG*, monthly meeting topics and web site. We provide public

## RARA License Test Schedule, 2001-2002

George Platteter, AA2FO

GET LICENSED, UPGRADE — The fall season is fast approaching, and it's the advent of the 2001-02 testing sessions.

These sessions are held in the September through May. The sessions are held on the third Saturday of the month with the exception of September when it is held on the 4<sup>th</sup> Saturday of the month and at the Hamfest, whose date varies.

THE PLACE — September through May; Cafeteria, Monroe County Bldg., 111 Westfall Rd., Rochester, NY

REGISTRATION — 8:30 AM, Exams 9:00 AM  
HAMFEST — Hamfest location, refer to Hamfest schedule.

SCHEDULE — September 22, 2001  
October 20, 2001  
November 17, 2001  
December 15, 2001  
January 19, 2002  
February 16, 2002  
March 16, 2002  
April 20, 2002  
May 18, 2002  
Hamfest, per Hamfest schedule

Applicants need to bring the following in addition to pen and pencil: Two forms of identification, one being picture ID (Drivers License), original FCC License (if you already have one) and a copy, Certificate of Completion and a copy if credit is to be claimed for elements passed at another test session.

We welcome handicapped applicants. Please phone in advance, (716) 334-4488.

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service opportunities that serve the community in general and refresh our amateur radio skills. We sustain and support growth of the hobby by our lesson classes and youth programs. Our annual RARA Hamfest cuts across all of these goals and extends these services to hams beyond Rochester. Please help us deliver these activities by supporting RARA by your membership and your participation.

## Radio Coaches Starts Fifth Season

Thomas Jefferson Middle School  
Welcomes Coaches

Keith Freeberg, N2BEL

This is the start of the 2001 – 2002 Radio Coaches season with a dozen new class plans in hand and eager young minds awaiting. The Coaching Program uses what you already know to teach sixth graders about science, math, electronics, and of course, radio.

Young minds are like thirsty sponges at this age and they eagerly embrace all the topics we can give them even, image this, code! Yes, they do code really well and pick up on it a lot faster than I did. Don't worry, we won't let the students give you a code test. We seek out special volunteers for that part, you know, those Code Wizards!

However, we need help in fifteen-minute increments from anyone with interest, especially if you already have your license. The topics and problems are all worked out for you. So, it is easy to do and a great way to get young people 'in the know' about amateur radio.

Can you help just once? Have you got fifteen minutes to spare or if your ambitious, thirty? Are you simply curious about what we do and how? Good! Give me a call. We'll have a cup of coffee and exchange ideas. Perhaps the child we help will be the next Astronaut, Senator, Congressperson or maybe our next contact. We just never know how the simple act of sharing the wonder and knowledge that comes with a 'ticket' will affect young people. Young people in our community need you, your talents, and your time, if only for fifteen minutes.

Call the Director of Youth Programs today at 716-458-8246.

### SILENT KEY

Robert A. Sprague, WB2JSB  
June 21, 2001

## RARA RAG 20 Years Ago, September 1981

Ed Gable, K2MP

Responding to numerous member complaints, the RARA Board selected a different meeting venue for the season. The new meeting place was the Eisenhart Auditorium at the Rochester Museum and Science Center. Kicking off the season, according to program chairman and VP Ed Holdsworth, N2EH, will be a presentation by Dr. Jay Eastman, Director of the Laser Lab at the University of Rochester.

1981 will be remembered by many as the year the NYS Tax department inappropriately raided the Rochester Hamfest. Heavy-handed techniques all but closed the Hamfest for a two-hour period before the Committee could straighten things out. Later, in a letter to Harold Smith, K2HC, and the Hamfest Committee, the Tax Commissioner's office apologized for their actions.

This issue of the *RARA RAG* features a new Editor, Ron Jakubowski, K2RJ, taking over for the retiring Harold Smith, K2HC, who held that position for over 20 years. Dwight Hill, K2KWK, remained as Associate Editor. President Don Drennon, W2EBF, reported that RARA's summer activities included the STPR Road Rally, the Mendon Pony Rally, Scotch Bonnet Yacht race, Hamlin Beach Iron Man contest, Canal Town Days and a Ham radio Demo at the Rochester Science Museum. In Part III of a series, Brice Kelley, W2ICE, continued his story of the history of RARA and their 50<sup>th</sup> anniversary. (1931-1981). From the Want-Ads you could purchase a Hunter "Bandit" linear amplifier from Len, WA2ZNC, for \$300. A new advertiser was Harris Corporation, RF Communications Division, advertising for electronic technicians.

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# Clippings

Ron Roach, W2FUI

This month finds me at the first landfall, just one giant 3,033-mile step away from America, at Mizen Head, the most southwesterly point in the Republic of Ireland.

The installation at Mizen Head owes its existence to the sinking of the American liner, "S Stephen Whitney" which went down off Crookhaven in 1847, a scant three miles east of Mizen Head and the site of the Marconi experiments.

The famous Fastnet lighthouse was subsequently constructed on Fastness Rock in 1854, succumbing to the fury of the Atlantic Ocean waves in 1891. The present lighthouse was installed in 1899, casting a biform oil light visible for 19 miles.

The Mizen Head signal station was constructed in 1909 on Cloghane Island and connected to the Irish mainland in 1910 when the 172-foot long arched stone pedestrian bridge, perched 150 feet above the Atlantic Ocean, was finished. When I crossed this 101 year old footbridge to tour the keepers' quarters and catch a glimpse of the original radio beacon equipment, seals were basking on the rocks far below.



In 1931, a manually operated wireless beacon was installed at the signal station and this was manned until 1972. A long wire antenna, strung between Cloghane Island and the Irish mainland, served this installation. In 1972, two huge transmitting towers were installed on the towering cliffs behind the Mizen signal station on the Irish mainland. The single long wire the current three-wire center feed long wire antenna replaced antenna and, after forty-one years, the beacon signal was automated. An auxiliary light was also installed right outside the keepers' quarters at this time, a commanding 180 feet above the Atlantic Ocean, its light visible a distance of thirteen miles.

This beacon continues to serve the maritime interests 70 years after the first signal went on the air. The original transmitter from 1931 is displayed in the keepers' house even as the automatic DGPS equipment writes the next chapter in the history of radio communications a Mizen Head.

The last keepers left the Mizen Head station in 1993, eighty-three years after they first crossed the arched stone bridge to protect the maritime interests off the Irish coast.

Next month - Detroit to Hangzhou, non-stop in sixteen hours.

## Historical Bits

Ed Gable, K2MP

- 1923 — WWV began time and frequency transmissions.
- 1933 — Astatic D-104 microphone introduced  
(still on market today!!)
- 1945 — November 15, Amateurs resume post-war operations

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# Amateur Radio News Release

Hugh Turnbull, W3ABC

The FOUNDATION FOR AMATEUR RADIO, INC. (FAR) is pleased to announce this year's winners for the sixty-five scholarships which it administers. The recipients for the individual awards will share in \$71,600 worth of scholarships.

These scholarships were open to all licensed Radio Amateurs meeting the qualification and residence requirements of the various sponsors. The FOUNDATION is a non-profit organization incorporated in the District of Columbia, representing more than seventy-five Amateur Radio clubs in Maryland, the District of Columbia and Northern Virginia. It is devoted exclusively to the scientific, literary and educational pursuits that advance the purposes of the Amateur Radio Service.

The announcements for the year 2002 awards will appear in the January or February issues of the major Amateur Radio publications and selected radio club newsletters.

For further information on FAR, write to:

FAR Scholarships  
Post Office Box 831  
Riverdale, MD 20783

**NEXT RAG DEADLINE  
SEPTEMBER 14, 2001**

# Greater Rochester Area Youth Net Gets Set For Back To School

Keith Freeberg, N2BEL

All those interested in finding out what secrets amateur radio can hold for those 18 and younger, tune in on Thursday Evenings at 7:30 PM, starting September 13<sup>th</sup>. All aspiring amateurs and those that are already licensed are invited to tune in and exchange ideas, stories and trivia on the frequency of 146.880 MHz.

The following week we'll be found on 146.790 MHz again at 7:30 PM. Then each week we'll continue the cycle alternating between the two frequencies that give the best coverage in our area. The schedule is below for your convenience.

Sept. 13, 2001	7:30 PM	146.880 MHz
Sept. 20, 2001	7:30 PM	146.790 MHz
Sept. 27, 2001	7:30 PM	146.880 MHz
Oct. 4, 2001	7:30 PM	146.790 MHz
Oct. 11, 2001	7:30 PM	146.880 MHz

Questions? What are those 'secrets'? Well, give the Youth Programs Director a call at 716-458-8246. Not a youth but want to learn about those secrets? Call the Youth Programs Director a call at 716-458-8246. We'll talk.

See next months issue for dates and times as we evolve and perhaps even move our day to accommodate more youth participation.

## RAGChew *(Continued from page 1)*

some of our old timers at a meeting. Lets change that this year as many of us would like to see you again. Remember the good times you had in the seventies and eighties or even earlier? Well things haven't changed that much; we still meet and have good times.

Be sure to renew your membership and consider coming to the meetings held the first Friday of each month, September through May. Lets have fun together!

**RARA HOTLINE  
442-0587**

RARA RAG 7



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## RRRA Tidbits

Brad Allen, KB2CHY

Well another year is about to start for ham radio meetings and activities. I am Brad Allen, KB2CHY and I am once again the President of RRRRA. I wish to invite all area Hams to the September 21, 2001 meeting of RRRRA. Our meetings are held at the Pittsford Town Hall at 8:00 PM on the third Friday of the month. We, also, do a number of public service events for local charities and our core group is getting more and more requests for our talent.

The 88 repeater has had some changes done to the antenna system and we are very close to getting the Cobbs Hill work done. The social services building site has had the antenna moved to the railing on the top of the building. This was a mandatory move that turned out for the better, but we are still analyzing the effects. A north site is planned somewhere near Dewey and Stone Road. This has been in the planning stages for a while, but we are at the mercy of building owners for this kind of thing. This may fix some of the coverage problems from the past.

The 2001-2002 year will hopefully be the turn around year for Ham Radio in general. I am hoping to see many more people at the meetings and activities. We are looking for people to man the Hamfest talk-in station in June next year. Yes, we start looking now. We also need a few good men/women for committees for upcoming projects.

Some info about RRRRA. We have been around for some time and had one of the first repeaters to go on the ham frequencies in the area. We strive to provide a good system for all. The repeater has a number of features that are useable only by members. Our technical team, now headed by Bob Shewell, (N2HJD) works to the best of their ability to keep the repeater on the air at all times. Many changes are in the works and our vision for the future is in committee to get the changes in place.

If anyone, member or not would like any further info on the club operations, you can contact myself or any other board member. Our website at this time is in the midst of changes and not available. Major club announcements will be soon available on the RRRRA hotline 426-1156. My email address is [ballen@frontiernet.net](mailto:ballen@frontiernet.net) and a number to reach

## Rochester Amateur Packet Society

George Mansy, KA2GPJ

So you picked up a TNC at the Hamfest. What can you do with it? Come to our meeting with your questions and there will always be someone to help you connect that GIZMO to your radio and computer... You don't need to be a member to visit our meetings, but if you decide to join, membership in RAPS is open to anyone in the amateur radio community who has an interest in packet radio. Experienced packeteers, as well as newcomers, are welcome to join. We meet on the **2<sup>nd</sup> Thursday** of each month from September through May, at 7:30 PM in the first floor auditorium of the Monroe County Social Services Building at 111 Westfall Road. Dues are \$5.00 per year.

**RAPS Club Call sign:** KB2WYA

**RAPS on the Internet:** [www.ggw.org/raps](http://www.ggw.org/raps)

**Next Meeting Date:** Thursday, Sept. 13, 2001

**Program:** To be announced

**Future Meeting Dates:** October 11, 2001

November 8, 2001

December 13, 2001

January 10, 2002

### RARA Amateur Radio License Testing

All Elements Needed  
To Complete a License Class

Saturday  
September 22, 2001

Registration - 8:30AM  
Testing - 9:00AM

Social Services Building  
111 Westfall Rd., Rochester

Inquires (716) 334-4488  
[aa2fo@rpa.net](mailto:aa2fo@rpa.net)

me is 247-3724. Better yet, mark your yearly calendar for the third Friday, the 21<sup>st</sup> of September and come to the meeting. This is looking to be a promising year for our club. Come join and be a part of it. We welcome you!!!

# Digital Sound On HF

Peter Fournia, W2SKY

The idea of passing digital sound on HF is another novel idea that has been tried over the past years. More recently Charles Brain, G4GUO has made some pertinent advances that are worth writing about.

Digital sound is now in use by the US military. One could question the practical use of this on the HF ham bands where we currently have an analog sound transmission system that compresses the 15 KHz human hearing range into 2.5 KHz of HF bandwidth. We know this as single sideband. Would digital do better and could it take less bandwidth? I don't know the answer to that question. However, I do know that amateur radio has multiple modes of digital keyboard communication methods (CW, PSK, Packet, MFSK31, RTTY...) that one can consider as redundant and unnecessary. But this is fun. It is amateur radio! Playing with digital sound or digital voice on HF is nothing different.

I came across an interesting discussion of digital sound when reading the Digital Radio e-groups at Yahoo. (You can tap into this discussion by sending an e-mail with "digitalradio-subscribe@egroups.com" in the subject field. Search back to the July 1<sup>st</sup> 2001 time frame.) One of the subscribers, Ken, VE5KC wrote:

"I spent about 30 minutes... talking with my son... over a 300-3000 Hz twisted-pair phone line connection at each end. Only hardware at my end was my soundcard and computer/modem and a Radio shack dynamic mic."

A response came from George, W5YR:

"...why are we not doing this same thing by amateur radio? The same signal that the modem put out over the phone line could have gone to an SSB transmitter and the SSB receiver could have fed similar received audio to the modem/soundcard equivalent. ...We must be missing something pretty basic here..."

Another response was posted that references digital voice currently being tested on 20 and

40 meters:

"... here is another mode being tested that could account for some of the other different sounds we find while tuning the bands."

"... wonder how soon it will be before someone writes some software that will use the power of newer computers. Might not be long before we are talking Digital!"

Charles Brain, G4GUO, is doing the digital voice test being referred to. He has tested it on 20 and 40 meters. So far he has developed an experimental state of the art PC board costing \$300 in parts. It is not commercially available... yet.

The voice encoder/decoder is a printed circuit board controlled by a PIC micro-controller with a 29 MHz clock. It uses a commercial speech processor operated at 2400 bps. He has provided a total solution to many problems encountered with the transmitting and receiving digital voice on HF using current technology. The system uses a commercial modem and includes communications protocols with PPT.

In the past 24 months he has been dealing with the special challenges of HF radio. He has applied several simulation techniques with on-the-air trials to optimize the design. Consideration of errors from weak signals and phase error from multi-path propagation greatly affected the design. His current design uses a DQPSK mode resulting from 36 tones spaced at 62.5 Hz intervals. It is a mode used by the military and is compatible with most HF transceivers.

His first two-way voice communications was in March 1999 on 40 meters. He has since used 20 meters and has focused on poor signals to help optimize the design. There is no outlook for when this mode may be available for wider use. However, it seems to the most advanced development on this topic at this time. You can read more about the digital voice being tested at G4GUO's website (<http://www.chbrain.dircon.co.uk/index.html>).

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SEPTEMBER 14, 2001**

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**ELECTRONIC  
 COMPONENT PARTS**  
 (NEW AND NEW SURPLUS)

- LARGE SELECTION
- HIGH QUALITY
- LOW PRICES
- IN-DEPTH INVENTORY

**WE STOCK THE FOLLOWING:**

AC CORDS	IC'S	SOLDER
CAPACITORS	LAMPS	SWITCHES
COAX CABLE	LED'S	TRANSISTORS
CONNECTORS	MOTORS	TRIACS
DIODES	POTENTIOMETERS	TRIMPOTS
ENCLOSURES	RELAYS	VARIABLE CAPS
FANS	RESISTORS	WIRE/CABLE
FUSES	SCR'S	ZENER DIODES
FUSEHOLDERS	SHRINK TUBE	LOTS MORE

TRY GLENWOOD FOR ALL YOUR COMPONENT REQUIREMENTS

**FULL LINE DISTRIBUTORS FOR**

<u>NTE</u>	Replacement Semi's	<u>TYTON</u>	Cable Ties
<u>PRB</u>	VCR Belts & Accy	<u>PROTEK</u>	Test Gear
<u>GC/THORSEN</u>	Tools & Chemicals	<u>MUELLER</u>	Test Leads
<u>SL WABER</u>	Outlet Strips +	<u>GOLDSTAR</u>	Test Gear
<u>WAHL</u>	Soldering/Drilling	<u>PALADIN</u>	Tools
	Tools & Accy		