Tode-RC

Users Guide

Setup and Operation

http://www.TGit-Tech.com
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TGit-Tech
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1. Contents

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2. Introduction

✔ The Tode Project is a Universal Platform of...

- User Inter-Face Options
- Back-plane Models optional Radio & Arduino Micro-Controller
- Extensions - IO Interfaces, Battery Trays

User Inter-face Options		
Model	**Components**	**Resources**
#TFT18KB6	1.8" TFT LCD Color Screen + (6) Key keypad	Design Files @ https://github.com/TGit-Tech/Tode-RC
#COVER	A Cover Only	*Not available at this time*

Tode Models *(post-fix RC=Remote/Radio Control equipped)*	
Model	**Components**
Tode #AMP	Arduino Mega Pro (AtMega2560)
Tode-RC #AMPE32T30	Arduino Mega Pro (AtMega2560) Ebyte E32-433T30D Radio (1W/30dbm)
Tode-RC #AMPE32T20	Arduino Mega Pro (AtMega2560) Ebyte E32-433T20D Radio (250mW/20dbm)
Tode-RC #AMPXBEE	Arduino Mega Pro (AtMega2560) Digi Xbee Radio

SIO Stations (*Input/Output by Todes Side-IO [SIO] plug*)		
Model	**Components**	**Resources**
#SIOST	Screw Terminals	Design Files https://github.com/TGit-Tech/Tode-SIOST
#SIOAP	Aviation Plugs	*Not available at this time*

The Tode System is licensed under the MIT License. It's hosted on Github.com at: https://github.com/TGit-Tech/Tode-RC

2.1 Menu Structure

✔ **Top-Level Menu** Structure (Introduced at Power-ON)

○ Multiple Todes make-up a remote-control-network of Individual Todes.
- ▪ The particular Tode in subject is self-described as **This-Tode**.

○ Every Tode has (2) Top-Level Display Screens
- ▪ 1st Screen is **This-Tode** IO-Control Screen (1st screen on Power-ON)
- ▪ 2nd Screen is **This-Tode** SETUP Screen
- ▪ 3rd, 4th, etc.... Screens are Remote Controllable Todes (i.e. Not This-Tode)

1st Screen **This-Todes** **IO-Control Screen**	2nd Screen **This-Todes** **SETUP Screen**	3rd , 4th , etc. Screens **Remote-Todes** **IO-Control**
On initial Power-ON this screen is blank because This-Tode hasn't been configured yet. Press Right ⇨	Where all configuration is done Press Right ⇨	Remote Todes
		On Initial Power-ON the SETUP Screen doesn't change because there are NO other Remote Todes added at this Time.

✔ **Sub-Level Menu** Screens (*From This-Todes* **SETUP** *Screen*)
- ○ Selecting **Radio** and GET will produce Sub-Level Radio Settings.
- ○ Selecting **Add Device** and GET will produce Add a Device Screen.
- ○ Selecting **Del Tode** and GET will produce List of Todes.
- ○ To Exit a Sub-Level Screen press the ⇦ button.

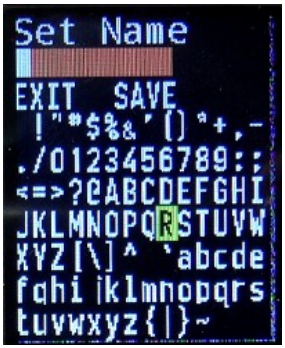
3. Configure

3.1 Set Name

1. Enter a Name for **This-Tode**

SETUP	**SETUP, 'Set Name'**	**SETUP,'Set Name'**
Press ⇩ to the blank [NAME] field. Press SET	On 'Set Name' Screen Press ⇩	*Text Entry Field* highlights (Blue)
		

Text Entry Field is Red when not selected else Blue when Selected by ⇩⇧. Once Selected (BLUE) Character Position (WHITE) can be Selected by ⇦⇨

SETUP 'Set Name' *Entering a Name*	**SETUP 'Set Name'** *Saving & Exiting*	**SETUP**
		

To Edit or Clear a Character Position; Highlight the Text Field (BLUE) and select the character to replace (WHITE) then choose the replacement character press SET. The BLANK character is directly under the "EXIT".

3.2 Radio Settings

3.2.1 Requirements

✔ Radio Settings that **must be identical** for Tode Communication.

SecNet (Range 01-7F)	Security Code selected by you that prevents unauthorized access to your Tode network.
Frequency (410 to 441)MHz	The radio frequency (channel) for Tode Communication.

✔ Radio Setting that **must be Unique**

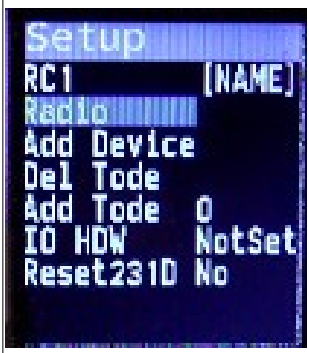
Address (Range 0000-FFFE)	A radio address to identify each Tode uniquely decided upon by you.

✔ Other Radio Settings

Tx Power (21,24,27,30)dBm	Sets the (Tx) Transmitting Power of the Radio. Lower saves power, Higher transmits farther.
PC Connex (On -or- Off)	When set to On it ties the radio terminal to the USB Port. This a special function generally ignored by users.

3.2.2 Per-Digit Setting

1. Choose any **SecNet** Value between 01 to 7F and Set that Value.

SETUP	**SETUP RADIO**	**SETUP RADIO (Per-Digit Set)**
⇩ to select **Radio**. Press (SET)	⇩ to select **SecNet** ⇨ to select **Value**	Press SET to change. Press SET again to set.
		

SecNet and **Address** use Per-Digit Set where each digit is changed at a time. The WHITE background indicates the selected digit. Use ⇦⇨ to change the selected digit and ⇧⇩ to change the digits value. Going ⇦ beyond the number of select-able digits will exit setting without saving changes.

2. Choose any ***Unique*** **Address** Value for this Tode between 0001 and FFFE and set that Value the same way Per-Digit Set as done to set SecNet.
   - In this example Address is set to 1112.

3.2.3 Value Setting

3. Choose any **Frequency** between 410MHz and 441MHz (default is 433MHz).
   - The chosen frequency must be identical on all Todes expected to communicate with each other.

SETUP **RADIO** ⇩ to **Frequency**	**SETUP** **RADIO** ⇨ to select **Value**	**SETUP** **RADIO (Value Set)** Press SET to change.
		
⇧ to Increment Value ⇩ to Decrement Value	Press SET to save Value. ⇦ to **Frequency**	⇦ again to **SETUP**
		

4. Choose the lowest **Tx Power** level that will sustain communications.

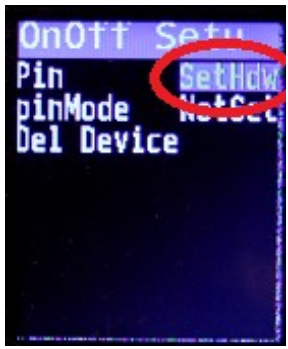
3.3 IO HDW Setting

1. A Tode that has connected devices must know what **IO HDW** is used to connect the devices. If the Tode will be used only as a hand-held control device, then setting the **IO HDW** is not needed.

   a) At the time of this writing the only option for connecting devices is a **SideIO** Plug (SIOST stands for SideIO with Screw Terminals).

SETUP ⇩ to **IO HDW**	**SETUP** ⇨ to select **Value** (I.e. 'NotSet' in picture)	**SETUP** SET then ⇧ or ⇩ select **SideIO** SET to set the value
		

2. **NOTICE**: If the **IO HDW** has not been set before trying to set a device **PIN** the Tode will notify you with **SetHDW** as shown below.



3.4 Adding Devices

See 5.1 Section for more information on Device Support and Setup.

SETUP	**SETUP** **Add Device**	**This-Tode**
⇧ or ⇩ select **Add Device** Press (GET)	⇧ or ⇩ Select Device to Add. Press (GET)	The added device appears as **?NAME?** *0 is the Device Index #*
		
This-Tode **Select Device**	**Selected Device** **SET=Device Set Name**	**Selected Device** **(GET)=Device Setup**
⇩ select 0?NAME?	Press SET enter Set Name for the Device. *Same routine as setting a Tode name.*	Re-Select Device. Press (GET) enter Setup *Enter Device specific Setup Settings (Ex. Only)*
		 **Note: OLoOff Output Low, when Off**

3.5 Device Control

Below shows an example of how to change an Output Device's State.

This can be done on LOCAL (This-Tode) devices or devices on Remote Todes.
To add a Remote Tode see 3.6.Add Tode (Remote)

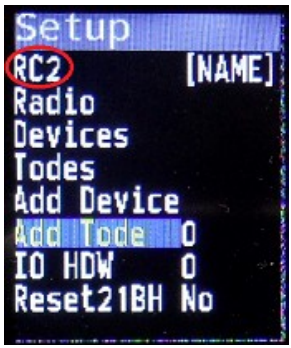
NOTE: Remote Tode Devices will show a value of '?' until the readings are requesting by pressing GET.

This-Tode	This-Tode	This-Tode
⇩ select **RELAY1** ⇨ to select **Value** Value 'Off' Press SET	SET to set a new value. ⇧ ⇩ change **Value** SET to set the value	Once set to 'On' Relay1 on pin 33 should activate.
		

3.6 Add Tode (Remote)

✔ To Remotely Control another Todes Devices.
- ○ The "Remote" Tode (RC1 with RELAY1:IO-Device used this far)
- ○ is added to a new Tode (RC2)

✔ Obtain a 2nd Tode
- ○ Repeat Steps 3.1.Set Name and Name the 2nd Tode **RC2**
- ○ Assign a *Unique* Radio Address to RC2

RC2 Radio Settings	**Required**	**RC1 Radio Settings**
	**SecNet** has to Match. **Address** must be different / unique. **Frequency** has to Match.	
On Tode RC2		
⇩ select **Add Tode**	add **RC1** by **Address** ⇨ to select **Value** SET to set RC1-Address	Check for an **RC1** "remote" Tode Screen. SET Again to load RC1 ⇨ RC1 remote Screen
		

Now the Devices on RC1 can be controlled by RC2.
If the "remote" Tode RC1 failed to show up; try again closer to the unit.

3.7 Deleting

3.7.1 Deleting Devices

To Delete a Device enter the Device Setup Screen as shown in 3.4.Adding Devices and select **Del Device** and press GET.

3.7.2 Deleting Remote Todes

To Delete a Remote Tode control screen. Select **Del Tode** on the SETUP menu and then select the Remote Tode by Name on the list and press GET.

3.7.3 Factory Reset

Preforming a factory reset deletes the Tode Name and all Devices and Remote Todes. Radio Setting are preserved. To preform this operation...

⇩ select **Reset????** **Note:** The 4-Digit after Reset is the Firmware Version Loaded. Firmware 231D	⇨ **to** select **Value** SET to set ⇩ to set **Yes** SET again to apply.	The Tode will automatically Reboot and the blank Tode screen will show.
		

4. IO Devices

4.1 Common Settings

✔ Every Device Setup has a **Del Device** option.

✔ Every **Pin** has a corresponding **pinMode** option.
- **OLoOff** = Output Low, when Off – Active High
- **OHiOff** = Output High, when Off – Active Low
- **InHigh** = Input Pull-Up(High) – Active Low
- **InLow** = Input Low – Active High (Default Setting)

4.2 OnOff

On Off Device Setup Screen	
Pin	Can be any Pin Selectable
pinMode	See pinMode options in #4.1.Common Settings
Del Device	Select and (GET) to delete this device

4.3 AnaInput

The equation for Value = (Pin-Reading + PreAdd) * (MultNum/MultDen) + Add.
MultDen cannot be 0 so 0 equivocates to 10K (10,000)

On Off Device Setup Screen	
Pin	The Pin to read from (must be an 'A' pin)
pinMode	
PreAdd	1st Add this amount to the Pin reading.
MultNum	2nd Multiply by fraction (Fraction Numerator)
MultDen	(Fraction Denominator)
Add	3rd Add after fraction multiply (i.e. offset value)
Samples	Number of reading to gather and average for value.

4.4 AnaOutput

AnaOutput is the PWM output operation	
Pin	Analog Output is Always on PIN #45

4.5 Distance

This is used for Sonic Distance Sensors with a Trigger & Echo Pins.

Distance Device Setup Screen	
Trig	The Trigger Pin
	The Trigger Pins pinMode
Echo	The Echo Pin
EchoPMode	Echo Pins pinMode
Samples	Number of Samples to Average for Value

4.6 STSTP3W

This is used for panels with a START and STOP momentary push buttons.

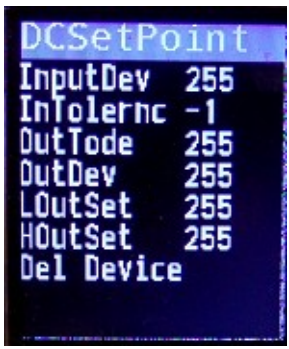
3-Wire On/Off Momentary (3-second) Switch	
StartPin	OUTPUT hat triggers to initiate a START button.
StartPMode	StartPin pinMode Setting
StopPin	The Pin that triggers to initiate a STOP button.
StopPMode	StopPin pinMode Setting
Status	INPUT; Pin that determines current state.
StatPMode	Status Pins pinMode
Del Device	Select and (GET) to delete this device

5. Automation (Controllers)

5.1 SetPoint

Compares an Input Device reading to a User SetPoint and if the Input reading is outside the boundaries (+/- Tolerance) then it sets an Output Device respectively.

For example; A tank of water with a level sensor can maintain it's water level by switching ON or OFF a pump that feeds the tank.



On Off Device Setup Screen	
InputDev	The Device Index to read a value from
InTolernc	The (+/-) tolerance allowed from setpoint
OutTode	The Tode Index of Out Device (optional) or 0-local
OutDev	The Device Index to SET the value on (optional)
LOutSet	SET value on OutDev when Input is < setpoint
HOutSet	SET value on OutDev when Input is > setpoint
	SET value can be ON or OFF
	Or INCR/DECR where Difference between setpoint

5.2 Math

Implements Mathematical Operation on TWO input readings and (Optionally) sends the computed value to an output device if the value breaks tolerance (+/-) boundaries (i.e. Value changes significantly).

On Off Device Setup Screen	
In1Dev	The Device Index to read a value from
Operator	(+)(-)(x)(/) plus, minus, times, divide or AVE-average
In2Dev	The Device Index to read a value from
Tolerenc	+/- Change Tolerance before setting Output
OutTode	The Tode Index of Out Device (optional) or 0-local
OutDev	The Device Index to SET the value on (optional)