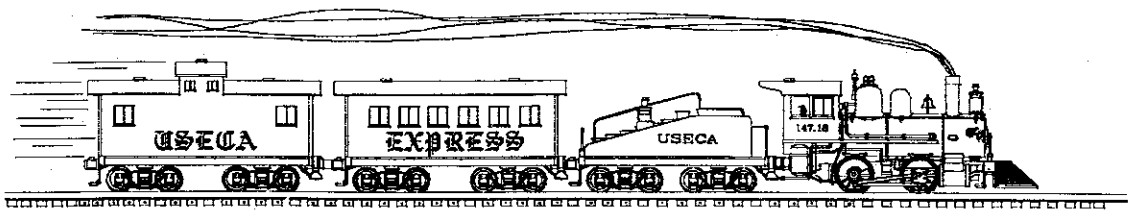

UTICA SHELBY EMERGENCY COMMUNICATIONS ASSOCIATION VOLUME 9 - NUMBER 3

"Hear It On The Air, See It In The Press"

The USECA Express is published monthly by the Utica Shelby Emergency Communications Association of Macomb County, Michigan. Club meetings are held on the second Tuesday of each month at 7:30 p.m. local time at the Donald Bemis Junior High School, 12500 Nineteen Mile Road in Sterling Heights, Michigan (between Schoenherr and Clinton River Roads).

Articles submitted for publication in the EXPRESS should be delivered to the Editor no later than the Friday after the night of the Club Meeting for publication in the following months issue.

For those who need to get a message to the Board or the Membership Secretary please call our answering machine at 268-6730.

IMPORTANT ANNOUNCEMENT!!!

Walt bought a computer!!!!...no, wait, it's not April Fools Day yet.....Oh yeah, here it is....

THE APRIL CLUB MEETING

The April Club meeting will be held the first Tuesday instead of the second Tuesday for this month only. The school had the nerve to be closed on our meeting day. Also, the Board of Directors meeting will be held the last Tuesday in March.

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BOARD OF DIRECTORS

President	Earl Hoskins/ N8OEX
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Recording Sec'y	Dave Larson/ N8OEV
Treasurer	Rick Parady /KB8KLW
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WA8Z	WB8F	KG8F	NW8M	N8KDL
WM8V	WS8D	WF8I	WI8L	AA8CY
WJ8Q	WQ4I	WR8O	WS8I	KF8CT
WI8K	WV8I	WY8K	WY8M	KF8RF
WX8L	WX3L	WY9K	N8CVC	W8VRW
AA8HF	KF8RG	KF8MB	KF8AT	

COMMITTEES

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Swap Dictator	Virginia Przekaza/ N8NLS and Committee
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Club Videographers	Charlie Lupo/ WY8K Floyd Soo/ KF8AT
Door Prizes	Bill Isbister/ KF8FK
Net Managers (2M)	Bill Stranahan/ N8NMX Scott Kraft/ KB8NXS
Net Manager (CW)	Don Chisholm/ WX3M
Refreshments	Walt Gracey/ WB8E Don Chisholm/ WX3M Kathy Sears/ KF8FX

HONORARY/CHARTER MEMBERS

C= Charter H= Honorary F= Founder

KA8KTV	(F,C,SK)	N8HCT	(F,C)	WD8MFN	(F,C,)
KA8IZM	(F,C,SK)	N8FNO	(F,C)	N8BK	(H)
WB8NHT	(F,C)	K8QLM	(F,C)	KA8BDG	(C)
WB8QNI	(C)	N8FDN	(C)	WA8VZZ	(C)
WA8OSF	(H)	KA8VYV	(H)	N8AWV	(H)

J. HAUBNER (C) G. MANQUHARDT (H)

From The Editor

Dave - KF8RF

Whewwwww.....finally got done with the first issue! Now it's time for the second one.....

You know, I never realized what amount of work is involved with this thing. Not only do I have to get together all of the stuff that goes in it but I also have to learn the word processing program at the same time. Whoever told me that Word for Windows 2.0 was easy to learn must have been underthe influence!

By now I am sure that you have received the first EXPRESS of the year. Hope you liked it. Along with learning the new word processor I have also invested in a scanner so that I can digitize pictures. By next month I hope to have learned how to use it enough to get some neat stuff in here.

Well, on with the serious stuff. One thing nice about being the Editor of the Express is that I can use this column to "vent my spleen" . This months "spleen venting " is going to involve the financial aspects of the club, specifically the correlation between membership dues and the activities of the club.

I had a chance to look into the database kept by the Membership Sec'y, Joan/ N8VLY, and I was shocked to see that we have only had 68 renewals out a club total of 250 + members! Considering that this is the beginning of February already and we have way more than 68 people that attend the club meeting (as well as those that regularly use the repeater, though membership is not required to use it) the math does not add up. Lets take a look at what your membership dollars do for you:

- Support the repeater ($500 or more not including remote sites)
- Pay for Field Day (last year it cost around $3000)
- Pay for the Picnic (last year it cost around $500)
- Pay for Pre-Field Day (estimated at $500 this year)
- Pay for Door Prizes at the club meetings (about $750)
- Help pay for the Halloween and X-Mas parties (around $1000 total)
- Pay for Coffee and Doughnuts at the club meetings (around $300)
- Pay for this Rag ($200 per month for postage and printing)

Get the picture yet? There are 2 major ways that this club makes enough money to provide the kind of events that you like to attend and the niceties you enjoy. That is by having the Swap (which requires $1500 cash up front in order to reserve the building) and by..... you got it.....

MEMBERSHIP DUES!

Now that I've cried on your shoulder I hope you have the message. Please renew your dues soon!

FOR SALE:Computer - 286 PC/AT, 4 megs of Ram, Math Co-Processor, New 80 Meg Hard Drive, 1/2 height baby tower, both floppy drives, VGA monochrome monitor, Epson LQ 1000 wide carriage printer. Price: $995.00 Call Arpad (WY8M) at 751-3804

Minutes for USECA General Meeting - March 1993

Unfortunately the Meeting Minutes for February were not available in time to be published. Hopefully this will be resolved by next month.

****

LETTERS TO THE EDITOR

Hello All,

Well, I just finished reading Arpads article in the January Express and I will first preface my remarks with the usual disclaimer. These are my own opinions and should be regarded as such.

Many of the topics which he dealt with were certainly worthy of discussion, but the manner in which he addressed them was often rude and undiplomatic. I also feel the language used needs to be toned down considerably. Rather than fostering healthy debate the article can only alienate, offend and confuse those who have come to expect patience and friendly advice while they are "learning the ropes". This club's repeater and newspaper reach a very diverse group of people. Not everybody feels comfortable with many of the words used and the subjects to which he alluded.

We must consider the feelings and rights of each person exposed to the club and it's activities. It's time for the silent majority to be heard. Be kind, and be patient but be heard. I feel much better now! 73 to all.

de

KE8VM, DAN

Editors Note:
This subject has come up in the past, last year as a matter of fact. I have been contacted by another club member who was upset about the language used in the article and have heard that a number of members who were not happy with the language will be letting me know.

Here are the facts as I see them: The writing style that Arpad uses is uniquely his own. You may like it, or you may hate it...the choice is yours. While he uses the words spoken on TV to be his guide, you may find them offensive. Up to this point I simply published articles as I received them with no censorship.

I suffer no delusions, however, that I have the responsibility of maintaining freedom of speech in this paper. It is a club newspaper intended for club members, not the general public. So here is my proposal to resolve the situation: I want feedback from as many CLUB MEMBERS as possible telling me if they think the language used in the Soapbox was acceptable or not acceptable. Get me these responses by April 1st, 1993. Then, depending on what the MAJORITY decides, I will edit accordingly. DO NOT, repeat, DO NOT CALL ME ON THE PHONE WITH YOUR OPINIONS!! Either send them to me at home or via packet. My address is:

Dave Duncanson
1365 Diana
Madison Heights, Michigan
48071

If you feel strongly enough about this subject then send in your vote and DO NOT COMPLAIN if it does not turn out your way. The MAJORITY WILL DECIDE!!!!

LETTER'S TO THE EDITOR - CONTINUED

After the Soapbox column I feel compelled to give my opinion of several points mentioned.

First of all, with the "FM clarity " noted, why, oh why, do so many people find it necessary to break into a conversation with just the last couple of letters of their call. I could understand this if people were on CW or a very crowded HF band, but remember, "this is FM clarity boys and girls!!". I don't feel it is necessary to make a quickbreak like this on this or any other repeater.

Second, I do and will continue to state that I am monitoring. Many times this has resulted in somebody getting ahold of me, or my getting ahold of someone else, without having to constantly call for somebody who may be out there and listening. Sometimes I will just turn on the radio and go about my business and if I hear somebody on I want to talk to, I'll talk. I don't always want to be the host , or go through a laundry list of people who might be out there that could answer a question. I just guess some of us know everything that there is to know about Amateur Radio, and would therefore object to the practice.

Since CB'ers were noted, and also the presence of (heaven forbid) ham related topics on the Hoot Owl Net, this I cannot let pass without a comment. During some of the past Hoot Owl Nets, I had a hard time distinguishing whether this was 2 meters or 11 meters. Common decency does not allow me to repeat the language that has been used. Even if this paper was restricted to the over 18 crowd, I still probably would'nt repeat it. Aren't we supposed to be setting an example for the new people or the people considering getting into Amateur Radio? I am by no means a prude (and I can easily prove that), but is'nt that one reason why many of us left the CB band?

Which brings me to my next topic. Listen to the typical check-in on any USECA Net, then listen to check-ins on almost any other repeater. Is this how we are supposed to behave, everybody just jumping in? It sound like rush hour on CB channel 19! I firmly believe that you can have just as much fun, and far better communication by observing simple courtesy. I still have to use 11 meters in conjunction with my Neighborhood Watch and Michigan Emergency Patrol work and find it disgusting that many unlicensed CB'ers have better operating practice than my fellow hams! Do we really have the right to cut anybody down, if we are not perfect ourselves?

During the time that I was NCS on the Hoot Owl net I got a lot of feedback that this was desired and appreciated, much more so than people wanting to do it the "old way". I have no objections to discussing non-ham radio related topics, but the anarchy that often accompanies the nets really bothers me. I personally find it surprising that many of the under 18 and/or No Code Tech crowd seem to be much better behaved than a lot of the old timer advanced and extra's. Of course there are always exceptions, but I feel that the more experienced operators should be setting a GOOD example. Also, keep in mind that Amateur Radio is a SERVICE. This means that we should always be ready to help to the best of our abilities. This does not mean that plutocracy should be alive and rampant in our ranks. Everybody has something to contribute and I firmly believe that nobody knows everything about the service. For example, who do you think knows more about theory: a no code tech who just got their license or an old timer who has'nt studied theory in

LETTER'S TO THE EDITOR - CONTINUED

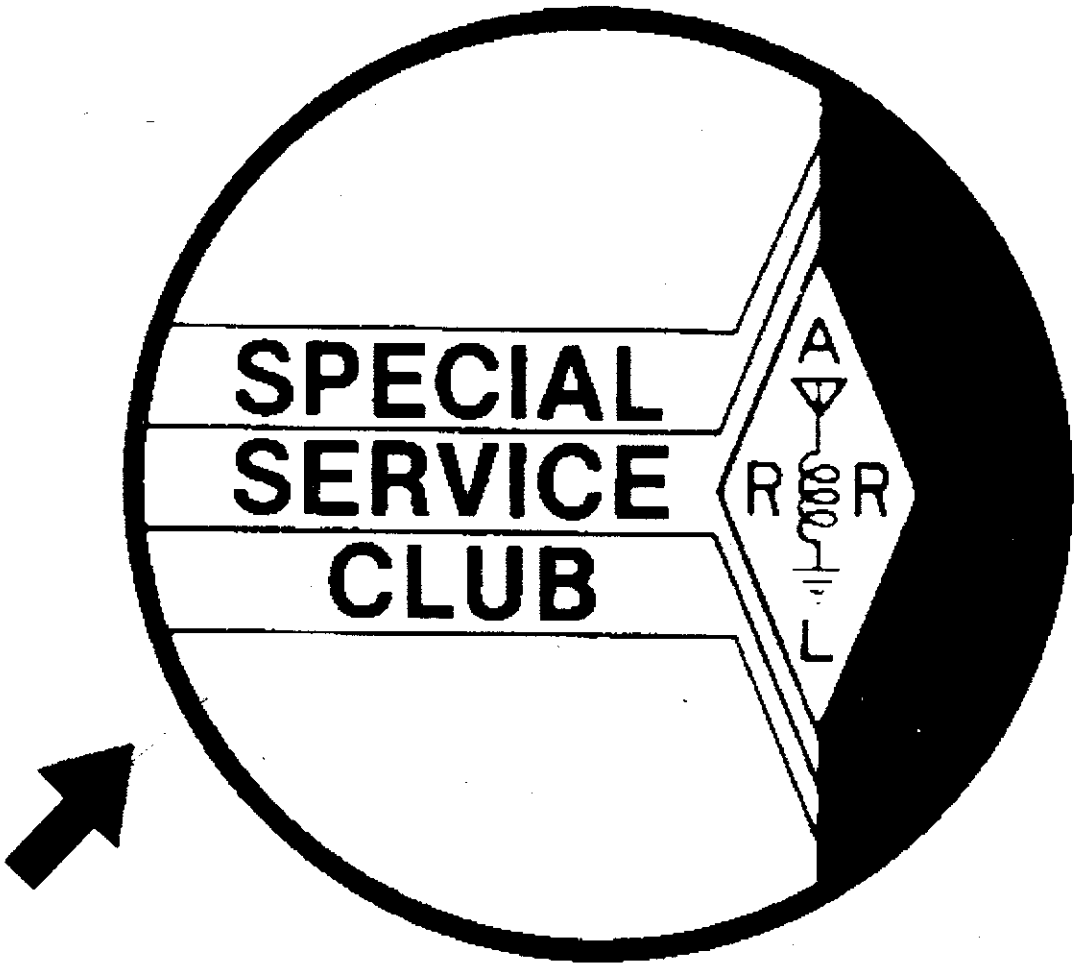
years? I'll be the last to claim expertise , and have found, as many others have, that even though I easily passed the Novice tests 10 years ago I would have a difficult time passing them now. Go ahead and try it, you may be surprised at how much you've forgotten, or how much the tests have changed.

It was mentioned that you could'nt bust into a conversation fast anymore. Sorry if anyone else has had a problem, but I do want to thank the people who VERY PROMPTLY cleared out of the repeater on the night of October 31, 1992 when I had a REAL emergency and needed the patch to get help. It impressed quite a few pwople, including the police and EMS who responded!

Lastly, on the subject of phonetics, the phonetics were designed to promote accuracy and should be used to that end. I feel that if somebody has asked for a repeat they OBVIOUSLY did'nt understand what I said the first time. I don't mumble, I enunciate clearly, but I can't tel what my signal sounds like at the other end. Maybe you happen to be listening and can hear just fine, but what if the other person is on the fringe or in a dead area (I-696 for instance)?

I hope everybody takes this in the manner which it was intended, which is not to lay blame but to improve Ham Radio in general.

73 ES CUL DE N8TLC, Bill Dobiesz



NOT YET!, BUT IT IS SOMETHING TO STRIVE FOR!!!!

MOONLIGHT MONTE ROAD RALLY

On the evening of February 13, 1993, a group of competitors and workers got together to conduct the 1993 version of the Moonlight Monte Road Rally. While most of the participants were members of the Detroit Region, Sports Car Club of America (SCCA), there were several Hams from USECA who helped provide radio communications.

For those of you who have not been involve in a road rally such as this, let me explain how it works. The Monte is a Time-Speed-Distance (TSD) rally. The idea of the event is to follow written instructions which define the course and speed to be maintained. The specified speeds change with the road conditions. Obviously you are expected to go faster on a wide open paved road than on a snow covered, twisty, unpaved one. At points along the course, the organizers place checkpoints or controls to measure the competitors exact time of arrival. The competitors are penalized for being either early or late at the rate of one point for each 1/100 minute error. At the end of the event, the scores at each checkpoint are added together and the low score wins. So that competitors are less tempted to speed, each leg (the section from one control to the next) is scored separately, with time reverting to a specified start time at each control.

The Monte was 190 miles long with most of the roads being snow covered and a bit slippery, as well as being unpaved. There were 17 checkpoints placed along the route. By judicious use of checkpoint teams, we were to get by with only four crews. Three of these teams had a ham radio operator as part of their crew. The three Hams involved were: John Sonnenfeld, KA7KZO, Biff Baydoun, N8NQQ, and Bill Stranahan, N8NMX. The additions of ham radio at the controls made the job of running the event much easier as I was able to know what was happening most all the time.

Floyd Soo, KF8AT, and I were in the opening car. Floyd drove while I ran the 1/1000 mile odometer and checked to be sure that all the instructions were still correct, all roads were open, signs were still in place and that the controls were properly located and ready for the first cars to arrive. In addition to being my driver the night of the event, Floyd also drove for me on the final pre-check of the route two weeks before the event.

Everyone seemed to have a good time, and appear ready to do it again. Biff has already signed up with his wife to be one of the checkpoint crews or the Thumbs Up Rally scheduled on November 13th. John, KA7KZO may set up a portable repeater and act as net control, if his military duties allow. Floyd also plans to be there, either as a competitor or worker.

It was great to have all the help, and my appreciation goes to all those who helped with the event. Perhaps we will have enough Hams to have radio at every control in November. Come on out and join us for the fun in November.

Jim Mickle, N8OKW
Organizer, Moonlight Monte, 1993

ELMER LIST

Over the past several months the need for a "Elmer System" within the club has been discussed. For those that don't know, an Elmer is an experienced Ham that is willing to provide advice or guidance to a less experienced Ham.

While the idea for an Elmer list has been around for awhile, the only thing missing was a volunteer. UNTIL NOW.....T.J., N8RUH, has accepted the challenge of maintaining a current list of Elmer volunteers within the club.

Also discussed was what type of Elmering skills should be included in the list. It was decided that 2 lists will be established: One list will include Amateur Radio Elmers, which will be updated and published monthly. The other list will include General Elmers, with specialties not limited to Amateur Radio. This list will be published in the Express only 1 time per year. If you feel particularly experienced in any give subject, put it down: ie. Scuba Diving, Car Repair, Cooking, Plumbing, Electrical , etc.

If you get tired of being on the list all you have to do is to notify the Express Editor and your name will be removed. Here is your chance to help other Hams.

SIGN UP SHEET

Name:

Callsign:

Phone Number:

Your Specialties:

When completed, please mail to : T.J. Iley - N8RUH
2035 Cecil Avenue
Troy, Michigan
48083

USECA MEMBERSHIP APPLICATION

TYPE OF APPLICATION: [ ] NEW [ ] RENEWAL [ ] NEWSLETTER ONLY

DATE OF APPLICATION:

NAME:

ADDRESS:

CITY, STATE, ZIP CODE:

BIRTHDATE:

TELEPHONE NUMBER:

WANT IT LISTED IN ROSTER? [ ] YES [ ] NO

ARE YOU A MEMBER OF THE ARRL? [ ] YES [ ] NO
IF YES, WHEN DOES IT EXPIRE? (MM/YY)

DO YOU DESIRE AUTOPATCH PRIVELEGES? [ ] Yes [ ] No
IF THIS IS A RENEWAL, PLEASE LIST YOUR AUTODIAL NUMBER.

A CURRENT COPY OF YOUR LICENSE IS REQUIRED FOR CLUB RECORDS.
HAS THE CLUB RECEIVED A COPY OF YOUR CURRENT LICENSE?

FAMILY MEMBERSHIP: IF THIS IS A FAMILY MEMBERSHIP PLEASE LIST THEIR CALL SIGNS

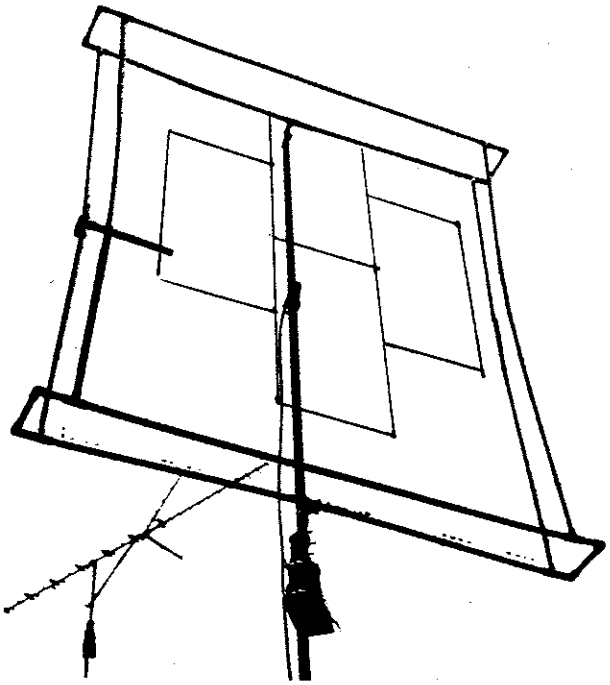
ANNUAL MEMBERSHIP DUES

REGULAR MEMBERSHIP (INCLUDES NEWSLETTER)	$15.00
FAMILY MEMBERSHIP (INCLUDES 1 NEWSLETTER)	$25.00
NEWSLETTER ONLY (NO MEMBERSHIP OR AUTOPATCH)	$ 3.00

Dues can be given to the Membership Secretary or mailed to:

Utica Shelby Emergency Communications Assoc.
P.O. Box 1222
Sterling Heights, Michigan 48311-1222

Antenna of the Month - The VHF/UHF CURTAIN QUAD



Meet the Curtain-Quad Antenna

Some VHF and UHF enthusiasts maintain "There's nothing new under the sun," but W1HBQ proves otherwise — at least where full-wavelength loop antennas are concerned.

By J. Ross Anderson,* W1HBQ

Gain and bandwidth can be yours with a 3-wavelength loop as a basic antenna building block. This arrangement is possible as a multielement broadside-array collinear system with a single feed point.

Here's an opportunity for you to participate in the development of a new kind of antenna — the Curtain Quad. It consists of an array of broadside and collinear elements that provide high gain and broad bandwidth with no need for element tuning. Like other quad types of antennas, the radiating elements are connected on the ends by those elements that radiate only a negligible amount of energy. The Curtain Quad differs from other quad antennas in that many elements can be connected together to provide broadside and collinear gain.

Some Basic Configurations

Fig. 1 shows the basic types of quad antennas. A 1-wavelength loop forms the basis of the cubical quad, as illustrated at Fig. 1A. A 2-wavelength loop (X-Q quad) is shown at Fig. 1B. The 3-wavelength loop at Fig. 1C represents the fundamental building block for the Curtain Quad. The current reverses every half cycle, as indicated by the arrows. The illustrations show the 1- and 3-wavelength loops being fed at a current maximum. The opposite is true of the 2-wavelength loop, which is fed at a voltage maximum (current minimum). Each antenna type has one thing in common: The horizontal elements have their currents in phase. This causes broadside gain. The vertical elements have out-of-phase currents; therefore, they do not radiate appreciably. The vertical elements carry power to the horizontal elements.

Multielement Loop Arrays

A big advantage is common to the Curtain Quad: Additional elements can be connected to the low-current points of the antenna. In principle, this permits us to build very large arrays. Fig. 2 shows how the basic building blocks may be assembled to provide large high-gain systems. Fig. 2A (identical to Fig. 1C) depicts the basic building block. Since this antenna has two horizontal ½-wavelength elements in phase, it can be considered a two-element array. For your convenience you may consider the polarization of this antenna and the others discussed in this article as horizontal. Of course, if vertical polarization is desired you may rotate these arrays 90 degrees.

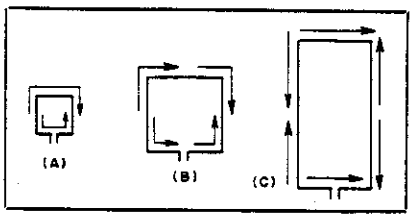


Fig. 1 — The three basic quad loops. At A is the 1-wavelength loop, the basis for the cubical quad. B shows the 2-wavelength loop, the basis for the X-Q Quad. C shows the 3-wavelength loop — the building block for the Curtain Quad. The arrows represent the direction of the current, which reverses every half cycle.

Fig. 2B shows how two of the loops may be connected to form a three-element array. This arrangement might be useful as the driven element of a stacked Yagi type of array, which is similar to the 1-wavelength loop that is used as a quagi driven element.

A seven-element array is shown at Fig.

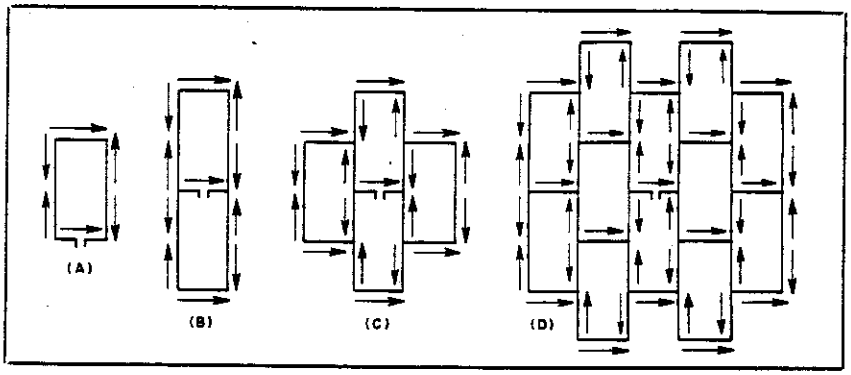


Fig. 2 — Various possible Curtain Quad arrays. A shows the basic building block, and can be considered a two-element array. B shows how two of the loops can be combined to make a three-element array. At C is a seven-element array. D shows how a 17-element array may be constructed.

*1065 Oleander Ct., Sunnyvale, CA 94086

Antenna of the Month - Continued

2C. This method provides both broadside and collinear gain. The former gain results from the vertically stacked horizontal elements. Collinear gain comes from the horizontally stacked horizontal elements. We will discuss construction and performance of a 435-MHz version of this antenna later in the text.

Fig. 2D illustrates how a 17-element curtain may be constructed. The maximum number of elements that can be connected in this way has not been determined. Certain characteristics may tend to limit the number of elements:

1) If the array is too large, the energy will radiate before it can be distributed over the antenna. How well the energy is distributed throughout the antenna will depend on the system Q: The greater the Q the better the distribution, but the smaller the bandwidth will become.

2) The greater the number of elements, the higher the feed impedance. This can be understood by considering the relationship between this antenna and a multiwire folded dipole (Fig. 3): The greater the number of dipole wires, the higher the impedance. For very large curtain arrays, the impedance may be too high for a convenient match to 50 ohms. The seven-element version has a feed impedance of some 1200 ohms.

Array Gain

The gain of a Curtain Quad will be approximately G = 10 log n, where n is the number of elements, and G is the gain in decibels over a dipole. If we place a reflective screen ¼ wavelength behind the array, our gain formula becomes G = 10 log n + 5.2. A seven-element version with a reflector should yield 13.7 dB of gain in theory. A Curtain Quad that is 10 elements across, and with 200 elements, might provide 28 dB of gain if the current were distributed uniformly throughout the antenna.

An important additional point to consider is that the physical length of any quad element is greater than the free-space length. This length increase depends on a number of factors, such as operating frequency and loop circumference-to-conductor diameter ratio.[1] I found that the individual Curtain Quad elements had to be increased by about 10% over those calculated from the *Antenna Book* equations.

Construction Details

I built an experimental antenna for 435 MHz with PVC pipe as the support material. There were two structures made from ½-inch-diameter Schedule 40 PVC pipe.[2] They were 66 × 81 inches and were spaced 7 inches apart. The supports could, of course, have been made from aluminum, wood or fiberglass.

Fig. 4 shows the construction method for the array. After one 66- × 81-inch section is assembled, lay a grid of nylon cord, spaced 15 inches apart, in both directions. Where the cords cross one another, bond them together with a drop of PVC cement. This grid provides a framework on which to build the array.

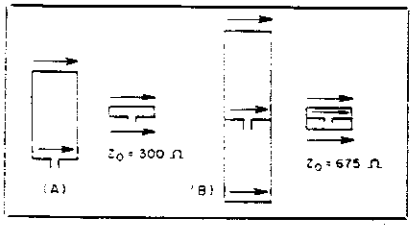


Fig. 3 — At A is shown that a two-element Curtain Quad has a current distribution similar to that of a folded dipole, and thus will have an impedance similar to it. At B, the similarity between a three-element Curtain Quad and a three-wire dipole is shown. The impedances shown are for the dipoles: the impedances of the corresponding Curtain Quads will not be as high for the dipoles.

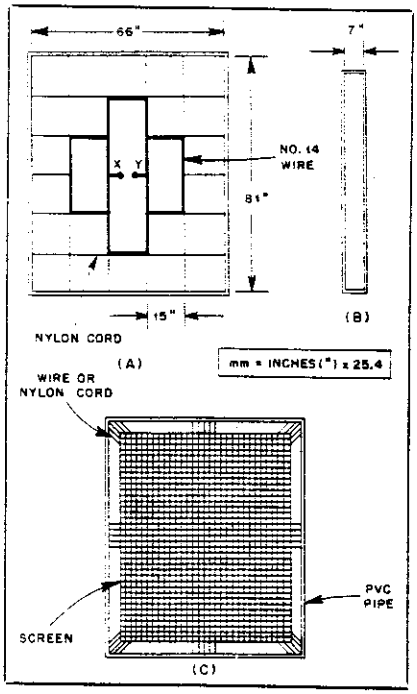


Fig. 4 — Front (A), side (B) and back (C) views of a seven-element Curtain Quad with reflecting screen for 435 MHz. The supporting structures will deform slightly from rectangular as the nylon cord is pulled tight.

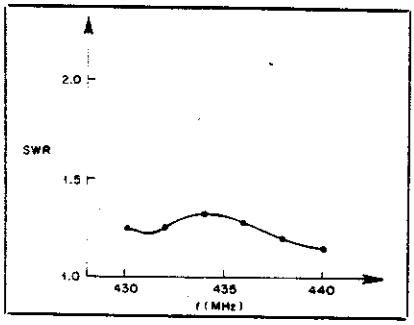


Fig. 5 — SWR of the antenna shown in Fig. 4 and described in the text.

Next, assemble the array while using no. 14 copper wire. Secure the antenna to the grid by means of tape or more nylon cord. The horizontal elements are 15 inches long and the vertical ones are 30 inches in length.

Now, stretch a 60- × 75-inch reflecting screen inside the remaining PVC frame. I used aluminum window screen for the reflector. A screen with wider mesh, such as chicken wire, will present less wind resistance. It will work fine provided the openings do not exceed approximately 0.06 wavelength. Make sure the screen is flexible enough to be stretched flat by the supporting framework.

The driven array and reflector are secured ¼ wavelength apart (roughly 7 inches at 435 MHz) by using short sections of PVC pipe. The 50-ohm feed line is connected to the antenna through a coaxial balun and ¼-wavelength transformer. The transformer is made from two pieces of no. 18 wire that are spaced 1.5 inches apart.

Performance Data

The antenna should work satisfactorily without any need for adjustment. But, if an SWR meter is available, the spacing of the ¼-wavelength transformer can be adjusted for the lowest SWR. Fig. 5 shows the SWR versus frequency for the antenna as measured through a 22-foot length of foam-insulated RG-8/U cable. The E-plane 3-dB beamwidth is approximately 40 degrees, while the 3-dB H-plane beamwidth is on the order of 30 degrees. Array gain can be calculated by

$$G(dB) = 10 \log (41{,}213/\theta_E\theta_H) - 2.14 \quad \text{(Eq. 1)}$$

where

θ_E is the E-plane beamwidth
θ_H is the H-plane beamwidth.

The Curtain Quad gain, determined by Eq. 1, is 13.2 dB, close to the 13.7 dB estimated earlier in this article.[3]

Future development of this antenna depends on you, the antenna designer. One possibility is a parasitic array of Curtain Quad elements. It seems likely that the spacing between elements in such an array will be on the order of wavelengths rather than fractions of a wavelength, as in a Yagi system. I am sure you can think of other approaches to try. Good luck and successful designing!

Notes

[1] G. Hall, ed., *The ARRL Antenna Book* (Newington: ARRL, 1982).

[2] mm = in × 25.4; m = ft × 0.3048.

[3] [The gain figures stated in this article have not been proven on an antenna test range, nor have they been verified by the ARRL. Bear in mind that the numbers given are theoretical. — Ed.]

Ross Anderson was first licensed in 1956. He received his BS degree in 1963, his MS degree in 1969 and his PhD from Stanford in 1976, all in electrical engineering. His professional career has been in the field of microwave research, working for various laboratories. He is presently on the staff of Avantek, where he is working with gallium-arsenide FETs. Ross's primary amateur interest is in antennas — especially quad types of antennas. He first thought about a planar array of quads in 1959, but a practical design was not completed until recently.

USECA Net Points Information
by Ken - KF8RG

U.S.E.C.A. NET POINTS

CALL	NAME	PTS	CALL	NAME	PTS
VE3PGI	GARY	10	N8OEM	BARB	9
VY3L	MIKE	79	N8OEV	DAVE	67
VE3OKH	MIKE	1	* N8OEX	EARL	55
VE3VLA	JERRY	1	N8OFB	DAVE	12
WQ4I	JOE	17	W8OFB	JIM	1
KD4RTV	RON	1	* N8OKW	JIM	60
KA7KZO	JOHN	31	N8OML	JOHN	16
* KF8AT	FLOYD	104	N8OMR	DAVE	3
K8AYZ	PAUL	20	N8OWI	COLE	87
N8BYY	BOB	64	KB8OI	BILL	1
WU8C	TOM	28	N8PMO	DAVE	32
KA8CBZ	BILL	47	W8PSC	AL	13
K8CFY	JERRY	82	N8QDW	JOHN	16
KF8CT	DAVE	61	N8QOP	DAN	8
N8CVC	BILL	20	N8QPC	NEEDNAME	1
K8DIT	FRANK	20	N8QPF	NICK	28
WB8E	VALT	145	N8QVX	KEVIN	22
WD8EGV	ART	3	N8QZS	PAUL	27
KA8ESU	STEVE	1	N8RAM	GARY	23
KF8FK	BILL	60	N8RAR	WAYNE	14
KF8FX	KATHY	3	N8REZ	MARK	7
N8FIS	JOHN	1	* KF8RG	KEN	57
KB8GGI	PAUL	8	N8RHT	RICH	15
KB4GPO	KEN	15	N8RRU	GARY	30
WB8H	GORDIE	43	* N8RUD	MIKE	51
AA8HP	DARWIN	29	N8RUE	EDDIE	60
VY8I	GREG	1	N8RUH	TJ	11
* WD8IPL	DAVE	63	KC8RY	BRIAN	1
AA8IL	NEEDNAME	1	N8SIH	BETTY	10
KB8IQX	JOE	3	N8SNH	SARAH	3
W8JEK	BOB	15	N8TLC	BILL	29
* N8JEX	RICH	50	N8TMJ	MARIANNE	22
K8JRE	JOE	2	N8TUN	STEVE	10
KB8KLW	RICK	144	N8TWA	ROY	1
N8KNS	DON	47	N8UJK	HELEN	1
VY8L	SEAN	13	N8UJL	SARA	11
W8LLJ	JOHN	2	WA8UVW	BILL	3
WD8LOW	PHIL	1	N8VBG	MIKE	6
KE8LT	HANK	38	N8VBH	PAT	21
VY8M	ARPAD	57	N8VBL	STAN	8
KF8MB	MEL	36	N8VDW	NEIL	1
N8MCD	JIM	120	N8VGC	NEEDNAME	1
N8MGD	SHARON	1	WA8VIJ	GULLIVER	5
N8MIJ	JIM	24	N8VLY	JOHN	1
N8MLD	CAROLYN	1	N8VLZ	GORDY	1
N8MOJ	MARION	2	KE8VM	DAN	80
KB8MDS	TOM	12	N8VMH	DAVE	7
N8NLS	VIRGINIA	16	N8VOH	KATHY	18
N8NMG	JOHN	17	N8VRW	NEEDNAME	1
N8NMX	BILL	76	N8VSI	SCOTT	9
N8NNU	KARL	2	N8VTF	DON	8
N8NQQ	BIFF	62	N8VVH	LINDA	13
N8NXN	ED	13	N8WCA	VANCE	1
KB8NXS	SCOTT	37	N8WDI	JOHN	5
KB8NYY	ANN	5	N8WDO	DAN	2
N8ODY	STEVE	2	N8WJE	KEVIN	3
K8OEP	JOE	8	KF8XO	JEFF	2
N8OEP	VAL	17	WA8ZOF	PHIL	11

Date: 02/13/93, KEN (KF8RG) Displayed 116 of 550

Net Control Ops:
I am not on packett...Please MAIL your net points to me at:
53762 Kristen Ct.
Shelby Twp, Mi. 48316

NOTE: If you change your call, let me know, or your records will be wrong!

TOP TWENTY CONTESTANTS

No.	Call	Name	Pts	Totals
1	WB8E	VALT	13	145
2	KB8KLW	RICK	10	144
3	N8MCD	JIM	10	120
4	* KF8AT	FLOYD	16	104
5	N8OWI	COLE	10	87
6	K8CFY	JERRY	7	82
7	KE8VM	DAN	2	80
8	VY3L	MIKE	4	79
9	N8NMX	BILL	19	76
10	N8OEV	DAVE	9	67
11	N8BYY	BOB	6	64
12	* WD8IPL	DAVE	15	63
13	N8NQQ	BIFF	3	62
14	KF8CT	DAVE	7	61
15	* N8OKW	JIM	15	60
16	N8RUE	EDDIE	10	60
17	KF8FK	BILL	3	60
18	* KF8RG	KEN	11	57
19	VY8M	ARPAD	2	57
20	* N8OEX	EARL	7	55

Date: 02/13/93, KEN (KF8RG)

Net Point Explanation:

1) A "*" by your call denotes a forthcoming award. (There is a certificate for 50 check-ins and each multiple thereof.)

2) A "NEEDNAME" means just that, either the net control op did not note names with calls or the name was not given at net time.

3) FM net control ops receive 2pts for each net. CW control ops get 4 pts each net.

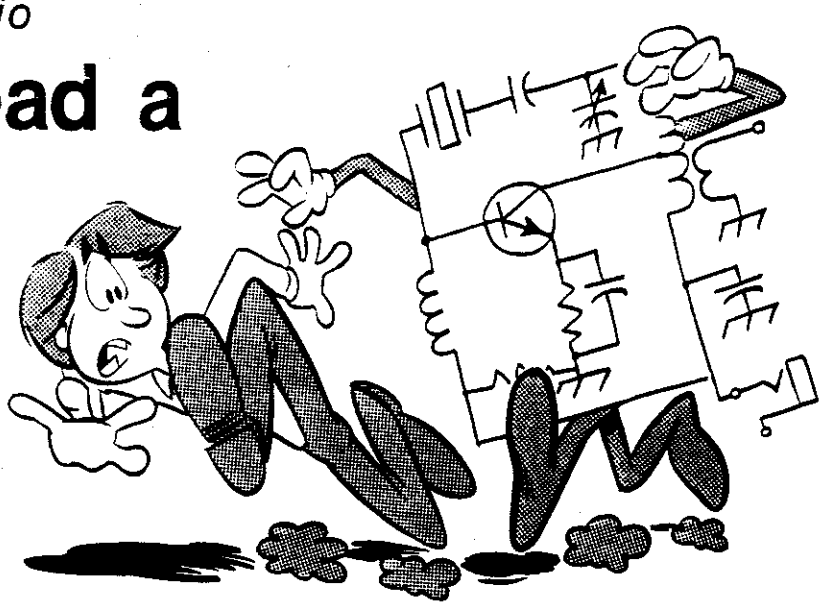
4) FM check-ins receive 1 pt each net. CW check-ins get 2 pts. (The difference is meant to encourage upgrading by use of the Code and to reward the extra time and effort of a CW net.)

5) If you have not checked into a net in the last 3 months, your points total will not be listed. A simple check-in will put you back on the list!

6) Finally... Net points can only be awarded as I receive them. (Net control ops; Please get check-in sheets to me as soon as possible and as complete as possible!)

• *First Steps in Radio*

How to Read a Schematic Diagram



Part 2: The first step toward learning the basic theory of this series is to understand circuit diagrams — the "road maps" that allow us to build or repair equipment.

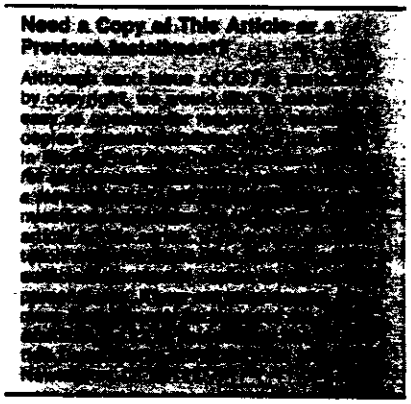
By Doug DeMaw,* W1FB

"Sure, I can handle the electronics — up to a point. I start having problems when I try to figure out what's going on in schematic diagrams." Many newcomers to radio electronics have this problem. Perhaps you're one of them.

In this installment, we'll learn what the various electronics symbols stand for, and we'll get a feel for how the diagram relates to the actual circuit-board layout.

Learning the Symbols

We must first accept the fact that very few electronics symbols look like the physical item they represent. Only a *pictorial* diagram can satisfy that requirement. Most electronic parts are encased or encapsulated in some manner, which prevents us from peering inside to see what is there. Semiconductors (diodes, transistors and integrated circuits) are the worst in this regard, for if we did saw one open for a look-see, we might be hard-pressed to recognize the various elements (drain, base, emitter, collector, source, gate, or whatever) unless we understood the philosophy of semiconductor design and fabrication. So, our best approach is to ignore for now the contents of the enclosed components and think mainly about how the leads relate to the inner elements, as defined by the assigned symbol. In the days



of vacuum tubes we could dismantle a tube and easily identify the grid, plate, cathode and filaments, but things have changed!

Unfortunately, each publisher of amateur and commercial electronics magazines or journals follows his or her own symbology. For this reason, diagrams found around the world can conflict. The ARRL has adopted and used the IEEE (Institute of Electrical and Electronic Engineers) standard symbols for many years. Only a few exceptions exist, and that is done to simplify (or unclutter) the drawings in *QST* and other League publications. We will focus on the *QST* symbology here, and despite differences found in other publications, you should be able to determine what a symbol stands for, because there will be ample similarity. Some magazine publishers, in order to establish a distinctive "style," have more or less ignored the recommended standards for electrical symbols. It is unfortunate, but we must accept it.

An abbreviated presentation of electrical symbols is provided in Fig. 1. You will see that some symbols do, indeed, resemble what they stand for, such as the headset, speaker and hand key. Conversely, the symbols for ICs (integrated circuits) would in some instances fill one or two *QST* pages if we were to see all of what was inside the IC. So for these complex circuits we accept the practical solution — to use just a box, a triangle or similar representation. In a real-life situation we think only about where each external lead connects, according to the numbers assigned to the pins by the manufacturer. This was for many years known as the "black box" approach. In other words, don't worry about what's within the box; just concentrate on what the box will do for us.

You will note that for some symbols we have more than one format. This means that we may use any of the illustrations given, and we may find one or all of them in a single issue of *QST*. The wiring junctions at the lower right of Fig. 1 are an example of what we are discussing.

The best advice I can offer at this time is to spend a few evenings studying and memorizing the symbols in Fig. 1. When you feel that you have the data implanted

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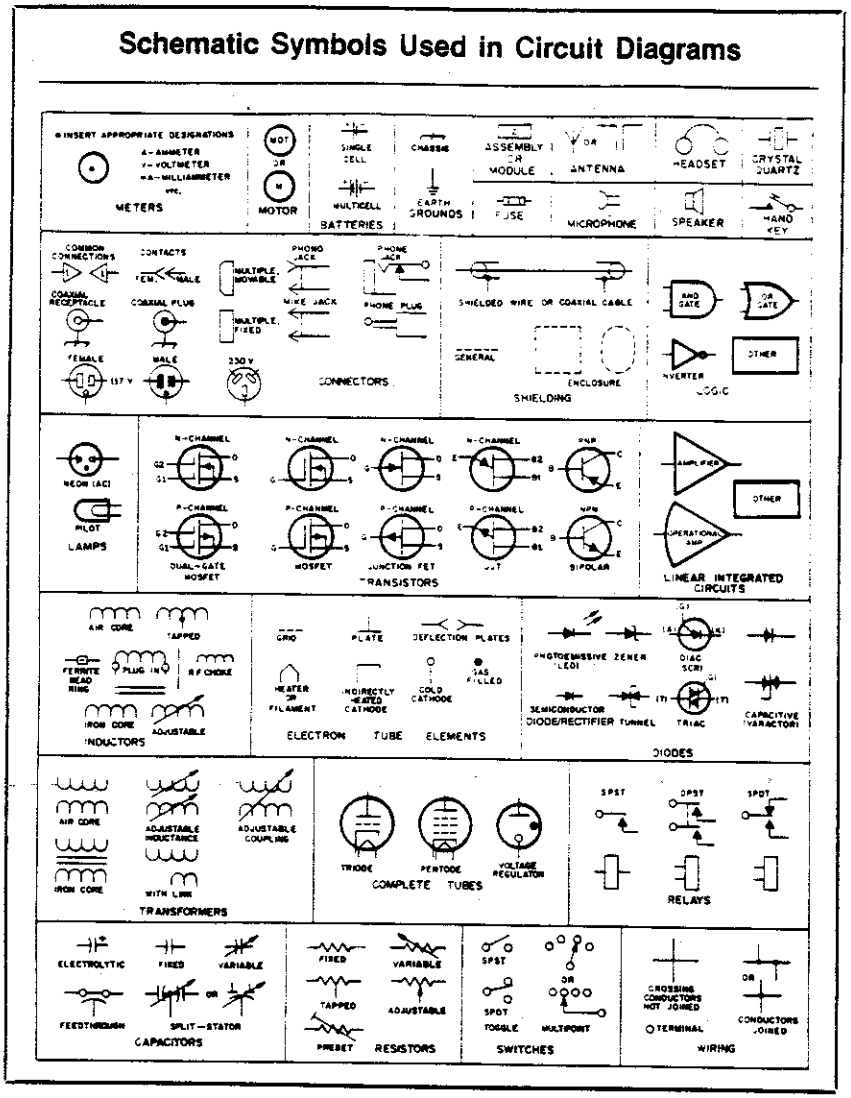


Fig. 1 — Collection of standard symbols used by the ARRL for circuit diagrams. Most of these symbols were adopted from the IEEE standards.

firmly in your mind, put away the symbols page and try to draw each symbol by memory, writing its name next to it. Continue with the exercise until you make no mistakes. This knowledge will prove invaluable to you as you pursue that ham license. It will be helpful to know the symbols after you pass the exam, also. You will need to have this knowledge in order to repair your equipment, to duplicate home-construction projects in the magazines, or to do your own circuit designs. If you are a person without sight, have a friend provide you with word pictures of the symbols and learn them that way. I know at least two blind amateurs who repair their own equipment by having someone give them word pictures of the diagram section that applies to the problem.

A Simple Circuit Example

Let's try our luck at relating a simple circuit to a pictorial diagram. This will enable you to see how things hook together when assembling a circuit from a schematic diagram. Fig. 2 shows two schematic diagrams of a two-stage audio amplifier, such as we might find in the early stages of a receiver. Although the two drawings look quite different at first perusal, you will observe that they represent the same circuit in complete detail. The difference is only in the manner of illustrating the circuit schematically. Fig. 2A shows the ground connections separately. Likewise with the two +12-volt connections. Fig. 2B shows the ground and +12-volt lines joined together, respectively. The net result is the same in either case: In a practical circuit the ground or +voltage lines would eventually be joined at a common point when example A is followed. It merely illustrates that you may find more than one style of presenting a circuit. You will note also that the resistors which connect to the +12-volt source (Fig. 2B) are routed upward rather than downward, as in Fig. 2A. You may find a mixture of the two methods in a given drawing, so don't let that confuse you. The main objective is to make sure that all of the parts are connected to the appropriate circuit points. A pictorial representation of these circuits is provided in Fig. 2C.

A Few Subtleties

You are probably wondering why the capacitors (sometimes wrongly called "condensers") have a curved line at one end and a straight one at the other end. The curved line indicates the end of the capacitor that goes to the terminal of lowest impedance or potential, such as circuit ground or the least positive of the two circuit points between which the part is installed. This applies mainly to polarized capacitors. Most of these parts are marked with a + symbol or may have a black band at the opposite end to indicate the negative terminal of the capacitor. This concept does not apply to disc-ceramic, mica and other nonpolarized capacitors, but the curve is always used in the symbol to show which end represents the low-impedance side of the circuit. Always pay close attention to the + symbols of capacitors: Hooking them up backward can cause them to short out or even explode!

Notice also that within the circular borders of Q1 and Q2 are arrows on the emitter line. When the arrowhead points toward the outer circle, the device is an NPN type, which requires a positive voltage on the collector terminal. If the arrows point inward toward the junction of the three lines, it signifies a PNP transistor, which needs a negative collector voltage. If you use the wrong transistor you may destroy it when voltage of the improper polarity is applied to it.

The arrowhead on R6 — the audio-gain control (sometimes called a "pot" for potentiometer) — tells us that the resistor value is variable by means of mechanical adjustment. In this case we would have the control mounted on the front panel of our equipment. Its shaft would be fitted with a knob to permit us to adjust the value of R6 when we wished to. If the adjustment were to be made only one time, then left in a preset position, we might install a trimmer pot at R6 (screwdriver adjust), and it could be installed right on the circuit board or chassis. Some hams call these controls "trimpots," but Trimpot® is a trade name, not a generic term.

J1 and J2 are jacks into which we may plug our outboard circuits or accessories, such as a microphone at J1. This electrical symbol is representative of a number of styles of jack. So just think of it as a connector of your choice — one that has a "hot" (center) terminal and a ground point (outer ring). It could be a phono jack, or one that a standard audio plug mates with. It could even be a coaxial-cable jack, if you wanted to use something that unusual for

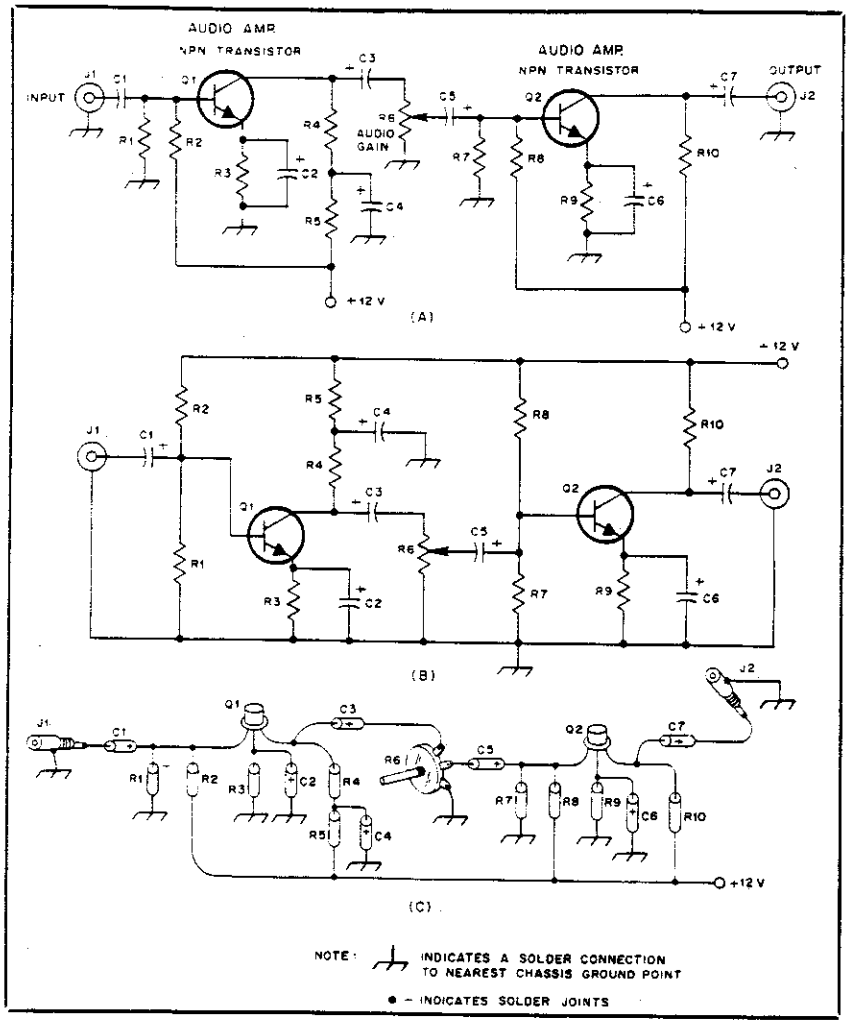


Fig. 2 — Examples of an identical circuit (A and B), drawn in different ways (see text). The pictorial representation at C is for the circuits shown in illustrations A and B. This shows how we can relate the drawing to the assembled circuit, which would normally be mounted on a circuit board or a metal chassis.

audio work! Examination of Fig. 1 will show that jacks with additional electrical contacts have a more complex symbol.

Notice that the symbol for ground in Fig. 2 looks like a rake. This is the proper symbol for *chassis ground* in a circuit. The earth-ground symbol of Fig. 1 is frequently misused by publishers for indicating chassis ground. Try not to be confused if you encounter disparity of this type: There is a significant difference between an earth ground and a chassis ground!

Voltage- and Ground-Bus Lines

I've noticed that one of the points of greatest confusion among beginners is how to configure the chassis-ground connections and the voltage-line network. In bygone days, when hams used wooden chassis, it was standard practice to run a ground-bus wire across the chassis. Each ground point in the circuit was then tied to this line by means of the shortest connecting lead possible. Other builders would return all ground connections for a single-circuit stage to a nearby common terminal, then route a lead from that point to the ground-bus wire. Although these techniques could still be applied, it is easier for us (and often better in terms of circuit performance) to bring each ground return to the metal chassis or circuit-board ground in the immediate area of the stage being wired. Not only does this impart a neater end product, it aids circuit performance (stability and reduced losses) when the ground leads are kept short and direct. The chassis or circuit board ground foil serves as the old-style ground bus when we do this. The "bottom line" here is to not worry about the maze of ground lines in the diagram. Simply make your ground connections short and direct near the related circuit elements.

Voltage-bus lines are treated like the old-time ground-bus conductors. That is, they are "floated" above ground on insulating terminals (or along specific voltage-bus foils on circuit boards). The various circuit points that connect to the voltage lines are connected by means of short jumper wires, or by the related components themselves (resistors, for example).

Circuit Direction

Another question that is asked frequently is, "Which way does a circuit run on a diagram?" The confused person means, does the first stage of a circuit start at the left or right of a drawing? Frankly, it makes no difference. Traditionally, for reasons I don't comprehend, a circuit has commenced at the left of the page and proceeded to the right. For example, considering a transmitter, the VFO or crystal oscillator would begin at the left of the sheet, followed by the intermediate stages, with the PA (power amplifier, or last stage) at the far right. Hams have developed the habit, as a consequence, of laying out the assembled unit from left to right also. I always did! But, it matters not how you lay out your project, provided you isolate one stage from another by reasonable physical separation, or by means of individual shield compartments. The last stage should never be placed alongside the input stages, lest unwanted feedback occur. The straight-line layout is the best method to adopt when in doubt.

Although it may not be apparent when examining a schematic diagram, we should always try to physically isolate the input and output components of a circuit stage from one another. Grouping them together will often cause feedback (output energy being fed back to the input circuit), which can cause a stage to self-oscillate, which renders the circuit useless. Some diagrams show a particular stage or stages enclosed in dashed lines. This indicates that that part of the circuit is contained in a shielded compartment to isolate it from the remainder of the circuit. A solid line around a circuit normally indicates that it is a separate module of a composite unit.

Potentiometers and Meters

We can't tell from the electrical symbol which end of a potentiometer (volume, tone, drive control, etc.) should be connected to ground. Many beginners have a problem with this: After wiring in the control, it operates backwards! For example, maximum volume occurs when the control is set fully *counterclockwise*. I understand this annoyance, for it used to happen to me!

Also, the circuit symbol for meters shows that one terminal is plus and the other is minus. But, which is which? Some meters have the polarity marked on the cases: Others bear no identification. Fig. 3 shows which end of a control should go to ground, and the meter drawing indicates which terminal is the positive one. The positive meter lug always connects to the circuit point of *highest* potential, as shown by the examples in Fig. 3. Incorrect

Glossary

base — the internal part of a bipolar transistor that controls the flow of current.
bus — a conductor of electrical current that carries a potential from one point in a circuit to another, such as positive or negative voltage, or ground.
capacitor — a device that stores dc energy but prevents its flow; permits the passage of ac energy, however.
cathode — negative electrode from which electrons flow in a stream inside a vacuum tube.
collector — in a bipolar transistor, the region through which the primary flow of charge carriers leaves the base. Generally, the output terminal of the transistor.
diode — a device having an anode and cathode, and which allows current to flow only one way.
disc-ceramic — a type of capacitor containing a ceramic dielectric (nonconducting material).
drain — a field-effect transistor electrode that supplies the amplified output signal in a grounded-source or grounded-gate hookup.
emitter — the element in a bipolar transistor that injects electrons into the base, which can be modulated by the base input signal.
encapsulated — a component that is embedded in a hard protective substance, or in a metal case.
feedback — ac energy that follows a path from one part of a circuit to another, intentionally or otherwise.
filament (heater) — in a vacuum tube, metallic wire heated by electric current; may serve also as the cathode in some tubes.
gate — part of an electronic device such as a field-effect transistor that controls the passage of current.
grid — in a vacuum tube an electrode that controls current flow.
hand key — a device used for sending Morse code.
impedance — the total resistance in an electrical circuit to the flow of alternating current at a specific frequency; expressed in ohms.
impedance, low — minimal resistance to ac.
integrated circuit — an electronics component that contains many individual transistors, diodes, capacitors and resistors and is sealed permanently in a single block or unit (unrepairable); usually referred to as an "IC" or "chip"; the various internal components are connected together or "integrated."
mica — an insulating (or dielectric) material found in nature; a mineral silicate.
oscillator — a circuit that generates a particular frequency.
plate — in a vacuum tube, the anode (positive element; in capacitors, the internal metal conductors.
polarized — a component that has positive and negative terminals marked on the case; the polarity is sometimes indicated by the shape of the part — each end being slightly different.
potentiometer — a variable resistor, such as a volume control.
resistor — a component that opposes the flow of current; available in a wide range of ohmic values and power ratings.
schematic — a diagram using electrical symbols that illustrates a circuit plan or "scheme."
semiconductor — an electrical component that is made from solid crystal materials such as silicon or germanium; modern diodes, transistors and ICs are semiconductors; conductivity is intentionally poor compared to metal conductors.
source — the element in a field-effect transistor that supplies electrons; similar to the emitter in a bipolar transistor or the cathode in a vacuum tube.
transistor — a triode or tetrode semiconductor device that is capable of performing amplification, oscillation, detection and other functions.
trimmer — an adjustable component, usually as a capacitor or resistor, generally used for fine adjustment and left in a preset position.
vacuum tube — a device used to generate or amplify signals; can also be used as a rectifier or to perform control functions.
VFO (variable-frequency oscillator) — an oscillator whose frequency can be varied over a wide range by mechanical or electrical means; normally adjustable from the front panel of the equipment.

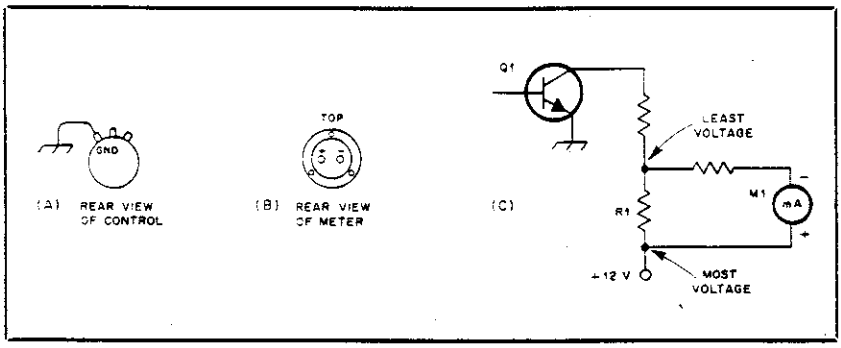


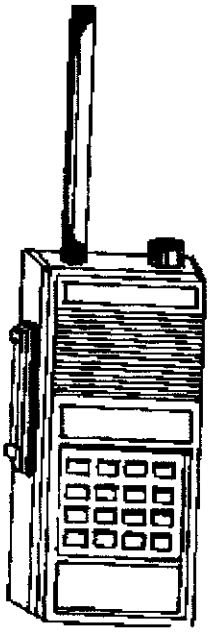
Fig. 3 — When wiring audio or tone controls, the ground end of the control is at the far left when viewing the control from the rear (A). Similarly, when viewing a meter from the back side (B), the positive terminal is at the left. The circuit at C shows that the negative terminal of a dc meter must be connected to the circuit point that has the lower of the two available potentials. The voltage drop across R1 in this example, caused by the current taken by Q1, makes the dc voltage lower at the top of R1 than it is at the low end of the resistor. This type of circuit can be used to monitor the current that Q1 draws.

polarization can destroy a meter at once. No one likes a meter with an S-shaped needle, jammed all the way to the left of the meter face! Ouch!

Some Final Words

The intent of this article is to help prepare you for the installments that follow in First Steps in Radio. How adept you become at following a schematic diagram easily and accurately will depend entirely on your tenacity in learning the symbology. Now is the proper time to apply yourself. This will make the lessons that follow a lot less difficult to digest. Practice drawing some simple circuits from memory. But, don't worry about the quality of your artwork. We aren't trying to follow in the footsteps of Rembrandt when drawing our diagrams; clarity is all that is required!

USECA NET INFORMATION



USECA NETS

USECA sponsors Nets on both 2 meters and HF frequencies. 2 meter information nets are conducted on the Club Repeater frequency of 147.18 Mhz at the following times:

Day	Local Time
Sunday	1:00 p.m.
Tuesday	8:00 p.m.

For those who prefer "non-conventional" topics there is also the Hootowl Net, which is run every Friday evening at 12:00 Midnite. Also, lest I forget , USECA sponsors a C.W. Net on Friday Night that starts at 10 to 10:30 pm on 21.145 Mhz +/- 5 Mhz. Don, WX3M, runs this net at whatever speed you send him so don't be the slightest bit intimidated. Just unplug that mike, plug in your key and fire up your HF rig!

Think Field Day!!

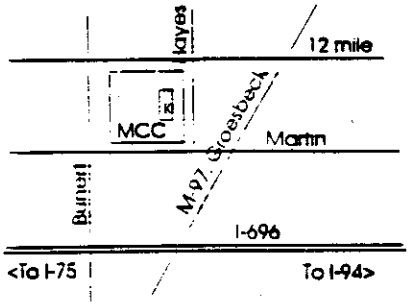
But since it is such a long way off THINK PRE-FIELD DAY!!!! Elizabeth Iley (N8XCZ) has organized this years event and it promises to be a great time for people of all ages! The time and date for this event is May 8, 1993 at the Wintercove Picnic Area of the Stoney Creek Metropark. It will run from 9 a.m. to 6 p.m. though the park is open until 10 p.m. There will be 2 H.F. Stations, a Packet station, and an ATV Station running. What do you need to attend this gala event? Not much except the desire to socialize with your fellow hams, a healthy appetite (don't worry about that Walt!!!) and a Pass a Dish. Like any other USECA Event this one will include a copious assortment of gastronomic delights. A Pass a Dish list is being set up by Elizabeth. See her at the meeting or call 524-0183

USECA SWAP

SUNDAY, OCTOBER 24, 1993
8:00 AM to 2:00 PM

NEW LARGER LOCATION
STUDENT COMMUNITY CENTER (K - BLDG.)
MACOMB COMMUNITY COLLEGE, SOUTH CAMPUS

Ham Gear, Electronic Parts, Connectors and Cable
Computer Hardware and Software
VE Testing (Pre-registration required)
Non ham related gift items(get your Christmas gifts early)
Many seminars to choose from (packet, antennas, skywarn, electrical safety, etc.)
Food service by the Culinary Arts Department of the school



Exit I-696 at M-97, Groesbeck
Go north on M-97 to Martin
Left on Martin, then right on Hayes
Bldg. K is on left at second crossing

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Table information: Virginia, N8NLS, 313-268-0691
VE test registration: Bill, N8CVC, 313-468-8345

Sponsored by: Utica Shelby Emergency Communications Association

Amateur Radio, R.A.C.E.S., and You.

By Pete Matejcik, AA8GK

Last year I almost got out of the hobby altogether. I thought I had seen everything of interest to me in ham radio that I could afford. Then it happened...a tornado forced me to seek shelter under an overpass on I-94 near Kalamazoo. What a rush! I've never seen rain fall from the right to the left before! I still can't tell if what I felt then was fascination with Nature's most deadly storm, or sheer white-knuckled panic.

After the adrenaline dump subsided, several hours later, and rational thought processes replaced the animal survival instincts that had previously threatened control of my person, I began to think. I wondered, "What would I really be able to do with all of my expensive radio equipment if I had to use it during or after an emergency?", and "Would I be more of a hinderance to disaster trained operators than a help?" I had too many questions. I wanted some answers...I joined R.A.C.E.S.

That was a year ago. Since then, I've learned to use my equipment in concert with other Radio Amateur Civil Emergency Service stations. I've learned that there is a whole lot more to spotting tornadoes than counting clouds. Through civil defense training provided by R.A.C.E.S. I've learned to be prepared to respond to just about every natural disaster, (and even the not-so-natural ones). In addition, there is a tremendous feeling of accomplishment that goes with belonging to a team dedicated to responding to just about every emergency that can affect our community.

These last few years could be called The Decade of the Ham. How many tornadoes, hurricanes, earthquakes, and even wars have hams responded to? Every one. How many pieces of traffic have come into and out of disaster stricken areas? We'll never know - the number is enormous to be sure. I can't help but be proud when a local television news crew shows how hams have kept the lines of communications open, even during the Persian Gulf War, not to mention the devastation of Andrew's visit on Florida. Yeah, I'm a ham.

But, equipment and desire alone do not an emergency radio operator make. It also requires training. However, we're not talking about a P.h.D., only a few hours a year, some net check-ins, and a meeting, or two. The time spent is informative, even entertaining, but never wasted. And lastly, for those hams wondering 'is this all there is to the hobby?', R.A.C.E.S. just might spark new interest in ham radio.

This article was not sponsored by R.A.C.E.S. and no one knew anything about it until now. All it is is one ham's experience. However, if your interest in R.A.C.E.S. is whetted enough, please feel free to contact me at 264-1218. We can talk, and I'll put you in touch with the membership personnel. 73's.