



MEMBER

Printed Circuit

– Jan/Feb 2023 –

Published by the Southwest Iowa Amateur Radio Club Inc.
SWIARC meets the 4th Thursday of every month at the Loess Hills Red Cross Chapter
Charles E. Lakin Human Services Campus
705 N. 16th Street Council Bluffs, IA 51501

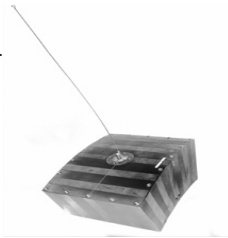


Visit us at <http://www.swiradio.org>

Amateur Radio in Space

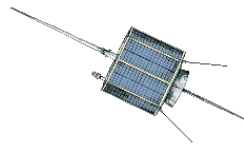
Oscar 1, launched Dec 12, 1961, was the first Amateur built NGO spacecraft designed and built by the [TRW Radio Club](#) of Redondo Beach, California. After forming the organization called [Project Oscar Inc](#) in 1960, the group designed and built an amateur CW transmitting satellite to be placed in orbit. The acronym Oscar stands for “Orbiting Satellite Carrying Amateur Radio”.

https://en.wikipedia.org/wiki/OSCAR_1



Oscar-7 launched into [Low Earth Orbit](#) on November 15, 1974, It is the oldest amateur satellite still in use, and is one of the oldest operational [communications satellites](#) still circling the earth.

https://en.wikipedia.org/wiki/AMSAT-OSCAR_7



CONT Page 3

Saturday Breakfast at Sugars Diner reported by

Paul WBOGXD

There was a good turnout for breakfast last Saturday, Dec 3rd at Sugars Diner near Bomgaars in Council Bluffs. Twelve people enjoyed a good meal and excellent conversation.



Feel free to join us on Saturday mornings any time from 8AM to 10 AM, and we'll pull up another chair for you!

The SWIARC Action 2023

- *Jan 7 8-930am **Saturday Breakfast(every Sat) Sugars Diner***
- Jan 7 9-1030am **Heartland Hams Monthly Breakfast Toby Jack's Mineola Steak House***
- Jan 26 7-8pm **SWIARC Club Meeting Red Cross Building***
- *Feb 3 8-930am **Saturday Breakfast(every Sat) Sugars Diner***
- Feb 3 9-1030am **Heartland Hams Monthly Breakfast Toby Jack's Mineola Steak House***
- Feb 23 7-8pm **SWIARC Club Meeting Red Cross Building***

* Sugars is an every Saturday Breakfast!



Hamfest

SWIARC Inc March 2023 Hamfest
Plan on It !!!

A
D
D
R
E
S
S

Sugars Diner
2725 E Kanesville
Blvd, Council
Bluffs, IA 51503

Red Cross CB
705 N. 16th Street
Council Bluffs, IA
51501

Toby Jack's
408 Main St,
Mineola, IA
51554



Xmas Dinner Rpt.

REPORTED BY RICH WAOZQG DECEMBER 29TH, 2022

Our Christmas meeting/dinner at INTERNATIONAL BUFFET, at 48th and L St in Omaha, was attended by a dozen of us (including 3 XYLs).

Beside the great dinner for \$13, there was some interesting conversation and a few presents. Joel QGD brought several presents and handed out a selection of Baofeng accessories to Art UWR and a kit radio to Derek TYG's nephew Isaac, a high school student in Harlan IA.



Figure 1: Rick RLR and Derek TYG are next to high school student Isaac from Harlan IA.

One of the Show and Tells was Rich ZQG's sixty dollar Spectrum Analyzer showing commercial TV activity in the range 500 to 800 Mc.

Kudos to Joel QGD and his wife Bonnie, Who went literally out of their way to both pick up Art UWR and take him back home after the dinner (West Omaha to Glenwood IA).

Attendees were: Derek K0TYG, and Isacc NOTYET, Bill KDOFJR, Rick KFOIQL and Cathy, Joel KDOQGD and Bonnie, Rick KAORLR, Art KBOUWR, Don WBOVGB Rich WAOZQG



Figure 2: ZQG's sixty dollar Spectrum Analyzer and Patsy.

For more Info visit:
<https://swiradio.org/2022/12/18/xmas-dinner-12-29-2/>



Would you like to submit an article to the SWIARC Newsletter?

We encourage your involvement. Share your stories, wit, knowledge, experience, and upcoming events here. Submit your articles at a SWIARC Meeting, or to newsletter@swiradio.org or SWIARC PO Box 661 Council Bluffs, Iowa 51502. Please use this email address to also make requests for newsletter re-prints and your feedback of the newsletter.

WOW, Congratulations

1st LT Polack!

Brought to our attention by Jim N6HFJ

“Airmen compete in joint global radio contest Noble Skywave”

Jim Polack **N6HFJ** of Omaha reports his son 1st Lt Polack has earned 1st Place in the 2022 Noble Skywave Competition, US low power category, 2nd place in international low power competition and 8th place team out of 400 teams competing.

Published Nov. 6, 2022

By Airman 1st Class Jared Lovett
86th Airlift Wing Public Affairs
U.S. ARMY GARRISON
BAUMHOLDER, Germany (AFNS) --

Military units from around the world recently participated in Noble Skywave, a global cyber contest, at U.S. Army Garrison Baumholder. Noble Skywave is a multi-national high-frequency radio contest hosted by the Canadian Armed Forces. This year's competition brought together 429 military units from across 13 nations competing to determine who can most efficiently utilize high-frequency radio technology.

See the full article on the Official United States Air Force Website

<https://www.af.mil/News/Article-Display/Article/3210447/airmen-compete-in-joint-global-radio-contest-noble-skywave/>

What is a “Signal Report?”

check the link out!

“N3XYZ, can someone give me a signal report?”

“Signal Report” is what most amateur radio stations ask for,

“Radio Check” is a term most used by CB users

Amateur Radio in Space Cont.

A year ago, Jan 13 2022, Spain-Oscar-114 and Spain-Oscar-115 were released into orbit built by a Spanish team and AMSAT-EA.

On Jan 15, 2022 first contacts with the 2 satellites were reported by Daniel Estévez, EA4GPZ, at 1807 UTC, using two antennas from the Allen Telescope Array northeast of San Francisco, California.



<http://www.arrl.org/news/weak-signals-heard-from-spanish-satellites-easat-2-and-hades>

It seems there are too many Amateur Radio equipped satellites for any one source to capture all the details from the governing bodies but the best seems to be <https://www.satblog.info> with almost 350 amateur radio satellite entries. Quite enough to keep you busy tracking them all.

Where to find many more Satellites, *Hopefully not in the dirt!*

Just a couple more sites worth exploring!

<https://www.n2yo.com/satellites/?c=18>

<http://www.ne.jp/asahi/hamradio/je9pel/satslist.htm>

This is just “purty” to browse!

<http://www.ka7fvv.net/satelliteFM.htm>

73's KORWJ

SWIARC Repeater Committee Report

SWIARC Station Trustee Chris KF0FBL announced at the SWIARC November monthly Club meeting that the Club's repeater site at Simms Avenue in Council Bluffs will have to be abandoned at some time in the future. This is the site that hosts the main portion of the K0SWI 146.82 repeater, with the exception of the 146.22 remote receiver at Iowa Western Community College. We were made aware of this on November 16th.

The reason why this is happening is that the company that owned the tower site sold it to another company that manages tower sites. This new owner wants the County to pay rent for their tower space. The County has decided not to pay rent for this tower space. As the Club was granted space on this tower by the County this means that we will also have to vacate the site also. This is in no way the fault of the County.

At this point in time this is all we know. We do not have a time frame for when we have to vacate. We do not have any definite plans as of yet for moving forward with the 146.82 system, except that we will do what we can to keep it on the air. Rumors of the Club shutting down the 82 repeater are greatly exaggerated. There may be periods of short outages as other arrangements are made, but we will endeavor to keep 82 on the air.

If anyone has any suggestions or offers that they wish to have considered please submit them via email to repeater@swiradio.org and the repeater committee will contemplate them.

SWIARC Repeater Committee

Chris KF0FBL, Station Trustee, Chairman

SWIARC ONLINE



SWIARC REPEATERS and NETS:

Club Repeaters

Primary Club Repeater: 2M @ 146.820 R- No PL

SWIARC digital C4FM 442.225 R+ PL 136.5 Wires-X connected K0SWI-ND 33633 K0SWI Digital

Club Nets

146.82 Tues. OPS Net 9:00 pm - 10:00 pm

146.82 Wed. Ragchew Net 9:00 pm - 10:00 pm

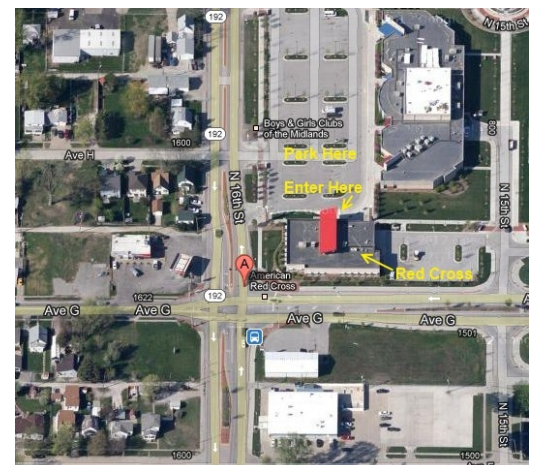
146.82 Sat. Swap Net 12:00 pm - 1:00 pm

More Local Nets here;

<https://swiradio.org/ants/>

Club Meetings

4th Thursday of the month at the Charles E. Lakin Foundation, Inc. 705 N. 16th Street Council Bluffs, IA 51501





Shack Chat

Pyramid PS-52KX Power Supply

Submitted by Jay W0ENX

I mentioned on the six meter net that I bought another Pyramid PS-52KX power supply. This PS is the newest version. When I discovered the listing on ebay for \$100 as a buy it now with free shipping and returnable, there were two watchers and I thought to myself "are you kidding me" this is too good to wait on.



Figure 1: PS-52KX

I received the new Pyramid PS-52KX power supply from someone who evidently must have decided they were so unhappy with it they wanted to get rid of it. It came in the original box and packing and it looks new inside and out. The PCB has been redesigned.

There is no schematic circulating on the web for this newest version yet so it would require some time to step through it in more detail but it appears they have made an effort to improve upon the older design(s). Incredibly this supply was forfeited by its previous owner simply due to a faulty mains switch which should have been detected through any QA effort. I had a dozen or so switches in stock in both red and green so it was replaced and the unit is fully operational now.

On the PCB there is no "REV" code. I opened an older PS-52KX (Printed on the front face of the PS) that I have on hand and it has no printed identification on the board other than "PS-52K". For the unit I received in question the transformer has a print of

"Date:2021.7" and the code "200652" which is also printed on the edge of the PCB but does not indicate any model



Figure 2: No "REV" code

number on the board. The PCB has a "2015-7-16" print but shows no revision code. I opened a third PS-52KX I have here and found it only has PS-52K printed on the edge of the board but once again no other information.

Cont Column 2

Shack Chat cont.

Pyramid PS-52KX Power Supply

They are now using six, 10,000uf 25V 105 degree C filter capacitors instead of five. They added two thermal switches on one of the two power transistor heat sinks.

The components now reside on one PCB instead of two. So the filter caps are now on the same board as the regulation circuit. The first note of interest involves the

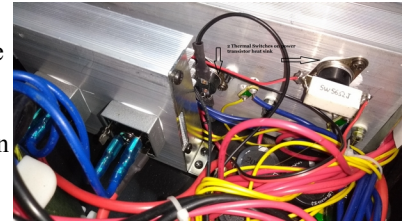


Figure 3: Power Transistor Heat Sinks

two thermal switches mounted to the power transistor heat sink. In the photo below the thermal switch to the right is a bypass for increasing the speed of the cooling fan if a certain temperature is exceeded. The thermal switch to the left (and lower) is the main thermal disconnect switch.

So the question someone might ask is why is there a 5W Ceramic resistor attached to the terminals of the thermal switch for the fan. The positive side of the fan passes through the parallel configuration of the thermal switch and the resistor. The thermal switch is normally open (N.O.) thus the 56 ohm resistor is inline and this reduces the speed of the 24VDC cooling fan. If the thermal switch closes the resistor is bypassed and the full available voltage, whatever that happens to be, is supplied to the fan. So the resistor serves as a load resistor creating a voltage drop across it and reducing the voltage to the fan motor.

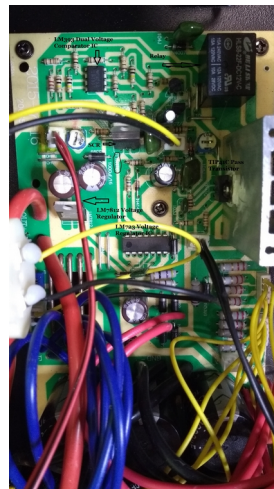


Figure 4: LM393 Dual Voltage Comparator IC

They have added an LM7812 voltage regulator in the TO-220 case, a relay and an LM393 dual voltage comparator IC to the PCB in addition to continuing to use the LM723CN voltage regulator IC.

The relay is likely part of a surge or inrush current limiter circuit which would be a new feature of the supply, however I can't confirm this without mapping the traces.

Cont Page 5

Shack Chat cont. from pg 4

Pyramid PS-52KX Power Supply

The SCR is a TYN416 and the pass transistor remains the TIP46C. Most of the component placement on the board has been rearranged as well.

Also there are a pair of NPN small signal diodes near the relay highlighted in the yellow box which are C1815 (similar to 2N2222

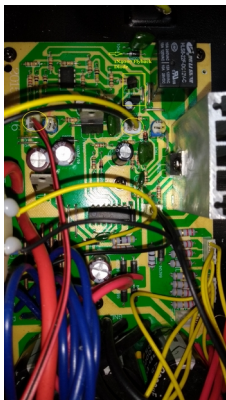


Figure 5: Pair of NPN Small Signal Diodes

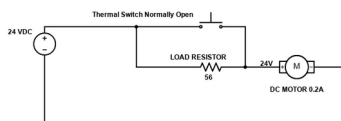
or 2N3904). C1815 spec sheet shows V_{be} max is 5V and the collector-base voltage rating is 50V max. The IC is rated at 150mA. The proximity to the relay and their appearance in the redesign suggests these are associated with the relay which could be used in numerous ways. Again, without dismounting the board or obtaining a schematic there is nothing more I can say with certainty about how they are used but surge/current inrush protection disconnect is

my thinking. So none of this matters of course if you can't feed the transformer primary through a defective power switch.

Here is an ideal circuit example:

The next sensible question is why the resistor value of 56 ohm(Figure 3, Power Heat Sink)? The answer is with the fan specification of a 0.2A current draw, $R = V / I = 24 / 0.2 = 120$ ohm. We have a series circuit with the voltage supply, the 56 ohm resistor and the 120 ohm fan

motor. Thus the current in the circuit, $I = V / R(\text{total}) = 24 / 176 \sim 0.136$ A. Now we can calculate our voltage drop across the 56 ohm resistor as, $V_d = I R = (0.136)(56) \sim 7.636$ V. So the fan in our example is being supplied 24 - 7.636, or 16.364 V in normal operation and 24V if the thermal limit is exceeded and the resistor is bypassed thereby increasing the fan speed to cool the power transistors more aggressively. The airflow direction is inward through the opposing power transistor heat sinks.



It should be noted that these calculations are generalized as an example because of numerous factors. The current drawn by the fan motor will vary since the voltage to current curve is non-linear.

Cont Column 2

Shack Chat cont.

Pyramid PS-52KX Power Supply

The resistor's actual value is a factor. Any change in resistor value caused by ambient and operating temperature is another factor and finally the fan is supplied ahead of any voltage regulation so the voltage supplied to the fan may vary with line voltage and subsequently the secondary voltage from the transformer.

I measured the voltage across the 56 ohm resistor on my supply and found it to be 6.53V. The next note is that this PS unit also employs eight 2N3771 power transistors. In Figure 6 is a bank of eight of 1W

2.2 ohm 5% tolerance resistors (lower left corner). These are the resistors before the base of each power transistor.

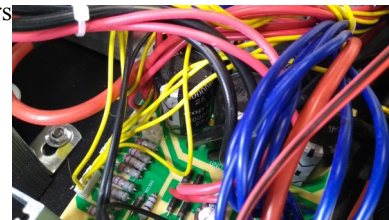


Figure 6: 1W 2.2 ohm 5% Tolerance Resistors

The Figure 7 is of the fan and the Figure 8 is of the left side



Figure 7: Fan



Figure 8: Power Switch and Resettable Fuse

of the PS where the power switch and resettable fuse are located.

The Figure 9 photo is an image of the fan circuit schematic. There is



Figure9: Fan Circuit

a 1N4007 diode near the relay which is almost certainly the flyback diode parallel to the relay. Flyback circuits are a worthwhile topic in and of themselves. Hopefully this is of some interest to you. Jay, W0ENX

Share your Shack Chat story with us. Tell us what you use in your Ham Shack and what you like and don't like about that special or not special device you use!

Submit your articles at a SWIARC Meeting, or to newsletter@swiradio.org

Business Meeting Minutes 11/2022

President Derek W0TYG was there early to set up the Zoom equipment again, leading the pledge to the flag promptly at 7PM with these present:

Derek	W0TYG		
Don	W0AF	Rick	KF0IQI
Bruce	N0BHB	Norm	WA0JYD
Chris	KF0FBL	John	KB0QKH
Bill	KD0FJR	Rick	KA0RLR
Greg	N0GR	Rick	K0RWJ
Mark	KF0GVT	Suz	KE0WYL
Paul	WB0GXD	Rich	WA0ZQG
		(15)	

Rich ZQG had a program on club's **Astron 35** power supply with an emphasis on differential amps (they're used extensively in ICs, and he showed a schematic with 2 NPN transistors). The meeting resumed 40 minutes later.

Minutes & Treasury

Minutes of last month's meeting were approved on a motion by Paul GXD with second by JYD. The Treasurer (N0GR) reported \$6,599 in the bank. Rick RLR objected, suggesting we should report \$5k less because of the authourized funds to install an antenna at the new 442.225 site at which Greg N0GR threatened to resign if we wanted him to keep "two sets of books." That ended the discussion. Greg remains.

Hamfest 2023

Chmn Derek TYG says there are **new owners** at the potential Cow Patty's site (btwn CoBlfs and Underwood IA off Hwy 191) and conditions to rent it aren't as before. We may not have access the night before for our vendor to set up; might be a problem with snow removal, and table setup may not be included. (The alternate site was in the mix because McClelland is small, and prices are going up.) After much discussion, Derek seems likely to decide on **McClelland** again.

Repeater

Our UHF repeater (442.225) has been moved to the new site at Memorial Park (adjacent to the original blue water tower where .22 receive was in 1968) but with only a Diamond antenna on the roof of the shack (100 ft lower than optimum).

The .82 repeater site (185 ft tower) has been sold to a tower site company (previously by a cell company) and we are likely to lose the site. Ideas for a new site should be sent to 'Trustee at SWIARC' address as shown on our SWI radio dot org website. (Your house; another tower?)

The IWCC site where we have our .22 remote receiver is declining. We are the only occupant right now and the shack is in disrepair.

John QKH said they took down the 500 ft tower at Ch. 6 in Omaha, and no one came to pick it up so they tossed it. New member Mark GVT asked if we could publish a history of .82 and whether it could be put up in Nebraska rather than Iowa. (Repeaters are 'coordinated' by state QTH.)

Emergency Service

Rick RLR said the Milwaukee HRO location may help to find radio donations for Emer use, also that he is dealing with a medical issue.

Old Business

Paul GXD said the Nov 5 downtown parade went well with these Hams helping:

Bruce	N0BHB
Chris	KF0FBL
Bob	KA0OCA
Derek	W0TYG
Suzanne	KE0WYL

Chris FBL said it appears we have met challenge offered by previous club President Gary K8JOK to do two (2) public service events this year.

We have a reservation at International Buffet (48th and L St in Omaha) for Christmas dinner 6:30 PM, Thursday 29th of December.

New Business

Rich K0RWJ has offered to edit Printed Circuit newsletter (print version from 1991 – 2012 and intermittently since).

Late Note: December issue on **SWIARC io grp.**

continued next page

Minutes 11.2022 (cont.)

Announcements

Steve KE0SS (Steve Schmidt, Sneaky Snake, and a few others) is a Silent Key as of Veteran's Day this year (11.11). He was 63 and was taught by Cecil W0RMB (SK) at Westside High School way back when.

John QKH asked if anyone knew whereabouts of Boyd K0LGG, a former member of SWIARC and Hamfest expert.

Norm JYD mentioned an aurora forecast for the weekend, and asked about the Norfolk Fest.

Don W0AF who rides his bicycle often, said there are 5 area races coming up in 2023.

Paul GXD said the Simplex Net on 147.427.42 Tuesday nights at 7PM has the potential to cause interference if a strong 7.42 signal mixes with our .82. One of the mix products is 146.22. (See the '2A minus B' article on SWI radio dot org.)

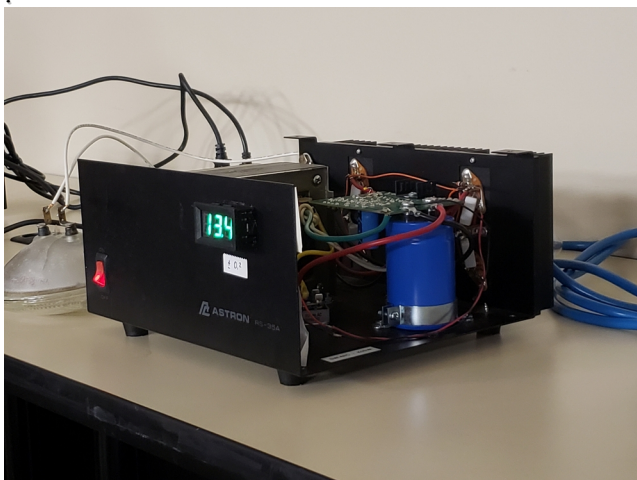
Late Note: They're moving up 15 to 147.435

Meeting adjourned 8:32PM.

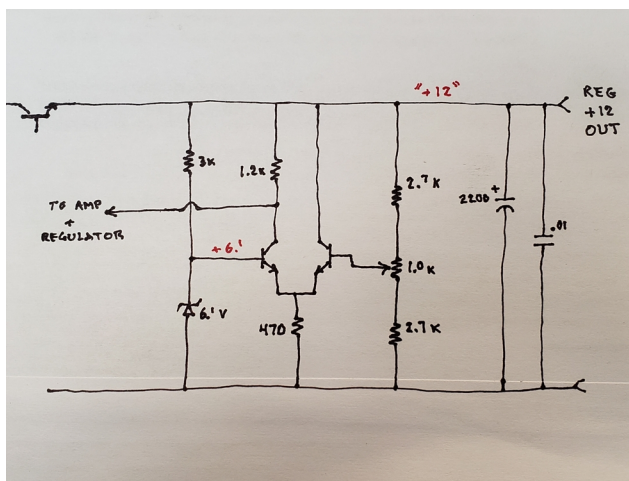
Minutes by club Sec'y, WA0ZQG

Program Review

The club owned Astron 35 power supply died some time ago, and Rich ZQG volunteered to fix it. Paul GXD had already determined it was the power rectifiers and ordered parts from Astron.



The Astron was there at the meeting with guts exposed, and a shiny new green LED voltmeter glued to the front showing 13.4 Volts. As with any digital display, the last digit may be off by 1 but this one, Chinese origin off EBay, was really bad, not 1 percent like some meters or even 3% like the old analog meters. Four (4%) percent plus. **Low.** So with the supply at **13.6** it showed 13.2. Rich 'fixed it' by hooking the voltmeter to the base of one of the 4 output transistors. That raised the display by about 0.7 volts – too much. Then he added an inline series resistor to drop a couple of tenths back down to 13.4 – too little. But as the load increases, so does the base drive and though the **output doesn't change**, the volt display comes up a little. And then some more. Below the green display is a hand drawn note “+/- 0.2”. Rich says, “There, I fixed it for ya.”



ZQG drew a schematic of 2 transistors in the classic differential amplifier layout often used in regulated power supplies with the Base of 1 going to the volt adjusting pot, and the other Base hooked to a 6.1 V Zener voltage reference diode. His question, “What happens to Base 1 when you turn the pot to increase output from, like, 12V up to 13.8 V?”

Here's the answer:

.ameshetsiaemrit,yglninntuS