TRW SYSTEMS GROUP
W6TRW
AMATEUR RADIO CLUB

cross talk

OCTOBER

WAC
WAS
DXCC
FD'71
FD'73

TRW/ARC Saturday Morning Nets 10AM LT

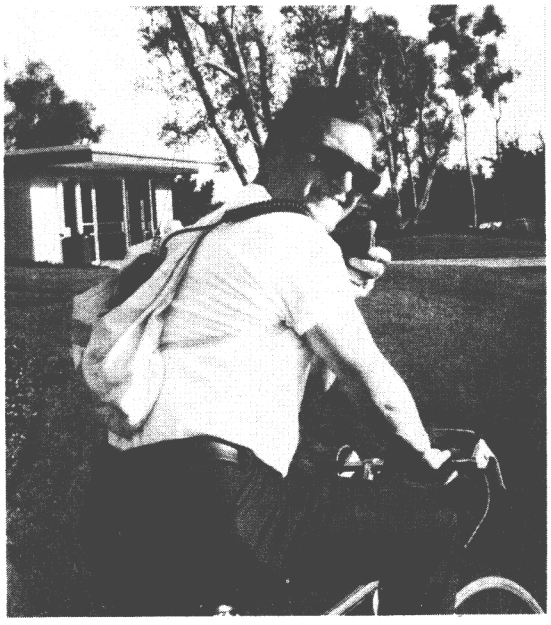
Primary	*7.280 MHz*
Secondary	*3.980 MHz*
Novice	*7.140 MHz*
Simplex	*147.510 MHz*

EKK SAVES ENERGY....

W6EKK RIDES BIKE, SAVES ENERGY

This month's CrossTalk highlights Stan Johnson's contribution to the effort of conserving energy (even at the expense, puff, puff, of added bodily exercise) by riding his bicycle from Gardena to TRW Systems work in Manhattan Beach. And, thanks to his new Wilson HandiTalkie, he is still maintaining his activities in the to/from work net on 147.51 MHz.

Stan indicates that the best days for his biking activities are Tuesdays thru Thursdays, the other week days he feels are too hazardous on the surface streets. All considered, Stan is able to do pretty well QSOing to and from work, and at close in range his 2 watts keeps him haming on the days he isn't driving with his IC230.



FRANK MULLEN (W6SCL) WINS DOOR-PRIZE

Looking very smug after having just won the September Meeting Door Prize is W6SCL, also known as Sex Crazed Lover. As it turned out the prize fits perfectly in with his station plan ("I knew I would win it all along") as he operates both lo and hi bands, and his new wattmeter covers 1.9 to 150 MHz, and measures 5 to 2000 watts!

MONTHLY CLUB MEETING

Featured this month is Mr. George Mair, of KNX Radio, who will present "The History of Radio"; you will hear the actual voices and news events of early radio.....door prize,too!

EVERYONE WELCOME....BRING A FRIEND!!!

*** MEETING REMINDER *** R2-1055
Always the last Wednesday at noon
Subject: THE HISTORY OF RADIO

Speaker: George Mair, of KNX Radio

The Editor's Page

by Frank Halligan, W6RLN

Notice: The October issue of the TRW/ARC CrossTalk will be published this month!

Wayne Hale, W6IZK...receives my thanks for his technical contributions once again for the two fine articles in this month's issue relating to Touch-Tone Decoders and a Companion Function Decoder. His articles are very timely as the interest in 2 meters builds up, and the need for selective calling becomes a necessity to reduce "noise pollution".

NO ONE EVER READS CrossTalk...is like saying that no one is ever on 147.51MHz! Wayne Hale relates that he received a phone call recently from TRW International Resistance Corporation in Iowa. Would you believe that the office mate there of TRW/ARC member Tom Allen, WAØLUD, was looking for additional info on his 40 Watt 2 Meter Amplifier? In addition to that inquiry, I recently received a phone call from an Arcadia amateur radio operator seeking a copy of the CrossTalk with the Weatheradio conversion article.

Reprinting of CrossTalk articles may be done by anyone wishing to do so, all we ask that credit be given where credit is due!

The difference between men and boys.... is the price of their toys; just ask any XYL!!

Speaking of toys...have you heard "Halligan's Law", which states something to the effect that there is no such thing as a VHF enthusiast with just one rig. To test that statement, just run down the club roster and see how many pass the test (and with not just two units, in many cases either!!). For instance, TDU, AWO, GZF, IDJ, CGR, FQ, OOU, RLN, VBB, VCZ, QET, EKK, FLL, HPD, JPR, YCZ, JIZ, NRQ, SSN, EMV, FVG, UJX, TDE, QIV, FHN, PQY, MYC, and I'll venture a guess that all of the gear is less than two years of age!!! (If I missed your call, let me know.....just for the record!!)

Congratulations...to Mac McGrew, Dave Gilmore, and Bill Ivey...all are the proud owners of Midland 220 MHZ transceivers!!! And the word is that John, WB6JIZ, missed a chance to buy into 220, and so instead has an IC30 on order for 450 MHz! Also heard on the party line (that's 147.51 MHz) is that Herb Manoli, WB6FHN has a Wilson on order, and his XYL, Jeanie, has a Tech Ticket coming (hopefully) and their QTH is about to be wired for a 450 MHz repeater!! Also, yours truly, has an IC22A at the home base (when it isn't back for factory service!).

South Bay Area 2M Repeaters....really do exist, inspite of the poor showing by WR6AAC. Wally Linstruth, WA6JPR, is actively getting his RACES repeater going in the Redondo Beach area. Ken Arck, WA6EMV, also has a reversed split-split operating on PV, also with autopatch capability.

220 MHz Repeater...Dave Glawson, WA6CGR, advises me that all TRW/ARC club members are welcome to use his repeater, which is located on PV. He indicates it gives excellent coverage throughout Orage county and the LA basin area. The repeater freq is 222.70-in and 224.30-out, and the call is WR6AKU. For further information on some of its other capabilities, don't hesitate to contact him directly.

GI Benefits...run out next May 31st, 1976, for many in the service from 1955 to 1966. And Uncle Sam will probably not send you an engraved invitation to take advantage of any benefits still available. I recently woke up to that fact myself, and have now joined the ranks of many taking the Bell & Howell home entertainment course, looks like a good way to brush up on electronics and receive such goodies as a DVM, oscilloscope, and a 25" TV.

Club Library...still resides in Jack Koho's office, Bldg S, where club members can be assured of always getting the latest issues of QST, 73, HamRadio, and CQ. Prior year issues are in the Club Ham Shack...Bldg 65. Sign the Club Log at building entrance for key.

Treasurer's Report

by Susan Kennedy

Balance on hand Sept 1, 1975		$478.08
Receipts		
Dues (Renewal)	55.75	
ARRL Memberships	16.00	
QSL Sales	8.25	
REfund - QSL Bureau	10.00	
Sept Raffle	39.50	
	129.50	
Expenses		
ICOM Repair	40.60	
Sept Door Prizes	33.07	
ARRL Memberships	32.00	
Aug/Sept Meeting Expense	12.24	
Field Day Expense	10.00	
CrossTalk/Club Postage	24.00	
QSL Orders	5.25	
CallBook Listing	6.00	
	163.16	
Balance on hand October 2, 1975		$444.42

Last Notice: If your membership expiration date is/was on or before Sept 30, 1975, this is your final notification prior to your name being dropped from the club membership roster.

Membership cards have not been mailed out yet, but you can expect to receive your new membership card in the mails very shortly. In the meantime, you should still be able to gain access to the Radio Shack in Bldg 65, by signing the log at the entrance guard desk.

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FLASH FLASH FLASH FLASH FLASH FLASH FLASH FLASH

TRW/ARC HAMFEAST IS NOW SCHEDULED FOR SATURDAY NOVEMBER 22nd

HOLD NOVEMBER 22nd OPEN!!!!!!!!

DINNER ON THE QUEEN MARY GUEST SPEAKER TO BE ANNOUNCED!!!!!!!

DOOR PRIZES!!!!!! WATCH YOUR MAIL BOX FOR MORE DETAILS!!!!!!

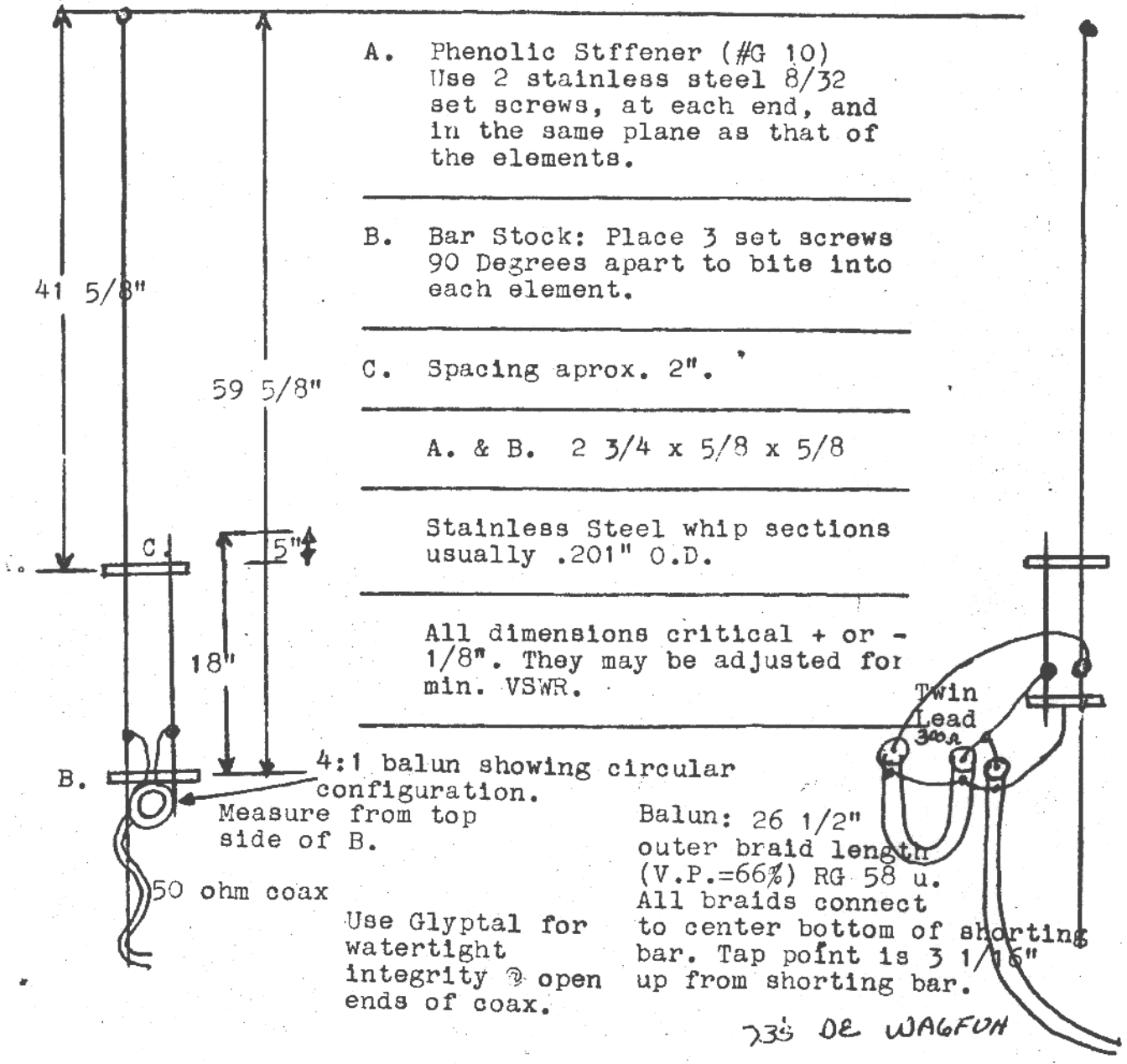
The "J" Antenna from PARC Bulletin, August 1975

Been wondering what that ugly thing is sitting on W6VBB's back bumper?

The W6TYP 2 meter " J " antenna..... An excellent omni for the dedicated conoisseur primarily interested in the greatest possible VHF aera illumination. As opposed to the vast majority of pickle pushers, who, by the pressures of a misplaced female oriented sense of esthetic value, or by the overwhelming dire need to seek group communication by means of a crutch atop a mile high mountain, are employing 19" semi-radiating dummy loads, etc.

The " J " is effectively a bottom fed dipole, and even on a direct "height substitution" basis will show a gain of 9db over a ground plane antenna, and 3.3db over the socalled "3db gain 5/8 wave antenna."

The " J " should be at the tip 13'6" above the road, representing an additional gain of at least 6db, over these roof top monstrosities.



A. Phenolic Stffener (#G 10) Use 2 stainless steel 8/32 set screws, at each end, and in the same plane as that of the elements.

B. Bar Stock: Place 3 set screws 90 Degrees apart to bite into each element.

C. Spacing aprox. 2".

A. & B. 2 3/4 x 5/8 x 5/8

Stainless Steel whip sections usually .201" O.D.

All dimensions critical + or - 1/8". They may be adjusted for min. VSWR.

4:1 balun showing circular configuration. Measure from top side of B.

Use Glyptal for watertight integrity @ open ends of coax.

Balun: 26 1/2" outer braid length (V.P.=66%) RG 58 u. All braids connect to center bottom of shorting bar. Tap point is 3 1/16" up from shorting bar.

73's DE WA6FUH

FROM IZK's DRAWING BOARD - "Touch-Tone Decoder"

By Wayne Hale, W6IZK

Another Project for the 2-Meter Bunch

With the growing popularity of the VHF band, the noise, intermod and constant chatter make fulltime monitoring of a channel somewhat disturbing at the least. Herein is described a relatively inexpensive and easy to construct cure for some of the problems. By utilizing readily available components, a touch-tone decoder can be built that will keep your receiver audio off until a signal consisting of a proper code number comes along. The possibilities of this system are endless, each member can be assigned a number, or a general number for TRW used to either selectively call one other member, or all at once.

As a bonus, some interesting features of phase locked loops are learned. Construction is a matter of mounting 10 IC's on a printed circuit board. Thanks to Dave, WA6CGR, a set of negatives are available for the board. Although point-to-point wiring could be used, there are 98 pins alone on just the IC's and most are active. The 567 decoder chips are available locally for $1.40 each, and the Quad NOR gates are about $0.35 each. The rest of the components are 1/4 watt carbon resistors, a few pots and some capacitors. Only one adjustment is needed per chip and tune up is easily accomplished in 15 minutes with a minimum of equipment. Once aligned, it should not need attention at all. Best of all, no modification need be done to the receiver other than hooking into the speaker line and supplying 12 volts to the decoder board. For further information contact IZK on 147.51 or 62484.

See next page for schematic diagram of Touch-Tone Decoder.
Editor's Note: Also see subsequent pages for the companion Function Decoder.

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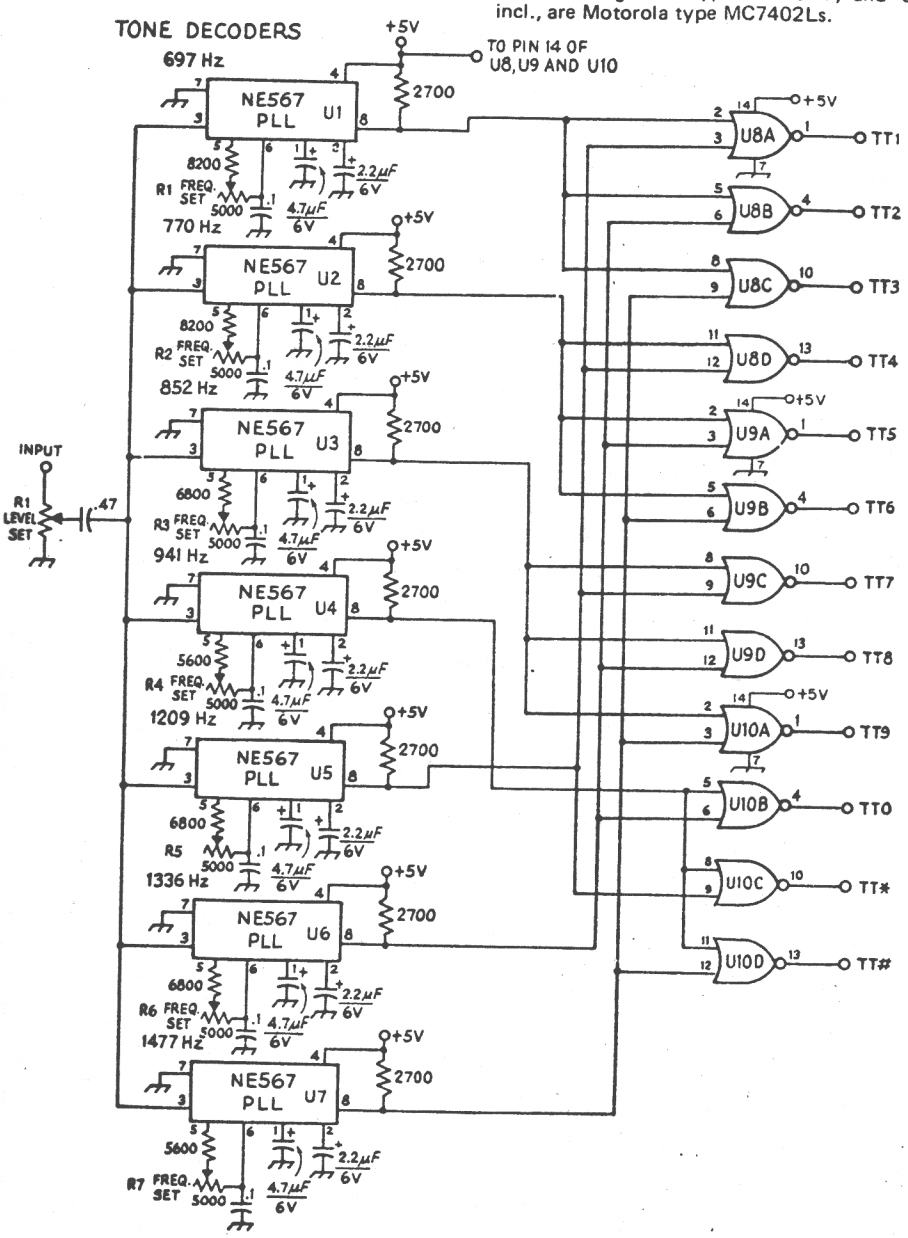
FROM IZK's DRAWING BOARD (continued) - "Touch-Tone Decoder"

Fig. 8-18 — Touch-Tone decoder. Resistors are 1/2-watt composition and capacitors are mylar. R1-R8, incl., are 1/2-watt, pc-mount composition controls. Final adjustment of the frequency of each PLL should be made by adjusting the control as needed to center each phase-locked loop on the telephone-company frequency. A frequency counter facilitates the adjustment procedure. U1-U7, incl., are Signetics type NE-567V, and U8-U10, incl., are Motorola type MC7402Ls.

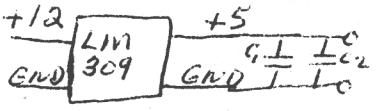


The circuit of the IC Touch-Tone decoder is shown in Fig. 8-18. This design was developed by Jim Wyland of Signetics Corp., with a few modifications added by WA5CJG. Seven NE567 ICs are used in the decoder section and four TTL quad gate packages are used in the logic portion. Each IC is tuned to a Touch-Tone frequency by a resistor and a capacitor. The approximate frequency is given by the relationship:

$$f \cong \frac{1}{RC}$$

The bandwidth of the PLL has been set so that a tone no more than four percent high or low in frequency will be demodulated. When a tone is received, the PLL output goes from a logic high to a logic low. When a Touch-Tone encoded pair is present, 697 and 1209 Hz representing the number 1 for example, PLLs U1 and U5 will have logic low outputs. These two lows appear at the input to NOR gate U8A, changing its output to a high. The output of the NOR gate can be used to drive a relay (using a switching transistor) or a function decoder.

Power Supply



C1 = 10μfd 25v

C2 = .1μfd

COMPANION FUNCTION DECODER FOR TOUCH TONE DECODER

by Wayne Hale, W6IZK

For those interested in a useful mate to the already described TT decoder, herein is described a 32 function decoder. The block diagram shows only seven IC's, one resistor, two capacitors and an RF choke. The unit is assembled on a two sided PC board with a 22 pin edge connector. The negative for same is available from ZIK, again with thanks to Dave, WA6CGR.

In operation, jumpers are added from the touch tone decoder to the input lines of the function card. The star and pound outputs are used to access, reset, and execute the commands. A look at the LOGIC table indicates which output pin will go to logic 0 (0 volts) with appropriate input signals on the A, B, C, D, E lines. Note, it matters not what order the numbers are entered. One to five inputs are used and they may be any digits you desire.

An interesting feature is the addition of a 555 timer which determines how much time is allowed to make an entry. This is to discourage those who play with tones to see if they can upset a system. With the values shown approximately 9 seconds are allowed but lowering either the 1 Meg resistor or 3.3 fd capacitor will decrease the time period.

A reset (star) signal is applied to the 7404 Hex inverter, which in turn resets all the registers to a starting point, and starts the timer. One to five bits are then entered into the 7496 5-bit shift register. Four bits are entered into the 74195 4-bit shift register. The fifth output, if present, is used to set and reset the 7474 dual flipflop through the 7404 hex inverter. An execute (pound) signal clocks the 74195, transfering its information in parallel to the 74154 four line to 16 line decoders.

Depending on whether line E was used or not, the 7474 dual flipflop determines which of the 74154's will have an output. Note that provision is made via pins 8 & 40 to disable the outputs externally. The control output will remain LOW (0 volt) until reset by turning off DC power, or a reset signal is received. The timer only controls the entry of data into

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Reference: 73 Magazine, October 1974, "Selective Calling", W5LCT, page 51.

FUNCTION DECODER (Continued) by W6IZK

the system, data may be entered but not executed until a latter time, a handy feature, allowing an execute with only one button.

Hopefully, enough of the 2 meter bunch will build up these units, adding a great deal of sophistication to our operating. Each user can have a unique access code so 51 or popular repeaters may be monitored in silence until specifically called.

Considering the large number of possible combinations and small number of users, both specific calls and general calls should be possible. At worse case, two decoder boards could be used to allow detection of all 10 possible numbers. Total cost of the function decoder should be less than $5.00.

Since only DC levels are present, layout is absolutely not critical but the PC board removes all the work and assures operation the first time.

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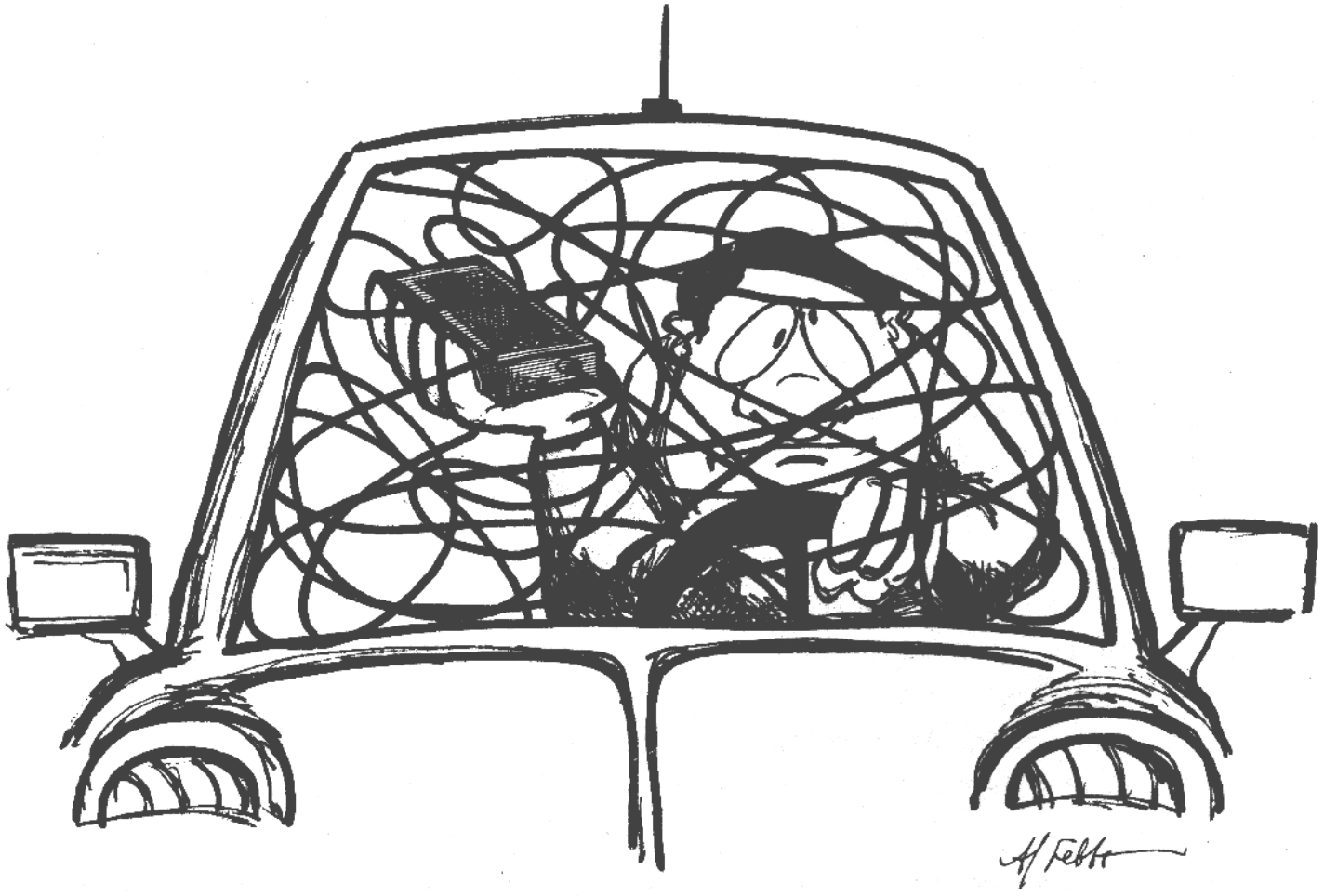
"MOBILE AMATEUR RADIO - AS VIEWED BY THE EYES OF THE ARTIST - ALL WRAPPED UP"



LOGIC TABLE - FUNCTION DECODER

#	PIN-INPUT 2 3 4 5 6 (D)(C)(B)(A)(E)	Pin OUTPUT
1	L L L L L	41
2	H L L L L	42
3	L H L L L	22
4	H H L L L	21
5	L L H L L	20
6	H L H L L	14
7	L H H L L	15
8	H H H L L	16
9	L L L H L	19
10	H L L H L	18
11	L H L H L	17
12	H H L H L	11
13	L L H H L	12
14	H L H H L	13
15	L H H H L	10
16	H H H H L	9
17	L L L L H	33
18	H L L L H	32
19	L H L L H	31
20	H H L L H	30
21	L L H L H	29
22	H L H L H	23
23	L H H L H	24
24	H H H L H	25
25	L L L H H	26
26	H L L H H	27
27	L H L H H	28
28	H H L H H	34
29	L L H H H	35
30	H L H H H	36
31	L H H H H	37
32	H H H H H	39

PIN # 7 = RESET

PIN 8+40 = EXTERNAL DISABLE WITH LOGIC HIGH

PIN 43 = +5V

PIN 44 = GND

PIN 1 = EXECUTE

(PIN Numbers Refer To PINS on circuit Board)

Example: A = 1 B = 2 C = 3 D = 4 E = 5

*,4,3,2,# = 16 low

*,2,5,# = 29 low

32 BIT FUNCTION DECODER