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To: UVLBI Group

From: A. Burns and J. SooHoo

Subject: Downconverter for LMT Mexico

Attached in Figure 1 is the circuit diagram for the Downconverter as designed by Alan E.E. Rogers. To build the downconverter a 1U chassis was used and the components placed according to fitment and to reach the outputs on the back panel of the chassis. The components were attached to the chassis using #2 hardware and 12VDC power was supplied via a terminal breakout strip located next to the power supply. Figure 2 shows the item listing used in assembly and specifications are linked where possible. Figures 3 and 4 are photographs depicting the rear panel and circuit, respectively. Rotary step attenuators on the front panel allow for adjustment in both channels without changing internal components. Initial testing consists of verifying power and ground to amplifiers, and signal is present out of all four outputs. We also injected a test signal with broadband noise through to verify with a spectrum analyzer that we were able to see the signal mixed with the second LO in both the low and high.

The downconverter was shipped to INAOE and brought up to the LMT site. We ran through the same test signal tests on site for additional verification (Figure 5). Also we had redone some measurements regarding the power levels with the following results:

- With nothing connected to the spectrum analyzer = -76dBm 1MHz RBW
- Connecting the downconverter with no receiver connected, attenuator knob set to  $z0$  = -56dBm 1MHz RBW
- Receiver connected to downconverter and attenuator knob set to 0 = -37dBm 1MHz RBW

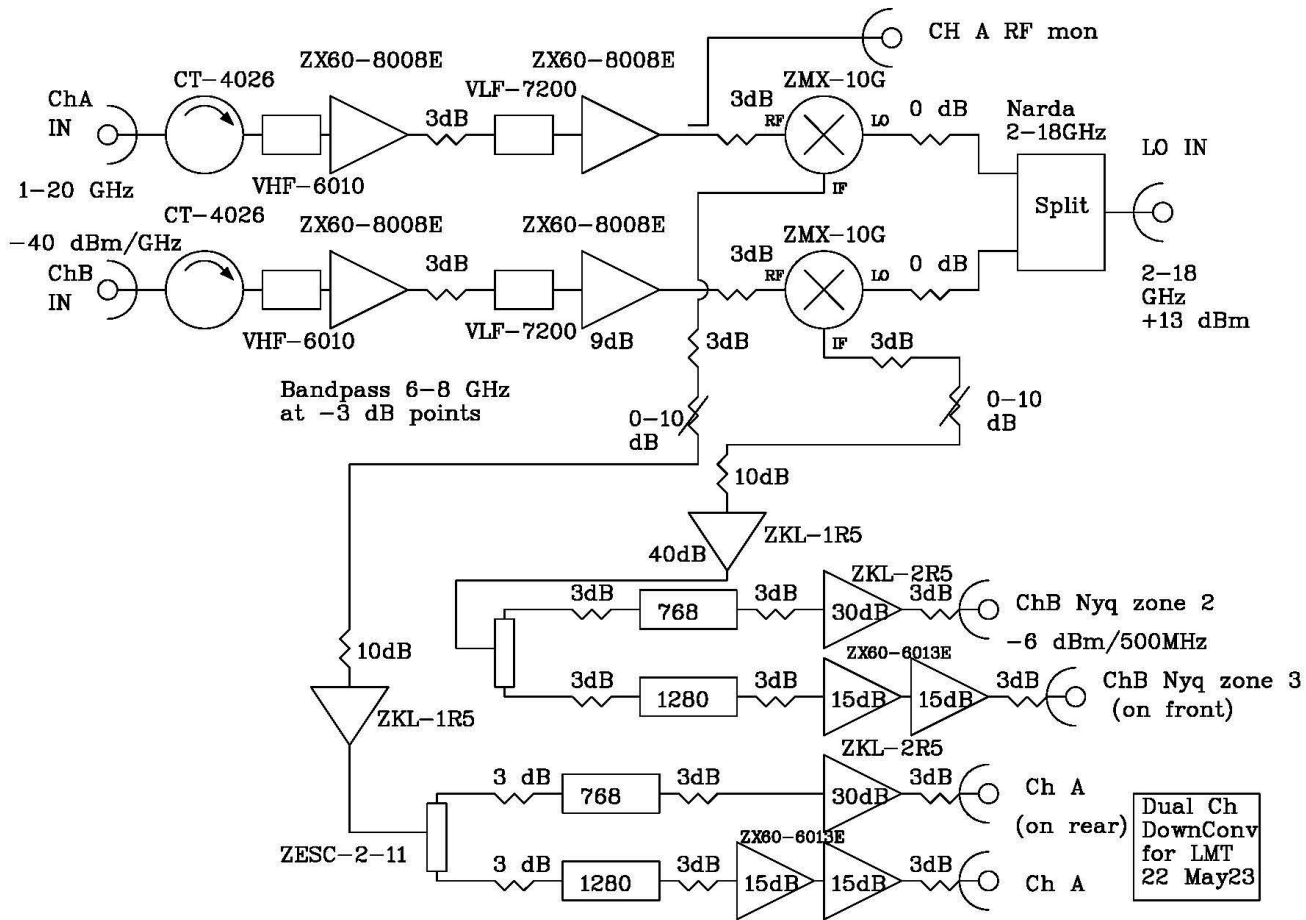


Figure 1. Circuit Diagram by A.E.E.R.

<a href="#"><u>(17) VAT-3+ Attenuators</u></a>	<a href="#"><u>Various Lengths 3-20" Coax Cable</u></a>
<a href="#"><u>(2) CT-4026 Isolators</u></a>	1U Chassis with feed throughs
<a href="#"><u>(2) VHF-6010 High Pass Filters</u></a>	#2 Hardware (Bolts, aircraft nuts)
<a href="#"><u>(1) ZX10-2-183-S+ Splitter</u></a>	<a href="#"><u>(4) ZX60-8080E Amplifiers</u></a>
<a href="#"><u>(2) ZMX-10G Mixers</u></a>	<a href="#"><u>(2) VLF-7200 Low Pass Filters</u></a>
<a href="#"><u>(2) 0-10dB Rotary Step Attenuators</u></a>	<a href="#"><u>(1) 25W Switching 12V Power Supply</u></a>
<a href="#"><u>(2) ZKL-1R5 Amplifiers</u></a>	<a href="#"><u>(2) ZESC-2-11 Splitters</u></a>
<a href="#"><u>(2) VAT-10+ Attenuators</u></a>	(2) Lark Engineering XMC768
<a href="#"><u>(4) ZX60-6013E Amplifiers</u></a>	(2) Lark Engineering XMC1280
<a href="#"><u>(2) ZKL-2R5 Amplifiers</u></a>	

Figure 2. Items listing and spec sheets (When available)



Figure 3. Rear Panel showing EMI filter and feed throughs

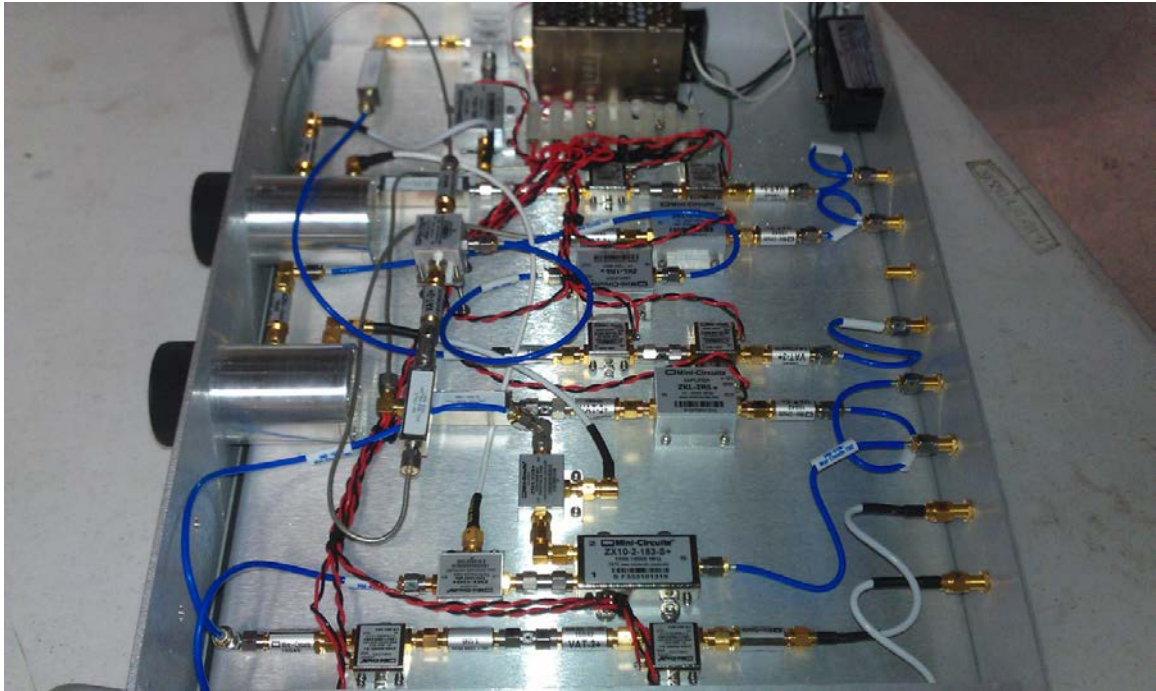


Figure 4. Assembled Circuit with top panel removed.

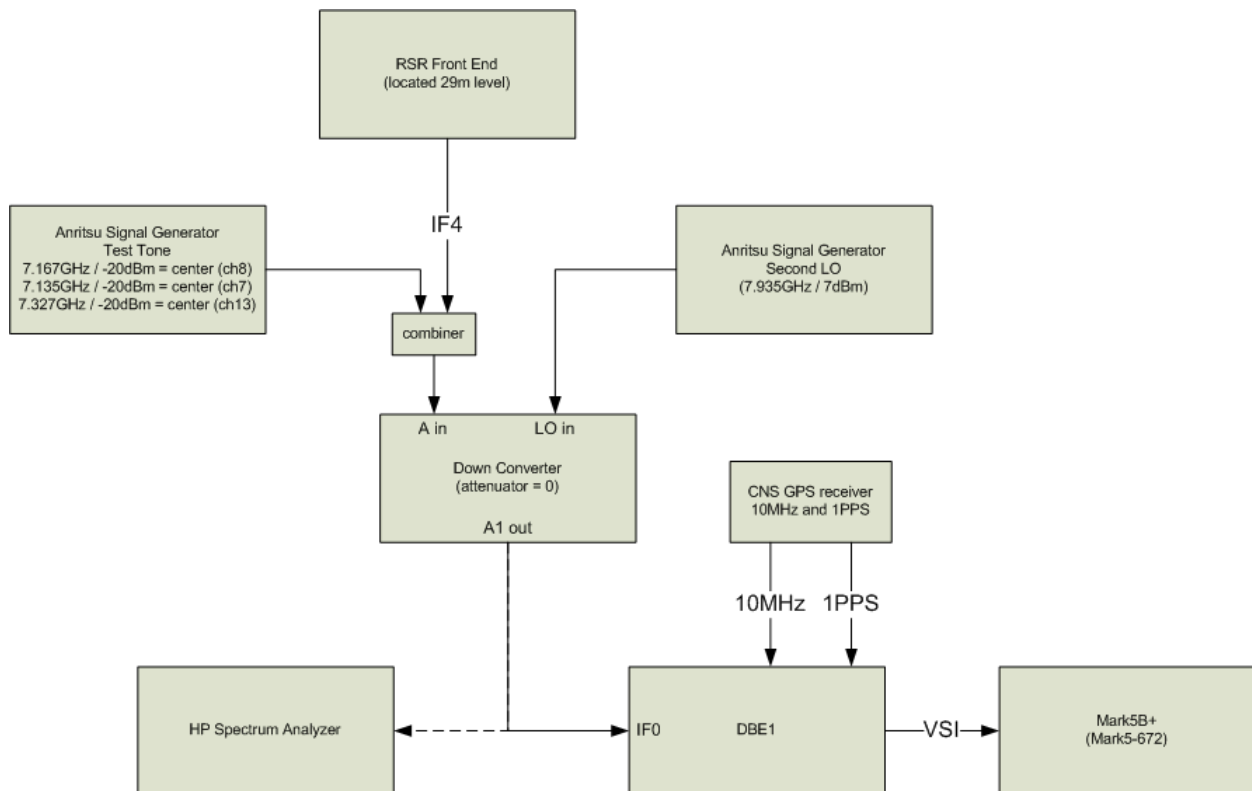


Figure 5. Test signal injection test.