D R A F T

The PTR175 derived from the AN/ARC-52

The PTR175 is a VHF/ UHF transceiver, developed by Plessey in the UK , based on the AN/ARC-52 in the early seventies.
There are several improvements:
- The channel distance is 50kHz
- 370 VHF channels were added to the 3500 UHF channels.

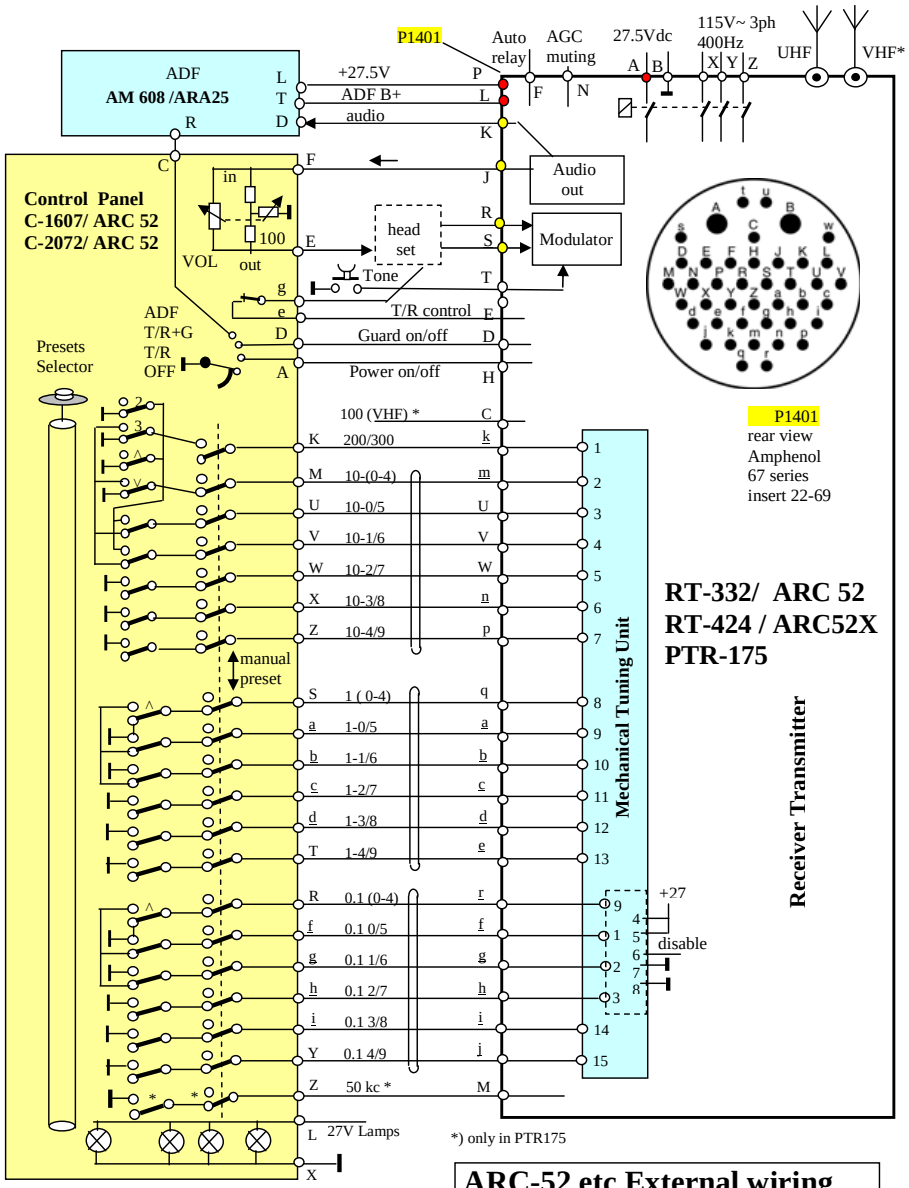
UHF: receive and transmit between 225 and 399.95 MHz, RF output level 20W.
VHF: receive and transmit between 117.5 and 135.95 MHz, RF output level 3W
The transceiver includes either a separate receiver on 243 MHz, the guard channel, or an fsk demodulator for data transmission.
The extra functionality was possible by the use of miniature valves and relays, and some transistors.

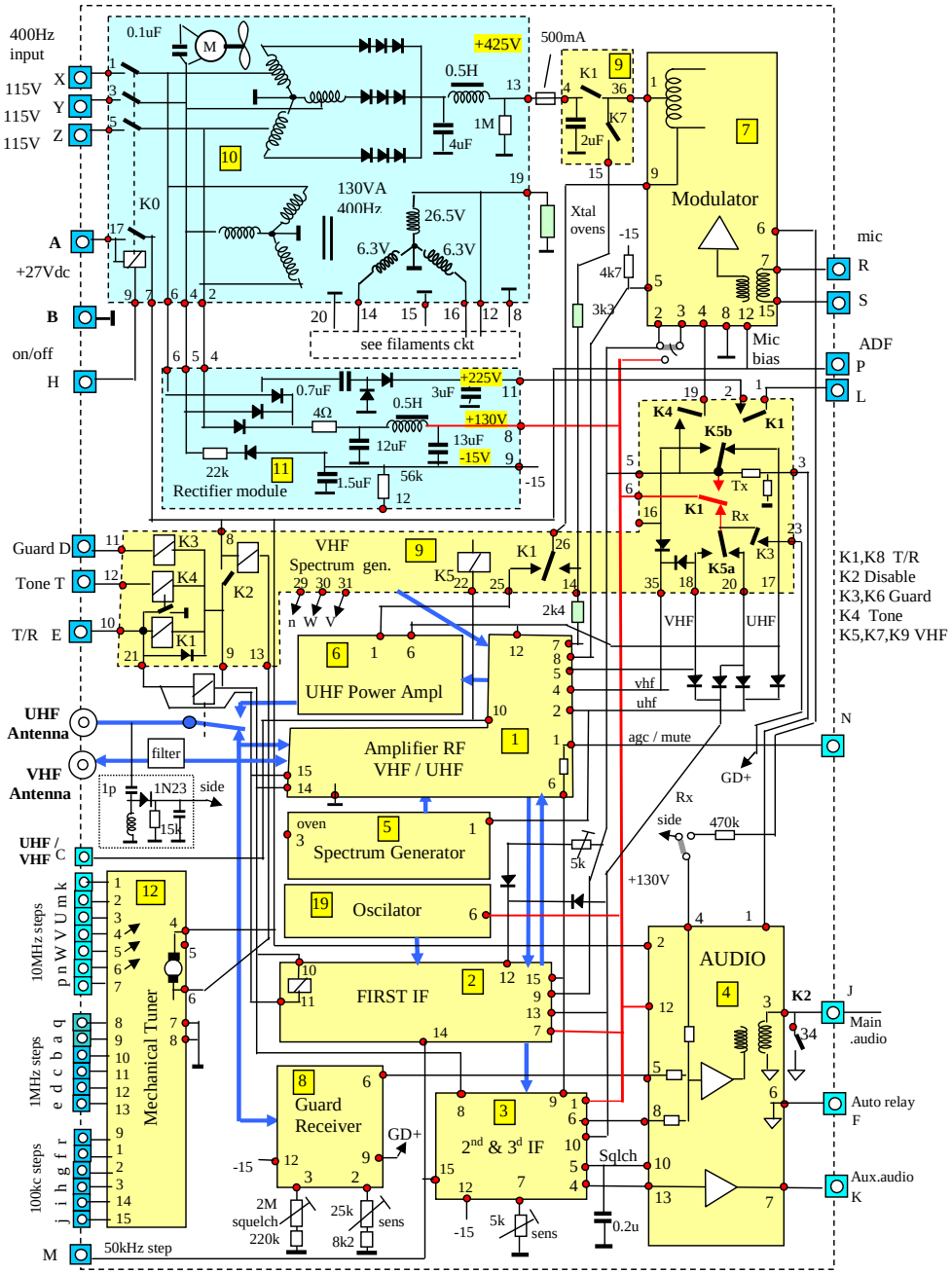
There are two versions:
PTR175 with a dynamotor for DC only power supply;
PTR175A with transformer based power supply for 115V-400Hz supply

External connection is with the same 42-way plug as the ARC52; cable looms, interconnecting box and control can be interchanged. Of course the special PTR175 features are not available when an ARC52 control is connected.
All modules look identical between the ARC52 and the PTR175. However, the inside of the RF amplifier module (1) and the relay module (9) are totally different.

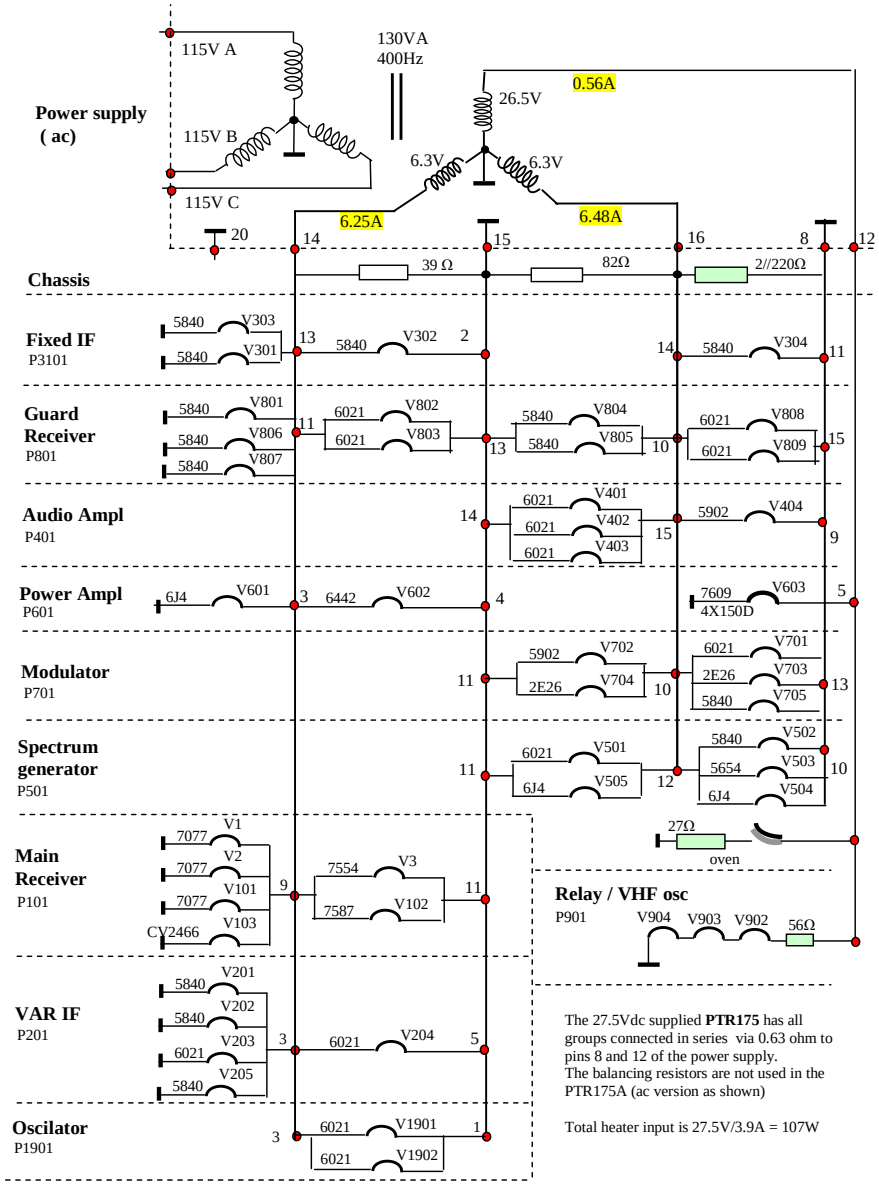
Prefix	Module
1	Main Receiver (VHF/UHF) including the VHF final (3W)
2	Variable IF
3	Fixed IF
4	Audio Amplifier
5	Spectrum Generator
6	RF Power Amplifier
7	Modulator
8	Guard Receiver
9	Relay Unit (includes the VHF first LO and smaller relays)
10	Power Supply or Dynamotor
11	Rectifiers in case of ac powered version
12	Mechanical Tuning Unit
15	Chassis
19	Oscillator

Where the ARC52 receiver was a dual conversion superhet with 30 kHz bandwidth and 100kHz channel spacing, the PTR175 receiver is a triple conversion superhet with 20 kHz bandwidth and 50kHz channel spacing. The IF frequencies are 20-30MHz (tuned), 1.85MHz (fixed) and 500kHz (fixed, LC filters)





PTR175A Main Chassis 12 May 2016



The 27.5Vdc supplied **PTR175** has all groups connected in series via 0.63 ohm to pins 8 and 12 of the power supply.
The balancing resistors are not used in the PTR175A (ac version as shown)

Total heater input is 27.5V/3.9A = 107W

46 tubes

PTR 175 and PTR175A Heater circuit
26 aug 2017 kb

ARC52 Family Frequency coding

All members of the ARC52 family use the same auto positioner. The 50kc bit for the 618W-2 and PTR175 is routed directly to a relay, the autopositioner is not involved.

10Mc coding

pos	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
mc	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39
10-1				X					X					X				
10-2					X					X					X			
10-3	X					X					X					X		
10-4		X					X					X					X	
10-5			X					X					X					X
10lo	X	X	X						X	X	X	X	X					
200	X	X	X	X	X	X	X	X										

An “X” indicates that the line connects to ground in the control panel
The remaining lines in that column are interconnected in the control panel
Control lines 10-1, 10-2 and 10-3 are used inside the PTR175 to select the first local oscillator frequency when the 100MHz is set to "1"

1 Mc coding

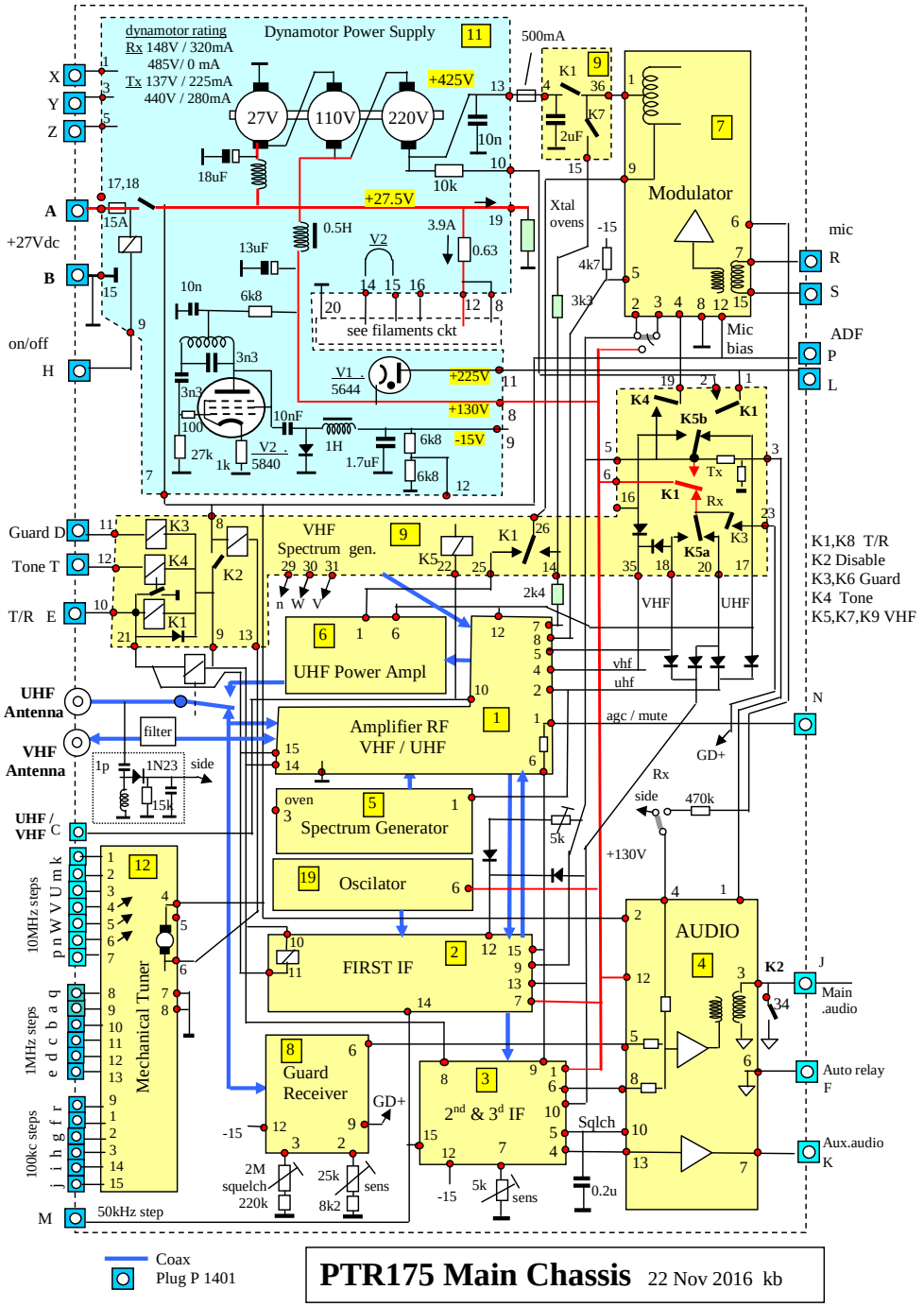
	0	0	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9
1-1	X	X									X	X								
1-2			X	X									X	X						
1-3					X	X									X	X				
1-4							X	X									X	X		
1-5									X	X									X	X
1.lo	X	X	X	X	X	X	X	X	X	X										
x		X		X		X		X		X		X		X		X		X		X
y	X		X		X		X		X		X		X		X		X		X	

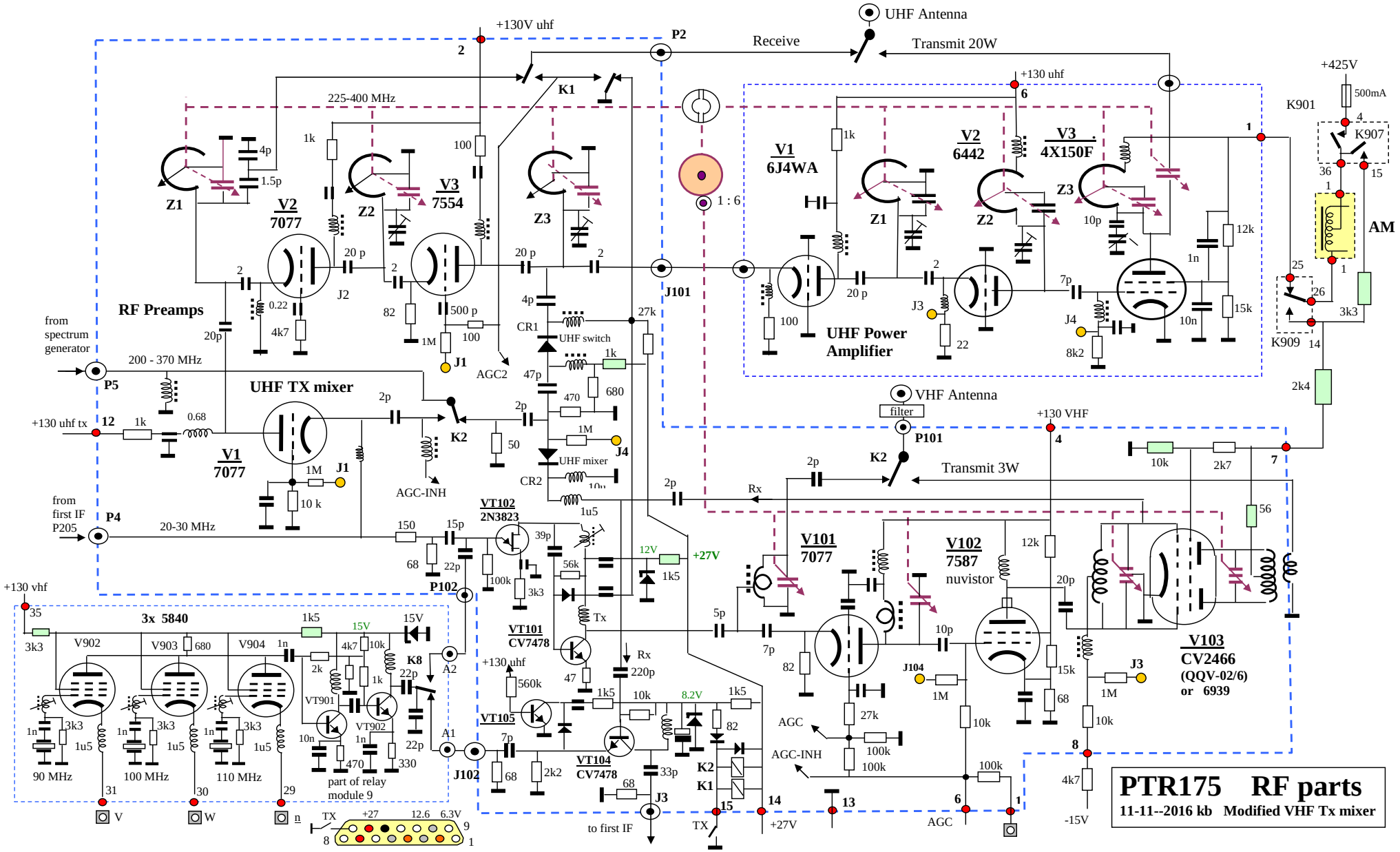
The x and y lines are internally connected with the xxx.0 thru xxx.4, resp.
xxx.5 thru xxx.9, lines of the 0.1 Mc selection.. The 1Mc knob on the control panel has only 10 positions, but the 1Mc shaft in the transceiver has 20 positions to facilitate smooth tuning of the VAR-IF filters which have 400kc bandwidth.

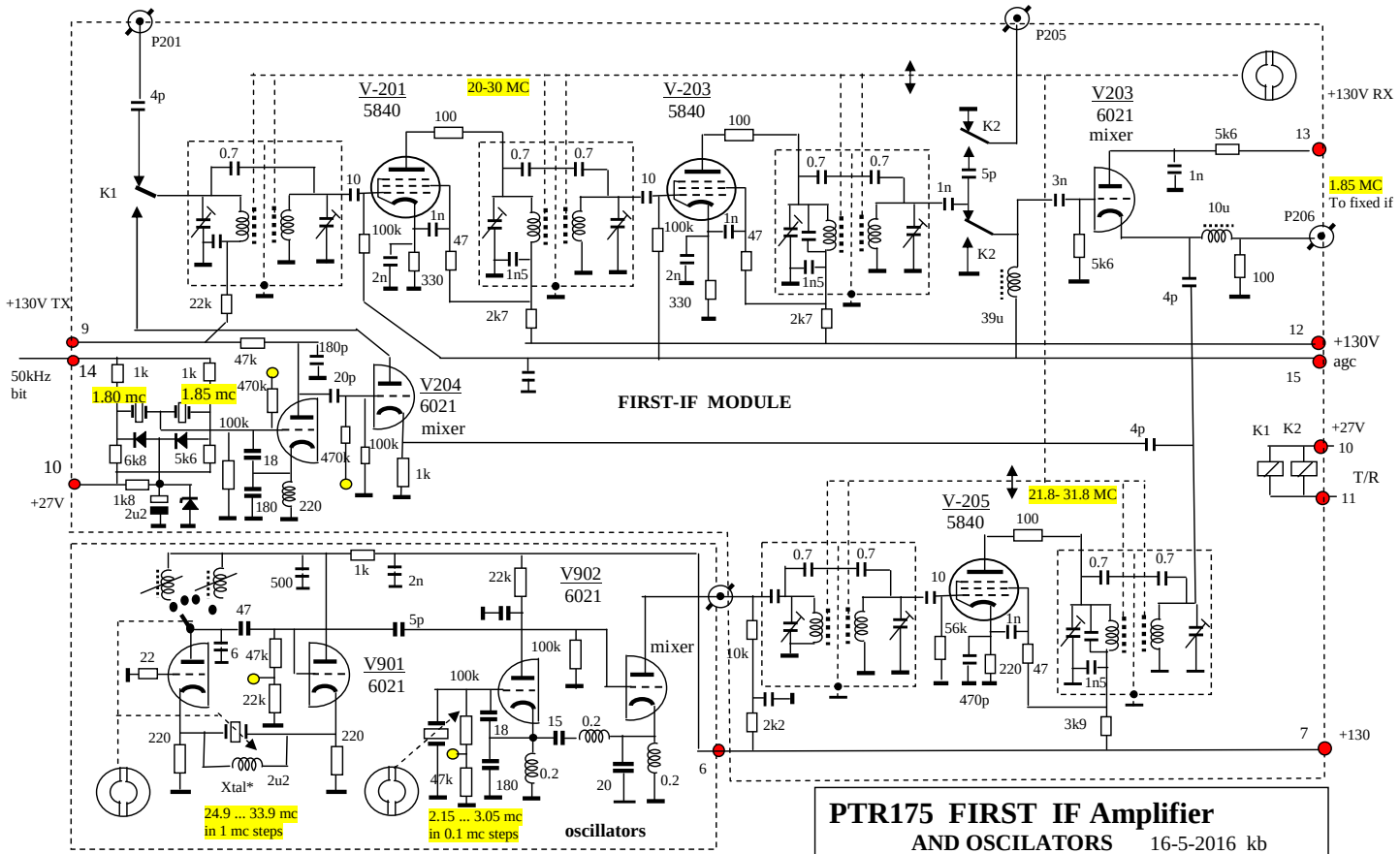
0.1 Mc coding

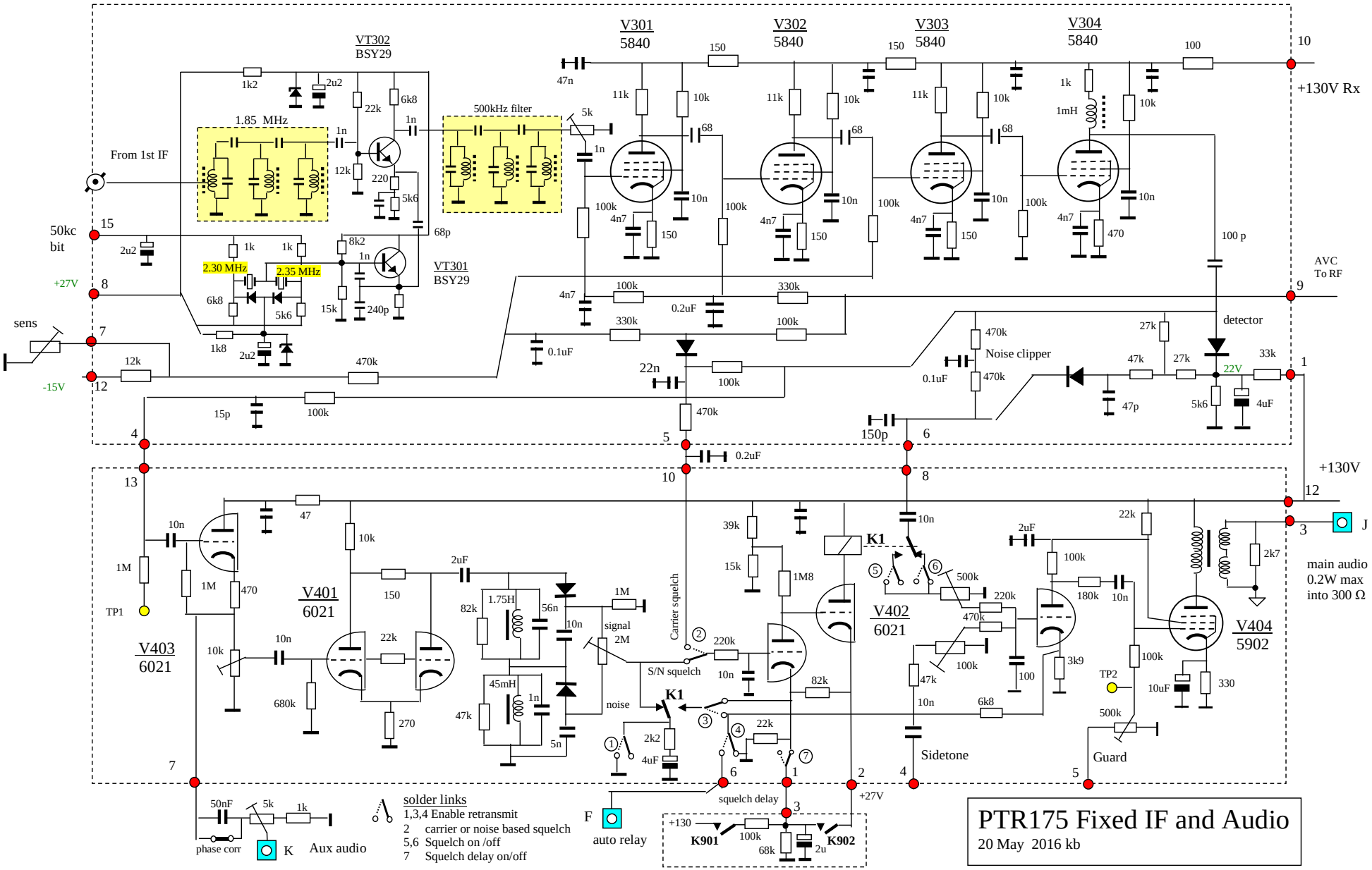
	.0	.1	.2	.3	.4	. 5	.6	.7	.8	.9	-	-	-	-
.1-1	X					X								
.1-2		X					X							
.1-3			X					X						
.1-4				X					X					
.1-5					X					X				
.1 lo	X	X	X	X	X									

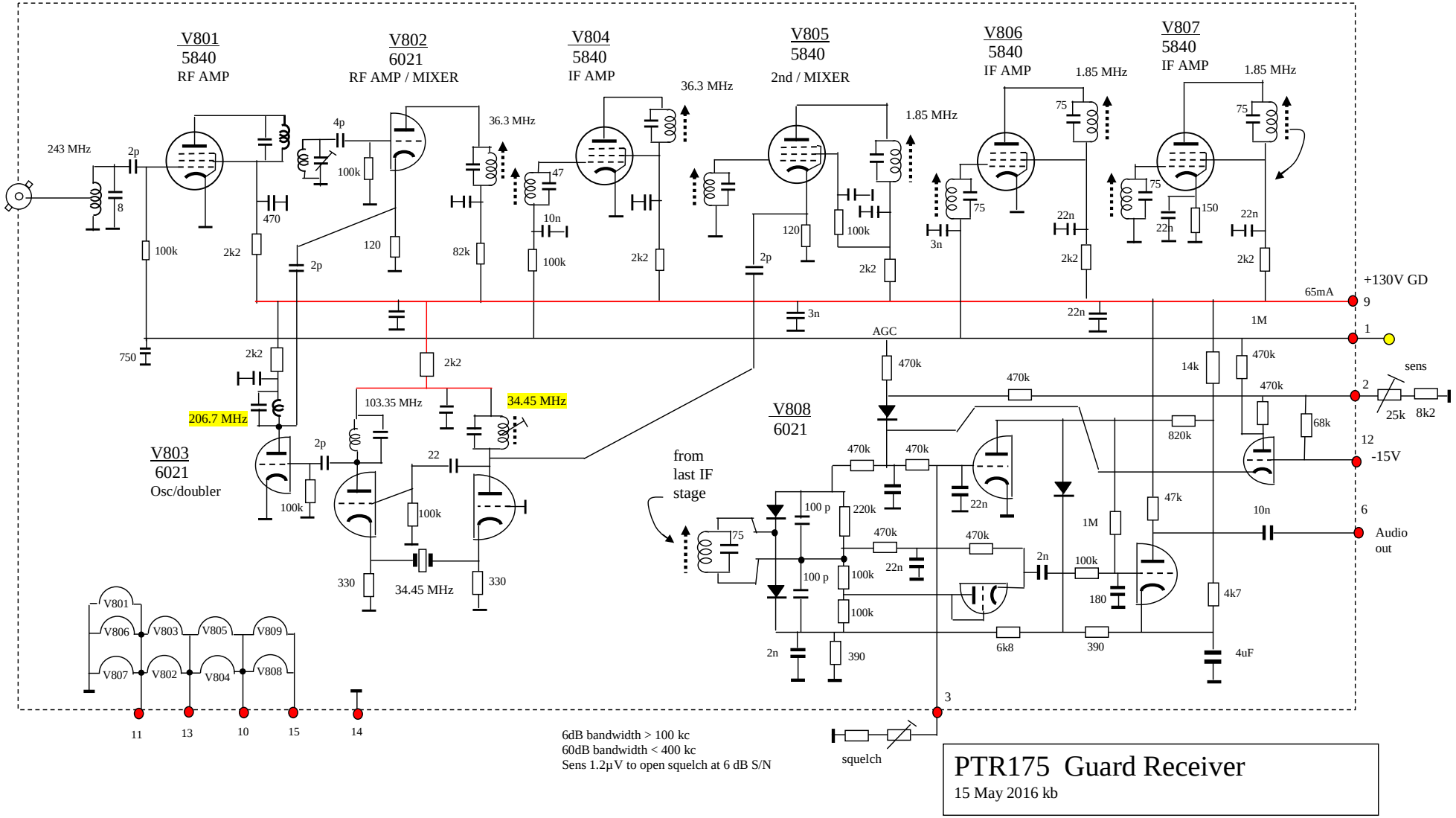
An “X” indicates that the line connects to ground in the control panel
The remaining lines are interconnected in the control panel.

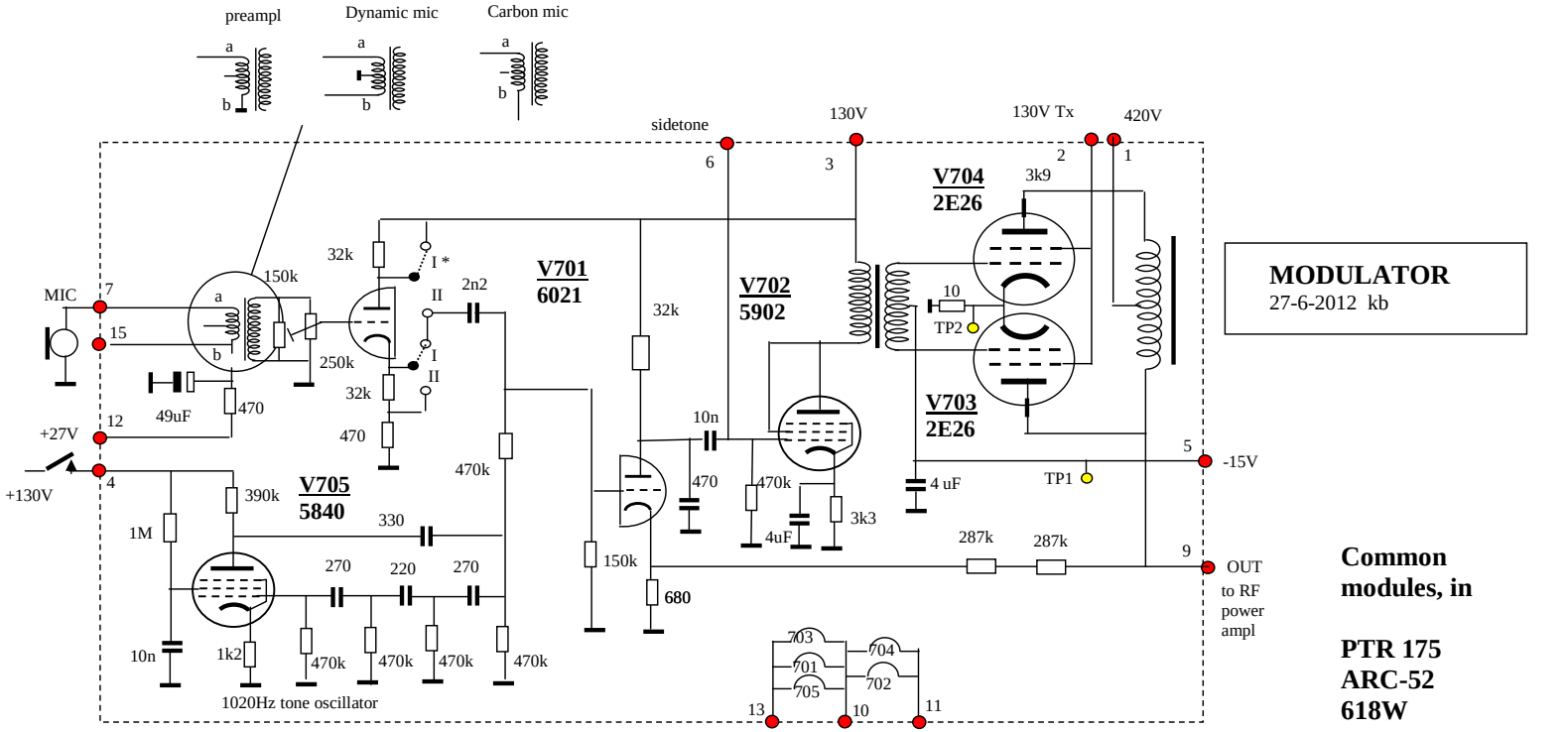



PTR175 RF parts
11-11--2016 kb Modified VHF Tx mixer
RF Preamps
UHF TX mixer
UHF Power Amplifier
UHF Antenna
VHF Antenna
Receive
Transmit 20W
Transmit 3W
+130V uhf
+130 uhf
+130 VHF
+130 uhf tx
+130 vhf
+425V
225-400 MHz
200 - 370 MHz
20-30 MHz
from spectrum generator
from first IF P205
to first IF
V1 6J4WA
V2 6442
V3 4X150F
V1 7077
V2 7077
V3 7554
VT102 2N3823
VT101 CV7478
VT105
VT104 CV7478
V101 7077
V102 7587 nuvistor
V103 CV2466 (QQV-02/6) or 6939
3x 5840
V902
V903
V904
VT901
VT902
90 MHz
100 MHz
110 MHz
part of relay module 9
UHF switch
UHF mixer
AGC2
AGC-INH
AGC
TX
filter
Z1
Z2
Z3
J1
J2
J3
J4
J101
J102
J104
P2
P4
P5
P101
P102
K1
K2
K8
K901
K907
K909
AM
1 : 6
-15V
+27V


P201
4p
K1
V-201
5840
20-30 MC
V-203
5840
P205
K2
V203
6021
mixer
+130V RX
1.85 MC
To fixed if
P206
+130V TX
50kHz
bit
FIRST-IF MODULE
V204
6021
mixer
1.80 mc
1.85 mc
+130V
agc
+27V
T/R
V-205
5840
21.8- 31.8 MC
V902
6021
mixer
V901
6021
Xtal*
24.9 ... 33.9 mc
in 1 mc steps
2.15 ... 3.05 mc
in 0.1 mc steps
oscillators
PTR175 FIRST IF Amplifier
AND OSCILATORS 16-5-2016 kb


V301
5840
V302
5840
V303
5840
V304
5840
VT302
BSY29
VT301
BSY29
1.85 MHz
500kHz filter
From 1st IF
50kc
bit
+27V
sens
-15V
2.30 MHz
2.35 MHz
+130V Rx
AVC
To RF
detector
Noise clipper
+130V
main audio
0.2W max
into 300 Ω
V401
6021
V402
6021
V403
6021
V404
5902
Carrier squelch
S/N squelch
signal
noise
squelch delay
Sidetone
Guard
TP1
TP2
K1
K901
K902
phase corr
Aux audio
auto relay
solder links
1,3,4 Enable retransmit
2 carrier or noise based squelch
5,6 Squelch on /off
7 Squelch delay on/off
PTR175 Fixed IF and Audio
20 May 2016 kb


V801
5840
RF AMP
V802
6021
RF AMP / MIXER
V804
5840
IF AMP
V805
5840
2nd / MIXER
V806
5840
IF AMP
V807
5840
IF AMP
V803
6021
Osc/doubler
V808
6021
243 MHz
36.3 MHz
1.85 MHz
206.7 MHz
103.35 MHz
34.45 MHz
from last IF stage
AGC
+130V GD
65mA
-15V
sens
25k
8k2
Audio out
squelch
6dB bandwidth > 100 kc
60dB bandwidth < 400 kc
Sens 1.2µV to open squelch at 6 dB S/N
PTR175 Guard Receiver
15 May 2016 kb
8



MODULATOR
27-6-2012 kb

Common modules, in

PTR 175
ARC-52
618W

* Solderlinks I for use with preamplifier or carbon mike.
Solderlinks II for use with dynamic mike

5 Spectrum generator
(UHF first local oscillator)

First LO 200 - 370 MHz
in 18 steps of 10 MHz

Dial	Xtal	Mult	Freq
22	33 33	6	200
23	35.00	6	210
24	36.66	6	220
25	38.33	6	230
26	40.00	6	240
Z7	41.66	6	250
28	43.33	6	260
29	45.00	6	270
30	31.11	9	280
31	32.22	9	290
32	33.33 *	9	300
33	34.44	9	310
34	35-55	9	320
35	36.66*	9	330
36	37.77	9	340
37	38.88	9	350
38	40.00*	9	360
39	41.11	9	370

* Xtal dual used