



Clandestine radio fitted in a scouring powder box (#4A).  
Collection Royal Signals Museum, UK.

## Clandestine Midget Receivers #4

Country of origin: Holland

### DATA SUMMARY

**Design/Manufacturer:** Dutch radio amateurs and Philips employees.

**Year of Introduction:** Mid- to the end of WW2.

**Purpose:** Clandestine listening to Allied broadcasts.

**Circuit Features:** Regenerative TRF; reflex superhet.

**Frequency Coverage:** Long, medium or short wave, depending on model.

**AF output:** High impedance headphones.

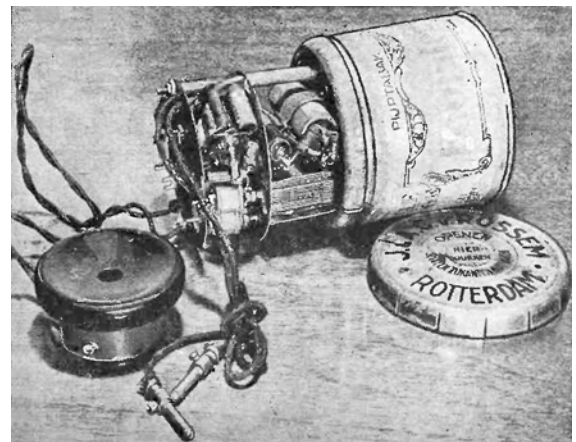
**Valves:** E1C (4671), E1F (4672, EA50, ECH4, ECH21, UCH21 and more, depending on what was available to the constructor.

**Power Supply:** AC mains, after 1944 due to frequent power cuts a 6V dynamo mounted on e.g. a bicycle frame.

### Remarks

In WW2 German occupied Holland it was strictly forbidden to listen to Allied radio broadcasts and eventually all radio receivers were confiscated. As a substitute small and easy to conceal receivers were secretly constructed by radio amateurs.

Shown in this chapter is another selection of midget receivers that survived, now carefully treasured in private collections and museums. Considering the choice of components it must be concluded that a great many were built by Philips employees at home.



Clandestine midget receiver hidden in a pipe tobacco tin (#4B) constructed by a Philips employee. The receiver was built with two E1F valves, a metal rectifier, and a re-wound miniature loudspeaker transformer providing LT.

### References:

- Photographs taken from clandestine midget receivers held in the collections of:
  - The Royal Signals Museum, Blandford Forum, UK.
  - Rotterdam's Radio Museum, Rotterdam, Holland.
  - Kazematten Museum, Holland.
  - Resistance Museum Amsterdam.
- 'Secret production of radio receivers in occupied territory', Philips Technical Review, Vol. 8, No. 11, pp 337-340.
- Various post-war issues of Radio Express.
- Radio Craft, July 1945.

### Dynamo powered radio #4C.

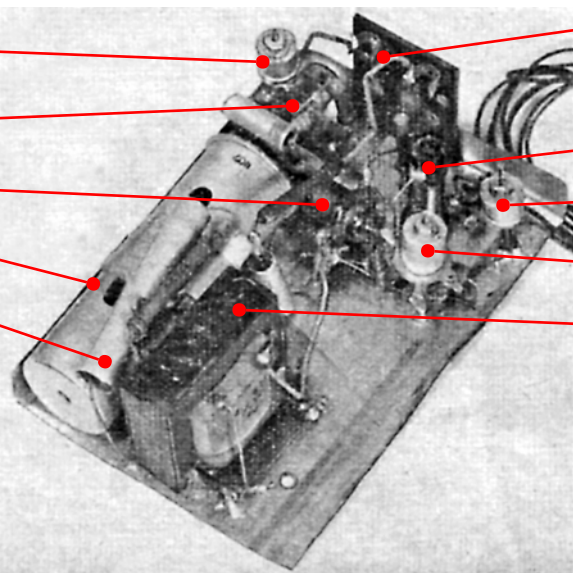


During the last year of World War 2 the mains electricity supply in occupied Holland was frequently cut. 20 year old O. Sillem, at that time living with his parents, constructed a nifty electricity generator from an old pedal sewing machine driving a bicycle dynamo.

This provided enough power for a home-made clandestine receiver which was fitted inside an ordinary one litre food can. When not in use, the can was closed with a false bottom lid and put away upside down in the larder. Looking at the dimensions of the tuning components it is very likely that the radio operated on short wave.

Photographs: © W. Boon – Collection Resistance Museum Amsterdam.





**C3 regeneration control**

**V2 E1C detector**

**V1 E1F Oscillator/mixer**

**M/T IF transformer**

**G Metal (Selenium) rectifier**

**Headphones sockets**

**Aerial / oscillator coils**

**C1 aerial tuning**

**C2 oscillator tuning**

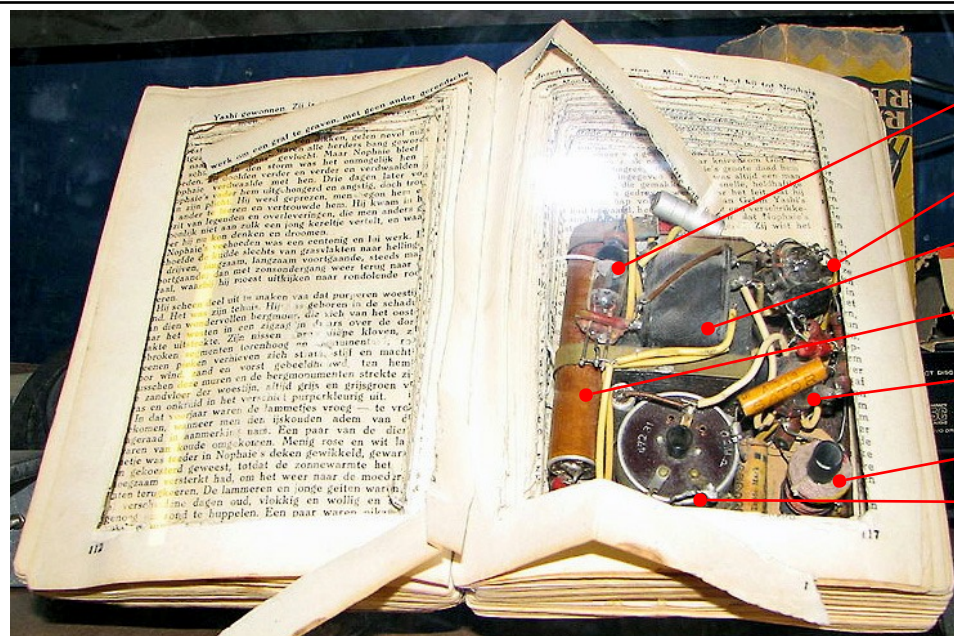
**Mains transformer**

C <sub>1</sub> , C <sub>2</sub> , C <sub>3</sub> = variabele trimmers 35 $\mu$ F.	R <sub>1</sub> = 1 M $\Omega$
C <sub>4</sub> = 50 $\mu$ F.	R <sub>2</sub> = 30000 $\Omega$
C <sub>5</sub> = 750 $\mu$ F.	R <sub>3</sub> = 0,5 M $\Omega$
C <sub>6</sub> = 50 $\mu$ F.	R <sub>4</sub> = 5000 $\Omega$
C <sub>7</sub> = 250 $\mu$ F.	R <sub>5</sub> = 3000 $\Omega$
C <sub>8</sub> = 250 $\mu$ F.	R <sub>6</sub> = 7500 $\Omega$
C <sub>9</sub> = 2,5 $\mu$ F.	
C <sub>10</sub> = 5 $\mu$ F.	

**Circuit diagram #1**

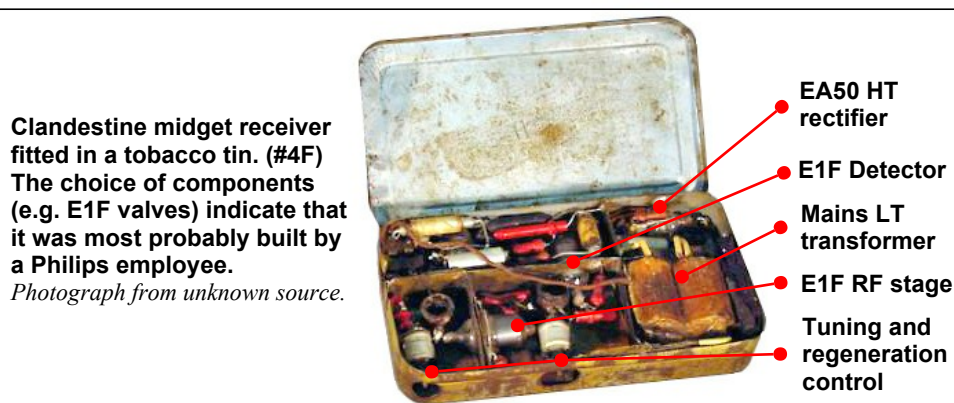
Superheterodyne midget receiver, probably constructed by a Philips employee. (#4D)

The circuit comprised basically an autodyne oscillator/mixer stage (V1) and regenerative detector (V2), mounted on a tin chassis sized 10x14cm. A rewound miniature loudspeaker transformer provided 6.3V for the filaments; HT was derived direct from AC mains, rectified by a metal (selenium) rectifier G. The receiver operated from 25m to 49m. Needless to say that radiation of the oscillator must have been excessive. Source: *Radio Express*.



Clandestine midget receiver built in cut-out pages of a book. (#4E) A close look at the components of this clandestine midget receiver reveals that it was most likely built by a Philips employee, who had access to specific Philips components such as the E1F acorn valves and miniature HT capacitors.

Photograph courtesy Rotterdam's Radio Museum, Holland.

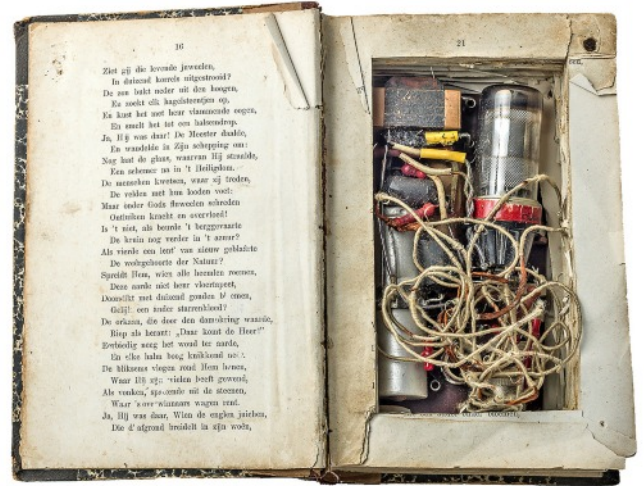




Clandestine radio receiver in the cut-out pages of a book. (#4G)



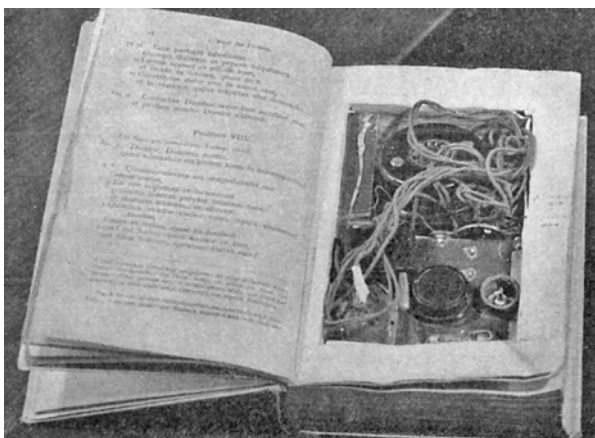
This receiver was probably constructed by a radio amateur. The valve was an ECH 21, powered by 220V AC mains, or as an alternative taken from a bicycle dynamo connected to the low voltage side of the filament transformer. The circuit diagram may be similar to #5 on the next page.



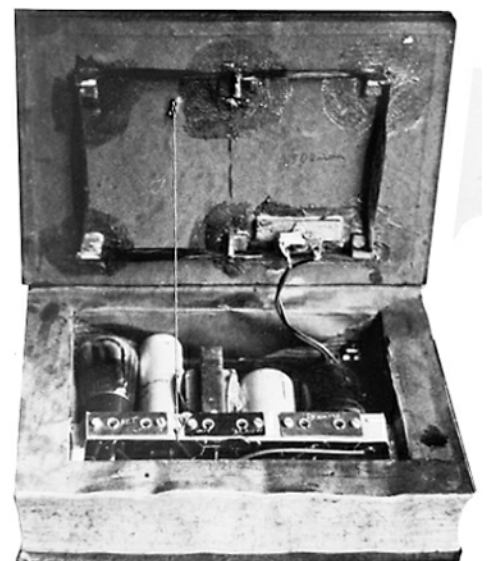
Close-up of the clandestine receiver #4G.



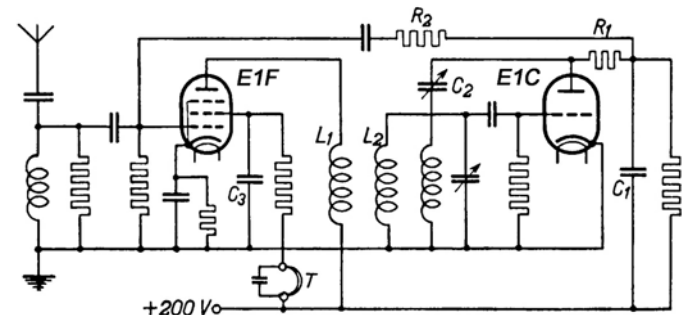
Listening to an Allied broadcast station with a clandestine radio hidden in a book. Note that the listener at the left is operating the crank of an upturned bicycle to power the receiver from a dynamo.



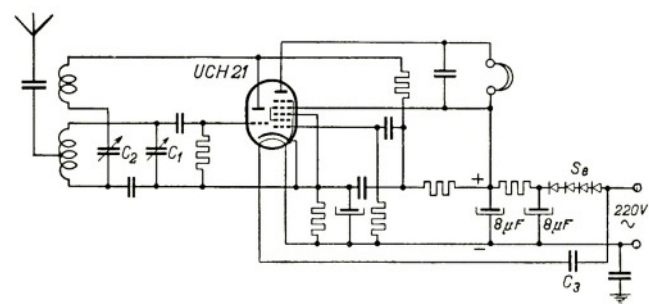
More examples of clandestine receivers concealed in the cut-out pages of a thick book. (#4H above and #4J right)



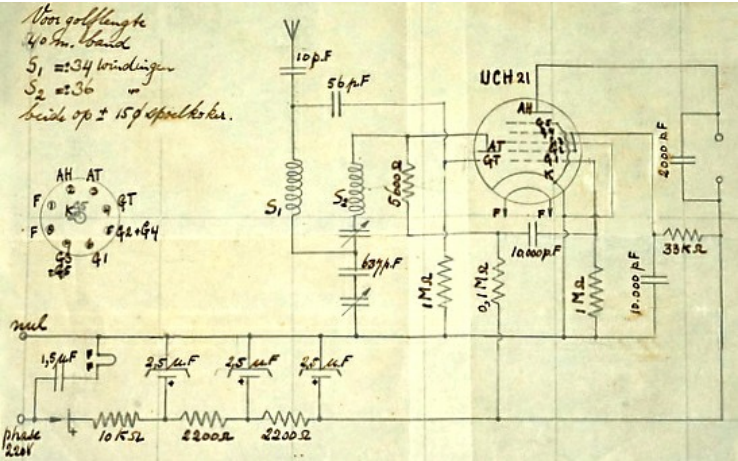




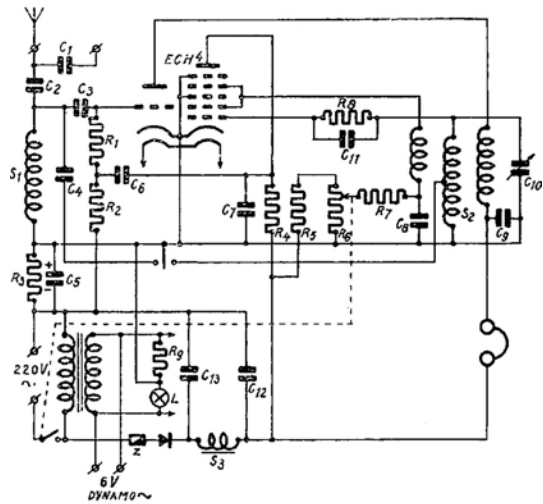
**Circuit diagram #2 .** Reflex circuit with two subminiature acorn valves. An E1F penthode served as RF and AF amplifier, with its anode weakly inductively coupled to the grid of regenerative detector E1C triode precluding AF feedback. The AF signal from its anode was fed back to the grid of the E1F via a low pass filter; the headphones are taken up in the screen grid with RF filtering.



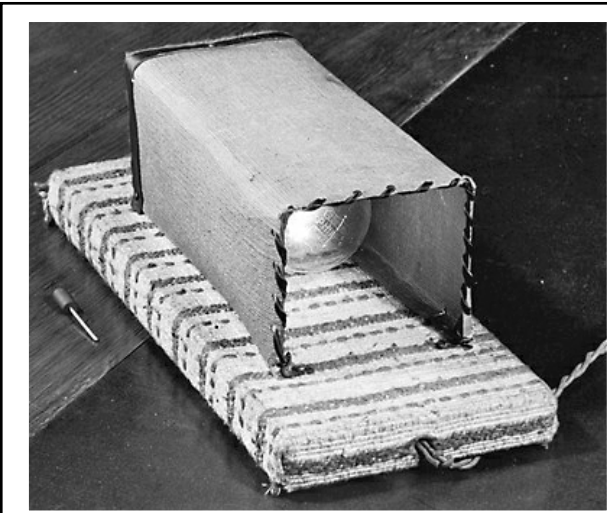
**Circuit diagram #3 X (See Chapter 151 #3B).** A circuit which found frequent application using an UCH21 valve with its triode used as regenerative grid detector, and the hexode as AF amplifier. The filament was fed direct from AC mains via series capacitor C3; HT was derived from a miniature metal (selenium) rectifier Se.



**Circuit diagram #4.** Original drawn circuit diagram of a mains powered clandestine receiver using an UCH21 valve, with the filament series fed with a suitable 1.5µF condenser to avoid the use of a difficult to obtain transformer. (See Chapters 95 and 151 #3B)



**Circuit diagram #5.** Circuit of a clandestine midget receiver suitable for 220V AC mains power using a reflex circuit with an ECH4 valve. During mains cuts it was powered by a 6V bicycle dynamo.



The base of this lamp contained a receiver, with a built-in single headphone serving as loudspeaker (left). The radio could be put in operation by plugging a pin in an almost invisible hole (#4M).

Both lamp and powder duster radio (below) were made in secret by Philips employees at their homes .

A clandestine radio receiver (#4K) fitted in a baby's powder duster. The AC mains power lead was disguised by a knitted covering and used as a girdle on mother's dressing gown. The single headphone covered in similar fashion was hung in the cradle as baby rattle.

