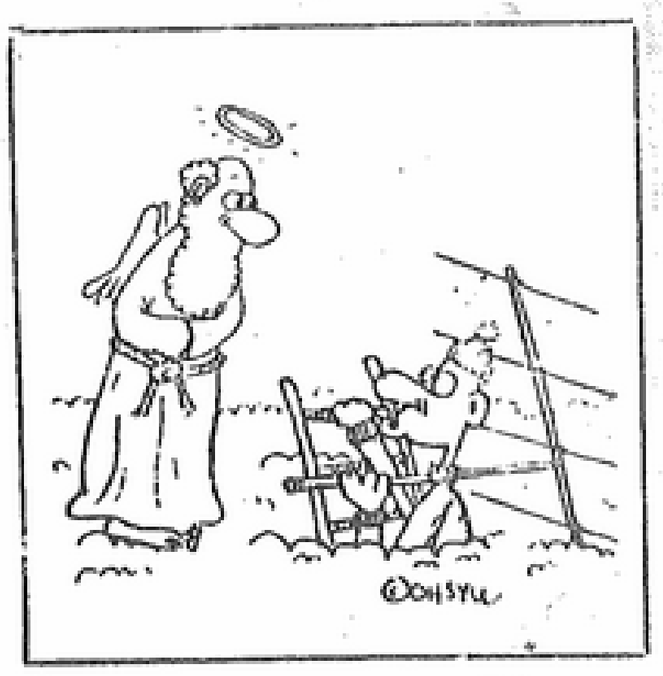
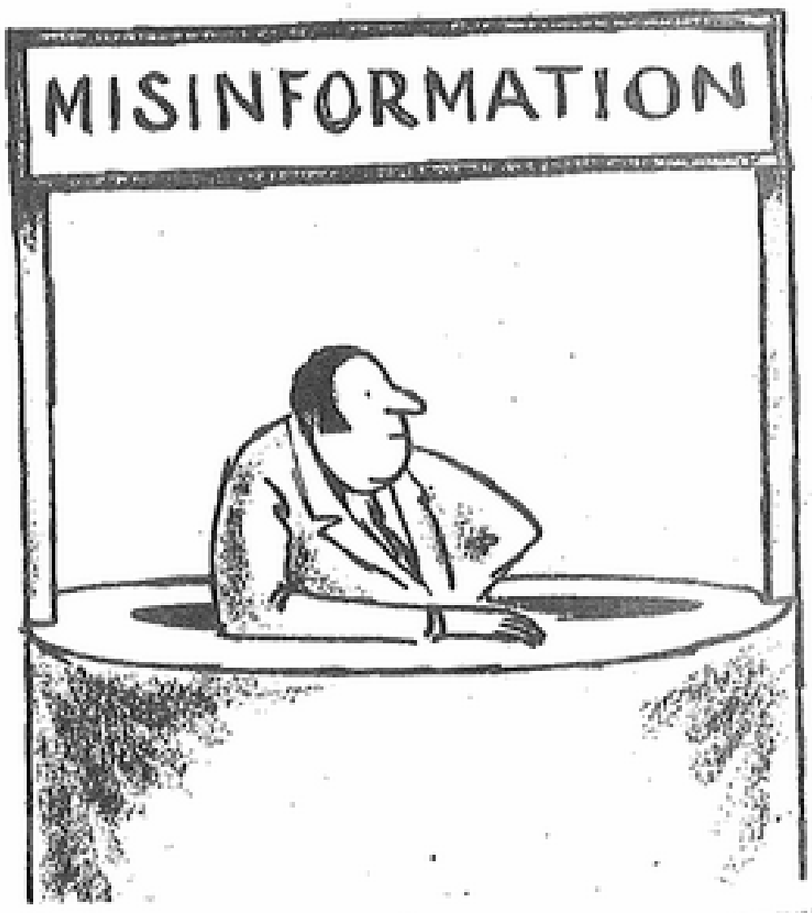
CENTRAL OKLAHOMA RADIO AMATEURS
COLLECTOR AND EMITTER

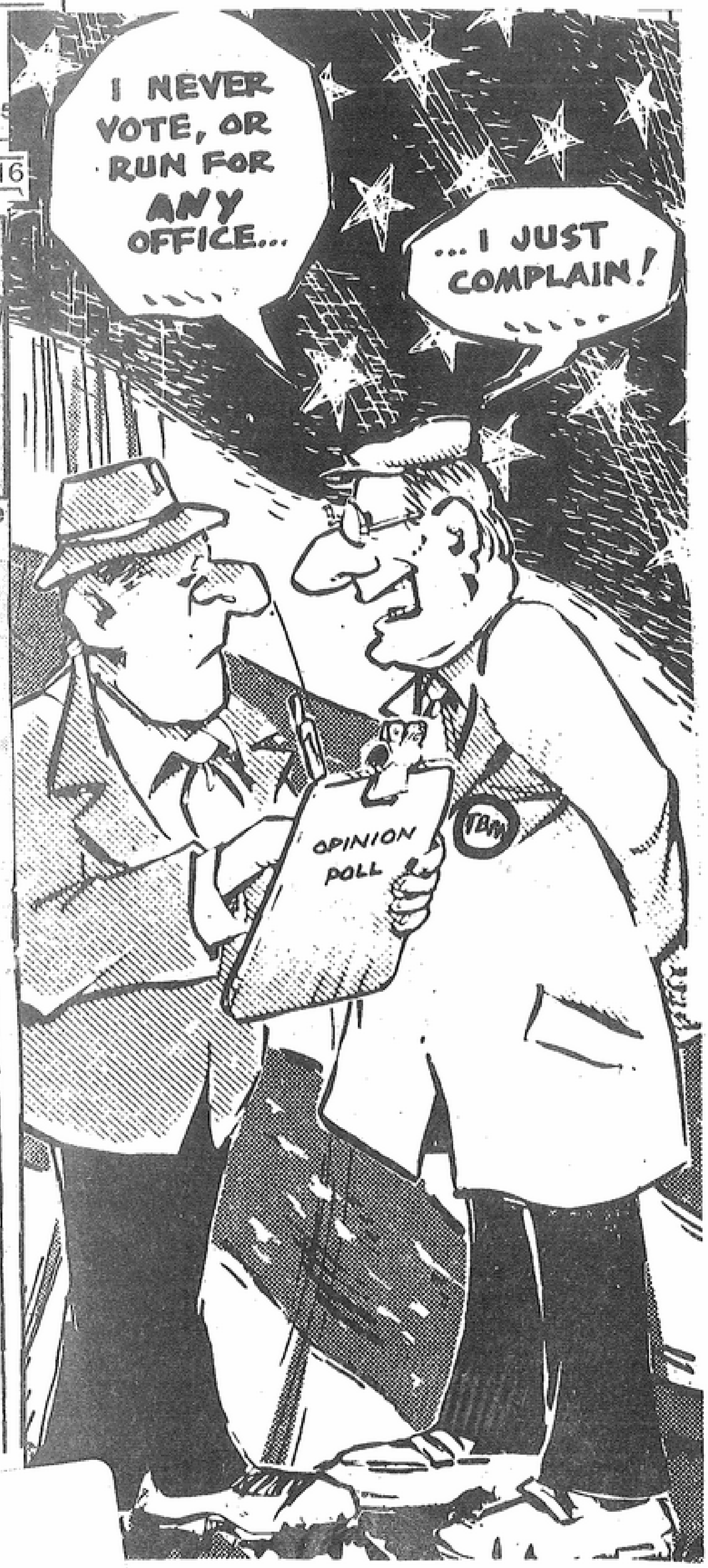
VOL 10 SEPTEMBER 1984 NO 116

'Forget About the Hereafter. Help Me Communicate With My Computer.'



"Pardon me. Looks like we're up a little too high . . ."





EARS — Edmond Amateur Radio Society

The next E.A.R.S. meeting will be at the E.O.C. Sunday 9-16-84 at 2:00P.M. Edmond.

It seems as if many Amateurs do not realize what an excellant repeater we really have available for their use. It has complete micoprocessor control and can be operated either open or closed as the need arrises. Also it was all amateur designed and built and could have a voice according to Mike KA5MJT and there were others involved in the design and construction of this devise too. N5BUJ is another one I have heard working on this unit

We have some real brains in our group and many amateurs who are not affiliated are missing out on anexcellant group to associate themselves with.

We also have a low band segment who come up with programs on DX and other programs of interest to the low band user.

We welcome everyone and maintain a friendly attitude to attracked new members. Our repeater has much better coverage than is commonly thought as it covers half way up the Turner Turnpike and otherwise tends to have a 50 mile radius.

Cal KB0OU wrote an article on this subject in the C.&E. previously and he has heard 147.735/ 147.135 as far away as the corner of Okla. and Missouri border on his way home to visit relatives.

In October we will again have our dinner meeting which includes all members of the family so why don't you come up and look us over we would be very happy to have you join our group.

Some of our members went on extended vacations this summer such as N5DBM who went to Kentucky to visit friends and relatives. The Calisons really did it up brown and went to Californmia but, didn't make the Olympics Just camped and visited relatives. But did get a bit of rest from thier daughter while she visited Grandparents in Missouri for a week. Maybe daughter got the better end of the deal who knows.

Hey! come on out and visit our club next month wewould be glad to have you.

Well N5DBM's luck is holding as could be expected heard him say his 0A2AT failed. It seems some guys have that something extra special when it comes to good luck and good st like that you know.

As usual Bill K5SKA

"AMATEUR RADIO" Jan. 1984

What would a nuclear blast do to commucation? Read in detail!

This issue starts a new series: "The Experimental Amateur." Could be good, but the first article left many details untouched.

Here in the USA we have a block of frequncies in the LF range that can be used with no operator or station license. In Australia Radio Amateurs are being issued Experimental Licenses to use up to 100 W on 196 kHz (1530 meters) but with a "backyard" antenna restriction.

In pre-Kaiser War days, there was a 1200 meter band for "Experiment and Instruction," in the USA and British amateurs had one around 1000 meters even after that war.

THESE CORA MEMBER CLUBS PROMOTE AMATEUR RADIO

1 AERONAUTICAL CENTER ARC
MEETS: 7:30pm First Thursday Flight Standards Bldg., FAA, S. Macarthur

PR	WB5SVN	Jack Iman	677-8537
VP	N5ABL	Holly Holcomb	799-2539
Sec	WD5JPW	Gloria Seignious	722-1740
Tr	WA5CJG	Bob Pace	376-3569
EDITOR: Gloria Seignious, WD5JPW			722-1740

2 OKLAHOMA CENTRAL VHF CLUB
MEETS: 10:00am Third Saturday. Red Cross. 10th & Hudson(Back door) Okla City.

PR	KD5IS	Jerry Wetmore	524-5080
VP	KA5MYY	Chris Sartorious	728-0058
SE	K5JB	Joe Buswell	732-0676
TR	W5KE	Ellard Foster	789-6702
EDITOR: Joe Buswell, K5JB			732-0676

3 MID-OKLAHOMA REPEATOR, Inc.
MEETS: 8:00pm First Tuesday. Okla City EOC. 4600 N Eastern

PR	N5EPV	Bob Allen	Unlisted
VP	WD5ISS	Don Saunders	751-0404
SE	N5BEQ	Jim Buswell	236-0368
TR	W5KOZ	Sid Gerber	737-1050
EDITOR: Susie Atkinson, KA5FED			842-8014

4 OKLAHOMA CITY AUTOPATCH ASSOCIATION
MEETS: 7:30pm Third Tuesday. Okla City Fire Training Center. 800 N Portland

PR	WB5NDO	Kathey Whited	799-1457
VP	WD5CSM	Dennis Patterson	495-0769
SE	N5DLM	Vicki Adkins	722-6195
TR	KE5M	Ron Recer	341-7030
EDITOR: Kathy Whited WB5NDO			799-1457

5 OKLAHOMA UNIVERSITY AMATEUR RADIO CLUB
MEETS: 7:30pm Second Tuesday (Sep-May) 119 Wilson Center. 1334 S Jenkins

PR	KA5BAY	Luke Noah	325-1775
VP	KE5N	John Wustenberg	325-2382
SE	KA5COI	Peter Richeson	329-3217
TR	KA5LZN	Greg Smith	366-1641
EDITOR: Greg Smith, KA5LZN			366-1641

6 ALTUS AREA AMATEUR RADIO ASSOCIATION
MEETS: 7:30pm Second Thursday
North Main Fire Station (CD) Altus

PR	W5CCV	Joe McDonald	782-3454
VP			
S/T	WA5CBF	Loren Simms	477-0921
EDITOR: Loren Simms, WA5CBF			477-0921

7 BICENTENNIAL (76ers) ARC
MEETS: 7:00pm Second Tuesday. OG&E Bldg. SE 3rd & E. K. Gaylord Blvd.

PR	AE5N	Donald Duck	691-4199
VP	WD5JNT	Ted Vanlaningham	262-1675
SE	N5AUH	Jerry Sproul	354-2061
TR	WA9AFM	Tom Webb	737-6716
EDITOR: Jim Seals, KB5XN			381-2005

9 WHEATSTRAW AMATEUR RADIO CLUB
MEETS: 2:30pm Second Sunday. Location varies. See club section.

PR	KA5DUO	Leo Peil	886-2998
VP	WA5FLT		
S/T	K5GGL	George Maschino	263-7614
EDITOR: Marvin Stokes, WA5JHB			893-2221

QUARTER CENTURY WIRELESS ASSOCIATION
MEETS: Quarterly at various places.
NET: 3855 kHz Sunday at 8:00 am.

CHM	W5NL	Fred Boardman	427-2505
VCH	W5TY	Ray Long	942-4314
S/T	W5AS	Howard Baker	721-5453
EDITOR: Robert Runyon, AAØO			373-1818

13 KAY COUNTY AMATEUR RADIO CLUB
MEETS: 7:00pm Third Thursday
Ponca City EOC

PR	KA5PYG	Paul Davis	765-2227
VP	WA5UBO	Marsh Pronneke	363-2526
S/T	WBOVHC	Marvin Cullison	762-3981
EDITOR: Dave Land, KD5FX			762-8616

14 CIMMARON AMATEUR RADIO ASSOCIATION
MEETS: 7:00pm Second and Fourth Mondays. Place varies. See club section.

PR	WB5ECM	Dennis Painton	764-3599
VP	N5FUP	Steve Schoonmaker	886-3274
SE	N5FMH	Nadine Painton	764-3599
TR	N5FUR	Ruth Simpson	227-2791
EDITOR: Major Bailey, KI5P			227-2061

15 SOUTH CANADIAN AMATEUR RADIO SOCIETY
MEETS: 9:30am Second Saturday. Red Cross Bldg., North OU Campus. Norman

PR	KA5MIZ	Bob Rabin	360-6996
VP	KA5EFJ	Ken Neptune	321-7789
SE	WD5GTC	Gene Johnson	321-6759
TR	N5BEW	Ken Esadoah	329-4667
EDITOR: Sam Barrett, WA5RPP			321-2601

16 EDMOND AMATEUR RADIO CLUB
MEETS: 7:00pm First Thursday. See club section for location and type.

PR	WB5UIY	Stan Van Nort	Unlisted
VP	WB5MLX	Glen Cochran	942-7148
S/T	WD5DYJ	Kay Northcutt	755-4672
EDITOR: Mark Northcutt, WD5DYI			755-4672

18 GREAT PLAINS AMATEUR RADIO CLUB
MEETS: 7:30pm First Tuesday
Civil Defense room, Woodward courthouse.

PR	WA5PLW	Windle Hatchett	766-3561
VP	W5KEK	Lewis Patterson	
SE	K5YZK	Jim Phares	254-2319
TR	KA5SDE	James Rockhold	
EDITOR: Jim Phares, K5YZK			

10 EDMOND AMATEUR RADIO SOCIETY
MEETS: Varies. See club section

PR	KBØOU	Cal Callison	751-3620
VP	WA5ZGM	John Keeling	340-1253
S/T	KC5GN	Bill Wright	341-6076
EDITOR: John Keeling, WA5ZGM			340-1253

20 ARDMORE AMATEUR RADIO CLUB
MEETS: 8:00pm First Wed. Red Cross Bldg. Informal, 8:00pm other Weds. 221 9th NW

PR	WB5VBK	Fred Innis	223-1709
VP	WD5FZD	John W Merlyn	223-9543
SE	W5JCX	Jim Chilcoat	226-6816
TR	W5BLW	Charles Dibrell	226-0589
EDITOR: Glen Hamilton KE5ES			226-4379

CENTRAL OKLAHOMA RADIO AMATEURS, Inc.
MEETS: 7:30pm Fourth Tuesday. OKC Fire Training Center. 800 N Portland

PR	WN5NWX	Reggy Whited	799-1457
VP	K2GKK	D. C. Macdnald	672-4947
SE	N5BEQ	Jim Buswell	236-0368
TR	WDOFTM	Linda Callison	751-3620

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The Work Behind The Scenes

For the Preregistration committee the work towards Ham Holiday begins far in advance of the big day. To start off, there is a print out of last years preregistration list. That task automatically falls to who ever did the main task the previous year. AE5N inheireted this job. Also someone has to enter the whole door registration file into a computor, sort it and print out this list. Since Don and his computor were busy with the above list, K5GGL took this part of the job. Both these printouts go to the C & E editor in the form of gummed labels. He checks these lists against each other to eliminate possible duplicates. He checks each against the C & E list to eliminate duplicates. Finally, he checks all 3 lists against the ARRL list of Oklahoma members. This results in one master list that determines who will get the special edition of C & E that is the HAM HOLLIDAY advertising flier. This cross checking of 4 lists is a tedious job, but is neccessary in order to cut down on postage and printing costs.

The preregistrations group meanwhile is making plans for this year. What do we want to do differantly this year?? What were the problems last year? SEVERAL
We need to change the way registration numbers were assigned.... change the computor program that enters the list so that it keeps track of this, determines the last # used, and adds on from there when more registrations dribble in. A few trial runs with sample data to determine if the program does as we want it to do takes time, but is neccessary as we want no foul-ups on the actual list. Don's computor now keeps track of who preregistered by name, callsign who ordered Banquet tickets, QCWA tickets, who ordered how many flea market tables, how much paid, and how paid and check #. Don will need a print out of each of these lists after preregistrations close, so he will be busy sorting and doing these various printouts.
Several years back, CORA purchased the round badges you have been used to using. They had your name, callsign and registration # on them. To ensure getting them back so we could reuse them the following year, we had you put them in the hopper as the pawn for the drawing If we didn' get it back, you had no chance in the drawing. Simple?? NO! It was a lot of work putting the badges together, getting all the right info on them, getting all the various tickets etc all in the right envelope. CORA tried to cut down on the work by just put ing the registration nr on the badge, but the work remained of keeping track of who got what badge, Banquet ticket or QCWA ticket etc, and getting it all together in the proper envelope There had to be a better way!! It was found last year but too late to use. It worked this year.

I think it was back in Feburary that the Preregistrations committee told the CORA board what the registrations system would be. Much discussion resulted in an ok to do it. The result was the yellow tags you used this year. The computor did it all. It printed the name tags you put in your shirt pocket or pinned on It put name, callsign, and registration # on without operator intervention to keep the nr.s straight and it printed the Banquet ticket -if paid for-, the QCWA ticket -if paid for-, drawing stub and the preregistration ticket all on the same piece of paper. Since now everything is on one piece of paper, we had no need to stuff envelopes... so there went the hardest part of the registrations...
Stuffing those beasts. EASY? NO!
Problems started right off the bat. Cardboard stock in rolls or in fanfold with tractor feed holes punched in the edges for computors was not a stock item. We could not find any, so it looked like it was doomed to early failure. By accident in late May or early June, I was talking to a guy and happened to mention the ticket idea and how for lack of a source of suitable paper we was having to forget it. He said it sounded like we was wanting some of the material they used where he worked. This was early Saturday afternoon, but I went to work with the name and phone # he gave me. By 7 PM I had found the proper person, seen the paper and it was suitable although of a funny yellow color, and had determined that they had it custom made to their specs and thus I could not go to his source. I negotiated a small purchase, and I had the cardstock in hand.
The paper was wide enough for 2 tickets side by side and too wide to work on Don's machine, Looks like I am stuck again. That is I got an other job, as it would work on mine. Now the task of laying out the format of what goes on the ticket, and where to print it.
Lets see now.... the list of registrants was in Don's machine and I was going to do the job of printing the tickets.... how to get his list to my machine. I can't read his disks and I don't have a modem.

I start work on the program to print the tickets. Since I am doing it on a home computor, and others have home computors, it has to be hard to duplicate wihin a limited time. To make the tickets look good I want to use several differant type sizes. First samples look fair. 2 tickets side by side? What if 2nd one needs Banquet ticket but not the first More problems. The differant size type confuses the tab function. It don't work right. Somebody suggests printing drawing rules on it too. Not enough space... smallest size type and 8 lines per inch and got it to fit. Now a new problem. Page lenght doesn't fit paper. Week of nights dont solve this one. It is too long or too short. It won't set to the right pagesize.
Meanwhile Don finds a modem that will be loaned till after HAM HOLLIDAY so we can transfer the file from him to me. He learns that I do not have a communications program to control a modem either. I come up with a guy I met several years ago whose computor uses disks I can read. He has a modem and is agreeable. We try a transfer via modem from Don to him, then I go by and pick up his disk. A test run had partial success. Seems his communications program is somewhat differant than Don's.
We learn how the print shop that will perforate the tickets and separate the side-by-side pairs will handle the job. That makes another problem to program around. We need the first half of the file on the left side of the paper and the 2nd half on the right side... Can do but it means another change in the program.... COMMENTS are that we need more space above the 2 fill in lines regarding ticket drawing. I used printer feature to add about 1/2 linefeed above the two lines. Looks good but threw the page lenght even wilder. The 2nd ticket has a few lines that indented differant than the first ticket. Need to change that so both are the same. I work at it.
Don finds a communications program I can use. Question is how to get it to me in a useable form. KB5BS asks what other computors might use a disk I can read. One of them connects. He knows a guy with that kind. It works and I get the program via his disk. However I have to adapt the program to my machine before I can use it. Meanwhile, back to my programs... Lets see now..if all lines were spaced 6 lines per inch, then 66 lines would make a page come out right. If they were all 8 lines per inch it would take 88. That is, if no incremental paper movement were used. Question is, why is 82 too short and 83 too long? Why the 2 inch differance?
CORA Pres. wants to add a few questions and a space for comments. I tell him where to go, but later do it anyway. Regret the attempt as problems worsen. What? Now pagesize varies Differant pages are differant lenghts.. Why? AHA!! There is a repeative pattern to it. I analize the pattern for a few hours and decide that we either have to add 3/8 linefeed or remove 5/8 linefeed. Lets see now. If I add 1/8 linefeed here, another 1/8 there and one above that line will it work? Try it and it is consistant. Remove one whole line and now it fits the paper.
Reggie wants to add another question and is refused. I tell him where he can put it.
Someone wanted programs printed on back of the tickets. Not enough space, but smallest print

size and most lines per inch and condensed the program schedule and got it to fit. I printed 1400 tickets program side. It took 10 1/2 hrs and 3 ribbons to print it. Start adapting the communications program to work on my computor. Got partial success as I can communicate with Don on it, but had trouble transfering a test file. July 6th. Preregistrations close. I spend the weekend finetuning my programs and work on the communications program some more. Tuesday, July 10 76er meeting moved to Dons house so we could finish entering the last of the preregistrations. Some of the 76ers are mad as they didn't hear of the last minite move. I think I have the communications program working, but never had a chance to try it so to be sure, we send the file to Bill's friend and about midnight I get to his house to pick up the disk yet that night. The next couple nights I manage to get it all printed while also getting ready for the summer church carnaval here. I have quite a bit to do at it Somehow the tickets get done and to the print shop. I don't have time to pick them up, so arrange for WA5ZNF to get them from printshop then WD5JNT to get them from Joe at night and bring them to me.

COMPUTOR QUITS I call Ted and ask him to pick up a test board that I had loaned to AE5N some time earlier, so I could trouble-shoot the monster. When Don learned of the latest problem, he kept the tickets and I did not see them untill at Ham Holliday. Don got the tickets arranged and ready to hand out. The computor should have had them all in order but I wonder... If the printer had of started perforating them from the wrong end of the job they would have come out in exactly reverse order. I have not had the heart to ask Don if they were right or reversed.

It took over 40 hours time on the programing and about 10 to 10 1/2 hours per side to print the tickets. At the usual programing rates, CORA should owe somebody (me) at least $1000 for writing the programs and for time on the computor doing all the printing. I forgot to turn in a bill and now it is too late as all the profits have been spent on prizes.

NEXT YEAR? Why don't we get preregistration and door registration in the same computor and let it find and eliminate the duplicates. Do the same with the C & E list and if we can get a disk copy of the ARRL list that we can read do it there too. It would sure save a lot of trouble checking all the lists against each other and probably more accurately too.

We were lucky the computor didn't quit 24 or more hours earlier. As it was,we were finished with it. The long hours of use, was not the reason it quit. It was because of a bad connection on the keyboard. Due to being a busy time, it took about a week to get it going again.

RESULTS: We had a ticket that would be hard to duplicate. Don or I could tell if it was one of ours and we could tell if it was printed in the right or left column on the paper. The differances were small and I doubt if anyone else could tell. The programing for next year should be already debugged except if we make some changes and there should be few of them. It will be a lot easier next time.

George K5GGL

FLEX

If you are not aware of flex, let me tell you a little about it. Mind you it'll have to be a little, because that is all I know!

TSC first released FLEX back in 1977, then a 4K operating systen for SWTPC's 6800 system. Frank Hogg Laboratory Inc. of Syracuse, new York Modified the Flex system to run in the Color Computer.

Flex is a Disk operating system (DOS), and runs over in the 64K side of COCO at address $C000. That is the same place as Radio Shacks DOS, so only one at a time can be used.

The Flex DOS is different from R.S. in that it's commands are on the disk itself and not in the program or ROM. When you type CAT enter (cat is flex equivalent of DIR), flex goes to the disk to get the CAT program, exec's it, then the cat program does it's thing. This nakes Flex, Flexible -- which is where it got it's name to start with.

Up to this point, Flex had only one big draw back. That was the difficulty in making a master disk. A master disk is one that will boot up the flex system when you type 'RUN"FLEX". Only people with two drives could do it.

Well Thanks to Larry Bugg, that is no more. You can even make double sided masters if you wish. Larry wrote a program that will put a boot on any diskette (formated in Flex of coarse). Strangely enough it's call putboot.

To use putboot, first foruat a disk.
NEWDISKA,1 (the one denote drive number, use 0 if you are using one drive)
Newdiska, will prompt as follows:
DS ? (double sided yes/no)
DD ? (double density yes/no)
track (use 35)
Disk name (call it what ever you wish)
disk # (any number you wish)
After formating is complete, then type :
PUTBOOT.LDR,1 (use 0 for one drive)
putboot will ask if you are sure, answer yes.
After the boot is on the disk, next you must put the flex system on that same disk. Do that, like this -- COPY,FLEX.SYS,1 -- after the flex system is copied, you must link the boot to the flex system. This tells the boot program where the flex system is. You do that as follows:
LINK,1.FLEX.SYS (use 0 for one drive)
When the link program is complete, you'll have a master disk and can start copying what ever you wish onto the disk.
This should make flex somewhat easier to use. One can make specialized Flex masters for modem use or for writing letters. ect.
Take COLOR COMPUTER TRAINING

HOW MANY TIMES HAVE YOU SAID TO YOURSELF I SURE WOULD LIKE TO KNOW HOW THE 6809E CPU CHIP WORKS. HOW MANY TIMES HAVE YOU WISHED YOU COULD ASK SOME OF THE FOLLOWING QUESTIONS.

1. WHAT THE HECK IS A 6821 PIA?
2. WHAT IS A 6883 SAM CHIP AND HOW DOES IT WORK?
3. HOW DOES THE 6847 VIDEO GENERATOR WORK?
4. WHY ARE THERE ONLY 32 CHARACTORS ACROSS THE SCREEN?
5. WHY IS THE MAXIUM FORMAT 64 BY 24?
6. WHAT IS AN ADDRESS DECODER?
7. WHAT IS BASIC PROGRAMMING?
8. WHAT IS ASSEMBLY LANGUAGE PROGRAMMING?
9. WHAT IS THE ASSEMBLER?
10. WHAT ARE MACRO'S?

IF THESE ARE SOME OF THE QUESTIONS YOU WOULD LIKE ANSWERED THEN COME TO THE COCO MEETING IN SEPTEMBER. WE WILL START OUR NEW TRAINING PROGRAM THIS MONTH. IT WILL BE A SERIES OF PROGRAMS COVERING BOTH HARDWARE AND SOFTWARE. WE WOULD LIKE TO ASK ANYONE WHO IS WILLING TO SHARE YOUR KNOWLEDGE WITH OTHERS AND WOULD LIKE TO HELP US WITH THE PROGRAMS LET THE CHAIRMAN KNOW AND HE WILL PUT YOU DOWN ON THE SKEDULE FOR ONE OF THE PRESENTATIONS. WE NEED YOUR HELP SO SPEAK UP AND HELP ONE OF YOUR FELLOW COCO USERS.

TRS 80C Central Oklahoma Computer Organization

VIDTEX COMMANDS

COMPUSERVE VERS 4.0

THE META KEY IS THE UP ARROW
CONTROL KEY IS THE DOWN ARROW

META M - META FUNCTION MENU
META H - HELP PAGE
META X - EXITS VIDTEX PROGRAM
META O - OPENS RAM BUFFER
META C - CLOSES RAM BUFFER
META Z - ZEROES RAM BUFFER
META G - ADD SCREEN TO BUFFER
(DOESN'T OPEN OR CLOSE THE RAM BUFFER.)
META D - DISPLAYS BUFFER
META P - PRINTS THE BUFFER
META S - SAVE TO DISK (EDITED)
META U - SAVE TO DISK (UNEDITED)
META L - LOAD BUFFER FROM DISK
META V - XMITS BUFFER
META Y - XMITS 1 LINE AT A TIME
META : - PRINTS SCREEN
META A - ABORT FUNCTION
META F - SET FUNCTION KEYS
META I - CREATE AUTOLOGON
META J - EXECUTE AUTOLOG
META Q - SELECT COMMUNICATION SETTINGS
META E - WORD WRAP ACTIVE
META B - WORD WRAP INACTIVE
META K - TOGGLES SCREEN COLOR
META CLEAR - CLS

CONTROL CHARACTERS

CONTROL A - SUSPENDS DATA BEING RECEIVED. PRESSING CONT. A REPEATEDLY SENDS 1 LINE AT A TIME.

CONTROL S - SUSPENDS OUTPUT IMMEDIATELY.

CONTROL Q - RESTORES OUTPUT AFTER A CONTROL A OR CONTROL S.

CONTROL C - INTERRUPT!

CONTROL H - BACKSPACE

MEMORY COMPARE UTILITY

CHPMEM .SRC, .BIN and .DOC refer to the source code, object code and documentation for a M/L utility used to perform a byte by byte comparison of two blocks of memory. This program is being developed for several purposes.

1. To compare two M/L files that are supposed to be identical but show differences in either addresses or function.

2. To compare two versions of a program to identify the changed areas. The most obvious reason for this is to expose the patched areas for disassenbly and study.

3. To compare two versions of a program that is written to operate on certain versions of ROM. This will allow publishing public domain BASIC programs to use to modify M/L programs so they will function on a certain version of ROM. The BASIC program written to do the patch can be passed around in clubs or groups without fear of piracy suits.

How it is supposed to work. Perhaps the final version will actually work!!

1. Upon execution a screen of abbreviated instructions are presented along with a request for the end memory address in the upper block to be compared.

2. After entry of the fourth digit for the hex end address the program checks to see that it is in the valid address range. If not it presents a prompt and exits to BASIC. If the defined end address is valid, the comparison begins.

3. Bytes are compared using 16 bit registers for speed; if either of the pair of bytes do not match they are printed to the screen. The information printed to the screen is the values contained in the two bytes in the lower block being checked followed by the address of the first byte of the pair in the upper block being checked and finally the values contained in the two bytes in the upper block being checked.

4. The display is on the left margin and will stop for a prompt before the information scrolls off the screen. Touching any key allows the next screen full to be presented. Once the desired end address is reached a prompt is shown displaying the end address and the program exits to BASIC.

The addresses involved are as follows:

$1000 = start address of the lower block to compare

$3FFF = highest possible address for the end of the lower block to compare - - allows files up to $2FFF bytes in length to be compared

$4000 = start address of the upper block to compare

$6FFF = highest possible address for the end of the upper block to compare

$7003 = execute address of the utility program

EXAMPLE: To compare two copies of CBUG do a LOADM of one copy so its start address if $1000 and LOADM the second copy so its start address is $4000. CBUG is $734 bytes long so the end address for each copy is $1734 and $4734 respectively BUT the address to enter is the end address of the UPPER BLOCK - - so enter $4734 at the prompt. The comparison will be done - - nothing should be displayed from $4000 to $4732 however since bytes at $4734 and $4735 are compared at the sane time if the upper bytes ($1735 and $4735) do not match then the display will be EEXX 4734 EEYY. Where EE is the value of the last byte in each copy of CBUG and XX and YY are the mis-matched bytes located at $1735 and $4735 respectively.

To compare longer programs split them up in segments. For example take say $2000 bytes at a time and do the comparison. Also when comparing programs it may be necessary to adjust for inserted or deleted subroutines to get a accurate picture of the differences. For example lets say a programmer deleted a routine by placing 5 NOPs ($12) in the middle of the first version of a program and then later took out the unnecessary NOPs and therefore made the second version 5 bytes shorter. A comparison of the two versions would likely display every byte after the point where the NOPs were located when in fact if the second version was offset loaded to compensate for the removed bytes there would be no display of differences in the areas above the removed bytes (NOPs).

DISCLAIMER: I have included the source code so feel free to modify the program. It certainly can be improved in many ways. If you have ideas but don't know how to program them - pass them on anyway and maybe I can figure (or flounder) out a way to do it!

S I G M O N

SIGMON is a powerful and versatile machine language (M/L) monitor/debugger and mini-assembler which gives you access to the M/L capabilities of your TRS-80 Color Computer (TRS-80C).

The following commands are available in Signon:

DUMP(G) Dumps contents of memory to screen in Hexadecimal and ASCII format. (G) option displays graphic values.

LIST List memory contents, including graphics, indicating memory locations.

DIS Disassemble memory to mnemonics.

FIND Search for specific data in memory.

ASM Enter mnemonics, characters or values direct to memory.

MOVE Move a block of memory to a new address.

STEP Single step a M/L program.

BREAK Set break points in a M/L program.

SET Place specific values in CPU registers.

GO Go to a specified memory address (execute).

WRITE Writes a M/L tape file into memory (CSAVEM).

READ Reads a M/L tape file into memory (CLOADM).

PLOAD Load RS-232C serial data into memory.

PRT Link the screen output to the printer.

NOPRT Turn off printer link.

MODE(H) Sets numeric entries to hexadecimal default. Hex is the recommended mode.

EXIT Exit to BASIC - performs a RESET.

SPEED Set video scrolling speed.

SIGMON normally occupyies memory from decimal 4082 through 10040 (Hex $0FF2-$2738), but may be relocated anywhere in RAM with the MOVE command.

The TRS-80C and SIGMON uses a buffer area for tape I/O. This buffer begins at memory location $01D2 (466 decimal). Buffer allocation is as follows:

$01D2 - $01D9 8 byte filename to load/save (if specified in command) padded with spaces ($20). If the filename is not specified then the area contains 8 spaces.

$01DA - $01E1 8 byte filename of last file loaded. It is stored in the same format as the above.

$01E2 Function code of block just read from tape. 0 = filename header, 1 = data block (hi-bit set if last one), 2 = machine language file

$01E5 - $01E6 Starting address of program loaded

$01E7 - $01E8 Entry point of program just loaded.

$007E - $007F Address of last byte loaded from tape +1.

$009D - $009E BASIC's EXEC address (MSB/LSB).

$0019 - $001A Starting address of BASIC program.

$001B - $001C End of BASIC program & start of variable table.

$001D - $001E Beginning of BASIC array table.

$001F - $0020 End of BASIC's array table & start of free user memory.

Programs written with SIGMON may be located anywhere in free RAM except the address range occupied by SIGMON and page zero (0 - $FF). When working in conjunction with BASIC programs, the above addresses may be checked for non-conflicting memory use. Generally, you are safe in locating programs in memory higher than the end address of SIGMON's work space (eg above $2800).

LOADING AND EXECUTING SIGMON

SIGMON is supplied on a cassette tape and uses standard TRS-80C M/L format. To load the tape, power up your computer into BASIC, make sure that the tape is positioned at the beginning and type CLOADM. When BASIC has finished loading and the word "OK" is displayed on the screen, type EXEC. The SIGMON title page will appear on the screen. You may now begin entering commands.

If you wish to use SIGMON in conjunction with a BASIC program you must reserve memory for SIGMON. This will prevent BASIC from "writing over" the monitor. To do this, simply enter the BASIC command "CLEARXXXX,4080" where XXXX is the amount of string space you wish to reserve for BASIC. If you return to BASIC, SIGMON can be reentered by using the execute command (EXEC4096 if you have re-assigned the EXEC value in your BASIC program). SIGMON may also be accessed via the USR(0) basic FUNCTION. This method requires that you execute the statement POKE275,15:POKE276,242. If you do not change the values in the USR address, SIGMON may be entered with the command print USR(0) or X=USR(0) where X is a dummy variable. You may use any variable not used in your BASIC program.

U S I N G S I G M O N

In the normal mode, values may be entered into SIGMON from the keyboard in one of three forms:

Hexadecimal values must be preceeded by a dollar sign ($) - - i.e.

```
LIST $1000
```

Character values must be preceeded by a single quote ('). i.e.

```
 ASM 'This is text
```

Double quotes may be used if you need an apostrophe.

Decimal numeric values need no prefix (decimal default). i.e. DUMP 1024

Entering the command MODE H causes SIGMON to expect all numeric entries to be hexadecimal. In this mode all numeric entries must begin with a numeric figure and only hex entries are allowed. Hex is the recommended mode. i.e. LIST 0AF

ALL NUMERIC OUTPUT OF ADDRESSES AND VALUES ARE IN HEXADECIMAL.

S I G M O N C O M M A N D S

Please note that spaces and commas are interchangeable in command lines. Any parameters enclosed in brackets are optional.

MODE H

This command will set or turn off the hexadecimal default value of numeric entries. Examples - -

MODE H = All entries to be hexadecimal.
MODE = Numerics entered in "normal" fashion.

PRT/NOPRT

Entering PRT will cause the screen to lock and all output to be directed to the printer. The printer must be connected and on-line before the command is entered or SIGMON will hang and accept no further commands. Escape this condition by hitting RESET and type EXEC again. The command NOPRT turns off the printer link.

DUMP start address , end address
DUMPG start address , end address

The DUMP commands displays the contents of memory beginning at start address . If no start address is specified, DUMP begins at $0000 and continues through end address . If no end address is specified, DUMP goes to the end of memory. This command displays the current address at the left margin, followed by 8 values in hexadecimal. Directly under the hex values is the ASCII character (if its value is below $80) or a period if the value is above $80. DUMPG displays the grapic block values for values above $80. Examples - -

DUMP $1000 $10FF (hex)
DUMPG 4096 4351 (decimal with graphics)

LIST start address , end address

The LIST command displays the character representation of memory contents beginning at start address , if specified, through end address , if specified. Like DUMP, LIST continues through to the end of memory if "+" follows, or shows a single line if no end address is stated. This command displays the current address at the left margin, followed by 25 characters or graphic blocks, produced by the values in those memory locations. Examples - -

LIST $1000 $1234 (hex)
LIST 4096 4132 (decimal)

DIS start address , end address

The DIS command displays a disassembly of code in the address ranges indicated, if specified. Default is to $0000 for the start and end of memory for the end. The form of disassembled memory is:

aaaa oooo dddd xxxx nnnn

where aaaa = address field oooo = opcode field
dddd = operand field xxxx = mnemonic field
nnnn = correct addressing expression

SIGMON always expresses values in hexadecimal and does not use a dollar sign ($) during output.

The "nnnn" field will show the absolute address for relative branches and PC (program counter) relative indexing mode. For instance the disassembled instruction LDA 3010,PC indicates that the data in address $3010 RELATIVE to the current position of the program counter is to be loaded into the A register. If the instruction is move to another location in memory, the display value $3000 wil be different as it was only valid in the original position. The offset value will be found in the "dddd" field and it will remain the same, given the same program, no matter where the instruction is in memory. Using this as an example, if the original disassembled instruction appeared thus:

3000 A6 8C0D LDA 3010,PC

3010 00 NOP (this is data location)

and the whole chunk was moved to $3100, without rewriting (reassembling the source code), then the same code at location $3100 would be disassembled as:

3100 A6 8C0D LDA 3110,PC

3110 00 NOP 3110,PC

As you can see, the offset value in the "dddd" field remains the same, although the NEW disassembled address in the "nnnn" field is different (although correct).

The display output during the execution of the above commands may be paused by pressing SHIFT @ keys. Each successive single line may be displayed by pressing any other character on the keyboard except ENTER or BREAK. Pressing ENTER will resume scrolling and pressing BREAK will abort the command and return to the SIGMON prompt ( ).

FIND start address,end address,data

The FIND command allows searching for virtually any single or combination of values and will even locate occurences of mnemonic code. Just state the address range to search and the data you wish to FIND and the addresses of all occurences of the data will be displayed. Examples - -

FIND $A000,$C000,"LLIS" $D4

Will FIND the BASIC reserved word "LLIST" (the seventh bit on the last letter is set), in BASIC's look-up table. In this case, AACE will be displayed. Other examples - -

FIND $3000 $4000 44,$0d,123,'test',55
FIND $3000 $4000 LDX #$0400

In the last example, SIGMON will decode the mnemonic into numeric values and search for those values. Because the same sequence of values (in this case $BE, $04, $00) may occur as part of data blocks or in the middle of other instructions, you are likely to get meaningless addresses at times. When searching, be sure to look at the code around the addresses to be certain the desired interpretation of data was achieved.

ASM start address

The ASM command allows you to modify values in memory with mnemonics, numerics or character values. All input may be concatenated (entered all at once), or each value, character or mnemonic may be terminated with the ENTER key. When finished with entries, pressing ENTER after an address display will exit this mode. Examples - -

ASM $3000 ENTER
(address) (user input)
3000 = 'this is a test' enter
300E = $0D enter
300F = 99 enter
3010 = enter (exit mode)

This exanple entered the text line "this is a test" into memory starting at address $3000. Other hex and decimal values were entered but address $3010 was unchanged.

Mnemonics may also be entered with ASM, but only one per line is allowed:

3000 = LDA #$0D
3002 = BRA $3010
3004 = enter

SIGMON optomizes code entered under the ASM command. Thus if the code could use either an 8 or 16 bit offset (i.e. BSR $2000,PC), SIGMON

will use the 8 bit offset form, if appropriate. Keep this in mind when figuring relative addresses.

SIGMON uses standard Motorola syntax except with the "auto decrement" instruction. Motorola examples include STX 0,--S STA 0,+X however SIGMON syntax requires STX 0,S-- or STX S-- STA 0,X+ or STA X+.

MOVE start address,end address,target address

The MOVE command moves the memory block beginning at start address and ending with end address to the target address. This provides you with a quick method of shuffling memory. If you are moving blocks of code that need data or incorporate absolute addresses, the data must be included in the range of addresses to be moved if it is referred to in the relative addressing mode, or it will be lost to the program. Absolute addresses should not be in the range of the addresses moved,or they will change and likewise be lost to the program. Example - -

MOVE $3000 $3100 $3200

STEP start address

The single step master tracer routine allows you to execute one line of code at a time and displays the registers before and after each step. Here is the format of the display:

```
STEP $A027

CC=80  A=00 B=00 DP=00 X=0000
Y=0000  U=0000  PC=A027  S=3F33

A027   CE A00E    LDU #A00E
```

This code is found at the entry point of BASIC. As you can see, SIGMON initializes the D (A+B), X, and Y to null but maintains the CC register, as well as the U and S stack pointers as they are on entry. You may continue the STEP process by pressing the spacebar , or some other key, or abort the operation by pressing enter . In this example pressing spacebar will produce the message:

ROM! GO!
This lets you know that the next step in the program is in a ROM address. This warning is given because SIGMON will lose control when entering the ROM, and you will wind up back in BASIC when an RTS instruction is encountered. (This is also true in RAM, by the way.)
If you want the program to go to ROM, press the "Y" key. Otherwise press "N", and you will be back in command level of SIGMON.

To examine ROM in a 64K RAM machine use a utility program to copy ROM to RAM and operate in the MAP TYPE 1 or "All RAM" mode. SIGMON can then single step through the entire 64K address range of the system and maintain control.

BREAK addr1,addr2,...addr9
You can set up to nine break points in RAM. When executing a program, SIGMON will stop and display the registers each time it encounters a break point. The PC register shows the address that the break occured. Break points are created by replacing the code with a software interrupt (SWI) instruction. The break point will be cleared once it has been executed, and the original code is replaced. Here are the commands to manipulate the break points:

```
BREAK 1,5,$30,$3A00  . . . sets the list
BREAK !$30 !1 - kills break points at those addresses
BREAK K - kills ALL break points
BREAK  ?  - displays all current break points
BREAK 1,5,!$30,?
```

If you attempt to set a break point in ROM, or give the wrong parameters, a BREAK ERR message will be displayed. You may also get this message during a program execution if a SWI is encountered and no break points are set.

SET reg=val

With this command you can assign values to any of the registers, including the PC. This will allow you to set up a group of conditions that you want to exist at some given point in your program and STEP through from that point. To see the current status of the registers, enter SET with no parameters. Examples - -

```
SET  (show current registers)
SET CC=$80
SET Y=$0FF5
SET X=$1234,Y=$6734,A=20
```

GO address

This will cause the CPU to execute or jump to the specified address. If you have set break points, execution will pause at those points, as discussed earlier. If you have SET the PC to an address, GO will start at that address if not specified in the command. If you have not specified the address in either the command or by placing it in the PC, then GO will take you to wherever the PC on the stack leads you - - most likely into space!!

SPEED val

Enter a value to set the display scrolling speed. Entering 0 gives the fastest rate and entering 255 gives the slowest rate.

EXIT

This cleans up the stack and returns to BASIC via the RESET routine at $A027. SIGMON may be re-executed if it has not been over-written in memory.

WRITE "filename",start address,end address, entry point

SIGMON writes a standard TRS-80C format M/L tape which may be read into either BASIC with a CLOADM or into SIGMON with the READ command. You must specify the filename and start and end addresses, if the entry point is not specified it will default to the start address. Personal experience dictates that you enter the dollar signs ($) to precede hexadecimal addresses EVEN when in MODE H - - This is believed to be a minor bug in SIGMON.

READ

This command will read a TRS-80C M/L tape file into its specified addresses. No parameters are required. If an I/O error occurs you will be returned to BASIC - type EXEC to re-enter SIGMON.

PLOAD

This command allows reading data into memory from the RS-232-C serial interface port at 600 baud. The data must be in the following format:

```
first byte      $02 (marks start of record)
next 2 bytes    MSB/LSB of file's load address
next byte        Length of record (up to 255 decimal)
   .
   .                 data bytes
   .
```

end of record nul (00) or $02 if another block to follow or $16 if execution address to follow.

In the last case, the two bytes following a $16 will be loaded into the PC as the entry point for this record. Issuing the GO command will execute the file. When using this command you must have a terminal or printer attached to the serial I/O port or SIGMON will hang up waiting for a serial input.

O - P A K

FRANK HOGG LABS

O-Pak is a three part utility package. It is designed to enhance the OS-9 Operating system and is not susposed to work with any other operating system.

O-Pak consists of HiRes, CSEdit, and four "X" commands. HiRes is a program which provides a higher resolution screen display than the standard 32 by 16 characters supplied by Radio Shack. With HiRes you have the ability to change character sets (a variety of which have been supplied on the disk) and to mix graphics with text on the same screen. Do this in two-color or four-color mode.

You may wish to modify some of these character sets - or create some new ones of your own! You don't like the way we make our number seven? Change it! It's possible with CSEdit, the Character Set Editor. CSEdit is a screen-oriented, menu-driven program which is designed to make changing your character sets simple and fun.

As you begin to use OS-9 you may wish to transfer some data files from a Disk Basic or Flex-formatted disk to an OS-9 disk. The four "X" commands; XCOPY, XDIR, XDUMP and XLIST will assist you in doing just that.

O-Pak is on a 40 track diskette. The easiest way to make a backup copy is to use the OS-9 Backup command.

First you must format a blank disk to hold the backup copy. Use the OS-9 command:

```
format /d1 (ENTER)
```

to format a new disk in drive 1. Then simply type:

```
backup (ENTER)
```

and when OS-9 questions "Ready to backup /d0 /d1 ?" remove the system disk from drive 0 and insert the O-Pak disk. When the OS9: prompt comes back reinsert the system disk, and repeat the entire procedure if you want a backup to keep before you send the O-Pak master on around the "3838 circle".

To continue, put a backup O-Pak in drive 1, (system back in drive 0).

The first thing that we have to do is to copy some files from the supplied disk to your system disk. Make sure that your system disk is not write protected. The easiest way to start HiRes is to follow these steps:

```
copy /d1/hires /d0/cmds/hires (ENTER)
copy /d1/stdcs /d0/cmds/stdcs (ENTER)
hires                         (ENTER)
```

You should now see the "OS9:" prompt in the upper-left corner of the screen, in smaller characters than you're used to. This is the default 51 column by 24 line character set supplied with HiRes. It is called "stdcs".

Now that HiRes is running, type the command:

```
tmode -upc (ENTER)
```

so you may see lower case letters. This command is from OS9 (not o-pak) and is what allows OS9 to display lower case letters. However, upper case letters will still not be generated by your keyboard until you "take off the alpha-lock." This is doneby holding down the CLEAR key and typing a zero. We suggest you now try some of the commands you're already familiar with, to see how they look with HiRes. How about using the "dir" command to explore the O-Pak disk?

The rest of O-paks utility programs are on the disk in the /CMDS directory. Because not all of them will fit on your system disk you may not wish to install any. To use them you LOAD them from /d1/cmds and then use the same syntax as any other command. Example:

```
load /d1/cmds/xcopy  (ENTER)
xcopy etc,etc
```

Unlike most commands, HiRes remains in effect afterit exits and control is returned to OS-9. You will see that the module HiRes is still in memory after you run it. you will not be able to unlink or save it. The module "StdCS" is also still in memory. You will be able to unlink it, but if you do and you load something else into memory, you will no longer see recognizable characters on the screen. This is because HiRes gets information about how to draw the characters from StdCS.

HiRes may be terminated by sending control codes to it. One way to do this is using the DISPLAY command. Type:

```
display 1f 1f 1f e 12 (ENTER)
```

to terminate HiRes and return you to the standard display mode. HiRes will automatically unlink itself and StdCS.

The sequence of three 1f codes is the actual command to terminate HiRes. It doesn't get rid of the graphics screen for you - in case you want to do something else with it. that's what the "e 12" does.

HiRes has a mode in which it passes all commands directly to CCIO, the display device driver which comes with OS-9. The control code, hex 1C, enters this mode. Example:

```
display 1c e 12 (ENTER)
```

to enter pass-through mode, deallocate the screen, and get back 6K of memory.

To end this pass-through mode, send three 1E codes.

```
display 1e 1e 1e (ENTER)
```

HiRes recognizes all of the text control codes recognized by CCIO. A very useful one is the clear screen command, hex 0C.

If a graphics screen is already allocated when you run HiRes, then HiRes does not automatically clear the screen. To clear the screen (while in HiRes), simply type:

```
display c (ENTER)
```

USING A DIFFERENT CHARACTER SET

When you first call in HiRes the character set defaults to the standard character set, STDCS. However, you may select a different character set when initializing HiRes. To do this, simply type HiRes followed by the name of the character set. As an example:

```
hires /d1/cmds/roman (ENTER)
```

where roman is the name of the character set.

When you are running HiRes you may also switch to a different character set at any time. To accomplish this you must send to HiRes the hex codes 1B 4A, followed by the name of the character set (as a string of ASCII codes) and a carriage return. The easiest way to do this is to use the DISPLAY and ECHO commands:

```
display 1b 4a ; echo  character set name
```

The two commands must appear on the same line, separated by a semicolon as shown, to work properly.

The rules that apply to the OS-9 commands also apply to the character sets. That is, the character set must either be loaded in memory, or in the current execution directory, which upon boot up is the /d0/CMDS directory. Therefore, if your character set file is on another disk you must either load the file in memory (load file name), or change your execution directory to the directory the character set file is in (chx directory). Alternatively, you nay give a complete pathname in the ECHO command. For example:

display 1b 4a ; echo /d1/cs2/roman (ENTER)

indicating the character set roman in a directory called CS2 located on drive one.

The file "CharSets" on the O-Pak disk contains a list of the character sets that are provided, and gives a brief description of each. You may list this file:

list /d1/charsets

if you want to review this information. The actual character sets are contained in directories CS2 and CS4.

THE DOCUMENTATION GOES ON FOR 30 PAGES, ALL KINDS OF WINDOWS, EDITING CHARACTER SETS, SCROLL RATE, TYPE OF CURSOR ETC ,ETC....

THE "X" COMMANDS

The "X" commands XCOPY, XDIR, XDUMP, and XLIST are utility commands that allow you to manipulate Disk Extended Color Basic (DECB or RS) and FHL FLEX files from OS-9. These commands are similar to the corresponding commands provided with OS-9, except that the pathname has been extended to designate an RS or FLEX file.

The disk operating system (DOS) to be accessed is specified by a file system specifier dos .

The following are valid specifiers:

rs% or
decb% (a DISK EXTENDED COLOR BASIC file)

flex% (a FLEX text file, with space compression)

flexb% (a FLEX binary file, without space compression)

If no file system specifier is indicated, the specifier defaults to OS-9.

The device specifier dev is used to designate the drive to be accessed. The specifier is defined the same way a drive is specified by its corresponding DOS. For example:

flex% or flexb% - drive .
rs or decb% - drive :
OS-9 - / device /

The file name file indicates the file to be accessed, The syntax of the file name must be the same as the syntax used by its corresponding DOS. Therefore, the syntax for each DOS is:

flex% or flexb% - name . ext Example NAME.TXT
rs% or decb% - name / ext Example NAME/DAT

The complete file specifier filespec consists of the file system specifier, device specifier and the file name that is to be accessed. The specifier has the following syntax:

dos dev file

Please note that, for the purpose of finding a file which is to be read from a disk, upper and lower case letters are considered to be equivalent.

Examples of valid file specifiers are:

/d0/DEFS/os9defs (standard OS-9)
flex%0.DATA.TXT (Flex text file)
flexb%1.PROG.BIN (Flex binary file)
rs%0:PROG/BAS (Color Basic program)
decb%1:PROG/BAS (Color Basic program)

COMMAND SYNTAX

XCOPY:

xcopy filespec filespec

Copies the data of the first file to the second. XCOPY will copy in any direction between DISK EXTENDED COLOR BASIC formatted disk, FLEX formatted disks and OS-9 format. The first file must already exist. An error will be reported if the second file already exists.

Note that copying a file does not translate the file in any way, it just means that byte for byte information in the file is copied form on disk format to another. Therefore, XCOPY is only useful for copying ASCII files such as source files, BASIC ASCII files etc. For example, you may copy an OS-9 text file to a FLEX file so that you may edit the file with an editor that runs under FLEX. Or you may want to copy a RS BASIC program saved in ASCII to OS-9 and complete the necessary modifications so it will run as a BASIC09 program. Although XCOPY will copy binary files, the results will be of limited use.

XDIR:

Xdir dos device

Displays a directory of the files on the disk indicated. XDIR can only be used with FLEX or RS files; i.e. for OS-9 files the OS-9 DIR command must be used.

XDUMP:

xdump filespec

List out a hex/ASCII display of the contents in the file.

FLEX% files are considered to be FLEXB files, in other words space compression is not expanded.

XLIST:

xlist filespec

Lists the file to standard output (typically the screen).

EXAMPLES:

xdir flex%1 (ENTER)
xdump rs%1:ARMENU/BAS (ENTER)
xlist flex%1.STARTUP.TXT (ENTER)
xcopy rs%1:ARMENU/BAS flex%2.ARMENU.BAS (ENTER)
xcopy rs%1:ARMENU/BAS /d0/source/armenu (ENTER)

The first example will do a directory of a FLEX disk in drive 1. The second example will dump the file "ARMENU/BAS" on a Radio Shack DOS disk in drive 1 to the screen. (Useful to determine if it is and ASCII file). The third example will list the FLEX file in drive 1 by the name of "STARTUP.TXT". The fourth example will copy the file on the Radio Shack DOS disk in drive 1 called "ARMENU/BAS" to the FLEX disk in drive 2 with the name of "ARMENU.BAS". The last example will copy the file on the Radio Shack disk in drive 1 by the name of "ARMENU/BAS" to the OS-9 disk in drive 0 into the directory "source" under the file name of "armenu".

CONDENSED SUMMARY OF OS-9 DISPLAY CONTROL CODES:

HEX

01 Home alpha cursor 02 x,y Position alpha cursor x=Col+$20 y=Row+$20 03 Erase line

06 Cursor right 08 Cursor left 09 Cursor up 0A Cursor down

0C Clear screen 0D Carriage return 0E Select alpha mode 0F a,b Select graphics mode a=mode b=color code

10 a Preset screen a=color code 11 a Select color a=color code 12 Deallocate graphics screen 13 Erase screen

14 Hone graphics cursor 15 x,y Move graphics cursor x coord y coord 16 x,y Draw line to x,y x coord y coord 17 x,y Erase line to x,y x coord y coord

18 x,y Set point at x,y x coord y coord 19 x,y Clear point at x,y x coord y coord 1A r Draw circle r= Radius

HIRES DISPLAY CONTROL CODES:

HEX

1B 41 Erase to end of line 1B 42 Erase to end of window 1B 43 Create window boundary 1B 44 Combine window w/1 above

1B 45 Insert line 1B 46 Delete line 1B 47 Shift right 1B 48 Shift left

1B 49 Fine cursor right 1B 4A n 0D Change char set n ame 1B 4B Fine cursor up 1B 4C Fine cursor down

1B 4D Fine cursor left 1B 4E Renove all windows

1B 51 Enable overstrike mode 1B 52 f Change f oreground color 1B 53 b Change b ackground color 1B 54 w Change w idth of cell

1B 55 h Change h eight of cell 1B 56 Block cursor 1B 57 r Set blinking cursor r ate 1B 58 r Change scroll r ate

1B 71 Disable overstrike mode 1B 76 Underline cursor

1C Enter pass-through 1E 1E 1E Terminate pass-through 1F 1F 1F Terminate HiRes

Not long ago, as I remember, (it was only last December)
The postman came a-knocking, knocking at my kitchen door.
I had seen him near my thicket. "Surely," I thought, "he'll have my ticket..."
---And I shuddered as I hastened to greet him at the door---
"...or will this day, like many others that have gone before
Bring only bills---and NOTHING MORE?"

Aloud, I shouted: "How can this be? I've waited weeks. How can they miss me?
Pray, search your bag. Another letter there must be.
I fathom not what the delay is. All my anxious soul can pray is:
There is a certain notice in your bag for me---
Yet another letter that could fill my heart with glee..."
Asked the postman, "From the FCC?"

As I watched the postman grinning like a cherub who'd been sinning
With that ever-present, winning smile of his,
The wind blew hard; the door was creaking; but o'er the din I heard him speaking:
"I think I know just what you're seeking.
Yes,..." quoth the postman, "...here it is!"
My postman seemed to caper, and not unlike a dwindling taper
Disappeared. He left me with a paper, with my call sign from the FCC!!!
I seized that paper and a tack, then scurried to my new-built shack
And panting, tuned my rig. I grabbed my key.
I'd find some pleading ham's CQ---whoever it might be---
And have him judge my RST.

The 15-meter band was humming, but my CQ was yet forthcoming
And the very loudest tapping was from my banging knees.
Outside the shack, the snow was glist'ning. The world seemed bright.
I kept on list'ning,
Impressed and jealous of that apparent ease
Of other fellow Novices working at their keys.
But all their letters seemed to ME---like C's.

Then I did what other men would, tuned more sharply on my Kenwood
And held my breath 'till I was almost blue.
I thought my pounding heart was snapping, but then my fist began its tapping
As if I knew just what a ham should do.
Yes, just as if I knew what any ham might do
I batted out my very first CQ.

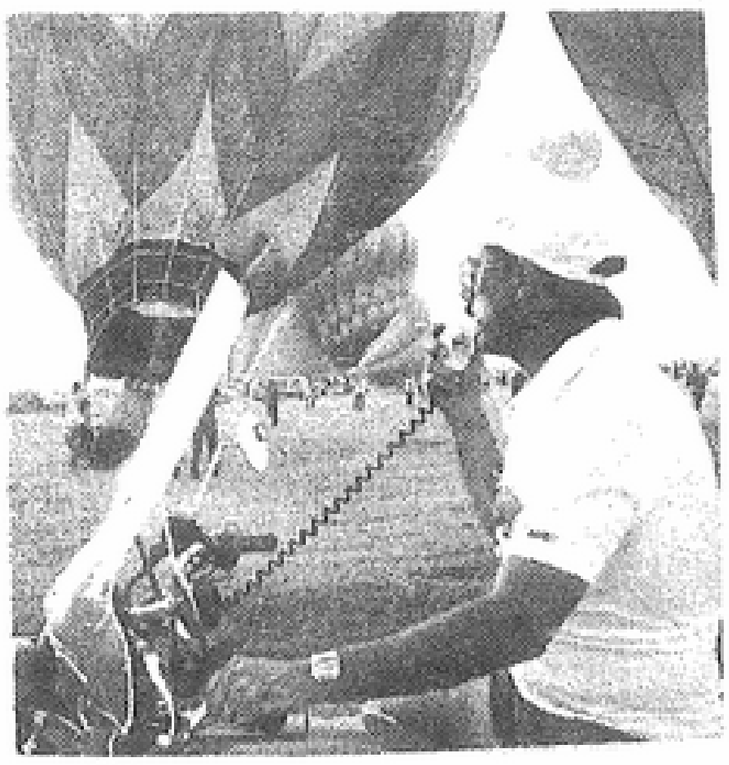
Upon my brow the sweat was pouring. My XYL was near, adoring
The unprecedented courage I now began to show.
An answer came! No time for rueing what I'd done or would be doing.
How pure my letters? I did not care or know.
But on my wall today a QSL will clearly show
Beyond a doubt---in fact---I'd had a QSO,
Leon Picon, WB3KMD

The above was sent to Jack E Stewart, N5FZK. TNX

The South Canadian Amateur Radio Society

K6N, KA5EFJ

LOUIS, KO5WA



LELAND, W5NCH

THE SECOND ANNUAL GREAT OKLAHOMA BALLOON RACE of August 18 & 19 is now history and 21 amateurs from Norman, Moore, and Oklahoma City joined forces to make it happen. Over 50 hot air balloons were present, along with a large contingent from the Oklahoma Wing of the Confederate Air Force, as well as, aerobatic flyers, wing walkers, parachutists, and other things that zoom through the air.

The most capable Lord High Mocus of the amateurs present was Ken Neptune-KA 5EFJ, whose duty, nay whose honor it was to recruit the amateurs, work up the schedules, fill the holes, run for lunch, be yelled at, and generally ride around on his motorcycle and look busy. Our basic responsibility was to assist the OU Police Department with perimeter security, complaint relaying from the gates, and watering the thirsty (103 degrees on Saturday). This we did from 4:30 am each morning until 7:00 pm on Saturday and 4:00 pm on Sunday.

The largest contingent from the amateur community were from South Canadian Amateur Radio Society (SCARS), but we could not have done it without our visitors. A BIG tip of the SCARS cap to: Jack-KE5KR, Bob-KA5ETA, Hershel-KA5KWH, Mike-KA5TSD, Mike-N5FFO, and Harold-KA5SQP. SCARS members assisting were: Ken-KA5EFJ, Ken-N5BEW, Gene-WD5GTC, Jim-WD5HPU, Dave-KD5IT, Bill-K5KDR, Jerry-W5MCJ, Leland-W5NCH, Bob-KA5HIZ, Dave-K5PL, Monty-WB5RZX, Gary-WB5ULK, Charlie-WB5UUX, Louis-KD5WA, and Q.R.-A5A.

Did we do public service? YES

Did we have fun? I'll let KD5WA answer that, "Let's do it again next week!" Maybe week after next, Louis.

de WB5ULK

DAVE, KD5IT

DAVE, K5PL

MONTY, WB5RZY
GARY, WB5ULK
KEN, N5BEW

JACK, KE5KR & ?

BOB, KA5HIZ
GENE, WD5GTC

AUGUST HAPPENINGS.....

For various reasons, there was no meeting of the South Canadian Amateur Radio Society this month. The weather, as well as vacations and other acivities have kept most SCARS members tied up. Cold weather will almost be welcome, when it appears this fall and winter, as it will provide an excuse to stay indoors and work in the shack. Now is the time of year to finish up on all of those antenna projects that have been put off until summer. It's not much fun to try to solder the feedline on a dipole when the wind chill factor is below zero.

Gleaning tidbits of news from this group is like trying to discover the combination to the lock on Fort Knox. Something must be happening. By doing some heavy-duty digging, a few newsworthy items were discovered:
-W5SQJ has been on a trip to Colorado.
-AF5X was back in town for a visit.
-WB5ULK took a drive to Houston for vacation.
-A large supply of back issues of QST have been donated to the club and are available at the club station.
-KA5EFJ took a trip to Minnesota, and N5BEW & W5MCN talked to him almost daily via 20 and 40 meters.
-The receive crystal on the repeater is off frequency, however the machine is still very usable, and the problem will soon be solved.
-Twenty-one persons helped with the 2nd Annual Great Oklahoma Balloon Race, including W5MCN who constructed the j-pole antenna used on the command post. (See the story and pictures elsewhere in this issue.)

DX WITH A 2-METER HANDI.....

The other day on 147.06MHz, some fellow was talking to a guy in Florida. What a great VHF station that guy must have! How many stacked yagis would it take to be able to do something like that? Could it be done with 200mw and a rubber duckie? Just keep listening to the W5OU/R and anything can happen (almost) thanks to a 2meter to 10 meter link which is on the air courtesy of Jeff, KE5EB. Jeff has rigged the link so that it will receive 10 meter FM signals and re-transmit them on 2 meters. In turn, the link will take the signals received by the 147.06 repeater and re-transmit them on 10 meters. Jeff moniors 10 meters to determine when the band is open, and then activates the link so that others can enjoy the fun of 10 meter FM, and all by way of a 2 meter talkie.

FOR SALE: Rohn HDBX 48' self support tower. To be sold as a package deal with 3 BR, 2 bath, 1800 sq ft home on 2 acres. In the Tuttle-Newcastle area. Priced $10,000 below market value. Gene 392-5486.

Ron told me that he used to use Evelyn Wood's Speed Reading Method until he went blind in one finger.

We bought a transmitter but no receiver. At our age we figure we've heard it all.

Marconi never had TVI.

The YF is in the hospital. She was working on our antenna and came down the ladder five minutes after we had put it back in the garage.

Did you hear about the Novice who flunked his ZIP code?

AUGUST MEETING NOTES

A forum didn't show up for the August meeting so not much was done. I had harmonic problems at home, so I couldn't make the meeting. (Number two daughter was born at 3:27 am on Thursday morning of the meeting day, mother and daughter are doing fine and are home already). There were three visitors at the meeting, one was Jay, KA9???, listen for him on 2 meters FM, he just upgraded to tech and is on his way to extra. The second was Shawn Papinchock who just passed his novice exam on Sat. 8/25/84, so listen for him on the novice bands soon. I missed the name of the third visitor so I guess he'll remain unheard from.

*** BIG NEWS ***

The September meeting (September 20th) will be held at Hutchins Memorial. (7pm like usual). A representative from NASA will give a presentation about current activities at NASA. (It is rumored that A5A the famous Q. R. Zedd may also be there!) YOU BE THERE TOO!! Also, there will be another election for club treasurer since Mary, WB0VHC is going back to school and must quit. Thanks for all your good work Mary! Till next month, "be good now, ya hear?"

Dave

FOR SALE: KENWOOD TS-130S w/PS-30 pwr supply, 500 hz CW filter, mic, narrow SSB filter (not installed).$525. Low hours, like new cond. Doug Everitt, N5DUB, 1706 E Okla, Enid OK 73701 or call him on the 444.1 OKC repeater or 145.29 in Enid.

While waiting for a DX station to come back to us the other day, we discovered that there are 4,234 polka dots on the drapes in our shack.

In hamming we learned one thing for sure: The first screw to get loose in a person's head is the one that controls the tongue.

A ham we all know, on leaving Central State Hospital at Norman, "For three years I was Napoleon, now I'm nobody."

If the politicians aren't careful, the first of our natural recources to be depleted will be the taxpayer.

On the rifle range the sergeant explained, "This type of bullet will penetrate two feet of solid wood ... be sure and keep your heads down."

Jeff put a chain around his neck to look macho. A girl came along and locked her bicycle to him.

Women have never had their pictures on paper money, but my YL isn't concerned. All she wants is to get her hands on it.

Jim escaped a bad accident the other day. He was at a friend's house who served him a drink. Jim thought the swizzle stick was a straw and sucked his tongue right into the glass.

CUSTOMER: "I'd like some ceiling wax."
CLERK: "You must be kidding! Who would wax a ceiling?"

Hazel thinks a holdup man is a bra salesman.

RAY MILLER, W5REC

SECTION MANAGER

What a great day it is!!! Oklahoma has a Novice Net! KA5STC, Mike Bowman out at Vici is the Net Manager. Congratulations, Mike! We wish you the very best. All Novices and anyone that is interested is invited to help Mike. It is meeting on 3740 KHz at 9:00 PM on Tuesdays, Thursdays, Saturdays and Sunday.

The Section Manager election is over. The Ballots have been counted as of today, 21 August. Our Section Manager (SM) will be Dave Cox, NB5N as of 1 October 1984. Those of you who wish to send him your best wishes, his address is; 1812 So. Umbrella Ct., Broken Arrow, OK 74012, tele: (918)250-2285. It will be my pleasure to work with him in the transfer of the Office of Section Manager in late September or early October. Mike Schenkel, W5VXU and Dave have been the finest example of gentlemen in their campaigns. Mike showing his graciousness and Dave showing his humbleness makes me even more proud of the OK OK Section.

ATTENTION ALL AFFILIATED CLUBS!!! Be getting ready to gather the information to make your Annual Club Report to the Club and Training Department of ARRL. Oklahoma has four Clubs that did not make their last report and are scheduled to be dropped on 28 September unless they immediately comply.

Again, if you are interested in becoming a VE for ARRL, write ARRL Headquarters, 225 Main Street, Newington, CT 06111 and express your desire. You will receive the VE Package with further instruction. If you are interested in getting FCC to change policy to allow Advanced Licensees to examine up through General Class write: Federal Communications Commission Private Radio Bureau, 2025 M Street, N.W., Washington DC 20554 Attn: Mr. John Johnston.

I have certified two stations as Amateur Auxiliary Members! If you are interested in this program (see August QST page 11), write me.

OK SECTION NET REPORT (July)

OLZ-------31 sess	196 c/i	88 msgs		K5CXP
OTWN------26	505	449	362 wx	WA5OUV
ONON------31	547	175		W5AS
QCWA 63---5	141	19		W5AS
STN-------26	443	86		WD5IFB
NWOSN-----13	123	8		N5CCV

FOR SALE: 64K COLOR COMPUTER, w/HJL keyboard, double disk drives, Kantronics Ham Soft. $500. Heath SB-610 signal monitor, $25. Bill, 670-5022 after 10 pm.

MID-OKLAHOMA REPEATER ASS'N. WA5YTI

A VERY IMPORTANT MESSAGE!!!

MORI DID NOT HAVE MEETINGS DURING JULY AND AUGUST

We will be back together on a regular schedule September 4. We hope that everyone had a very safe and enjoyable vacation or whatever...Also, hope that you enjoyed Han Holiday. A very special thanks to the women for providing the refreshments that were in the hospitality room, and thanks to Bobbi for coordinating it...

COMING EVENTS

OCTOBER MORI MEETING
FCC will be giving exams, good luck to all. (Maybe this is your first time or maybe it is an upgrade.) Don't forget to attend the Texhoma Hamfest coming this month.

NOVEMBER MORI MEETING
Thanksgiving Day -- Remember to give your thanks and count your blessings. Also, I would like to mention that this is the month for nominations for officers of who you want for your next President, etc., so put on your thinking caps...

DECEMBER I am sure MORI will have their annual Christmas Party, but as of now, I have not received the date, tine, etc., so be sure to listen to 07/67 or watch for details to be published.
There will be plenty of activity for the remainder of the year, and on into the next (new) year.

MORI would like to express deepest and heartfelt sympathy to the loved ones of Bob, W5OE of Purcell who became a silent key. Bob passed a lot of traffic for amateurs as well as many other things he had done. We will miss him greatly. Jerry, KD5IS sent flowers from the contributions he received.

Susie, KA5FED

FOR SALE: Galaxy V, Mark 2, xcvr, AC and DC power supply & mic. Asking $125. Halicrafter SR-150, xcvr, AC power supply, PS-150-120. Asking $125. Heath, HW-8, QRP xcvr, with HWA 7-1 power supply. Asking $100. Heath, DX -60-B, CW xmtr. Asking $40. Knight, T-60 xmtr. Asking $25. TS-382 audio oscillator. Asking $30.
Various other test equipment items such as HP 200CDR oscillator. Triplet 630A VOM. Hickok 1600 multimeter. Model 912 tube tester. Model 45 Weston DC voltmeter. Model 320A digital scaler-DC voltmeter. Sprague capacity indicator. Model 632 Magnameter reads DB DCA DCV ACV ohm. I-7 signal generator. R55A Knoght receiver. TS-505 multimeter. I-130A signal generator.
Contact W5VXU, 1211 S Main, Altus OK 73521. Phone 405-482-1797, and make an offer on these items.
All these items are from the estate of Silent Key, K5LYH, Bob Parks, and his widow would like to use all proceeds for placing a marker on his grave.

Club
NEWS

VOL 09

Minutes of August Meeting

There are none, of course. The August meeting is always replaced with the wonderful watermelon whoop, held in conjunction with the Aeronautical Center Club. I just came from that event and the last couple of slices of watermelon are still reminding me that there certainly was enough watermelon to go around!

There were at least forty melon-munchers who finally assembled at the East shelter of Bethany City park. The directions in last month's C&E were cleverly designed to find out either: 1. How well Amateur radio operators follow directions, or, 2. How many know East from West. The answer was, about half. By using the miracle of two meters, Robby, AA0O, concluded the test and advised the winners (West shelter) that the losers (East shelter) would share their consolation prize (the watermelons).

Well, that started things off on a big yack. After all, something had to be done to top last years fizzling hurricane which came through last year at the melon mash. What are we going to do next year? Joe, K5JB, Sec'y

Packet Patter

There is not really much new to report from the packet radio front this month except that TAPR TNC kits are now available without waiting. Bill, WA6CMJ, got his almost by return mail. I had loaned him the Beta test book to while away his time during the wait and I think he probably just had time to skim it before the real McCoy arrived. He should have his cooking from Del City soon.

Mark, WD5DYI, got his hardware functioning again after gremlins busted his radio and computer. The radio was still down for repair, last I heard, but he rolled out the big iron and substituted his primary rig to keep in touch with the Packeteros.

Sandy, WB5RRR, in Enid doesn't have to wait for a good opening to Oklahoma City to play packet now that he has his TAPR TNC running and has loaned Doug, N5DUB, the GLB. Doug has a GLB on order, and has for a long time. I am surprised at the delay. Maybe there is a firmware change in the works. Joe, WA5FLT, found a clock problem in Sandy's TNC by part's substitution with his own TNC. The problem had been documented in the TAPR Status Register but we didn't connect until Joe found the flakey part. Good piece of detective work...

Since Sandy and I have common computers, he has sent me several programs and pictures via packet radio. I think, by now, most of the local Packeteros have started either turning their printers off, or turned the monitor mode off, so they don't see printer paper all over the floor when they get up in the morning and Sandy and I have had a heavy duty file transfer session. When the band is poor, the crazy TNCs can be allowed to retry until the cows come home or a passing meteor helps the packet through. The poor sucker who is monitoring sees all the retrys.

One trick that is commonly pulled with the TAPR TNC, is issuing an XOFF (Ctrl-S) or drop the Data Terminal Ready line and shut down the terminal or computer. Upon returning, the received text will be in the TNC buffer, what there is of it. They come stock with 2K of the 8K RAM available for receive buffering. When the buffer is full, the TNC goes catatonic and no longer responds to connect requests, etc. I have jammed Mike's up a couple of times so far. If one has a case of terminal curiosity, he just needs more ram, or leave the printer running.

According to the handy-dandy great circle program, I figured Sandy and I are 69 miles apart, as the radio wave flys. Prior to Sandy's arrival on packet radio, Joe, WA5FLT, in Calumet, was my farthest regular packet contact, at 41 miles. Now, Joe is often an effective relay point when direct path to Enid is not good enough. Sandy is using some kind of directional antenna while Joe and I are using omni-directional DB-224/264s (approx 6dB over dipole). I can usually talk to Sandy (16F3) in the evenings but the signal has to be full quieting for no-retry packet. This usually happens about 6 A.M.! He is going to try a popular sensitivity increase mod and flat pass band active filter mod (kitted by TAPR) to his TNC and start getting ready for HF work with the 30 Meter Packeteros. Joe, K5JB

What Goes On Must Come Off

Stan, WB5UIY, gave me an idea for this month's column when he asked if I had any special equipment that would desolder a bad transistor from his hand held radio. He had been so far unsuccessful and one plated through hole was already damaged. I replied facetiously that I didn't have any special desoldering equipment but I could give him a six hour course on component removal from printed circuit boards. The problem is that there is no single way to get those little buggers off a board, so one has to be flexible to figure out how to do it without tearing things up too bad. I will try and share some of the more successful methods I have used.

There is a line of special equipment made by Pace that is used on the well equipped workbench. They are usually referred to as "desoldering stations". There may be other manufacturers; and of course, there are special attachments made for soldering irons that perform in the same way. These things have foot switch controlled vacuum pumps attached to them that have enough suck to remove the molten solder and chill the joint so it remains loose after the tool is removed. Unless, there is a very tight fit between the lead and a plated through hole, these things really work well. The winning combination is the high heat iron and the strong vacuum. Modified soldering irons having a hollow tip and a little rubber bulb for the vacuum are much less satisfactory.

Only once did I try the specially shaped soldering iron tip designed to melt the solder on all a component's leads simultaneously but it didn't work very well so I never tried it again. The problem seemed that there wasn't sufficient heat available to melt all the joints at once and nothing came loose.

Assuming the typical amateur's workbench is less well equipped, I will share the three methods I use, vacuum, wicking, and wiggling.

Before getting into the nitty-gritty of removing solder, a little review of the mechanical engineering of the problem is in order. There are a couple of things that are important to remember. First, debonding of the copper foil from the circuit is time and temperature dependent. At elevated temperatures, the bond weakens with the passing of time, and it never recovers. You only have a limited amount of time before the bond lets go so it is important to use a hot enough iron to melt the solder quickly and get it hot enough to stay melted until you can get it out of the joint without dallying. Minimum iron wattage is about 25 watts and 40 watts is better.

Incidentally, the iron plated tips have performed extremely well for me. The shape is dependent on the preference of the owner but I use a conical tip.

The second important thing to know is that solder decomposes at high temperature. It gets pastey and won't flow, no matter what. The longer it is kept hot, the worse it gets, so here is another reason for using a hot iron. If there is a little bit of stubborn residue that is preventing removal of a part, it is best to add fresh solder and start from scratch rather than continuing to reheat it. The third thing that should be recognized is the fit between the lead and the hole. If it is a tight fit, It may be impossible to overcome capillary action and remove the solder. The third, and final method, wiggling, will probably have to be used.

Where there is room to make a minor mess, I usually try the solder sucker first. There are two types that are rather successful, the spring-loaded piston and cylinder and the teflon tipped rubber bulb types. The spring loaded version is much more powerful but is rather violent, jarring the workpiece and usually leaving fragments of solder lying around, requiring careful inspection when finished. On hand-held radios, and other miniature things, I sometimes try the rubber bulb sucker first because it is a lot neater.

I try to have the radio positioned so it won't scoot around while applying pressure with the desoldering tools. Things happen fast when the solder has reached the proper temperature. One has to move quickly so there is no time to fight radio positioning. An old towel, folded and lying on the bench, does a good job of holding the radio where you want it. My technique is to have the solder sucker cocked (or bulb squeezed) and positioned right over the joint while heat is being applied with the iron. The iron is removed and the sucker tip placed over the joint in nearly one motion, and fired.

The released spring on the piston type solder sucker jars the workpiece and some of the molten solder tends to splatter. After the component is removed, I carefully inspect the board, removing foreign spatter and sometimes adding fresh solder to the empty hole so solder wick can be used to remove the residue from hole. If the replacement component lead won't easily go in the hole, this is the solution.

Solder wick works well with holes that have significant clearance. Since heat is conducted through the wick to the joint, it is even more important to have a big enough iron to do the job. Where the lead lies against the side of the hole, surface tension of the solder will keep it from wicking and the lead will remain soldered at this point. If it is only a minor tack point, the cut end of the lead can be grasped with a small pliers or hemostat and wiggled sideways to break the remaining bond. I prefer this to using a tool to try and push the lead over because, invariably, the lead will bend over, causing a kink and making it more difficult to remove. Grasping the lead and wiggling provides clue as to whether the lead is actually loose. If it is, attention can be directed to the next victim.

Dual in-line packages seem to be most responsive to the wick method because the leads, being flat, leave a lot of clearance in the hole. After wicking, the remaining bond is quite weak and easy to pop loose.

The wiggling method is effective if the other methods fail and there are only two or three leads to deal with. With a three legged transistor, one lead can be heated and the transistor can be tilted, bending the remaining two leads, causing the hot lead to creep out of the hole a little. Alternating between the three leads will walk the thing out of the hole. Heat should be applied only long enough to melt the joint and let the lead move as far as it can during that heating. I usually grasp the transistor body with a hemostat but where there is insufficient space i just use a soldering probe to lever the thing in the desired direction.

After component removal using the wiggle method, the hole is still full of solder so the solder sucker or the solder wick will clean the hole nicely. I keep an assortment of sewing needles handy for the really fine work (example Motorola HT's) to open up a hole enough to reinsert a lead. This reduces the amount of heating and trace damage.

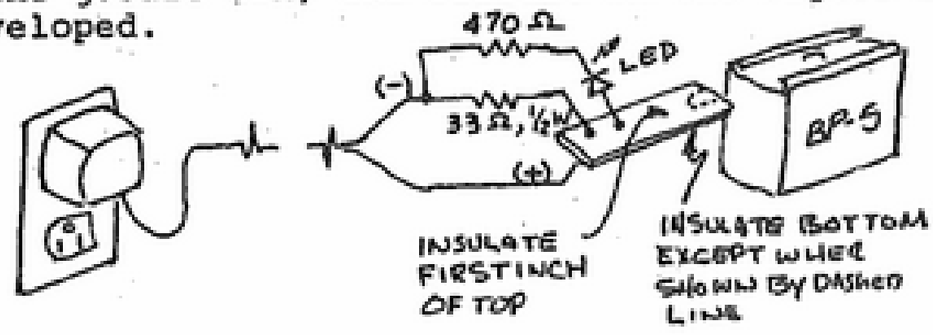
The final method is prone to cause the least board damage but it is the hardest to accept. Crush the component and get it separated from its leads. If it is certainly bad, nothing is lost. If it is a $.25 part, and a replacement is handy, it really isn't a bad troubleshooting technique if you suspect it may be bad. Dual inline packages can be removed from their leads by cutting them with a fine diagonal cutter. Removal of each lead is simple if it is grasped with a hemostat before heating. The real killer-diller is the eight and ten lead round package IC that is flush mounted to the board. If the solder sucker or solder wick doesn't free it, it will almost have to be crushed and removed violently.

One method I read about in 73 magazine was to grasp the board with vice grips, heat the solder side with a blowtorch and shake it when it looks about right. This is probably best done out in the garage. Hmm, come to think of it, I haven't seen a copy of 73 magazine in a long time...did my subscription lapse? Joe, K5JB

Circuit of the Month

...is another battery charger. This one might be a little difficult to duplicate exactly because I made use of some extremely thin, double sided circuit board which is not commonly found. However, with some imagination, another material, like aluminum or brass sheet could be substituted. The board holding the parts is slipped onto the top of the battery, making contact with the battery's rails and center terminal.

The need was for a method to charge my Icom's BP-5 battery without rigging clip leads and the workbench power supply every time it needed a tad of juice. After a little rummage in the goodie box, the circuit in the figure developed.



The transformer is marked 13.2 Volts with a current of 120 mA. It has "Smoke Alarm" printed on the front and I think I got it at Smitty's. The voltage is a little low for constant current charging the BP-5. This battery has nine, 400 mAh cells and will climb to 13 volts when fuly charged. By juggling resistor values, I got the current to stabilize at about 75 mA during most of the charge cycle, dropping down to about 28 mA near end of charge. The 33 Ohm resistor is the one that sets the charge current. The LED was added to be sure that the thing was really charging. It has normal brightness until near end of charge. Because of the low overhead, it extinguishes near the end of charge. After getting the resistor valuess figured out and blowing two fuses in the VOM while making current measurements, I added the Mylar tape to the surfaces that didn't really need to contact anything. (Mylar tape=book tape.) The only thing sexy about this charger is the use of the thin circuit board material. There is no reason why the same idea wouldn't work if a couple of pieces of brass shim stock were trimmed to fit, insulated with Mylar tape and then taped together. Joe, K5JB

Edmond Amateur Radio Club
Edmond Amateur Radio Club
P.O. Box 70282 / Okla. City, Ok. 73147

YUMMMMMMMMMMY!

Home-made ice cream was the order of business at the August 13th Dinner Meeting of the Edmond Amateur Radio Club. Members gathered at Hafer Park in Edmond for some good eatin' and socializin'.

Members and spouses brought all kinds of goodies, including home-made ice cream, cake, cookies, lemonade, and iced tea. Of course, not much was left-over to take home!

Although a far drive from Norman, our Norman contingency was well-represented: Mike Salem, N5MS, Roger Ryan, WA5JXX, and friend Chas Gaunce fended off traffic on Interstate 35 to come up and munch on the goodies.

Special thanks goes to EARC member Martin Vinson, WD5FEI for suggesting the location and reserving the nice pavillion. The park facilities were really nice.

WEATHER WIRE COSTS PREDICTED TO ZOOM

Over the past few weeks, there have been announcements predicting the dramatic increase in subscription costs for the teletype wire service which provides much of the state's weather warning system.

Western Union, owners of the system, predict costs may go up to each subscriber in the area of 15 TIMES current costs. Many subscribers fear budgets will not allow the service to continue.

The wire service provides many cities and towns with vital information from the National Weather Service, the official agency charged with the responsibility of issuing warnings related to weather.

Broadcast radio and television stations, county and city Civil Defense and Sherriff's offices, and emergency services such as the Red Cross are subscribers. Many cannot afford the increased cost.

It is now time to step forward as an Amateur Radio operator and associate yourself with your local Amateur emergency groups. Hams as a group should contact their local Civil Defense authorities, and discuss how Amateur Radio can help in this respect. A statewide system is needed NOW to be ready for next season's storms. If indeed the costs are as expected, this may be Amateur Radio's chance to shine--but it has to be done by YOU first! --de WD5DYI--

HF PHONE BANDS EXPANDED

Effective September 1, 1984, the voice sub-bands will undergo a dramatic change. Although the following information is contained in all the major ham radio publications, it bears repeating for those who haven't seen it yet:

"Effective 0001 UTC, September 1, U.S. Amateur Radio operators may operate phone (A3 and F3 emissions, as well as slow-scan television and FAX [A4, A5, F4 and F5 emissions]) on the following frequencies:

*3750 to 3775 kHz -- Amateur Extra
*3775 to 3850 kHz -- Advanced and Extra
*3850 to 4000 kHz -- General, Advanced, and Extra
*21,200 to 21,225 kHz -- Amateur Extra
*21,225 to 21,300 kHz -- Advanced & Extra
*21,300 to 21,450 kHz -- General,Advanced, and Extra
*28,300 to 29,700 kHz -- General,Advanced, and Extra"

"Consistent with past practice, RTTY (F1 Emission) will not be permitted in the newly expanded phone segments." QST,

TELECONFERENCE NET

Another of the Teleconference Radio Nets will be held September 14th. Guest speaker for the TRN Net will be Bob Heil, K9EID, of Marissa, Illinois.

Heil's talk will be on audio shaping techniques for the radio amateur. Various topics, including optimum frequency response for optimum single-sideband communications, will be discussed.

K9EID's company, Heil Sound Ltd., has been in business for a number of years, specializing in audio filtering and processing equipment. Heil is an advertiser in all the major ham radio publications.

Mark your calendar now for Friday, September 14th, at 7:30 p.m. The frequency will be 147.030 MHz.

GOOD LUCK -- YOU'RE MAKING HISTORY

The FCC Exams to be held September 18 thru 20 will be the last given in the State of Oklahoma, according to FCC announcements.

The new Volunteer Examiner's program is designed to take over the entire responsibility of the Amateur exams. FCC has announced it will discontinue all Amateur examinations as of January 1, 1985. (The Commission may, on its own descretion, test any Amateur or Amateurs it feels did not meet the requirements of the Volunteer Examiner's program).

It's time for the hams in the state to get going with the VE program. We must not let the licensing situation stagnate; however, we must also insure that no "wholesaling" of licenses occurs. Integrity must be maintained now more than ever. --de WD5DYI--

CALLSIGN TAGS

Remember, Amateur Radio Identification License Plates must be applied for BEFORE October 1!

As in past years, renewals for the callsign plates will only receive a renewal sticker to be added to their current plate. However, the application form now includes a provision for replacement, in the event the tag has been lost, stolen or mutilated.

For those applying for the first time, the application form must include a photocopy of your license. Technician Class and higher may apply.

The fee for TWO tags with your callsign is $2.70. Under law, the tags must be affixed to the FRONT and REAR of the same vehicle described on the form. The regular tag is to be carried in the vehicle. There are provisions to notify the Commission in the event you transfer ownership of the vehicle to which the tags are registered.

The two-part form is available from:

OKLAHOMA TAX COMMISSION
Motor Vehicle Division
2501 Lincoln Boulevard
Oklahoma City, OK 73194-0013
Telephone (405) 521-2468

New Amateur Radio Identification License Plates issued for the calendar year of 1985 will be available approximately January, 1985. You are, however, required to purchase the regular tag or decal during the month indicated on the regular tag in order to keep your vehicle currently registered in Oklahoma.

Oklahoma House Bill 571 of the 1957 Legislature provides for the special tags. The tags are used by public service officials to readily identify Amateur Radio operators during emergency situations.

REMEMBER.....GET 'EM IN THE MAIL!

Salem

MORE ON PAGE TWO (TONE SEQUENTIAL) . . .
(Turn the Page Please. . .)

YACK, YACK, BLAH, BLAH, BELCH, JUNK, . . The typical two meter QSO is generally not a work of literary art and usually just as exciting as a speech at the Political conventions. Oh, there might be a few gems of oratorical wisdom, but I don't have time to listen to the Night Owl Net every night. And, for the most part, the law of conservation of repeater conversation and leisure is generally operative. That rule of physics generally specifies that when repeater conversation is at a low level, leisure time is at a maximum and when repeater conversation is at a high level, leisure time is at a premium and the work load is generally that one can not afford the distraction from the business at hand.

Thus it is with us all, we look for a solution that allows availability over the airwaves while not cutting into business. I generally leave the walkie talkie on in the office. Occasionally it goes off when somebody is sitting there talking to me, but since it is within easy reach, I can squelch it off before the "Big Kahuna" gets to the call letters after the voice ID. This is indeed a small price to pay for freedom of speech (voice synthesizer, that is, we may have found a whole new constitutional right for the Kahuna. . .) I do occasionally forget and leave the radio off after my visitor has exited. This leaves me unavailable for the all important dinner or lunch call.

About a year ago, I traded for a two tone sequential pager, a Dimension IV, made by Motorola. It didn't have any reeds for it, and the battery was poor, but I figured that it would come in handy when I was able to get the Paging terminal on the Kahuna working. Time was a critical factor, also, and I really didn't get around to ordering a crystal for the pager until just about a month ago. International quoted me about 10 days to two weeks and delivered in about a week, bless em. The Dimension is one of the newer model two tone sequential pagers. Several of the Radio Common Carrier Paging companies in the city are changing to the new display pagers or the five tone sequentials because everybody is getting on the service. I understand that the cost of the paging service if you own your own pager is less than $20.00 a month and not a whole lot more than that if you use theirs. The new digital pagers are freeing up a lot of the older two tone sequential models. One rumor that I heard is that you can get the Pageboy two pager with charger, reeds (active filters) tuned up and with a warranty for less than a hundred dollars. Not bad. Might be just the thing for the amateur. And my experience is that the Pageboy Two will move down to the amateur frequencies with no trouble at all. The Dimension came down, but not without a fight.

If you do decide that selective calling on the amateur band is for you, chose your pager with care. The Dimension uses a completely different scheme for its crystal oscillator below 148 Mhz and while it is not tricky to get it working, it is not for the faint of heart. These radios use an IF of 17.9 Mhz. In the VHF Dimension, you calculate the crystal frequency by subtracting 17.9 from your carrier frequency, then dividing by 3. The only problem is that when you go below 148 Mhz, the division is by 2 instead of 3. This is no problem and the people at International will have no trouble keeping up with you. The crystal I ordered arrived on time and on frequency. The Dimension book that I looked at didn't have the frequency information in the main book, but in a supplement inside the front cover. But nobody gets up before International and they got the crystal to me for about $15.00 or so.

I have never messed with a pager before and fortunately I had N5AMV looking over my shoulder when needed. It took about 10 minutes to pop the radio out of its case and shuffle the new crystal in, but before I did, I put a couple of filters into the slots and checked it out on the frequency it came with. The sensitivity of these devices is absolutely amazing. Several years ago, Motorola switched from the older bulky reeds to newer active filter and the improvement in tone sensitivity is nothing short of fantastic. As I was experimenting, I found that the pager would still key on down below .1 uV sensitivity and in fact with 4.0 khz deviation of the tones, I was still getting reliable pages down to .07 uV signal level into the pager. I would like to see the new digital pagers manage that. I just coupled the signal generator into the antenna that circles the pager and I could barely hear the audio through the noise and it was still paging reliably 100% of the time.

Two tone sequential paging is based on a 1 second (first tone) 3 second (second tone) format. There are sixty tones available (See Figure 2 on the next page). For those of you who wonder where I got the paging encoder, it comes standard on the ACC RC-850 controller (and the RC-85 also, I understand). It is simply implemented by bringing it up out of software. You identify the groups and tones and by a little judicious touchtoning, an operator can bring a page tone sequence up to call his buddy. I don't think that anybody has taken advantage of this yet in Oklahoma City (found out this past week that Stan WB5UIY is well on his way to getting one in his walkie talkie and I tuned up a pager for KA5OHU this past weekend).

I installed the crystal in the Dimension, and it, of course, did not work. I listened for the first oscillator and couldn't hear it. I checked the book and found that the coil for the first oscillator has 4 less turns on it for the low split since the crystal is now oscillating at 2X instead of 3X. Not wanting to wait around to order a new coil since my experiment had failed, I unsoldered a shield, pulled the can off the coil, pulled the coil out and very carefully unsoldered the wire to the board contact. The oscillator circuit is reproduced below:

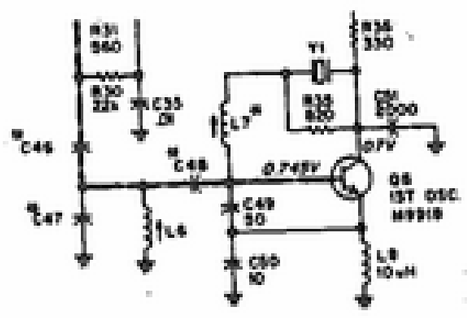


Figure 1. Motorola Dimension IV First Oscillator. L7 must have 4 turns removed to oscillate with 2X crystal for range below 148 Mhz.

L7 determines the frequency. Nominally, the crystal frequency must be between 43 and 52 Mhz for the range from 148.0 to 175 Mhz. Unfortunately, the oscillator doesn't readily take off below 148 Mhz if the formula:

$$F_{Car} = 3(\text{Ist Osc Freq}) + 17.9 \text{ Mhz}$$

is applied. I verified this empirically. It might have worked if I could have added a couple of turns to the coil, but that was a lot of trouble. The information contained in the supplement indicated that the new formula:

Table 2.

TONE NUMBER *	TONE GROUP 1		TONE GROUP 2		TONE GROUP 3		TONE GROUP 4		TONE GROUP 5		TONE GROUP 6	
	FILTER CODE	FREQ. (Hz)	FILTER CODE	FREQ. (Hz)	FILTER CODE	FREQ. (Hz)	FILTER CODE	FREQ. (Hz)	FILTER CODE	FREQ. (Hz)	FILTER CODE	FREQ. (Hz)
1	111	349.0	121	600.9	131	288.5	141	339.6	151	584.8	191	1153.4
2	112	368.5	122	654.5	108	296.5	142	358.6	152	617.4	192	1185.2
3	113	389.0	123	669.9	159	304.7	143	378.6	153	652.9	193	1217.8
4	114	410.8	124	707.3	109	313.0	144	399.8	154	688.3	194	1251.4
5	115	433.7	125	746.8	160	953.7	145	422.1	155	726.8	195	1285.8
6	116	457.9	126	788.5	130	979.9	146	445.7	156	767.4	196	1321.2
7	117	483.5	127	832.5	161	1006.9	147	470.5	157	810.2	197	1357.6
8	118	510.5	128	879.0	131	1034.7	148	496.8	158	855.5	198	1395.0
9	119	539.0	129	928.1	162	1063.2	149	524.6	159	903.2	199	1433.4
0	110	330.5	120	569.1	189	1092.4	140	321.7	150	553.9	190	1122.5

*Second or third digit of pager code; or third or fourth digit of pager code used in "Metro-Page" system.

EPF-397-B

FIGURE 2. Motorola Standard Two Tone Frequencies. There are six tone groups and 10 tones in each group. The paging format consists of two tones with the first tone playing for 1 second and the second tone for 3 seconds. The first tone is called Tone A and the Second tone is called Tone B. Most pagers have a group call option which allows every pager with the same Tone B to be summoned with an 8 second continous Tone B. Tone A and B can be any combination of the two tones, but generally the same tone is not selected for Tone A and B. Most tones are usually selected from the same Tone Group. So unless there is a group call option within the pagers of the group, there are 10 x 9 tone combinations within each group. More on pager tone selection later.

F_{Car} = 2 (1st Osc Freq) + 17.9 Mhz

It took about 30 minutes to pull the coil out and pull off the turns, reinstall it and reassemble the radio. The pager took off like a bandit! The sensitivity was pretty poor, but I set to work tuning the various slugs. This is done by just putting a carrier to the pager and tuning until the signal became full quieting, reducing the carrier and retuning for more quieting etc, etc. until everything "bottomed out." There is an antenna tuning capacitor which had to be peaked up also, but it was no problem, just a little sensitive to the metallic tuning tool. There about 10 parts that are specified different for the lower split and for 146.88 Mhz, I had the wrong IF crystal in the radio, but it worked. After some judicious dwiddling, I was able to get the pager to set off reliably down to .09 uV without replacing anything except the coil and the crystal. Didn't think that I could improve on that a lot without garbaging the pager, so I left well enough alone.

There is a rather complicated procedure in the book for tuning up the frequency, so I just settled for it by reducing the signal and tuning L7 back and forth until the signal got noisy, then centering it between those two points. Dean suggested that he did the same thing with just one variation. He would modulate the carrier with a 5 khz tone, then reduce it to the point of noise creeping in around the edges, then tune for the best modulation signal and least distortion. This requires someone with an ear. Might need a little practice.

Once I got the thing assembled, I found that it worked like a champ. There basically wasn't a place in Norman that was immune from reception from the Kahuna. I got as far north as 29th Street in O-K-C with the pager still on my belt and still hearing the Kahuna. I have to chalk that one up to the fact that they are just fine receivers. When I drive past the Intermod generator at Crossroads, the IC-2AT goes berserk while the pager is just noise and no intermod when I open the squelch.

A week or two later, KA5OHU breezed back into town to start the first semester. When he saw that I had gotten my pager working, he allowed as he had bought a crystal for a Pageboy II that he had traded for. I stared at the schematic a bit and saw that there were fewer parts to change than even for the Dimension. So we popped the crystal in and started cranking with the signal generator. Other than the fact that one of the slugs had bottomed out and could not be easily moved, the radio tuned up in about 10 minutes, crystal replacement and all. It had a slight intermittent and that took about another 30 minutes to dwiddle with and hopefully fix, and Tim indicated that it had been working perfectly since then. The sensitivity was just about as good as the Dimension (around .11 uV or so) and if we could have freed up that one frozen slug, I think that it would have come out just fine. As it is, it is nothing to sneeze out and it is only about a db or so worse than the Dimension. Works fine. The tuneup procedure was basically the same.

The Dimension has group call capability and I intend to assign group codes for those who want them. I don't expect activity to take off, but I think that there will be some people who will be interested. Especially our "page em for lunch bunch." Which brings up a point, a fine legal one, that is. Is paging legal? Well, paging per se might not be illegal since this could be considered to be a one-way transmission similiar to a broadcast, but paging for the purpose of getting someone's attention doesn't seem legal. This would be equivalent to calling somebody's call over and over to get his attention. With that thought in mind, I have restricted paging to calls between amateurs. When one person wants to get ahold of another who he knows is maintaining radio silence, he can page to get the person's attention. An amateur cannot give a pager to a nonamateur and page that person. It probably is permissable to proceed a reverse autopatch call with a paging sequence. That is merely to inform the person being called that he is being called. Anything that ultimately results in a two way conversation is probably legal. The controller will not nor will I permit anyone calling the reverse autopatch to be put directly on the air without supervision. Definitely not conducive to maintenance of the R & R's. This is especially true after I put the channel in OKC in the Bearcat 250 for awhile. Needless, the conversation from the people calling in on the page got a little salty, probably because these people don't think anyone is listening.

There are several versions of pagers that might be useful. Haven't ever worked on a Pageboy I but my recollection is that it is a pretty good pager. It uses the older reeds that are a little easier to get and just a little cheaper. There is a minitor Pager by Motorola, but I haven't looked at them very much. They have a squelch that is built in that can be adjusted. I also don't know if other brands besides Motorola are easily tamed. I would assume so, they are basically all very simple. The Spirit and the Dimension IV pagers by Motorola are functional and electrical

equivalents. I compared the books and they even use the same chassis. One sells for more than the other. The only functional differences that I could find is that they have different case parts and the Dimension uses slightly more curret in the listen mode. But after looking at the schematic, I can't really find that one.

WB5UIY is trying to add a two tone sequential pager to his Yaseu FT-208 and succeeded until he blew up a PNP transistor switch. He should be back on the line shortly. Stan is using a model two tone sequential pager device made by Communications Specialists, Inc. The Model SD-1 is about $60.00 and is about 1.2 x 1.70 x .65 inches in dimensions and operates from 6-16 Volts. It takes audio directly from the discriminator with a sensitivity of about 25 mV. The decoder uses two ceramic resonators that you can buy for a couple of dollars apiece. Something that is a real savings over the active filters which go new for something over the rainbow. The ceramic filters have a band width of about + 2 Hz. It has a momentary open collector output for a horn relay, a latched open collector output for a call light and a latched open collector to unmute receiver audio. The ceramic resonators go for no more than about $4.00 apiece.

I saw a blurb in a magazine the other day about a company that has come out with a thick film circuit that detects and decodes two tone sequential paging. The size is just a little more than .2 inch thick and this just might be big enough (or maybe small enough) to go in an IC2-AT or 4AT. That has been one of the problems with these radios. Adding PL or any type of paging or PL decode is virtually impossible since the radio is virtually chock full o parts. This device only draws about 5 ma or so. The blurb is new and if it has any merit might mention it later. The device apparently uses trim pots to set the frequency (that is not the best). I would feel a lot better if it used a crystal and switched capacitor filters.

Micheal Salem N5MS

MORE ON PAGE 3. . .OTHER FORMATS

The two tone sequential paging technique has been around for a long time. It's birth is somewhat nebulous. Not sure whether I remember all the details, but I seem to remember reading about a lawsuit in which a major radio manufacturer got stung by Reach Electronics, one of the original developers of two tone. I am sure that the birth of the beeper and this subsequent sting for it being proven that it "wasn't invented here" spurred the development of other paging formats. The general rise in the number of people wanting to be "wired in" either professionally or personally also gave rise to a need for more paging codes than provided bye the 60 x 59 number of combinations that were available from the 60 tone format. I also have to say that listening to page tones all day long can drive somebody batty. I don't think that I would get really excited about a lot of beeps all day long and in fact if it appeared that paging was going to expand very much, I might consider limiting its usuage.

That is why I read about the new version of software for the ACC RC-850 with interest. I also saw the new ASCII format selcal that Kenwood has built into one of their new radios. I think that the growth of repeater usuage will make selcal such as these a useful tool for some and a mandatory requirement for others. Even though, selcal is under some circumstances, just a little selfish. The person who is only interested in calls for himself ought to just go out and buy himself a commercial pager. One of the things about amateur radio that is laudable is that amateurs monitor and help in emergency situations. The maintenance of this public service function will only occur if we set up special codes to allow emergency messages to take priority and "cut through" the selcal decoder. With two tone paging, that might require another pager, not a practical situation right now.

I leave a radio on all night long at the house. Generally, someone who needs help at night might be able to get ahold of me if they are persistent or urgent. There are probably some whose calls I have missed, but I do remember getting out about 3 O'clock in the morning once to help WB5UIY chugging back from a vacation and stranded just outside of Norman. I was glad that I had the radio on, otherwise Stan would have had about a 4 mile walk on his hands.

So, I hope that these people who develop decoders for paging also wire in some type of "all call" emergency method so that anyone with a touch tone pad can get some kind of a signal through. I use the pager as a sort of "supplemental set of ears." It actually adds to the time that I listen to the radio since the time that I turn the pager on is time I would normally have the radio off. Even if the radio is on, but turned down, the pager is still helpful because it listens to the air for calls when somebody is trying to get in touch with me. Of course, there are times when you just can't be available (theatre, concert, etc.) Well, in any case, I hope that something is done about the use of selcal for emergency signalling. Something more than just SOS. I think that now would be a good time to designate some type of standard for emergency signalling for Touch tone, two tone or just about any of the others. Two tone should be easy. With all the ACC RC-850 controllers around, it is easy to convert touchtones to paging tones. Touch tones have even more universal application and usuage. I don't think that it would be too difficult to designate a sequence that would selectively decode for emergency.

For two tone sequential, I suggest something in the first or sixth tone group. The first group is equipment that is readily available. Most paging system start out with tones in the first group. Thus with the arrival of the newer paging formats, two tone sequential pagers will be more readily available. With the rise of availability of add on decoders in addition to surplus (the ComSpec stuff and others) tone frequencies will not be a problem when selecting since the elements are relatively inexpensive. At this point, tone elements in the 6th group should be considered since the higher tones are more easily heard over the air. There are still some who listen. The lower tones are a lot less obtrusive and not as easily heard.

For touchtone, the number should be something simple and something that is not normally heard on the repeater. It cannot be something that repeats a telephone exchange prefix or follows some universal convention (like the phone patch * up, pound down). It should not be any particular buttons in a row, column or diagonal since those are the favorite of the touch tone "fairies" who key up and touch tone away unidentified.

Decoders must be simple and compact. Anything more than two tones will require some different decoding techniques. I think that three tones for touchtone is a minimum. If we go to four, then we might be able to follow some of the transponder codes for aircraft and save a couple of numbers that have to be remembered. It just seems to me that this would be a useful adjunct to increasing the emergency capability of a repeater.

Micheal Salem N5MS

PAGER LEGALITY ON THE HAM BANDS??!!

With the last article, I peaked my own interest regarding the legality of pagers on the amateur band. As I indicated, it seems to me that if you using the selcal to signal someone to initiate a two conversation between two licensed amateurs, that would be all right. This is just like the story of the man who told a friend how well trained his mule was. When he friend asked him to have the mule do a trick, the first man picked up a two by four and whopped the mule up the side of the head, the mule then performed the trick in a perfectly obedient fashion. The friend was dutifully impressed, but said he didn't think that an animal was obedient if he had to be hit with a board. The first man said,"Nah, I was just trying to get his attention, first."

Depending upon what you are doing and who you are talking to, paging or selcal is legal on the amateur bands. A recent article in the ACC Notes briefly summarizes some of the pertinent regulations of what is defined as "broadcasting" on the air.

"One way transmissions" and "broadcasting" are really two different things. One way transmissions are permitted under certain conditions. Broadcasting is prohibited under all circumstances. To determine what is s what, consider the following from the Rules and Regulations of Part 97 (Hey, I remember those!):

> 97.113 Broadcasting Prohibited. Subject to the provisions of 97.91, an amateur station shall not be used to engage in any form of broadcasting, that is, the dissemination of radio communications intended to be received by the public directly or by the intermediary of relay stations, nor for the retransmission by automatic means of programs or signals emanating from any class of station other than amateur. The foregoing provisions shall not be construed to prohibit amateur operators from giving their consent to rebroadcast by broadcast stations of the transmissions of their amateur stations, provided that the transmissions of the amateur station shall not contain any direct or indirect reference to the rebroadcast.

Thus it can be seen that a broadcast is a radio communications intended to be received by the public directly . . . Interestingly enough, it is possible that a two way transmission can be a broadcast if it is intended to be received by the general public directly. So, is paging a broadcast? No, since there in no intention to be received by anyone other than the person to whom you are paging. Can an amateur send a page to a nonamateur? Good question and the possibility of finding the answer might just be in Section 97.91:

> 97.91 One-Way Communications. In addition to beacon operation and radio control operation, the following kinds of one-way communications, addressed to amateur stations, are authorized and will not be construed as broadcasting: (a) Emergency communications, including bonafide emergency drill practice transmissions;
> (b) Information bulletins consisting solely of subject matter having direct interest to the the amateur radio service as such; (c) Round-table discussions or net-type operations where more than two amateur stations are in communication, each station taking a turn at transmitting to the other station(s) of the group; and (d) Code practice transmissions intended for persons learning or improving proficiency in the International Morse Code.

Well, it is likely that a reasonable interpretation of the rules would be that a transmission addressed to the general public (i.e. one nonlicensed person) would be illegal as a one-way transmission since section 91 implies that one-way transmissions such as those listed will not be construed as broadcasting leaving the impression that other types of one way transmissions will be construed as broadcasting. I think that this is reasonable especially given the fact that the paging tones are transmitted to an unlicensed person. However, paging tones addressed to another licensed amateur is permissible since "it is not intended for the general public." And it also may not even be a one-way transmission since it is a method to attempt to establish two way communications.

Can a nonamateur page someone over the phone? Not without a control operator and that is a matter that touches on the legality of reverse patches in general. I think that with a control operator to screen the calls, that a person may page only over the telephone to a repeater. I don't think that this would be permissible if the person on the phone was automatically placed on the air to broadcast, uhh, make that transmit his message to the amateur.

It is possible that a tone only page to a nonlicensed amateur could be legal, but only if it were a radio control operation:

> 97.89 Point of Communications. . . .
> (b) Amateur radio stations may transmit one way signals to receiving apparatus while in beacon operation or remote control operation.

The tone only pager is a receiving apparatus, no doubt about that. Is a page a "remote control operation?" Well, that is arguable. I think that out of form, it probably would not be a good idea although useful in a pinch. I basically don't see anything any more dangerous in this that the autopatch. In fact, I suppose that tone and voice would be akin to an autopatch call. Still, I think that it is not radio control because radio control is specifically defined as a particular mode of operation:

> 97.3 Definitions . . .
> Radio Control operation. One way communications for remotely controlling objects or apparatus other than amateur radio stations.
>
> 97.99 Stations used only for radio control of remote model craft and vehicles. An amateur radio station in radio control operation with a mean output power not exceeding one watt may, when used for the control of a remote model craft of vehicle, be operated under the special provisions of this section, provided that a writing indicating the station call sign and the licensee's name and address is affixed to the transmitter.
> (a) Station identification is not required for transmission directed only to a remote model craft or vehicle.
> (b) transmissions containing only control signals directed only to a remote model craft or vehicle are not sonsidered to be codes or ciphers in the context of the meaning of 97.117.

What I gleam out of this is that radio control is not just limited to just model boats and airplanes. Section 97.99 is written in a way to include a special category where such actions are permitted without excluding the greater operation of radio control outside its immediate context. Thus One way signalling to a nonamateur might be considered legal. Just like activating a tape recorder at home to leave a message. Local repeaters might restrict such usuage to prevent abuse, but it doesn't seem like it would be clearly illegal.

Micheal Salem N5MS

QUO VADIS DTMF . . . .(TT CHIPS DROP)

The Bell method of touchtone signalling is something that has always had a fascination for me. I started out a long time ago building tone decoders out of phase lock loops and 88 mh inductors with op amps and all kinds of stuff. Eventually using the PLL's I was able to get a fairly reliable decoder that worked very well on the 88 repeater (preKahuna) with ease and reliability. This included prefiltering, AGC, and missing pulse detection. They rarely falsed. I made the boards and tried to interest others in them to help defray my costs of production. The expense (over $100 in parts alone) was a deterrent and I never sold very many of those board sets, and then no complete sets. I build up a complete extra set as a spare and tried to sell it, but no dice.

When the new breed of digital tone decoders became available, I got one, but never got around to experimenting with it very much. It was the Collins Rockwell and it was pretty neat, but still needed some prefiltering. Finally, along came one made by Telaris. This featured the Collins digital decoder in the same can with a hybrid prefilter. A group of us went together and bought one for a remote base on UHF. Joe K5HMD put it together on a card along with several levels of voltage regulation and protection. We weren't interested in buying any more of these over $100.00 chips. It worked OK, but had a real problem with speech and noise. A little noise in your signal would shut it down. We finally had to wind up disabling the speech detector so that the decoder would work. It put in good service and still is OK. I saw a bunch of these at Dallas last year for $25.00 apiece. Not a bad price, but still a bit of trouble to work with. I didn't buy any of them.

The reason I didn't buy any of the Telaris chips is because I have been up to my, ahh, ankles. in touchtone decoders for a couple of years now with a new board that I got. I laid out a card in 1982 that used the AMI prefilter S3525A and Mostek 5103 chip prefilter and tone decoder combination. And it works slick. The science of switched capacitor prefilters and digital techniques of decoding work very well, even in the presence of a little bit of noise. When these chips first appeared, the MK5103 was about $40.00 (when I first saw them). The price dropped to about $25.00 when I built the boards and I don't know where the price is now. The prefilters have been $16.50 from the time that I first saw them. Considering that the S3525A replaces an entire board of components that might be a thousand times larger that this 16 pin chip, it is really impressive.

The MK5103 and S3525A combo had excellent specifications. It detected touchtones over a dynamic range of 30 db (I measured 32 db with one of my decoders) and detected tones in about 30 milliseconds average. I sold a couple of blank boards and ordered about 30 or so. I built up some of them myself and tried to sell complete constructed boards, but the price after taking into account all the parts and things was still about $100.00. There were improvements, however. This new board had BCD and 1 of 16 out. It also had a LED that displayed the decoded character. The size had been cut from four cards to one card and even that card was overdesigned.

A company called Silicon Systems Inc (SSI) came out with a single chip decoder that used the chip, a crystal and two capacitors. It used the switched capacitor prefilters and digital decoding and was about $100.00 when it came out. Still not too bad. I got a couple of these surplus and after their price had dropped somewhat (now down to about $40.00 or so, I think). This chip is so small that it makes selective calling inside a walkie talkie a possibility. This and another chip would probably do the trick. No need for a printed circuit card, just wire it in space and put some heat shrink around it. The original SSI 201 was 12 volts. I think that they have had a 5 volt version for a couple of years now.

There has been a virtual explosion of touchtone decoder circuits in recent times. The RC-850 controller uses a two chip set (decoder and prefilter) MT8865 and MT8860 made by Mitel. And I see where Plessy Solid State Ltd in Irvine, California has come out with what appears to be a functional equivalent to the Mitel chips for the unbelievable price of $11.26 apiece in 100 quantities. And delivery is from stock. The specifications on these devices are unbelievable. Current drain at 5 volts is 1.3 ma for the 8860 and 1.2 for the 8865. The dynamic range is over 30 db and the twist can be + 10 db, an incredible figure. Detect time is 25 to 35 milliseconds. They will decode in a signal to noise ratio of 14 db. The prefilter has a built in dial tone rejection filter that suppresses dialtone over 60 db. All this in two chips that need a total of seven extra parts (including a crystal) to work. Simply amazing.

Well, I saw this article the other day and it made me think of the idea of selective calling for emergency traffic (that has been written about previously), but in addition, touch tone decoders are so cheap that there is no reason why manufacturers can not just include them in their products for transceivers. If the cost is about $10.00 per chip (a reasonable assumption assuming quantity pricing around a thousand or so), then the cost of manufacturer in the transceiver might be only a couple of times that. For $30.00 to $40.00 would you want a DTMF receiver in the radio? Probably so. Most of the modern radios are microprocessor controlled. Adding selective calling would be no problem. Additionally, there should be no reason why the radio couldn't be used in a remote base fashion by interfacing with another UHF or VHF radio, or even over the telephone. Sounds interesting? Well, there are numerous possibilities. In fact, ACC has built an add on device for your Icom 751 and VHF radio to do that. The only problem is that with all the software and hardware, the cost is over the $600.00 level. Still, it is impressive. So keep it in mind. Meanwhile, might want to get out that soldering iron and wire up some tone decoders for that emergency selcal detector. Or you might want to wait for some standard to emerge. Might not be a bad idea to let the Repeater and VHF committee of the ARRL look into.

Micheal Salem N5MS

SPY V. SPY V. OMNIBUS CRIME CONTROL ACT

Everybody is getting bugged these days. Buz Sawyer and Dick Tracy are the bugger and buggee respectively. In Sawyer's case, one of the crooks swallows the bug, in the other, Dick Tracy's friend Diet Smith sends someone in who detects the bug by listening for feedback with a broadband receiver. The result is that we have to listen to a bunch of bad puns with the latest of Chester Gould's "theme criminals." The FBI bugs in both audio and video and John Delorean walks because I suppose that they made them watch black and white and not color.

What Buz Sawyer is doing is illegal. Unless court ordered, it is illegal to "bug" a third party. That is a felony and a federal crime under the Federal Omnibus Crime Control Act. In Sawyer's

case, he is recording the conversations of unsuspecting third parties and he has the permission of neither. Here is a case where the good buys break the law. I am surprized that Sawyer got away with it. Jack Anthony did not. Of course, if the bugging incident took place outside the three mile limit of the territorial boundaries of the United States, then it might be legal.

In Dick Tracy's case, somebody is bugging him. And Chester's Gould's puns are "bugging" me. But a short lesson was given in bug detection by the explanation of the use of a wide band receiver brought into the presence of the bug. The result is feedback and the eventual ability to spot the bug. In Macy's case (as B.O. calls him), they decide to leave the bug as it now becomes a useful tool for providing false information to the crooks.

Which brings up a letter I saw in the October issue of Defense Electronics. This is an interesting magazine which generally has the inside poop of unclassified eletrical systems for communications and weapons. The magazine is a preview of tomorrow's surplus today. It is always nice to know what might be coming down the pike. You MARS boys might want to become subscribers.

Anyway, the letter was from a Harry Augenblick, the president of Microlab. It concerned an article about the bugging of the president of Brazil. The story had reported that "an electronic sweek of the room will not detect the listening devices if they have been turned off." No t true, says Mr. Augenblick, and he is right. He says, "Modern sweeps utilize technology developed by defense electronic scientists. Bugs are easily detected, whether or not they have dead batteries or when they have been turned off. These sweeps look for the presence of the semiconductors inside the bugs, not the transmissions from the bug."

How do they do it? Well, I don't read Defense Electronics from cover to cover, but my guess is that they sweep the area while transmitting and simultaneously listening for harmonics of the radiated signal. This is the way that I would detect the presence of a semiconductor device. The transistor or diode contains a semiconductor junction which is nonlinear and when excited by RF energy generates harmonics of the signal being received because it distort the waveform. Most of the bugging devices around are simply not big enough to contain inductors and capacitors sufficiently large enough to prevent this harmonic radiation. As a result, these semiconductor "junction finders" can locate the offending device. The technique is fairly straightforward and I suspect that the equipment is fairly sophisticated (i.e. expensive) given the problem and the interest in solving it.

This technique is not new. Harmonic detection is an old tried and true method. Audio distortion analyzers have used this method for years to test audio amps and mixing consoles. You essentially match the input to the output, then null out the fundamental signal and measure the remaining harmonic energy. Assuming that your primary tone was pretty clean, you should have a good idea of what type of distortion you are getting through the amplifier. Hewlett Packard and several others make distortion analyzers based on this principle.

One of the first applications I have seen of this idea was an in circuit transistor checker and gain checker. Philco made a transistor checker like this through its Sierra Division for the military. It would check transistors in circuit and produce a relative gain measurement. It would excite the transistor with an audio signal and measure the activity of the semiconductor junction. The indication of the amount of harmonic energy present at the collector was an indication of gain. Unless there were a lot of other semiconductor devices in the circuit, this was usually a pretty good indication of the gain. The circuit checker wasn't too reliable for RF circuits with tank circuits, but would work OK for the average run of the mill transistor. Back when this thing was designed, there weren't a lot of transistors to choose from anyway.

I am still amazed that no FBI agent hasn't come knocking at Buz Sawyer's door to ask him about that bug, but I guess that they are pretty busy.

Micheal Salem N5MS

220 MHZ FREQUENCY GRAB AGAIN AND AGAIN . . .

As the old sign from HyGain used to say, This is an amateur radio station and "keep your cotton picking hands off of the goodies." I don't know how long this is going to go on, but it is something of concern to all red blooded frequency hungry amateurs. Their after 220 Mhz again. The problem is the land mobile service is burgeoning and the 32 Mhz allocated in the 800 Mhz spectrum for future use is being eyed hungrily by a variety of groups including air-to-ground and rail passenger radiotelephone service, a consumer "medium range" portable telephone service, a mobile satellite service, and a new form of CB. In response to this grab, the Land Mobile Communications Council filed a Petition for Rulemaking, asking that these reserves be released to Land Mobile now (to populate the band and make it harder to steal later) and also asked for investigation by the FCC for the use of other spectrum to meet long term land mobile needs, including the Amateur 220 - 225 Mhz band. Additionally, Sideband Technologies, Inc. has requested that 216 -222 Mhz be allocated to channelized narrowband land mobile use (amplitude compandered sideband).

So the grab goes on and there is soon going to be nothing that amateurs will be able to do about a grab unless we undertake to populate this band. Use simplex walkie talkies, go buy a repeater, put in a control link. The problem is and always has been the availability of equipment. Now that is being met by some of the manufacturers who are producing radios for us to use. I wish more people would consider taking up my suggestion for using 220 Mhz as a linking band between repeaters. In fact, I have been looking for a 220 Mhz radio for some time now. Anybody got an IC-3 or 3AT they would like to sell for cheap? Give me a call. It would easy to wire it into the Kahuna.

It would also be useful to write the FCC a letter now. They have not issued any rulemaking yet, but if they should think about it, they should know that they have us looking over their shoulder. 220 Mhz is fairly heavily used in populated areas like San Diego and California and elsewhere. With the way that amateur population growth is going and the present crowded situation on two meters, we should be using 220 Mhz right now in Oklahoma. And we are not by any stretch of the imagination, a populated area.

Commission Rules allow just one copy to be filed. You might check around in QST or some of the other magazines for details on how to file a complaint. I detailed it several months ago in the C & E on the code-free license issue. And that is a good example, where the Commission listened to the Comments; thinking that a code-free license was a lead pipe cinch was all wrong. Don't just get angry. Be cool and rational. It is a good idea to register some protest early. The RuleMaking Request is RM-4829 submitted by the Land Mobile Communications Council. More details next month.

Micheal Salem N5MS

CENTRAL OKLAHOMA CHAPTER #63
CHARTERED MARCH 19,1973

QUARTER CENTURY WIRELESS ASS'N

'MAN'S CORNER

Fred Boardman, W5NL

Dateline-Forest Park, OK. In consideration of Chapter 63's INAUGURAL input to CORA "Collector and Emitter" (C&E), I feel that more than just a few passing remarks are in order. Hence, this can be called project "catchup" for the entire membership. For future issues, my pledge is one of brevity.

Hence, an open invitation is hereby issued to the entire membership - "make this your PRIMARY COMMUNICATION MEDIA to input your NEWS AND VIEWS". This is an earnest and open invitation to all members of Chapter 63, and to other QCWA chapters, and to non-QCWA-ers as well, to express your saved up thoughts (controversial, otherwise, & all like that). In my opinion, QCWA is fast becoming an important and effective part of the entire Amateur Radio Service. Through written media we now have a unique way to better it's posture. Enough said...

FIRST: It is of interest to know how we (Chapter 63) arrived in CORA. So, briefly: (1), At our spring Quarterly meeting, April 8, 1984, after open discussion, an affirmative vote to petition CORA for membership was taken. (2), A subsequent request to the QCWA, Inc. Board of Directors was made for approval to join an outside organization. This was required by the QCWA by-laws. (3), A subsequent telephone conversation with Ted Heithecker, W5EJ signaled approval. This was followed by a letter from QCWA Secretary Jim Walsh, W7LVN confirming the approval. The letter contained the following statement: "Hope this works out for your chapter, and it is too bad that there are not more such cooperative groups around the country." (4), A petition to CORA dated July 12, 1984 was made requesting affilliation with Chapter 63. (5), The CORA Board unanimously approved the request at their monthly meeting July 12, 1984. (6) A unanimous vote by Chapter 63's Board of Directors was made July 21 during a special meeting at Ham Holiday '84 to commence the affilliation effective September 1984. Also at that meeting, a separate vote approved paying CORA $3.00 per Chapter member from the treasury, and to internally assess Chapter membership dues at the rate of $5.00 per member commencing January 1, 1985. Therefore, for calendar year 1985, Chapter 63 dues will increase from $2.00 to $5.00. Note: Where both spouses of a family are licensed, and members of QCWA, only one CORA assessment of $3.00 will be made, but both names will be included in the annual CORA membership roster. (7) Chapter 63's Secretary/Treasurer, Howard Baker, W5AS, has already submitted a membership list by ZIP sequence so that each member will reveive the September Issue of C&E. (Thanks Howard)

SECONDLY: Ham Holiday '84/ARRL State Convention has passed (July 20,21,22) but it's memories are still fresh. Most comments I heard, during & after, were very complimentary as to programs, commercial exhibitors, flea market, the ladies activities (especially the Style Show), and a very big plus for the CORA committees & individuals (names too numerous to include here). In particular, the out-of-town attendees were lavish in their praise. If the cost seemed a little step, the free parking, and easy access to the facilities made it worth while and generally satisfying. The most expressed gripe was the one day only stint for the Flea Market, but this was offset by the convenience, food, drink, and eye-ball QSO's in the Hospitality Room.

Our Chapter hosted the annual QCWA Breakfast, Sunday July 22, and the event was reportedly a very memorable success. Memorable because we were honored by the presence of three very able VIP speakers, each with important messages. In order of appearance were, Ray Wangler, W5EDZ ARRL West Gulf Division Director; Sandra Morris, KA5QZD, FCC Public Service Division; and, as previously scheduled and announced, our featured speaker Leland Smith, W5KL, QCWA International Vice-President. Ray Wangler represented both the ARRL, and his Home-Chapter 38 in San Antonio. He expressed his pleasure at being with fellow QCWA members, and spoke briefly to the gathered breakfasteers. He cited the close ties and mutual goals of ARRL, and QCWA, and stated he has no problem wearing his two-hats. He also spoke briefly citing the Volunteer Licensing Program, the VEC publication (available to interested VE's from League HQ), the QCWA/ARRL Cooperative Agreement (see QCWA News, Summer 1984, Pg 42), and cited a need for more definitive language in the agreement.

Sandra, a frequent participant at Amateur Radio gatherings, expressed her pleasure with meeting and addressing the gathering. She stated that much mutual respect exists between FCC and QCWA. Also the VEC Program should be an excellent avenue for QCWA because of the wealth of expretise and integrity represented by QCWA members.

Leland (who is a member of Chapter 63, and attends many of our quarterly meetings) gave us a super pep-talk covering QCWA's plans and programs (current and future). He spoke of the role we must collectively play as QCWA matures with its fast-growing membership, now exceeding ten thousand, and takes on more responsibilities in Amateur Radio circles. We were most pleased by the presence of Leland's wife Helen, WA5WAR. She added much to the spirit of the gathering. Time, always at a premium, did not allow questions from the floor of the FORUM theatre where we met.

In addition to the messages; other activities took place. (1) Leland formalized presentations of 50 year certificates (continuous & golden) to Howard Baker, W5AS; Melvin Bolger, W5AXM; George Bunce, W5DKC; Carl Drumeller, W5JJ; Ray Long W5TY; and Ralph Rea, W5AA. Leland also recognized that many other members of Chapter 63 also qualify, and/or already have these awards.

A presentation was made to Eunice Holt (honorary Chapter Secretary) for her Meritorous Service (1981-1984).

Unusual items were presented to Jerry Broudy, W5MCJ, Bill Noland, WA5FWD, and to Leland Smith, W5KL.

Each QCWA member attending the breakfast meeting was presented with a numbered pamphlet hand-prepared (by Fred and Maggie; ed.) containing reproductions of the Chapter 63 Charter, and a commemorative dedication to Major Edwin Armstrong, complete with reproductions of commorative stamps honoring Armstrong's many accomplishments in the field of radio transmission.

LASTLY: Robby, AA0O, has graciously consented to be our first C&E news editor. Robby needs a reasonable time to retype and assemble monthly inputs from members and officers into proper format. Hence, a tentative DEADLINE of the 15th of each month has been set for his receipt of copy for inclusion. He hopes to use Modem from his computer to Joe Harding, WA5ZNF, Managing

Editor of C&E in Midwest City. Please submit your articles to :

Robert E. Runyon, AA0O
RFD-2
Yukon, OK 73099

Submittals may be typed (double spaced) or hand-scribed. Legibility is important! If local, please include your telephone number so if he needs to discuss the article, he can call you.

Robby requests that if you submit any copy other than your own (such as material from other publications), you make sure it is okay to reproduce in C&E, and not copywrite protected. Many Amateur publications permit reproduction of their material as long as the source is acknowledged.

Hopefully, a simplified format will evolve in the months to come. We need ideas from you chapter members!!!

We wish to acknowledge and welcome two new members to Chapter 63: Les Edmonds, W5GOO, from Dennison, TX. (Les, your signals are strong on Sunday mornings here), and Bill Myrick, NG5G, from Ada, Oklahoma. (Bill, we trust
you can induce Abe, W5LLP to Recheck)

Most members now know that the Sunday On-The-Air Meeting of Chapter 63 has been moved to 3855kHz with the informal session starting at 0800, and Roll Call at 0830 as in the past. We are awaiting the September 1 expansion of the General sub-band to 3850kHz at which time we will test for QRM. Chapter 63 GENERAL CLASS OPERATORS, please note...

We will be contacting past members who have dropped Chapter membership because of this long-standing communication problem.

73
Fred Boardman, W5NL

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FILE ZERO - from robby

This is the first of what we hope will be a long-running series of articles under the QCWA logo. When Chairman Fred, W5NL asked me to serve as editor for this column, I didn't hesitate very long before accepting the assignment. Since I was one of the Chapter 63 directors actively supporting the decision to affilliate with CORA, I figured I'd better pitch in to help make that a good decision!

One of the important reasons for deciding to affilliate with CORA was to make available this space each month for member communications. Perhaps "forum" is a poor choice of word, but that pretty well expresses what this space in C&E can be for Chapter 63 each month.

For that reason, we would like to encourage each QCWA member to contribute to the column as much as you can. Joe Harding, WA5ZNF, Editor of C&E assures us that we will have adequate space available for our column. I can assure you that no attempt will be made to restrict the subject matter of your contributions so long as the subject matter stays in the bounds of good taste, isn't too inflammatory, and is not restricted by copywrite. Final decisions as to propriety of material (in case we get to discussing highly sensitive issues) will, of course, be in the capable hands of WA5ZNF who has overall responsibility for C&E content.

With those understandings I see no reason why we can't have an open forum for Chapter 63 on a monthly basis.

As you can see, several members are contributing from the start. I have made myself a promise to get up a decent HF antenna system again (the old one blew down May, 1983), so I can begin checking into the Sunday on-the-air meeting again. When I come up on frequency, you can make any suggestions you wish concerning the column, and ways we might improve it as time goes by.

I might explain how we anticipate it will work: I am writing the text on a Radio Shack Color Computer II using a word processor program. Anyone wishing to contribute text needs to get it to me on or before the fifteenth of the month before publication. I'll type it in final form, and then transmit it to WA5ZNF via telephone so that he can produce the camera ready text. That's the way we have it doped out at present...whether it works as planned, is another story. Joe, and I have experimented passing text back and forth, so we know it will work. (Joe lives in Midwest City, and I'm in Canadian County..that's the reason for the fancy data transmitting schemes).(Ain't computers wunnerful?).

For that reason, anything you send me for inclusion in the column should be plain text because I will have to do the original composition on it before transmitting it to Joe. If you have a COCO and Elite Word, you can compose your own text, and either send it to me on a diskette, or via modem provided we have compatable terminal emulators.

If you have pictures, or illustrations to go with your text, then I'll need that a little earlier so I can mail them to Joe. He then will insert them in the proper place at paste-up for publication.

I'm writing this part of the column prior to receiving Fred's, and some of the other text, so need to keep my remarks short so as not to duplicate their material. I would like to make at least one observation concerning the QCWA. Our International Vice President, Leland Smith, W5KL, made an interesting point during his address at the HH-84 breakfast the other day. He observed that QCWA contains the largest single collection of radio experience in the world today, and that we should be using that experience and maturity for the benefit of Amateur Radio...good point Leland...and an interesting challange for us "greybeards".
I can promise you more on that point later.

73 de Robby AA0O

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The following was received from Chapter 63 Secretary Howard Baker, W5AS on August 11, 1984:

Chapter 63 on-the-air meetings for July 1984 = 5 sessions, 141 checkins, and a traffic count of 19. Not too bad for a bunch of old codgers getting up before breakfast on Sundays.

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On August 8, 1984, the following was picked up off the Hot Line by W5AS:

Five (5) new International Directors have been elected:

Lew McCoy	W1ICP
Esther Given	W6BDE
Wade Holland	W4AZT
Hugh Winter	W5HD
John Kanoe	N4MM

Looks like the International QCWA leadership is remaining strong, and attracting well proven talent to the critical jobs.

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SHUNT-FED GROUNDED TOWER

If, by any chance, you think this to be an exciting new technique, just read "Nikola Tesla, Colorado Springs Notes, 1899-1900." On page 197 of that book, you'll find a full description of feeding such towers.

Carl W5JJ

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RF TUNING AID

It's often supposed that the use of a single turn of wire, loosely coupled to a circuit to be tuned for maximum power, and using a small lightbulb as an indicator, came into use around 1932. By then Radio Amateurs were using crystal-controlled transmitters that required resonating the plate tank to a frequency near (but not equal to) the frequency of the quartz crystal.

WRONG!

On november 10, 1899 Tesla used such a device. He improved its operation by putting the light bulb in a black box to decrease the effect of ambient light. Too, he added a battery and variable resistor, isolated by RF chokes, and adjusted the quiescent current to a value barely sufficient to bring the bulb into a state of incandescence, thereby making it very responsive to minute changes in RF energy.

Carl W5JJ

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The following was received by phone from our Vice-Chairman, Ray Long, W5TY:

NOTICE OF MEETING

The next quarterly meeting of QCWA Chapter 63 will be October 21, 1984 at the Anna Maude Cafeteria in Penn Square.

The program will commence at 1:PM. It is recommended that you plan to eat at 12:Noon or earlier so as to beat the church crowd, and have some conversational time before the meeting and program.

A good program of interest to both OM's and XYL's is planned. More information will be published in the October issue of C&E.

RAY W5TY

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VUCC VUCC VUCC VUCC VUCC

For those of you not in the know, there is a new game in town, i.e. chasing grid squares (two degrees Longtitude by one degree Latitude). Full details are in the January 1983 QST, page 49.

The VHF/UHF Century Club Certificate is the new ARRL-sponsored achievement award for working grid squares on frequencies above 50mHz. The VUCC program was established to promote increased activity on the higher frequencies and it has effectively accomplished this objective. Take a listen on the next opening and join the fun!!

Requirements for the various bands are as follows:

50mHz	100 squares
144mHz	100 squares
220mHz	50 squares
432mHz	50 squares
1292mHz	25 squares

To initiate action for the VUCC award, send request for proper forms (CD-259, and CD-260) to ARRL. After accumulating the necessary QSL's and completing the application forms you may submit them for verification at the local level through W5JME, ARRL-VHF Awards Manager. You may contact Bob (W5JME) for any other information on this program.

As indicated by Ray Wangler, W5EDZ, at the ARRL Forum during HH-84, (and again at the QCWA Breakfast) there is on-going pressure from other services for frequencies within Amateur Bands. It is therefore imperative that we make fullest use of our frequencies. VUCC provides objectives, incentives, operator satisfaction, and great "wallpaper"!! "KOBO"(Keep Our Bands Occupied).

Bob, W5JME

CONSOLIZING THE KENWOOD TR-7930

The microphone that comes with the Kenwood TR-7930 (or TR-7950) has, in addition to the PTT bar,two push buttons, one marked "UP" the other marked "DOWN". These plus the PTT perform functions in addition to the obvious ones. Press the UP or DOWN button for two steps of channel change and the scan starts. Press one of these switches and hold it to speed up the scan. Scan direction can be reversed. Press the PTT once quickly and the scan stops. The next press of the PTT will cause transmission. So you see that most of the operating can be done with one neat handheld package. This unit is great for mobile operation, but I have replaced the microphone and its buttons for more efficient operation at home.

Although Kenwood makes a desk mike with the necessary buttons, I have taken a different and cheaper route. My console is a small table with a shelf assembly set on the back.

The TR-7930 is hanging from a shelf by the supplied mounting brackets. Another shelf is 1¼" below the rig. A small switch box (home-made) is mounted on the lower shelf in the 1¼" space. On the front of this switch box are two push buttons (RS 275-609). The red switch on the right is labeled "up". The black switch is labeled "down". A hole in the switch box allows the new wires to pass to the connector (ordered from Kenwood) at the mike socket. On the back are connections to the microphone and added PTT switch. The new PTT switch is a telegraph key mounted on the table to the left for easy left-hand operation.

Just above the first layer of equipment in the console is a shelf. An aluminum angle bar is mounted on this shelf so that it may swing out or fold back out of the way. A 600 ohm dynamic microphone sets on the end of this bar in speaking position. The mike also hooks up to the HF rig. A clear table space in front of the equipment permits note taking. Kenwood's home station unit would take up a lot of the table top writing space.

Other similar rigs can surely be hooked up to the console in like manner. Some would require a tone button pad.

Operation is made more accurate, faster and more convenient with the main buttons solidly mounted in fixed positions, and the microphone held in talking position compared to the mobile configuration. An uncluttered note-taking surface adds greatly to the operating convenience.

Bill, WA5RAQ

Q. R. Zedd

HINTS ON AUTUMN DXING FROM THE GREAT MAN

September annually brings the first hopes for cooler weather in the Southwest, along with plans for antenna work and other projects that we won't get to until it's snowing.

Q. R. Zedd, A5A, was reminiscing about autumn radio projects and the like the other day, and some of us local boys were fortunate enough to be allowed to listen.

"Winter is probably the best time for Dxing," said Zedd, hiking his spurs up on the edge of the Tuesday morning coffee table at OU's Commons Restaurant. "But fall is good, too, especially if you know how to sandwich in your operating between football games and the World Series. If you would like, I could give you a few tips."

There was a general chorus of pleading, of course, and Zedd laid out a few observations, to wit:

"Number one, you got to remember that tall grass seems to have a magical effect on the ground plane under your antennas. That's true even if you got a modest monobander at 75 feet. **Never mow your lawn after the end of August.**

"Naturally it might be that your lawn will start looking cruddy, but just reflect on this fact: nobody ever saw the house of a DXer that had a nice lawn. If your wife or girlfriend wants to mow the lawn, why, you can let her. Just don't take part in it yourself. Maybe she will get discouraged and let the lawn get suitable cruddy. Meanwhile, you will be having more time at the rig.

"Number two, always keep in mind that all the best DX is always on when you're at the golf course. **Therefore, give up golf.** You can always start again next year, or maybe you can learn croquet, which is a dandy game for DXers because you can play in your own yard (right after your wife mows it for the spring) and keep your receiver strapped to your tee shirt or propped in the window of the shack, so you never miss anything.

"Number three, cooler weather lets you drink more coffee. This is vital. The older you get, the more coffee is likely to keep you awake. That's good. If it doesn't keep you awake, drink more anyway because you'll have to get up a lot in the night to go to the bathroom, and every time you do, scan the band and holler 'CQ DX' a few times; you might be surprised at the results. **Try to drink at least six cups of coffe every evening after supper.** It also helps if you eat a lot of heavy stuff like hamhocks and pork bellies.

"Number four, always keep in mind that Murphy's Law applies to DXing. The more you plan, the more you will screw up. **Stay on the air at least fifteen hours a day and you don't have to plan nothing.** Murphy strikes more often in the fall, especially in the Norman area. I don't know why.

"Now as to preparations for later fall and winter," Zedd went on, refilling his coffee cup, I'm sure you boys all know some of the things you want to do --

"Never fix your beam until there's ice on it. Your bare hands will stick to the frozen metal real good, and keep you more secure up there.

"Always run your linear full-bore, even if you're talking to a pal a block away. You never know when someone exotic might be listening. I met Tondelayo that way.

"If you plan any major new antenna work, set it up for around November 20. There's almost always a good sleet storm around then, and you will find that you work at peak speed and efficiency in sleet.

"If you hear a pileup and don't where to point the beam, aim it at your neighbor right across the street. This will remind him you're home, and he'll be more careful when he backs out of his driveway that he don't slide on the snow and hit your extra pickup parked out there curbside.

"Make sure you are up on the current best prices for Alpha linears and new computers and the like, because Santa Claus is coming, and your wife and kids may be looking for shopping hints along about now. It's also good to gripe at the supper table a lot about how you missed that good one the other day on account of how decrepit your transceiver has gotten, or how you need a new crankup tower for the safety of the house, and so on.

"If you get really snowed in and your antennas all have fallen down, try writing a piece for one of the ham magazines. Keep a record of your time and when you sent it off and all. If they happen to buy it, your buddies will be real impressed and tend to forget you started in amateur radio out of CB, and even if you don't, you can claim on your income tax that your station was all purchased as a research project for the article, and you can write off the whole station.

"This last gambit, incidentally, ain't likely to work. But you'll meet some real interesting people from the IRS, and by the time they get done the audit, warmer weather will be around again."

-- KU5B

Great Plains A.R.C.

W5HGM Repeater 146. 13/73

The Great Plains ARC

The Great Plains ARC met on Aug.7,1984 at the Woodward Maintance Building. WA5FLW presiding. The minutes were read and approved. The Treasurer's report was read and approved.

The following net report was made by N5CCV: 13 sessions, 123 checkins,5 rountine messages. Michael Bowman reported on 28.150 KC: 9 checkins and no traffic.

Discussion on the Eye-Ball QSO for next year: April 14,1985 was reported to have no conflicts. We will have V.E.tests,if permitted.

NC5C made the motion we have the Eye-Ball QSO at Mooreland(pending approval of FCC).KA5SDD seconded. Passed.

In the way of old business,acquiring coax for an emergency antennas was mentioned. This was discussed briefly.

KB5XI proposed that we commend Harry Watts for his work with prospective amateurs in Vici and surrounding community. Ka5SDD seconded. Passed. It was mentioned that Mark Bowman,Sandy Lively, and Michael Bowman are on the air through his efforts. A formal message is to be forwarded to him via the net from the club--relating to this commendation.

It was mentioned about Ron and Carla losing their radio gear from their home. It was suggested that we not tell on the air when we are goin to be gone--attending some meeting or convention.

The club recognized the plague that Mark Bowman received from the State of Oklahoma,EXecutive Department."It salutes Mark Bowman for being the Recipient of the ARRL for the youngest Novice Licensee (at Ham Holiday). Congradulations on a Job Well Done!" July 27,1984, George Nigh,governor.

We, as a club,are invited to meet with the Wheatstraw ARC at Canton next Sunday, Aug.12th. Pot Luck at 1:30 at the Canadian Shelter.

Discussion followed on setting up a reward fund for stolen amateur radio gear. This was tabled until our next meeting.

Program: Angie Brison and Ann Flessas on Buglar Alarms.

Adjorned.

73's,
K5YZK

ALTUS AREA AMATEUR RADIO ASSOCIATION

The August meeting of the Altus Area Amateur Radio Association took place at the North Main Fire Station at 1930 hrs. on the 9th. We had 6 members present. They were WB5UMH, Deanna; WD5BBO, Paul; W5CCV, Joe; WA5OGC, Oliver; N5FQR, Herb; and WA5CBF, Loren.

Loren gave the club financial report. We have currently $376.84 in the treasury. We have a number of club members who need to forward their eight dollars to WA5CBF. Those arear's are:

NE5BS	8401	WA2JXD	8404
K5KCJ	8408	WB5MJS	8408
WB5CFS	8404	NE5A	8402
WB5UEB	8402	W5UOV	8404.

Some we have carried in good faith for a while- BUT BUSINESS IS BUSINESS. As we need to be able to pay our expenses, so please.

Deanna said A.L., WA5MCR, has "tennis elbow" from being slammed around by a tractor door. He currently has a cast on his left arm. The Doctor told him this was a sure cure for not getting hurt again by the tractor door.

Another of our group, newly departed to Ardmore, Gary Alexander, has been having his share of problems. Hope Gary gets to feeling better following surgery. The last time we saw him- he was not moving too swiftly.

The assembled group got into a big discussion concerning "arrow head hunting." Oliver spoke about the Indian Head Rock which is located northwest of Mountain Park, Ok. and the old Gold Bell Gold Mine near the submerged town of Cold Springs, Ok.

Paul and Deanna jumped into the discussion about the old Spanish mine near Snyder on Highway 62 going to Lawton, Ok. Joe gave a few comments concerning the Bat Caves near Jester, Ok.

Oliver gave some information concerning the openning of the ten meter band for 30 or 40 minutes last week. Joe discussed new information concerning the new sets of frequencies available to Hams. Deanna and Herb had a short Question and Answer period concerning the new licensing proceedures starting Jan. the first.

Joe gave the news that N5AIP, Bob Brattan, is the new O.B.S. for southwestern Oklahoma. Bob is going to be using the WB5KRH/R .19-.79 repeater on Tuesdays at 9:00 p.m.

Oliver discussed the 6 inch rain near Snyder a few days ago. The rain drops were measured and found to be spaced 6 inches apart. "Go to bed, Olie!" Oliver said the local .19-.79 repeater is monitored especially during the severe wx season.

Chuck Smith, WB5MJS, went on a long awaited vacation of two weeks away from the trials and tribulations of the radio shop at Altus Air Force Base. He and his wife, Linda, have "went to the birds." They had a good time getting to see the country: Lawton, Wichita Falls, Vernon, and Wewoka, Ok. He said he could have stood another three weeks off.

Have you heard about the proposed AMSAT geostationary satellite fleet? I received some information in the mail from the ARRL concerning such. I thought it was pretty interesting so am going to include it also,

"AMSAT needs your comments and suggestions regarding the construction and launch of a system of geostationary (no tracking required) satellites. A possible launch opportunity exists for such a system around 1988. Three pairs of communications satellites would be placed above the equator in fixed positions equal distances apart and 22,300 miles up. Located in this manner, they would cover the major part of the earth's surface. Such a system would provide reliable communications coverage for radio amateurs on a worldwide basis for 24 hours per day. - - - - -

Your comments, thoughts, suggestions, support and design ideas are urgently sought. Please send your QSL, postcard or letter to: AMSAT, 850 SLigo Ave., #601, Silver Spring, MD 20910."

The next regularly scheduled meeting of the Altus Area Amateur Radio Association is September 13, 1984 at 1930 hrs. at the North Main Fire Station.

A lot of THANK YOU'S go to Irene MacDonald and Deanna McEndree for the goodies they send to the club meetings. For those who do not attend the club meetings, you are sure missing out on the treats.

73's Loren WA5CBF

The Altus Ham Club invites you to its ice cream social on Saturday, August 11 at 7:30 P.M. at the Altus City Reservoir. Please let me know if you can bring ice cream or refreshments and how many will attend.

Thanks,
Deanna WB5UMH
482-6777

The above short note was sent out by Deanna, WB5UMH. It was an invitation to the ice cream social we hold every year down in the southwest part of the state in August.

To sum up, we had 43 hams and families attend this years gathering on the north side of the city reservoir. We were lucky that the wind was from the north in the early part of the evening as a 'fish odor' was detected later in the evening. Hi.

I don't think the kids really mind at all as they were playing hard in the sand and on the swing sets. There were lots of refreshments (cakes, cookies, etc) brought by the various families. Someone brought two cases of cokes, Dr. Pepper, and ice. We had 7 freezers of home made ice cream. There was strawberry, Butter-finger, fresh peach, chocolate, and some others- but I was too full to try them! Those who brought ice cream were WA5MCR, WA5MCS, WA5CBF, WB5UMH, K7BSY, and W5VXU.

I do not think that anyone went away hungary from this meeting of the A.A.A.R.A.

73's Loren WA5CBF

Want to insert this note here:

Dear Friend and Fellow Ham:

The Altus Area Amateur Radio Association would like to invite you and your family to the 7th. annual HAMFEAST and 1st. annual CAMPOUT.

We have reserved the Shelter #1 (the first covered pavilion on the south side of the roa as you enter Quartz Mountain State Park-south entrance) from 0600 to 2300 hrs on September 8th, 1984. The feast will consists of a Hamburger cookout (furnished by the club) and a covered dish (furnished by the attendees). If you plan to attend, PLEASE check with Deanna to get a count and to coordinate the list of needed items. A famous chef will perform magic over an open grill turning raw hamburger meat into a tasty treat!

The first annual CAMPOUT is an open invitation to those hardy souls who brave the weather in September and like to take their camper / motor home / tent / sleeping bag / blanket / or back of pickup. We plan to spend Friday and Saturday night (the 7th. and 8th. in the paved camping area (where all of the hookups are). We plan to sit around the camp fire and tell tall tales about working far away DX stations.

Talk-in will be on 146.52 MHz FM simplex and 146.190-.790 MHz on WB5KRH/r from 0900 to 1500 hrs. on Saturday.

Hope to see you there.

73's Loren WA5CBF

QST Abbreviations List

These abbreviations, compiled and updated annually, appear in QST and other League publications. Keep them handy for easy future reference.

A — ampere
ac — alternating current
ACC — Affiliated Club Coordinator
ACNF — AMSAT coordination and network frequency
A/D — analog-to-digital
af — audio frequency
afc — automatic frequency control
afsk — audio frequency-shift keying
agc — automatic gain control
Ah — ampere hour
alc — automatic load (or level) control
a-m — amplitude modulation
A.M. — morning
AMSAT — Radio Amateur Satellite Corporation
anl — automatic noise limiter
AOS — acquisition of signal
ARA — Amateur Radio Association
ARC — Amateur Radio Club
ARES — Amateur Radio Emergency Service
ARS — Amateur Radio Society; Amateur Radio station
ASCII — American National Standard Code for Information Interchange
ASSC — Amateur Satellite Service Council
ATV — amateur television
ave — automatic volume control
AWG — American wire gauge
az-el — azimuth-elevation

BASIC — beginner's all-purpose symbolic instruction code (computer language)
b — byte; a group of bits or binary digits, usually eight
bc — broadcast
BCD — binary-coded decimal
BCI — broadcast interference
bcl — broadcast listener
bit — binary digit
BFO — beat-frequency oscillator
BM — bulletin manager
BPF — band-pass filter
BPL — Brass Pounders League
bps — bits per second
BPT — bipolar transistor
BW — bandwidth
BWL — loaded bandwidth

C — Celsius
CAC — Contest Advisory Committee
CATVI — cable-television interference
CB — citizens band
CCIR — International Radio Consultative Committee
CCITT — Consultative Committee for International Telegraph and Telephone, a part of ITU
cew — coherent cw; counterclockwise
c.d. — civil defense
CD — Communications Department (ARRL)
CMOS — complementary-symmetry metal-oxide semiconductor
coax — coaxial cable or connector
COR — carrier-operated relay
CP — code proficiency (award)
CPU — Central Processing Unit
CRRL — Canadian Radio Relay League
CRT — cathode-ray tube
CSMA — carrier sense multiple access
ct — center-tap
CTCSS — continuous tone-coded squelch system (PL)
cw — continuous wave (code); clockwise

D/A — digital-to-analog
dB — decibel
dBc — decibels referenced to carrier level
dBd — antenna gain referenced to a dipole
dBi — antenna gain referenced to isotropic; a dipole has a gain of 2.14 dBi
dBm — decibels referenced to 1 mW
DBM — doubly balanced mixer
dc — direct current
D-C — direct conversion
DEC — district emergency coordinator
DEMUX — demultiplexer
DF — direction finder; direction finding
DIP — dual in-line package
DOC — Department of Communications (Canada)
dpdt — double-pole double-throw
dpst — double-pole single-throw
dsb — double sideband
DTL — diode-transistor logic
DTMF — dual-tone, multi-frequency
DVM — digital voltmeter
DX — long distance
DXAC — DX Advisory Committee
DXCC — DX Century Club

E — voltage
EAROM — electrically alterable read-only memory
EC — emergency coordinator
ECAC — Emergency Communications Advisory Committee
ECL — emitter-coupled logic
ECO — electron-coupled oscillator
eirp — equivalent isotropically radiated power; erp referenced to an isotropic antenna
EME — earth-moon-earth (moonbounce)
emf — electromotive force (voltage)
EMI — electromagnetic interference
EMP — electromagnetic pulse
EOC — emergency operations center
EPROM — erasable programmable read-only memory
EQX — equator crossing
erp — effective radiated power
EUV — extreme ultraviolet radiation
f — frequency
F — farad; Fahrenheit
FAX — facsimile
FCC — Federal Communications Commission
FD — Field Day

30

FET — field-effect transistor
FF — flip-flop
FL — filter
fm — frequency modulation
FMT — Frequency Measuring Test
fot — optimum working frequency
FSD — full-scale deflection
fsk — frequency-shift keying
ft — foot

g — gram
GaAs FET — gallium arsenide field-effect transistor
GDO — grid-dip or gate-dip oscillator
GHz — gigahertz
gnd — ground

H — henry
HAAT — height above average terrain
HDLC — high-level data link control
hf — high frequency
HFO — heterodyne-frequency oscillator
hpf — highest possible frequency
Hz — hertz

I — current
IARU — International Amateur Radio Union
IC — integrated circuit
i-d — identification, identifier
ID — inside diameter
i-f — intermediate frequency
IMD — intermodulation distortion
in. — inch
in./s — inches per second
I/O — input/output
IRAC — Interdepartment Radio Advisory Committee
IRC — International Reply Coupon
isb — independent sideband
ITF — ARRL Interference Task Force
ITU — International Telecommunication Union
IW — Intruder Watch

J — joule
j — indicator for reactive component of an impedance (+j inductive; −j capacitive)
JFET — junction field-effect transistor

K — kilobyte, Kelvin
k — kilo, 1000
KB — keyboard
kg — kilogram
kHz — kilohertz
km/h — kilometers per hour
kW — kilowatt
kWh — kilowatt hour

L — inductance
lb — pound
L-C — inductor-capacitor
LCD — liquid crystal display
LED — light-emitting diode
lf — low frequency
lhcp — left-hand circular polarization
LMO — linear master oscillator

LO — local oscillator, League Official
Loran — long-range navigation
LOS — loss of signal
lp — log periodic
lpm — letters per minute
lsb — lower sideband
LSB — least-significant bit
LSI — large-scale integration
luf — lowest usable frequency

m — meter (distance or band)
mA — milliampere
mAh — milliampere hour
MARS — Military Affiliate Radio System
MDS — minimum discernible signal
mf — medium frequency
mH — millihenry
MHz — megahertz
mi — mile
mike — microphone
mini-DIP — dual in-line package, 8 pins
mi/h — miles per hour
mi/s — miles per second
mix — mixer
mm — millimeter
MO — master oscillator
modem — modulator/demodulator
MOS — metal-oxide semiconductor
MOX — manually operated switching
ms — millisecond
m.s. — meteor scatter
m/s — meters per second
MSB — most-significant bit
MSI — medium-scale integration
MSTV — medium-scan television
muf — maximum usable frequency
MUX — multiplex; multiplexer
mV — millivolt
mW — milliwatt

nbfm — narrow-band frequency modulation
nbvm — narrow-band voice modulation
n.c. — no connection
NC — normally closed
NCS — National Communications System
ncs — net control station
NF — noise figure
nH — nanohenry
NIAC — National Industry Advisory Committee
NiCd — nickel cadmium
NM — net manager
NMOS — n-channel MOS device
NO — normally open
NOI — Notice of Inquiry
npn — negative-positive-negative
NPRM — Notice of Proposed Rule Making
NR — Novice Roundup (contest)
ns — nanosecond
NTIA — National Telecommunications and Information Administation
NTS — National Traffic System (ARRL)

OBS — official bulletin station
OD — outside diameter
OES — official emergency station
OO — official observer
op amp — operational amplifier
ORS — official relay station
osc — oscillator
OSCAR — Orbiting Satellite Carrying Amateur Radio
OTA — operational transconductance amplifier
OTC — Old Timer's Club
oz — ounce

P — power
PA — power amplifier
pc — printed or etched circuit
PEP — peak envelope power
PEV — peak envelope voltage
pF — picofarad
PIA — public information assistant
PIO — public information officer
PIV — peak inverse voltage
pk — peak
pk-pk — peak-to-peak
PL — Private Line (Motorola trademark)
PLL — phase-locked loop
pm — phase modulation
P.M. — afternoon/night
PMOS — p-channel MOS device
pnp — positive-negative-positive
pot — potentiometer
ppd — postpaid
PRAC — Public Relations Advisory Committee
PROM — programmable read-only memory
PRV — peak reverse voltage
PSHR — Public Service Honor Roll
psk — phase-shift keying
PTO — permeability-tuned oscillator
PTT — push-to-talk
PV — photovoltaic
PVC — polyvinyl chloride

QCWA — Quarter Century Wireless Association
QRP — low power (less than 10-W input)

R — resistance
RACES — Radio Amateur Civil Emergency Service
RAM — random access memory
R/C — radio control
R-C — resistor-capacitor
RCC — Rag Chewers Club
rcvr — receiver
rev/min — revolutions per minute
rf — radio frequency
rfc — radio-frequency choke
RFI — radio-frequency interference
rhcp — right-hand circular polarization
RIT — receiver incremental tuning
RM-(number) — number assigned by FCC to a petition for rule making
rms — root-mean-square
RO — radio officer
ROM — read-only memory
RS — Radiosport Satellite (USSR)
RST — readability-strength-tone
RTL — resistor-transistor logic
RTTY — radioteletype

s — second
s.a.e. — self-addressed envelope
s.a.s.e. — stamped s.a.e.
SCM — section communications manager
SCR — silicon-controlled rectifier
SEC — section emergency coordinator
SET — Simulated Emergency Test
SGL — state government liaison
shf — super-high frequency
SM — section manager
S.M. — silver mica (capacitor)
SNR or S/N — signal-to-noise ratio
spdt — single-pole double-throw
spst — single-pole single-throw
SS — Sweepstakes; spread spectrum
ssb — single sideband
SSC — Special Service Club/AMSAT Phase III special service channels
SSTV — slow-scan TV
STM — section traffic manager
SWL — shortwave listener
SWR — standing-wave ratio
sync — synchronous, synchronizing
SYNCART — synchronous satellite carrying Amateur Radio transponder

TA — technical advisor
TC — technical coordinator
TCA — time of closest approach
TCC — Transcontinental Corps
TE — transequatorial (propagation)
tfc — traffic
THz — terahertz
THD — total harmonic distortion
tpi — turns per inch
T-R — transmit-receive
T-T — Touch-Tone, trademark of Bell Telephone Co.
TTL — transistor-transistor logic
TTY — teletypewriter (from Teletype, trademark of Teletype Corp.)
TV — television
TVI — television interference

uhf — ultra-high frequency
UJT — unijunction transistor
UoSAT — University of Surrey educational/research satellite (Great Britain)
usb — upper sideband
UTC — Universal Coordinated Time

V — volt; voltage
VCO — voltage-controlled oscillator
VCXO — voltage-controlled crystal oscillator
VFBO — variable-frequency beat oscillator
VFO — variable-frequency oscillator
vhf — very-high frequency
vlf — very-low frequency
VMOS — vertical power FET
VOM — volt-ohm-milliammeter
VOX — voice-operated switching
VR — voltage regulator
VRAC — VHF Repeater Advisory Committee
VSWR — voltage standing-wave ratio
VTVM — vacuum-tube voltmeter
VUAC — VHF-UHF Advisory Committee
VXO — variable crystal oscillator

W — watt
WAC — Worked All Continents
WARC — World Administrative Radio Conference
WAS — Worked All States
wbfm — wide-band fm
wpm — words per minute
wVdc — working voltage, dc

X — reactance
xcvr — transceiver
xmtr — transmitter
xtal — crystal

Z — impedance
Z — see UTC

5BDXCC — Five-Band DXCC
5BWAC — Five-Band WAC
6BWAC — Six-Band WAC
5BWAS — Five-Band WAS

° — degrees
α — alpha; angles; common-base forward current-transfer ratio of a bipolar transistor
β — beta; angles; current gain of common-emitter transistor amplifiers
γ — gamma; angles
Δ — delta; increments
δ — gamma; angles
ε — epsilon; base of natural logarithms (2.71828)
θ — theta; angles
λ — lambda; wavelength; longitude
μ — mu; micro (10^{-6}); amplification factor; permeability
μP — microprocessor
π — pi; 3.14159
Σ — sigma; summation
τ — tau; time constant; time phase displacement
ϕ — phi; angles; latitude
ψ — psi; angles
Ω — omega; resistance in ohms
ω — omega; angular velocity, $2\pi f$

HAM HAPPENINGS REFER TO CLUB SECTION FOR SPECIFICS

September 84

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
						1
2	3	Great Plains MORI 4	ARDMORE 5	EDMOND Club 6	Aeronautical Center ARC 7	SCARS COCO 8
Wheatstraw 9	CIMARRON 10	76'ers OU 11	12	ALTUS AREA 13	TELECONFERENCE NET 7:30 PM 147.036 14	VHF Club 15
EARS 16	17	AUTOPATCH 18	19	KAY County 20	21	22
23/30	EDIT Central Oklahoma Radio Amateurs COLLECTOR - EMITTER 24	CORA AT RED CROSS 25	26	27	28	29

Mike Kramer KA5NUP

146.025 / 146.625 REPEATER

FEEL FREE TO USE IT