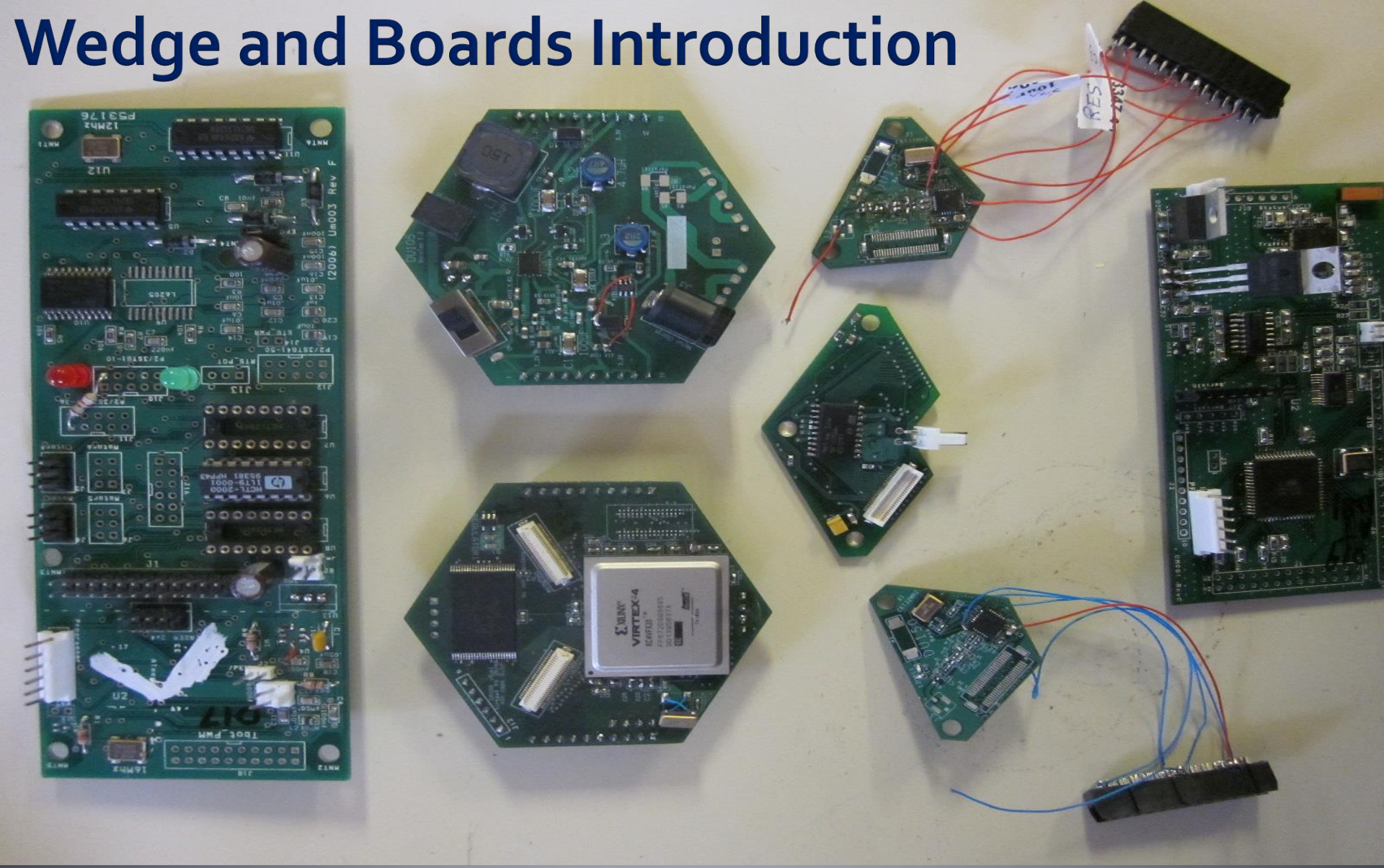
Wedge and Boards Introduction



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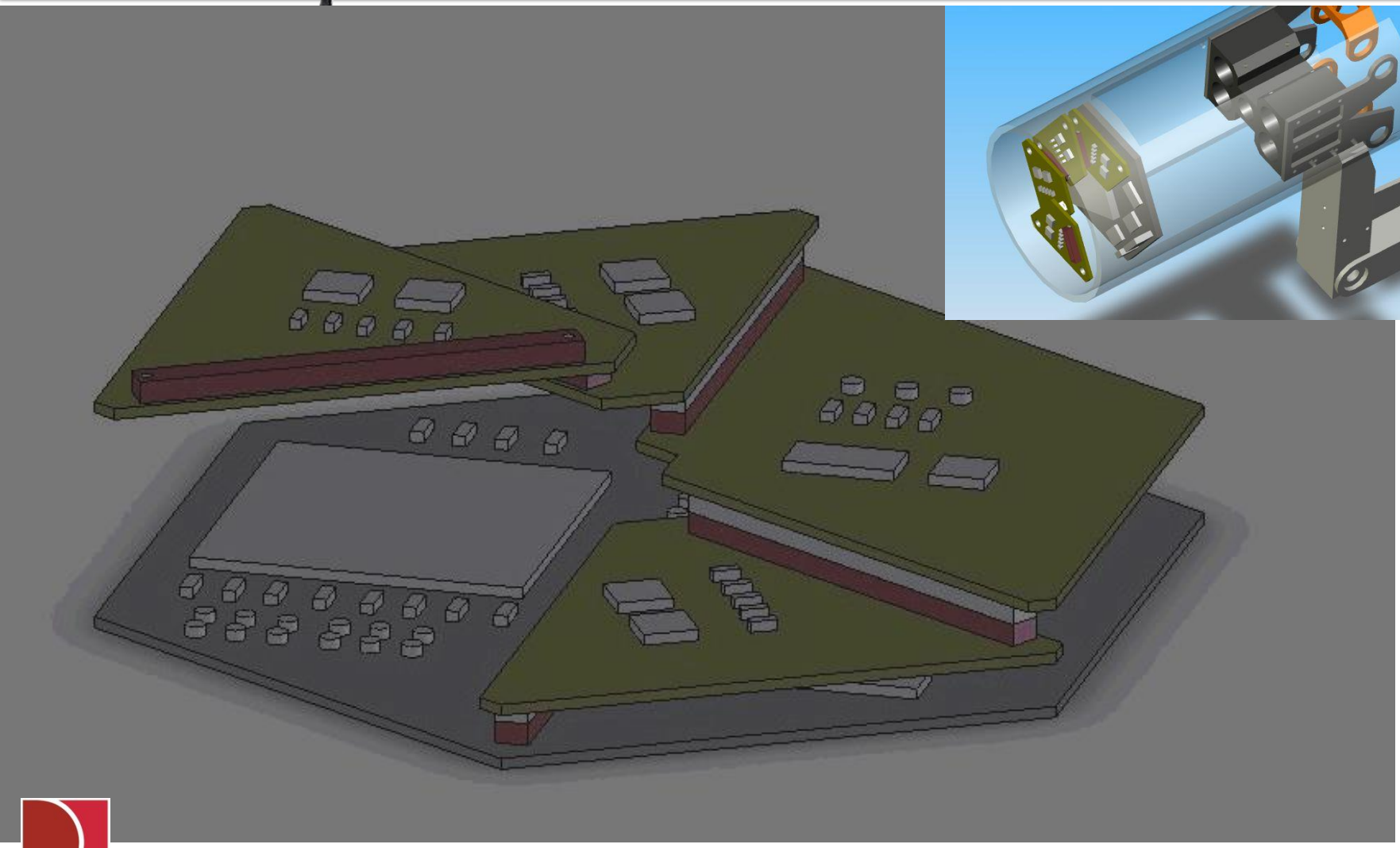
2/8/2019

Purdue University, West Lafayette, IN, 47907, USA

Wedge and Boards Assembly Drawing



Boards List (12 kinds of boards)

Board Name	Purpose
TRC1000	***RecoNode*** Main Board
Robei	Zynq 7000 Platform
TRC1002	***RecoNode*** Main Board – FX40 dual-core
TRC1105	Power Supply Board
DU109	Morphing Bus Adapter Board for ML405
DU110, DU111	V6502/OmniVision Camera Board
TRC1120	DC Motor I/O Board
TRC1121	RC Servo Output Board
TRC1140	IMU Board
DU141	ADC Board
TRC1150	ZigBee Communication Board
TRC1160	Ethernet 100/10 Communication Board
TRC1161	USB 2.0 Communication Board
DU151 (not designed)	Dual-Band Communication Board
DU155	Bluetooth Communication Board

TRC1000 - *RecoNode* Main Board

Major Chips:

1. Virtex 4
2. DRAM
3. PROM

FPGA chip Virtex 4 includes embedded PowerPC 405,
2 male Morphing Bus connectors.

Version:
V1.1

Working Status:
Download Codes and Work fine

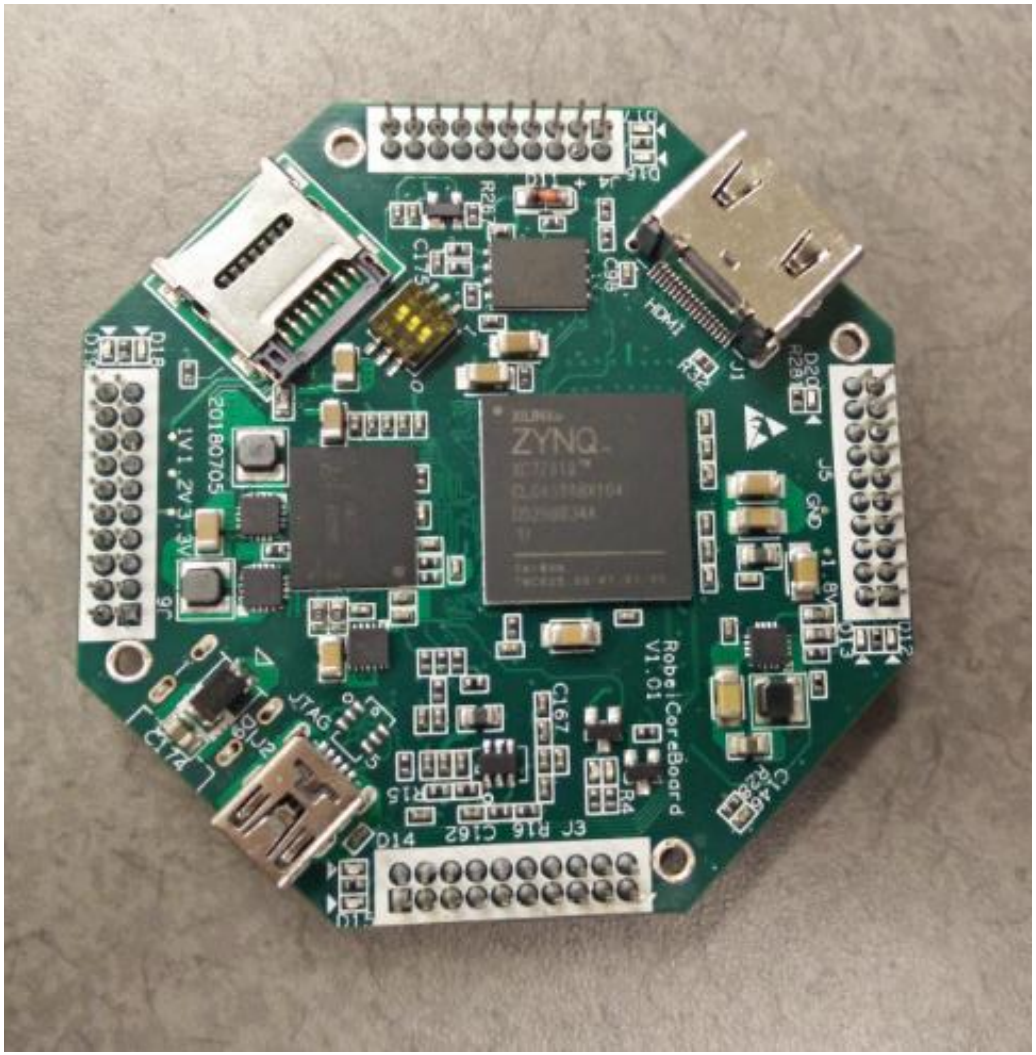
Virtex 4 –PowerPC 405

The 405 Core enables high performance designs in which low cost, low power and versatility are the critical selection criteria.

Specifications

- Technology: 0.25 µm CMOS process (0.18 µm L_{eff})
- Frequency: 0-200MHz (200MHz at WC process, 85C, 2.3V)
  - 276MHz nominal
- Performance: 228 Dhrystone 2.1 MIPS@200MHz (est.)
- Supply Voltage: 2.5V
- Die Size: 2.0 mm^2 for CPU only (est.)
- Power (typ.): 400mW @ 200MHz (est.), CPU only
- 3.04 mW/MHz with 16KB ICU/8KB DCU (est.)
- Qualified operating range –40C to 125C, 2.3V to 2.7V

Robei – RecoNode Zynq?



Major Chips:

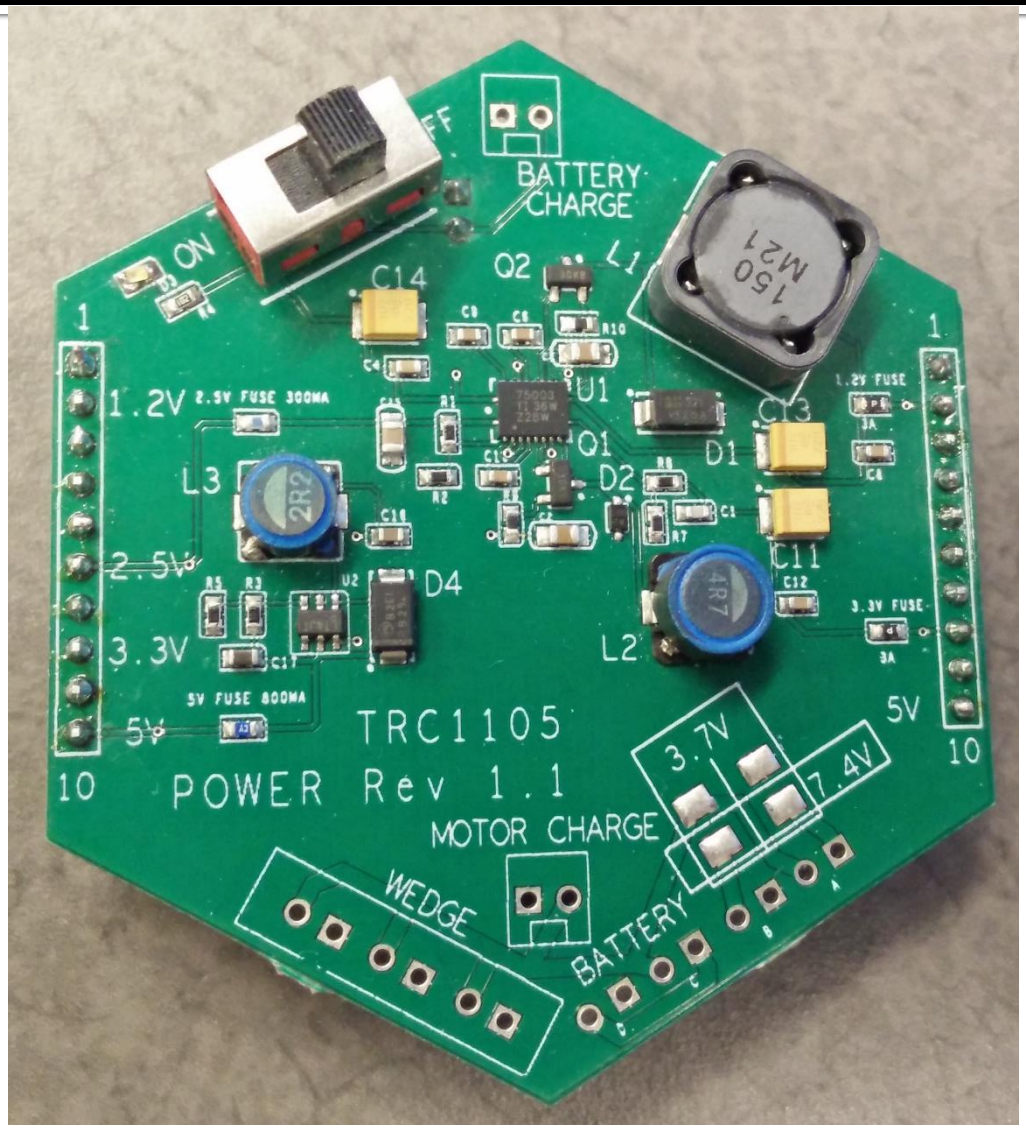
1. Zynq7000

FPGA chip Zynq7000 contains an ARM A9 core processor.

Version:
V1.01

Working Status:
This is a potential replacement for the RecoNode by partner company
DDR problem

TRC1105 - Power Supply Board



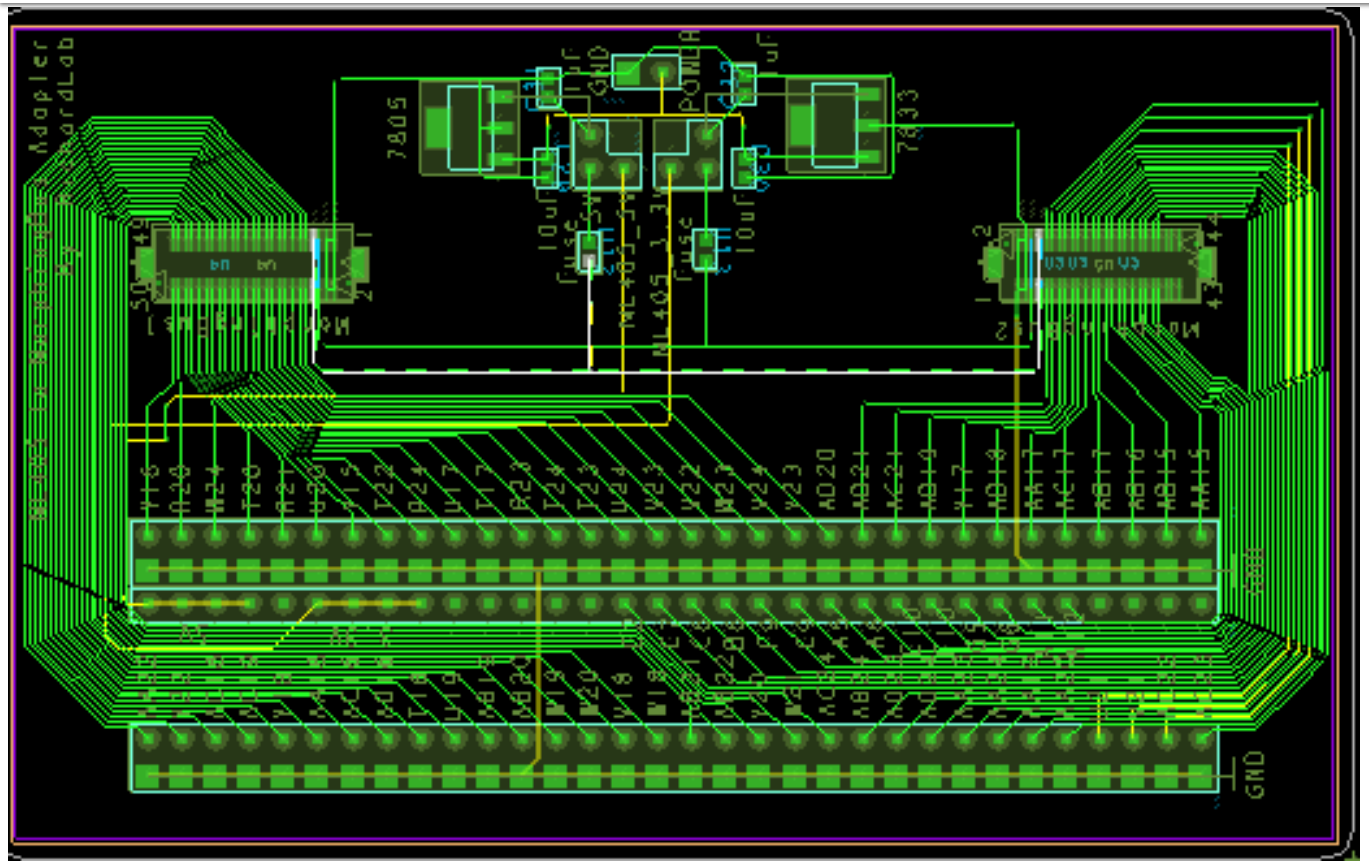
Major Chips:
1. TPS75003
2. LTC3426

Version:
V1.1

Working Status:
It can provides 4-level voltages(1.2V, 2.5V, 3.3V, 5V) correctly.

But we need to correct 2 wiring errors in V1.1

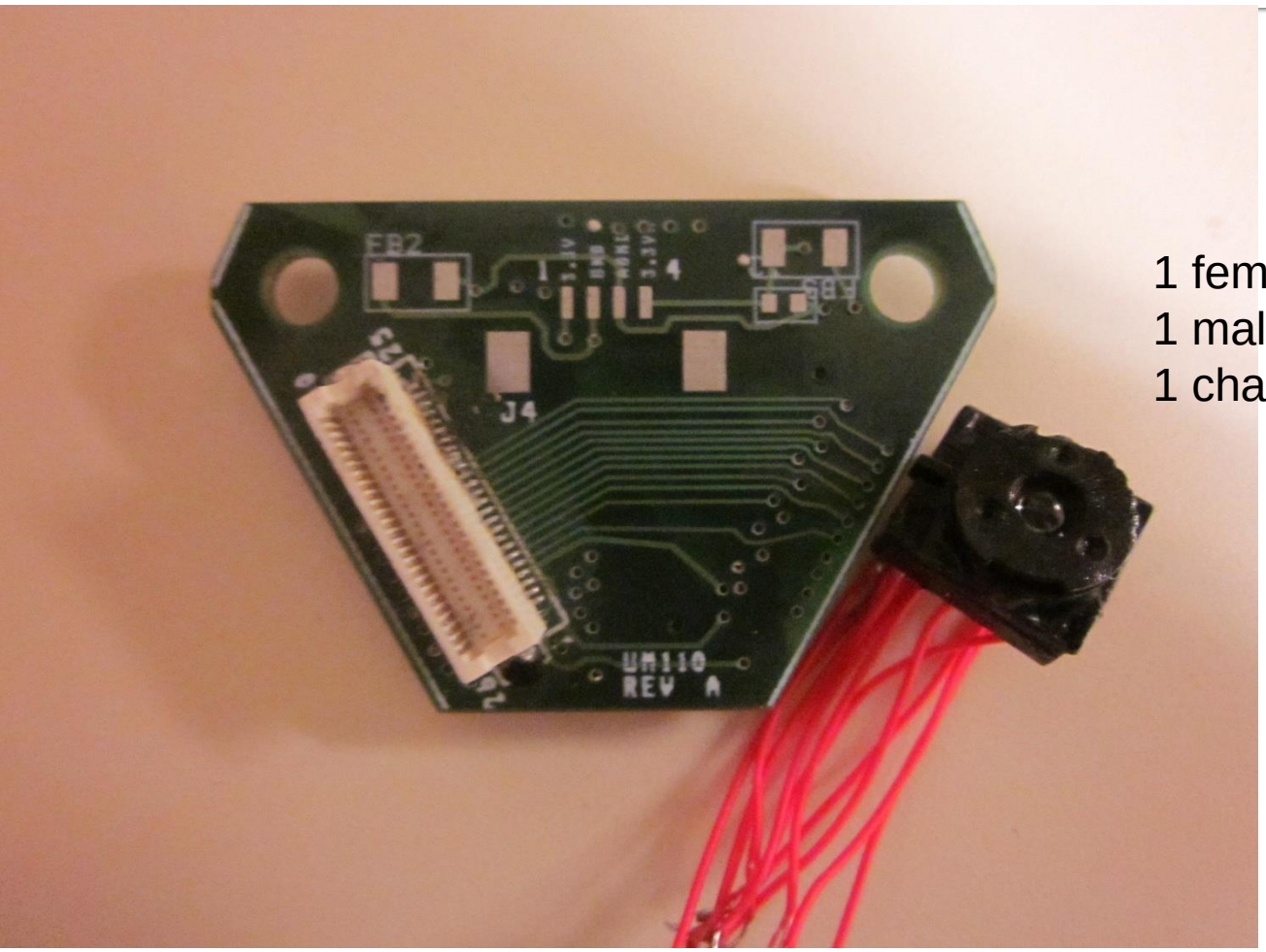
DU109 - Morphing Bus Adapter



Version:
V1.0

Working Status:
Will be produced, it works for ML405.

DU110 - ST Micro V6502 Camera Board

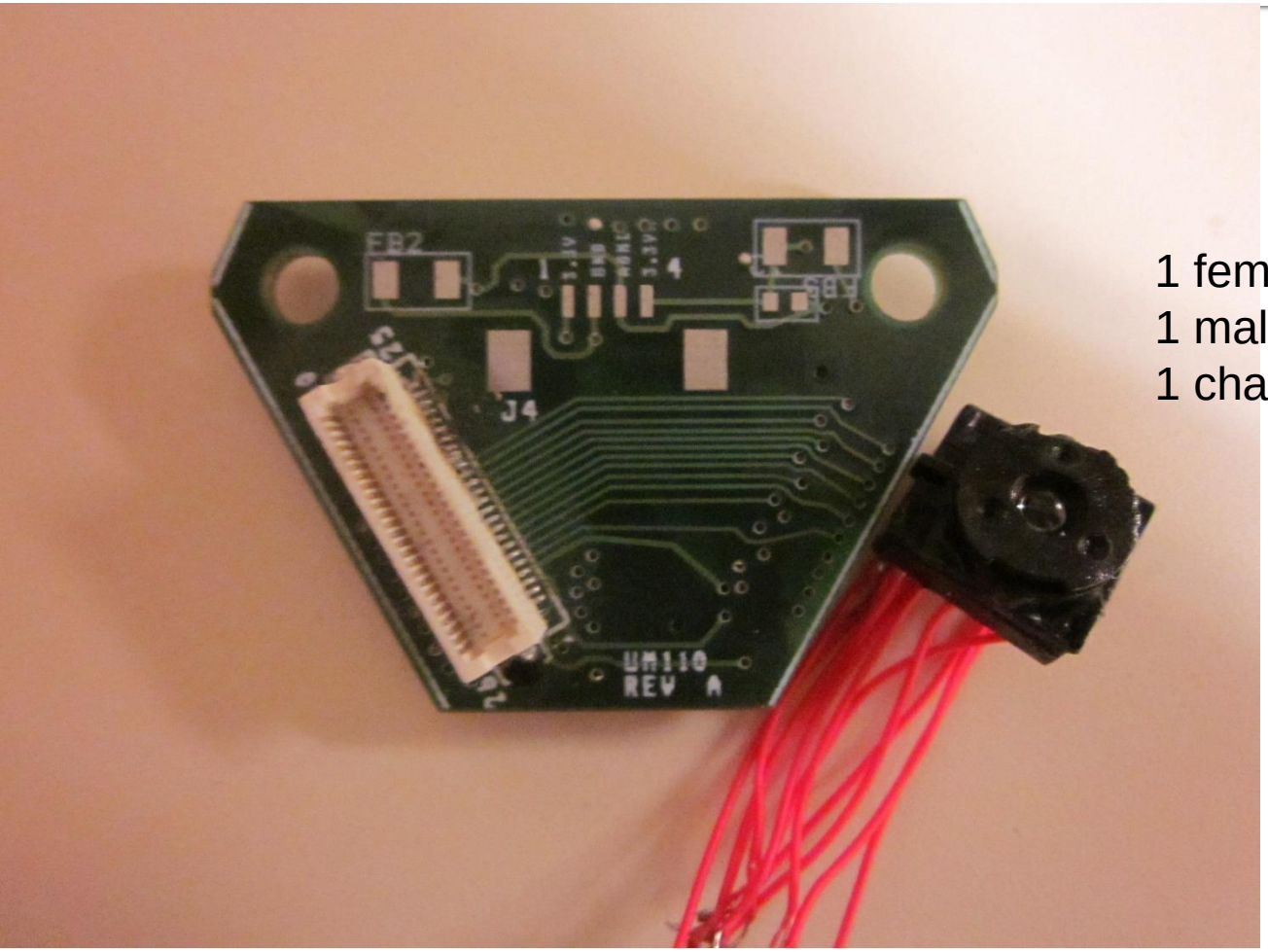


Version:
Rev A

1 female morphing bus connector
1 male morphing bus connector
1 channel for camera

Working Status:
should be tested again, and make sure it can work correctly.

DU111 - OmniVision Camera Board



Version:
Rev A

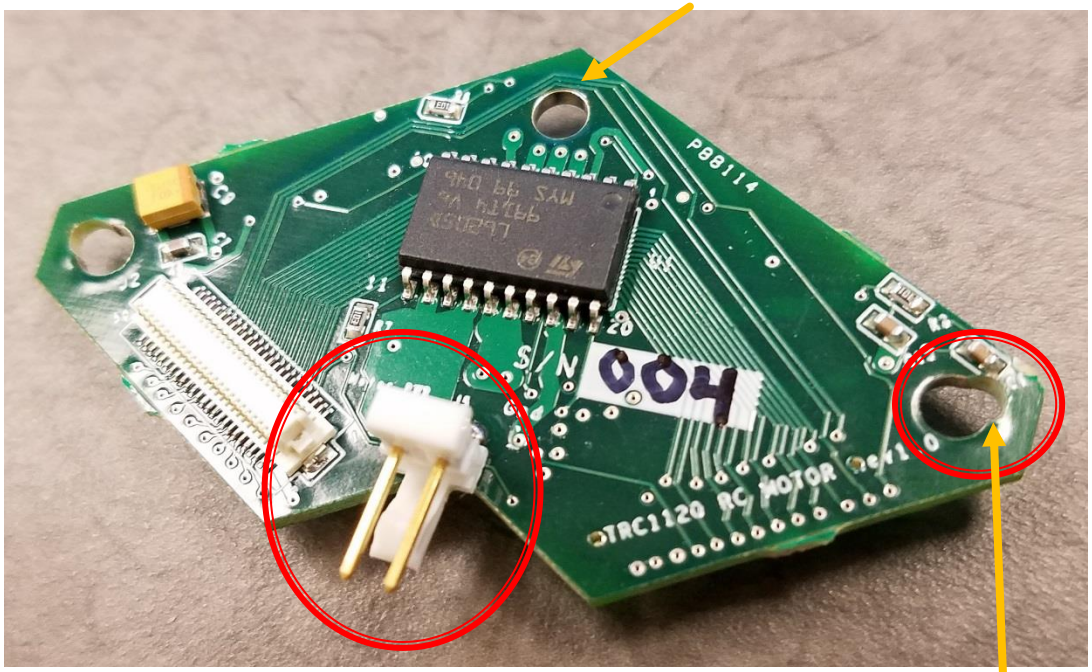
1 female morphing bus connector
1 male morphing bus connector
1 channel for camera

Working Status:
Being designed, will be produced..

TRC1120 - DC Motor I/O Board

6.3V Cap
(adjust for
Motor Power)

Do not modify



Major Chips:
L6205

2 channels for 3A PWM output
2 channels encoder input

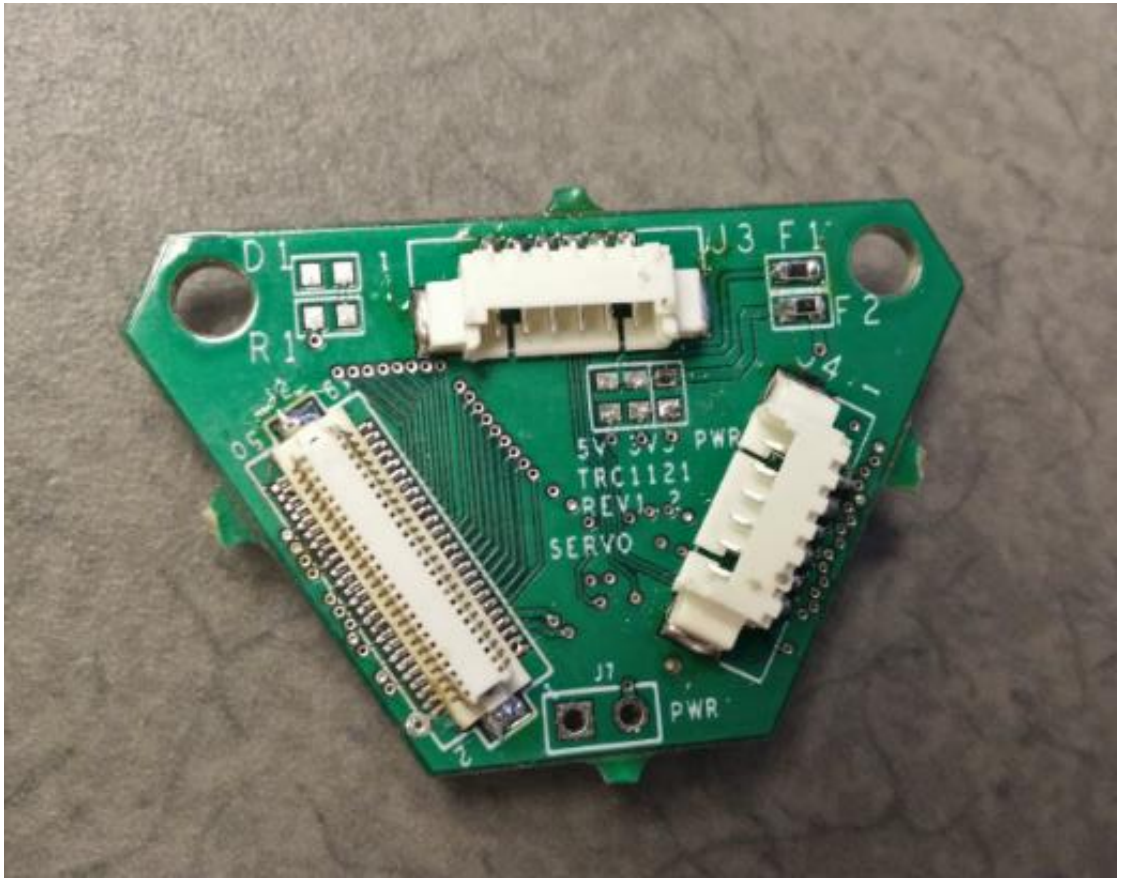
Version:
Rev1.0

Working Status:
Can get the parameters of the motor, works fine
Adjust cap for motor supply

Connector for
Motor Power
(proper orientation)

Enlarge holes
2x

TRC1121 - RC Servo Output Board

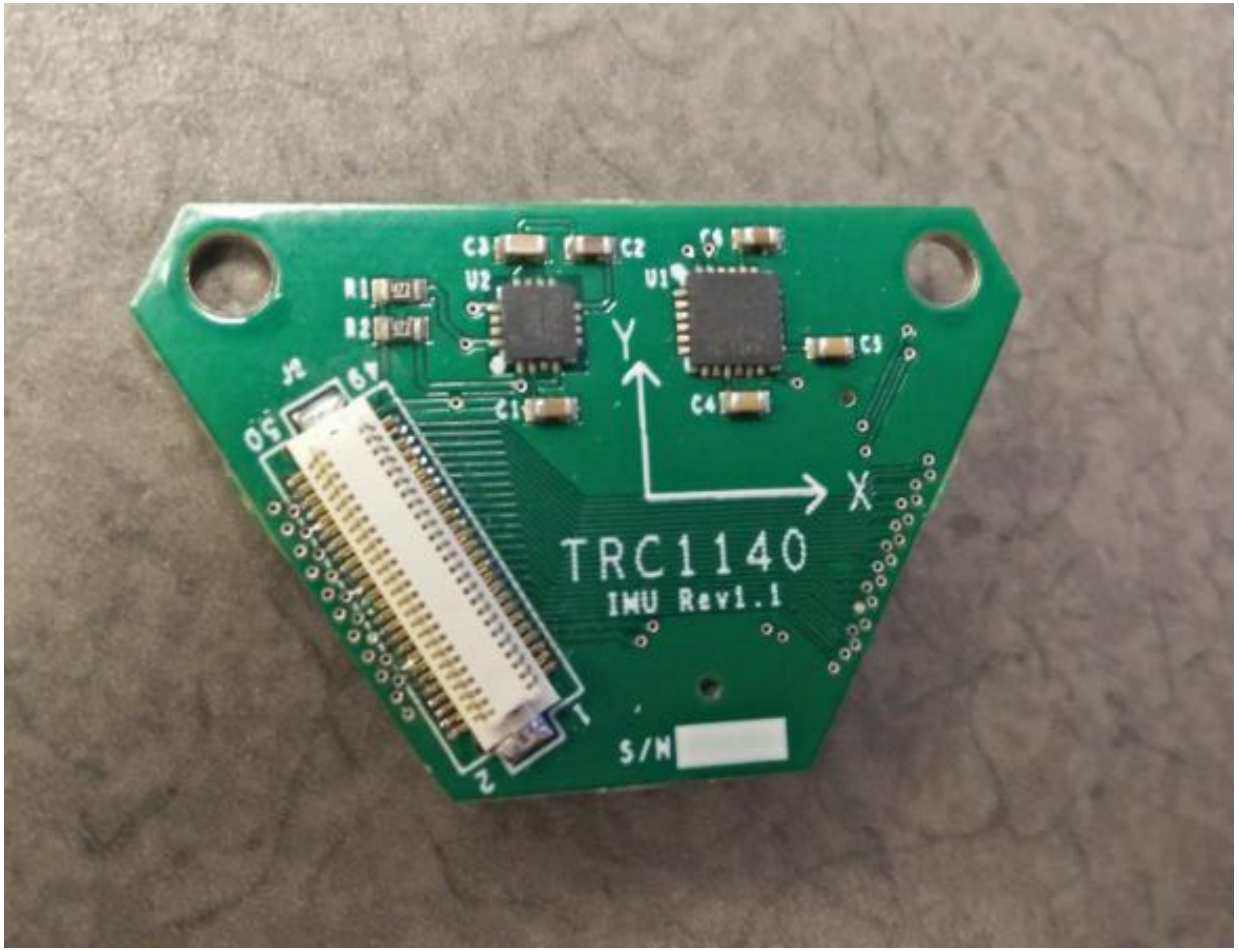


Version:
Rev 1.2

4 channels for RC servos
Updated to a single-wedge

Working Status:
J6 wiring error

TRC1140 - IMU Board



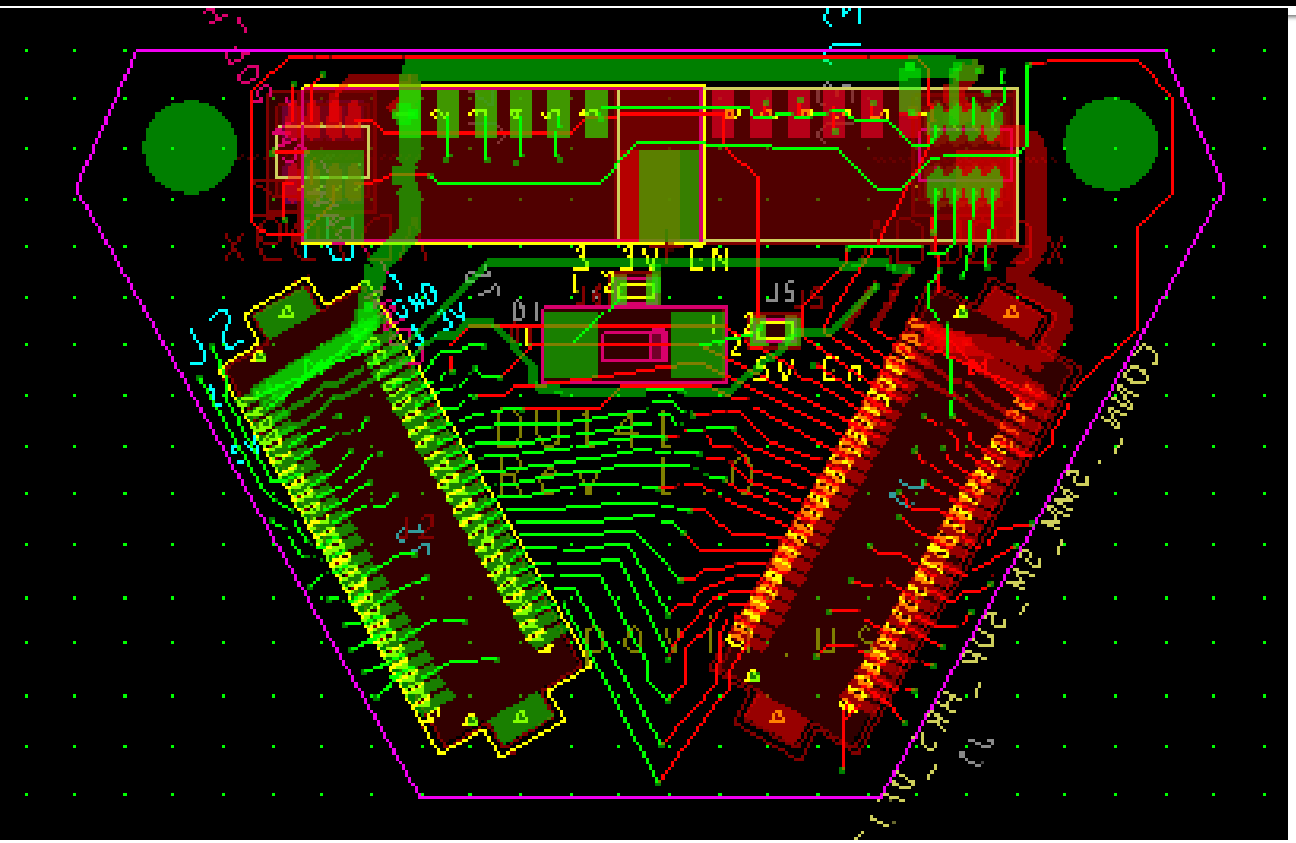
Version:
Rev1.1

Major Chips:
1. LSM303DLH
2. AD799x
3. ITG-3220

1 female morphing bus connector
1 male morphing bus connector

Working Status:
C4 wiring error
Gyros - untested

DU141 - ADC Board



Major Chips:
AD7991

Version:
Rev1.0

Working Status:
Not available

1 female morphing bus connector
1 male morphing bus connector

TRC1150 - ZigBee Communication Board

Major Chips:

1. CC2520
2. I-PEX connector
3. Chip antenna

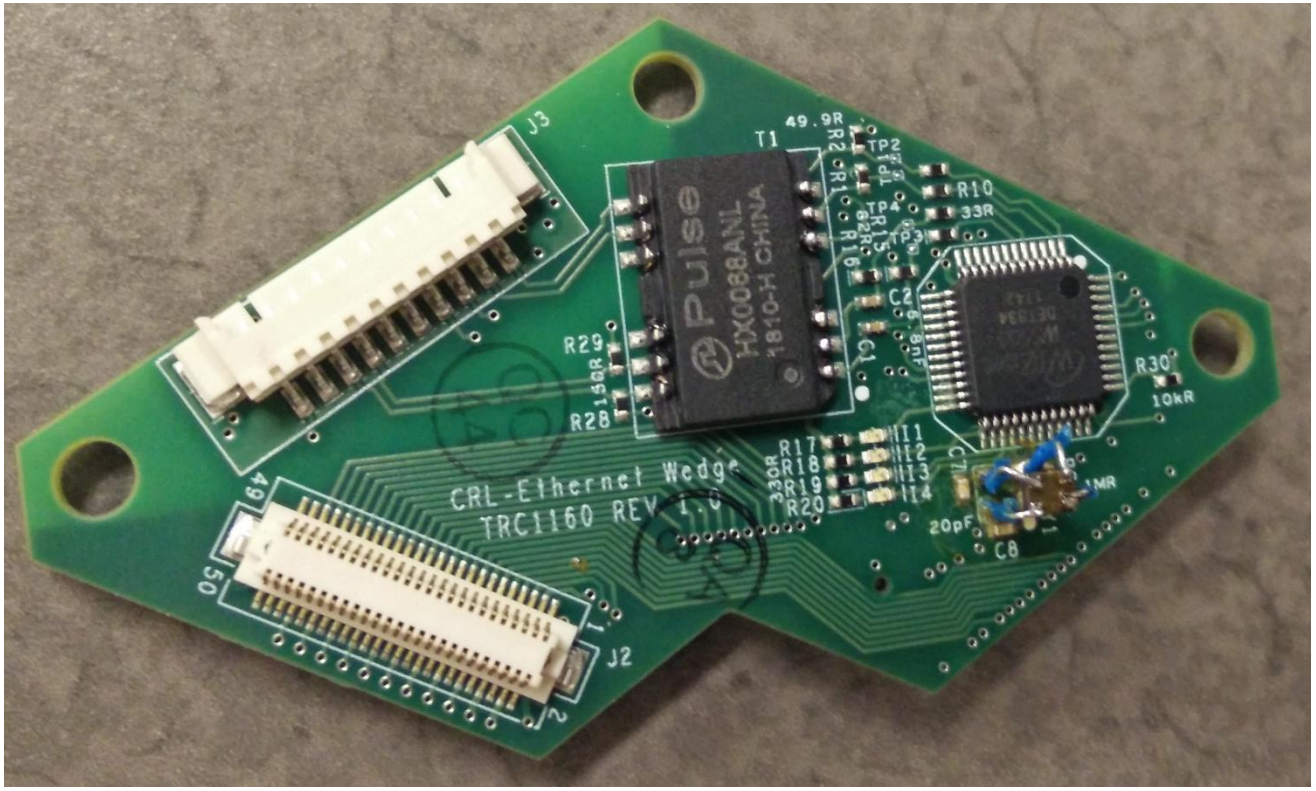
ZigBee Chip with two kinds of antennas

Version:
V 1.0

Working Status:
Digital Part can work;
RF Part can not work.

RevB will be designed according to TI's Reference and will be produced.

TRC1160 - Ethernet Communication Board



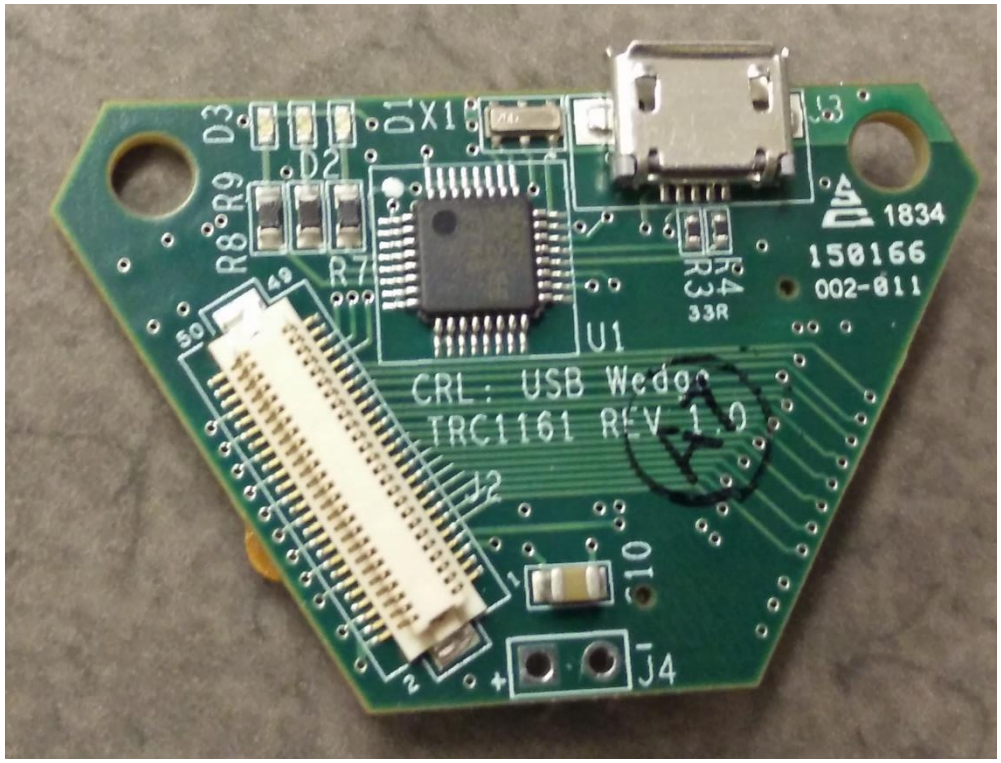
Major Chips:

1. W5500 SPI Ethernet 100/10 Controller
2. Pulse HX0088 Low Profile Magnetics

Version:
V 1.0

Working Status:
Board has been designed and powered up. Drivers do not yet exist

TRC1161 - USB Communication Board



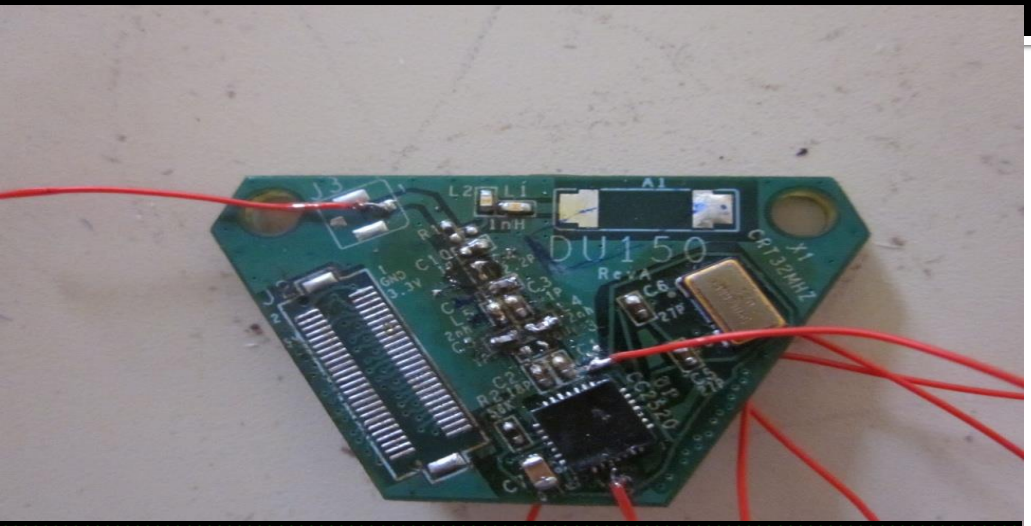
Major Chips:

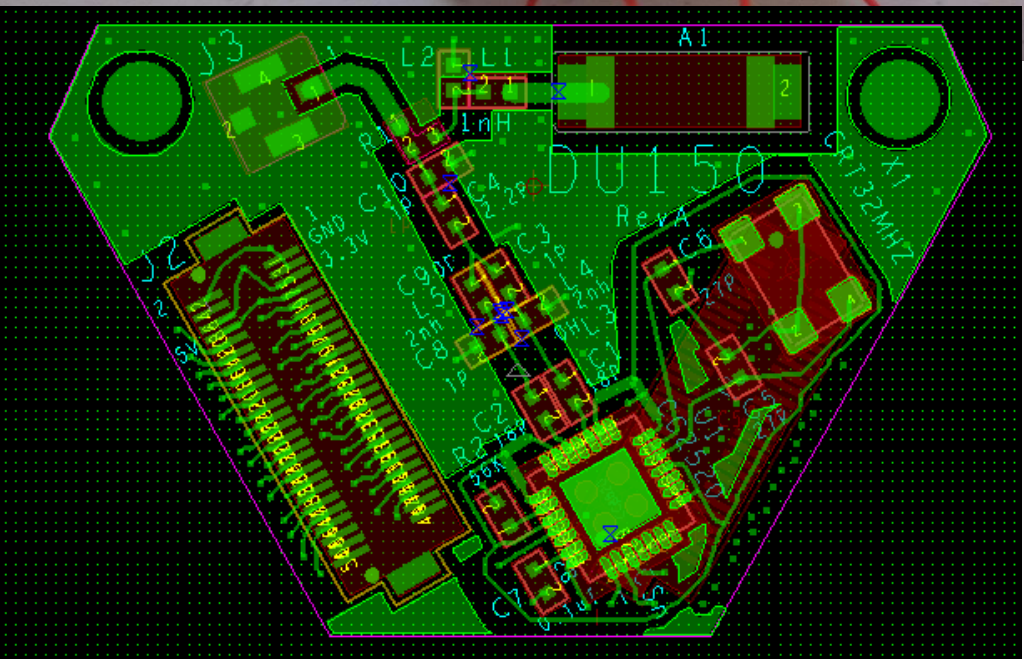
1. MAX3421E SPI Host/Slave USB 2.0 Controller

Version:
V 1.0

Working Status:
Board has been designed and powered up. Drivers do not yet exist

DU151 - Dual-Band Communication Board





Major Chips:

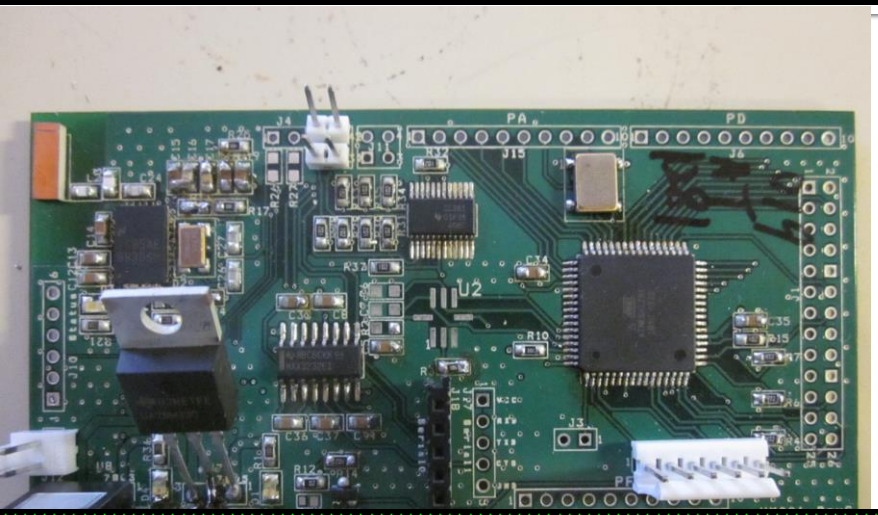
1. LMX9830SM
2. CC2520
3. Chip Antenna

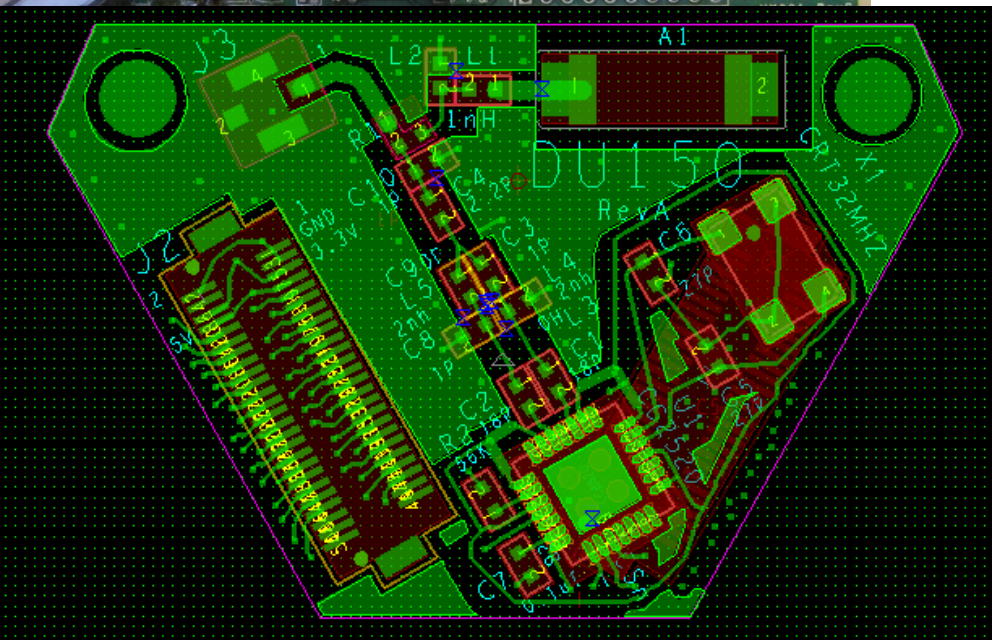
This board can support Bluetooth and ZigBee Communication together

Version:
Rev A

Working Status:
VaporWare

DU155 - Bluetooth Communication Board





Major Chips:

1. LMX9830SM
2. Chip Antenna

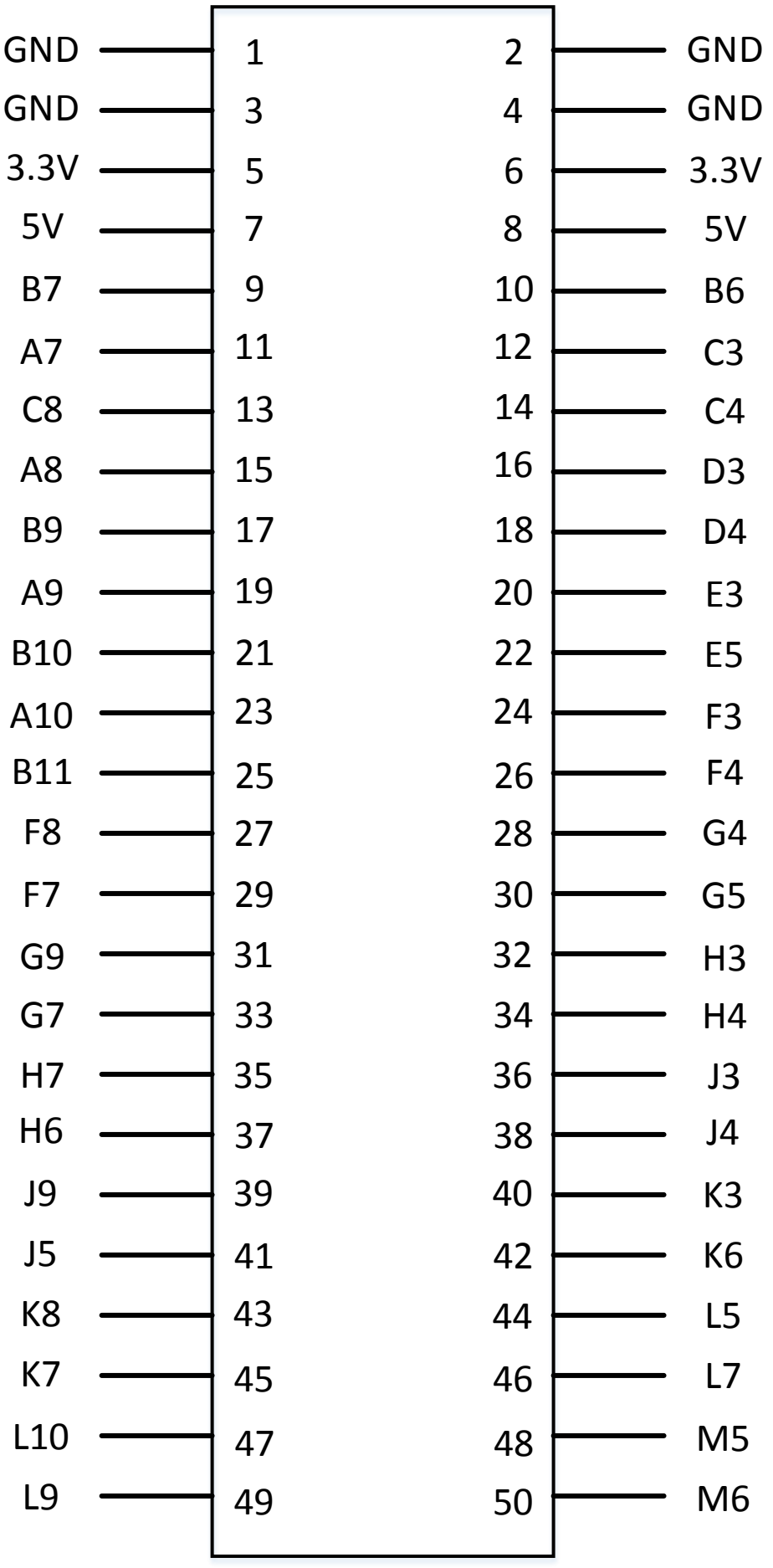
Bluetooth Chip with chip antennas

1 female morphing bus connector
1 male morphing bus connector

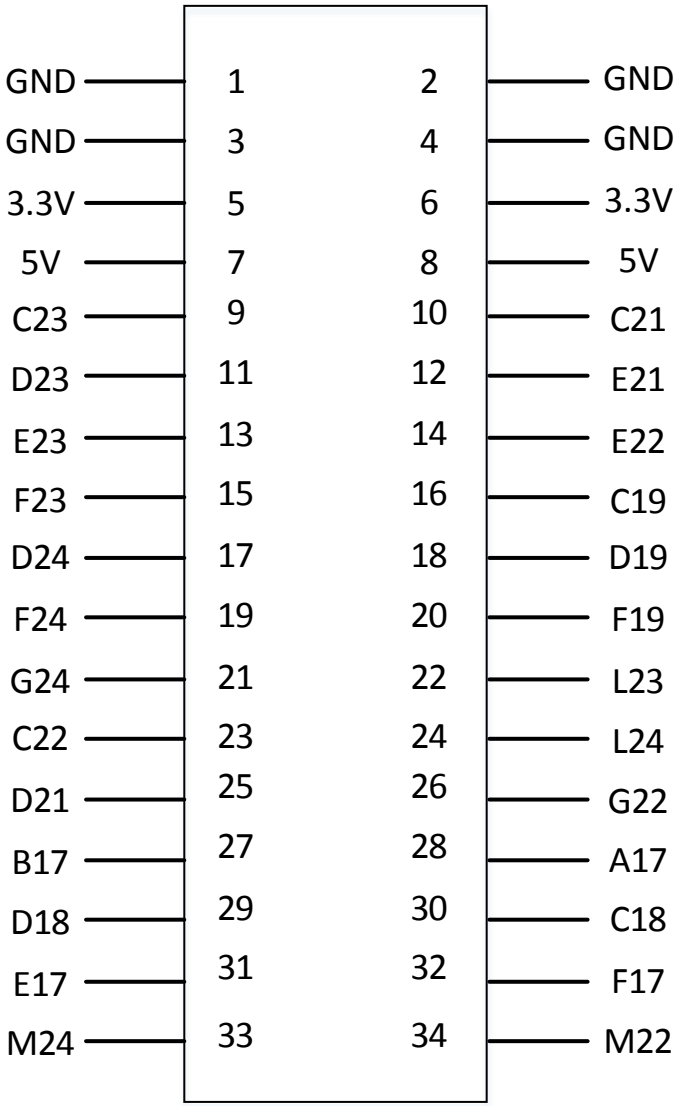
Version:
Rev A

Working Status:
The prototype works fine, now we are designing DU155 which has the morphing bus connector.

Morphing Bus 1 on TRC1000



Morphing Bus 2 on TRC1000



The End

Thank You