



Next Meeting:

Tuesday, October 7, 6:00pm Bullock's BBQ

**Program: Building and Improving the Mantis Mill
By Jeff Crews**

Our program will be presented by Jeff Crews on his Mantis project. I have met Jeff at Maker Faire and several other maker venues. I was fascinated by what he was doing. I think you will be too. Here is Jeff's more formal description of the program.

The Mantis 9.1 mill is a low-cost, open-source CNC mill fabricated from plywood that uses innovative design and construction techniques to achieve high precision with simple tools. It was originally developed by a graduate student at MIT, and uses a standard Arduino microcontroller board and the GRBL Arduino firmware to interpret Gcode and drive standard stepper motors.

After building one for himself, Jeffrey Crews and other members at Splatspace (a Durham maker space) revisited and improved the existing documentation for the Mantis and made further refinements to the design so that it can be used for other materials and techniques beyond PCB fabrication.

Jeff will explain the operation of the mill and its companion open-source software, give background on the challenges of making and using one, and also demonstrate its use. A bill of materials, links to instructions and supplies, and advice about suggested upgrades will be provided for anyone interested in making one.

President's Corner

I saw a colorful leaf fall to the ground the other day -- so it's officially Fall. You don't need to shiver. At least not yet. You can all have a warm feeling come over you knowing that some of your officers are hard at work (ok, moderately laboring) with some of the initiatives we wanted to put in place.

Dan, KR4UB, has been able to successfully verify that renewing DFMA memberships via PayPal is something that will happen without incident or error (none of you really wants to pay twice, do you?). We expect to be able to roll that out with our next update of the DFMA website.

Concurrently, I can report that I have a database created consisting of our latest list of active members so that we'll be able to better track the actives/inactives within our organization and have active record keeping and reporting for our secretary and treasurer. Better living through Technology, right?

Finally, something I'm really charged up about -- mapping technology for our website is increasing. Based on the small fireside chat we had at our meeting last month I've implemented a number of the mapping applications we've talked about. A few bugs exist that I'm still stamping out. But, I feel confident we could have it in place sometime in the Thanksgiving/Christmas timeframes.

Looking forward to the next meeting and sharing some BBQ with the whole gang and we have what looks like a really interesting program -- don't you want to be able to design your own custom circuits off your own circuit printer system (minus all the nasty etching chemicals). Congratulations, everyone -- you live in interesting times!

See you all soon! - 73, Miachael, KK4EIB

Bargains Still Waiting for You

AE4EC Estate -- Steve, KZ1X here, in Chapel Hill.

I am administering the sale of AE4EC's estate gear on behalf of OCRA, to which it was bequeathed on Ed's passing last year. Many items have sold but several still remain. I have set the prices at very attractive levels below current 'street price.' You can view the latest revised list at the following URL:

https://dl.dropboxusercontent.com/u/14415115/gear_ae4ec-sk_082414.pdf

The FT-897 with the DSP and Heil ProSet is an especially attractive deal, as are the Icom R75 receiver and the Microham interface.

I would truly prefer to sell these items locally, and I think Ed would have preferred that, too. But, if they are not sold by October 6th, I will be listing them on eBay at prices closer to street, with buy-it-now option, and I expect they will sell within hours there.

Contact me via email (kz1x@yahoo.com) and I will get right back to you if you are interested.

Gifts to the DFMA - Dee, KU4GC

At the last two meetings we have auctioned off a number of items. I will bring in several more items to

sell at the next meeting. The current list can be found at

<https://docs.google.com/spreadsheets/d/1i8CzPgNUycZhhQJ8sRae5Ob04cAUQwHqa2D00PhFJOk/edit?usp=sharing>

If you are interested in any item, you can make a bid by email. (ku4gc@amsat.org) On request, I can also bring items to the meeting for inspection and possible bids.

Ham Radio meets Photo-Art

Some of you may remember Minjin Kang (goes by MJ) who attended our meeting last month. She came after her email inquiry through our web site resulted in my suggesting that she visit. She is interested in Ham Radio as a subject of Photographic Art. She had already taken pictures in the shack of one of our members. As a result of coming to our meeting, she has taken pictures with two more local hams. She is interested in more subjects, so I suggested a blurb in the Link. MJ describes her interest as follows:

You can call me MJ. I'm a visual artist in Chapel Hill. I recently graduated from the Art Department, UNC, Chapel Hill. Actually, I'm really interested in Ham radio. I think this is very interesting way to communicate with each other. Also, I love the visual features of ham radio stuff. Is there any way I can take pictures about Ham radio? I already have made some ham radio pictures. Here is my website and you can check under the name of "Ham radio".
www.minjinkang.com

I just would like to visit you and take a picture of, not only ham radio stuff but, also you and your homes. I plan to use the images on my website and representing the images through many different ways like in competitions, shows and things like that.

If you are interested in my project, please email me and we can talk about the details. minjinjae9@gmail.com Thank you so much for your time. Hope to hear from you. (For more information about the artistic motivation involved, an artist's statement below is shown below.)

Ham Radio: Artist Statement, Minjin Kang

Even though most users of Ham Radio are Caucasian old men, and I am a South Korean young woman, they are like me - trying to speak in a "second language" to get their ideas across. The risk of being misunderstood by someone who speaks a different language or comes from a different background makes us think harder as we converse. The distance we experience can draw out feelings of loneliness. I

think it is important to capture this shared feeling of loneliness, which creates our inner drive to communicate and to be understood.

I am keenly interested how other people live. I began the Ham Radio exploration when I lived in Chicago as an undergraduate. I was wandering around rural areas of Chicago in search of subject matter. I found one isolated house and I was so curious about who lived there, with no one else around, I knocked on the door and met Ron. I asked him how he lives this way. He said he could show me the secret and he brought me to his basement to see his large collection of Ham Radio equipment. He showed me how to talk with somebody through his Ham Radio. The interaction of Ham Radio reminded me of Facebook and the ways we choose to reveal ourselves to other people. Interestingly, most Ham Radio operators talk to each other almost every night, but not during the day. Ham Radio allows communication with voice that is publically heard by other operators. No face accompanies the voice, and it has its own unique "language." To me, this is a genuine communication. I am inspired by an African saying, "The earth is a beehive; we all enter by the same door but live in different cells."

Signal Generators & Service Monitors

Lowell Tieszen, KK4PH, October 2014

Let me start by acknowledging that I am not an Electrical Engineer. In some places I am identified as a Software Engineer, and I find that, in some ways, to be a stretch considering what I do for my work. So, I learned to use test equipment as there was need. It's been part of the fun of the hobby for me.

In the early 1980's our radio club in Newton, KS, acquired a number of all-tube transceivers from the local power company. We would add some capacitance to the coils in the transmitter and receiver front-end. We would get crystals and move these radios from 37 Mhz to 29.6 Mhz FM and work the world. With a dummy load and an analog voltmeter the transmitter could be peaked on the new frequency. The receiver, however, required a stable signal generator with control on its output level.

A good friend at the time, Larry - W0KA, sold me a Measurements 80. The Measurements 80 is a WWII vintage analog signal generator that is stable-enough at VHF, but pretty touchy at UHF. I used this generator for many years as the equipment I was modifying changed from tubes to solid-state

receivers and exciters and tubes for finals, and finally to all solid-state.

In the mid-1990's DFMA purchased a CT Systems 3000B Service Monitor. I seemed to be the only one



CTS3000B Service Monitor Picture courtesy of KK4PH

working on radio modifications and have kept this generator around and have used it a few times a month. It has the advantage over the M-80, in that frequencies could be dialed in directly and the generator works up to 1Ghz. I've always thought that the calibration on the CT-3000B isn't accurate but for relative measurements it's not a problem. The Service Monitor also provides an internal 100Watt dummy load, and watt meter so the transmitter can be easily evaluated. A drawback is that it can only generate or receive, but not both at the same time.

A few weeks ago we were on the DFMA Thursday night net, and Ray-WA5PPD checked in. When we called on Ray for comments, he mentioned that he had an IFR1200 that he would like to donate to DFMA. IFR Service Monitors were made in my hometown of Wichita, KS and I know something of their equipment and the potential value. Ray was invited to the next board meeting where he presented an IFR1200 to the club.

Charlie - NC4CD was the first to try it out and found that there is a problem in that the signal generator doesn't "lock" above about 420Mhz. [Ray had noted UHF problems when he made the gift.] So it's only usable at this time below that. One of the qualities of this over the earlier DFMA Service Monitor is that it can transmit and receive at the same time, which allows it to be more functional for repeater evaluations, or where one needs to evaluate one frequency while transmitting on another. At some

point the club should consider having this repaired to allow its use at UHF frequencies.

While I mentioned that I was storing the first signal generator, I now have the second as well. I would be encouraged if others were to make use of these Service Monitors, whether you are testing a design or working with existing radio circuits which require the use of signal generators. If you are a DFMA member, these Service Monitors belong to you - and are available for your use.

Manuals are available for both Service Monitors. The basic functions of the CT 3000B are not difficult and could be figured out, or learned with some brief training. As with any signal generator, one needs to be very careful to only transmit into a Service Monitor in the correct port, and when it is configured to receive the power to be transmitted. The IFR-1200 is more complex so you might do some reading in the manual before trying to use it.



IFR1200 Service Monitor Picture courtesy of KK4PH

Let me, or any board member, know if you would like to make use of these valuable tools.

Antennas for Everyone

(Below is a copy of Max's article on making a "Ruthless" 2 meter quad beam. I expect to have more reprints of Max's articles in future editions of the Link. - Dee, KU4GC, editor)

The "Ruthless Quad" 2 m Beam - Max, KO4TV (From the May 1997 DFMA Link)

This one was first constructed by my XYL, KE4DRI, using nothing but readily available household materials, plus, of course, a coax feed line and connector. It can be suspended from a ceiling with a heavy rubber band and rotated, using the old

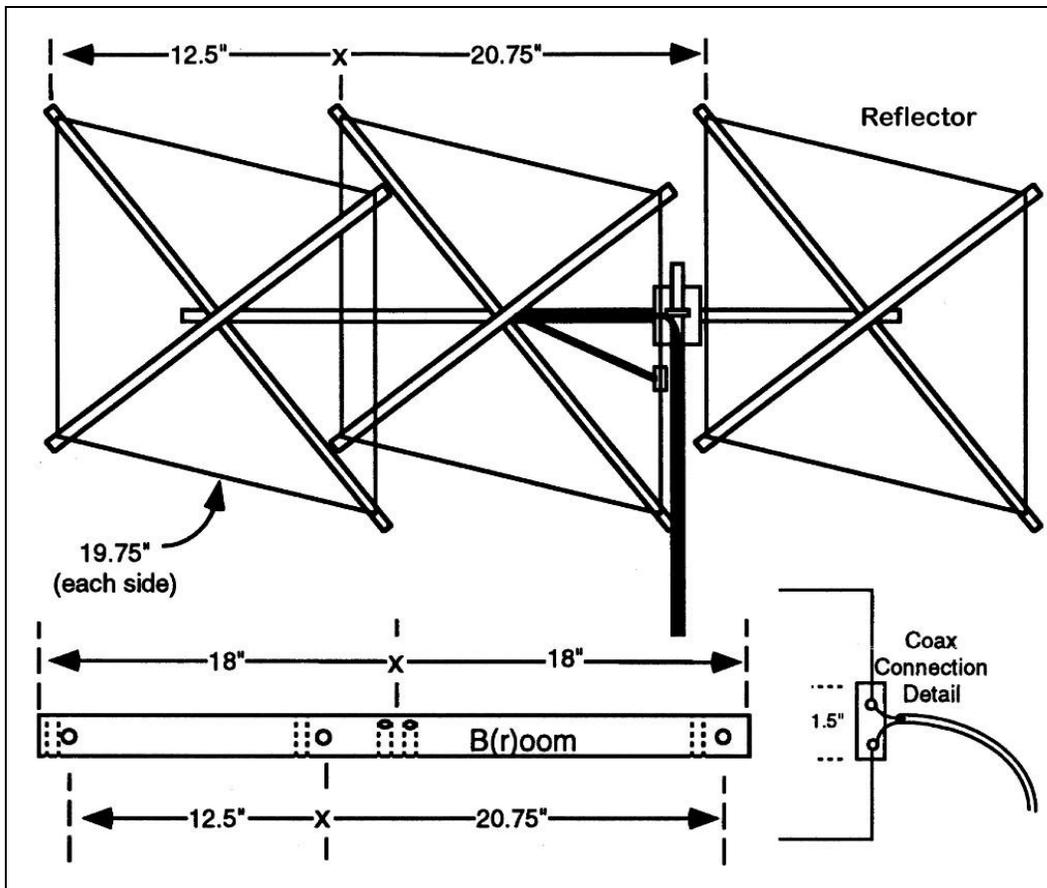
“Armstrong” method, or mounted outside and rotated with a light-duty television rotator. It requires no tuning or adjustment, and will provide about 10 dB gain over a dipole, or approximately 10 times the radiated power in the forward direction.

If it is intended for outdoor mounting with a TV rotator, it will be desirable to add some U-bolts for mast mounting. These are readily available at any hardware store for under \$1.00 each. Other materials are several plastic coat hangers, about 21 feet of wire (preferably copper, but in the spirit of household material, galvanized picture hanging wire will suffice), a discarded broom or mop handle for the boom, and a few small brads for holding everything in place. If you intend to use it indoors suspended from the ceiling, a couple of small cup hooks will

weatherproof sealer, to keep water out of the feed line.

This is not really a “RUTHLESS” antenna to build, but was simply named for its original constructor, Ruth Bloodworth, KE4DRI. She didn’t even use my electric drill for her original. She made the holes in the coat hangers with an ice pick, heated red-hot over a stove burner. The improved model for outdoor use pretty much required a drill for making the holes in the broom handle for the coat hanger spreaders and U-bolt mounting, but, as with most antenna construction, let your imagination run wild on methods of assembly.

HAPPY ANTENNA CONSTRUCTION UNTIL THE NEXT INSTALLMENT !
73, KO4TV Max



Instructions:

- Procure 6 plastic coat hangers, about 5/16 inch diameter. Cut the hook section off, leaving as much of the straight portions as possible. Heat the bends with a heat gun or stove burner VERY CAREFULLY. This material will burn, so use only enough heat to allow you to straighten it out. When straight, carefully measure and cut 6 pieces 32 inches long. These will be your diagonal spreaders.
- For the two reflectors, drill small holes in each end, exactly 15 3/8 inches from the center of the spreader.
- For the two driven elements, drill small holes exactly 14 5/8 inches from center.
- For the two directors, drill small holes exactly 14 inches from center of spreader.
- Cut a piece from the leftover scraps 1 1/2 inches long. Drill

provide the necessary loops to connect the rubber band to the ceiling.

small holes about 1/4 inch from each end, as shown in the drawing.

Tools required will be a drill and bits, soldering iron and solder, hacksaw or coping saw (not required, but nice) and either wire cutters or old scissors (Don’t use Mama’s good scissors, or you will be in DEEP trouble). As with the previous construction articles, the drawings are mostly self-explanatory, and dimensions are not especially critical, If you plan to use it outdoors, be sure to seal the end of the coax with RTV Silicone sealant or some other good quality

BOOM PREPARATION: Drill a 3 foot piece of mop or broom handle as shown above. Each pair of holes will be at right angles to each other, 5/16 inch diameter to match coat hangers. If you intend to use antenna outdoors, drill holes for the U-bolt for mounting to the mast, exactly 45 degrees from the spreader holes, so that the antenna will be properly aligned when mounted.

WIRING: String wires through the holes in the director and reflector elements and solder the ends together. Solder one end of the driven element wire to the 1 1/2 inch insulator. String it through the spreaders, solder to other insulator hole. Attach coax.

73, Max K04TV

Board Meeting Minutes

(draft, not yet approved)

Durham FM Association (DFMA)

DFMA Board Meeting Minutes -09/16/2014 – Dan, KR4UB, Secretary

Location: 1920 Front Street, Durham

Attending: Dee, KU4GC, vice president; MK, W4MKR, treasurer; Dan, KR4UB, secretary; Charlie, NC4CD, repeater manager; Dave, W4SAR, field day coordinator; Pete, K4PHS, at-large member; Bob, W4RWC, at-large member; Dan, KK4DMS, at-large member; Karen, KD4YJZ, at-large member

President: In Michael's absence Dee, KU4GC, called the meeting to order at 7pm.

REPORTS

Treasurer – MK, W4MKR

Current Members: 90 are paid up so far this year.

The club liability insurance has been obtained with Nationwide Insurance. The new policy cost is \$450.00 per year.

Secretary – Dan, KR4UB

The 8/19 Board Minutes and 09/02 Club Minutes were reviewed and approved.

A letter of appreciation to be sent to Ray Loewy for his generous donation of an IFR-2000 Service Monitor, was circulated and signed by board members.

The DFMA PayPal account is now in operation and links will be added to the DFMA website prior to the next club meeting to give renewing members the option to pay their dues online.

The MCU now has new tires at a cost of approximately \$1179.00. Per latest status from Wilson, the MCU is at the shop to be greased and brake system flushed. When the MCU is returned, the roof will be inspected and the source of the leak repaired. Wilson will get the serial numbers of all

equipment in the MCU to complete the photographic inventory for insurance purposes.

Dee asked if Winlink is set up and operational on the MCU. That will need to be a follow-up work item to determine the status.

Vice President – Dee KU4GC

Dee reported that Jeff, KK4QMB has successfully negotiated access to an enclosed garage at Durham Fire Station #1 for MCU storage.

The program for the next club meeting will be a presentation by Jeff Crews on the "Mantis Milling" project from Splat Space in Durham. This is an automated milling machine that can build prototype boards at low cost.

Repeater Manager – Charlie, NC4CD

The IRLP computer occasionally locks up due to a suspected hardware issue. A replacement for the current IRLP computer will be located. Charlie showed the I/O controller and radio rack for the 1st satellite receiver system. Schematics of the hardware to be located at the eight remote sites, and at the central Hillsborough site, were reviewed. Detail was presented on the hardware needed for the eight links to do their own ID, yet be unobtrusive to users on the system. A motion was made and approved for a request of \$495.00 to purchase the IO controllers and shelf enclosures for the remaining seven remote sites.

Negotiations on the Hillsborough site lease are still on-going.

ARES

Dan, KK4DMS presented a brief update on ARES activities and stated that Jim Wagner (NN4JW) has updated the Durham / Durham County Emergency Operations Plan, Emergency Support Function (ESF) - 2 Communications, with review by Dan and Lowell Tiezen (KK4PH). Jim based the revised ESF-2 on the State ESF-2 and will be presenting it to David Marsee, Durham County, Emergency Management Coordinator.

Field Day Coordinator – Dave, W4SAR

Dave reported that Field Day score results are expected to be posted on the ARRL website by the end of October.

NEW BUSINESS

Regarding the 2014 DFMA Annual Christmas Dinner, Dee, KU4GC made the motion, which passed unanimously, for the club to pay dinner costs for

members in good standing + 1 guest attending the event.

A brief discussion was initiated by Dee, whether there would be sufficient interest in holding a class for members wishing to upgrade their licenses to Extra Class. This will be brought up at the next club meeting.

Meeting adjourned at 8:30pm

Club Meeting Minutes

Durham FM Association (DFMA)

DFMA Meeting - 09/02/14 -, KR4UB, Secretary

Location: Bennett Pointe Grill, Durham

Attending: Wilson, W4BOH; Dan, KR4UB; Dan, KK4DMS; Banks, W4OFZ; Skip, WB4P; Dewey, WA4AHR; Pete, K4PHS; Tucker, KK4UNZ; Adriano, KV7D; Mark, KR3AM; Jim, KB4OT; Dee, KU4GC; MK, W4MKR; Dick, WA2ROC; Mike, KK4BPH; Jim, KG4NEL; Charlie, NC4CD; Joanna, KE4QOZ; Rhett, KE4HIH; Duke, K2MZ; Nancy; Bob, W4RWC; Allen, KE4IHX; Jim, WA4OPI; Gail; Bill, KK4QDZ; Richard, KM4ASD; Jen (&son); Russell, KM4DVD; Lad, W4ORD; Donna; Jim, KI4HQO; Matthew Dewin; Paul, N2XZF; J.R., KG4NNT; Don, KE4UVJ; Minjin Kang; friend;

A total of 38 attending, 31 of them hams.

President: Michael, KK4EIB arrived later due to a business conflict, so Dee opened the meeting at 7:06pm with the introductions. He then introduced Minjin Kang, a visual artist who is working on an artwork series related to ham radio. Briefly from Minjin's web site, in the long established home, we tend to furnish them with items meant to last for years that reflect our culture, personal and private lives. Amateur Radio stations in our homes make a unique statement reflecting our interests, values and personal contributions to the hobby. (Minjin would appreciate hearing from anyone who would be willing to have pictures taken of themselves and/or their ham gear. You can email her at minjinjae9@gmail.com.) Dee then opened the floor to an auction of items from the KO4T estate and gift items from W4OFZ. This netted \$49 for the DFMA.

REPORTS

Vice President – Dee, KU4GC

Dee reported that the presentation at the next meeting will be a program on the "Mantis Milling" project from Splat Space in Durham. This is an automated milling machine to build prototype circuit boards at low cost.

Treasurer – MK, W4MKR

Members: 91 (whose dues are current).

Secretary - Dan, KR4UB

Dan gave a brief status on his assumption of duties as club secretary. In so doing, it brings strong recognition and appreciation of all the work Dee, KU4GC does for the club. Board and club meeting minutes duties have been turned over to Dan. Dan will also become involved in maintaining the DFMA website.

Some club members have expressed interest in having the option to renew their DFMA membership online. Dan has set up the a new DFMA PayPal account and is working with Dee to make the required programming changes to the DFMA website. Testing is underway and this option will likely be online to members by the next meeting.

A status report on the MCU work by Wilson W4BOH and Dan was given. Vehicle electrical system repairs consisting of starter solenoid replacement, main battery wiring & fusible link repairs, and removal of some of the abandoned wiring left over from the book mobile days is complete.

Repeater Manager – Charlie, NC4CD

Charlie reported work is continuing on the redesign of the new voting system. Negotiations are on the Hillsborough tower site lease are still ongoing.

ARES – Lowell, KK4PH, was not able to attend.

Presentation of the DFMA "Lid" Award

No presentation this meeting.

Door Prizes

Don, KE4UVJ won the large magnifier. Skip WB4P won the screw driver set (donated by Paul, N2XZF) and Duke K2MZ won the LED flashlight.

Program Presentation

Michael, KK4EIB made a presentation recounting some of the history of the DFMA club which was founded in 1970. A brief review of the club's significant accomplishments and acquisitions over the years and some thoughts about the future of the club were presented. He invited members to share their thoughts about where they would like to see the club in 5, 10, 15 years in the future. While the club is in good financial shape, large expenses are foreseeable down the road. The MCU and the

repeaters are in good shape, but as those assets reach their end of life, the future cost of replacement is something to consider and plan for. One of his goals as president is to put plans in place to ensure the club is on solid footing for those expenses down the road.

Another area Michael wants to pursue is software that could eliminate some of the manual work in maintaining club membership records, and disseminating dues status to members. Regarding the club website, he opened the floor for discussion of what applications and tools would be of interest to amateurs in our local region.

Meeting adjourned at 8:30pm.

Buy – Sell – Trade

Wanted: Dead Microwave Ovens

I can use dead/dying/unwanted microwave ovens. The power transformers can be used for power supply construction. Thanks.
Wilson – W4BOH

For Sale: items from the Estate of AE4EC

See the article above “**Bargains Still Waiting for You**”

Upcoming Events (dfma.org for details)

10/7 6pm DFMA Meeting, Bullock’s BBQ
10/11 10am VE Session, Orange County EOC
10/13 7pm OCRA Meeting, Orange County EOC
10/15 7pm DC ARES Meeting, Parkwood FD#1
10/21 7pm DFMA Board Meeting, NC4CD Office
11/4 6pm DFMA Meeting, Bullock’s BBQ

Web Site: dfma.org

73 - Dee, KU4GC, Editor

- MK, W4MKR, Proofreader

Send copy to ku4gc@amsat.org

Deadline: one week before the Club Meeting

(Images and copy: KU4GC or as credited)