The Link

July 2003

The Official Journal of the Buffalo Amateur Radio Repeater Association, Inc.

Join Us for the Annual Mobile Clinic and Picnic

July always finds the BARRA crowd at our Cole Road repeater site for the Annual Mobile Clinic and Picnic. It's our annual summer opportunity to see our "flagship" repeater site, check out our rigs, and enjoy a picnic with our fellow members and families.

Started in the days when mobile rigs were a bit drifty and often home-brewed, the Mobile Clinic was the time when those without sophisticated test equipment at home could check out and tweak up their 2 meter rigs. Today's "rice boxes" may not need the constant internal attention as the old rigs, but there is still the occasional rig that comes out of the box with poorly set deviation, or a CTCSS tone level set too low, or whatever. Come find out what your rig's stats are!

The picnic portion of the event is a bring-your-own. BARRA will provide grills at the site for cooking. Please note that our rural repeater site has no comfort facilities, so please plan ahead. The site is not hard to find, and a map with directions appear on this page.

Monday, July 21st is the date, with a rain date of the following Monday, July 28th. Gathering time is in the post-5PM time frame and the festivities will continue until dark. Drop in whenever you can at any time throughout the evening -- bring the spouse, or bring a ham friend and introduce them to BARRA. The site is ready for us -- everything was mowed on Sunday the 12th by a crew consisting of Dave, KC2JUF; Sandy, KC2LGK; Dave, WA2TVT, and Ed, W2EAS. A big THANK YOU to the mowing crew!

So, plan on spending a summer evening with the BARRA bunch -- see you there!

Another Field Trip/Tour Opportunity

Joe Puma, chief engineer of Radio for Western New York Public Broadcasting (WNED) has agreed to conduct a tour of the WNED AM / WHLD AM transmitter site on Cloverbank Road in Hamburg. This is a five-tower site with two 5 kW AM stations diplexed on all five towers. It may not have all the glitz of the WNSA site we visited last month but it's a lot closer to most of us.

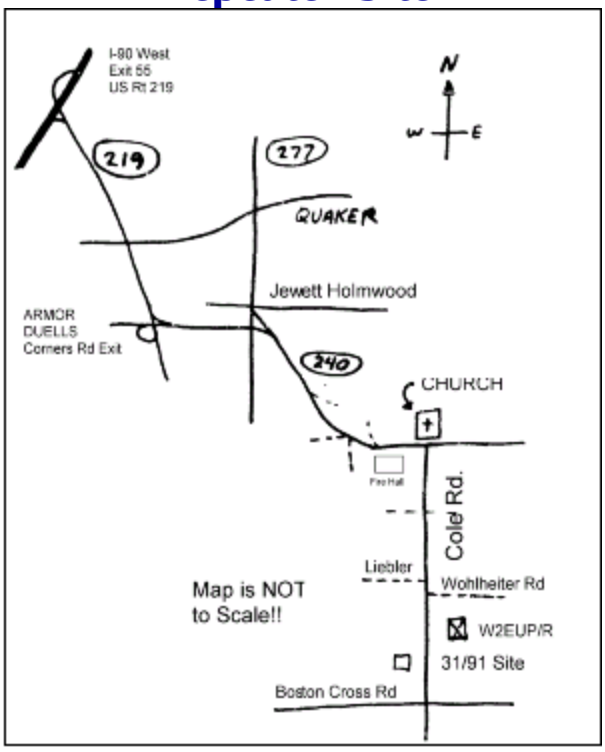
Joe has agreed to keep **Monday August 4th at 7:00 PM** open for the tour.

This is a site that I have a lot of familiarity with. I was involved in the planning and execution of the diplexing project, so I may have a few cents to add to the conversation that night.

So mark your calendars. I will be taking an RSVP head count in late July -- see me at the Mobile Clinic or drop me an email at dave.halik@verizon.net. The summer will fly by so don't miss this one!

73 de Dave, KC2JUF.

Map to Cole Road Repeater Site



TO W2EUP/R FROM BUFFALO:

Take the Thruway, I-90, westbound, to Exit 55, US Rt 219.

Continue down US 219 to the Armor Duells Corners exit (after Mile Strip Rd).

At the top of the exit, turn right.

Proceed to intersection with Rt 277, and continue straight through.

Proceed along Rt. 240 about 2.1 mi. as it bends and twists its way along. Watch for a fire hall on your right – Cole Rd is soon after!

After the fire hall, very shortly on your left is a white church. Almost immediately is a right turn, watch for yellow "T" sign – this is Cole Rd! Turn rt. onto Cole Rd.

Proceed along Cole Rd approx. 6.1 miles. The site is less than ½ mile from the intersection of Liebler and Wohlheiter Roads. Look for two 100 ft. towers on your left.

Turn left onto dirt road just past a pond and small house. Go up small hill and watch for directions for where to park. DO NOT PARK ON THE DIRT ROAD – IT IS A DRIVEWAY FOR A RESIDENCE!

The Mobile Clinic will begin around 5:00 pm and continue until dark, or thereabouts. In case of "iffy" weather, listen to 146.91/444.00 for updates about local conditions in Boston.

Buffalo Amateur Radio Repeater Association, Inc.

Club Officers & Directors

President	Nelson Oldfield WA2ZSJ '03	634-6394
Vice President	Doug Alderdice KA2WFT '03	834-2664
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Voice Repeaters

WB2JQK		29.68 -	Boston
K2ISO		145.17 -	Wethersfield
K2DSN	PL 107.2	146.73 -	Niagara Falls
W2EUP		146.91 -	Boston
N2YDM	PL 107.2	147.00 +	Kenmore
W2EUP		224.82 -	Boston
WR2AHL	PL 110.9	442.00 +	Wethersfield
WB2DSS	PL 151.4	443.925 +	Niagara Falls
WA2HKS		444.00 +	Buffalo
WB2DSS	PL 151.4	444.75 +	Kenmore

UO-14 Retransmissions

The downlink of amateur satellite UO-14 is retransmitted on every pass over the Buffalo area on our 444.00 and 146.91 repeaters. For information on uplinking to the satellite, see the BARRA web page.

RAWNY Net

Stop by Monday evenings at 7:00 pm and join the RAWNY club's net which meets on our 146.91 and 444.00 repeaters.

BARRA on the Internet

http://barra.hamgate.net

Back issues of The Link and a membership application are available on our web site.

The BARRA E-Mail List Serve

To join, send an e-mail message to:

majordomo@hamgate.net

with the message subscribe barra in the main body of the note.

To send a message to the list subscribers, address your e-mail to:

barra@hamgate.net

The Link is published eight times a year by BARRA, the Buffalo Amateur Radio Repeater Association, Inc. The opinions expressed herein, however, are not necessarily those of the Board of Directors or membership of BARRA. Letters to the editor are solicited and must be signed. Names and addresses will be withheld if requested. Material for *The Link* should be sent to the Editor:

Buffalo Amateur Radio Repeater Ass'n
P.O. Box 507
N. Tonawanda, NY 14120-0507

or may be submitted electronically to the editor's e-mail address: ka2wft@arrl.net. The editor may be reached by telephone in the evenings at (716) 834-2664.

DISTRIBUTION

The Link is available in both print and electronic formats. If you wish to receive *The Link* in the Adobe cross-platform PDF format by e-mail instead of regular mail, please notify the editor at ka2wft@arrl.net.

ARTICLES

Articles for the *Link* on any subject, technical or general interest, are always welcome and encouraged. When submitting material to the *Link*, please type it or submit it electronically, if possible. Remember that the editor reserves the right to make necessary changes including reformatting and condensing for space and that Full Membership may be obtained by writing articles.

***LINK* DEADLINES**

All material must be submitted to the Editor by the end of the month previous to the issue (e.g. December 31st for the January issue). Of course, if the material is received earlier than that date, you will have a better chance of getting your article in the next issue. All advertising is subject to the same deadline.

ADVERTISING

Want-Ads are free to BARRA members and are published in the next available issue. Ads from other hams are accepted free on a space-available basis. Ads appearing in other club newsletters with which BARRA has an exchange agreement are reprinted on a space-available basis.

Display advertising is available at the prevailing rates. Business card size is currently $2.00/mo; full page is $16.00/mo. Contact the editor for rates for other sizes.

DUES

Basic membership rate: $20.00
Family member in the same household as first member: $3.00
Discounts from basic rate
Senior Citizen (65+): -5.00
Disabled: -5.00
Voting member: -5.00
Full-time student with ID: -5.00
Each new member recommended: -1.00

Note: A voting member is a member who has performed a service for BARRA (e.g. helped out at an activity, written a *Link* article, etc.).

Greater Buffalo Hamfest & Exposition

WNY ARRL Section Convention

Sunday, August 3rd, 2003, Main Transit Fireman's Grounds, Main Street near Transit Rd, Williamsville.

20 acres of Pure Ham Radio Excitement ... at its best!
Hamfest / convention Web Site: http://gbhamfest.hamgate.net/
Complete with .....

Midway, All You can Eat Pan Cake breakfast, huge flea -- 20 Acres,

Several army vehicles, several communications trucks, fireman demos, Fox Hunt, disaster prepardness,Ham dealers, contests , trophies, demos, forums, FREE parking, VE testing , plus much more!

You can enter to win...

"the Vehicle with the Most and Gaudiest Antenna Array Contest"

Trophies for winners..

You have seen the cars with all of those antennas .. Now is your chance to show off and win a nice trophy!

For information email : wgittere@buffnet.net

"WNY Section Clubs convention champion contest"
Entering section clubs will compete in a club show down
Take home the Club Champion Trophy

For general information:
Hamfest / convention: http://gbhamfest.hamgate.net/
VE Test session: http://gbhamfest.hamgate.net/GBSHF_test.htm
Maps & Directions: http://gbhamfest.hamgate.net/GBSHF_location.htm

Don't Forget to Get Your BARRA Mug!

These great looking, sturdy, quality ceramic mugs sport the BARRA buffalo logo, are dishwasher safe, and let you show your club colors in style!

Only $5.00 Each!

Available at all club meetings

RC Soaring

Bill Pike, K2ILH

Hams are interested in many esoteric activities and some of them are attracted to RC soaring. The operation of RC sailplanes can present many opportunities to apply electronics know-how. Sailplanes are distinguished from gliders in that the latter generally gain altitude with assistance and, after release, progress to lower heights, while sailplanes gain height after release.

Soaring has been around since long before the Wright brothers made their historic flight 100 years ago. While often referred to as "unpowered," sailplane power comes from the air around us. That air is moving vertically as well as horizontally and can carry aircraft with it. The addition of a remote control system allows us to maneuver an unmanned aircraft into the desired air conditions or, taking advantage of them, to fly the aircraft where we want it to go.

The usual means of remote control is by radio operating in the 72 MHz band where 50 channels are available. The 50 Mhz amateur band can be used by hams and has 10 channels from 50.80 to 51.00. The old 53 MHz frequencies are discouraged. Some flyers do "roll their own" for these frequencies but commercially made equipment is available from many of the same manufacturers that build for 72 MHz.

When utilizing "air" power, the "fuel" lasts as long as the air moves and extended flights may be limited only by the capacity of the batteries used for the electronics. A set of 4 AA nicads will usually run the gear for several hours and other battery technologies can provide over 8 hours in the air.

Launching sailplanes is done by any appropriate means such as hand toss, manual tow, auto tow, winch, elastic launcher, air tow, electric motor, or even a swift push with the foot. There are basically two types of lift that carry the sailplane aloft. Thermals (rising warm air) can take the plane to great height, limited only by the pilot's ability to keep the plane in sight. Slope lift is produced by air being deflected upward by terrain and results in close-in operation and heights limited to a few hundred feet. Frequently these combine to make a wide range of operations possible. Besides the fun of operating remotely controlled aircraft, playing with other on-board gear can be fun for the ham. Telemetry systems can provide information about the aircraft's rate of climb and, when combined with GPS, its speed, distance, and location. Video transmissions provide a bird's-eye view but planes are seldom flown beyond visual range. Because of weight considerations this gear must be small and light but the lack of noise and vibration in a sailplane can be an asset, and without wet fuel the environment is clean and dry.

A useful telemetry tool is the variometer. This barometric device translates air pressure into a tone modulated radio signal that varies in tone frequency with altitude. Listening to the changing tone helps the pilot find thermals. Commercial radio variometers operate on 433 MHz. GPS can be as simple as placing a hand held GPS unit in the aircraft and examining the saved data (max. speed, distance, etc.) after landing. Further enhancement could involve a microcontroller and transmitter to relay real-time data.

Still camera arial photography is easily implemented with digital still cameras. Surplus (discontinued) cameras are often available at low cost and remote shutter operation is fertile ground for the ham.

TV fans can relay live video back from the plane for viewing or recording. A popular 2.4 GHz unit available from X-10 can yield good video and will give the opportunity to experiment with increased range through antenna improvements.

When electric motors are used to assist in reaching altitude their power and control systems are of interest to the technologist who may choose to build their own speed controls or even to build their own motors. Competition in limited motor run events require timing devices.

With the recent easing of requirements for Amateur Radio licenses some flyers have been motivated to acquire use of the relatively unoccupied 50 MHz frequencies by becoming hams. Having found their way to ham radio they have become aware of our interesting hobby. Perhaps some of us would enjoy the world of silent flight that touches ham radio through RC soaring.

Bill has more photos and descriptions of his planes on the web at http://home.att.net/~billpike/rc/index.htm

Breakfast With Ted

A Technical Series for The Link
By Dave Halik, KC2JUF

In this technical series I will attempt to take on the task of writing about concepts in electronics as they relate to the club.

The first time I visited the Cole road Repeater site with Ted, WA2HKS, we entered the small "A" frame on the top of the hill and I started to look around. "Hey, Ted what are all these RCA cables plugged into this rack panel?" I asked. "Those are the audio and control cables, the panel is the controller", Ted replied. As I look closer at the wiring I wondered where the control wires were. "Ted", I asked, "Where are the control lines into the controller". "You're looking at them," he said. "But I thought these RCA cables were the audio from the receivers and to the transmitters" I said. "They are" answered Ted with a smile. "OK, are these RCA cables for audio or control?" I asked in a tone that indicated that I didn't want to play this game any more. "Yes both", replied Ted. Not wanting to sound like we were doing an Abbott and Costello routine I asked, "Please explain!"

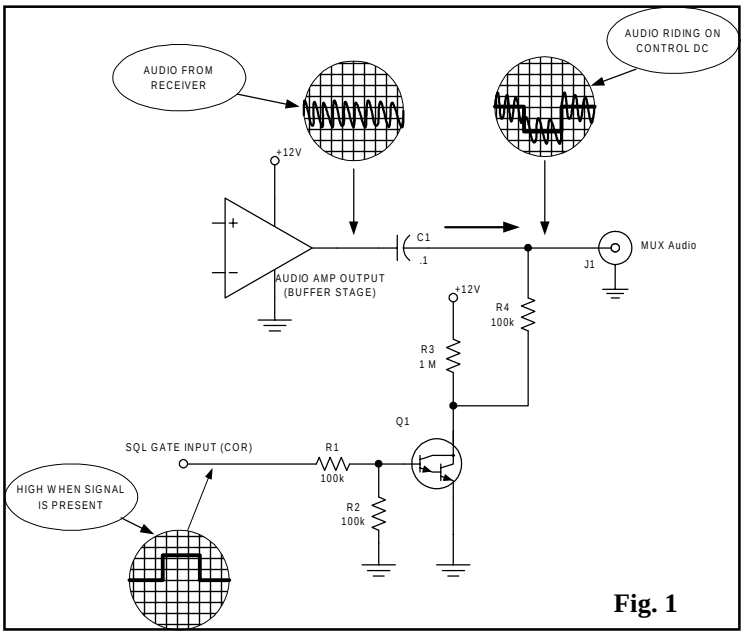

Fig. 1

Ted's response explained just what was going on with the RCA cables — "When Gil designed the controller he multiplexed the audio and keying on one cable". Ted went on to explain the receivers each sent audio and COR (carrier operated relay) on one cable, and that the transmitters also accept audio and keying on a single cable. Ahhh I replied as the light went on in my head. "Say no more," I told Ted, "I get it." And the funny thing is I thought I did until I decided to interface a pair of linking radios to the controller.

Just like the founding fathers creating the US constitution attempted to form a more perfect union, Gil, W2EUP, designed a perfect interface to the repeater controller. Simple and eloquent. The concept of multiplexing the control signals (Keying and Carrier Operated Relay, COR) with audio means that in the event of a complete controller failure, any of the receivers can be plugged directly into any of the transmitters to restore repeater functionality, just by plugging in one cable. This also makes the controller design simpler. The controller, it turns out, is simply a "Matrix" or a cross point switch. Each of the inputs from the receiver (audio and control multiplexed) can be feed to any of the transmitters. This is how multiple receivers can easily feed any transmitter. The controller does more then that, it can mix selected audio sources, and make sources background to others. The Controller also decodes DTMF tones and much more.

OK, so I'm building this link system and I have to MULTIPLEX the control and audio on one cable. I have a good idea how it should be done but not wanting to reinvent the circuit I give Ted a call "Hey Ted, do you have a copy of that MULTIPLEXER circuit?" I asked. "Meet me for breakfast and I'll give you what I have" replied Ted

"Good morning Ted," I said as we walked up to the counter and I glanced up at the full color pictures of the breakfast menu." I'll have a number 3 with coffee, just sweetener." Ted never even had to tell the lady what he wanted, she just put his usual order on the tray and Ted put the exact change on the counter. "Thank you" he responded. "Follow me Dave, I have a table here." Ted stirred his coffee and opened a notebook containing drawings, hand written notes on graph paper, and printed schematics of all sorts of circuits and systems. "Take a look at this, I found this in some stuff I got from Gil." Ted placed the schematic on the table facing me and proceeded to explain every detail of the circuits. It was just like a time warp back to my days in tech school. For just a moment I was suspended in time thinking about Gil's design and Ted's professor-like dissertation.

It turns out that to multiplex control and audio on one cable, two circuits are needed. One circuit is used for sending audio and inserting DC on to the cable this is called the Multiplexer. The other is used to receive the audio from the cable and sense the DC, this is called the De-multplexer.

The multiplexer circuit is connected to the receiver as shown in Fig. 1 The output amp stage drives about 2 volts P-P (@ 1KHz) of audio down the cable thru C1. This capacitor blocks the DC voltage at the output of the opamp from the DC on J1. R3 feeds DC to J1 through R4. If a signal is received, the input to R1 goes high and turns on the Darlington transistor Q1. With Q1 turned on, the voltage at the junction of R3, R4, and Collector of Q1 goes low (<1.2 volts). This low represents an active keyed state. Note that R4 100K ohm prevents the audio from being shorted to ground.

I looked up at Ted and he sipped his coffee. "Do you follow me so far Dave?" "Yep, please go on." Focused on the drawings again Ted goes on.

Continued on the next page

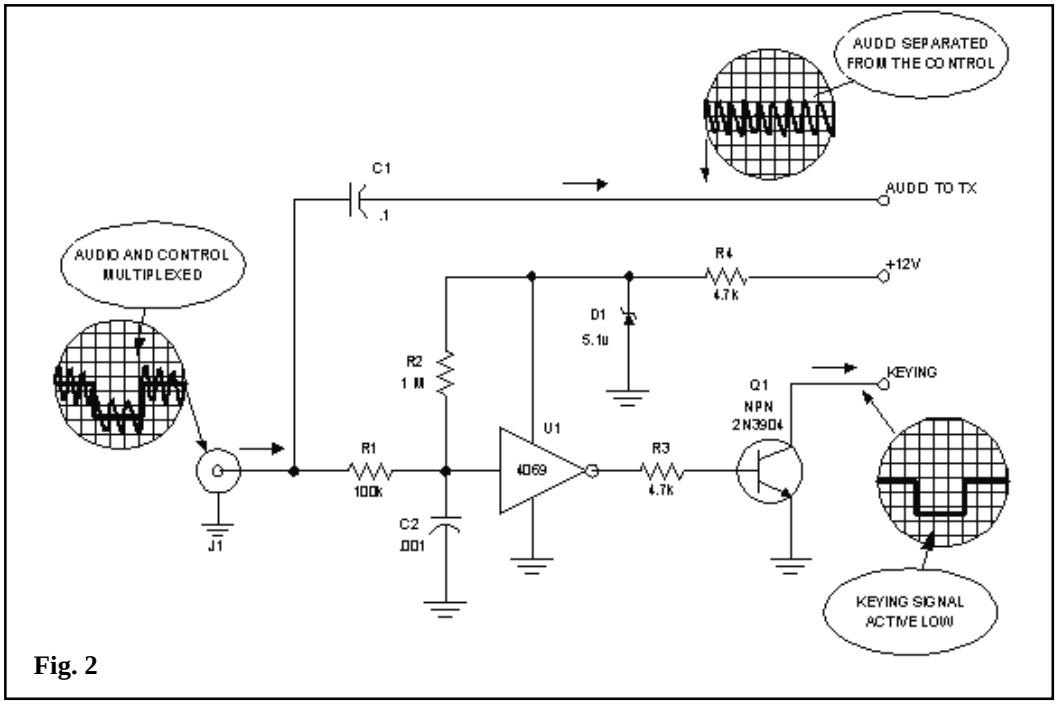

Fig. 2

At the transmitters we need a de-multiplexer circuit. Fig.2 shows the audio and control enter the circuit on J1. The audio is stripped off through C1. The control signal (DC) is passed into the inverter U1. C2 removes any remaining audio to prevent chatter at the collector of Q1. The zener diode D1 forms a regulated voltage source for U1. This sets the inverter threshold at a fixed trigger voltage (>2/3 VCC and <1/3 VCC). The output of U1 drives the base of Q1 through R3. The Collector of Q1 is an active low keying signal (connected to the transmitter PTT line). R3 is a pull-up resistor that holds the input of U1 high to prevent Q1 from keying the transmitter when the cable is disconnected from J1.

"That's all there is to it Dave." Ted got up from his seat and grabbed his coffee cup. "Twenty-five after, time for my refill before I go." As Ted walked to the counter the lady working there walked up and got ready to pour his refill. Ted returned to the table and packed up his papers and notes. "Ted did you forget this?" I held up the schematic that just a minute ago was the focus of our attention. "That's your copy, put it in your notebook. I've got to go to work now. I'll talk to you on 444." We both headed for the door. "Thanks Ted, will I see you for breakfast again?" Count on it.

In the next issue we will discuss other little known facts about the Cole Road repeater site when we meet for "Breakfast with Ted."

About The Author. Dave Halik, KC2JUF, is an RF engineer currently working in the microelectronics field. He is the former chief engineer for Citadel Broadcasting, Mercury Radio, and former senior engineer for S&B Communications - "The Broadcast Engineering Group." He has an extensive background in industrial control and high power broadcast. Dave is a new ham with a lifetime interest in the hobby.

Remember that The Link is available in cross-platform Adobe Acrobat electronic format, delivered crisply and neatly to your email in-box. Help the club save a few bucks on postage and printing, and receive a pristine COLOR newsletter in return. Contact your editor to sign up!

Batavia Hamfest and Computer show

July 19th 2003 at Alexander, N.Y.

on Rt 98 1 mile south of Alexander, N.Y.

Come and enjoy a Saturday morning. Lots of Prizes -Radios & Money

- Admission only $5.00
- Flea market Free
- The inside Hall will open at 7:30 Am.
- Breakfast starts at 6:30 Am.
- Chicken Barbecue starts at 11:00 Am

Questions , contact Harold Hay
wa2abq@localnet.com

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Calendar of Events

GENERAL MEETINGS

General meetings are held at St. Bartholomews Episcopal Church, Brighton and Fries Roads, Tonawanda, across from Kenmore East HS. Doors open at 7:00 pm for rag chew, business meeting at 7:30, with program following.

Monday, July 21, 2003 -- Annual BARRA Mobile Clinic and Picnic at the Cole Road repeater site. Bring your own picnic supper and your rigs to be checked out.

Monday, August 4, 2003 -- Tour of WNED AM/WHLD AM transmitter site, Cloverbank Road, Hamburg, 7 PM. RSVP to Dave Halik, KC2JUF, dave.halik@verizon.net and get detailed directions.

Monday, September 15, 2003 -- Program topic TBA.

Monday, October 20, 2003 -- BARRA Annual Meeting and election of officers.

NO GENERAL MEETINGS IN MARCH, MAY, AUGUST OR NOVEMBER
The *Link* is not published in those months.

BOARD MEETINGS

Board Meetings are held the second Monday of every month at Crest A/V Electronics, 1570 Main Street, Buffalo, between Michigan and Ferry Streets. The meetings begin at 7:30 PM and members are always welcome to sit in on a meeting or bring concerns to the board.

TECHNICAL COMMITTEE

The Technical Committee has formal meetings the first Friday of every month at 7:00 PM in Room 117 of the BOCES Potter Road Career and Technical Center, 705 Potter Road, West Seneca (Corner of Slade, Potter and Orchard Park Rds). Come on out to BARRA's own CCITT (**C**offee & **C**rumpets **I**nterrupted by **T**echnical **T**alk), where progress of current projects is evaluated and new projects are planned. The meetings usually conclude with munchies at a nearby restaurant.

The 2003 Empire State Games will be held in Buffalo July 23-27. Communications for the Games will take place on our repeaters during this time and we ask your indulgence for this important Public Service event. Members wishing to volunteer their time for Games communications should contact Bob, KD2IM, at 607-347-4444, or at bob.brackett@mt.com or kd2im@bluefrog.com.