

5	4	3	2	1	
<h1>Radio Telescope Control System</h1> <p>Aaron Olsen, Zach Martin, Loc Pham</p> <p>Revision & Notes:</p> <p>* 11/9/2022: Initial Schematic, Zach Martin</p>					
D					D
C					C
B					B
A					A
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Program/Debug Port

J1

TC2030-IDC-NL

+5V

R1 10k

6 VPP/MCLR

5 VDD

4 GND

3 PGD

2 PGC

1 PGD/U2TX

PGC/U2RX

DIAGS

C7 100n

GND

Processor

U1

PIC24FV32KA304-1

PIC24FV32KA304-1/PT

RA0 19

RA1 20

RA2 30

RA3 31

RA4 34

RA5 6

RA7 32

RA8 35

RA9 12

RA10 13

RA11 18

MCLR/RAS

RB0 21

RB1 22

RB2 23

RB3 24

RB4 33

RB5 41

RB6 42

RB7 43

RB8 44

RB9 1

RB10 8

RB11 9

RB12 10

RB13 11

RB14 141

RB15 151

TP3 1

TP4 1

TP5 1

TP6 1

TP7 1

TP8 1

TP9 1

TP10 1

TP11 1

TP12 1

TP13 1

TP14 1

TP15 1

TP16 1

TP17 1

TP18 1

TP19 1

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TP292 1

TP293 1

TP294 1

ROTARY ENCODERS

The diagram illustrates the electrical connections for two rotary encoders, AZIMUTH and ELEVATION, using 74HCT14 inverters and 4-MTA-100 encoder modules.

AZIMUTH ENCODER INPUT:

- U4A 74HCT14:** Inverter 1 (pin 2) is connected to AZ_ENCODER2. Inverter 1 (pin 1) is connected to pin 4 of the 4-MTA-100 encoder (J2).
- U4B 74HCT14:** Inverter 3 (pin 4) is connected to AZ_ENCODER1. Inverter 3 (pin 3) is connected to pin 1 of the 4-MTA-100 encoder (J2).
- Resistors:** R2 (10k) and R3 (10k) are pull-up resistors connected to the +5V supply and the encoder pins 4 and 1, respectively.
- Capacitor:** C1 (10uF) is a decoupling capacitor connected to the +5V supply and ground.

ELEVATION ENCODER INPUT:

- U4C 74HCT14:** Inverter 5 (pin 6) is connected to EL_ENCODER2. Inverter 5 (pin 5) is connected to pin 4 of the 4-MTA-100 encoder (J3).
- U4D 74HCT14:** Inverter 9 (pin 8) is connected to EL_ENCODER1. Inverter 9 (pin 9) is connected to pin 1 of the 4-MTA-100 encoder (J3).
- Resistors:** R7 (10k) and R8 (10k) are pull-up resistors connected to the +5V supply and the encoder pins 4 and 1, respectively.
- Capacitor:** C8 (10uF) is a decoupling capacitor connected to the +5V supply and ground.

LOCAL CONTROL INTERFACE

The circuit diagram shows a 5V power supply connected to a 10uF capacitor and a network of resistors (R11-R16). The circuit includes three 74HCT14 inverters (U5B, U5E, U5C) and two 74HCT14 inverters (U5F, U5A). The output of U5B is EXT_LED. The outputs of U5E, U5C, U5F, and U5A are connected to buttons (BUTTON1, BUTTON2, BUTTON3) and auxiliary inputs (AUX1, AUX2). The circuit is connected to a connector J4 (CON10) with pins 1 through 10.

The diagram illustrates a USB-UART interface circuit. A USB connector (j5) is connected to an FT232RL chip (U2). The USB D- and D+ lines are connected to the chip's USB D- and D+ pins. The USB ID pin is connected to ground. The USB GND pin is connected to ground. The FT232RL chip is connected to a UART module. The chip's VCC and VCCIO pins are connected to a +5V supply. The chip's RESET pin is connected to the UART module's TX pin. The chip's OSCI and OSCO pins are connected to ground. The chip's 3V3OUT pin is connected to the UART module's TX pin. The chip's USBDP and USBDM pins are connected to the UART module's RX and TX pins. The UART module's TX pin is connected to the TX pin of the TX TO PC module. The TX TO PC module's TX pin is connected to the TX pin of the TX TO PC module. The TX TO PC module's RX pin is connected to the RX pin of the TX TO PC module. The TX TO PC module's GND pin is connected to ground. The TX TO PC module's TX pin is connected to the TX pin of the TX TO PC module. The TX TO PC module's RX pin is connected to the RX pin of the TX TO PC module. The TX TO PC module's GND pin is connected to ground. The TX TO PC module's TX pin is connected to the TX pin of the TX TO PC module. The TX TO PC module's RX pin is connected to the RX pin of the TX TO PC module. The TX TO PC module's GND pin is connected to ground.

TODO: We may not want two LEDs here.
Also, CBUS can be configured to blink an LED on both RX and TX

Place Near 74HCT14s

Make sure VCC rails are tied together

Make sure GND nets are tied together:

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