DenTron

INTRODUCTION

The MLX series of radios from Dentron Radio Co., Inc. are constructed in a modular fashion using all solid state techniques and small rugged miniature construction with a low current drain so as to facilitate battery operation if desired. The case is heavy aluminum with a minimum of controls to make operating easy.

Some of the features include:

Led display
Low impedance mic input
Analog meter lighted for dim or no light conditions
Adjustable mic gain to control SSB power
A RIT control for stations that are not completely on frequency
Low power drain in receive and even lower drain with led display and Meter lamp turned off.

OPERATION PROCEDURES

POWER SOURCE

The power source should be regulated at 13.8 volts D.C. and capable of delivering 2 amps continous and 3 amps peak.

ANTENNA SSB:

Turn the radio on at AF control and adjust volume for a comfortable level. To Transmit make sure that your antenna is showing an S.W.R. of 2 to 1 or less and is not a reactive load impedence below are the instructions for wiring the mic.

Use standard 1/4 inch stero phone plug
TIP = PTT to ground
RING = TX audio
CASE = ground/shield

Once you have met the above requirements you should be ready to transmit. Adjust mic gain to produce approximately 10 watts output to antenna. Further increase may produce unwanted spurious emmissions. The panel meter does not indicate power out on TX.

CW

To receive CW use the radio just as you would for SSB. To transmit CW rotate the mic control counterclockwise till you feel the CW transmit switch click and stop rotation. Be careful not to force the control beyond this position or damage will result. Note that you cannot receive in this position. Simply operate CW key that is plugged in mic jack as a PTT switch as you normaly would, when you are done transmitting CW. Move the mic control clockwise until the switch disingages.

On the next few pages of this manual we will explain the basic operating theory behind the various modules inside the radio. Along with drawings and parts list for those who would like to service their own or to just become familiar with their rig.

DENTRON MLX MINI SERIES

The radio is divided into several modules. The power output module which contains the relay switching for RX TX and predrive, drive and power transistors for the transmitter. The signal from the transmitter is amplified by Q2 on the RF mixer board which also has the TX mixer.

The RX signal is amplified by Q-2 also and then fed to the RX mixer Q1.

The VFO board has its own buffer which feeds the signal to the RF/MIX board and the digital display.

The RX/TX/Af (SG-9) board has all the 9MHZ I.F. amps with AGC and carrier oscillator along with SSB detection and generation with the audio amp on this one board giving simplicity of construction and reliability in design.

This brief explanation is completed with the further discussions on the following pages, and again we hope that you will have many years of enjoyment with your hobby.

RF BOARD RX/TX/MIX

This board performs mixing for TX and RX and some amplification by Q2 which is used in both TX and TX modes. The VFO is injected to both Q1 and Q4. Q4 is biased on only during TX from P-24, which also biases the the predriver on the power output module during TX through R-7, R6.

DIGITAL DISPLAY BOARD

Q1 and Q2 are amplifiers for the counter divider IC. IC2 which divides the signal by 10 and then feeds it to IC3, the 7216 counter chip, that performs the count and display multiplex/drive functions driving the LEDS through IC4 the segment buffer driver. Digit drive is provided by Q3-Q6.

POWER OUTPUT MODULE

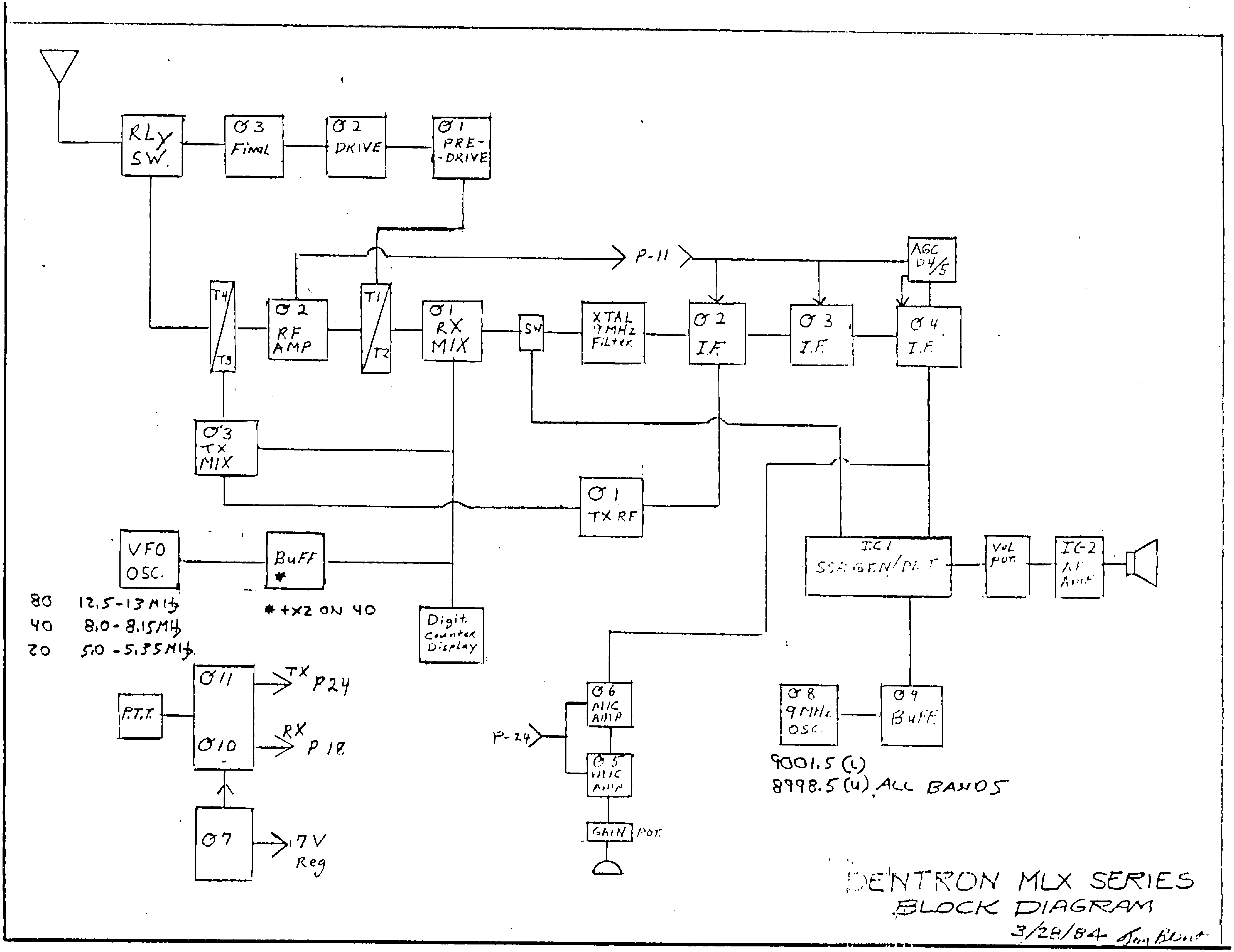
This module contains the final RF power amp along with the driver and predriver, Q3, Q2, Q1. It also has the switching relay that moves the antenna on the receiver through D-2, to the RF/MIX board, T-4, T-3 and Q2.

SSB IF/RX/TX/AF BOARD

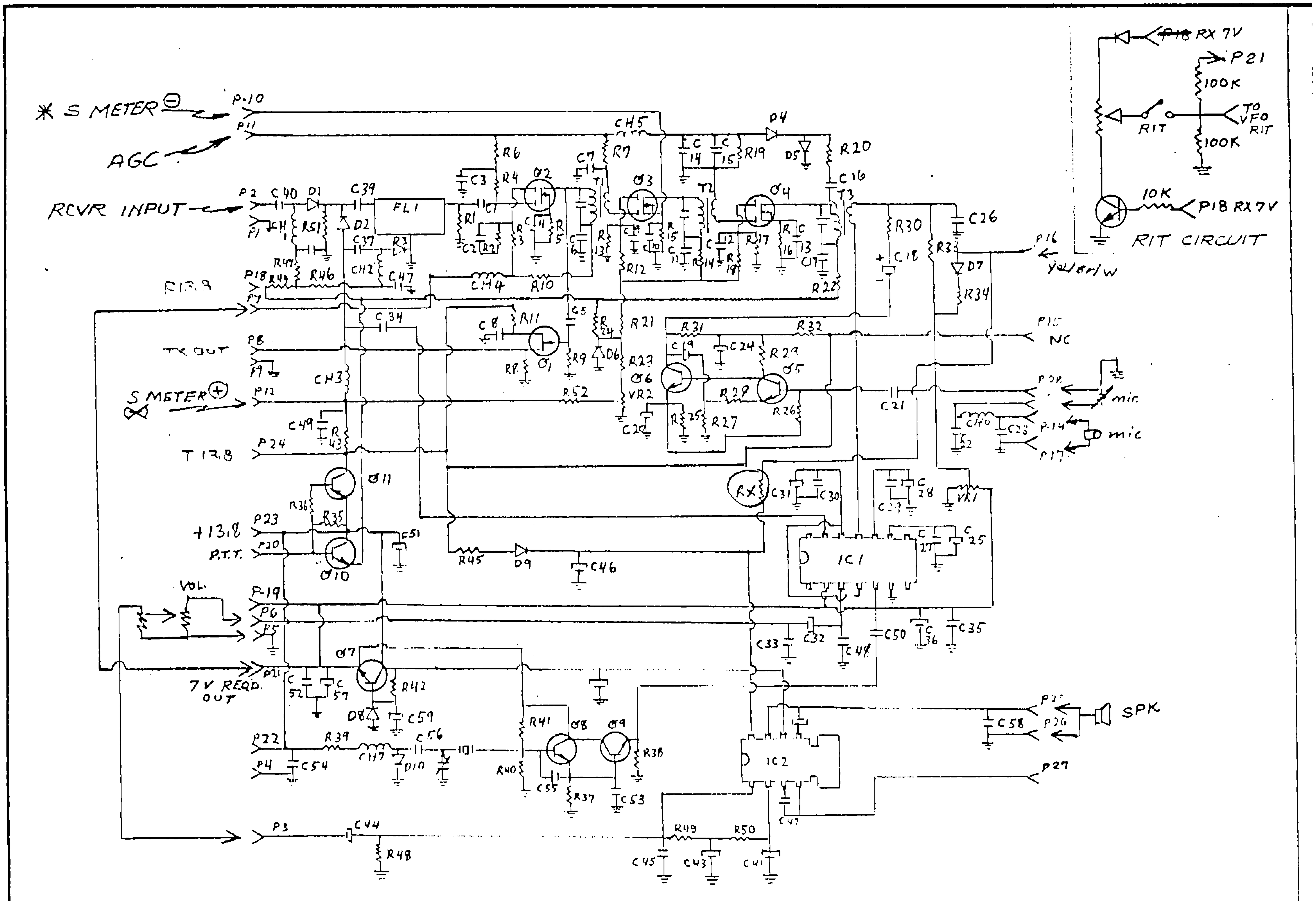
This is the heart of the radio. Q7 is a 7 volt regulator with output on P-21 and P-7. It operates Q-8 the 9 MHZ carrier osc. and buffer Q-9, and Q-2 the 1st IF amp that is used in TX and RX. Q10 and Q-11 are used to switch 13.8 to P-24 TX or P-18 RX and are controlled by P.T.T. to ground on P-20. IC-1 is the SSB generator and detector being fed with 9MHZ on pin 5 from the carrier osc. in the RX mode. The IF signal is fed to pin 11 and the detected audio is output on pin 3. In the TX mode the circuit is balanced for SSB or unbalanced for CW by applying 13.8 to P-16 which is fed to the balance adjust pot, VR-1. The voltage that is fed to P-16 in CW comes from the power module switch Q-5. In SSB TX mode the microphone audio is fed to P-28 from the mic gain pot, and amplified by Q5 & Q6 and fed to VR-1. The DSB output is fed from pin 13 through D-2 to the SSB filter which removes the lower SSB signal and feeds the upper sideband signal to Q-2 and Q-1 for amplification before it goes to P-8.

In the RX mode the filter and Q2, Q3, Q4, all form the SSB IF stages with AGC being developed by D5 and D4, which is also fed to P-11 for the RF/MIX board.

All the above discussions assume prior knowledge of electronics and radio circuits. It is recommended that you do not try to work on the radio with out some past experience in the above due to the size and somewhat complexity of the unit.



DENTRON MLX SERIES
BLOCK DIAGRAM
3/28/84

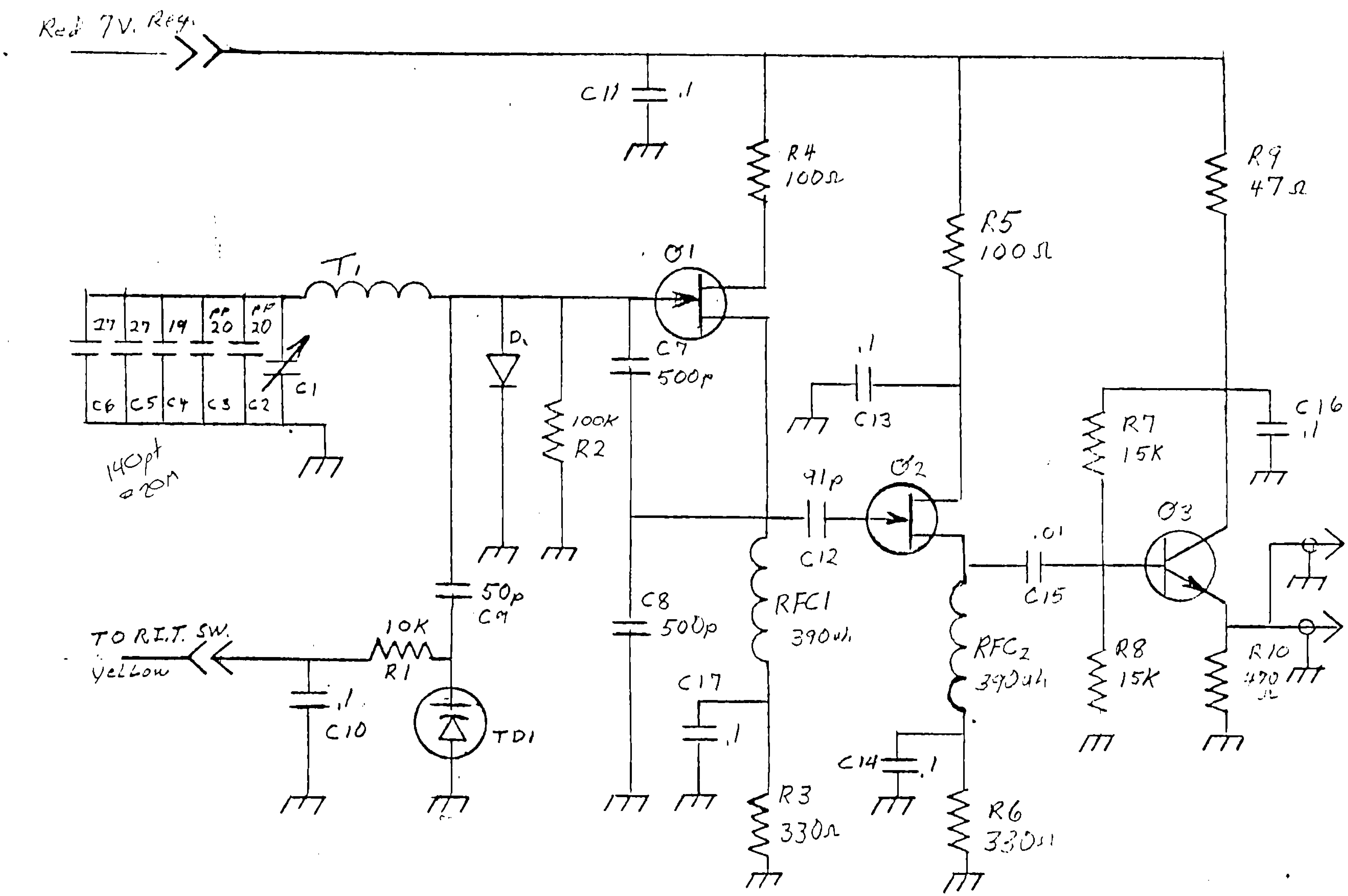


DENTRON MLX SERIES
IF RX/TX/AF BOARD (SG-9)
REVISION 3/18/84

9 MHz Filter & Audio

IC1 – SN76514
IC2 – 575C2
Q1 – 2SK19
Q2 – 3SK49
Q3 – 3SK49
Q4 – 3SK49
Q5 – 2SC945
Q6 – 2SC945
Q7 – 2SC945
Q8 – 2SC945
Q9 – 2SC945
Q10 – 2SC945
Q11 – 2SA719
D1 – Mc 301
D2 – MC301
D3 – MC301
D4 – IN60
D5 – IN60
D6 – RD82EB
D7 – 1S1588
D8 – RD82EB
D9 – IN60
D10 – MC301
CH1 – 1mhy
CH2 – 1mhy
CH3 – 1mhy
CH4 – 1mhy
CH5 – 470uhy
CH6 – 10uhy
CH7 – 470uhy
T1 – IF can variable
T2 – IF can variable
T3 – IF can variable
VC1 – 35pf
C1 – .01 Disc
C2 – .01 Disc
C3 – .01 Disc
C4 – .01 Disc
C5 – 2pf Disc
C6 – .01 Disc
C7 – .01 Disc
C8 – .01 Disc
C9 – .01 Disc
C10 – .01 Disc
C11 – .01 Disc
C12 – .01 Disc
C13 – .01 Disc
C14 – 6.8uf Tant
C15 – .01 Disc
C16 – 100pf Disc
C17 – .01 Disc
C18 – .47uf Electrolytic
C19 – .47uf Electrolytic
C20 – 4.7uf Electrolytic
C21 – .047 Disc
C22 – .001 Disc
C23 – .001 Disc
C24 – 33uf Electrolytic
C25 – 10uf Electrolytic
C26 – .0047 Disc
C27 – .01 Disc
C28 – 10uf Electrolytic
C29 – .01 Disc
C30 – .01 Disc
C31 – 10uf Electrolytic
C32 – 4.7uf Electrolytic
C33 – .001 Disc
C34 – .01 Disc
C35 – .01 Disc
C36 – 33uf Electrolytic
C37 – .01 Disc
C38 – .01 Disc
C39 – .01 Disc
C40 – .01 Disc
C41 – 100uf Electrolytic
C42 – .001 Disc
C43 – 4.7uf Electrolytic
C44 – 4.7uf Electrolytic
C45 – .001 Disc
C46 – 100uf Electrolytic
C47 – .01 Disc
C48 – .001 Disc
C49 – .01 Disc
C50 – .001 Disc
C51 – 47uf Electrolytic
C52 – .01 Disc
C53 – 220pf Disc
C54 – .01 Disc
C55 470pf Disc
C56 – 18pf Disc
C57 – 33uf Electrolytic
C58 – .1 Mylar
C59 – 10uf Electrolytic
C60 – 470uf Electrolytic
C61 – 220uf Electrolytic
VR1 – 100K P.C. Trim Pot
VR2 – 500 ohm P.C. Trim Pot
R1 – 560 ohm ¼W
R2 – 10K ¼W
R3 – 15K ¼W
R4 – 22K ¼W
R5 – 100 ohm ¼W
R6 – 10K ¼W
R7 – 6.8K ¼W
R8 – 51 ohm ¼W
R9 – 470K ¼W
R10 – 220 ohm ¼W
R11 – 220 ohm ¼W
R12 – 15K ¼W
R13 – 10K ¼W
R14 – 220 ohm ¼W
R15 – 220 ohm ¼W
R16 – 100 ohm ¼W
R17 – 10K ¼W
R18 – 15K ¼W
R19 – 470K ¼W
R20 – 15K ¼W
R21 – 51 ohm ¼W
R22 – 220 ohm ¼W
R23 – 4.7K ¼W
R24 – 390 ohm ¼W
R25 – 220 ohm ¼W
R26 – 150K ¼W
R27 – 1K ¼W
R28 – 22K ¼W
R29 – 22K ¼W
R30 – 820 ohm ¼W
R31 – 1K ¼W
R32 – 820 ohm ¼W
R33 – 47K ¼W
R34 – 1K ¼W
R35 – 1K ¼W
R36 – 1K ¼W
R37 – 1K ¼W
R38 – 1K ¼W
R39 – 10K ¼W
R40 – 8.2K ¼W
R41 – 22K ¼W
R42 – 560 ohm ¼W
R43 – 10K ¼W
R44 – 51 ohm ¼W
R45 – 27K ¼W
R46 – 10K ¼W
R47 – 10K ¼W
R48 – 47K ¼W
R49 – 150K ¼W
R50 – 120K ¼W
R51 – 10K ¼W
R52 – 470 ohm ¼W
X1 – Xtal 8.9985 MHz
FL1 – Filter, Xtal 9MHz

DENTRON MLX SERIES
VFO



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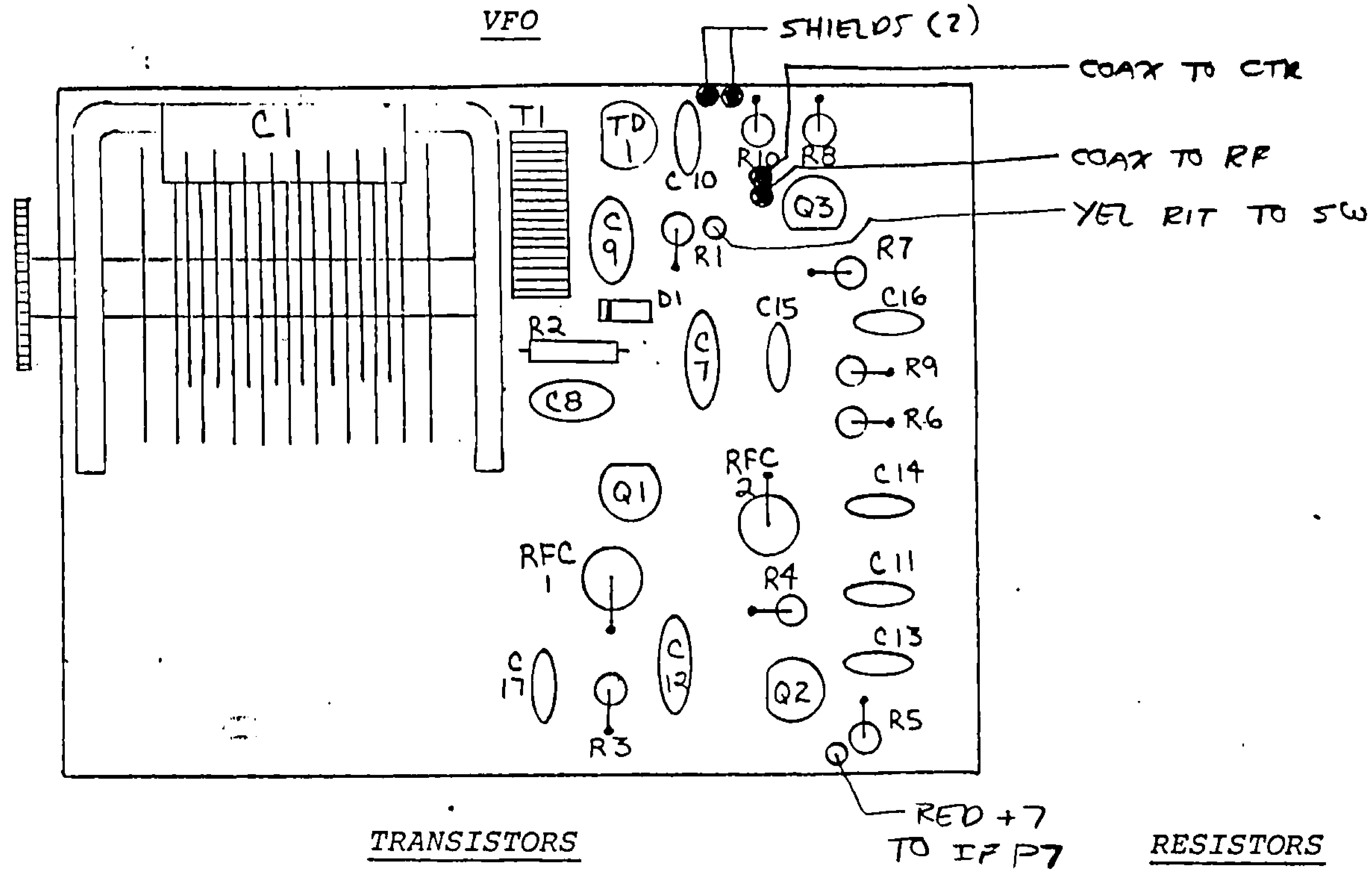


CAPACITORS

C1	ASP8232
C2	20pf
C3	20pf
C4	19pf
C5	27pf
C6	27pf
C7	500pf
C8	500pf
C9	50pf
C10	.1
C11	.1
C12	91pf
C13	.1
C14	.1
C15	.01
C16	.1
C17	.1

TRANSISTORS

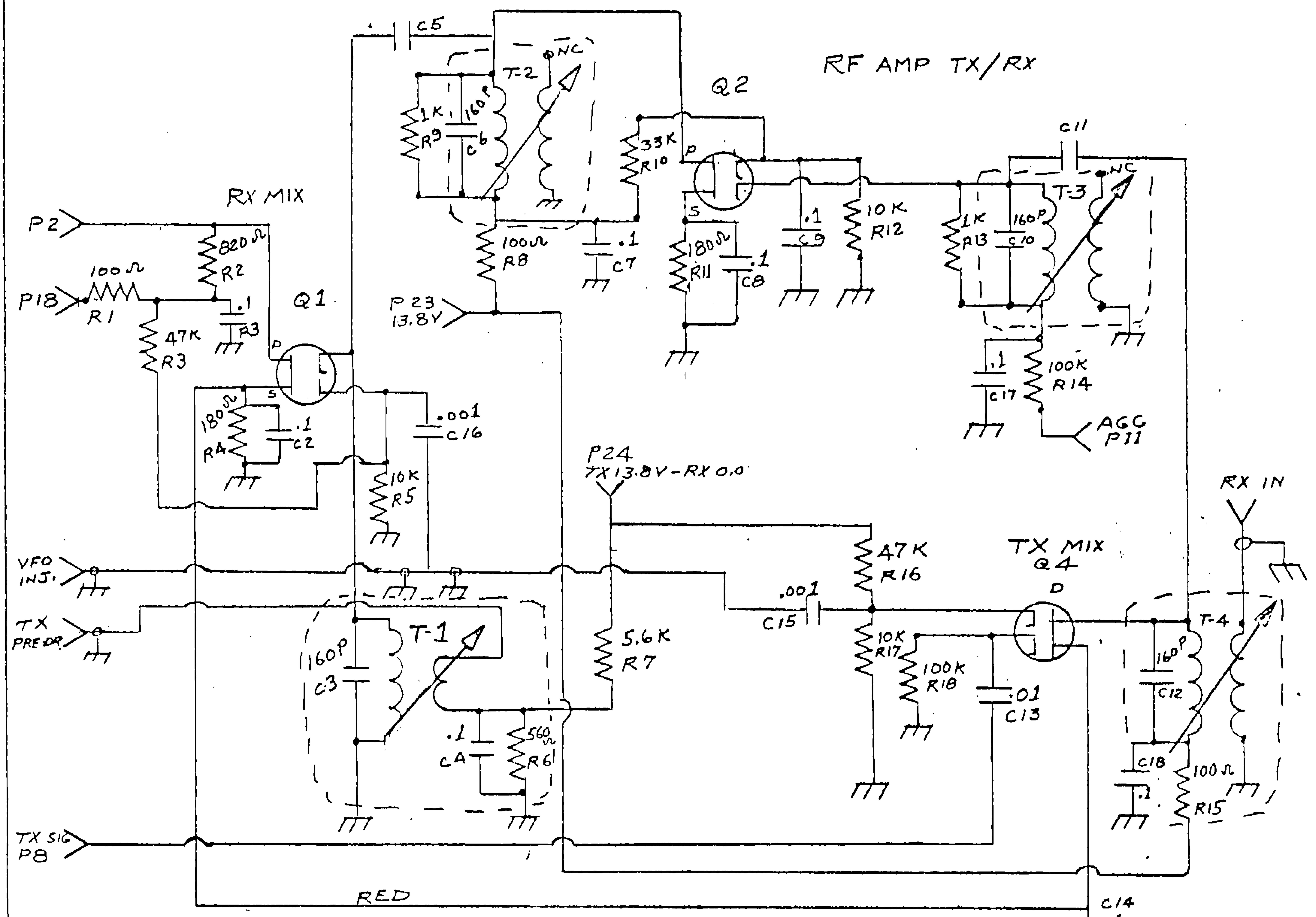
TD1	MV2109
Q1	MPF102
Q2	MPF102
Q3	2N4123

CHOKE

RFC1	390uh
RFC2	390uh

RESISTORS

R1	10K
R2	100K
R3	330
R4	100
R5	100
R6	330
R7	15K
R8	15K
R9	47
R10	470



DENTRON MLX SERIES ~ MINI 80 RF BOARD RX/TX MIX

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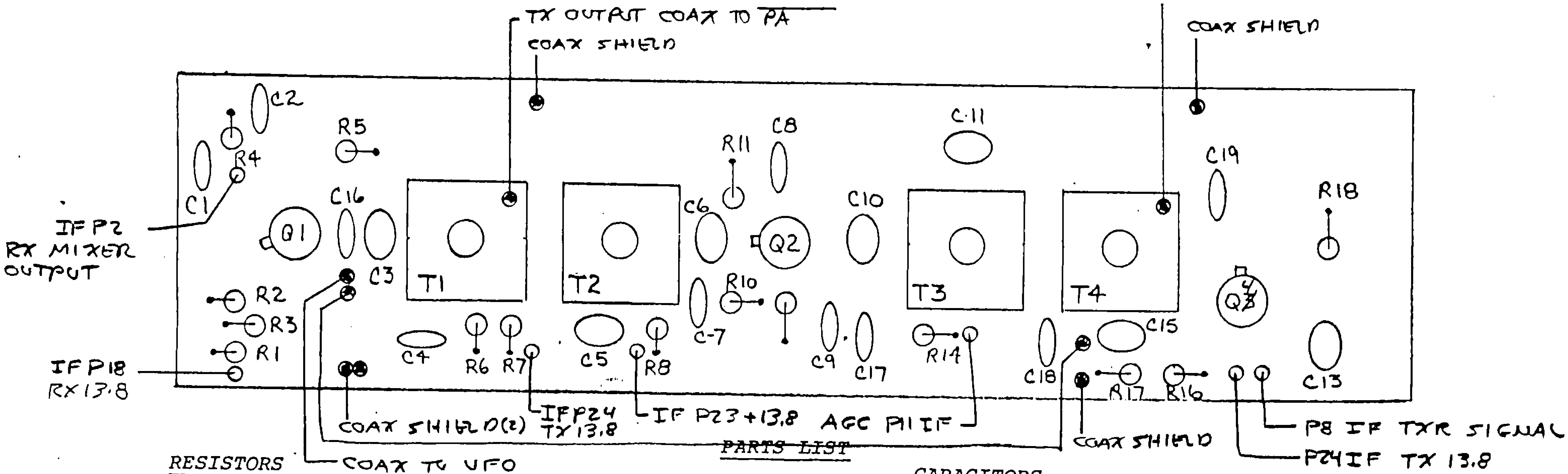
RF/MIX



PARTS LIST

RESISTORS

R1	100
R2	820
R3	47K
R4	180
R5	10K
R6	560
R7	5.6K
R8	100
R9	1K
R10	33K
R11	180
R12	10K
R13	1K
R14	100K
R15	100
R16	47K
R17	10K
R18	100K

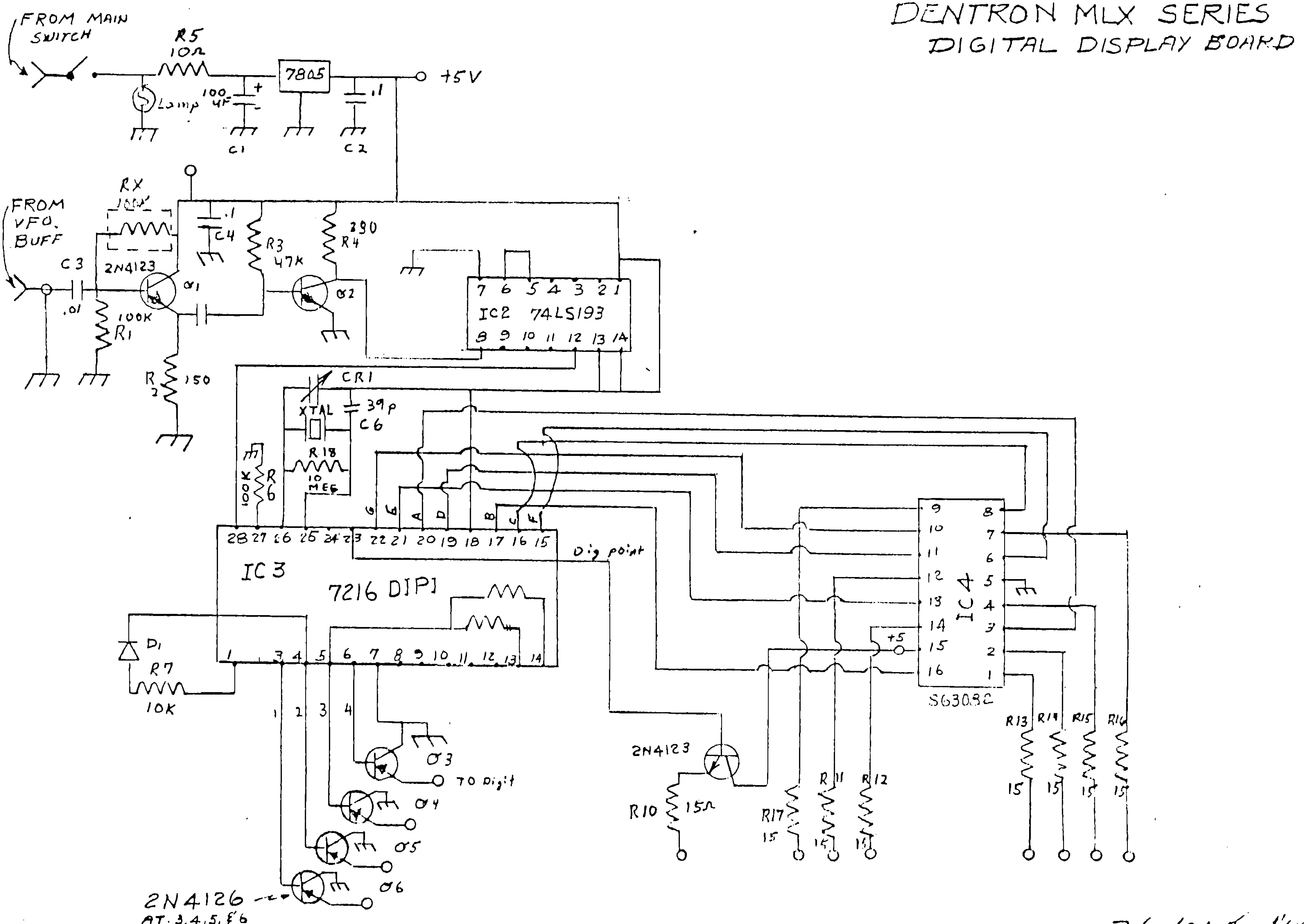
CAPACITORS

C1	.1
C2	.1
C3	160pf
C4	.1
C5	
C6	160pf
C7	.1
C8	.1
C9	.1
C10	160pf
C11	
C12	160pf
C13	.01
C14	.1
C15	.001
C16.	.001
C17	.1

MISC.

T1	CS4852
T2	CS4852
T3	CS4852
T4	CS4852
Q1	3N202
Q2	3N201
Q3	3N202

DENTRON MLX SERIES
DIGITAL DISPLAY BOARD



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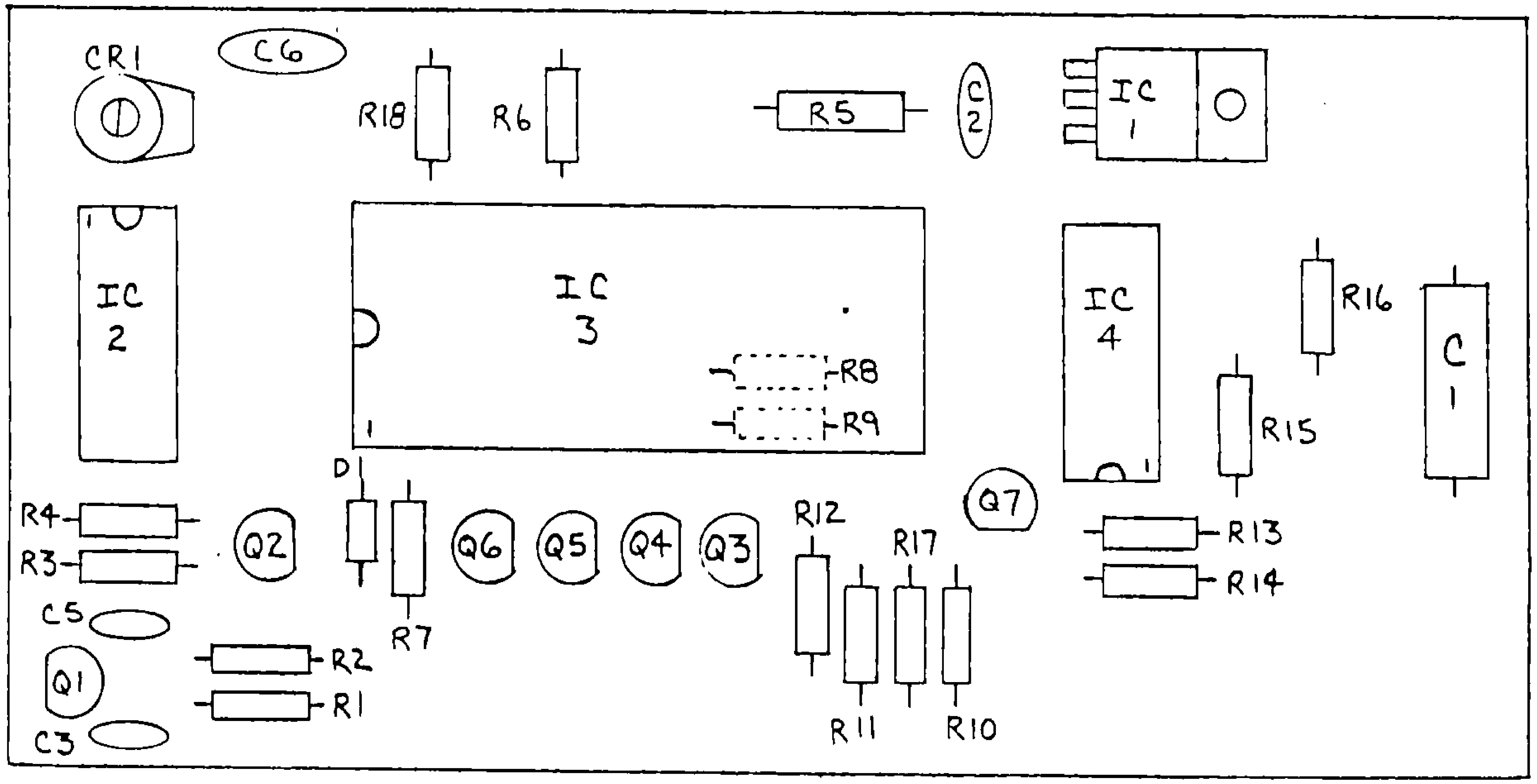
DIGITAL DISPLAY



IC

IC1	7805
IC2	74LS196
IC3	ICM7216 DIPI
IC4	SG3082

TRANSISTORS

Q1	2N4123
Q2	2N4123
Q3	2N4126
Q4	2N4126
Q5	2N4126
Q6	2N4126
Q7	2N4123

DIODES

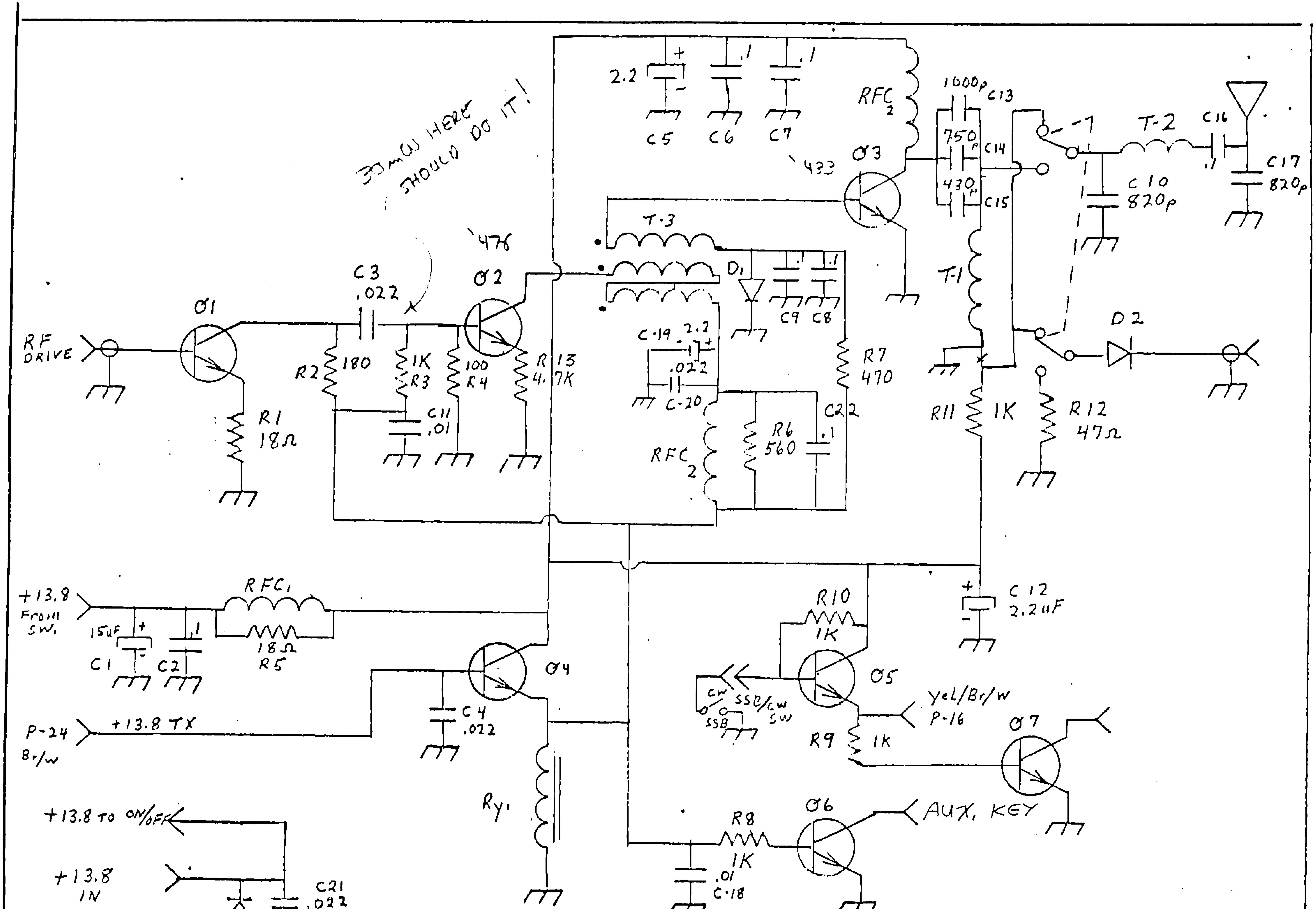
D1	IN4148

RESISTORS

R1	100K
R2	150
R3	47K
R4	330
R5	10
R6	100K
R7	10K
R8	100K
R9	100K
R10	15
R11	15
R12	15
R13	15
R14	15
R15	15
R16	15
R17	15
R18	10 MEG

CAPACITORS

C1	100UF
C2	.1
C3	.01
C4	.1
C5	.01
C6	39pf
CR1	5-50pf



DENTRON MLX SERIES
80 METER MODULE

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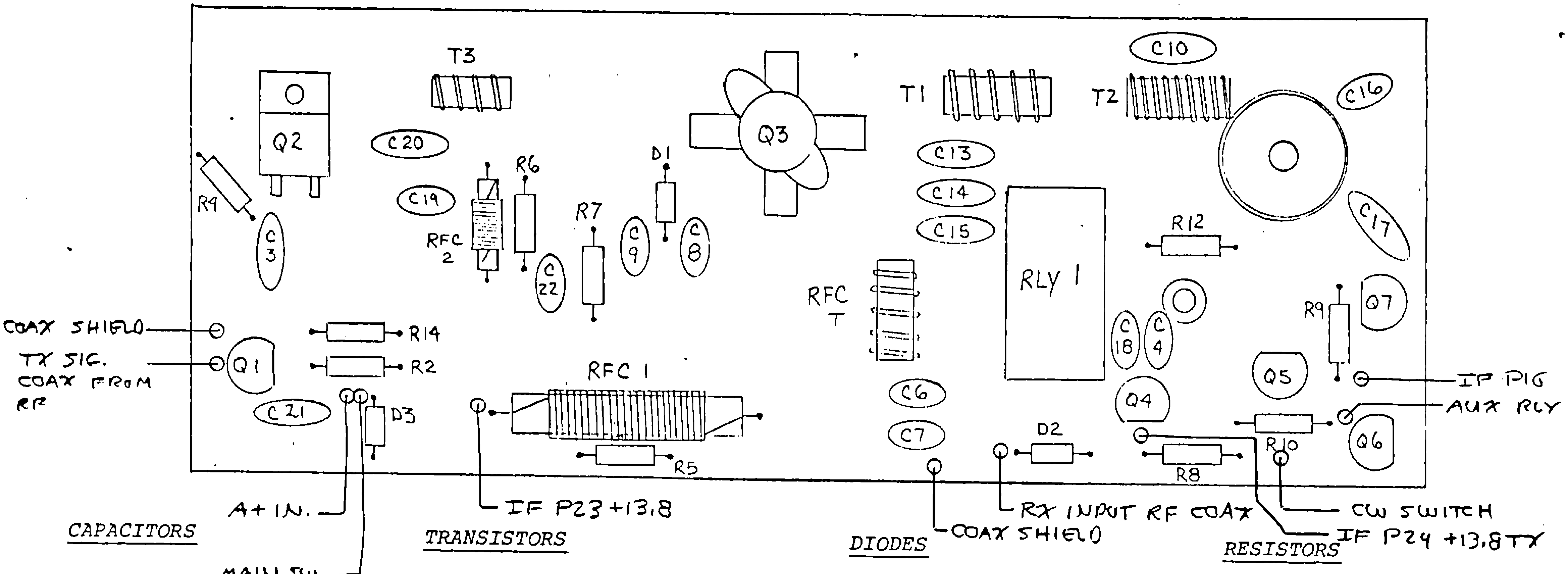
RF/PA BOARD



CAPACITORS	
C1	15
C2	.1
C3	.022
C4	.022
C5	2.2
C6	.1
C7	.1
C8	.1
C9	.1
C10	820pf
C11	.01
C12	2.2
C13	1000pf
C14	750pf
C15	430pf
C16	.1
C17	820pf
C18	.01
C19	2.2
C20	.022
C21	.022
C22	.1

TRANSISTORS	
Q1	2N4123
Q2	MRF476
Q3	MRF433
Q4	2N4123
Q5	2N4123
Q6	2N4123
Q7	2N4123

DIODES	
D1	IN4003
D2	IN4148
D3	IN4003

RESISTORS	
R1	18
R2	180
R3	1K
R4	100
R5	18
R6	560
R7	470
R8	1K
R9	1K
R10	1K
R11	1K
R12	47
R13	4.7K