Central Oklahoma Radio Amateurs

COLLECTOR AND EMITTER

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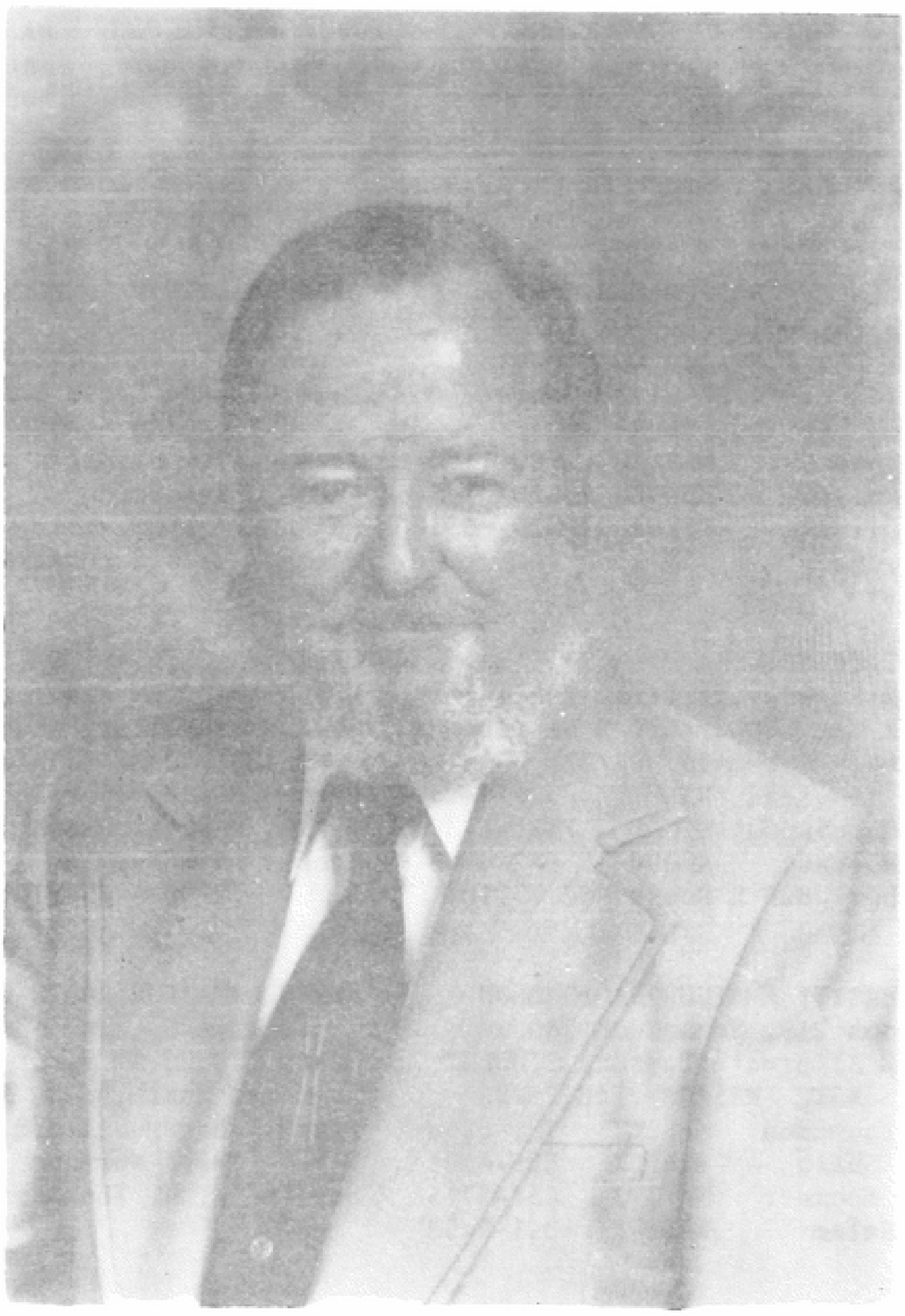
VOL 2 NO 21

AN INFORMATIVE MAGAZINE PUBLISHED MONTHLY BY AND FOR OKLAHOMA RADIO AMATEURS AND ANYONE INTERESTED IN LEARNING ABOUT IT



Jack Gant, W5GM, of Ardmore OK was appointed by hq ARRL to fill out a year of the unexpired time as Vice Director for the West Gulf Division. Their confidence in him was well placed and since that time Jack has been re-elected for a total of nearly five years. During that time he has given freely of his time to advance the cause of amateur radio by his many visits to clubs in Oklahoma and Texas, being keynote speaker at Ham Fests, attending directors meetings at Newington. He instituted several streamlined and productive methods of solving problems. With Roy Albrights retirement Jack has decided to run for the West Gulf Directors position, or rather, job for it is a big job. Jack is well experienced and qualified and a lot of his friends are in favor of the action and are helping him get the word out.

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COLLECTOR AND EMITTER

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Central Oklahoma Radio Amateurs, Inc. (CORA) is a not-for profit association of radio amateurs, founded for the promotion of interest in amateur radio communication and experimentation, for the advancement of the radio art and of the public welfare and operates to enhance the cooperation of member clubs in sponsoring activities of mutual interest to the clubs and all radio amateurs.

President	Ken Kendrick	WB5ECJ	751-4917
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PARTICIPATING CLUBS FOR CORA COLLECTOR & EMITTER:

AERONAUTICAL CENTER AMATEUR RADIO CLUB
Postal Station 18, Okla City OK 73169
Meets: 8:00 PM First Friday each month
Flight Standards Bldg, FAA Aero Center
Club Station W5PAA

Pres.	Al Prince	WB5KCU	789-1160
V-P	Bill Hulse	K5UGZ	376-2125
Sec/Tr	Bill Oliver	K5KDR	329-6333

MID-OKLAHOMA REPEATOR
Meets: 8:00 PM Tuesday of first full week in month. Okla City EOC, 4600 N Eastern
WR5AJP 34/94 WR5ADF 07/67

Pres	H. O. Townsend	WA5MLT	329-4426
V-P	Chet Hazelwood	W5GDL	427-1439
Sec/Tr	John Huckaby	K5QDR	672-4706

Dues: Sid Gerber, 829 E Bouse MWC 73110

OKLAHOMA UNIVERSITY AMATEUR RADIO CLUB
202 W Boyd, Room 219, Norman OK 73069
Meets: 7:30 PM Alternate Tuesday STUDENT UNION Rm 161. W5TC WR5AFW 146.28/88

Pres	Paul Thompson	WB5EEY	321-6265
V-P	Wayne Smith	WB5FEX	325-6391
Sec	James Koerner	WA5JTJ	634-3713
Treas	Mike Salem	WA5EPK	321-5453

BICENTENNIAL AMATEUR RADIO CLUB
Meets: 3rd Tuesday each month. Air National Guard, Will Rogers Airport

Pres	Coy Day	K5LMG	691-1194
V-P	Earnest Wolf	K5YDK	848-3425
Sec	Ken Newberry	WB5PYN	685-2717
Treas	John Oltmans	WB5PZG	525-6066

OKLAHOMA CENTRAL VHF AMATEUR RADIO CLUB
323 NW 10th, Okla City OK 73103
Meets: 8:00 PM third Friday each month
American Red Cross Bldg, 10th & Hudson
Club Station W5LOW

Pres	Tom Stinson	W5OZE	942-3714
V-P	Ken Ford	WB5KHU	528-8770
Sec	Joe Buswell	WA5TRS	732-0676
Treas	Ellard Foster	W5KE	789-6702

OKLAHOMA CITY AUTOPATCH ASSOCIATION
Meets: 7:30 PM 3rd Tuesday, Bi-Monthly
Oklahoma Military Academy 36th & Grand
WR5ACB 22/82 147.81/21

Pres	Gary McCormick	WA5ETV	946-2898
V-P	Guy Liebmann	WA5TKS	787-9547
Sec/Tr	Jim Denman	WB5EOL	681-6048
	7705 S Charlotte Dr OKC 73159		

EDMOND AMATEUR RADIO CLUB
WR5AHG 147.63/03
Meets: 10:00 AM first Saturday of odd numbered month, 3220 N Santa Fe (GE)

Pres	Larry Dillard	WB5CWB	685-4065
V-P	Bart Wortham	WA5JUU	751-9536
Sec/Tr	W. H. Thompson	W5UVI	348-1475

Club
NEWS

W5LOW
The Elmer Goehler Memorial
Station

MINUTES OF MEETING

IN THE ABSENCE OF PRESIDENT TOM, W5OZE, THE MEETING WAS CALLED TO ORDER AT 8:00 PM BY VICE-PRESIDENT KEN, WB5KHU, WHO PROMPTLY TURNED THE FLOOR TO THE VISITING WEST GULF VICE-DIRECTOR, JACK GANT, W5GM. HE REMINDED THE CLUB THAT HE WAS USUALLY AVAILABLE TO HELP ON PROGRAMS AND PROBLEMS. HE STATED THAT HE WAS HIGHLY IMPRESSED WITH CORA AND WAS SPREADING THE WORD IN OTHER METROPOLITAN AREAS IN THE DIVISION.

SELF INTRODUCTIONS FOLLOWED WITH 16 PRESENT. (44 MISSED A GOOD MEETING)

W5PDH ANNOUNCED THAT HE HAD TAKEN TOM, W5OZE, HOME FROM THE HOSPITAL AND WAS AMAZED AT HIS PROGRESS.

BOB, W5HXL, ANNOUNCED THE ESTABLISHMENT OF A JACK GANT CAMPAIGN FUND AND THAT SOME $200.00 HAD ALREADY BEENCONTRIBUTED BY CLUBS AND INDIVIDUALS. HE MOVED THAT THE VHF CLUB CONTRIBUTE $50.00 TO THE FUND. IT WAS SECONDED BY W5JJ AND AFTER A SHORT DISCUSSION WAS PASSED. BOB ALSO ADVISED THAT THE TEXOMA HAMARAMA PROGRAM HAD BEEN FIRMED UP. HE ALSO ADVISED THAT THE LODGE REQUIRES ONE NIGHT'S LODGING BE PAID 30 DAYS IN ADVANCE. (THAT'S NOW!)

A PROGRAM ON SIGHT AND COLOR PERCEPTION WAS PRESENTED BY FRANK, W5PDH. THE MEETING WAS ADJOURNED AT 9:30 IN FAVOR OF COFFEE AND DONUTS. WA5TRS, VIA WA5ZNF

HAMS IN HOSPITALS

IN ADDITION TO TOM, W5OZE, IN THE HOSPITAL, THERE WAS FRED,K5HFN WHO SUFFERED A HEART PROBLEM RIGHT AFTER THE RDF SEMINAR. HE WAS IN INTENSIVE CARE FOR A WHILE BUT IS HOME NOW AND DOING BETTER. WAYNE, WB5HWH, JACKTOWN, WAS SICK BUT AT HOME. REEDY,W5ADC, HOLDENVILLE WAS SENT HOME AFTER AN OPERATION ON ONE OF THE AREA HOSPITALS. THAT'S ENOUGH OF THAT! LET's SEE IF WE CAN STAY OFF THE SICK LIST.
JOE, WA5TRS

RDF SEMINAR

Hart Postlethwaite, WB6CQW, conducted an interesting seminar on Radio Direction Finding and related many amusing ancedotes at a gathering of over sixty local amateurs on September 14. The seminar was held at Oklahoma Military Academy and was hosted by Autopatch Association through special effort of Jay Liebmann, K5JL, Commander, Squadron No. 10, Happy Flyers.

Hart and Happy Flyers have been actively promoting the construction and correct use of radio direction finding equipment for downed aircraft search and jammer hunting. His experiences in the Bay area have proven that airborne radio direction finding is extremely fast and efficient. He was accompanied and assisted by his pretty wife Janie, WB6ODQ, who is quite a gal. She is an active pilot, and Flight Leader of 99s, an international organization of woman pilots. She was named Woman Pilot of the Year for the Golden West Chapter.

A large number of circuit boards and instruction manuals left the meeting in the hands of some very able and enthusiastic area amateurs so the jammer location around here is going to be made pretty simple in the future. Those who missed the seminar can get in on the action by writing to Hart at 1811 Hillman Avenue, Belmont, CA 94002 and sending $10.00 for a board, construction information and Radio Direction Finding Information. The money is used to finance RDF work and the Happy Flyers is a non-profit, no-dues organization. Joe, WA5TRS

MARGINAL COGNIZANCE

WE ALL KNOW THAT RADIO IS A FAIRLY COMPLICATED TECHNICAL SUBJECT. HOWEVER, AS TIME PASSES ON, RADIO RELATED THINGS GET MORE COMPLICATED.

IT HAS BEEN SAID THAT LEONARDO DA VINCI HOLDS THE RECORL FOR HAVING THE HIGHEST PERCENTAGE OF KNOWLEDGE OF EVERYTHING THAT COULD BE KNOWN AT THE TIME. HIS RECORD WILL PROBABLY NEVER BE BEATEN. EVEN WHEN TAKING A SINGLE SUBJECT LIKE RADIO, IT IS DIFFICULT TO KNOW MORE THAN A SMALL PERCENTAGE OF WHAT IS GOING ON.

IT IS, HOWEVER, THE RESPONSIBILITY OF AMATEUR RADIO OPERATORS TO BE COGNIZANT ENOUGH TO BE ACCOUNTABLE FOR THEIR ACTIONS, AS A MINIMUM, AND CONTRIBUTE TO THE ADVANCEMENT OF THE STATE OF THE ART AS A LITTLE MORE THAN THE MINIMUM.

RECENTLY, I WAS SOBERED BY THE REALIZATION THAT THE AVERAGE AMATEUR RADIO OPERATOR IS PROBABLY NOT WORTH HIS SALT. SHOCKING STATEMENT? WELL, I'LL MODIFY IT A LITTLE. I AM AFRAID THAT THE AVERAGE AMATEUR IS LOSING GROUND. WHAT MADE ME AWARE OF THIS IS THE FCC STUDY GUIDE MATERIAL I HAVE BEEN REVIEWING FOR LICENSE CLASS PREPARATIONS. LAST YEAR, I SPENT SIX MONTHS OF SPARE TIME PREPARING INSTRUCTION MATERIAL BASED ON THE LAST FCC INFORMATION. NOW, I FIND THAT PROBABLY 25 PERCENT OF THE MATERIAL NEEDS TO BE THROWN OUT AND REPLACED WITH NEWER, MORE SOPHISITICATED MATERIAL.

I HATE LIKE HELL TO DO IT AT THIS ELEVENTH HOUR BUT HAVE NO ALTERNATIVE. THE AVERAGE AMATEUR DOESN'T KNOW ENOUGH ABOUT THE NEW SUBJECTS TO TEACH THEM OFF THE TOP OF HIS HEAD AND THE PURPOSE OF THE INSTRUCTOR GUIDES IS TO PREVENT THAT AND RESULTING SURPRISES TO THE INSTRUCTOR.

WHAT REALLY BOTHERS ME IS THAT MANY AMATEURS I KNOW WOULD BE HARD PRESSED TO KNOW 70 PERCENT OF THE SUBJECT MATERIAL IN THESE STUDY GUIDES. WHAT THIS MEANS IS THAT IF RE-EXAMINED, ONLY LUCKY GUESSING WOULD ENABLE THEM TO RETAIN THEIR LICENSES.

NOW YOU KNOW THE REASON WHY WE CONSUMED 16 PAGES OF THE C & E TO GIVE YOU COPIES OF THE NOVICE, GENERAL AND ADVANCED CLASS FCC STUDY GUIDES. THE EXTRA CLASS MAY BE PUBLISHED LATER IF THERE IS SUFFICIENT DEMAND. NOTICE THAT THEY ARE DATED FEBRUARY 1976. THE CURRENT (75TH) EDITION OF THE ARRL LICENSE MANUAL DOES NOT REFLECT THE NEW SUBJECTS AND ARRL PERSONNEL ARE PROBABLY SCRABBLING TO GET A NEW VERSION OUT. IN THE INTERIM, YOU HAVE YOUR CHOICE. EITHER ISSUE FORTH WITH A HARRUMPH! AND TOSS THIS ISSUE ASIDE, OR, LOOK THROUGH THEM CAREFULLY AND ASK YOURSELF IF YOU HAVE A RUDIMENTARY KNOWLEDGE ABOUT ALL THOSE SUBJECTS THE FCC CONSIDERS AS A MINIMUM FOR ENTRY INTO AMATEUR RADIO. JOE, WA5TRS

RADIO DIRECTION FINDING - TECHNICAL ASPECTS

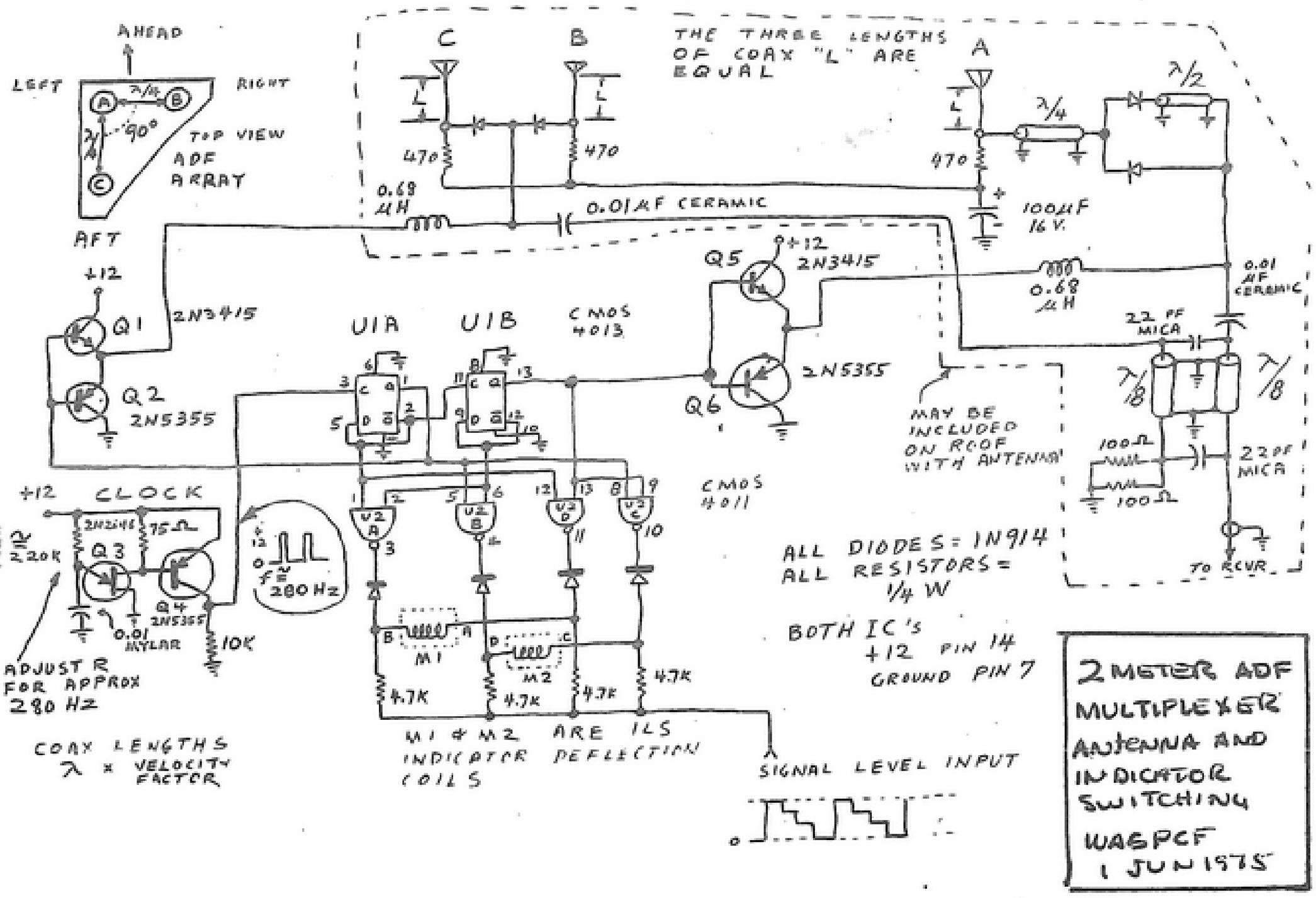
THIS IS THE CONCLUSION OF A TWO PART SERIES ON RADIO DIRECTION FINDING EQUIPMENT AND TECHNIQUES. LAST MONTH'S C & E COVERED SOME ANTENNAS AND PASSIVE RDF SYSTEMS. THIS MONTH THERE IS SOME INFORMATION ON ACTIVE (ELECTRONIC) DIRECTION FINDERS.

IN THE AUGUST C & E, PAGES 29 AND 30 WAS A SCHEMATIC OF AN ACTIVE RDF SYSTEM PROVIDED BY WA5PCF AND REDRAWN BY OUR OWN BILL, WA5RAQ, THE SCHEMATIC IS REPRODUCED HERE FOR REFERENCE. TO DATE, I KNOW OF NO ONE WHO HAS BUILT ONE OF THESE THINGS LOCALLY. AFTER CLOSE EXAMINATION, I AM CONVINCED SOMEONE OUGHT TO TRY THE CIRCUIT. I HAVE NO DOUBLE THAT IT WILL WORK, THOUGH I HAVE SOME DOUBT ABOUT ITS RESOLUTION. ONE ADVANTAGE IS APPARENT. THE ANTENNAS ARE STATIONARY AND CAN BE MOUNTED AT A HIGH LOCATION WITHOUT WORRYING ABOUT ROTATION.

THE CIRCUIT LOOKS COMPLICATED BUT IT ACTUALLY IS NOT IF IT IS CAREFULLY STUDIED. THE CMOS 4013 IC CONTAINS TWO FLIP-FLOPS, THE CLOCK IS GENERATING PULSES WHICH TOGGLE THE FIRST FLIP-FLOP. ONE OUTPUT OF THAT FLIP-FLOP IS TOGGLING THE SECOND FLIP-FLOP. THE OUTPUTS OF THE TWO FLIP-FLOPS ARE DOING TWO THINGS: SWITCHING ANTENNA PATTERNS AND SUPERVISING OPERATION OF AN ELECTRO-MECHANICAL INDICATOR THROUGH FOUR GATES CONTAINED IN A 4011 IC.

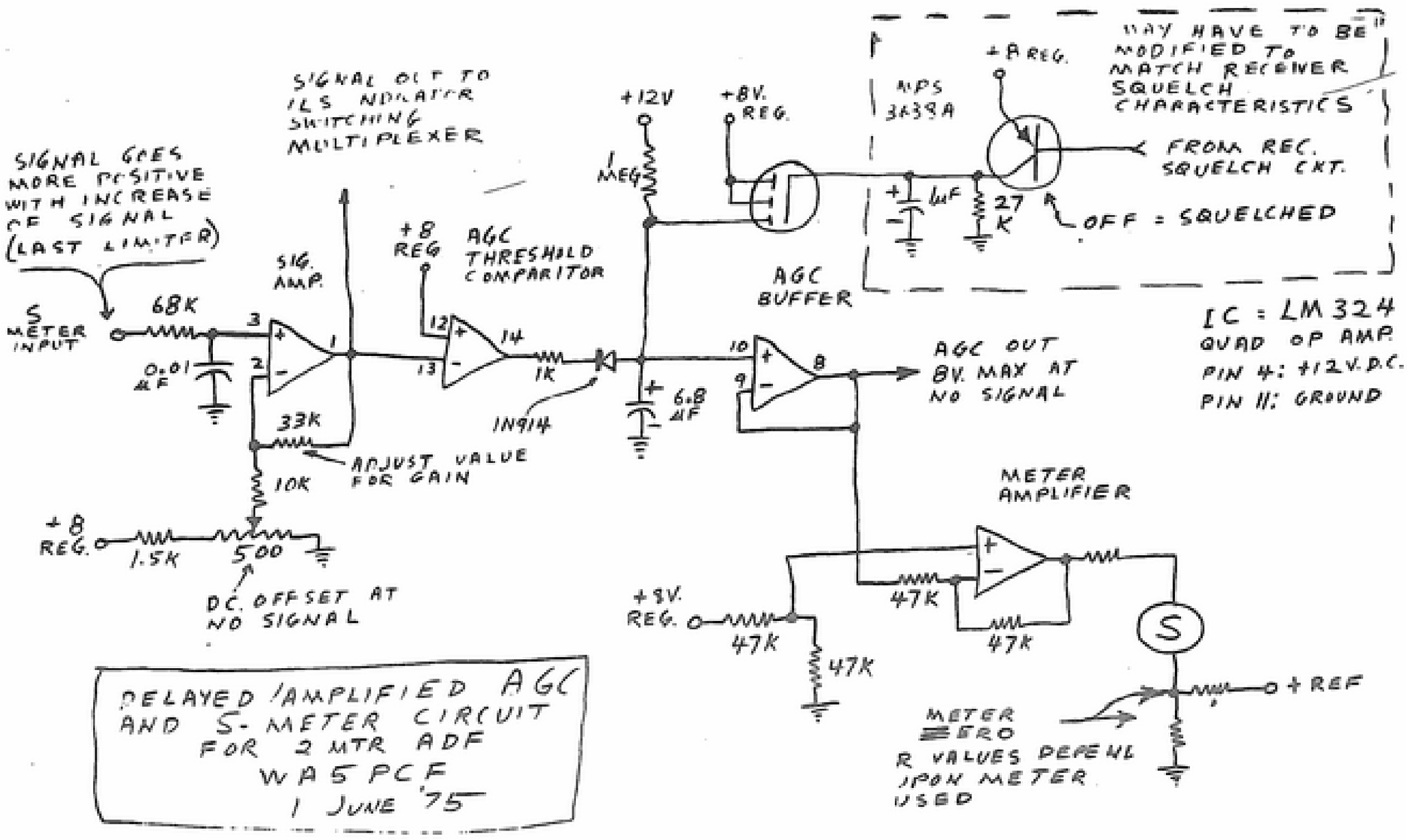
LOOK AT THE TIMING DIAGRAM. THE FLIP-FLOPS MAKE TRANSITION ON POSITIVE GOING EDGE OF CLOCK PULSES. OUTPUT Q FROM U1A IS SWITCHING ANTENNAS C AND B ON ALTERNATELY BY USING Q1 and Q2 AS EMITTER FOLLOWERS. OUTPUT Q FROM U1B IS SWITCHING A ½ WAVE DELAY LINE (180^{o}) IN AND OUT OF THE CIRCUIT WITH ANTENNA A. NOTICE THE 100 UF CAPACITOR NEAR ANTENNA A. IT WILL CHARGE TO ½ OF SUPPLY VOLTAGE AND PROVIDE SOURCE OF CURRENT WHEN EITHER Q2 or Q6 IS CONDUCTING.

IGNORE THE STAIRCASE WAVEFORM THAT SAYS "SIGNAL LEVEL INPUT." IT IS ONLY CONFUSING AND DEPENDS ON THE STRENGTH AND DIRECTION OF THE RECEIVED SIGNAL. THE ONLY

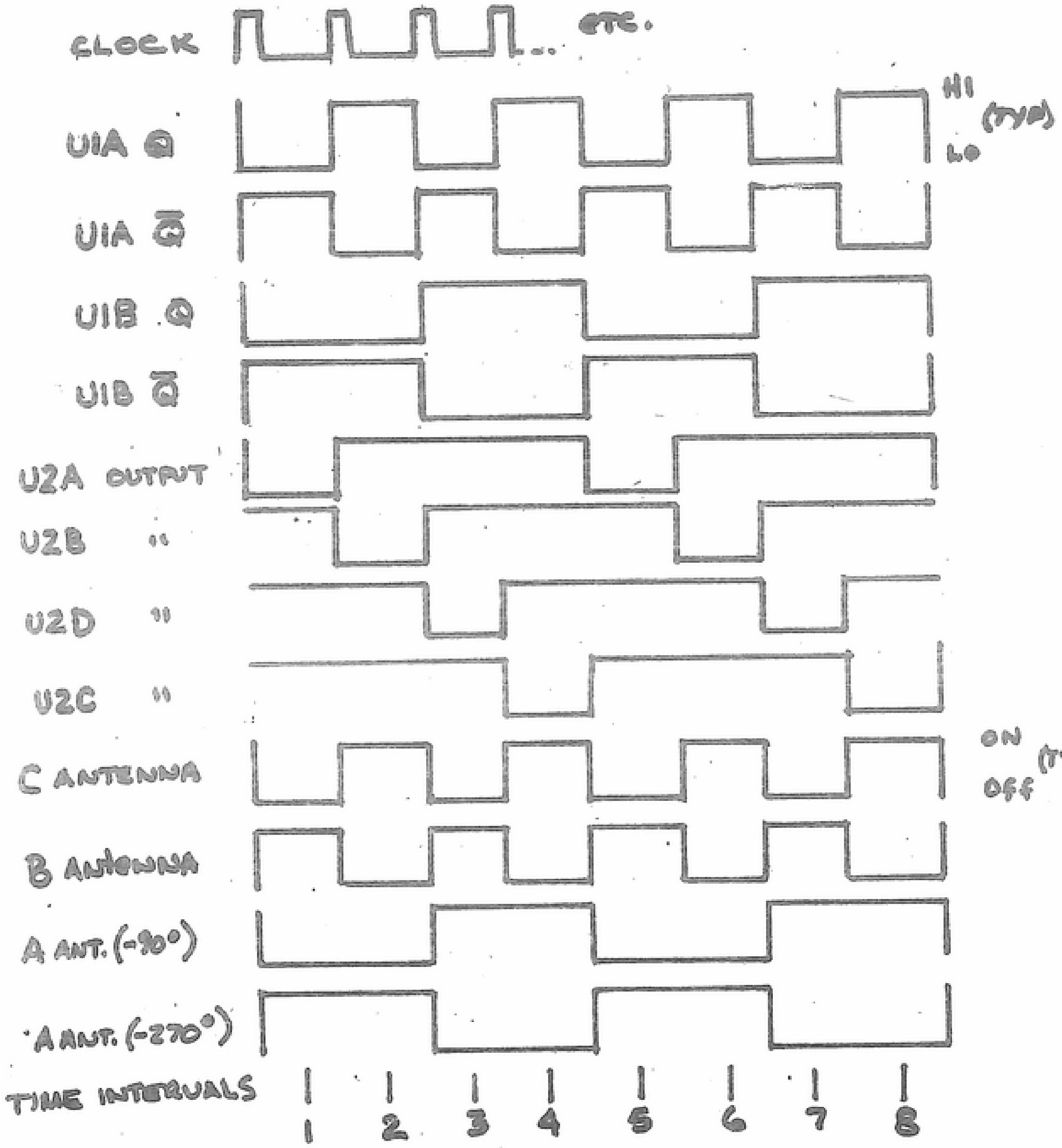


2 METER ADF MULTIPLEXER ANTENNA AND INDICATOR SWITCHING
WA6PCF
1 JUN 1975

PART OF THE SECOND SCHEMATIC THAT NEEDS TO BE BUILT, IF THE RECEIVER HAS AN "S" METER, IS THE PART WITH THE OP AMP ON THE LEFT SIDE CALLED "SIG AMP." THIS PROVIDES SIGNAL DRIVE TO THE ILS INDICATOR COILS. THE DRIVE TO THE ILS INDICATOR COILS WILL BE A FUNCTION OF RECEIVED SIGNAL STRENGTH. THIS SIGNAL STRENGTH WILL VARY AS ANTENNA PATTERN IS ELECTRONICALLY ROTATED. THE GROUNDING OF POINTS A, B, C AND D ON THE INDICATOR COILS IS DONE BY THE GATES AND DIODES (SEE TIMING DIAGRAM) AND IS SYNC WITH THE ANTENNA PATTERN ROTATION. (IF AN ILS INDICATOR CAN'T



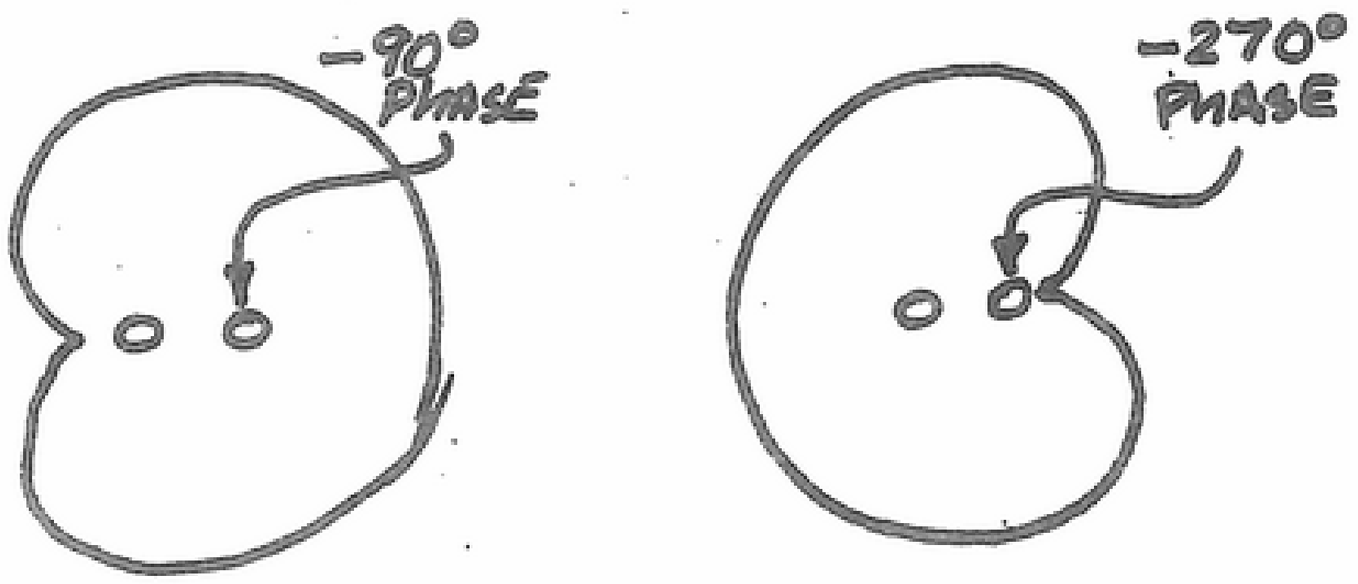
DELAYED/AMPLIFIED AGC AND S-METER CIRCUIT FOR 2 MTR ADF
WA5PCF
1 JUNE '75



TIMING DIAGRAM - ELECTRONIC RDF ANTENNA

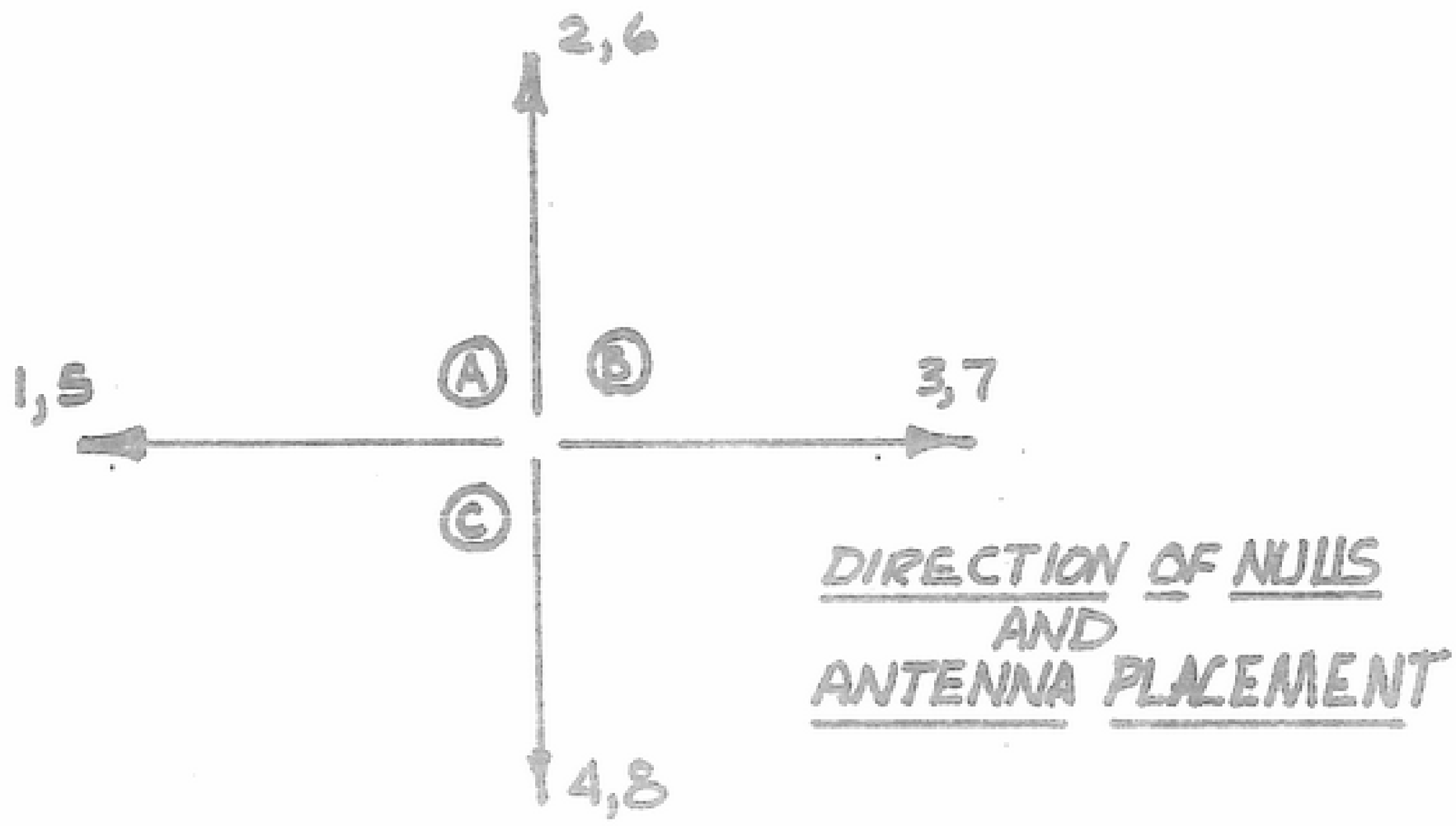
BE LOCATED, PERHAPS TWO METER MOVEMENTS OR AN ARRAY OF LIGHT EMITTING DIODES COULD BE SUBSTITUTED).

THE ANTENNA PATTERNS FOR TWO ANTENNAS SEPARATED BY 90^0 AND FED WITH SIGNALS LAGGING 90^0 AND LEADING 90^0 (SAME AS -270^0) IS SHOWN. THEY ARE CARDOIDS AND ARE KNOWN FOR THEIR DISTINCTIVE NULLS (SEE PART 1).



CARDOID PATTERNS

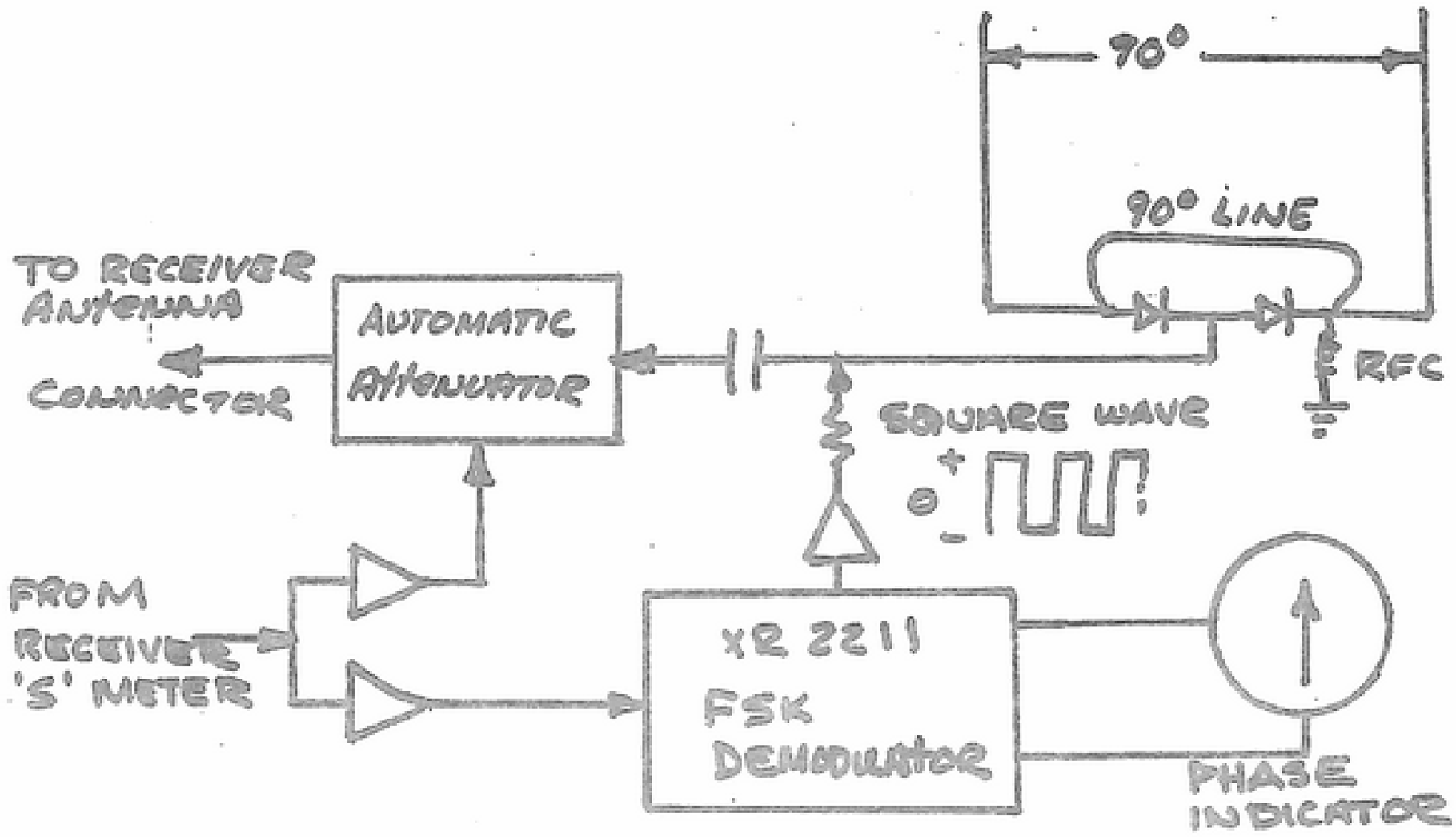
THE PLACEMENT OF THE THREE ANTENNAS AND DIRECTION OF NULL DURING THE EIGHT TIME INTERVALS SHOWN ON THE TIMING DIAGRAM IS SHOWN IN THE FIGURE. ONE ROTATION IS COMPLETED DURING THE FIRST FOUR TIME INTERVALS BUT I TOOK IT THROUGH THE NEXT FOUR TO SEE IF THERE WERE ANY FURTHER TRICKS.



DIRECTION OF NULLS AND ANTENNA PLACEMENT

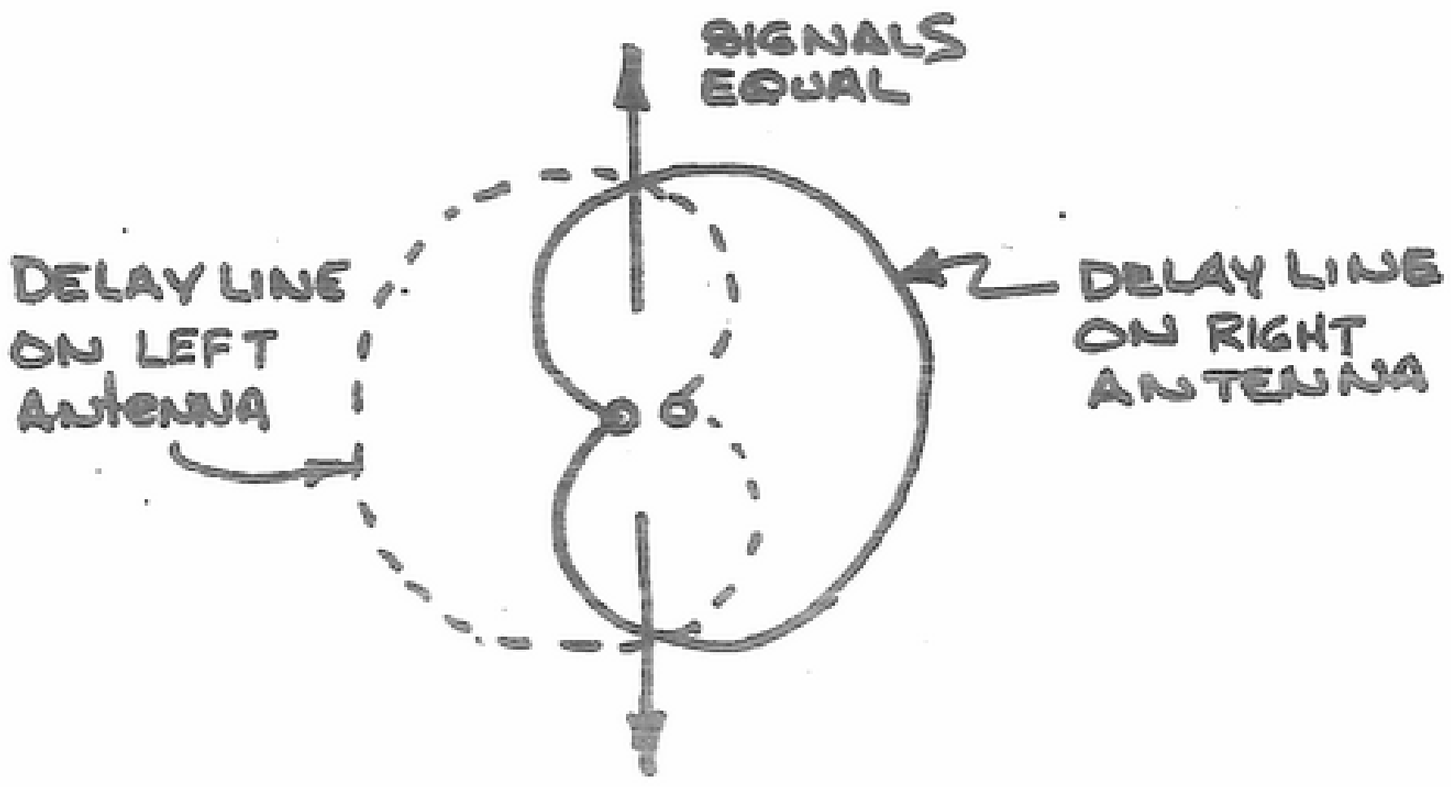
SIGNALS FROM ANTENNAS A AND B OR C ARE COMBINED IN THE LITTLE FOUR PORT COMBINER MADE UP OF 1/8 WAVELENGTH PIECES OF COAX AND 22 PF CAPACITORS. THIS IS A NICE FRILL BUT MAY NOT BE NECESSARY. (IT ISN'T IN THE CIRCUIT TO BE DESCRIBED NEXT). THE DISADVANTAGE OF THIS COMBINER IS A 3dB LOSS IN SIGNAL THROUGH THE CIRCUIT. THE ADVANTAGE IS BETTER CHANCE OF MIXING SIGNALS WITHOUT STRANGE TRANSMISSION LINE PROBLEMS SHOWING UP.

THE HAPPY FLYERS RADIO DIRECTION FINDING UNIT IS SHOWN IN BLOCK DIAGRAM. THE HEART OF THE THING IS THE XR 2211 FSK DEMODULATOR MADE BY EXAR INTEGRATED SYSTEMS, INC. IT IS BEING USED TO GENERATE A SQUARE WAVE SWITCHING VOLTAGE WHICH ALTERNATELY PUTS THE TWO ANTENNA DIODES INTO CONDUCTION CAUSING THE DELAY LINE TO SWITCH FROM SIDE TO SIDE IN THE ANTENNA SYSTEM. THE CHANGE IN SIGNAL STRENGTH THAT RESULTS, CAUSES THE RECEIVER "S" METER (OR LIMITER CURRENT) TO HAVE A FLUCTUATION AT THE SAME FREQUENCY AS THE SWITCHING. THE PHASE OF THIS FLUCTUATION IS COMPARED, IN THE XR CHIP, WITH ITS INTERNAL OSCILLATOR PHASE. IF THERE IS A DIFFERENCE, IT CAUSES THE METER MOVEMENT TO DEFLECT ONE WAY, IF THERE IS NO DIFFERENCE IT WILL DEFLECT THE OTHER WAY. IF THERE IS NO VARIATION IN SIGNAL STRENGTH, THE METER WILL SET IN THE CENTER.



BLOCK DIAGRAM - HAPPY FLYER'S RDF UNIT

SEE THE ANTENNA PATTERNS CAUSED BY THE SWITCHED DELAY LINE. THE METER WILL NULL AT TWO POINTS WHERE SIGNALS ARE EQUAL BUT ROTATING THE ANTENNA SLIGHTLY WILL CAUSE THE METER TO DEFLECT EITHER TO RIGHT OR LEFT DEPENDING ON WHETHER THE OPERATOR IS LOOKING AT, OR AWAY FROM, THE SIGNAL SOURCE. THE DIRECTION INDICATING IS THEREFORE UNIQUE.



ANTENNA PATTERNS - HAPPY FLYER'S RDF UNIT

THE ANTENNAS I USE ARE OF TWO DESIGNS. ONE IS A PAIR OF QUARTER WAVE VERTICALS ON A MAGNETIC MOUNT. THE OTHER IS A PAIR OF HALFWAVELENGTH VERTICALS ON A BOOM MOUNTED ON MY MAST WITH THE OTHER ANTENNAS.

THE RESOLUTION OF THIS SYSTEM IS CLOSER THAN THE AVERAGE INDICATOR SYSTEM CAN MEASURE. FOR REALLY ACCURATE AZMUTH READINGS, THE CAR CAN BE PARKED AND ALIGNED WITH A KNOWN SIGNAL SOURCE AND THE ANTENNA SCOOTED AROUND FOR A NULL IN THE METER. THE AZMUTH TO THE UNKNOWN SIGNAL SOURCE IS READ WITH A LENSATIC COMPASS WITH A RESOLUTION OF PERHAPS ONE DEGREE.

THE KEY TO ACCURATE PINPOINTING OF SIGNAL SOURCES IS OBTAINING TWO VALID AZMUTH READINGS AND TRANSFERRING THEM TO A MAP. WHEN TAKING COMPASS READINGS, IT IS NECESSARY TO CORRECT FOR MAGNETIC DECLINATION. THIS IS THE ERROR BETWEEN MAGNETIC NORTH AND GRID (MAP) NORTH. IN OKLAHOMA COUNTY, THIS VARIES BETWEEN 8 AND 9 DEGREES EAST OF NORTH. THIS MEANS THE COMPASS NEEDLE (OR DISC) WILL BE A LITTLE BIT EAST AND ABOUT 8 DEGREES MUST BE ADDED TO A LENSATIC COMPASS READING, OR THE COMPASS MUST BE ORIENTED WITH THE NEEDLE ON 8 DEGREES IF IT IS BEING USED TO ALIGN A MAP.

IF A MAP IS DIVIDED INTO EAST-WEST AND NORTH-SOUTH COORDINATES AND ALL MEMBERS OF A TEAM HAVE THE SAME MAPS, THE COORDINATES OF THE SIGNAL SOURCE CAN BE COMPUTED USING A PROGRAMMABLE CALCULATOR. (IN DALLAS, SOMEONE HAS ACCESS TO A FULL SCALE COMPUTER FOR THIS LITTLE TRICK).

OWNERS OF HP-25 CALCULATORS CAN USE A PROGRAM I DEVELOPED (WITH THE HELP OF A TEN-YEAR OLD BOY WHO PROVIDED THE EQUATIONS AND WROTE THE PROGRAM. WHO WOULD BELIEVE IT!) OWNERS OF OTHER CALCULATORS CAN USE THE EQUATIONS AND WRITE THEIR OWN PROGRAMS, (OR FIND YOUR OWN TEN-YEAR OLD ADVISOR).

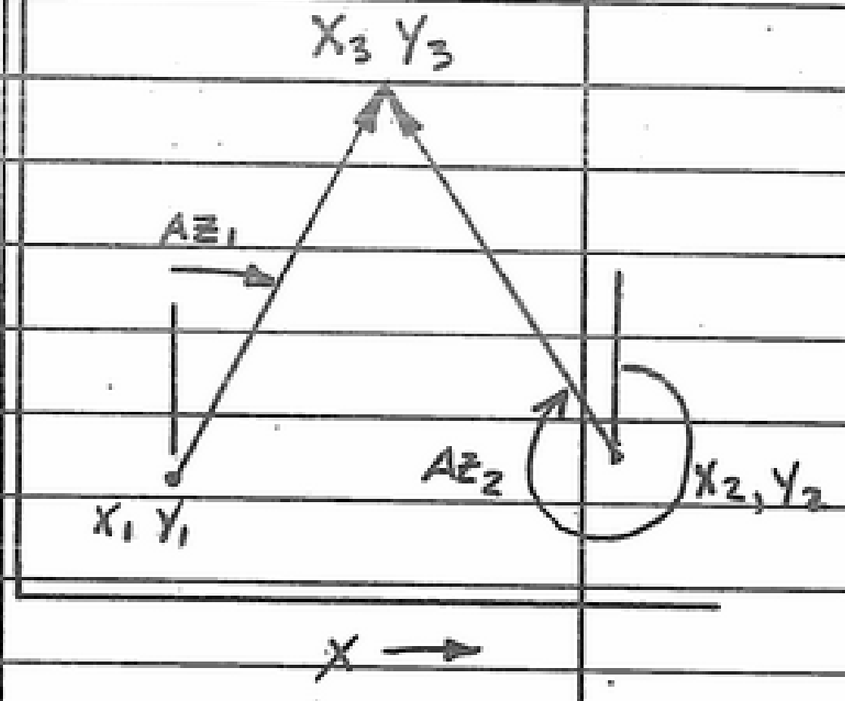
WITH ALL THIS SOPHISTICATION IN EQUIPMENT YOU WOULD THINK THAT FINDING AN INTRUDER IS EASY, RIGHT? WRONG! YOU STILL HAVE TO GET UP FROM YOUR EASY CHAIR AND STOP READING ABOUT IT AND START DOING IT. THE MORE EQUIPMENT AND EXPERIENCED OPERATORS THERE ARE, THE EASIER IT IS TO KEEP UP WITH THOSE MYSTERIOUS "HOW 'BOUT A SMOKY REPORT, GOOD BUDDY?" CALLS HEARD OCCASIONALLY ON 2M BAND. JOE, WA5TRS

HP-25 Program Form

Title RADIO DIRECTION FINDING Page 1 of 2

Programmer R. TODD / J. BUSWELL

STEP	INSTRUCTIONS	INPUT DATA/UNITS	KEYS				OUTPUT DATA/UNITS
1	KEY IN PROGRAM						
2	LOAD DATA	AZ_1	STO	1			
		X_1	STO	2			
		Y_1	STO	3			
		AZ_2	STO	4			
		X_2	STO	5			
		Y_2	STO	6			
			f	PROM	R/S		X_3
			X⇄Y				Y_3



EQUATIONS:

$$\alpha_2 = 90 - AZ_1$$

$$\beta_2 = 90 - AZ_2$$

$$r_1 = \frac{\begin{vmatrix} X_2 - X_1 - \cos\beta_2 \\ Y_2 - Y_1, - \sin\beta_2 \end{vmatrix}}{\begin{vmatrix} \cos\alpha_2, - \cos\beta_2 \\ \sin\alpha_2, - \sin\beta_2 \end{vmatrix}}$$

$$X_3 = X_1 + r_1 \cos\alpha_2$$

$$Y_3 = Y_1 + r_1 \sin\alpha_2$$

TEST: $AZ_1 = 25°$, $X_1 = 3$, $Y_1 = 3$

$AZ_2 = 311.5°$; $X_2 = 11$, $Y_2 = 5$

ANS: $X_3 = 6$, $Y_3 = 9.43$

PROGRAMMING INSTRUCTIONS, RDF PROGRAM

October 1976 CORA Collector & Emitter

HP-25 Program Form

Title KADIO DIRECTION FINDING Page ____ of ____

Switch to PRGM mode, press [f] [PRGM], then key in the program.

DISPLAY LINE	DISPLAY CODE	KEY ENTRY	X	Y	Z	T	COMMENTS
00							
01	0109	9					
02	0200	0					
03	23401	STO-1					
04	23404	STO-4					
05	01	1					
06	32	CHS					
07	23601	STOX1					
08	23604	STOX4					
09	2405	RCL5	X_2				
10	2402	RCL2	X_1				
11	41	−					
12	2404	RCL4	$90-AB_2$				
13	1404	fSIN					
14	32	CHS					
15	2300	STO0					
16	61	X	P_{11}				
17	2404	RCL4					
18	1405	fCOS					
19	2307	STO7					
20	2406	RCL6	X_2				
21	2403	RCL3	Y_1				
22	41	−					
23	61	X	P_{22}				
24	51	+					
25	2401	RCL1					
26	1405	fCOS					
27	2400	RCL0					
28	61	X	P_{12}				
29	2401	RCL1	α_2				
30	1404	fSIN					
31	2407	RCL7					
32	61	X	P_{21}				
33	51	+	D				
34	71	÷	r_1				
35	31	↑					
36	31	↑					
37	2401	RCL1					
38	1404	fSIN					
39	61	X					
40	2403	RCL3					
41	51	+					
42	21	x⇄y					
43	31	↑					
44	2401	RCL1					
45	1405	fCOS					
46	61	X					
47	2402	RCL2					
48	51	+	X_3	Y_3			
49	1300	GTO 00					

REGISTERS

R0 $-\sin(90-AB_2)$

R1 AB_1 $(90-AB_2)$

R2 X_1

R3 Y_1

R4 AB_2 $(90-AB_2)$

R5 X_2

R6 Y_2

R7 $\cos(90-AB_2)$

HEWLETT PACKARD

RDF PROGRAM FOR PROGRAMMABLE CALCULATOR

OU ARC NEWS

Friends, Romans, countrymen, Hams (I'm going to put this in here no matter what you say, Jef!) Lend me your ears! Hope everyone had an enjoyable summer and found more time to do their operating, rig building, tc. than during the school year. This summer found me back in Ada again working for the O.G.&E. power generating station in Konawa. (KO-n -wa) I worked directly under a good friend (& ham) K5HKW Montie Adams as a student engineering trainee. We tend to forget about the tremendous amount of manhours and money put into the electric power plants allowing your lights to come on every time you throw the switch! (Well, nearly every time,HI)

The OU Amateur Radio Club begins their fall meeting schedule on Wednesday, Sept. 22. The meeting was first scheduled for Sept. 14 but was cancelled as it conflicted with the Radio Direction Finding Seminar in OKC, which by the way,was a show not to be missed! This meeting will consist of a nomination of officers for the school year 1976-1977. Also progress in the licensing classes set up this semester and plans for some films to be shown explaining Amateur Radio to the Public will be discussed.

Congrats to newly licensed Radio Amateurs in Norman!

WN5WJW	Robert Elb
WN5VXL	Robbie Reid
WB5RXZ	Kenny Hutchison (General)
WN5TZZ	Jack Bickham
WN5UWB	Jess McKinzie
WN5UUX	Charles McCown

Most of these attended the licensing classes in Norman last semester.

The next meeting of OU ARC will include election of officers and a good program which you won't want to miss (of course)! It occurs Oct. 6 at 7:00 P.M. Room 161 of the student union. PLEASE BE THERE FOR THIS MOST IMPORTANT MEETING!

Kenny Hutchison, Assistant Editor for OU ARC, wrote the following article:

"HI, MOM!"

ED. NOTE: Kenny will be spicing up the OU ARC pages this year with some occasional goodies! GL Kenny!

Paul WB5EEY

QUESTION AND ANSWER DEPARTMENT

What is the charge-discharge cycle for maximum life from ni-cads ? My present knowledge comes from equipment instructions and random comments. There is conflict everywhere. "Discharge thoroughly, then recharge fully." "Don't discharge beyond some low point or the polarity of one or more cells will reverse." "Charge once a month if appliance is not used often" "Charge continuously while appliance is not in use." "Do not charge over____hours." What is the straight dope ? - - - - Bill, WA5RAQ.

Bill, WA5RAQ, has a new granddaughter. Jennifer Diane was born August 19 to Bill's daughter, Myra & Son-in-Law Bill Reiter. She's cute. This is Granddaughter #2. Number 1 is Gina Louise born June 2, 1975 and is now getting into things. Her parents are Linda (Bill's daughter) and Connie Bazemore. She's cute too.

DO YOU LIKE C&E THE WAY IT IS?

Frankly, I think it is the best club publication I have ever encountered. YOU can make it even better by submitting something of interest to other amateurs.

WHAT CAN YOU CONTRIBUTE?

1. Tell how you solved a problem.
2. Describe something you have built - generally or in detail.
3. Tell about operating awards, goals or unusual contacts.
4. Describe your mobile operating experiences while on vacation this summer, or just some unusual or interesting experience.
5. Submit a question for which you would like an answer.
6. Your constructive comments about:
   Clubs - hamfests
   Equipment
   Rules & Regulations
   Etc.....
7. Your experiences of years past.
8. Anything you think others may be interested in or benefit by.

HOW DO YOU GET YOUR STORY INTO C&E ? ? ? ?

------- there are several ways:

1. You may type it up pretty & neat. Use paper that is large enough so that all material is within a rectangle 7" across by 11 3/4" vertically. Paper is available that has club headings and the border outlined. See your editor for this paper or for any technicalities you may wish to know about to get good reproduction in the C&E.
2. Or scribble your article on any piece of paper, just so that it is legible. Send it to your editor.
3. Or call your editor and tell him what you would like to put in.
4. I, Bill, WA5RAQ, 632-4375, will compose your scribbled (legible) notes and produce an article for <u>any CORA club</u>. Even the notes are not necessary. Tell me your story via telephone. I can record it on my cassette, and write it up for you. If you wish, I can read the finished article to you or send you a copy for your approval prior to publication. This offer is for any CORA club, although I am presently the MORI editor. Send me your notes or call me and give me some time to produce a good article for you. Most of my MORI articles from others have been produced from mailed notes or via the recording method just described.

HELP MAKE C&E EVEN BETTER BY MAKING YOUR CONTRIBUTION, LARGE OR SMALL

+ - + - + - Bill, WA5RAQ - + - + - +

THE BIG SIGNAL NEWS
OKLAHOMA CITY AUTOPATCH ASSOCIATION, INC.

Letter from the President
Oklahoma City Auto Patch Association

Oklahoma City Auto Patch Association had its annual picnic-pizza party September 11, 1976. A good time was had by all that attended. The meeting broke-up about 8:30 p.m. with an auction of the surplus beer.

I would like to thank Dennis Orcutt, Howard Thompson and Larry Dillard for the efforts to make the picnic a success. In addition, special note must be taken of [illegible]'S PIZZA who supplied the super frozen pizza. Remember their name when you or your spouse go to the grocery store. Love's Country Store also need special recognition as they provided the refreshments to us at their actual cost. The Liebmann Ice Company supplied 300 plus pounds of ice at no charge for the occasion.

Mark a date on your calender of October 12, 1976. This will be the next meeting date. The date has been changed to allow us to visit the National Weather Service. Everyone is encouraged to attend the meeting.

The C&E last month carried the minutes of the meeting. It is my opinion that in the future no minutes of the meeting shall be printed in the C&E. In other words, if you desire to know what goes-on at club meetings--show up. If you care not what happens at club meetings--do not come.

One further comment of the minutes of the meeting must be made concerning K5CFM, Tony Merritt. Quoted from last month's C&E, "K5CFM's resignation was asked for and received." This statement does not accurately reflect the facts. The truth is that Tony was asked by myself to meet with the executive committee, He declined and stated that he no longer wanted to be involved with the club. Tony is no longer a member of the club. He has yet to come before the executive committee to answer the charges brought against him. This shall be the last printed matter on this or any related subject to appear in the Oklahoma City Auto Patch Association column.

There is a need for input to the paper. With the new policy as outlined above, there should be plenty of room for your comments and articles. Let us hear from YOU!

Gary McCormick [illegible]
President
Oklahoma City Auto Patch Association

FEDERAL COMMUNICATIONS COMMISSION
Safety and Special Radio Services Bureau
Washington, D. C. 20554

SS BULLETIN 1035
February 1976

STUDY GUIDE FOR ELEMENT 2 EXAMINATION FOR NOVICE CLASS AMATEUR RADIO OPERATOR LICENSE

Basic law comprising rules and regulations essential to beginners' operation including sufficient elementary theory for the understanding of those rules.

A. RULES AND REGULATIONS

A. 2.1 Basis and Purpose

(1) Voluntary non-commercial communications service
(2) Advancement of the radio art
(3) Creation of a reservoir of trained radio operators and electronics experts

A.2.2. Definitions

(1) Amateur Radio Service
(2) Amateur radio operator
(3) Amateur radio station
(4) Control operator
(5) Station license
(6) Primary station

A.2.3. Novice Class operator privileges

(1) Frequencies
(2) Emissions
(3) Transmitter power

A.2.4. Limitations

(1) License period
(2) Antenna structures

A.2.5. Responsibilities

(1) Station licensee
(2) Third Party
(3) Control operator

A.2.6. Station operation

(1) Station identification
(2) One-way communications
(3) Operator license availability
(4) Station license availability
(5) Station logs
(6) Frequency measurement
(7) Points of communication

A.2.7. Administrative sanctions

(1) Notice of violation
(2) Restricted operation

A.2.8. Prohibited practices

(1) Broadcasting
(2) Unidentified communications
(3) Obscenity, indecency and profanity
(4) Interference
(5) Third party traffic

A.2.9. Licenses

(1) General eligibility
  (a) Operator
  (b) Station
(2) Renewal
(3) Commission Modification
(4) Availability and posting

A.2.10. Sample question

Which of the following is required in the log of an amateur radio station?
A. The call sign of the station.
B. The signature of the station licensee.
C. The dates upon which fixed operation of the station is initiated.
D. The primary station call sign of the duty control operator.
E. All of the above.

B. RADIO PHENOMENA

B.2.1. Definition.

(1) Sky wave
(2) Ground wave
(3) Refraction
(4) Sunspot cycle
(5) Skip distance
(6) Wavelength
(7) Ionosphere

B.2.2. Wave propagation

(1) Types of propagation
  (a) Skywave versus ground wave
(2) Atmospheric conditions versus communications
  (a) Daylight versus night hours
  (b) Seasonal variations
  (c) Ionospheric storms
(3) Effects of ionization upon wave propagation
(4) Wavelength versus frequency
(5) Frequency versus distance
(6) Velocity of radio waves

B.2.3. Sample question

Long range transmissions by way of the ionosphere are generally confined to
A. the VHF portion of the radio spectrum.
B. the UHF portion of the radio spectrum.
C. the microwave region of the radio spectrum.
D. the HF portion of the radio spectrum.
E. none of the above.

C. OPERATING PROCEDURES

C.2.1. Basic Principles

(1) Courtesy
(2) Frequency selection
(3) Frequency sharing
(4) Avoiding interference

C.2.2. Telegraphy Procedures

(1) Q signal system
(2) R.S.T. reporting system
(3) Standard abbreviations
(4) Choice of code speed

C.2.4. Public service operating

(1) Responsibility
(2) Message traffic
(3) Network operation
(4) Operation during emergencies

C.2.5. Sample question

The Q signal "QRM" generally means
A. a transmission is experiencing interference.
B. a frequency is varying.
C. a reply is requested on a certain frequency.
D. the sending speed is too fast.
E. the previous message is to be repeated.

D. EMISSION CHARACTERISTICS

D.2.1. Definitions

(1) Spurious emissions
(2) Key Clicks
(3) Chirps
(4) Carrier frequency
(5) Frequency drift
(6) Continuous waves

D.2.2. Classification of emissions

(1) A$\emptyset$
(2) A1

D.2.3. General factors concerning A1 emissions

(1) Standards of good quality A1 emissions
(2) Methods of keying
(3) Frequency stability
(4) Monitoring the transmitted signal

D.2.4. Sample question

The symbol A1 designates
A. the purity of an emission.
B. the readability of a signal.
C. the power level of an emission.
D. the stability of an emission.
E. the type of emission.

E. ELECTRICAL PRINCIPLES

E.2.1. Definitions

(1) Electromotive force
(2) Resistance
(3) Capacitance
(4) Inductance
(5) Alternating current
(6) Hertz, kilohertz & megahertz
(7) Direct current
(8) Voltage drop
(9) Electrical power
(10) Rectification
(11) Spurious signals
(12) Harmonics

E.2.2. Fundamental units and concepts

(1) Units.
(a) Volt
(b) Ampere
(c) Ohm
(d) Watt
(e) Henry
(f) Farad

(2) Potential difference
(3) Electrical energy

E.2.3. Direct current theory
(1) Ohm's Law.
(a) Fundamental calculations.
(i) Current (ii) Voltage (iii) Power
(b) Resistance
(i) In series
(ii) In parallel

(2) Series and parallel circuits
(a) Characteristics
(i) Current through the branches
(ii) Voltage across the branches

E.2.4. Principles of magnetism.

(1) Fundamental laws
(a) Magnetic fields
(b) Magnetomotive force

E.2.5. Sample question

The electromotive force (e.m.f.) that will produce a current of one (1) ampere through a resistance of one (1) ohm is a
A. Henry.
B. Farad.
C. Joule.
D. Volt.
E. Watt.

F. PRACTICAL CIRCUITS

F.2.1. Basic circuits

(1) Elementary oscillators
(2) Elementary amplifiers
(3) Elementary transmitters
(4) Elementary receivers

F.2.2. Filter circuits

(1) Types versus utilization
(a) Key click
(b) Low pass
(c) High pass

F.2.3. Solid state and vacuum tube rectifier circuits

(1) Types versus utilization
(a) Half wave
(b) Full wave

F.2.4. Sample question

A basic radio transmitter for use at a Novice station would not include
A. an oscillator stage.
B. a frequency multiplier stage.
C. a detector stage.
D. tuning and loading controls.
E. a final amplifier stage.

G. CIRCUIT COMPONENTS

G.2.1. Component parts

(1) Types, characteristics, applications, and schematic symbols
(a) Capacitors
(b) Crystals
(c) Transformers
(d) Resistors
(e) Diodes
(f) Transistors
(g) Inductors

G.2.2. Vacuum tubes

(1) Classification by elements
(2) Basic operating principles

G.2.3. Meters

(1) Voltmeter
(2) Ammeter
(3) Ohmmeter

G.2.4. Sample question.

What is the device represented by the symbol shown in Figure A?
A. NPN transistor
B. Tunnel Diode
C. PNP Transistor
D. Zener diode
E. None of the above

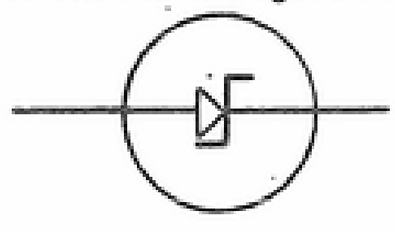


Figure A

H. ANTENNAS AND TRANSMISSION LINES

H.2.1. Definitions

(1) Electrical length
(2) Antenna input impedance
(3) Characteristic impedance
(4) Standing waves
(5) Transmatch

H.2.2. Dipole antenna

(1) Basic characteristics
(2) Length versus frequency
(3) Harmonic operation

H.2.3. Transmission lines

(1) Types
(a) Open-wire parallel conductor
(b) Single wire line
(c) Coaxial

(2) Standing wave ratio
(a) Significance
(b) Measurement

H.2.4. Sample Question

The approximate length of a half-wave antenna suitable for use by Novice Class licensees operating on 40 meters would be

A. 252 ft.
B. 66 ft.
C. 132 ft.
D. 80 ft.
E. 16 ft.

I. RADIO COMMUNICATION PRACTICES

I.2.1 Definitions

(1) Ground Rod
(2) Ground potential
(3) Amplifier plate circuit

I.2.2. Radio frequency interference

(1) Television receiver interference
(2) Audio equipment interference
(3) Harmonic radiation
(4) Interference to other devices

I.2.3. Use of test equipment.

(1) Voltmeter
(2) Ammeter
(3) Ohmmeter
(4) Wattmeter

I.2.4. Transmitters

(1) Determination of transmitter power
(2) Determination of transmitter frequency
(3) Tuning and loading
(4) Harmonic tests and reduction

I.2.5. Safety

(1) Electrical shock avoidance
(2) Lightning protection
(3) Treatment for electrical shock
(4) Antenna support installation and maintenance

I.2.6. Sample Question

Which one of the following instruments could be used by a Novice Class licensee to determine that the output frequency of his transmitter is within authorized limits?

A. An Oersted meter.
B. An Ohmmeter.
C. An accurately calibrated receiver.
D. A field-strength meter.
E. A thermogalvanometer.

FEDERAL COMMUNICATIONS COMMISSION
Safety and Special Radio Services Bureau
Washington, D. C. 20554

SS BULLETIN 1035c
February 1976

STUDY GUIDE FOR ELEMENT 3 EXAMINATION FOR GENERAL, CONDITIONAL, AND TECHNICIAN CLASS AMATEUR RADIO OPERATOR LICENSE

General amateur practice and regulations involving station operation and apparatus and provisions of treaties, statutes, and rules affecting amateur stations and operators. (The topics in the following outline are the general subjects which form the basis for the examination questions. In addition the applicant should be knowledgeable of the subject matter as outlined in the Element 2 Study Guide).

A. RULES AND REGULATIONS

A.3.1. Definitions.

(1) Amateur radio communication.
(2) Third party traffic.
(3) Control point.
(4) Remote control.
(5) Control station.
(6) Emergency communications.
(7) Fixed operation.
(8) Portable operation.
(9) Mobile operation.

A.3.2. General, conditional, Technician Class Operator privileges.

(1) Frequencies.
(2) Emissions.
(3) Transmitter power.

A.3.3. Limitations

(1) Purity and stability of emissions.
(2) Effective radiated power.

A.3.4. Station operation.

(1) Operation of additional stations.
  (a) Control stations
  (b) Remotely controlled stations.
  (c) Model control.
(2) Fixed location operation.
(3) Portable operation.
(4) Mobile operation.
(5) Operation outside the U. S. (e.g. maritime mobile)

A.3.5. Responsibilities.

(1) Volunteer examiner.
(2) Control operator.

A.3.6. Prohibited practices.

(1) Remuneration.
(2) Music.

A.3.7. Sample question.

The instrument of authorization for a radio station in the Amateur Radio Service is
A. the operator license.
B. the transmitting apparatus.
C. Part 97 of the Commission's Rules and Regulations.
D. the station license.
E. none of the above.

B. RADIO PHENOMENA

B.3.1. Definitions.

(1) Maximum useable frequency
(2) Virtual height.
(3) The D-layer.
(4) The E-layer.
(5) The F-layer.
(6) Direct wave.
(7) Ground reflected wave.
(8) Surface wave.
(9) Ionospheric absorption.
(10) Critical frequency.

B.3.2. Wave Characteristics.

(1) Polarization.
(2) Speed versus medium through which waves travel.
(3) Inverse Distance Law.

B.3.3. Wave propagation.

(1) Determination of M.U.F. and optimum frequency.
(2) Ionospheric propagation in the HF and VHF amateur bands.
(3) Surface wave propagation in the VHF and UHF amateur bands.
(4) Effects of sunspot activity

B.3.4. Sample question.

Long distance transmissions by way of the ionosphere take place principally in which one of the following portions of the radio spectrum?

A. VHF.
B. UHF.
C. HF.
D. Microwave.
E. All of the above.

C. OPERATING PROCEDURES

C.3.1. Radio interference.

(1) Determination of quality of emissions.
(2) Determination of proper frequency.
(3) Elimination or reduction of harmonics and parasitics.
(4) Shared band concept (e.g. the "party line" concept).
(5) Deliberate interference prohibitions.

C.3.2. Radiotelephony procedure.

(1) Observation of third party regulations.
(2) Station identification.
(3) Emergency communications.
  (a) Operator responsibility.
  (b) Designation of emergency communications bands.

C.3.3. Sample Question.

When a general state of communications emergency exists, the Commission may, in accordance with existing rules,

A. direct amateurs to cease all communications except in areas designated as emergency areas.
B. direct all amateurs to monitor certain frequencies.
C. permit only incidental calling, testing, or answering in bands not designated as emergency bands.
D. designate certain amateur stations to monitor designated emergency communications bands.
E. direct amateurs to cease all communications for a period of 48 hours.

D. EMISSION CHARACTERISTICS

D.3.1. Definitions.

(1) Peak-envelope power.
(2) Deviation.
(3) Sidebands.
(4) Signal to distortion ratio.
(5) Occupied bandwidth.

D.3.2. Classification of emission.

(1) A2.
(2) A3.
(3) F1.
(4) F2.
(5) F3.

D.3.3. Modulation.

(1) Characteristics and types.
(2) Percentage of modulation.
(3) Conveying of intelligence.
(4) Voice intelligibility range.

D.3.4. Single sideband power ratings.

(1) Determination of peak-envelope power.
(2) Determination of average power.
(3) Determination of peak-to-average power ratio.

D.3.5. General factors concerning emissions.

(1) Standards of good quality telephony emissions.
  (a) Avoiding overmodulation.
  (b) Frequency stability
  (c) Linear amplification.

(2) Distortion.
  (a) Types.
  (b) Causes.
  (c) Reduction or elimination.

D.3.6. Radioteleprinting.

(1) Frequency-shift keying.
(2) Audio frequency-shift keying.
(3) Mark and space intelligence.
(4) RTTY duty cycle.
(5) RTTY reception/converters.

D.3.7. Sample question.

The ratio of peak-envelope-power to average power in a single sideband signal is primarily dependent upon the
A. ratio of the maximum plate current to the amplifier's plate voltage.
B. final amplifier unmodulated plate current.
C. loading of the final amplifier.
D. size of the power supply output filter.
E. characteristics of the speech waveform.

E. ELECTRICAL PRINCIPLES

E.3.1. Definitions.

(1) Impedance.
(2) Reactance.
(3) Decibels.
(4) Peak power.
(5) r.m.s. voltage
(6) Coulomb.
(7) Eddy Currents.
(8) Mutual inductance.
(9) Permeability.
(10) Ampere turns.
(11) Resonance.
(12) Circuit Q.
(13) Hysteresis Loss.

E.3.2. Circuit theory.

(1) Ohm's Law.
  (a) Capacitors in series versus parallel.
  (b) Inductors in series versus parallel.
  (c) Voltage division across capacitors.
  (d) Inductive reactance versus capacitive reactance.
  (e) Power in resistive circuits.
  (f) Conductance.

(2) Kirchoff's Laws.
  (a) Parallel RLC networks.

(3) Series and parallel resonance.
  (a) Determination of resonant frequency.
  (b) Determination of circuit Q.

(4) Impedance matching

E.3.3. Principles of transformers.

(1) Operating principles.
(2) Turns ratio with regard to voltage and impedance.
(3) Transformer efficiency.

E.3.4. Principles of magnetism.

(1) Induced voltage.
(2) Magnetomotive force.

E.3.5. Sample question.

If the capacitive reactance of a series resonant circuit is 2,000 ohms and the resistance is 10 ohms, the circuit Q will be
A. 500
B. 20
C. 50
D. 5
E. 200

EDMOND AMATEUR RADIO CLUB INC.

How to go to a hamfest that is 1900miles of round trip driving and do it.in a weekend. If anybody has any idea how much driving is involved this shouldn't intrest you.

Friday morning September 17 at 6:30 am. Joe Garland WA5FLT, Joe Buswell WA5TRS, and me Dennis Orcutt WB5ISN passed through the Turner Turnpike gate for our trip to the Chicago RADIO EXPO 76. This trip was more than a hamfest. It was a very fine,tiring,long, intresting, ect. trip. We worked the 63/03 repeater almost to the Tulsa gate. We also worked the rain from Bristow to Bartlesville. There is one conselation about starting out on a east bound trip in the morning in the rain and that is that there is no sun in your eyes. We got to our motel at 9:08 pm. That is a good time for a 875 mile trip. We estimated about 16 hours. I would suggest that if you were to take such a trip that no less than three people go to divide up the driving.

It had its good points too. There were alot of comercial displays there with their oldest and their newest products. A company called Cresent wire and cable had a new frequency counter which read to 600 MHZ for 179.00. I couldnt stand the temptation and so I bought one. Their 300 MHZ counter went up for 129.00.

Some of the events of our trip made me realize that we really got it good back in Oklahoma. The prices were high, the traffic was heavy, the roads were torn up, the repeaters had problems with (WOLFMAN) no id... Even one of the grand prizes, an IC22S, was given away to a known CB. operator. It is evident to me that they are just begging for trouble. Even the main man from the FCC was there in the show with his two handles. UNCLE CHARLIE , and THE BALD EAGLE, The names were cute but where do you go to complain about something when you have to complain to that something.

Now for the good news: ACCORDING TO THE MAN, IN THE NEAR FUTURE WE MAY HAVE INSTANT UP-GRADES. When you pass your general, advanced, or extra you get your new license then. Also the code requirements may change to content instead of 65 or100 consecutive characters.

REPEATER NEWS

As for the operation and maintainence of the 63/03 repeater, we are still having some transmitter problems, but they will clear up when i purchase a new transmitter. I have located one through my friendly Motorola rep in Chicago. The relays that turn the rx on are getting intermittent sometimes too. 01/61 was off the whole time I was in Chicago due to cable trouble. The Edmond 3 cable was struck by lightning and blown into several pieces, and it took till Monday night to get it on the air.

DON'T FORGET THOSE WHOSE DUES COME DUE THIS OCTOBER 1st.

Dennis Orcutt
WB5ISN

F. PRACTICAL CIRCUITS

F.3.1. Definitions.

(1) Secondary emission.
(2) Interelectrode capacitance.
(3) Thermal runaway.
(4) Transit time.
(5) Feedback.

F.3.2. General circuits.

(1) Amplifiers.
  (a) Classification by function or use.
    (i) Class A.
    (ii) Class AB.
    (iii) Class B.
    (iv) Class C.

  (b) Classification by circuit.
    (i) Grounded-grid and common base.
    (ii) Grounded-cathode and common emitter.
    (iii) Grounded plate and common collector.

  (c) Characteristics. (Tube type amplifiers)
    (i) Amplification factor.
    (ii) Plate current saturation.
    (iii) Distortion.

  (d) Characteristics. (Transistor amplifiers)
    (i) Current amplification factor.
    (ii) Maximum power dissipation.
    (iii) Transit time.

  (e) Biasing (Tubes)
    (i) Grid bias. (ii) Cathode bias.

  (f) Biasing. (Transistors)
    (i) Forward bias (ii) Reverse bias. (iii) Self bias.

(2) Oscillators. (Tube-type and transistor)
  (a) Types
    (i) Crystal versus variable frequency
  (b) Basic operation
  (c) Characteristics
  (d) Biasing
  (e) Stability

F.3.3. Rectifier circuits.

(1) Types, uses, and limitations
(2) Characteristics.
  (a) Peak inverse voltage.
  (b) Peak current
(3) Diode protection.

F.3.4. Filter circuits.

(1) Power supply filters.
(2) Band-elimination filters.
(3) Bandpass filters.
(4) Low pass filters.

F.3.5. Power Supplies.

(1) Basic functions.
(2) Series operation of diodes.
(3) Voltage doubling.
(4) Voltage regulation.
(5) Negative-lead filtering.

F.3.6. Coupling Circuits.

(1) Direct coupling.
(2) Capacitive coupling.
(3) Impedance coupling.
(4) Link coupling.

F.3.7. Transmitters and transmitter circuits.

(1) Amplitude modulated transmission.
(2) Single sideband transmission.
  (a) Filter method.
  (b) Phasing method.
(3) Transmitter keying circuits.
  (a) Cathode keying.
  (b) Grid circuit keying.
  (c) Screen grid keying.
  (d) Clicks and chirps (shaping).
(4) Frequency and phase modulated transmitted.
(c) Power ratings.

F.3.8. Receiver circuits.

(1) Detector and demodulator circuits.
(2) Automatic gain control.
(3) Local oscillator.
(4) Beat frequency oscillator.
(5) Squelch circuits.

F.3.9. Integrated Circuits.

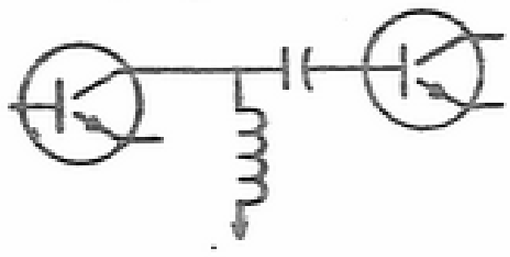
(1) Characteristics and applications.
(2) Types.
(a) Digital. **(b) Linear.**

F.3.10. Radioteleprinting circuits.

(1) Operating principles. **(2) Circuit diagrams.**

F.3.11. Sample question

Which one of the following describes the type of coupling between stages in the circuit shown?
A. Capacitive.
B. RC.
C. Inductive.
D. Impedance.
E. Link.



G. CIRCUIT COMPONENTS

G.3.1. Component parts.

(1) Characteristics, types, and uses.
(a) Capacitors. (b) Resistors. (c) Inductors.

G.3.2. Solid state components.

(1) Diodes.
(a) Operating characteristics. (c) Ratings and terminology.
(b) Junction capacitance.
(2) Transistors.
(a) Characteristics.
(b)

G.3.3. Vacuum tubes.

(1) Characteristics.
(a) Plate current saturation. (d) Amplification factor.
(b) Polarity inversion. (e) Interelectrode capacitance.
(c) Plate dissipation.

G.3.4. Crystals.

(1) Advantages versus disadvantages.
(2) Thickness and cut versus frequency.
(3) Piezoelectric Effect.
(4) Load capacitance.

G.3.5. Sample question.

The principal factor limiting some types of capacitors to use at DC or at audio frequencies is
A. the dielectric constant.
B. the dissipation factor.
C. the insulating quality of the dielectric.
D. the working voltage of the capacitor.
E. none of the above.

H. ANTENNAS AND TRANSMISSION LINES

H.3.1. Definitions.

(1) Radiation resistance.
(2) Parasitic elements.
(3) Field strength.
(4) End-effect.
(5) Reflection factor.
(6) Antenna resonance.
(7) Voltage and current antinodes.
(8) Skin effect.

H.3.2. Types of antennas.

(1) Multi-element arrays.
(a) Driven. (b) Parasitic.
(2) Grounded antennas.

H.3.3. Antenna characteristics.

(1) Polarization.
(2) Directivity.
(3) Voltage and Current distribution
(4) Radiation resistance.
( ) Bandwidth.
( ) Effective power gain.
( ) The image principle.
( ) Wave angle.

H.3.4. Transmission lines.

(1) Calculation and measurement of SWR.
(2) Attenuation versus frequency.
(3) Advantages versus disadvantages of different types of lines.
(4) Characteristic impedance.
(5) Radiation losses.

H.3.5. Sample question.

The ratio of the total power radiated to the square of the current in the antenna is
A. the radiation resistance.
B. the power gain.
C. the power density.
D. the feed point impedance.
E. the field strength.

I. RADIOCOMMUNICATION PRACTICES

I.3.1. Functional diagrams.

(1) Single sideband transmitters.
(2) Amplitude modulated transmitters.
(3) Frequency modulated transmitters.
(4) Basic amateur radio station.

I.3.2. Tests, measurements, and adjustments.

(1) Determination of transmitted frequency.
(2) Percentage of modulation tests.
(3) Grounded-grid amplifier tuning.
(4) Linear amplifier adjustments.
(5) Transmitter tuning.
  (a) Use of dummy loads.
  (b) Tuning of final amplifier.
(6) Neutralization checks.
(7) Two tone tests.
(8) Distortion tests.
(9) Spurious output tests.

I.3.3. Use of test equipment.

(1) Oscilloscope.
(2) Reflectometer.
(3) Marker generator.
(4) Calibrated receiver.
(5) Dip meter.
(6) Frequency counter.

I.3.4. Receiver principles.

(1) Intermodulation and cross modulation.
(2) Sensitivity and selectivity.
(3) Noise.
  (a) Thermal. (b) Man-made. (c) Atmospheric.
(4) Desensitization.
(5) Signal to noise ratio.
(6) Overall bandwidth, intermediate frequency and front end.
(7) Receiver images.

I.3.5. Sample question.

In which one of the following would a frequency discriminator circuit be used?
A. Single sideband transmitter.
B. A.M. receiver.
C. F.M. exciter.
D. Double sideband transmitter.
E. F.M. receiver.

C. OPERATING PROCEDURES

C.4(A).1. Radio interference

(1) Broadcast interference (AM, FM)
  (a) Use of wavetraps and filters

(2) Television interference
  (a) TV receiver front-end overload
  (b) Picture impairment by spurious emissions and harmonics
  (c) Use of high pass filter
(3) Harmonic radiation
  (a) Causes of harmonic interference (conditions favorable to harmonic generation)
  (b) Use of low-pass filters

C.4(A).2. Sample question

Which one of the following will not reduce the generation of harmonics?
A. Operating all frequency multiplier stages at low power levels
B. Using a minimum number of amplifier stages up to the final output power level
C. Using tubes that require a maximum of driving power
D. Installing a low-pass filter externally to the transmitter enclosure
E. Operation of the tank circuit of an r.f. amplifier at a Q of 10 or more

D. EMISSION CHARACTERISTICS

D.4(A).1. Definitions

(1) Modulation capability
(2) Overmodulation.
(3) Modulation index
(4) Modulation limiting
(5) Splatter
(6) Deviation ratio

D.4(A).2. Classification of emissions

(1) A5
(2) F5
(3) F1
(4) F2

D.4(A).3. Amplitude modulation

(1) Modulation systems
  (a) Plate or collector modulation
  (b) Grid modulation
(2) AM sidebands

D.4(A).4. Frequency modulation

(1) Carrier wave distortion
(2) Narrowband versus wideband FM
(3) Speech Clipping
(4) Measurement of deviation
(5) FM sidebands

D.4(A).5. Slow-scan television

(1) Modulation mode versus frequency
(2) Signal bandwidth

D.4(A).6. Sample question

Frequency Shift Keying is
A. achieved by varying the transmitted frequency of the radio signal a fixed amount during the keying process.
B. analogous to simple c-w transmissions.
C. permitted on all amateur bands.
D. the modulation of a steady radio carrier by an audio tone.
E. designated as F2 emission.

E. ELECTRICAL PRINCIPLES

E.4(A).1. Definitions

(1) Coefficient of coupling (transformer)
(2) Hysteresis losses
(3) Phase
(4) Skin-effect

E.4(A).2. Circuit theory, (A.C.)

(1) Phase in resistive circuits
(2) Ohm's Law for reactance
(3) Impedance Calculations
(4) Power factor
(5) Power
  (a) Peak
  (b) Average
  (c) Reactive

E.4(A).3. Principles of magnetism

(1) Ohm's Law for magnetic circuits
(2) Saturation Point

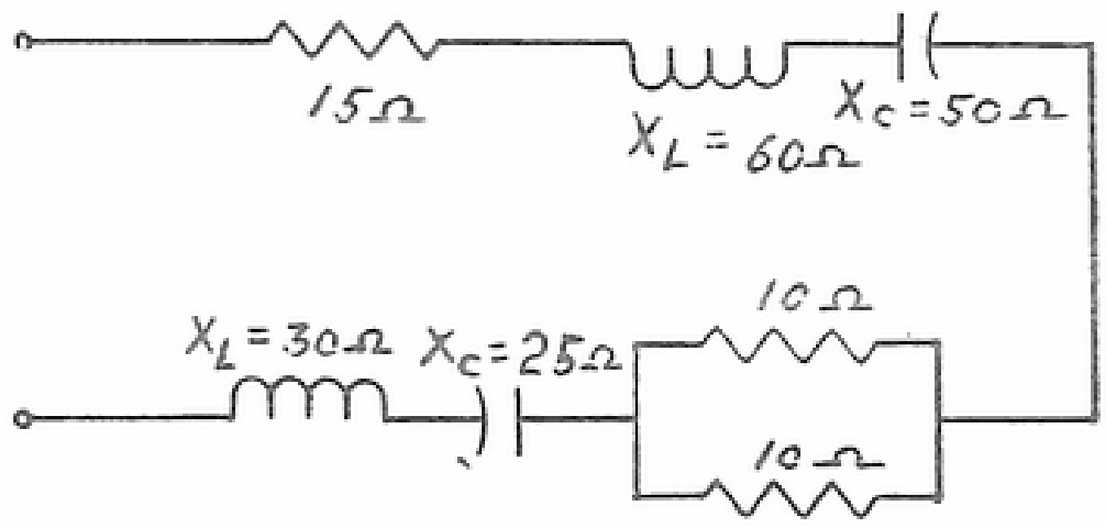
E.4(A).4. Principles of transformers

(1) Power relationships
(2) Leakage reactance

E.4(A).5. Sample question

What is the total impedance of the circuit shown?

A. 200 ohms
B. 33 ohms
C. 13 ohms
D. 185 ohms
E. 25 ohms



F. PRACTICAL CIRCUITS

F.4(A).1. Amplifiers amplifier circuits

(1) R.F. power amplifiers
(2) Buffer amplifiers
(3) Cathode emitter follower circuits
(4) Push-pull amplifiers
(5) Video amplifiers
(6) Parallel amplifiers

F.4(A).2. Transistorized amplifiers

(1) Circuit parameters
  (a) Current amplification factor (Beta)
  (b) Gain bandwidth product (Alpha cutoff)

F.4(A).3. Oscillator oscillator circuits/transistorized oscillators

(1) Crystal oscillator circuits
(2) Variable frequency oscillator
(3) The Colpitts harmonic oscillator
  (a) Circuit operation
  (b) Amplitude and frequency stability
  (c) Grid-leak biasing
(4) The Pierce oscillator

F.4(A).4. Rectifier circuits

(1) Bridge rectifiers
  (a) Principles of operation
  (b) Voltage and current characteristics

F.4(A).5. Filter circuits

(1) Crystal lattice filters
  (a) Shape factor
  (b) Selectivity

(2) Mechanical filters
  (a) Electrical to mechanical energy conversion
  (b) Signal handling capability

F.4(A).6. Radioteleprinting circuits

(1) Operating principles
(2) Circuit diagrams

F.4(A).7. Slow-scan television circuits

(1) Operating principles
(2) Circuit diagrams

F.4(A).8. Sample question

Which one of the following statements regarding transistorized amplifier configurations is correct?
A. The common-collector amplifier has the highest voltage gain.
B. The common-collector amplifier has the highest power gain.
C. The common-base amplifier has the highest input resistance.
D. The common-base amplifier has the highest current gain.
E. The common-emitter amplifier exhibits a phase shift between input current and output current.

G. CIRCUIT COMPONENTS

G.4(A).1. Solid state components

(1) Operating characteristics
  (a) Zener diodes
  (b) Field Effect transistors
  (c) Silicon-controlled rectifiers
  (d) High-speed switching diodes
  (e) Varicaps

(2) Transistors
  (a) Transistor biasing
  (b) Conduction mechanisms

G.4(A).2. Vacuum tubes

(1) Operation at very high frequencies
  (a) Effects of lead inductance
  (b) Transit time

(2) Cathode-ray tubes
  (a) Operating principles
  (b) Connecting r-f to the vertical deflection plates
  (c) Electrostatic deflection

(3) Types versus functions
  (a) Triodes/grounded grid amplifiers
  (b) Single cavity klystron/Low power VHF transmitters
  (c) VR tube/voltage regulator

(4) Photomultiplier tubes

G.4(A).3. Sample question

Which one of the following is used to help prevent burnout of VHF solid state devices by accidental application of a high input signal to a receiver?
A. Reverse-connected diodes
B. A clamp tube
C. A dropping resistor
D. A low-pass filter
E. Feed through capacitors

H. ANTENNAS AND TRANSMISSION LINES

H.4(A).1 Antennas

(1) Long-wire antennas
  (a) Impedance and power gain
  (b) Directional characteristics

(2) Multiband antennas
  (a) End-fed Hertz
  (b) Folded flat top dual-band antenna
  (c) End-fed Zepp

(3) Multiband dipoles

(4) Directive antennas (high frequency)
  (a) Types
  (b) Patterns
  (c) Gain
  (d) Types versus applications

H.4(A).2. Definitions

(1) Major lobes
(2) Resonant lengths
(3) Array
(4) Beamwidth
(5) Effective height
(6) Parasitic element

H.4(A).3. Transmission lines

(1) Resonant lines versus non resonant lines
(2) Line discontinuities
(3) Power capability
(4) Electrical length

H.4(A).4. Sample question

In the vertical and horizontal radiation patterns plotted in terms of field strength, the points at which the width of the pattern is equivalent to the half power points are known as
A. the beamwidth.
B. zero dB reference points.
C. the minor lobe.
D. feed points.
E. none of the above.

I. RADIO COMMUNICATION PRACTICES

I.4(A).1. System and circuit diagrams

(1) Radioteleprinting
(2) Slow-scan television

I.4(A).2. Mobile/portable operation

(1) Vehicular noise suppression

I.4(A).3. Test equipment, measurements and adjustments

(1) Field strength meters
(2) Absorption frequency meter
(3) Thermocouple ammeter and power measurements
(4) R.F. oscillators for circuit alignment
(5) Vacuum-tube voltmeters

I.4(A).4. Satellite communications

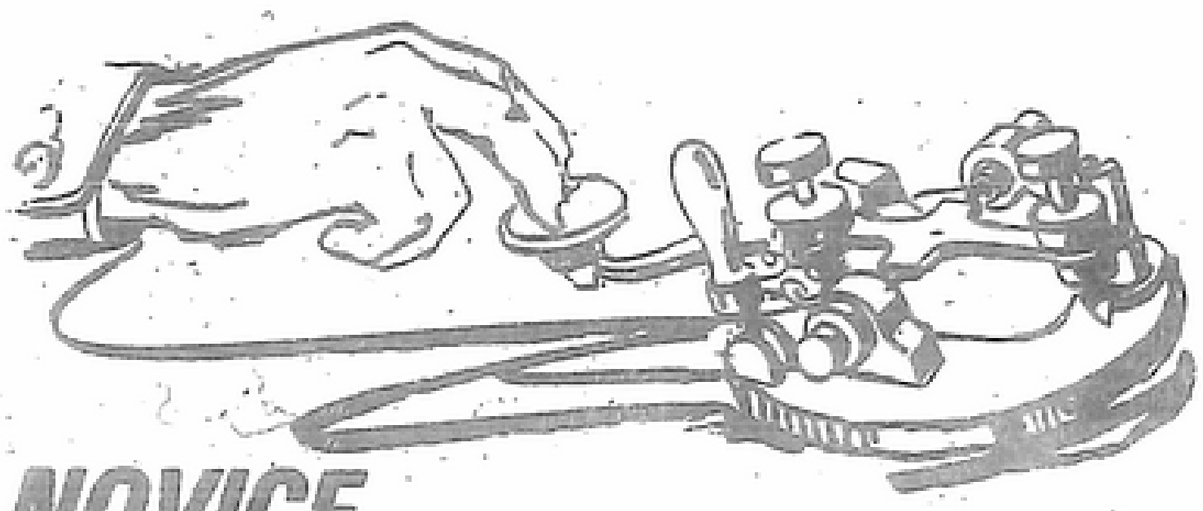
(1) Operating techniques
  (a) Frequencies of operation
  (b) Scheduling
(2) Equipment required
(3) Antenna requirements

I.4(A).5. Sample question

A two-tone test signal may best be used to
A. determine interelectrode capacitance.
B. determine the degree of intermodulation distortion in an r.f. amplifier.
C. determine amplifier plate efficiency.
D. determine the degree of phase distortion in an amplifier.
E. determine correct carrier balance adjustments.

THE BIG SIGNAL NEWS

OKLAHOMA CITY AUTOPATCH ASSOCIATION, INC.



NOVICE

Upon receiving my Novice license I tried four types of antennas ranging from inverted vees to trapped dipoles. All seemed to work fair but they required more space than I could afford. Also, signal direction was always northeast by southwest due to the area utilized.

Well, no more. Thanks to Ivan Corey, WN6GKE, of Roseville, California, I now use a modified military configuration. As you can see from the drawing, it's quite a strange looking antenna. A few vintage amateurs said, "It won't work." Well, true, it doesn't look like it would, but now I have worked Ed Saphore, WH6IPZ; John Weber, WN9PGY; Ruthe Ferguson, ZF1RF, and various others, all within ten days from when this antenna was installed.

When I received an RST of 569 from ZF1RF on Cayman Island I knew this was the antenna I was looking for. The antenna is not vertically or horizontally polarized, so in essence it hears both types of signals very well. The SWRs on 40 meters and 20 meters are very low — 1.1 to 1, but on 10 and 15 meters it does read higher.

I use a home-brewed transmatch on 10 and 15 meters but on 40 you don't need one. This antenna has a tendency to follow the propagation. It is omnidirectional and never fails to surprise me when I CQ and get an answer from a direction I didn't expect.

Construction

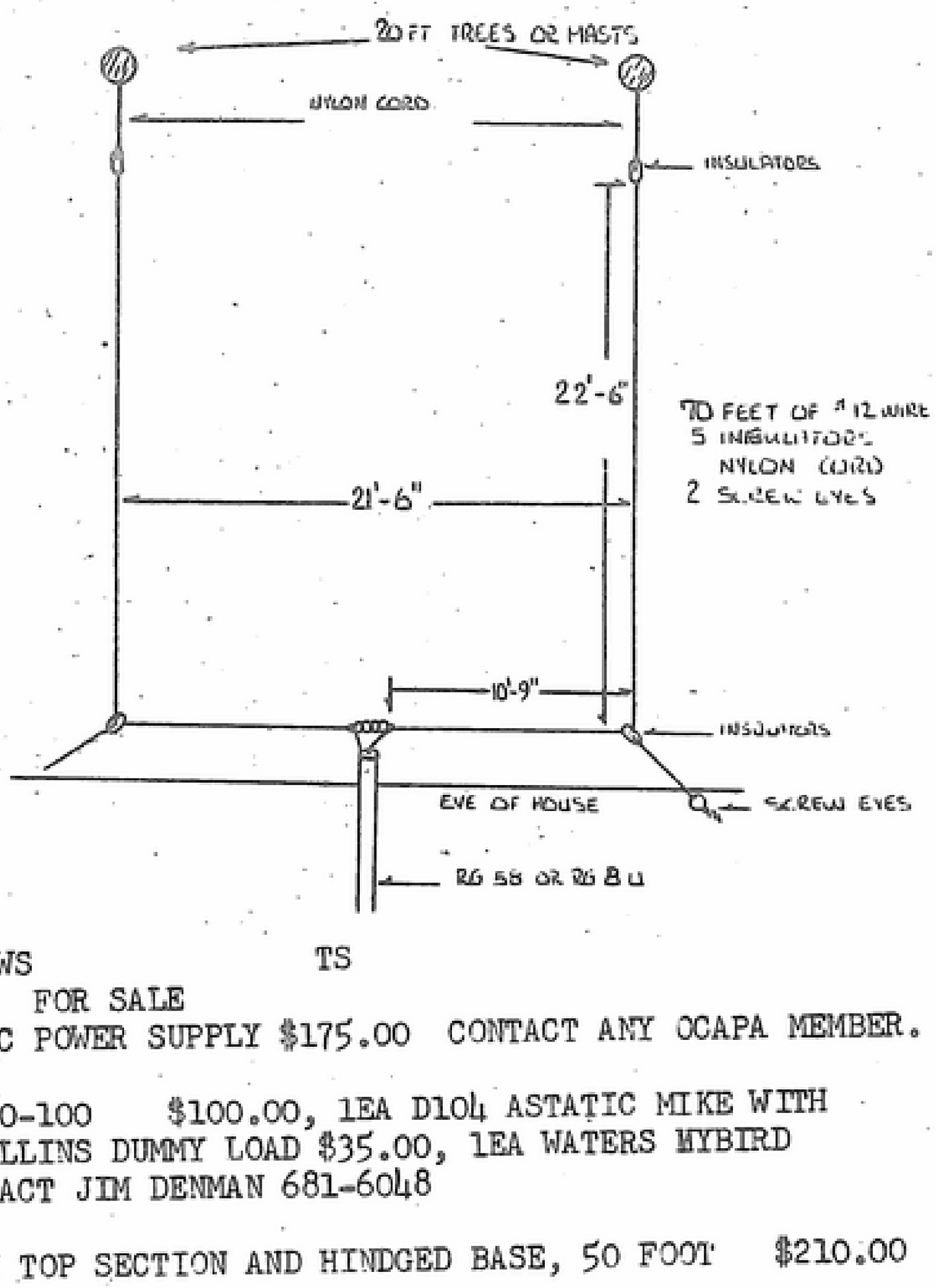
When constructing this antenna the feed point should be as far from any metal objects, such as raingutters, etc., as possible. When cutting the wire for each leg of the antenna add two extra feet of wire length; this will be used for trimming down the SWR. Pulleys are very handy on the high ends of the antenna in order to raise and lower the ends for trimming. My choice for support was two 20-foot masts spaced 21 ft. 6 in. apart. However, trees or a combination of both could have been utilized. Keep the spacing of both the high and low ends of the antenna at 21 ft. 6 in. apart; this is very important. Try to obtain a 45 degree angle in relationship to ground level. However, this is not critical as mine is about 30 degrees.

Tuning

Set your transmitter on 40 meters at 7.125 MHz. Make an SWR reading, then, if need by, trim each leg of the antenna three inches. Remember to cut both legs equally. Repeat this step until the SWR is down to a level at which you wish to operate. At 7.125 MHz my SWR is 1.1 to 1.

Cost for this antenna was around $20.00 but could have been made for far less.

So, fellow amateurs, if space and money are your problem, try tuning up with a "tuning fork" and get ready for some nice surprises.



TAKEN FROM WORLD RADIO NEWS TS

FOR SALE

1 EA REGENCY HR2B With AC POWER SUPPLY $175.00 CONTACT ANY OCAPA MEMBER.

1 ea DYCOM LINEAR 2M FM 10-100 $100.00, 1EA D104 ASTATIC MIKE WITH STAND NEW $30.00, 1EA COLLINS DUMMY LOAD $35.00, 1EA WATERS MYBIRD PHONE PATCH $40.00. CONTACT JIM DENMAN 681-6048

RON TOWER 25G , NEW WITH TOP SECTION AND HINDGED BASE, 50 FOOT $210.00 DON MOORE 787-5189.

THE AMP EATER

While playing around with batteries, battery chargers, and regulated low voltage power supplies, I was continually frustrated by the lack of a good adjustable load. A makeshift resistor bank using the wire coils of a worn out "cool cushion" served in a crude way, but suffered from large incremental steps and severe temperature sensitivity.

This need, plus the desire to make something useful out of some big transistors in the "junque" box, resulted in the "amp eater". It is smoothly adjustable from 0 to 20 amps on a nominal 12 volt source, and very stable.

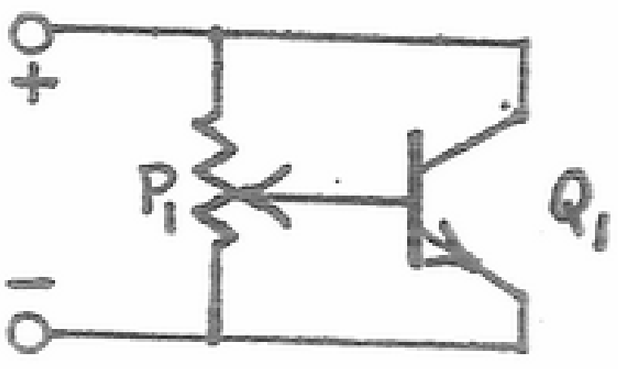


FIGURE 1

The basic circuit is shown in Figure 1 where the potentiometer forward biases the base of Q_1 to control the conduction. This gives a good adjustable load up to the current and power dissipation limit of Q_1. This is fine for current up to about 5 amps with a transistor that can handle the 5 amps and 60 watts. However, the base current, depending on the transistor type could run several hundred mills. This requires a healthy pot, P_1. (Incidentally, this is a good circuit to get some feel for what an unknown transistor can do by metering the base and collector currents.)

The final version uses a transistor Q_1 to control 5 transistors Q_2 in parallel, See Figure 2. The emitter resistors in Q_2 keep one transistor from hogging all the current. These should be about 0.5 ohm. I used 0.1 ohm because they were already wired in place when I started with 6 unknown transistors on two heat sinks. With the unknown transistors, 0 to 500 μA on the base of Q_1 controls 0 to 20 amps, a current gain of 40,000! So what?

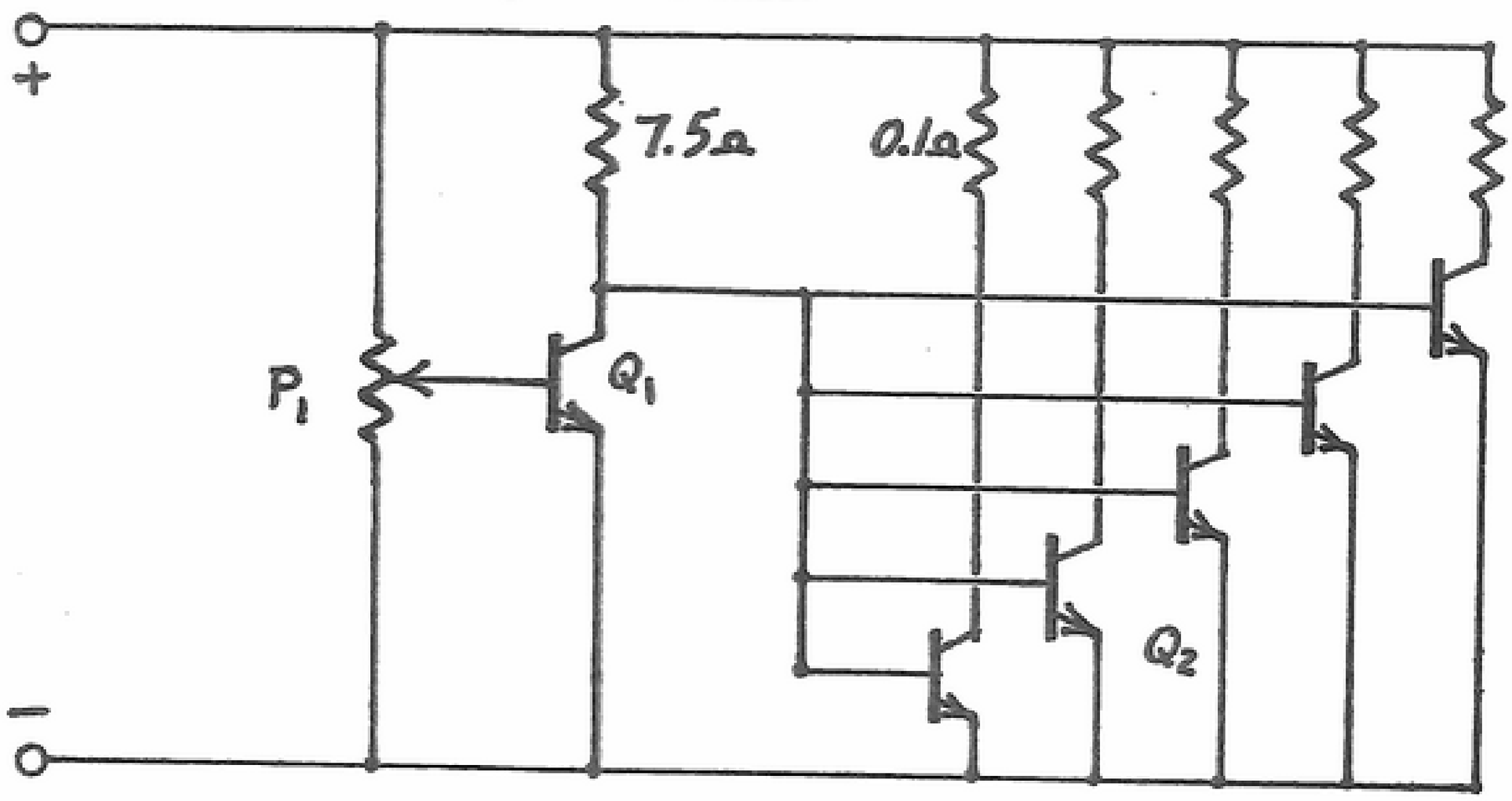


FIGURE 2

P_1 is a 500Ω 10 turn pot that fell out of the "junque" box. Works great, but may be overdoing it a bit. Initially, I used a 150 ohm pot in series with a 1 K resistor. This was OK, but couldn't set small current values - jumped between turns on the wire wound pot.

Physically the two heat sinks and a small fan are mounted in a box about 5" square and a foot long, open at both ends. The fan is necessary to keep the heat sinks from melting with 250 to 350 watts being dissipated.

FOR SALE: SB-220, KW Linear, $400.00. Call Coy K5LMG, 691-1194.

WANTED: General coverage SSB receiver; prefer solid state 200kc - 30MHZ. Eugene Lothes, 8413 Brookridge Dr., Oklahoma City, OK 73132 (405) 721-2720

FOR SALE: Brown Brothers Mod. BTL Paddle and Iambic Keyer. $55.00 Contact Jack Iman WN5SVN, 691-2447.

FOR SALE: ICOM 22A, like new, with 94/94, 34/94, 22/82, 28/88, 52/52, 16/76, 46/46, 147.63/03, $200.00. Call Ken WB5PYN, 685-2717.

THE TEXOMA HAMARAMA

Along about the time the Monarch butterflies begin to migrate, there seems to be a sort of feeling growing that it's "HAMARAMA TIME" in our Oklahoma--Texas amateur radio ranks....This year there will be old and new activities at your favorite and best HAMARAMA. There'll be contests, prizes for the best "Home Brew" project-lots of good programs arranged by Bob Ashby, W5HXL and much more of that kind of stuff. For the Ladies...well Doris Wiseman and Alice Janecka are already working up a lot of things of interest to the gals..whether amateurs or xyl's. We understand that they've arranged for a first rate bunch of musicians for the traditional Saturday-Night Dance. That's an activity that you won't want to miss, but a word to remind you to wear shoes that fit 'cause you'll dance your feet off.

There will be some special meetings on the docket - for instance, the Sooner Traffic Net will be scheduled for a meeting...QCWA, OOTC, the Society of Wireless Pioneers and others will all have private meetings listed on the program....there will be others before HAMARAMA time, we're sure! In case you're interested in the prizes to be awarded - well, last year nearly 3500 dollars worth of prizes went to those in attendance....in addition, nearly 750 dollars worth of prizes of the type dear to the Ladies hearts were also given. We hope and expect to do about as well this year. Our Prize Chairman, Jim Haynie, WB5JBP is already high-gearing it in an effort to outdo his friend Tom O'Brien.

There are things about the HAMARAMA, and for that matter, all Conventions which do not rank with the glamour of prizes, but which are a necessary part of making a successful Hamarama. Some find the work enjoyable, others just do the work which must be done if the Hamarama is to be a happy successful venture. Our hat is off in a salute to those who do that work....Registration is a necessary job and we're lucky to have Betty Roden, WB5DMR in Charge. Betty is from Hurst, Texas......Then there is "Jim Ewing" who, as Facilities Chairman makes sure that there are tables, chairs, PA Systems, etc., at the right place and the right time...without his work we'd be in a mess. Then there's money and Barney Moffatt, Treasurer of Hamarama.. Barney keeps us in the black, and our credit rating is good. That's the gang with exception of one imprtant man - Jack Gant, W5GM, who has managed HAMARAMA for a long time - Jack is Consultant to the Committee, and will Host the Sunday Luncheon and maybe he'll have a story for us!

This year we've made a few small changes in the HAMARAMA...for instance, many of you will check-in early, on Friday evening, October 29....previously there were no activities for the early checker-ins...but this year the popular "Hospitality Room Activities" will take place on Friday evening. Come early, relax and visit with a bunch of your old friends. We'll miss you if you don't make TEXOMA!

The Hamarama Committee thanks CORA for its support of the HAMARAMA....all we can say is OK-lahoma...thank you very much. In case you haven't received a registration form, use the one below. Do it now'.

- -

Texoma Hamarama
P. O. Box 47382
Dallas, Texas 75247

PRE-REGISTRATION $3.50/Person

Name ______________________ Call __________ Lady's Name __________

Address ____
Number - Street City State Zip

Pre-registration registrants are eligible for the pre-registration prize. If you win, you get the prize whether in attendance or not. You may pre-register more than one..just write their names on the border and addresses too..enclose $3.50 for each one so registered.

Amount enclosed __________

TEXOMA HAMARAMA PROGRAM HI-LITES

Ladies	Amateurs		
		New Equipment - Dealer Displays) Arrange for space with Jim Ewing,	
		"Junque" - Flea Market) WB5BPK, P. O. Box E, Madill, OK 73446	
		FRIDAY, October 29	
●	●	8:00 - 10:00 p.m.	Hospitality Room
		SATURDAY, October 30	
●		10:00 - 11:30 a.m.	Get acquainted - Arts & Crafts - Prizes
	●	10:30 - 11:30	MARS/Special interest
	●	1:30 - 2:30 p.m.	"ORIS" Oklahoma Repeater Interconnect System, Bob Pace, WA5CJG
●		2:30 - 4:30	Bingo
	●	3:30 - 5:30	Microprocessor Applications to Amateur Radio, John Lawerence, W5CEG
●	●	5:30	Catholic mass
	●	7:00 - 8:00	ARRL open meeting, Roy Albright, W5EYB
●	●	9:00 - ???	Dance - live music (BYOB)
		SUNDAY, October 31	
●	●	7:00 - 9:00 a.m.	Buffet breakfast - QCWA meeting, Bert Gunn, W5FU
●	●	9:30 - 10:00	Morning worship service, Reverend Tom Arney
	●	10:00 - 12:00	Transmitter hunt - Walk in - 146.52 Simplex
	●	11:00 - 11:30	Homebrew contest - Judging
●	●	12:00 -	Served banquet - Jack Gant, W5GM, MC
			Prize drawings

If you were monitoring 37/97 on Sep 16 around 4:40 p.m., you were in on a real treat to the ears! One very obviously surprised and proud husband Gene Taylor, W5GC, got a call from his wife, Margaret, WB5WNV, who had just received her license that day.
We understand another new licensee that day was Hazel Brooks, WB5WLL, the wife of Jim Brooks, W5PYH. Conqratulations to both of you.

FOR SALE: TR-22 WITH MOBILE MOUNT. XTALS FOR 34/94, 94/94, 22/82, 07/67, 16/76, 52/52. $160.00. ALSO, MOTOROLA HT-200 HANDIE TALKIE WITH BATTERY, ANTENNA AND CRYSTALS FOR 34/94. $110.00 WAYNE, WA5AOB, 732-1870

FOR SALE: Four linear amplifiers. One has 2 810s, two have 4-65s, one has a T 200. Complete w/power supply. Elmer, W5BKN. 943-4979

FOR SALE: Hustler 10-80 meter vertical antenna. Includes the 1 KW 80 meter resonator. $75 Hobe Burgan WB5MLN 751-8388 days 751-1646 even.

FOR SALE: Ham-M Rotor, Complete w/ 150 ft Cable. $75
Frank McCollom, WB5JBL 751-3577

NEW MEMBERS AND CORRECTIONS TO CORA ROSTER (Changes underlined)

WB5CTR	Loretta Worthy	5935 NW 43	Okla City	789-6954
WB5FYL	Richard Zanni	Box T-848	Tinker AFB	
WB5MNO	Sue Kinney	1332 Dorchester Dr	OKC	329-7572
WB5NMK	George Lee	2410 NW 34	Okla City	946-2754
WA4PLG	Charles Kennamer	2232 Flair Dr	Okla City	
WN5RRZ	John Beaty	8404 NW 101	Okla City	
WB5SIP	Ruby Zuck	Box 526	Harrah OK	454-2125
W5TJL	Al Hogue	4145 NW 61 Ter	Okla City	946-4299
K5TZS	Jim Stanberry	234 Bolling Dr	Hamiltin AFB CA	
W5UNF	H C McDonald	1048 NW 8	Moore OK	794-8672
WN5VBE	Robert Moore	2712 Lancaster Ln	OKC	348-0548

FEDERAL COMMUNICATIONS COMMISSION
Safety and Special Radio Services Bureau
Washington, D. C. 20554

SS BULLETIN 1035b
February 1976

STUDY GUIDE FOR ELEMENT 4(A) EXAMINATION FOR THE ADVANCED CLASS AMATEUR RADIO OPERATOR LICENSE

Intermediate amateur practice involving intermediate level radio theory and operation as applicable to modern amateur techniques, including, but not limited to, radiotelephony and radiotelegraphy. (The topics in the following outline are the general subjects which form the basis for the examination questions. In addition to these subjects, the applicant should be knowledgeable of the subject matter as outlined in the Element 2 and Element 3 Study Guides.)

A. RULES AND REGULATIONS

A.4(A).1. Definitions

(1) Military Recreation Station
(2) Auxiliary Link Station
(3) System network diagram
(4) Antenna height above average terrain, (HAAT)
(5) Secondary Station
(6) Repeater Station
(7) Space Station

A.4(A).2. Amateur Advanced Class operator privileges

(1) Frequencies
(2) Emissions

A.4(A).3. Station operation

(1) Slow scan television
(2) Auxiliary link stations
(3) Repeater stations
(4) Radioteleprinter transmissions
(5) Aboard ships and aircraft
(6) Facsimile

A.4(A).4. Sample question

A repeater station is defined in the Rules as
A. a station licensed for a land location other than a primary station.
B. a separate amateur radio station for use by members of a bona fide amateur radio club.
C. a station licensed to conduct remote control of another radio station.
D. a station licensed only for the purpose of relaying radio signals to another specific land location.
E. a station licensed to automatically retransmit the radio signals of other amateur radio stations for the purpose of extending their intra-community range.

B. RADIO PHENOMENA

B.4(A).1. Definitions

(1) Aurora Effect
(2) Absorption
(3) Space wave
(4) Sporadic-E layer

B.4(A).2. Wave propogation

(1) Atmospheric attenuation
(2) Standard refraction
(3) Propagation data and its uses
(4) Superrefraction
(5) Effect of earth curvature

B.4(A).3. Propagation modes

(1) Meteor bursts
(2) Ducting
(3) Moon bounce (earth-moon-earth)
(4) Satellite
(5) Scatter
(6) Sporadic-E layer

B.4(A).4. Sample question

Absorption in the ionosphere
A. causes signals to weaken.
B. varies inversely as the square of the frequency.
C. is caused primarily by the D-layer.
D. increases with the intensity of ionization.
E. is characterized by all of the above.

THE BICENTENNIAL AMATEUR RADIO CLUB

A FEW WORDS FROM THE PREZ:

Our club meeting this month isn't until the 21st. So, we'll print the minutes next month.

Since we are starting a lot of new radio classes, I thought I would give the new ones a look at Amateur Radio. The best way I could think of was to note a few things that I have heard on the bands lately.

- Don't worry about the SWR. Just run more power.
- The guys aren't very patriotic. They don't use their bicentennial call signs.
- I went to their club meeting once and didn't feel welcome.
- He quit ham radio when they went to that duck sounding SSB.
- You have to use a balun when you connect coax to a dipole.
- I wish they would knock off all this prefix junk. You can't tell if you are talking to Pennsylvania or Sikkim any more.
- They go around to all the club meetings, bragging about what great hams they are, but you don't ever hear them on the air.
- I wish there was a contest every week end.
- You don't rate with them unless you were licensed before 1930 and have a 2 letter call.
- There is still a few die hards that wont give up AM.
- 2 meters? Isn't that HAM-CB?
- Did you hear that pig pile on 20 yesterday?
- What's the F.C.C. trying to do, giving all those kids two letter calls, just because they passed a test?
- If he thinks that operating in a contest is more important than attending the club meeting, he's not much of a ham.
- Then I heard this nut calling CQ on 52.
- Those automatic keyers are really great. Now you can make mistakes at 40 wpm, automatically.
- He spent more money on his antenna than he did on his rig.
- Did you know that the Japanese equipment is so bad that they have special nets just to discuss all their troubles?
- Vertical antennas receive equally poor from all directions.
- Base stations should leave the repeaters free for mobiles.
- If the hams keep using CB lingo, we are going to degenerate to their level.
- Quads always out perform yagis.
- We need to let everyone know that repeaters are for local use only.
- Did you ever hear such garbage as those speach processors put out?
- They have to be crazy, trying to use 500 mw in kilowatt alley.
- I wish they would quit having all those radio classes. The bands are too crowded now.
- What's a novice going to do with 250 watts?
- We've got to convince the CBers that their service is worthless when compared with ham radio.
- The League sold us out with incentive licensing.
- He got his license from a Cracker Jack box.
- SSTV is just a lot of QRM.
- LID - QLF
- 160 DX is where it's at.
- Only on 2 can you call for an hour and no one is listening, but just give a call for help and see what happens.
- 25/85 is my favorite frequency to monitor. I can hear all the OKC repeaters at the same time.
- Appliance operators! I just can't stand them.
- A log book sure is an expensive scratch pad.
- The F.C.C. found that most Conditionals failed to show for exams, when requested. So, they decided to grandfather them to Generals??
- Moon bounce WAC?
- And then the CBer said to me "Oh, you're only an amateur".

Yes Amateur Radio is alive and well. Come on in and get your feet wet.

AERONAUTICAL CENTER AMATEUR RADIO CLUB, INC.

W5PAA

THE PRESIDENT'S CORNER

Thanks to Bill, W5UGZ, for taking over at the September meeting, and to Bob, W5HXL, for the program which I understand was very good. Sorry I missed it.

We spent a week at the Cabin on Lake Euraula, where it was cool. Sure enough it rained the second day we were there. Also it rained the fourth day we were there, and guess what, that meakes it too wet to be outside, so how about a few hours at the radio. Isn't that a good excuse? Anyway, enjoyed working 20 meters from the portable location. All I needed was an amplifier and tall tower with a tri-bander on top. The SWR increases as the leaves on the trees get wet, since the inverted "V" is not exactly in the clear! Then the weather cleared for the weekend and we were abbe to put the ole Chriscraft on the lake for an afternoon cruise.down to the marina for a soda-pop and gasoline. We were called home early, but will try it again in October or even November.

Joe, WA5TRS, is working late to finish up the instructor guides for use in the new classes to start next week. With locations selected and instructors ready, any many new faces to show up for these classes, we wish them good luch and hope to have many of them join the ranks of Amatuer Operators soon.

Joe is to be complimented for this work he is doing to start the classes, as well as the instructors who devote their time for a good cause.

Please note that Roy Albright will not seek re-election as West Gulf Director, but Jack Gant, W5GM, the present Vice-Director would serve us well as Director. So let's all give him our support.

Remember Texoma Hamarama October 29-30-31, 1976. See you there!

Also the Aeronautical Center Club Meeting the first Friday in October. Bring a friend and join us for coffee and donuts, and a program that may be good or bad.

73

Al WB5KCU

MINUTES OF THE AERONAUTICAL CENTER AMATEUR RADIO CLUB MEETING OF SEPTEMBER 3, 1976

The meeting was called to order at 8:05 p.m. by Vice President Hulse. There were 30 members and guests present. A round of self introductions was called for and a few made comments.

Gil, W5RB, reported Reedy, W5ADC, is in the Veterans Hospital here.

Bill, WA5RAQ, got his second granddaughter recently. Bob Moore got his Novice call, WN5VBG. He has a receiver, but is looking for a transmitter. Charlie, WA5JGU, brought his new Heathkit, HT10, for show and tell. The CW Keyer works good.

Bill, W5UEZ, filled in for President Al, WB5KCU, who was taking it easy at the lake. Bob W5HXL, gave a very interesting program on Hints and Kinks and building techniques.

A motion was made and passed that the club give $50.00 toward the mailing expense of Jack Gant, W5GM. Jack is running for the Director of the West Gulf Division of the ARRL.

The meeting was adjourned for refreshments at 9:56 p.m.

TECHNICAL REVIEWS

W S J J

CQ, Aug, offers two articles on building 5/8-wave 2-m antennas and little else.

SPARK-GAP TIMES, May-Jun, has more on ELF (below 300 hertz) stations.

SHORT WAVE MAGAZINE, May (only the Good Lord may know where the Postal Service had it ditched!), tosses out several ideas on improving out-dated receivers and shows still another AF speech clipper.

SHORT WAVE MAGAZINE, Aug (came the same date), starts off with an editorial that every radio amateur should read and ponder over. For the builder, there's an amplifier for VHF, even UHF; another in the endless series of AF speech clippers; a 2-m converter (two transistors); and an external signal-frequency oscillator for SSB reception on SWL receivers.

AMATEUR RADIO, Jun, completes its series on a linear amplifier, reviews the FT-221, shows improvements for the DX-160 receiver, and reveals the price (in AUS dollars) on the Yaesu FRG-7 0.5 to 29.9 MHz receiver ($239). Wonder what it'll be here? I want to buy one!

RADIO COMMUNICATION, Jul, has a scholarly discussion of the sunspot cycle, a continuation of its series of logic, a converter and tripler of 1.3 GHz, an antenna tuning unit, and its always good Technical Topics.

IEEE SPECTRUM, Aug, relates the human interest side of the development of ICs. For Sep it tells about NiCad cells, showing how one variety develops a memory of depth of discharge.

73, Oct, has an interesting variety....mobile antennas and other antennas, several aspects of counters, and a low powered VT CC transmitter; beware of this one, though, it has fixed loading like the old Heathkit AT-1!

QST, Sep, shows how to build an appealing little receiver, tells how to trouble-shoot VHF-FM receivers, suggests paneling your tower's bottom section so brats won't climb it, joins in the debunking of the "double-bazooka" antenna, and talks about noisy resistors.

HAM RADIO, Sep, has its usual stack of goodies. The best, in my estimation, is one on a 2-m transverter; it introduces the VMP-1 high power FET. A 10-A voltage regulator is described. Construction details are given for a digital readout for transceivers, a turn-off timer, and a solid-state Morse keyboard.

IMPORTANT NOTICE: TEXOMA LODGE MUST HAVE A DEPOSIT. FIRST NIGHT'S LODGING 30 DAYS PRIOR TO ARRIVAL, TO HOLD YOUR RESERVATION. DON'T GET CAUGHT WITHOUT A BED TO SLEEP IN! Sorry it has to be this way, but this was laid on all State Lodgers from the State Capitol.

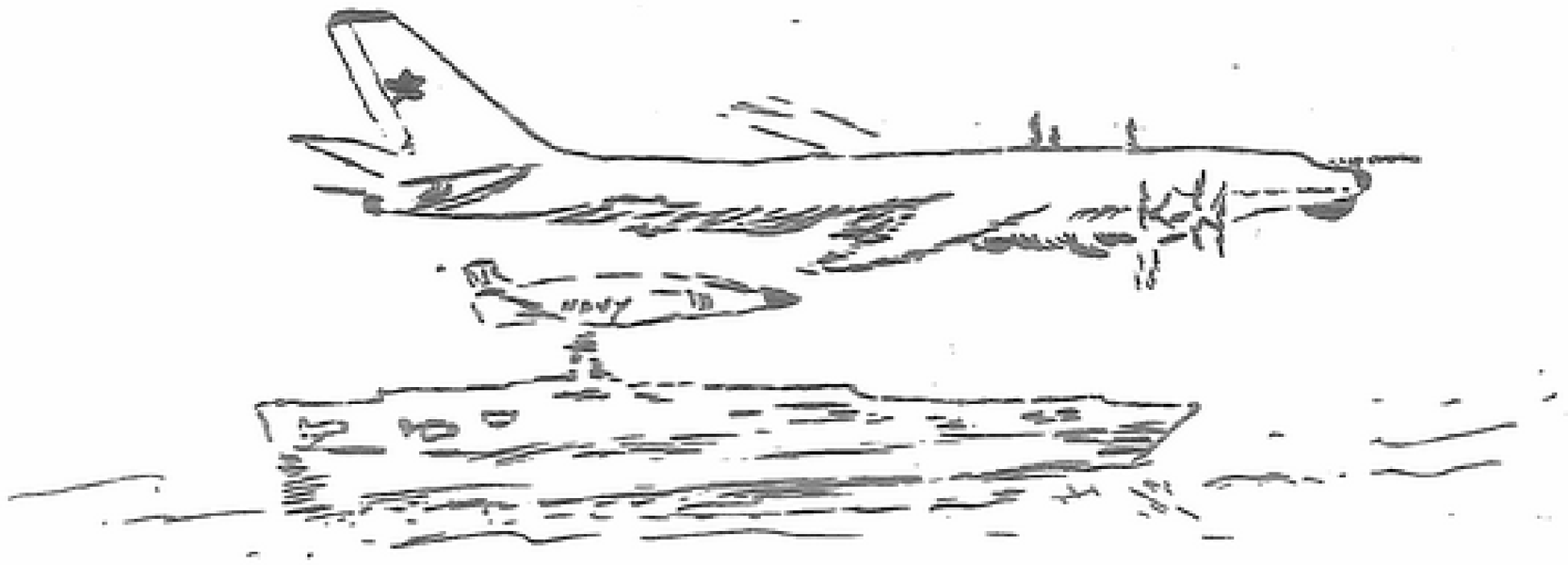
BOB, W5HXL WRITES: The West Gulf Division needs Jack Gant as its new director. Texas has Oklahoma outnumbered 6 to 1. We must work hard to overcome this for Jack. A mailing is being made to the entire West Gulf Division - about 6500. This will cost about $800.00. Jack has guaranteed this cost. We in OKC do not believe this should come out of Jack's pocket. An account has been set up at a local bank. if you would like to contribute, send your check to:

Jack Gant Campaign Fund
% Bob Ashby, W5HXL
2837 NW 19
Oklahoma City OK 73107

If you believe in Jack, pass the word and get the vote out.

MID-OKLAHOMA REPEATOR INC.

Frank Arnold, W5PDH, sent me a short article about an incident concerning the new atomic carrier NIMITZ. His son Tim is assigned to this ship. Frank's other son Mark is on the ENTERPRISE. The only copy available would not reproduce, so it is re-typed below along with a crude sketch to substitute for the photo.



MORE ABOUT BEARS: (Russian- - that is! !)

(Article submitted by LTJG Kurz from VF-74)

Efforts by NIMITZ and CVW-8 aircraft went a long way towards holding off the Bears. On our transit across the Atlantic we radiated our radars and radio frequencies, only under very limited conditions, which helped prevent the Bears from locating us.

On the morning of the 13th, Bears were first intercepted and identified by the VF-74 "Be-Devilers". During the next three days, Bear activity increased to a level at which there were as many as four Bears in the air, all looking for NIMITZ. Due to our restricted use of radiating frequencies, it wasn't until the third day that a Bear finally got a look at NIMITZ as shown above.

In the above (photo), CDR F. E. Templeton, CO of VF-74, and LTJG Coggins, his radar intercept officer, escorted the Bear over the NIMITZ for their first look at our mighty ship. Special thanks to LTJG D. Childress and LCDR B. Bailey of VF-74 for this fine shot. For those who were above decks, this was a sight to see!

= = = = = = = = = = = = =

I have heard just enough about Navy electronics to suspect they have some fantastic equipment. My XYL and I were visiting our daughter, granddaughter and son-in-law last Spring in Charleston, S. C. My son-in-law, Connie Bazemore, was planning to take us aboard his submarine where I was hoping to make a few notes for an article for C&E. I would get clearance, of course. Before we could arrange the tour, the submarine slipped quietly away to parts unknown. I still hope I can get some unclassified goodies.

- - - Bill, WA5RAQ

(Autopatch and Third-Party Traffic . . continued from page 35)

repeater station tape logs all autopatch calls and because of that, the amateur does not have to log the traffic. This is also incorrect. The third-party traffic must be logged by the amateur initiating the traffic and the repeater station. (And both records must be kept for one year.)

Then you get the argument from the ham who accesses the autopatch, calls his wife and gives her a message. He argues that because his wife is also a ham there is no third party involved. Not so. The repeater station is an identity and he is talking to the repeater station, which in turn is talking to his wife."

Bill, WA5RAQ

MID-OKLAHOMA REPEATOR INC.

These are the minutes for Sept. meeting held at EOC Sept. 7, 1976.

The meeting was opened at 2005 CDT by Vice President Chet Hazelwood W5GDL.

We immediately turned the program over to WA5LTM who introduced the speaker, Weldon Davis. KTVY was there filming the nite's speaker and the members who attended for the night. We had 37 members and 5 guests.

The meeting then broke for refreshments at 2045.

At 2100 meeting was reopened for business.

A move to re-emburse Sid Gerber W5KOZ for the Bumper Stickers he had printed up for us & was seconded by Fred K5HFN. The vote was then taken and passed, The secretary then issued the check to Sid.

W5PDH gave a very good report from CORA on the Ham Holiday. He had the composite report fixed up by WA5ZNF.

Ken K5VVZ gave the report that last Saturday WA5TAW, K5EEL, WA5POW, and WB5ISO, and WB6FYL helped in the move from 300 to 450 feet up the KTVY tower with our .67 receiver. And at the present time the autopatch is out on .67. The heat got it and he has not had much luck getting it back together and on.

WA5TRS says 449 doing very well but need more people on that machine. Joe also gave the reports on the new schools being started.

HAMARAMA on Oct. 30 and 31 is now pretty well all lined up great according to W5HXL.

Roy Albright has decided not to run for director for this year since his heart attack so Jack Gant W5GM is now running for this district Director. A motion from WA5AOB to donate $50 to assist Jack Gant with his expenses for the election was seconded by Jerry W5MCJ. This was then sent to executive committee about the legality of the donation. The ammendment was then opposed by a vote of the members present.

September 30 is the deadline on auto license tag applications.

Motion to close by WA5LTM and 2nd by W5KOZ.

Hope to be seeing every one next month. Remember that is the month for the committee to be selected for nominations for the next year's officers. Sorry too that our Pres WA5MLT H. O. could not attend; he had to teach and could not make for the night. Anyone else having anything for the paper or any other kind of articles for the paper will be welcome.

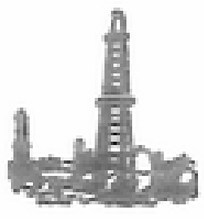
From Your Secretary.....John K5QDR.....

AUTOPATCH AND THIRD-PARTY TRAFFIC (from QST, June, 1976, page 60)

"We keep getting questions about the use of autopatch and third-party traffic. Should it be logged? By whom? How long should the third-party log be kept?

Simply, when an amateur accesses a repeater and activates the auto-patch and makes a call, he must enter into his log a notation that includes the names of all participants and a brief description of the message content. Some amateurs will argue that FCC does not require an amateur to keep a log while operating mobile so this means he does not have to log third-party traffic. This is incorrect. If you conduct third-party traffic, it must be logged, and the log or record must be kept for one year. Some amateurs will argue that the

(continued on page 36 42)



MID-OKLAHOMA REPEATOR INC.

The LONG Wire

h. o. townsend, AA5MLT
President MORI

Greetings! October is here and its time for Halloween and two holidays. The holidays should provide additional time for enjoying our hobby. I am not sure exactly what Halloween will do. Maybe it will scare the horrible band conditions away.

I must admit, however, that 2-meters was open several mornings in September. I do not recall any super outstanding conditions, but on several mornings the repeater was running open from several points around the state.

I was able to make a few DX contacts on 20-meters. For example, Spain, Italy, Germany, England, and Portugal. I am not much of a DX person, however, the stations were really coming in. I hope you did as well. I heard several other countries, but hearing them is just hearing them.

I believe this proves our hobby is really several hobbies rolled into one. For example, as a general rule, one finds a somewhat different Amateur on 2-meters verses 80-meters, verses 40-meters, verses etc. At times it is difficult to know which band to operate. By the same token many are interested in only one band. In summary, our hobby has much to offer to everyone.

The program for this months meeting will be presented by Jack Gant of Ardmore. As you know, Jack is presently our ARRL West Gulf Division Vice-Director. Due to Roy Albright's recent decision not to seek re-election as Director, Jack has been encouraged by many to seek the Director's post.

Personally, I view Jack's decision not as a battle between Oklahoma and Texas, but rather I feel Jack is the best qualified person in our Division. As you, I anticipate his program.

Anyway, being from Texas I know which state is the besT!

At this months meeting we will be selecting a nominating committee. The committee will be responsibile for nominating members for President, Vice-President, and Secretary/Treasurer for the next year. Please be present so that the club can chose a strong committee. These are important positions that must be filled with the most energetic and qualified members the club has to offer.

At the September meeting of the Executive Committee, the officers decided to sell some the excess equipment the club owns. The sale of the equipment would relieve some of the storage space problems and the club could recover some dollars and cents. Who knows, maybe we can get another club to join us! Incidentially, the items that will be sold, will be items other than our back-up equipment.

In closing, I want to thank Chet for conducting the September meeting. I had to be away because of the college course I am taking. I appreciated it and I know the club did too! Thanks Chet.

I will make this meeting and I hope to see each of you.

THE ZANYNEWS FREQUENCY

Joe, WA5ZNF

ANOTHER CORA BONUS - - If you started at the front of this issue and read, or at least noted, each page you have already discovered the Bonus Book Section. It was designed to be removed and used.

The FCC has issued new study guides for Novice, General, Advance and Extra class license for those who wish to attain any of those classes. (The Extra section will be published later.)

There are a lot of questions in each of the guides, but no answers. That's the idea - - you learn the subject, then you can pass the written elements regardless of how the question is worded. That is better than memorizing the answers to a bunch of questions as published in some license manuals.

You say you don't know where to find the answers/ Well, if you live in the Oklahoma City Metro area there is a class starting up right now where you can get all the help you need, good teachers, printed lesson guides advice and concerned attention to your learning problems. The classes are being held in several geographical areas so you won't have to drive so far, wherever you live.

The classes and lesson helps are free but you are expected to deposit $4.00 to show genuine interest, then when you are ready to take the FCC exam CORA will refund the money in the form of a check made out to FCC. Just attach it to your application and wait for the examiner. Of course the Novice exam has no fees so you get your money back if you take the exam. It won't go far toward bying a novice rig but it will help on the sales tax.

Look in last months CORA C&E for names and phone nembers to contact. One of them can put you in touch with an instructor in your area, or call Joe, WA5TRS at 732-0676. He will probably beat me for this last bit of information but - - he is the guiding hand and " "knows all".

SO YOU ALREADY HAVE A LICENSE covered by one of the study guides, or worse yet you aren't interested in upgrading. Don't let this valuable information just lay there, or don't throw it in the waste basket - - find someone who doesn't have one and get him interested by giving him/her your copy, go over it, sell them on the fun and satisfaction of being a "ham". I know there are those who don't like that word but 95% of the CBers and plain people have no idea of what a amateur is but all recognize "ham".

* * * * *

FREE FILM - - You don't even have to pay for the developing. If you have a 35mm camera that you can use to take pictures for CORA C&E we will furnish black & white film, develop it, make the prints and use in a future issue. Personalities, shacks, building projects and most anything of interest to readers will be welcome. Call 737-1044 and I will furnish the film pronto. If you have a good picture idea and don't feel capable of photographing it let me know and I or one of the others will take a crack at it.

* * * * *

GET WELL MESSAGES WORK - - Last month we ran a get-well message for Roy Albright, W5EYB, ARRL West Gulf Director. Within a few days he was out of the hospital and announcing that he was not going to run for re-election. At the same time he praised the Vice Director, Jack Gant, W5GM, for his dedication over the past 5 years and for his accomplishments.

After several pages of petitions were presented to him Jack decided to run for the Director's slot. I, for one, intend to vote for him and help in any way that I can to tell ARRL members that he would be a good director. The fact that he is an Okie should make him that much more attractive.

SECOND CLASS POSTAGE PAID
AT OKLAHOMA CITY OK

POSTMASTER: Send Form 3579 to:
CORA C&E Box 15013
Oklahoma City OK 73115

OCTOBER HAM HAPPENINGS

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
					1 ACARC	2
3	4	5 MORI	6 QARC	7	8	9
10	11	12	13	14	15 VHF CLUB	16
17	18 EDIT C&E	19 OKCAP ~~~~~~ 76'ers	20 QARC	21 ACARC MAILS C&E	22 CORA	23
24 / 31 TEXOMA HAMARAMA	25	26	27	28	29 TEXOMA HAMARAMA	30

See page 2 and/or individual club sections for details