



cross talk

NEWS BULLETIN OF TRW AMATEUR RADIO CLUB



Sponsored by Systems Employee Association



WAC
WAS
DXCC
FD'71
FD'73
FD'75

FEBRUARY 1976

TRW/ARC Saturday Morning Nets 10AM LT

Primary	7.280 MHz
Secondary	3.980 MHz
Novice	7.140 MHz
Simplex	147.510 MHz

THE RADIO AMATEUR AND PUBLIC RELATIONS

Pete Hoover, W6APW, gave us a thought-provoking briefing on WARC at the January meeting. Toward the end of Pete's presentation, having been exposed to the issues that will be addressed and the problems that will be faced at the international level, I think many of us shared a sort of helpless feeling. "If Daniel Moynihan couldn't hack it at the UN, how can I, W6QRU, hope to influence the World Administrative Radio Conference? What can an individual do against the massed governments of the world?" Well, Pete did provide a set of guidelines that have some promise, and a couple of them will be discussed here in the light of actual experience: application of our unique capabilities to the communities in which we live, and the application of public relations techniques to improve our image in the eyes of the public.

The average normal radio amateur is very much a low profile type; perhaps this is because the decades of dodging TVI complaints, HiFi complaints, unsightly antenna complaints and the like have made us wary. Or perhaps its because of the fact that some members of the public think we're a little strange, and technology and technologists don't stand very high right now in the public view. Anyway, amateur radio does not receive very much publicity, and much of what it does get is not too favorable. Thats the way it is, but not the way it has to be! Some recent personal experience indicates that:

- o Amateurs provide (or should provide) useful and sometimes vital services to the communities in which they live.
 - o Some of the things we do can be easily shown to the public, and will impress them greatly if properly presented.
 - o Local governments are very much interested in the range of special event and emergency communications services that amateurs can provide.
 - o The media (newspapers and TV) will be pleased to present amateur radio in a favorable light if someone will just give them an interesting story. Many of the things we do are considered very interesting indeed.
- (Continued next page)

*** MEETING REMINDER *** R2-1055

Always the last Wednesday at noon

Subject: Amateur Satellite
Communications

Speaker: Skip Reymann, W6PAJ

Your kindly editor lives in a small city that recently adopted a development code that severely restricts amateur radio antennas. The amateurs who live in the city formed a group, and developed a plan for persuading city government to modify the offending portions of the code. The outcome of this effort is still in doubt, but our energetic public relations work has:

- o Convinced local government that they want an amateur special event and emergency communications capability; a display at the city hall for the bicentennial weekend, with a station with a special event callsign, is planned, under city sponsorship.
- o Convinced the local newspapers that amateur radio can be newsworthy. Two front page articles on amateur activities have been printed, and a monthly amateur radio column has been requested by the editor.
- o Brought our disaster communication work (the Guatemalan Earthquake) to the attention of a metropolitan newspaper and one of the network TV stations. A mention in the LA Times and a two minute TV news story resulted.

All of this may not have won the day for us as far as our major goals are concerned, but the favorable mention has certainly helped our cause. The moral of this story is: modesty is a virtue if you don't need public support; if you do need such support, you'd better blow your own horn, and loudly. These days, governments at all levels are swayed by public sentiment rather than by the merits of a case. End of lecture.

RIP-OFF ALERT

There has been a nationwide rash of thefts involving mobile amateur radio installations. In our own immediate area, Prez Frank Cartier, WA6RAY, lost a TR22C (R5 parking lot), Wayne Hale, W6IZK, lost an IC22A (Del Amo parking lot). Even your kindly editor is not immune. His Cushcraft trunk-lid antenna was literally ripped off his car (R5 parking lot). There is no satisfactory answer to this problem. Put in a burglar alarm, make your installation as inconspicuous as possible, check your auto insurance, mark all your gear with your driver's license number, and worry a lot.

BICENTENNIAL WORKED ALL STATES AWARD

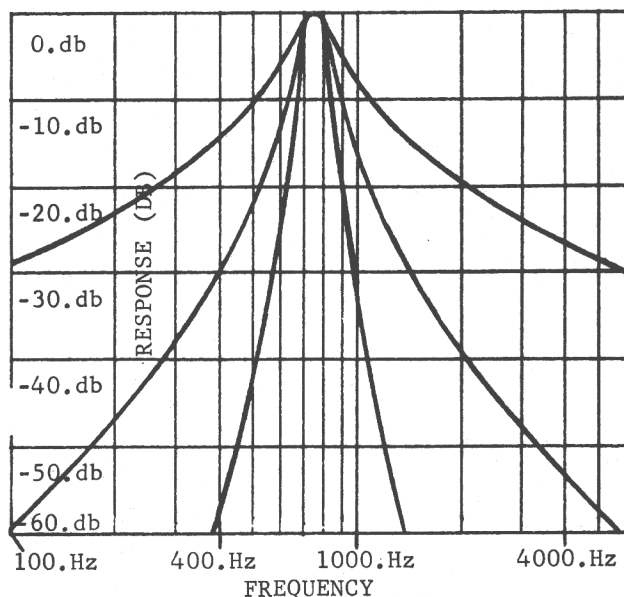
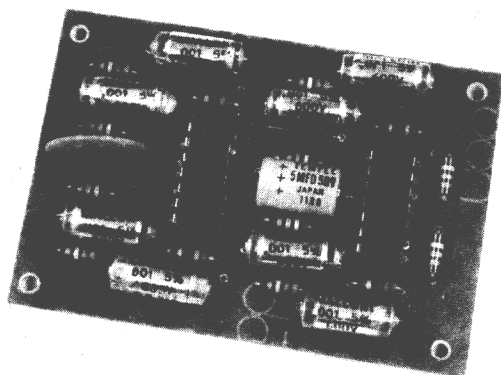
For 1976 only, the ARRL is issuing a special colorful WAS certificate to all those who work all 50 states between 1 January and 31 December. Since so many are trying for it, it may be a little easier to achieve this year. Give it a go!

NEW EQUIPMENT AT W6TRW

Through the generosity of Bill Dews, K6AWO, and MFJ Enterprises, of Mississippi State, Mississippi, the TRW/ARC club station, W6TRW, now possesses a new outboard CW filter. This device, an active filter, will permit interference-free reception on either the Swan 500 or the Heathkit novice rig. The specs for the filter are presented on the next page; looks like a great opportunity to evaluate these filters for home station use.

MFJ ENTERPRISES

P. O. BOX 494, MISSISSIPPI STATE, MS. 39762



SPECIFICATIONS

BANDWIDTH: 80 Hz, 110 Hz, 180 Hz (switch selectable)

SKIRT REJECTION: At least 60 db down 1 octave from center frequency for 80 Hz bandwidth.

CENTER FREQUENCY: 750 Hz.

INSERTION LOSS: None. Typical gain 1.2 at 180 Hz BW 1.5 at 110 Hz BW, 2.4 at 80 Hz BW.

INDIVIDUAL STAGE Q: 4 (minimizes ringing).

INPUT IMPEDANCE: 680 K ohms.

OUTPUT IMPEDANCE: Less than 2 ohms.

MAXIMUM OUTPUT VOLTAGE SWING: 2 volts less than power supply voltage.

POWER REQUIRED: Any positive voltage from 6 volts (2 ma.) to 30 volts (8 ma.).

COMPONENTS: 4 IC operational amplifiers, (dual 741's); hand matched polystyrene capacitors and carbon resistors; 4 position switch.

DIMENSIONS: 2 inch X 3 inch printed circuit board.

WARRANTY: Full 90 day warranty against defects in workmanship and materials.

NEW HIGH PERFORMANCE

CW Filter

MODEL CWF-2

■ SUPERB SELECTIVITY

Three degrees of selectivity (switch selectable) are available in a single filter! The three bandwidths are 180 Hz, 110 Hz and 80 Hz. In the 80 Hz position, the response is down 60 db one octave away from the center frequency. What does this mean? If we compare two equal amplitude signals, one at center frequency and one at twice or half the center frequency, then the signal off center frequency would be 1000 times weaker than the signal at center frequency. This means that we can hear only one signal even if it is buried under mountains of QRM.

■ INCREASED SIGNAL TO NOISE RATIO

Not only is the adjacent interference eliminated but the signal to noise ratio is improved.

The signal to noise ratio is proportional to the logarithm of the bandwidth ratio, i.e. the smaller the bandwidth, the better the signal to noise ratio. For example, if your receiver or transceiver has a bandwidth of 2.5 KHz and the filter is switched into the 80 Hz position the improvement in the signal to noise ratio is 15 db ($10 \log \frac{2500}{80} = 15$ db). This is equivalent to obtaining an increase of 3 S units (assuming 5 db per S unit) simply by switching in the filter. This means that all background noise is drastically reduced.

■ NO INSERTION LOSS

In fact, there is a gain in each selectivity position! Typically, for bandwidths of 180 Hz, 110 Hz, and 80 Hz, the gains are respectively, 1.2, 1.5, and 2.4. This distribution of gain literally makes the signal jump into your lap as you increase selectivity!

■ NO RINGING

In many narrow band filters, ringing can make copying impossible. The CWF-2 almost totally eliminates ringing by using the technique of cascading four low Q stages. This results in very narrow bandwidth and in extremely high skirt rejection without audible ringing.

■ NO IMPEDANCE MATCHING

This new CW filter offers a very low output impedance and a very high input impedance. This very fact means that unlike other filters no impedance matching is required for optimum performance. Loads greater than 500 ohms produce no distortion and loads less than 500 ohms (i.e. 8 ohm speaker) produce some distortion which does not affect copying.

■ EASY TO USE

You bet it is! Simply plug it into the phone jack or connect it to speaker terminals of any receiver or transceiver and use headphones, small speaker, or speaker-amplifier. Better yet, connect it between any audio stages (i.e. between detector and volume control or between 1st and 2nd audio amplifiers, etc.) to take advantage of the built in amplifier. The small size will fit inside even the most compact receiver or transceiver, eliminating any external accessory. Any voltage from + 6 volts to + 30 volts at 2 to 8 milliamperes will power the filter.

■ ULTRA MODERN IC DESIGN

This filter does not use old fashioned discrete transistors. Instead, 4 integrated circuit operational amplifiers (the equivalent of 80 transistors) are used in an ultra modern active filter design which eliminates all inductors and reduces the size to a mere 2 X 3 inch printed circuit board.

The CWF-2 uses four cascaded stages for extremely high skirt rejection. Note that it is not possible to obtain extreme skirt rejection by using a single stage.

■ CONSTRUCTION

Make no mistake about it. This is a high quality, superbly engineered CW filter manufactured in the U.S. using only high quality parts.

ANTENNA PARTY AT W6TRW

by Doug Freeman, W6NHX (DTC)

On Saturday, January 31, a working party was assembled by Bill Dews, K6AWO, at Building 65. The antenna group, under the direction of Nelson Hayes, W6VBB, had the mission of removing the Ham-M rotator from the TH6-DX antenna installation in order to complete repair of the rotator. After two hours of effort by the Designated Tower Climber (DTC) and his assistant (ADTC), the rotator remained at the top (60 foot) level of the tower, though completely loose. It was found that the rotator would not fit sideways through the tower, but must be jockeyed through it at an angle. Since the antenna was resting on a board approximately one half inch above the top of the rotator, there was not enough room to work the rotator out. Therefore, the antenna was secured in place, and the attempt abandoned for the day. It is important, however, that another attempt be made to remove the rotator as soon as possible. The following procedure is suggested: 1) C-clamp the antenna mast securely above top plate of tower; 2) Remove board from under mast; and 3) Jockey the rotator out and lower it.

During the course of the rotator work, it was also noted that the tower guy wires were rusty. This was a cause of some concern to the DTC. The cables are one eighth inch galvanized, and appear to be badly rusted and in need of replacement, after eight years in place. It is recommended that they be inspected by a knowledgeable person, and replaced if necessary with new and heavier stainless steel cable. It is believed that it is probably safe for one person to go up the tower to remove the rotator and attach new guys at the top.

Before the rotator is re-installed, there are several things which should be done besides replacing the guys. 1) A thrust bearing should be purchased and installed. The current installation has a pipe, believed to be 1-5/8 inches OD, going through a 2-1/8 inch hole in the top of the tower. This is insufficient support for an antenna this size. It is also important that when the rotator is installed, the mast must be properly shimmed at both rotator and thrust bearing to achieve the proper diameter, since this is the design center point of the antenna. 2) The in-line connector in the rotator cable, about one foot from the rotator, is very badly rusted and must be replaced. This will be a difficult task, since the cable runs through a large plastic conduit along with the coax. There is no break point for the coax above the conduit, except at the antenna itself. Possible solutions to this problem are: a) Climb to the very top of tower and disconnect the coax at the antenna. Bring the conduit down and repair the connector. b) Cut the rotator cable and try to pull it back through the conduit. c) Cut the coax, bring the conduit down, replace the control cable connector and install coax connector on the cut end. Install a new coax connector at the upper cut end and connect with a barrel. d) Solder in a new connector up at the top of the tower (tricky).

Another working party has been scheduled by Activity Manager Bill Dews for Saturday morning, February 28. See you there.

A SIX ELEMENT DIAMOND QUAD FOR TWO METERS

By Paul Weisz, K6YQ

In CROSSTALK for January, we mentioned that a six element cubical quad for two meters had been developed, and that K6YQ and WA6PAS were successfully using these antennas. Since that time, at least one other quad has been built (by Bill Schrecengost, WA6EVS), and there has been enough general interest expressed to justify the publication of design data for this antenna.

Basic Design Data

This antenna uses six wire loop elements spaced ten inches ($1/8$ wavelength) apart. All elements are made from No. 18 insulated wire; there is a driven element, a reflector, and four directors, arranged as shown in Figure 1. Element lengths are fairly critical, as are loop dimensions; for a nominal frequency of 147 Mhz, these lengths are:

Driven Element (see discussion below)	77 $3/4$ inches
Reflector	81 $3/4$
Directors (all the same length)	75 $3/4$

It is suggested that the reflector and directors be cut to the lengths specified above, and that the driven element be cut a little longer and trimmed until the SWR curve indicates the correct resonant frequency. If necessary, the reflector and directors, can be trimmed later to optimize antenna performance. One of the nice things about a quad: wire is cheap and plentiful- changing element length or replacing an element takes less than five minutes.

The diamond quad is fed directly with RG58U coax, with no balun, gamma or other matching device. The driven element must be trimmed because the parts of the coax transmission line that feed the antenna become part of the driven element, and each coax termination is slightly and randomly different.

Physical Configuration

The boom may be made from 2x2 lumber painted with boat resin, like those already built, or from Schedule 40 PVC pipe. The spreaders are made from $1/4$ inch diameter fiberglass rod. The configuration of the element loops appears to be important, and significant deviations from the dimensions shown in Figure 2 will probably affect element lengths. The diamond configuration was selected primarily for ease of construction. Actually, any reasonably symmetrical shape can be made to work just as well if you are willing to put in the time to trim and tune properly.

Mechanical Details

There are two mechanical aspects of the diamond quad that require special attention: the terminals at the junction between the coax line and the driven element, and the method adopted for keeping each wire element taut. Figure 3 shows the method for connecting the coax line to the driven element. The coax conductors should be separated as little as possible, without shorting them.

The quad loops can be tightened during the test and tuning process by the clamps shown in Figure 4. Each of these is made from two $1/4$ inch butyrate cable clamps. Six are needed, one for each quad element; they may be cemented in place before raising the antenna.

Tuning and Trimming

With the elements cut to nominal lengths and installed on the spreaders, measure the SWR at several points across the 146-148 MHz range. The shape of the curve should indicate whether the antenna is resonant too high or too low in the range. Trim (or lengthen) the driven element to make it resonant at the desired frequency. If the SWR is now too high, trim the reflector and directors to bring it down. Treat the directors as a single element; i.e. change them all by the same amount each time.

Performance

Lacking facilities for antenna measurement, I can only report that the diamond quad works very well. for those who insist on numbers, be advised that a six element quad is supposed to provide 13.4 Db gain (over isotropic), and some 36 to 40 Db front to back ratio. Good luck, and call me if you run into problems.

Figure 1

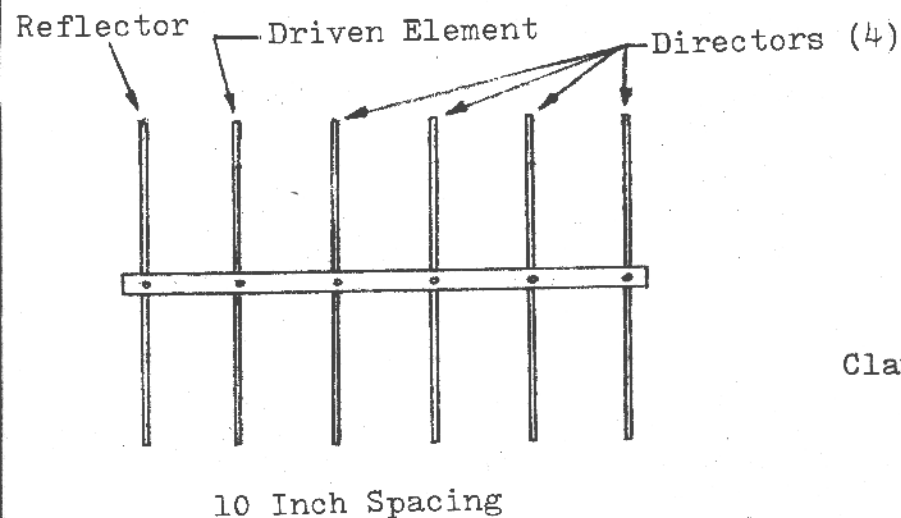


Figure 2

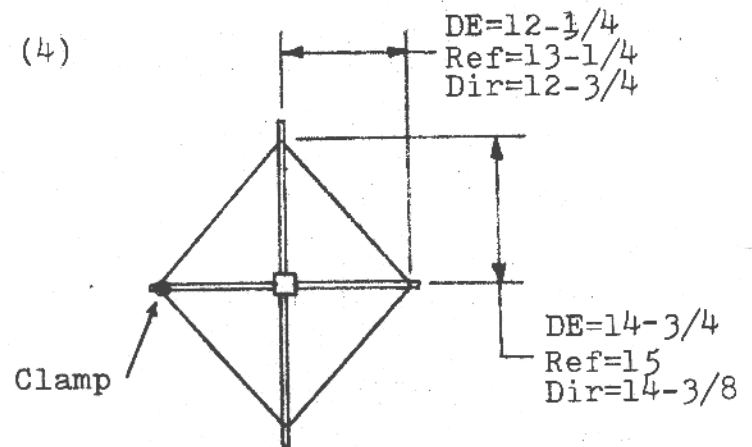


Figure 3

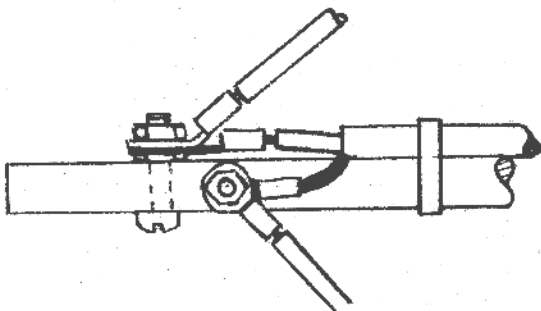
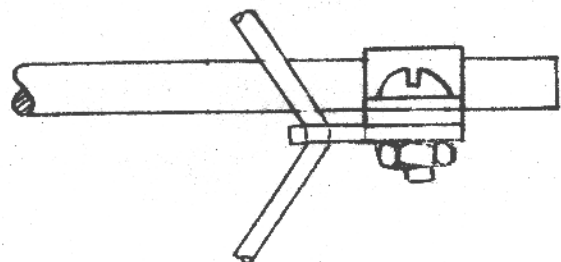


Figure 4



Treasurer's Report for January 1976

Balance on hand, January 1, 1976: \$640.64

<u>Receipts</u>		<u>Expenses</u>	
New Member Dues	47.75	Postage Stamps	2.99
QSL Orders	60.50	ICOM 230 Repair	39.57
ARRL Memberships	136.00	Training Materials	369.84
SEA Allotment		December/January	
(3rd Quarter 75)	51.50	Meeting Expense	9.79
Training Course Fees	500.00	January, February	
Raffle 1-28	33.75	Door Prizes	94.44
	<u>830.00</u>	ARRL Memberships	144.00
		QSL Orders	60.50
		73 Magazine	
		Subscription	8.00
		Bank Service Charge	4.00
			<u>733.13</u>

Balance on hand, January 31, 1976: \$737.51

Respectfully submitted,
David P. Carson, WB6BGO
TRW/ARC Treasurer

FOR SALE

1. 2-Meter Motorola 60 Watt Upright Base Station,
with Phone Line Termination and Manual.
Tuned and operating on .94 \$100
6 Meter Motorola 50 Watt T-Power with Accessories
(Head, Speaker, Mike and Cables). 2 Channel(52.525
Simplex and UJS repeater). 12 volt, tuned and working. \$75
Roland Hinkle, WB6EZH, 213-374-6987 (8-10PM)
2. Swan DC power supply, Model 14-117 with all connecting cables
Master Mobile antennas for 20 and 40 meters
Mobile microphone
Some mounting hardware for the Swan transceivers
Price for all of the above, \$100
Richard Carter, M2/1184, 536-2851

EXECUTIVE COMMITTEE REPORT

By ED THORNLEY, W6RXD

A continuation of the January Executive Committee was held on 21 January. Officers present were: Cartier, Carson, Dews, Halligan, Thornley. In addition, Editor Weisz and Training Manager Davis attended.

Items of business discussed were:

1. Davis reported on the status of the training program. The first General Class session was held on 20 February with four students starting CW. At least seven are expected for the theory session on 22 February.

The Novice Class will start on 27 February with at least 21 potential students indicating interest.

The training manager was authorized an advance of \$ 150 from the club treasury to cover costs of training material and equipment. Student payments to be placed back in treasury as they are received.

2. Dews offered to the Club an active CW audio filter (MFJ model CWF-2) to be used as a door prize or used in the Club shack. The committee decided that it be used on the Novice rig at W6TRW.
3. Halligan proposed that the Club fund door prizes for the entire year at the rate of \$ 50 per month. Discussion revealed that ticket sales amount to nearly this much so the fund is essentially self-sustaining. Motion was made, seconded and carried to authorize the first three months of the fund.
4. Halligan announced that Herbert J. Hoover III, W6APW would be our guest speaker for the January meeting.
5. Thornley proposed that the committee consider scheduling future committee meeting at officer's homes during evening hours in order that adequate time to conduct club business be available. The first such is set up for 11 February at Thornley's home.
6. Dews submitted a calendar of proposed Club activities and events for the year. He suggested that it be published as part of Cross-Talk each month to keep members informed of coming events.
7. Dews discussed a proposal by Ollie Saunders for Club Bi-Centennial QSL cards. A quick development program utilizing a hired graphic arts expert to create a basic card with individual members calls added by over-printing is considered feasible. Discussion on this subject to be continued at the next meeting.
8. Dews showed a sample Tee-shirt that could be marked with TRW/ARC logo, member's name and call for approximately \$ 5.50 when purchased in quantity. No action was taken.
9. Cartier indicated a need for a list of Chairpersons to head the various activities and functions of the club. Any volunteers?

EXECUTIVE COMMITTEE REPORT (CONT.)

The February meeting of the Executive Committee was held on 12 February at Thornley's home. Officers in attendance were: Cartier, Halligan, Dews, Carson and Thornley. Also in attendance but not participating in Club business were the WF's of Halligan, Dews, Carson and Thornley.

Items of business covered were:

1. Minutes of the 21 January meeting were read and approved.
2. Halligan reported good progress in the General Class theory session. He is covering FCC rules and regs. Thornley reported that his first two sessions reviewing DC and AC theory went well. Approximately nine students are pursuing General Class studies.
3. Halligan advised that February meeting of the Club will feature Joe Reymann, W6PAJ speaking on Oscar-Amsat. Halligan stated that program planning for the next several months is in good shape.
4. New W6TRW QSL cards have arrived and a supply will be maintained in the Club shack. All station operators are requested to fill out and mail QSL cards to stations contacted. New Domestic and Foreign call books are now in the shack. Carson will check if SEA or TRW can provide postage for these cards in view of good publicity cards provide.
5. Halligan was excused from meeting in order to procure new six-pack of 807's as supply on hand in Thornley's refer had been rapidly depleted.
6. Carson reported approximately \$ 750 in Club treasury. Detailed statement will be included in February Cross-Talk.

Note to all members: There is no correlation between item 5 and item 6 of this report.

7. Thornley read excerpts from a letter received from long-lost honorary member Ben Cantaros in the Phillipine Islands. Ben is no longer living in the leper colony, and has opened his own electronics shop. Ben is asking for help from the Club in obtaining electronic test equipment. In particular, he needs a 20K ohms/volt VOM and a transistor checker. The committee agreed to help Ben. We will first ask if any member can help with a donation of either of these articles, or any other tools or equipment, new or good used that we can furnish Ben. Thornley will coordinate accumulation of donations. We will seek assistance from TRW in packing and shipping of a "Care" package to Ben. Please call Ed Thornley, ext 50743 if you can help.
8. Dews reported the the Club ICOM 230 has been serviced and returned. Committee agreed that this equpment will be made available to members for their use at home QTH or special activities. Cartier will be custodian. Contact him at ext 51188 for info.
9. Halligan raised the point that Club still does not own decent AC operated power supply for the ICOM. He moved that Club buy Heath supply in kit form. Motion seconded and carried. Halligan will order supply from Heath and Thornley will assemble and test.

EXECUTIVE COMMITTEE REPORT (CONT.)

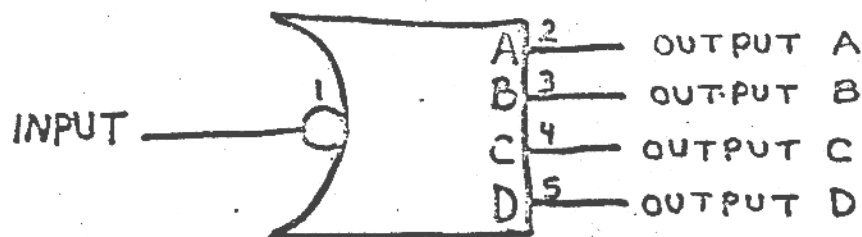
10. Thornley reported that 147.51 MHz has been severely QRM'd by a remote-base transmitter operating on 147.525 allegedly by Lakewood ARC. During Club net operations on .51 7 February, many stations were blocked. Another group in Compton using 147.54 also reports their operations are being splattered by same transmitter. Cartier will contact Lakewood group and request they investigate and take corrective action.
11. Carson discussed problems with ordering and handling of QSL cards for members. He indicated that he receives orders and places them with printer, but since printer usually mails orders direct to member, he (Carson) has no idea of delivery cycle and it is hard for him to coordinate. What is needed is one individual to manage the total QSL card system. Since our printer, Art Bliss, lives in Burbank, easy coordination is not readily apparent. Do we have a member who lives in the Burbank area who could take over this important job? Call Cartier at ext 51188 to volunteer.
12. The Ollie Saunders Proposal for Bi-Centennial Club QSL cards was brought up again. After discussion, it was moved by Dews, seconded by Halligan that the Club spend up to \$ 50 for design of a suitable card. Motion was carried. We suspect that Saunders has just volunteered to spear-head this task! It was suggested that if the card design cleverly displayed certain spacecraft, TRW might be disposed to underwrite some of the costs.
13. Dews reported on the activities of the antenna work party held at the Club station on 31 January. He stated that considerable work is necessary to restore the TH6-DX beam and Ham-M installation to good order. The rotator position indicating circuits are not functioning properly and some guy wires seem to require replacement. Also, a thrust bearing is required on top of the tower to support the beam mast. After some further discussion, Dews moved and Halligan seconded a motion to spend up to \$ 200 in refurbishing the installation. The motion carried. Dews has scheduled a working party for Saturday, February 28th to continue the effort.
14. Cartier scheduled the next committee meeting for the noon hour, in his office on Wednesday, 17 March. Meeting adjourned at 2220 PST.

THE LOGICAL DESIGN CORNER

by Jack Clarke, WB6TCR

The CROSSTALK is following the recent trend toward digital design of amateur equipment. On the next page you will find technical data on a new scheme called BUT logic, with features that are all but overwhelming. We are informed that these same wonderful folks are coming out soon with IF and MAYBE logic, and we can look forward with interest to learning all about it.

NEW PRODUCT NOTICE

7413 $\frac{1}{2}$ Dual Four-Output BUT GateAPPLICATIONS:

- * Secret Encoders
- * Power Supply Loads
- * Tie Tacs
- * Ballast
- * True Random Number Generators
- * Tax Write offs

TRUTH TABLE

Input	Outputs			
	A	B	C	D
X	0	0	0	0
X	0	0	0	1
X	0	0	1	0
X	0	0	1	1
X	0	1	0	0
X	0	1	0	1
X	0	1	1	0
X	0	1	1	1
X	1	0	0	0

0 = Logical "0"

1 = Logical "1"

X = Don't Care

TECHNICAL NOTES:

The 7413 $\frac{1}{2}$ Dual Four Output BUT Gate is a SSI (Super Slow/Intermittant) circuit developed by the microengineering and building maintenance team at the Baja Electronics & Auto Upholstery Corp. This circuit, which undeniably represents a new extreme in micro-circuit design, is available in the standard 17 pin dual-in-line configuration. Departing from the standard method of "doping" the semiconductor material with electron donor or acceptor materials to form 'P' or 'N' type areas, Baja's head engineer came up with a procedure for "doping" the semiconductor with real dope. The effect of this departure from the norm is some what unpredictable, depending on the quality of the junk that their purchasing dept, (Oscar "the-street-man" Valdez) can get.

Outputs A,B,C,&D are TTL Tri-state, and an internal connection of the output enable term to Vcc disables all outputs when power is applied.

VIBRATION AND SHOCK DATA:

All units are run 24 hours strapped to a '57 Chevy V-8 running on 3 cylinders.

POWER SUPPLY REQUIREMENTS:

Implementation is simplified by the fact that only one power source is required: 5vdc with an AC ripple component of 2.75vrms \pm 2%

Typical Risetimes: