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RF linear power amplifier with build-in antenna tuner (ATU)

PA500

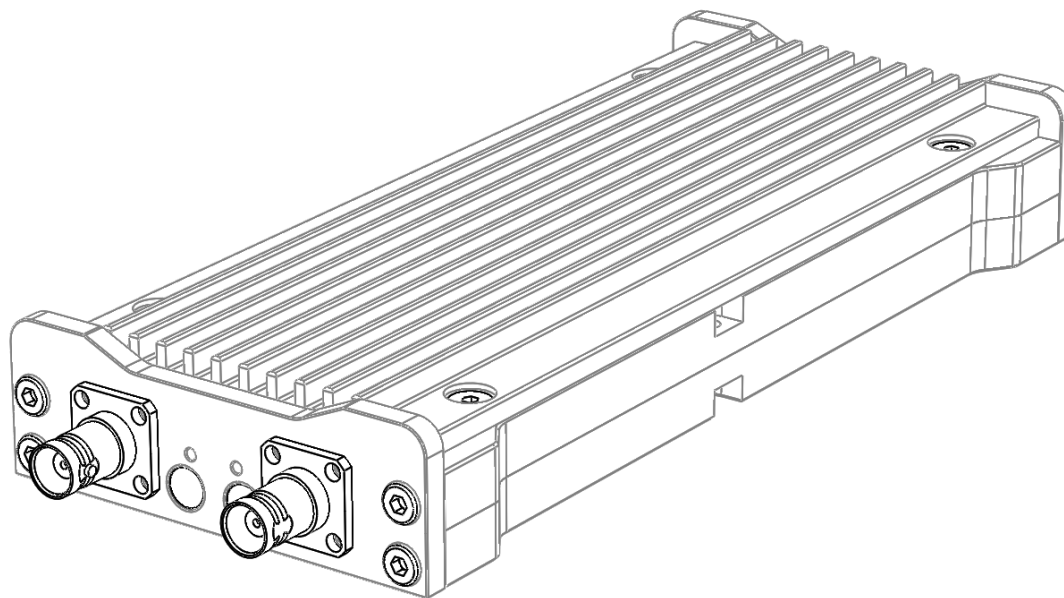
Operational Description

operating frequency range between 3.5MHz-30MHz

The device requires an amateur radio transceiver to operate.

This device is for use by licensed radio amateurs only

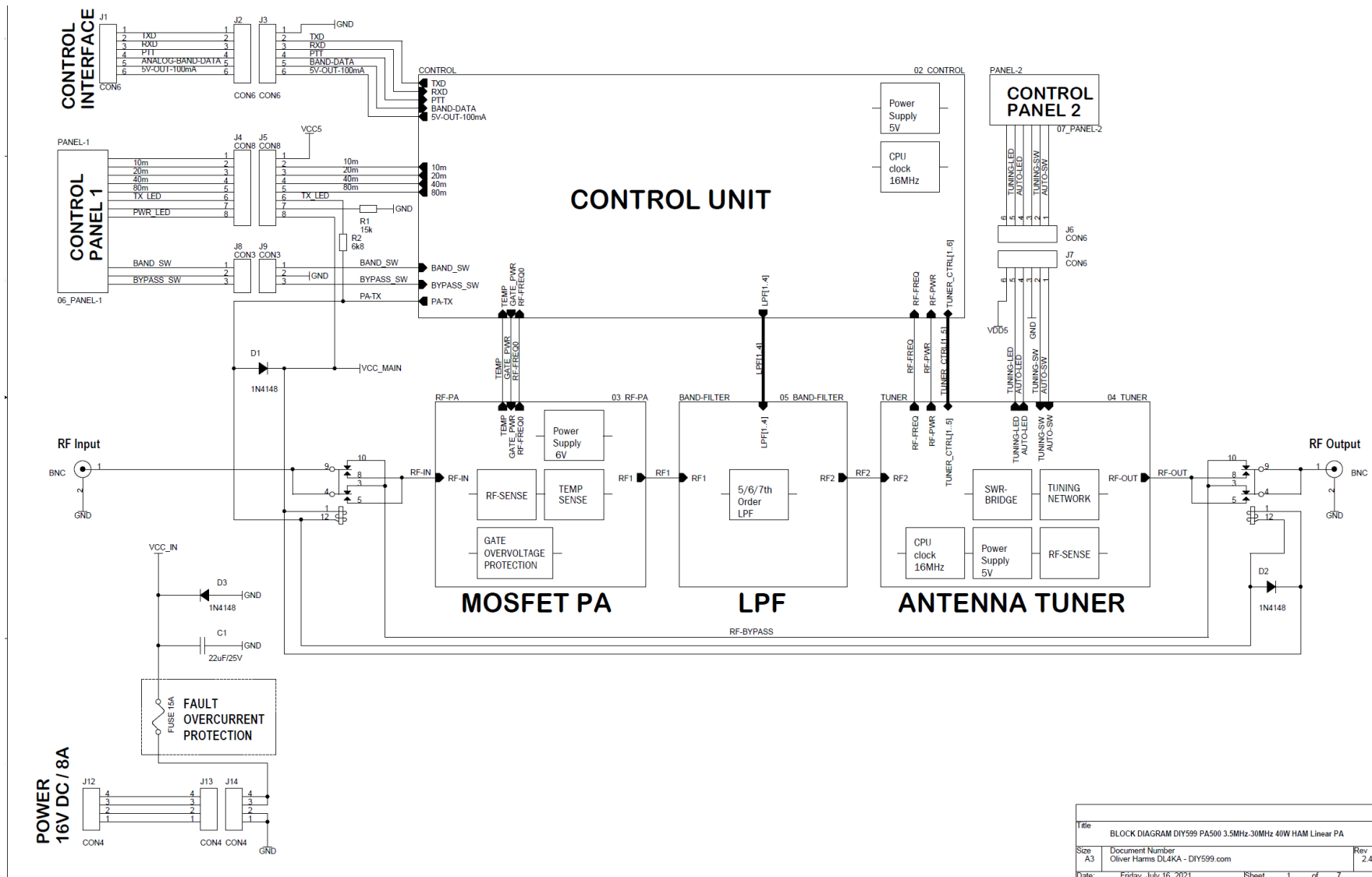
FCC ID: 2A2IEPA500



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Block Diagram



RF Amp and Tuner

Driving RF signal transmitted from the transceiver is lead to the internal T-pad 6dB attenuator. An overvoltage protection is implemented to protect the LDMOS gates for over voltage. The matching balun 4:1 Transformer match the impedance and level the input power to a value which is suitable for the LDMOS inputs. The LDMOS Module MRF151G or SD2932W are configured as a Class AB amplifier to minimize IM3 products. The linear amplifier uses the push-pull form. A minimum of 40W is achieved of the amplifier stage.

Multiple measuring and protection methods are implemented throughout the amplifier. The operating status of the PA is strictly monitored in a way that the following parameters are controlled and monitored. Gate voltage vs temperature, RF-Input power monitoring, RF-output power monitoring, LDMOS heatsink temperature monitoring, over temperature shut down, over power shut down for RF-output power.

A connected filter bank configured with Chebyshev filter in 5 pol, 6 pol and 7 pol configuration filter out the harmonics and spurious signals from the spectrum to meet the FCC requirements. The filter bank is fully controlled by the PA controller and can also be used combined to choose the right pair for the certain frequency to operate.

An Antenna automatic tuner which matches the impedance of the antenna system to the output impedance of the PA stage. The tuner is configured as a L-match type of a number C and L reactance. The maximum L reactance is 9uH and the maximum C reactance is 880pF. The configuration can handle 6x6 or 36 different combinations to find the best match between Antenna system and the PA impedance.

The control circuit performs various control using a micro-processor ATmega3248PB. Also, basic interface meets the necessary rules and conditions using the specialized semiconductor devices. The whole protection and monitoring system includes a complete bypass of the RF signal for all non-supported frequencies.

The amplifier is operated with a DC voltage between 12-16V. An internal overcurrent protection protects the device.