

ANNECKE 200w PEP SYMMETRICAL KOPPLER



80-10m Symmetrical Matchbox

- 8 shortwave bands in 5 segments
- Maximum 200w PEP/CW
- Continuously variable output impedance from 20 to 3000 Ohm
- Size: (HxWxD) 125 mm x 300 mm x 250 mm (5" x 12" x 10")
- Original price: 525 Deutsch Mark (about \$300 to \$350)

History

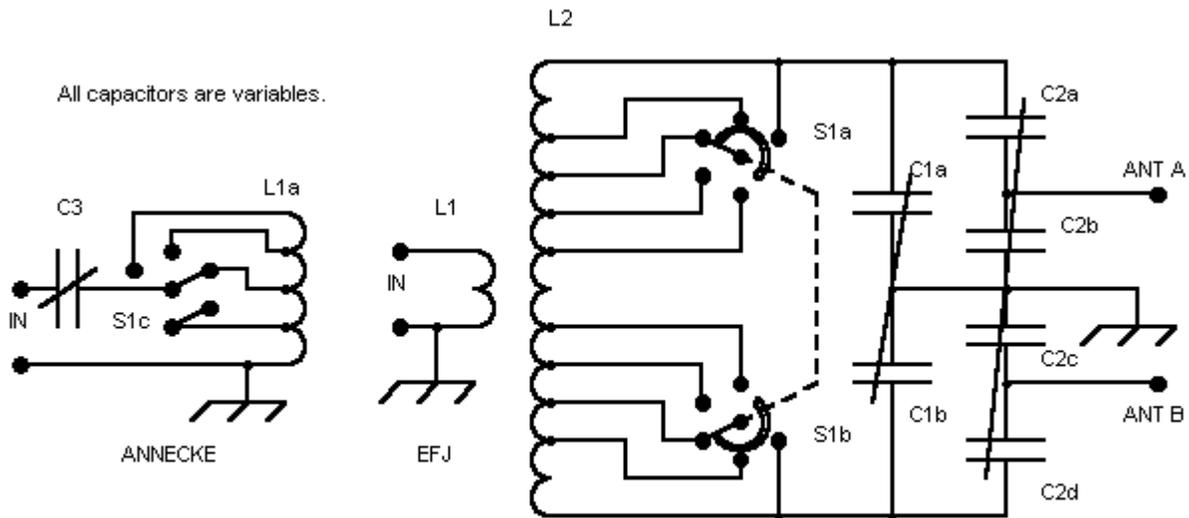
To promote interest in home brewing, Alfred Annecke introduced a large link coupled coil, a 1x5 + 2x5 summing band switch, and a special double-differential variable capacitor. These and other standard components enabled hams to easily build a symmetrical matchbox that covers the ham bands from 80-10m in 5 segments. This matchbox enables us to take full advantage of openwire-fed symmetrical antennas. The output impedance is continuously variable from 20 to 3000 Ohms.

The double-differential variable capacitor, C2 (Ant Anpassung) is key to the matching, while the split-stator variable capacitor, C1 (Abstimmung) tunes the resonance. C3 (TX Abstimmung) helps improve the match to the 50 Ohm output of the transmitter.

Note: Whereas the output side of the matchbox is nearly identical to that of the famous EF Johnson Viking Matchbox, the input side differs significantly. It incorporates a large over-coupled and tapped coil (link), as well as a variable capacitor. This enables it to present a better load to today's 50 Ohm solid state transmitters over a much broader output impedance range than the EFJ, which used a simple link.

See schematic comparing Annecke design to that of the EFJ, below.

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Simplified schematic of the Johnson and Annecké Matchboxes

L2 is made of silver-plated copper wire and has the dimensions 60 mm x 130 mm (2.4" x 5.1"), oversized (by today's standards) for a matchbox designed to handle 100/150w (continuous). This guarantees the best characteristics for the coil, limits the amount of power lost due to heating and assures the highest efficiency for the antenna system.

When in receive mode, the high Q of the matchbox improves the preselection, rejects signals outside of the passband and protects the receiver's front-end circuitry. This enhances the receiver's overall performance.

The huge matching range of this type of matchbox enables independence of any particular antenna or feedline length. You bring the entire antenna system into resonance by tuning both the feedline and the antenna as one. The result is an extraordinarily high efficiency, even with short antennas.

The antenna system is a major component of the amateur radio station. The antenna makes or breaks the efficiency of the station and its ability to communicate effectively. Therefore it is important to pay special attention to the antenna system.

Only resonant antennas deliver good transmitting and receiving results. They are much less susceptible to the negative influence of RF currents on the A.C. power lines and ground wires. As such they reduce radio frequency interference (TVI/BCI).

Avoid all compromises in the feedline. These include coax cable and baluns, whose luxury waste double energy; specifically in both the receive and the transmit path.

Coax cables whose impedance is far from the actual antenna impedance, which is typically the case when trying to cover a broad frequency spectrum of the amateur bands, exhibit far more loss than the values shown in the cable loss tables. The values shown there always assume a perfect (resistive) match to the

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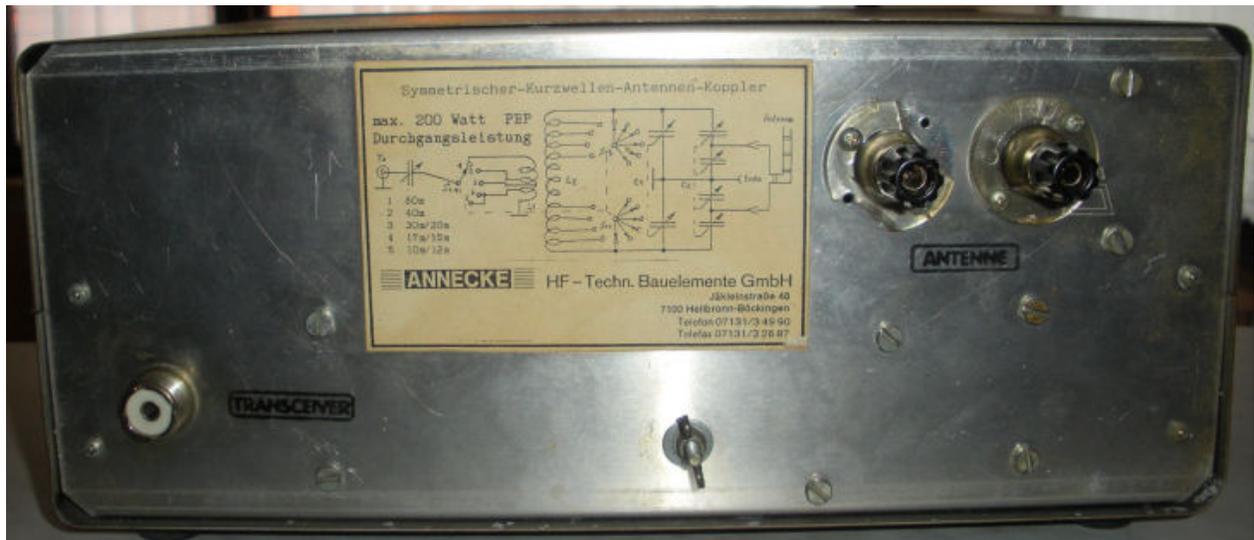
antenna, which is [almost] never the case. Attempts to compensate for this loss by increasing the output power of the transmitter produce other problems, such as with the neighbors.

Many hams seem to believe in the myth that the radiation of a non-resonant (high SWR) coax-fed antenna can be improved through the use of a matchbox. In reality, the matchbox does enable more RF current to be generated from the transmitter, but this additional current is transformed into heat within the matchbox. There is no improvement in the radiation of the antenna.

Note: *The tiny 100w transceivers offered today reduce their power rapidly as the SWR increases. In this case a matchbox will enable more power to be radiated from transmitter and into the antenna, but at the same time, the high power loss in the matchbox is still present.*

Therefore it makes sense to use antenna systems which may be tuned across the entire operating frequency spectrum. Openwire-fed dipoles (doublets) are well suited for this job. They have practically no loss in the feedline and enable you to bring the antenna system into resonance from the operating position. This is even true with highly shortened antennas.

The high efficiency and preselection of the symmetrical antenna system gives you an excellent signal, even without a linear amplifier.



(Back Panel)

The back panel was very sparse. The cabinet, SO-239, two banana jacks, nuts, screws and front panel knobs were the only components which Annecké did not manufacture himself.

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(Inside view; the front panel is at the bottom of the picture.)

Components:

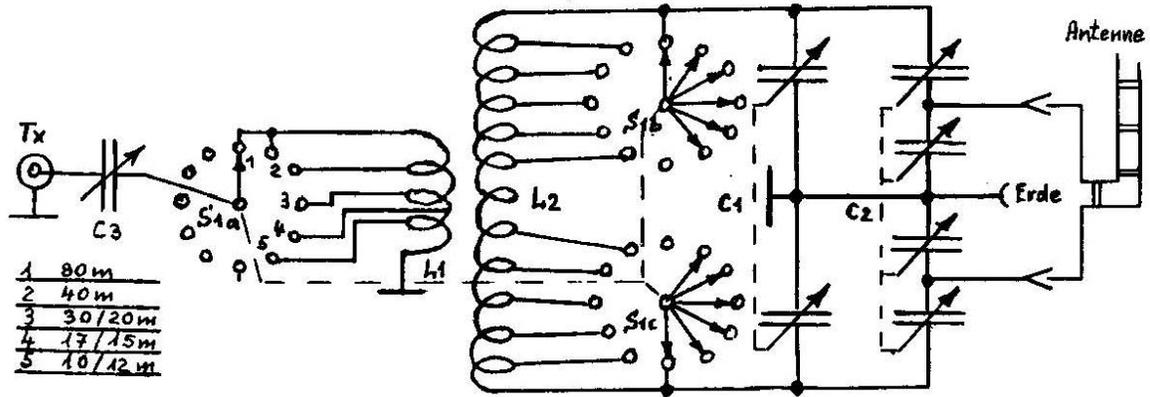
- | | |
|-----------------------------|---|
| Top Left: | C2: Double Differential Var. Cap.; 2x2x100pF, 2x1500v |
| Bottom Left: | C1: Double Var. Cap.; 2x155pF, 3000v |
| 2 nd from Left: | Very heavy duty band switch |
| 2 nd from Right: | L1 (outer), L2 (inner); Large silver-plated link-coupled coils, tapped
L2 dimensions: 60 mm x 130 mm (2.4" x 5.1") |
| Right: | C3: 270pF, 750v |

All components except the cabinet, knobs, SO-239 and two banana jacks were built in Annecke's fine-mechanic machine shop in southern Germany.

Most matchboxes were purchased as kits, with very little instructions. According to Alfred, "hams know how to build them without instructions".

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Original Schematic:



Notice that it only supported openwire-fed antennas.

Note: "Erde" = Ground

DISCLAIMER

This document was created by translating excerpts from various documentation (e.g., manual, marketing brochures, and catalogues), as well as numerous telephone and eyeball conversations with Alfred Annecke in the 1980's. I have translated (from German to English) the meaning of his printed text and word, to the best of my ability – even in instances where I did not fully agree with his conclusion.

This document is intended to be a useful aid to those who are lucky enough to find one of these tuners on the used market. You will rarely find accompanying documentation at all.

HOWEVER, I take no responsibility for the ultimate accuracy of the contents of this document. I am not a professional translator. Use this at your own discretion and risk.

73, de Rick, NJØIP / DJØIP . . . July, 2009

