



**ROYAL ENGINEERS OF NADOO**

# Episode II - After Hours



# Overview

 Who Are We?

 Frequently Asked Questions

 Lessons Learned

 The Problems

 Parts & Pieces

 Secret Sauce

 Distributed Open Modular Environment

 RSeries

 Vader

 IA-Parts

 And another thing...

 XBee Myths & Facts

 Future

 Q & A



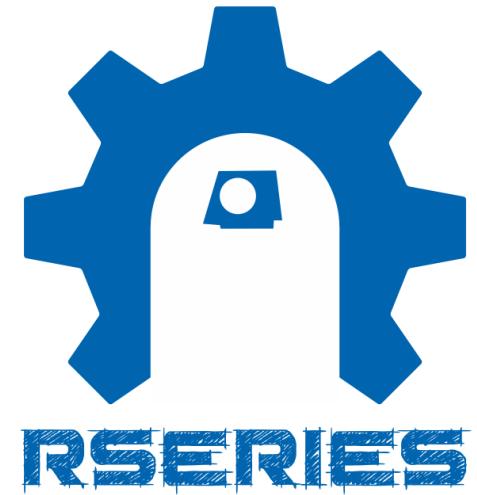
# Who Are We?

- Small group of somewhat like minded fellow builders
- Engineers, HW, SW, Graphics, Documentation, Sanity Checkers
- All wanting to learn!
- Supports both Open & Closed source
- By working behind the scenes, dramatically reduces group peer pressure!
- See an Astromech is a Integrated Platform
- Primarily focused on evolving the Astromech technology:
  - Interoperability
  - Hide complexity
  - Knowledge transfer
  - Standardized components
  - Reduce reliance on general consumer products
- Open & frank communication
- Nothing is sacred when it comes to the projects
  - MCU Agnostic
  - Communication - Serial TTL & I2C
  - Protocols - Simple & well not so simple
  - PTH & SMD
  - Light & Dark Side



# Frequent Questions

- |R Where do we start at with RSeries?
- |R Do I have to buy a DIY kit?
- |R Can I get it pre-assembled?
- |R Can you program it for me?
- |R Can we lower the cost?
- |R Can it work with ....
  - |R Teeces
  - |R J.E.D.I.
  - |R WiFi or BlueTooth
  - |R iOS App
  - |R Android
- |R Can we make the footprint Smaller or Stealthy?



# Lessons Learned

- Evolutional vs. Big Bang
- Must be easier to implement for Builders
- Re-factored the entire software stack
- Screen Software Configurable
- End Points, Area Zones
- Telemetry
- Custom Controls
- Discrete SW Modules
- Display I/O
- RF/XBee
- Control Input - Multiple Input Options
  - Wii Nunchuk
  - Dual Wii Nunchuk
  - Wireless Vader Controller
- Configuration
- Integration of Tuscen into the base Code!
- Vader dual Wireless handhelds

**STILL TOO**  
**RSERIES**  
**COMPLEX**



# The Problems

- |R Every droid & builder is unique
- |R Tried & True vs. Blazing Path
- |R No Complete Solution
- |R Complexity to “integrate” custom Pieces & Parts
- |R Features & Functions vs Cost
- |R Perceived Competing Solutions
- |R Hardware & Software
  - |R Compatibility
  - |R Complexity
- |R Airplane RCs are still #1, Why??
  - |R Plug & Play
  - |R Simple: Move Stick = Servo Movement
  - |R Push Button = Sound Happens



# Parts & Pieces

## Parts

-  Simple... give it power, it works
-  Velchek PSI
-  Dave's Logics
-  Teeces v3 Logics
-  LFS
-  CF3 Sound
-  Simple, works for simple droid, however hard to integrate, HW & SW skills

## Pieces & Components

-  Helps make a Part
-  Helps with complete system
-  Arduino Shields
-  Various parts of a motor controllers
-  Misc
-  VMusic, rMP3, VLSI 10053b
-  Complexity is a problem, requires even more HW & SW skills to Integrate!



We have to fix this!



# Pieces & Parts Modular



## AND SIMPLE TO USE!



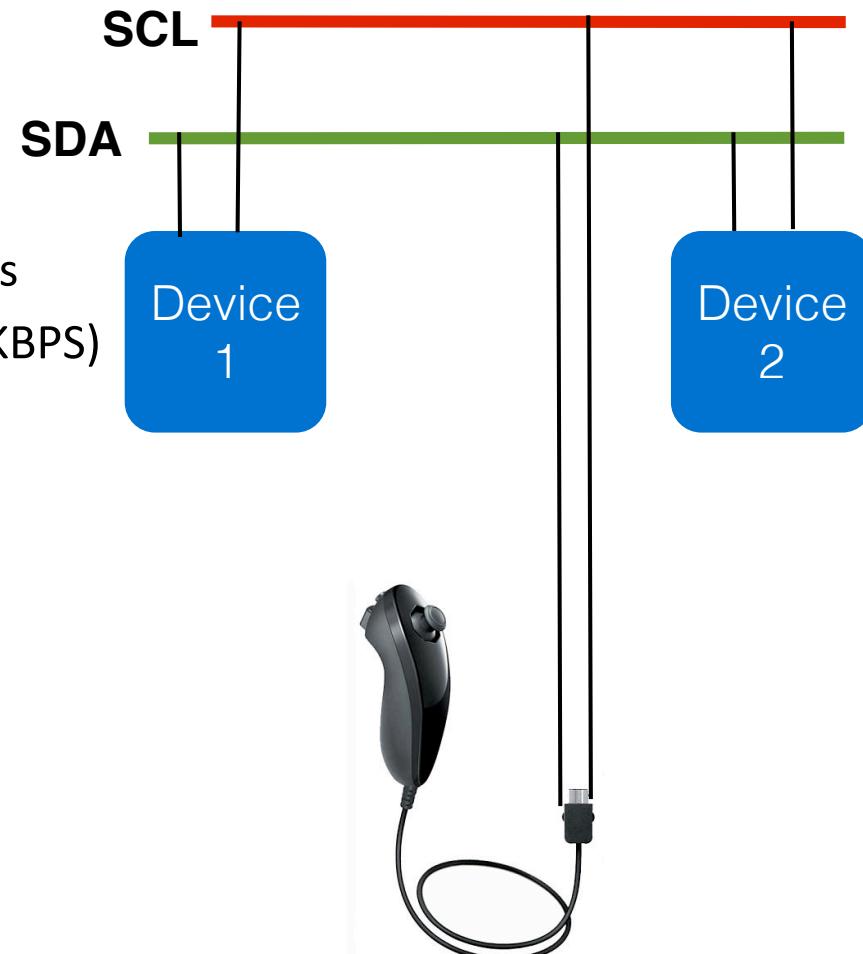
The Real Power with RSeries is...

I<sup>2</sup>C



# I<sup>2</sup>C Secret Sauce

- Industry standard way to link devices
- Two Wire Interface (TWI)
- Serial CLock - Speed
- Serial DAta - bidirectional transfer
- All I<sup>2</sup>C device connect in parallel on a serial bus
- Nominal data rate 100 K bits per second (100KBPS)
- Multiple masters
  - 127 Addresses
  - Master to Master Networking
  - 7 bit address
- Allows for large servo #s
  - 125,984 to be exact
  - 1,035 a single I<sup>2</sup>C bus
- I<sup>2</sup>C address assignment & reservation list
- Easy expansion & functionality
- TBD protocols will ride on top of I<sup>2</sup>C.



# Third Party I<sup>2</sup>C Devices

 Integrated Circuits

 Adafruit.com

 DIY Kits

 16 Channel 12bit Servo

 Real Time Clock

 LCD, LED & VC Sensors

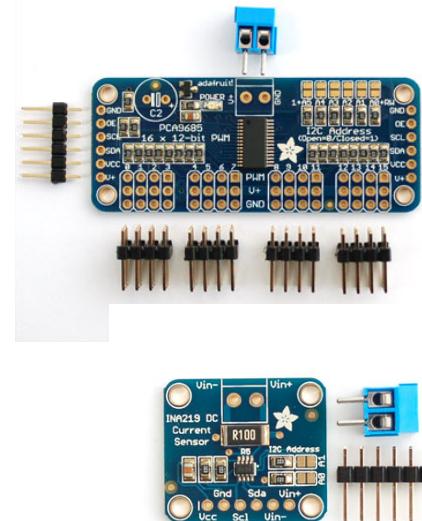
 Sparkfun.com

 BlinkM RGB LEDs

 Expansion Ports

 EEPROM Storage

 Cellular/GPS/SMS



ATtiny45 / ATtiny85

Reset	1	8	VCC (+)
(Analog Input 3) Pin 3	2	7	Pin 2 (Analog Input 1, SCK)
(Analog Input 2) Pin 4	3	6	Pin 1 (PWM, MISO)
(-) GND	4	5	Pin 0 (PWM, AREF, MOSI)

Atmel ATtiny85 via TinyWireS

# Three Step Proposal



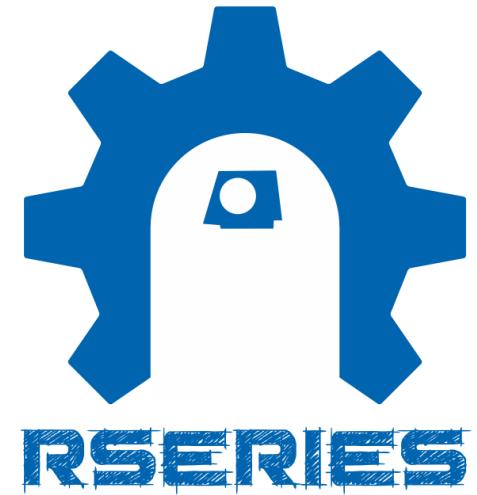
# Distributed Open Modular Environment

Step 1



# Distributed Open Modular Environment

- Stand Alone
- Addressable I<sup>2</sup>C Communication
- Holistic & Distributed Approach
- Controller & Receiver Agnostic
- SMD and PTH = DIY or SMD Runs
- I<sup>2</sup>C Standardized Address List
- Easy Expansion & Functionality
- Future Protocols should ride on top of I<sup>2</sup>C



# Distributed Open Modular Environment

DomeBump

MagicPanel

RLD & RPSI

HoloProjectors

Dome Servos

MP3 FX

Grappler

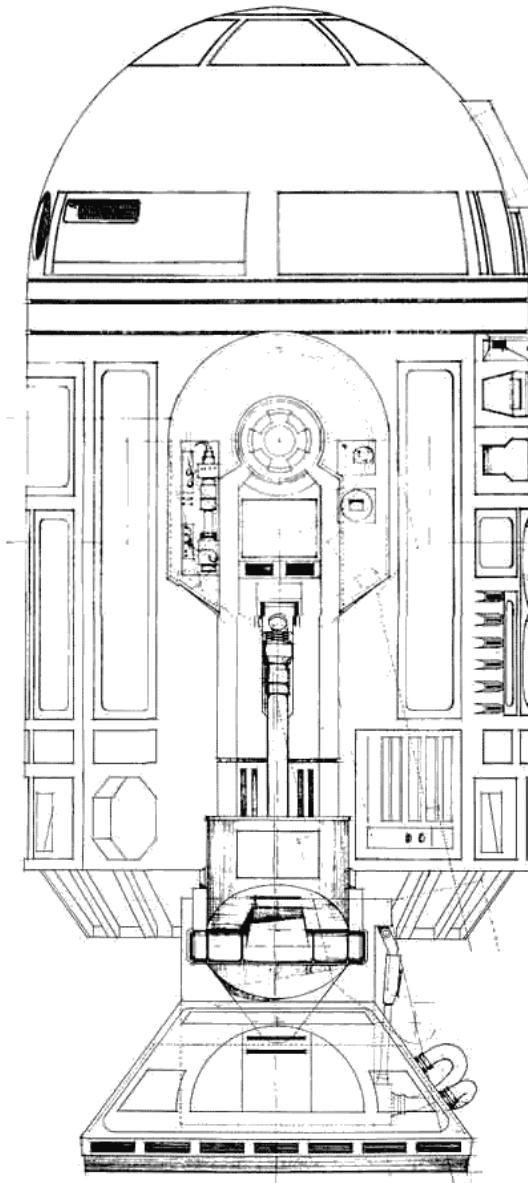
Boosters

Fusion 2-3-2

Character ID

VCsensors

Motor Control



I<sup>2</sup>C Addressable Bus - SlipRing

Per & LFS

Launcher

FLD & FPSI

GPS

Arms

Body Servos

CBI & DP

CBI & DP

Receiver

JEDI

Vader's FiST

WiFi

Prototype

Future



# Standards and a Open Reference Architecture Design

Step 2



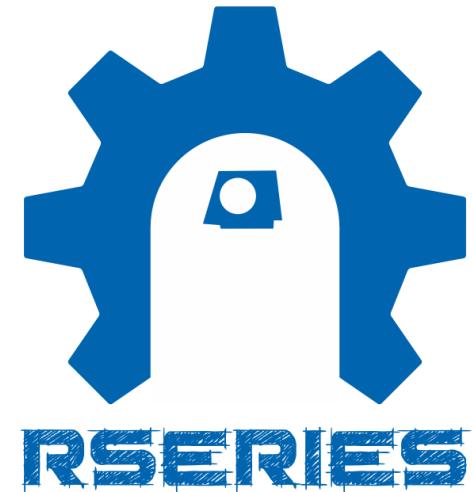
# Design Goals

- Safe & Fault Tolerant --- Fail Safes!
- Autonomous Features
- Easy to use
- Easy to fabricate
- Easy for DIY Builds
- Unified Parts
- Modular, Expandable & Customizable
- Obsolescence Avoidance
- Open Source SW & OS HW
- Creative Commons - Attribution - Share Alike, v.3
- FCC Approved
- Must provide “Magical” feel vs. “Radio Controlled”
  - Rapid interaction with people
  - Easy to hide



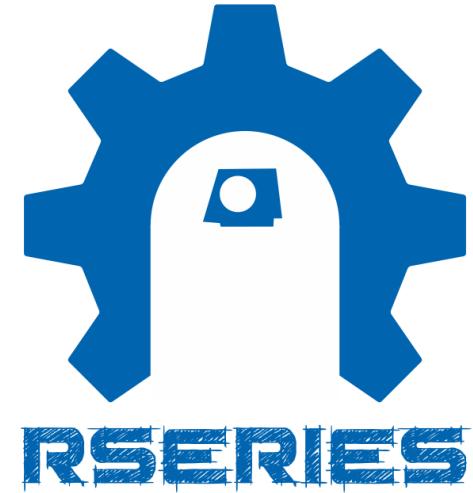
# Reference Architecture

- |R Droid Assigned I<sup>2</sup>C Address
- |R Droid Unique Address based on Function
- |R Droid 2+ x I<sup>2</sup>C Ports
  - |R Droid 4 Pins @ .100/2.54mm spacing\*
  - |R Droid SDA - Data
  - |R Droid SCL - Clock
  - |R Droid Gnd - Ground/Negative
  - |R Droid +5V - Positive +5V DC
- |R Droid 6V to 15V DC Input Main Power Jack of 2.1mm x 5.5mm
  - |R Droid Low Drop Out Voltage Regulators (LDO)
  - |R Droid Having 2+ different voltage buses inside your droid is ????
  - |R Droid For 24V systems, just use power from 1 battery



# Reference Architecture - cont.

- |R Droid Published Function/Operational Control
  - | R Droid HW Switches or Jumpers for functional options
  - | R Droid I<sup>2</sup>C Event
- |R Droid MCU Agnostic
  - | R Droid Atmel
  - | R Droid PIC
  - | R Droid Propeller
  - | R Droid Arm, BeagleBone, T.I., etc...
- |R Droid Reference HW & SW Available
  - | R Droid OSHW PCB Reference
  - | R Droid OS Code
- |R Droid RSeries Eagle Library & Footprints



# Integration

Step 3



# RSeries 1.0 Open Architecture

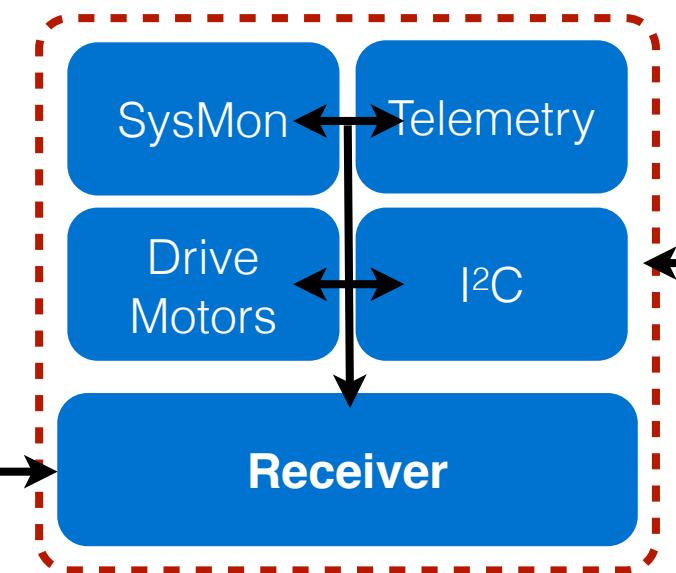
Simplicity with Flexibility  
is  
Strength



RSeries Foundation Controller

Tuscen Controller

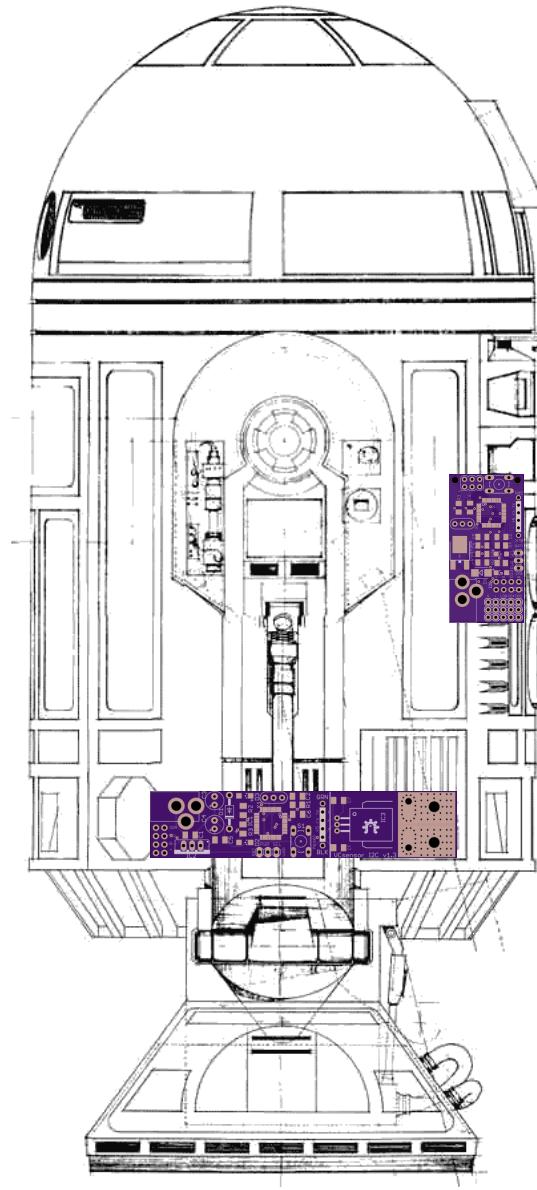
Vader's FiST



I<sup>2</sup>C  
Modules



# Modular Independence



I<sup>2</sup>C Addressable Bus - SlipRing



# What about our Investment?

Throw away? I don't think so...



# What are we announcing?

Flexibility & Strength



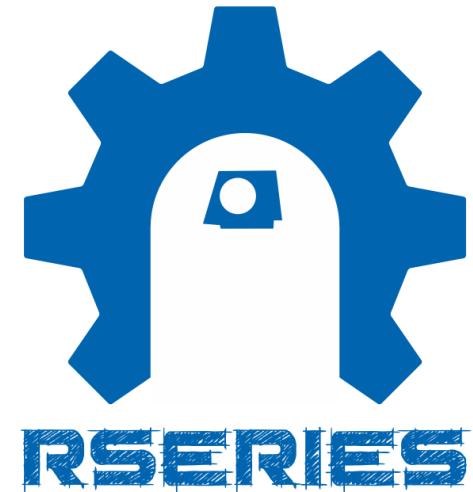
# Part 1: the Code!

Release 1.0 of Software



# RSeries Software v1.0

- Re-factored the Software stack
- Modularized the Code
  - Display - 4GDL or other possible
  - Multiple Controller Inputs
  - Configuration & Storage
  - Communications
  - Telemetry
  - FX Support
- Cross-Platform Controller Support
  - Vader's FiST
  - Micke Askernäs's Tuscen
  - Part of the main code tree



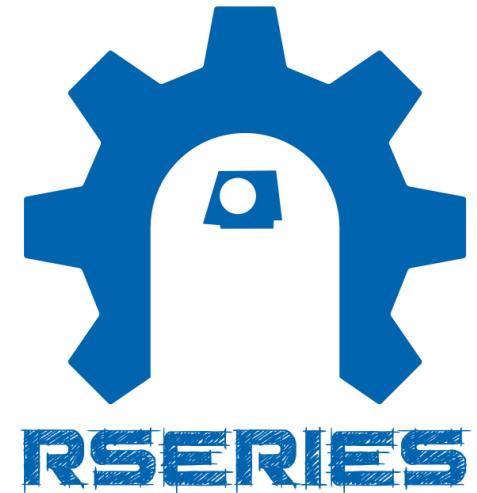
# Part 2: The Hardware

Simplified  
(Hide the Complexity)



# RSeries Hardware

- ▀ Unified parts used, in order to:
  - ▀ Simplified Parts List Across Platform
  - ▀ Lowers Run Startup Cost
  - ▀ Easier Supportability
- ▀ Modularized, to:
  - ▀ Reasonable SMD
  - ▀ SMD sizes selected to make hand soldering possible
  - ▀ Reuse as many as parts as possible between modules
- ▀ Fabricator Friendly
  - ▀ Reduces Cost
  - ▀ Reduces Time
  - ▀ Reduces Run Organizer Time
  - ▀ Reduces Failures
- ▀ Requesting all runs organizers to only offer pre-assembled



# RSeries Foundation

 Controller SMD:

 Embedded ATmega 2560

 Wii Nunchuk

 320x240 TFTLCD

 Receiver SMD:

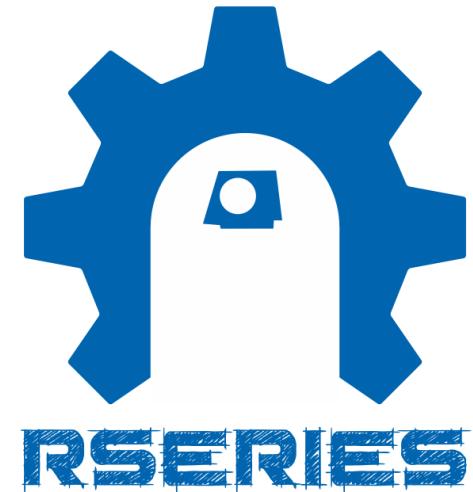
 Embedded ATmega 2560

 XBee Series2 Pro Mated/Bound (2)

 FX I<sup>2</sup>C MCU Modules for MP3 #1

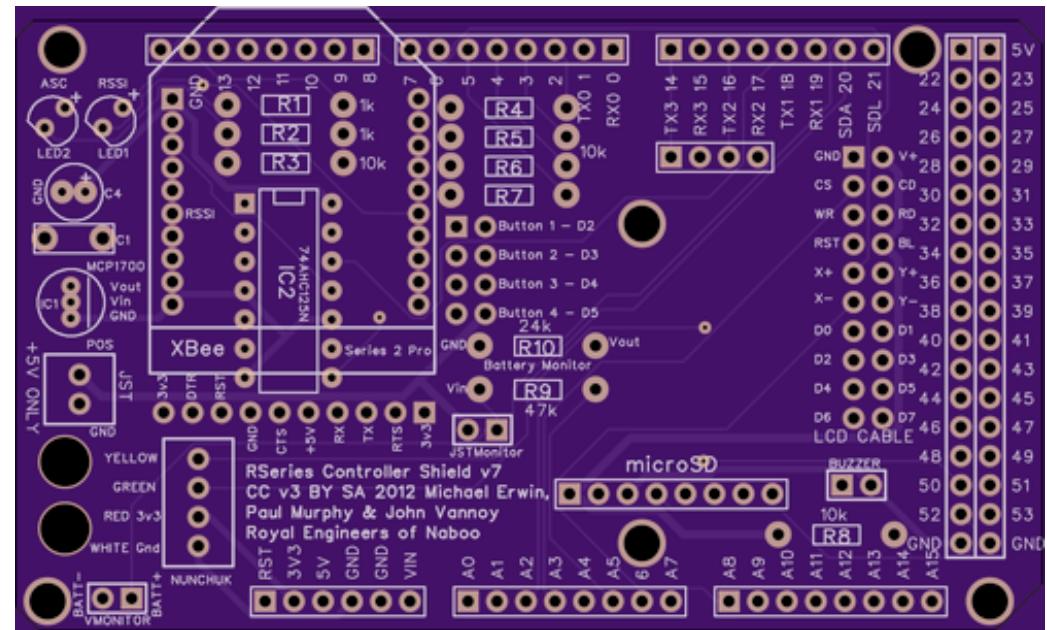
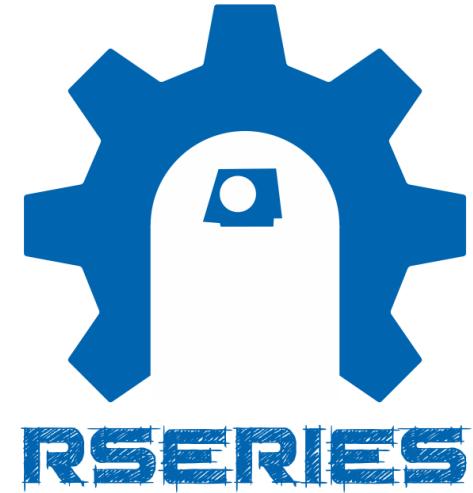
 Servo I<sup>2</sup>C Controller (16 Servos)

 Assembled, Programmed & Tested



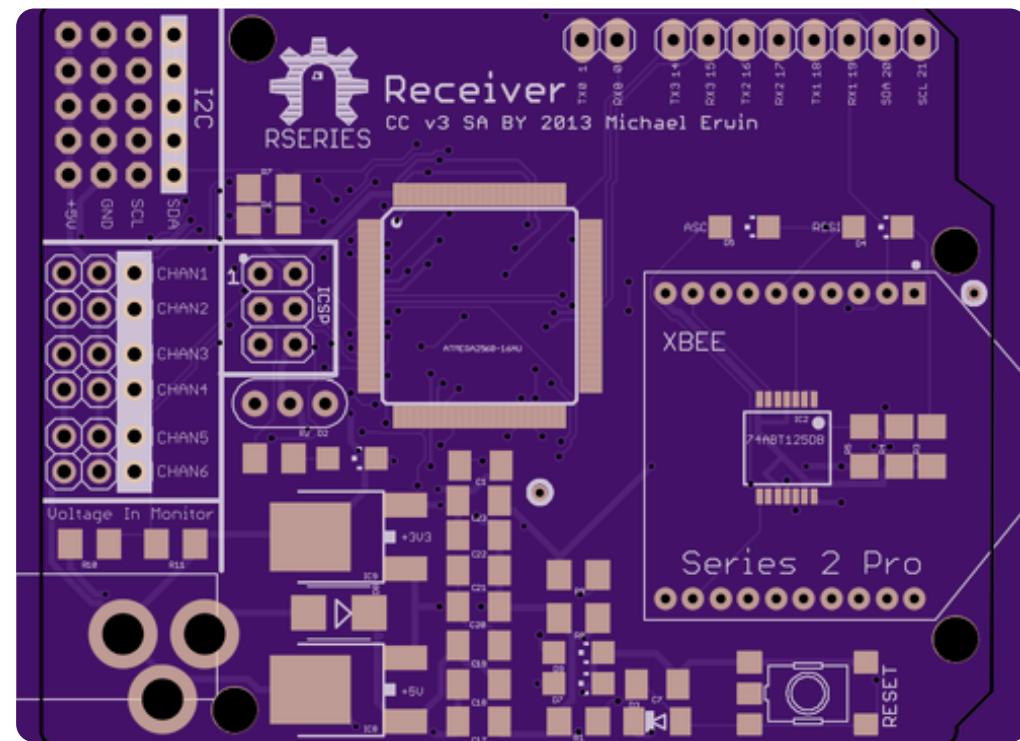
# Controller SMD

- Lower Cost
  - Embedded ATmega 2560
  - Wired & Wireless Input
  - R2D2  
Wii Nunchuk Input (I<sup>2</sup>C)
  - Wireless
  - R2D2  
2.8" TFT LCD Touch Screen
  - R2D2  
Micro SD Card Configuration (Optional)
  - R2D2  
4 Additional Buttons
  - R2D2  
LiPo Charger On Board
  - R2D2  
Battery Monitor
  - R2D2  
Warning Buzzer
  - R2D2  
Xbee 2 Pro 2.4Ghz
    - R2D2  
1.5 Mile Range\*
    - R2D2  
FCC Approved
    - R2D2  
1000s of Droids can co-exist



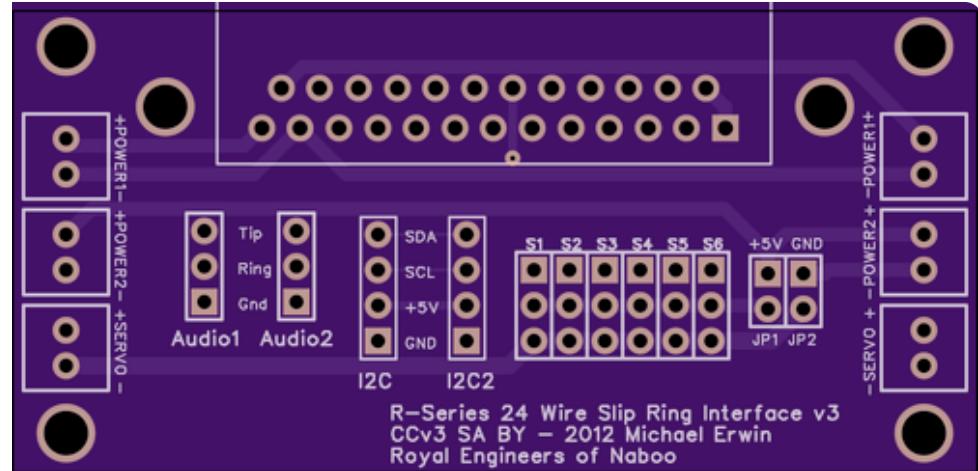
# Receiver SMD

- └ R2-D2 Lower Cost
- └ R2-D2 Embedded ATmega 2560
- └ R2-D2 Arduino UNO Footprint
- └ R2-D2 6 Servo Channels
- └ R2-D2 I<sup>2</sup>C FX Bus Connectors (5)
- └ R2-D2 4 Serial Ports (3 Available)
- └ R2-D2 ICSP Firmware Update
- └ R2-D2 Associate & RSSI Indicators
- └ R2-D2 2 LDO Regulators
  - └ R2-D2 1.5 Amp +5V
  - └ R2-D2 1.25 Amp +3v3
- └ R2-D2 Power Indicators
- └ R2-D2 3v3 Logic Shift Converter
- └ R2-D2 Voltage Input Monitor
- └ R2-D2 External Power Input
- └ R2-D2 Assembled & Tested



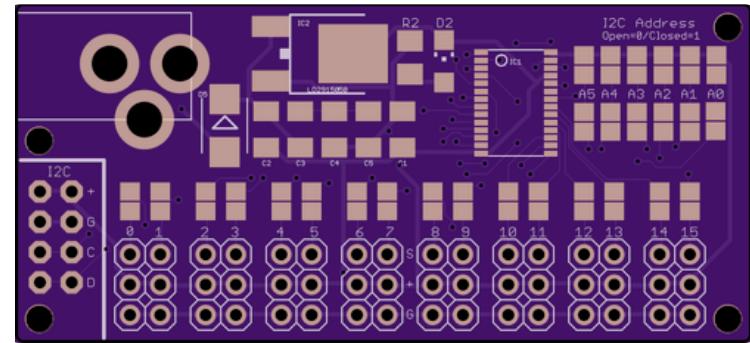
# 24 Wire Slip Ring Interface

- 基础设施设备
- 独立运行
- DB25 连接器
- 4 x 音频通道
- 6 伺服总线
- 2 x I<sup>2</sup>C FX 总线
- 2 x 功率总线 - 双侧供电 @ 2 安培
- 伺服电源总线 - 双侧供电跳线可选
- 适合圆顶盖板槽间距



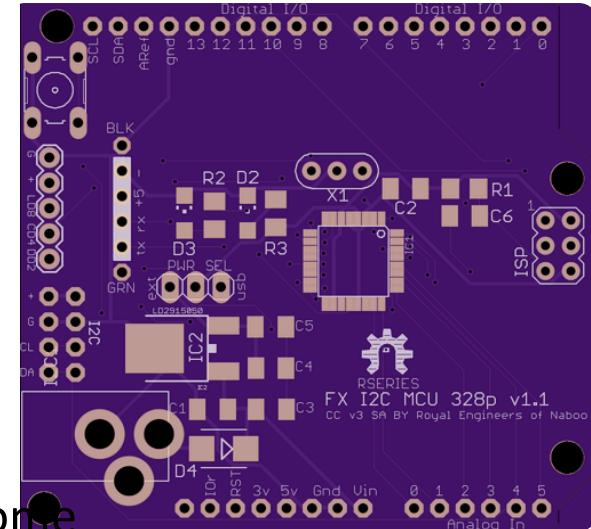
# Servo I<sup>2</sup>C Module

- 🤖 Plug & Play I<sup>2</sup>C Module
- 🤖 PCA9685 PWM Driver
- 🤖 16 Servo
- 🤖 Smaller Footprint - Shorter Height
- 🤖 1.5 Amp Onboard D-Pak Regulator
- 🤖 Addressability
- 🤖 I<sup>2</sup>C Connections (2)
- 🤖 Based on AdaFruit PCA9685 Breakout - Thanks Limor!
- 🤖 805 Resistors SMD are used due to size constraints.



# FX I<sup>2</sup>C MCU

- Plug & Play Module!
- Don't need to know the code
- Embedded ATmega 328P
- Smaller Footprint - Shorter Height
- Multiple Mounting Options
- Multiple MP3 Players Modules Supported - More to come
- Will plug directly into Teece's 72xx Logics as add on card
- HW Switch Selects Functional Mode & Assigns I<sup>2</sup>C address (also SW)
  - 1 = MP3 #1 - Vocal SFX
  - 2 = MP3 #2 - Dome SFX
  - 3 = MP3 #3 - Body SFX
  - 4 = Saber Launcher, Fire Extinguisher & GPS Telemetry



# Controller & Receiver DIY

## Controller & Receiver DIY Versions

Shield Based for Arduino Mega 2560 R3

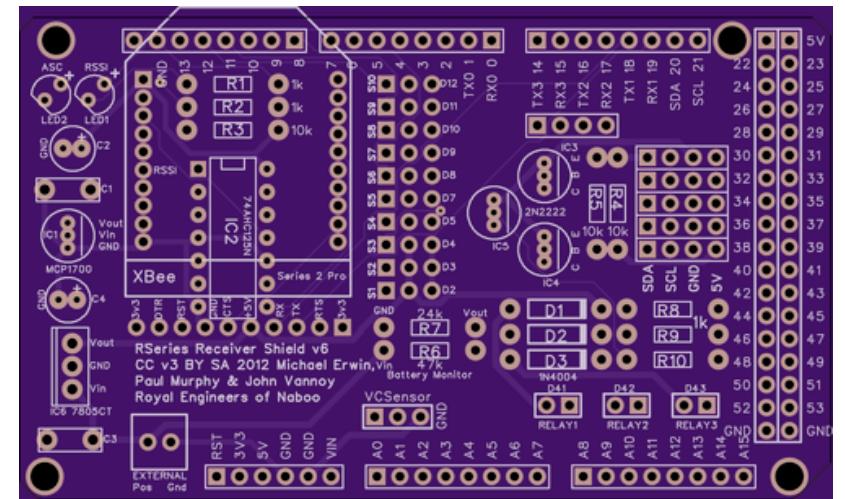
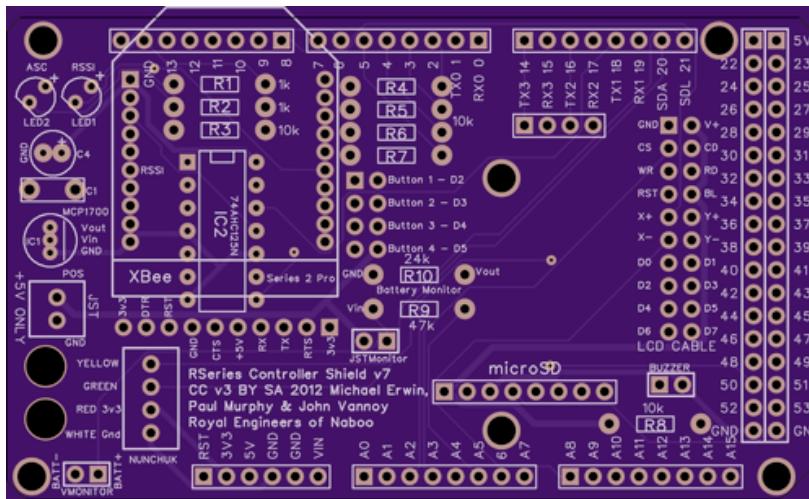
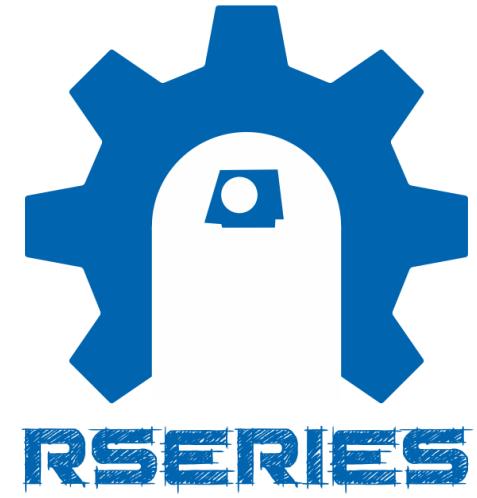
All PTH - Through Hole Components

Wired Controller Wii Nunchuk I<sup>2</sup>C

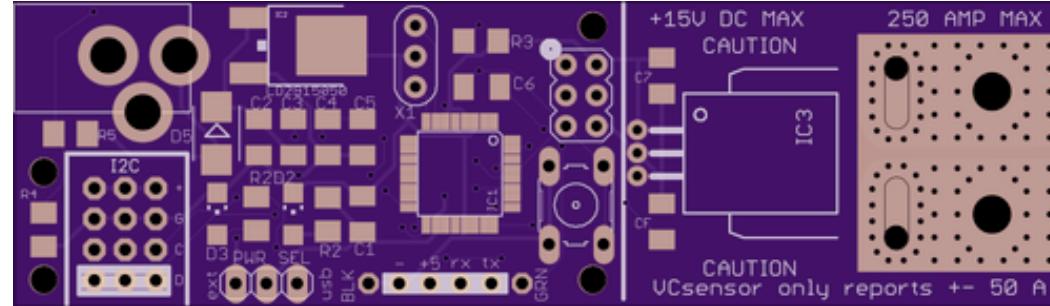
Available as DIY KITS

Open Source Hardware

Been Available for 1 year!!



# VCsensor I<sup>2</sup>C



- 🤖 Monitors Voltage & Current
- 🤖 RSeries Modular Open Architecture
- 🤖 Atmel 328p SMD On board
- 🤖 Allegro 758 Hall Effect Sensor
- 🤖 15 VDC Max
- 🤖 50(default), 150 or 250 Amps BiDirectional
- 🤖 2 x I<sup>2</sup>C Connections



# Protocol Bridges

## |R J.E.D.I. Bridge

- | I<sup>2</sup>C address 124

- | Bi-Directional Bridge

- | JEDI TTL Serial Connection

- | Maps JEDI to I<sup>2</sup>C events

- | Maps Addressed I<sup>2</sup>C to JEDI Serial

## |R WiFi Bridge

- | Roving Networks RN 171XV “WiFly” module

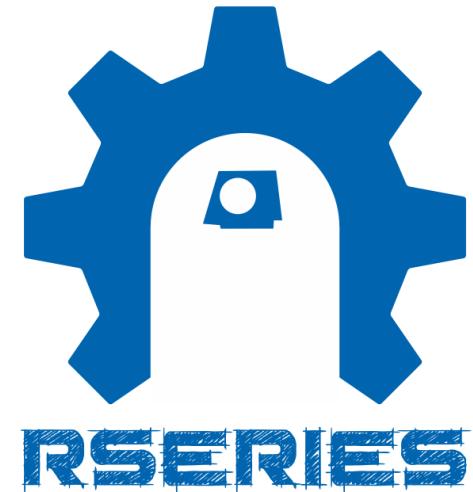
- | Receive Only - Currently i.e. R2touch, RN Apps

- | Bi-Directional is supported via RN App

- | Supports Android & iOS connections via AP mode

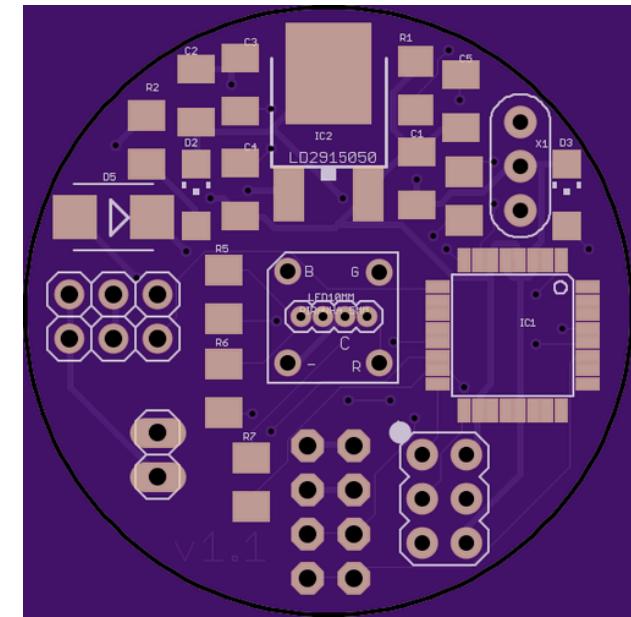
- | Receive WiFi “Serial” commands and maps to I<sup>2</sup>C events

- | This is a GAP prevention mechanism



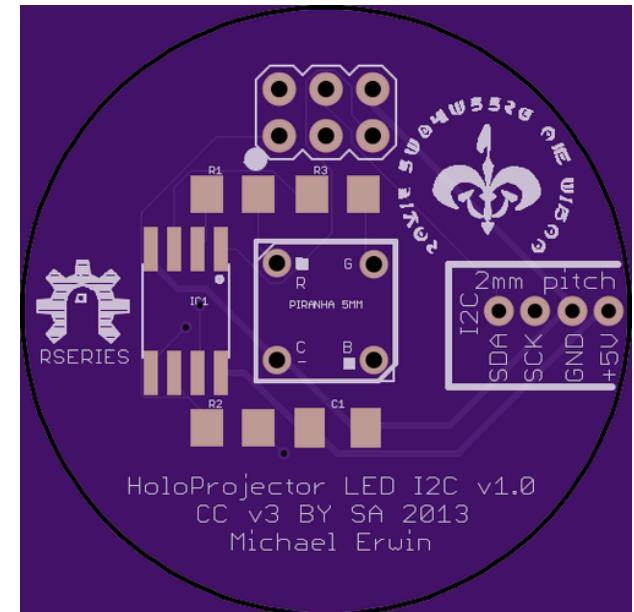
# HoloProjector I<sup>2</sup>C

- Single 10mm RGB LED
- Piranha RGB 5mm LED (Optional)
- 2 x Standard Servos for HP movements
- 2 x I<sup>2</sup>c Connections
- 1.375"
- On board 1.5 Amp +5V DC DPak Regulator
- 6V to 15V DC or I<sup>2</sup>C Powered\*
- Plug & Play! Just give it power, it takes care of the rest.
- Embedded 328p SMD with UNO Bootloader
- I<sup>2</sup>C Defined Event Interaction for FHP (25), THP (26), RHP (27)
- Comes with replacement custom polymer HP rear cover



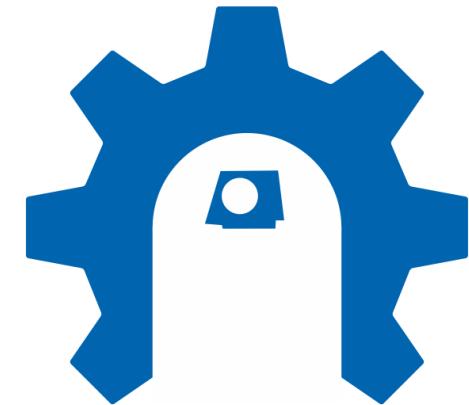
# HoloProjector RGB LED I<sup>2</sup>C

- Single 10mm RGB LED
- Piranha RGB 5mm LED (Optional)
- Embedded ATtiny 85s
- BlinkM Compatible\*
- 1.31"
- +5 V DC input only via I<sup>2</sup>C Connector
- Plug & Play! Just give it power
- 2mm pitch I<sup>2</sup>C Connection for standard Aluminum HP hole
- I<sup>2</sup>c Defined Event Interaction for FHP (25), THP (26), RHP (27)
- Designed for a specific low cost price point!



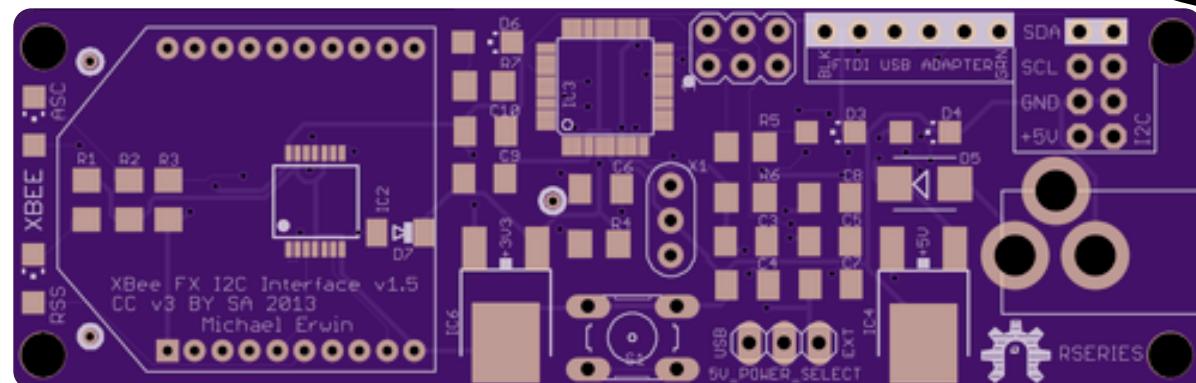
# XBee FX I<sup>2</sup>c Interface

- XBee Series 1, 2 & 2 Pro Compatible
- Roving Networks RN-171XV WiFi
- XBee BT Compatible
- Allows Droids to interact to events, characters, etc.
- 328p SMD Embedded
- 2 DPak regulators +5v (1.5A) & +3v3 (1.25A)
- Foundation for new CIDS & MSE6R...



RSERIES

Saved \$24.00



# Character ID System

Character ID System

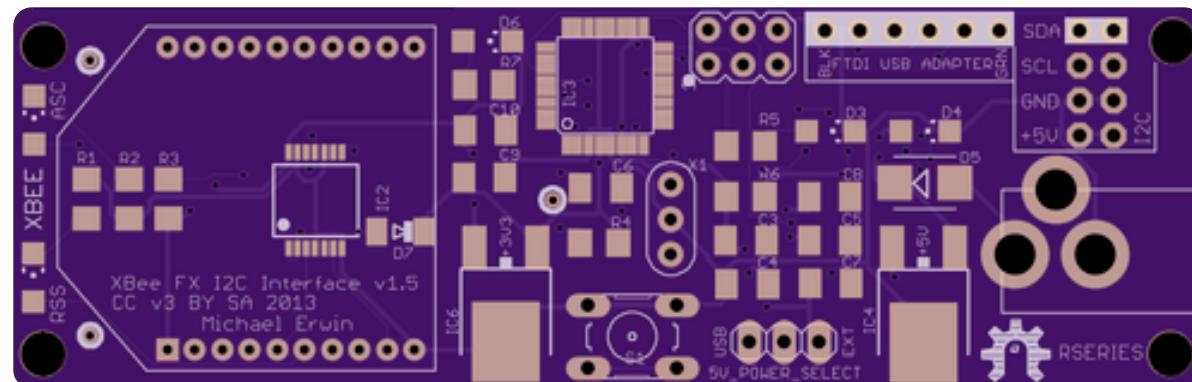
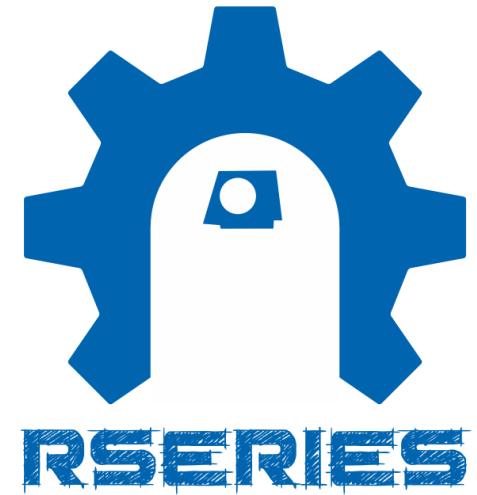
Transmitter & Receiver

Up to 4096 different Characters' IDs

Including Legion, Scum & Leia

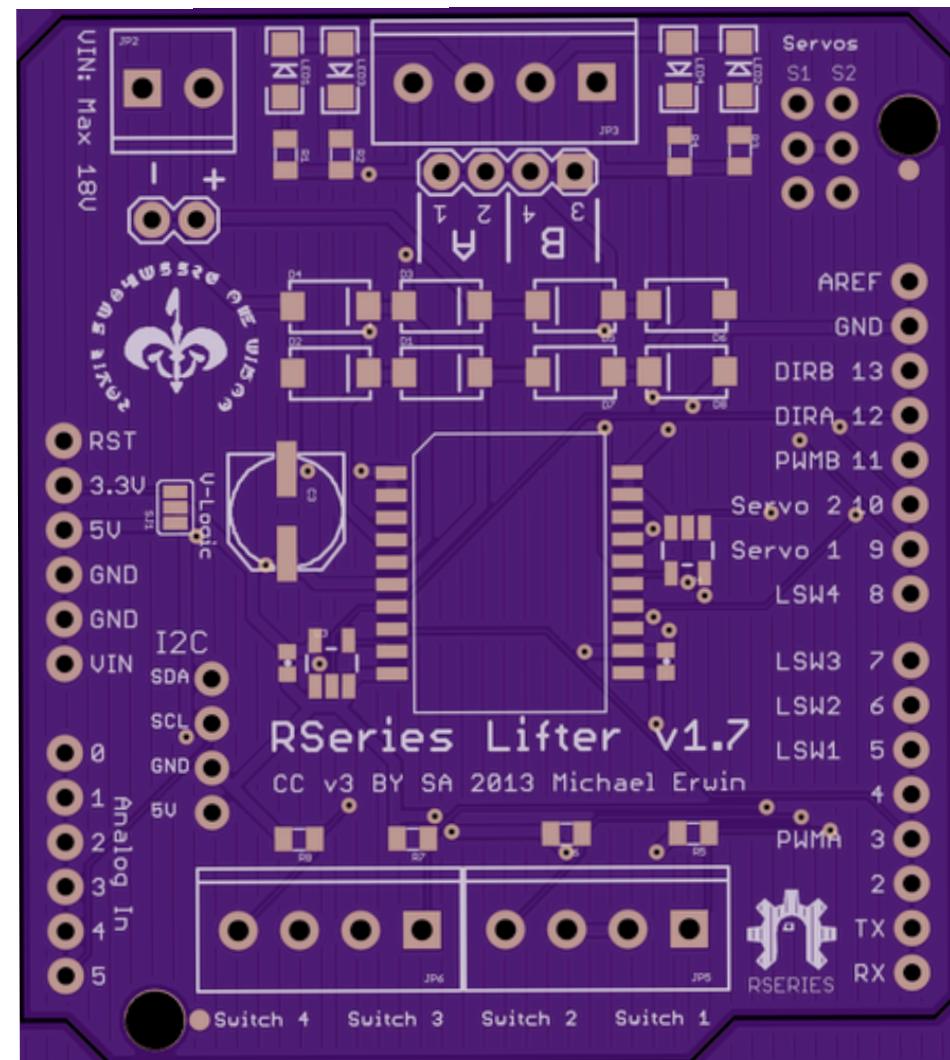
Daleks, B9s, Mars Rover... BENDER!

DIY & SMD Transmitter



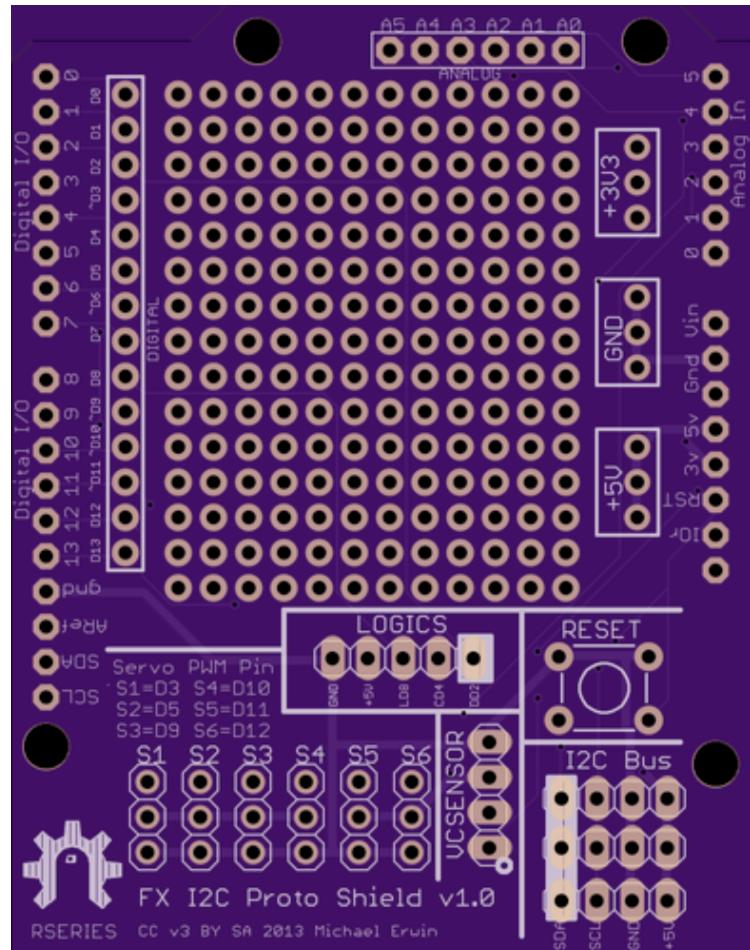
# Lifter Control System

- |R2D2| Arduino UNO Shield
  - |R2D2| Based on SFE ArduMotor
  - |R2D2| Adds 2 Servos
  - |R2D2| 4 Limit Switches
  - |R2D2| Jumper Configuration
  - |R2D2| Periscope & LFS
  - |R2D2| CPU Arm & Saw
  - |R2D2| Magnetic Grapple
  - |R2D2| Gripper Claw
  - |R2D2| Ewok Zapper
  - |R2D2| etc



# FX I<sup>2</sup>C Proto Shield

- Facilitates DIY
- Experimentation
- Arduino UNO Shield
- Adds 6 Servos
- 3 x I<sup>2</sup>C Bus
- Prototyping Area
- VCsensor Breakout
- Maxim 72xx Logics Bus
- Available only in kit form



# Protecting Your Investment



# Investment Protection

## Logics I<sup>2</sup>C Adapter

- └ Teeces, CBI & DP, etc
- └ 328p with Uno Bootloader

## J.E.D.I. I<sup>2</sup>C Bridge

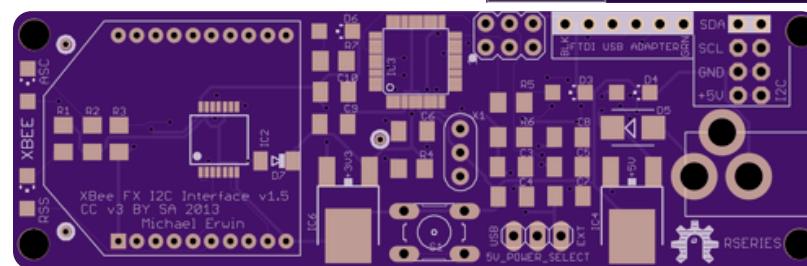
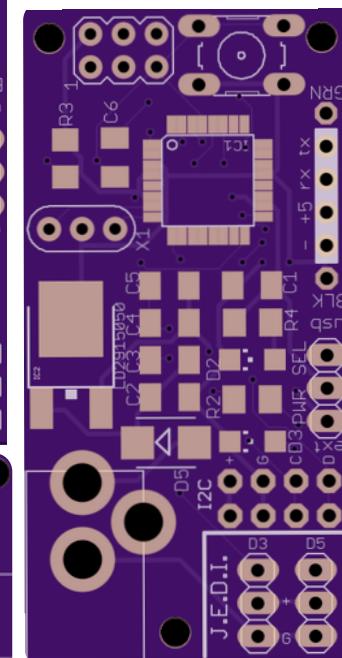
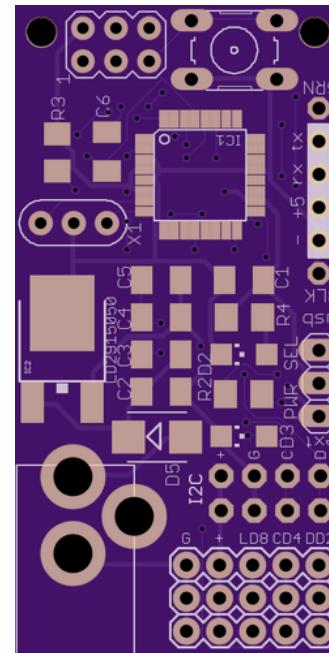
- └ Maps J.E.D.I. TTL Serial events to RSeries I<sup>2</sup>C
- └ 328p with Uno Bootloader

## WiFi I<sup>2</sup>C Bridge

- └ XV-171N Node
- └ APmode
- └ iOS (R2touch, etc)
- └ Android
- └ 328p with Uno Bootloader

└ Allows for phased integration approach

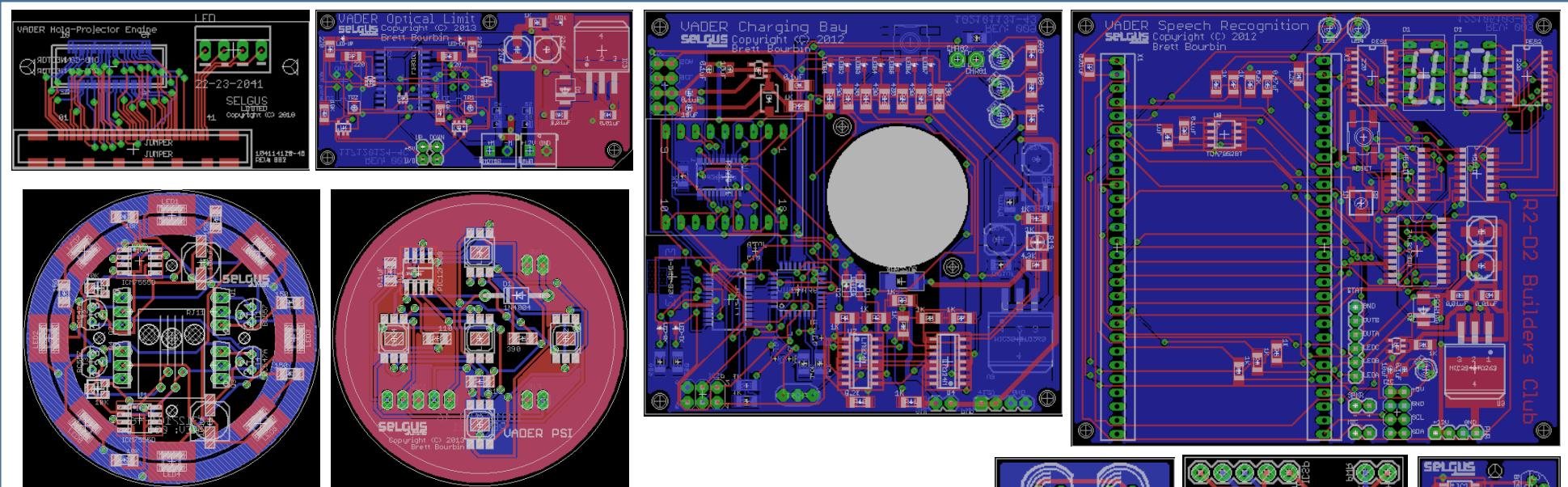
└ Run Organizers - Unified Parts across the Platform



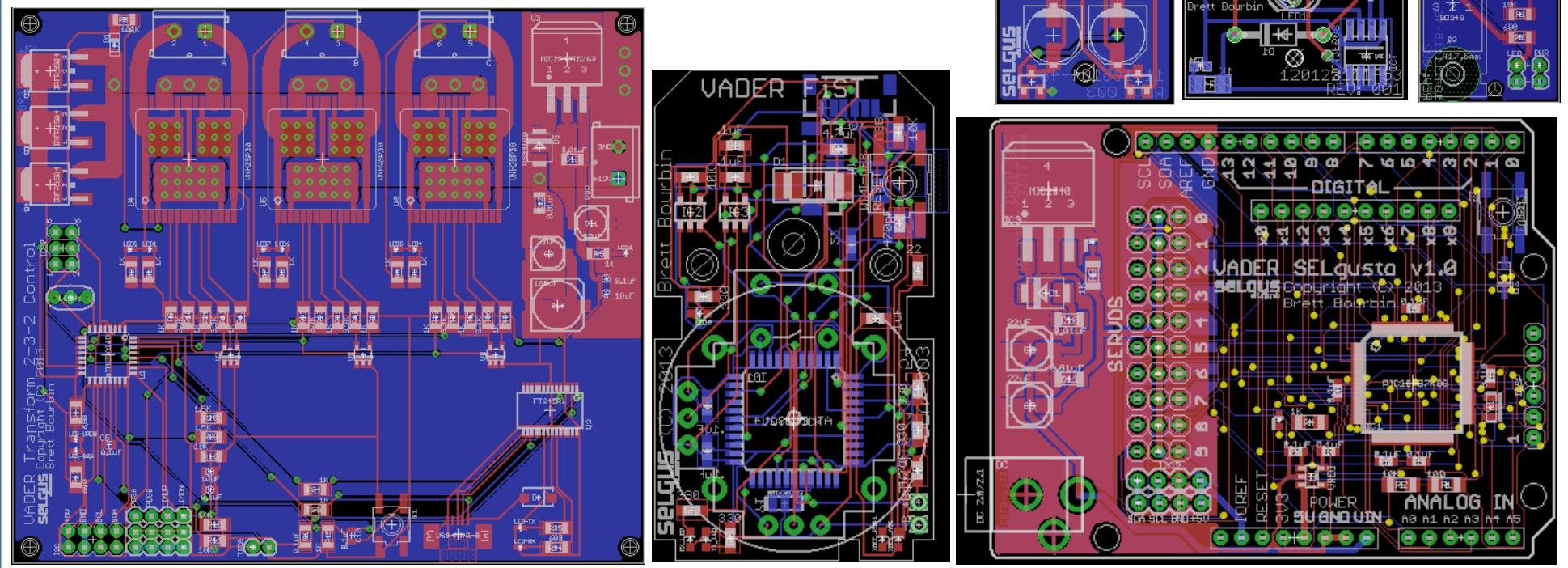
# V.A.D.E.R.

Voice Activated Droid  
Environmental Recognition





# V.A.D.E.R.



# VADER Holo Projector

- |R2-D2| Optoma DLP Projector Based
- |R2-D2| Main and Engine Boards
- |R2-D2| 0.5mm Traces
- |R2-D2| Glorified Extension Cable
- |R2-D2| SMD Design



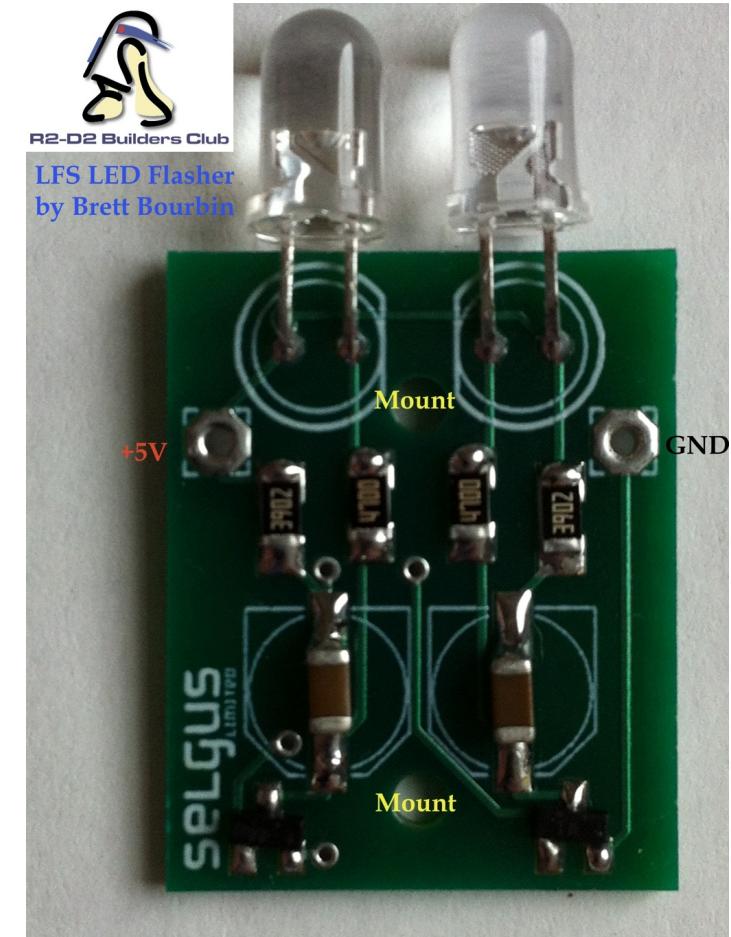
# VADER Charging Bay

- R2D2 Embedded ATmega Based
- R2D2 Alpha-Numeric Display
- R2D2 EVS Battery Voltmeter
- R2D2 I<sup>2</sup>c Buses
- R2D2 SMD Design
- R2D2 +12V VCC
- R2D2 LDO Voltage Regulator



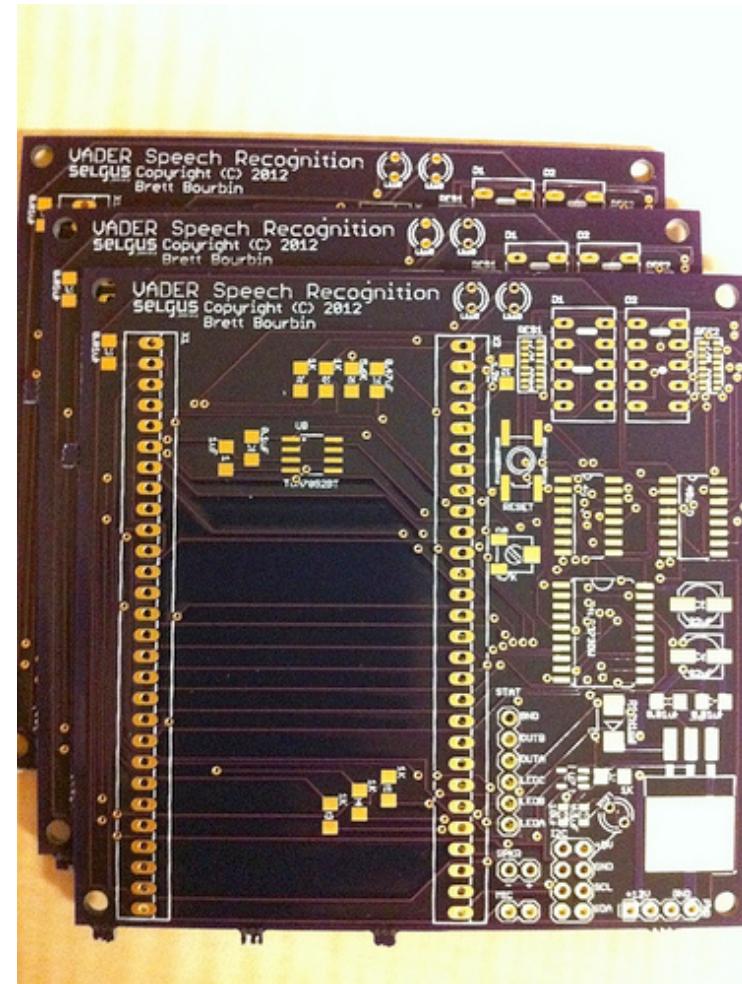
# VADER LFS Flasher

- ransistor Based
- Simple Circuit
- ual LED Flasher
- SMD Design
- Built 100's For Club



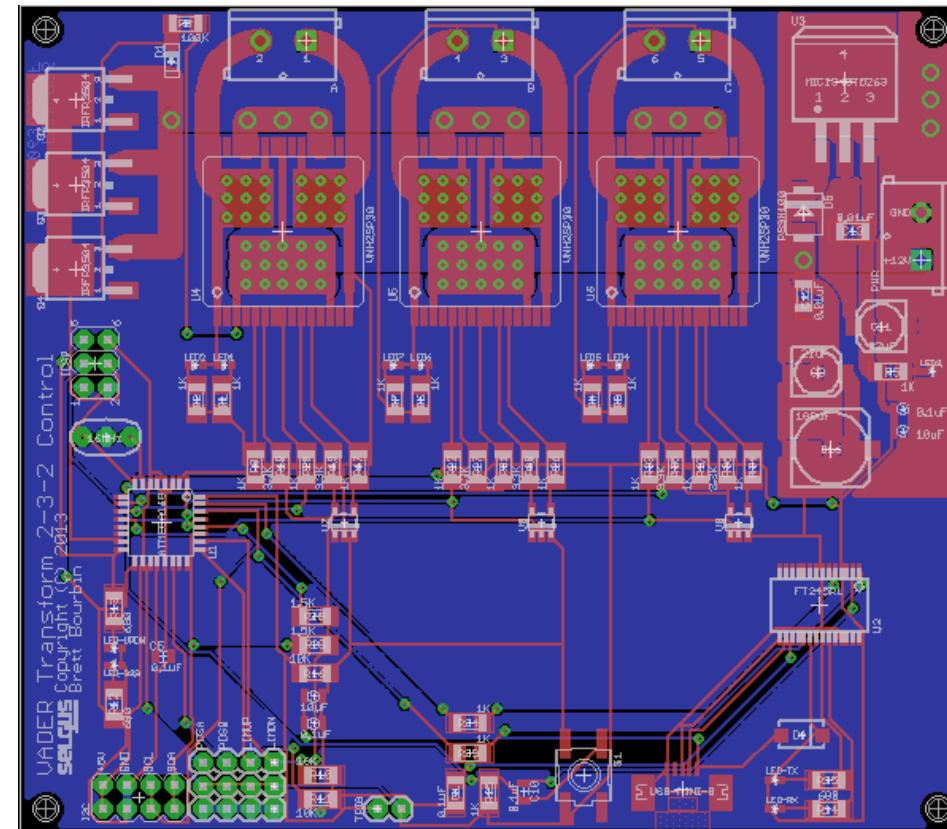
# VADER Speech Recognition

- ▀ SmartVR Based
- ▀ Sensory RSC-4128 Processor
- ▀ 512K Code Flash
- ▀ 512K Data Flash
- ▀ 128K External RAM
- ▀ Virtual Machine
- ▀ SMD Design
- ▀ I<sup>2</sup>c Buses
- ▀ LDO Voltage Regulator



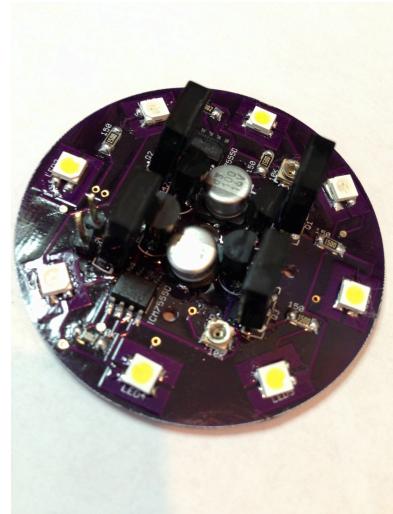
# VADER Transform 2-3-2 Control

- └ R2-D2 Embedded ATmega Based
- └ R2-D2 16 MHz
- └ R2-D2 3 VNH2SP30-E H-Bridges
- └ R2-D2 30A Output Each
- └ R2-D2 Sequences 2-3-2 Transition
- └ R2-D2 SMD Design
- └ R2-D2 I<sup>2</sup>c Buses
- └ R2-D2 LDO Voltage Regulator



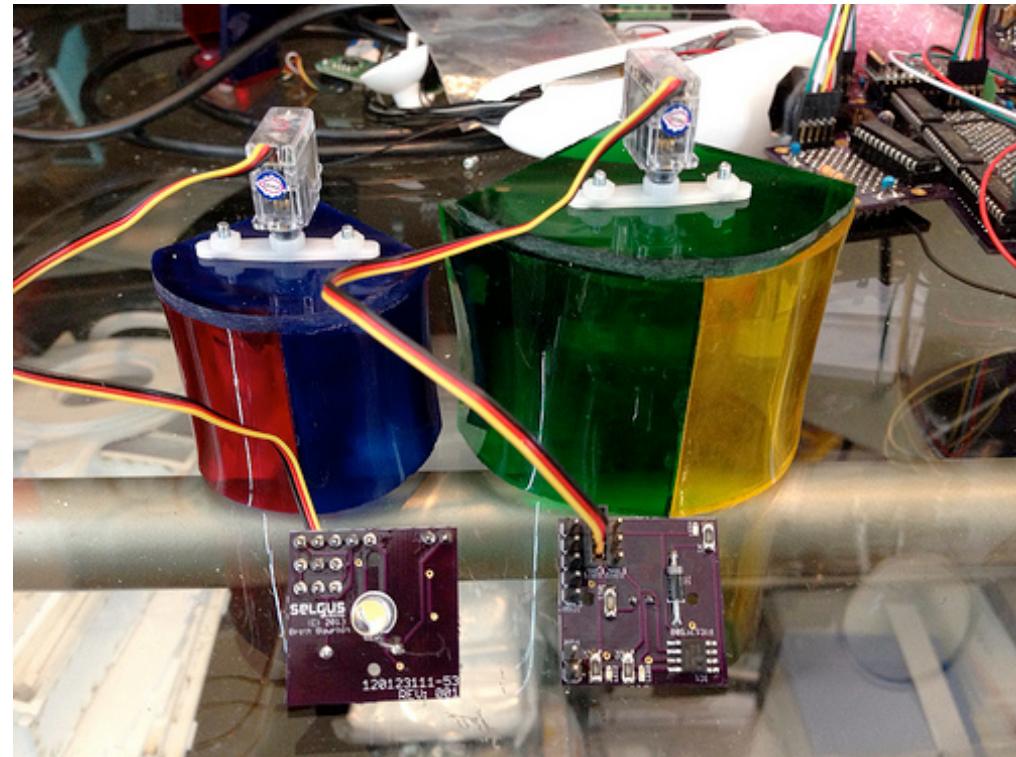
# VADER Fibre Optic Color Wheel

- └ R2-D2 NE555 Timer Based
- └ R2-D2 2 Independent Flashers
- └ R2-D2 Tunable Timing Values
- └ R2-D2 8 High Intensity LEDs
- └ R2-D2 +12V VCC
- └ R2-D2 SMD Design
- └ R2-D2 Fibre Optics
- └ R2-D2 Slip-Ring Power
- └ R2-D2 Custom Acrylics
- └ R2-D2 Voltage Regulators
- └ R2-D2 Low RPM Motors



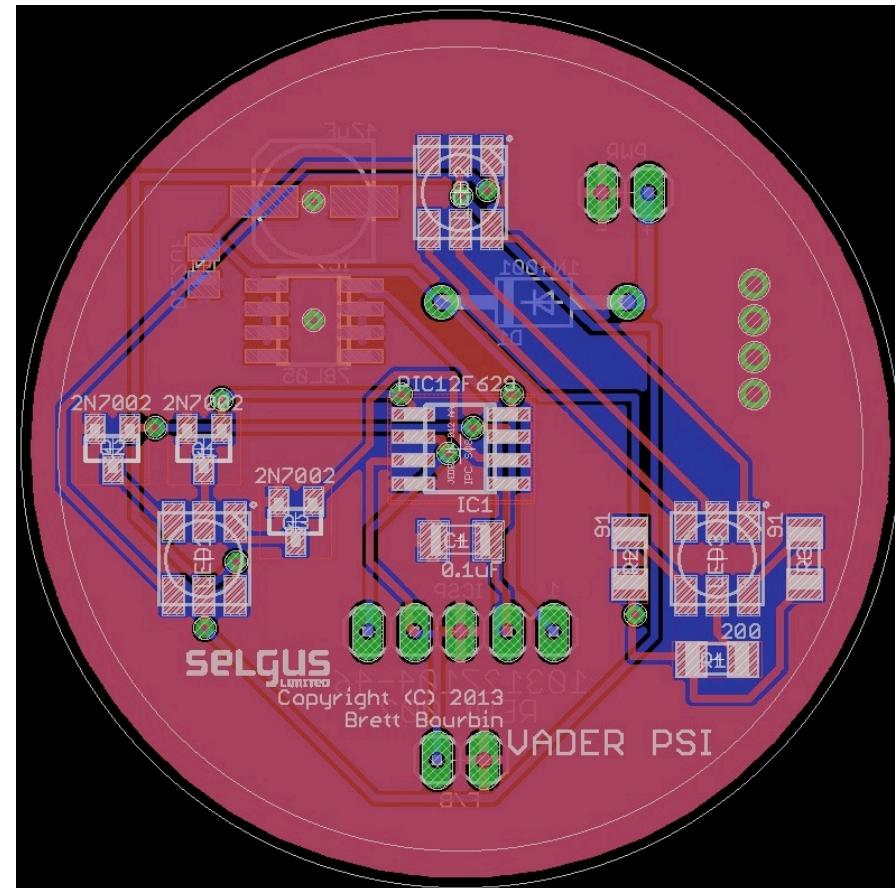
# VADER PSI Movement

- └ R2-D2 PIC12F Based
- └ R2-D2 4 MHz
- └ R2-D2 Micro Servo Control
- └ R2-D2 Translucent Acrylics
- └ R2-D2 SMD Design
- └ R2-D2 Simple PWM Firmware
- └ R2-D2 General Purpose



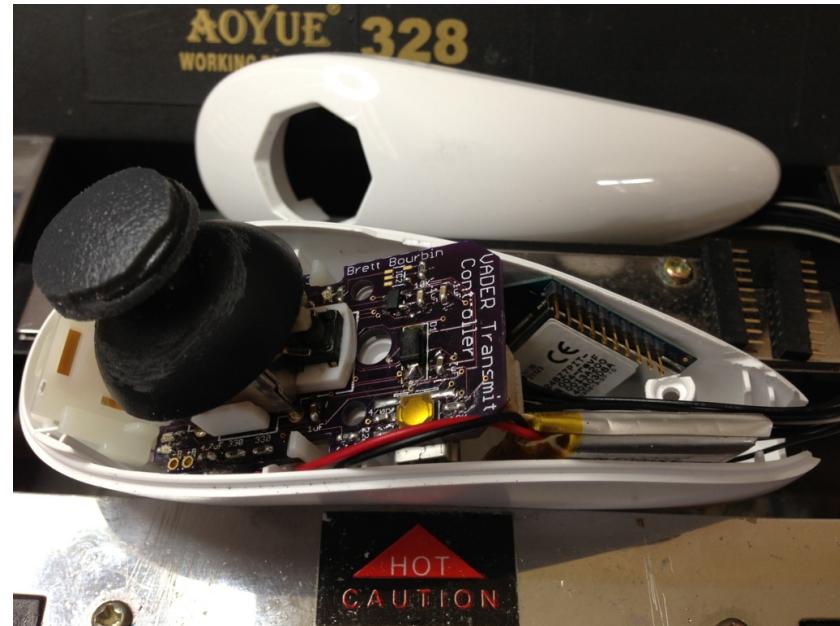
# VADER PSI

- PIC12F Based
- 4 MHz
- 3 RGB High Intensity LEDs
- Jumper Selectable Front/Rear
- +12V VCC
- PWM Color Fading Firmware



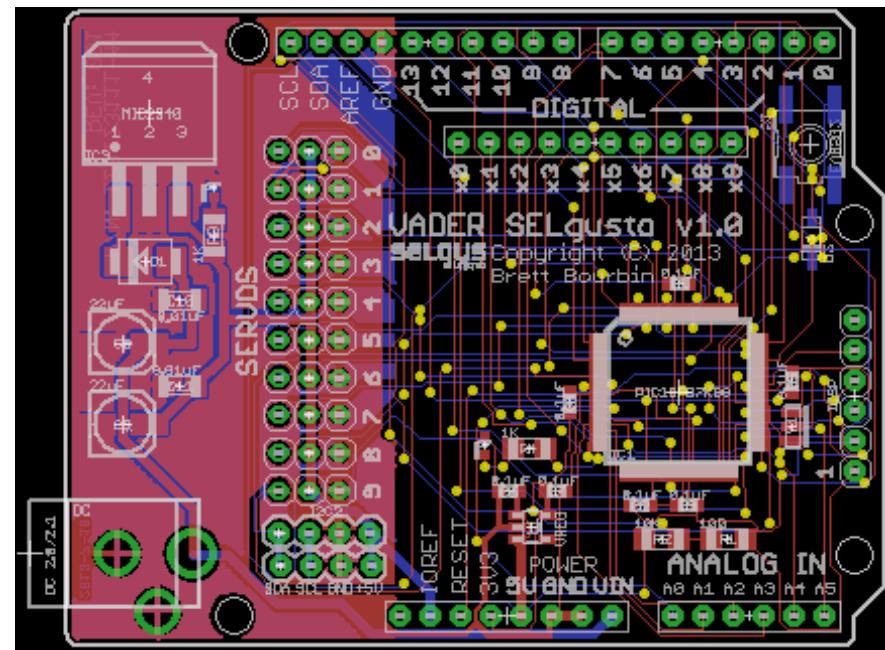
# VADER's FiST

-  Flexible independent System Transmitter
  -  1 or 2 at per receiver
  -  Atmel 32U4 (same as Arduino Micro)
  -  SMD Double Sided Design
  -  Fits inside of Wii Nunchuk!
  -  XY Joystick, 3 Independent Buttons
  -  Internal LiPo, charges via USB Micro
  -  Battery Voltage Monitor
  -  Xbee 2 Pro 2.4Ghz
  -  1.5 Mile Range
  -  FCC Approved



# VADER SELgusto

- PIC18F Based
- 20 MHz
- Arduino UNO footprint
- 2 Independent I<sup>2</sup>c Buses
- SMD Design
- 10 Hardware PWM Servos
- LDO Voltage Regulators



# Future Releases



# Future Releases

## Dome MCU

-  30 Amp @ 12 Volts DC
-  I2C & Servo Input Control
-  Rotational Sensor

## Motion & Audio Sensor I2C

-  3 to 6 Motion Sensor for motion
-  3 Audio Sensors
-  I2C Event Triggering

## Lifter MCU I2C

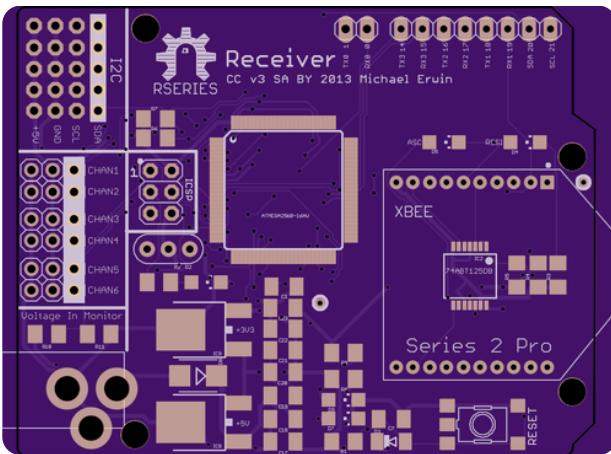
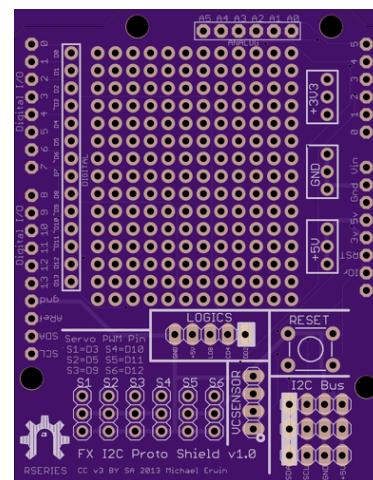
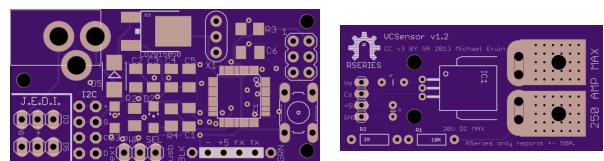
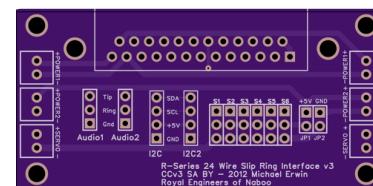
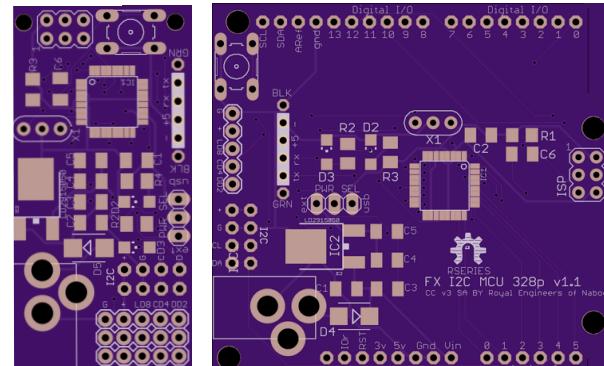
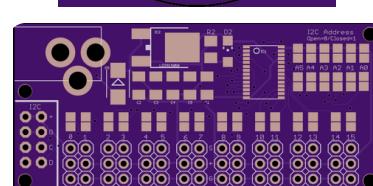
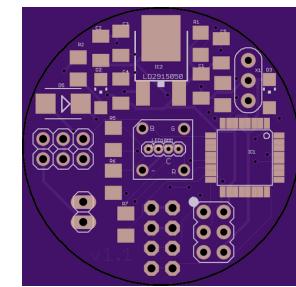
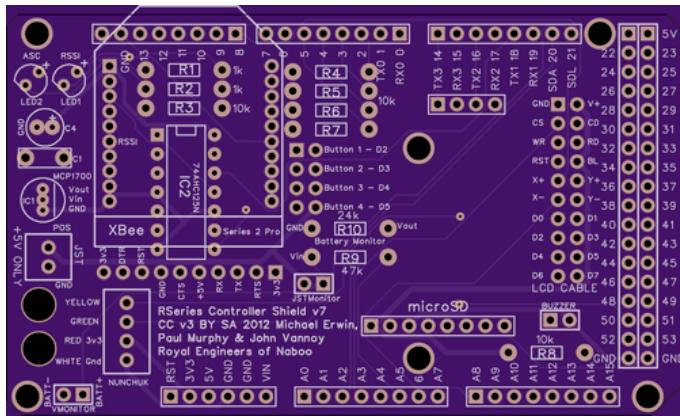
## MSE6 Receiver



Oh, one more thing...



# Most Available Tonight!



Oh, one last thing...



# Remember this guy?



# Identified a few Parts



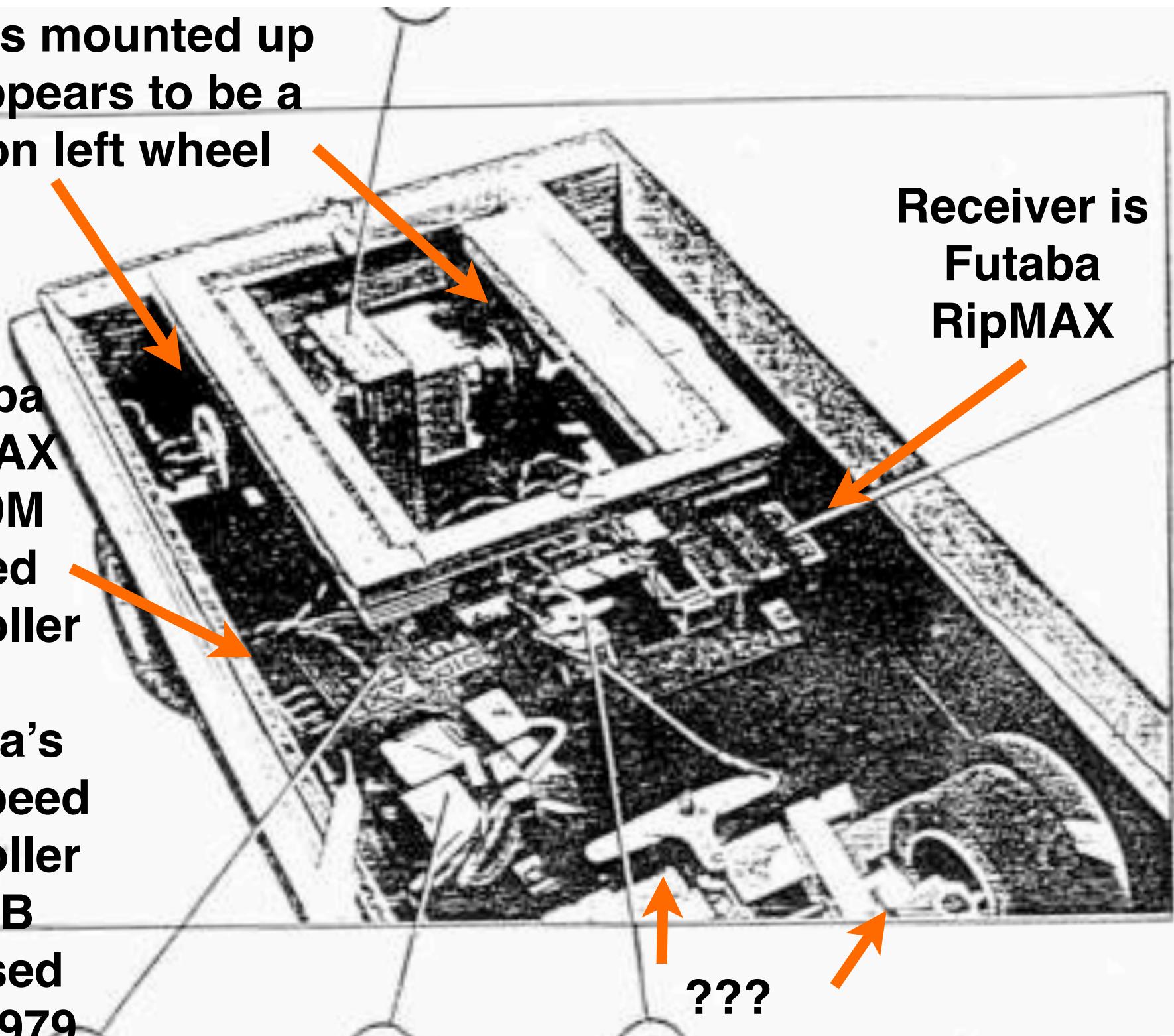
**Motor is mounted up  
and appears to be a  
belt on left wheel**

**Futaba  
RipMAX  
FD19M  
Speed  
Controller**

**Futaba's  
first Speed  
Controller  
MCIIIB  
released  
until 1979**

**Receiver is  
Futaba  
RipMAX**

**???**



# Chassis(s) Found

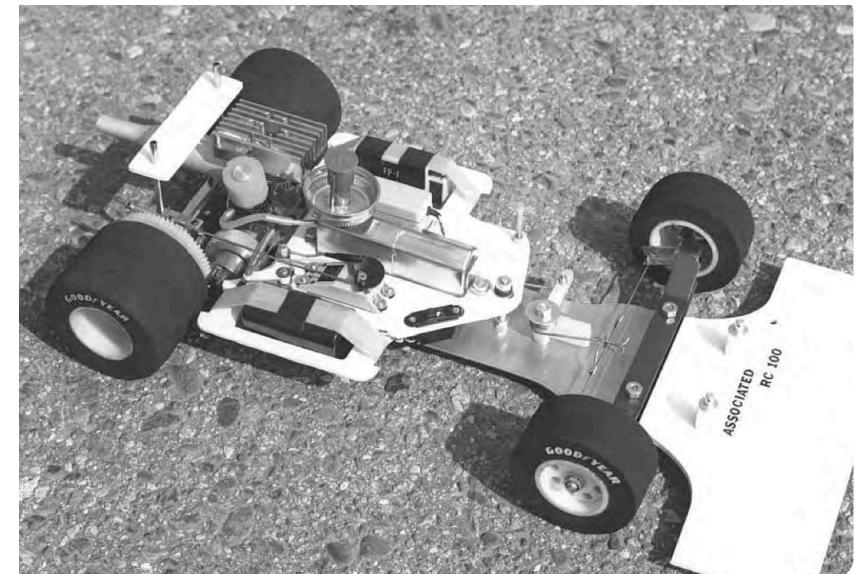
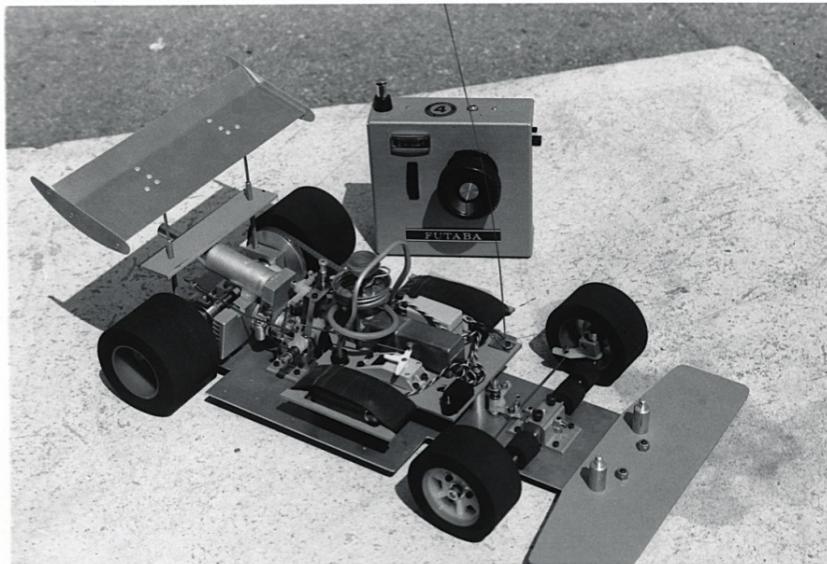
|R2D2| Thorp Manufacturing (Front End & Rear Axle)

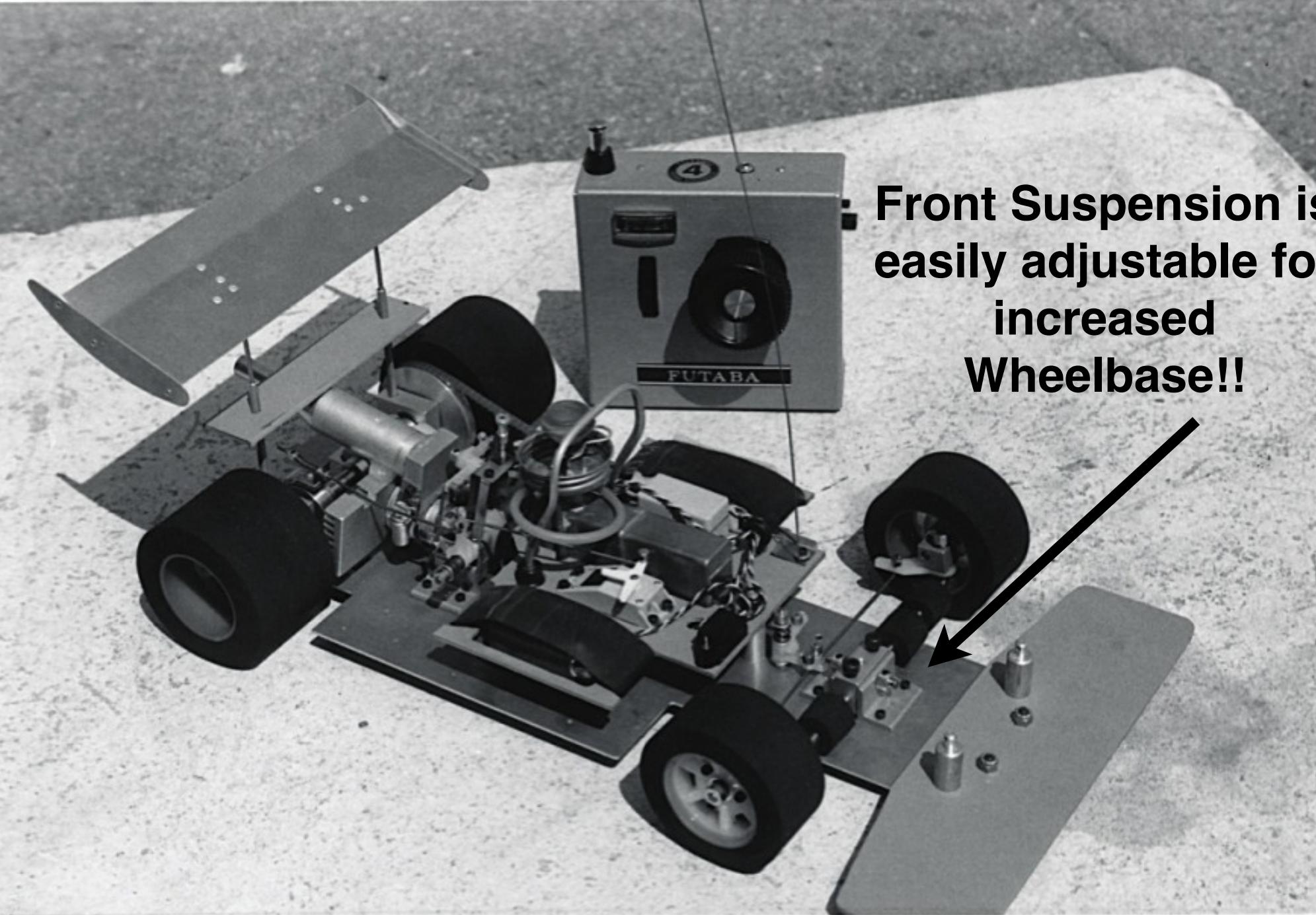
|R2D2| One of the First 1/8 Scale On Road RC Car Chassis

|R2D2| 1969 to 1978 - Widely popular in California

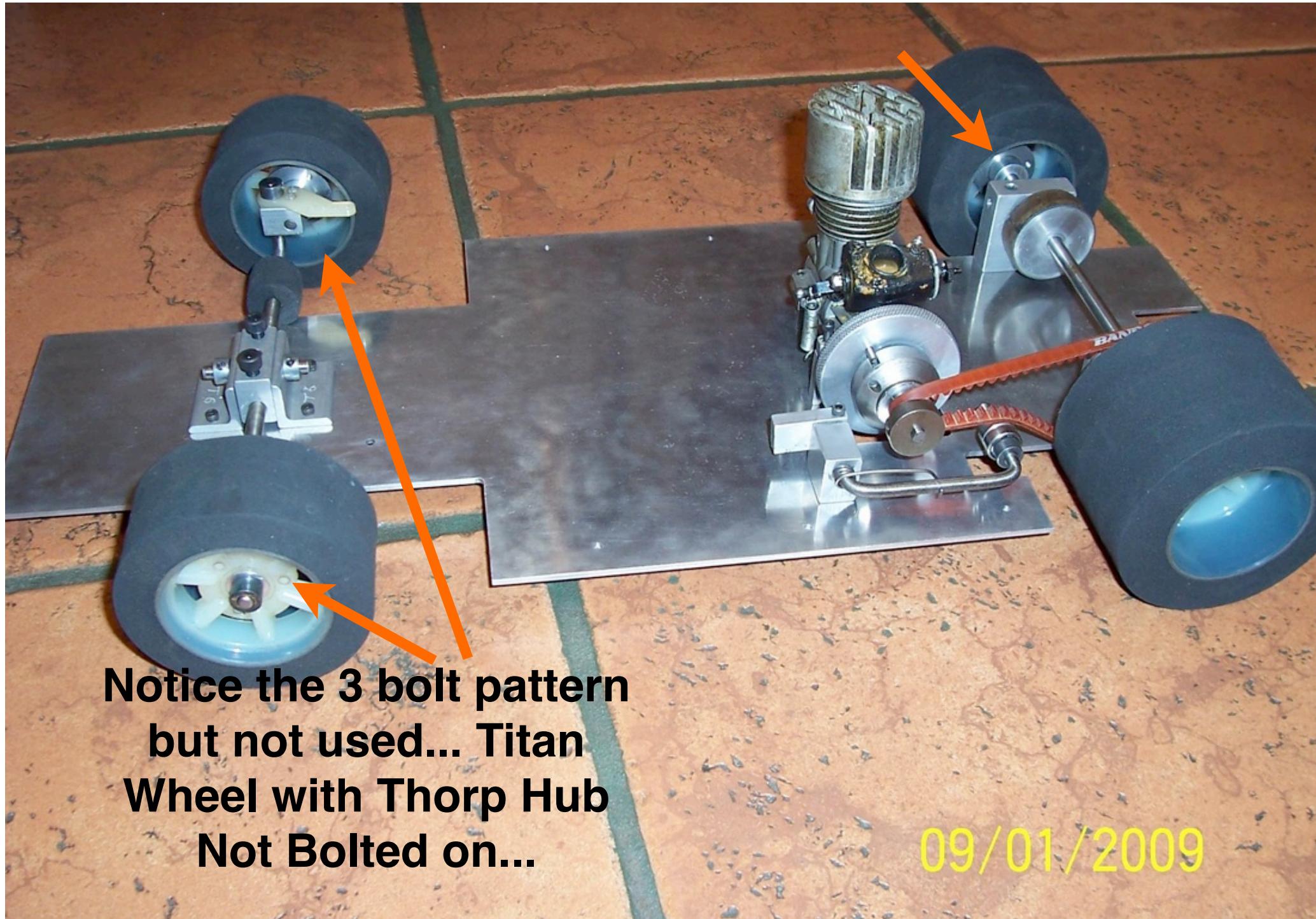
|R2D2| Associated RC100 (Rear Axle Mounts & Rear Plate)

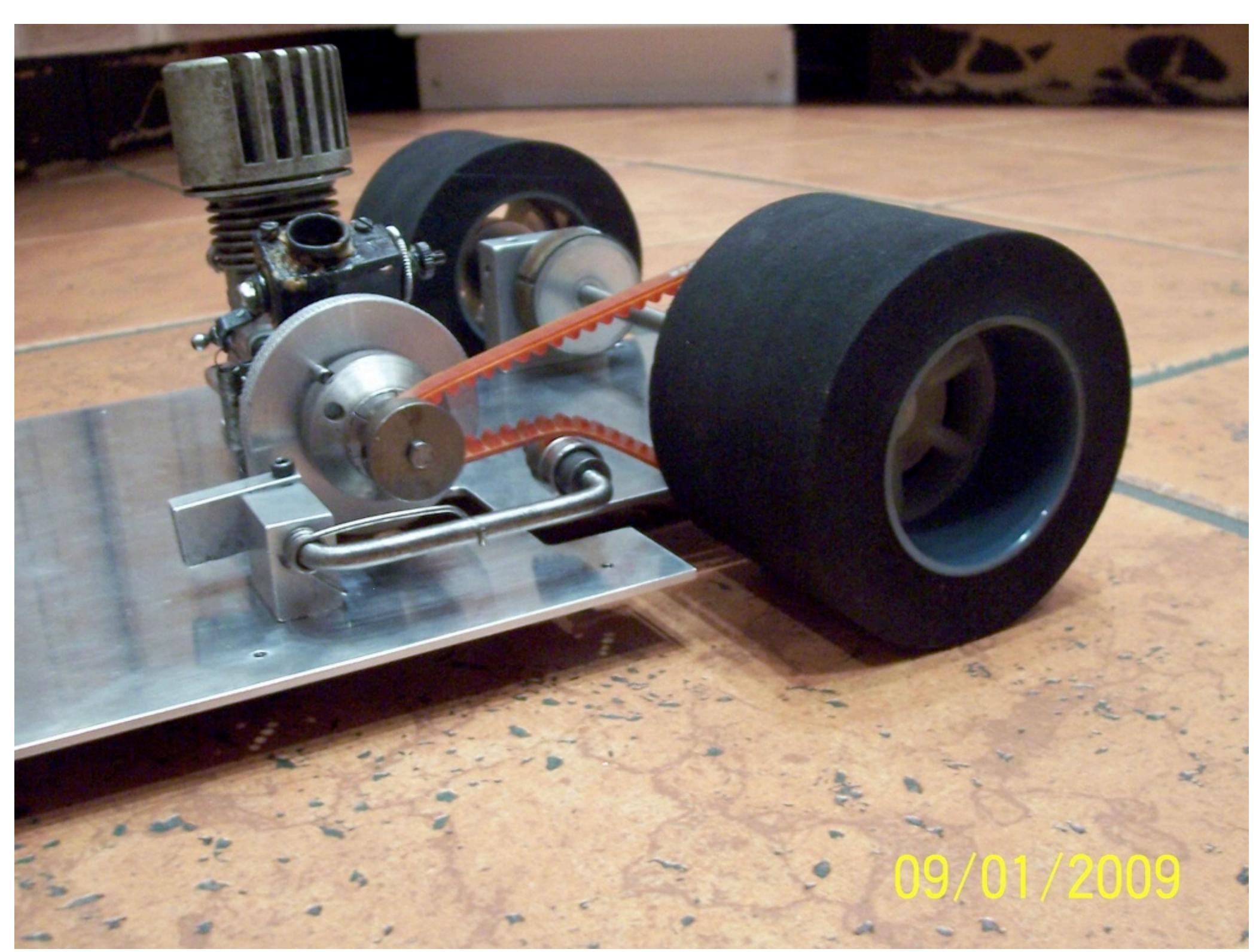
|R2D2| 1972 to 1974 - Over took Thorp by easier to build kits!



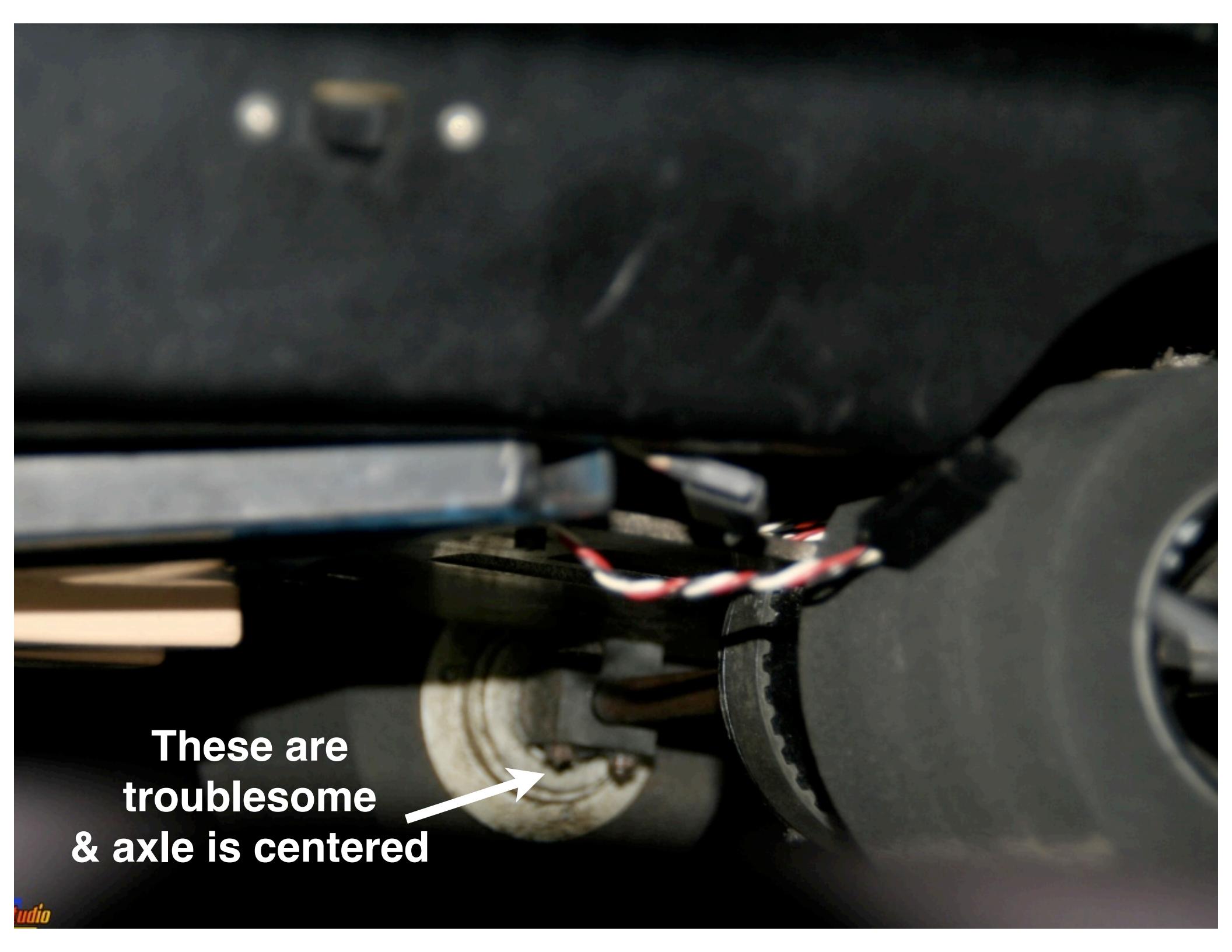


**Front Suspension is  
easily adjustable for  
increased  
Wheelbase!!**



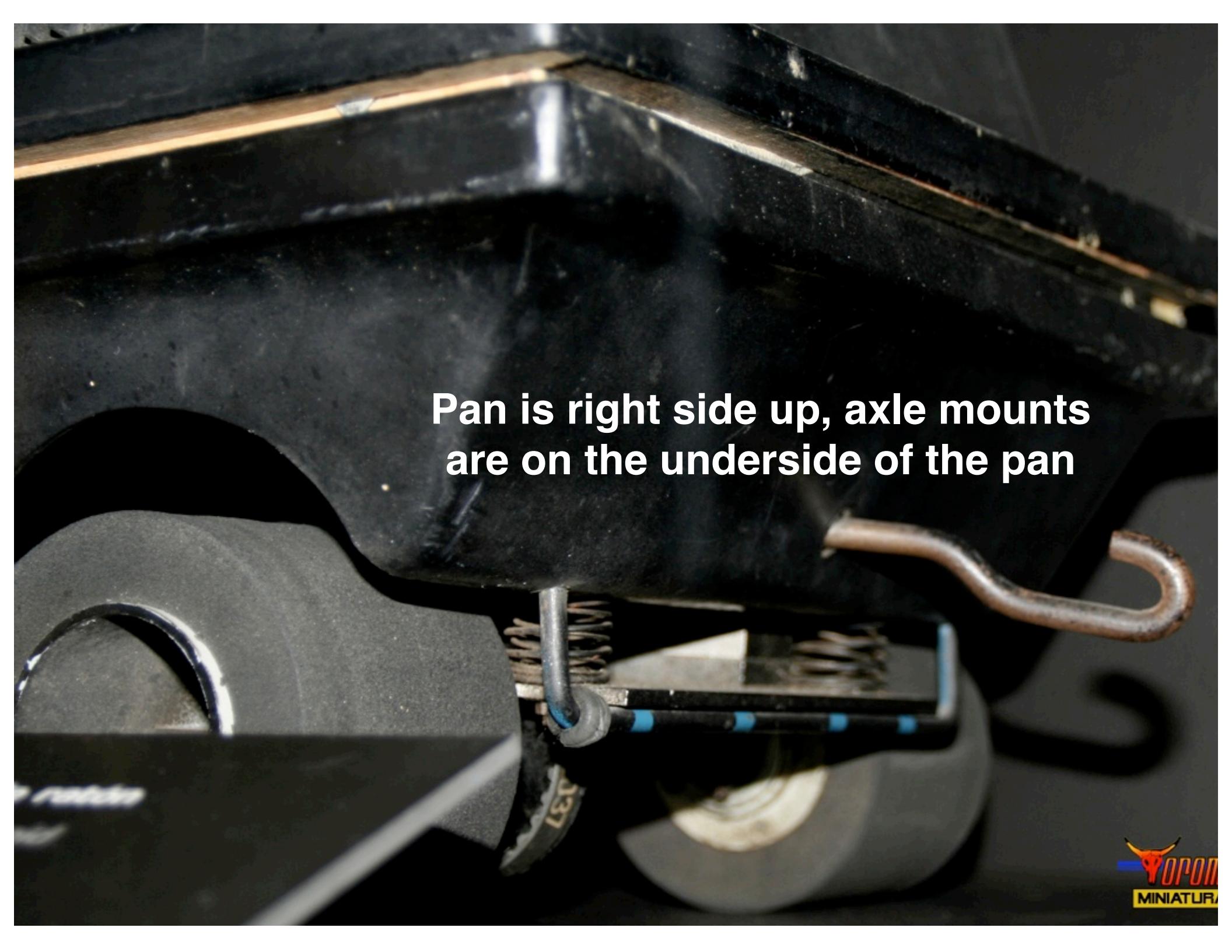


09/01/2009

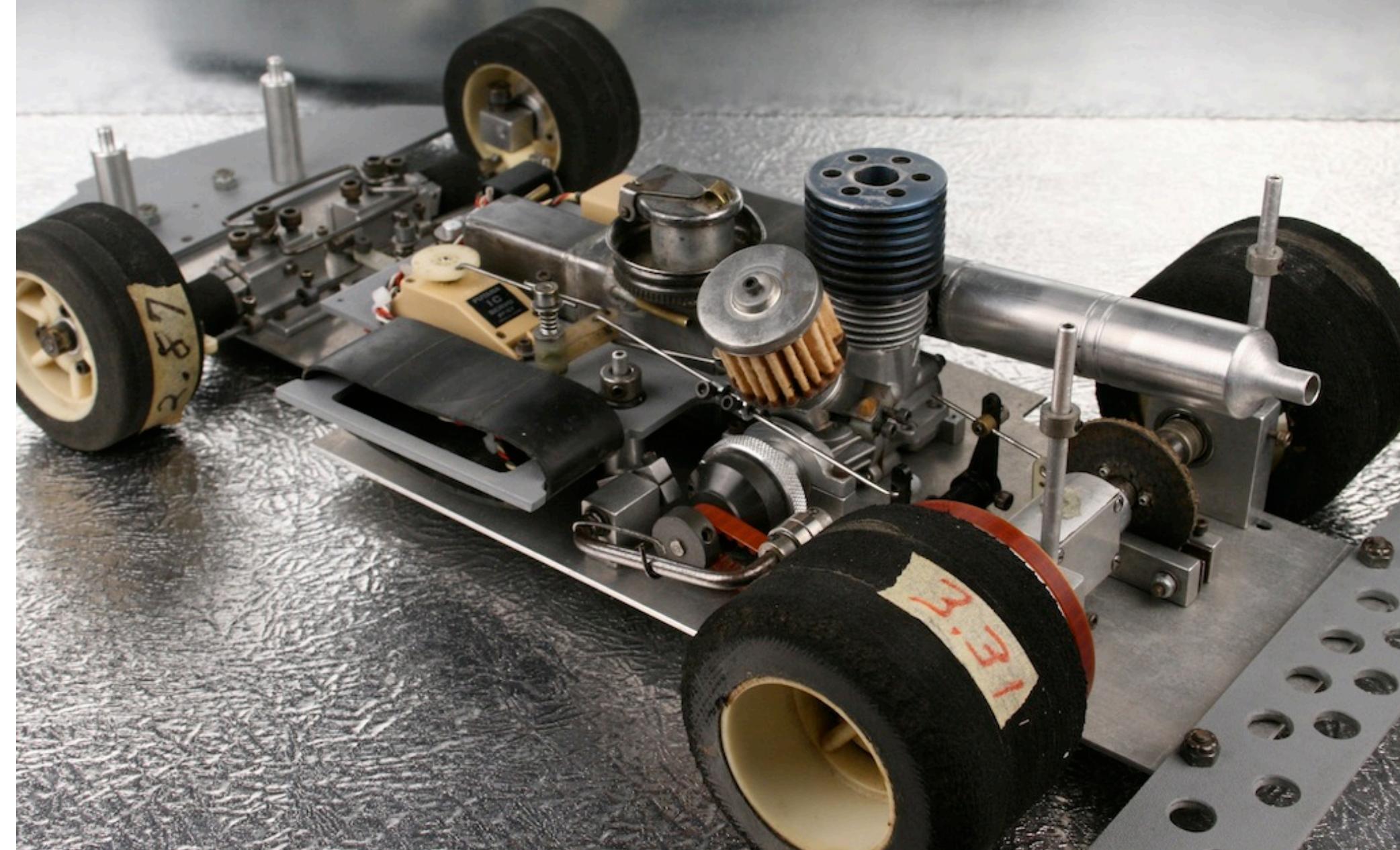


These are  
troublesome  
& axle is centered

A white arrow points from the text "axle is centered" towards the center of the vehicle's rear wheel assembly, specifically pointing at the central hub area.



Pan is right side up, axle mounts  
are on the underside of the pan

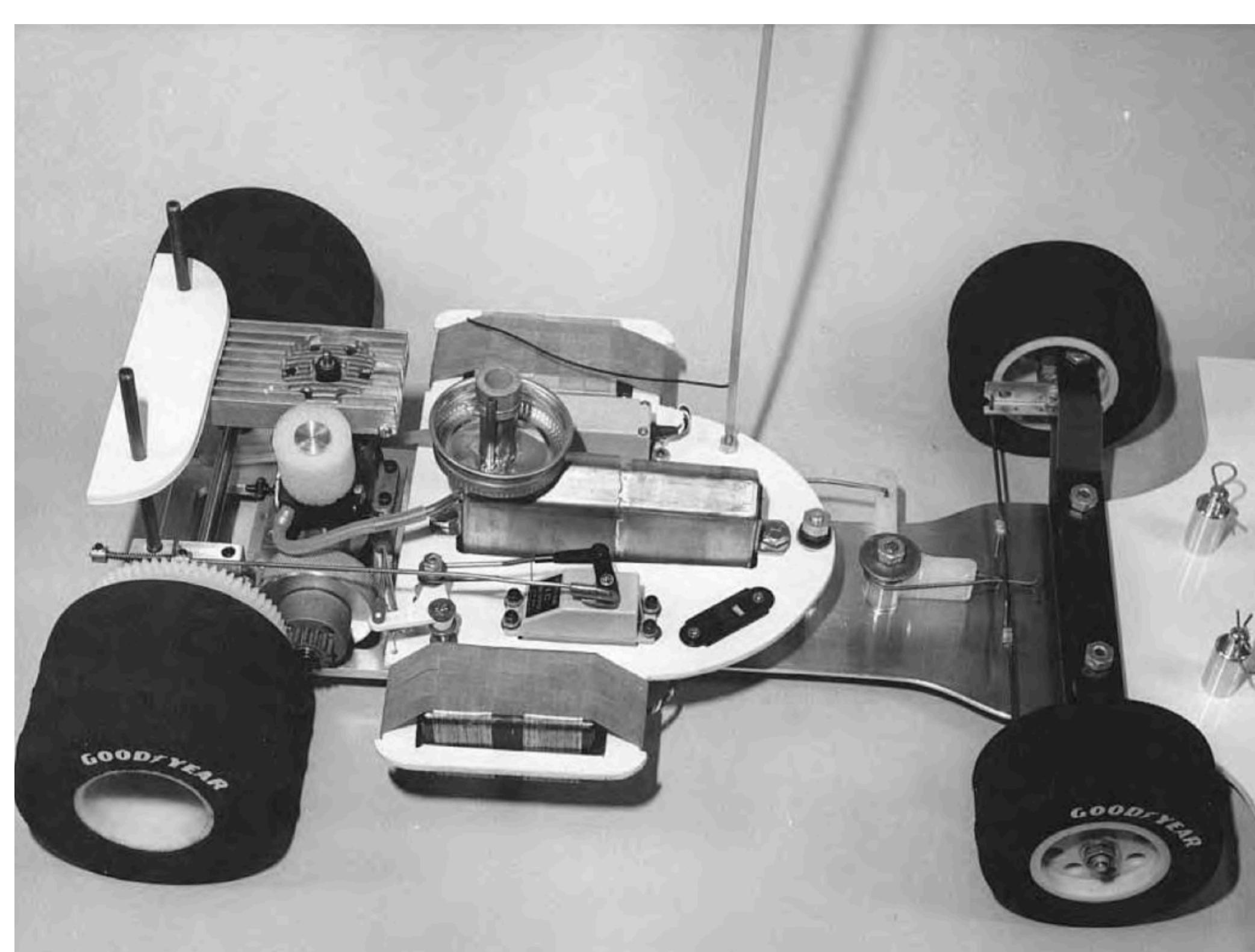




**They mounted Associated RC100 axle  
brackets on the bottom of an  
RC100 rear Pan Plate!**

**These are  
troublesome  
& axle is centered**

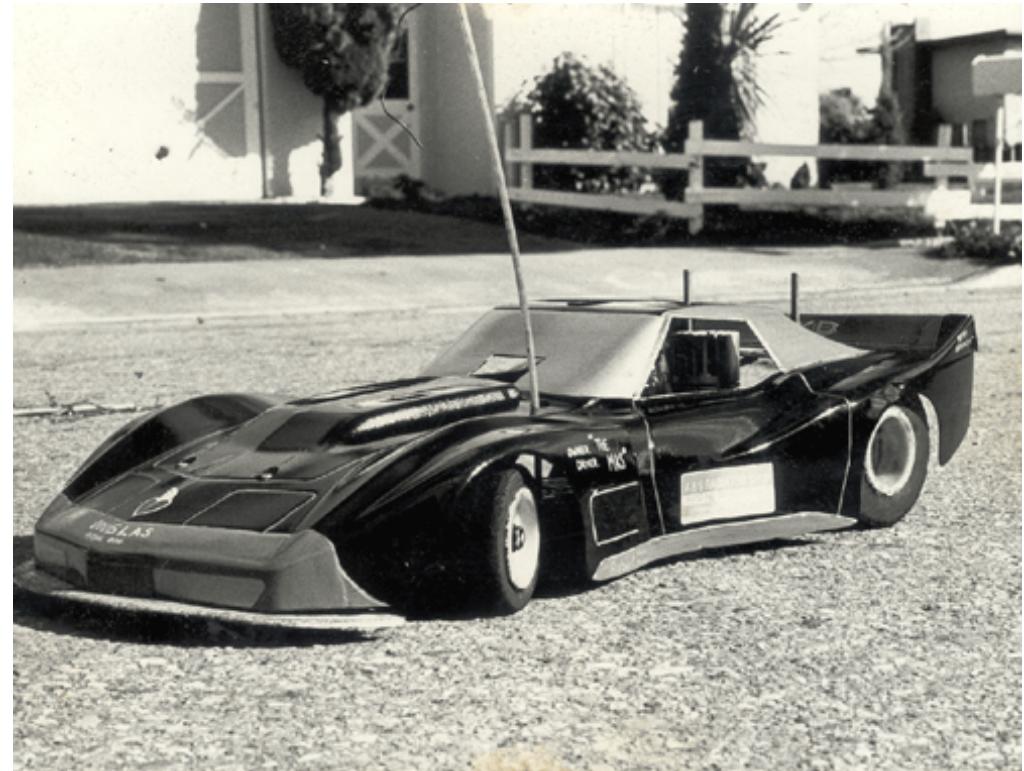




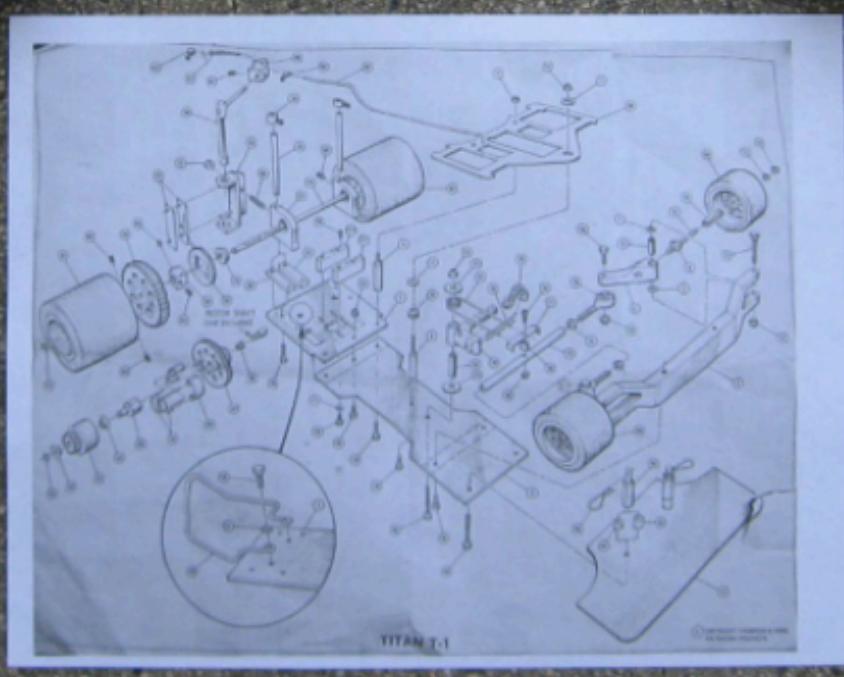
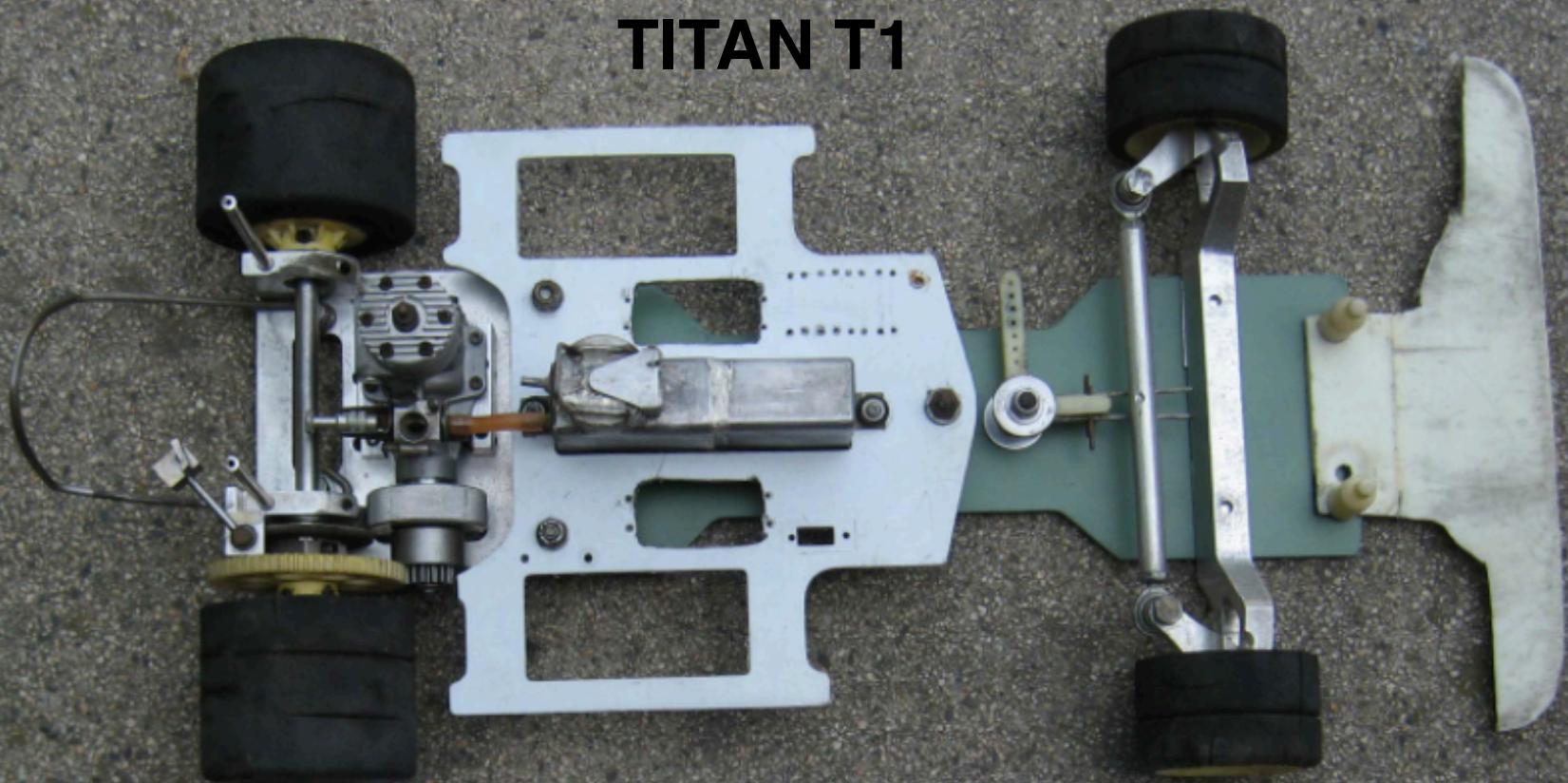
# Front Wheels & Tires Found

## Front

- └ Titan - Made an Associated RC100 Parts 1975 to 1977
- └ Titan T1 Mostly Associated RC100 Parts
- └ EXCEPT the wheels & Front Axle
- └ Both work with Thorp & RC100
- └ Mod'd Associated rear axle bushing mount "aero"
- └ Associated Rubber Tires
- └ Width: 2 1/8 wide
- └ OD: 2 7/8



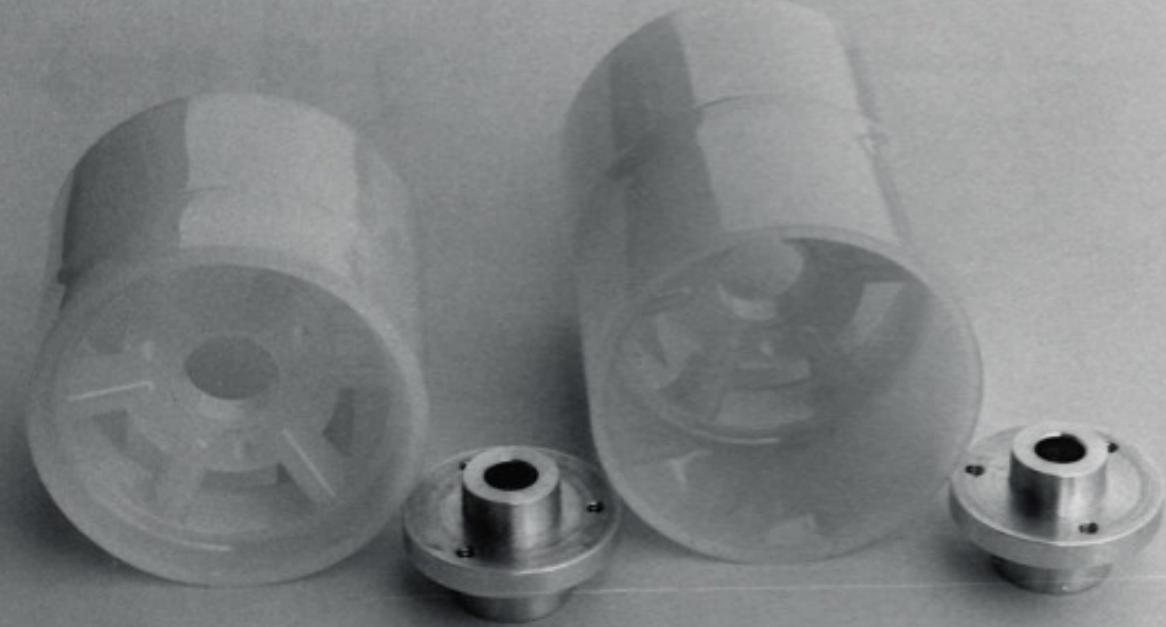
# TITAN T1



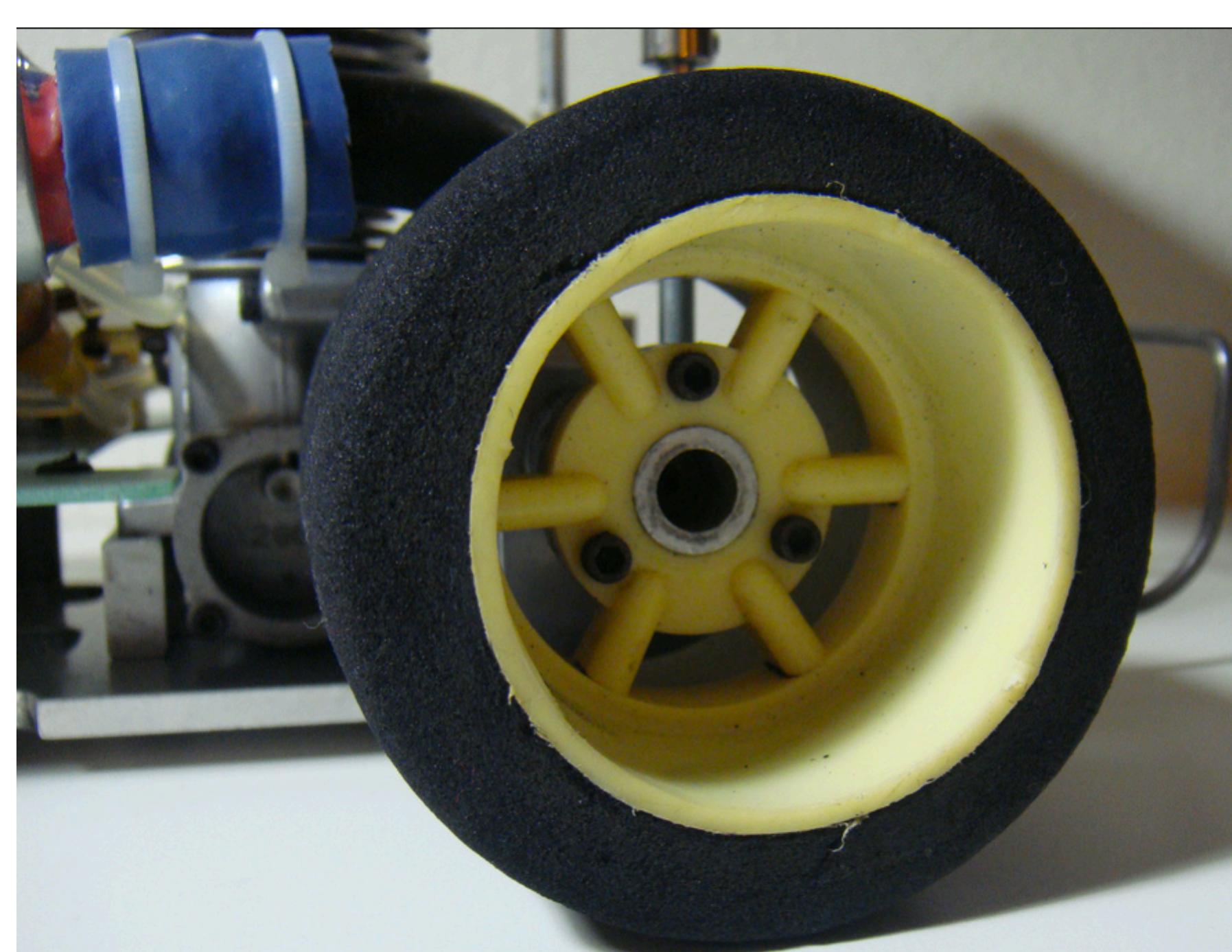




Titan Front Wheel with Thorp Hubs!



Titan Front & Rear Wheels  
3 pieces, not counting the Thorp hub



**Associated Titan Rear Wheel**

# Rear Wheels & Tires Found

## Rear

 Associated acquired from Titan

 RC100 & RC200 Wheels

 Associated Rubber Tires

 Width: 2 3/8 wide

 OD: 2 3/4 to 2 7/8



Correct Vintage  
RC Car parts will cost > \$\$\$\$  
(if you can find anyone willing to sell)

Then you get to hack on all the parts!

We needed to fix this... so...



MSE Chassis & Wheels  
for  
1:1 MSE Body



# MSE 1:1 Chassis & Wheels

## MSE Chassis

-  Exclusive Carbon Fibre Ladder Chassis
-  Wheelbase matches MSE 1:1
-  Uses standard modern parts
-  Nylon “shell” mounts

## MSE Wheels & Tires

-  Engineered Front & Rear Titan & Associated “Titan” Wheels
-  Geometry for new Chassis
-  Molded in Black Nylon
-  Rear wheels use 3 screw axle hubs
-  Tires match original “Associated” tires
-  Squared “Un-trued” side walls

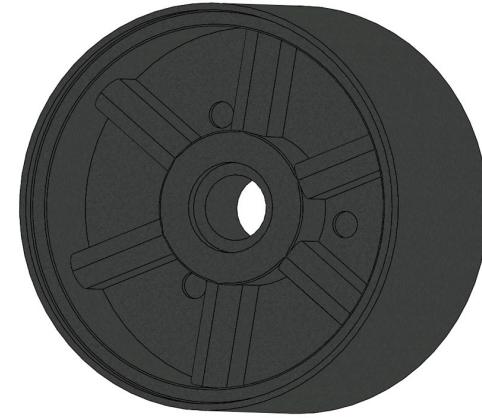
## MSE Controller & Receiver System (optional)



# Wheels

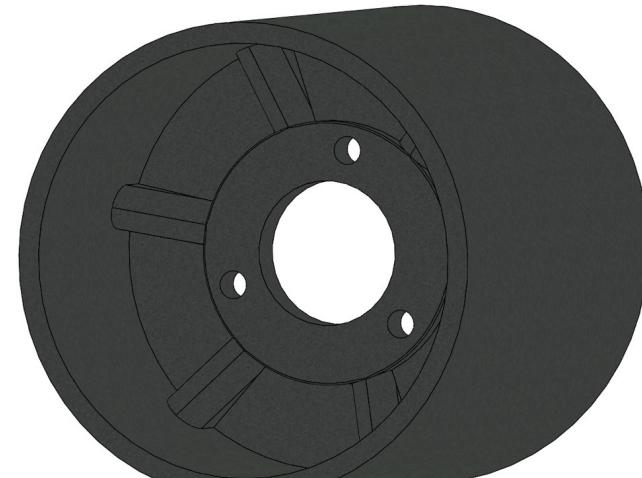
## Front

- Associated acquired from Titan
- RC100 & RC200 Wheels
- Associated Rubber Tires
- Width: 2 3/8 wide



## Rear

- Associated acquired from Titan
- RC100 & RC200 Wheels
- Associated Rubber Tires
- Width: 2 3/8 wide
- OD: 2 3/4 to 2 7/8





**ROYAL ENGINEERS OF NADOO**



<http://code.google.com/p/rsseries-open-control/>

Screenshot of the rseries-open-control project page on Google Project Hosting:

**Project Home** | [Downloads](#) | [Wiki](#) | [Issues](#) | [Source](#)

**Summary** | [People](#)

**Project Information**

An Arduino based controller, transmitter and receiver system for Astromech R-Series droids.

Requirements: Arduino IDE 1.0 is required. Digi XBee Series 2 operating API 2 mode, Pro series is optional & encouraged. Series 1 & 2.5 or clones are not supported, however may work with code changes.

Arduino Mega 2560 or better are needed for the Controller and Receiver due to variable memory requirement.

The design is a very modular, RF controller & receiver with optional additional modules. The RSeries receiver can operate as a centralized or distributed depending on your requirements.

The RSeries Controller & Receiver are shields that fit Arduino Mega 2560 [R1](#) to [R3](#), while the I2C FX Module is an Arduino Uno shield for [R1](#) to [R3](#) as well.

The SlipRing Interface, is a stand alone upto 24 Wire SlipRing interface at 2amps to pass signals, (Servo, Audio, I2C & Power) between the Dome & Body of the astromech via the slip ring via DB-25 connectors.

Some may just wish to use Controller/Receiver combination to trigger "Events" or actions in their astromech, and not actually control their droid motive systems.

It is possible to control other RC receivers, i.e. Spektrum & Hitech Aurora, with this effort, however that is currently outside of the scope of this project.

**Downloads**

- [FX2 v4.zip](#)
- [RSeries Controller v7 CAM.zip](#)
- [RSeries Data Port v4 CAM.zip](#)
- [RSeries FX I2C Shield v8.zip](#)
- [RSeries Receiver v6 CAM.zip](#)
- [RSeries\\_Controller\\_v038.zip](#)
- [RSeries\\_Receiver\\_AudioFX1module\\_v008.zip](#)
- [RSeries\\_Receiver\\_AudioFX2module\\_v008.zip](#)
- [RSeries\\_Receiver\\_v021.zip](#)

[Show all »](#)

**Wiki pages**

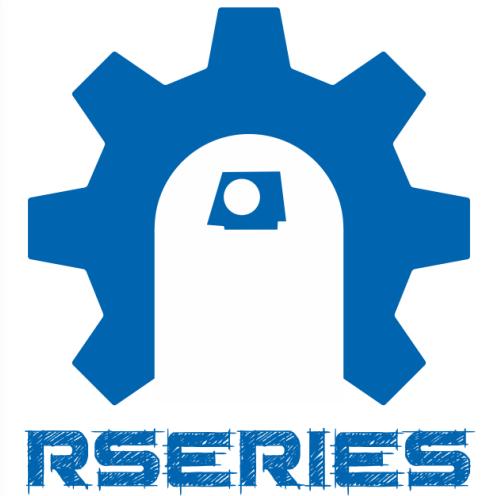
- [Controller](#)
- [Overview](#)

[Show all »](#)

**Links**

**External links**

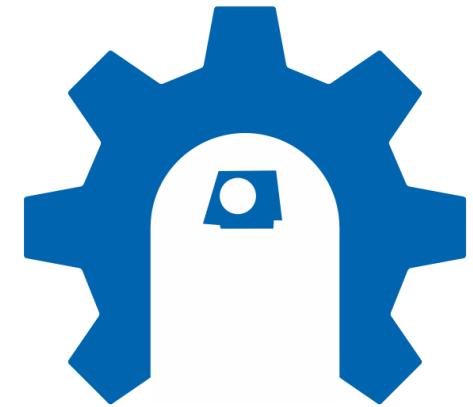
- [Astromech.net](#)
- [R2 Builders Yahoo Group](#)



Q

&t

A



R SERIES



# Thank the Maker for...

 Ted Koenig (bukhatj) - SVN & Code Master!

 Brett Bourbin (Selgus) - HW & Code

 Greg Tracy (PixelFiend) - Sanity Checker

 Micke Askernäs - Tuscen & Code

 Lars-Åke Siggelin (Sigge) - Sanity Checker

 Guy Vardamin - Sanity Checker

 Cory Pacione (Artoo-De-Dum)

 R2 Builders Council

 Bob Ross, Blake Mann, Scott Gray & Ben Lewitt

 Chris James - For forcing Answers to Hard Questions

