Bacon Bits

Flying Pigs QRP Club International, W8PIG

1900 Pittsfield St, Kettering, Ohio 45420

E-mail: w8pig@yahoo.com   Web Page: http://www.fpqrp.com

FPQRP membership is open to all licensed QRP operators who reside within 12,000 nautical miles of Cincinnati, Ohio.

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NETS:

DAY	TIME	FREQ
Sat	1400Z	14062
Sun	1300Z	7044
Sun	1400Z	14062
Thurs	0200Z	7044

CLUB FREQS.

1,814 kHz	3,564 kHz
7,044 kHz	10,110 kHz
14,062 kHz	18,100 kHz
21,064 kHz	24,910 kHz
28,064 kHz	

ALL FPqrp frequencies are UP 4 kHz from the standard qrp frequencies except for 20 meters.

Happy Thanksgiving!

In this issue:

Sweeps, Stamps, and Stuff.

Well folks winter is about here, but on the bright side so are the Sweeps! I'll be hosting a get together at my house for the November Sweepstakes, listen up for W8PIG and give us a call.

This month we finish up Mike's, WB8ICN article on the Basic Stamp project, we also have the next installment of Diz's article on the miniPIG and multiPIG.
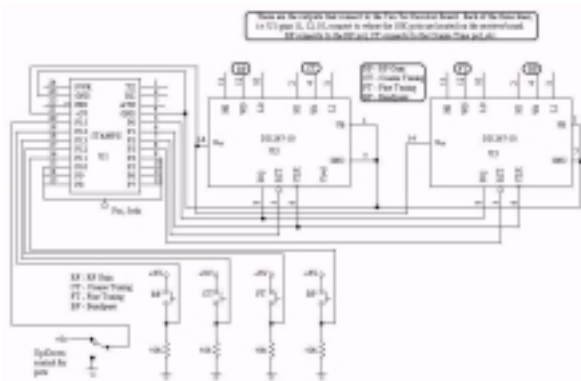
This month's newsletter is a bit larger than normal, part of the reason is I did not want to break up Mike's Basic Stamp project. But, just like antennas, bigger is better.

Enjoy,

Dan, N8IE Ω

Basic Stamp Application to Control Your Homebrew Receiver, Part 2
By Mike, WB8ICN

The project itself was to provide a means to digitally control my Ten TEC 7.0 to 7.3 MHz Direct Conversion SSB/CW, Model 1056, receiver board. I removed the RF gain (RF), the Coarse and Fine Tuning (CT and FT) and Bandpass (BP) 10K potentiometers and replaced them with the 1267's that would create the same effect as the 10K pots. I used two DS1267's to replace the four pots on the receiver board. I connected the two chips to the receiver board via a cable harness the function switches RF, CT, FT, and BP are momentary push-button switches I savaged from an old VCR camera. The up/down switch is just a toggle switch used to tell the pots whether to increase or decrease their values when I push one of the four function switches. The idea is simple enough. I wanted the ability to control my receiver either from a PC or a keyboard. But to get there, I needed to create this project with switches to prove the concept and later, as it turned out, to learn more about using the Stamp in many different ham applications. I may yet one of these days finish this and have a receive-only packet station for HF that I can carry in my pocket or use with a laptop PC.

I will list each segment of code (italic and in bold print) and then talk about what it does. I'm laying out each segment in the text instead of having you jump back and forth from text to yet another figure on some other page. You may find it helpful to have the flowchart which is just a shorthand way of seeing what a program does as you step through it. The flowchart is shown at the end of the article…

```
'Program: RCVR.BS2
'This program is an upgrade of WB8ICN's BS1
Receiver/DS1267 Project
'P11 thru 14 are inputs for the BP, FT, CT, and
RF pot controls
'p15 is used to determine if pots values increase or
decrease
'P0 thru 3 are outputs to the DS1267
'Special thanks goes to Beau Schwabe for his
contributions
'of the initial idea of using the DS1267 for this
type of interface.
```

This first segment is just a bunch of comment lines that I always put in my code to give the user an idea of what the program is all about. It also helps me to recall what I wrote the program for when I haven't looked at it for many months..

```
DQ con 0 'Pin 0 is for data connection
CLK con 1 'Pin 1 is for Clock
RST1 con 2 'Pin 2 is for reset of pot1&2 (RF,CT)
RST2 con 3 'Pin 3 is for reset of pot2&3 (FT/BP)
INPUT 11
INPUT 12
INPUT 13
INPUT 14
INPUT 15
```

This next section tells the Stamp what connections you are using. The "*con 0*", "*con 1*", etc., tell the Stamp that bit 0, bit 1, bit 2, are used for the data (DQ), clock (CLK), and which pot your selecting (RST1 is for pots 1 and 2, etc.). The "*INPUTxx*", where xx = bit number, tells the Stamp that bits 11 through 15 will be input pins only. These five input lines are from the five function switches. In a few minutes, you will see what the function switches do. A word of explanation and caution: Don't confuse "bit" numbers with actual chip pin numbers. The Stamp has no idea what a "pin" number is nor does it care. The software tells the Stamp what to do by referencing bit numbers. Remember that the BS2 Stamp uses 16 I/O lines, therefore we are dealing with a 16 bit word for programming considerations. The nice thing about the BS2 is that you can address each bit by itself, or address a nibble which is 4 bits, a byte which is 8 bits, or the whole word which is 16 bits. I didn't use 7 bits (bits 4 through 10), which you can see is on the BS2 chip pin numbers 9 through 15.

```
DSPOTA var  word 'Word variable holding
pot1&2 values
DSPOTB var  word 'Word variable holding
pot3&4 values
DSPOT1 var DSPOTA.lowbyte 'Variable for RF
pot
DSPOT2 var DSPOTA.highbyte 'Variable for CT
pot
DSPOT3 var DSPOTB.lowbyte 'Variable for FT
pot
DSPOT4 var DSPOTB.highbyte 'Variable for BP
pot
```

DIRA=%0000111111111111 'Output bits 0,1,2,3 to DS1267's,

' bits 4 thru 10 tied high since they are unused,

'bits 11 thru 15 are input bits from the function switches

This part of the code tells the Stamp I will the use labels (nicknames) **DSPOTx** for storing certain values that I will then use to control the DS1267's. These labels make it rather easy to create storage locations for the values you need to use and keep track of in a program. The Stamp decides where to store the values under the labels you give it. The last line, "**DIRA**" tells the Stamp that bits 0 through 10 are output bits, bits 11 through 15 are input bits. Seven bits (bits 4 thru 10) aren't used in the program but I still declare them just for safety sake which I think is a good habit for any programmer to get into when starting out.

DSPOT1=200 'Presetting RF pot
DSPOT2=200 'Presetting CT pot
DSPOT3=200 'Presetting FT pot
DSPOT4=200 'Presetting BP pot

These four lines were included just to get the pot values in into the ballpark. Otherwise, at power up, you will be starting at zero for all four pots and have to get the RF and BP into usable ranges before you can start tuning. You can set these values to your liking once you get a feel of what's good for an initial setting for you.

begin:
if in14 = 1 then rfsw
if in13 = 1 then ctsw
if in12 = 1 then ftsw
if in11 = 1 then bpsw
goto begin' if no switch was pushed, then start scan over again.

Believe it or not, this is the main program. If any of the "**if...then**" statements are true which occurs if you had pressed one of the four function switches (this puts a high on that particular input I/O line), you then branch to a subroutine for that true condition. If no function switch had been pushed, the last line, the "**goto begin**" statement, takes you back to the beginning of this loop and starts examining each switch again. "**in11**" through "**in14**" are the input bits for the function switches.

rfsw:
if in15 = 1 then rfup
goto rfdwn

ctsw:
if in15 = 1 then ctup
goto ctdwn

ftsw:
if in15 = 1 then ftup
goto ftdwn

bpsw:
if in15 = 1 then bpup
goto bpdwn

This portion of code is encountered if one of the function switches had been pushed. Depending which switch had been pressed, you would then enter one of these four subroutines. Each does the same thing...it checks to see if the Up/Down switch is set to 5 volts (indicating increase the pot value) or set to ground (which indicates to decrease the pot value). For instance, if you had pressed the CT button to change the coarse tuning of the receiver, the **if/then** statement would have been true, i.e. "**in13 = 1**". This action would have caused you to branch to the "**ctsw**" subroutine to see if you want to increase or decrease the CT pot value, which would either increase or decrease the tuning in coarse increments on the receiver board. For our example, we will say "**in = 1**" (meaning we want to increase the frequency). This will cause you to branch to the next set of subroutines (shown below), in this case the "**ctup**" subroutine. If "**in=0**", then the "**goto ctdwn**" routine would be selected.

rfup:
DSPOT1 = DSPOT1 + 1
***Please note that the "+1" and "-1" values are**
gosub outpot
what I chose for my project. By using your
goto begin
own settings, you can increase or decrease in

the resistive values in chunks to your liking.
rfdwn:
DSPOT1 = DSPOT1 - 1
gosub outpot
goto begin

ctup:
DSPOT2 = DSPOT2 + 1
gosub outpot
goto begin

ctdwn:
DSPOT2 = DSPOT2 - 1
gosub outpot
goto begin

ftup:
DSPOT3 = DSPOT3 + 1
gosub outpot
goto begin

ftdwn:
DSPOT3 = DSPOT3 - 1
gosub outpot
goto begin

bpup:
DSPOT4 = DSPOT4 + 1
gosub outpot
goto begin

```
        bpdwn:
        DSPOT4 = DSPOT4 - 1
        gosub outpot
        goto begin
```

Three separate actions occur in each of these like subroutines, all similar in nature, dependent on how you got to that particular subroutine. In our example, we want to increase the pot value for the CT pot. The "*ctup*" subroutine first adds 1 to the variable word "*DSPOT2*". Had we wanted to decrease in frequency (*in15=0*), the subroutine "*ctdwn*" would have subtracted 1 from the variable word "*DSPOT2*". After the 1 is added, you "*gosub*" to the "*outpot*" subroutine which moves the variable word values out of the Stamp and into the DS1267' digital pots. I chose to move all four pot values to the 1267 each time a switch was pressed. The reason for this is I can use just one routine to move word values to the DS1267 instead of writing four separate move routines. Remember, you only have 2K of data/program storage capability in the BS2, so being stingy is OK, at least when it comes to using memory in the Stamp. Once the values have been moved out to the DS1267 (this is done with the next routine shown below), you will "*return*" back to the "*ctup*" routine (or whatever routine you were using in this section) and then execute the last line of the subroutine, which is to "*goto*" the main loop of the program and start over. Actually, you can save eight lines of code by using "*goto*" for each of the eight "*gosub*" commands, and then change the "*return*" statement (in the "*outpot*" subroutine) to a "*goto begin*" statement. I've kept my code like it is for some debugging and future enhancement ideas I am currently playing around with. Its your call on this saving eight lines of code.

```
        outpot:
                high RST1 'Make RST1 high to start data
transfer to pot1&2
                pulsout CLK,1 ' Pulse for stack select of
DS1267
                Shiftout DQ,CLK,msbfirst,[DSPOTA\16]
'Shift out values for pot1&2
                low RST1 ' Make RST1 low to end data
transfer

                high RST2 'Make RST2 high to start data
transfer to pot3&4
                pulsout CLK,1 ' Pulse for stack select of
DS1267
                Shiftout DQ,CLK,msbfirst,[DSPOTB\16]
'Shift out values for pot3&4
                low RST2 ' Make RST2 low to end data
transfer
        return
```

OK, this is the last part...and one of the most important parts. This segment of code is used to get the pot values out to the digital pots so we can change gain, frequency, or the bandpass. The first four lines move the RF and CT pot values out to the first DS1267 (U2) and the second four lines move the FT and BP pot values out to the second DS1267 (U3). Since I am moving all four pot values each time I press a function switch, and each DS1267 has two pots on it, I have to do the actual move routine twice in this subroutine. Let me

address the first four lines, as the second four lines work the same way. The first line selects the correct 1267 for data transfer. The RST command is used to enable the 3–wire (DQ, CLK, RST) serial port operation of the device. The RST signal is an active high input (to the DS1267) and is required to begin any communication to the DS1267. The second line is really just a dummy line--serves no purpose in this application other than to send the dummy bit. Remember that the storage register in the 1267 is a 17-bit register and the data word is only 16 bits. The third line moves the data over, one bit at a time. The fourth line turns off the communication link between the Stamp and the DS1267. The "*return*" statement (last line) takes you back to the "*ctup*" routine, or whichever routine you came from. Like I mentioned earlier, you could change this to a "*goto begin*" statement and, with the corresponding changes in the *xxUP* or *xxDWN* routines, save eight lines of code.

Well that's it. Not really that difficult, but rather a neat way to go from analog to digital control for the Ten Tec receiver board. This concept can be applied to any similar situation. The DS1267 can be used to vary the 10K pots in 256 step increments. This means that each time a function switch is pressed, you change the pot value by roughly by 39 Ohms. You can lower this value by paralleling a fixed resistor with the wiper pin on the DS1267. This will limit your total movement (resistive range) ability, but for my project, this did not present a problem.

To just turn on the rig and talk...well after awhile that gets somewhat boring. Even with a DA1 or I7 call sign (those were some fun days--work the world on 5 watts and a vertical antenna), ragchewing has it limits and one can only talk about the weather, antennas and rigs, and the last few contacts just so many times. Homebrewing was a way of life for me back when I got my novice license. Shining shoes and washing dishes at local establishments didn't provide much in the way of ham dollars for new rigs and toys. Somewhere along the way though, homebrewing went from a necessity to a joy in this hobby. But the art and Elmership of homebrewing isn't what it used to be. I remembered all the projects I did years ago with rigs, antennas, filters, etc. To be honest about it, the spirit of Ham Radio almost died in me a few years ago. That is till I remembered how it was when I started out in this fantastic hobby of ours (1971 as WN8ICN). Since that recollection, I started playing not only on the rigs, but on the workbench as well.

There are a lot of paths one can take to provide new means or ways of doing the something when it comes to Hamming! The Basic Stamp is just one way to go. I see the Stamp as the prototype platform for designing and implementing a new idea. Then, one uses a cheap (less that $5.00) PIC chip to use as the final working microcontroller. To accomplish that, one has to learn a little PBASIC and assembly language programming, brave the world of interfacing in our analog world and use the digital devices that are getting cheaper and cheaper everyday, and then share it with the rest of us. Remember, no project is ever the final version! What I have done with my modest project is to provide some foundation or building blocks for a digital communication system that can be remote controlled via your HT. That's it…you can visit my web site

http://www.qsl.net/wb8icn to see the posting I made sometime ago, actually years ago and see where I started with this. Maybe one of these days, I will finish the original project with all the bells and whistles.

Project Flowchart

BS Pinout

72/73's and a big OO to all…Mike, WB8ICN Ω
There are more pics of Mike's project at the end of this newsletter.

Power verses signal strength
By Rick, KC8AON

During the Ohio Single Sideband Net the other night, I was watching for our friend Bob, KB8PIB to check in to see how strong his signal was. Bob has had some antenna problems lately and with the help or Steve, W8AFX, that problem

has been eliminated. Steve built Bob a new multi band dipole, and now Bob has went from unreadable to 20 over S9.

Well, Bob checks into the net, and yes his signal is still up to par - near 20 over S9. Then Bob informs me later that he had forgot to turn the heater switch on his rig that powers up the final output tubes, so he was basically running on the raw drive of his rig which is most likely less than 10 watts! Also, another net member in Toledo has been having output problems with his radio and is only radiating about 4 watts, and has shown almost normal signal strength in my neck of the woods!

Well, since I like to operate QRP (That's less than 5 watts CW and less than 10 watts on SSB), I decided to do a little research and find out why low power seems to hold it's own with the big guns.

First, lets look at something we all learned when we studied for our license. Remember the magical 3dB figure and how a 3dB increase was the same as doubling your power, and a 3dB decrease is like losing half your power. During my research, I found out that a 3dB increase in power will give you about 1/2 an S unit increase in signal strength at the receiving station. And, by quadrupling your power (6dB increase) gives you about 1 extra S unit. So, if you are running a 100 watt rig and a ham tells you that you are giving him a signal strength of S8, and you turn on an amp that boosts your output to 400 watts, which is a 6dB increase or quadruple your original power, you go from a signal reading of S8 to one of S9 which is not much of an increase.

Now you think, I'll pump it up to 1000 watts, a 10 dB increase over your original 100 watts and slightly less than 2 S units on the receive end! Are 2 S units worth the cost of a 1000-watt amp? Well, that's up to you to decide, but I think that money could be spent more wisely. Now, you ask, will all this mumbo jumbo work with lower power? And the answer is, of course it will! Take that 100 watts you've been running and cut it in half to 50 watts. That's a 3dB decrease, and if you are giving another station a signal of S9 with the 100 watts, the 50 watts will drop you back to slightly less than S9. If the other guy isn't looking at his meter when you drop your power, he won't even notice! Now drop back to 25 watts which is a 6dB decrease over your original 100 watts and you're now down to S8, and drop back to 10 watts and you are still slightly above S7 and still very readable on the other end! Don't buy an amp! Your TVI won't be messing up the XYL's soap operas - she'll love for that! And you can save enough money to but a new rig for the mobile! Do more with less!

73, KC8AON Ω

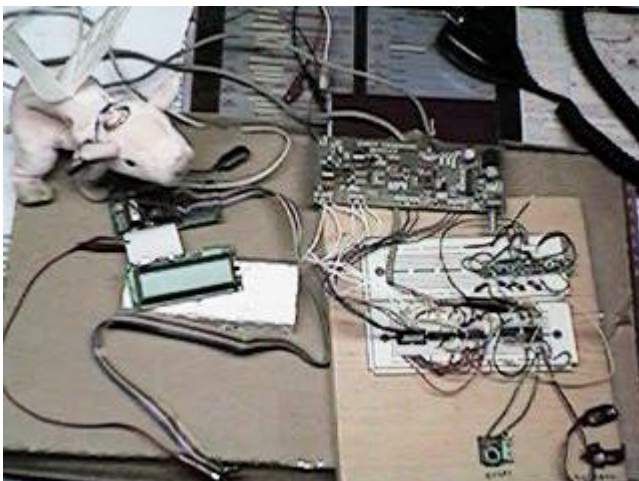## QRP at the Reno National Air Races
By Bill, KF6RMK

Every year, my son and I go to the Reno area for the National Air Races.
It's sort of like going to Mecca for us.

Station and camp at the far end of the racecourse called the "Valley of Speed". This location is far away from the grandstands and is "secret" to about 300 other air race nuts. People go to this location because this is where the unlimited class aircraft come ripping by, throttle to the wall, at only about 50 ft off the ground going about 450-475 mph. What a sound! (One year we saw a P-38 clipping the sagebrush with his wing tip but since then, they changed the rules to minimum of 50 ft)

There is a strange village that springs up each year in the Valley of Speed called Goonville. It is inhabited by a group of Smoke Jumpers from Oregon.

They have been coming to the air races since 1985. They are known for their abilities to consume great quantities of alcohol.

I set up a 20 ft SLV antenna as a support for a 40m dipole. (I wanted to test the SLV in the vertical mode but never got around to it) The pole for the SLV is very light weight and can be deployed very quickly. Also, I used a HamStick 40m on the truck.

My rig was a NC40a with a NC-BLT tuner and a gel cell for power.

I was able to make many contacts in CA, AZ, ID, and NV between races. I was truly in "Hog Heaven" doing QRP radio and listening to the beautiful sound of those magnificent old war birds and sipping an ice cold Rolling Rock. It doesn't get any better than that!

To top the day off, we were treated to an unofficial race between 3 MIGs, a Lockheed T33, and some other unidentified jet, all with afterburners ablaze.

Bill
KF6RMK Ω

Ham: a poor operator. A 'plug.'
By Diz, W8DIZ

That's the definition of the word given in G. M. Dodge's The Telegraph Instructor even before radio. The definition has never changed in wire telegraphy. The first wireless operators were landline telegraphers who left their offices to go to sea or to man the coastal stations. They brought with them their language and much of the tradition of their older profession.

In those early days, spark was king and every station occupied the same wavelength, or more accurately perhaps, every station occupied the whole spectrum with its broad spark signal. Government stations, ships, coastal stations and the increasingly numerous amateur operators all competed for time and signal supremacy in each other's receivers. Many of the amateur stations were very powerful. Two amateurs, working across town, could effectively jam all the other operators in the area. When this happened, frustrated commercial operators would call the ship whose weaker signals had been blotted out by the amateurs and say "SRI OM THOSE #&$!@ HAMS ARE JAMMING YOU."

Amateurs, possibly unfamiliar with the real meaning of the term, picked it up and applied it to themselves in true "Yankee Doodle" fashion and wore it with pride. As the years advanced, the original meaning has completely disappeared.

More info can be found at: http://www.qsl.net/w5www/73.html

73 Diz, W8DIZ Ω

FLYING PIG POEM
By Arnold CW Timm

Pledge allegiance to A1A,
assemble self a rig;
you love CW anyway,
so become a Flying Pig!

Flying Pigs low power group,
dit those dahs New York;
not an 11m chicken coup,
impress iambic pork!

Flying Pigs do reveal,
their aviation form;
Bacon Bits - hear'em squeal,
over flying QRM!

Flying Pigs are on-the-air,
in telegraphic glee;
the kilowatt doesn't care,
for pigs that qrp!

Notice new round logo rhine,
the simple circuit circle;
indicating piglet sign,
and how the pig is purple!

ka0tpz @ yahoo.com

COMMON HAM
RADIO ARCHIVES
NEWSLETTER
KA0TPZ

Squeezing out every milliwatt economically, and gaining multi band operation to boot!
By: Rick McKee, KC8AON

The last time I sat down to the keyboard to do my part for the newsletter, I explained why low power works so good - you did read it didn't you? Well, now I'm going to tell you a few inexpensive ways to squeeze every bit of power possible out of your system and put in where it belongs - into the wild blue yonder! And the easiest and cheapest way that I know to do this is to eliminate as much loss as possible from your antenna system and therefore boosting it's efficiency.

OK, I know what you're thinking, you're thinking, "if I can get my swr down to a 1 to 1, my antenna is doing all it can". Well, are you sure? Don't get me wrong, a low swr "is" what you want your rig looking into but is not the only way to guarantee that as much of your power is getting to your antenna as possible. Remember, a 50-ohm dummy load has a low swr anywhere you stop your dial but it sure doesn't radiate much power into the atmosphere!

To show you what I mean, lets say you put up a dipole for 75 meters, you trim it till you get a 1.1 match at 3.972 MHz and you hang it about 35 feet high. Well, that dipole is a good antenna and in fact is one that I would recommend if you only want to work one band, but it's not the best you can do. A dipole is only about 77% efficient, and that's only at its design frequency. If you stray from 3.972 MHz down to say 3.830 MHz your efficiency drops to 64% and your swr rises to about a 3:1. With most solid state rigs, the final protection circuit will begin to cut your power back long before you reach such a mismatch, so now you are loosing almost half your power!

Ok, now lets say you want to work 40 meters, but you only want to put up one antenna, so you buy an antenna tuner and use it to force feed your 75 meter antenna on 40 meters. With this combo, you will get out, but not to well! When you use a tuner, your rig does see a near perfect match, but that coax fed dipole still has an swr of about a 10 to 1 and your efficiency has dropped to 11%, so starting with 100 watts, you are now radiating somewhere around the equivalent of 10 watts - that's a BIG loss! I used a computer program to figure these statistics, so to save space and time, I won't even try to explain how to figure this out.

Well, by now you're wondering how to get around all this loss, and there are a couple of easy ways to do this. One way is to put multiple dipoles, one for each band of interest on one common coax feed line. But the one that I like to use, and the one that I think is easiest is to just install 450 ohm ladder line between the antenna and the tuner. This stuff is very low loss even when there is a very high swr on it - nuf said.

And I'll show you what I mean. Remember the 75-meter dipole with coax feed line and it's 77% efficiency? Well, just by switching to the 450 ohm ladder line, the efficiency jumps to 82%, now the feed line will show a whopping swr of 50 to 1 but you tune out that reactance with the tuner so that your rig will still see a 50 ohm match. OK, now switch to 40 meters, and the same antenna that shows 11% efficiency with coax, jumps to a very respectable 94% just by using the ladder line! And the efficiency stays around 94 to 95 % all the way to 10 meters too!

Ladder line is cheap to buy folks, so it's one way to work multi band and still not spend a fortune doing so! And you get a very neat bonus in doing so - MORE POWER OUT!

73 & Don't get on a power trip!
Rick McKee, KC8AON Ω

A Simple 74HC240 Based DC Transceiver for 20m
By Bill, KD4PWB

This short article describes a direct conversion transceiver I recently built based on the N7KSB 74HC240 simple one-chip transmitter. Some features:

-Uses 74HC240 as an oscillator/final
-Puts out about 450mW
-Uses a simple RC audio filter
-Uses a diode ring double balanced mixer
-Uses manual RIT and Transmit/Receive switching
-Uses a TL082 opamp as a audio preamp and an LM386 as an audio final.
-Constructed for 20m but can be put on 15 and 10m.
-Uses island type construction on double sided copperclad board.
-Simple to build, Simple to operate.

The circuit is pretty straightforward and uses N7KSB's original design. The only difference is pins 17 & 15 on the 74HC240 are ungrounded and connected to pin 4. Pins 3 & 5 are connected to form the output to the double balanced mixer. This provides enough signal to the double balanced mixer. Information on building the double balance mixer can be found at http://www.qrp.pops.net/xmfr.htm and won't be reproduced here. The FT37-43 toroids for the mixer can be ordered online from Radio Shack for a few bucks.

The chip is fed with 8V because it may self-destruct at higher voltages. A 7808 IC provides the necessary 8V and the rest of the xcvr is fed with 12-13V. I used a 20-pin socket for the 74HC240 because I wanted to be able to easily replace it. The other IC's (TL082 and LM386) were super glued to the PC board dead bug style. The 74HC240 has to have a pretty substantial heat sink. You can see in the photo that I cut a piece of flashing and exposed it to the chip. The chip is barely warm to touch with operating. The 7808 gets much hotter.

You'll have to experiment with the value of the inductor in series with the 20pf variable-tuning cap. I had one lying around and took off turns until the oscillator tuned properly. With my set up I'm getting about 20Khz of swing. The value for the cap in the RIT circuit was derived experimentally. You may want to try another value there.

The RC audio filter is simple and cheap. Without it you'll get all sorts of broadcast band interference. I do occasionally get some BCI but it fades as quickly as it comes in. BCI, at my QTH at least, is not a problem with this radio.

Put L1 as close as possible to the chip keeping the leads of the DC blocking cap very short. This cuts down on L1's tendency to be effected by stray inductance. If you build your rig for 10m N7KSB advises not to use a socket for the 74HC240 as it induces too much stray capacitance. Build it dead bug style on 10m. You may want to lay the xcvr out pretty much like the schematic keeping as much distance between the inductors of the filter and the rest of the circuit. You can wind the inductors on a BIC pen (app 3/8" diameter) with #14 bare wire.

The LM386 does provide audio but I usually route that through a Radio Shack pocket amplifier for adequate volume. The audio quality seems very good but the filter could be more selective and that's something you could experiment with.

Operation...I usually switch the RIT off and the Transmit/Receive switch to receive. Then I zero beat the signal, switch the RIT in and listen for the call. Then I call back. I do sometimes call CQ but not as often. I like to find the strong signals because they'll usually hear me better. My antenna is a 40m dipole fed with window line about 25 ft up.

Here's a list of contacts with it so far:

Station	QTH	RSTS	RSTR
VE3VAW	Toronto Canada	569	579
NB2T	Sunrise, FL	579	559
AA9UF	Bellflower, IL	599	459
NB2T	Sunrise, FL	599	559
K3NWD	Bradenton, FL	599	559
KA0V22	St Louis, MO	579	529
W9UW	Wisconsin Rapids, WI	559	339
K9QAG	Franklin Park, IL	579	559
N9BPE	Tuscola, IL	599	559
K3NY	Annapolis, MD	559	549
KW7D	Deming, NM	579	349
W2HDW	Haddonfield, NJ	599	579
K3NUP	Solebury, PA	449	339

So you see I've gotten some very good signal reports considering my 450mW. It's a simple rig for sure. Mines pretty ugly but it's been so much fun to operate it. My other QRP rig is an SW30+ and it's been gathering dust since I finished the 74HC240 xcvr. If you'd like to build the rig and need some help just drop me a line at bcharbour@zebra.net. If you build it let me hear from you...it'll bring a smile to my face!


Tx es 73
Bill Harbour
KD4PWB
FP#-42 Ω

Charles Augustin de Coulomb
14 June 1736 to 23 Aug 1806

Coulomb developed a theory of attraction and repulsion between bodies of the same and opposite electrical charge. He demonstrated an inverse square law for such forces and went on to examine perfect conductors and dielectrics. He suggested that there was no perfect dielectric, proposing that every substance has a limit above which it will conduct electricity. These fundamental papers put forward the case for action at a distance between electrical charges in a similar way as Newton's theory of gravitation was based on action at a distance between masses. Ω

The miniPIG the multiPIG and the "UGLY"
By Diz, W8DIZ

Part 3: multiPIG Transceiver:

multiPIG_Ver_1.0
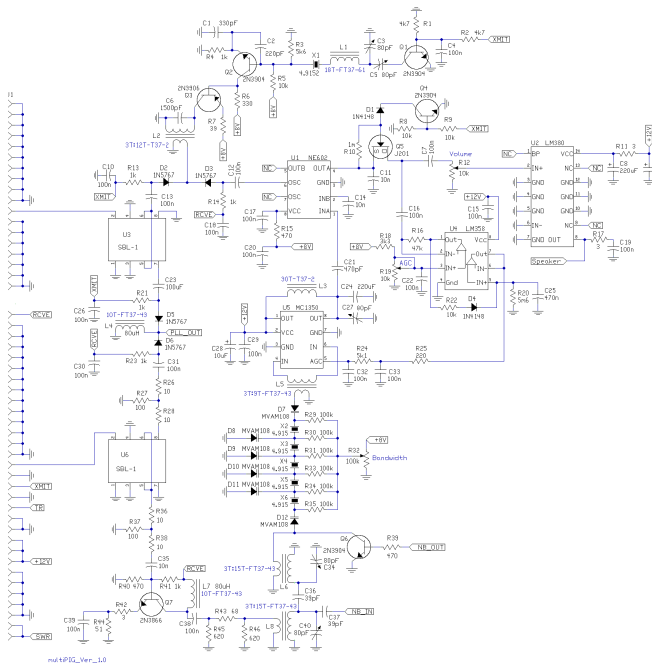
This is the heart of the miniPIG transceiver. The circuit discussed here is a general purpose radio component that can be used for most any HF radio project requiring CW and/or SSB modes of operation. The chosen IF is 4.9152 MHz. The frequency was chosen because of the readily available inexpensive crystals and a compromise frequency to eliminate out-of-band image signals and those unwanted birdies.

BFO - The BFO uses one 4.9152 MHz crystal to produce a 4.9140 MHz when in receive mode and 4.9135 MHz when in transmit mode. In the RCVE mode, C3 is used to adjust the BFO to 4.914 MHz. When in XMIT mode, C5's capacitance is added to the BFO oscillator to lower the frequency by 500 Hz for the XMIT frequency by turning on Q1. There is a small interaction between C3 and C5, but you should be able to set the capacitor within 3 tries. The actual TRUE frequencies mentioned above are determined by the bandpass of the crystal filter, X2-X6. I'll get back to that later. The BFO oscillator is Q2 followed by a tuned output amp Q3. The output of L2 transformer is about 10 milliwatts. This signal is switched to either the transmit mixer U3 or the receive audio detector U1 via 1N5767 PIN diodes. When these diodes are turned on with a 7 milliamp current, the exhibit an RF resistance of about 5 ohms. Both the XMIT and RCVE control lines are at 8 VDC when active.

MIXERS - The receiver front end mixer U6 is an old standard SBL-1 from mini-CIRCUITS. These devices are proven to be the best bet for the money when it comes to reliability and being able to handle a large dynamic range of signal inputs without excessive distortion products. This is critical when working along side other rigs such as Field Day ops or even another ham running a kW down the street. The transmit mixer U3 is also an SBL-1. It was chosen because the low

impedance characteristics. There is less chance of stray signals getting into the front end of the transmitter signal chain with a low impedance mixer. The output of U3, the transmit mixer goes to the BAND MODULES. The input of U6, the receiver mixer also comes from the BAND MODULES. Both mixers are also fed signals from a HF PLL oscillator, which will be covered in a future edition of Bacon Bits.

POST MIX AMP - The front end receiver mixer signal is passed through a 4 dB attenuator pad, R36-38 to help terminate the front end mixer U6 to an approximate 50 ohm impedance. Q7 is a high power class A amp running at approximately 25 milliamps. It will get warm to the touch.

NOISE BLANKER - This circuit is still in the design mode. If you do not plan on using a noise blanker, then you can remove transformers L6 and L8 and add a connection from R46 to D12.

CRYSTAL FILTER - The filter is comprised of crystals X2-X6 and D7 thru D12. The varactor diodes used, MVAM108 exhibit a capacitance of about 100-500 pF when reversed biased from 8 to 1 volts. This will give you a bandpass of about 3 kHz to 300 Hz. The lower the voltage, the lower the bandpass. One characteristic of this circuit is that as the bandpass gets tighter, so does the center frequency go lower. If we decide that a 500 Hz bandpass is the average listening bandpass, then we would measure that center frequency and use the same frequency for the BFO when in the transmit mode. Example...
500 Hz bandpass freq. = 4.9135 MHz then the XMIT BOO freq. is also 4.9135 MHz and the RCVE freq. is the XMIT freq. + 500 Hz or 4.9140 MHz. To find the center frequency of the crystal filter, set the bandwidth pot R32 to about 2 volts. Connect a wire from the cathode of D2 to R45. Connect an oscilloscope to the anode side of D7. Then adjust C3 for a maximum signal on the oscilloscope, and then measure the frequency at R45 with a frequency counter. Record the frequency. Remove the oscilloscope and freq. counter and the jumper from D2 to R45 and then connect the freq. counter to the cathode side of D2. Place the module into receive mode and adjust C3 for the recorded frequency + 500 Hz. Then place the module into transmit mode and adjust C5 to the recorded frequency. Repeat the adjustments until both C3 and C5 are adjusted to give the correct transmit and receive BFO frequencies.

IF AMP (MC1350) - This IOF amp IC will provide about 60 dB of receiver gain. L5 is a matching transformer to step up the impedance from the crystal filter from about 150 ohms to 1350 ohms for the IF amp input. The IF amp has an AGC input of 5-9 volts to control the gain. Maximum gain is a 5 volts or less.

AUDIO DETECTOR (NE602) - The audio detector is an NE602 mixer, providing about 14 dB of gain. The BFO injection is via C12. The suggested BFO injection is about 250 millivolts BFO signal. Currently, I have not attenuated the BFO signal to meet the 250-millivolt suggestion. This could be accomplished by reducing the value of C12 until a

measured 250 millivolts is at PIN #6 of the NE602 IC. The audio output of U1 via PIN #4 goes to a MUTE switch Q5, which is controlled by Q4 and XMIT signal.

AGC AMP (LM358) - A portion of the audio signal is passed to U4, the AGC amp. The gain of the AGC amp is determined by C16 and R16. The output of the 1st amp is detected by D4 and buffered by the 2nd amp. The RC time constant R20 and C25 determines the AGC delay time. With no audio signal present, R19 is adjusted for 5 VDC at R25. When an audio signal is present, it is detected by D4 and the voltage at R25 increases to reduce the gain on PIN#5 of U5.

AUDIO AMP (LM380) - The audio amp is a common LM380 IC. It provides more than enough audio for a speaker.

Next month Part 4: multiPIG Band Modules
72, oo
Diz, W8DIZ Ω

Field Day observations:
By Chuck, AA8VS

I took part in a field day this year and here are some of my observations.
I would like to say a couple of constructive things about this years Field Day and things we need to look at for next year.

No matter what people have said about the 'new' Extra and Generals they are here to stay. I noticed one thing at field day. I think some of our new Extra's were shocked at the speeds the CW contacts ran. This may be the first time they really sat down and listened. Had one who was struggling with the speed and would pick up a letter now and then. Another person got out a pad of paper and kept trying to write down the exchanges, but the point was.... they are trying!!

The new folks have been hearing allot of stuff about how antiquated and non-useful code is. It is possible they did not realize how efficient the mode actually is at traffic net speeds and how fast exchanges can be made. Also the band conditions, as folks found out in MI during the Y2K exercises rendered the SSB almost useless and the traffic nets quickly shifted to CW and got the traffic through. Code is not a nature, but must be an acquired skill and used to maintain efficiency.

A lot of people have been talking about how antiquated and outmoded it is, but ...... it strikes me most of the people that say it is outmoded, don't really understand the mechanics of CW, the minimal equipment and how it works, QRP equipment, batteries can be used during emergency operations.

Granted there are a lot of opportunities in the SSB sections, but as the bands become more crowded they may start migrating down to the CW bands. That sounds fine to me and I will be glad to help.

FD is both a contest and a social gathering. There is a serious side in making contacts. Many hams see it as a club picnic. Lots of thoughts in between. However, we had some rain during the night. I understand that some airtime was lost because of the rain. I heard a couple of folks talking about getting flooded out and having to pack it in and go home.

Sounds like the flooded out groups have some homework to do. This may be a good time for clubs to see what they did well and what went wrong. For the not so good things, what happened, what fixes are needed, and what can be done to avoid these things next year. Here is a good case for QRP and battery operations, batteries used as a backup do not flood out like generators do.

Seems like FD is about making as many contacts as you can in a twenty-four hour period to show emergency preparedness. Are we really ready to step in? This is part of the reason we enjoy the bands we do. Can people really put together a message in the standard traffic format and know the proper procedures for passing it.

In looking at what FD really means it to get set up to pass emergency traffic the best you can for a twenty-four hour time period. How many clubs work toward this goal on the HF bands? In the case of the rain and stations going off the air, strikes me as we are not ready to truly step into an emergency situation.
My guess is, the weather may not cooperate with us and traffic must be passed regardless.

So all in all, I hope everyone had as much fun as I did. We'll being seeing everyone either there or on the air next year.

73,
Chuck AA8VS Ω

ANTENNA IN A PEN!
By Arnold CW Timm

Yes Ohio - even the cheapest wire dipole antenna can be expensive for a student/elderly on a budget. If you ever had to repair a circuit board trace, the liquid metal conductive pen may of been used. Those of us, who hunt for the extreme opposite frugality radio, compared this useful item as a wire element. An antenna we all could afford. Or an alternative option, most qrpers would like to experiment with? Place metal filings in a cup of petroleum jelly also. Hi Advertising describes this pen full = 100 feet (approximately) of metal glue. A quarter wave dipole or vertical for 10-40 meters immediately springs to mind. Try various lengths of string, cord, (etc) which allows beaded trace of material to dry in minutes. Carefully bend/store makeshift element to reduce palpability breaks. Metal epoxy grease is also available. $8-$12 each. The carbon grease is the least expensive. Talk about your "portable" antenna! Hi For more info/ideas visit:
http://commonham.homepage.com
73, Arnold wdx0awt@juno.com Ω

Website Spotlight.

Harold, KE6TI, suggested this month's website.
It is http://www.w9rca.com/homebrew.html, which is sponsored by the Thomson Amateur Radio Club (TARC).

Thomson is the corporate successor to RCA's consumer electronics business, and we make RCA, GE and ProScan brand TVs, Satellite receivers and other consumer electronics.

In the course of designing and developing Thomson products, we buy a lot of parts. After the development finishes, or changes direction, a lot of these parts become surplus to the business, and the company graciously donates them to the TARC. Most of these we sell in bulk at hamfests, to finance our operations. (We operate a repeater, 146.28-88 in Indy, and we do a good sized field day operation every year, as well as maintaining a top notch club station at company headquarters.) However, some of the parts we get are the kind that might be useful to the people who build their own rigs, and these we've set aside for our "Share the Wealth" program.

The details are on the website, but basically, we offer the parts free, and only ask that we be reimbursed for postage and packing, since that is done and paid for by volunteers. The list of parts available grows occasionally. In fact I have another large batch of stuff that will get posted to the site as soon as I get it inventoried. Eventually we hope to add to the site some other stuff, such as a crystal filter design program that one of our members wrote.

73 de KE6TI, Harold Smith Ω

Member Spotlight!

This month were spotlighting:
Ian Purdie, VK2TIP. FPqrp #-91
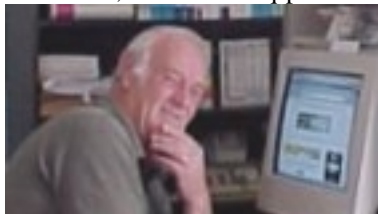
Ian, VK2TIP our boy from "down under" was born into the household of a professional radio operator/telegraphist (VK2ARP - SK) and managed to thoroughly distinguish himself by failing his first AR theory exam. Unfortunately the Radio Inspector who marked the long essay type papers back in those days was also a long time friend of his fathers........

In later years Ian did indeed pass his exams and then sat on his certificate of proficiency for many years without even applying for a call sign. This was remedied when Ian's father passed away and Ian then went into retirement himself. Today he lives in beautiful sunny Budgewoi NSW which also happens to be the QRM capital of Australia owing to the power station sited right next door.

Relying on his experience as a college lecturer, Ian now mostly spends his time passing along his knowledge of electronics in the form of comprehensive tutorials from his two sites as well as drinking home brew beer:

http://www.electronics-tutorials.com/
http://my.integritynet.com.au/purdic/ Ω

On a side note, Ian received this email about his website:

I have encountered your Website in "The Scout Report for Science & Engineering," a publication of the Computer Sciences Department at the University of Wisconsin-Madison (http://scout.cs.wisc.edu), funded by the National Science Foundation, which selects the "best of the Web."

I agree with their evaluation, and I congratulate you for the excellent work.

I am subscribed to the aforementioned "Internet Scout Project" both for personal and professional interest; as a matter of fact, I am the Internet Adviser of the Pirelli INTERNETional Award (http://www.pirelliaward.com), since 1996 the first international multimedia award entirely carried out on the Internet.

I have one question: is your Website in its final version, or will it be updated? Please let me know, because if your Website will undergo major changes, I will keep an eye on it.

Let me explain: part of my job is to identify excellent Websites, and to invite them to participate. Therefore, after visiting your Website myself, I wholeheartedly encourage you to participate in the Pirelli INTERNETional Award.

If you decide to participate please let me know at (marco@pirelliaward.com), and I will suggest you the best way to do it. I could give you all the information and explanations you wouldn't find on the Web, or that you may require for your specific work to be submitted.

Looking forward to your participation, I send my Best Regards
Marco (marco@pirelliaward.com)

Marco Farinelli
Internet Adviser
Pirelli INTERNETional Award

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00186 Rome, Italy

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fax ++39 06 69517208
http://www.pirelliaward.com

Letters:

We welcome your letters about the Bacon Bits.

Re: Launching wires into trees, 10/00
Great Job, folks!
About the launcher for antennas, and your information about spuds used as bullets, I remember the tale about the chicken gun...

The aircraft manufacturers use a big gun to test the aircraft windshield.
In order to check if they withstand the impact of wild birds, the throw chickens using the same scheme of the antenna launcher... (of course, dead chickens)

People making the TGV (high-speed train) in Europe got one of the launchers to test the windshields of the trains (they may run 350+ km/h, about 200mph). To their dismay, the chicken not only broke the windshield but penetrated throughout two walls into the engine.

They were shocked and couldn't make the windshield resistant enough. The chicken always found its way into the engine. A high consultant from the aircraft manufacturer was called in.

His outcome: "Unfreez the chicken before use"

Be well
jon, ea2sn Ω

New Kit info:

The North Georgia QRP club (NOGA) made a kit offering a few months ago of a QRP SWR/Watt meter that was very popular. The initial trial run of 50 kits went pretty quick and we decided to make another run of 65 kits. This is the same kit featured on the cover of QRP Homebrewer, Spring 2000. This is a version of the directional coupler made popular by Stockton in Sprat and DeMaw in ARRL pubs and CQ but modified to be able to be full scale at 3/8 watt if necessary. Keeping with the QRP tradition it is designed to be built into an Altoids tin with a second tin to be used to mount the meters.

All parts are included except for the Altoids tins and RF connectors. This is a dual meter bridge that includes both meters and new scales for 2 and 6 watts so it can be set up for either power level or higher if desired.

 If you would like one of the kits please send me an e-mail at w3irz@att.net so that I can assign your kit number. Then send me a check and a return address label, with the number, for $ 22.00 which includes shipping to the US and Canada.
Mail to:
Mike Branca W3IRZ
2880 Camary Place Drive
Conyers, Georgia 30094

Just a note to mention that the NoGa PIG kit is still available and for details contact Pickett, AD4S at jpcummins@att.net Ω

I Have Bill's Radio

By George Cook, AA3JU.

I have been reading some of the hate mail on the DX reflector regarding the SK ZX6DX and his widow. One stuck out that said maybe those QSL cards were just stuck in a box someplace and yet another basically accused his widow of running a scam to collect the hard earned greenstamps of well meaning Dxers. And then I remembered I have Bills radio.

Oh you probably don't know Bill Messiger W3VMH. He really wasn't much of a DXer from what I am told. Actually I never met him either because he died before I got the chance. What Bill really liked was 160 Meter and 80 Meter AM.

Well after he died lots of nice young hams came and bought up the more modern of Bill's gear real fast. But on his desk was HIS radio. A behemoth Viking Valliant and a Hammarlund HQ-110 along with a homemade relay box and wires of every sort. Nothing on the radio is stock and Lord knows he didn't document any of the changes. After all, it was HIS radio.

Well, I met his wife the day I came to buy Bill's radio. The money wasn't important to her and she was going to donate it to charity anyway. She apologized for not being able to tell me much about the gear, and just wanted to know I would give it a good home. She also wondered if I would turn on the old radio; even static she would be O.K. She said this from the door of Bill's shack. You see she could not bring herself to enter that room. She just wanted to hear that radio one last time.

So I fired up the rig on the AM freqs of 75 phone around 3.895, and told the world that Bill's radio was on the air and that it was going home with me. And when I was done working a couple of fellows in NJ and NY, I shut her down and started to disconnect her. WOW what a shock I got from the power supply. I guess the radio wanted me to know I would never really be more than a curator.

In the other room his wife just cried and cried. I tried to console her but it was for naught. You see, she was never going to hear that sound again. She missed the man she had loved very much. I don't think she cares a whit about ham radio or QSL cards or much of anything else. You see, the husband of all her life, her best friend in all the world, was gone forever and she would never bring him a cold 807, or yell at him that he was tearing up the TV or be awakened far to early by an alarm on a Hamfest Sunday.

So I have Bill's radio and really that's the whole story, save to say I think I will fire her up this week. And maybe I will give Mrs. Messenger a call and see how she is doing. Ω

FPI POWER SUPPLY
By Arnold CW Timm
(c) 2000 All Rights Reserved

Methane reeks about the pen,
high freeks on first hop;
assemble alternative power men,
from pig manure - slop!

Methodology we here imply,
pig propulsion - log;
methane (piglet) power supply,
utilize whole hog!

Aroma round the Flying Pigs,
their telltale droppings scat;
could operate CW rigs,
now what do you think of that?

Flying Pigs 12 voltaic gas,
makeshift methane maker;
save a buck on battery cash,
run low power Quaker!

Flying Pigs read Bacon Bits,
tea leaves elsewhere read;
buy those methane battery kits,
from Flying Pigs instead!

About the Flying Pigs QRP Club.

OUR MISSION:
1: Have Fun.
2: No rules.
3: Have a group of Friendly Hams who enjoy Amateur Radio, and sharing their skills with their fellow Hams.

CLUB EMAIL POLICY:
These are not rules, just common sense.
Club email is not moderated, as we are not a stuffy group. You can send off topic messages about most subjects, but please keep it clean and in good taste. We do like good-natured ribbing and joking with each other, but we will not tolerate flaming other members or spaming the group. We will remove offenders who abuse our open policy.

CLUB WEB PAGE:
The club web page is our forum for sharing projects, and information about us. You are encouraged to submit your ideas and projects to be added to the web page.
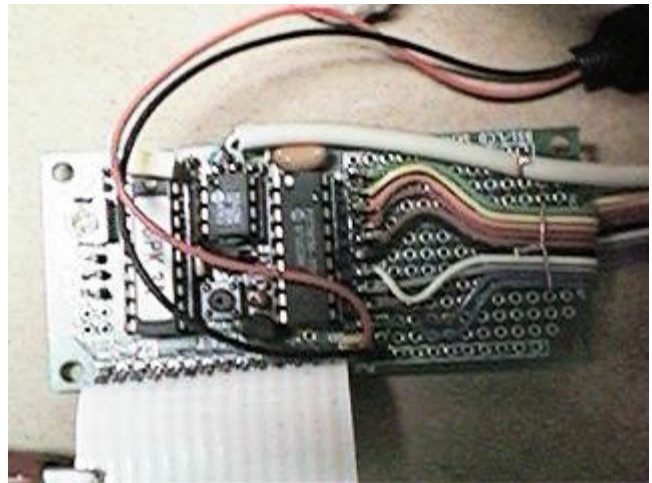
PROBLEM REPORTING:
If you are having problems with email, the web page, or a fellow club member, please report this to either Diz, W8DIZ at w8diz@cinci.rr.com Rick, WB6JBM at ripowell@mpna.com or Dan, N8IE at shephed@aol.com
We welcome all to join the Flying Pigs QRP Club, and we hope you have fun! Ω
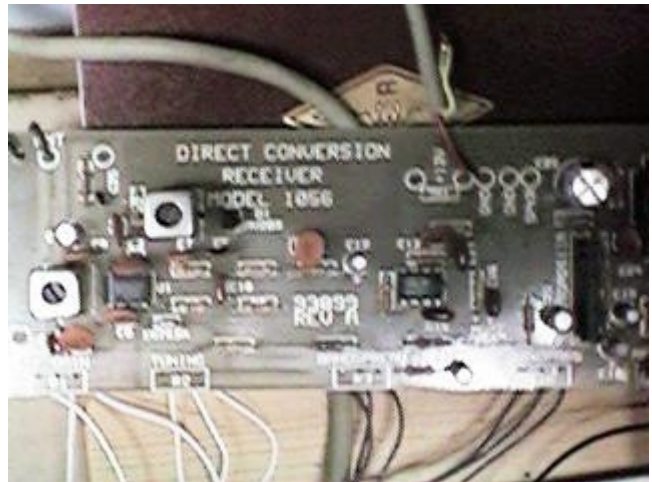
Pics from Mike's Basic Stamp project.
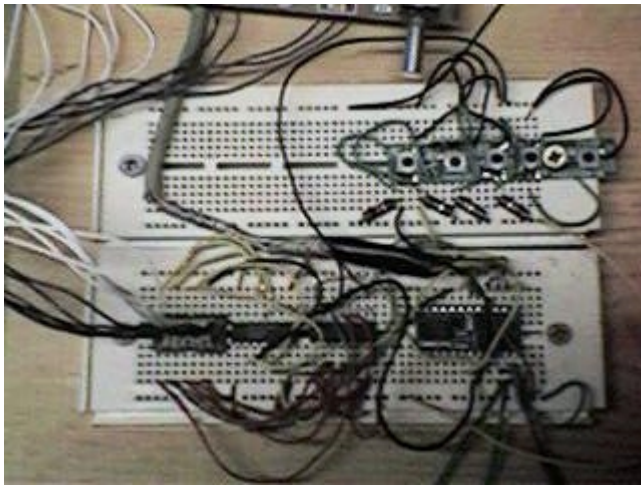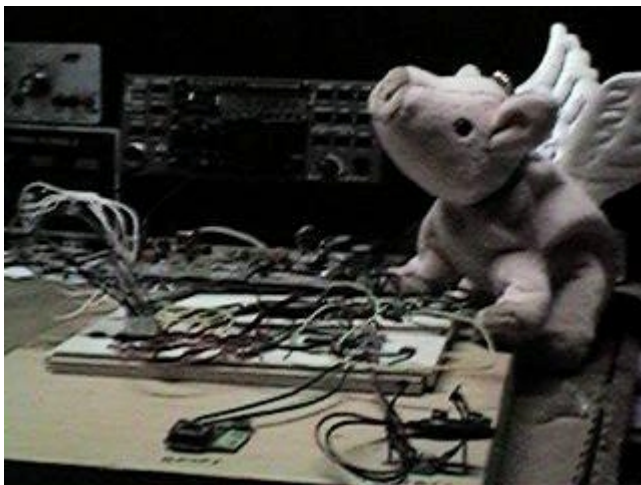

Switch panel on top - BS2 w/ 1267 chips on bottom.

Complete project: Receiver on top, switch panel in middle -
BS2/1267 on bottom.

Piggie eyeballing the project.

BS1 prototype board used in the very beginning fo the project.

Ten Tec Receiver board.