

SEITS

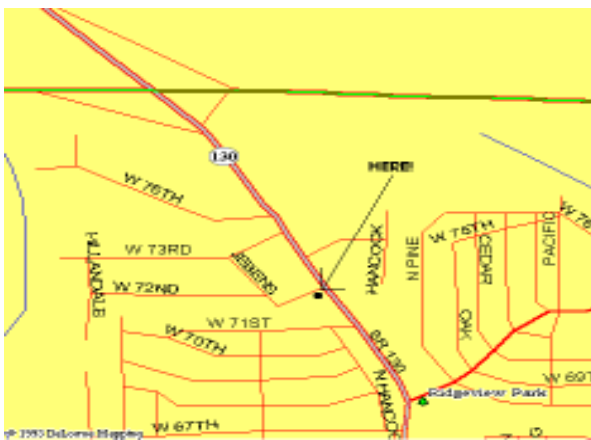
SouthEast Iowa Technical Society
<http://www.seits.org>

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February Meeting

Our Annual Dinner Meeting is Saturday, February 13, 1999. We will be having our meal at the Iowa Machine Shed Resturant at 7250 Northwest Blvd. in Davenport, Iowa.



We do have a minor problem however. We could not find a place to hold our meeting that would guarantee a private room. The best we could do was at the Machine Shed, who promised to do what they could to at least keep us in a group. Also, due to our desire to meet as a group, we have had to move the dinner time up slightly.

So please make a note of this: we will having dinner at 5:00 p.m. The best chances of making sure we are seated together as a group is to be there at 5:00 p.m. and go in together.

I do regret the early hour and lack of totally private facilities, but it seems to be a common policy in the area these days to not allow reserved areas on weekend nights. I called several places before I got the deal we have now. But we have a nice place to meet, with a very good menu at prices that aren't too bad. So come out and join us for this annual social event. Then fire up for the hamfest on Sunday!!

Club Officers:

President - Michael Muldoon, KE0BX
muldoon@seits.org
Vice President - Dennis Hoffman, KA0UKA
Sec/Treasurer - Mary Beth Penne, N0IJP
marybeth@seits.org

1999 Meeting Calendar

Here are the cities and dates for the meetings for 1999. Because of the changing face of the resturant scene in many areas, I will set the locations in these cities closer to the dates.

March 14: Sunday in Keokuk, Iowa.
April 10: Saturday in Iowa City, Iowa.
May 9: Sunday in Fairfield, Iowa.
June 12: Saturday in Waterloo, Iowa.
July 11: Sunday in Mt. Pleasant, Iowa.
August 8: Sunday at the Cedar Rapids Hamfest.
September 11: Saturday in Burlington, Iowa.
October 3: Sunday at the West Liberty Hamfest.
November 13: Saturday in Iowa City, Iowa.
December 11: Saturday in the Quad Cities.

Welcome!

This issue is going out to not only our current members, but past members also. We want to invite those of you whose membership has lapsed to take a look at SEITS again. We think we have a great organization, and we provide some great services for the ham community at large. We are also trying to provide timely and exciting features in this, the Technical Journal.

But we are nothing without our membership, and we miss you!! So take a look at the Journal, join us at our dinner meeting, or stop by our booth at the Davenport Hamfest. We look forward to seeing you!

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OPERATING ON STANDBY!

by Jerry Cooper, WB0PLZ
Photos by Mark Atherton, N0RXD

Where were you when the lights went out? No, I mean last year, last summer. It happened more than once. In fact, I heard Iowa had 78 tornadoes last year.

I remember on Friday, May 15 when Washington, Iowa, was hit at 5:10 PM (just 5 minutes after the sirens sounded). This storm proceeded through Johnson County into Cedar County damaging farms and homes. Also, remember the winds which forced people to run for cover at the Coralville reservoir on field day weekend June 27th and 28th? This was followed immediately by a very bad storm on Monday, June 29, 1998. At about 3:00 PM, Iowa City, Iowa was struck by winds reaching 100 miles per hour. Iowa City sounded the sirens but during the storm, most would be destroyed. These were battery operated so they could work even if power lines were down. Trees were down all over town. There were railroad cars hanging off the Iowa River bridge. Oxford, Iowa had a great deal of damage and Iowa City Hams responded to help with communications. The Oxford Fire Station was leveled and many trailer homes were destroyed.

We were without power for four days. What we lost in our refrigerator was minimal however. We were lucky the freezer was empty or we could have lost a lot (like our neighbors did). The sump pit was right at the top. I had a small fountain pump that would run on my small generator and it just kept the pit from running over. I couldn't run the refrigerator or regular sump pump on such a small generator.

Now I am finishing this article after the great blizzard of 1999 which happened on January 1st, 2nd, and 3rd. Roads closed. Schools closed. Shopping malls and airports closed. We received about 12 inches of snow in Iowa City with winds of up to 30 miles per hour and for the next few days, temperatures started to go down below zero! It was good that we did not get the sleet and freezing rain many people got from this same storm as it moved on towards the eastern states. We have had quite a few sleet and ice storms in Iowa City in past years when lots of tree limbs came down as well as many power lines.

This brings me to the reason for this article. I have always been concerned about storm damage and the resulting power failure. We have a greenhouse at our home and we have lost hundreds of plants because of a power failure in the winter. The small generator was enough to run the little natural gas heater in the greenhouse. I had been thinking about getting a bigger generator for some time but decided paying \$2500 for a Honda 5000 watt generator was just not possible. Besides, it is built to run day in and day out for construction work. My use would be limited to two or three times per year. I was looking for a 5000 watt generator with a large fuel tank for about 8 hours run time and electric start. This would allow my wife to start it if I was not home.

I located a nice Coleman 5000 watt generator with a 5 gallon gas tank and electric start for \$835.00 plus tax. The output connectors include: a 15 amp/120 volt duplex outlet like on the wall of your house, a 30 amp/120 volt twist-lock and a 20 amp/240 volt twist-lock. The last one is the one I am using to run some of my house. It supplies two 120 volt circuits (or one 240 volt). I have a 30 foot, heavy duty cable with 20 amp/240 volt twist-lock connectors on both ends.

I had to decide which circuits should run from the power line or switch to generator power. I sat down to make a list and included items needed according to the seasons. During the winter months it would be heating and lights. During the summer months - a sump pump, refrigerator and lights. It would be a good idea to have one or more kitchen outlets working for a microwave or hot plate. Don't forget to have power in the ham shack!

So, I purchased a small circuit breaker panel and transferred six circuits from my main power panel to it. The new panel is being fed by the output of a very special switch on a new panel designed for this application. On this new panel, when the new switch is moved one way it is connected to a twist-lock connector on the panel for a 240 volt input from the generator and when it is moved the other way, it is connected to a 240 volt





circuit from the main power panel. This special switch has a center off position where you have to pause when switching from one power source to the other. This is very easy to operate and change over is very quick when needed.

Be very careful how you do this - the power company gets nervous about this kind of home project. They don't want any power from a home generator getting back out on the power lines to kill or injure one of their linemen. Also, you don't want the power getting into your generator when power is restored. As I selected the various circuits to run on standby or regular power, I wrote down the starting and running wattage for all of them.

Then, as I wired them into the new standby power panel, I could balance out the loads for best starting, running, and total wattage on the two 120 volt circuits. These were carefully double checked while operating on normal ac power and on generator power using a clamp-on ammeter.

I don't have any voltmeters or ammeters on this panel, but that would be a very desirable addition. The company that manufactured the generator suggests that it be run once a month and maintained like any gas motor driven device. I therefore have a log where I jot down the date of operation and the length of time. This generator should last me a long time.

For more information, Jerry can be reached at WB0PLZ@aol.com



SEITS Voice Repeater System (The LINK)

LOCATION	CALL	FREQ.	OFFSET	CTCSS	RANGE	NOTES
Burlington, IA	WA0GUF/R	147.360	+600kHz	100.0	20 mi	
Cedar Rapids, IA	W0HUP/R	147.090	+600kHz	198.2	25 mi	
Cedar Rapids, IA	W0HUP/R	224.940	-1.6mHz	198.2	20 mi	
E.Moline, IL	K9JL/R	146.760	-600kHz	100.0	40 mi	
Fairfield, IA	K0TE/R	147.120	+600kHz	*100.0	25 mi	OFF-LINE
Iowa City, IA	KE0BX/R	145.470	-600kHz	100.0	30 mi	
Keokuk, IA	WB0VHB/L	145.350	Simplex	100.0		OFF-LINE
Lancaster, MO	KE0BX/R	145.330	-600kHz	*100.0	40 mi	OFF-LINE
Muscatine, IA	WA0AUQ/R	145.370	-600kHz	100.0	30 mi	
Ottumwa, IA	KE0BX/R	145.410	-600kHz	*100.0	20 mi	
Waterloo, IA	WA0INC/R	444.925	+5mHz	136.5	50 mi	
Winfield, IA	WB0VHB/R	145.290	-600kHz	100.0	30 mi	

* NOTE: *66 GIVES TEMP CARRIER ACCESS

All repeaters are independently owned and operated. The system is a coordinated volunteer effort and is coordinated through SEITS. The Link is open to any and all licensed amateur radio operators. Use of CTCSS access is to solve interference problems, not to close the system. Help is available through SEITS to add an encoder to your radio if you do not have this capability. You do not have to be a member of SEITS to use the Link. The owners and operators of the various machines welcome any contributions you wish to make either in help or money to help keep their equipment on the air. Another excellent way to support the Link is to join SEITS! Contact one of the officers for further information.

The NOS Box

by Mark Atherton, N0RXD

To understand how a NOS packet radio system works, it is first necessary to understand how TCP/IP addresses are used. The addressing scheme is the same one used for internet addresses. This is a sequence of four integers of one to three digits, separated by decimal points, and is called a "dotted quad". Addresses are of the form xxx.xxx.xxx.xxx where each xxx can be any number from 0 to 255.

IT'S ALL IN THE ADDRESS, MAN!

Amateur packet radio addresses, also known as amprnet addresses, all begin with the number 44. For example, one of my addresses is 44.50.4.14 - the 44 signifies amateur radio, the 50 means an Iowa location, the 4 means the Iowa City area, and the 14 identifies my particular device.

Numbers are easy for computers to remember, but hard for humans. This is why a unique name is assigned to each address. Amprnet names take the form of (somename).ampr.org where (somename) can be chosen by the ham and is usually (but not always) their amateur radio callsign. All amprnet names end in .ampr.org and have a corresponding decimal address beginning with 44. NOS systems have a lookup table that can find the decimal address for a given name, or a name for a given decimal address. This table is in a file called domain.txt.

SO WHAT?

That's all well and good, but so what? Who cares? Well, your computer does. In simple situations you can use the "connect" command to connect your NOSbox over the air to someone else's. This uses the AX.25 protocol just like regular packet programs. However, if the remote station is out of radio range and accessible only through one or more intermediate stations, digipeaters, or gateways, you must use the "telnet" command. For example, "telnet n0rx.ampr.org" will connect you to my box. For this to work, your NOSbox must look up, or resolve, the name n0rx.ampr.org to get its decimal address of 44.50.4.4. Based on the decimal address, it will then decide which path, or route, will be required to make the connection.

NOS also can use other internet standards to do different things, like ping, pop, ftp, telnet, finger, and http. All are based on looking up the address and then routing the request. To look up addresses that are not found in the local domain.txt file, a remote station can serve as a Domain Name Server, or DNS. The DNS I use is named atanasoff.kd9kx.ampr.org and is located in Cedar Rapids.

While the claim to fame for a NOS station is the TCP/IP networking, most packages also are compatible with standard packet protocols such as AX.25 and NET/ROM. They can handle packet bbs mail, also known as PBBS mail. One thing that makes a NOS bbs different from other BBS software such as FBB, RLI, and AA4RE is that NOS divides all the messages, whether public or private into separate folders called "areas". Your private message area has your callsign as its name. Other public areas are named by the subject, such as "sale". This makes it easier to browse through bulletins relating to a particular subject.

DIFFERENT FLAVORS

As it is with regular packet BBS software, there are several different NOS software packages available for downloading from the internet. The most common are JNOS and TNOS. I started out using JNOS running under DOS, and eventually changed to TNOS running on the Linux operating system. Next time, I'll tell about some of the similarities and differences between them.

73 de N0RXD

n0rx@n0rx.ampr.org

Mark can also be reached at atherton@blue.weeg.uiowa.edu

A CW IDer

by Frank Apple, W0GWK

Some time ago Michael Muldoon, KE0BX, suggested at a SEITS meeting that it might be nice if a small processor could be programmed to give a single character CW ID. The thought was to place one on the link transmitters of the SEITS Link repeaters. At the end of a transmission it would send a character which would indicate which repeater originated the transmission.

A DIFFERENT PATH

Not being that familiar with small processors, I thought another path could lead to the same result. The requirements were to receive a ground/open line from the squelch (ground = receiving a signal), generate a ground/open key line (ground = transmit), and when the squelch goes open after being low, to continue to hold the key line low and generate a CW id tone sequence, then release the key. I built a circuit which seemed to meet the requirements and brought it to the January meeting in Iowa City. It appeared to do roughly what was required and Michael said he would try to put it in the Ottumwa repeater as a test.

Figure X is a schematic of the circuit. The 5 volt regulator, speaker amp, and bypass caps were left off for clarity. The heart of the circuit is a state machine. A state machine is a device which is sequentially clocked one state to another based on the present state and external input(s). In our case we have only the single squelch input. There are many ways to implement a state machine, but I find it easiest using a PROM and a latch. The address of the PROM is the present state and the output of the PROM contains the next states address and any other outputs. When the latch is clocked, the next state becomes the current state and the process continues. The next address can be anything. Sometimes it is convenient to use desired output signals as part or all of the next address.

In our case, I just used the lower six output bits of the PROM as the least significant bits of the next address. Squelch is the seventh address bit and the eighth through 13th address bits are fixed by jumpers or dip switches to determine which character to send. In state 0 (idle) with the squelch open, the next address is 0 and we remain in state 0. In this state, the key line is open and there is no tone. If however a signal is received, the state machine will go to state 1 (ready). The key line will close but no tone will be generated. While in state 1, as long as we are receiving a signal (squelch line low) we will remain in state 1. When the squelch goes high again at the end of a transmission, we go to state 2. In state 2 the key is also held low and the next state is always one more than the present. As we step through the states the tone line puts out ones and zeros to key the tone oscillator. When the sequence is done the state machine sets state 0 as the next address and we start all over again.

OSCILLATORS

The two oscillators are ones I've used for years. The circuit requires two CMOS inverters. The family doesn't seem too critical but it should not be of the HCT, ACT, or other family with TTL input (non-centered switch point). The oscillators are described in a couple of application notes ICAN-6230 and ICAN-6267 found in an old (1977) RCA "COS/MOS Integrated Circuits" book. The frequency is determined by: $f = 1 / (2.2 * R * C)$ Where f is the frequency in hertz, R is the frequency controlling resistance in ohms. In our case this resistance is RT, and RSC is the capacitance in farads. The output frequency can easily be varied by varying the frequency control resistor using a pot or test select resistors.

The voltage at the junction of R1 and C1 (and R3 and C2) ranges from -2.5 volts to 7.5 volts. The second resistors, R2 and R4 are used to prevent the input voltage protection of the first stage from loading down the junction. This would effect the frequency. If the input resistor is 10 times the controlling resistor, there is essentially no effect from the input stage. If the two resistors are equal, the frequency may increase about 5%. As you can see the value of this resistor isn't too critical. The tone oscillator uses one of the NAND inputs to enable and disable the oscillator. This allows us to actually key the oscillator on and off. On startup the first half cycle is a little longer than the rest but in this case who cares.

SPEED

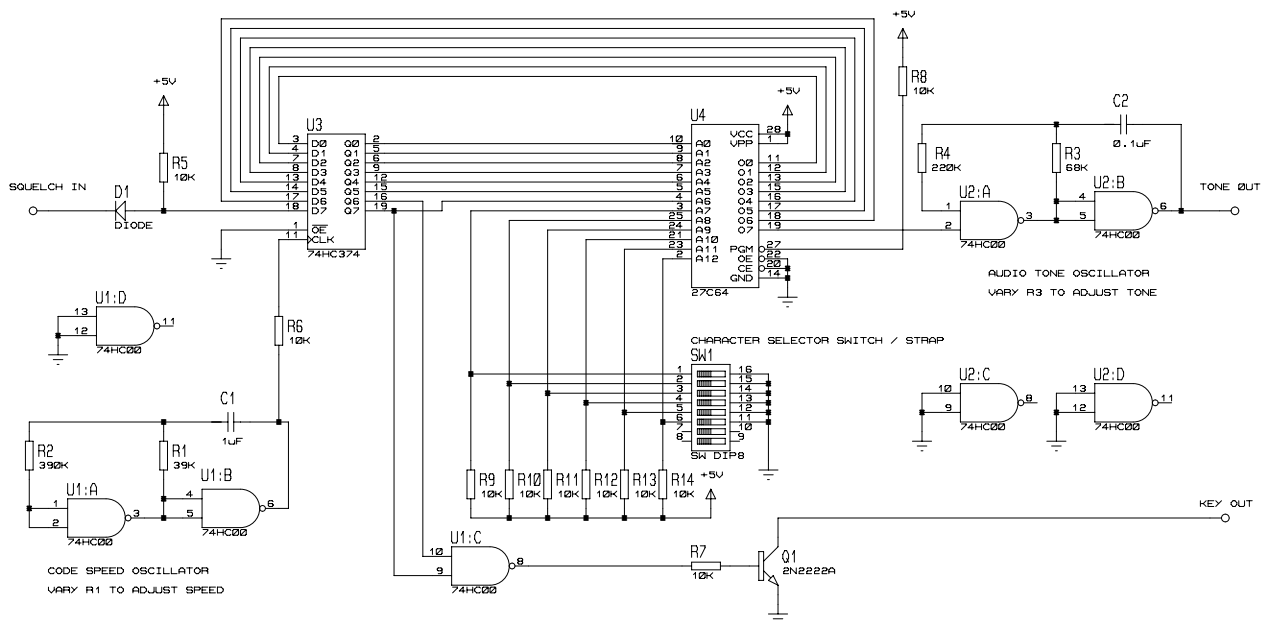
The demonstration at the January meeting did point out that I probably had the code speed too low. Lowering R1 should be able to bring it up to the desired speed. Since the speed oscillator is free running, the code speed can be determined with a frequency counter and a little math. There are 50 bits one CW word. (PARIS is

the normally used standard word.) A little math and we find that speed in wpm is $1.2 \times$ clock speed in Hz. A clock speed of 10 Hz would yield a code speed of 12 wpm. The key line is actually the combination of the input squelch and the key line out of the state machine. This is done to eliminate the slight delay in getting the key line out of the state machine. (That's just what we need more delay in keying the transmitters.)

The circuit can be implemented using a number of different PROMs with just two strapping options. This circuit would except 2716, 2732A, 2764A, 27C64, 27128, 27C128, 27256, 27C256, 27512, or 27C512 PROMS. The '64s can contain 64 different characters. (I actually found that many by using foreign characters). Anything bigger of course can also hold 64 characters. The 2732A can hold 32. This could be the entire alphabet plus a few. The 2716A can hold only 16 characters. Since any site only needs one this would still be enough. Looking through the catalogs it appears that the larger parts may be less expensive.

One of the considerations when I designed this circuit was cost and availability of parts. I tried to use inexpensive, easily obtained parts. If we use jumpers instead of the dip switch it would save the cost and reliability problems of the switch. Without the switch and PC board, I believe that all the parts will cost less than \$10. The hardest part will be getting the PROMs programmed and I think I can help there.

Frank can be reached at fpapple@inav.net.



JOURNAL NOTES

The deadline for the March issue is Monday, March 1. We will begin assembling and printing on Tuesday, March 2 with a target mailing date of Friday, March 5.

The March meeting will be our first visit to Keokuk. Keokuk is the location of our newest addition to the SEITS VRS Link. The equipment is in place, there is just a minor antenna problem to solve before it can go on the system. So let's get to Keokuk and welcome the area to the system.

SEITS has reserved three tables for the Davenport Hamfest. We will be using some of the space for SEITS promotional material. The rest is available as consignment space for SEITS members. So if you have stuff to sell, but not enough for your own table, bring it on down. All we ask is that you take a turn at the tables so Mary and I can get out and see the Hamfest too!!

As always, for the most up-to-date SEITS information, check into our website at www.seits.org. We are always adding new stuff, so if you haven't been there lately, you may be missing something!

Til next time. KE0BX