

This document applies to DSA815s with RF/Digital FPGA Boards 00.05 (Boot 01.02 and 01.03), and Newer Units with later Boards, 00.07, etc (Boot 01.04) with notes. i.e. \* Newer Units . . .

## **List of DSA815 RF Front-End/IF Components – Rev D, Nov 19, 2018**

You will find the following component reference designators on your DSA815's main PCB

**SA RF Input**, Type N female connector. *This is where we are starting from.*

The following components are in general listed in order of signal flow

**D106**, P/N RN152G PIN Diode RF Overload Limiter on U100 RF Input (pin 5).

**\* Newer Units instead use D105, D109, D110, and/or D111 PIN Diode(s).**

**U100**, P/N HMC221B (Hittite) RF Switch for opening SA RF Input and connecting it instead to R105, 106, 130, and 131 (parallel  $4 \times 200 \Omega$ ) for a  $50 \Omega$  Load when a RF Overload is detected. Note: *A recommended more rugged replacement especially for U100 (also can be used for U101) is a HMC595A with ~10dB higher power and 3IP rating.*

**D101**, UHF Schottky Diode RF Overload Detector (failure of this device due to high RF overload is unlikely).

**U108 & U109**, P/Ns TL072C (TI) Dual Op Amp for control of RF Switches U100/U101.

**\* Newer Units use a different device for U109.**

**U101**, P/N HMC221B (Hittite) RF Switch for inserting the RF Cal. 45MHz, -10dBm reference signal in place of RF input signal during the SA Calibration routine.

**U103**, P/N PE4306 or PE4312 (Peregrine) RF Step Attenuator.

**U104**, P/N HMC284MS8G (Hittite) RF Switch to Input/bypassing RF Pre-Amp U102.

**U102**, P/N ABA-52563 (Avago) RF Pre-Amp.

**U105**, P/N HMC284MS8G (Hittite) RF Switch from Output/bypassing RF Pre-Amp U102.

**U107**, P/N HMC213AMS8 (Hittite) 1<sup>st</sup> Mixer (Up Converter). Mixer signal flow: RF In to pin 5, 2,285.709MHz - 3,785.700MHz LO to pin 2 ( $LO\ MHz = f_c + 2,285.700$ ), 2,285.7MHz 1<sup>st</sup> IF from pin 7.

**\* Newer Units have a new U113 and U11x here with U107 for additional gain here (helps make up for gain reduction in 3<sup>rd</sup> IF due to U113/U114 being removed there).**

**U106**, P/N MGA-53543 (Avago) 2,285.7MHz 1<sup>st</sup> IF Amp.

**U110**, P/N HMC213AMS8 (Hittite) 2<sup>nd</sup> Mixer (Down Converter). Mixer signal flow: 2,285.7MHz 1<sup>st</sup> IF to pin 7, 1,820.0 MHz LO to pin 2, 465.7MHz 2<sup>nd</sup> IF from pin 5.

**U111**, P/N ADA-4643 (Avago), 465.7MHz 2<sup>nd</sup> IF Amp.

**U112**, P/N ADE-2 (Mini Circuits) 3<sup>rd</sup> Mixer (Down Converter). Mixer signal flow: 465.7MHz 2<sup>nd</sup> IF to pin 3, 455MHz LO to pin 6, 10.7MHz 3<sup>rd</sup> IF from pin 1.

**\* Newer Units have reduced attenuation in the 3<sup>rd</sup> Mixer's I/O matching.**

**U113**, P/N MAR-6 (Mini Circuits), 10.7MHz 3<sup>rd</sup> IF Amp.

**\* Newer Units use U120 (P/N no known, TBD) on the bottom of the PCB (electrically connected to the top side circuitry) and it drives the input of the Digital IF.**

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**U114**, P/N ADA-4643 (Avago) 10.7MHz 3<sup>rd</sup> IF Amp. with its output going to the Digital IFs Analog WB Filter/Input Interface.

**\* Newer Units Do Not use U114 in the 3<sup>rd</sup> IF. Operationally similar with just U120.**

**VCOs**, The DSA815 uses three (3) VCOs that are located in the lower compartment next to the SA Input Compartment. These VCOs cover the frequency range of 9kHz - 1.5GHz as follows: VCO 1. For  $f_o$  of 9kHz - 499.9MHz, LO  $f_c$  is 2,285.709MHz - 2785.7MHz; VCO 2.  $f_o$  500MHz - 899.9MHz, LO  $f_c$  2,785.7MHz - 3,185.7MHz; VCO 3.  $f_o$  900MHz - 1,500MHz, LO  $f_c$  3.185.7MHz - 3785.7MHz. *Note: The frequencies at the transition between LO 1, 2, and 3 are close estimates. These frequencies aren't a fixed constant, and may change somewhat dependent on the selected Scan frequencies.*

When VCO 1 is active Red LED **D211** will be ON, for VCO 2 it will be **D200**, and for VCO 3 **D205**. When you have the factory Default mode running (9kHz to 1.5GHz) you will see these three LEDs flashing in sequence as the LOs are activated in turn for 9kHz through 1.5GHz.

**Other devices not in the SA RF Input path:**

#### **Initial List of DSA815 LO/TG Components**

**U201, U509**, P/N BB5089Z (rfmd), LO RF Buffer Amp

**U501**, P/N HMC213A (Hittite), TG Mixer

*This List may be expanded dependent on time and interest. Contributions by PM would be appreciated from others that have identified components without P/N Labels.*