QRZ NEWS

A MONTHLY PUBLICATION OF
SOUTHERN PENNSYLVANIA AMATEUR RADIO CLUB, INC
PO BOX 1033 - LANCASTER, PA 17608-1033
(Founded June 1960)
AN AFFILIATED SPECIAL SERVICE CLUB OF THE ARRL, INC.
"Public Service through Communication"
Website: WWW. K3IR.org
Email address: k3ir@arrl.net
Repeaters: 145.230 - 449.975 - Packet 145.030 - ATV 923.250, FN10se
Club site 1715 Breneman Road, Rapho Twp. (Manheim P.O. 17545 no delivery)

April 2011

President's Message

CAMP CAN DO

One of the objectives of the Board of Directors is to fulfill our non-profit objective of public service while promoting Amateur Radio. We have been successful in aiding area organizations by helping with several events, in cooperation with other radio clubs in the area. Examples are the Lancaster MS walk, the MS Bike Tour, the TMI and Peach Bottom drills, and the Columbia Halloween Parade.

Those are worthy causes but we can do more. Several months ago I contacted the Lancaster Chapter of the American Cancer Society offering our help with one of their programs called Camp Can Do. The ACS holds two programs at Camp Gretna Glen each summer. Camp Can Do is a special needs camp for young people with cancer. The second is the Sibling's Camp for the brothers and sisters of cancer victims. The American Cancer Society realizes that cancer also places a burden on the family of the victim and wanted to provide a camp experience aimed at helping siblings deal with the situation.

We have been asked to provide a one hour long program featuring HAM radio for the Sibling Camp. Our activity is scheduled for Sunday June 5 at 1:30 PM. One Club member has already expressed interest in doing an FLDIGI demonstration and I would like to have a portable HF station in operation. We will need volunteers to assist with setting up the stations (practice for Field Day?) and also volunteers to monitor the airways from home to provide contacts.

We are still in the planning stages. As soon as we decide on operating frequencies and modes I will contact club members via email. If you are not a member of SPARC but are interested in helping drop an email to k3ir@arrl.net and we will include you in the email list. ALL ARE WELCOME.

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FIELD DAY

Okay, this month I get to bug you about two things. Field Day is coming up. SPARC again will operate from the Club site at 1715 Breneman Road. If you are looking for an intense weekend with cut throat competition we are probably not for you. We have a lot of fun, and actually score fairly well but the real emphasis is on operating while enjoying some time with other HAMs and our neighbors. We

always try to encourage new HAMs and those who don't normally operate a lot to take the mike and make a few contacts.

The food committee of two – George and his daughter – have the most important part nailed down. We do need a logistics coordinator and someone to handle publicity. The logistics pretty much takes care of itself as far as rigs but we need to make sure we have a generator and fuel lined up. Publicity is mainly aimed at our neighbors, maybe some posters in area stores and a few small signs placed around the area. Placement of signs should be cleared with Rapho Township.

The Board of Directors does a lot to allow these activities to take place and we all appreciate their efforts but our real desire is to see the membership take an active roll in the club. Please consider supporting both Camp Can Do and Field Day.

Harry, WA3FFK

MINUTES OF THE MARCH 2011 MEETING OF THE SOUTHERN PENNSYLVANIA AMATEUR RADIO CLUB (SPARC)

Held Tuesday, March 22, 2011 at 7 PM at the Rapho Township Municipal Building

The following members and guests were present:

Harry Bauder, WA3FFK
Jon Rudy, K3QF
Mike Warner, N3XPD
Jack Reed, N3BBC
Jim Silvius, KW3E
Glenn Kurzenknabe, K3SWZ
George Gadbois, W3FEY
Conrad Nasatka, WB3DQD
Ted Freedman, K3KSA
Gerry Wagner, KB3SSJ
Bill Mahan, KB3MEW
Dan Milligan, KA3KHR

The meeting was called to order at 7:00 PM by Harry Bauder, with a round robin introduction by name and call.

The scheduled technical session was delayed while Jim Silvius left to get a laptop for the presentation. The business meeting was opened immediately after the introductions.

General Topics

Harry summarized the February minutes as published in the March newsletter.

Harry then reviewed the March Board of Director's minutes for the membership.

Ted Freedman moved, seconded by Jon Rudy that both reports be accepted. There being no objections, the reports were accepted

Mike Warner read the Treasurer's Report as of March 22nd. Gerry Wagner moved, seconded by Ted Freedman to accept the report as read. There being no objections, the report was accepted.

The membership application of Jack Reed, N3BBC, was read by Harry. Gerry Wagner moved, seconded by Jon Rudy that the application be accepted. There being no objections, the application was accepted.

Upcoming Activities

- Field Day planning was reviewed by Harry. Jon Rudy will be unable to participate in Field Day because of family commitments. A Field Day chairman is needed ASAP. A separate publicity chairman is also needed to spread the work around. We need an all night CW operator to fill Jon's FD score collecting position.

- JOTA is in mid October. Early planning is in progress. The objective is to include training for the Radio Merit Badge. The requirements are very close to the requirements for a Technician License. Harry is in contact with last year's group. Jack Reed will contact

scouting people he knows to see if there is any interest.

- SPARC would like to sponsor a General and/or Extra class licensing course. We need a lead instructor to handle this task and a place to teach the class. Several members have expressed willingness to fill in when needed, but are too committed to take on the lead instructor position.
- The visit to the Ron Frisbie Marconi Museum is scheduled for 10:00AM, Saturday 21 May 2011. Harry will send an email to the membership inviting them to attend. A count of attendees is needed because of limited space.

Ted Freedman moved and Jim Silvius seconded to close the meeting at 8:00PM

A technical presentation on the art and science of HF contesting by Glenn Kurzenknabe, K3SWZ followed.

Respectfully submitted,
George Gadbois, W3FEY
Acting Secretary

Recycle Program

We haven't been running this column each month because there have been no significant changes in handling for recycle materials. Recycling is still a major part of our monthly income. Recycle prices are up a little. Aluminum cans, copper, and copper alloys bring good prices. Old coax can also be salvaged.

We need everyone's help to keep this revenue coming in. Please take recyclables to Dave Payne's mini recycling center at 1373 Malleable Rd, Columbia or to a SPARC club meeting. You may also place recyclables in the box at the SPARC club site.

The SPARC truck still has not been sold. I t is not equipped for snow plowing. If you know anyone looking for a heavy duty pickup, contact Dave Payne, N3LOM .

Coming Events

SPARC programs for 2011
Tuesday 26 April Jon Rudy, K3QF. "Burkina Faso DXpedition Report"

Tuesday 24 May Field Day planning session

Tuesday, 28 June Phil Theis, K3TUF, will present a talk on "Solar Basics: Bimodal, Hybrid and Grid-tied"

If you would like to offer a presentation for a future meeting, please contact George, W3FEY . We need programs for July through the rest of the year. The September program must be at the club site or another venue. The Rapho Twp meeting room is not available.
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Spring VHF Sprints

Dates for the 2011 Spring Sprints will be: 144 MHz - Monday, April 11; 222 MHz - Tuesday, April 19; and 432 MHz - Wednesday, April 27. Each of these will be from 7pm to 11 pm LOCAL time. The Microwave/902 MHz & Up Sprint will be on Saturday, May 7, from 6 AM until 1 PM local time. The 50 MHz Sprint will be from 2300Z Saturday, May 14, until 0300Z Sunday, May 15, 2011.

73,
Bill - K3EGE
***

SPARC Visit to Marconi Museum

On Saturday, May 21, 2011 at 10:30AM there will be a tour of Ron Frisbie's Marconi Museum in Akron, PA.

We need to know how many people are coming. Please send email to W3FEY with

your reservation. XYLs may find this museum interesting.

See photos at the end of this newsletter.
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June VHF QSO Party, Begins 1800 UTC Saturday, ends 0300 UTC Monday (**June 12-14, 2011).**

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25-26 June 2011 ARRL Field Day Please put this on your calendar. More details as the date gets closer.

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Green Bank Star Quest 8, June 29th - July 2nd, 2011

Star party at the National Radio Astronomy Observatory. There are few opportunities to see the Greenbank observatory. See http://www.greenbankstarquest.org/ for details. I am sure they will not allow any radios.

Aphelion, Monday, 4 July 2011 at 1500UTC

This is when the Earth is at its' greatest distance from the Sun and the approximate maximum of the Summer Es season. Look for Es openings on 6m from about two months before aphelion until two months after aphelion.

Editor's Notes

This month there is a lot of emphasis on Field Day past and present. Jim Ibaugh has prepared some Field Day memorabilia at http://www.k3ir.org/QRZ_News.html and http://www.k3ir.org/Field_Day/fieldday.pdf.

Harry Bauder summed up the operating objectives in his column above. Let's get out in the field and do it!

Those interested in photovoltaic solar energy should put the June 28 meeting on their calendar. Invite your friends as this will be a high end presentation by Phil Theis on "Solar Basics: Bimodal, Hybrid and Grid-tied"

Future meeting programs are summarized at the beginning of the Coming Events section above. Check there to see what future programs are scheduled. We need speakers for July and after. Keep those cards and letters coming.

73, George, W3FEY

ARES/RACES

As part of the SPARC commitment to emergency communications, the SPARC repeater system is maintained as available for linking with other area repeaters.

Lancaster County RACES VHF Net is held on the first Tuesday of the month at 2030 hours local time on the 145.310 MHz repeater in Rawlinsville.

The Lancaster County primary ARES/RACES repeater is on 145.310 MHz with minus offset and 118.8 PL.

Combined York County Amateur and ARES/RACES NET convenes at 8:30 PM (2030) Mondays on 146.97.

Pennsylvania RACES HF Nets are held at 3993.5 kHz LSB on all Sundays except holidays.

The statewide net is on the first Sunday of the month at 0800 hours local time.
The Central Area (including Lancaster County) net is at 08:30 local time.

EPA NBEMS Net, Tuesday, 7:30pm local EST,
3.5920mhz Mode: Olivia 8/500 1khz,
Net Mgr: WA3WSJ@arrl.net

SPARC Nets

SPARC holds nets every Tuesday at 2100 local time on 145.230 MHz minus offset and a PL of 118.8. The 449.975MHz repeater is linked to the 2m repeater for the net.

Club Officers

President Harry Bauder – WA3FFK
Vice-President: George Gadbois – W3FEY
Secretary - Dave Sarraf. - N3NDJ
Treasurer - Mike Warner – N3XPD
Repeater Trustee - Dave Payne - N3LOM

Nearby Nets of Local Interest

York County Sponsored Nets:

Tuesday Nets (Note new schedule for Technical Net)
Elmer/DIGITAL NET -- Tuesday, 8 PM on the York 146.97 Repeater --
The first 15 minutes or so will be open to questions. DIGITAL Communications testing will continue after that.
Friday Digital Net
Friday evenings starting at 8 PM on the 146.610 (PL:131.8 Hz) EARS repeater on Ephrata Mountain.

This is an excellent Digital net called by Bob, AB3GF. Check in is by digital, BPSK125.
It is an informal, well run net with plenty of Digital transmissions along with discussion by voice.
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Delaware Co. Mobile Sixers Net Schedule
Sunday 2000 50.550 MHz USB

PACKRAT MONDAY NIGHT NETS

Visit the Mt Airy VHF Radio Club at:
http://packratvhf.com/airtimes.htm for the latest information on VHF/UHF nets.

QRZ News Publication

QRZ News is published monthly on the third Tuesday of each month, one week before the monthly meeting. Deadline for article submission is the third Monday of each month. If a large amount of editing is required, earlier submission is required.

We operate on an exchange basis with other non-commercial publications. Articles printed in QRZ News may be reprinted in a not for profit publication provided proper credit is given

QRZ News is archived at
http://www.k3ir.org/QRZ_News.html.
Documents are in PDF format.

K3ITG/KL7's 1968 Field Day in Alaska

By James L. Ibaugh,
AA3C, ex-K3ITG / KL7

It was only two months 'til the National Field Day, the last full weekend in June 1968. I was so glad to pack away my snowshoes, my hips hurt from the daily trek out and back to the VHF/UHF radio **GATR-TR** (**G**round to **A**ir **T**ransmit & **R**eceive – **TR**ansmit only), split site. I was the **NCOIC** (**N**on-**C**ommissioned **O**fficer **I**n-**C**harge) of radio transmitter site, the squadron **MARS** (**M**ilitary **A**ffiliate **R**adio **S**ervice) station "AK1AP", the AFRN-FI (Armed Forces Radio Network - Fire Island) 640KC transmitter, AMBS station and the Auxiliary Amateur Radio Station "KL7FAO" which was attached to the MARS unit. When I got to the island there were only two licensed hams on the whole of Fire Island. I was the third. KL7EBM (an FAA systems engineer), a K6??? general class Californian radar A1C airman doing off duty volunteer MARS work and myself. Let me tell you a little about Fire Island.

In September 1951, the U.S. Air Force 626th Airborne Control and Warning (Radar) Squadron (AC&W) was established on the island at a base near center island on the 250 ft flat top hill called **Fire Island AFS**. Staffed by about 200 personnel, the base was an air defense radar center, a Nike surface-to-air missile site for NORAD, doubling as a Federal Aviation Administration air traffic control radar and communications site. Since the island is not connected to the mainland, all supplies came by helicopter from Elmendorf Air Force Base. During summer, by large barge from Anchorage. A few native fishermen, during fishing season, continue to occupy the village near the south end. I visited the native fishing village and asked them how Fire Island got its' name. They told me the island has been occupied on and off for maybe 5,000 years after the volcano stopped belching **fire** and smoke. There is a small lake just east of the squadron area that is all that is left of the fiery volcano. During WWII (1941) the Army came and bulldozed the top of the hill flat for a radar station and an antiaircraft gun battery. When I arrived here last year, men of the squadron had no idea how the island got it's name.

After the bear incident the first week I was here, I decided to take my Remington 308 caliber Safari Carbine along with me when I explored the island. We were allowed to keep our hunting and fishing gear in the NCO barracks as long as it is double locked in our closets. Hand guns were collected by the Master at Arms who just happened to be the squadron first shirt (Squadron First Sergeant).

The K6??? general class radar A1C airman left the island two weeks after I landed there. He was selling off his personal ham radio equipment and planned to buy a Collins KWM-2A when he got back to California. He had an almost brand new Hallicrafters SX-115 (triple conversion ham band only), $700 in 1968$'s,

he offered for sale. I only had $250 to my name, he took my offer.

HALLICRAFTERS SX-115 HAM BANDS

Back to the field day preparation. I had to recruit volunteers to man the MARS station "AK1AP" during field day because the trans-Pacific AI8' MARS H&W (Health & Welfare) message traffic from Vietnam was so heavy. The traffic from the 200 man (no females on F.I.) complement was a very small fraction of the total message traffic handled by gateway "AK1AP".

Before I did any planning, I made a quick appointment to see the squadron **C**ommanding **O**fficer. I really lucked out, the CO's brother was a licensed ham and he did field day with his brother for many of his teenage years. When I requested permission to do field day close to the squadron, I had sense enough to invite the CO to be a guest operator. He asked if I had picked out a location. I said I hadn't got that far into the planning yet. He suggested an unused Q-hut on the north side of the helo-pad because it is almost empty, it will soon be torn down and it is far enough from the radar and radio sites to reduce the QRM and/or RFI. I

thanked the CO for his suggestions and will include them in our plans. After saluting the CO and marching out of the building, I broke into a flat run to find the old Quonset hut on the western edge of the squadron near the tree line.

The Army must have made a million(+) of those sheet metal utility buildings during WWII. This one had electrical wiring but no hook up with the 626th Base Power Grid. That gave me an excuse to get the MD-18 "genny" emergency power generator worked on. I had the MD-18 towed over to the motor pool because the engine was a small four cylinder Willys jeep engine. They had a jeep parts supply and mechanics who liked working on jeep stuff. A quick stop at the NCO CLUB to borrow folding chairs and a 8ft bingo table.

KL7EBM (**E**mpty **B**eer **M**ugs) said he would be off the island that weekend but he would lend us his old Viking Ranger all band CW/AM transmitter. The Johnson Viking Ranger was a multiband AM and CW, VFO or Xtal controlled 75W (CW) and 50W (AM) transmitter. KL7EBM included the T/R switching and cables were ready to operate with a receiver.

E. F. JOHNSON VIKING RANGER

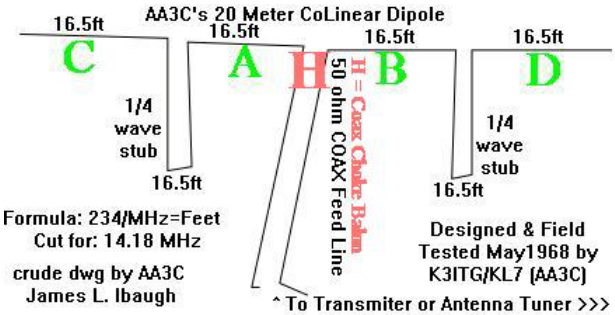
I called a meeting of all MARS operators and those interested in participating in the 24 hour practice emergency **F**ield **D**ay exercise. I made a list of primary things needed for the FD and asked for volunteers. At the end of the meeting all items on the list were assigned to one or more troops.

We decided early on that we would operate "1A" class, which limited us to only one operating station and that would take a crew of two. An operator and a logger at KL7FAO station. One of the operators had to be the site Operations Supervisor on Duty (OSD) with a general or higher class license. Since we only had two general class'ers, Crypto A1C (K4???) and me, we would take 8 hour shifts. By our democratic decision, we would set up one week before field day and conduct an 8 hour dry run, in 2 hour shifts, using our own call signs like K3ITG/KL7, etc. Field day we will all use the squadron Auxiliary ARS's, "KL7FAO" (Kilo Lima 7 Foxtrot Alpha Oscar) on voice & CW modes.

No, I didn't forget the antennas. We found a spool of 500 feet of #12 gauge red (?) insulated stranded copper wire. We also found a spool of 200 feet of AN/RG-8 coax. We cut it into two 100 foot lengths, that was enough to get into the trees from the Q-hut. The trees were about 25 to 35 feet tall and spaced about 20 feet apart. We put up a full sized forty meter dipole (65.91ft) and a twenty meter co-linear horizontal antenna.

KL7FAO's Colinear 20 Meter Antenna

The ¼ wave at 14.18MCs = 16.5 ft.
Gain about +3db gain (ref:half wave ant.)
50W @ 3db gain = 100watts ERP!



A coax choke balun was added at point "H".

Everything came together amazingly smooth for the dry run on the Saturday before FD. We set up the SX-115 / Ranger on 20 meter CW starting at 14.050MC and up. We tested AM on the phone sub band. After a couple hours on 20m we switched to 40. The Ranger worked very well on 40 meters and had 1.3:1 SWR at 7.100MC. We made over a hundred casual contacts in 8 hours (2hr shifts, almost everyone had a chance to operate). It works! We all went back to our regular duty for a week.

The Field Day crew met at the chow hall Saturday at 0600hrs FD breakfast meeting. We welcomed all to visit the KL7FAO Field Day Site, and a few did visit. We walked over to the Q-hut and opened the doors to air it out. We started the small kerosene space heater to take the chill out of the Q-hut and keep the GI coffee hot. We brought two gallons over from the chow hall in one of those stainless steel containers with a small spigot (faucet) near the bottom edge. What will they think of next? It was 0800hrs and only one hour to warm up the station. Both bands sounded in good shape to the lower 48 states. 1968 was the peak of a sunspot cycle and the bands up to 6M were very good. Both antennas were broad side to central USA (145°SE)... FD operation shifts: 0900hrs AK time(1300EST) to 1700hrs, 1700hrs to 0100hrs and 0100hrs to 0900hrs. Sign off at 0900hrs & Chapel Call. Chow Call at 1100hrs, 1300hrs FD clean up duty and 1400hrs is StandDown!

Get ready, set.....On the SX-115, WWV says: 1800HRS UTC. It is 0900HRS(AK), I said "Field Day Go!" I sent the first call out on CW**;** "CQ FD CQ FD de KL7FAO KL7FAO FD KN". I took the first shift on 20 meter CW and worked about 40 stations in the first hour. Everybody in the USA must have their beams pointed in our direction, the signals were so very strong, like S9+10db and a few up to S9+30db! I had to turn my RF gain down to about 50% to keep it from over loading the front end.

My logger was doing well for being his first time in the loggers chair. For the last two hours of my shift I QSY'd up to where the AM'ers do FD and showed my logger how it is done on voice. For the last hour of my shift we changed chairs, I did the logging and he made voice contacts. My logger/novice phone operator was on shortwave for the first time and made 12 voice contacts in 10 different states and afterward could not stand on his feet because of his ***totally overwhelming experience***, **he called it his Epiphany**. I called it my everyday hamming**.... ..**

The second FD shift operators stood behind us for the last half hour studying the band conditions and log sheets. Ham operators in the continental U.S. can't realize what the 20m band sounds like over seas. On Field Day from Alaska, it sounds like half the U.S. licensed hams are calling CQ FD from one end of the band to the other, it was a real great and glorious cacophony!

After my 8 hours, mostly on CW, I had to return to the AK1AP MARS station to do a full shift running weekly Saturday phone patches home, including two of my own. I was the MARS NCOIC, so I asked the duty operator A1C to take a long break and when he comes back to please bring a large pot of hot black GI coffee. When he returned hours later, he had a gallon of GI coffee and a bag of several thick GI fried Spam sandwiches with thick slices of onion and cheese. Life couldn't be better!

I could tell the 20m band was holding up well. I was running MARS AK1AP Gateway phone patches to the lower US on 13.985MC, just below the 20m ham band. I was a quarter mile from the FD site and couldn't hear any RFI. The fried spam & onion sandwiches were good but they reminded me that the FD crew did not have the room service that I enjoyed. I noted that one KWM2A wasn't being used at the moment so I spun the dial up to the Ham phone sub band and tuned around for a strong AM signal from KL7FAO. I found them deep

in a pile up working single sideband stations cross mode. I turned the 30L1 kilowatt amp off. In our practice shakedown last week I showed the crew how to work cross mode AM/USB, so I gave them a call on their frequency with my call, K3ITG/KL7. I gave them a FD point and asked if they had any coffee or chow over there at the Q-hut. They said the coffee ran out three hours ago and the **Tango Papa** supply also ran out one hour ago!. "Ok, roger the Tango Papa situation, K3ITG/KL7 signing off." Last week, we had one of those GI job johnnies mounted on wheels towed over and stationed behind the FD Q-hut. Nobody bothered to check the **T**ango **P**apa supply, so I grabbed 6 rolls of **TP** from the barracks supply closet on my way to the chow hall.

I borrowed one of the chow hall's hand carts and loaded it with a dozen GI spam, onion & cheese sandwiches and two more gallons of hot coffee. Then, I bought at the base PX in the next building, six big bags of chips, pretzels, and a case of Coke. Loaded it all on the cart and crossed the squadron and out to the FD Q-hut. I rolled the cart into the Q-hut and the first thing I saw and heard was the Lt.Col. 626th CO calling "CQ Field Day CQ Field Day from Kilo Lima Seven Foxtrot Alpha Oscar, K-L-7-F-A-O Field Day over." He had a return call and made the point. I pulled the A1C operations supervisor aside and asked how our CO was doing. He said, "Our CO had obviously been a FD op before, he has been operating for a full hour and making points as fast as we can. He started just after you called us about the coffee and Tango Papa problem".

Our CO worked another hour and added more points to our total. When he was done operating, he walked over to me and thanked me for the opportunity to work FD as KL7FAO and offered a handshake. While shaking his hand I said, "I am glad to have you on the Field Day crew, sir."

The KL7FAO crew finished FD operation at 0900hrs Sunday morning with a good score for a low power 50/75W (barefoot) AM/CW single transmitter class 1A station. Our crew of five airmen and one CO had worked well together. The equipment was returned to its' owners and the Q-hut was cleaned up and looked better than before we used it. The antennas and coax were taken down, rolled up and labeled and fully documented for use by next years crew. Coax and antenna rolls were stored in the MARS storage and supply room.

Wednesday, a week after FD, the CO sent for me. I went into his office and saluted him, he returned it. He asked me to sit down and said he has bad news. He waved an official looking paper. He said, "The 626th is being disbanded next year, 1969. **Our KL7FAO Field Day will be the very last here on Fire Island**. The MARS station AK1AP will be closed and decommissioned by April 1969. There will be only one more MARS NCOIC of AK1AP for next year, starting in October when you leave. I will expect your recommendation for a new NCOIC. Good luck in your civilian career....73's." I stood and came to attention.

We did a handshake and saluted.

I felt so bad about the closing of the 626th MARS and Aux Ham Radio Station KL7FAO that I forgot to mail in KL7FAO's FD score.

73's de AA3C, ex-K3ITG/KL7,
ex-AK1LE, ex-Sgt.USAF30454,

Making a Repeater on the Cheap

By Jon Rudy – K3QF

I have wanted to make my own "repeater on the cheap" ever since I cracked open my first 2-meter radio, a Drake TR-22C, in the 1970's.

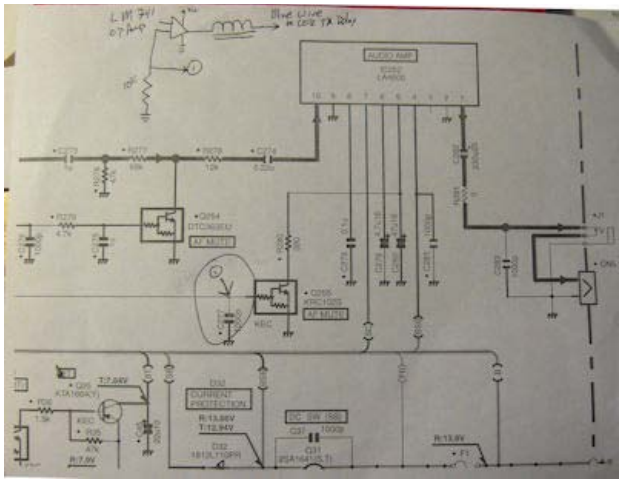
That early 2-meter radio was actually made by Kenwood. It was a rock bound radio (crystal only-no frequency synthesizer) and had completely independent TX and RX boards (see http://www.wb4hfn.com/DRAKE/DrakeManuals/TR22/Manual_TR22.htm for a schematic). The project imagination part of my brain couldn't help but dream about separating those boards and making a small repeater. That never became a project since I sold that little radio at a hamfest.

Fast forward to 3 months ago when a local ham friend of mine, Dale-N3BNA received 5 new Kenwood TM-271A 2-Meter radios that were meant for the Haiti Earthquake relief but never got shipped.

He has connections with a small non-profit and struggling broadcast radio station network in Haiti that needs 2-way radios to keep in touch with their remote transmitter from the main studio. He wondered if I could make a repeater out of two of these radios since the remote transmitter locations are not all in line of site from each other.

Dale told me that this radio station has a 2-way radio license for 143.900 MHz. I suggested that if we used a 4 MHz split, the RX being in the ham bands at 147.900, desense from close in TX/RX should be minimized especially keeping the TX power on low (derated to 10 watts) and separating the TX/RX antennas either vertically or horizontally. Given the few hams in Haiti, frequency coordination is apparently not an issue.

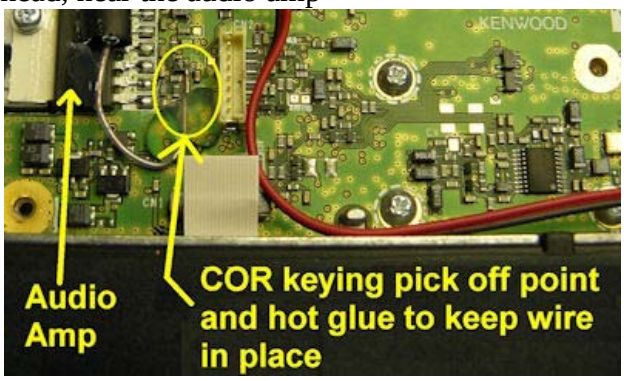
I responded that "sure it should be easy to make a repeater." I did a quick mental checklist for what was needed. First make some sort of carrier operated relay (COR) circuit that would key the TX when a RX signal was received. Second, connect the RX audio to the TX audio. Fortunately Kenwood has released the digital version of the service manual on line so I looked that up and began looking for the keying and audio points needed to pull off this task.



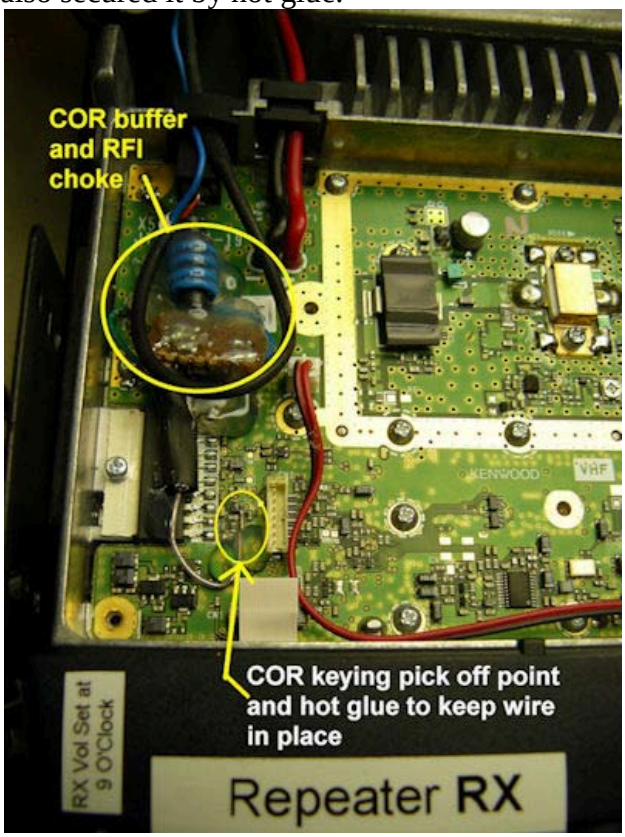
COR pickoff on schematic

It was not as easy as I thought since these radios use only surface mount components. My parameters for keying included letting RX radio microprocessor controller decode a tone squelch (PL) tone so as to keep random noise from keying the TX radio. I searched and searched for a keying point on the RX radio

and finally found one right off a tiny surface mount transistor component, as small as a pin head, near the audio amp

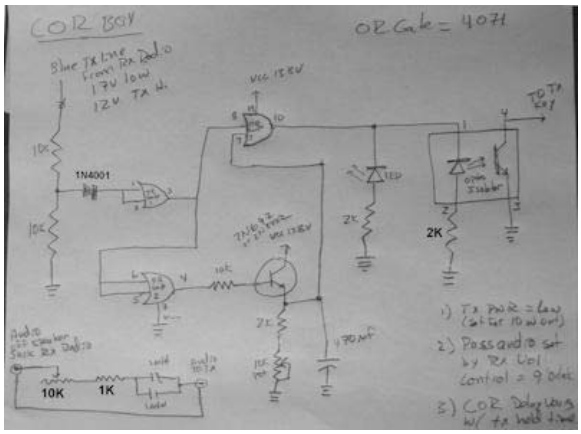


I carefully tacked down a keying line, secured it with hot glue and made a buffer circuit out of an op amp which was powered by the radio and also secured it by hot glue.



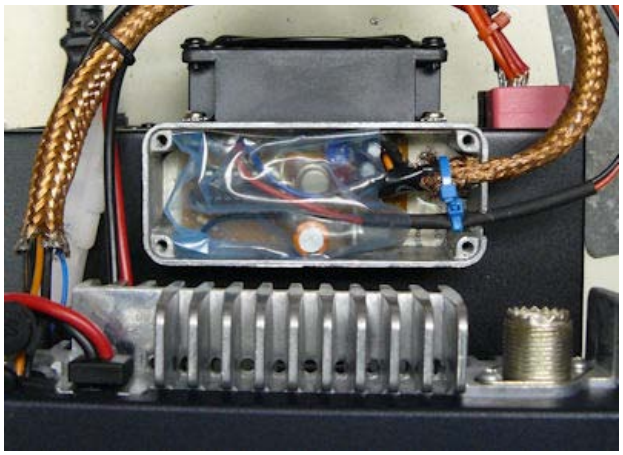
The first COR I made was exceedingly simple and only keyed the TX when an RX signal was present. This worked well but as any 2-meter operator knows, it is nice to have the repeater TX remain on the air a second or more after the mic is unkeyed so that the operator knows he is keying the repeater. This is known as "hang time." Hang time gives a satisfying "kerchunk" confirming access to the repeater.

I rebuilt the COR using OR gates so that the repeater TX was held in transmit in two ways, first by the buffer line from the repeater RX radio and second through the decay in an RC circuit so that it held the TX line just a bit longer giving the kerchunk all hams like to hear when using a repeater. It's a really crude circuit since the capacitor C1 charges in proportion to the amount of time the TX line is held down thus giving a varying length of kerchunk time.



Oh well, I know I could have used dozens of other circuits but I searched my junkbox and used parts on hand.

The audio connection was straight forward. I found audio on the speaker jack and tied that through a level pot and 2ufd of pass capacitance. I mounted both radios and the COR to a 13.8v power supply and the repeater was born.

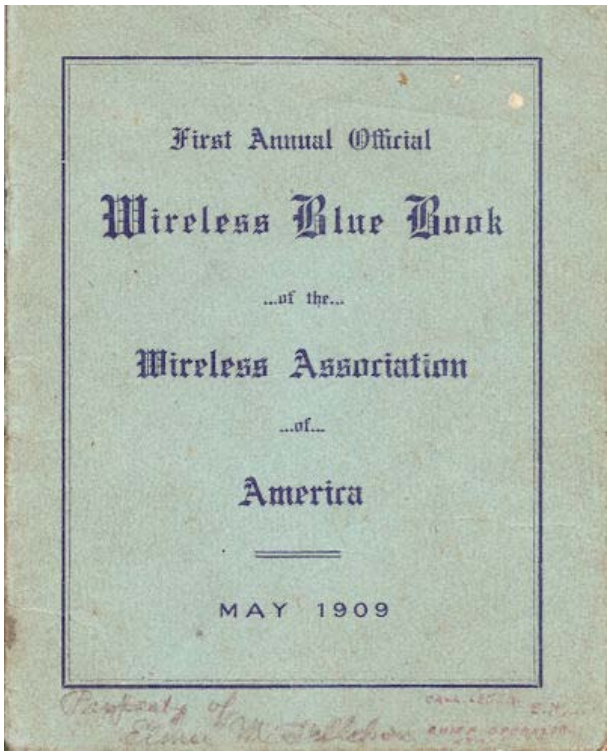


I still have yet to test it at the fringes of operation to check desense but it works well locally on my 2 antennas and handhelds. In case anyone is wondering, I tested it with a 3MHz split so as to keep the ham bands (144.90/147.90). Audio pass through is very clear and the hang time is one second after TX keying for 6 seconds or more. I am pleased with how dream has come to fruition after 30 years, ironically with some slightly more advanced Kenwood radios!

Jon Rudy – K3QF October 29, 2010

P.S. The repeater needs a set of duplexers in order to work, the front end of the TM-721 is not very robust so it will not work well even with a 3MHz split. They are going to Haiti in the coming months. April 07, 2011

More Radio History on Line



This book and several others in the series are available on the University of Pennsylvania web site at http://www.seas.upenn.edu/~uparc/history.html .

Thanks to Russ Miller, WA3FRP, for providing the link to this great source of early radio history.

Ron Frisbie Marconi Museum Photo by Ron Frisbie

More below

Guglielmo Marconi greets visitors at the entrance Ron Frisbie photo