7x 2N2423 (Ge pnp)

White Automatic Overload Control (AOC)

7 R1801 2k 5k1 560p 1k7 2k7 1k7 2k2 2k2 2k2 2k2 2k2 2k2 2k2 2k2 2k2 2k2 2k2 5k6 390 220k 1

21 R1803 1k 2N2398 2k2 390 70 1k 1k7 2k2 390 2k4 37k 5u 2N697 3 +20V

390 7k2 1k -10mV 100 300 820 47k 1k 9

R1851

CODEC See next page

60 MC IF AMPLIFIER

+20 1 out

antenna

C-connector

Local Oscillator

+20 V 50mA L1903 722 MHz C1911 1k 1N3075 1k2 390 33 1n 15 1n RFC 2p C1903 510 22 1k8 10 1n 72 150 220 2x 2N3118 90.8333 MHz

Mixer

1090Mc 1030Mc 1030Mc

Self test module

TRANSMITTER

Tune at 1090Mc

+2 kV ML7855K isolator

PRESSURIZED 2x 1nF 6 x 510k 4 x 0.5uF- 600V 15 13 14 15 16

27k 4uF -140 V 100k 11 12 9 10

T1 integrated in transmitter module

hour meter

MODULATOR

+20V 6 2N2018 12 10k 100 10 100 Pulse equal ntc 390p 1n 0.1u 180 2 1 100 4k7 100 100 13 width 50 +20V 4 Power up delay 2k 2k2 20k 750k 33k 42k 3k3 +4.2V 5x 2N697 1M5 47uF 47uF 14 60 sec Power-up delay 23 standby 17

POWER SUPPLY

31 3A T 200uH 152-06 47uF 32 33 2 4 55V STC5610 10 2k2 2x 47uF 6 82V 330 56 560 4k7 3k volt. adj 500 +8.2V 2N697 470 2k 16 1 ON/OFF 22

28V dc / 3A Power Supply

+20V bus -20V 100 7 8

200uH 47 uF 2N1485 1 2 3 330 6 5 4 1N2610 **8 kHz**

INVERTER

32 pins on main plug at rear of box

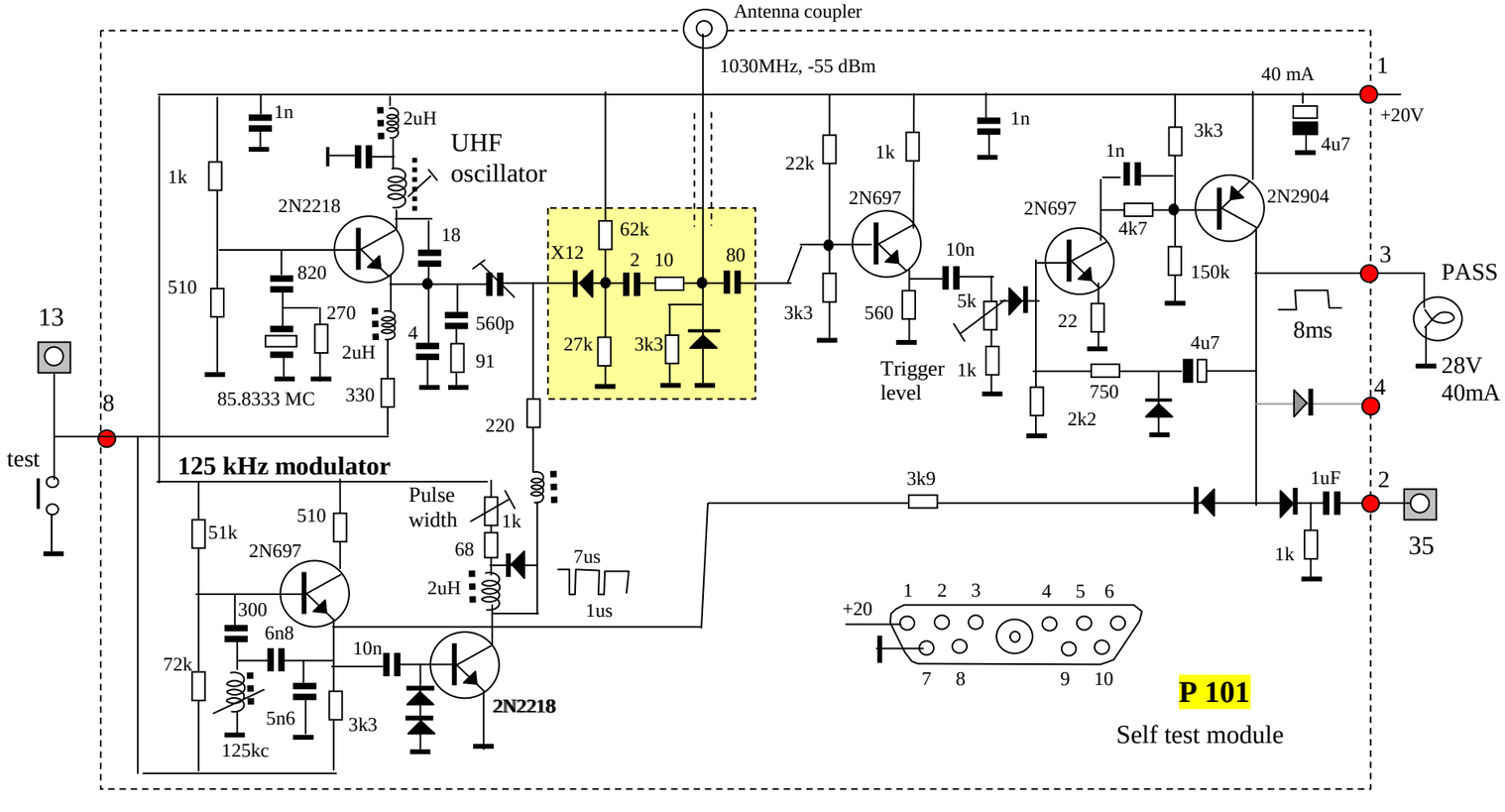
pin on a module

WILCOX 914A RF modules

05-11-2011 kb

There are several modes of interrogation, each indicated by the difference in spacing between two transmitter pulses, known as P1 and P3. Each mode produces a different response from the aircraft. A third pulse, P2, is for sidelobe suppression and sent 2us after P1 with an omnidirectional antenna at a higher level than the sidelobe, but lower than the main lobe. If P2 is higher than P1, the transponder should not respond.

Mode		Distance between P1 - P3	mode description
military	civil		
1		**3 (±0.2) µs**	Military Identification Military mode 1 is used to support 32 military identification codes (although 4096 mode 1 codes could also be used). Normally, the 32 codes could be used to indicate role / mission / type. However, this mode itself is not in common use in a normal peacetime environment.
2		**5 (±0.2) µs**	Military Identification Military mode 2 provides 4096 ID codes for military use (as for mode A). Normally used to identify an individual aircraft airframe.
3	**A**	**8 (±0.2) µs**	Civil / Military Identification Provides 4096 ID codes for civil / military use. The commonly used mode
	B	**17 (±0.2) µs**	*not used*
	C	**21 (±0.2) µs**	Civil, Pressure Altitude Extraction mode C is used to extract the pressure altitude mode C value (or true altitude if below the transition altitude).
	D	**25 (±0.2) µs**	*not (never) used*



Wilcox 914A Built-in Test module
5-11-2011 kb

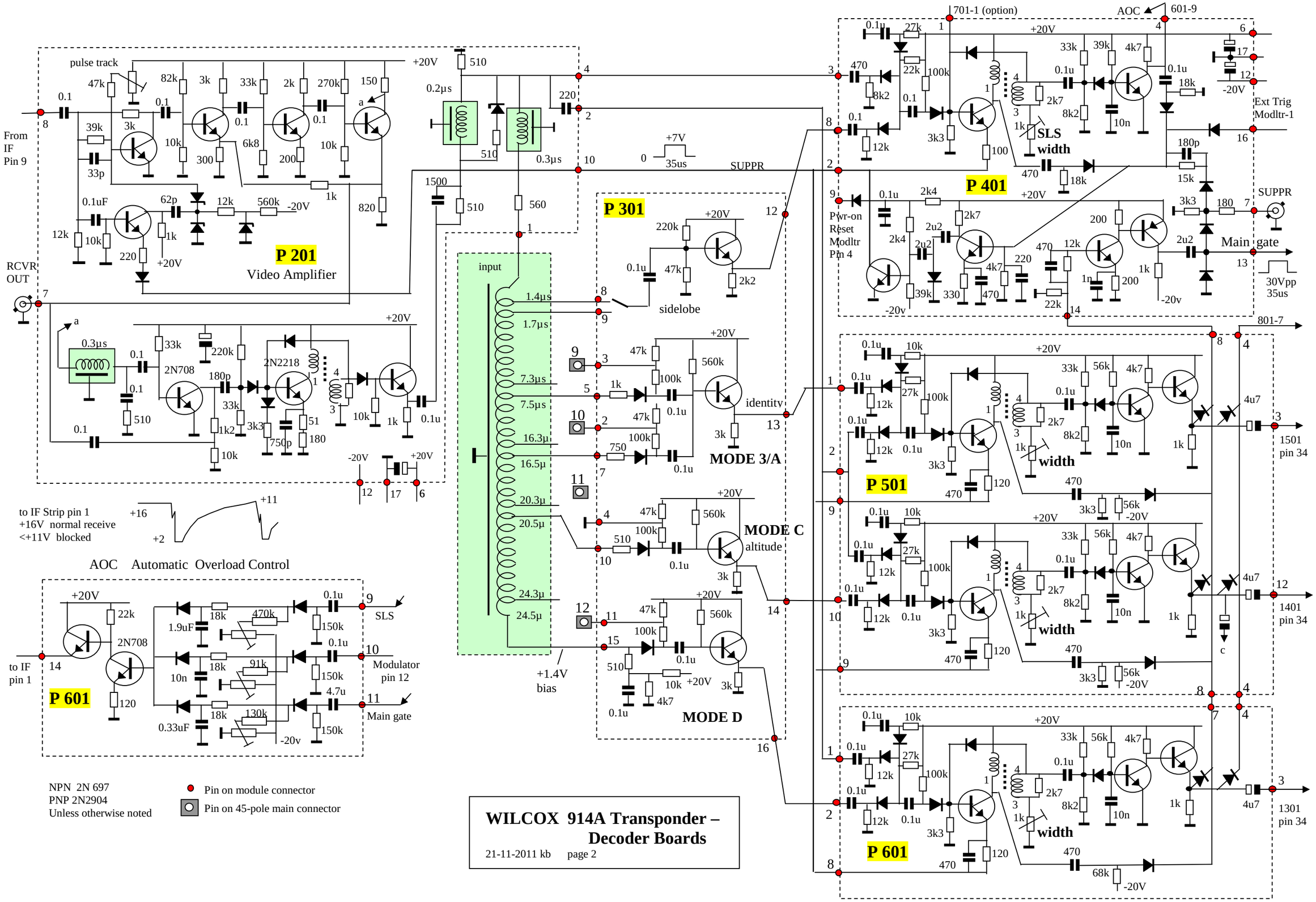
Module 1 Self test

This module (P101) is mounted optionally in the Wilcox 914A transponder.

Press the **test button on the front or on the control panel** for a few seconds.

The self test module then continually interrogates the transponder in mode 3/A. Once an interrogation is recognized, the IF strip is cut-off, and a response is made according to the present code switch setting.

Any response from the transmitter is detected by the selftest module, and will turn-on the PASS lamp. This also happens with a regular (in flight) interrogation, however at a much lower rate as there only a few interrogations per second.



WILCOX 914A Transponder – Decoder Boards

21-11-2011 kb page 2

690 kHz

Main gate

+30V 35us

To Modulator

14 IP

P 501

P 801

width

IP delay

29 sec.

NPN 2N697
PNP 2N1904
unless noted

690kHz clock burst

Blank altitude

MODE 3/A

MODE C

MODE D

From mode gates

P1501

P1401

P1301

Start

Main Gate

clock

Shift register P 901 and P 1001

IPS

Pin on module connector

Pin on 45-pole main connector

Pulse coder J801, J1301, J1401 and J1501
17-11-2011 kb

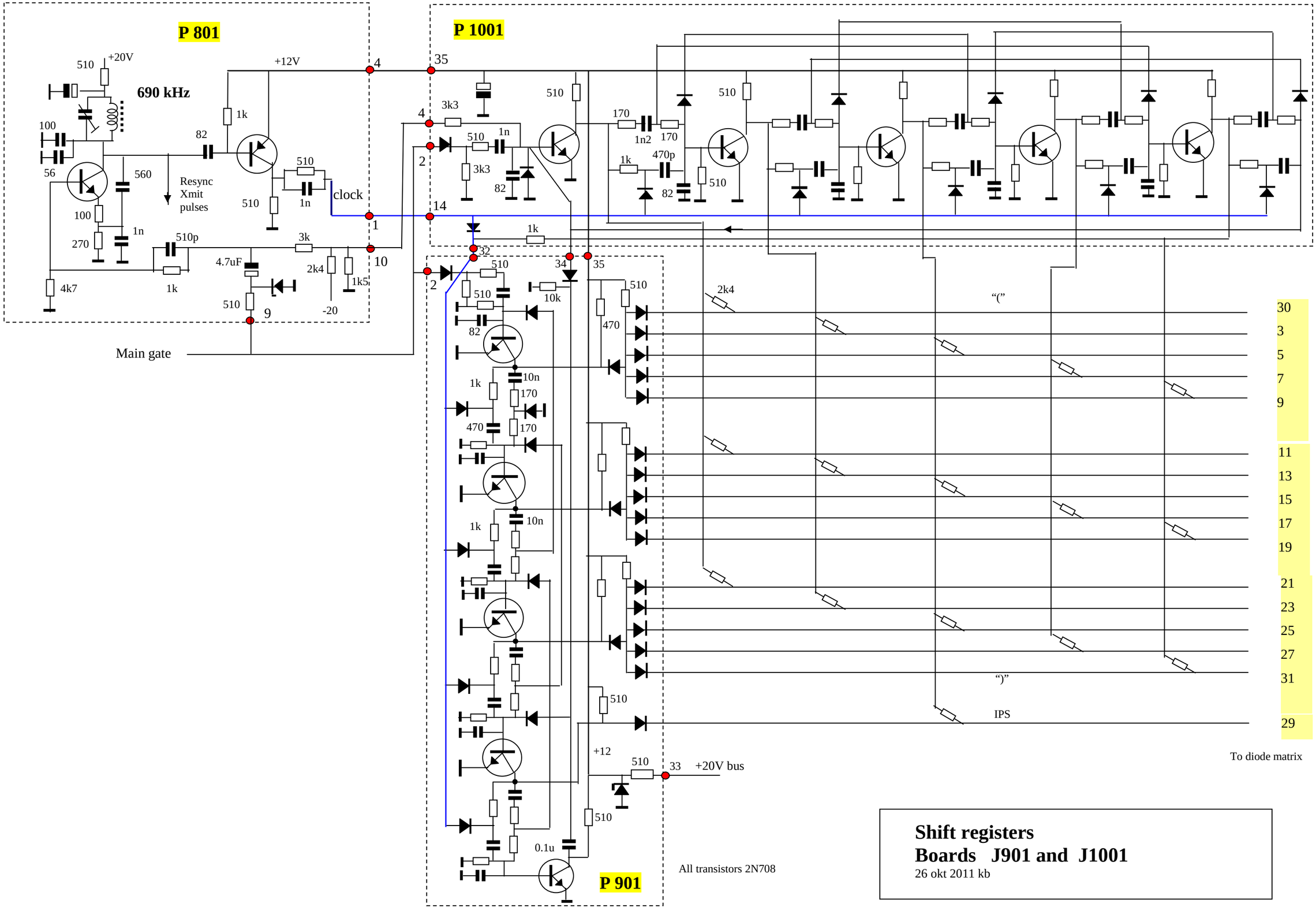
Diode switch detail

1N 627

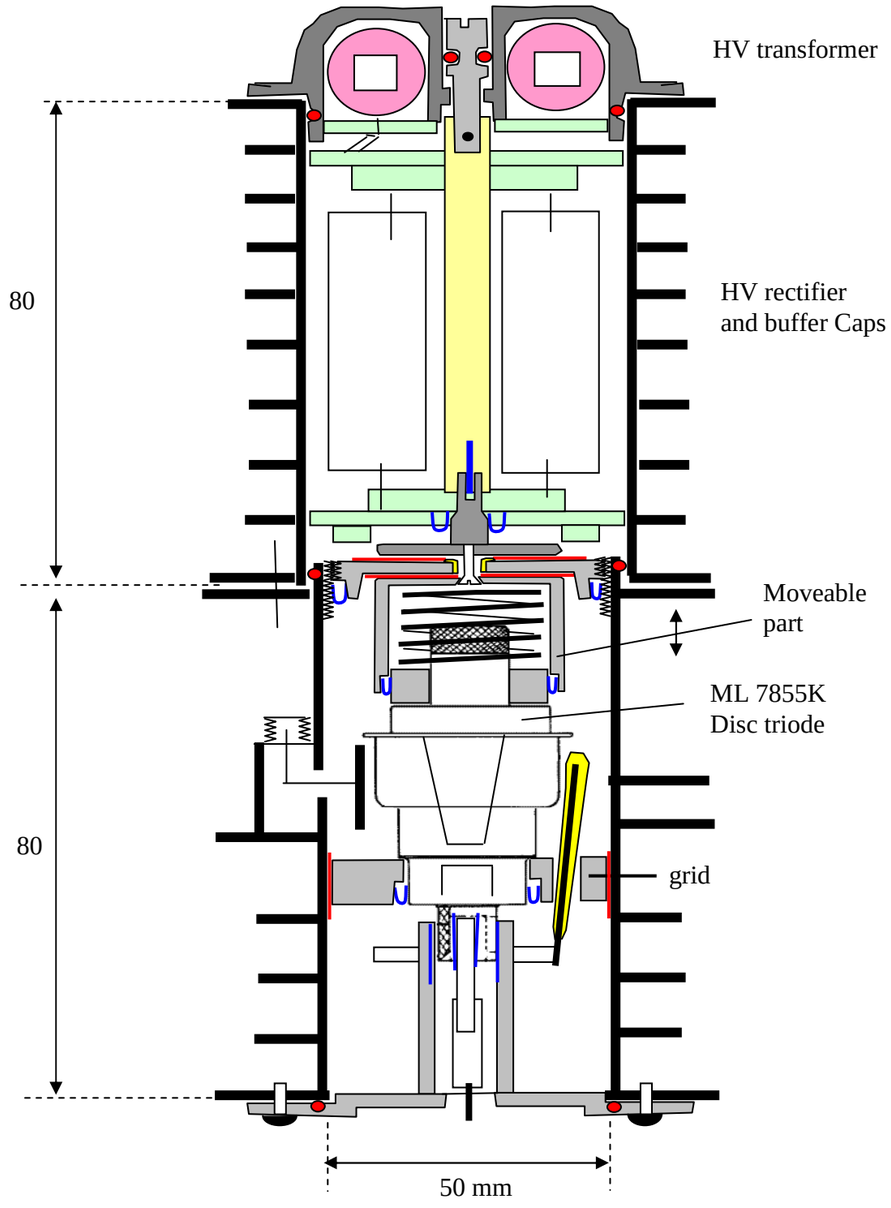
20 pole Mode D
Connector on front

Self test command
Mode D enable
Mode B enable
Mode A enable
Blank altitude
I/P
HiSens
Mode 3/A code
Mode C code
Stdby
On
Self test result
+27V
Spare wire
Not connected

45 pole
Main connector



Shift registers
Boards J901 and J1001
26 okt 2011 kb



WILCOX 914A Transponder
Transmitter module

The transmitter

The transmitter module includes the High Voltage dc supply and the cavity with the self-oscillating planar triode ML 7855K without radiator.
Tuning is done from the front panel of the Wilcox 914A to set the frequency at 1090 MHz.
The output power is 1.5 kW pulse (0.5us wide)

HV supply
The 2kVdc high voltage capacitor (4x 0.47uF in series is 0.12uF effective capacitance) is permanently connected to the anode of the planar triode. During a transmit pulse, 2A anode current during 0.6us is drawn from this capacitor, causing a voltage drop of 3 x 0.6us/0.12uF = 15V. A series of (worst case) 15 such pulses in rapid succession gives a voltage drop of 225V, about 10% of the high voltage.
The inverter with toroid transformer and rectifier supplies about 20mA to recharge the capacitor to 2kV even with 1000 interrogations per second.
The average input is 2kV x 20mA = 40W, the average RF output is 15W.

Oscillator
The 2C39 look–alike triode operates in (RF) grounded grid with a tuned anode cavity and a quarter wave cathode cavity. Fingers from anode to cathode cavity provide for feed back and to start oscillation quickly.
During the transmit pulse of 0.6us width, there are only 660 cycles of the 1090MHz RF frequency.

RF output filter
The coax system from cavity to antenna has a low pass filter to reduce the second harmonic, and an isolator to protect the triode from mismatch