



The **RF Out** is an accessory daughterboard for the QICK system that mounts directly onto the QICK RF 216 Main Board, providing four user-configurable RF output channels to support flexible signal generation in quantum control applications. In a typical setup, the RF Out board is connected to the RF Main Board and installed within a QICK enclosure, with its SMA output connectors connected to the enclosure's front panel SMA ports using the included coaxial cables.



The RF Out board features a highly configurable analog signal chain with user-programmable gain and filtering, enabling precise RF signal conditioning over a broad frequency range. These configurable elements are controlled through a software interface provided with the QICK system, allowing for seamless integration and straightforward user control.







From input to output, the analog signal processing chain includes:

- A Macom MABA-011118 balun that converts the differential RF signal to a single-ended signal
- An Analog Devices ADMV8818 digitally tunable filter that contains four independently controlled high-pass and four low-pass filters, and that can achieve tunable band-pass, low-pass, high-pass, all-pass, or all reject responses from 2GHz to 18GHz
- A PMA3-83LN+_low-noise amplifier that provides 15 dB of gain from 0.5-8 GHz
- A pSemi PE43705 programmable attenuator that provides up to 32 dB of programmable attenuation in monotonic .25, .5 or 1 dB steps across a range of 50MHz to 8GHz.
- A second PMA3-83LN+ low-noise amplifier that provides 15 dB of gain from 0.5-8 GHz

This programmable analog signal chain supports up to 60 dB of gain for analog signal generation, delivering a maximum output power of +4 dBm, depending on the signal frequency.



For more information and additional performance plots, see the QICK system whitepaper (see link on Real Digital's QICK webpage).