AF7O - Darryl's Report on the 1998 DXpedition to the Maldives

The UARC 146.62 Repeater

A full 360+ degree view from near 146.62. The repeater's receive site is near center.

Volume XLII Issue 4, April 1998

the MICROVOLT

Periodical - Postage Paid

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Prologue

The Utah Amateur Radio Club was organized under it's present name in 1927, although its beginnings may date back as early as 1909. In 1928, it became affiliated with the American Radio Relay League (club #1602) and is a non-profit organization under the laws of Utah. It holds a club station license with the call W7SP, a memorial call for Leonard (Zim) Zimmerman, an amateur radio pioneer in the Salt Lake City Area.

The club meets each month except July and August. The meetings are held on the first Thursday of the month at 7:30 PM in the Exhibition hall located on the Salt Lake County Fairgrounds just south of Murray City Park.

Club membership is open to anyone interested in amateur radio; a current license is not required.. Dues are $15 per year, including a *Microvolt* subscription. Those living at the same address as a member who has paid $15 may obtain a membership without a *Microvolt* subscription for $9. ARRL membership renewals should specify ARRL Club #1602.

Monetary contributions are gladly accepted. Send directly to the Club Treasurer: Chuck Johnson, 1612 W. 4915 S., Taylorsville, UT 84123-4244. For in kind contributions, please contact any board member to make appropriate arrangements.

UARC maintains the following repeaters: 146.62 (-), 146.76(-), and 449.10. The repeaters are administered by the UARC Repeater Committee. Comments and questions may be directed to any Committee member. The Lake Mountain repeater (146.76(-) has Autopatch facilities on both the Orem exchange (covering Santequin to Lehi) and the Salt lake City exchange (covering Draper to Layton). The 449.10 repeater has autopatch facilities into Salt Lake City only. Due to the volume of traffic, only mobiles should use this autopatch. Autopatch use is open to all visitors to our area and to all club members. Non members who wish to use the Autopatch are encouraged to help with the cost of maintaining the equipment by joining the club.

THE MICROVOLT: *The Microvolt* is the official publication of the club. Deadline for submissions to the Microvolt is the 10th of each month prior to publication. Submissions by email are preferred (bbergen@xmission.com), but other means including diskettes and typewritten submissions can be mailed directly to: Bruce Bergen, 3543 Fieldstone Cir., SLC, UT 84121. In order to maintain ease of conversion it is suggested that you contact Bruce at 943-1365, or via e-mail before making electronic submissions.. All submissions are welcome but what is printed and editing are the responsibility of the UARC board. Reprints are allowed with proper credits to *The Microvolt*, UARC, and authors. ❑

UARC 1998 Board - Partial Listing

President: Tom Schaefer, NY4I	569-2664
Exec VP: Ray Allen, N7TEI	963-0790
Vice Pres: Gordon Smith, K7HFV	582-2438
Secretary: Russell Smith, KC7ZDZ	463-2568
Treasurer: Chuck Johnson, WA7JOS	268-0153
Microvolt Editor: Bruce Bergen, KI7OM	943-1365
Asst Editor: Maurine Strektenfinger, KC7HOZ	254-1536
Book "Lady": Fred DeSmet, KI7KM	485-9245

Note: Detailed listing of board members address's, phone numbers, and email address's will not appear in every issue. For current information either refer to the January '98 issue or to the club's web-page: www.xmission.com/~uarc ❑

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For late breaking news listen to the UARC Information Net Sundays at 21:00 on 146.62 or set : your browser to:
www.xmission.com/~uarc/announce.html

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The Official Publcation of the Utah Amateur Radio Club, Salt lake City, Utah

Volume, XLII, Issue 4 April 1998

QST from the Prez

Thanks to the volunteer spirit of the club, we now have a Field Day chairman. Joel Neal, KC7UBP, has volunteered to be Field Day chairmen and take his place in the honored Field Day chairman's club. Joel will need quite a bit of help with this project. I would like to see a committee form to help Joel with each person taking a responsibility. If you would like to help, please call Joel at 352-0322 to volunteer.

Recently, the club started a membership drive to get 100 **new** members in 1998. We would like to bring our numbers to about 700. Ray, N7TEI, is leading this project. If you see a place that you think should have some UARC/ham radio literature, please let a club officer know.

We have quite a few events for club members to help out in the next few months. Of course, we have the club station project, Scout-A-Rama on May 1st and 2nd, and Field Day in June. This is a great time to come out and meet some great people, enjoy some good times, and experience many of the aspects of ham radio. If you want to volunteer, just let us know.
Finally, thanks to all the club members that have made the year so far a great one. We have had great programs at the club meetings, great response to our "book lady", and several key challenges for the year are progressing. It is only with the help of club members like you, that we can make UARC what it is. Thanks again for everyone's help!

Best Regards,

Tom Schaefer, NY4I ❑

Featured Member Of The Month

This month we are featuring Mel Parkes, N5UVP, who has been an amateur radio operator since 1991. Mel has always been interested in amateur radio and electronics since he was a child. His father, Ira (K7ERR), was licensed in 1958 and his mother, Audrey (KA7HTG), got her license in 1981. Mel remembers going to field day and other amateur events with his father. Although it took him a while to finally get around to getting his license, he got his Novice ticket while living in Albuquerque, New Mexico. With in a year he upgraded to an is presently Advanced Class.

He attended Weber State University and obtained a bachelors degree in engineering (BSEET). He is currently employed at KJZZ-TV, Channel 14, as a transmitter engineer. Mel's wife Mary Lee isn't a ham yet, but she may start working on her license some day soon Mel hopes! He also has seven children and three grandchildren.

During 1996 Mel served as President of the Davis County Amateur Radio Club (DCARC) and was elected last December to serve as president a second time during 1998. He is currently the Vice President of the Utah VHF Society and has filled that position since 1997. The Utah VHF Society provides support to a number of repeaters throughout the state of Utah and also conducts the annual VHF Swap meet at the beginning of each year.

As a member of Air Force Military Affiliate Radio Service (AFMARS), Mel has the call sign of AFA5CO. MARS uses volunteer amateur radio operators to support the military by providing communications support to military personnel stationed all over the world, and to assist the military in times of emergency. He served as the Utah State Director of AFMARS during 1995 and has been the Net Control Officer of the Utah Administrative Net for three years.

Mel is a life member of the American Radio Relay League (ARRL) and also serves as a volunteer examiner with the DCARC testing group. Membership in ARRL is a great way to learn more about amateur radio. He also enjoys checking in to the Beehive Utah Net, that meets daily on 7.272 MHz at 1230 hours Local. One thing Mel enjoys the most is helping others get started in amateur radio and to enjoy the hobby as much as he does. He suggests that every ham should find a friend and help share with them the knowledge you have about ham radio.

Mel, you are a great asset to amateur radio.

73 N7HVF Linda Reeder ❑

More Budget Balancing Needed

Even if the measure to increase dues passes, more effort will be needed to keep the club in the black in 1998. Several options are under consideration, such as a less expensive meeting place (for which we have high hopes as this is written), a less expensive place to store the club generator, and a less expensive way to create mailing labels for *The Micvrovolt.*

However, the most obvious way to help balance the budget is fairly simple: get more members. Another 100 members would probably solve the whole problem. All current members are encouraged to help spread the word. Do you know people who make use of our repeaters and come to our meetings, but have never actually become members? Maybe you can do some "missionary" work. Allen Wright, N7QFI, who spends many hours monitoring the 146.76 autopatches, tells us that about 7 of 8 people who use the patch are not UARC members! So there are lots of new member opportunities out there.

Maybe you know people who simply don't know how to get the most out of their licenses. Tell them about the great meetings, newsletter, repeaters, autopatches, steakfry, Field Day, and swapmeets. You could help them find purpose in their whole amateur existence for only $13 (or maybe $15) per year!

Memorize the Secretary's address so that when someone pops on the air and wonders where to send his dues, you'll have the answer. The address "2684 Kenwood St." isn't too hard to remember (unless, of course, you're a Yaesu or Icom fan). So, have it ready the next time the opportunity turns up. You can help save the club from another dues increase.

Gordon - K7HFV ❑

Utah VHF Society Meets

The Utah VHF Society held its annual business meeting and swap meet on Saturday, February 14. Highlights included reelection of all officers and alignment of a new repeater.

The Utah VHF Society is a state organization devoted entirely to VHF and UHF repeaters and to frequency coordination. Because members come from all parts of the state, it tries to keep inperson meetings to a minimum, normally just the one event per year. The members took the action of including the 146.86 MHz repeater at Medicine Butte, Wyoming, as an "aligned" repeater. Aligned repeaters are operated by groups other than the VHF Society, but are eligible to receive operating and maintenance funds from the Society. Medicine Butte (which is part of the Snowbird Link system) brings the total of VHF Society owned and aligned repeaters to 14.

Use of the National Guard armory, which in the past has cost tens of dollars for the event, this year cost about $400. A charge of $2.00 for nonmembers attending the meeting helped defray this cost. The officers are looking for a less expensive site for next year's event.

1998 Utah VHF Society Officers

President:	Eldon Kearl, KB7OGM
VicePresident:	Mel Parkes, N5UVP
Secretary:	John Mabey, W7CWK
Treasurer:	Brent Thomas, AC7H
Frequency Coordinator:	John Lloyd, K7JL

Those wishing to join the Society may do so by sending $10.00 for 1998 dues to the club's PO Box:

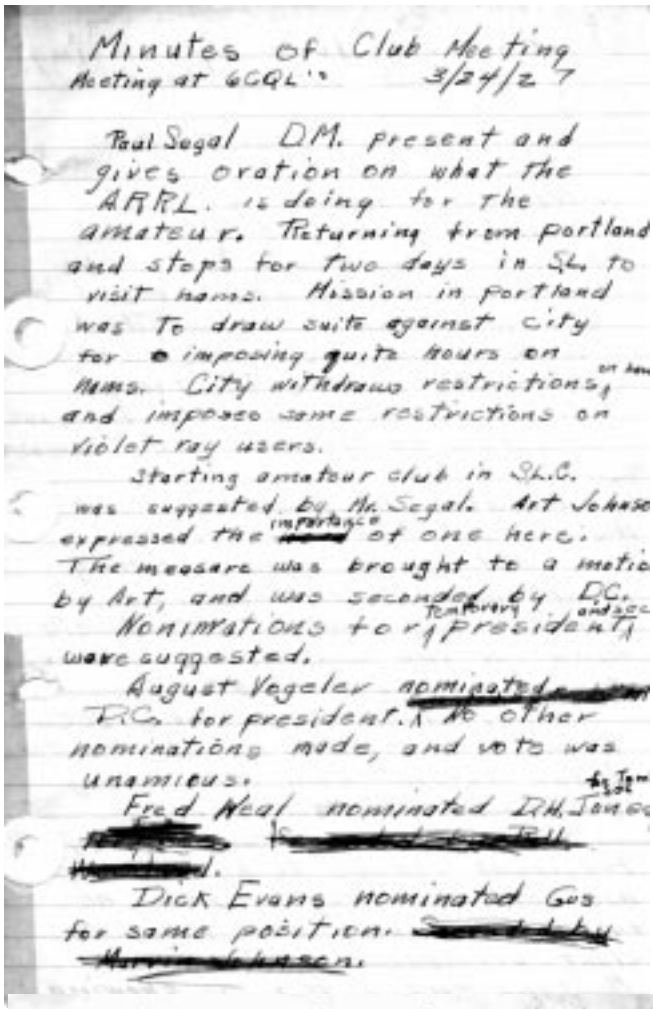
Utah VHF Society
P. O. Box 482
Bountiful, Utah 840110482

Checks should be made payable to "Utah VHF Society."

UVHFS conducts a net each Tuesday evening at 8 P.M. on the 146.94 repeater near Salt Lake City. The net serves as a place where VHF Society business can be transacted without the need for inperson meetings. It is also widely used to announce equipment wanted and for sale. VHF Society members are eligible to be placed on the net roster. ▫

A Blast from the Past

This appears to be the meeting in which UARC was first organized. The issue of restrictions on violet ray users in Portland is a curious one - anyone with a theory, please write.



Minutes of Club Meeting
Meeting at 6CQL's 3/24/27

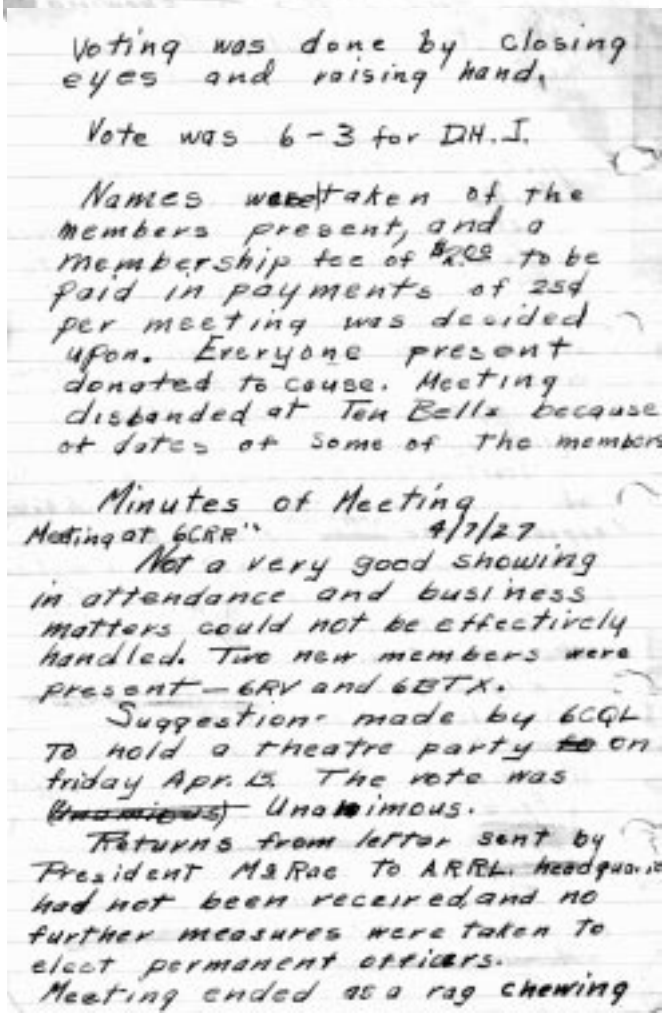
Paul Segal DM. present and gives oration on what the ARRL. is doing for the amateur. Returning from portland and stops for two days in SL to visit hams. Mission in portland was To draw suite against city for imposing quite hours on hams. City withdraws restrictions on ham and imposes some restrictions on violet ray users.

Starting amateur club in SLC. was suggested by Mr. Segal. Art Johnson expressed the importance of one here. The measure was brought to a motion by Art, and was seconded by DC. Nominations for president were suggested.

August Vegeler nominated RC. for president. No other nominations made, and vote was unanimous.

Fred Neal nominated DH. Jones [illegible].

Dick Evans nominated Gus for same position. [illegible]



Voting was done by closing eyes and raising hand.

Vote was 6-3 for DH. J.

Names were taken of the members present, and a membership fee of $2.00 to be paid in payments of 25¢ per meeting was decided upon. Everyone present donated to cause. Meeting disbanded at Ten Bells because of dates of some of the members.

Minutes of Meeting
Meeting at 6CRR's 4/7/27

Not a very good showing in attendance and business matters could not be effectively handled. Two new members were present — 6RV and 6BTX.

Suggestions made by 6CQL to hold a theatre party on Friday Apr. 15. The vote was ~~Unanimous~~ Unanimous.

Returns from letter sent by President McRae to ARRL. headquarters had not been received and no further measures were taken to elect permanent officers.

Meeting ended as a rag chewing

CADXA January 1998 DXpedition to Republic of Maldives

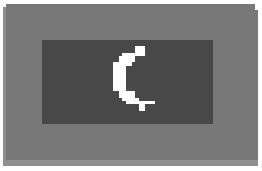
Central Arizona DX Association --N7KJ--

A group of nine Amateur Radio operators, consisting primarily of members from the Central Arizona DX Association, were QRV as 8Q7AA from the Maldive Islands in the Indian Ocean on January 19 - 28, 1998.

Although there have been several HF operations from the Maldives in the recent months, contacts to 8Q7 are still rare. While operation took place on all bands, there was a special effort made to work North America on the low bands. Zone 22 is rare on 160 and 80 meters! The first full weekend of the 8Q7AA operation was timed to coincide with the CQ 160-meter CW DX Contest and 8Q7AA was a high power multi-operator entry in the contest.

The Maldives are a tropical island chain near the Equator southwest of the Indian subcontinent

The independent Republic of the Maldives is a stretch of nearly 1,200 coral islands spanning 750 km. from North to South. Located approximately 650 km. southwest of Sri Lanka in the Indian Ocean (3.0 deg. N, 73.0 deg. E), the islands' primary industries include fishing and tourism. The Maldives is considered one of the best locations in the world for scuba diving.



Republic of Maldives Flag

The Maldive population is approaching a quarter million people, and Malé, the capital city of the Maldives, contains the majority of the islands' population. The operation took place on Alimatha Island located in the Felidu approximately 30 miles south of Malé. This location is also designated as IOTA AS-013.

Two charming Maldivian YLs.

Included in the team were both seasoned DXpedition veterans from the CADXA, as well as expert CW and SSB ops who were traveling to an exotic location for the first time. Phone operators included Dan NA7DB, Sally KM5EP, Oscar KP4RF, Rich K7ZV, and Paul W8AEF. CW operators were Warren K7WX, Steve N7TX, Bruce N6NT, and Darryl AF7O.

The 8Q7AA OPS. Darryl is 2nd from the right.

The Central Arizona DX Association or CADXA is a small but very influential club in the DXpeditioning world. Current members of the club have operated from over 100 DXCC countries. Just recently members have participated in five different very high profile DXpeditions including VK9WM, 8Q7AA, 9M0C, XZ1N and the perennial CQ World Wide

efforts of the VooDoo Contest Group to Africa as 5A7A and other well known callsigns.

Each operating position had a Yaesu FT-1000MP with an Alpha Amplifier. We had two Alpha 76s, and older Alpha 374 and an Alpha 81beta. Bird or RF Applications meters, Heil headsets, Dunestar filters, and coaxial stubs were standard at all positions. The cw operators brought their own special keyer and paddles, of course, and a laptop rounded out the necessary equipment on each station.

A 160/80 CW/RTTY Operating position at 8Q7AA

The team was very disappointed to find that two of the FT-1000MPs had sustained damage during transit. One had the coax connectors bent and had obviously taken quite a hit. The second had no apparent damage but was not operational. It was discovered that the main control pc board was cracked. Paul and Oscar worked miracles to get them both running perfectly—Oscar soldered 42 jumpers to bridge the lands on that pc card! Yaesu has agreed to repair the damaged radios at no charge. Thank you, Yaesu, for your support.

The antenna farm included custom 40 meter and 30 meter verticals, which turned out to be star performers, and an R5 vertical. Twenty and forty became our most productive bands, and thirty was definitely a favorite of the cw operators. Added to these verticals were a Gladiator for 80 meters and another custom vertical for 160. Each of these were erected at the water's edge, generally directly out on the coral, and were installed with elevated radials.

Two Force 12 C3 yagis were erected on 20 foot push up masts, one on coral and the other on the land. These were positioned so we could turn them to either long or short path via the Armstrong method. The team had also brought 2 element Yagis for both 30 and 40 meters but, after seeing the outstanding performance of the verticals on all bands, they were left in their boxes. A valuable lesson learned from all of this is that verticals near the water are killer antennas.

The operation from Alimatha Island in the Republic of Maldives is now history. After the long trip home, the crew is reflecting on this operation and their accomplishments. Their goal of having a meaningful presence on the low bands, and concentrating on North America, was certainly met. Of a total 17,903 contacts, 6,755 (38%) were on 160, 80 and 40 meters and 5,559 (31%) were with North America.

Sure beats tents in the sand!

Our 160-meter specialist, Bruce Sawyer, N6NT, was able to put 85 North America Top Banders in the log. Because of sunrise/sunset timing issues, most of these stations were from the Eastern 2/3 of the NA continent, and just after their sunset. At sunrise for the West coast of NA, it was just too early in the evening from our location off the southwest tip of India to be effective. Conditions would vary from outstanding (contacts ranging from KH6, JA8, OH2 and YL2 in less than 60 minutes) to so bad that I had to check to see if our 160-meter vertical had been washed away! Unfortunately, for the weekend of the 160-meter CW DX contest, conditions were some of the worst of the entire DXpedition. For those who are interested, N6NT has posted a detailed summary of our 160-meter experience to the Top Band Reflector.

On 75-meter SSB, Rich Chatelain, K7ZV, gave the same outstanding performance as he did from XZ1N during the 1996 Myanmar operation. During one simply amazing 14-hour opening, he worked hundreds of stations on both the East and West coasts of NA, along with a few hundred Europeans thrown in for good measure. Many now have zone 22 on this band/mode because of his dedicated efforts night after night.

Our hard working HF SSB crew of Oscar Resto, KP4RF, Sally Martinez, KM5EP, Dan Brown, NA7DB, and Paul Playford, W8AEF handed out thousands of contacts, day and night. As NM7M predicted, each day the 20-meter West coast sunset long path opening from zone 22 was absolutely terrific! KP4RF even spent several evenings on 40-meters working Spanish language South America stations, an area often overlooked. Not a surprise, Europe on 17-meter SSB was unbelievable! This is the first year that the SSB ops of our team beat the CW ops in total number of contacts.

The energetic CW boys, Bruce Sawyer, N6NT, Darryl Hazelgren, AF7O, Warren, K7WX, and Steve Thompson, N7TX, racked up thousands of CW QSOs, night after night on 40, 30 and 17-meters and made a special effort to work into W5 and W0, knowing that these areas would have the most difficulty both hearing and being heard. I am grateful to the many East coast stations who so very patiently stood by as we tried to make ourselves available to the Midwest.

Without exception, European stations also graciously allowed us to meet our stated objective, even during times when we were still loud into zones 14 and 15. N7TX has begun an analysis of the logs. Below is a "first pass" through the .bin files from the four operating positions:

BAND	CW	SSB	RTTY	TOTALS
160	664	40	0	704
80/75	537	1,704	0	2,241
40	2,149	1,661	0	3 , 8 1 0
30	1,178	0	0	1,178
20	1,519	2,625	200	4 , 3 4 4
17	1,734	909	0	2,643
15	434	1,654	0	2,088
12	348	423	0	771
10	65	59	0	124
	8,628	9,075	200	17,903

We will begin mailing QSLs in several weeks. Direct requests can be made to: Steve Thompson, N7TX, 119 E. Jasmine St., Mesa, AZ 85201-1811 USA

We are also much indebted to our West coast pilot Dick Wolf, N6FF, who during our time in the Indian Ocean made daily summaries of hundreds of your e-mail comments. These very helpful observations / criticisms / encouragement's made all the difference for us!

Further details, and some pictures, will soon be available on our web site located at: http://cadxa.org/8q7aa Additional comments about this operation are always welcome. Thanks again for the QSOs!

Darryl - AF7O ❑

Granite Community Education Offers Ham Radio Class

Marty Schoenheiter, WD0EFZ, is offering a 12 session class through Granite Community Education. The course is designed to provide the technical instruction which will help those attending really understand the concepts behind the license test questions. The class will be held at Skyline High School, 3251 E 3760 S, in Salt Lake City. The bulletin from Granite indicates the class will be held on Thursday evenings, from 7:00 to 8:30 pm beginning April 2, but Marty tells me that he is trying to get it changed to Wednesday evenings, beginning April 1. The class fee is $30.00 with study materials extra. Call the Adult Education Office, 273-2090, between the hours of 4:00pm and 8:00pm for final disposition of the Wednesday vs Thursday question. They can also provide you with more details, reservations and registration information.

Bruce, KI7OM ❑

UARC Thanks WB7SLK

Thanks to Jim Magleby, WB7SLK, for donating a large amount of equipment to UARC for the club station! The major donations include a Kenwood TS820S with all accessories, an ICOM multi-mode 2 meter rig, some other 2 meters rigs, keyers, cables, and an antique, DeForest Radio Company receiver. This equipment will be put to good use at the station. Thanks again, Jim.

Tom - NY4I ❑

The UARC 146.62 Repeater W7SP/RPT

GPS Location: 40 deg 39.63'N by 112 deg 12.08'W

Approximate altitude: 9000 ft (2800 m)

The 146.62 repeater is of one of several repeaters that UARC maintains. This repeater is located on Farnsworth Peak, on the Oquirrhs mountains, the mountain chain along the west side of the Salt Lake valley. Farnsworth peak is also home to KSL, Channel 5.

Panoramic view to the north, showing the 02/62 repeater's receive site (center.)

Repeater coverage

Via Mobile (50 watts, 1/4 wave or better): This repeater covers the Utah and Salt Lake Valleys, south along I15 as far south as Nephi, west along I80 as far past Wendover, Nevada, North past Malad, Idaho, and spotty coverage East into higher parts of the Wasatch range. Via HandieTalkie: Good coverage in Salt Lake and southern Davis counties. Requires better than stock antenna for solid HT coverage from Utah and northern Davis county. Spotty coverage from Ogden, depending on location.

Operation

This repeater does not have an autopatch or any other controller function. It does have the typical (and required!) timeout timer. The repeater will cease transmitting after a continuous carrier of more than about 3.5 minutes duration. This timer is reset when the repeater's carrier drops. When using this (or any repeater!) leave a long enough pause between transmisions so that others may be able to break in. Who knows: they may need to report an accident, or tell their spouse that they will be home in 30 seconds...

History of the '62 repeater

The idea of a repeater on Farnsworth Peak began to emerge shortly after UARC's success in putting the 146.76 repeater on the air in the mid 70's. Some hams who had had experience in the television industry called Farnsworth "the best site in the state of Utah." The 9000-foot mountain sits near the north end of the Oquirrh range which is just west of the Salt Lake valley. It certainly appeared that it had a wonderful view of the valley and a chance of getting into Logan.

One sour note kept coming out, however. There were reports that the site had bad noise and intermodulation problems. So a party was assembled to go to the mountain and check it out. Permission was obtained from KSL-TV, owners of the site, to make a visit, and a spectrum analyzer was obtained. The party headed for the 9000-foot level.

A winter sun silhouttes the KSL-TV transmitting tower and old tram building

They found that the reports of receiving problems, unfortunately, had been correct. As well as big spikes that the analyzer showed popping up randomly from intermodulation products, it showed a lot of "grass," a low level noise floor that would surely mask any weak signals. On the positive side, the view from the site certainly looked promising. The whole Salt Lake valley was laid out before us; most of Utah valley was easily visible; we could look straight into Grantsville; and the view to the northwest, across the Great Salt Lake toward Idaho, seemed to go on forever before disappearing in the haze.

In the months that followed, a partial solution appeared when one of the local hams offered access to nearby Kessler Peak, just north of Farnsworth. Although not quite as high as Farnsworth, this peak had no television station and probably did not suffer from the noise problem. It had its own set of disadvantages, though. Space was severely limited, so only a small antenna could be accommodated. Management concerns were such that we would be

able to access the site only when the ham that worked there was available.

We thought a hybrid arrangement could be devised. Why not put the transmitter for the new repeater and its logic on Farnsworth, and put the receiver on Kessler? We could take advantage of the lower noise level on Kessler and the greater accessibility of Farnsworth at the same time. The rough spot here was that some sort of link would have to be built to send the receiver audio from Kessler to Farnsworth.

We started procuring equipment for the new repeater, keeping in mind that transmitter and receiver might be separated in the final configuration. About this time, Dirk Ostermiller, W7KCC, the club's repeater engineer, who had spearheaded the '76 project, found that his time was overcommitted. He resigned and left the Farnsworth project to others to complete.
Randy Finch, K7SL, agreed to take the position, and started assembling the new equipment into a working repeater. Before long, a new 146.61 MHz repeater appeared on the air from Randy's home in Magna. It came on just in time to be announced at the 1979 UARC Christmas Banquet. (The switch to 146.62 came a few years later when Utah adopted 20 kHz spacing, the plan pioneered by Washington and Oregon.)

By the time we got that far, another monkey wrench seemed to have fallen in the works. (We thought we could blame it on Murphy, but it wasn't even close to Field Day.) Other commercial installations had consumed most of the remaining space at the Kessler site, and it was no longer available to us.

After some amount of hair-tearing and carpet-pacing, the idea of a split site at Farnsworth was born. We contacted people at KSL to see if they would go along with the idea of letting us just plop our receiver outdoors somewhere away from the building (and the noise). They told us their property ended on the south just a short distance from the TV buildings, but it extended quite some distance to the north, and something north of the building might just work out.

It would have cost us too much to do Class 1 wiring to bring power down to the remote site. So placing the entire repeater there was not practical. But just a receiver could run happily on 12V at 100 ma. So a split-site repeater seemed to be the answer.

Summers are short at 9000 feet. Usually, by June, it is possible to clear the remaining snow from the road and declare the road open for travel. Snow often closes it again by October. We waited impatiently for June of 1980 and clear roads to come along. Finally the time came. Randy and the author went to the mountain taking a mobile 2-meter rig, a Gel-Cell, a 1/4-wave whip, and a cavity. We hooked it all up just north of the TV station buildings. Sure enough, an S-9 noise level.

Next, we started walking down the ridge to the north, away from the buildings. The S-meter started to drop, just as we had hoped. It finally reached a zero reading about 400 feet north of KSL's northernmost building, the tram shack. We ceremoniously announced, “The receiver goes here!”

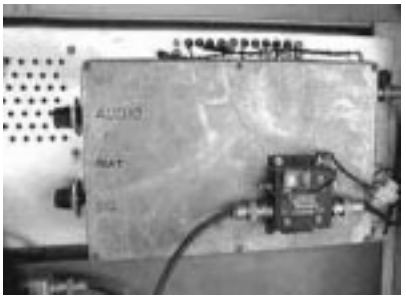
Shown here is the receive site, its tower, and antennas. The black antenna on the left is the main receive antenna. It is placed on the tower to provide a null toward the transmitter site to reduce the possibility of interference from the transmitter site. The white antenna is the spare antenna, to be used should the main antenna become damaged or fail.

Of course, declaring it so and making it happen were two different things. Many man-hours from a large number of volunteers were required to finally place a repeater on the mountain. Steve Kleinlein, WC7G, built a power supply. Larry Jacobs, WA7ZBO, built two J-pole antennas. Russ Michaelson, N7SM, built rack-mounts for several pieces of equipment. Steve Berlin, WB7VCI, built the audio board for the controller. Don Richardson, WA7QKF, built the logic board. Mac MacDonald, WA7SVN, built an ID board. Randy built many of the remaining pieces and coordinated numerous work parties on the mountain and in his basement.

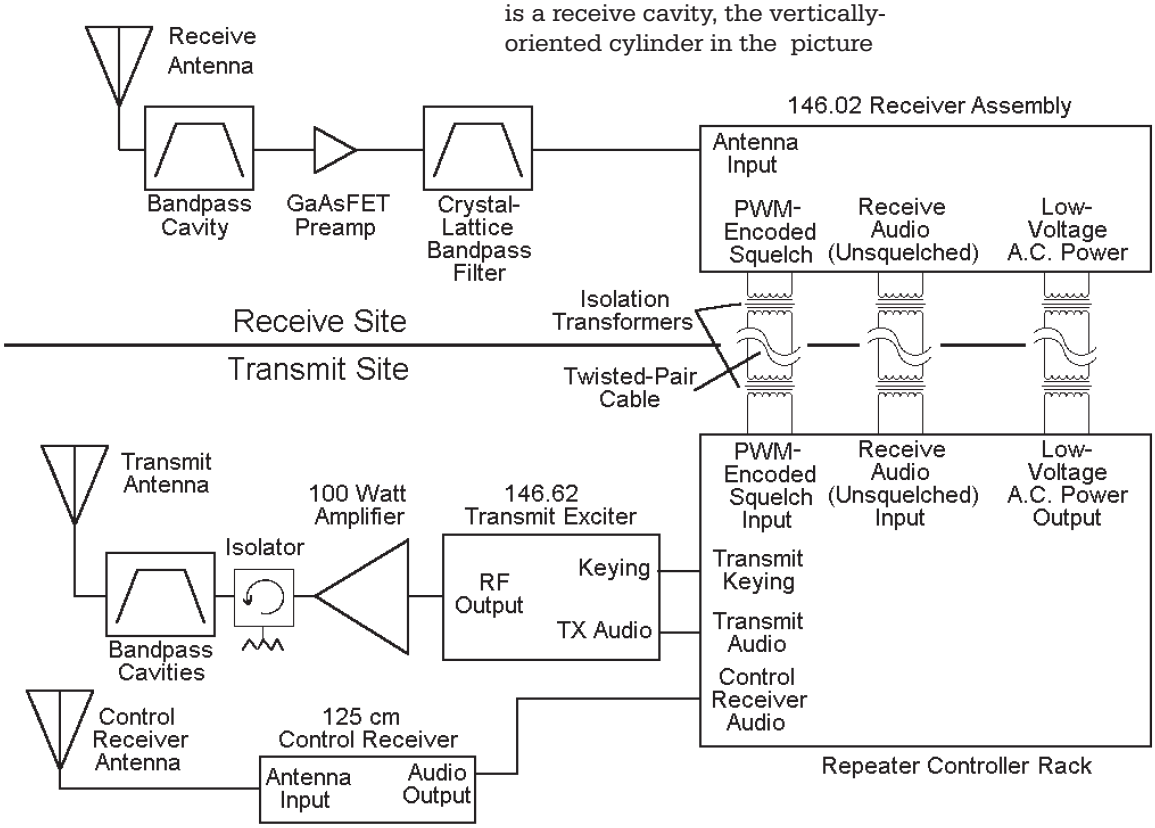
Work continued. Copper for a ground system was obtained. Burial cable that could be used to connect the transmitter site to the receiver site was located. A rack was found to use for the transmitter end of the repeater.

The black antenna on the left is the main receive antenna

Inside the receive cabinet, there is a receive cavity, the vertically-oriented cylinder in the picture



The receiver (the rectangular box) and the preamplifier (the box connected by cable to the cavity, mounted on the receiver.)



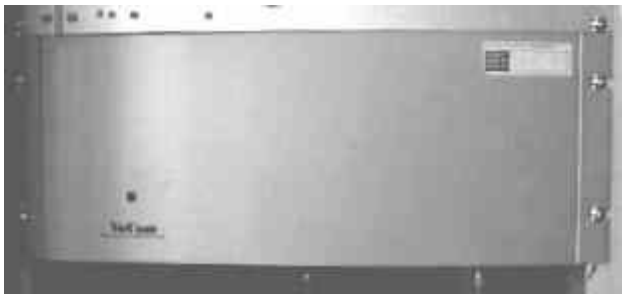
Controller logic for the '62 repeater

Transmit antenna

Control receiver

Exciter

Transmit cavities



100 watt amplifier

A space was negotiated with the KSL staff for the transmitter. It was in a dark corner on the upper level of the old tram building. The brake-release arm was conveniently located where one could sit on it to work on the repeater. Only a thin layer of metal separated us from the elements outside, and this metal had a number of holes in it. We would have to provide some rain and snow protection for our rack. A plastic cooler cover finally met this need.

As bizarre as this space was in some ways, it had some features that made it just what we needed. It was at the end of the KSL buildings closest to our chosen receiver site, and it was not likely that any commercial clients would be competing with us for it.

The solution to one problem fell into our laps unexpectedly. A gentleman had donated an old commercial repeater to the club. He had planned to use it at a particularly good mountain site. Before he got his repeater on the air, however, his work took him out of the country for several years. When he returned, he found that someone had already put a repeater on at the Snowbird ski resort, so he donated his equipment to UARC. It was old tube gear and the receiver did not have a particularly good reputation, so we thanked him kindly and put the unit in storage.

But as the construction of the Farnsworth repeater proceeded we remembered one very useful feature of the donated repeater: it had a weatherproof rack! Soon a worthy receipient for the transmitter and receiver strips was found and their rack became the new home of the Farnsworth receiver.

How time flies when you're having fun! There was snow on the ground at Farnsworth again by the time we were ready to erect a tower for the remote receiver. It took several weekend trips to get a hole dug, and about 15 hams to actually erect the tower. We had to carry up, not only the cement, sand, and gravel, but also the water. The final fifty feet of the journey was uphill and had to be done on foot.

A few more weekends were devoted to burying the cable that would connect the two sites. It was a multi-pair cable and the design called for one pair to carry 12-volt power down to the receiver, another to bring audio back up, and a third to bring squelch information up. It sounded easy enough to dig a trench, but most of the ground turned out to be not soil, but stones on top of bedrock. We settled, frequently, for just piling rocks on top of the cable.

Other trips were made to get equipment up to the mountain. On one of these a great clatter arose as the vehicle pulled out from in front of Randy's house in Magna. It seems that the exciter and receiver had been placed, temporarily, on the roof of the the Jeep while it was being loaded. Somehow, they never got moved to more permanent storage, and were thrown out on the asphalt as the Jeep started to move.

Perhaps dropping the RF gear on the road is a necessary part of the initiation of UARC repeaters. Several years earlier, the '76 repeater had been carried to its site in a truck supplied by the National Guard. Part way up the 30% grades, the whole rack fell out.

The moment of truth for the Farnsworth project finally came on a Saturday night in the fall of 1980 when two different teams worked at hooking up the cables at the transmitter and receiver sites. The power and squelch pairs had to be connected with correct polarity, but no particular color standard had been agreed to by the two ends. We figured we would just hook it up any old way, take some voltmeter readings, and then reverse whichever pairs were wrong. The crew at the receiver end was ready first, but couldn't do much until the transmitter crew fed them some power down the cable. So they waited impatiently, making occasional wisecracks on simplex. Finally, the transmitter team got ready to call on '61 simplex and announce that power was on. They never got the chance to make the call.

Suddenly, the repeater was on the air, and there was a station using it from Snowville, Utah, near the Idaho border. Magically, the right polarities had been found on the first try. Why someone in Snowville happened to be trying the 01/61 repeater pair at that moment is still mysterious. But, the repeater was on the air! It wasn't the best-sounding repeater in the world. In fact, its audio was troubled by mysterious hums, squeals, and bursts of audio from the FM broadcast stations on the site. But after another hour of cable routing, bypassing, and level adjustment, it began to sound like a useable repeater.

It's very traditional for new repeaters not to make it through their first night. This one survived its first night, but its first day was a different story. When things came up to daytime temperatures, it became clear that the squelch was too loose, and the repeater was transmitting noise for long periods. The author and Scott Bidstrup, WA7UZO, made a trip and cured the problem.

After that, the repeater ran happily through the winter. Usage was light, but gradually, a few people began using the machine. We thought our job was done.

The real excitement didn't start until late spring when the first thunderstorm came by and the repeater promptly went off the air. We went to the mountain and repaired some power supply components and added some surge supression. The next week another storm came by and the repeater was off again. We went to the mountain and replaced some cable-receiver components and added more surge protection.

Soon, it became the joke that '61 was a better weather predictor than the Weather Service. It went off the air at the first hint of a storm coming in from the west. This seemed unfair, because, by this time, we had beefed up the circuitry to the point the repeater only went off every second or third thunderstorm. Sometimes it would be on for over two weeks at a stretch. However, some of the IC sockets were wearing out because the parts in them had been changed too many times.

Our problem seemed to revolve around the fact that a 10,000-amp lightning stroke parallel to our cable (the one connecting the transmitter site to the receiver site) could easily induce enough voltage to destroy the ICs at both ends. We finally realized we had to convert to a new religion and espouse a creed the phone company had known about for years: *The way to minimize induced voltages in a balanced pair is to make sure there is no ground reference.* The cable pairs would have to float and have no ground connection.

To practice our new belief, we had to make sure everything that went from one site to the other had to couple through transformers at both ends. That, in turn, meant everything had to be a-c. That was no problem for the audio -- it was a-c already. For the power, it meant we had to wind a couple of unusual transformers and feed the line with 60 Hz. The hardest one to convert was the squelch line which carried DC proportional to the receiver's noise detector voltage.

Just a little too sure of our abilities, we decided we could do the conversion one evening after work. I breadboarded an op-amp circuit to convert the squelch circuit's DC to a pulse-width modulated signal. Randy rounded up transformers and built a more permanent model of the circuit. We enlisted Dale Jarvis, WB7FID, and headed for the mountain. We didn't leave until daylight was in the east, a scheduling feature we had neglected to tell Dale about. The famous "modification 42" was complete.

The repeater was much more reliable, now, reaching a rating of 6 mtsbf (mean thunderstorms between failures). But it took modifications 43 and 44, involving huskier receiver and driver transistors, respectively, before it really settled down. Thus, by the end of 1981, the thunderstorm problem was pretty well behind us.

Some of the changes and enhancements over the years included:

- Change of the receiving antenna to a 4-element colinear
- Change of frequency from 146.61 to 146.62 MHz to match the new Utah bandplan
- Increase of amplifier power from 35 to 120 watts
- Change of transmitter location to a building with concrete walls
- Change of squelch pulse detector from the original analog circuit to a digital design
- Addition of squelch remote-control
- Addition of a GaAsFET preamplifier to the receiver
- Move of the intersite cable to conduit (This solved the problem causing the majority of failures at the time: porcupines chewing into the cable.)

No account would be complete without a mention of the installation of the new receiving antenna in the fall of 1982. It happened on a Sunday afternoon with rain coming down in buckets. In fact, so much rain came down that when the party was ready to leave, the County flood-control net took over the repeater. (This was the start of the famous 1982/83 winter which ended with State Street being used as a river.) As everyone was going about their business with garbage bags over their heads, Roger Davis, N7BNC, commented: "It's a good thing we do this on a volunteer basis. Otherwise, you couldn't pay me enough!"

Gordon, K7HFV
Clint, KA7OEI

Photos: Clint, KA7OEI ❑

Modern Lightning Protection for Radio Facilities: RF Entry Ports

Lightning is one of nature's most destructive forces. It has the power of a good-sized explosive and cannot be avoided if you're connected to antennas that are high and in the clear. And it's not just lightning. On a recent evening our 160 Meter dipole (260 foot wire span) strung between towers at 180' here at the I.C.E. factory exhibited several hundred volts of charge from a light rainshower - enough to shock one of the technicians working with the cable outside. During an electrical storm with overhead discharges many thousands of volts have been measured on this wire, respective to earth ground terminals.

In installations employing coaxial feedlines the measures used to protect station equipment are simple but critically important. Here is a list of observations and our recommendations ...

1- *Always bring coaxial cables to ground level before entering equipment area*. Never bring coaxial lines into the building at an elevated height directly. Lightning currents induced into the cables will be forced through the equipment chassis on the way to ground, and that's what causes extensive damage. Even if your equipment is on the second floor, always bring coax to ground level first and insert appropriate lightning protection, then route the cable to the station gear.

2- *Absolutely, positively ground coaxial cable shields with as short an earth terminal connection as possible*. Use a commercial shield grounding block if possible, or fashion your own. In most cases as much as 80% of an induced or direct lightning blast comes in on the shield. This is because of the external exposed nature of the shield and its larger metallic mass. Always make sure that grounding of the shields occurs **before** the cable enters the building or reaches equipment chassis. Multiple shield grounding (such as once at the tower base and once more before building entry) is an excellent, low cost idea.

3- *Use lightning arrestors on lines that feed sensitive electronics*. But beware. Don't use so-called lightning arrestors that offer nothing more than a gas-discharge device to ground. These units are DC-passive and only activate when the potential voltage between conductors reaches hundreds of volts. By that time in most cases the radio gear has already been damaged before the arrestor attacks, leaving you with an arrestor that did mostly nothing and a damaged rig. Also, gas discharge tubes are very low power rated, typically only about 1 watt dissipation. They may be "rated" for 20,000 amps or more, but only if a lightning bolt starts and ends in a few billionths of a second. Few bolts ever do, and blasts that are slowed down coming through transmission lines almost never do. That's why gas discharge arrestors require repair or replacement so often. They are overpriced and offer little, if any, protection from induced voltages.

If arrestors are used always specify a blocking-type arrestor - a unit that has no DC continuity from input port to output port and some means to handle current besides or in addition to a-gas tube.

4- *Establish a bulkhead grounding system near the radio equipment where the distance from the bulkhead to soil entry is short - preferably less than a foot*. Use this bulkhead for lightning protection as well as RF neutral for interference filters and similar items. The bulkhead can be a bar, metal sheet or just heavy wire. But remember - the length of ground leads is far more significant to good grounding performance than the specific materials or even wire size used.

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April Meeting: The Friendship Cruise

Utah's two largest rivers join forces deep in 1000 foot red rock canyons. This very scenic point lies in the middle of Canyonlands National Park, but few humans ever see it. An occasional party of jeepers or hikers look out from an overlook at the top of one of the canyons. An occasional raft trip goes past, looking forward to the fabled rapids down river in Cataract Canyon. But, otherwise, this confluence sits alone, viewed by only deer and jackrabits.

Once a year, there is an unusual chance to see the confluence and the miles of stunning canyons that lead to it. This chance is an event called The Friendship Cruise. It is an opportunity for people with power boats and a bit of adventurous spirit to experience 183 miles of exceptionally scenic river.

The Friendship Cruise is held each year on Memorial Day weekend. Those who take their boats on the Cruise put in at Green River, Utah, go down the Green River to its confluence with the Colorado, and then travel up the Colorado to Moab, the end of the Cruise. The whole trip typically takes two days.

Coordinating efforts over that many miles of river has proved to be a challenge, and that is where ham radio comes in. Hams set up stations along the river, in rescue boats, and at temporary repeater sites. They are able to get word communicated about stranded boaters, trailers that need to be taken to unexpected places, and even occasional emergency situations.

Two people who have been coordinating most of the ham communications for the last several years of cruises will give a presentation at the next UARC meeting on Thursday, April 2. Mike Collett, K7DOU, and Ron Jones, K7RJ, will tell how hams were able to communicate into the deep canyons of the cruise when other services failed. They will have slides and tales of cruises past as well as information on how you can participate in future cruises.

Presentations about the Friendship Cruise inevitably involve pictures of southern Utah's Canyon Country. The program could be worthwhile for the photo show, alone. Don't miss it!

UARC meetings are held in the Little Theater building in the Salt Lake County fairgrounds on the first Thursday of each month (except July and August). Neither the building nor the street is marked with a number, but the address is approximately 150 East 5150 South. Follow the sign that says “Square Dancing.” Meeting time is 7:30 P.M. ❑

“Of Ice and Lids”

One of my great pleasures is QSOing on 2 meters, but sometimes I get so wrapped up in "what" I am saying that I forget "how" I am saying it. On the twisted pair or during an eyeball, mild discourtesy though annoying can be overlooked. Amateur communication however, requires that certain protocol be observed. Otherwise we lose control, step on other operator's transmissions, hurt feelings or worst of all miss those breaks where needed traffic does not get passed. On occasion I get so excited about my turn to talk that I hit my PTT switch before the repeater has time to reset. Meanwhile KC7HOZ is out there trying to break in with automobile trouble.

Contrast this poor operating practice on my part with K7HFV, when it is his turn to talk he waits and then he waits a little longer. Breaking station KI7AR has no trouble joining the QSO in progress. It is a pleasure to get on the air with Hams who use a little courtesy and who observe a little common sense. I have been an Amateur operator long enough to know that I am an influence on other Hams’ operating practices. When I am on the air I have no idea who might be listening. I can be a harbinger of good amateur radio practice, uplifting new young radio minds to the positive merits of this hobby, or I can be a "lid". I would like KI7OM and N7TEI to think of me as a good operator. I shudder to think that KA7NFF would be a better ham for never having heard me on the air.

Hopefully my radio manners will be emulated for the common good of my fellow hams and not to their detriment. KC7KRE telsl about running an ice delivery wagon in Kentucky many sun spot cycles ago. His horse would recognize the yes sign in the windows of his customers and calmly stop at the appropriate residence. Critters learn positive practices like this by repetitive doing. So I need to think about this horse when I pick up my mike. Yes I have something to say, but how am I going to say it? Am I going to calmly stop at the right places and make an enjoyable trip for my fellow hams or am I going to prove the adage of my silent key fishing buddy N7CAW who said, "There are more horses rear ends than there are horses"?

Richard - KJ6TL ❑

Wasatch Front Amateur Radio Examination Schedule for March

04/04/98 (Sat.) Salt Lake City
Contact: Gordon Smith, K7HFV
Phone: H 582-2438 B 534-8116

04/15/98 (Wed.) Provo
Contact: Steve Whitehead, NV7V
Phone: H 465-3983 B 225-5200

04/28/98* (Tue.) Salt Lake City
Contact: Eugene McWherter, N7OVT
Phone: H 484-635

*Only Novice and Technician elements (1A, 2, and 3A) given at this session.

For more detail either call the contact or checkout the information on our webpage
http://www.xmission.com/~uarc ❑

Top 10 Pleasures of Field Day

1 0. Fishing bugs out of your coffee cup.

9. Getting lost on the way to the porta-potty.

8. Tripping over guy wires and tent ropes in the dark.

7. Discovering that your three-element wire beam for 40 meters, which took all day Friday to erect, is oriented in the wrong direction.

6. Fixing a broken paddle with duct tape.

5.Finding out what happens to a tribander when you drop it from the top of the tower.

4. Having to choose between Field Day operation and your wedding anniversary.

3. The "food."

2. Explaining to your XYL that the YL ops are "just hams."

And the Number 1 Pleasure of Field Day:

1. Getting in the truck to go home and finding that someone has borrowed your battery.

Submitted by Eugene Hecker, WB5CCF ❑

UARC News

Dues Increase Approved
Without dissent, the UARC members present at the March 1998 meeting voted to raise the club dues to $15 per year, effective April 1 of this year. The non-Microvolt, family membership will stay at $9 per year. This increase will allow UARC to help defray increased *The Microvolt* printing costs.

Club Station
The club station project at the Salt Lake Red Cross is awaiting plan approval from the building management. The building owners are reviewing the plan and have asked some questions. The final details are being worked out between all parties.

New Meeting Place
The Doxey-Hatch Medical Center at 3900 South and 1300 East will be the new meeting location effective with the September 1998 meeting. More information and maps will follow in future issues of *The Microvolt*.

Field Day Chairman
Joel Neal, KC7UBP, has accepted the position of 1998 Field Day chairman. Joel will be organizing a committee to help organize the UARC event. Joel can be reached at 801-352-0322.

Tom, NY4I ❑

Amateur Radio Licensing Class
There will be a class beginning March 26 at 7:00pm at the home of Jerry - WR7N and Verna - N7LNL Bennion, 3666 S State in Salt Lake City. Call the Bennions - 268-4194 - for more information. Anyone interested in obtaining a licence and learning about Ham Radio is invited to attend. The class will run every Thursday for 8 weeks.

Gary, KC7AWU ❑

Ham Hot-Line
The Utah Amateur Radio Club (UARC) has a Ham Hotline, 583-3002. Information regarding Amateur Radio can be obtained, including club information, testing, meeting information, and membership information. Leave your name, telephone number and a short message on the answering machine if no one answers and your call will be returned.

Gary, KC7AWU ❑