

Pilot Tone Unit TQ801

The pilot tone unit contains a combined tone transmitter and tone receiver for the Stornophone 800 radiotelephone.

The unit consists of a chassis with a motherboard for four subassemblies.

When used as a pilot tone transmitter, the unit generates a low frequency signal for modulation of the transmitter.

Used as a pilot tone receiver the unit, when receiving a pilot tone modulated RF carrier, provide a logic control signal for the squelch circuit.

A 5-position switch on the motherboard is set to one of the 5 frequencies to which the unit has been adjusted. The 5 frequencies are to be selected from a series of 8 in the frequency range 71.9 Hz to 136 MHz. The receiving frequency and the generated frequency are identical.

Circuit Description

Pilot tone receiving mode.

A third order active filter suppresses the speech modulation contents of the input signal. The pilot tone modulation is applied to a limiter stage ensuring a constant drive for the band pass selection circuit. This circuit, which is a second order active filter of the state variable type, determines the tone to which the receiver responds. The selected signal is applied to a detector followed by a DC amplifier. The TQ signal output will assume a low state output ($\sim 0V$), when a tone of the correct frequency is received.

A third order high pass filter suppresses the tone modulation before the speech modulation is applied to the terminal connecting to the AF output amplifier.

Pilot tone transmitting mode.

When keying the transmitter, battery voltage is applied to the transmitter key terminal (24) on the TQ801. The voltage turns diode E7 on thereby opening a regenerative feed-back loop. The charging of C13 injects a pulse into the circuit ensuring a rapid start of oscillations. The generated signal is applied to the pilot tone terminal (39).

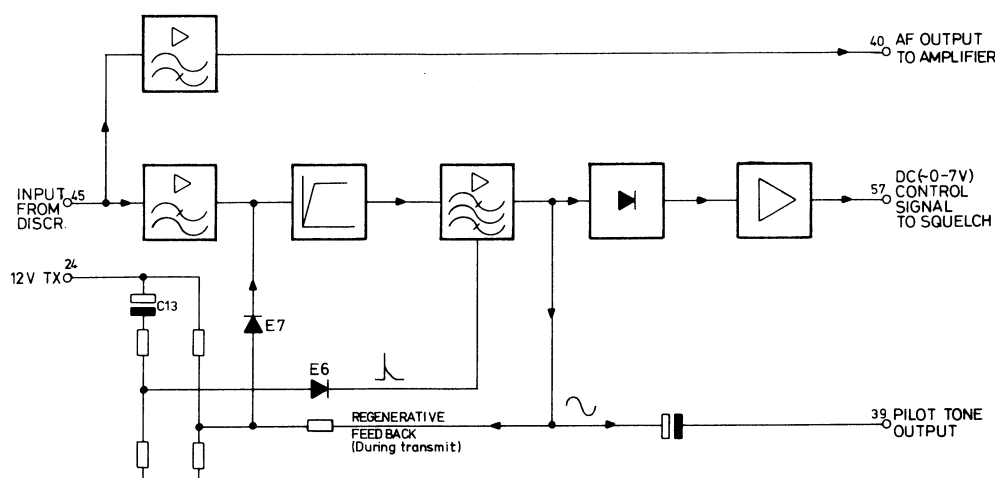
Regarding the mechanical construction the unit is divided into three thick film circuits and one printed circuit, all with plug-in pins for a common motherboard. Thick film circuit 14.0043 contains the low pass and the high pass filters, the limiter and the detector.

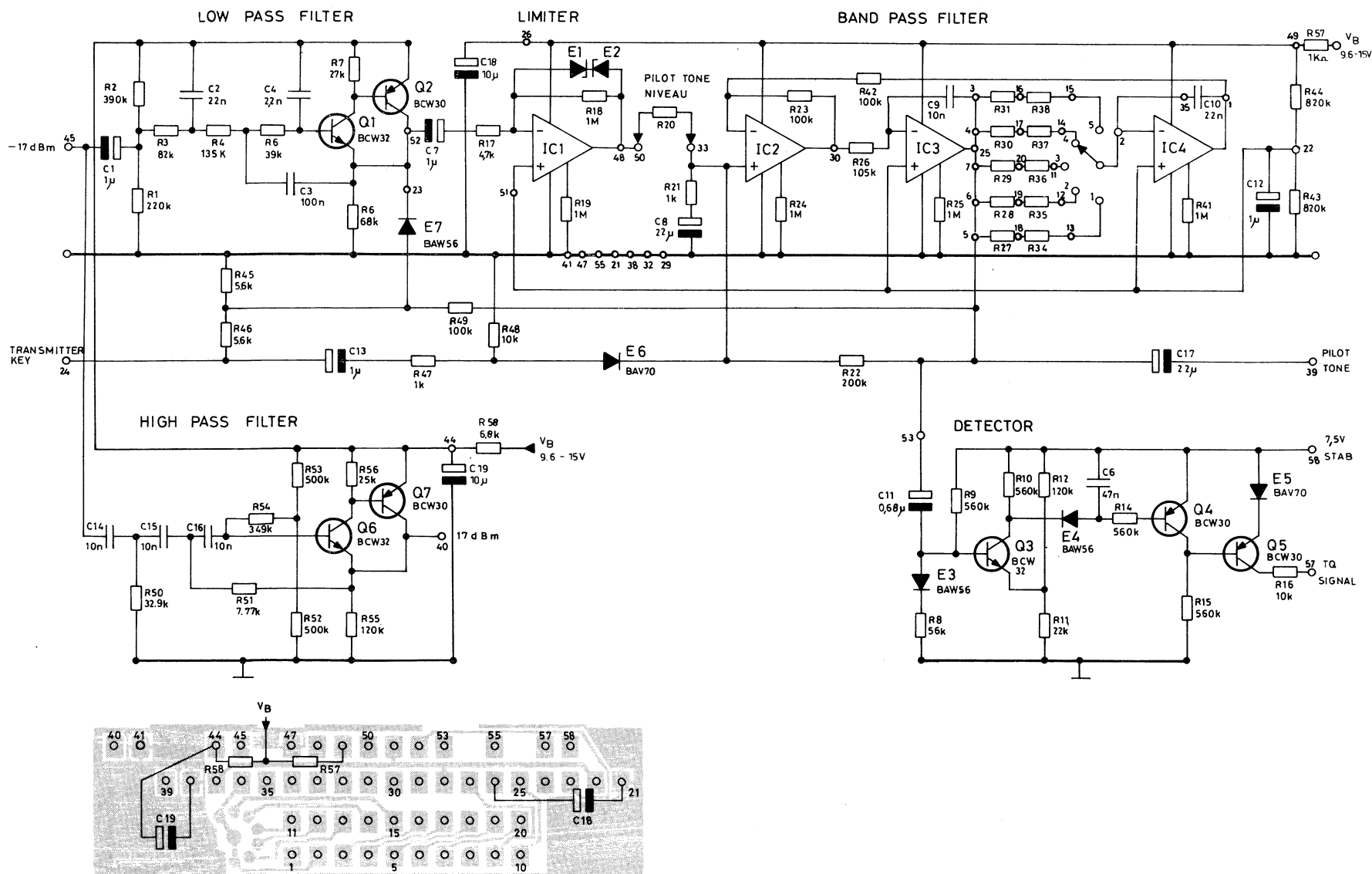
Thick film circuit 14.0047 and 14.0049 together with the printed circuit 15.0139 composes the band pass filter.

In order to achieve a frequency tolerance of 0.05% the series resistors R34 - R38 placed on thick film 14.0049 is adjusted during an operational test.

The frequency determining part of TQ801 is sub-assembly 15.0139 consisting of an epoxy glass fibre printed circuit on which six metal film resistors, 2 polystyrene capacitors and ten pins are mounted.

The five frequencies are to be selected from the series below and the corresponding resistor values are given.





PILOT TONE UNIT TQ801a

D401.804/2

Frequency Hz	period μ sec.	Code no	Description
71.9	13908.2	89.5044-00	191 k Ω 1% metalfilm 0.25 W
82.5	12121.2	89.5041-00	143 k Ω 1% metalfilm 0.25 W
94.8	10548.5	89.5040-00	105 k Ω 1% metalfilm 0.25 W
103.5	9661.8	89.5039-00	93.1 k Ω 1% metalfilm 0.25 W
110.9	9017.1	89.5038-00	80.6 k Ω 1% metalfilm 0.25 W
118.8	8417.5	89.5037-00	71.5 k Ω 1% metalfilm 0.25 W
127.3	7855.4	89.5049-00	61.9 k Ω 1% metalfilm 0.25 W
136.5	7326.0	89.5067-00	53.6 k Ω 1% metalfilm 0.25 W

Normally R27 will have the higher value and the following resistors decreasing values to R31 as the lower.

Technical Specifications

General

Tone frequencies (EIA - RS220)

71.9Hz, 82, 5Hz, 94, 8Hz, 103, 5Hz, 110, 9Hz, 118, 8Hz, 127, 3Hz, and 136, 5Hz.

Adjustment tolerance

$$\frac{\Delta}{f_0} = 0.05\%$$

Frequency stability

0.5%

Temperature range

-25⁰ C - +60⁰ C.

Polarity

Negative chassis

Dimensions

56.4mm x 14.3mm x 25.8mm

Tone transmitter

Supply voltage

9, 6V - 15V

Current drain

2 mA

Activating signal

Positive

Output impedance

600 Ω ; AC or DC coupling

Load

≥ 1 k Ω

Output level

2.2V \pm 1 dB ($R_L = 10$ k Ω)

Distortion

0.1%

Response time

5 ms.

Tone Receiver

Supply voltage

a: 9.6V - 15V

b: 7.5V stabilized

Current drain

0.6 mA

Activating signal

Continuous tone input

Selectivity

The tone receiver will react with certainty within a bandwidth of $\pm 1\%$, but not to the adjacent tone.

Signal to noise sensitivity

2 dB

Response time

100 ms

Activating input level

15.7 mV \pm 6 dB

Generator impedance of input signal

≤ 3 k Ω

Input impedance

30 k Ω

Input frequency response

Flat; linear

Output level

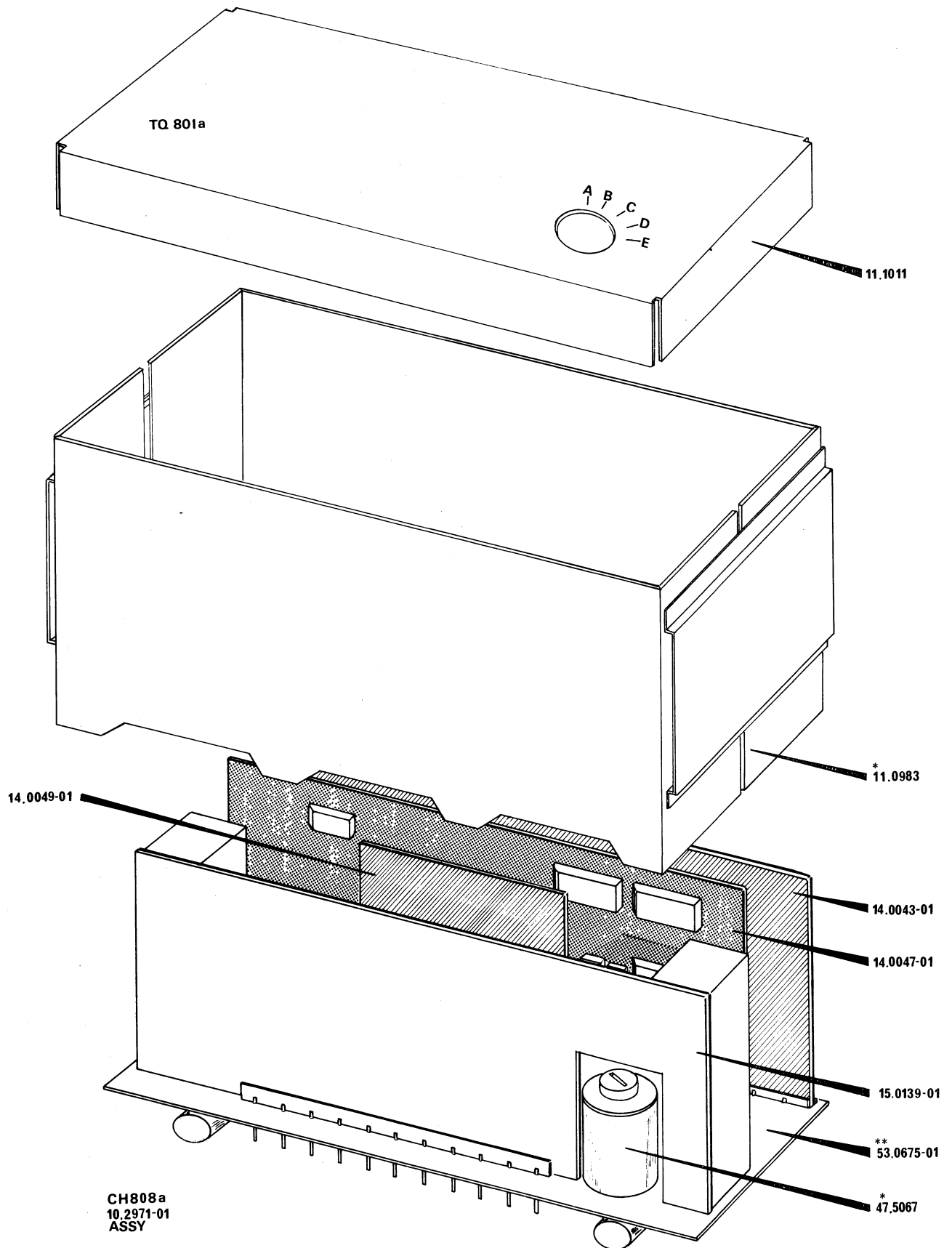
Not activated: 7 V; Internal resistance 10 k Ω

Activated: Disconnection; Internal resistance ≥ 10 k Ω

TYPE	Nº	CODE	DATA
TQ801a		10. 2882-01	Pilot tone receiver/transmitter
		10. 2971-01	CH808a Chassis
		14. 0043-01	Subassembly; Filters, Limiter, Detector
		14. 0047-01	Subassembly } Bandpass filter
		14. 0049-01	Subassembly }
		15. 0039-01	Subassembly }

TYPE	Nº	CODE	DATA

X402.262



PILOT TONE UNIT TQ801a
Mechanical Lay-out