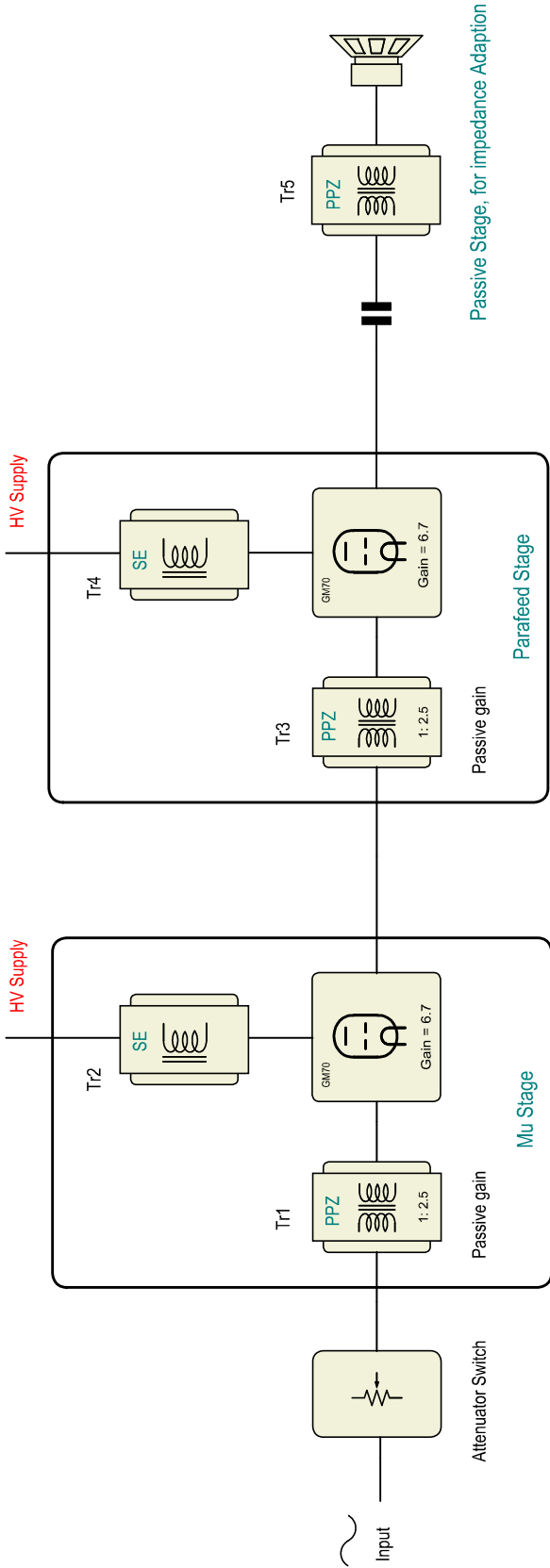


SAKUMA PRINCIPLE, BLOCK DIAGRAM



TUBE DISTORTION:

Triodes produce mainly 2nd. harmonics distortion. With directly heated triodes (DHT), the 3rd. harmonic is extremely low. Some residual 4th. harmonics will be present, but higher orders are almost not present. To some extent, very high quality SE transformers behave this way as well.

This is the basis for the Single Ended Triode sound.

TRANSFORMER DISTORTION:

Interesting, air gapped SE transformers have mainly even harmonics as long as there is no saturation. This is in line with the even harmonics cancellation principle, as used here. The Parafeed makes it more elegant, since both stages are now almost identical. This makes it all work almost ideally.

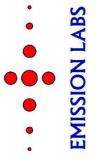
OVERALL DISTORTION

Elements, not significantly contributing to distortion are the transformers, Used for passive gain, and the impedance change transformer of the output stage. These are PPZ type transformers, used DC free, and these stay away very far away from their saturation levels.

Remaining distortion comes from the combination GM70 and Plate choke. Mainly this is second harmonics only. Third harmonics are almost not generated by DHT Triodes, and fourth and higher orders are at neglectable low level, provided the signal transformers are of high quality. It is this second harmonic which can be cancelled almost completely by bias adjustment of the driver stage. A bias point must be found, which adds a small portion of 2nd harmonics distortion to the output signal. This is in 180° phase shift with the second stage. Like this it gets eliminated.

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Revisions

Date	Name	Date	Name
9-Jan-2013	V1.0	08-Feb-2021	V1.4
28-Dec-2017	V1.2	24-Aug-2024	V1.5
20-Aug-2019	V1.3		

Name

GM70 Parafeed, Amplifier Monoblock
With even harmonics cancellation

Date

24.6.10

Drawn

JW

Name

Dipl. Ing. Jac van de Walle



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Drawing Nr.: