

PRINTED CIRCUIT

April 1998

Newsletter of the Joplin Amateur Radio Club

Volume 8 Issue No. 4

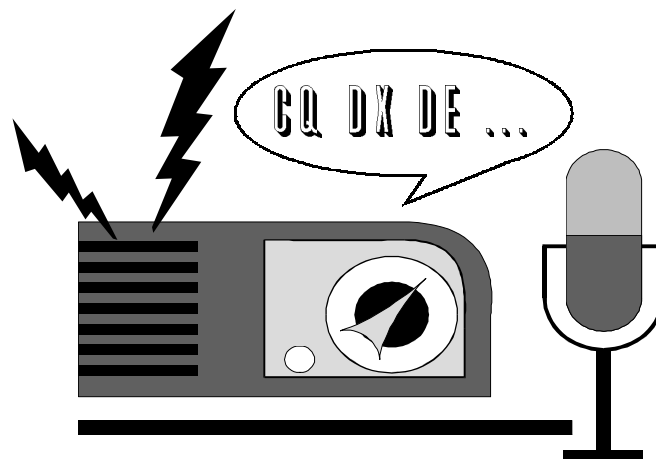
PROPAGATION

THE PROGRESS OF CYCLE 23

Many hams who work the HF bands now realize that solar cycle 23 has begun. Solar flux on some days has topped 100 (comparing to the 70's) in most of 1996 and early 1997. Both 15 and 17 meters is sounding good, both 10 and 12 meters are improved but still have a long way to go to reach the peak which should occur by the year 2000. The solar flux alone isn't a perfect indicator of F2 layer skip propagation conditions, it varies with the season and also the part of the world in which you are located. Generally the Maximum Usable Frequency (MUF) is highest in areas near the equator.

A few F2 layer six meter contacts have been made in areas crossing the equator, where the MUF exceeded 50MHz. During the summer months, conditions will usually favor the southern hemisphere, while most long skip openings will be in a southerly direction. The April QST propagation report predicts an MUF exceeding 36MHz on 10% of the days for the path from the Midwest to South America, while it won't even reach the 10m band on east and west paths. This implies good 10 meter propagation to Central America and the West Indies over the next few months. Of course during the late Spring and Summer months we will enjoy our usual Sporadic

E skip (Short Skip) openings on ten and six meters, usually covering distances between 600 and 1300 miles but this has nothing to do with the solar cycle. By next fall the solar flux numbers will be



higher, and the east west propagation (long skip) will return to ten meters. With it we may even expect some real DX for a few days on six meters.

CRITICAL FREQUENCY vs MAXIMUM USABLE FREQUENCY

The Critical Frequency (CF) can be defined as the highest frequency when propagated by the F layer returns to the earth at the point from which it was transmitted. The Maximum Usable Frequency (MUF) is the highest possible frequency that the signal returns to the Earth. The rule of the thumb is that the MUF is usually 5 times the CF, so for a CF of 7 MHz, the MUF will be about 35 MHz. From this we can determine the

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JARC

HAMFEST '98

Once again the John Q. Hammons Convention Center will be the hub of activity for this, the 9th annual club sponsored event. Scheduled for Saturday, April 18th, hams from surrounding areas as well as across the Midwest will converge in droves on Joplin to swap out their old equipment and search for that ever-elusive piece of new gear or part.

With over 200 swap tables in a spacious air-conditioned environment, this event has become one of the most popular in the Midwest, attracting hams from as far away as Texas and Minnesota.

A variety of events are scheduled throughout the day, along with VEC testing (offered at 11am), and a large number of door prizes drawn hourly for both the ham guys and gals, followed by the grand prize drawings at 2pm. Cost for individual admission is \$5.

The size of this event requires the support of many volunteers for its success. Many thanks to the numerous club members who have given of their time to handle security, ticket collection, and a host of other jobs during the weekend. If you haven't taken the opportunity to help before, a variety of jobs are available on both Friday night and Saturday, and volunteers are always needed. Sign-up sheets are posted at the meetings, and you are urged to help. It will require only a couple of hours of your time and will distribute the work so others can enjoy the hamfest too. ¶

inside...

ATV Repeater Needs Help
QRP for the Radio Amateur - East Coast on 1 Watt
ELMERING and What it Means

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THE WORLD OF VHF/UHF BAND PLANS

There seems to be a lot of confusion especially among newer hams about what is an FCC regulation and what is a band plan. For instance, on Two Meters the band extends from 144-148 MHz. Voice is permitted from 144.1-148.0 MHz, while CW is permitted across the entire band.

According to the band plans, which are *not* regulated by the FCC, there are groupings of frequencies in the 2m band for various modes of operation. These include FM repeaters input and output, FM Simplex, SSB and AM, Packet, and Satellite uplinks and down links. I was surprised to find out that many hams even in our club didn't know the frequencies from 145.6 to 146.0 MHz are reserved for satellite uplink or downlink. According to "Newsline" heard on our Monday night net, this has caused major problems in some congested areas, the FCC may have to create regulations to enforce these band plans. You can't really blame the newer hams, as many were unaware that these band plans even existed. I know that local radio hams would not want to hear single sideband signals on 147.21 MHz (the Joplin Repeater), or FM signals on 144.2 MHz.

The frequencies 144.0-144.1 MHz are reserved for CW by FCC regulations, and are mostly used for EME (Earth-Moon-Earth) operation. Unless you have a very high gain antenna (at least 20dB) aimed at the moon, you would never hear the low level signals coming off the moon.

Not much VHF DX openings to report this month. March is usually one of the poorest months for E skip or Tropo openings, which usually pick up later in mid April. There have been some TE type openings from the West Indies to South America. However, these usually occur at Latitudes below 20°

We have several newcomers to six meter sideband, including my neighbor Larry KCØAUY. Larry and others are waiting for the skip season to begin.

Anyone wanting more information on band plans or any VHF subject call me at (417) 624-8058.

73 John WØJRP

LIBRARY DISPLAY A SUCCESS!

4 April 1998

I would like to thank everyone who participated by donating their equipment to the club for the display case at the Joplin Library for the month of March. We had many compliments from numerous people and school groups that viewed our display. Everyone said it was very educational for the public. The Librarians would come over and tell me



as I would add items from week to week to the case how many people had come over to their counter and commented how pleased they were with the display! I made a special trip to the library with my grandchildren in from San Antonio, Texas to see the display before the end of the month. Everyone should have their items and equipment back to them by now.

Thanks again for all the support and help from Mary Anne Phillips, Jim Scott, Sue and Larry Linthicum, and Jack Purdum (KGØVR) for helping me assemble the "goodies" in the case on March 1st. A big "thank you" to Mary Anne for creating the informational cards describing each item of interest. The Club did a professional job and hope this display will generate a lot of interest in Joplin and the surrounding 4 States Community.

Thanks again all for a job well done!!
Betty KBØTKX

ATV REPEATER NEEDS HELP

VIA LARRY HENDRIX WBØOYU

It appears that the ATV repeater is down for the count. Although it has worked great for a long time, now it seems that everything is breaking down at once. To add to the problems, the receive antenna has failed and Ron (WØTQR) can't find anyone to climb the tower to take it down. The repeater power supply has failed twice, and the controller is on it's 4th rebuild. With all the problems occurring at once, we have just been overwhelmed, and can't seem to be able to do much to turn this project around.

We are still trying to hold the Thursday night nets, but the count has dwindled down to just a few old supporters. Last week, for example, we had only four check-ins counting myself. ¶

YOU CAN CONTACT LARRY OR RON THURS NIGHTS AT 19:30 ON 146.94.

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skip zone between the CF and MUF. The MUF skip distance is usually about 2800 miles at the highest frequency and will decrease with frequency. On ten meters it may be 1800 miles, while only 1400 miles on 15 meters. Signals are almost always the strongest near the MUF for a given path. To work a DX station around 5000 miles distance at least two hops would be necessary. The highest F2 MUF ever observed was in November 1957 near the peak of cycle 19, and was around 72 MHz. Today, some European countries still have a ham band at 72MHz, located between our TV Ch. 4 and 5.

Another type of long haul propagation is called Trans- Equatorial skip (TE), where the MUF has reached 220 MHz but that only occurs in the Southern latitudes. Frequent contacts have been made even on two meters between Puerto Rico and Argentina among other places.

John Tudenham WØJRP

QRP FOR THE RADIO AMATEUR

BY JOHN TUDENHAM WØJRP

A lot of fun you get out of Amateur Radio is making contacts with equipment thrown together from a bunch of junk parts (That's why they call me WØJRP, Junk Radio Parts). Recently I built a 160 Volt DC power supply in a small 5"x5¼"x3" box. It consisted of an isolation transformer that also had a 6.3 volt filament winding, some silicon diodes, a filter capacitor, and a couple of resistors. It supplies 160 volts at 50 mA and 6.3 VAC at 1 Amp for tube filaments. The next step was to build a transmitter in a box the same size. I chose a 6AQ5 power pentode, it fits a miniature 7 pin tube socket, and capable of much more power than 160 Volts would produce. I chose the 6AQ5 because I had many of them laying around. The tube oscillator circuit uses two 1 watt resistors, four small caps, a crystal socket, a coil wound of hookup wire on a form made from a plastic coin holder, and a 50 pfd. variable cap for tuning. One note, my transmitter uses a 2 turn link over the cold side of the coil directly fed through an SO-239 connector into a 50' length of RG-8X then into my 40 meter dipole antenna.

The other evening I fired it up on 40m using a 7040 kHz crystal (one of the 40m QRP frequencies), my watt meter showed 2 Watts loading directly into my 40m dipole with near 1to1 SWR. Backing the output off slightly to 1½W for better keying, I called "CQ de WØJRP/QRP". The first contact returned was W8KC near Detroit MI who was also running QRP but at 5 watts. He gave me an RST of "559" but reported QRN from thunderstorms nearby. We had a good QSO until we got too much QRM from a W2 station.

I knew the rig would work on 40 meters, but several nights later I decided to try something else. That's when I got my big surprise, I found a crystal for 10,108 kHz in our 30 meter band. I wanted to see if my homemade 40m coil would resonate on 30m. I hadn't checked it with my grid dip meter, but decided to try transmitting first. Tuning with reduced capacity, the rig showed about 2 watts out on 30m. The 40 meter dipole was loading on 30m with about a 3to1 SWR. Unfortunately that meant my watt meter was actually reading high, since the reflected power adds to the forward power, I was lucky if I had one watt in the antenna. I decided to try a CQ anyway, and transmitted the usual

**I WAS LUCKY IF
I HAD ONE
WATT IN THE
ANTENNA.**

WØJRP/QRP then stood by. To my surprise I was called by W3MWY in Baltimore MD. He gave me a RST 559 report and a solid 30 minute QSO. George was also running QRP, a Ten

Tech Argosy with about 4 watts to a full wave antenna. We had a lot in common, he has been a ham since 1947 (me 1948), and was only about 4 years older. He said he only works QRP and enjoys it. He did advise me to find a crystal for 10,115 kHz, the 30m QRP frequency. He happened to be tuning around and heard my CQ. Amazing, my little one watt signal was hitting the F layer about 200 miles up, in eastern Kentucky or southern Ohio, then coming down in Baltimore MD. This isn't rare it's done all the time on HF frequencies, but usually not with very low power and a mismatched antenna.

If you are not familiar with the 30 meter band, it covers 10.1-10.15 MHz, has a limit of 200 watts PEP, is CW only, and requires a General class license or above.

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HAMFEST CALENDAR

APRIL 11

BENTONVILLE, AR

Arkansas National Guard Bldg. 801 S. W. A St. Tables \$5 Talk in 145.29. For tickets contact Shirley Harris KC5RDU (501)451-8626

APRIL 18 HAMFEST '98

JOPLIN, MO

John Q. Hammons Convention Center, Exit 7B, Jct I-44 and US Hwy 71. Registration \$5, Talk in 147.21. For tickets, JARC P.O. Box 2983, Joplin, MO 64803, or contact Andy Gabbert KAØTUD (417)673-8371

MAY 15-17 HAMVENTION

DAYTON, OH

Hara Convention Center Online at: www.hamvention.org

JUNE 11-14 HAM-COM

ARLINGTON, TX

JULY 11 PHD-ARA

KANSAS CITY, MO

PHD-ARA ARRL Hamfest, KC Market Center. Contact Bob Roske WAØCLR (816)436-0069, PHD-ARA, P.O. Box 28954, Kansas City, MO 64118

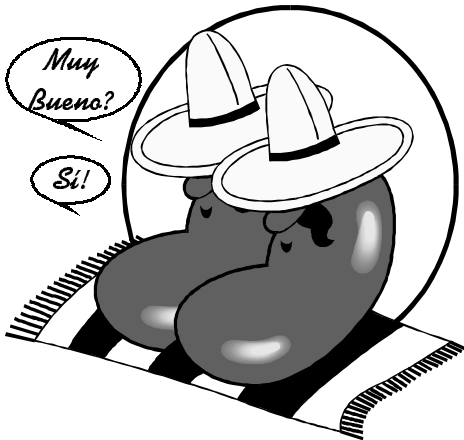
REGARDING ARRL AFFILIATION

The membership at the March meeting was queried for the number of ARRL members also members of JARC. It was later determined that the club met the 50% requirement and was entitled to the benefits afforded by the ARRL. John WØJRP tallied this information and gave it to JARC president Larry NØMST for disposal. When confirmed by the ARRL, we will be entitled to discounts and other savings, as well as kickbacks when you renew your ARRL membership thru the club. ¶

Report on the Annual Chili Cookoff

BY BETTY MILLER KBØTKX

We really had a fun evening on Tuesday, March 24th with our annual Chili-Cook Off dinner. We had several pots of good chili, and for the non-chili folks, "Mac" (W9NLA) made Venison Stew, Betty brought ham and potato salad, and several



folks brought yummy desserts, covered dishes, lots of chips, soda pop, crackers, and breads.

We had 30 adults and three children participate, and we had our new yellow and black **Joplin Amateur Radio Club** banner hanging on the wall. A big "thank you" goes to Jim Scott for designing the logos that were used on the new banner. We enjoyed having all the wives and family members join us. Some members came who we had not seen for a long time. A great time was had by all.

Thanks again for helping me make this a great annual fun, food, and family dinner! ¶

ELMERING and What it Means

A BRIEF HISTORICAL OVERVIEW

If there is any one constant in the changing state of the communications art, it is that "Hams" (Amateur Radio Operators) have always been on the forefront of it. Rumors abound where the term "Ham" came from. Regardless of origin of the name, a "Ham" is universally recognizable as one who experiments in radio and communications. Whether it be constructing a low-power CW radios with vacuum tubes or transistors, or designing TCP/IP packet networks, such experimentation has historically spilled over into the mainstream such as was the case with Howard Armstrong, who developed the regenerative oscillator and FM radio, or General Curtis LeMay (W6EZV) who was instrumental in making Single-Sideband the communications standard for the Strategic Air Command (1946-1992, now reorganized into a joint command called USSTRATCOM) and eventually the U.S. Air Force. Although packet-switching techniques originated from DARPA (Defense Advanced Research Projects Agency) and the ARPANet, no one can deny the tremendous influence that amateurs have had in demonstrating the viability of TCP/IP and AX.25 communications via radio links. The efforts of AMSAT (the Amateur Satellite Corporation), including the development of many ham satellites and the low-orbiting Microsats (communications satellites no bigger than a breadbox that use store-and-forward packet techniques), have certainly advanced the state-of-the-art in communications, one of the defined purposes of the Amateur Radio Service, as recognized by international treaty.

WHAT IS AN ELMER?

Since in many cases hams are writing the book", there is often no "book" or other established reference for a beginner to refer to. Traditionally, information has been passed on from ham to ham via word-of-mouth. Like many of the traditional crafts, a variation of the Master-Apprentice system has emerged, the Elmer-Novice relationship. Called "Elmers" because they are usually older and wiser, having the benefit of many years in the hobby, including several failed projects, and an electric shock or two, they have traditionally been the mainstay of amateur radio, and the source of many new hams, particularly those interested in working on emerging technologies.

Even more importantly, Elmers provided an outlet for the impatient newcomer who wanted "to know everything, and right away". Faced with such a request, a good Elmer will smile and proceed to lead the novice through some project or operating experience. Several hours, days, or weeks later, the novice would have his answers, but would have earned them. Even better, the sense of accomplishment would boost the novice's confidence and nudge him or her down the road to being a model, experienced ham operator.

Many present hams feel that such an experience is missing today. In today's hustle-bustle world, the response to such natural curiosity and desire to learn is, more often than not, "I'm too busy" or "RTFM." As a result, the quality of new hams declines and the knowledge and operating habits they develop in their first formative months and years leave much to be desired. The very same hams who claim that they "can't understand the new generation" also, in

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almost the same breath, lament about the "decline of amateur radio."

WHAT IS AN ELMER TODAY?

An Elmer today is of any age, male or female, who has some expertise and is willing to share it with beginners. Elmers don't even need to be licensed amateurs, just people with knowledge in some area of electronics or communications technology. Ironically, sometimes the best Elmers are those who say "I'm not an expert, but..."

Those desiring more information regarding elmering, are encouraged to contact Rosalie White, WA1STO, Educational Services Manager at the American Radio Relay League, 225 Main St., Newington, CT 06111 or via electronic mail addressed to rwhite@arrl.org.

THE PHONETIC ALPHABET

- | | |
|--------------|-------------|
| A - Alpha | P - Papa |
| B - Bravo | Q - Quebec |
| C - Charlie | R - Romeo |
| D - Delta | S - Sugar |
| E - Echo | T - Tango |
| F - Foxtrot | U - Uncle |
| G - Golf | V - Victor |
| H - Hotel | W - Whiskey |
| I - India | X - X-ray |
| J - Juliette | Y - Yankee |
| K - Kilo | Z - Zulu |
| L - Lima | |
| M - Mike | |
| N - November | |
| O - Oscar | |

Q-Codes

Q codes may be used as query or to confirm a statement or a question.

"Q" code	Definition
QRA	What is your name, and location (grid square) of your station?
QRG	What is my exact frequency (or that of ...?)
QRH	Your frequency is changing/moving/varies.
QRK 1-5	Your signals is: 1 Bad, 2 Poor, 3 Fair, 4 Good, 5 Excellent.
QRM 1-5	I am receiving interference: 1 None, 2 Slightly, 3 Moderate, 4 Severe, 5 Heavy.
QRN 1-5	Static problems are : 1 None, 2 Some, 3 Moderate, 4 Severe, 5 Heavy.
QRO	I will (can you) Increase power.
QRP	I am running low power, (can you decrease power).
QRQ	Shall I send faster?
QRS	Please send slower (.... words per minute).
QRT	Stop sending.(I'm going to quit for now).
QRV	Are you ready?
QRX	Standby for a few... (I'll call you again at)
QRX	I'll call you back at ... hours (on ... kHz or MHz).
QRZ	Who is calling me? (please identify your station).
QSA 1-5	The strength of your signals (or those of ...) is: 1 Barely readable, 2 Weak, 3 Fairly good, 4 Good, 5 Very good.
QSB	Your signals are fading. (your signal is up and down).
QSL	Can you acknowledge receipt / I am acknowledging receipt. (Please Confirm).
QSO	I can communicate with ... direct (or by relay through)
QSP	Will you relay to ...? / I will relay to
QSX	I am listening to (call / sign[s]) on ... kHz or MHz.
QSY	Change to transmission on another frequency (or on ..kHz or MHz).
QSZ	Send each word or group twice (or ... times).
QTH	What is your location? / My location is(may include grid square)
QLF	Try sending with your left foot awhile.

Buy/Sell Trade

For Sale - Tower 50ft. Rohn 25G , 100ft. #9913 Coax

Make Offer.

Les Hovland AAØGY (417) 776-8420

4/98

For Sale - Kenwood TS-440S with PS-430 Power Supply, excellent condition, with manuals, has CW & SSB filters, auto antenna tuner built in.

\$700

Billy Durham NØHNO (316) 251-4439

4/98

For Sale - Kenwood TS-430, Power Supply, Antenna Tuner, Mini Quad Antenna (80-10 m), Keyer \$1000 cash.

Kent Jones NDØZ (417) 623-3668

2/98

For Sale - Alpine #3505 Power Amp, 12VDC-neg gnd.

Motorola Mostar Base, Model #D35TLA5B00BK.

Motorola Mobile, Model #D35TLA5B00BK.

Motorola Power Supply, Model #HPN1004A. 120VAC, 60 Hz 2.0A, Output 14.2 VDC.

Doug Torson KM5JM (918) 782-2976

3/98

5lbs. of Capacitors

Assortment of both new/used, low/high Voltage. \$20

Jim Scott WBØIYC (417) 781-2211

2/98

(Continued from page 3)

The other night with my Kenwood TS-830 and about 100 watts on the same 40 meter dipole and an SWR of 3to1 with no antenna tuner, I worked 3B8CF on Mauritius Island off the coast of East Africa, a distance of over 10000 miles. If some of the the newer hams wonder why some of us old timers like CW, this is a few examples.

If you would like to construct a QRP rig, contact me and I will help you. Bob KBØNRD is building one now. ¶

(JOHN MAY BE CONTACTED THRU THE CLUB P.O.Box)

MINUTES from recent CLUB MEETINGS

Joplin Amateur Radio Club February 10, 1998

The meeting was called to order by President Larry NOMST. The pledge of allegiance and Self-induction were completed. The Chair was then turned over to Jack KBOWFE. The minutes and treasurer's report were given. Andy, KAOTUD reported on the hamfest tables and prizes. It was noted that Ray Brown was chairman of security for the hamfest. The prizes were discussed. A motion was passed to spend no more than \$800 on prizes. It was noted that Dave Fergusson volunteered to head the prize committee. We discussed the repeater controller and decided to shelve the purchase of the controller till after the hamfest. It was noted that the vocational industrial club at Crowder College, are asking amateurs to act as judges of the electronics projects. on March 5 at 7:30AM. It is also noted that John W0JRP has gotten together a large list of amateurs in the city of Joplin and would like others to help him call the people on the list. A motion was passed to Spent \$150 to buy a banner for the club. It is also noted that the cans in the repeater are for sale.

Mark Mitchelson
Secretary

Joplin Amateur Radio Club February 24, 1998

The meeting was called to order by Larry NOMST. The pledge of allegiance and self-introductions were completed. The minutes and treasurers report were given. We discussed the increases in postage for the hamfest mailings. Andy KAOTUD reported that we need more volunteers with the hamfest. Jim Johanas reported that KSN would be willing to let us put our repeater on their tower. John W0JRP also reported that that the FCC computer is down. It was determined that a majority of the members are members of ARRL and that the club could become ARRL affiliated. Mark KBOVVQ reported about the club Webb page. Jim Scott reported about when the club call can be changed on the repeater. He also reported about the 5o1c3 paper work and wither we wanted to be a 5o1c3 or 5o1c7 organization. We also discussed the Library display. It was noted that Carthage is looking for a new repeater and that John Eubanks' 145.39 repeater is for sell. We also discussed the ownership of our repeater and ownership of its parts. It was noted that the steering committee has the following officer in addition to the elected officers. Jack Purdum and Betty Miller.

The following other positions were noted

news letter editor	Jim Scott
soda pop chairman	Dave Ferguson
Testing	Les Hovland, John Tudenham, Don Longcrier, Dave Hill and others
code and theory class	Jack Purdum, Dave Hill, Mark Mitchelson, and Don Longcrier
Prize chairmen	Dave Ferguson
Library case	Betty Miller
Banner	Betty Miller
Social committee	Jack Huber, Betty Miller, Sue Linthicum
Hamfest committee	Andy Gabbert, Jack Huber, Jim Johannes
Fieldday chairman	Ralph Orahood
Membership	John Tudenham
Publicity	Ray Brown

Don reported that we are invited to a Valentine Party this coming Saturday by the Four State Amateur Radio Club. The tentative activities for the rest of the year were reported. It was noted that John Miller rebuilt the computer Data Base.

Mark Mitchelson
Secretary

Joplin Amateur Radio Club March 10, 1998

The meeting was called to order by President Larry NOMST. The pledge of allegiance and self-induction and were completed. It was noted that at the next meeting there well be a chili feed. This meeting will be at 7:00. Who would bring the chili was noted. The minutes and treasurer report were then given. It was noted that we received a packet of information for ARRL club affiliation. John Tudenham reported that he would check out the ARRL affiliation of the membership. It was noted that we need to keep track of the coming events of the 125 Birthday of Joplin. It was noted that the library display was very good. John Tudenham ask if the club would be interested in a commercial ad in the news letter. It was decided that we need to thank about it and vote on it at a future meeting. It was decided that we need a speaker to tell up exactly an non profit organization. Ralph volunteered one. A motion was passed that a person with 50 years in Amateur Radio should be given a lifetime membership in the club. This resulted in a new member Harry Butterfield W0CLQ receiving a life membership. Ray KB0STN mentioned the possibility of a MCW net to do 5 WPM.

Secretary
Mark L. Mitchelson

CALENDAR ON THIS PAGE

Meeting Times, Testing, Events, other Club Information

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

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

Club members often meet weekday mornings in Joplin for coffee at either Hardee's (804 S. Rangeline) or

Target (7th St. East of Rangeline) around 8:30 AM. Members also meet for breakfast on Saturday morning around 8:30 AM in the restaurant at Smitty's (18th and Maiden Lane) in Joplin.

1998 CLUB OFFICERS:

President: Larry NØMST
Vice-Pres., Jackson KBØWFE
Treasurer, Jim NØZSQ
Secretary, Mark NØZPD

Testing is offered for Amateur Radio

licensing by volunteer examiners on the 3rd Thursday of each month. The tests are given at the St. Paul's Methodist Church at 2423 West 26th St. in Joplin. Sign up at 6:30 PM, testing begins promptly at 7 PM.

ABOUT THE NEWSLETTER

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

Deadline for submissions is the 20th of the month preceding the month of publication. Non-Commercial Classified ads are free and will be run on a space available basis whenever requested. Submissions may be typed, handwritten, ASCII text files attached with email, or on disks formatted for IBM. *All items* are subject to editing for spelling, content, and space limitations as required. '73 and Thanks. **Jim WBØIYC ¶**

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PRINTED CIRCUIT

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