Kilimanjaro EVM Getting Started

EVM Board Rev F
Rev 2: 5-20-2016

This document contains information on a product under development. The parametric information contains target parameters that are subject to change.

1 Introduction

The Kilimanjaro EVM board provides the device power supply voltages and input biases required to properly operate the Kilimanjaro Dual Pin Electronics chip. It also allows the user to provide any or all of these externally to evaluate device operation under non-standard conditions.

The only external signals required to operate the board are +18V and -10V supply voltages (@1A). To evaluate AC performance of the Kilimanjaro, a pulse generator and oscilloscope are also required and may be connected to the board using SMA type connectors.

1.1 Power Supplies

Ground, -10V, and +18V power should normally be provided to the board through banana connectors J2, J3 and J4, respectively, at the top of the board. The voltage regulators (also located at the top area of the board) are used to provide power to the Kilimanjaro as well as the support circuitry.

Jumpers are provided to allow the user to select the on-board regulators. An ammeter can be connected in place of these jumpers to make power supply current measurements. External supplies can also be used to supply power to operate the board through J1. JP43 is used to measure the VDD current (or disconnect the on-board VDD supply), JP42 to measure the DVEE current, JP2 to measure the VCC current, and JP1 to measure the VEE current

All of the on-board regulators can be adjusted over the full allowable power supply range for this part. The VDD supply is adjusted using R110, VCC is adjusted using R7, VEE is adjusted using R1, and DVEE is adjusted using R37.

When adjusting these supplies, the voltages to the Kilimanjaro can be measured on the appropriately labeled pins of J1. (All odd-numbered pins on J1 are connected to ground).

All device supply levels (VCC, VEE, VDD, and DVEE) are preset at the factory to recommended operating conditions.

Set at the Factory:

Recommended Settings Readable on J1:
+18V = 18V
--10V = -10V
OUT VCC = 11.5V
OUT VEE = -5
VDD_BUF = 3.3V
DUT_DVEE = -3V
POS_REF = 15V
NEG_REF = -6.5V

Recommended Settings Readable on JP17:
+3.3V = 3.3V
DVEE = -3V
VDD = 3.3V
CVL# = 2.5V
CVH# = 2.5V
VL# = 0V
VH# = 3V

1.2 Digital Inputs

The digital inputs for each channel (DATA and EN) can be set in one of two ways: either via an external signal input on the board using the labeled SMA connectors, or using the 3-pin jumpers situated next to each of these connectors. If more convenient, the external signal can also be inserted at the center pin of a 3-pin connector. Note, however, that the SMA connectors, not the 3-pin connectors, are at the end of the transmission line. So, if a fast rise/fall time signal is input at the 3-pin connector, there will be a short-duration reflection in the waveform at the Kilimanjaro due to the reflection from the SMA connector end of the transmission line. Therefore, optimum waveforms will be obtained at the Kilimanjaro inputs if the signals are input at the SMA connectors.

When external signals are applied using the SMA connectors, the jumpers on the corresponding 3-pin connectors should be removed since these will short the signal to VDD or GND if left in place.

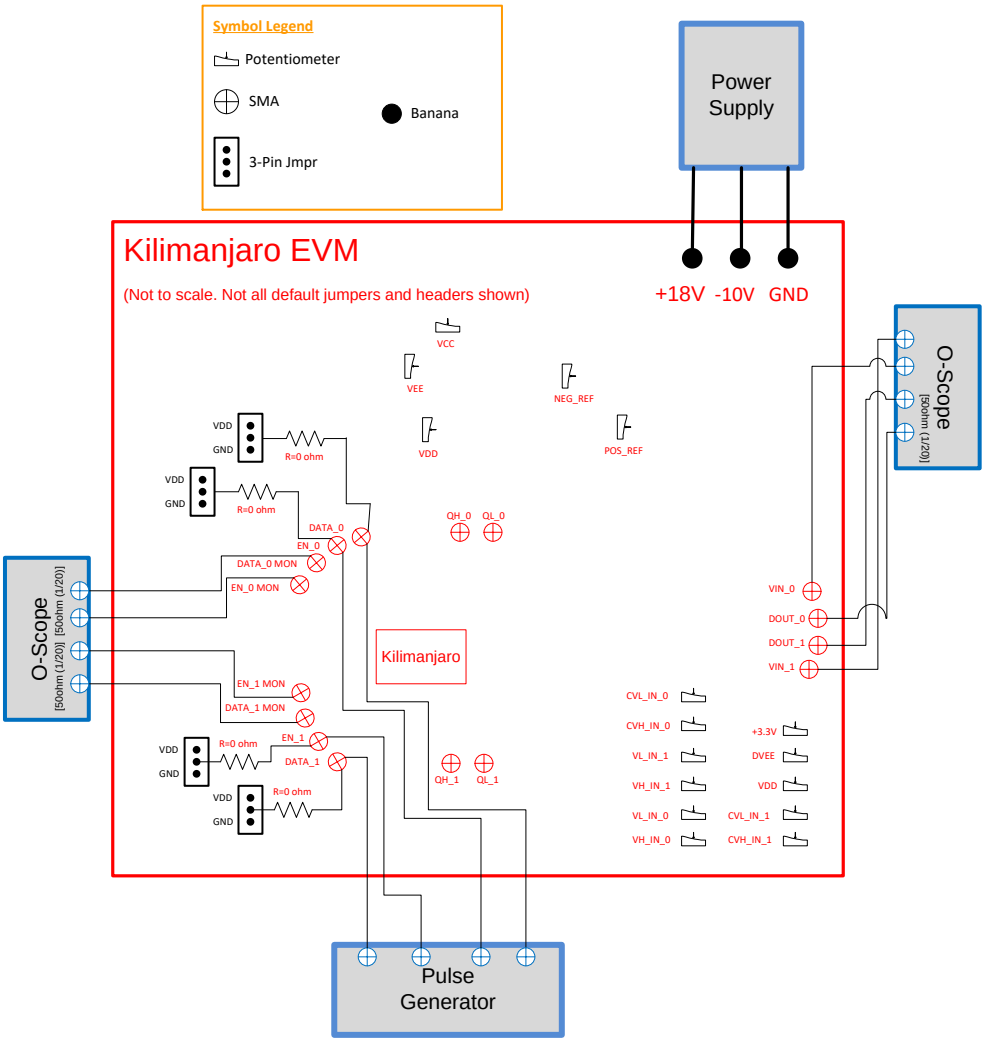

Figure 1. Kilimanjaro EVM Board Setup

1.3 Comparator Outputs

The comparator outputs of the Kilimanjaro are designed to be LVTTL compatible.

Under normal operation, these outputs indicate where a measurement lies with respect to the CVH and CVL thresholds. However, when driver short circuit protection is triggered, QH and QL are both designed to assert logic low to indicate that a short-circuit condition is present. A dual NOR gate is connected between QH, QL of both channels and the LEDs to indicate short-circuit. Since QH and QL are both a logic low on power-up, weak pull-up resistors (3.3V/10KΩ = 0.33mA) are added to the outputs of the comparator to prevent the LEDs from turning on during power-up.

A 953Ω resistor is routed in series with the QH/QL outputs of the EVM. When using an oscilloscope to measure these outputs, it is recommended to place it in 50Ω termination mode and account for the amplitude reduction (1/20 of expected value).

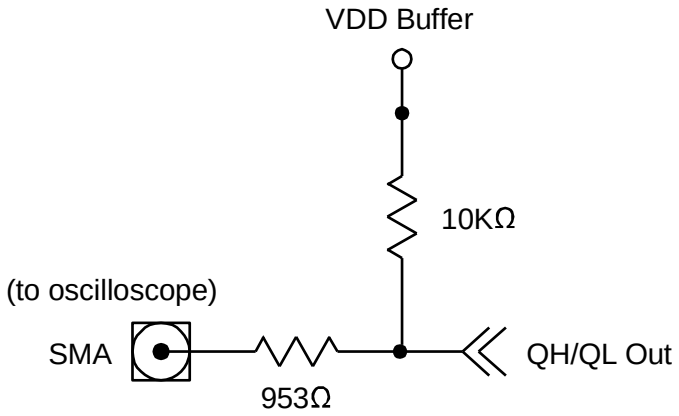

Figure 2. Comparator Output Load Circuit

1.4 Driver Output and Comparator Input

The output of the driver (DOUT#) and the comparator input (VINP_MON#) are connected together for I/O configuration. Both DOUT# and the comparator input can be accessed through the DOUT# SMA's. If the user wishes to evaluate the driver performance based on driver-only configuration, the comparator can be disconnected by cutting the PCB trace between L5 and R99 for DOUT0 and the trace between L6 and R97 and then installing "0" ohm resistor in R97 and R99. The driver output DOUT# can then be monitored through the DOUT# SMAs and the comparator input through VINP#_MON pad on the edge of the board.

1.5 Analog Inputs (levels)

The analog input to the Kilimanjaro (VH, VL, CVH, and CVL) can all be set using the trim pots located at the bottom of the board. VH, VL, CVH and CVL are independently set for each channel.

When setting the analog input voltages using the trim pots, a shorting plug must be installed in the jumper adjacent to the trim pot being adjusted. The adjustment voltage can be measured on the correspondingly labeled pin of JP17.

Alternatively, any of these voltages can be input from an external source using JP17. If this is done, the jumper connecting the corresponding trim pot should be removed to keep the trim pot from loading down the applied signal.

Note VH_1, VL_1, VH_0, VL_0 are the kelvin connections for VH_IN_1, VL_IN_1, VH_IN_0, VL_IN_0.

1.6 Voltage References

The POS_REF and NEG_REF voltages are used to set the minimum and maximum voltages for the analog inputs to the Kilimanjaro. The POS_REF voltage is also used to supply the voltages for VDD and DVEE to the KILIMANJARO. These voltages are usually set to POS_REF = 15V and NEG_REF = -6.5V, and should not normally be changed. These voltages can be measured at the POS_REF and NEG_REF pins of J1.

1.7 Temperature Sensor Diodes

The TEMP pin (pin#8) of the Kilimanjaro is connected to the anode of its internal temperature sensor diode string. This pin is connected to the pin labeled “ANODE” of JP17, the anode of the diode string will be connected to the +18V supply through a 158KΩ resistor which will provide 100µA of current through the diodes. The Cathode side of the temperature diode string is connected to the EN [1] pin (pin #12) of the Kilimanjaro. This pin is connected to the EN[1] pin of JP17 on the EVM board. The die temperature according to the equation in the Kilimanjaro datasheet can be measured across the ANODE and EN_1 pins of JP17.

2 Jumper Placement

2.1 Default Jumper Placement

The following jumpers should be installed for standard board/part operation:

JP1 (VEE supplied using on-board regulator)
JP2 (VCC supplied using on-board regulator)
JP13 (DVEE)
JP42 (DVEE)
JP3 (Positive ref supplied using on-board regulator)
JP4 (Negative ref supplied using on-board regulator)
JP43 (VDD)
JP36 EN0 between center pin and 3.3 VDD pin
JP37 DATA0 between center pin and 3.3 VDD pin
JP38 EN1 between center pin and 3.3 VDD pin
JP39 DATA1 between center pin and 3.3 VDD pin
JP5 (VH_0 trim pot)
JP6 (VL_0 trim pot)
JP7 (VH_1 trim pot)
JP8 (VL_1 trim pot)
JP9 (CVH_0 trim pot)
JP10 (CVL_0 trim pot)
JP11 (CVH_1 trim pot)
JP12 (CVL_1 trim pot)
JP14 +3.3V

2.2 Misc.

JP27 between center pin and VCC pin
JP40 between center pin and VDD pin
JP41 install
JP44 install
JP100 install
JP101 install
JP102 install
JP103 install

2.3 Trim pot list

R3 Adjustment potentiometer for VEE
R7 Adjustment potentiometer for VCC
R15 Adjustment potentiometer for NEG_REF
R11 Adjustment potentiometer for POS_REF
R17 Adjustment potentiometer for DVEE
R18 Adjustment potentiometer for VH_IN_0
R19 Adjustment potentiometer for VL_IN_0
R20 Adjustment potentiometer for VH_IN_1
R21 Adjustment potentiometer for VL_IN_1
R22 Adjustment potentiometer for CH_IN_0
R23 Adjustment potentiometer for CL_IN_0
R24 Adjustment potentiometer for CH_IN_1
R25 Adjustment potentiometer for CL_IN_1
R110 Adjustment potentiometer for VDD
R106 Adjustment potentiometer for +3.3 (voltage for +3.3 external circuitry)