**Elcano Transceiver Board**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Arduino** | **Bluetooth** | **RC receiver** | **Rfm69rcw Radio** | **CAN 2515** | **Receiver Controls** | **Transmitter Controls** |
| D0 RX | RX1 | CH3\_A |  |  |  |  |
| D1 TX | TX0 | CH4\_A |  |  |  |  |
| D2 |  |  |  | CAN\_INT |  |  |
| D3 |  |  |  | CAN\_SS |  |  |
| D4 |  |  |  |  | E-stop | E-stop |
| D5 |  |  |  |  | Manual/Auto | Manual/Auto |
| D6 |  | CH5\_A | Radio OK LED |  |  | Radio Ok led |
| D7 | MOD | CH1\_A |  |  |  |  |
| D8 | CTS | CH2\_A |  |  |  |  |
| D9 | RTS | CH6\_A |  |  |  |  |
| D10 SS |  |  | Radio\_SS |  |  |  |
| D11 MOSI |  |  | MOSI | MOSI |  |  |
| D12 MISO |  |  | MISO | MISO |  |  |
| D13 SCK |  |  | SCK | SCK |  |  |
| D20 |  |  |  |  | Reverse | Reverse |
| D21 |  |  | Radio Interrupt |  |  |  |
| A0 |  |  |  |  | 2 Up-Dn / Center |  |
| A1 |  |  |  |  | 1 L-R / center | 1 L-R / center |
| A2 |  |  |  |  | 1 Joystick Up-Dn | 1 Joystick Up-Dn |
| A3 |  |  |  |  | 2 Joystick L-R | 2 Joystick L-R |
| RESET |  |  | Reset |  |  | Reset sw |
| Vin (5V) |  |  |  |  |  |  |
| Vcc (3.3V) | Vin = 3.3V | 3.3V | 3.3V | 3.3V | 3.3V | 3.3V |
| GND | GND | GND | GND | GND | GND | GND |
| AREF to 3.3V |  |  |  |  |  |  |

Gray shaded columns are mutually exclusive; so are blue shaded columns.

Transmitter board will not have CAN or RC receiver. Transmitter switches shall incorporate LEDs that indicate their state.  
Receiver may have all components, but normally will use only one of Radio, Bluetooth or RC receiver.

Arduino: Sparkfun SAMD21: <https://www.sparkfun.com/products/13664>

Radio: SparkFun parts 12775, 14875, 592: <https://www.sparkfun.com/products/12775> ,   
<http://www.orcam.eu/res/Datablad/rf69v12.pdf>

Bluetooth: Adafruit Bluefruit: <https://www.adafruit.com/product/2479?gclid=EAIaIQobChMI_Iv29-CR4AIVi8JkCh0fKwybEAYYASABEgKXWfD_BwE>

RC Receiver: Spektrum AR610: <https://spektrumrc.com/Products/Default.aspx?ProdId=SPM6700>

Level shifter: <https://www.addicore.com/TXS0108E-p/ad284.htm>

An equivalent level shifter is <https://www.adafruit.com/product/395?gclid=EAIaIQobChMIk7nvup_Q4AIVER6tBh0WywndEAQYAiABEgJw7fD_BwE>

CAN: MCP 2515 <http://ww1.microchip.com/downloads/en/devicedoc/21801e.pdf> and  
MCP 2551 <http://ww1.microchip.com/downloads/en/devicedoc/21667d.pdf>

Controls: Two joysticks and three toggle switches. Toggle switches have built-in LEDs to show their state. There is also an LED connected to power.

Bluetooth and RC Receiver use separate physical socket:   
Bluetooth 8 pins: Mod, CTS, TX0, RX1, Vin, RTS, GND, DFU

RC receiver 7 pins: Ch1, Ch2, Ch3, Ch4, Ch), Ch6, BND  
RC receiver also has 7 rows of power and 7 rows of ground forming a 3x7 socket.

Pin view is top view of the transceiver board or bottom view of RC Receiver

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Gnd | Gnd | Gnd | Gnd | Gnd | Gnd | Gnd |
| 5V | 5V | 5V | 5V | 5V | 5V | 5V |
| Ch1\_B | Ch2\_B | Ch3\_B | Ch4\_B | Ch5\_B | Ch6\_B | BND |

ChX Signals from RC Receiver will need to be converted from 5V to 3.3V. This is the only voltage conversion needed on the transceiver board. At present, neither of the receivers will bind or respond to the Spektrum transmitter.

The level shifter is connected with VB to 5V, and VA and OE to 3.3V. On the level shifter, channels A 1-6 are 3.3V signals connected to the Arduino. Channels B 1-6 are 5V signals connected to the RC receiver socket. Channels 7 and 8 are not used.

There is a jumper to set the Radio reset to either D6 or Arduino RESET.

~~JB: tx and rx sketch resets RF69 radio on D6 but radio reset should not connect electrically to Arduino reset so we can perform a radio reset in software by toggling the pin.~~  
D6 is jumpered to either Radio OK LED or RC Receiver CH5.

There may be two joysticks. Jumpers select which axes are used. There are several configurations

1. Up to two joysticks that do not return a center value. Software may choose to process only the left-right reading from one and only the up-down reading from the other.
2. Two joysticks returning center values. One produces a left-right reading and the other produces up-down.
3. A single joystick returning a center value, a left-right, and an up-down signal.

Board has an input jack for 9 to 12V DC, which is put through regulators to produce 5V and 3.3V. All parts (except RC receiver) run from 3.3V. The 2551 will use 5V for CAN transmission.

CANRX and CAN\_RXD are the same. CANTX and CAN\_TXD are the same.  
The signals CANH and CANL are the outputs to the CAN bus connector.



