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ADFB hardware: Modifications made for the MWA 32T system

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Class: MWA: Digital Receiver

Abstract

MWA plans to use an ADC board which is developed based on a design provided by CSIRO-ICT center for the 32 tile system. This board is referred to as Analog to Digital converter Filter Bank (ADFB) board. This report summarizes the modifications made on the ADFB board to use it for the MWA application. The circuit schematic of the original CSIRO-ICT design for reference is available in the file `adfb_full1a.pdf`.

1 Modifications made on the ADFB board

- The resistors R28, R31, R35, R41, R30, R34, R40 (7 resistors) are not needed for the MWA application.
- For the initial stand alone testing of the ADFB card, the crystal oscillator U3 can be used. In this case the 2.5V of the crystal oscillator, pin-14, is to be connected to the +ve of the C21 tantalum capacitor and the resistor R6 should be shorted. Also make sure that the Jumper JP1 is removed from the berg-sticks.
- For the initial stand alone testing the output of the crystal oscillator need to be distributed through MC100LVEL14 (U1). The 2.5V supply to the clock chip U1 (MC100LVEL14) is wired from the 2.5V coming to the JTAG connector. The wiring is done by soldering one end of the wire to U1 pin 18,20, which is same as the +ve pad of C1 (pad opposite to the label C1). The wire need to be taken through the mounting hole of the RJ45 connector RJ1 and the other end is connected to pin-8 of the J9 (JTAG header).
- For the initial testing of ADFB card, if an external clock has to be provided through MMCX connector J1, then short the resistor R7. Also make sure that the crystal oscillator is removed from the base (U3) and the jumper JP1 is removed from the berg-sticks.
- The I and Q Channel input return loss are improved by soldering $27\ \Omega$ resistors for R106, R109 (for Q channel), R101 and R104 (for I channel) at the input termination path of the ADC. With these resistors, the return loss is better than $-23\ \text{dB}$ through out the freq range 0 to 330 MHz.
- The ADC 3.3V needs an additional supply wiring to compensate the voltage drop in the PCB trace. This 3.3V connection is made using twisted pair wire. The +ve and ground connections

are made near the label F8 and the other end is connected to the +ve of C114C and gnd of C100C.

Acknowledgement