

# PRINTED CIRCUIT

MAY 2001

Newsletter of the Joplin Amateur Radio Club Vol.

11 Issue No. 1

## AO-40 TRANSPONDER TESTS A HIT

**T**he inaugural AO-40 transponder tests this past week have been a huge success. Reports from amateurs making their first contacts on AO-40 have come from all over.

"It was just great!" enthused AMSAT-NA President Robin Haighton, VE3FRH, who worked a dozen or so stations via AO-40 last weekend. AMSAT has announced plans to test the 10-GHz X-band downlink over the weekend. The solid state X-band amplifier will be turned on and adjusted on May 13 at 0500 UTC, at MA165. If that works, the 60-W

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## ARRL TO PETITION FOR ALLOCATION OF 5 MHZ BAND

**T**he ARRL Executive Committee has reviewed a preliminary draft Petition for Rule Making seeking a new US ham band in the vicinity of 5 MHz. Experimental operation at 5 MHz under a license issued to the ARRL has been going on since 1999. Participants in the ARRL WA2XSY experimental operation have established that an allocation at 5 MHz could improve emergency communication capabilities by filling the gap between 80 and 40 meters.

On a motion from Southwestern Division Director Fried Heyn, WA6WZO, the EC agreed that the petition should seek a domestic secondary amateur allocation around 5 MHz

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## MARK YOUR CALENDAR & PLAN TO ATTEND THIS EVENT!

## JOPLIN ARC FIELD DAY EXERCISE

**JUNE 23-24, 2001**

Field Day this year may prove more interesting than ever. At the meeting on May 8th, the membership decided that the club should approach the other Ham organizations in the area to establish this as a competitive event. "The local competition should add some fun!" said Jim Scott when the club was discussing the idea.

The club has always setup and operated several transmitters. Last year, the club's eight operators logged 476 contacts to post an overall score of 1550 points in the "2A" class (the winning club had made 1351 contacts with 14 operators). The location on Dover Hill, the portable lighting, the erection of a 30' portable tower supplied by T-Bird NØNFZ, and the TV coverage we received of "Field Day" made it a great event.

Please support and promote your club by attending this event. Also, this is an ideal time to introduce potential new hams to the "on the air" experience provided by "Field Day". Sign up sheets are available at the meetings to help schedule operators.

Although it's still in the planning stages, a warm-up picnic to kick off the event is in the works. ¶

## 2001 HAMFEST HISTORIC SUCCESS

**W**hew! What a Hamfest. This year certainly set some records, one of them the net income. This Hamfest produced the single largest income for the club ever posted - a whopping \$1423.42 after paying all expenses. Although not fully sold out at 155 tables, the sales were slightly up this year compared to 2000. Attendance was about the same with 738 tickets sold - not including vendors. One note, the Holiday Inn indicated that the number of **room nites quadrupled** over last year.

Many thanks to all who participated, and to the many people who contributed their time and effort in helping with this event. I want to especially thank Jim Johannes NØZSQ for his guidance and extra effort that he put forth to make this event a success.

Congratulations to this year's winners of the JARC Hamfest 2001 Grand Prizes.

### Winner of the MFJ 269 Analyzer

**Lee Shafer WØTLS**  
1326 E. High Point Street  
Springfield, MO 65804

### Winner of the MFJ 4245MV Power Supply

**Jim Croke KJØL**  
255 W. Swan  
Springfield, MO 65807

### Winner of the Comfortable Swivel Chair

**Dave Garner**  
30187 4th Ave. Way  
Randolph, MN 55068

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with a bandwidth of 150 kHz. Executive Committee members will review the completed draft petition before it's filed with the FCC, possibly before the next ARRL Board meeting in July.

An amateur allocation in the vicinity of 5 MHz long has been an objective of the International Amateur Radio Union. The IARU's Administrative Council has approved a goal of "a narrow allocation, even on a shared basis in the vicinity of 5 MHz." Winning an allocation at 5 MHz—even on a domestic basis—could take several years. Securing an international allocation will be more difficult and take even longer. Consideration of an allocation at 5 MHz is not on the agenda for WRC-03 nor on the preliminary agenda for WRC-05/06.

A review of FCC-related issues dominated the May 5 Executive Committee session in Dallas. In other matters, the Executive Committee was told that an FCC Notice of Proposed Rule Making still is expected soon in response to the ARRL's petition, RM-9404, seeking Amateur Radio access to the low-frequency spectrum. Filed in late 1998, the ARRL petition asks the FCC to establish LF allocations in the vicinity of 136 kHz and between 160 and 190 kHz.

ARRL General Counsel Chris Imlay, W3KD, also told the Committee that the ARRL's Application for Review that seeks to clarify the FCC's PRB-1 limited preemption policy with respect to amateur antennas is pending before the full Commission. The ARRL wants the full Commission to review—and reverse—an FCC staff decision declining to extend PRB-1 coverage to include CC&Rs—covenants, conditions and restrictions. The EC agreed to request an en banc presentation to the full FCC this fall, after new Commission appointees have been seated.

The Committee also was told that favorable FCC action is anticipated on a petition seeking to upgrade Amateur Radio's status from secondary to primary at 2400 to 2402 MHz. The ARRL recently renewed a long standing request that the FCC elevate Amateur Radio from secondary to primary at 2300 to 2305 MHz. The minutes of the ARRL Executive Committee meeting in Dallas are available on the ARRL Web site.

[http://www.arrl.org/announce/ec\\_minutes\\_466.html](http://www.arrl.org/announce/ec_minutes_466.html)

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## NOTES FROM THE BOSS

Greetings, everyone.

By the time you read this, the 2001 edition of the J.A.R.C.'s hamfest is history, and a SUCCESSFUL hamfest at that! To be frank and honest, the hamfest turned a profit this year. This was done with a LOT of hard work by members of the club. The proceeds of the hamfest, as well as coaxial wire sales and other fundraisers, goes towards projects that the club funds.

The biggest single cost to the club so far this year has been our 147.210 club repeater. As many of you know, the repeater has been somewhat ill lately. It is also being moved from its' home east of town to a TEMPORARY site near 32nd and Indiana Streets in Joplin, where it will be operating as a local repeater. We are actively seeking a new repeater site, one in which the repeater will be accessible by not only us club members (and travelers), but also by the Springfield office of the National Weather Service, to assist in SKYWARN severe weather activities.

Some upcoming events that the J.A.R.C. will participate in this year includes assisting the Children's Miracle Network's Bike Tour (in mid-May) and the MS 150 2-day bike ride (mid-September), as well as Field Day (always the last full weekend in June). We also have a foxhunt planned for August, a tailgate session planned for October, and a special event station to celebrate the 75th anniversary of Route 66 in mid-September.

The club has several committees, and the club needs your help. Volunteer today!

Thanks, and 73!

Ray KBØSTN  
President, J.A.R.C.

## CHECK OUT THE JARC WEBSITE

<http://www.joplin-arc.org>

## NØLL WORKS DXCC ON 6M

Larry Lambert of Smith Center Kansas has something to celebrate these days. He has just completed his DXCC on 50 MHz.

So what is so special about this, you ask? He is the **first Ham in "Ø" land** ever to accomplish this feat. There have been over 100 people who have received 6M DXCC awards, but never one from this call area. It seems that working other countries on 6 Meters is easier from the coasts. ¶



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traveling-wave tube amplifier will be fired up. "Beacons will be used and probably the L1 uplink," said the AO-40 team's Peter Guelzow, DB2OS. Guelzow said plans also call for connecting the C-band receiver to the X-band downlink.

AO-40 ground controllers opened up the next-generation satellite's transponders May 5 for general amateur use on an experimental basis. Stations can uplink on either 435 MHz or 1.2 GHz. The transponder downlink is at 2.4 GHz. The operation is experimental, the schedule subject to change, and the transponders could be shut down at any time without warning.

Mike Seguin, N1JEZ, in Vermont, says he successfully logged a dozen contacts in the first hour of operation, including two contacts using the Mode-L uplink. "I also logged my first DX contact with IZ8EDE." Seguin said his final first-day tally was 24 contacts.

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# 2001 HAMFEST COMMENTS

BY JIM SCOTT WBØIYC

**W**ith the Hamfest behind us, let's take a look at what comments were made by some of the attendees, and club members, and what yours truly observed and recorded. Then I will make a feeble attempt to list what I believe is needed for the next hamfest to be handled successfully.

To start, I queried several people who attended the hamfest and noted their ideas, comments, and suggestions. At the last meeting held in April, a comment sheet was passed around also to elicit ideas from those club members that attended or worked the Hamfest. From this information I compiled a summary for consideration. So, for what it's worth...

Many people commented on the **wide aisles**, these seem to be a big plus at this hamfest. The **BINGO** games were well received. The major Hamfest prizes were adequate, but there were not nearly enough **hourly prizes** so the drawings seemed thin.

Very few negative comments were received. Notably - lack of seating - and one misunderstanding about the 6' tables. A reoccurring problem that has plagued this fest since it moved to the Hammons Center has been the poor lighting in some areas. On the lighter side - there was one complaint about "**no donuts**" for the Saturday morning helpers.

Ideas for **next year** included requests for **more forums** and to get some **product representatives** like Yaesu, Kenwood, and Icom, among others, to attend. A **barbecue** on Friday nite, and to establish an **Early Bird** Friday nite fest, since there is some selling is going on anyway.

One issue which needs to be addressed is the **lack of participation** of the members **to prepare** for this event. Many of the shortcomings of this hamfest can be directly attributed to this problem.

Certainly, help is needed at the Hamfest, but for the months preceding, there are many jobs that must be done to make the Hamfest effective. The lack of participation may be only because members haven't been asked, or may not know how much effort is required to put on an event of this magnitude. So now I offer the following ideas based on my involvement, and my observations.

The standing Hamfest Committee needs to consist of subcommittees that handle specific tasks for the Hamfest, and they need to meet often, throughout the year. Some of these subcommittees can consist of a single person, while others will require several. Most will have a single task to accomplish within a time frame - then be done. Some committees act alone, while others depend on another to complete their task before they can function. In any case, the event requires more detailed management than can be accomplished by a few persons - as before.

Anyway, here is my list of some of the committee tasks that I believe need to be performed to successfully manage this club's hamfest.

- Create a timeline (a schedule), and establish a budget for the event.
- Acquire Hamfest and Bingo prize donations.
- Coordinate and handle Hamfest publicity both locally and nationally.
- Update website and handle email queries.
- Add attendees (from ticket stubs), maintain, prepare, and print the mailing label database.
- Update flyer layout annually, and supervise printing of flyers.
- Distribute Flyers. Includes labeling, sorting, and actual mailing of flyers to clubs and individuals. Four months prior to event, ship flyers to vendors.
- Fill the mail orders for tickets and tables - and preparing table assignments.
- Schedule, coordinate, and manage event help and security.

So there you have it. Perhaps you might see something in the list that you can do for the fest next year. So lend a hand, and volunteer, so we can make next year the best hamfest ever. ¶

# ARES EVENTS AND SCHEDULE

**T**he Jasper County/Tri-States ARES holds semi-monthly meetings at 7:30pm on the first and third Tuesday of each month at the Red Cross Headquarters in Joplin.

The building is located at 402 Jackson Ave. (7 blocks west of Main St.). The meeting room is on the west side of the building, with parking access from the alley west of Jackson St.

It should be noted that the weekly ARES net is held at 9:00 p.m. Monday nights on the JARC repeater 147.21 MHz (+).

For more information about ARES go to [http://www.geocities.com/jasco\\_ares/](http://www.geocities.com/jasco_ares/) or contact Andy either on the air or email him at [ka0tud@arrl.net](mailto:ka0tud@arrl.net) ¶

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Ed Krome, K9EK, in Indiana, echoed N1JEZ's comments. "Wow, AO-40 was terrific on this first morning of transponder operation, he said. "After almost 10 years, what a thrill!

Bruce Paige, KK5DO, in Texas also got lucky, racking up several DX contacts in Europe and later in Japan.

At this point, AO-40 may be available for use several hours a day, starting at orbital positions MA 136 and continuing through MA 240. During recent passes, the transponders have been available for six hours or so from a given point on Earth.

The tests have shown that uplink frequencies (without taking Doppler into account) are 435.495-435.780 MHz and 1269.211-1269.496 MHz, and the downlink passband is 2401.210-2401.495 MHz. The transponders are inverting, so a downward change in uplink frequency will result in an upward frequency shift in the downlink.

Users are being asked to avoid the "middle" telemetry beacon at 2401.323 MHz. For maximum QSO signal strength, stations should aim for a passband signal that's 10 dB below the beacon's. AO-40 has been operating without the

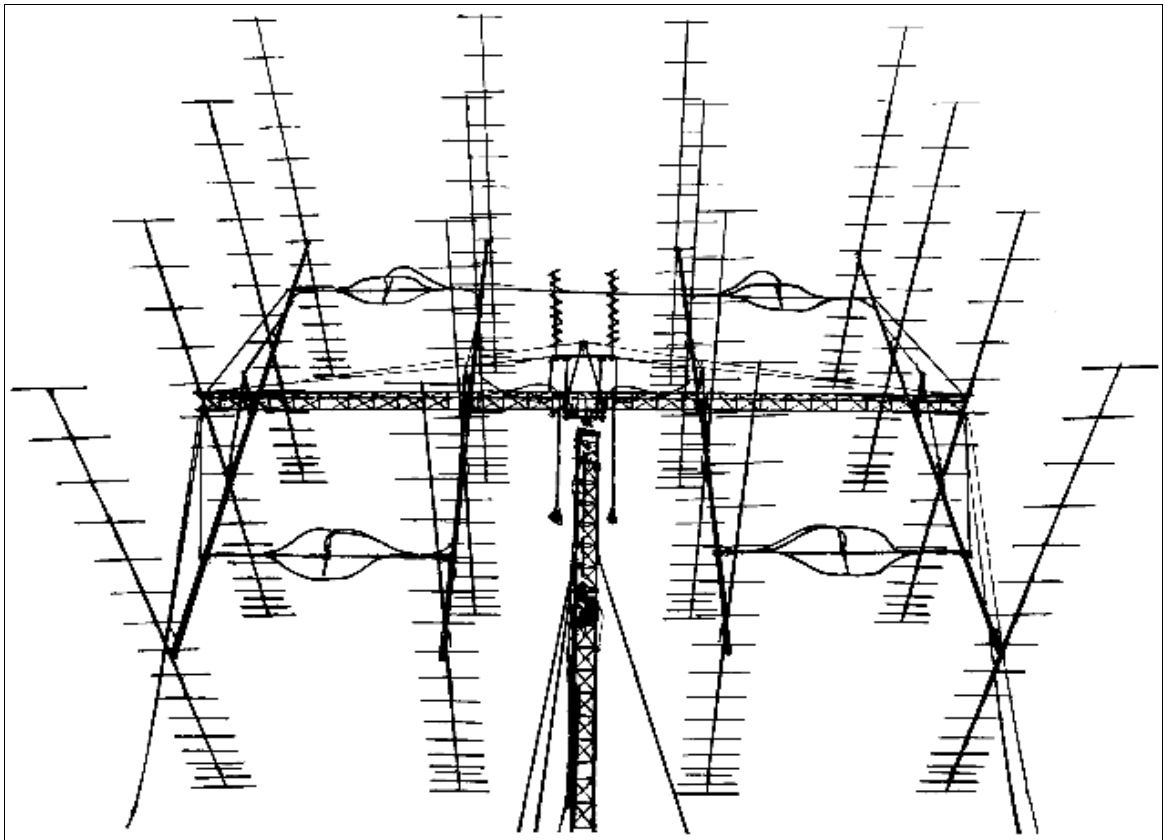
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# NOTES ON USING CATV 75 OHM HARDLINE ON VHF

By NIBUG

## INTRODUCTION

Cable companies try to avoid splices wherever possible, and often discard cable ends. These range in length from a few feet to as much as 300 feet. These ends can often be obtained for free or very close to it. This is 75 ohm cable, but there is absolutely no reason why it cannot be used to good advantage in amateur installations. It has very low loss characteristics, very similar to that of 50 ohm hardline of equal size. I have personally used it to feed numerous VHF antennas, including both of my former 144 Mhz EME (moonbounce) arrays, and more recently on the Deepwoods Repeater Group 145.110 repeater: both critical applications! The method of cutting the cable to length is crude but works perfectly well. There is no reason not to do it with a return loss bridge, if one is available. Most hams don't have one, and it is my assumption that the reader does not.



to use the bare aluminum stuff on a repeater, however. Due to the full duplex nature of a repeater, any loose metal-to-metal connections will cause noise on receive, and it is very difficult to prevent the chaffing of the aluminum hardline against tower legs, etc. in the wind. It may be unwise for multi transmitter contest

hydroscopic variety, the foam dielectric feels quite "hard", and generally has rather large "air cells" in the foam; it will also be glued to the center conductor and to the inside of the aluminum jacket. The regular foam type looks and feels more like dielectric in more familiar foam cable, such as RG-8/U foam, and usually

## TYPES AND SIZES OF CABLE

Common sizes of this cable are 1/2" and 3/4". It is also made in other sizes: 3/8", 5/8", 1", and even 1.25"... but these are not common (at least not in Maine!).

At first glance, there appear to be two basic varieties of the stuff: those with the bare aluminum outer conductor exposed on the surface, and those with a (usually black) PVC jacket over the aluminum. Except in rare cases, either one may be used with equal success. Since, in a properly matched antenna system, the RF current we are concerned about flows on the inside of the shield, minor weathering of the outside of the aluminum is of no concern, and will not increase the losses. I would not attempt

stations for the same reason.

That said, there is one factor to consider when choosing between the two varieties of cable. The bare aluminum stuff is very easy to kink if not handled carefully. The PVC jacket offers a measure of protection against kinking, and for this reason I prefer cable that has the jacket for many installations.

There are also at least three types of this cable as far as internal construction is concerned. Two of these use foam dielectric, the difference being in whether it is just plain foam or the "non-hydroscopic" flavor which will not absorb or propagate moisture. The non-hydroscopic foam type is to be preferred if you are not certain of your ability to seal out water at the connections!

How to tell the difference? In the non-

is not glued to the center conductor and aluminum jacket. Losses with either of the foam varieties is about the same as for the corresponding size of 50 ohm hardline.

The third variety is known as "air cell" or "fused disc" cable. This stuff is mostly air dielectric, and has a thin layer of (usually clear or slightly opaque) poly around the center conductor, and another thin layer on the inside of the aluminum shield, with "discs" of the same material spaced 1 to 6 inches apart to hold the center conductor in place. Sometimes the center conductor is bare, and is only touched by the supporting discs. This variety has lower loss than either of the foam cables, and is great for long runs or loss-critical applications such as

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EME. But be careful: if water gets in, you will have big problems! Once water has intruded into the first cell at one end of the cable, changing barometric pressure will "suck" it from cell to cell, and soon the whole cable will be destroyed! Seal, seal, seal, seal the tower end of this cable: but drill a small air hole through the jacket and shield somewhere inside your shack or where water cannot get to it to minimize pressure differential between the cable and the outside atmosphere.

## YEAH, SOUNDS OK, BUT 75 OHMS??!

Yep. With certain limitations, perhaps. There are several ways to use 75 ohm cable on a single band without increased SWR or losses. Multiband use is another story, and will not be covered here. It is necessary to do things right, and it can take a little longer to install and "prune" the 75 ohm cables... but your efforts will be rewarded with excellent performance at very low cost. Now what could be better than that?

One common way to use 75 ohm cable in a 50 ohm system is to use quarter wave matching sections at each end in order to transform the impedance from 50 to 75 ohms. These can be homebrewed or purchased, but I have found this method to be undesirable for several reasons: cost; an extra potential water entry point; time consuming to build; etc.

The other method, and my favorite, involves cutting the line to a multiple of a half wavelength at the operating frequency. Recall from antenna and feedline theory that regardless of the characteristic impedance of the line, the impedance the line is terminated in repeats every half wavelength along the line. Say what? This means that if the antenna is properly set up to provide a 50 ohm load at one end of the line, and the line is an exact multiple of a half wavelength that 50 ohms will also show up at the far end or the line!

### HMM... SO HOW DO I DO THAT?

One step at a time. First things first...

## ADJUSTING THE ANTENNA

The first thing you must do is adjust the antenna so that it is 50 ohms. If you don't have 50 ohms at the antenna end, you will have trouble getting

it at the rig end!

Proceed as follows: Get a good (read new) piece of high quality (not Rat Shack) RG-213 or RG-8 cable with solid dielectric. Cut it to exactly one electrical wavelength, by using the formula:

$$\text{Length(ft)} = 984/f(\text{MHz}) * \text{Velocity Factor}$$

The VF of RG-213 is 0.66, so for example let's pick 144.2 MHz as our operating frequency:

$$L = (984/144.2) * 0.66$$

$$L = 4.50 \text{ feet.}$$

Install connectors. The final length, from tip of center pin to tip of center pin, should be the length calculated above. Connect one end of this cable to your antenna, and run the cable down the boom or away from the antenna connection point exactly the same as the final cable will be in the final installation! Attach an SWR meter to the other end of this cable, and then run a random length piece of cable from there to your transmitter. Now very carefully adjust the antenna for 1:1 SWR (or close to it). In practice, 1.2 or even 1.3 is close enough, but get it better if you can.

While tuning the antenna, do not stand in close proximity to the driven element while checking the SWR, as this may detune the antenna somewhat. The reason for the one wavelength piece of cable is to assure that what you are measuring is the actual impedance presented by the antenna, and please do not try to get by without it! Try to keep the antenna at least one wavelength away from ground (or point it straight up) and other conductive objects during this process.

Also, if you are to be putting up more than one antenna (as in a stacked array) it would be very wise to mount all antennas on the supporting frame before adjusting them as just described. Then adjust each antenna individually for lowest SWR. The reason for this is that mutual coupling between antennas will affect the SWR slightly.

## NOW PRUNE THE HARDLINE

Next we have to cut the hardline to a multiple of a half wavelength. Do NOT try to do this by relying on any published velocity factor for the cable you are using. The VF of CATV hardline is not held to close enough tolerances during manufacture for this to work. Believe me! I learned this the hard way! Cut and try is the only way to do this!

Now that the antenna has been adjusted, attach the hardline to it (See the section on connectors, below). NOTE: if you need a flexible piece of coax to go around a rotator or whatever, you can use 50 ohm or 75 ohm of whatever length is convenient, from the antenna feed point to the end of your hardline. My personal preference here is toward using 75 ohm coax, but it really shouldn't matter (much). Alternatively, you can run a random length of your 75 ohm CATV hardline along the boom and down to the rotator, then use a flexible piece of 75 ohm coax around the rotator, then continue on down from there with the rest of your CATV hardline. Although this adds one extra connection, it reduces losses a bit more and is an approach I highly recommend!

OK. So, run the hardline to your station, and cut it about one half wavelength longer than you need to reach your gear. Stick a connector on it (and you may be able to do this in a temporary, unsoldered fashion if you are careful... see below). Attach your SWR bridge either directly to the connector on the hardline, or use your one wavelength piece of RG-213 between the bridge and hardline. Now check the SWR. If it is higher than what you had the antenna adjusted for, you will need to trim the hardline until it comes down.

The safest way to do this is to trim the hardline a little at a time until you get the same SWR you measured at the antenna earlier. I'd recommend a half inch at a time for 144 MHz, and less at higher frequencies. An inch or two at a time will work on 50 MHz.

However, if you believe your SWR bridge is accurate there are some shortcuts. I do this myself, but I don't recommend it to anyone who has not been through this process several times. If something goes wrong, it can ruin your whole day! If at some point in the process you measure an SWR of 2:1, you are about one quarter wavelength too long on the hardline. You could speed up operations by cutting off almost a quarter wavelength (taking the approximate VF of the line into account) all at once. For the foam cables, the VF is in the 75 to 80% range; for fused disc, it should be 83 to 93%. On the other hand, if when you first start trimming you notice the SWR was almost low enough (but not quite) and it goes slightly higher when you make that first little cut, then you are almost a half wavelength too long... and you could try

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cutting off almost a half wavelength in one whack. These shortcuts can save time, but remember they are not always safe (much depends on the accuracy of your SWR bridge). Warned you, I did!

Once you are satisfied with the SWR (or get it as low as it will go, and it should come down to at least what you had at the antenna), you are ready to permanently install a connector on the hardline. Then use a random length of 50 ohm coax to hook it to your transceiver or whatever. There is no reason why you should not connect the hardline directly to your rig, if it is convenient to do so and the situation is such that your rig won't end up dangling in the air...

## WHAT ABOUT CONNECTORS?

I have seen methods of installing modified UG-21 "N" connectors on this stuff... mostly in the EME newsletters over the years. I have yet to try this myself.

I personally have no problem with using "UHF" PL-259 connectors (Teflon / silver, please!) at frequencies below 400 MHz. These can be easily (?) installed on the 1/2" CATV cable:

If the cable has a PVC jacket, strip it off to a length of 2.5". Cut and remove 1.625" of the aluminum jacket. On fused disc cable, also remove all dielectric to a length of 1.625"; on foam cable, taper the foam dielectric from full diameter right next to where you cut the shield off down to about a quarter inch diameter at 1" from the end of the cable. This is easily done with a knife. NOTE: on some cables where the foam is glued to the shield, you may have to slit the shield lengthwise to peel it off the dielectric. Be careful with the center conductor. It's copper plated aluminum: don't flex it back and forth too many times, and don't scrape all the copper off. Make certain the aluminum shield is clean.

Slide the outer shell of the PL-259 over the end of the hardline. The body of the connector should slip right into place so that the back end of it butts up against the aluminum shield on the cable. If you are using foam cable and left some of the dielectric on, you may have to screw the connector over it. The center conductor should fit into the center pin nicely. The center pin can be soldered for a permanent installation. For a temporary connection, you should be able to put

a very slight "S" bend or similar in the center conductor prior to pushing the connector on; this will cause the conductor to fit tightly into the connector center pin.

Screw the outer shell of the connector over the body. Now for the electrical connection to the shield. Take a 1.25" long piece of 1/2" ID aluminum tubing, and cut it in two lengthwise. Make certain the inner surface of it is clean. Place the two halves together around the connector body and the exposed hardline shield, butting one end up against the outer shell of the connector (which should be pushed as far forward toward the tip as it will go). Wrap several layers of vinyl tape tightly around this to hold it firmly in place. After the first layer or two of tape goes on, you should apply thin coats of RTV silicone or a similar sealant between layers of tape. Secure the whole thing by tightening two 1" stainless compression ("hose") clamps over the tape. One clamp should be over the rear of the connector body, the other over the hardline shield.

This method of attaching connectors looks terrible and works great. I've yet to have a failure in one of these, and some were up for almost 10 years. Beware that this is not, in itself, a waterproof connection! The secret to waterproofing is in the overall assembly, after the thing is attached to the antenna! Hint on taping over the whole assembly after connecting to the antenna driven element: If the driven element can be removed from the boom easily (CushCraft, for example), remove it temporarily... you'll be able to tape around the connector much more easily!

On 3/4" cable, I've used a PL-258 (female/female) adapter to good advantage. "Core" out the dielectric from the end of the cable to a depth of about 3/4". A CATV coring tool, made for the job is great; a Dremel tool or equivalent works well; but it can be done with a knife, screwdriver, or whatever if you have patience. Make sure there is no dielectric remaining on the center conductor or the inside of the shield. Push the PL-258 into the end of the cable. You will probably need to use a shim of aluminum sheet wrapped around the threads of the PL-258 to make it fit better. Wrap the outside with tape and secure with a stainless compression clamp, placed such that it will compress the shield onto the connector as it is tightened. Of course, you do end up with a female connector this way... that can actually be an advantage in some situations. If not, just use

a male/male adaptor.

Note on connector losses and SWR: I would not be inclined to lose too much sleep worrying about these installation methods and "extra" connectors based on my experience with them in the past. On the EME arrays I was concerned, but subsequent testing with return loss bridges etc. proved everything was working very well.

In recent years I have at times left the compression clamps off the assembly (only on 1/2" cable! It's needed on the 3/4" system!) in order to make it look better. This has been successful in all but one case; and that failure was caused by slight and repeated flexing of the cable end, along with a minute hole that allowed water entry.

I have successfully installed PL-259's on 5/8" cable as well, but it is somewhat more tricky. The 145.110 repeater is currently (September 1997) using this size cable.

I am currently (September 1997) experimenting with other methods of attaching connectors that may be less bulky and look better.

## PHASING LINES

CATV hardline also makes excellent phasing lines for multiple antenna arrays. All phasing lines on my second EME array were this type of cable (1/2" for the short runs and 3/4" for the long ones).

To phase two antennas, proceed as follows. Mount both antennas and adjust each for 50 ohms as discussed above. Cut two exactly equal lengths of hardline from the same piece of cable, making them about a half wavelength longer than needed to reach the "array center" where they will join together. Connect one piece to each antenna, and run them to the center of the array. Connect them together at the center junction and check the SWR at that point. Remember to either connect the SWR bridge directly to the junction or use your one wavelength piece of RG-213. In this case, trim both lines in EXACTLY equal amounts until a 1:1 (or lowest possible) SWR is attained.

You are in this case tuning the phasing lines to an odd multiple of a quarter wavelength. The theory behind this is that an odd quarter

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## ARRL DUES REBATE OFFERED

You may not be aware, but the club is actively affiliated with the ARRL. When you renew or upgrade your membership, or obtain a new membership with the ARRL, the JARC is eligible for a rebate. The rebate comes from the ARRL, and provides additional funds for the club.

To obtain the rebate, the club treasurer must complete the "ARRL AFFILIATED CLUB REBATE RECONCILIATION FORM" and forward that form with the correct moneys to the ARRL. **The renewing member must submit his money via cash or a check payable to the Club.** When you receive your renewal notice from the ARRL, don't delay in getting your money to the club treasurer to insure that your membership and QST subscription does not expire.

Your membership to the ARRL guarantees other benefits for the club through affiliation. All hamfests that are sanctioned by the ARRL receive door prizes for distribution, and representatives of the ARRL are made available to provide forums and lectures for the club.

If you not now an ARRL member, but are contemplating membership, be sure to contact Jim NØZSQ and help the club take advantage of the rebate that they offer.

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benefit of the LEILA system, which can compensate for stations that are too strong in the uplink.

Haighton expressed appreciation for the "very hard work" of Project Leader Karl Meinzer, DJ4ZC, AMSAT-DL President Guelzow and the worldwide support group of command stations and technical advisors "for providing us with a great satellite."

Check the AMSAT-DL Web site for the latest information.  
<http://www.amsat-dl.org/journal/adlj-p3d.htm>

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## BUY - SELL - TRADE

**For Sale** - Misc estate items. D-104 Chrome Mic \$40; Soldering Irons \$1-\$5 ea.; Several Heathkit accessory items including a Tube Tester, Watt Meter, and much more. Charlie Borneman NT5R (903) 454-2128, email nt5r@netscape.net, or call John WØJRP at (417) 624-8058

**For Sale** - Clearance - Z80A CPU, Z80-DMA, Z80 CTC, 7805T, Z8 ROMLESS, LM393, LM307, 4164, 2716, 2732, 2764 choice 2/\$1. Carbon Film Resistors ¼W 5% - 100/\$1. Also large assortment of SK parts - call for pricing. Jim WBØIYC (417) 781-2211, email wb0iyc@arrl.net

*(Continued from page 6)*

wavelength line will transform the 50 ohm impedance of the antenna up to 100 ohms. When you connect the two lines in parallel, the impedance divides by a factor of two (just like resistors in parallel) and you end up with 50 ohms again!

Four antennas? Then just phase two sets of two, each as just described; then phase the two sets of antennas in exactly the same manner. Eight or sixteen antennas can also be handled this way. The method of tuning is crude, but if all the antennas were tuned to the same SWR, and if all phasing lines were cut from the same length of cable, and if they all end up being the same length (be careful when measuring and cutting) this will work. The antenna purists will have a heart attack reading this. But it works! It allowed me to get on EME when I didn't have any fancy equipment to work with, and very little money!

Paul Kelley, N1BUG  
September 1997

SOURCE: [HTTP://WWW.N1BUG.NET/TECH/CATVLINE.HTML](http://www.n1bug.net/tech/catvline.html)

## HAMFEST CALENDAR

Note: Listings are provided from the ARRL.ORG site as they become available. To submit an entry, see back page.

**Saturday June 9th, 2001** - Macon, MO  
Macon County, Tri-County, Nemo, & Schuyler County ARCs  
Contact Dale Bagley, KØKY 1402  
Eastern Drive, Macon, MO 63552  
Phone: 660-385-3629  
Email: n0pr@arrl.net  
\*\*\*

**June 8-10, 2001** - Arlington, TX  
Midwest Gulf Division Convention  
Ham-Com  
Arlington Convention Center, 1200  
Ballpark Way, Arlington, TX 76011  
Fri. 12-7pm, Sat. 7am-5pm, Sun. 7am-1pm  
<http://www.hamcom.org>  
Contact: Dr. Maury Guzik, W5BGP, PO  
Box 12774, Dallas, TX 75225-0774  
Phone: 214-361-7574  
Email: chairman@hamcom.org  
\*\*\*

**June 16th** - Houston, MO  
Ozark Mountain Repeater Group  
Contact: Blanche White, NØFLR, 628  
Cleveland Road, Houston, MO 65483  
Phone: 417-967-3000  
\*\*\*

**July 7th** - Indianapolis, IN  
Central Division Convention  
Indianapolis Hamfest Association  
<http://www.indyhamfest.com>  
Contact: Rick Ogan, N9LRR, 5329 Lester  
Street, Indianapolis, IN 46208-2441  
Phone: 317-257-4050  
Email: oganr@in.net  
\*\*\*

**July 15th, 2001** - Washington, MO  
Zero Beaters ARC  
<http://www.yhti.net/~w0bob/zbarc>  
Contact: Keith Wilson KØZH, PO Box  
1305, Washington, MO 63090  
Phone: 636-629-2264  
Email: W0BOB@arrl.net  
\*\*\*

**July 27-28th** - Oklahoma City, OK  
Oklahoma State Convention  
Central Oklahoma Radio Amateurs  
<http://www.geocities.com/coraokc>  
Contact: Tom Miller, KD5ENL, 2602  
Linden Avenue, Norman, OK 73072  
Phone: 405-321-7889  
Email: tmiller4@mmcable.com

# CW DEAD? I DON'T THINK SO...

## NOT WHEN YOU'RE THIS CLOSE TO IT!

**M**orse code and its use, has been held in high esteem by the Ham radio community, since its inception. Although today, there are different schools of thought regarding CW and its use, it finds its way into many of our lives, and the mystique lives on, especially in the Ham community.

Mac W9NLA, one of our club members is a very active CW operator, and promotes it here, with a story for your enjoyment.

I have a keen interest in CW, as it has been a part of my life since I was 12 years old. I have had many experiences that involved the use of CW through the course of my life, including working for the Highway Patrol as a CW operator when it was used instead of Teletype.

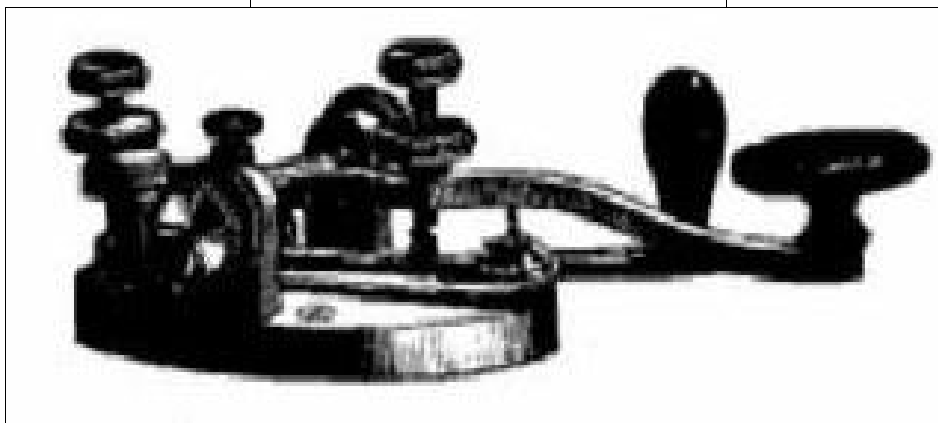
In my youth, I was very active in the Boy Scout program.

I had a Scoutmaster who was an electrician by trade, and who encouraged all of us by offering classes for the different Merit Badges. Electricity, Radio, Signalling, and Communications were four of the badges that I earned as soon as it was possible to start on them. In those days we had rallies that pitted one Scout Troop against another in the different fields of activity, like signalling, first aid, and close order drill. The competition was quite fierce and we got pretty good at the skills needed.

A very good friend of mine and I, became Eagle Scouts at the age of 15, and enroute to that award, we participated in, and won most every signalling contest we entered. Our mode was CW with a single flag; with a dot on one side, a dash on the other, a swipe from up to down marked the end of a word, two passes marked the end of a

sentence, and various other signs were used as were part of the skill. We would tutor younger scouts to become scribes and copy down what we told them the messages were, and because of the proficiency we reached, and their abilities, we did well.

One time, we were pitted against a new organization at a neighboring district rally, and they were skilled in the two flag semaphore version of signalling. It was our first introduction to that mode, as no one in our District had used it, and they were extremely good. This method using



two flags would produce a letter when held in a certain position, but a different letter when held in the same relative position on the other side of the body. Those scouts would make an about face, and with very little motion produce a different letter, then do another about face to face front. "Whirling Dervishes" we called them, and was the method used later by Navy signalmen on board ships. This was the forerunner of the Sea Scouts and Explorer program.

I learned the International Morse Code by sound in my Radio Merit badge skills and was able to copy approximately 12 words per minute audio, and eight per minute using a flashlight or visual. During WWII, in particular aboard ship, both the semaphore and CW sent by "blinker" were used to exchange information visually. Of course, audio CW was utilized for many years as the only "reliable" means of

communication over long distances by radio.

WWII days and CW

Oct. 5, 1942 found me as an Aviation Cadet, having been duly qualified and sworn into the US Army Air Corps. I was on my way to start basic training and then hopefully receive a subsequent aviation assignment. I was unassigned, headed for training at Sheppard Field, TX. Testing had shown that I had an ability to copy the Morse code in both visual and audio modes, in excess of the speeds needed for pilot training. In those days there were audio beacons, with identifiers in CW at around 8 wpm, which you could look up their location on navigation charts and get a pretty good fix on your position. Visual airway beacons would also give an indication of how far you were from the originating point of that route. Daytime flight was aided by the audio but night flying was really helped with the audio and visual. The visual was found on the opposite side of the rotating beacon aimed so it would sweep across the sky, and show you, by CW letter, where that beacon was by changing its brightness. The simple sentence, "When Undertaking Very Hard Routes Keep Direction By Good Means", using the first letter in each word showed where the beacon was, and they were spaced 20 miles apart on the route. This type of aid was still around in late 1947 and used in many places.

Facility Charts provided data on airfields, aids to navigation, etc. and CW was an integral part of the means to impart that information to you, by video and audio. When my experience as an Aviation Cadet

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ended, I enrolled in the Radio Operator and Mechanic Training School. At this school you had to obtain a code speed of 18 wpm, using a pencil for copy and straight key sending. A speed of 10 wpm visual was also required for graduation.

The Air Corps would never accept the idea that you couldn't learn code, and the only way to ever get out of the classes was to go completely berserk - and some did. I went into the course with a high expectation of it being a snap. To my dying day I will never understand how it ever took me 29 days, in a row of 6 hours continual code practice, to get my speed up from 16 wpm, to the required 18 wpm. Frustration, complete boredom, and a host of other adjectives come to mind. Then, the afternoon I passed the 18 wpm, I also took the 20 wpm test and passed it too. I found that it is true that sometimes there is a certain code speed that will be a stumbling block, this depends on the person, but I have seen it at every test speed I have encountered. My advice, keep at it, it will come.

WWII, Radio Operator/Gunner.

Picking up our aircraft and heading out over the Pacific was an experience that produced some worry, even though our training tried to instill in us the fact that, we could do it - and we durned well better. We led a 3 plane formation, after the pilots had drawn straws to see which plane would lead the formation. It was up to our plane to be the eyes, ears, and voice (no audio). We transmitted strictly my CW and then only in coded messages and procedure short transmissions. There were 3 Navy destroyers spaced 500 miles apart, designated as beacons A, B, and C, and we used them as homing targets to assure us we were still headed for Hawaii. No contact was made with them, other than our copying their beacon, and our visual spotting of them. I, in turn, had CW radio contact to the Army Airways Communication System stations at San Francisco and in Hawaii. Our on board receiver was the BC-348, which was a reliable boat anchor. A rotation of the BFO control from full left to full right would give you only a 4 KC frequency spread. This was the spread between the

two stations and it was a simple matter of sticking in the middle and copying the traffic. The traffic was destination weather, and at times a directed message to us for our in flight weather or position, or the possibility of a change in routing or a time slot.

We had a short crew to keep the weight down and to allow for auxiliary fuel tanks for the flight. Our normal compliment of air crew was 2 pilots, a radio operator and a crew chief, however, on this trip a navigator was also on board. He had been involved in previous flights to our ultimate destination, which at that time was New Guinea. His expertise kept us on track, and my operation of the Radio Compass and SeaSearch Radar allowed us to back up his findings making all of us feel a whole lot better. It's a big ocean, and Hawaii had a flight time of 15 hours 12 minutes. What a sight, Hawaii around 7:15A, fluffy clouds about 2,000 feet below us, slight chop to the ocean with rolling white caps visible, shipping spotted going every which way, keeping alert for other aircraft, and finally, instructions to switch to voice and Hickam Field Control Tower. My job was done for that part of the flight.

Island hopping to New Guinea was next. We still had to guard the AACS CW frequencies and enroute each destination. We had to maintain radio silence unless asked for a report on something. Logging what was sent to "all" was a must and you had better not miss a directed message to your flight. You could ignore other traffic and it was generally a very calm and quiet trip as the flight times were around 8 hours in duration, all daytime flight. The navigator had scheduled this, so he was pretty sharp.

The first leg from Hawaii was to Christmas Island across the EQUATOR. On board ship, those new to the crossing of it got pretty wet as King Neptune dunked you as part of the ceremony. Confident we would not have any of that stuff, we felt quite good about the whole thing. It was a new experience for all but the navigator. I should have known. At the time we crossed the line, I had to provide a position report by request of the AACS station. We wore light poplin

flying suits and my radio position had a metal chair from which the seat parachute had been removed, so I was sitting on bare metal. When I started sending our position by CW, the navigator decided King Neptune should strike and dumped a canteen cup of water into the seat. "SPARKS", as most of us radio ops were called, developed a few sparks of my own, it was a shocking experience. Nothing serious, but I did feel a tingling for a spell, and decided that it was an RF burn, not electrical, I'm still not sure. It was entertaining to see the pilots and crew chief end up with wet behinds, now full fledged inductees in the King Neptune Club.

I recall the time that a USO Tour group were missing on a flight from Australia to Nadzab, New Guinea. The show was called "Mexican Hay Ride" and to our dismay they were never located, at least I do not recall ever hearing if they were found. We were desperate for the sight of some good looking white girls, and there were something like 20 people in the cast, of which 14 or 15 were pretty girls. What a waste. I volunteered for sea search duty along with other "sparks" and had my first ride on Navy aircraft. A matter of 2 hours familiarization, a briefing, intro to the pilot and crew, and off we went for 9 hours flying a grid pattern assigned us, at 500 feet altitude, intently watching the water for anything resembling the missing aircraft. We use the radio compass, grid chart, and magnetic compass to keep us in a reasonable search pattern. Unfortunately, after 2 days of hard flying and attention to the job at hand, the search was called off.

The nice part of those flying days was you monitored but it was absolute radio silence as far as transmitting, other than voice, which in those days, we felt could only travel "line of sight" so it was allowed for exchange of data. How wrong we were. At 8,000 feet, a 100W "Coffee Grinder" - ART-13, and on UHF frequencies, who knows who heard us?

Mac/W9NLA FISTS #3610

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**DO YOU KNOW  
YOUR RF?**

# JUNE 2001

## Joplin Amateur Radio Club Meetings and Events

<i>Sunday</i>	<i>Monday</i>	<i>Tuesday</i>	<i>Wednesday</i>	<i>Thursday</i>	<i>Friday</i>	<i>Saturday</i>
					<b>1</b>	<b>2</b>
<b>3</b>	<b>4</b> 19:30 JARC NET NØKMP NET CTRL 21:00 ARES NET KAØTUD NET CTRL	<b>5</b> 19:30 ARES MEETING	<b>6</b>	<b>7</b>	<b>8</b> HAM COM - BEGINS ARLINGTON, TX JUNE 8TH - 10TH	<b>9</b> MACON COUNTY MO HAMFEST HAM COM - ARLINGTON, TX
<b>10</b> HAM COM - ARLINGTON, TX JUNE 8TH - 10TH	<b>11</b> 19:30 JARC NET KBØSTN NET CTRL 21:00 ARES NET KAØTUD NET CTRL	<b>12</b> 19:30 BUS MEETING	<b>13</b>	<b>14</b>	<b>15</b>	<b>16</b> HOUSTON, MO HAMFEST
<b>17</b>	<b>18</b> 19:30 JARC NET WØJRP NET CTRL 21:00 ARES NET KAØTUD NET CTRL	<b>19</b> 19:30 ARES MEETING	<b>20</b>	<b>21</b>	<b>22</b>	<b>23</b> 13:00 FIELD DAY BEGINS AT DOVER PARK
<b>24</b> FIELD DAY ENDS AT 13:00 DOVER PARK	<b>25</b> 19:30 JARC NET NØZPD NET CTRL 21:00 ARES NET KAØTUD NET CTRL	<b>26</b> 19:30 PGM MEETING	<b>27</b>	<b>28</b>	<b>29</b>	<b>30</b>

## Meeting Times, Testing, and other Club Information

**T**he Joplin Amateur Radio Club, Inc., a Missouri *not-for-profit* organization, meets on the second and fourth Tuesdays of each month at the Joplin Municipal Building, on the lower level, in the Civil Defense dining room at 7:30 PM. The facility is accessible to the handicapped.

The club supports and promotes annual operating events, assists area agencies with communications when requested, and offers training classes for advancement in amateur radio. It also sponsors the JARC Hamfest each year in April, and maintains a wide area coverage OPEN 2m repeater on 147.21 MHz.

Club members often meet weekday mornings in Joplin for coffee at the McDonalds at 12th and Rangeline Road around 8:30 a.m. On Saturday mornings, area Hams also gather for

breakfast around 8:30 a.m. at the restaurant in the Ramada Inn, 3320 Rangeline Road in Joplin. For more details please contact Ray Brown KBØSTN at (417) 781-4967

### 2001 CLUB OFFICERS:

President: Ray Brown KBØSTN  
V.P.: Martin Matarazzo WD6FIC  
Treasurer: Jim Johannes NØZSQ  
Secretary: Mark Mitchelson NØZPD

## Amateur Radio VE Testing

License testing by volunteer examiners takes place on the 3rd Thursday of each month (except June & July) at St. Paul's Methodist Church located at 2423 West 26th St. in Joplin. Sign up at 6:30 PM, testing begins promptly at 7 PM.

### ABOUT THE NEWSLETTER

This club newsletter offers an open forum for the Four-State area amateur radio community, and **your** comments and contributions are always invited. Items for publication, including classified ads and amateur radio related articles, may be sent to the **JARC Printed Circuit**, P.O. Box 2983, Joplin, MO 64803-2983, or send email to: **jim-scott@janics.com**

Deadline for submissions is the 20th of the month preceding the month of publication. Non-Commercial Classified ads are free and will be run on a space available basis whenever requested. Submissions may be typed, handwritten, ASCII text files attached with email, or on disks formatted for IBM. *All items* are subject to editing for spelling, content,

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PRINTED CIRCUIT

Joplin Amateur Radio Club, Inc.  
P.O. Box 2983  
Joplin, Missouri 64803-2983