

Tode Hardware

General Hardware Development

Equipment, Tools, Supplies, Procedure and Settings

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1. Introduction

The Tode System (*Dimmed ones are still a work in progress. Not Available Yet.*)

- Tode-RC = Handheld Remote Control Models
 - Model #AMP Arduino Mega Pro (No RF Module)
 - Model #AMPE32T30 Arduino Mega Pro + Ebyte E32-433T30D (1W/30dbm) RF module
 - Model #AMPE32T20 Arduino Mega Pro + Ebyte E32-433T20D (250mW/20dbm) RF module
 - Model #AMPXBEE Arduino Mega Pro + Digi XBee RF Module
- Tode-SideIO = Input/Output Stations
 - Model #TSIOST Tode SideIO with Screw Terminals
 - Model #TSIOAP Tode SideIO with Aviation Plugs

Manuals

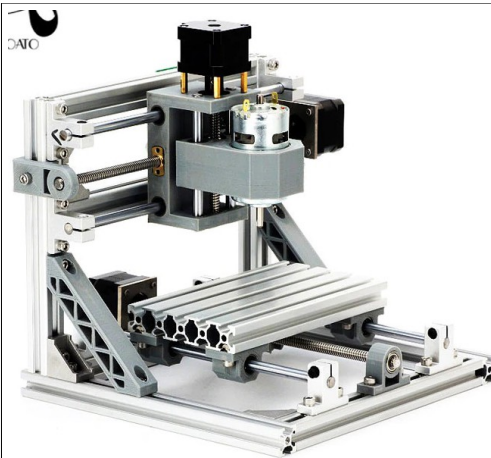
- User Manual Operator Instructions including Setup and Wiring
- Hardware Development How to build the hardware including detailed circuit diagrams
- Firmware Development How to adjust and create firmware for the Tode

The Tode System is liscensed under the MIT Liscense. It's hosted on Github.com at:

<https://github.com/TGit-Tech/Tode-RC>

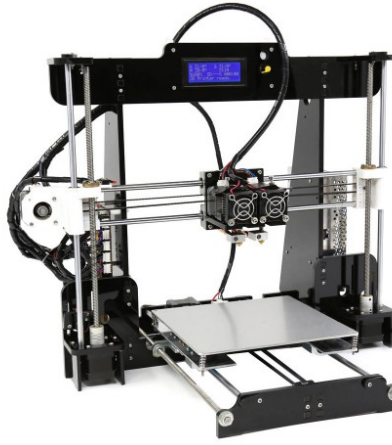
2. Workstation \$770

2.1 Equipment \$530



- ✓ CNC Mill (~ \$150)
 - DIY CNC1610
 - Equipped with End-Stops and Board-Level Clips
 - Using bCNC controller and GRBL v1.1

Various CNC Mill models will work



- ✓ 3D Printer (~ \$150)
 - Anet A8
 - Cura

Various 3D Printers will work.



- ✓ Reflow Oven T-962 (~ \$230)
 - Infrared IC Heater
 - 800W
- ✓

2.2 Tools \$120



Solder Iron
With Tiny Tips
Price \$40



Dikes / Cutters
Price: \$10



Wire Strippers
Price \$12












Manification
Price \$40



Tweezers Kit
Price: \$10

2.3 General Supplies \$120

 <p>No-Clean Price: \$4.00</p>  <p>Pyramid CNC Bits 0.2mm Tip 45-deg Price \$10/10pcs</p>	 <p>Leaded Solder Paste Price: \$16.00</p>  <p>V-Shape CNC Bits 0.2mm Tip 10-deg Price: \$10.00/10pcs</p>	 <p>Wick Price: \$3.50</p>  <p>Drill CNC Bits 0.1 to 1.0mm (10) 1.0 to 3.0mm (10) Price \$20.00/20pcs</p>	 <p>0.031" 60/40 Rosin-Core Solder Price \$8.00</p>  <p>22AWG Stranded Colored Wire Price \$20/6-roll</p>	 <p>Liquid Tin Price \$20</p>
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2.4 CNC Routing a PCB (Settings & Process)

- Using the CNC machine shown in Workstation::Equipment
- Using the 3D Printed 3" x 4" Cu-Clad PCB Holder
- Using Isolation Bit 45-deg, 0.2mm tip, Diamond Shape
- Using Flatcam Settings
 - Speed: 45 mm/s
 - Depth: -0.045mm
- Using bCNC
- Load PCB onto CNC1610 using PCB holder
- Load the Trace Isolation Bit (Suggest 45-deg 0.2mm Tip Diamond Shape)
- Open bCNC
- Home the CNC
- Zero Coordinates (Under [Control] Press the 'XYZ=0' button)
- Command G01 X22Y17 F300 (Enter Command at bottom-left press Enter)
- Zero Coordinates (Under [Control] Press the 'XYZ=0' button)
- Manually move bit close but not touching PCB (Under [Control] bottom-left "Control" Section)
- Zero Z Coordinate
- Probe for Board-Level Z=0
 - Settings → Fast Probe @100, Probe Feed @ 5
 - Push 'Probe' ribbon button, then under 'Probe' Section click 'Probe' button under 'Goto'.
- Once the Probe stops and machine goes to 'Idle' Press Z=0.
- Open File
- Set Autolevel margins (Usually ~10x10 Steps)
- Scan for Autolevel (Press Ribbon-Bar 'Scan' Button)
- Probe again and Autolevel Zero
- Remove Autolevel Probe Wire
- Start Isolation Routing

- 23. Preform Isolation Routing
- 24. Preform Hole Drilling
- 25. Preform Edge-Cuts
- 26. Sand & Treat with Liquid Tin