

Phase Frequency Discriminator test report

JGW-E2113026

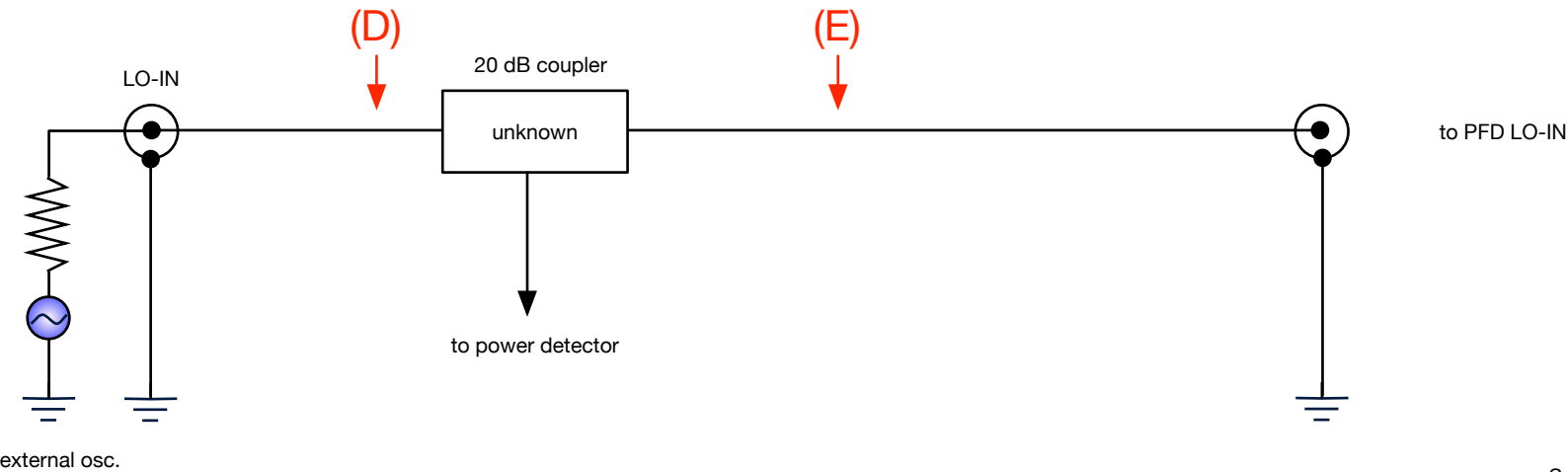
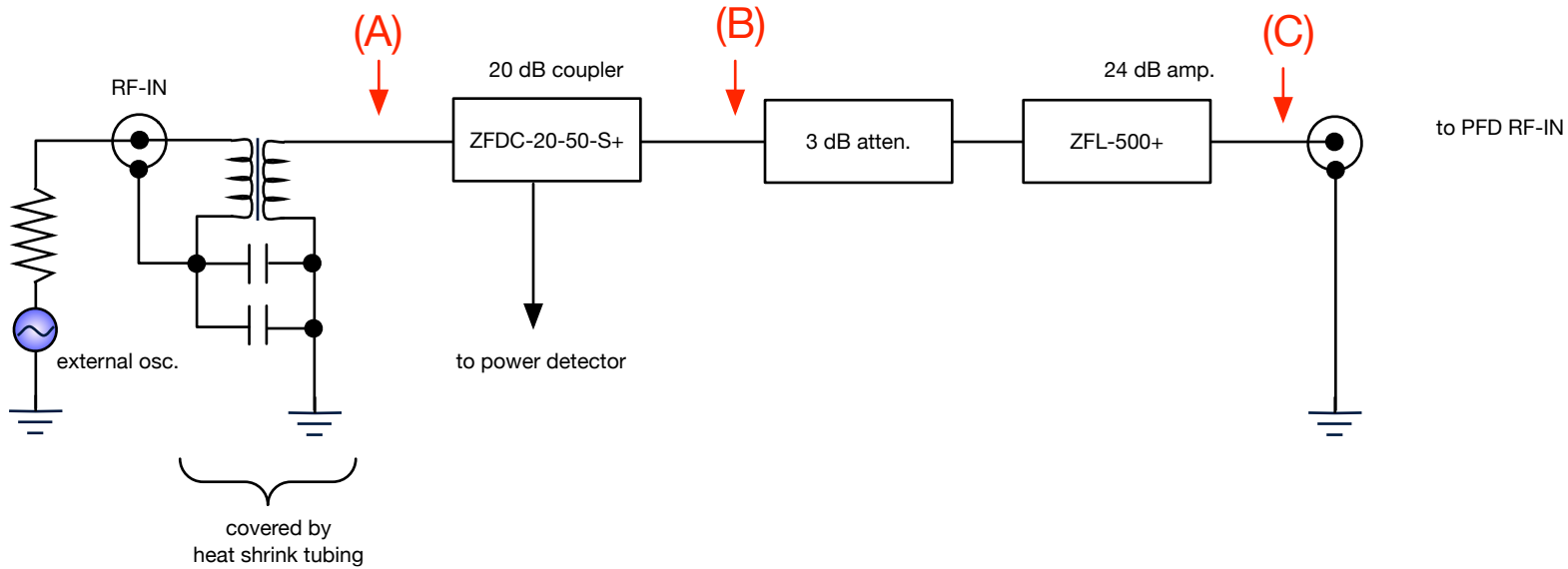
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Overview

We performed health checkup for the PFD unit S1809057 to make sure that there is no obvious fault in the unit. The checkup measurements were done in June 22nd in 2021 only for the X channel and we did not perform any of it for the Y channel due to difficulties in accessing the circuits.

List of checkups

- Measurement of amplitude level for RF signals
- Measurement of the supply voltage levels at all the active components



See E1808745 for complete diagram

The amplitude level of the RF signals are peeked at various points as shown above. We used a Moku-lab as the external source and Lecroy oscilloscope for measuring the p-p voltages. In each measurement, the measurement point was electronically disconnected and piped into the oscilloscope via a coax cable.

Measurement results

	(A)	(B)	(C)	(D)	(E)
measured	170 mVpp	144 mVpp	1.70 Vpp	1.70 Vpp	1.5 Vpp
expected	170 mVpp	151 mVpp	1.69 Vpp	1.70 Vpp	1.515 Vpp

1 dB loss assumed

24-3=21 dB gain
assumed

1 dB loss assumed

Setting for the external oscillators

The Moku-lab was configured for an arbitrary wave form generator.

As for the RF path measurement, the setting was such that

- waveform: sine
- amplitude: 200 mVpp
- load impedance: 50 Ohms

As for the LO path measurement,

- waveform: sine
- amplitude: 2 Vpp
- load impedance: 50 Ohms

Measurement systematics

The input of the oscilloscope was externally set to 50 Ohms by using a T-splitter and a 50 Ohm terminator upfront. However, for some reasons, the raw 2Vp-p signal appeared on the oscilloscope as 1.7 Vp-p, **implying there is a systematic calibration error somewhere.**

We did not try to chase the calibration error this time.

Checking the supply voltage levels

Using a Fluke hand—held voltmeter, we checked the supply voltages for all the active components. The non-inverted probe of the voltmeter was physically attached to a leg of the active components at each time while the inverted probe stayed connected to the chassis ground.

Results

No faulty voltage values were found and the voltage level was precisely the same as those described in JGW-D1809187 at a level of a few percent.

Conclusion

The X channel of the PFD unit appears to be healthy in terms of the signal level and the supply voltages.